

Operator Manual

Screw Compressor

CSG-2 A

902380 04 USE

Read this manual before using this product.

Failure to follow the instructions and safety precautions in this manual can result in serious injury or death.

Manufacturer:

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1 Regarding this Document

1.1 Using this document

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

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

1.2 Further documents

Further documents included with this operating manual are:

- Operating manual for SIGMA CONTROL 2

Missing documents can be requested from KAESER.

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

1.3 Copyright

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

1.4 Symbols and labels

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

1.4.1 Warnings

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

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

Signal term	Meaning	Consequences of disregard
DANGER	Warns of an imminent danger	Will very likely result in death or severe injury
WARNING	Warns of a potentially imminent danger	May result in death or severe injury
CAUTION	Warns of a potentially dangerous situation	May result in a moderate physical injury

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

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

Example:

1 Regarding this Document

1.4 Symbols and labels

DANGER

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


The possible consequences of ignoring a warning are shown here.

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

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

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

Example:

1.  **WARNING** *The type and source of the imminent danger is shown here!*
The possible consequences of ignoring a warning are shown here.
If you ignore the warning notice, the "WARNING" signal word indicates that a lethal or severe injury may occur.
 ➤ *The measures required to protect yourself from danger are shown here.*
2. Always read and comply with warning instructions.

1.4.2 Potential damage warnings

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

Warning notices for damages are identified by their signal term.

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

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

Example:

NOTICE

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

Potential effects when ignoring the warning are indicated here.

➤ *The protective measures against the damages are shown here.*

➤ Carefully read and fully comply with warnings against damages.

1.4.3 Other alerts and their symbols



This symbol identifies particularly important information.

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

Precondition Here you will find conditional requirements necessary to carry out the task.
The conditions relevant to safety shown here will help you to avoid dangerous situations.

Option H1 ➤ This symbol denotes lists of actions comprising one stage of a task.
Operating instructions with several steps are numbered in the sequence of the operating steps.
Information relating to one option only are marked with an option code (e.g., H1 indicates that this section applies only to machines with machine mountings). Option codes used in this operator manual are explained in chapter 2.2.



Information referring to potential problems are identified by a question mark.

The cause is named in the help text ...

➤ ... as is a solution.



This symbol identifies important information or measures regarding the protection of the environment.

Further information Further subjects are introduced here.

2 Technical Data

2.1 Nameplate

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

The nameplate is located at the machine's front below the SIGMA CONTROL 2 display.

➤ Enter here the nameplate data as a reference:

Feature	Value
Model	
Material No.	
Serial No.	
Ambient temperature	
Rated power	
Maximum working pressure PS	
Rated motor speed	
Phases	
Voltage	
Full load current	
Full load current drive motor	
Short circuit current	
Supply fuse	
Class	
Electrical wiring Diagram	

Tab. 3 Nameplate

2.2 Options

The table contains a list of possible options.

➤ Enter options here as a reference:

Option	Option code	Available?
SIGMA CONTROL 2: Connection to control technology available	C3	✓
IT power network	C35	—
Rotation dryer	D1	—
Heat exchanger downstream of rotary dryer: Finned cooler	D2	—
Heat exchanger downstream of rotary dryer: Plate-type heat exchanger	D3	—
Pressure dew point measuring	D8	—
Pressure dew point adjustment	D9	—

2 Technical Data

2.3 Weight

Option	Option code	Available?
Pressure dew point control	D10	—
Bolt-down machine mounts	H1	
Inlet air silencer	H7	—
Hot air outlet with regulation	H23	
Air cooling	K1	✓
Cooling air filter mat	K3	
Auxiliary heat exchanger, second stage: Plate-type heat exchanger	K10	—
Water cooling: Shell-and-tube and plate-type heat exchanger	K11	—
Heat recovery system with water pump	W5	—
Heat recovery system without water pump	W6	—
Provided: ✓		
Not provided: —		

Tab. 4 Options

2.3 Weight

The values shown are maximum values. Actual weight of individual machines is dependent on equipment fitted.

	CSG 55-2	CSG 70-2	CSG 90-2
Weight [lb.]	5005	5093	5236
	CSG 120-2	CSG 130-2	—
Weight [lb.]	5545	5820	—

Tab. 5 Weight

2.4 Temperature

	CSG 55-2 – CSG 130-2
Minimum cut-in temperature [°F]	40

Tab. 6 Temperature

1st stage airend - airend temperature

	CSG 55-2 – CSG 130-2
Typical airend discharge temperature during operation [°F]	285 – 420

2 Technical Data

2.5 Ambient conditions

	CSG 55-2 – CSG 130-2
Maximum airend discharge temperature (automatic safety shut-down) [°F]	480

Tab. 7 1st stage airend - airend temperature

2nd stage airend - airend temperature

	CSG 55-2 – CSG 130-2				
Maximum working gauge pressure [psig]	60	90	125	145	—
Typical airend discharge temperature during operation [°F]	210 – 300	265 – 355	320 – 410	375 – 480	—
Maximum airend discharge temperature (automatic safety shut-down) [°F]	520	520	520	520	—

Tab. 8 2nd stage airend - airend temperature

2.5 Ambient conditions

	CSG 55-2	CSG 70-2	CSG 90-2
Maximum altitude amsl* [ft]	1640	1640	1640
Permissible ambient temperature [°F]	40 – 115	40 – 115	40 – 115
Inlet air / cooling air temperature [°F]	40 – 115	40 – 115	40 – 115
	CSG 120-2	CSG 130-2	—
Maximum altitude amsl* [ft]	1640	1640	—
Permissible ambient temperature [°F]	40 – 115	40 – 115	—
Inlet air / cooling air temperature [°F]	40 – 115	40 – 115	—

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

Tab. 9 Ambient conditions

2.6 Ventilation



The specified values are guidelines.

	CSG 55-2	CSG 70-2	CSG 90-2
Inlet aperture (free cross-section) [Z] [sq.ft.], see figure 18	10.8	12.9	15.1
Usable volumetric flow rate in hot air [cfm]	7652	7652	7652
	CSG 120-2	CSG 130-2	—
Inlet aperture (free cross-section) [Z] [sq.ft.], see figure 18	19.4	23.7	—
Usable volumetric flow rate in hot air [cfm]	7652	7652	—

Tab. 10 Ventilation

2.7 Pressure

Maximum working pressure: see nameplate

1st stage safety relief valve activating pressure

	CSG 55-2 – CSG 130-2
Activating pressure [psig]	52

Tab. 11 1st stage safety relief valve activating pressure

2nd stage safety relief valve activating pressure

	CSG 55-2 – CSG 130-2				
Maximum working pressure [psig]	60	90	125	145	—
Activating pressure [psig]	145	145	145	164	—

Tab. 12 2nd stage safety relief valve activating pressure

2.8 Flow rate (constant delivery volume relative to intake conditions)

Flow rate [cfm]

Maximum working gauge pressure [psig]	CSG 55-2	CSG 70-2	CSG 90-2
60	—	—	—
90	247	298	343
125	192	245	296
145	—	—	273
—	—	—	—

Flow rate as per ISO 1217:2009. Annex C

2 Technical Data

2.9 Cooling oil recommendation (gear)

Maximum working gauge pressure [psig]	CSG 120-2	CSG 130-2	—
60	—	—	—
90	459	—	—
125	421	457	—
145	420	456	—
—	—	—	—

Flow rate as per ISO 1217:2009. Annex C

Tab. 13 Flow rate

2.9 Cooling oil recommendation (gear)

The type of cooling oil with which the gear is filled is given on a label next to the filling port.
 For information on ordering cooling oil, please see chapter 11.

Cooling oils for general applications

	SIGMA FLUID	
	G-460	G-680
Description	Synthetic oil	Synthetic oil
Application	Standard oil for all applications except in connection with processing of food products.	Especially for machines with heat recovery, high temperatures in the water systems and with high ambient temperatures.
Viscosity at 40°C (104°F)	46.4 mm ² /s (0.07 in ² /s) (ASTM D445)	64.7 mm ² /s (0.10 in ² /s) (ASTM D445)
Viscosity at 100°C (212°F)	8.2 mm ² /s (0.01 in ² /s) (ASTM D445)	10.3 mm ² /s (0.02 in ² /s) (ASTM D445)
Flash point	266°C (510°F) (ASTM D92)	280°C (536°F) (ASTM D92)
Density at 15°C (59°F)	0.98 g/cm ³ (61 lb/ft ³) (ASTM D1298)	0.983 g/cm ³ (61 lb/ft ³) (ASTM D1298)
Pour point:	-58°C (-72°F) (ASTM D97)	-48°C (-54°F) (ASTM D97)

Tab. 14 Cooling oil recommendation

Cooling oils for applications in food processing

	SIGMA FLUID	
	FG-460	FG-680
Description	Synthetic oil	Synthetic oil

2 Technical Data

2.10 Cooling oil charge (gearbox)

	SIGMA FLUID	
	FG-460	FG-680
Application	Specifically for machines in applications where the compressed air may come into contact with food products.	Especially for machines with heat recovery, high temperatures in the water systems and with high ambient temperatures. Specifically for machines in applications where the compressed air may come into contact with food products.
Approval	USDA H1, NSF Approved for applications where contact with food products may sporadically or incidentally be possible.	USDA H1, NSF Approved for applications where contact with food products may sporadically or incidentally be possible.
Viscosity at 40°C (104°F)	46 mm ² /s (0.07 in ² /s) (ASTM D445)	68 mm ² /s (0.11 in ² /s) (ASTM D445)
Viscosity at 100°C (212°F)	8.0 mm ² /s (0.01 in ² /s) (ASTM D445)	10.5 mm ² /s (0.02 in ² /s) (ASTM D445)
Flash point	246°C (475°F) (ASTM D92)	238°C (460°F) (ASTM D92)
Density at 15°C (59°F)	0.842 g/cm ³ (53 lb/ft ³) (ASTM D1298)	0.854 g/cm ³ (53.3 lb/ft ³) (ASTM D1298)
Pour point:	-39°C (-38.2°F) (ASTM D97)	-39°C (-38.2°F) (ASTM D97)

Tab. 15 Cooling oil recommendation (food processing)

2.10 Cooling oil charge (gearbox)

	CSG 55-2 – CSG 130-2
Total charge [gal]	9.8

Tab. 16 Cooling oil charge

2.11 Motors and power

Compressor drive motor

	CSG 55-2	CSG 70-2	CSG 90-2
Rated power [kW]	37	45	55
Rated speed [rpm]	1786	3575 ²⁾ / 1786 ³⁾	3578
Enclosure protection	TEFC	TEFC	TEFC
Motor bearing greasing interval [h] ¹⁾	4000	2000	2000
Grease requirement, each bearing [g]	20	20	20

2 Technical Data

2.12 Sound emission

	CSG 120-2	CSG 130-2	—
Rated power [kW]	75	90	—
Rated speed [rpm]	3585	3584	—
Enclosure protection	TEFC	TEFC	—
Motor bearing greasing interval [h] ¹⁾	2000	2000	—
Grease requirement, each bearing [g]	20	25	—

¹⁾ operating hours

²⁾ at working pressure 90 psig

³⁾ at working pressure 125 psig

Tab. 17 Drive motor data

Fan motor

	CSG 55-2	CSG 70-2	CSG 90-2
Rated power [kW]	2.2	2.2	2.2
Rated speed [rpm]	1185	1185	1185
Enclosure protection	TEFC	TEFC	TEFC
Motor bearing greasing interval [h]*	6000	6000	6000
Grease requirement, each bearing [g]	10	10	10
	CSG 120-2	CSG 130-2	—
Rated power [kW]	2.2	2.2	—
Rated speed [rpm]	1185	1185	—
Enclosure protection	TEFC	TEFC	—
Motor bearing greasing interval [h]*	6000	6000	—
Grease requirement, each bearing [g]	10	10	—

* Operating hours

Tab. 18 Fan motor data

2.12 Sound emission

	CSG 55-2	CSG 70-2	CSG 90-2
Sound emission ¹⁾ [dB(A)]	73 ²⁾	73 ²⁾	74 ²⁾

	CSG 120-2	CSG 130-2	—
Sound emission ¹⁾ [dB(A)]	75 ²⁾	76 ²⁾	—

¹⁾ without inlet and exhaust ducting

²⁾ Sound pressure level as per ISO 2151 and the basic standard ISO 9614–2, tolerance: ±3 dB(A) at maximum machine working pressure.

Tab. 19 Sound emission

2.13 Power Supply

Basic requirements

The machine is designed for an electrical supply according to National Electric Code (NEC), edition 2020, particularly article 670 and NFPA 79, edition 2018, particularly 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.

The incoming line within the control panel should be as short as possible.

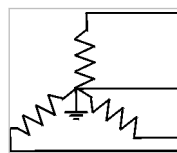
If external sensors or communication lines are to be connected to the machine, use shielded cables and insert the same through EMC fittings into the control panel.

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.

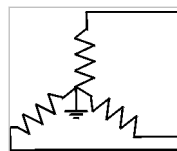
The machine requires a symmetrical three-phase power supply transformer with a WYE configuration output as shown in Figure 1 and Figure 2. In a symmetrical three phase supply the phase angles and voltages are all the same.

Other power supplies are not suitable.



03-S0235

Fig. 1 Three-phase star (wye); 4 wire; grounded neutral



03-S0236

Fig. 2 Three-phase star (wye); 3 wire; grounded neutral

Further information Please contact an authorized KAESER service representative for options.

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

2.14 Power supply specifications

The following multi-strand copper core wires are given according to 2020 NEC 310.14, 310.15, 310.16 and 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 2020 NEC 110.14(C), 220.3, 310.14, 310.15, 310.16, table 310.15(B)(1), table 310.15(C)(1), 430.6, 430.22, 430.24, 670.4(A) and other local codes.

Dual element time delay fuses are selected according to 2020 NEC 240.6, 430.52 and tables 430.52, 430.248 and 430.250.

It is recommended to use a ground conductor the same size as the current carrying conductors, if local codes allow. Neither the minimum ground wire size as pointed out in 2020 NEC table 250.122 nor using conduit as the sole ground connection is recommended.

Further information The electrical diagram in chapter 13.3 contains further specifications for electrical connection.

2.14.1 Power supply details

Rated power supply: 380V ±10% / 3ph / 60Hz

	CSG 55-2	CSG 70-2	CSG 90-2
Pre-fuse [A]	125 ¹⁾	150	175
Supply per phase and ground (75 °C) [AWG/MCM]	AWG1 ¹⁾	AWG1/0	AWG2/0
Consumption [A]	85 ¹⁾	103 ²⁾ / 101 ³⁾	121
	CSG 120-2	CSG 130-2	—
Pre-fuse [A]	250	250	—
Supply per phase and ground (75 °C) [AWG/MCM]	MCM250	MCM300	—
Consumption [A]	171	181	—

¹⁾ at working pressure ≥60 psig

²⁾ at working pressure ≤90 psig

³⁾ at working pressure >90 psig

Tab. 20 Rated power supply: 380V±10%/3ph/60Hz

Rated power supply: 460V ±10% / 3ph / 60Hz

	CSG 55-2	CSG 70-2	CSG 90-2
Pre-fuse [A]	100 ¹⁾	110	125
Supply per phase and ground (75 °C) [AWG/MCM]	AWG2 ¹⁾	AWG1	AWG1/0
Consumption [A]	71 ¹⁾	82 ²⁾ / 81 ³⁾	98
	CSG 120-2	CSG 130-2	—
Pre-fuse [A]	200	200	—

	CSG 120-2	CSG 130-2	—
Supply per phase and ground (75 °C) [AWG/MCM]	AWG4/0	AWG4/0	—
Consumption [A]	141	147	—

¹⁾ at working pressure ≥ 60 psig

²⁾ at working pressure ≤ 90 psig

³⁾ at working pressure > 90 psig

Tab. 21 Rated power supply: 460V \pm 10%/3ph/60Hz

3 Safety and Responsibility

3.1 Basic instructions

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

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

⚠ DANGER

Disregard of warning or safety instructions can cause serious injuries!

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

3.2 Specified use

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

- Keep to the specifications listed in this service manual.
- Operate the machine only within its performance limits and under the permitted ambient conditions.
- Do not use compressed air for breathing purposes unless it is specifically treated.
- Do not use compressed air for any application that will bring it into direct contact with food products unless it is specifically treated.

3.3 Improper use

- Never direct compressed air at persons or animals.
- Use hot cooling air for heating purposes only if there is no risk to the health of humans or animals. If necessary, hot cooling air should be treated by suitable means.
- Do not allow the machine to take in toxic, acidic, flammable or explosive gases or vapors.
- Do not operate the machine in areas in which specific requirements with regard to explosion protection are in force.
- Hearing protection must be worn before entering a zone or room in which the sound pressure level may reach or exceed 85 dB(A).

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 familiar with and adhere to the safety instructions and sections of the service manual relevant to operation,
- have received adequate training and authorization to operate electrical and compressed air devices,
- Additional qualifications for machines with refrigerated dryers:
 - they must have training and qualification for safe operation of refrigeration devices.

Authorized installation and maintenance personnel have the following qualifications:

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

3.4.3 Adherence to inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

- Ensure that local inspection schedules are adhered to.

3.5 Dangers

Basic instructions

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

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

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

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

Electricity

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

- Allow only qualified and authorized electricians or trained personnel under the supervision of a qualified and authorized electrician to carry out work on electrical equipment according to electrical engineering regulations.
- Before commissioning or re-commissioning the machine, the user must make sure there is adequate protection against electric shock from direct or indirect contact.
- Before starting any work on electrical equipment:
Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.
- Switch off any external power sources.
These could be connections to floating relay contacts or electrical machine heating, for example.
- Use fuses corresponding to machine power.
- Check regularly that all electrical connections are tight and in proper condition.

Forces of compression

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

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

Compressed air quality

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

Proper operation and maintenance of the machine ensures that the compressed air cannot be contaminated with oil or oil mists from the machine.

- Never directly inhale compressed air.
- If there is oil or oil vapor in the intake 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-stuffs.

Spring forces

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

The safety relief valve and the inlet valve control cylinder are under powerful spring loading.

- Do not open or dismantle any valves.

Rotating components

Touching rotating parts, such as fan wheels or coupling, while the machine is switched on can result in serious injury.

- Do not open the enclosure while the machine is switched on.
- Before opening the machine: switch off the power supply disconnecting device, lock it in the off position and check that the machine is free of voltage.
- Wear close-fitting clothes and a hair net if necessary.
- Ensure that all covers and safety guards are in place and secured before re-starting.

Temperature

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

- Avoid contact with hot components.
These include, for example, compressor airends, compressed air, water and oil lines, heat exchanger, snubber, 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.
- Clearly identify all high-temperature pipelines.
- Provide pipelines, user's water pipelines or other components with surface temperatures above 167°F, should be covered in protective guarding or insulated.

Noise

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

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

Operating fluids/materials

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

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

Unsuitable spare parts

Unsuitable spare parts compromise the safety of the machine.

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

Conversion or modification of the machine

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

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

Extending or modifying the compressed air station

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

- When extending or modifying the compressed air station
Check the blow-off capacity of safety relief valves on air receivers and compressed air lines before installing a new machine.
- If the blow off capacity is too low or the activating pressure is unsuitable:
Replace any pressure relief valves with correctly selected valves.

3.5.2 Safe machine operation

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

Personal protective equipment

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

- Wear protective clothing as necessary.

Suitable protective clothing (examples):

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

Transport

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

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

Assembly

- Make sure no power is applied when electrical connections are made.

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

Positioning

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

- Install the machine in a suitable compressor room.
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.
- If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain and splashing water.
- Do not operate the machine in areas where specific requirements with regard to explosion protection are in force.
- Ensure adequate ventilation.
- Place the machine in such a manner that the working conditions in its environment are not impaired.
- Comply with limit values for ambient temperature and humidity.
- The intake air must not contain any damaging contaminants.
Damaging contaminants are for instance: explosive or chemically instable gases and vapors, acid or base forming substances such as ammonia, chlorine or hydrogen sulfide.
- Do not position the machine in the warm exhaust air flow from other machines.
- Keep suitable fire extinguishing agents ready for use.

Commissioning, operation and maintenance

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

- Allow maintenance work to be carried out only by authorized personnel.
- Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Check that there is no voltage on floating relay contacts.
- Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- Never operate the machine without an air filter.
- Depressurize all pressurized components and enclosures.
- Allow the machine to cool down.
- Do not open the cabinet while the machine is switched on.
- Do not open or dismantle any valves.

3 Safety and Responsibility

3.6 Safety devices

- Use only spare parts approved by KAESER for use in this machine.
- Carry out regular inspections:
for visible damages,
of safety installations,
of the EMERGENCY STOP push button,
of any components requiring monitoring.
- Pay particular attention to cleanliness during all maintenance and repair work. Cover components and openings with clean cloths, paper or tape to keep them clean.
- Do not leave any loose components, tools or cleaning rags on or in the machine.
- Components removed from the machine can still be dangerous.
Do not attempt to open or destroy any components taken from the machine. (Examples: The safety relief valve and the inlet valve control cylinder are under powerful spring loading).

Decommissioning, storage and disposal

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

- Drain out fluids and dispose of them according to environmental regulations.
These include, for example, compressor lubricant and cooling water.
- 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 below gives information on areas dangerous to personnel.

Only authorized personnel may enter these areas!

Function	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 power supply cables.	Installation personnel
Operation	Within a 3 ft. radius of the machine.	Operating personnel
Maintenance	Within the machine.	Maintenance personnel
	Within a 3 ft. radius of the machine.	

Tab. 22 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 4.2.1.

3.7 Service life of safety functions

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

The following components are affected:

- Resistance thermometer (Pt100 sensor for measuring safety-relevant temperatures)
 - EMERGENCY STOP push button
 - Main contactor
1. The components of the safety functions must be replaced by an authorized KAESER service representative after a working life of 20 years.
 2. Have the reliability of the safety functions checked by an authorized KAESER service representative.

3.8 Safety signs

The tables list the various safety signs used and their meanings.
The figures show the position of the safety signs on the machine inside and out.

Safety signs outside

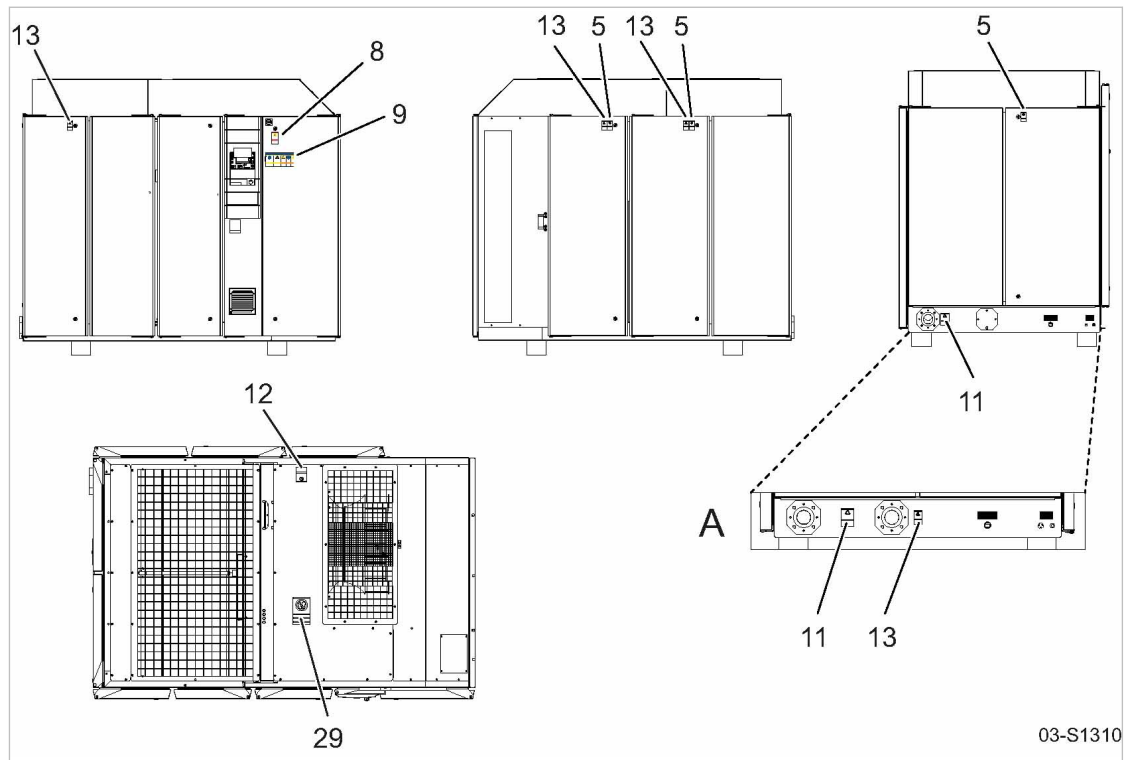










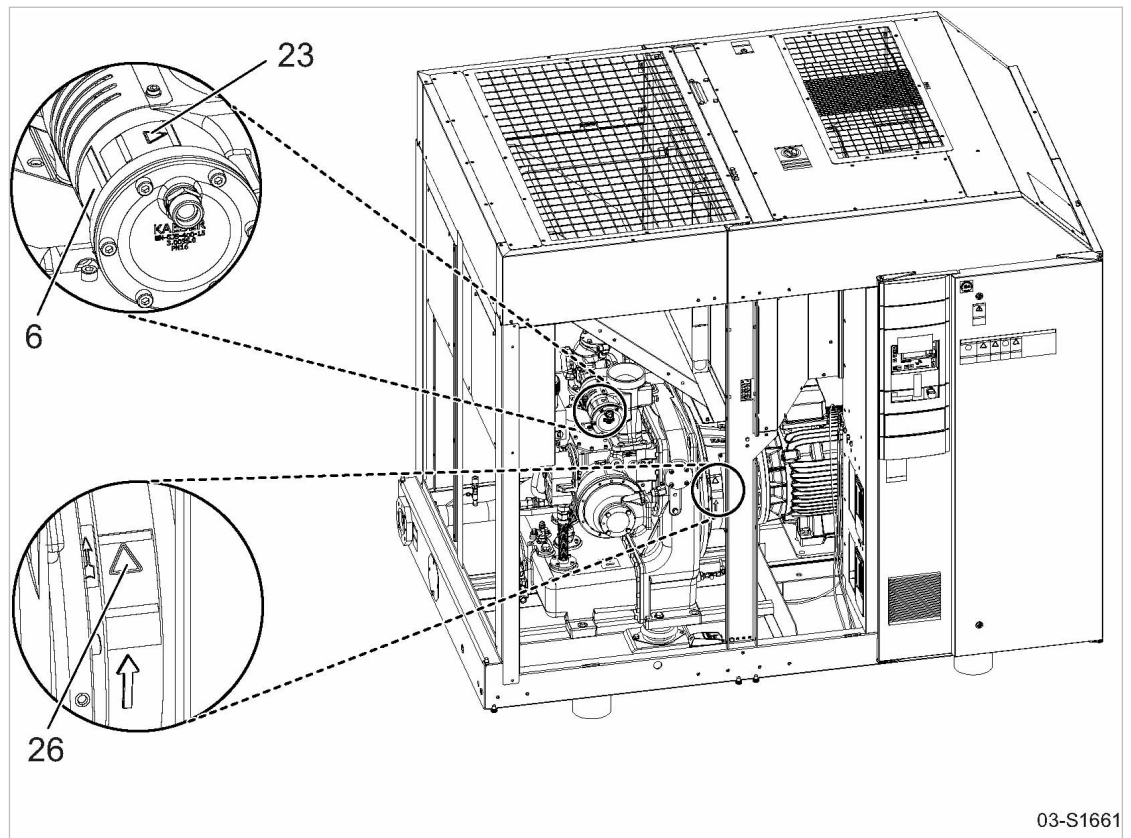
Fig. 3 Location of safety signs (outside)

Item	Sign	Meaning
A		Hot air connection
5		<p>Loud machine noise! Serious ear damage can occur.</p> <ul style="list-style-type: none"> ➤ Wear adequate ear protection. ➤ Never operate the unit without the enclosure.
8		<p>HAZARDOUS VOLTAGE! Touching electrically live components can cause serious injury or death.</p> <ul style="list-style-type: none"> ➤ Switch off and lock out/tag out the power supply disconnecting device. ➤ Verify the absence of any voltage.

Item	Sign	Meaning
9		<p>Injury and/or machine defects caused by improper use!</p> <ul style="list-style-type: none"> ➤ Maintenance should be performed by properly trained personnel only. ➤ Read and understand manual and all safety labels before switching the machine on. ➤ Never remove or cover safety labels.
		<p>Machine starts automatically!</p> <p>Severe injury can result from rotating components, electrical voltage, and air pressure.</p> <ul style="list-style-type: none"> ➤ Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage before opening any machine enclosures or guard.
		<p>Hot surface can cause burns!</p> <ul style="list-style-type: none"> ➤ Let the machine cool down. ➤ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
		<p>Loud machine noise!</p> <p>Serious ear damage can occur.</p> <ul style="list-style-type: none"> ➤ Wear adequate ear protection. ➤ Never operate the unit without the enclosure.
11		<p>Compressed air quality!</p> <p>Injury and/or contamination can result from breathing compressed air. Contamination of food can result from using untreated compressed air for food processing!</p> <ul style="list-style-type: none"> ➤ Never breath 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. ➤ Food grade coolant must be used for food processing.
12		<p>Flying debris!</p> <p>Severe injury, especially of the eyes, could result while the fan is rotating.</p> <ul style="list-style-type: none"> ➤ Prevent all materials from falling into the fan guard. ➤ Never work over the running machine. ➤ Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage.
13		<p>Hot surface can cause serious burns!</p> <ul style="list-style-type: none"> ➤ Let the machine cool down. ➤ Work carefully. ➤ Wear protective clothing and protective gloves.
29		<p>Danger of falling or damage to the machine!</p> <ul style="list-style-type: none"> ➤ Do not sit or walk on the enclosure. ➤ Do not place or store any load on the enclosure.




Tab. 23 Safety signs (outside)

Safety signs front panel



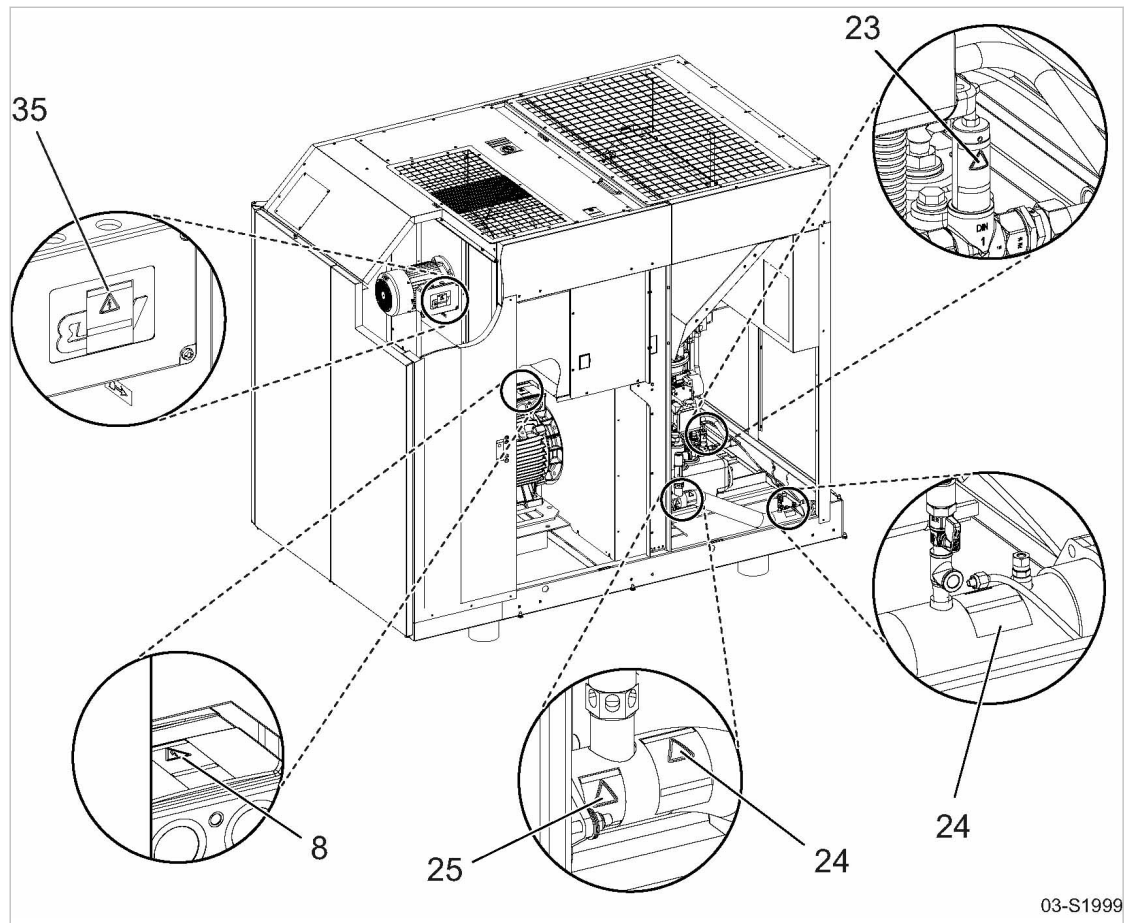
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Fig. 4 Location of safety signs front panel

Item	Sign	Meaning
6		Severe injury could result from touching the actuator while it is in motion! <ul style="list-style-type: none"> ➤ Never switch the machine on without the guard in place over the actuator. ➤ Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage.
23		Serious injury or death can result from tampering with this component! <ul style="list-style-type: none"> ➤ Never open (dismantle) valves. ➤ Contact an authorized KAESER service representative.
26		Severe injury could result from touching the coupling while it is rotating! <ul style="list-style-type: none"> ➤ Never switch the machine on without the guard in place over the coupling. ➤ Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage.

Tab. 24 Safety signs front panel



Safety signs rear panel



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Fig. 5 Location of safety signs rear panel

Item	Sign	Meaning
8		HAZARDOUS VOLTAGE! Touching electrically live components can cause serious injury or death. <ul style="list-style-type: none"> ➤ Switch off and lock out/tag out the power supply disconnecting device. ➤ Verify the absence of any voltage.
23		Serious injury or death can result from loosening or opening component that is under pressure and heavily spring loaded! <ul style="list-style-type: none"> ➤ Never open or dismantle valves. ➤ Contact an authorized KAESER service representative if a fault occurs.
24		Serious injury or death can result from loosening or opening component under pressure! <ul style="list-style-type: none"> ➤ Depressurize all pressurized components and enclosures. ➤ Ensure that the machine remains depressurized. ➤ Check that machine is depressurized.

Item	Sign	Meaning
25		Loud noise when safety relief valve opens! Ear damage and burns can occur. <ul style="list-style-type: none"> ➤ Wear ear protection and protective clothing. ➤ Close all maintenance doors and cover panels.
35		HAZARDOUS VOLTAGE! Touching electrically live components can cause serious injury or death. <ul style="list-style-type: none"> ➤ Switch off and lock out/tag out the power supply disconnecting device. ➤ Verify the absence of any voltage.

Tab. 25 Safety signs rear panel

Safety signs control cabinet

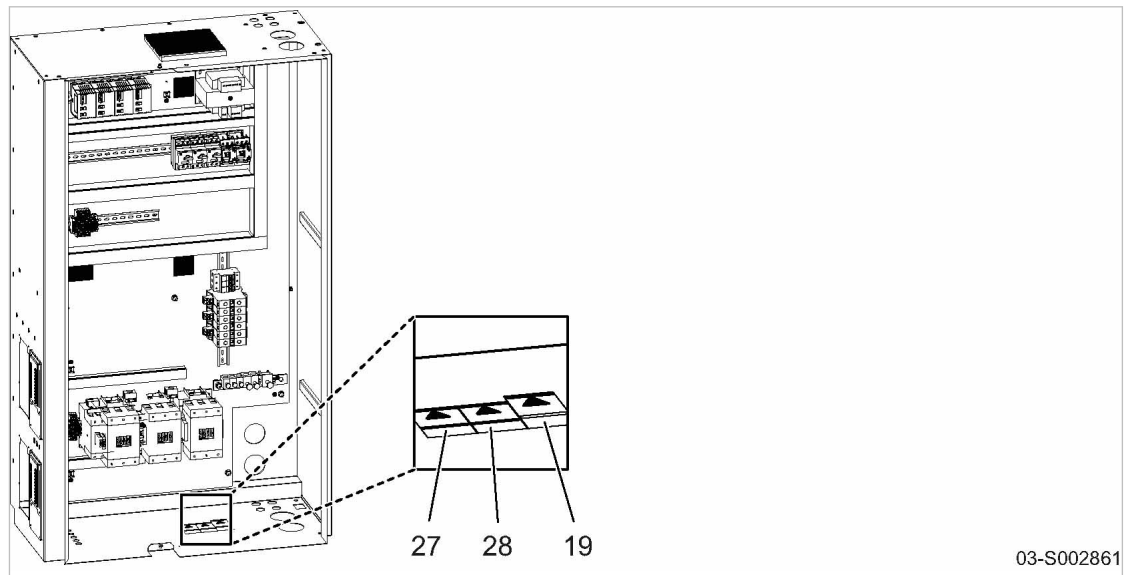





Fig. 6 Location of safety signs in the control cabinet

Item	Sign	Meaning
19		HAZARDOUS EXTERNAL VOLTAGE! Touching electrically live components can cause serious injury or death. <ul style="list-style-type: none"> ➤ Switch off and lock out/tag out the power supply disconnecting device. ➤ Verify the absence of any voltage.
27		Risk of fire or 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.
28		Risk of fire or electric shock! To maintain overcurrent short-circuit and ground-fault protection, the manufacturers instructions for setting the interrupter must be followed to reduce the risk of fire or electric shock.

Tab. 26 Safety signs control cabinet

3.9 Emergency situations

3.9.1 Correct fire fighting

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

1. Keep calm.
2. Give the alarm.
3. Shut off supply lines if possible: Power supply disconnecting device (all poles), cooling water (if present), heat recovery (if present)
4. Warn and move endangered personnel to safety
5. Help incapacitated persons
6. Close the doors
7. If trained accordingly: Attempt to extinguish the fire
 - Suitable extinguishing media:
 - Foam
 - Carbon dioxide
 - Sand or soil
 - Unsuitable extinguishing media:
 - Strong jet of water

3.9.2 Treating injuries from handling cooling oil

Eye contact:

Cooling oil can cause irritation.

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

Skin contact:

Cooling oil may irritate skin after prolonged contact.

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

Inhalation:

Cooling oil mist may make breathing difficult.

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

Ingestion:

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

3.10 Warranty

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

A condition of our warranty is that the machine is used for the purpose for which it is intended under the conditions specified.

Due to the multitude applications for which the machine is suitable the obligation lies with the user to determine its suitability for his specific application.

In addition, we accept no warranty obligation for:

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

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

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

3.11 Environmental protection

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

- Store and dispose of operating materials and replaced parts in accordance with local environment protection regulations.
- Observe relevant national regulations.

This applies particularly to parts contaminated with compressor cooling oil.



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

4 Design and Function

4.1 Enclosure

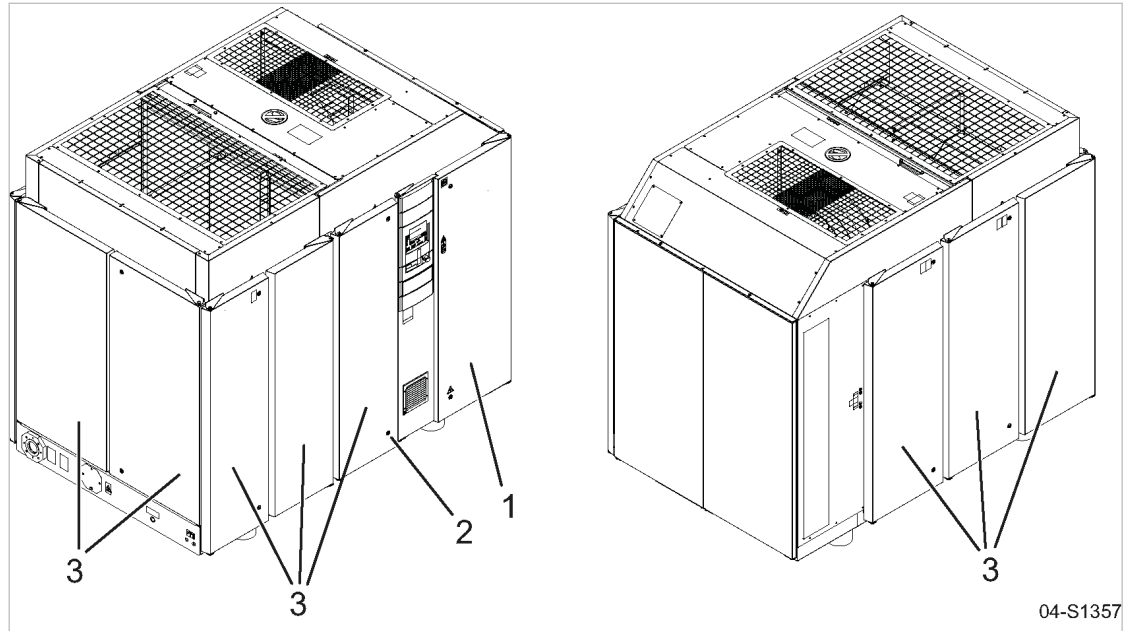


Fig. 7 Enclosure overview

- ① Control cabinet door
- ② Turning lock
- ③ Access door

When closed, the enclosure serves various functions:

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

The enclosure is not suitable for the following:

- Walking on, standing on, or sitting on
- No loads of any kind should be placed or stored on the machine

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.

The snap fasteners should be opened using the supplied key.

4.2 Machine function

Air system

Ambient air is drawn through a filter into the first stage where it is compressed and passes through a pulsation damper into the heat exchanger for the air cooler downstream of the first stage airend. The cooled compressed air is further compressed in the second stage airend and passes through a pulsation damper, check valve and second stage cooler into the air network.

The airends are driven over a transmission by an electric motor.

Condensate drainage system

Two condensate separators are installed:

One is located downstream of the heat exchanger for the air cooling of the first stage airend. It prevents the entry of condensate in the second stage airend.

The other is located downstream of the heat exchanger for the air cooling of the second stage airend. It prevents the entry of condensate into the compressed air outlet pipe.

The condensate is removed via automatic condensate drains.

Oil system

A pump takes oil from the gearbox sump and passes it through the heat exchanger and the filter.

The cooling oil lubricates the bearings, the main gear, and the synchronization gear and cools both airends. A minimum oil pressure is required to open the hydraulic inlet valve. If required, the cooling oil is cooled via a heat exchanger. Individual oil filters ensure reliable functioning.

Conceptual sketch

The simplified flow diagram provides an overview of the following sections:

- Air system
- Oil system
- Temperature monitoring
- Pressure monitoring

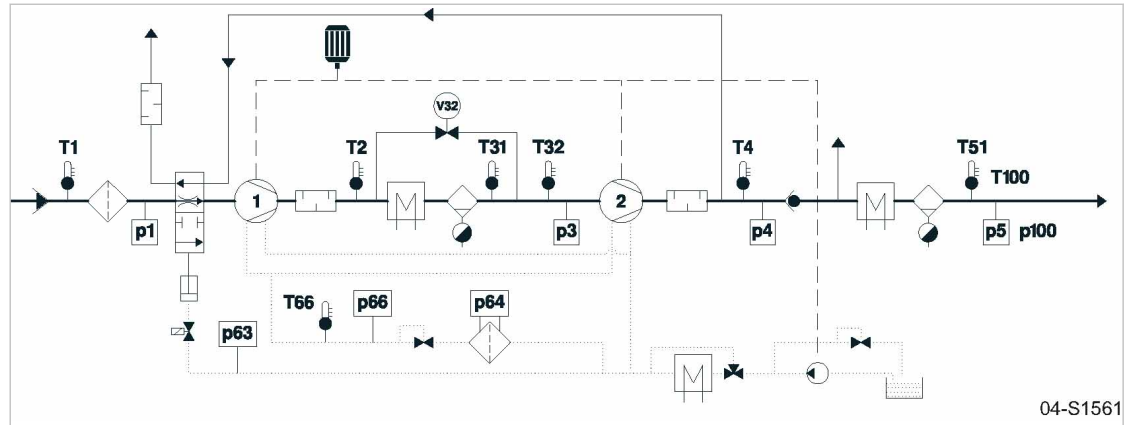
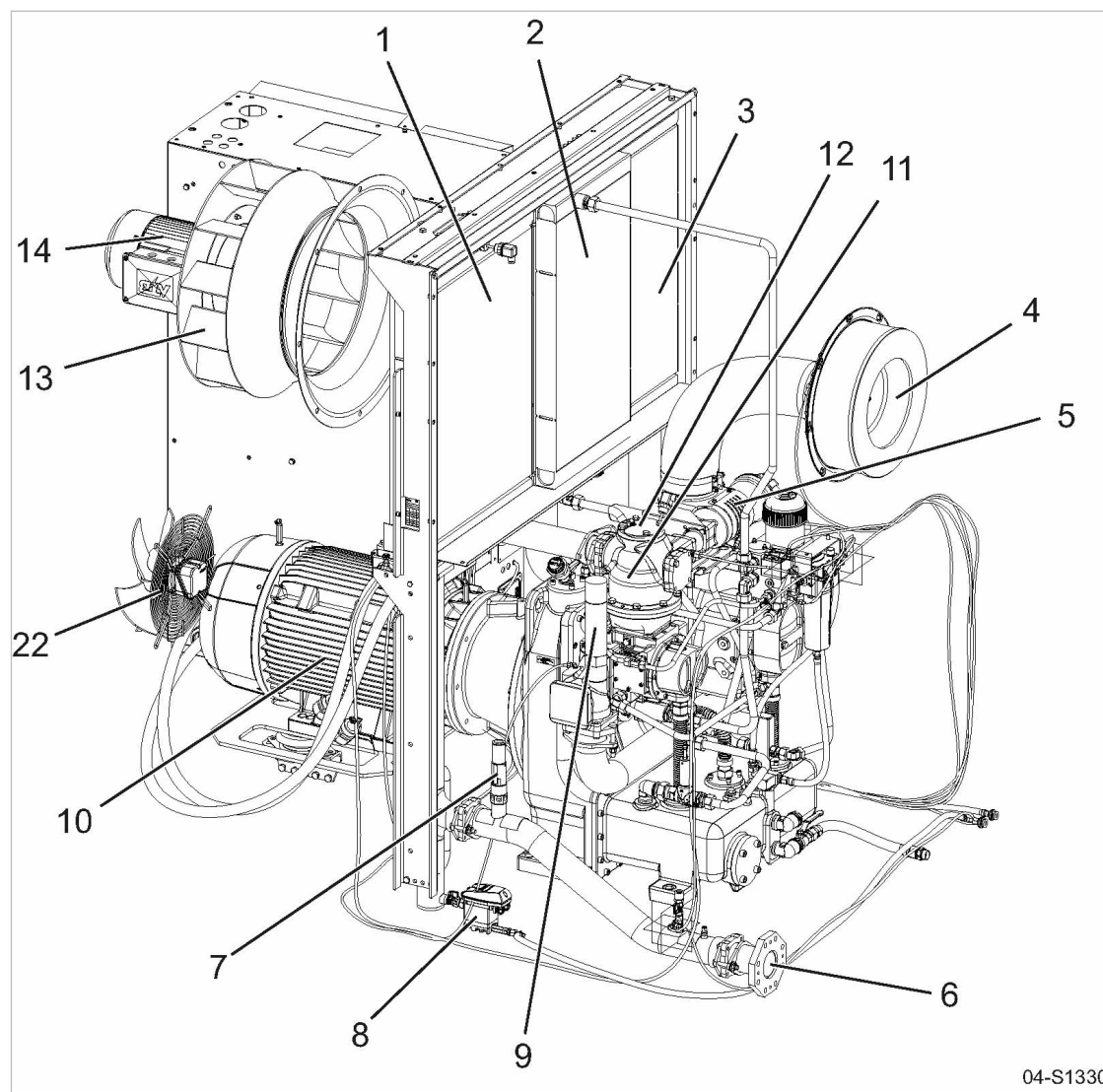


Fig. 8 Conceptual sketch (flow diagram)

①	First stage airend	p4	Pressure of the compressed air after leaving the second stage airend
②	Second stage airend	T51	Temperature of the cooled air at the compressed air outlet
T1	Temperature of the ambient air to be compressed	p5	Pressure of the cooled air at the compressed air outlet
p1	Air pressure at the machine's inlet (downstream of the air filter)	p63	Oil pressure at the inlet valve
T2	Temperature of the compressed air after leaving the first stage airend	p64	Differential pressure at the oil filter
T31	Temperature of the cooled air when entering the second stage airend	T66	Temperature of the cooling oil prior to entering the bearing lubrication of both air-ends
T32	Temperature of the compressed air after leaving the first stage airend	p66	Cooling oil pressure prior to entering the bearing lubrication of both air-ends
V32	Bypass control valve	T100	Temperature of the cooled air at the compressed air outlet
p3	Pressure of the compressed air when entering the second stage airend	p100	Pressure of the cooled air at the compressed air outlet
T4	Temperature of the compressed air after leaving the second stage airend		

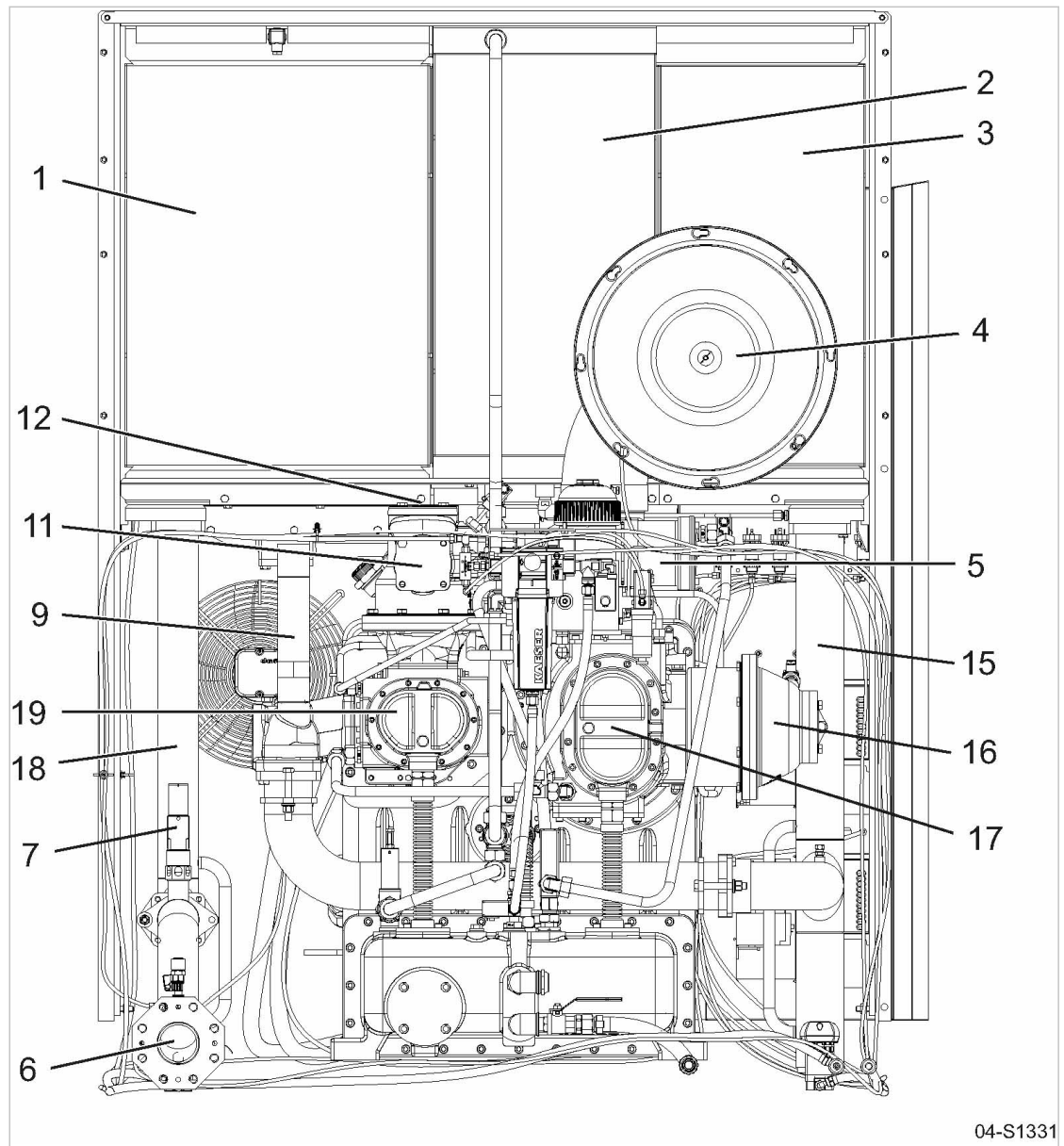
Machine overview



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Fig. 9 Machine overview (rear view)

- | | |
|--|---|
| ① Heat exchanger, air cooling of the second stage aircnd | ⑨ Safety relief valve, first stage aircnd |
| ② Heat exchanger, oil-cooling | ⑩ Drive motor |
| ③ Heat exchanger, air cooling of the first stage aircnd | ⑪ Pulsation damper, second stage aircnd |
| ④ Air filter | ⑫ Check valve |
| ⑤ Inlet valve | ⑬ Radial fan |
| ⑥ Compressed air outlet | ⑭ Fan motor |
| ⑦ Safety relief valve, second stage aircnd | ⑮ Auxiliary fan |
| ⑧ Condensate drain, second stage aircnd | |



04-S1331

Fig. 10 Machine overview (left side view)

- | | |
|---|--|
| ① Heat exchanger, air cooling of the second stage airen | ⑪ Pulsation damper, second stage airen |
| ② Heat exchanger, oil-cooling | ⑫ Check valve |
| ③ Heat exchanger, air cooling of the first stage airen | ⑮ Condensate separator, first stage airen |
| ④ Air filter | ⑯ Pulsation damper, first stage airen |
| ⑤ Inlet valve | ⑰ First stage airen |
| ⑥ Compressed air outlet | ⑱ Condensate separator, second stage airen |
| ⑦ Safety relief valve, second stage airen | ⑲ Second stage airen |
| ⑧ Safety relief valve, first stage airen | |

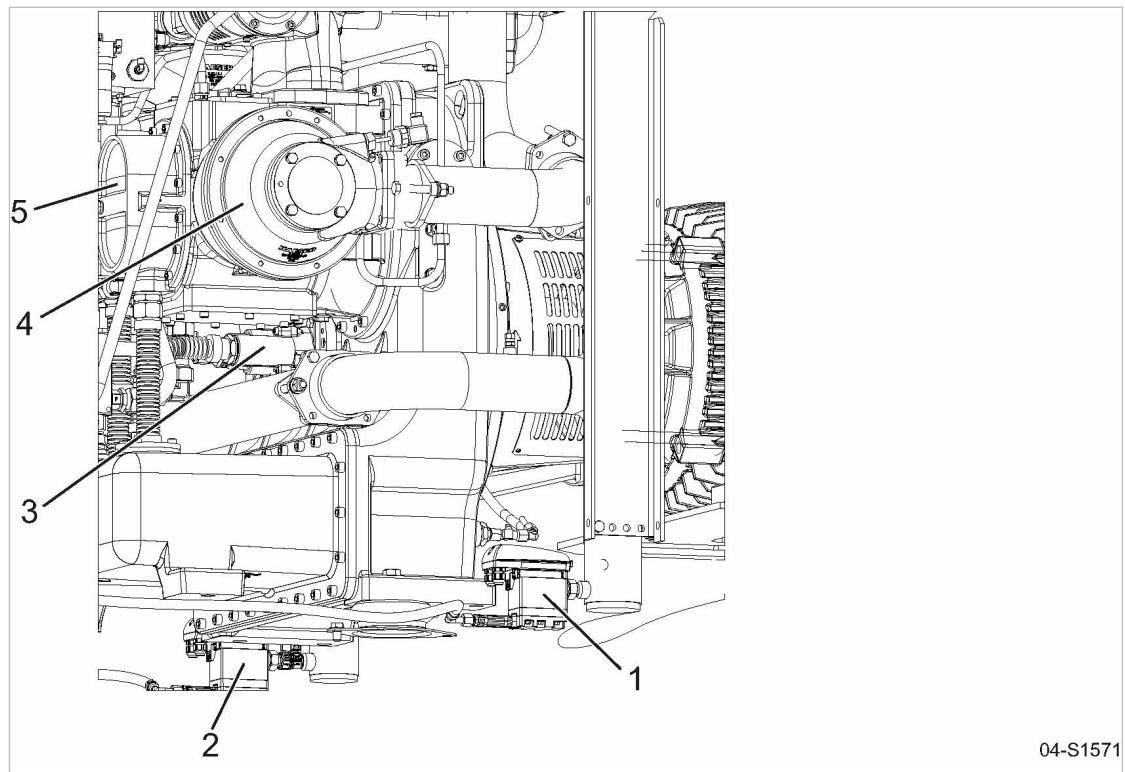


Fig. 11 Machine overview (front view)

- | | | | |
|---|---------------------------------------|---|--------------------------------------|
| ① | Condensate drain, first stage airend | ④ | Pulsation damper, first stage airend |
| ② | Condensate drain, second stage airend | ⑤ | First stage airend |
| ③ | Recirculating pump for cooling oil | | |

4.2.1 Safety devices

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

- **EMERGENCY STOP push button**
Stops the machine immediately in an emergency situation. The motor remains stopped. The pressure system is vented.
- **Safety relief valves**
Protect the first and second stages against excessive pressure. They are factory set.
- **Resistance thermometers**
Trigger a machine shut-down at excessive temperatures.
- **Pressure transducer**
Monitor the pressure conditions at various locations in the machine.
- **Enclosures and guards for moving parts and electrical connections**
Protect against accidental contact.

4.2.2 Floating contacts

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



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

4.3 Operating panel SIGMA CONTROL 2

Keys

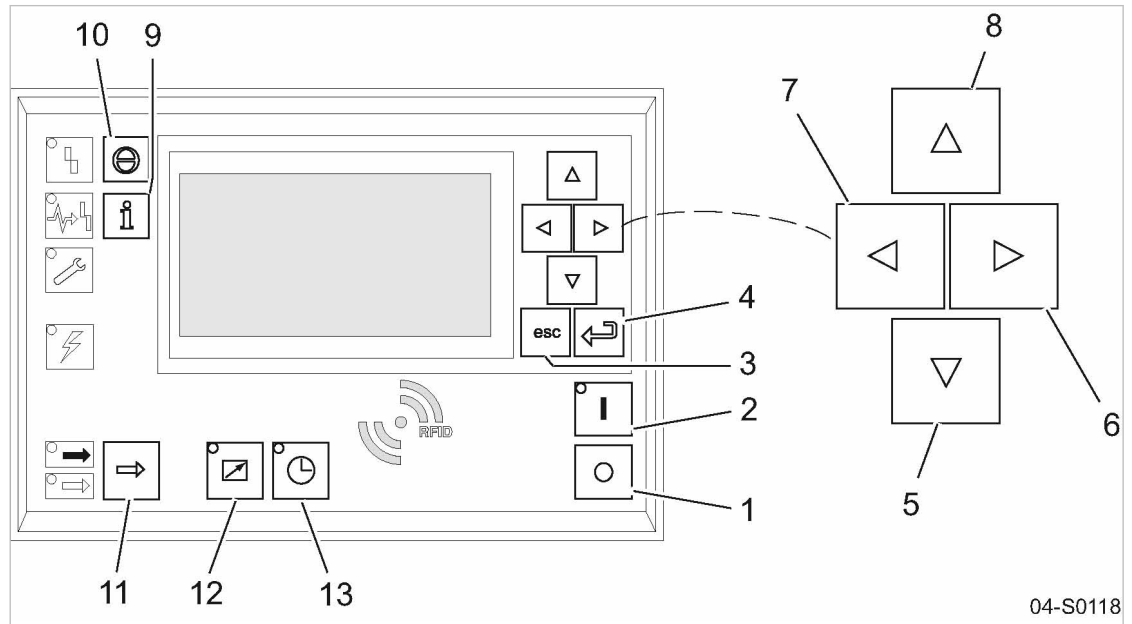
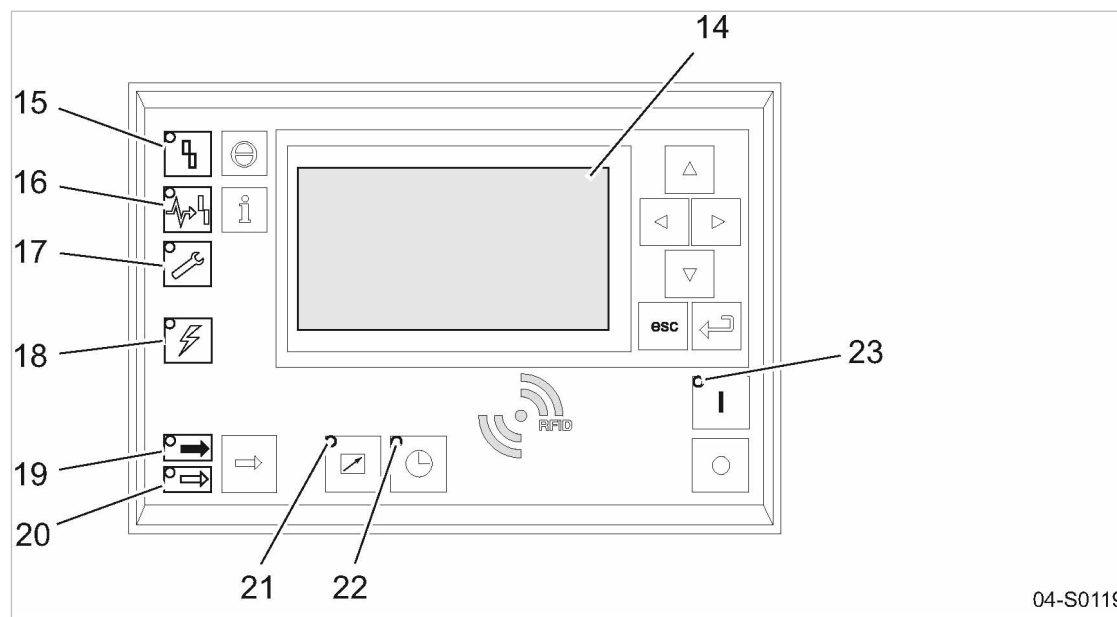


Fig. 12 Keys – overview

Item	Name	Function
1	«OFF»	Switches off the machine.
2	«ON»	Switches on the machine.
3	«Escape»	Returns to the next higher menu option level. Exits the edit mode without saving.
4	«Enter»	Jumps to the selected menu option. Exits the edit mode and saves.
5	«Down»	Scrolls down the menu options. Reduces a parameter value.
6	«Right»	Jumps to the right.
7	«Left»	Jumps to the left.
8	«Up»	Scrolls up the menu options. Increases a parameter value.
9	«Information & Events»	Operating mode: Displays the event memory.
10	«Acknowledgement»	Confirms/acknowledges alarms and warning messages. If permissible: Resets the fault counter (RESET).
11	«LOAD/IDLE»	Toggles between the LOAD and IDLE modes.
12	«Remote control»	Switches the remote control on and off.
13	«Timer control»	Switches the time control on and off.

Tab. 27 Keys

LEDs



04-S0119

Fig. 13 Indicators – overview

Item	Designation	Function
14	Indicator field or display	Graphic display with 8 lines and 30 characters.
15	<i>Fault</i>	Flashes red when an alarm occurs. Lights continuously when acknowledged.
16	<i>Communication</i>	Continuous red illumination if a communication connection (Ethernet, USS, COM modules) has a fault.
17	<i>Warning</i>	Flashes in yellow in the following events: <ul style="list-style-type: none"> ■ Maintenance work due ■ Warning message Lights continuously when acknowledged.
18	<i>Controller voltage</i>	Lights green when the power supply is switched on.
19	<i>LOAD</i>	Continuous green light when the machine is running in LOAD.
20	<i>IDLE</i>	Lights green when the compressor is running in IDLE mode. Flashes when the «LOAD/IDLE» toggle key is pressed.
21	<i>Remote control</i>	The LED lights when the machine is in remote control.
22	<i>Timer control</i>	The LED lights when the machine is in timer control.
23	<i>ON</i>	Lights green when the machine switched on.

Tab. 28 Indicators

RFID sensor field

RFID is the abbreviation for “**R**adio **F**requency **I**dentification” and enables the identification of persons or objects.

Placing a suitable transponder in front of the RFID sensor field of the controller will automatically activate the communication between transponder and SIGMA CONTROL 2.

A suitable transponder is the RFID Equipment Card supplied by KAESER. Two of them have been provided with the machine.

Typical application:

- Users log on to the machine.
(no manual input of the password required.)

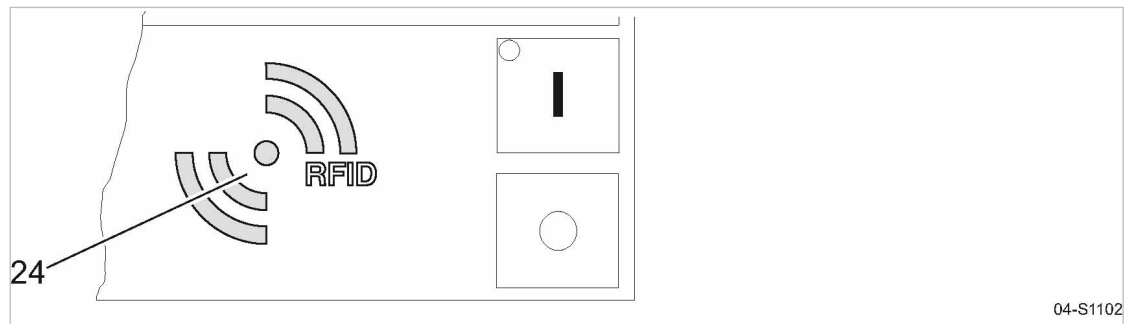


Fig. 14 RFID sensor field

Item	Name	Function
24	RFID	RFID sensor field for the communication with a suitable RFID transponder.

Tab. 29 RFID sensor field

Further information More information about the use of RFID technology is provided in the SIGMA CONTROL 2 operating manual.

4.4 Operating modes and control modes

4.4.1 Machine operating modes

STOP

The machine is connected to the power supply.

The *Controller voltage* LED lights green.

The machine is switched off. The *ON* LED is extinguished.

READY

The machine has been activated with «ON»:

- The *On* LED lights green.
- The drive motor is stopped.
- The inlet valve is closed.
- The venting valve is open.

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

LOAD

The compressor motor runs under load.

- The inlet valve is open.
- The venting valve coupled to the inlet valve is closed.
- The airends deliver compressed air to the system

IDLE

The compressor motor runs unloaded with low power consumption.

- The inlet valve is closed.
- The check valve blocks the machine after the second stage.
- The venting valve is open.
- The heat exchanger for air cooling after the second stage remains under system pressure during IDLE running.

4.4.2 Control modes

Two values are set for the operating overpressure defining the desired pressure range for the machine operation: cut-in and cut-out pressure. The machine switches to LOAD as soon as the cut-in pressure is attained and to IDLE or READY when the upper value (cut-out pressure) is reached.

Using the selected control mode, the controller switches the compressor motor according to defined rules (the control mode) between the various operating modes in order to compensate for air being drawn off by consumers and maintain the machine's working pressure between the preset cut-in and cut-out pressures.

The objective of this regulation is to attain the best possible energy efficiency and, at the same time, to limit the number of switching actions (cutting in and out of the compressor motor) as low as possible (≤ 8 switching actions per hour on average) in order to prevent motor damage.

The controller SIGMA CONTROL 2 can operate in the following modes:

- DUAL
- QUADRO
- DYNAMIC

DUAL

In 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 cut-out pressure is reached, the machine switches to IDLE. When the preset *idle period* has elapsed, the machine switches to READY.

The shorter the *idle period* setting, the sooner (and more frequently) the motor is stopped. Saves energy consumed in idle but increases the number of switching operations.

QUADRO

In QUADRO mode, the machine operates as in 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 READY.

Following extended times in the various operating modes, the machine switches directly from LOAD to READY. In this event, the controller considers the time in READY mode as *standstill time*. The time in LOAD and IDLE operating modes are taken as *minimum runtime*.

In this control mode, the controller requires two specified times: The running time and the *idle period standstill time*. The shorter these time period settings, the sooner (and more frequently) the motor is stopped.

DYNAMIC

The DYNAMIC mode is based on the DUAL control mode. Unlike DUAL control mode, DYNAMIC switches the compressor directly to READY when the compressor motor temperature is low. At higher motor temperatures, it switches to IDLE until the motor has cooled down enough.

The lower the drive motor temperature, the sooner (and, therefore, more often and longer) it is stopped.



DYNAMIC mode is recommended as this mode enables the shortest IDLE times. If this mode generates significantly more motor starts, you may limit the number of switching operations by extending the run-on time.

4.5 Options

The options available for your machine are described below.

4.5.1 Option C3

Controller SIGMA CONTROL 2: Connection to control technology

Connection to various control technology systems is possible.

SIGMA CONTROL 2

Main Control System (MCS):

- Slot for a communication module to connect to a control technology system.

Input-Output-Module (IOM):

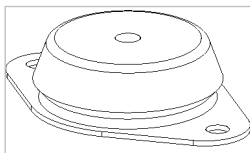
- Module with digital and analogue inputs and outputs.

Tab. 30 Components

4.5.2 Option H1

Machine mountings

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

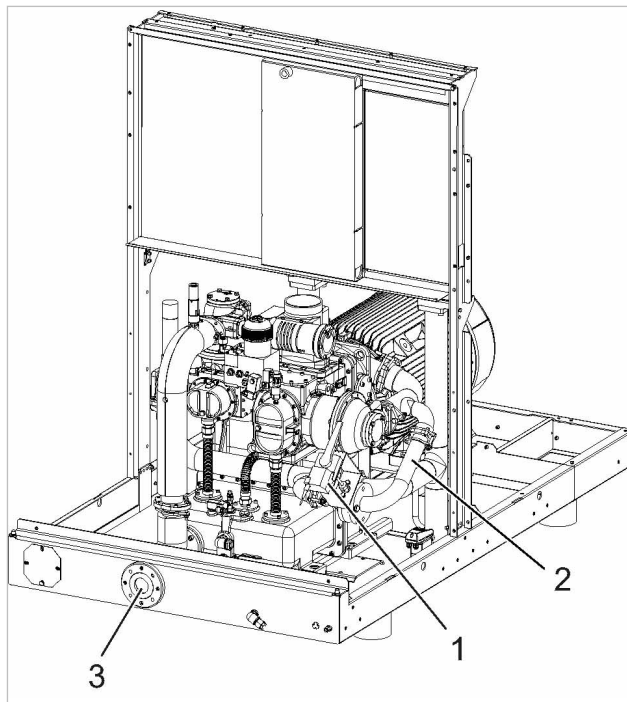


04-S0034

Fig. 15 Machine mountings

4.5.3 Option H23 Hot-air outlet with regulation

A machine with option H23 only has the hot air connection on the side of the compressed air outlet and no heat exchanger of the second stage airend, so that the hot compressed air is guided directly to the compressed air outlet of the compressor. This option furthermore includes a regulated bypass for bypassing the heat exchanger of the first stage airend. By bypassing this heat exchanger you raise the airend discharge temperature at the second stage airend outlet and consequently also the compressed air discharge temperature. By regulating the bypass section by using control valve V32, the compressed air discharge temperature can be kept at a constant level.



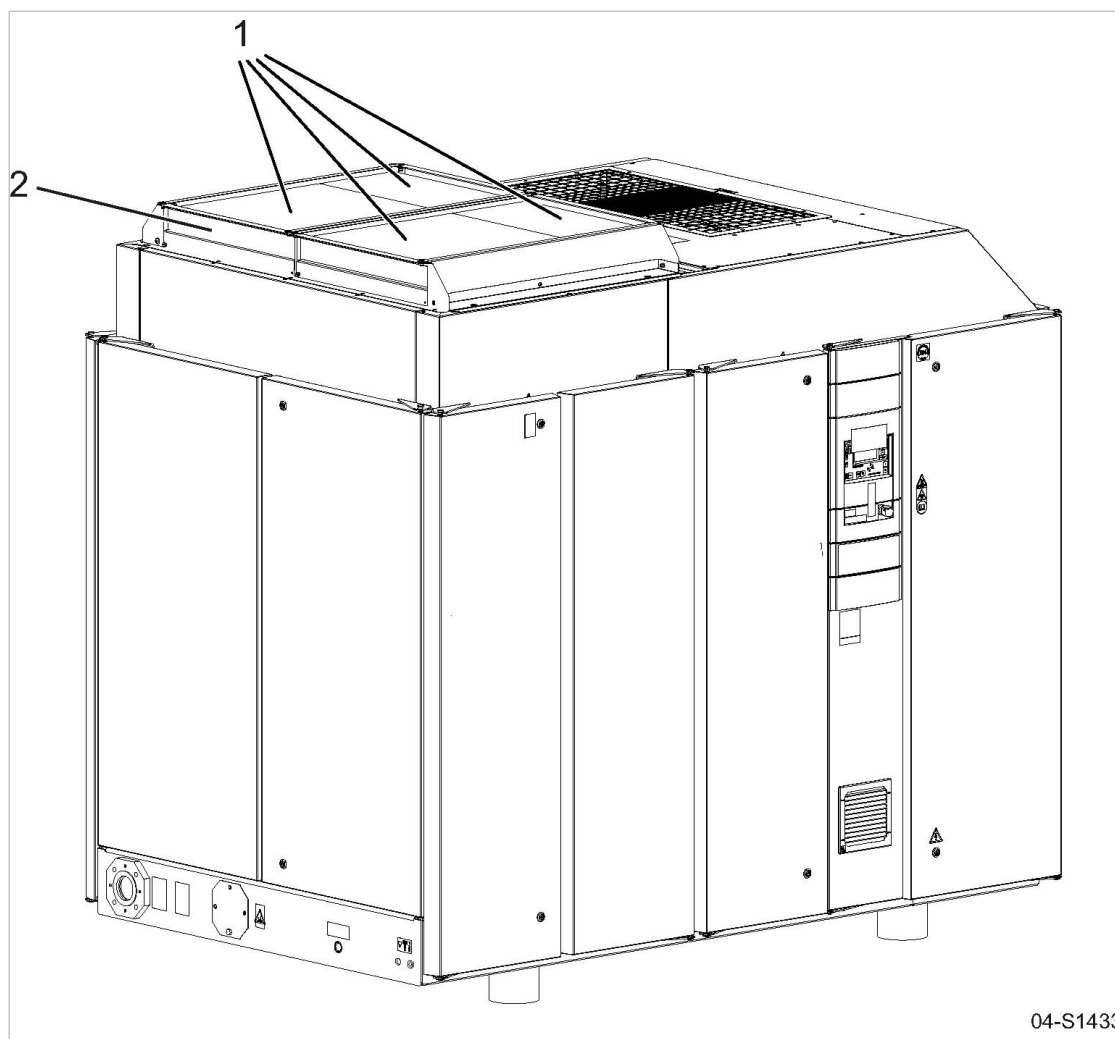
04-S003330

Fig. 16 Conceptual sketch (flow diagram)

- ① Control valve V32
- ② Bypass heat exchanger of 1st stage airend
- ③ Compressed air discharge

4.5.4 Option K3 Cooling air filter mats

The mat filters the cooling air and keeps the cooler surface clean.



04-S1433

Fig. 17 Cooling air filter mats (option K3)

- ① Cooling air filter mats
- ② Holding frame

5 Installation and Operating Conditions

5.1 Ensuring safety

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



Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

- Strictly forbid fire, open flame, and smoking.
- If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.
- Do not store flammable material in the vicinity of the machine.
- The machine is not explosion-proof!
Do not operate in areas in which specific requirements with regard to explosion protection are in force.
- Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- Keep suitable fire extinguishing agents ready for use.
- Ensure that required ambient conditions are maintained.

Required ambient conditions may be:

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

5.2 Installation conditions

5.2.1 Determining installation location and clearances

The machine is intended for installation in a suitable machine room. Information on wall clearances and ventilation of the machine room is provided below.



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

- Please consult KAESER if they cannot be adhered to.



- The machine must be operated with at least one exhaust air duct.
An air inlet duct will also improve the heat dissipation.
- The ducting should not allow cold air from the outside to enter the machine when at standstill.
- The ducting must be so arranged that exhaust air cannot re-enter the inlet.
- Do not connect the ducts rigidly to the machine (use canvas connections).

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

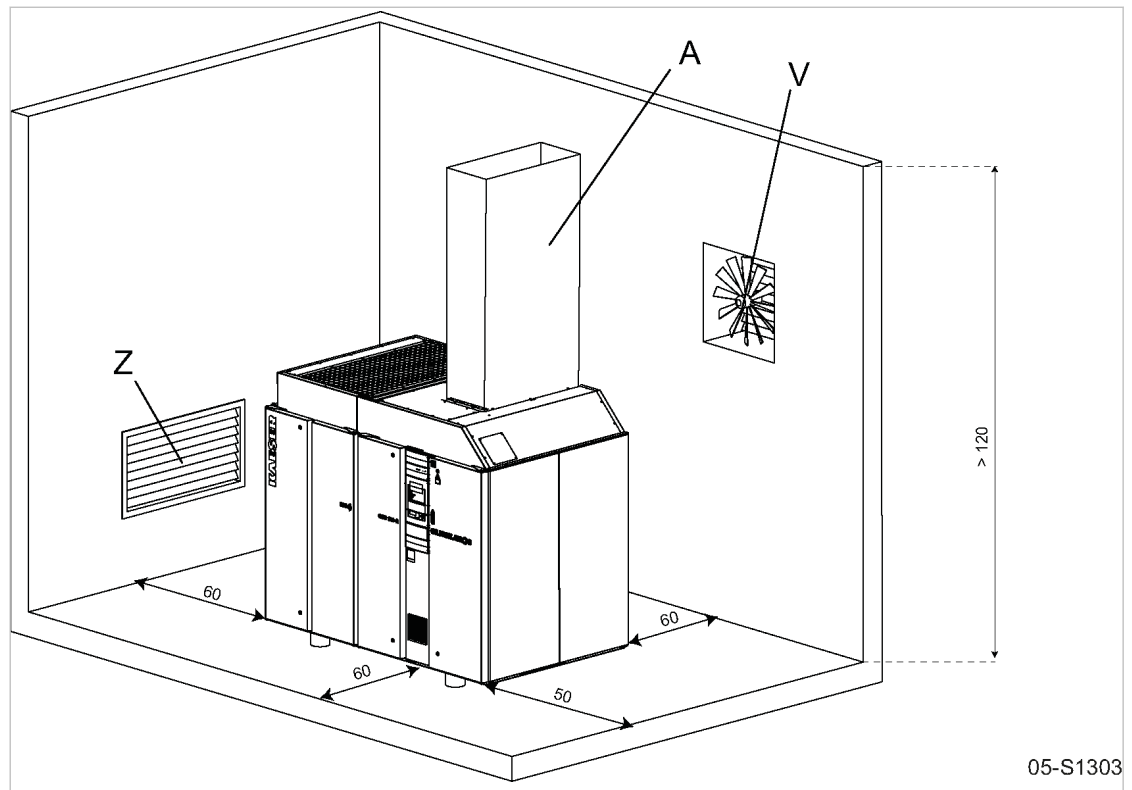


Fig. 18 Recommended installation, dimensions [in.]

- ☐ A Exhaust air duct
- ☐ V Exhaust fan
- ☐ Z Ventilation Inlet Air Opening

1. **NOTICE** *Ambient temperature too low.*
Frozen condensate and reduced lubrication caused by highly viscous cooling oil (gear) can cause damage when starting the machine.
 - *Ensure that the temperature of the machine is at least +37 °F before switching it on.*
 - *Heat the machine room sufficiently or install a standstill heater.*
2. Ensure accessibility and adequate lighting so that all work on the machine can be carried out without danger or hindrance.
3. Ensure that all displays can be read without glare and that the controller display cannot be damaged by direct sunlight (UV radiation).
4. Ensure that all air inlet and exhaust air apertures in the housing remain open.
5. Observe any additional clearances that may be specified in local occupational health & safety and building regulations, so that escape and rescue routes may safely be accessed, even when the machine housing is open.
6. For installation outdoors, the machine must be protected from frost, direct sunlight, dust and rain.

5.2.2 Ensuring adequate machine room ventilation

Adequate ventilation of the machine room fulfils several functions:

- It prevents a vacuum in the machine room.
- It discharges exhaust heat away from the machine, thus ensuring the necessary operating conditions.



- In the event that conditions for adequate ventilation of the machine room cannot be guaranteed, please consult KAESER for further advice.

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

5.2.3 Inlet and exhaust air ducting

At the inlet and exhaust air side, the machine can only overcome the air resistance resulting from the duct design. Any additional air resistance will reduce the airflow and thereby negatively affect cooling of the machine.

- Consult the KAESER SERVICE representative before deciding on:

- Design of the exhaust air ducting
- Transition between machine and exhaust air ducting
- Length of the ducting
- Number of bends in the ducting
- Design of flaps or louvres



In regular operation, a cooling air outlet temperature of $T_{\max.} \approx 176\text{ °F}$ can be expected. Significantly higher cooling air outlet temperatures are possible if the heat exchangers are soiled.

Take all necessary actions for a safe machine operation and ensure that neither personnel nor downstream components are endangered.

Further information Further information on the design of exhaust air ducts can be found in chapter 13.2.

5.3 Using the compressor to supply a compressed air system

The machine is designed for a specific maximum pressure. A safety relief valve ensures that this maximum pressure is not exceeded.

If the machine is integrated in a compressed air network, the cut-in pressure of the safety relief valve must be larger than the operating overpressure of the network.

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 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

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

When working on live components

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

- Work on electrical equipment may only be carried out by authorized electricians.
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Check that there is no voltage on floating relay contacts.

When working on the compressed air system

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

- Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- Depressurize all pressurized components and enclosures.
- Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
Ensure that no oil will escape from the pressure gauge into the compressed air system during this procedure!
- Do not open or dismantle any valves.

When working on the drive system

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

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

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

Further information

Details of authorized personnel are found in chapter 3.4.2.

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

6.2 Reporting transport damage

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

6.3 Connecting the machine with the compressed air network



Do not apply any torsion loads to the compensator (twisting).

When selecting a suitable compensator, the maximum permissible compressed air outlet temperature must be taken into account.

- For custom or special designs likely to exceed compressed air outlet temperature of > 167°F, contact KAESER.
- Implement suitable measures to protect any downstream components from high temperatures.
(For example, severe contamination could cause a malfunction of the stage 2 heat exchanger resulting in a discharge temperature of nearly 518°F.)

No significant forces may be applied to the machine via the compressed air connection. The compressed air forces must be balanced by the compensator. The settings are implemented via the corresponding compensator parts.

If a lot of noise is generated, you may also install a noise or pulsation dampener.

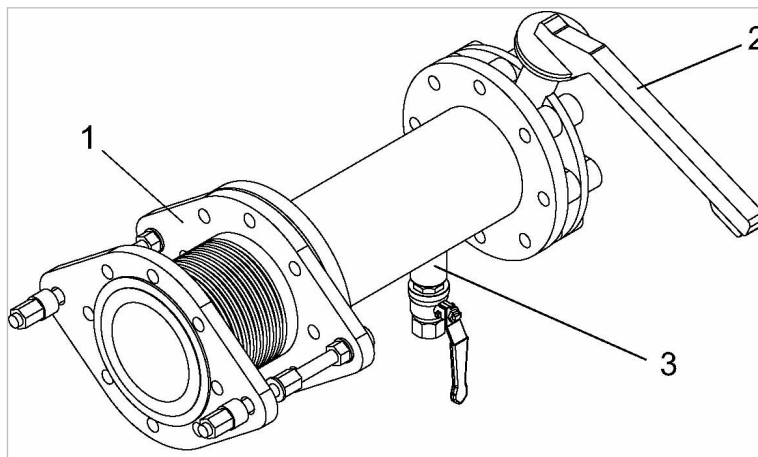
For purposes of de-commissioning, the user should install a venting point between the compressed air outlet and the shut-off valve. This allows any condensate to be released from the machine.

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

⚠ WARNING

Serious injury or death can result from loosening or opening components under pressure.

- *Depressurize all pressurized components and enclosures.*



06-S1306

Fig. 19 Compressed air connection

- ① Compensator
- ② Shut-off valve
- ③ Venting connection

1. A shut-off valve must be installed by the user in the connection line.

2. The user must install a venting connection with a downward opening between compensator and shut-off valve.
3. If required:
Adjust compensator until no major forces are still fed to the machine via the compressed air connection.
4. Install the compressed air connection so that no condensate can run back from the compressed air system into the compressor.

6.4 Connecting the power supply

Precondition The power supply disconnecting device is switched off, the device is locked off, the absence of any voltage has been verified.
The tolerance limits of the power supply are within the permissible tolerance limits of the rated machine voltage.

1. The power supply must only be connected by authorized installation personnel or an authorized electrician.
2. Carry out safety measures as stipulated in relevant regulations and in national accident prevention regulations. In addition, observe the regulations of the local electricity supplier.
3. Test the overload protection cut-out to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
4. Select supply cable conductor cross-sections and fusing in accordance with local regulations.
5. The user must provide the machine with a lockable power supply disconnecting device. This could be, for example, a load disconnect switch with fused input. If a circuit breaker is used it must be suitable for the motor starting characteristics.
6. Check that the tapplings on the control voltage transformer are connected according to the power supply voltage.
If not, change the tapplings to suit the power supply voltage.
7. **⚠ DANGER** *Danger of fatal injury from electric shock!*
 - *Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.*
8. Connect the machine to the power supply.
9. Ensure that the cabinet complies with the requirements of degree of protection IP54.

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

6.5 Connecting the external pressure transducer

Material Retrofit kit: "External pressure transducer SIGMA CONTROL 2"
Use suitable shielded, copper-core cable (e.g.: LIYCY 2x 0,75 mm² for ambient temperatures up to 86 °F and wiring method C).

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

Cable length between the machine and the pressure transducer: <98 ft.

By means of a pressure transducer, the pressure in the compressed air network can be measured at any selected location and this signal used to regulate the compressor.

This ensures optimum compressor regulation with regard to the network pressure at the selected location.



Safety monitoring of the machine's internal pressure is unaffected.

An authorized KAESER service representative can provide support on planning and executing an individual solution.

1. Install the pressure transducer at the selected location in the compressed air network.
2. Using a suitable cable, connect the pressure transducer to a spare analog input.



➤ Connect as large an area of the screening as possible to the mounting plate in the control cabinet or use an EMC fitting to make contact.

3. When commissioning the machine with SIGMA CONTROL 2, select the *<Network actual pressure>* setting in the *<All>* menu.
4. Select and activate the used analog input (All).

Further information

The electrical diagram in chapter 13.3 contains further details of the pressure transducer connection.

6.6 Connecting the condensate drain

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



The condensate must be able to drain freely.

➤ Only machines with 232 psi maximum permissible working pressure may be connected to the condensate collecting line.

Fig. 20 illustrates the recommended installation.

Condensate flows downward in the collecting line. This prevents condensate flowing back to the compressor.

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

Condensate line

Feature	Value
Max. length ¹⁾ [ft]	50
Max. delivery head [ft]	<13
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastics Hose line

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

Tab. 31 Condensate line

Condensate collecting line

Feature	Value
Gradient [%]	≥3
Max. length ¹⁾ [ft]	65
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastics Hose line

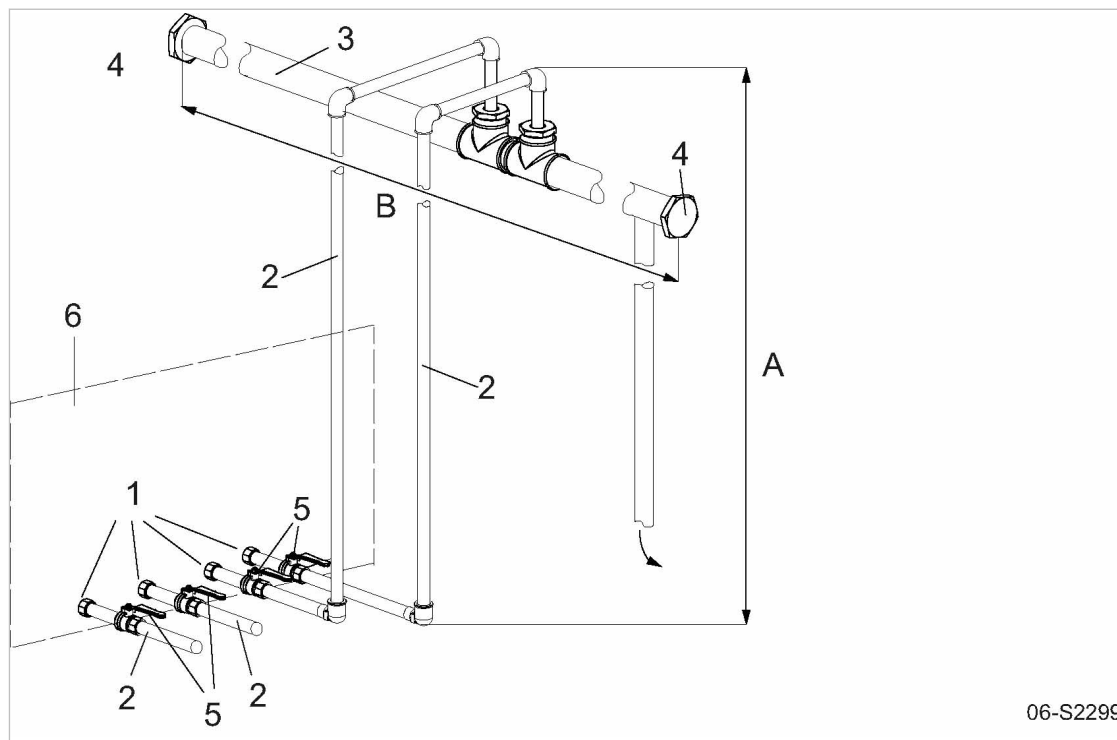
¹⁾ For longer lengths, please contact KAESER before installation.

Tab. 32 Condensate collecting line

Compressed air flow rate ¹⁾ [cfm]	Line cross-section ["]
<350	3/4
350 – 700	1
701 – 1400	1 1/2
>1400	2

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

Tab. 33 Condensate collecting line: Line cross-section



06-S2299

Fig. 20 Connecting the condensate drain

- | | |
|------------------------------|--|
| ① Threaded connection | ⑤ Shut-off valve |
| ② Condensate line | ⑥ Machine |
| ③ Condensate collecting line | Ⓐ Delivery head |
| ④ Screw plug | Ⓑ Length of the condensate collecting line |

Depending on the machine model, you may have two or more condensate drains.

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



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

Further information The dimensional drawing in chapter 13.2 provides the size and position of the connection port.

6.7 Options

6.7.1 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 13.2.

7 Initial Start-up

7.1 Ensuring safety

Follow the instructions below for safe commissioning of the machine.
Warning instructions are located before a potentially dangerous task.



Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

- Follow the instructions in chapter 3 “Safety and Responsibility”.
- Commissioning tasks may only be carried out by authorized personnel!
- Make sure that no one is working on the machine.
- Ensure that all service doors and panels are locked.

When working on live components

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

- Work on electrical equipment may only be carried out by authorized electricians.
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- Check that there is no voltage on floating relay contacts.

When working on the compressed air system

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

- Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- Depressurize all pressurized components and enclosures.
- Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
- Do not open or dismantle any valves.

When working on the drive system

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

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

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

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

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

7.2 Instructions to be observed before commissioning

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

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

Special measures for re-commissioning after storage

Storage longer than	Measure
12 months	<ul style="list-style-type: none"> ➤ Change the oil filter. ➤ Change the gearbox oil.
36 months	<ul style="list-style-type: none"> ➤ Have the overall technical condition checked by an authorized KAESER service representative.

Tab. 34 Re-commissioning after storage

7.3 Checking installation and operating conditions

- Check and confirm all the items of the checklist before commissioning the machine:

To be checked	See chapter	Confirmed?
➤ Are the operators fully familiar with safety regulations?	—	
➤ Has all packaging material been removed after the transport?	—	
➤ Have all the installation conditions been fulfilled?	5	
➤ Is a user-supplied lockable power supply disconnecting device installed?	6.4	
➤ Does the existing power supply voltage and frequency conform to the specifications on the nameplate?	2.1	
➤ Are the tolerance limits of the power supply within the permissible tolerance limits of the rated machine voltage? (see nameplate in the control cabinet)	13.3	
➤ Are the power supply cable cross sections and fuse ratings adequate?	2.14	
➤ Have all electrical connections been checked for tightness?	—	
➤ Has the inspection been repeated after 50 operating hours following the initial commissioning?		
➤ Is a shut-off valve fitted to the compressed air outlet?	6.3	
➤ Has the connection to the air network been made with a hose or compensator?	6.3	
➤ Is the drive motor overload protection switch set according to the power supply voltage?	7.4	
➤ Is the motor overload protection switch set correctly according to the power supply voltage?	7.5	
➤ Is there sufficient cooling oil in the gearbox oil pan? (Cooling oil in the upper half of the oil sight glass)	10.14	

To be checked	See chapter	Confirmed?
➤ Is the machine firmly anchored to the floor? (Option H1)	4.5.2	
➤ Has the direction of rotation been checked?	7.6	
➤ Are all access doors closed and latched and removable panels in place and secured?	—	

Tab. 35 Installation conditions checklist

7.4 Setting the overload protection relay

Electrical diagram 13.3 gives the location of the overload protection relay.

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

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

- Check the overload protection relay setting.



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

- Contact an authorized KAESER SERVICE representative.

7.5 Setting the motor overload protection relay

In direct online starting, the current for the fan motor is fed via the motor overload protection switch.

To prevent the overload protection switch from being triggered by voltage fluctuations, temperature influences or component tolerances, the setting can be higher than the motor rated current (see motor nameplate).

- Check the motor overload protection switch setting.



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

- Contact an authorized KAESER SERVICE representative.

7.6 Checking the direction of rotation

The machine is designed for a clockwise phase sequence.

Material Phase sequence indicator

1. Verify the direction of phase rotation by means of the phase sequence meter at the machine supply lines.
2. If the direction of rotation (counter-clockwise phase rotation) is incorrect, change the machine supply lines L1 and L2.



If you do not have access to a phase sequence indicator:

- Arrange for the phase sequence to be checked by an authorized KAESER service representative.

7.7 Starting the machine for the first time

Precondition No personnel are working on the machine.
 All access doors are closed.
 All removable panels 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 voltage* LED is lit continuously.
3. If required:
 Change the display language as described in chapter 7.8.
4. Press the «ON» key.
 The drive motor runs up and after a short time the machine switches to LOAD and delivers compressed air.



- Watch for any faults occurring in the first hour of operation.
- Check the oil level when the compressor is running, as described in chapter 10.14.
- After the first 50 operating hours, check all electrical connections and tighten where necessary.



- Does the machine stop when the compressor motor rotates in the wrong direction?
- Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
 - Change the machine supply phases L1 and L2.

7.8 Setting the display language

The controller can display text messages in several languages.

You can set the language for texts on the display. This setting will be retained even when the machine is switched off.

1. In operating mode, switch to the main menu with the «Enter» key.
2. Press the «UP» or «DOWN» keys until the current language is shown as active line (inverse):

88 psig	176° F	
de-DE Deutsch		Current language (active line)
▶1 xxxxxxxxxx		Submenu
▶2 xxxxxxxxxx		Submenu
▶3 xxxxxxxxxx		Submenu
▶4 xxxxxxxxxx		Submenu
▶5 xxxxxxxxxx		Submenu
▶6 xxxxxxxxxx		Submenu

3. Use the «Enter» key to switch to setting mode.
 The language display flashes.
4. Move to the required language with «UP» or «DOWN» keys.
5. Confirm the setting with the «Enter» key.

Result	The display texts are now in the selected language.
Further information	Detailed information can be found in the SIGMA CONTROL 2 operating manual.

7.9 Setting the set point pressure

The system pressure pA is factory set to the highest possible value.
Adjustment is necessary for individual operating conditions.



- Do not set the set point pressure of the machine higher than the maximum working pressure of the compressed air system.
- The machine may not switch 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 (pressure range).
 - Add a larger air receiver downstream to increase buffer capacity.
- Set the set point pressure as described in the SIGMA CONTROL 2 operating manual.

7.10 Option H23 Hot air outlet with regulation

Option H23 causes the T4 discharge temperature of the second stage airend to raise when the bypass to circumvent the heat exchanger of the first stage airend is (partially) opened.
The adjustable target value T4w affects the actual value T4 using the valve V32.



- For reasons of efficiency, you should set the T4w value only to a value as it is required for the downstream process to ensure that the hotter air can be used at the hot air connection. The compressor's power consumption will (slightly) raise when the bypass is opened.

Precondition T4w is evaluated only when the AUTO operating mode is set.

1. Select AUTO operating mode for the valve V32 in SIGMA CONTROL 2 if a different operating mode is set.
2. Enter the target value for T4w in SIGMA CONTROL 2.



- The temperature can be increased only to a value that assures the safe operation of the compressor. This may cause the bypass to not fully open even when the target value T4 is smaller than the target value T4w.
- Because the discharge temperature depends on various operating parameters, it may be higher than the set target value.

Further information See the SIGMA CONTROL 2 user manual for the various operating modes for the valve V32.

8 Operation

8.1 Switching on and off

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

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

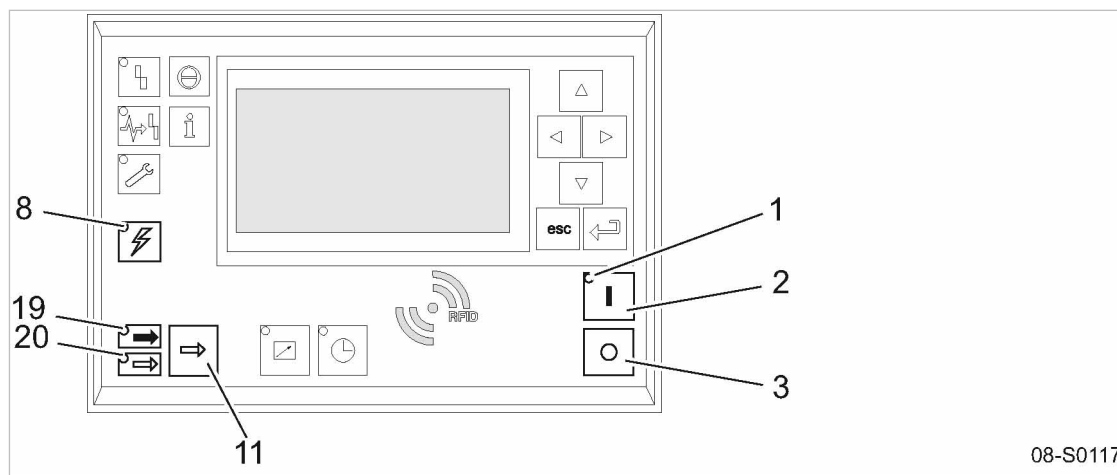


Fig. 21 Switching on and off

- | | |
|---|--------------------------|
| ① <i>Machine ON</i> LED (green) | ⑪ «LOAD/IDLE» toggle key |
| ② «ON» key | ⑲ <i>LOAD</i> LED |
| ③ «OFF» key | ⑳ <i>IDLE</i> LED |
| ⑧ <i>Controller voltage</i> LED (green) | |

8.1.1 Switching on

Precondition No personnel are working on the machine.
 All access doors and panels are closed and secure.
 The machine temperature has reached at least 37°F.

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



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

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

8.1.2 Switching off

An automatic shut-down process is started as soon as you push «OFF» at the machine. During this process, the *Machine ON* LED flashes and the display shows the message *Stopping*. The machine is shut-down only after the *Machine ON* LED has extinguished. It is in ready mode and can be re-activated at any time.

Certain components, such as the fan motors, remain active during the automatic shut-down process.

1. Press the «OFF» key once.

The *Machine ON* LED flashes.



In rare cases, you may want to shut down the machine immediately and cannot wait until the automatic shut-down process is finished.

- Press «OFF» once again.

2. After the *Machine ON* LED is extinguished, switch off and lock out the power supply disconnecting device.

The machine is switched off and disconnected from the power supply. The *Controller voltage* LED extinguishes.

3. After the complete shut-down, disconnect the machine from the compressed air network (close the user's shut-off valve).

8.2 Switching off in an emergency and switching on again

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

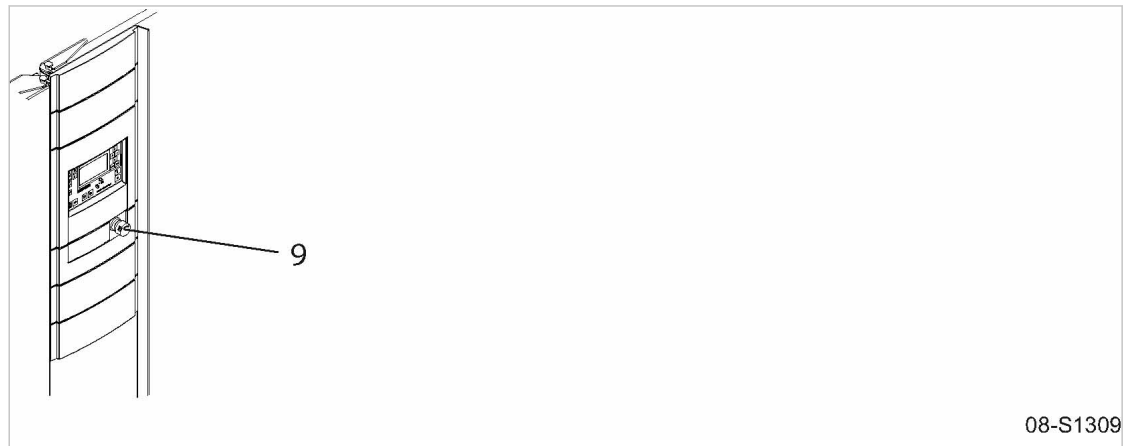


Fig. 22 Switching off in an emergency

- ⑨ EMERGENCY STOP push-button

Switching off

- Press the EMERGENCY STOP push-button.

The EMERGENCY STOP button remains latched after actuation.

The compressor's pressure system is vented and the machine is prevented from automatically restarting.

Switching on

Precondition The fault has been rectified

1. Turn the EMERGENCY STOP push-button in the direction of the arrow to unlatch it.
2. Acknowledge any existing alarm messages.
The machine can now be started.

8.3 Switching on and off from a remote control center

Precondition A link to the remote control center exists.

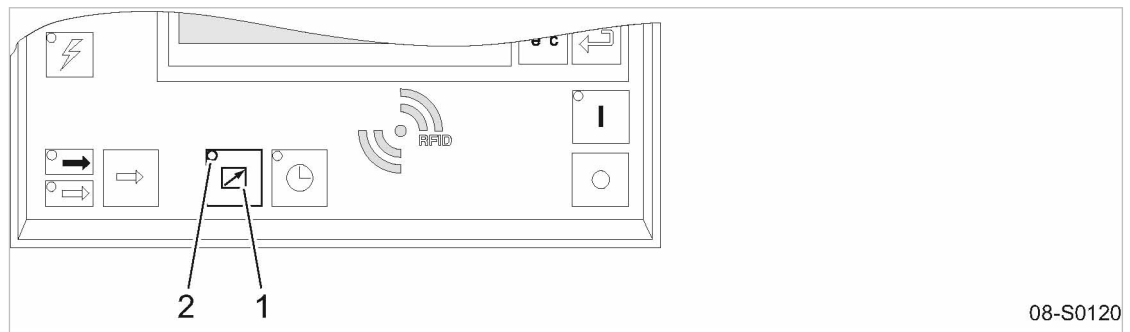


Fig. 23 Switching on and off from a remote control center

- ① «Remote control» key
- ② *Remote control*/LED

1. Attach an easily seen notice to the machine that warns of remote operation.

⚠ WARNING

Remote control: Danger of unexpected starting!

- Make sure the power supply disconnecting device is switched off before commencing any work on the machine.

Tab. 36 Machine identification

2. Label the starting device in the remote control center as follows:

⚠ WARNING

Remote control: Danger of unexpected starting!

- Before starting, make sure that no one is working on the machine and that it can be safely started.

Tab. 37 Remote control identification

3. Press the «Remote control» key.
The *Remote control*/LED lights. The machine can be remotely controlled.

8.4 Switching on and off with the shift clock

Precondition The shift clock is programmed.

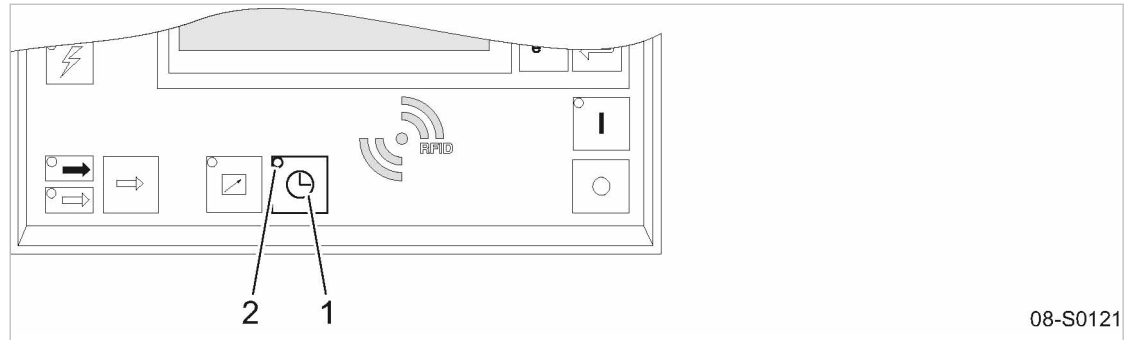


Fig. 24 Switching on and off with the shift clock

- ① «Shift clock» key
- ② *Shift clock* LED

1. Attach an easily seen notice warning of time-controlled operation:

⚠ WARNING

Time control: Danger of unexpected starting!

➤ Make sure the power supply disconnecting device is switched off before commencing any work on the machine.

Tab. 38 Machine identification

2. Press «Shift clock».
- The *shift clock* LED lights. The machine is switched on and off via the shift clock.

8.5 Interpreting operation messages

The controller will automatically display operation messages informing you about the current operational state of the machine.

Operating messages are identified with the letter O.

Further information Detailed information can be found in the SIGMA CONTROL 2 operating manual.

8.6 Acknowledging alarm and warning messages

Messages are displayed on the "new value" principle:

- Message coming LED flashes
- Message acknowledged: LED illuminates
- Message going: LED off

or

- Message coming LED flashes
- Message going: LED flashes
- Message acknowledged: LED off

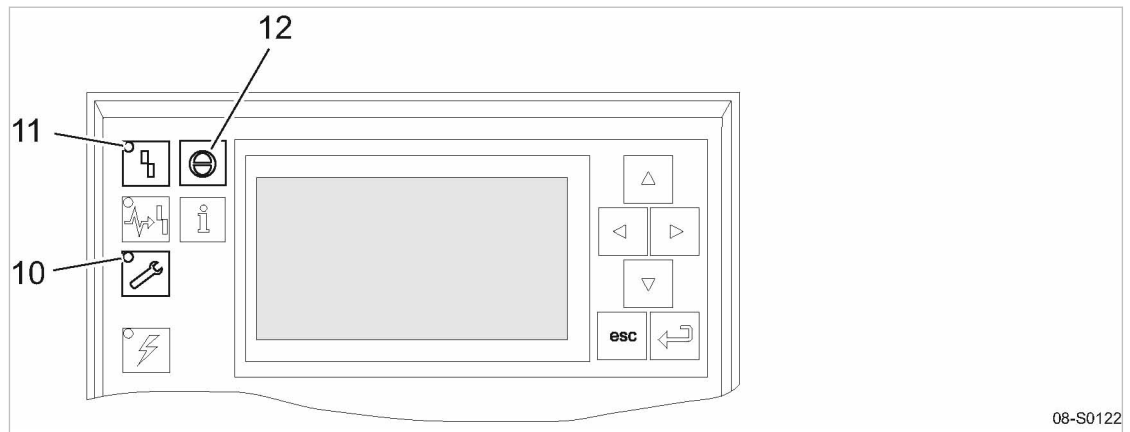


Fig. 25 Acknowledging messages

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

Alarm message

An alarm shuts the machine down automatically. The red *Alarm* LED flashes.
The system displays the appropriate message.

Precondition The fault has been rectified

- Acknowledge the message with the «Acknowledge» key.
Alarm LED extinguishes.
The machine is ready for operation again.



If the machine was switched off with the EMERGENCY STOP button:

- Unlatch the EMERGENCY STOP button (turn in direction of the arrow) before acknowledging the alarm message.

Further information A list of possible alarm messages occurring during operation can be found in the service manual SIGMA CONTROL 2.

Warning message

If maintenance work is to be carried out or if the warning is displayed before an alarm, the yellow *Warning* LED flashes.

The system displays the appropriate message.

Precondition The danger of an alarm is eliminated.
Maintenance has been carried out

- Acknowledge the message with the «Acknowledge» key.
The *Warning* LED extinguishes.

Further information A list of possible alarm messages occurring during operation can be found in the service manual SIGMA CONTROL 2.

9 Fault Recognition and Rectification

9.1 Basic instructions

There are three types of fault:

- Warning:
 - Warning messages *W*
- Fault (with indication):
 - Alarm messages *A*
 - System messages *Y*
 - Diagnostic messages *D*
- Other faults (without indication): see chapter 9.2

The output of messages depends on the individual equipment fitted to the machine.

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

Further information Detailed information for the various messages can be found in the service manual for the SIGMA CONTROL 2.

9.2 Other faults

Fault	Possible cause	Remedy
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	Contact an authorized KAESER service representative.
	Venting valve not closing.	Contact an authorized KAESER service representative.
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose connections.
	Air consumption is greater than the capacity of the compressor.	Check the air system for leaks. Shut down consumer(s).
	IDLE key is pressed	Press the IDLE key once again.
Compressor switches between LOAD and IDLE more than twice per minute.	Air receiver too small.	Increase size of receiver.
	Airflow into the compressed air network restricted.	Increase air pipe diameters. Check filter elements.
	The differential between cut-in and cut-out pressure (pressure range) is too small.	Check switching differential (pressure range). Have the pressure transducer installed. Request an authorized KAESER SERVICE representative to assess the mounting position of the external pressure transducer.

Fault	Possible cause	Remedy
Cooling oil leaking into the machine.	Leaking pipe joints.	Tighten pipe joints. Replace seals.
	Heat exchanger for cooling oil leaks.	Contact an authorized KAESER service representative.
Cooling oil leaking next to the fine filter.	Solenoid valve defective.	Replace the solenoid valve.
	Vacuum intake nozzle clogged.	Clean the vacuum intake nozzle.
	Fine filter clogged.	Replace the filter element.
	Main pressure p5 too low during operation.	Contact an authorized KAESER service representative.
Cooling oil in the exhaust ducting.	Solenoid valve defective.	Contact an authorized KAESER service representative.
	Ultra-fine filter defective.	

Tab. 39 Other faults and remedies

10 Maintenance

10.1 Ensuring safety

Follow the instructions below to ensure safe machine maintenance.

Warning instructions are located before a potentially dangerous task.





Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Ignoring safety warnings can cause unforeseeable dangers!

- Follow the instructions in chapter 3 "Safety and Responsibility".
- Maintenance work may only be performed by authorized personnel!
- Use one of the safety signs below to advise others that the machine is currently being serviced:

Symbol	Meaning
	Do not activate the machine.
	Warning: The machine is being serviced.

Tab. 40 Advise others that the machine is being serviced

- Before switching on, make sure that nobody is working on the machine and all access doors and panels are closed and locked.

When working on live components

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

- Work on electrical equipment may be carried out only by authorized electricians.
- Switch off and lock out/tag out the power supply disconnecting device and verify the absence of any voltage.
- Check that there is no voltage on the floating relay contacts.

When working on the compressed air system

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

- Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.
- Depressurize all pressurized components and enclosures.
- Check all machine hose connectors with a clean handheld pressure gauge to ensure that all read 0 psig. Ensure that no oil will escape from the pressure gauge into the compressed air system during this procedure!
- Do not open or dismantle any valves.

When working on the drive system

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

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

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

Further information Information regarding authorized personnel can be found in chapter 3.4.2.
Details of dangers and their avoidance can be found in chapter 3.5.

10.2 Maintenance schedule**10.2.1 Logging maintenance work**

The maintenance intervals given are those recommended for KAESER original components with average operating conditions.

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

Adverse conditions are, for example.:

- high temperatures
- a lot of dust
- high number of load changes
- low load

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

- Document all maintenance and service work.

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

Further information A prepared list is provided in chapter 10.21.

10.2.2 Resetting maintenance interval counters

According to the way a machine is equipped, sensors and/or maintenance interval counters monitor the operational state of important functional devices. Required maintenance work can be retrieved using SIGMA CONTROL 2.

Starting from a predefined starting value, maintenance counters count down the operating hours between two maintenance tasks.

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

Precondition Maintenance carried out,
warning message acknowledged
password level 2 activated.

1. Select the appropriate entry from the *<Maintenance>* menu.
2. Set "RESET" to "y" and confirm with «Enter».

Further information Detailed information can be found in the SIGMA CONTROL 2 operating manual.

10.2.3 Regular maintenance tasks

The table below gives an overview of the necessary maintenance tasks.

- Pay attention to maintenance messages on the controller and carry out maintenance work promptly, taking ambient and operating conditions into account:

Interval	Maintenance task	see chapter
Weekly	Check for leaks.	10.3
	Control cabinet: Check filter mats	10.5
	Ventilation: Check filter mats	10.6
	Option K3: Check filter mats	10.7
	Check the condensate drain.	10.19
Display: SIGMA CONTROL 2	Motor maintenance.	10.9
	Check the coupling.	10.10
Up to 6000 h At least annually	Check the cooling oil fill level.	10.14
	Control cabinet: Change the filter mats.	10.5
	Ventilation: Change the filter mats.	10.6
	Option K3: Change the filter mats.	10.7
	Carry out maintenance on the heat exchanger.	10.8
Up to 6000 h At least every 2 years	Condensate drain: Change the service UNIT.	10.19.3
Display: SIGMA CONTROL 2 Up to 6000 h At least every 2 years	Carry out air filter maintenance.	10.4
Display: SIGMA CONTROL 2 Maintenance intervals, see table 42	Gear: Change the cooling oil.	10.15
Display: SIGMA CONTROL 2 Up to 12000 h At least every 4 years	Gear: Change the oil filter.	10.16
Up to 12000 h At least every 4 years	Gear ventilation: Changing the filter element.	10.17
	Changing the control air filter.	10.20

h = operating hours

Interval	Maintenance task	see chapter
Annually	Check all electrical connections for tightness.	–
	Check the safety shut-down devices for safety-relevant temperatures.	10.11
	Check the safety relief valves.	10.13
	Check the EMERGENCY STOP push button.	10.12

h = operating hours

Tab. 41 Regular maintenance tasks

10.2.4 Cooling oil: Change interval

The number and duration of the change intervals depend on the following factors:

- the cooling oil used
- the loads on the machine
- the ambient conditions.



The values specified in the following table are guide values and can be exceeded or fallen below depending on the individual circumstances.

- Call the authorized KAESER service representative every 3,000 operating hours to have an accompanying analysis of the cooling oil in the gear carried out.

SIGMA FLUID	Maximum permissible oil change interval [operating hours/years]
FG-460 / FG-680	6000/2
G-460 / G-680	12000/4

Tab. 42 Cooling oil: Change intervals

10.2.5 Regular maintenance tasks

The table below lists necessary maintenance tasks.

- Have an authorized KAESER service representative carry out service tasks.
- Always perform maintenance tasks promptly, taking ambient and operating conditions into account:

Interval	Maintenance task
Up to 6000 h At least every 2 years	Service check valve at condensate drain stage 1
Up to 12000 h At least every 4 years	Service the following valves: <ul style="list-style-type: none"> ■ Check valve at pulsation dampener ■ Overflow valve

h = operating hours

Interval	Maintenance task
Up to 18000 h At least every 6 years	Service the following valves: <ul style="list-style-type: none"> ■ Inlet valve ■ Solenoid valve ■ Combination valve (oil temperature regulator) ■ Pressure control valve ■ Check valve at condensate drain stage 2
Up to 18000 h At least every 4 years	Fan motor: Replace anti-friction bearings with permanent lubrication.
Up to 36000 h At least every 6 years	Replace plastic piping and hose lines.
Up to 36000 h At least every 8 years	Compressor motor: Replace the anti-friction bearing. Fan motor: Replace anti-friction bearings with re-greasing device.
At least every 20 years	Replace safety-relevant components of the safety functions (see chapter 3.7).
h = operating hours	

Tab. 43 Regular service tasks

10.3 Checking the machine for leaks

Leaking connecting points result in the loss of operating materials or compressed air.

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



Small leakages at the openings of the gas drains are permissible.

- Inspect the following parts for leakage:
 - Oil system
 - Air system
 - Primary and secondary water system (if available)



The machine leaks?

- Contact an authorized KAESER service representative.

10.4 Air filter maintenance

The air filter is enveloped in a fleece prefilter. The prefilter prevents coarse dust from entering the air filter in order to increase its service life.



If the warning message 0113 is displayed on the SIGMA CONTROL 2, change the prefilter at the earliest opportunity (see Chapter 10.4.1).
Change the cooling air filter mats (if present) at the same time (see Chapter 10.7).



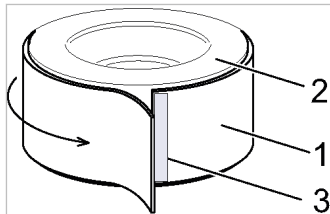
If the warning message *0013* or fault message *0114* is displayed, change the air filter together with the prefilter (see Chapter 10.4.2).
 Change the cooling air filter mats (if present) at the same time (see Chapter 10.7).

Precondition The power supply disconnecting device is switched off (all poles),
 lock out and tag out the device,
 the absence of any voltage is verified.
 The machine has cooled down.

- Replacing the prefilter (see chapter 10.4.1).
- Replacing the air filter (see chapter 10.4.2).

10.4.1 Replacing the prefilter

Material Prefilter



10-S004077

Fig. 26 Replacing the prefilter

- ① Prefilter
- ② Air filter
- ③ Hook and loop tape

1. Remove the air filter ② as described in chapter 10.4.2.
2. Clean all parts and sealing surfaces.
3. Remove the contaminated prefilter ① from the air filter.
4. Wrap the new prefilter around the air filter ② with the printed side facing inwards and seal it with hook and loop tape ③.



The prefilter must completely cover the filter material of the air filter.

5. Install the air filter ② as described in chapter 10.4.2.
6. Switch on the power supply disconnecting device and confirm the replacement of the prefilter in the *<Maintenance – Air filter>* menu of the controller.
 The maintenance message is acknowledged.

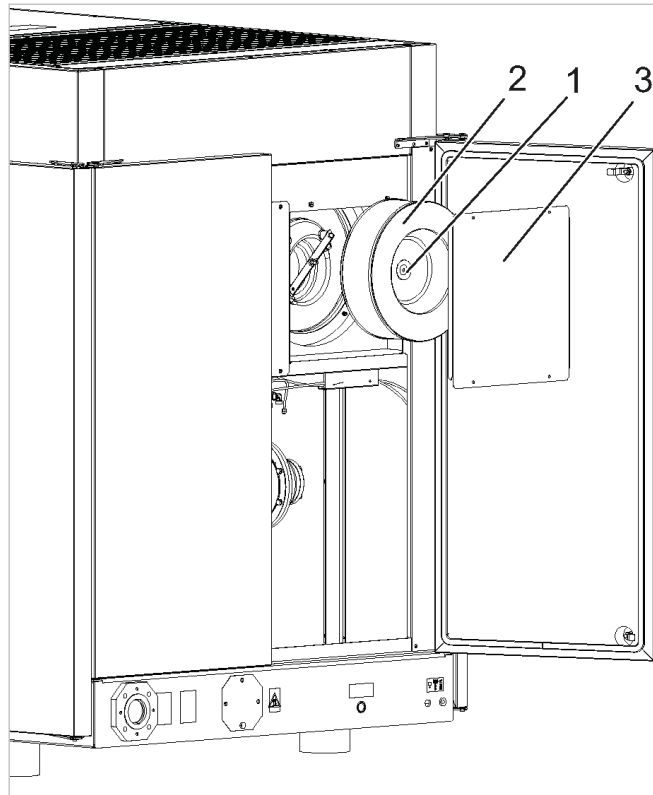
10.4.2 Replacing the air filter



Check that all sealing surfaces are matching. The use of unsuitable air filters can permit dirt to enter the pressure system, thus causing damage to the machine.

Do not clean the air filter. A damaged air filter can permit dirt to enter the pressure system and cause damage to the machine.

Material Air filter (incl. prefilter)



10-S1320

Fig. 27 Replacing the air filter (incl. prefilter)

- ① Wing nut
- ② Air filter
- ③ Cover

1. Open snap fasteners (90° rotation) and remove cover ③.
2. Unscrew the wing nut ① and remove the air filter ② together with the affixed prefilter. Dispose of the unit in accordance with environmental regulations.
3. Clean all parts and sealing surfaces.
4. Insert the new air filter including the affixed prefilter into the housing and fasten in place with the wing nut ①.
5. Screw down the cover ③.
6. Close all maintenance doors and refit all removable panels.
7. Switch on the power supply disconnecting device and reset the maintenance counter.

10.5 Control cabinet: Clean or renew the 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
New filter mat (as required)
- Precondition** The power supply disconnecting device is switched off,
the device is locked off,
the absence of any voltage has been verified.
The machine has cooled down.

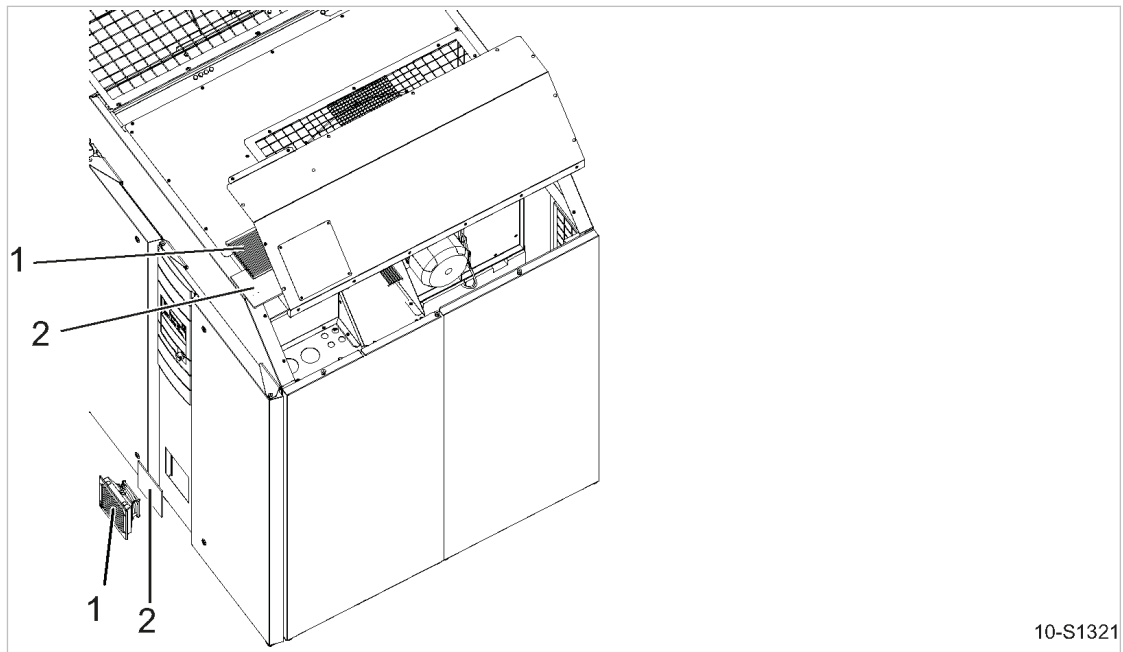


Fig. 28 Control cabinet ventilation grill

- ① Ventilation grill
- ② Filter mat

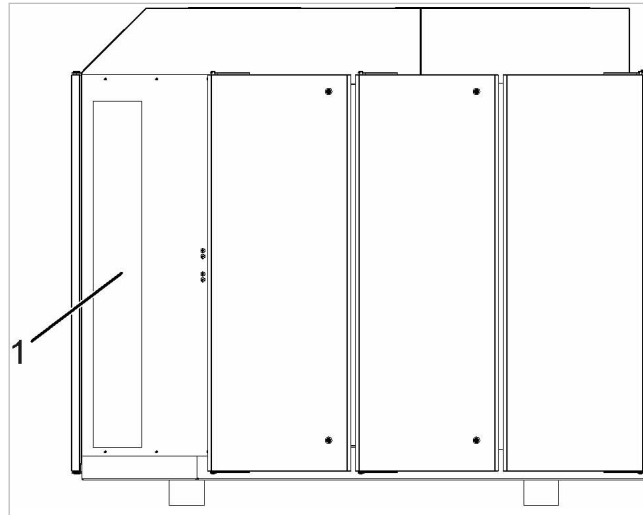
1. Carefully remove the ventilation grill ① and take out the filter mat ②.
2. Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent.
3. Change the filter mat if cleaning is not possible or if the change interval has expired.
4. Lay the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

10.6 Machine ventilation: Clean or replace the filter mats

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

In order to increase their effectiveness, a coarser filter mat is placed upstream of a finer filter mat.

Material	Warm water with household detergent Spare parts (as required)
Precondition	The power supply disconnecting device is switched off, the device is locked off, the absence of any voltage has been verified, the machine has cooled down.



10-S1322

Fig. 29 Cleaning the filter mats

① Filter mats

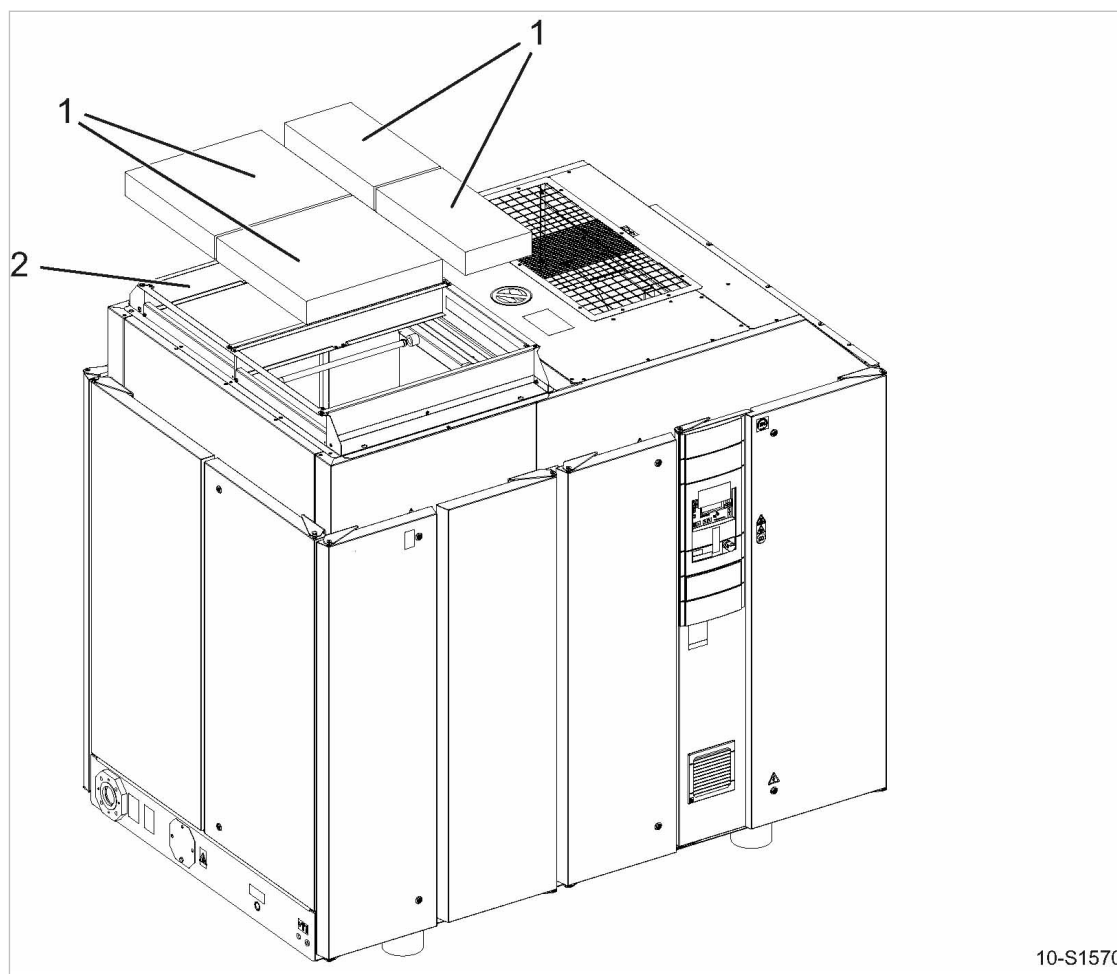
1. Carefully remove the ventilation grill and take out the filter mat.
2. Beat the mat or use a vacuum cleaner to remove the loose dirt. If necessary, wash with luke-warm water and household detergent.
3. Replace the filter mats if cleaning is not possible or if the change interval has expired.
4. Insert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

10.7 Option K3

Replacing the cooling air filter mats

In a machine without an exhaust air duct, you can remove the cooling air filter mats from the top of the holding frame. If an exhaust air duct is installed, you can pull them sideways from the holding frame.

Material	Spare parts (as required)
Precondition	The machine is switched off.

Replacing the cooling air filter mats from the top

10-S1570

Fig. 30 Replacing the cooling air filter mats (from the top)

- ① Cooling-air filter mats
- ② Retaining frame for cooling air filter mats

1. Pull the cooling air filter mats from the top out of the holding frame and dispose appropriately.
2. Place new cooling air filter mats from above into the retaining frame.

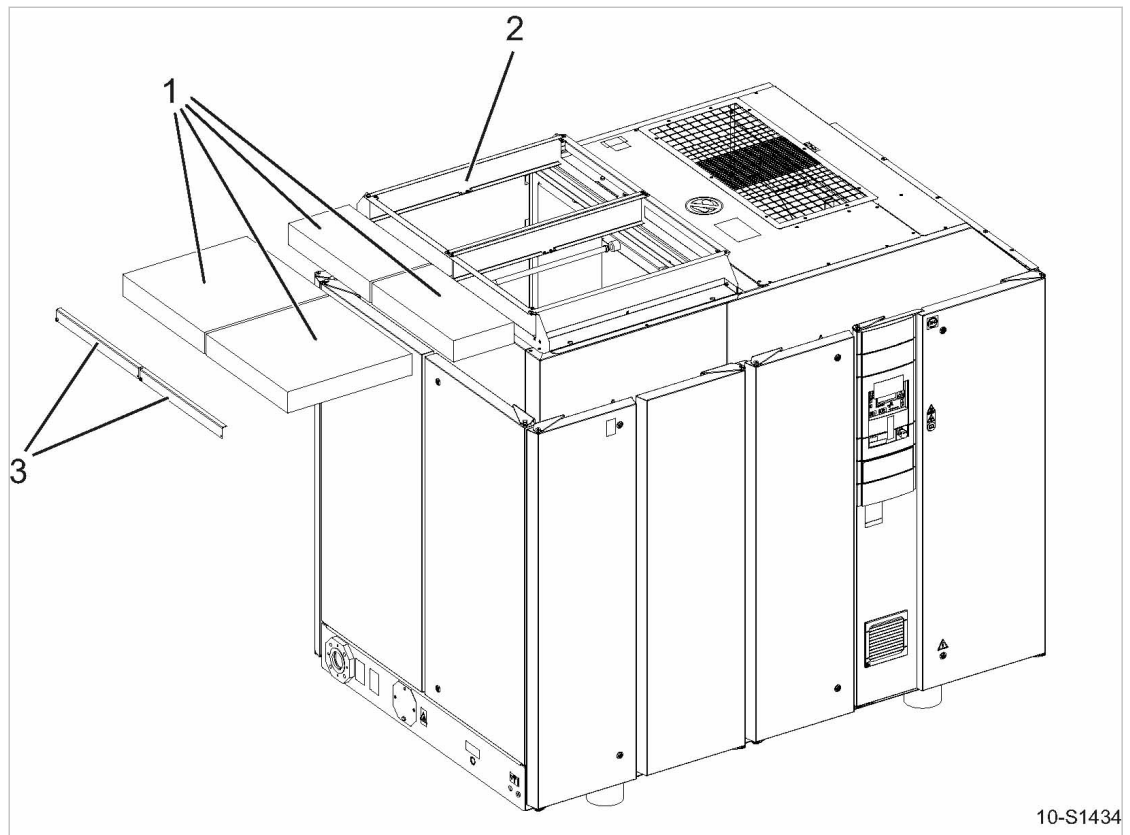
Replacing the cooling air filter mats from the side

Fig. 31 Replacing the cooling air filter mats (from the side)

- ① Cooling-air filter mats
- ② Retaining frame for cooling air filter mats
- ③ Metal sheets to be removed for a removal of the cooling air filter mats from the side

1. Undo the screws ③ and remove the metal sheets.
2. Pull the cooling air filter mats from the side out of the holding frame and dispose appropriately.
3. Place new cooling air filter mats sideways into the holding frame.
4. Replace the metal sheets and tighten the screws.

10.8 Cleaning the heat exchangers

Regularly clean the heat exchanger. This ensures reliable cooling of the machine and the compressed air. The frequency is mainly dependent on local operating conditions.

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

Material Brush and vacuum cleaner
Face mask (as required)

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

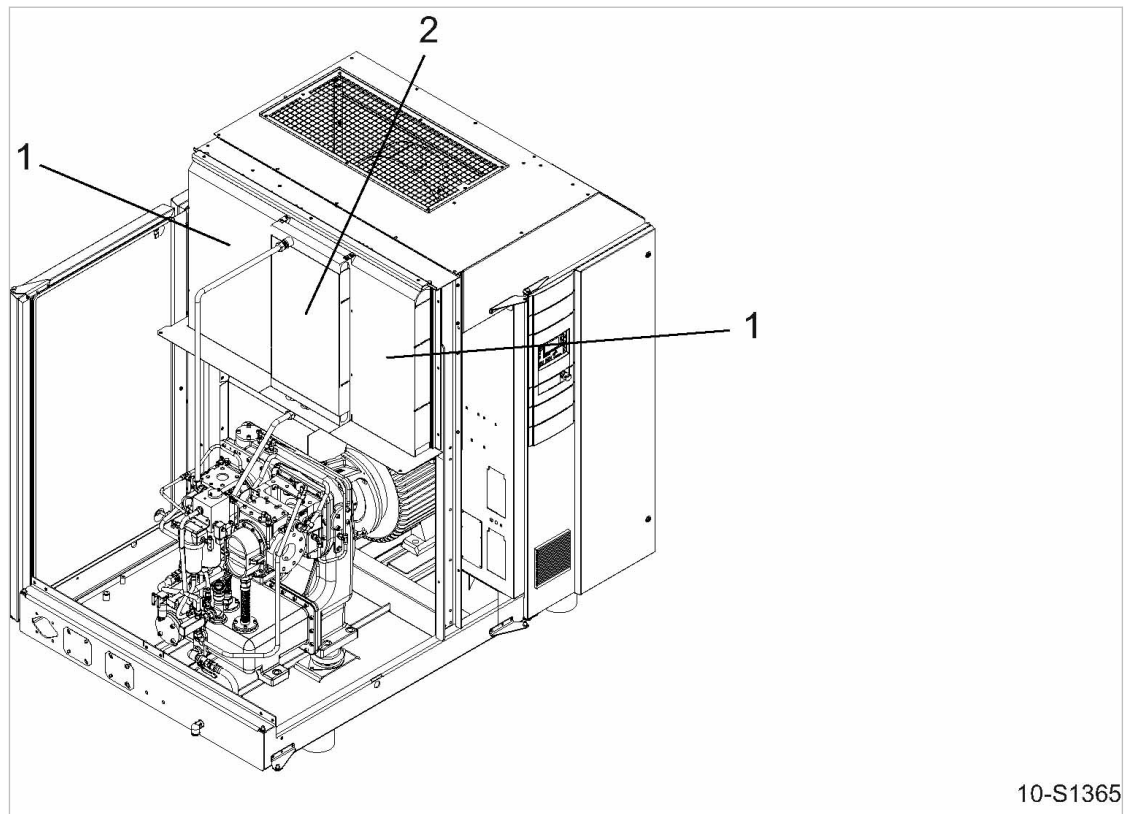


Fig. 32 Cleaning the heat exchanger

- ① Heat exchanger (air cooling)
- ② Heat exchanger (oil cooling)

Cleaning the heat exchangers

Do not use sharp objects to clean the heat exchangers. They could be damaged.

Avoid creating clouds of dust.

- Dry brush the heat exchanger and use a vacuum cleaner to suck up the dirt.



The heat exchanger can no longer be properly cleaned?

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

Checking the heat exchanger for leaks

- Carry out visual inspection: Did cooling oil escape?



Is the heat exchanger leaking?

- Immediately have the defective heat exchanger repaired by an authorized KAESER service representative.

10.9 Motor maintenance

The compressor motor as well as the fan motor are equipped with anti-friction bearings with re-greasing facility, the grease fittings are located on the outside of the machine. The grease lines are filled at the factory.



- Use only the high temperature grease UNIREX N3 for the anti-friction bearings. Damage to bearings caused by the use of other brands of grease is excluded from the warranty.
- The required grease quantity is shown in the tables in chapter 2.11.

Material Bearing grease: UNIREX N3
 Cleaning cloth

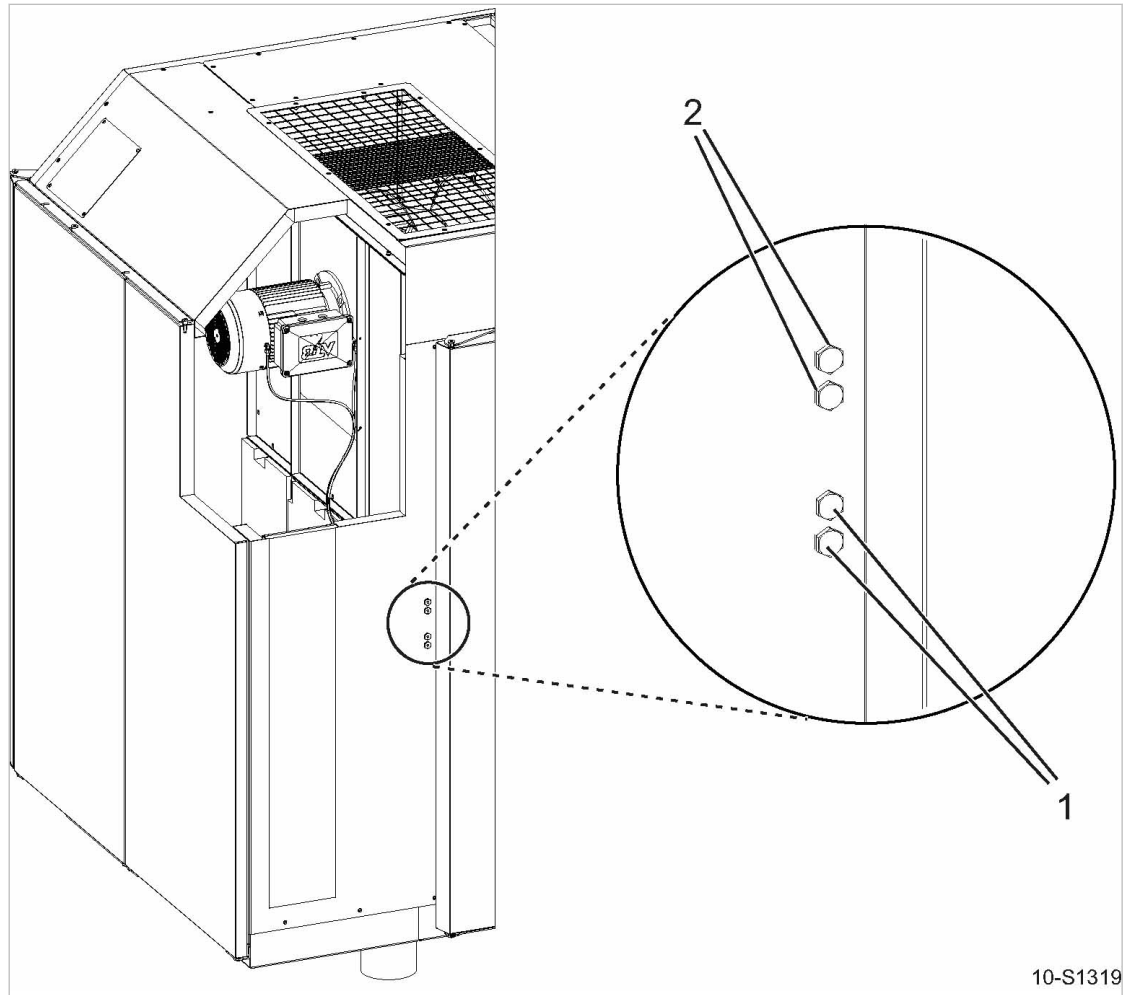


Fig. 33 Motor maintenance

- ① Grease fitting (compressor motor)
- ② Grease fitting (fan motor)

Compressor motor:

Precondition Motor running

1. Clean the grease fittings ① with a cloth before greasing.
2. Grease both anti-friction bearings with a grease gun.
3. Reset the maintenance counter.

Fan motor:

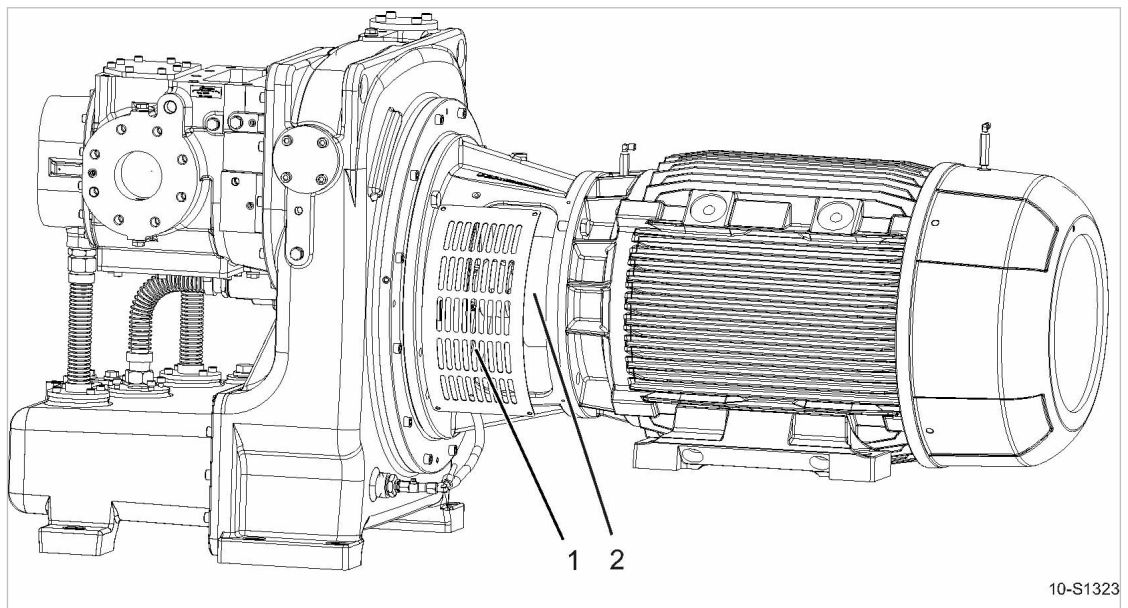
Precondition Fan motor running

1. Clean the grease fittings ② with a cloth before greasing.
2. Grease both anti-friction bearings with a grease gun.
3. Reset the maintenance counter.

10.10 Checking the coupling

A defective coupling is recognizable by:

- noisy running
- surface cracks
- color change.



10-S1323

Fig. 34 Checking the coupling

- ① Safety screen
- ② Coupling

Checking for uneven or noisy running

Precondition The machine runs in IDLE as much as possible, in order to keep a low noise level.

1. **⚠ WARNING** *Danger of injury from rotating coupling!*
 - *Never switch the machine on without the safety screen in place over the coupling.*
2. **⚠ WARNING** *Hearing damage due to loud operating noise!*
 - *Always wear ear protection.*
3. Visually check the coupling for uneven running.

Visually check for damages

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

1. Remove the securing screws and take off the safety screen.
2. Turn the coupling my hand and look for damage or color change.
3. Refit the safety screen.
4. Close all access doors and replace all enclosure panels.



Does the coupling have cracks or changes in color?

- Have a damaged coupling changed by an authorized KAESER service representative.

10.11 Checking the overheating safety shut-down function

The machine is designed to automatically switch off when reaching defined temperature thresholds.

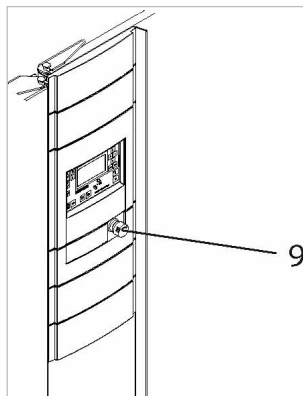
- Check the safety shut-down function as described in the SIGMA CONTROL 2 manual.



The machine does not shut down?

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

10.12 Check the EMERGENCY STOP push button



08-S1309

Fig. 35 Check the EMERGENCY STOP push button

⑨ EMERGENCY STOP push button

Precondition The compressor motor is running

1. Press the EMERGENCY STOP push button.
The compressor motor stops, the pressure system is vented, and the machine is prevented from automatically restarting.



The compressor motor does not stop?

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

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

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

10.13 Testing the safety relief valves



Never operate the machine without a correctly functioning safety relief valve.

The safety relief valves for both airends can be externally tested at a suitable test stand.

The safety relief valve of the second stage airend can also be checked internally for its functionality using a detailed description of the procedure in the SIGMA CONTROL 2 controller operating manual.



Perform an internal inspection only in the following situations:

- All pressure lines including the shut-off valves installed by the user, are suitable for the combinations of temperature and pressure that will occur.
- The machine can be disconnected from the air distribution network directly at the compressed air outlet.
- The electrical connection of the machine has been designed in such a manner that the increased power consumption in test mode does not overload the connection.

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

- Follow the detailed description of the internal function test as described in the SIGMA CONTROL 2 operating manual.

Precondition The machine is switched off.
Password access level 2 is activated through the controller.

1. **⚠ WARNING** *The safety relief valve may blow off at any time!
Excessive noise is caused when the safety relief valve blows off!
There is danger of injury from bursting components and compressed air.*
 - Close all access doors, replace and secure all removable panels.
 - Wear ear and eye protection.
2. Close all of the user's shut-off valves between the machine and the air distribution network.
3. Read the activating pressure on the valve.
(The activating pressure is usually to be found at the end of the part identification.)
4. Observe the display of pressure on SIGMA CONTROL 2 and call up the test function.
5. End the test as soon as the safety relief valve blows off or working pressure rises 10% above the activating pressure of the safety relief valve.
6. If necessary, vent the machine and replace the defective safety relief valve.
7. Deactivate the test function.
8. Open the user's shut-off valve between the machine and the air distribution network.

10.14 Checking cooling oil level and replenishing cooling oil (gear)

The cooling oil level must be visible in the upper half of the oil sight glass when the machine is running.

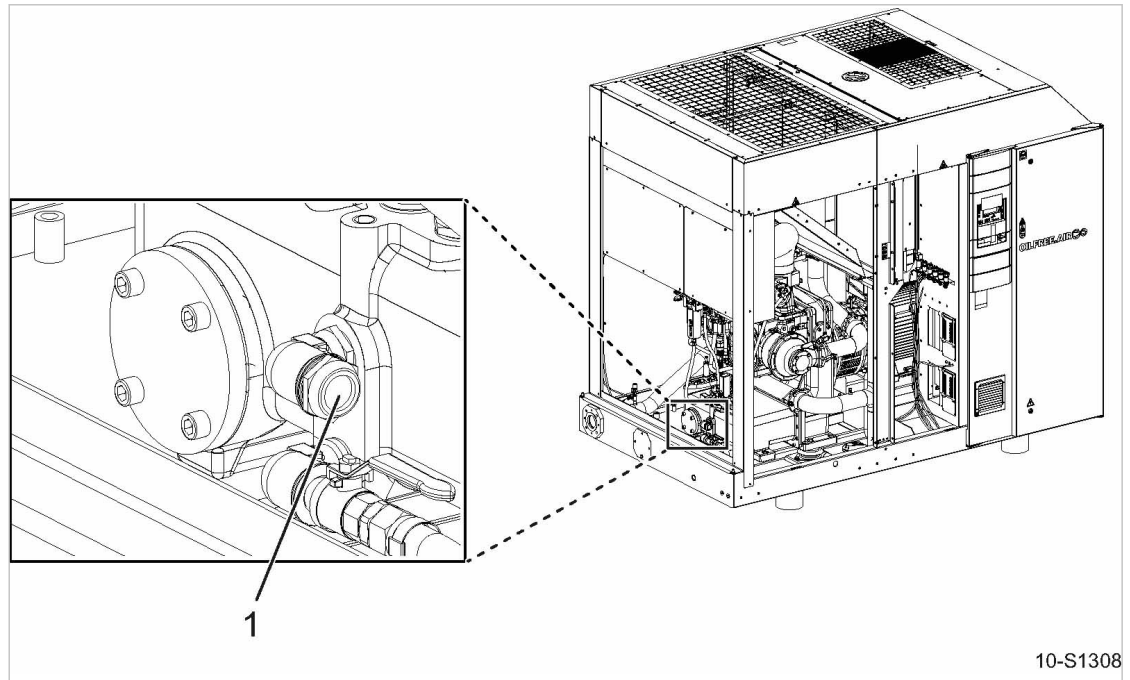


If possible, check the cooling oil level when the machine is in Idle mode!

⚠ WARNING

*High noise level when doors are open!
Risk of hearing damage.*

➤ *Always wear ear protection.*



10-S1308

Fig. 36 Checking the cooling oil level

① Oil sight glass

Checking the cooling oil level

1. **⚠ WARNING** *Danger of burning - hot surfaces!*
➤ *Never touch the surface of the machine when checking the cooling oil level*
2. Open the doors when the machine is running, if possible in IDLE.
3. Read the cooling oil level (use a flashlight, if necessary).
4. If the cooling oil level has dropped to the center of the sight glass, replenish the cooling oil.



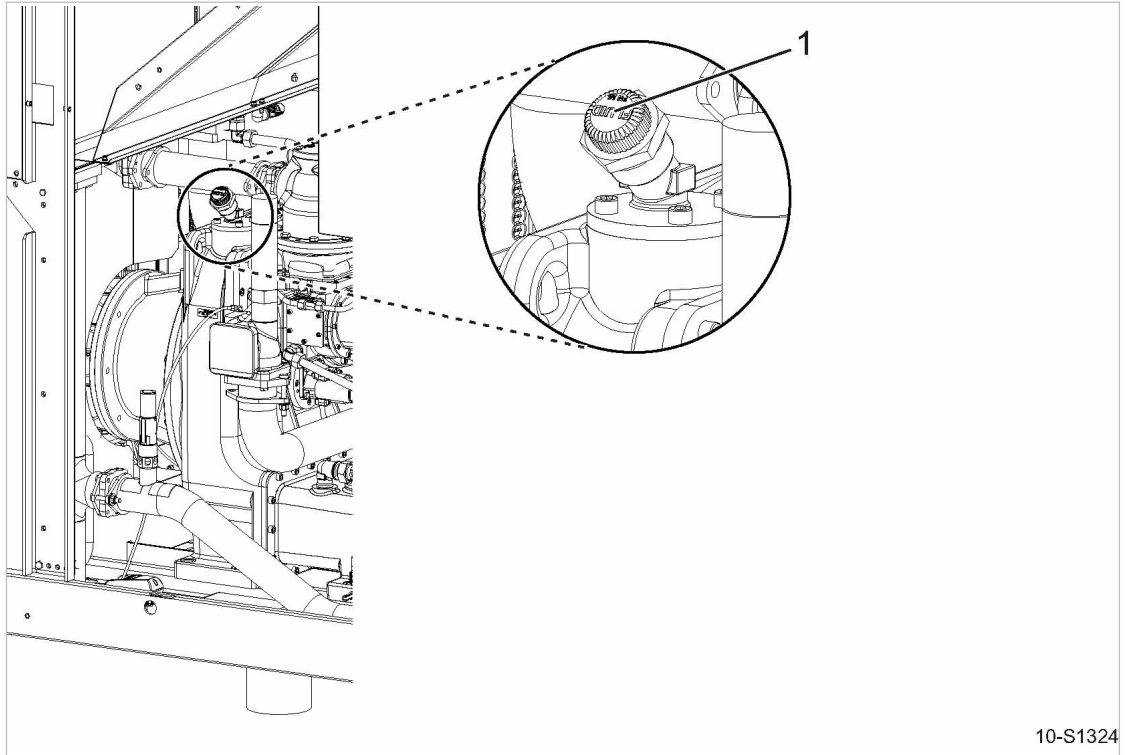
Escaped oil indicates a leak.

➤ Eliminate the cause of the leak before reactivating the machine.

Replenish cooling oil

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

Precondition The power supply disconnecting device is switched off, lock out and tag out the device, verify the absence of voltage.



10-S1324

Fig. 37 Replenish cooling oil

① Screw plug

1. **⚠ WARNING** *Danger of burning - hot surfaces!*
Skin burns are possible.
 - *Wear long-sleeved clothing and protective gloves.*
 - *Work with caution.*
2. Open the screw plug ①.
3. **NOTICE** *Machine damage caused by unsuitable cooling oil!*
 - *Always replenish with the same type of cooling oil.*
4. Add approximately one to two liters of cooling oil.
5. Check the screw plug seal for damage and screw the filler neck with the screw plug back in.

Starting the machine and performing a test run

1. Close all access doors, replace, and secure all removable panels.
2. Switch on the power supply disconnecting device and reset the maintenance counter.
3. As soon as T66 has attained the operating temperature (oil has flown through the heat exchanger for oil cooling), check the cooling oil level with the machine running (if possible in IDLE) and top off if necessary.
4. Switch off the machine and visually check for leaks.

10.15 Changing the cooling oil (gear)

Always change the oil filter and gearing ventilation filter when changing the cooling oil.

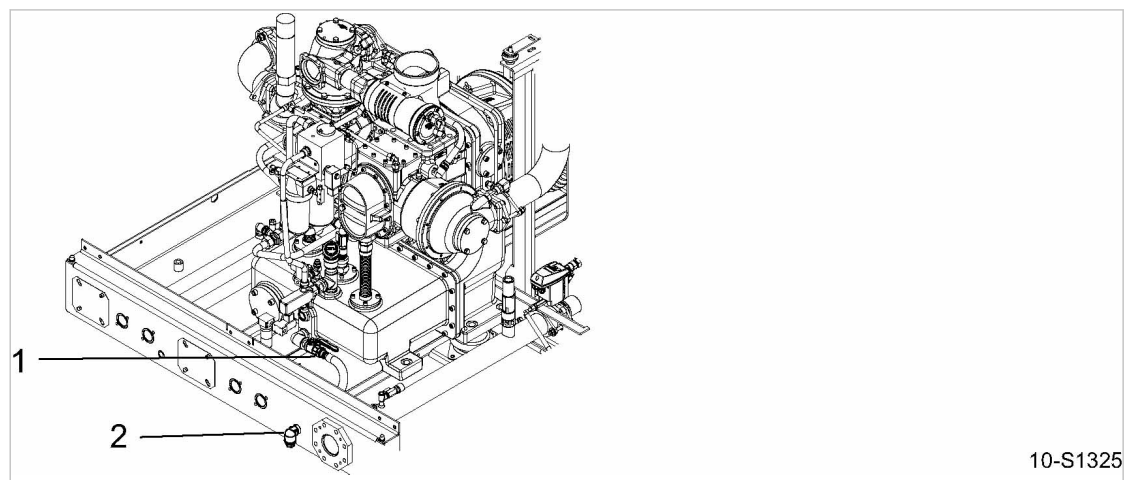
Material Cooling oil
Cooling oil receptacle

Precondition You can drain the cooling oil faster when it is warm ($T_{66} > 130\text{ }^{\circ}\text{F}$) and thus less viscous.
The power supply disconnecting device is switched off,
lock out and tag out the device,
verify the absence of voltage

⚠ WARNING

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

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

Drain cooling oil from the transmission pan

10-S1325

Fig. 38 Draining cooling oil from the transmission pan

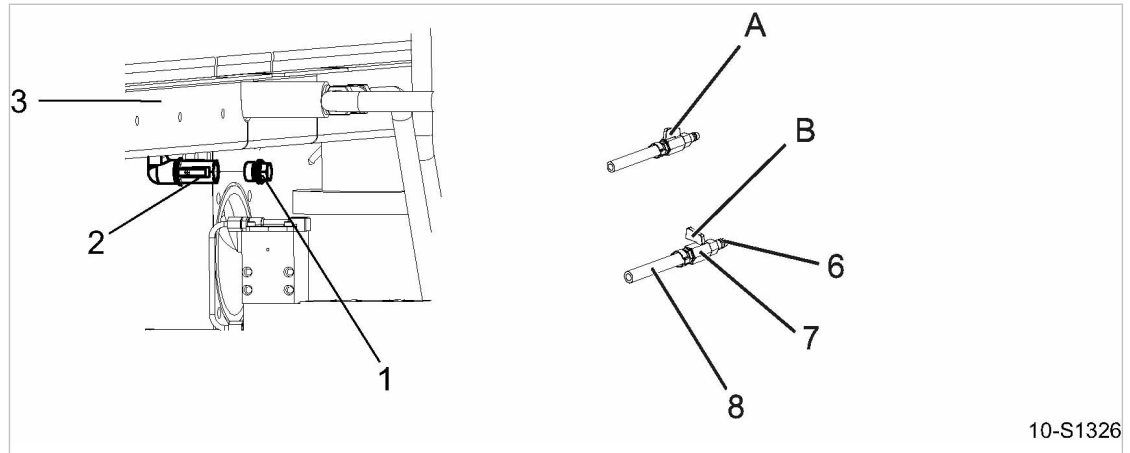
- ① Shut-off valve
- ② Drain hole

1. Place cooling oil receptacle below the drainage opening ②.
2. Slowly open the shut-off valve ① and completely drain the cooling oil.



➤ Dispose of used oil in accordance with applicable environmental provisions.

Draining the cooling oil from the heat exchanger for oil cooling



10-S1326

Fig. 39 Draining the cooling oil from the heat exchanger for oil cooling

- | | |
|----------------------------------|--|
| ① Hose coupling | ⑦ Shut off valve at the maintenance hose |
| ② Shut-off valve | ⑧ Maintenance hose |
| ③ Heat exchanger for oil cooling | Ⓐ Shut-off valve open |
| ⑥ Male hose fitting | Ⓑ Shut-off valve closed |

1. With the shut-off valves ② and ⑦ closed, insert the male hose fitting ⑥ into the hose coupling ①.
2. Insert the maintenance hose ⑧ into the cooling oil receptacle. Open the shut-off valves ② and ⑦ and completely drain the cooling oil.
3. Close the shut-off valves ② and ⑦ and remove the plug-in nozzle from the hose coupling.



- Dispose of used oil in accordance with applicable environmental provisions.

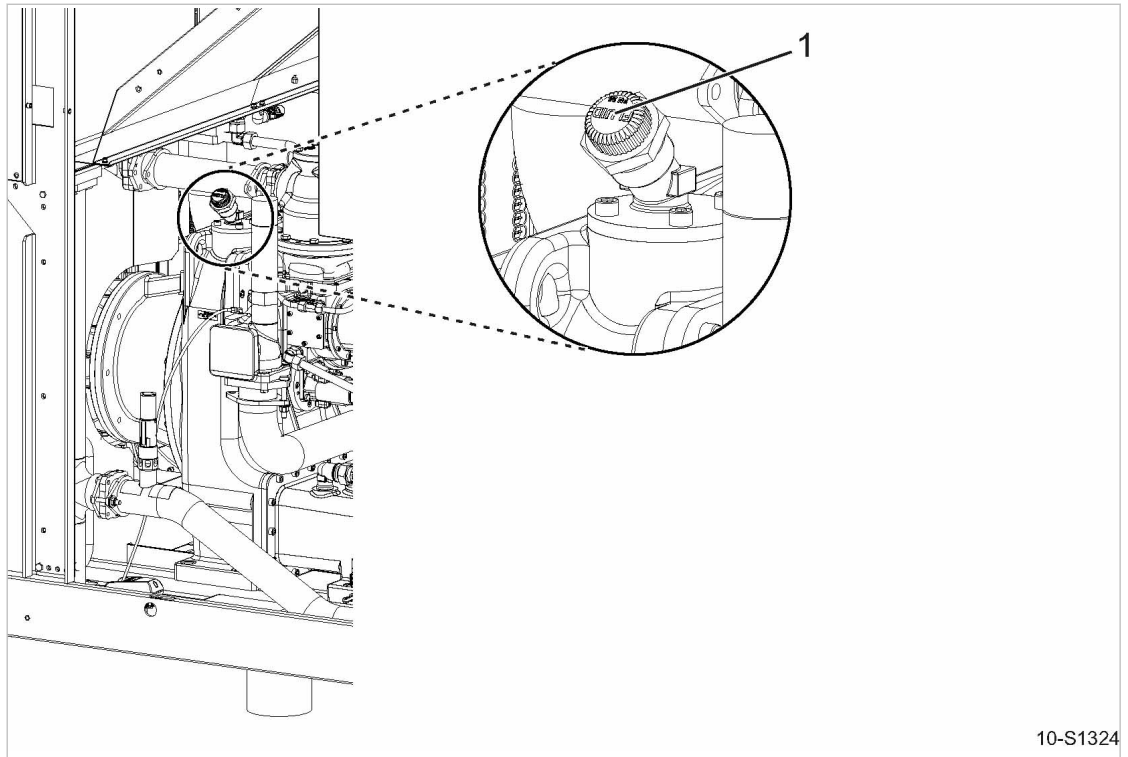
Filling with cooling oil

Fig. 40 Filling with cooling oil

① Screw plug

1. Open the plug ①.
2. Fill with cooling oil.
3. Check the screw plug seal for damage and screw the filler neck with the screw plug back in.

Starting the machine and performing a trial run

1. Close all access doors, replace and secure all removable panels.
2. Switch on the power supply disconnecting device and reset the maintenance counter.
3. As soon as T66 has attained the operating temperature (cooling oil has flown through the heat exchanger for oil cooling), check the cooling oil level with the machine running (if possible in IDLE) and top off if necessary.
4. Switch off the machine and visually check for leaks.

10.16 Changing the oil filter

Material Spare part
Cooling oil receptacle

Precondition The power supply disconnecting device is switched off,
lock out and tag out the device,
verify the absence of voltage

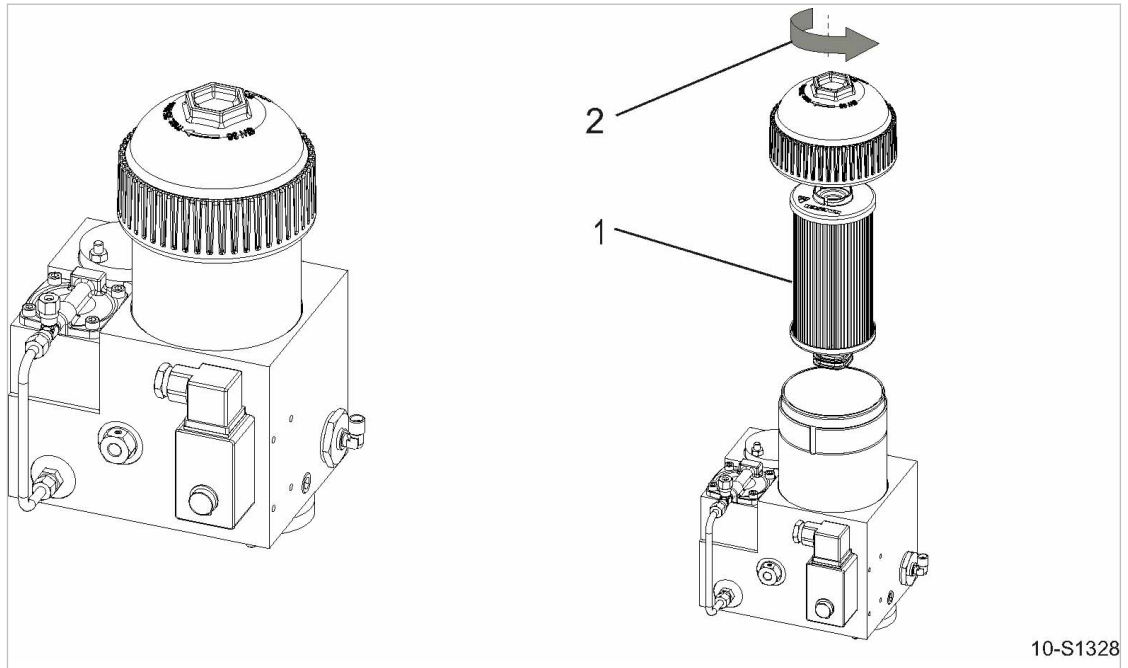


Fig. 41 Changing the oil filter

- ① Oil filter
- ② Direction of rotation for opening the filter housing

Changing the oil filter

1. **⚠ WARNING** *There is risk of burns from hot components and cooling oil!*
 - *Wear long-sleeved garments and protective gloves.*
2. Unscrew the cover of the filter housing.
3. Remove the oil filter, catch escaping cooling oil and dispose of according to environmental provisions.
4. Insert the new oil filter.
5. Ensure the correct torque when screwing the cover of the filter housing down.



The required torque is indicated on the cover.



➤ Dispose of parts and material contaminated with cooling oil according to environmental guidelines.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.
2. Switch on the power supply disconnecting device and reset the maintenance counter.
3. As soon as T66 has attained the operating temperature (cooling oil has flown through the heat exchanger for oil cooling), check the cooling oil level with the machine running (if possible in IDLE) and top off if necessary.
4. Switch off the machine and visually check for leaks.

10.17 Replacing the transmission ventilation filter

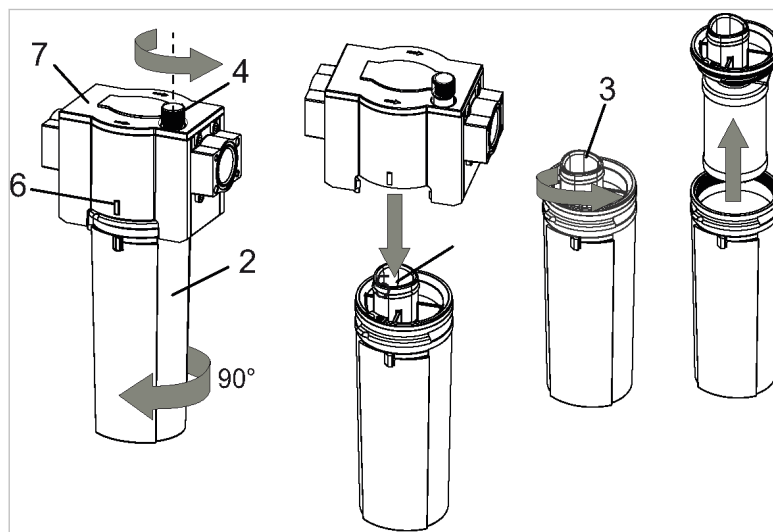


- Carefully handle and manually install all components in order to avoid damages. This applies to sealing surfaces, in particular.

Material KAESER filter element (including silicone-free sealing grease and O-ring)

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

10.17.1 Removing the filter element



10-S2482

Fig. 42 Removing the filter element

- | | | | |
|---|--|---|--------------------------------------|
| ② | Filter bowl | ⑤ | Installation mark at the filter bowl |
| ③ | Filter element | ⑥ | Installation mark at the filter head |
| ④ | Locking screw (secured against full removal) | ⑦ | Filter head |

1. Loosen the locking screw ④ only manually until you feel again resistance.
If the compressed air filter was pressurized, the residual compressed air will escape.



The equipment emits persistent whistling?

The compressed air filter is pressurized!

- Disconnect the compressed air filter from the air network, or de-pressurize the entire air network.

2. Gently jiggle the filter bowl ② and then turn by 90° until the installation markings at filter bowl ⑤ and filter head ⑥ face each other.
3. Remove the filter bowl and the screwed-in filter element vertically downward.
4. Unscrew the filter element ③ (approx. 1 1/2 turns) from the filter bowl.
5. If required: Drain and dispose of the condensate.
6. Check the filter bowl for corrosion.



The filter bowl is clearly corroded?

- Determine the cause (e.g., composition of the compressed air, operating conditions)
- Replace the compressed air filter completely.



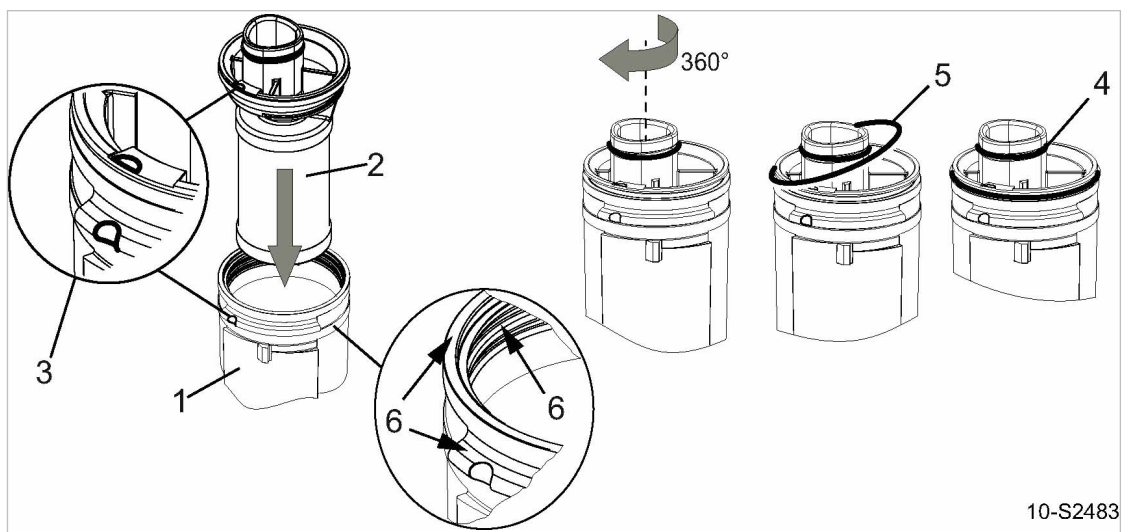
Dispose of the contaminated filter element according to environmental regulations.

10.17.2 Installing the filter element



- Do not touch the surface of the filter material with your hand.

Precondition The inner surfaces of the filter head and the filter bowl are clean.



10-S2483

Fig. 43 Installing the filter element

- | | |
|----------------------|-------------------------|
| ① Filter bowl | ④ O-ring |
| ② Filter element | ⑤ O-ring |
| ③ Installation marks | ⑥ Surface to be greased |

1. Grease the thread, front surface, and bayonet catch of the filter bowl (item ⑥).
2. Push the filter element ② into the filter bowl ① in such a manner that the installation marks ③ are aligned to each other.
3. Use one turn to screw the filter element into the filter bowl.
4. Fully grease the O-ring ⑤ and insert between filter element and filter bowl.
5. Grease the O-ring ④.

10.17.3 Installing the filter bowl

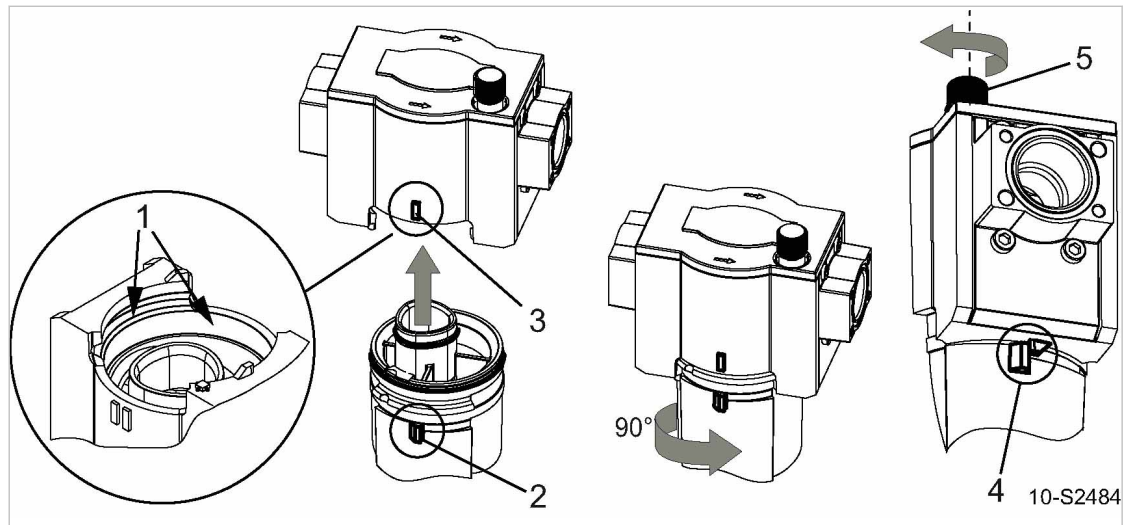


Fig. 44 Installing the filter bowl

- | | |
|--|---------------------------|
| ① Surface to be greased | ④ Stop at the filter head |
| ② Installation mark at the filter bowl | ⑤ Locking screw |
| ③ Installation mark at the filter head | |

1. Grease the interior of the filter bowl (item ①).
2. Align the installation marks (② and ③) at filter bowl and housing head to each other.
3. Insert the filter bowl into the filter head.
4. Turn the filter bowl 90° to the stop ④.
5. Manually tighten the locking screw ⑤.



You cannot tighten the locking screw?
 The bayonet catch of the filter bowl is not fully closed.
 ➤ Turn the filter bowl to the stop.

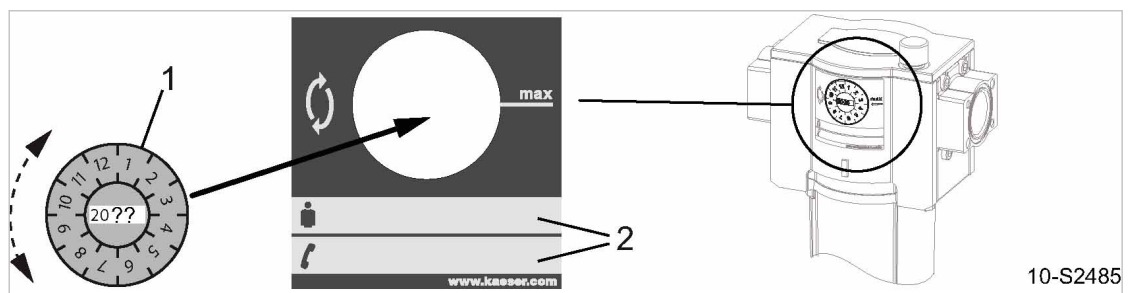


Fig. 45 Maintenance sticker.

- | |
|-------------------------------|
| ① Maintenance sticker |
| ② Service contact information |

6. Note the year for the next maintenance on the maintenance sticker.
 (See maintenance intervals in chapter 10.2.3).
7. Attach the maintenance sticker in such a manner that the marking *max* points to the month for the next maintenance.

10.18 Venting the machine (depressurizing)

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

The pressure system automatically vents up to the check valve as soon as the machine is switched off. All volumes from the check valve up to the compressed air system remain pressurized.

Venting takes place in two steps:

- Isolate the compressor from the air system.
- Manually drain the compressed air.

Material The maintenance hose with plug-in nozzle and shut-off valve needed for venting is stowed in the machine.

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

⚠ WARNING

Compressed air!

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

- *Depressurize all pressurized components and enclosures.*

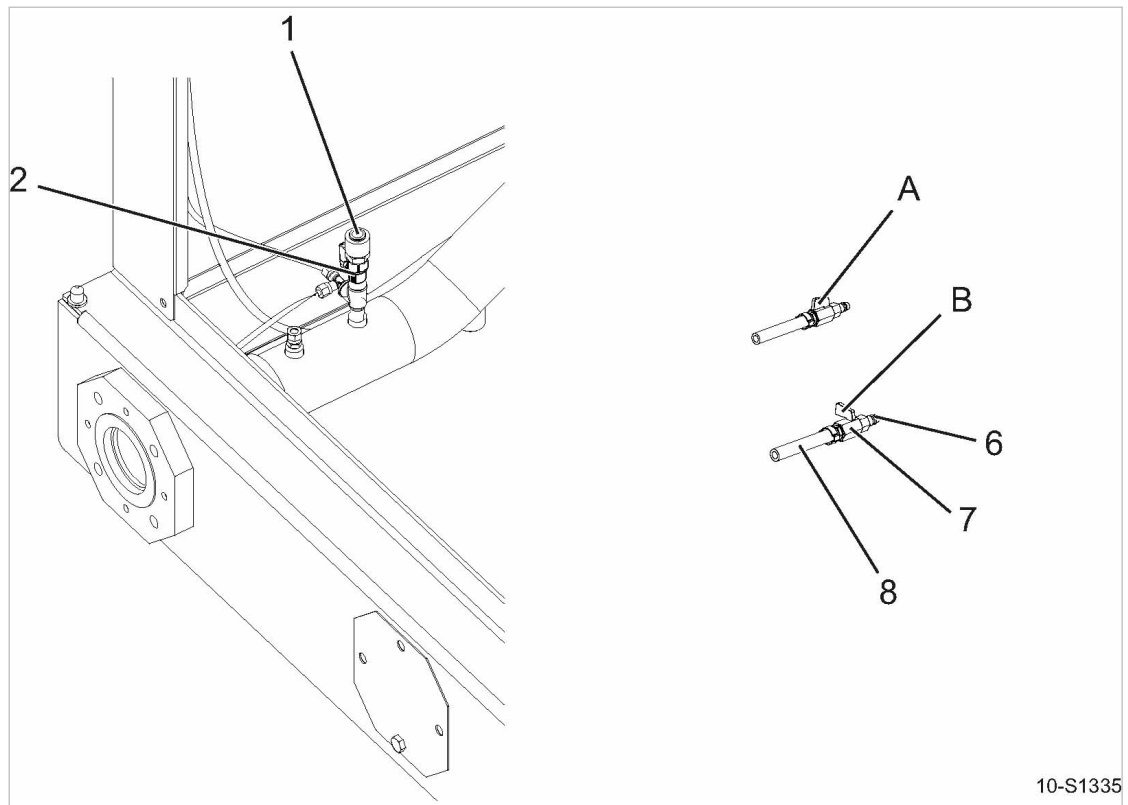


Fig. 46 Venting the machine

- | | |
|---------------------|---------------------------|
| ① Hose coupling | ⑧ Maintenance hose |
| ② Ball valve | Ⓐ Shut-off valve (open) |
| ⑥ Male hose fitting | Ⓑ Shut-off valve (closed) |
| ⑦ Shut-off valve | |

Isolating the machine from the air system

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

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

Manually draining the compressed air



The machine remains pressurized from the air system or the shut-off valves to the check valve, even after shutting down and venting.

1. With the shut-off valve closed, insert the male hose fitting ⑥ into the hose coupling ①.
2. Slowly open the shut-off valves ② and ⑦ and leave them open. For safety reasons, leave the hose attached until all required tasks are concluded.
3. Upon conclusion of all activities, pull the male hose fitting ⑥ from the hose coupling and close the shut-off valves ② and ⑦.

10.19 Condensate drain maintenance

Condensate is removed via electronic condensate drains at the following points:

- Condensate separator downstream from stage 1
- Condensate separator downstream from stage 2



The condensate must be able to drain off freely. Undrained condensate can cause damage to the machine and have a negative impact upon compressed air quality.

10.19.1 Checking the condensate drain downstream from stage 1

Precondition The power supply disconnecting device is switched on.
The machine is running under load.
The *Power* LED is illuminated.

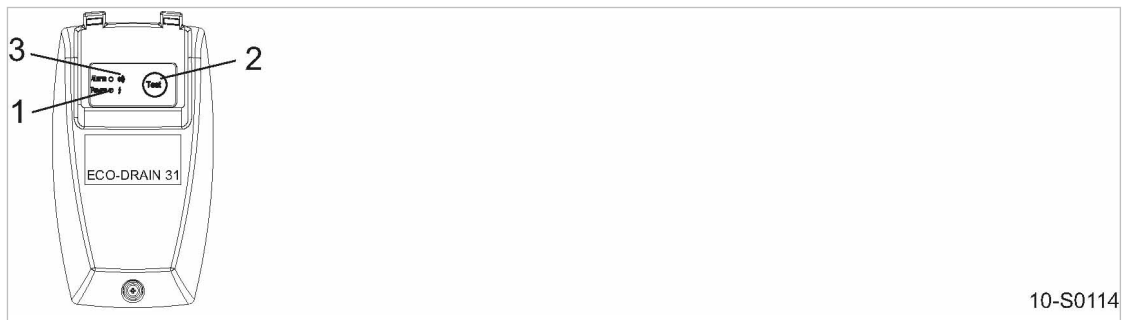


Fig. 47 Checking the condensate drain

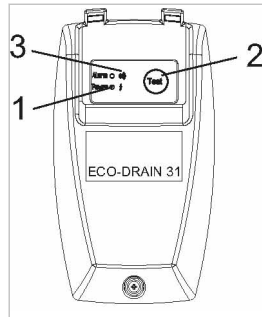
- ① *Power* LED
- ② «TEST» key
- ③ *Alarm* LED

1. **⚠ CAUTION** *Danger of burns from hot components around the condensate drain!*
➤ *Proceed with caution.*
2. **⚠ WARNING** *High noise levels when doors open!*
Risk of damage to hearing
➤ *Always wear ear protection.*
3. With one hand, lightly touch the condensate line on the condensate drain.
4. With your other hand, push and hold the «TEST» key on the condensate drain for at least 2 seconds.

Result As soon as the condensate drain opens, you will feel a short pressure surge in the condensate line. In the event that you do **not** feel any pressure surge during the manual test, replace the service unit.

10.19.2 Checking the condensate drain downstream from stage 2

Precondition The machine is switched off.
The *Power* LED is illuminated.



10-S0114

Fig. 48 Checking the condensate drain

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

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

Result As soon as the condensate drain opens, you will feel a short pressure surge in the condensate line. In the event that you do **not** feel any pressure surge during the manual test, replace the service unit.

10.19.3 Replacing the service unit

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

Material Sealing tape for sealing the screw-in part
If required: O-ring 16x2 (5.1519.0)

Precondition The power supply disconnecting device is switched off,
lock out and tag out the device,
the absence of voltage has been verified.
The machine is fully vented.

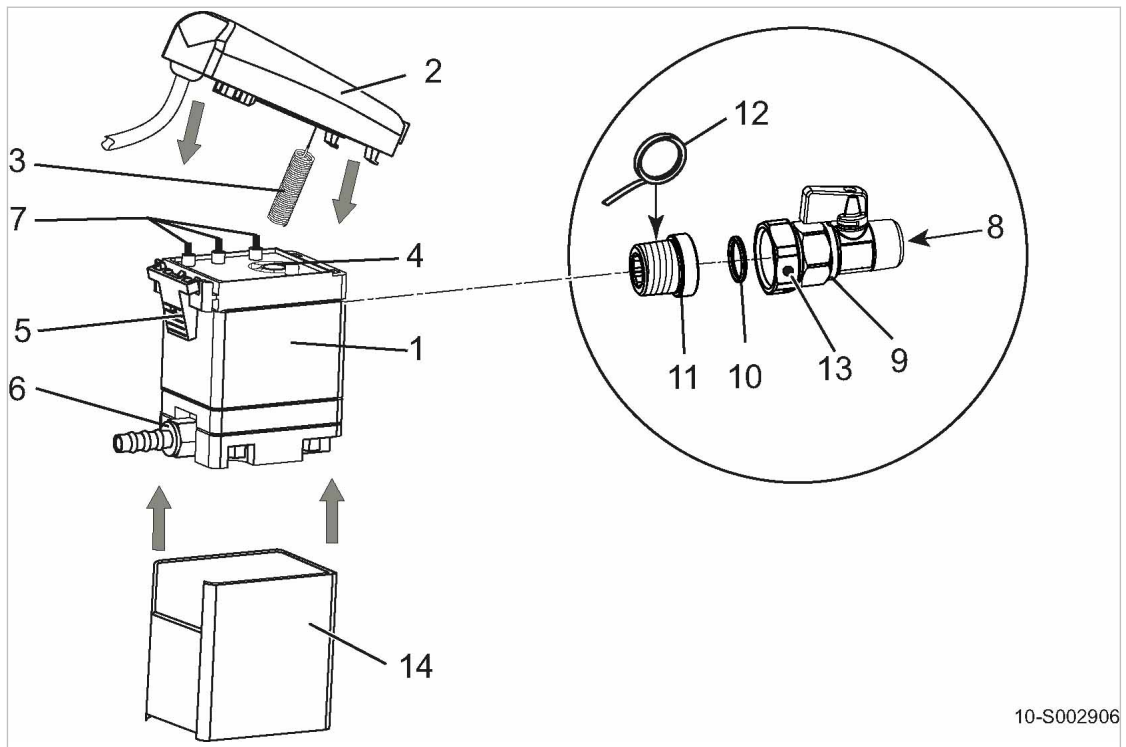


Fig. 49 Replacing the service unit

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

Removing the service unit

1. **⚠ WARNING** *Serious injury can result from loosening or opening components under pressure!*
 ➤ *Fully vent all pressurized components and enclosures.*
2. Close the shut-off valve ⑨ (if installed) upstream from the condensate drain.
3. Unscrew the screw connection ⑥ on the condensate line.
4. Press the snap fastener ⑤ and carefully remove the control unit ② from the service unit ①.
5. Carefully loosen the clamping nut ⑬ on the shut-off valve ⑨ until the remaining residual air has been released via the vent holes.
6. Unscrew the screw-in part ⑪ from the service unit and place aside.
7. Remove the insulation ⑭ (if installed) from the service unit.

Installing the service unit

To ensure that the condensate drain functions correctly, use only KAESER service units.

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

1. Fit the insulation ⑭ (if installed) to the service unit ①.

2. Carefully insert the sensor **3** for the control unit **2** into the opening **4** on the service unit.
3. Insert the snap fastener **5** on the control unit into the eyes on the service unit.
4. Press the control unit against the service unit until the snap fastener can be heard clicking into place.
5. Replace old sealing material on the screw-in part **11** with new sealing tape.
6. Install the screw-in part in the service unit.
7. If necessary, insert a new O-ring **10**.
8. Tighten the clamping nut **13** on the shut-off valve **9**.
9. Attach the condensate line.
10. Open the shut-off valve (if installed) upstream from the condensate drain.
11. Close all access doors, replace and secure all removable panels.

10.20 Changing the control air filter

You can unscrew (counterclockwise) the filter bowl when the system is depressurized.



- Do not use tools to open the filter housing!

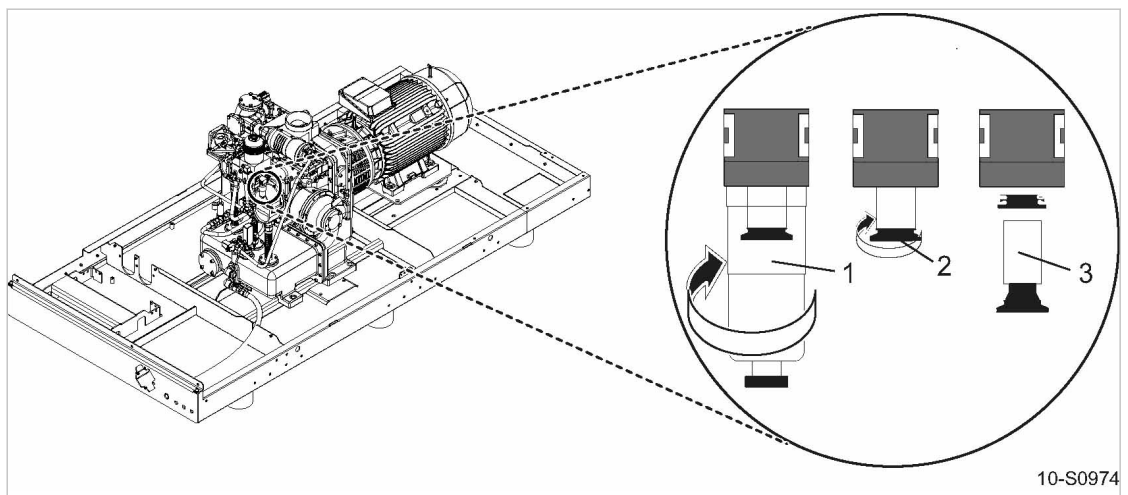
Material Filter element

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

⚠ WARNING

There is risk of burns from hot components and oil!

- Wear long-sleeved clothing and protective gloves.



10-S0974

Fig. 50 Changing the control air filter

- 1** Filter bowl
- 2** Filter element bracket
- 3** Filter element

1. Unscrew the filter bowl ① counterclockwise.
2. Unscrew the filter element bracket ② counterclockwise and remove the old filter element ③.
3. Place the new filter element on the filter element bracket and tighten the screws.
4. Screw in the filter bowl.

10.21 Documenting maintenance and service work

Equipment number:

- Enter maintenance and service work carried out in the checklist below.

Tab. 44 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 spare parts.

11.2 Ordering spare parts and operating fluids/materials

KAESER spare parts and operating materials are original products. They are specifically selected for use in KAESER machines.

⚠ WARNING

There is risk of personal injury or damage to the machine resulting from the use of unsuitable spare parts or operating fluids/materials!

Unsuitable or poor quality spare parts and operating fluids/materials may result in damage to the machine or significantly impair its proper function.

Personal injury may result from damage.

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

Machine

Name	Number
Prefilter (air filter)	1249
Air filter	1250
Filter cartridge (gearing ventilation)	1551
Filter cartridge (control air filter)	1556
Cooling-air filter mat	1051
Filter mat (control cabinet)	1100
Filter mat (control cabinet)	1106
Filter mat (Option K3)	1054
Oil filter (gear)	1200
Cooling oil	1610
Service unit condensate drain	9602
Bearing grease [g]	
100	9.0915.0
400	6.3234.0

Tab. 45 Consumable parts

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

➤ Why not sign a KAESER AIR SERVICE maintenance agreement!

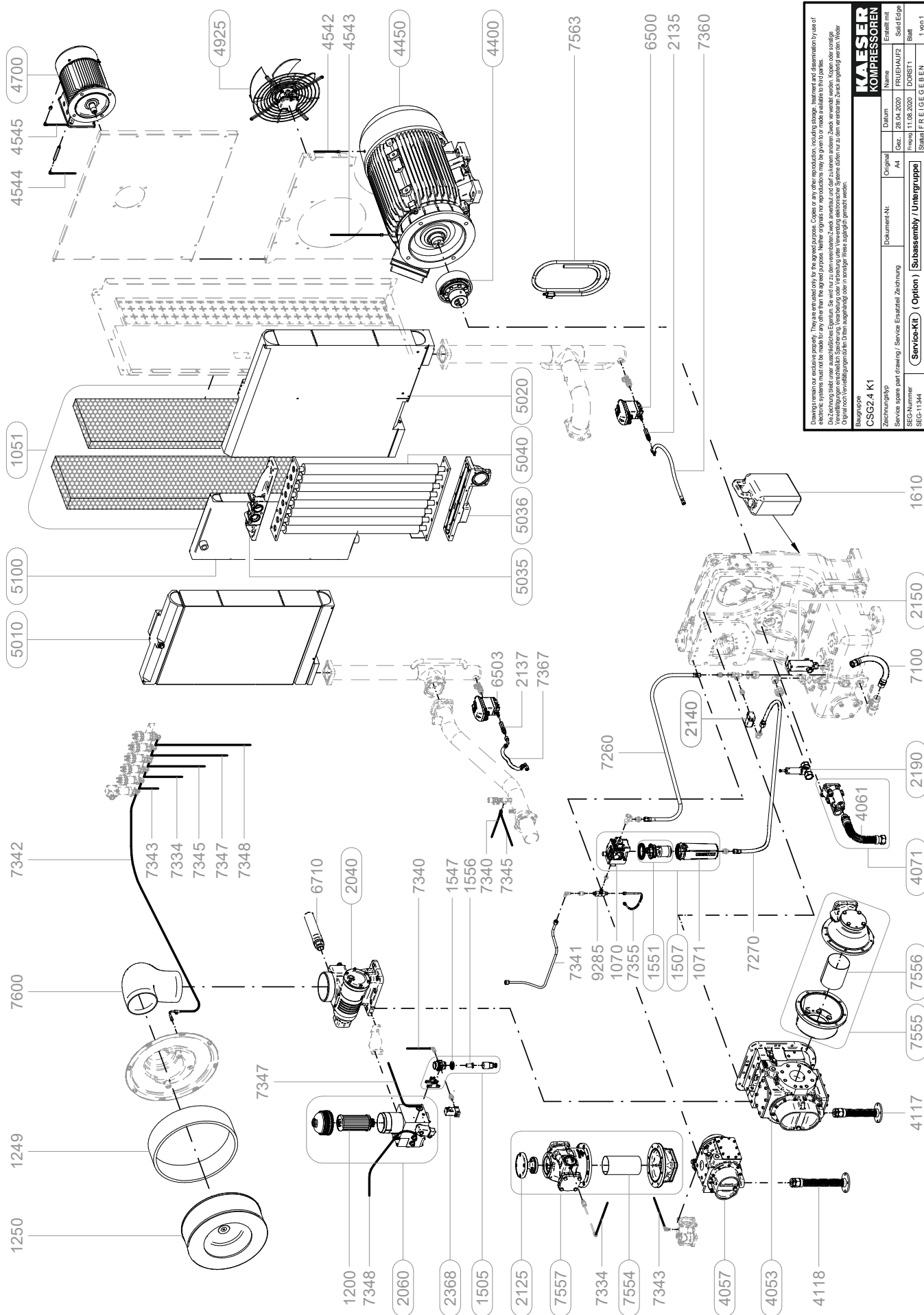
Result Your advantage:
lower costs and higher compressed air availability.

11.4 Replacement parts for service and repair

Use these parts lists to plan your material requirement according to operating conditions and to order the required spare parts.



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



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Baugruppe		ZSungroup		Service spare part drawing / Service Ersatzteil Zeichnung	
CSG2.4 K1		CSG2.4 K1		Document-Nr.	
				Original	
				A4	
				Name	
				Datum	
				Gaz.	
				28.04.2020	
				RUHEHAUFT	
				Solid Edge	
				DORST	
				11.03.2020	
				Bil	
				Skizze	
				DIEGELER	
				1 von 1	
				Service-Kit	
				(Option)	
				Subassembly / Unterguppe	
				SECS-Nummer	
				SEC-11344	
				SEC-11344	

Legend		KAESER KOMPRESSOREN
	CSG K1	SEL-4491_01 E

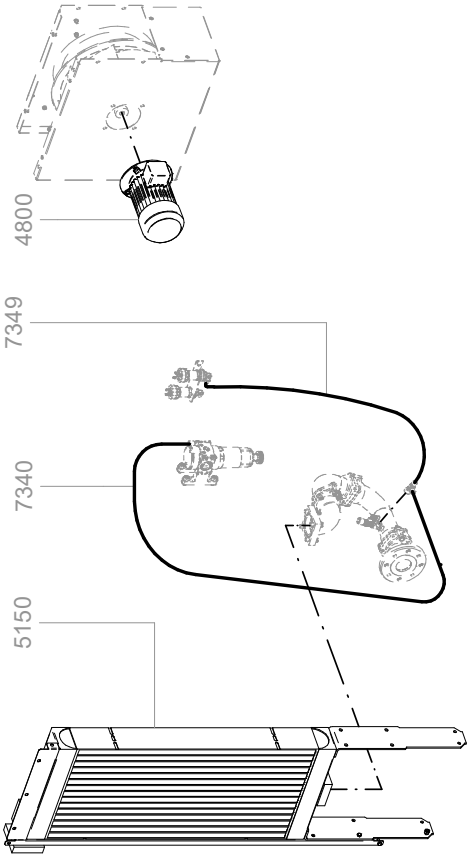
Item	Description	Option
1051	Filter mat, cooling air kit	
1249	Prefilter fleece	
1250	Air filter insert	
1505	Control air filter	
1547	Casing gasket	
1556	Control air filter element	
1507	Gear vent damp-filter	
1070	Filter head	
1071	Filter bowl	
1551	Microfilter element	
1610 *)	SIGMA FLUID	
2040	Inlet valve	
2042	Maintenance kit, inlet valve	
2044	Overhaul kit, inlet valve	
2060	Combination valve	
1200	Oil filter	
2062	Maintenance kit, comb. valve	
2064	Overhaul kit, comb. valve	
2135	Check valve, Condensate drain	
2137	Check valve, Condensate drain	
2140	Control valve	
2150	Control valve	
2190	Overflow valve, pump	
2368	Control valve	
4053	Exchange LP-Stages	
4057	Exchange HP-Stages	
4071	Oil pump	
4061	Oil suction hose	
4117	Oil drain pipe LP-Stages	
4118	Oil drain pipe HP-Stages	
4400	Drive coupling	
4405	Coupling element elastic	
4450	siehe manuelle Eintragungen	
4451	Drive motor bearing kit	
4542	Lubricant line	
4543	Lubricant line	
4544	Lubricant line	
4545	Lubricant line	
4700	siehe manuelle Eintragungen	
4701	Fan motor bearing kit	
4925	Exhauster, unit	
5010	Aftercooler, step 1	
5020	Aftercooler, step 2	
5035	Collecting box, top	
5036	Collecting box, lower	
5040	Precooler, step 2	
5100	Oil cooler	
6500	Condensate drain	
9602	Condensate drain service-unit	
6503	Condensate drain	
9602	Condensate drain service-unit	
6710	Venting silencer	
7100	Hose line	
7260	Hose line	
7270	Hose line	
7334	Control line	
7340	Control line	
7341	Control line	
7342	Control line	
7343	Control line	
7345	Control line	
7347	Control line	
7348	Control line	
7355	Control line	
7360	Condensate drain line kit	
7367	Condensate drain line	
7556	Strainer kit, pulse damper	
7557	Pulse damper, step 2	
2125	Check valve, pulse damper	
7554	Strainer kit, pulse damper	
7563	Hose line	
7600	Inlet hose	
9285	Vacuum suction nozzle	

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

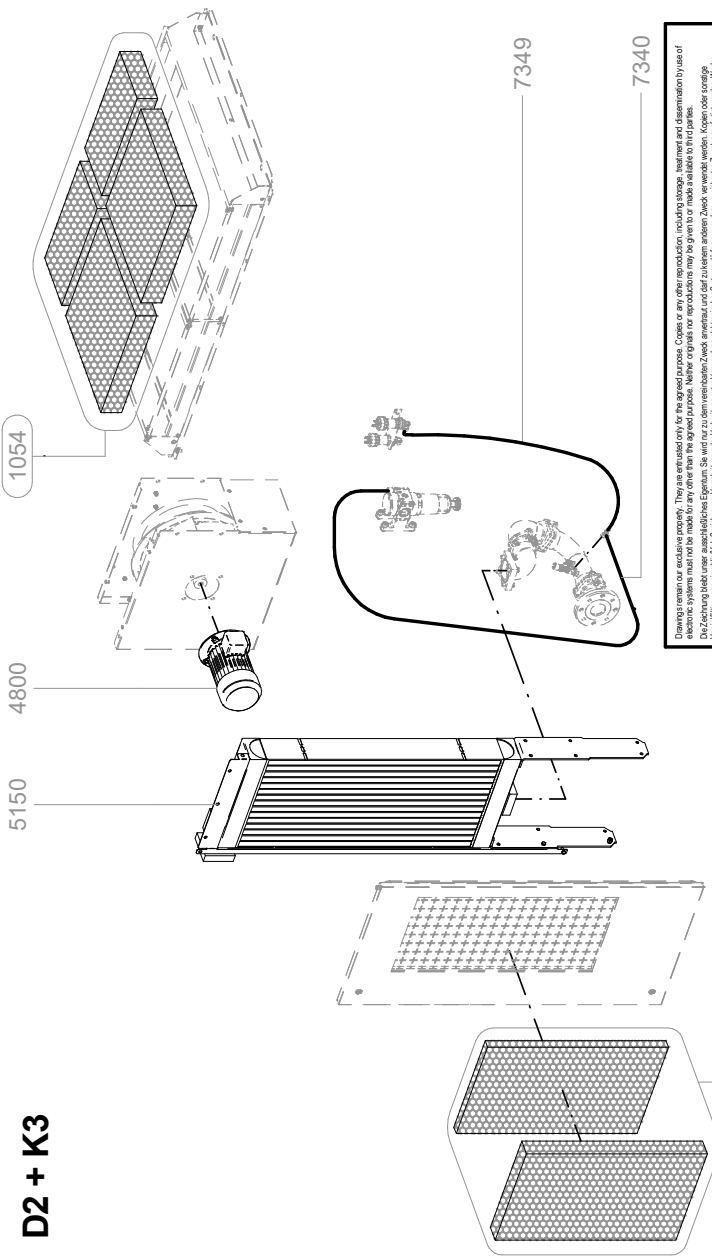
Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!

*) see cooling oil recommendations

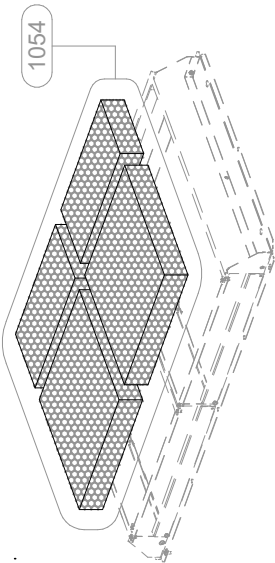
D2



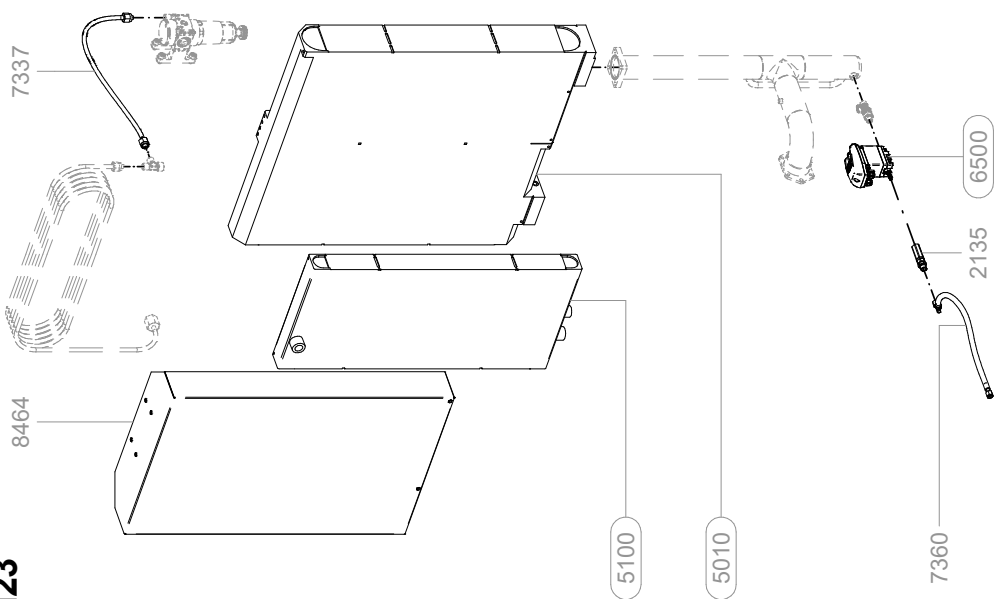
D2 + K3



K3



H23



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KAESER KOMPRESSOREN		Name		Erstellt mit	
Zachungstyp		Datum		Solid Edge	
Service spare part drawing / Service Ersatzteil Zeichnung		Gez.		FRUEHAUTZ	
SECS-Nummer		Revised		FRUEHAUTZ	
SEG-11.346		Status		1 von 1	
Baugruppe		Option / Untergruppe			
CSG2.4		Option			

Legend

KAESER
KOMPRESSOREN

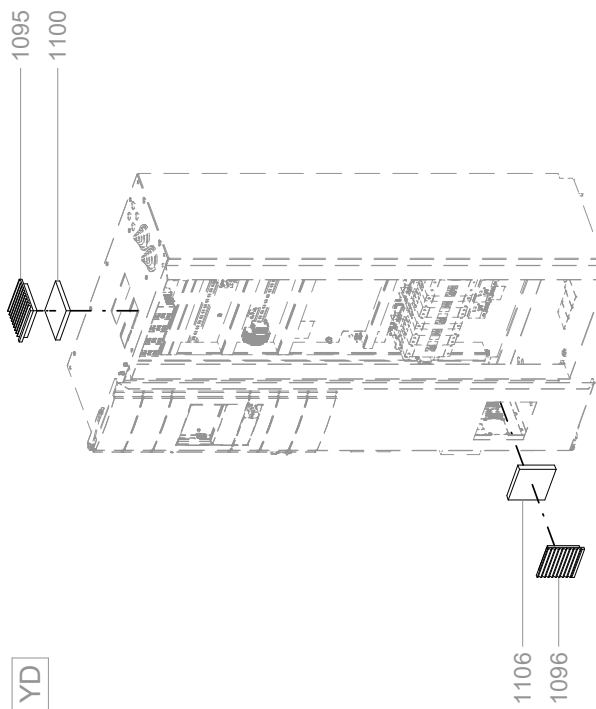
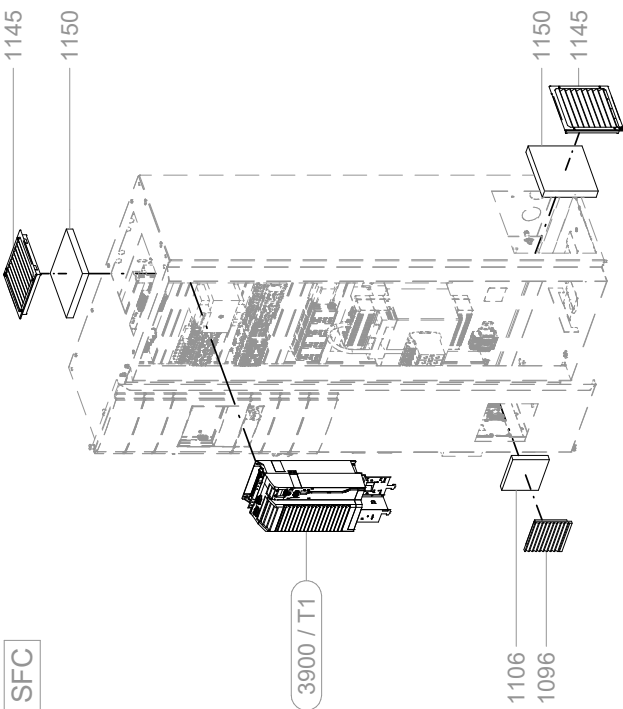
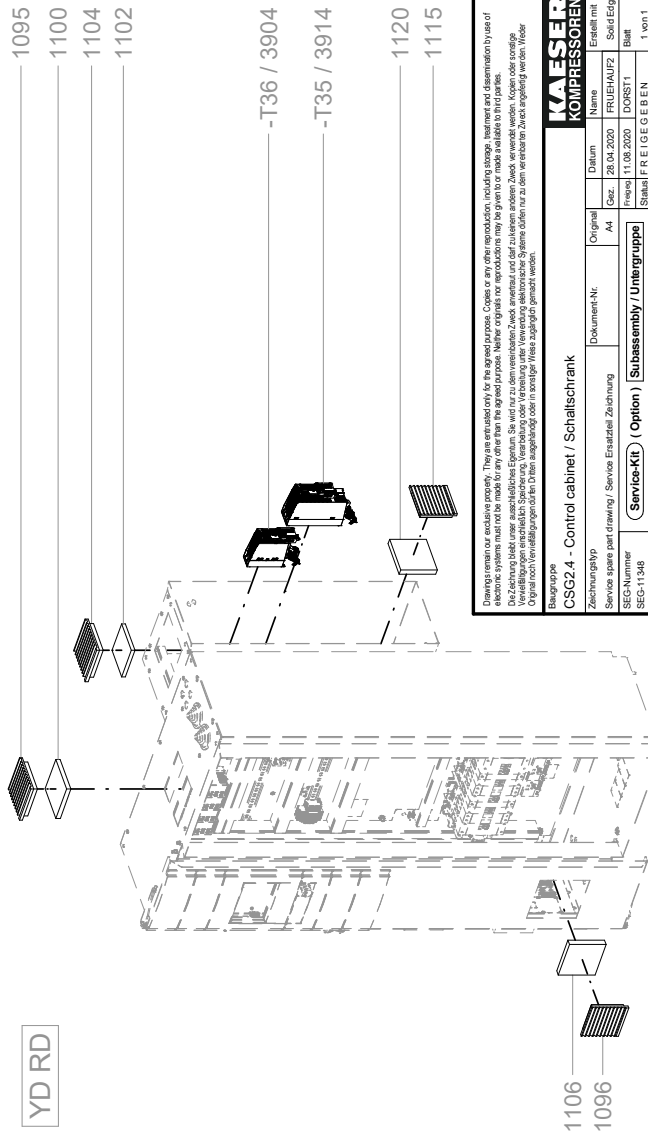
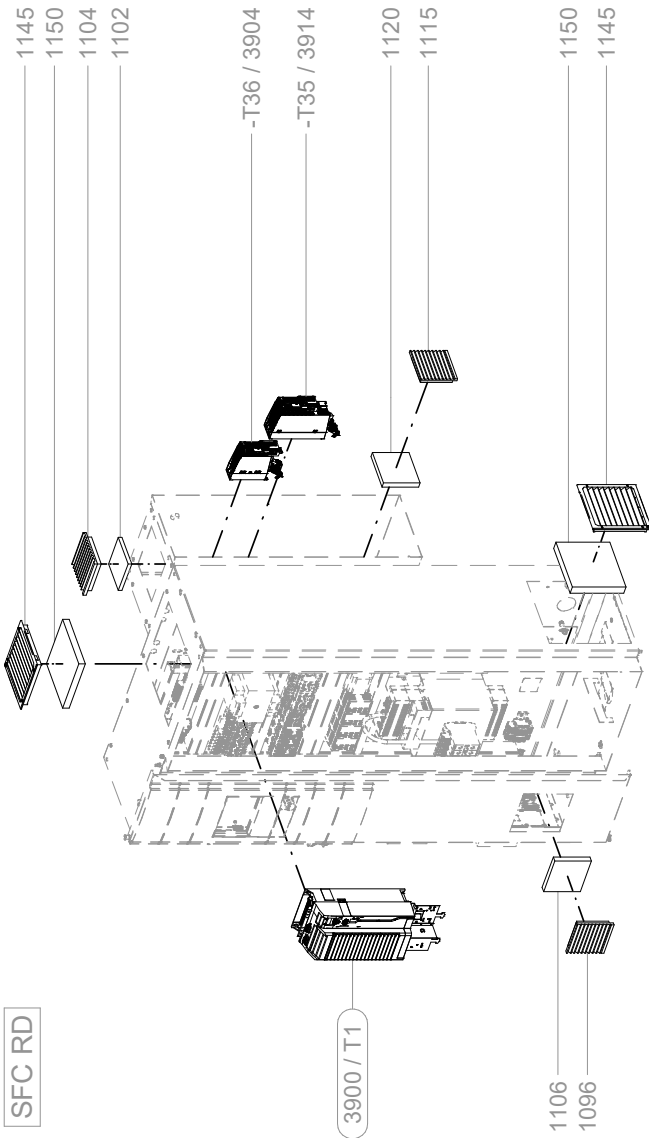
CSG Option K1

SEL-4493_01 E

Item	Description	Option
1053	Prefilter mat	x
1054	Prefilter mat kit	x
2135	Check valve, Condensate drain	x
4800	Fan motor	x
5010	Aftercooler, step 1	x
5100	Oil cooler	x
5150	Compressed air cooler	x
6500	Condensate drain	x
9602	Condensate drain service-unit	x
7337	Control line	x
7340	Control line	x
7349	Control line	x
7360	Condensate drain line kit	x
8464	Holding plate	x

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!



KAESER KOMPRESSOREN			
Original	Name	Datum	Erstellt mit
A4	FRUEHAUFZ	28.04.2020	FRUEHAUFZ
Gez.	11.08.2020	DORST1	Solid Edge
Stempel	11.08.2020	DORST1	Blatt
Stempel	11.08.2020	DORST1	1 von 1
Baugruppe			
CSG2.4 - Control cabinet / Schaltschrank			
Zachnungsmappe			
Service spare part drawing / Service Ersatzteil Zeichnung			
SECS-Nummer			
SEG-11.348			
Service-Kit (Option) / Untergruppe			

Legend		KAESER KOMPRESSOREN
CSG Schaltschrank YD/ SFC		SEL-4495_01 E
Item	Description	Option
1095	Control cabinet breather	
1096	Control cabinet breather	
1100	Filter mat, control cabinet	
1102	Filter mat, control cabinet	
1104	Control cabinet breather	
1106	Filter mat, control cabinet	
1115	Converter cabinet breather	
1120	Filter mat, outlet air	
1145	Converter cabinet breather	
1150	Filter mat, converter cabinet	
3900	Frequency converter	
3476	FC-fan motor	
3904	Frequency conv. wormdrivemotor	
3490	FC-fan motor	
3914	Frequency conv., blower motor	
3490	FC-fan motor	

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!

12 Decommissioning, Storage and Transport

12.1 Decommissioning

Decommissioning is necessary, for example, under the following circumstances:

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

Temporary decommissioning

In the event of a temporary decommissioning, you must ensure that the machine does not contain any condensate.

The condensate is removed from the machine in the following operational states:

- in LOAD operation with stage 1 condensate drain
- immediately after the last LOAD operation at stage two condensate drain, so long as network pressure is still present at the compressed air outlet (not at stage two however),



KAESER SERVICE will be glad to assist you if LOAD operation is not currently possible with your machine.

1. Still during the last LOAD operation, press the «TEST» button of the condensate drain at the first stage for a few seconds. Following this, immediately press the “OFF” button 1x.
2. Following shut-down, but before complete venting of pressure (the pressure at the p100 measuring point is still approx. 30 psig) and prior to disconnection of electrical power from the main supply, press the «TEST» button of the condensate drain at the second stage for a few seconds in order to purge the condensate from the condensate drain.
3. **⚠ WARNING** *Compressed air!*
Risk of injury due to high hot compressed air volume and loud noise when the venting connection is opened.
 - Always wear ear protection.
 - Keep a safe distance from the machine.
4. Isolating the machine from the air system.
5. Open the on-site venting connection.
6. Run the machine for approximately 1 minute in IDLE mode (if possible).
7. Switch off the machine.

Long-term decommissioning

Precondition Condensate is purged from all available condensate drains.

Prior to decommissioning, the machine should be run in IDLE mode for at least 1 minute (if possible).

The on-site shut-off valve is closed in order to prevent back-flow of compressed air into the compressor.

1. Switch off and lock out the power supply disconnecting device.
2. Verify the absence of any voltage.
3. Allow the machine to completely cool down.

4. Vent the machine to atmosphere and check that it is completely depressurized.
5. Detach the power supply and connecting line to the compressed air network.
6. Properly close all open connecting ports.

12.2 Packing

A wooden crate is required for overland transport to protect the machine from mechanical damage. Consult KAESER SERVICE for advice concerning sea or air transport.

Material	Desiccant Plastic sheeting Wooden transport crate
Precondition	The machine is decommissioned. Machine is dry and cooled down.

1. Place sufficient desiccant (silica gel or similar) inside the machine enclosure.
2. Wrap the machine in plastic sheeting.
3. Protecting the machine in a wooden crate against mechanical damages.

12.3 Storage

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

Frozen moisture can damage components, valve diaphragms and gaskets.

The following measures also apply to machines not yet commissioned.



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

NOTICE

Moisture and frost can damage the machine!

- Prevent ingress of moisture and formation of condensation.
- Maintain a storage temperature of $>32\text{ }^{\circ}\text{F}$.
- Store the machine in a dry, frost-proof room.

12.4 Transporting

12.4.1 Safety

Weight and center of gravity determine the most suitable method of transportation. Both are specified in the drawing in chapter 13.2.



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

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

- Make sure the danger area is clear of personnel.

12.4.2 Transport with a forklift truck

Precondition The forks are fully under the machine.



Fig. 51 Transport with a forklift truck

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

12.4.3 Transport with a crane

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

The machine is not equipped with fastening points.

Examples of unsuitable fastening points:

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



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

Precondition Load-carrying and attachment devices meet the local safety regulations.
The crane, load-carrying and attachment devices or the lifted machine do not endanger personnel.

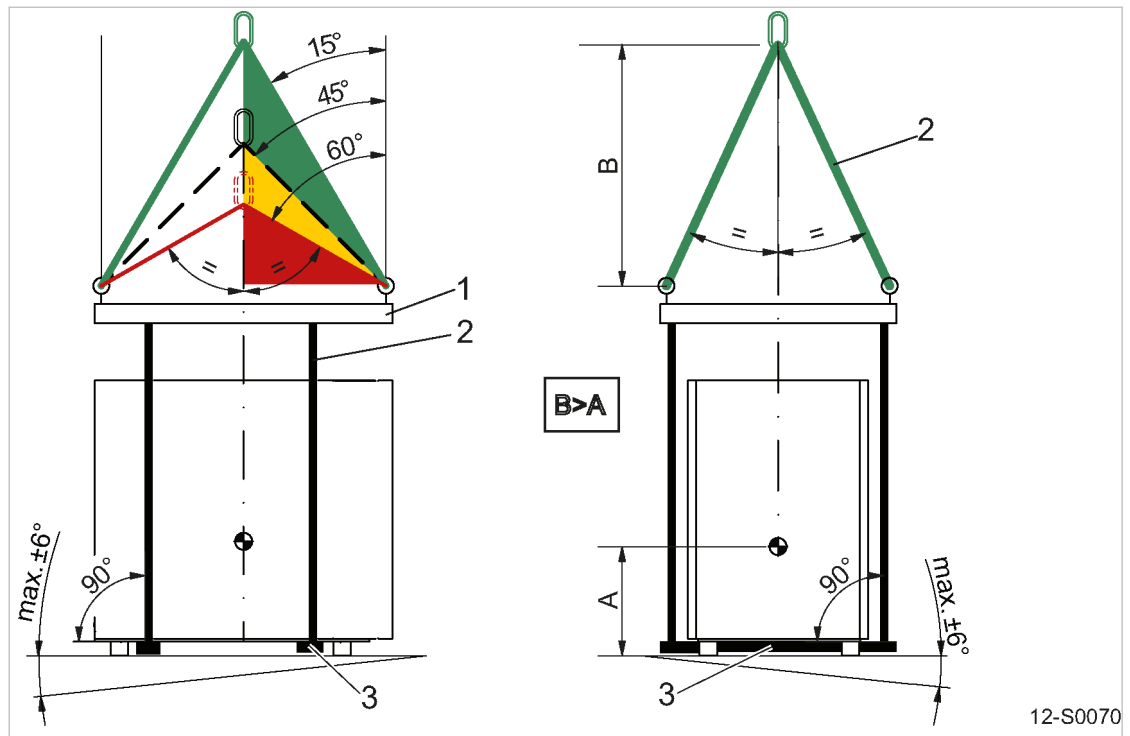


Fig. 52 Transport with a crane

- ① Load carrying devices
- ② Attachment resources
- ③ Crossbeam

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

12.5 Disposal

12.5.1 Dispose of the machine in accordance with local environmental regulations

When disposing of a machine, drain out all operating fluids/materials and remove old filters.

Precondition The machine is decommissioned.

1. Completely drain the cooling oil (gear) from the machine.
2. Remove used filters.
3. Dispose of the machine through an authorized disposal expert.



- Components contaminated with cooling oil must be disposed of in accordance with local environmental guidelines.

12.5.2 Battery disposal in accordance with environmental guidelines

Batteries contain substances that are harmful to living beings and the environment. For this reason, batteries must not be disposed of with unsorted municipal waste. They must be delivered to the national battery collection system. This procedure facilitates the handling and recycling of batteries. The SIGMA CONTROL 2 controller's housing contains a battery.

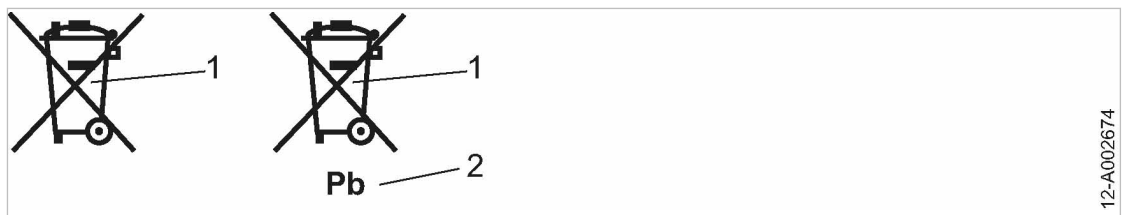


Fig. 53 Battery labelling

- ① Do not dispose of battery with municipal waste
- ② Battery contains lead (if applicable)

- Comply with national disposal regulations and dispose of batteries in an environmentally-friendly manner.

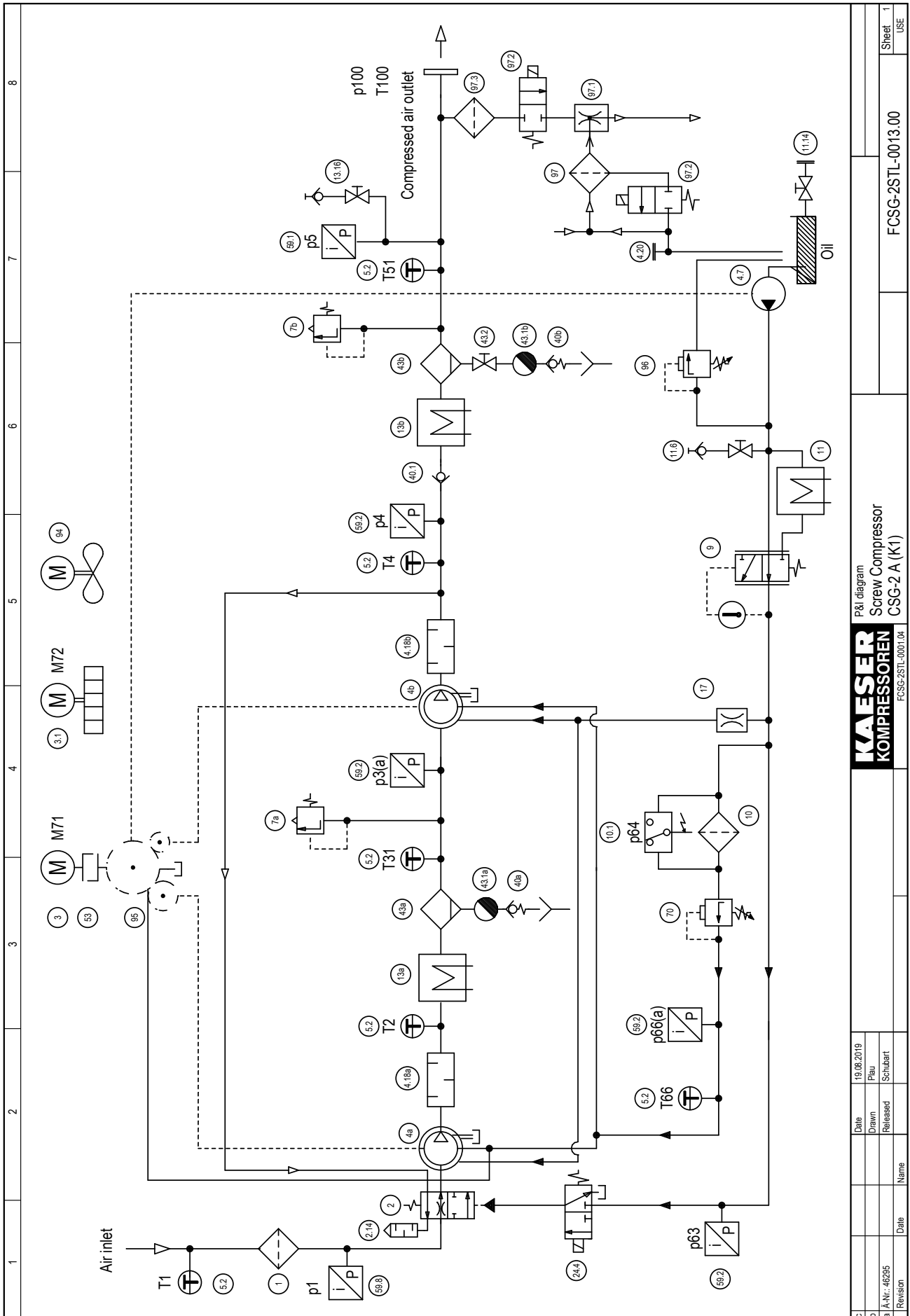


- You actively contribute to the protection of our environment when you take used batteries to the appropriate recycling system.

Further information Refer to the SIGMA CONTROL 2 User Manual for details regarding battery removal.

13 Annex

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



Revision	Date	Name
a	19.08.2019	Plau
b		Released
c		Schubert

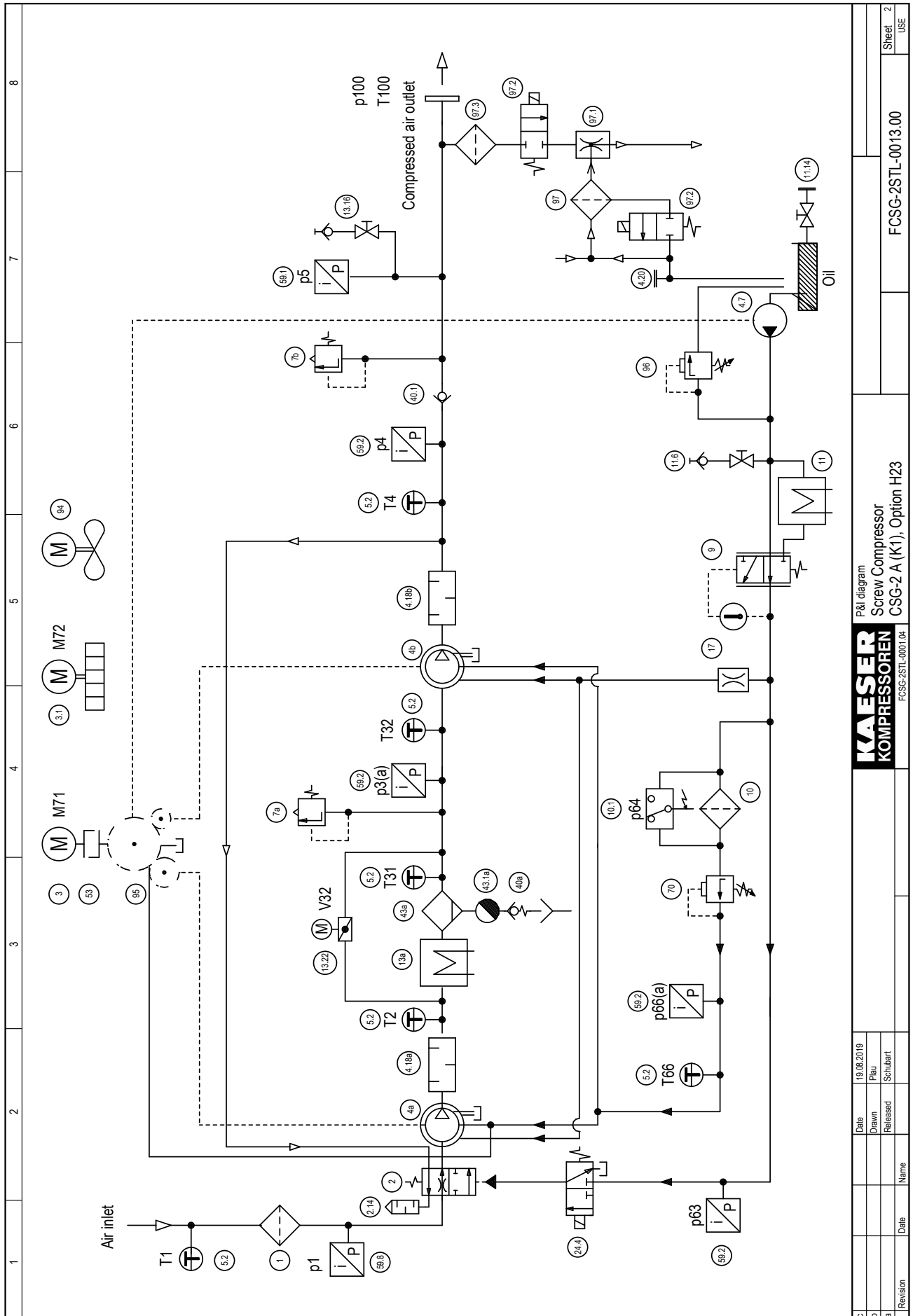
KAESER
KOMPRESSOREN

P&I diagram
Screw Compressor
CSG-2 A (K1)

FCSC-2STL-0001.04

FCSCG-2STL-0013.00

Sheet 1
USE



Revision	Date	Name
c	19.08.2019	Plau
b		Released
a		Schubert

P&I diagram
Screw Compressor
CSG-2 A (K1), Option H23

KAESER
KOMPRESSOREN

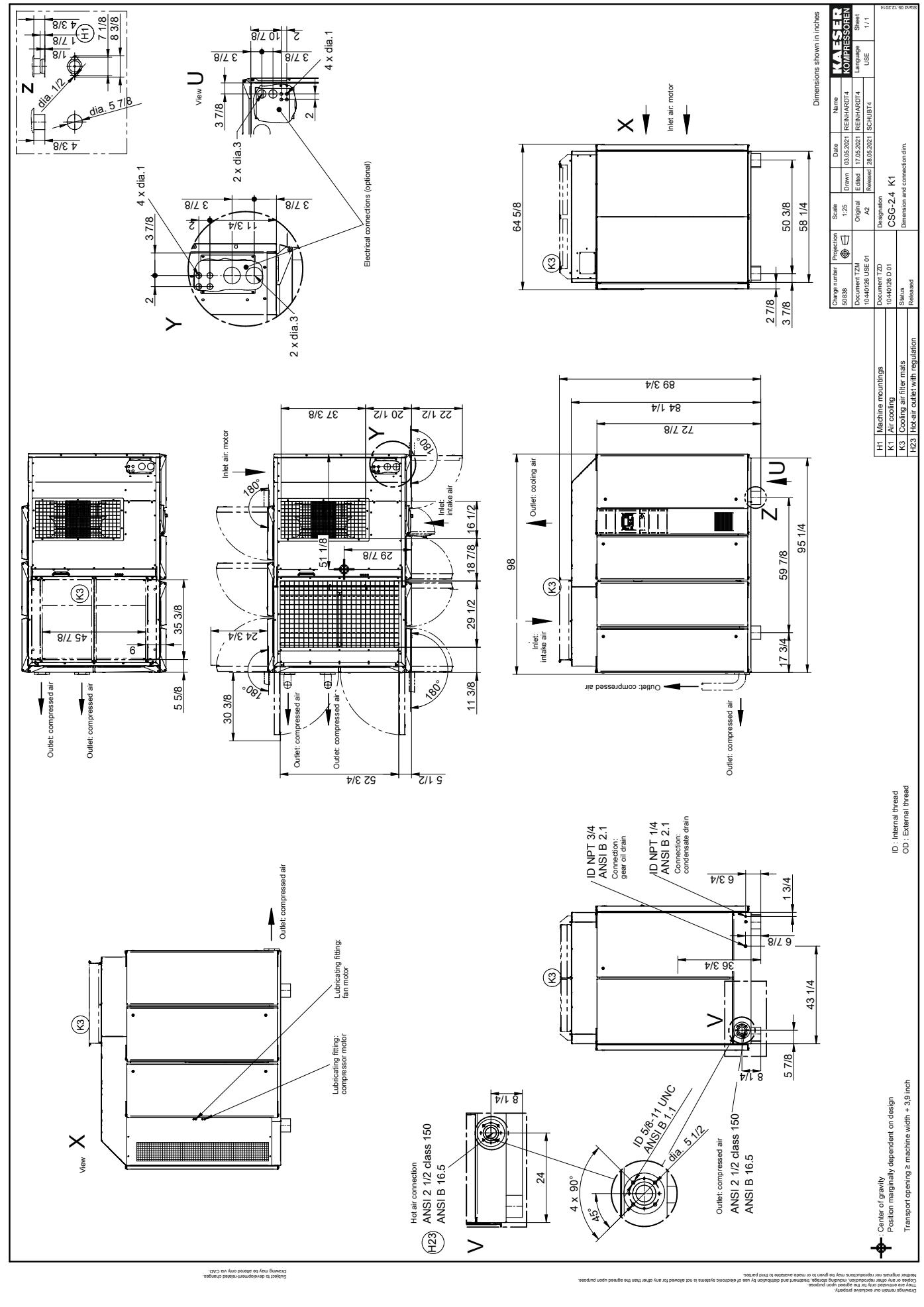
FCSG-2STL-0001.04

FCSG-2STL-0013.00

Sheet 2
USE

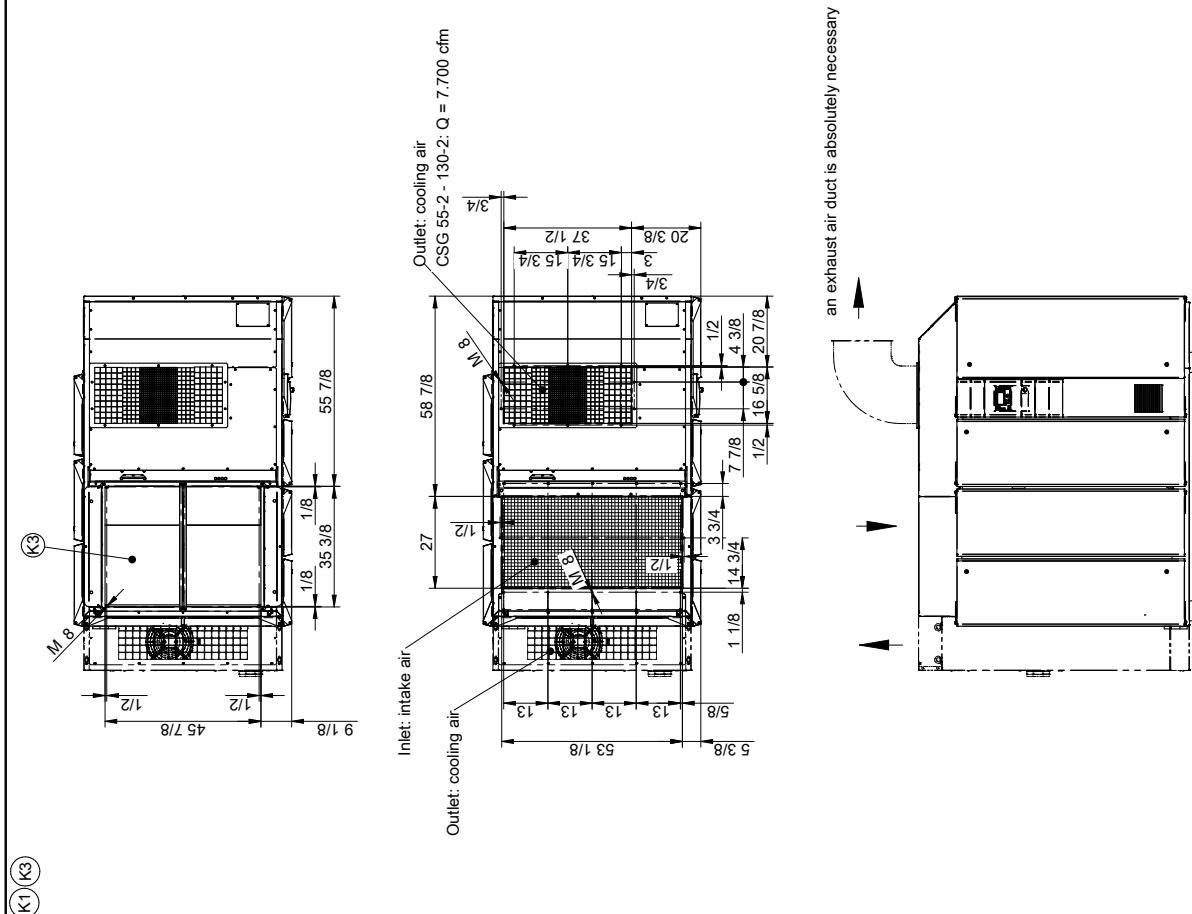
1	2	3	4	5	6	7	8
1	Air filter						
2	Combined inlet/venting valve						
2.14	Venting silencer						
3	Compressor motor						
3.1	Fan motor						
4a	Rotary screw airtend - Stage 1						
4b	Rotary screw airtend - Stage 2						
4.7	Oil pump						
4.18a	Snubber - Stage 1						
4.18b	Snubber - Stage 2						
4.20	Oil filler with screw plug						
5.2	PT100 temperature sensor						
7a	Safety relief valve - Stage 1						
7b	Safety relief valve - Final pressure						
9	Oil temperature controller						
10	Oil filter						
10.1	Differential pressure switch - Oil filter						
11	Heat exchanger oil cooling						
11.6	Shut-off valve with hose coupling - Oil drain device						
11.14	Shut-off valve - Oil drain device						
13a	Heat exchanger air cooling - Stage 1						
13b	Heat exchanger air cooling - Stage 2						
13.16	Shut-off valve with quick disconnect for venting						
17	Nozzle						
24.4	3/2-way solenoid valve for inlet valve control						
40a, b	Check valve - Condensate outlet						
40.1	Check valve downstream stage 2						
43a	Condensate separator - Stage 1						
43b	Condensate separator - Stage 2						
43.1a	Electronic condensate drain (Condensate separator - Stage 1)						
43.1b	Electronic condensate drain (Condensate separator - Stage 2)						
43.2	Shut-off valve, condensate drain connection						
53	Coupling						
59.1	Pressure transducer - Network pressure						
59.2	Pressure transducer - Internal pressure						
59.8	Pressure transducer - Pressure at stage 1 inlet						
70	Pressure regulating valve						
94	Axial fan						
95	Transmission						
96	Bypass valve						
97	Compressed air filter						
97.1	Ejector						
97.2	Solenoid valve (Closed when de-energized)						
97.3	Prefilter						
Option							
H23	Hot-air outlet with regulation						
K1	Air cooling						

13.2 Dimensional drawing



11

K1 K3



an exhaust air duct is absolutely necessary

an exhaust air duct is absolutely necessary

Dimensions shown in inches

Total permissible pressure loss for add-on ducting			
Without cooling air filter mats		With cooling air filter mats	
4.0 p. max.	CSG 55-2 K1	3.52 inch Water column	3.52 inch Water column
4.0 p. K1	60-2 K1	3.92 inch Water column	3.92 inch Water column
4.0 p. max.	CSG 120-2 K1	9 inch Water column	9 inch Water column
4.0 p. K1	CSG 120-2 K1-50-5 K1	1.68 inch Water column	1.68 inch Water column

13.3 Electrical Diagram

1	2	3	4	5	6	7	8
<div><div><div><div><div>Wiring Diagram</div><div>compressor series CSG</div><div>air cooled or water cooled</div><div>380V±10% 3ph 60Hz</div><div>460V±10% 3ph 60Hz</div><div>Power supply:</div><div>WYE system with center point solidly grounded</div></div></div><div><div>ATTENTION !!!</div><div>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.</div><div>The drawings remain our exclusive property. They are entrusted only for the agreed purpose. Copies or any other reproductions, including storage, treatment and dissemination by use of electronic systems must not be made for any other than the agreed purpose. Neither originals nor reproductions must be forwarded or otherwise made accessible to third parties.</div></div></div></div>							
				KAESER KOMPRESSOREN		cover page compressor series CSG	
c			Date	05.02.2021	USE	=	
b			Drawn	Sitter		+	
a			Released	Geiger			
A. Change			Date	Name		SC2 MCS	DCSG-U3060.01
						page 1	1 SHL

Lfd. Nr. No.	Benennung Name	Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page		DCSG-U3060.01	1	
2	list of contents		ZCSG-U3060.01	1	
3	general instructions		UCSG-U3060.01	1	
4	electrical equipment identification		UCSG-U3060.01	2	
5	electrical equipment identification		UCSG-U3060.01	3	
6	electrical component parts list		UCSG-U3060.01	4	
7	electrical component parts list		UCSG-U3060.01	5	
8	electrical component parts list		UCSG-U3060.01	6	
9	wiring diagram	power supply/power unit	SCSG-U3060.01	1	
10	wiring diagram	compressor motor	SCSG-U3060.01	2	
11	wiring diagram	vent motor / option K1	SCSG-U3060.01	3	
12	wiring diagram	vent motor / option K11	SCSG-U3060.01	4	
13	wiring diagram	control voltage tapping	SCSG-U3060.01	5	
14	wiring diagram	safety chain	SCSG-U3060.01	6	
15	wiring diagram	power supply unit	SCSG-U3060.01	7	
16	wiring diagram	IO-module/configuration	SCSG-U3060.01	8	
17	wiring diagram	IO-module/configuration	SCSG-U3060.01	9	
18	wiring diagram	sensors/actuators	SCSG-U3060.01	10	
19	wiring diagram	sensors/actuators	SCSG-U3060.01	11	
20	wiring diagram	sensors/actuators / option W6	SCSG-U3060.01	12	
21	wiring diagram	sensors/actuators / option K11	SCSG-U3060.01	13	
22	wiring diagram	sensors/actuators	SCSG-U3060.01	14	
23	wiring diagram	sensors/actuators / option K11	SCSG-U3060.01	15	
24	wiring diagram	sensors/actuators / option H23	SCSG-U3060.01	16	
25	wiring diagram	volt-free contacts	SCSG-U3060.01	17	
26	wiring diagram	digital inputs	SCSG-U3060.01	18	
27	wiring diagram	analog inputs	SCSG-U3060.01	19	
28	wiring diagram	Relay outputs	SCSG-U3060.01	20	
29	wiring diagram	digital/analog outputs	SCSG-U3060.01	21	
30	wiring diagram	Handling: Terminals	SCSG-U3060.01	22	
31	wiring diagram	Feed line connection	SCSG-U3060.01	23	
32	terminal connection	terminal strip -X0-X11-X12	KCSG-U3060.01	1	
33	lay-out	control panel control	ACSG-U3060.01	1	

c	Date	05.02.2021	list of contents	SC2 MCS	ZCSG-U3060.01	1
b	Drawn	Sitter				1
a	Released	Geiger				1
B. Change	Date	Name				1

1	2	3	4	5	6	7	8
<div><div><div>general instructions</div><div>ATTENTION !!!</div><div>Install supplies, grounding and shock protection to local safety regulations.</div><div>Do not make or break live plug-in connectors.</div></div><div><div>control cabinet wiring for non-designated conductors</div><div>primary circuits ungrounded: black, UL-Style 1015, CSA-TEW</div><div>primary circuits grounded: grey, UL-Style 1015, CSA-TEW</div><div>control voltage AC 115V ungrounded: red, 18AWG UL-Style 1015, CSA-TEW</div><div>control voltage AC 115V grounded: white, 18AWG UL-Style 1015, CSA-TEW</div><div>control voltage DC ungrounded: blue, 18AWG UL-Style 1015, CSA-TEW</div><div>control voltage DC grounded: white/blue, 18AWG UL-Style 1015, CSA-TEW</div><div>external voltage: orange, 16AWG UL-Style 1015, CSA-TEW</div><div>measuring circuits: violet, 18AWG UL-Style 1015, CSA-TEW</div><div>ground conductor: green/yellow, UL-Style 1015, CSA-TEW</div></div></div>							
<div><div><div>option K1 = air cooling</div><div>option K11 = water cooling</div><div>option K10 = Additional heat exchanger downstream from stage 2</div><div>option W6 = Heat recovery system without water pump</div><div>option H23 = Hot air outlet with regulation</div></div></div>							
<div><div><div><div><div>KAESER</div><div>KOMPRESSOREN</div></div><div><div>general instructions</div><div>compressor series CSG</div></div></div><div><div>SC2 MCS</div><div>UCSG-U3060.01</div></div></div></div> <div><div><div><div>c</div><div>b</div><div>a</div></div><div><div>Date</div><div>Drawn</div><div>Released</div></div><div><div>05.02.2021</div><div>Sitter</div><div>Geiger</div></div></div><div><div><div>Change</div><div>Date</div><div>Name</div></div><div><div></div><div></div><div></div></div></div></div> <div><div><div>=</div><div>+</div></div><div><div>page 1</div><div>6 SHL</div></div></div>							

1	2	3	4	5	6	7	8
general components		control					
-B25	overload relay,			-K20	Main Control System SC2MCS		
-F4	compressor motor			-X1	Ethernet		
-F5	circuit breaker,			-X2	IO-Bus		
	vent motor			-X3	RS485-FC (USS)		
-1FU, -2FU	Auxiliary fan/water cooling pump			-X4	communication module (Bus)		
-3FU	primary control fuse			-X5	SD card slot		
-40FU	secondary control fuse			-X6	ground connection		
-M1	compressor motor			-K21	IO-module SC2IOM-1		
-M4, -M5	vent motor			-X1	inside		
-M24	Bypass heat exchanger downstream from stage 1 valve V32			-X2	IO-Bus, input		
-M26	water cooling valve V14			-X3, -X8	IO-Bus, output		
-M27	water cooling valve V10			-X4	digital inputs		
-M29	water cooling valve V12			-X5, -X9	power supply unit, digital outputs		
-Q1	main contactor			-X6	Relay outputs		
-Q2	delta contactor			-X7	analog input, 4-20mA		
-Q3	wye contactor				analog input, Pt100		
-Q4	motor starter				external		
-Q5	motor starter			-X11...-X13	analog inputs, 4-20mA		
-S1	Auxiliary fan/water cooling pump			-X14...-X17	analog inputs, Pt100		
-T11	EMERGENCY STOP pushbutton			-X18...-X29	digital inputs		
-T21, -T22, -T23	control transformer			-X30...-X32	digital outputs		
	power unit						
terminal strips							
-X0	terminal strip, power supply			-K22, -K23	IO-module SC2IOM-3		
-X11	terminal strip, control			-X1	inside		
-X12	terminal strip, control			-X2	IO-Bus, input		
				-X3	IO-Bus, output		
				-X4	analog input, Pt100		
				-X5, -X9	power supply unit, digital outputs		
				-X6	Relay outputs		
				-X8	analog input, analog output 4-20mA		
					digital inputs		
				-X11...-X14	external		
				-X15	analog inputs, 4-20mA		
				-X18, -X19	analog output		
				-X20, -X21	digital inputs		
				-X22...-X32	digital outputs		
					analog inputs, Pt100		
						SC2 MCS	UCSG-U3060.01
							page 2
							6 SHL

1	2	3	4	5	6	7	8
sensors/actuators							
differential pressure switch							
-B3	Oil system: Differential pressure, oil filter dp64			control valve			
pressure transducer							
-B1	Heat exchanger Stage 2: Air pressure, outlet p5			-K2 solenoid valve Scavenging			
-B7	Stage 1: Air pressure inlet p1			-K3 solenoid valve Oil return			
-B15	Stage 2: Air pressure inlet p3			-K11 condensate drain, aftercooler			
-B16	Stage 2: Air pressure, outlet p4			-K12 condensate drain, intercooler			
-B17	Oil system: Oil pressure, inlet lubrication p66						
-B18	Oil system: Oil pressure for inlet valve p63						
-B19	Primary water system: Water pressure p14						
-B20	Secondary water system: Water pressure p20						
temperature probe							
-B60	compressor motor: temperature winding T711						
-B81	Stage 1: Air temperature, inlet T1						
-B82	Stage 1: Air temperature, outlet T2						
-B83	Heat exchanger Stage 1: Air temperature, outlet T31						
-B84	Stage 2: Air temperature, outlet T4						
-B85	Heat exchanger Stage 2: Air temperature, outlet T51						
-B86	Oil system: Oil temperature, inlet lubrication T66						
-B87	Primary water system:						
	Compressor cooling heat exchanger inlet temperature T10						
-B88	Primary water system:						
	Water temperature, outlet heat exchanger Stage 1 T11						
-B89	Primary water system:						
	Water temperature, outlet heat exchanger Stage 2 T12						
-B90	Stage 2: Water temperature, outlet T13						
-B91	Primary water system: Water temperature, outlet T14						
-B92	Water temperature, outlet heat exchanger, oil-cooling T16						
-B94	Water temperature, outlet Auxiliary heat exchanger, Stage 2 T25						
-B96	Primary water system: Water temperature, inlet T9						
-B97	Secondary water system: Water temperature, inlet T20						
-B98	Secondary water system:						
	Water temperature, outlet water/water heat exchanger T24						
-B99	Secondary water system: Water temperature, outlet T29						
-B101	Stage 2: Air temperature, inlet T32						
-B304	Auxiliary heat exchanger, Stage 2: Air temperature, outlet T52						
electrical equipment identification							
compressor series CSG							
				SC2 MCS		UCSG-U3060.01	
				=		+	
				page		3	
				6 Shit			

performance-related components							page	
model		CSG 55-2	CSG 70-2	CSG 90-2	CSG 120-2	CSG 130-2	4	6 Sht.
machine power supply		380 V±10 %, 60 Hz	380 V±10 %, 60 Hz	380 V±10 %, 60 Hz	380 V±10 %, 60 Hz	380 V±10 %, 60 Hz	UCSG-U3060.01	
motor	-M1	50 hp	60 hp	75 hp	100 hp	125 hp		
supply terminals	-X0:U1/V1/W1	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 895545.0 285-1185 fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM	3x 895545.0 285-1185 fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM	SC2 MCS	
	Handling Stripped length WAGO GRD rail	fig. 2, Sht. 22 35 mm 4 - 4/0 AWG fig. 20-22, Sht. 22	fig. 2, Sht. 22 35 mm 4 - 4/0 AWG fig. 20-22, Sht. 22	fig. 2, Sht. 22 35 mm 4 - 4/0 AWG fig. 20-22, Sht. 22	fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM fig. 20-22, Sht. 22	fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM fig. 20-22, Sht. 22		
supply	connection	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	electrical component parts list compressor series CSG	
contactor	-Q1/-Q2	7.8740.00400 3RT2035-1AK60	7.8740.00440 3RT2045-1AK60	7.3140.02140 3RT1054-1AF36	7.3140.02140 3RT1054-1AF36	7.3140.02140 3RT1054-1AF36		
interference suppressor		7.8740.05150 3RT2936-1CC00	7.8740.05170 3RT2946-1CC00	7.3140.02020 3RT1956-1CC00	7.3140.02020 3RT1956-1CC00	7.3140.02020 3RT1956-1CC00	KAESER KOMPRESSOREN	
auxiliary switch	-Q1	7.8740.05010 3RH2911-1HA11	7.8740.05010 3RH2911-1HA11	---	---	---		
terminal block	-Q1 Siemens	---	---	---	7.3140.01510 3RT1956-4G	7.3140.01510 3RT1956-4G		
contactor	-Q3	7.8740.00400 3RT2035-1AK60	7.8740.00400 3RT2035-1AK60	7.8740.00410 3RT2036-1AK60	7.8740.00440 3RT2045-1AK60	7.8740.00440 3RT2045-1AK60		
interference suppressor	Siemens	7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05170 3RT2946-1CC00	7.8740.05170 3RT2946-1CC00		
overload relay	-B25 Siemens	7.8741.00100 3RB3036-1WB0 20-80 A setting: 40 A --- NEC 430.32(C) incremental setting: 45 A ---	7.8741.00140 3RB3046-1XB0 32-115 A setting: 50 A ≤ 6 bar setting: 51 A > 6 bar NEC 430.32(C) incremental setting: 56 A ≤ 6 bar setting: 57 A > 6 bar	7.6873.00230 3RB2056-1FC2 50-200 A setting: 60 A --- NEC 430.32(C) incremental setting: 67 A ---	7.6873.00230 3RB2056-1FC2 50-200 A setting: 81 A --- NEC 430.32(C) incremental setting: 91 A ---	7.6873.00230 3RB2056-1FC2 50-200 A setting: 95 A --- NEC 430.32(C) incremental setting: 107 A ---		
circuit breaker	-F4 (option K1)	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 7.3 A NEC 430.32(C) incremental setting: 8.0 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 7.3 A NEC 430.32(C) incremental setting: 8.0 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 7.3 A NEC 430.32(C) incremental setting: 8.0 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 7.3 A NEC 430.32(C) incremental setting: 8.0 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 7.3 A NEC 430.32(C) incremental setting: 8.0 A		
	-F4 (option K11)	7.8742.01130 3RV2021-1CA10 1.8-2.5 A setting: 2.0 A NEC 430.32(C) incremental setting: 2.2 A	7.8742.01131 3RV2021-1CA11 1.8-2.5 A setting: 2.0 A NEC 430.32(C) incremental setting: 2.2 A	7.8742.01132 3RV2021-1CA12 1.8-2.5 A setting: 2.0 A NEC 430.32(C) incremental setting: 2.2 A	7.8742.01133 3RV2021-1CA13 1.8-2.5 A setting: 2.0 A NEC 430.32(C) incremental setting: 2.2 A	7.8742.01134 3RV2021-1CA14 1.8-2.5 A setting: 2.0 A NEC 430.32(C) incremental setting: 2.2 A		
circuit breaker	-F5 (option K1)	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A		
auxiliary switch	-F4/-F5 Siemens	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E		
contactor	-Q4	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60		
contactor	-Q5 (option K1)	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60		
interference suppressor	-Q4/-Q5 Siemens	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00		
transformer	-T11	7.2239.20070 USTE 400/2X115 Block 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 Block 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 Block 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 Block 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 Block 400 VA, 208-600 V		
fuse	-1FU/-2FU/-3FU Ferraz	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)		
connection	-W11	2 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C	3/0 AWG black 600 V, 90°C	3/0 AWG black 600 V, 90°C		
connection	-W13	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	4 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C		
connection	-W14	10 AWG black 600 V, 90°C	10 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C		
connection	-W15	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31	7.3140.00940 3RT1946-4BA31	7.3140.00940 3RT1946-4BA31		
motor cable -M1	-W19	2x 4x4 AWG 600 V, 90°C	2x 4x2 AWG 600 V, 90°C	2x 4x2 AWG 600 V, 90°C	2x 4x2/0 AWG 600 V, 90°C	2x 4x2/0 AWG 600 V, 90°C		
							Date	
							Name	
							Date	
							Date	

performance-related components							page 5 6 Sht.	
model		CSG 55-2	CSG 70-2	CSG 90-2	CSG 120-2	CSG 130-2		
machine power supply		460 V±10 %, 60 Hz	460 V±10 %, 60 Hz	460 V±10 %, 60 Hz	460 V±10 %, 60 Hz	460 V±10 %, 60 Hz		
motor	-M1	50 hp	60 hp	75 hp	100 hp	125 hp		
supply terminals	-X0:U1/V1/W1	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 894385.0 285-195 fig. 2, Sht. 22 35 mm 4 - 4/0 AWG	3x 895545.0 285-1185 fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM	3x 895545.0 285-1185 fig. 2, Sht. 22 45 mm 1/0 AWG - 350 MCM		
	Handling	fig. 2, Sht. 22	fig. 2, Sht. 22	fig. 2, Sht. 22	fig. 2, Sht. 22	fig. 2, Sht. 22		
	Stripped length	35 mm	35 mm	35 mm	45 mm	45 mm		
	WAGO	4 - 4/0 AWG	4 - 4/0 AWG	4 - 4/0 AWG	1/0 AWG - 350 MCM	1/0 AWG - 350 MCM		
	GRD rail	fig. 20-22, Sht. 22	fig. 20-22, Sht. 22	fig. 20-22, Sht. 22	fig. 20-22, Sht. 22	fig. 20-22, Sht. 22		
supply	connection	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23	fig. 10+ 11, Sht. 23		
contactor	-Q1/-Q2	7.8740.00400 3RT2035-1AK60	7.8740.00410 3RT2036-1AK60	7.8740.00440 3RT2045-1AK60	7.3140.02140 3RT1054-1AF36	7.3140.02140 3RT1054-1AF36		
interference suppressor		7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05170 3RT2946-1CC00	7.3140.02020 3RT1956-1CC00	7.3140.02020 3RT1956-1CC00		
auxiliary switch	-Q1	7.8740.05010 3RH2911-1HA11	7.8740.05010 3RH2911-1HA11	7.8740.05010 3RH2911-1HA11	---	---		
terminal block	-Q1 Siemens	---	---	---	7.3140.01510 3RT1956-4G	7.3140.01510 3RT1956-4G		
contactor	-Q3	7.8740.00400 3RT2035-1AK60	7.8740.00400 3RT2035-1AK60	7.8740.00400 3RT2035-1AK60	7.8740.00430 3RT2038-1AK60	7.8740.00430 3RT2038-1AK60		
interference suppressor		7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00	7.8740.05150 3RT2936-1CC00		
overload relay	-B25 Siemens	7.8741.00100 3RB3036-1WB0 20-80 A setting: 34 A --- NEC 430.32(C) incremental setting: 38 A ---	7.8741.00100 3RB3036-1WB0 20-80 A setting: 40 A ≤ 6 bar setting: 41 A > 6 bar NEC 430.32(C) incremental setting: 45 A ≤ 6 bar setting: 46 A > 6 bar	7.8741.00140 3RB3046-1XB0 32-115 A setting: 49 A --- NEC 430.32(C) incremental setting: 55 A ---	7.6873.00230 3RB2056-1FC2 50-200 A setting: 68 A --- NEC 430.32(C) incremental setting: 76 A ---	7.6873.00230 3RB2056-1FC2 50-200 A setting: 78 A --- NEC 430.32(C) incremental setting: 87 A ---		
circuit breaker	-F4 (option K1)	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 6.0 A NEC 430.32(C) incremental setting: 6.7 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 6.0 A NEC 430.32(C) incremental setting: 6.7 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 6.0 A NEC 430.32(C) incremental setting: 6.7 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 6.0 A NEC 430.32(C) incremental setting: 6.7 A	7.8742.01180 3RV2021-1HA10 5.5-8.0 A setting: 6.0 A NEC 430.32(C) incremental setting: 6.7 A		
circuit breaker	-F4 (option K11)	7.8742.01120 3RV2021-1BA10 1.4-2.0 A setting: 1.5 A NEC 430.32(C) incremental setting: 1.6 A	7.8742.01120 3RV2021-1BA10 1.4-2.0 A setting: 1.5 A NEC 430.32(C) incremental setting: 1.6 A	7.8742.01120 3RV2021-1BA10 1.4-2.0 A setting: 1.5 A NEC 430.32(C) incremental setting: 1.6 A	7.8742.01120 3RV2021-1BA10 1.4-2.0 A setting: 1.5 A NEC 430.32(C) incremental setting: 1.6 A	7.8742.01120 3RV2021-1BA10 1.4-2.0 A setting: 1.5 A NEC 430.32(C) incremental setting: 1.6 A		
circuit breaker	-F5 (option K1)	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A	7.8742.00060 3RV2011-0FA10 0.35-0.50 A setting: 0.39 A NEC 430.32(C) incremental setting: 0.44 A		
auxiliary switch	-F4/-F5 Siemens	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E	7.8742.05000 3RV2901-1E		
contactor	-Q4	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60		
interference suppressor		7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00		
contactor	-Q5 (option K1)	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60	7.8740.00340 3RT2023-1AK60		
interference suppressor	-Q4/-Q5 Siemens	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00	7.8740.05140 3RT2926-1CC00		
transformer	-T11	7.2239.20070 USTE 400/2X115 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 400 VA, 208-600 V	7.2239.20070 USTE 400/2X115 400 VA, 208-600 V		
fuse	-1FU/-2FU/-3FU Ferraz	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)	7.3161.00141 ATQR 4 (4 A, 600 V)		
connection	-W11	2 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C	1 AWG black 600 V, 90°C	3/0 AWG black 600 V, 90°C	3/0 AWG black 600 V, 90°C		
connection	-W13	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C	2 AWG black 600 V, 90°C		
connection	-W14	10 AWG black 600 V, 90°C	10 AWG black 600 V, 90°C	10 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C	6 AWG black 600 V, 90°C		
connection	-W15	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31	7.3140.01170 3RT1936-4BA31		
motor cable -M1	-W19	2x 4x4 AWG 600 V, 90°C	2x 4x4 AWG 600 V, 90°C	2x 4x2 AWG 600 V, 90°C	2x 4x1 AWG 600 V, 90°C	2x 4x2/0 AWG 600 V, 90°C		

electrical component parts list
compressor series CSG

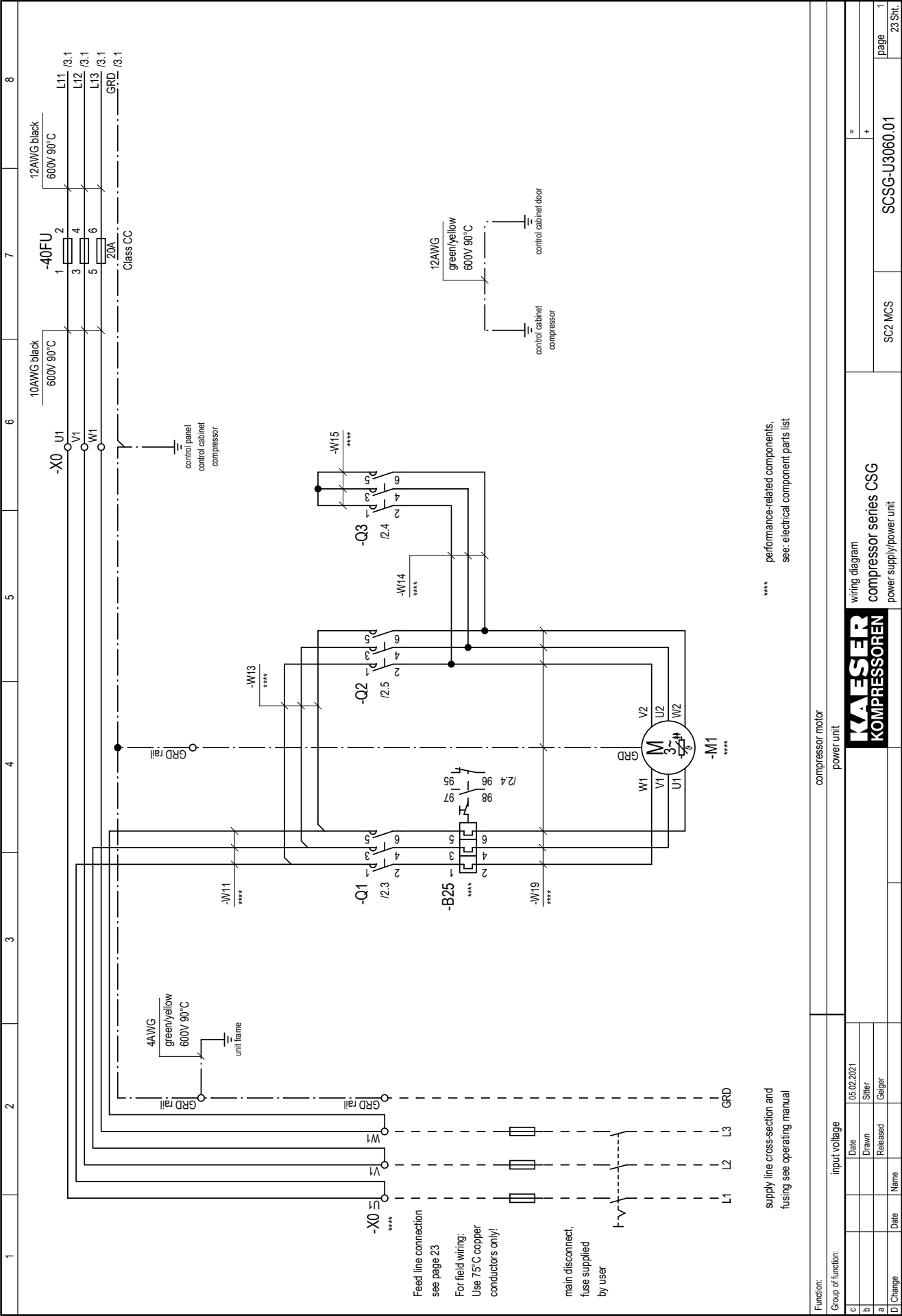
KAESER
KOMPRESSOREN

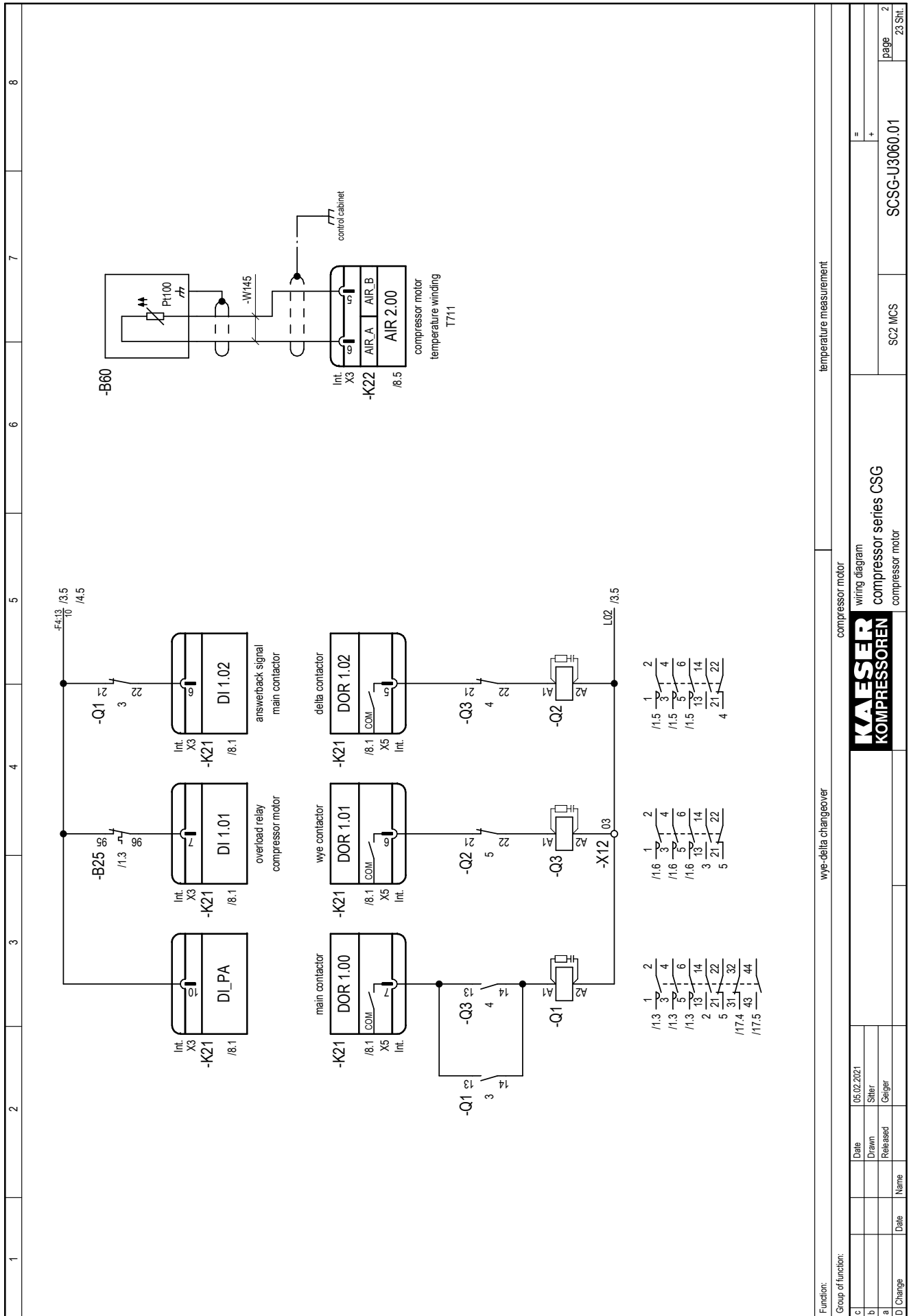
05.02.2021
Date
Drawn
Released
Geiger

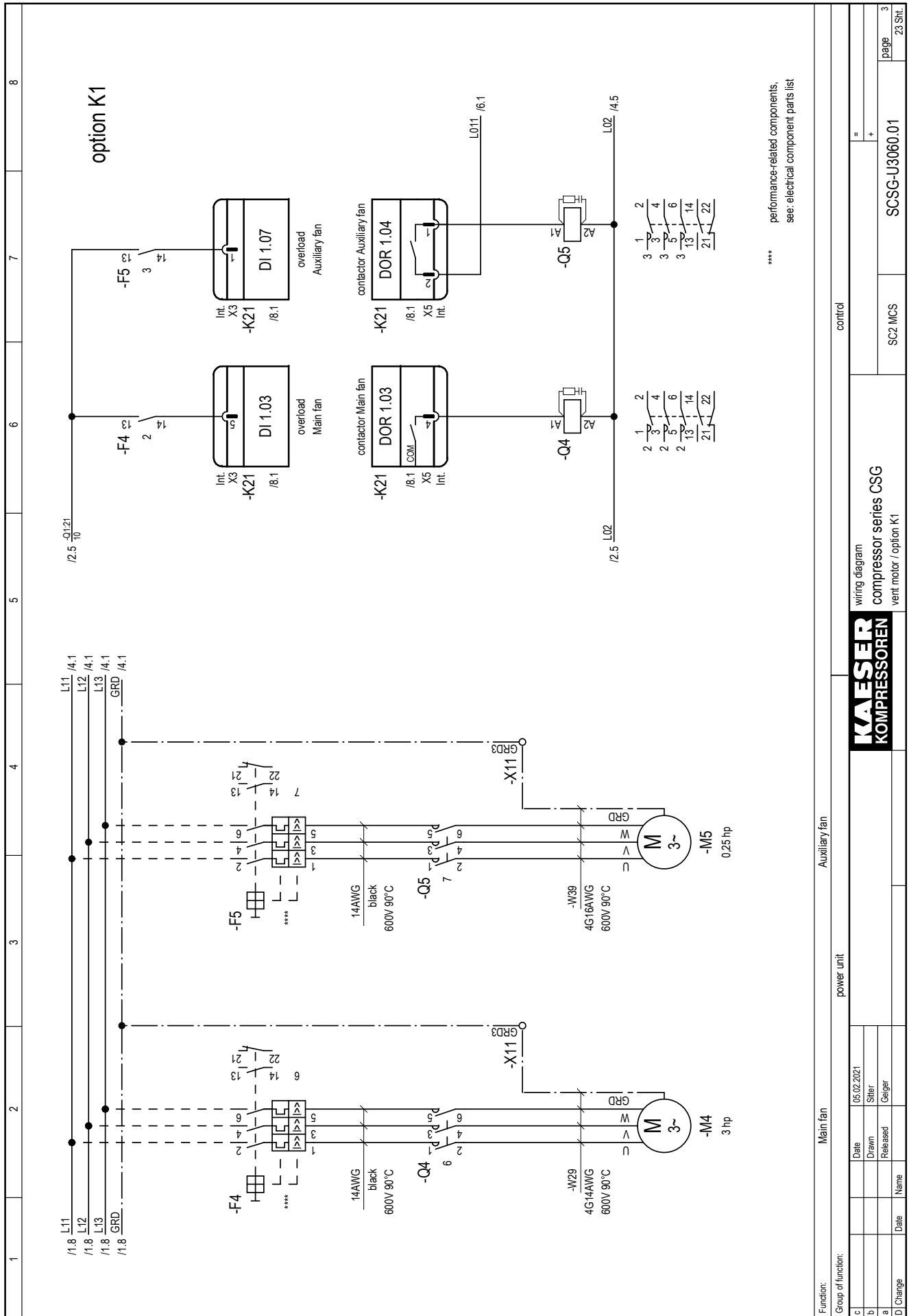
Name
Date

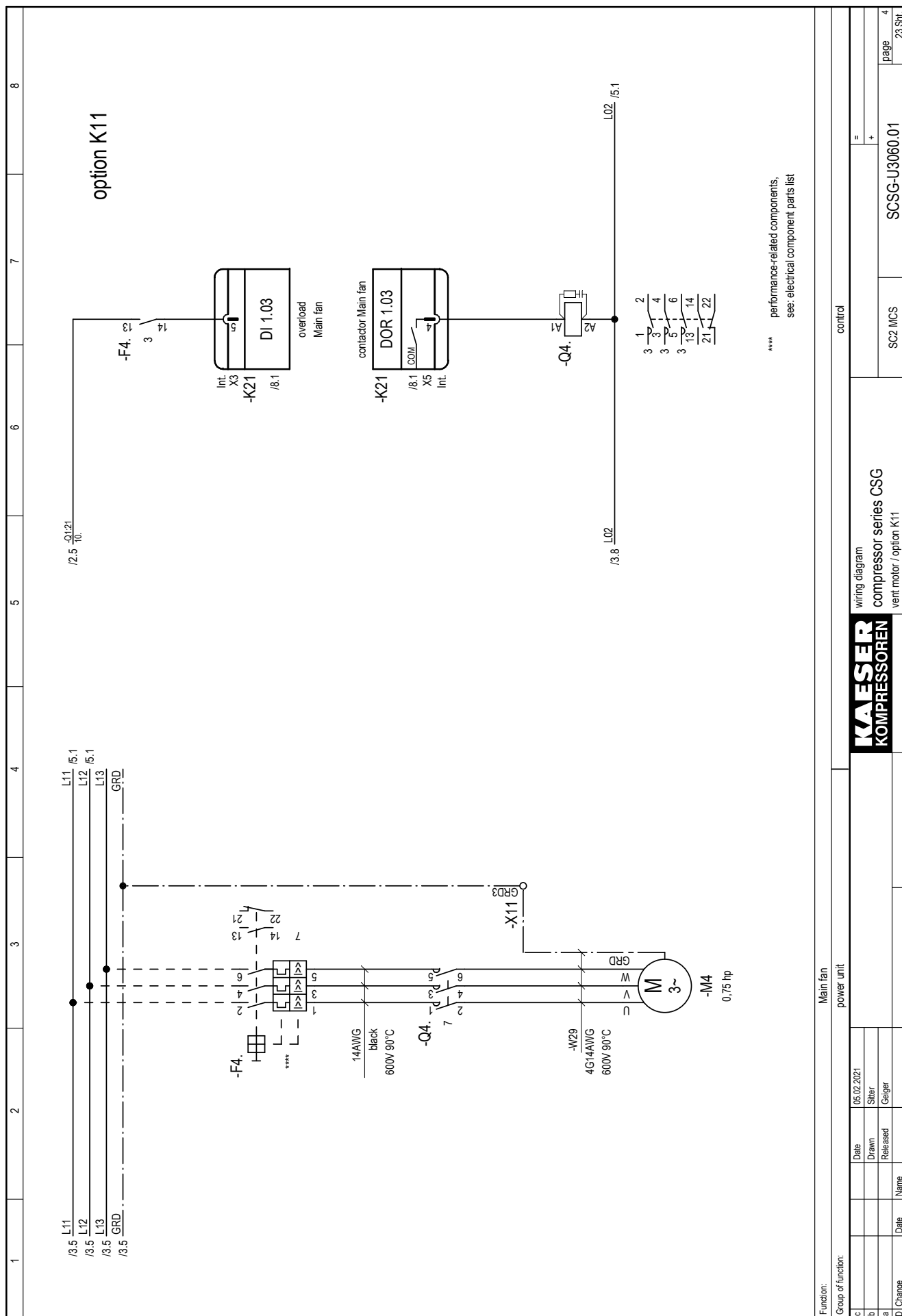
Change

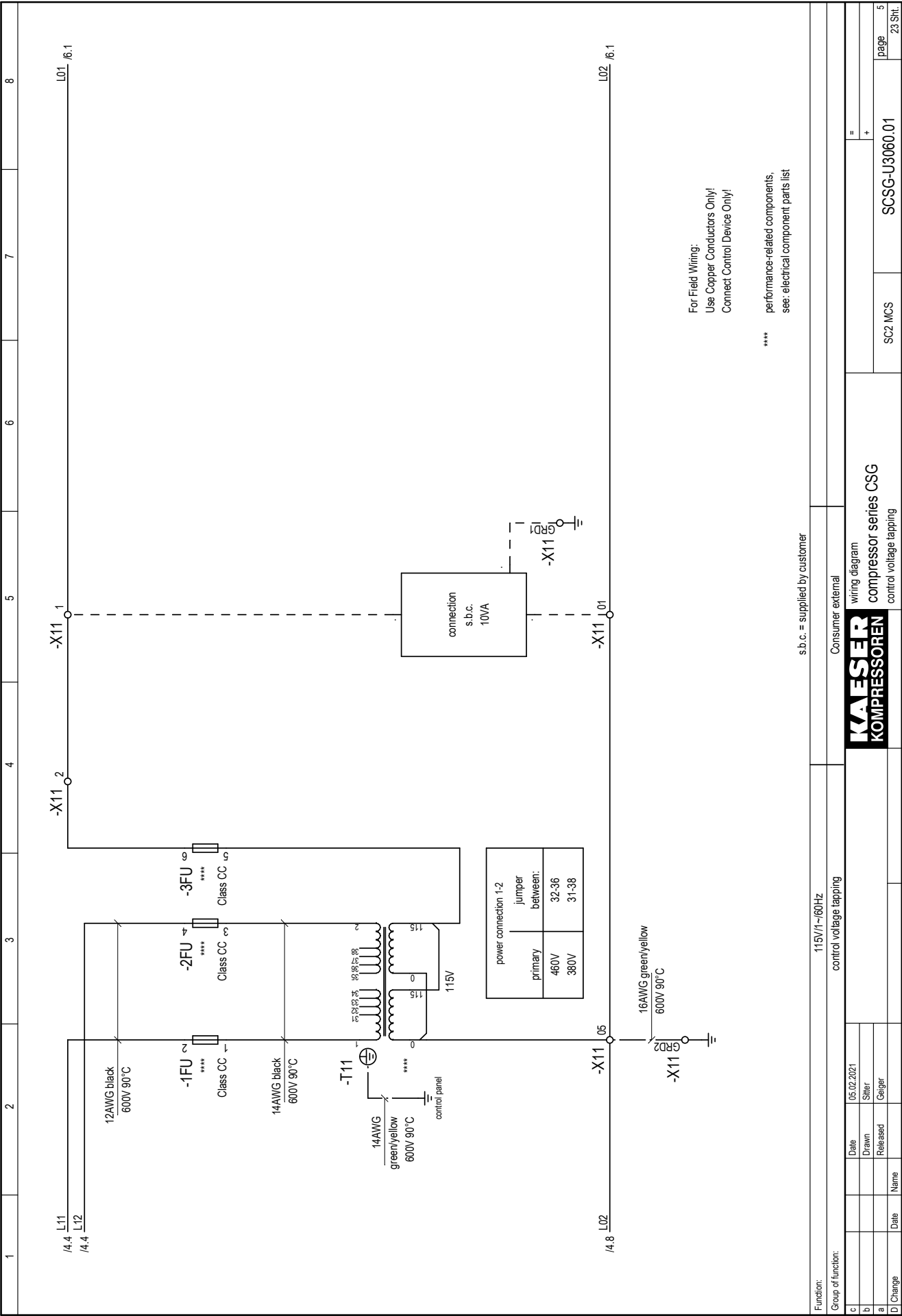
model		Common parts CSG2.4		=		+ UCSG-U3060.01		6 page		6 Sht.	
machine power supply		380 V±10 %, 60 Hz 460 V±10 %, 60 Hz									
fuse socket -40FU Wöhner		7.3320.00060 Class CC 3-pol 31297									
fuse -40FU Ferraz		7.3161.00320 ATDR 20 20 A, 600 V									
power supply -T21/-T22 Prodrive		7.7605P0 PSDC24/2.5									
power supply (option K11) -T23 Prodrive		7.7605P0 PSDC24/2.5									
compressor control -K20 Prodrive		7.7601.0 SIGMA CONTROL 2 MCS									
IO-module -K21 Prodrive		7.7602.1 SIGMA CONTROL 2 IOM-1									
IO-module -K22 Prodrive		7.7604.1 SIGMA CONTROL 2 IOM-3									
IO-module (option K11) -K23 Prodrive		7.7604.1 SIGMA CONTROL 2 IOM-3									
EMERGENCY STOP pushbutton -S1		7.3217.0 QRUV									
auxiliary contact Schlegel		7.3218.0 MHTOO									
outlet filter Rübsamen&Herr		7.2752.00010 GV300 / grey									
terminal strip -X11 Wieland		7.7114.00100 99.724.5333.8									
-X11 Handling		fig. 1, Sht. 22									
series terminal -X12		4x 7.3149.01590 WKFN2,5 E/35									
plug-connector Wieland		2x 7.3149.00960 IVB WKF2.5-4									
electrical component parts list compressor series CSG											
KAESER KOMPRESSOREN											
Date		05.02.2021		Name		Date		Name		Date	
Drawn		Sitter		Released		Geiger					
a											
C Change											

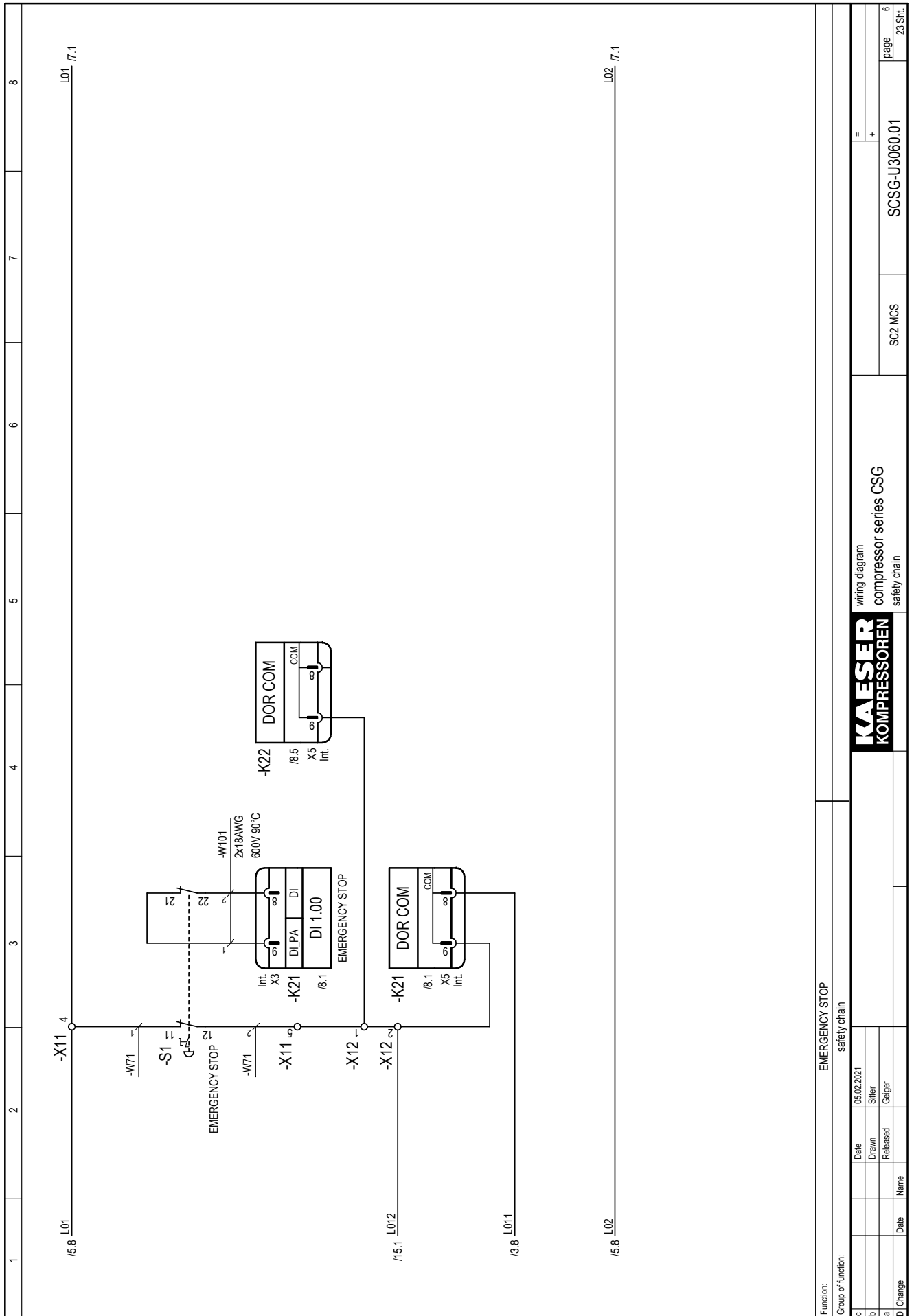


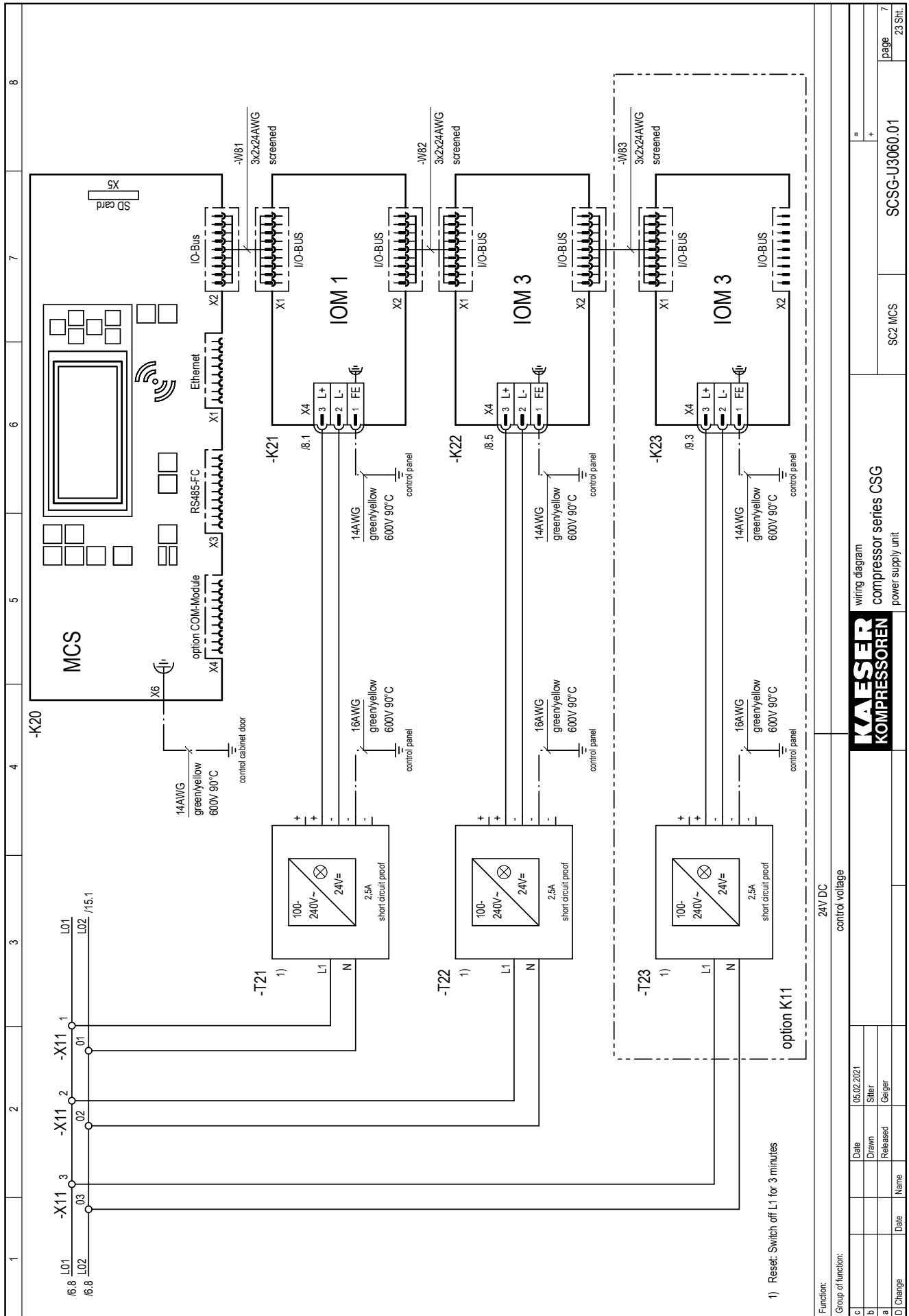


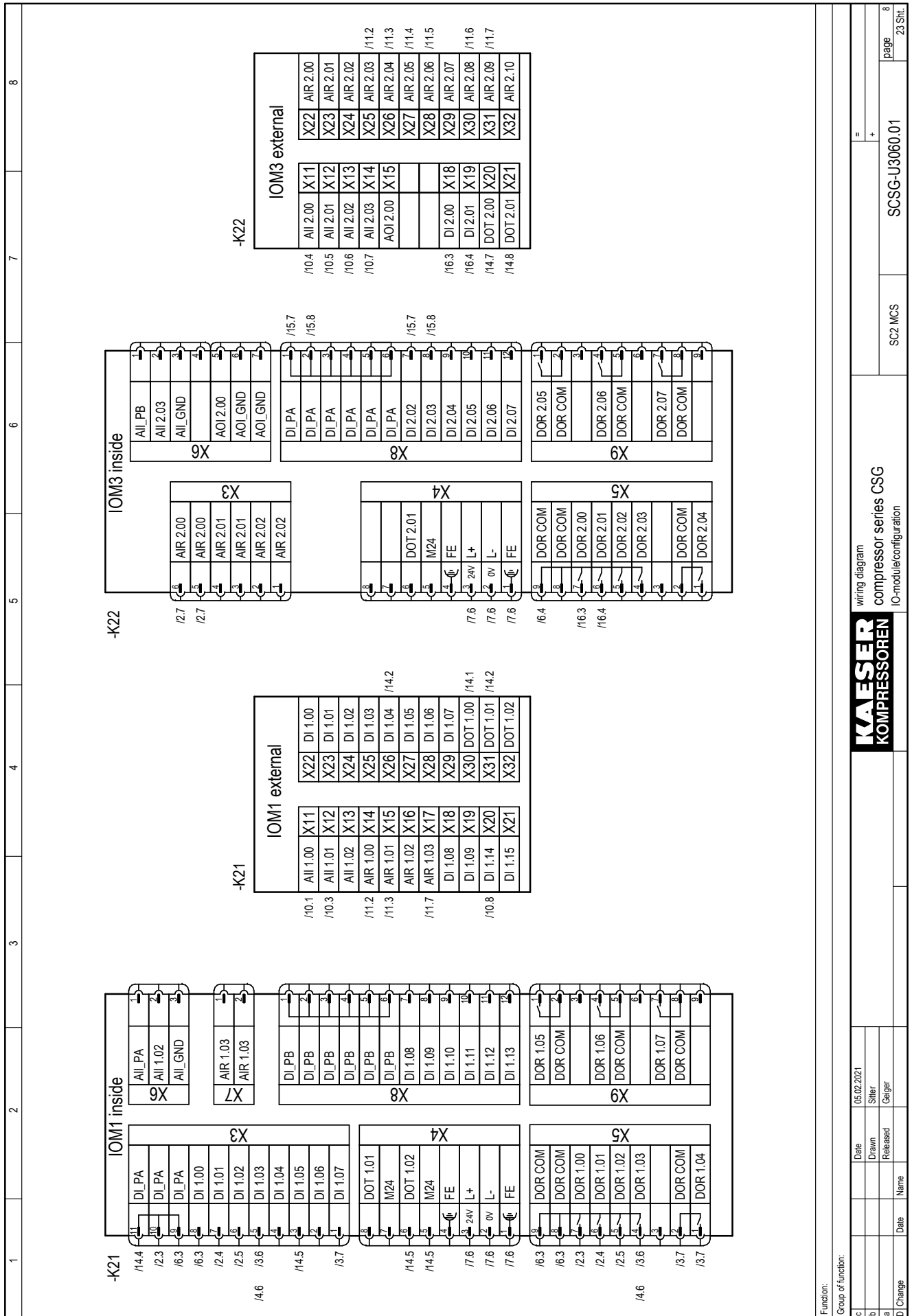


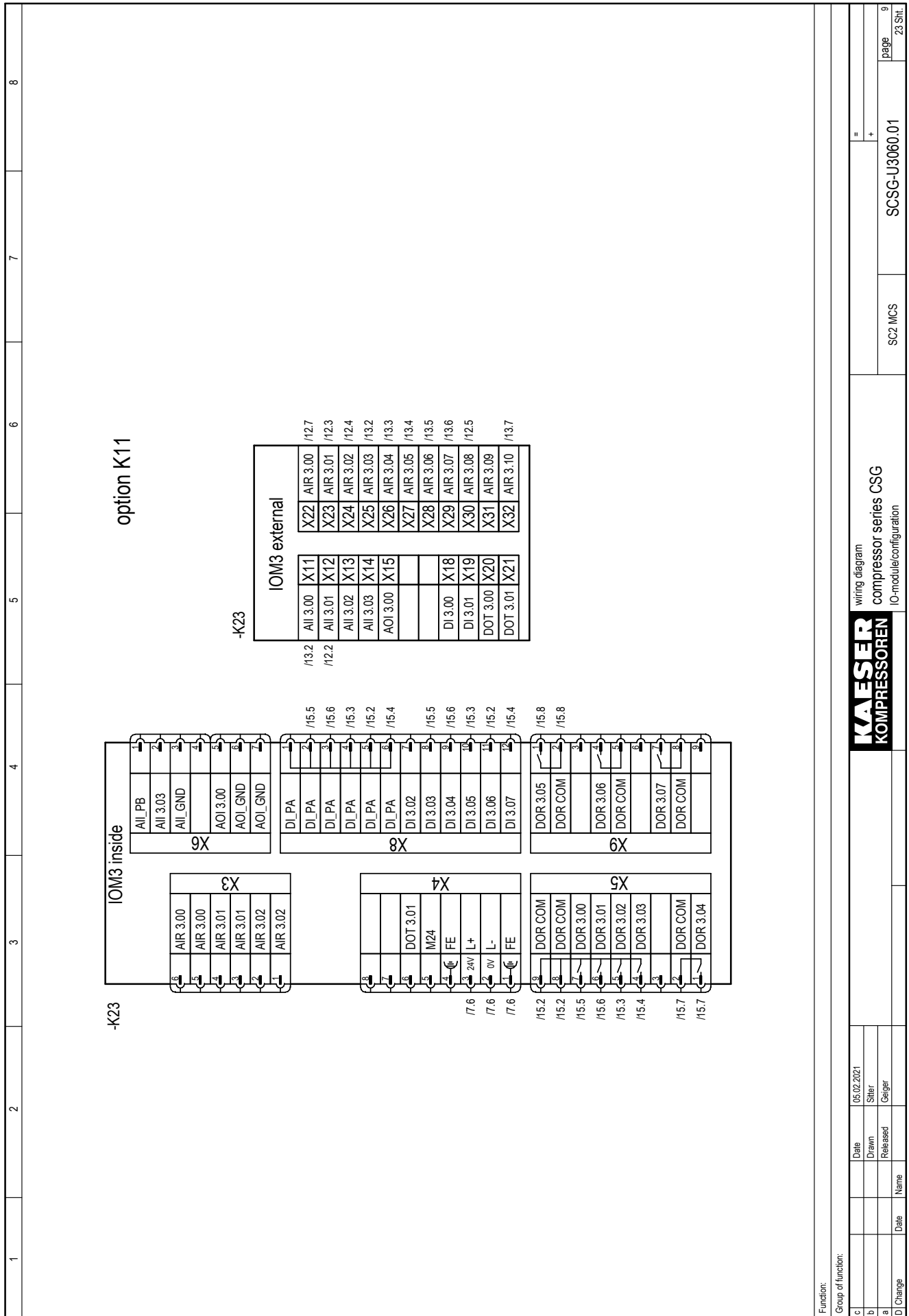


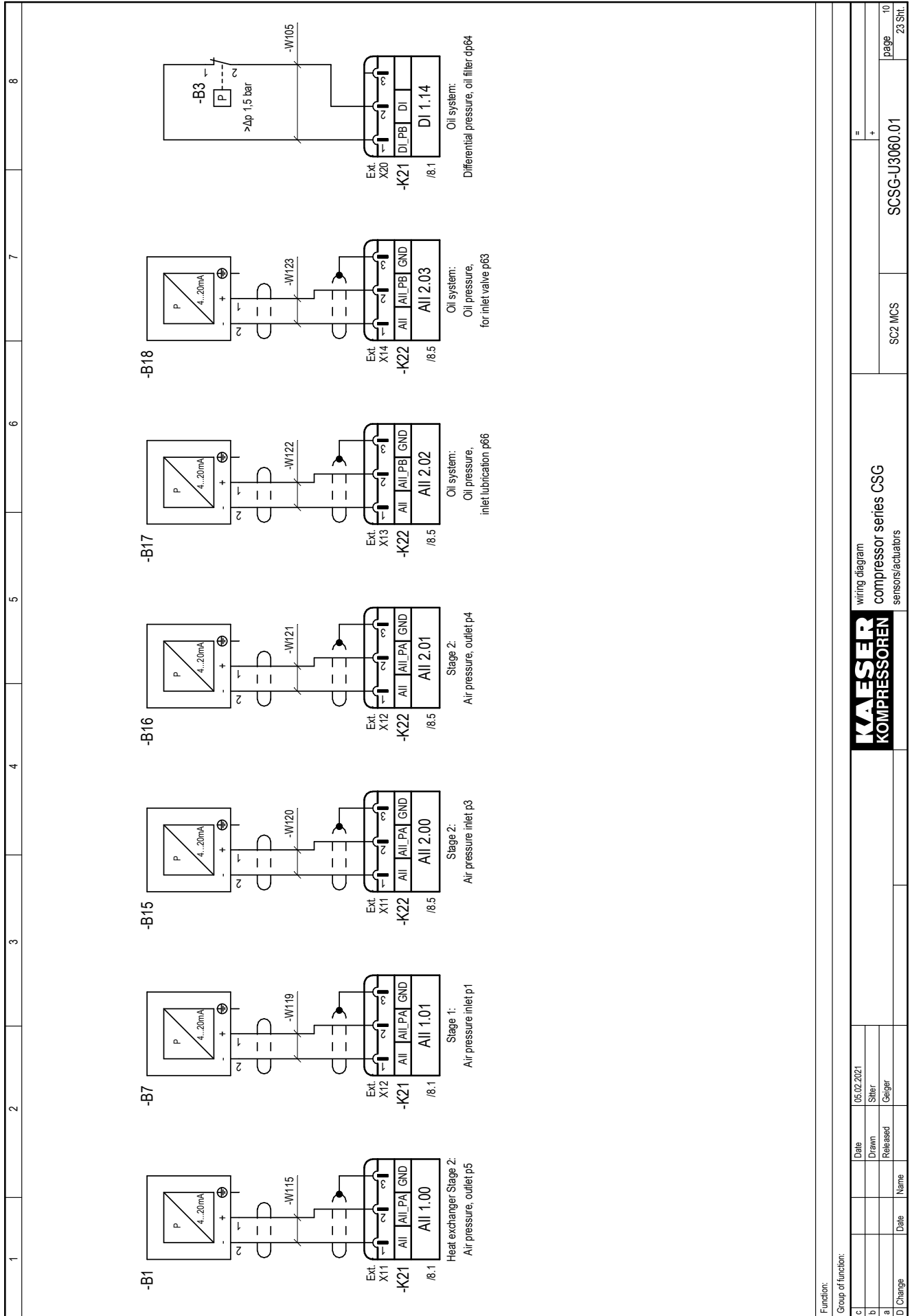


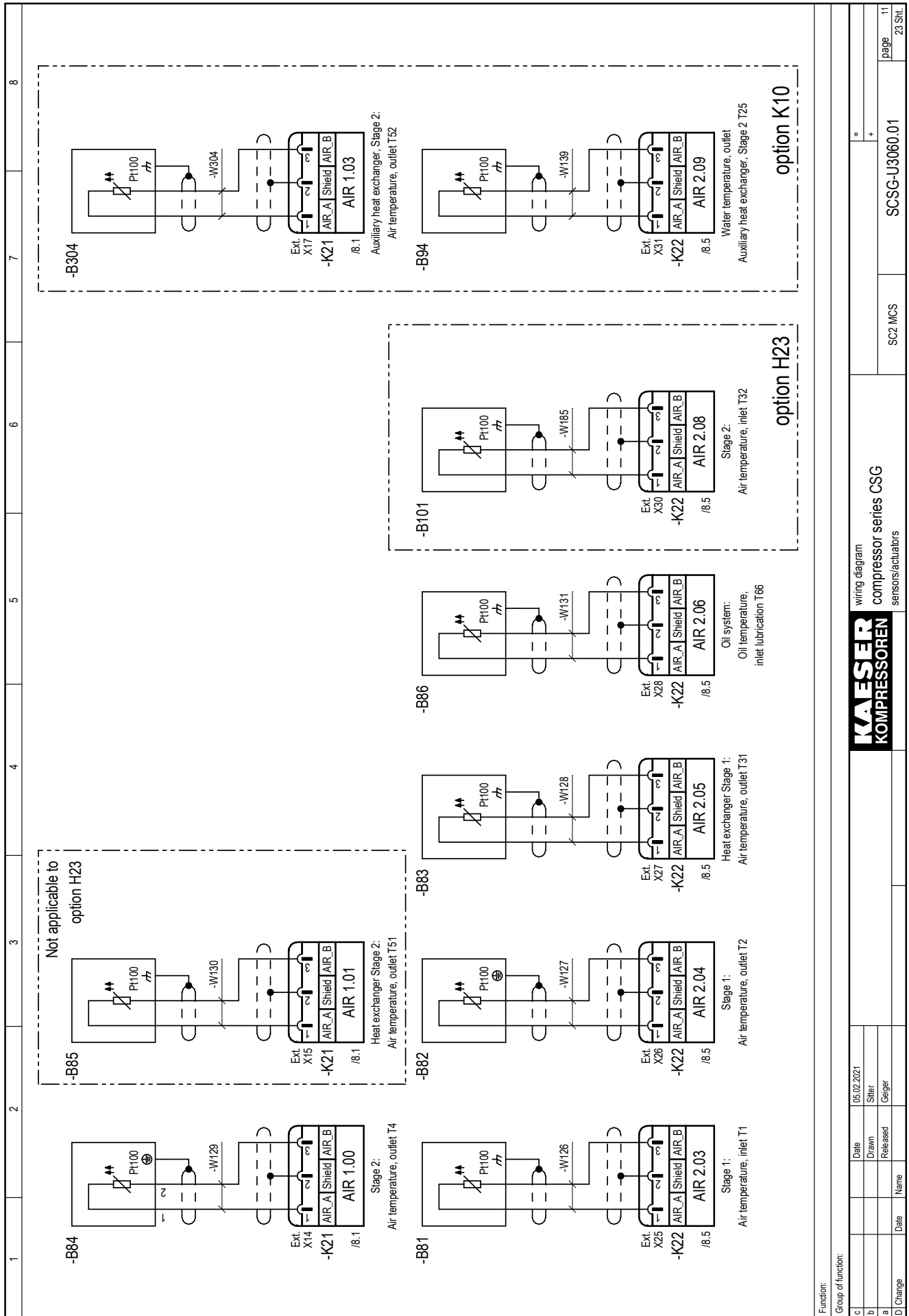


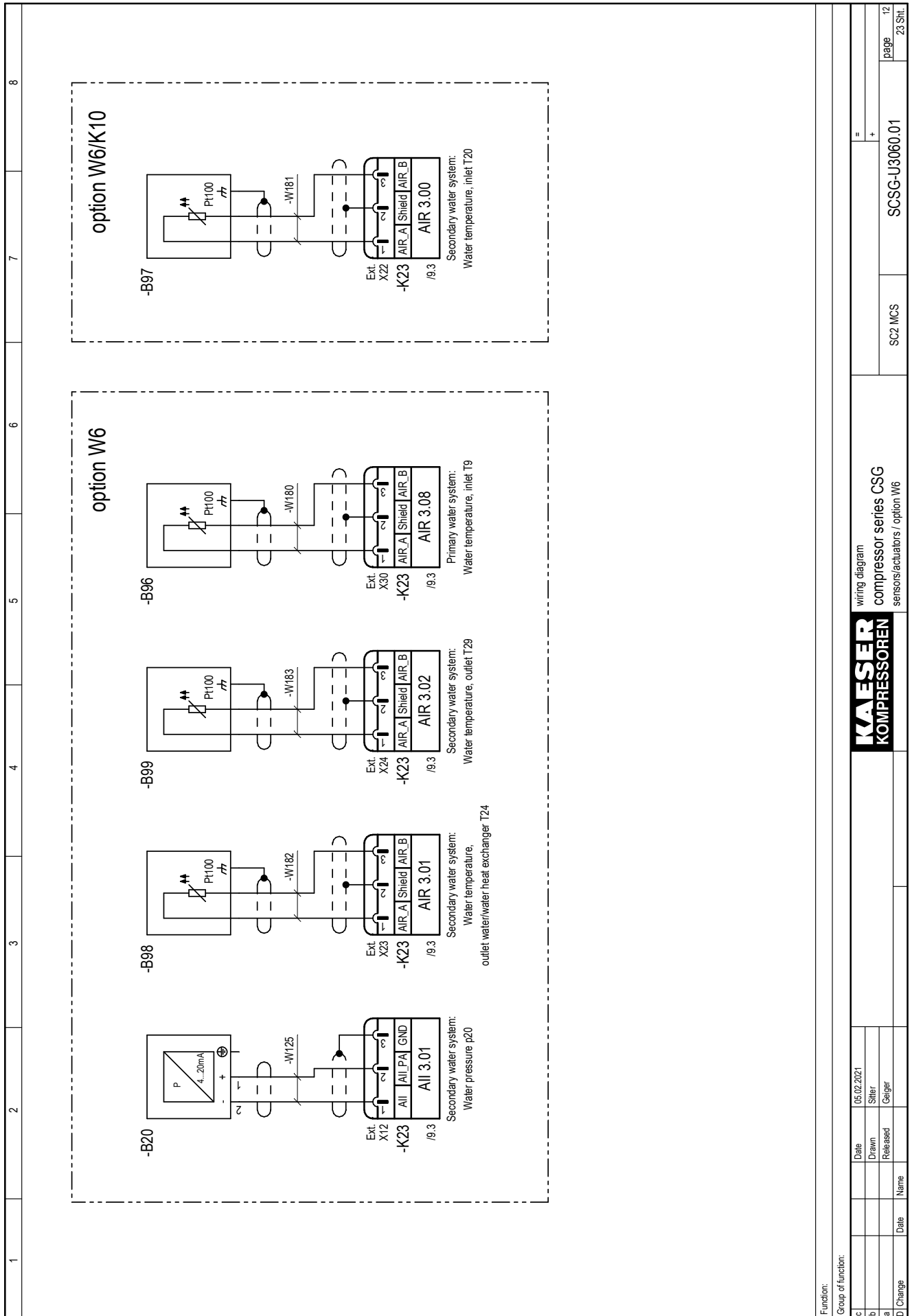




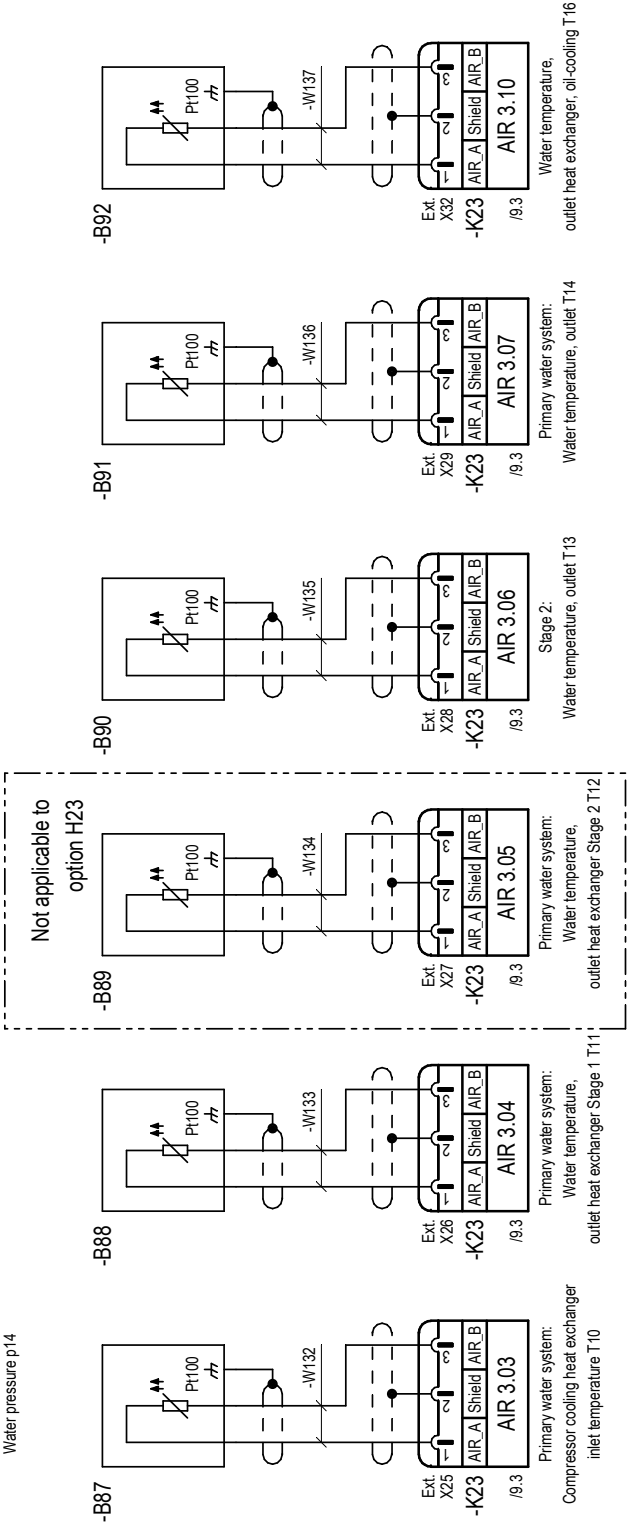
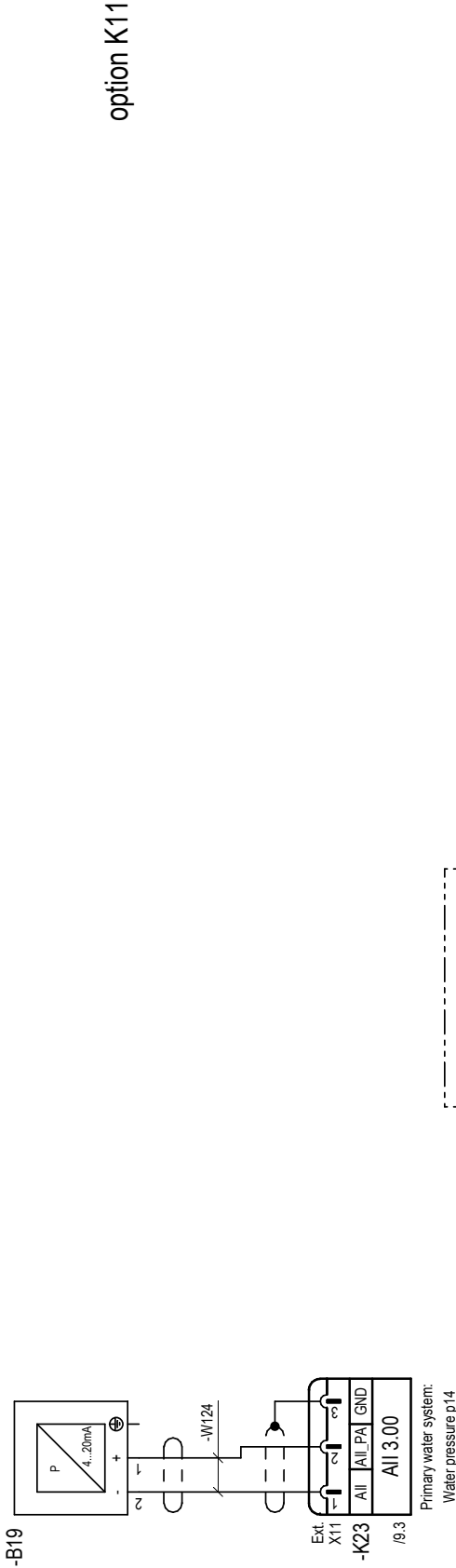




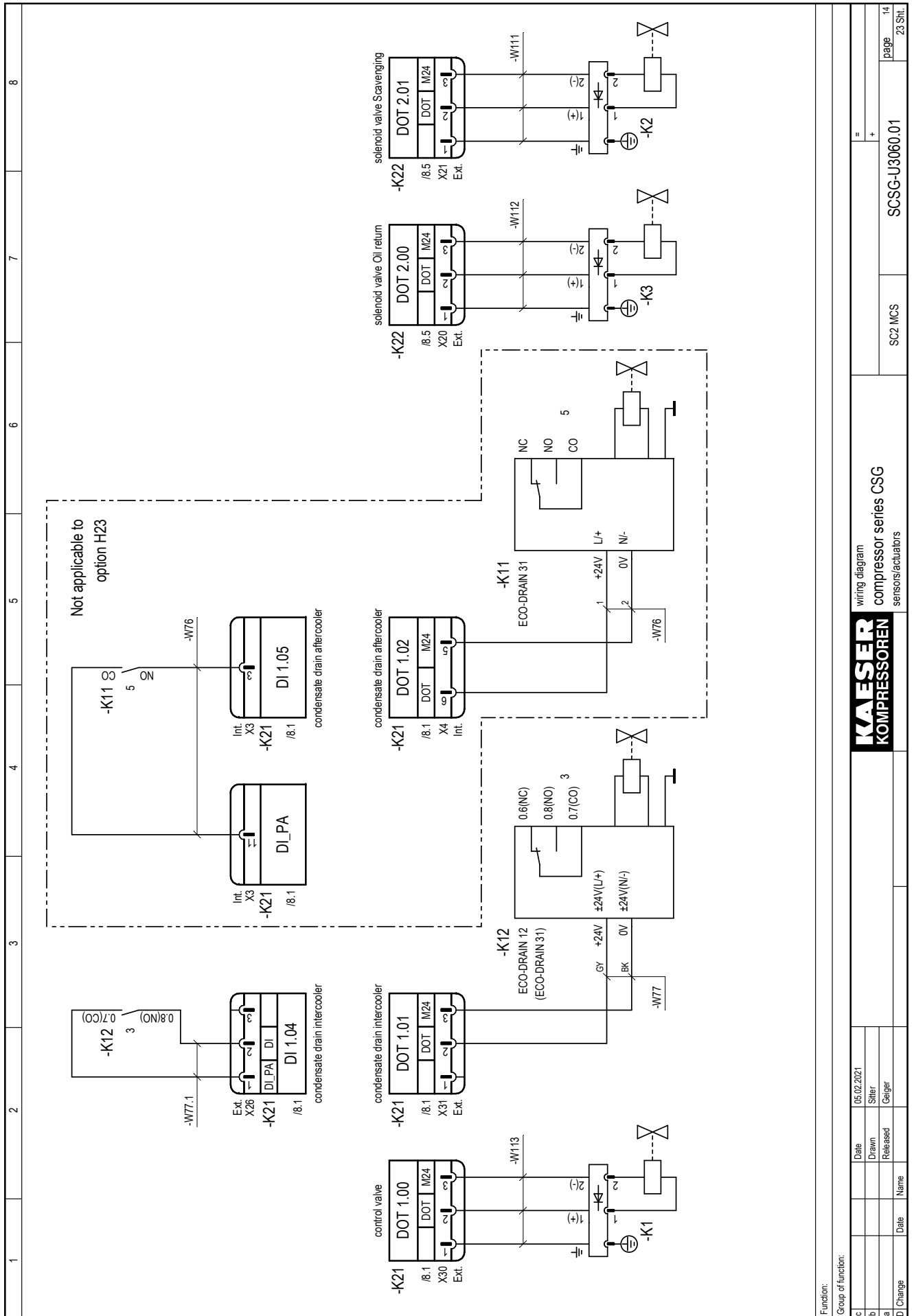


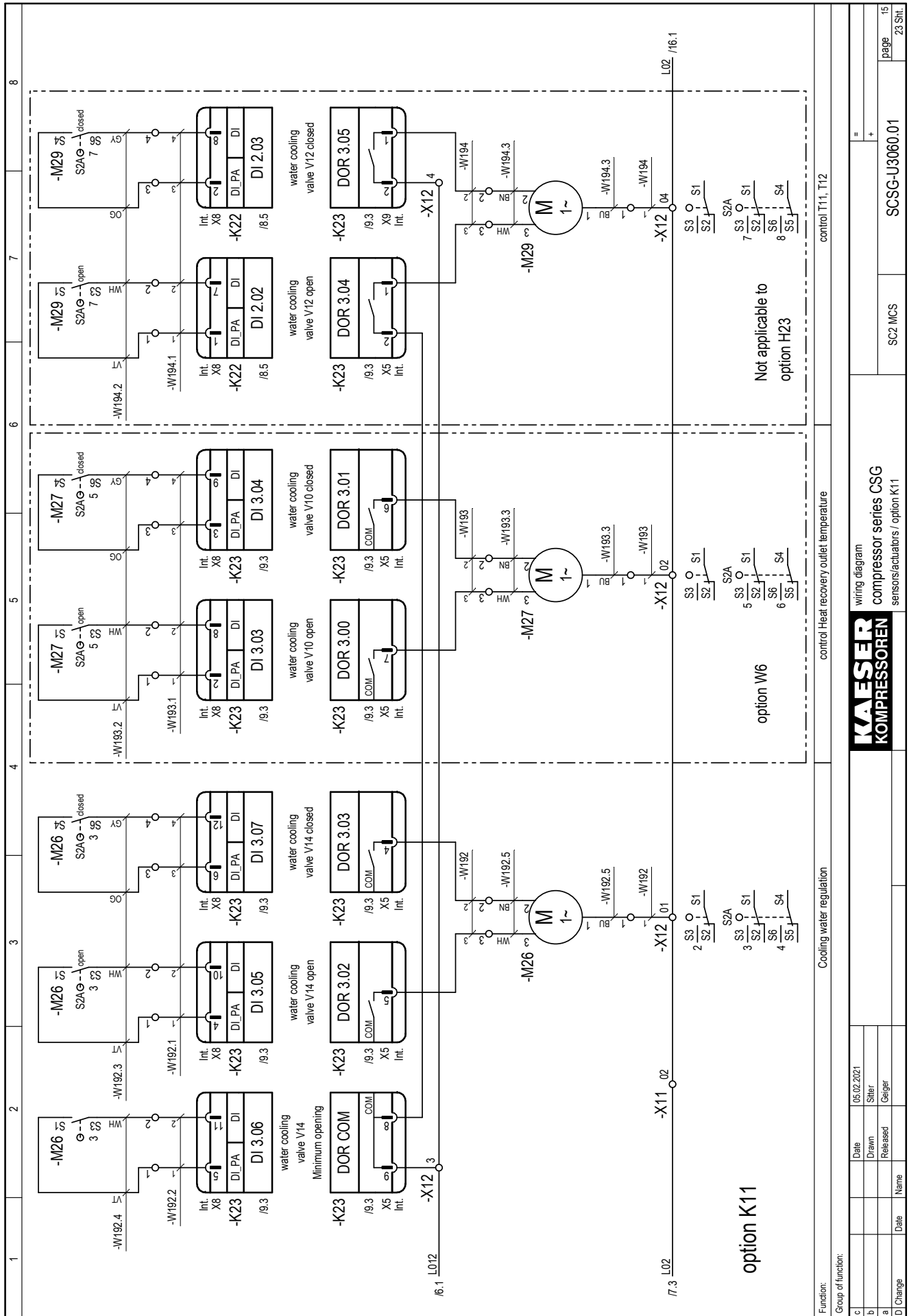


1 2 3 4 5 6 7 8

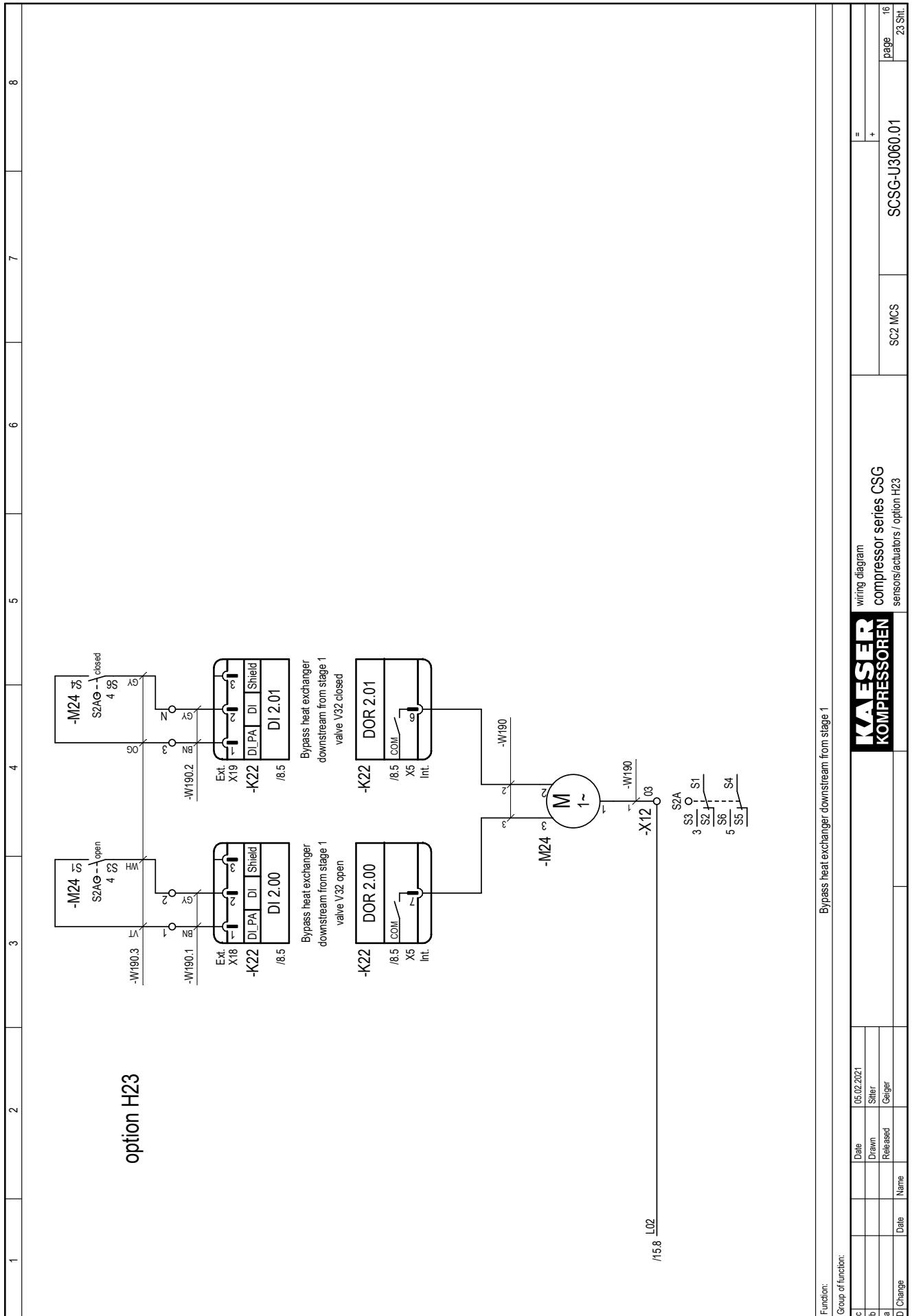


Function:				wiring diagram				compressor series CSG				sensors/actuators / option K11				SC2 MCS				SCSG-U3060.01				page 13				23 Str.			
Group of function:				Date				05.02.2021				Sitter				Geiger				Released				Name				Date			
C				b				a				D				Change															





Function:				control T11, T12			
Group of function:				control Heat recovery outlet temperature			
Cooling water regulation				option W6			
wiring diagram				control T11, T12			
compressor series CSG				Not applicable to option H23			
sensors/actuators / option K11				SC2 MCS			
SCSG-U3060.01				page 15			
				23 Str.			



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For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!

all non-designated conductors
16AWG orange 600V 90°C

volt-free contacts
User's connection

max. 250V AC/24V DC, 3A

Function:
Group of function:

compressor motor running

compressor motor running

volt-free contacts

wiring diagram
compressor series CSG
volt-free contacts

KAESER
KOMPRESSOREN

SC2 MCS

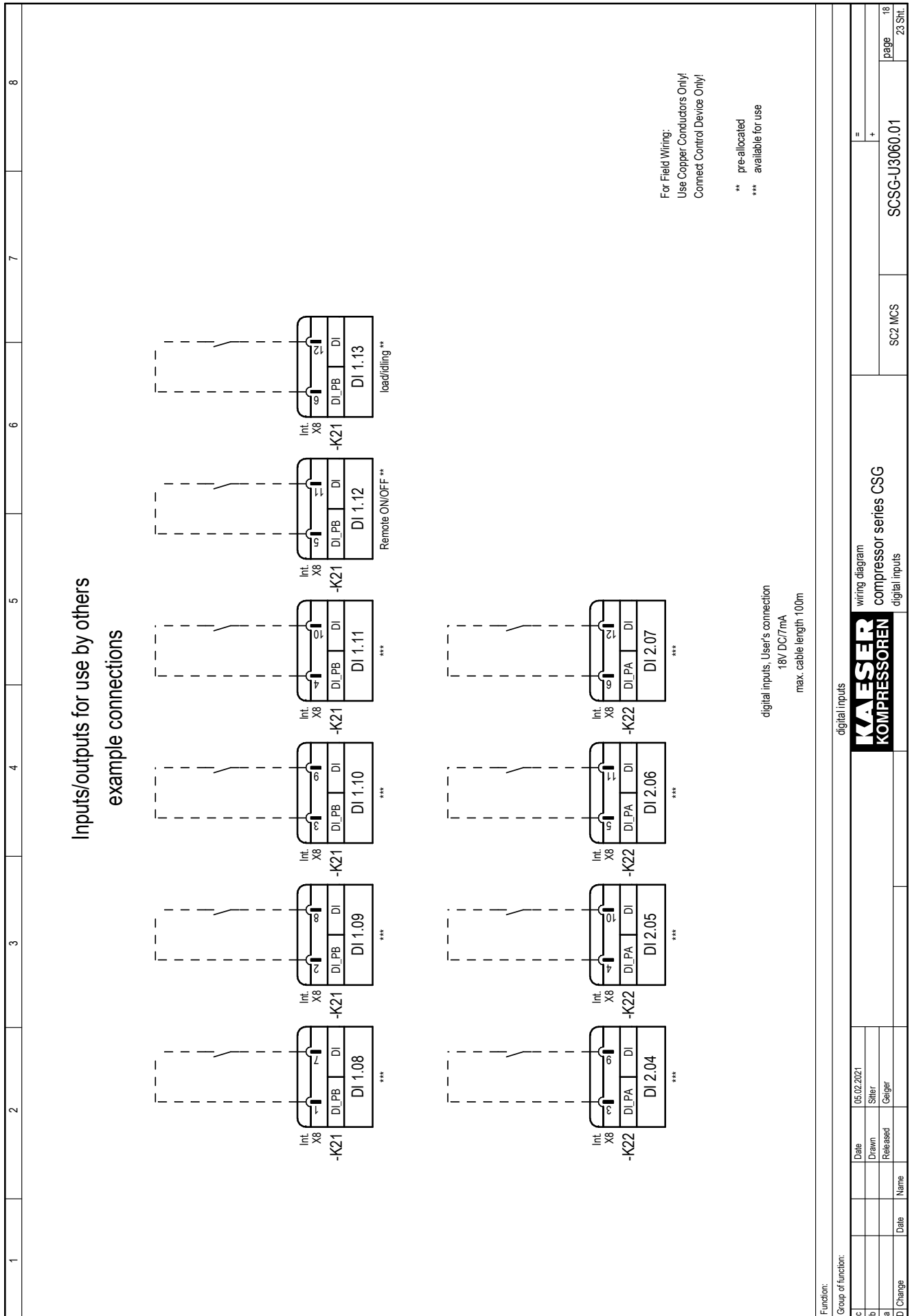
SCSG-U3060.01

page 17
23 Str.

142

Operator Manual Screw Compressor
CSG-2 A

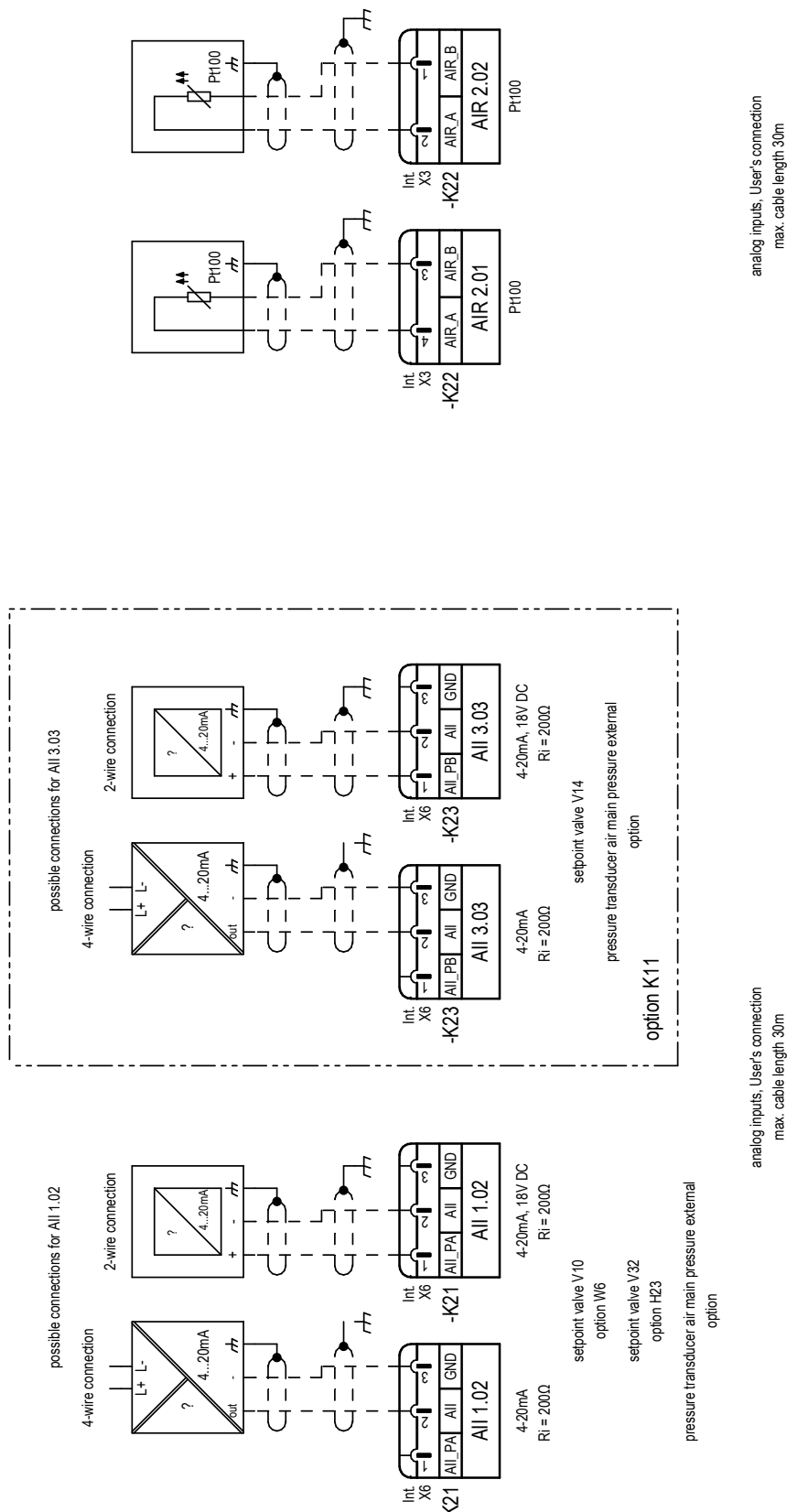
902380 04 USE



pre-allocated
available for use

**For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!**

Inputs/outputs for use by others
example connections



Function:

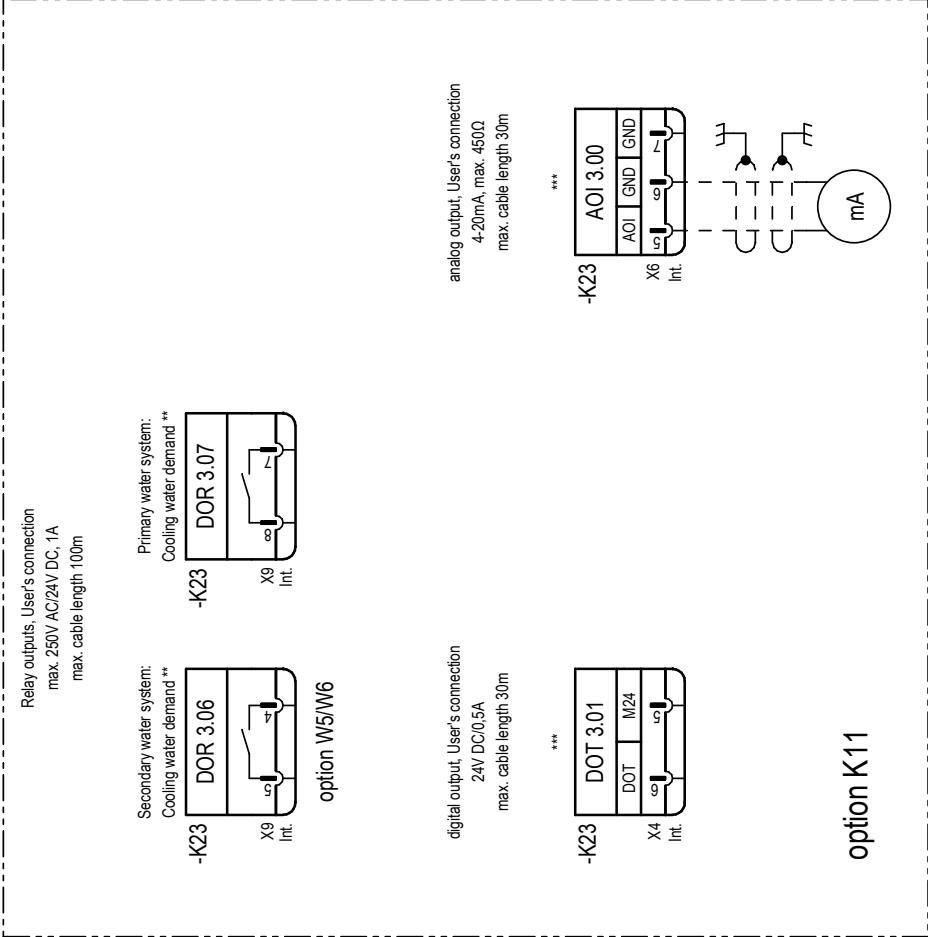
Group of function:

c			Date	05.02.2021	KAESER KOMPRESSOREN	wiring diagram compressor series CSG analog inputs	<div><div></div><div>=</div></div> <div><div></div><div>+</div></div>	<div><div></div><div>SC2 MCS</div></div> <div><div></div><div>SCSG-U3060.01</div></div>	<div><div></div><div>page 19</div></div> <div><div></div><div>23 Sht.</div></div>
b		Drawn							
a		Released	Geiger						
d	Change	Date	Name						

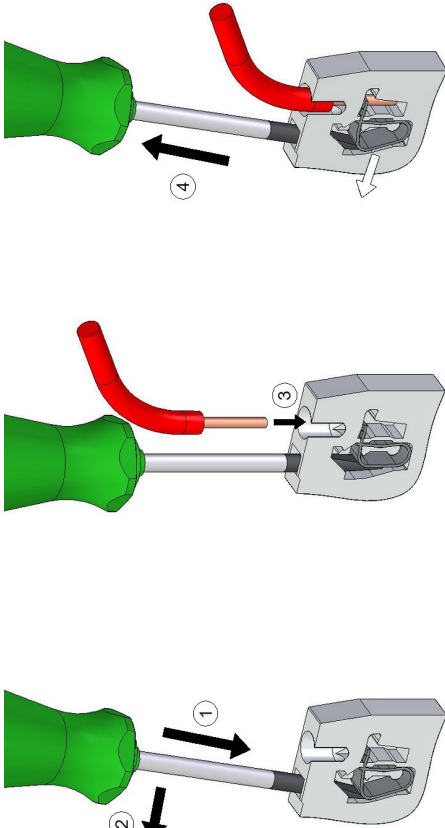
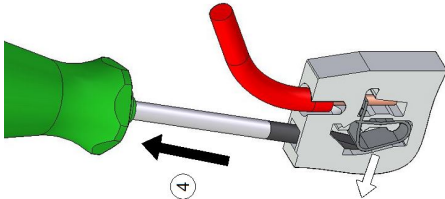
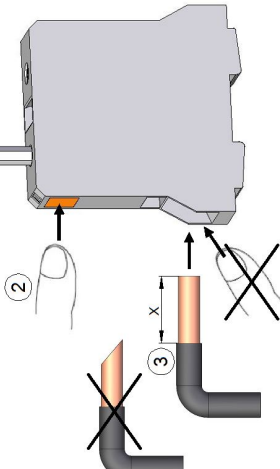
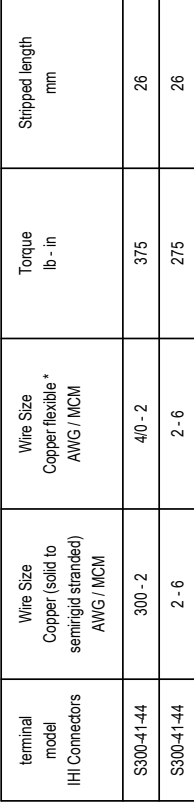
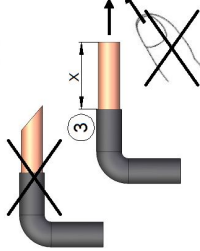
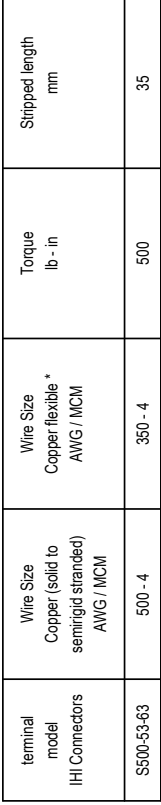
1	2	3	4	5	6	7	8
Inputs/outputs for use by others example connections							
Relay outputs, User's connection max. 250V AC/24V DC, 1A max. cable length 100m							
<div>control ON ** -K21 DOR 1.05 X9 Int.</div> <div>no alarm ** -K21 DOR 1.06 X9 Int.</div> <div>compressor motor running ** -K21 DOR 1.07 X9 Int.</div> <div>-K22 DOR 2.05 X9 Int.</div> <div>-K22 DOR 2.06 X9 Int.</div> <div>*** -K22 DOR 2.07 X9 Int.</div>							
For Field Wiring: Use Copper Conductors Only! Connect Control Device Only! ** pre-allocated *** available for use							
Function: Group of function:							
digital outputs							
KAESER KOMPRESSOREN				wiring diagram compressor series CSG Relay outputs			
				SC2 MCS		SCSG-U3060.01	
						page 20	23 Str.

1 2 3 4 5 6 7 8

Inputs/outputs for use by others
example connections



Function:										digital outputs										analog output																																																											
Group of function:										wiring diagram										compressor series CSG																																																											
c										Date										05.02.2021										=																																																	
b										Drawn										Sitter										+																																																	
a										Released										Geiger																																																											
D										Change										Date										Name										SC2 MCS										SCSG-U3060.01										page 21																			
																																																																						23 Sht.									

1	2	3	4	5	6	7	8
fig. 1: Handling: Control line terminal				fig. 20: Feed line connection			
GRD 7.8952.0				GRD 7.8952.0			
							
fig. 2: Handling: Supply terminal Wago				fig. 21: Feed line connection			
GRD 7.8952.00010				GRD 7.8952.00010			
							
fig. 22: Feed line connection				fig. 22: Feed line connection			
GRD 7.8952.00020				GRD 7.8952.00020			
							
wiring diagram				wiring diagram			
compressor series CSG				compressor series CSG			
Handling: Terminals				Handling: Terminals			
SC2 MCS				SC2 MCS			
SCSG-U3060.01				SCSG-U3060.01			
page 22				page 22			
23 Str.				23 Str.			

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fig. 11: Feed line connection

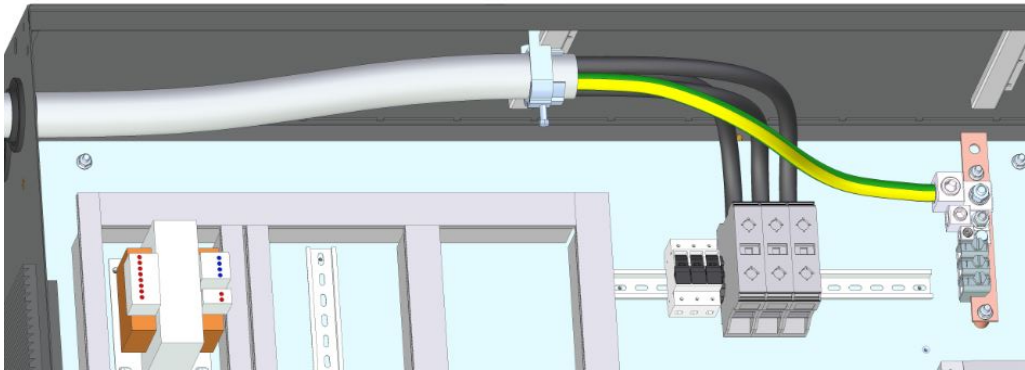
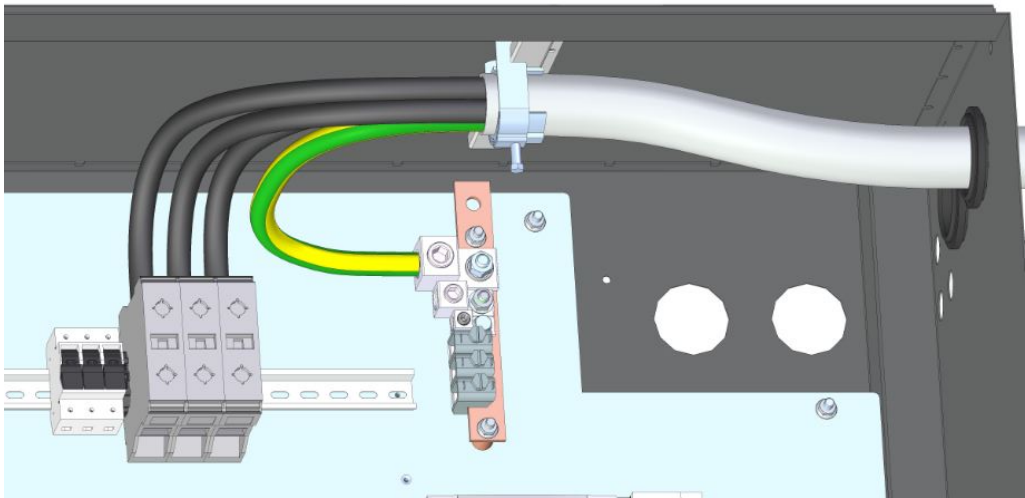


fig. 10: Feed line connection



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