Operating manual

Booster

CN C N2 SIGMA CONTROL 2

No.: 901870 24 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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KAESER KOMPRESSOREN

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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:

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

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:

⚠ 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 contains the model type and important technical information.

The nameplate is located on the outside of the machine:

- at the rear of the machine.

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

Feature	Value
booster	
Material No.:	
Serial No.:	
Ambient temperature*	
Compressed nitrogen inlet temp. TS*	
Rated power	
Inlet pressure* (ref. value: PS)	
Max. working pressure PS	
Rated motor speed	
Phases:	
Frequency:	
Voltage	
Full load current	
Full load current drive motor	
Electrical wiring diagram	
Option	
*Deviating values are given in the operating manual.	

Tab. 3 Nameplate

Further information The *compressor block's rated speed* and the *installed type of compressor block* are shown in the (Operating data/figures) menu of the SIGMA CONTROL 2 controller.

2.2 Options

The table contains a list of available options. The options for this machine are displayed on the nameplate.

➢ Enter the options here as a reference:

Option	Option code	Available?
KAESER FILTER KD	F15	
Available: ✓ Not available: -		

Option	Option code	Available?
Adjustable machine feet	H1	
Oil collection tray	H4	
Air cooling	K1	✓
Available: ✓ Not available: -		

Tab. 4 Options

2.3 Weight

The values shown are maximum values. The actual weight depends on equipment fitted.

	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Weight [lb.]	1742	2028	2028	2028

Tab. 5 Weight

2.4 Temperature

	CN 7 C - CN 22 C
Maximum Nitrogen discharge temperature[1)] [°F]	≤140
Maximum Block discharge temperature[1)] [°F]	≤430
[1)] Automatic shutdown	

Tab. 6 Temperature

2.5 Ambient conditions

	CN 7 C - CN 22 C
Maximum elevation AMSL [1)] [ft.]	3000
Permissible ambient temperature [°F]	37 – 115
Permissible inlet temperature [°F]	37 – 115
[1)] Higher altitudes are permissible only after consultation with the manufacturer.	

Tab. 7 Ambient conditions

2.6 Ventilation

The values specified are the minimum guideline values that must be maintained.

	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Air inlet aperture Ⓩ see Figure 14 [ft²] (free cross-section)	11.8	11.8	11.8	11.8
Required volume of air for exhaust fan Ⓐ at static compression 0.01 psi [cfm] (machine in enclosed space without ducting)	3767	3767	3767	3767
Exhaust air (hot air) without duct [cfm] 1)	2943	2943	2943	2943
Permissible pressure drop across user-end cooling air ducting [in. of water]	1/4	1/4	1/4	1/4

1) Basis for duct design

Tab. 8 Ventilation

2.7 Pressure

Cooler safety relief valve	
Maximum gauge working pressure [psig]	Safety relief valve actuating pressure [psig]
145	175
217	245
290	320
360	390
435	465
500	535
580	610
650	670
Maximum gauge working pressure: see nameplate	

Tab. 9 Cooler safety relief valve actuating pressure

Distribution tank safety relief valve	
Maximum gauge working pressure [psig]	Safety valve actuating pressure [psig]
210	232

Tab. 10 Distribution tank safety relief valve actuating pressure

Further information For technical specifications of safety relief valve, see chapter 13.5

2.8 Calculating the flow rate

Compressor block rated speed

Type	Rated speed 60Hz [rpm]
N 253	790
	840
	900
	960
	1020
	1080
	1200
N 502	740
	795
	850
	900
	950
	1060
	1190

Tab. 11 Compressor block rated speed

Flow rate parameters

	N 253	N 502
KLa = Coefficient Flow rate: a	–0.00166491000	0.00337566
KLb = Coefficient Flow rate: b	0.00381298000	0.0120406
KLc = Coefficient Flow rate: c	–0.01262020000	–0.0133394
KLd = Coefficient Flow rate: d	0.00000084641	–0.00000143101
KLe = Coefficient Flow rate: e	–0.00001625250	–0.0000483539
KLf = Coefficient Flow rate: f	0.00024541600	0.000531306

	N 253	N 502
KLg = Coefficient Flow rate: g	0.00009283030	0.000208973
KLh = Coefficient Flow rate: h	–0.00076322300	–0.00132836
KLi = Coefficient Flow rate: i	0.00094996800	0.00167599
KLk = Coefficient Flow rate: k	0.95238400000	–1.46988
KLr = Coefficient Flow rate: r	14.50377	14.50377
KLs = Coefficient Flow rate: s	35.31467	35.31467

Tab. 12 Flow rate parameters

Formula for flow rate calculation (valid for compressor block type N253 / N502)

$$Q = (k + a \times n + b \times (\frac{p4}{r}) + c \times (\frac{p1}{r}) + d \times (n)^2 + e \times n \times (\frac{p4}{r}) + f \times n \times (\frac{p1}{r}) + g \times (\frac{p4}{r})^2 + h \times (\frac{p4}{r}) \times (\frac{p1}{r}) + i \times (\frac{p1}{r})^2) \times s$$

Description of formula:

- Q = Flow rate as per ISO 1217: 2009 (Annex C)
- n = Compressor rated speed
- p1 = Initial pressure [psi (g)]
- p4 = Final pressure [psi (g)]

Example for N 502 compressor block:

p1 = 100 psi(g)

p4 = 400 psi(g)

n = 1060 rpm

$$Q = (-1.46988 + 0.00337566 \times 1060 + 0.0120406 \times (\frac{400}{14.50377}) + -0.0133394 \times (\frac{100}{14.50377}) + -0.00000143101 \times (1060)^2 + -0.0000483539 \times 1060 \times (\frac{400}{14.50377}) + 0.000531306 \times 1060 \times (\frac{100}{14.50377}) + 0.000208973 \times (\frac{400}{14.50377})^2 + -0.00132836 \times (\frac{400}{14.50377}) \times (\frac{100}{14.50377}) + 0.00167599 \times (\frac{100}{14,50377})^2) \times 35.31467$$

Q = 113 cfm

2.9 Example for determining the permissible initial pressure

For more diagrams to be used when calculating the permissible initial pressure, see chapter 13.4.

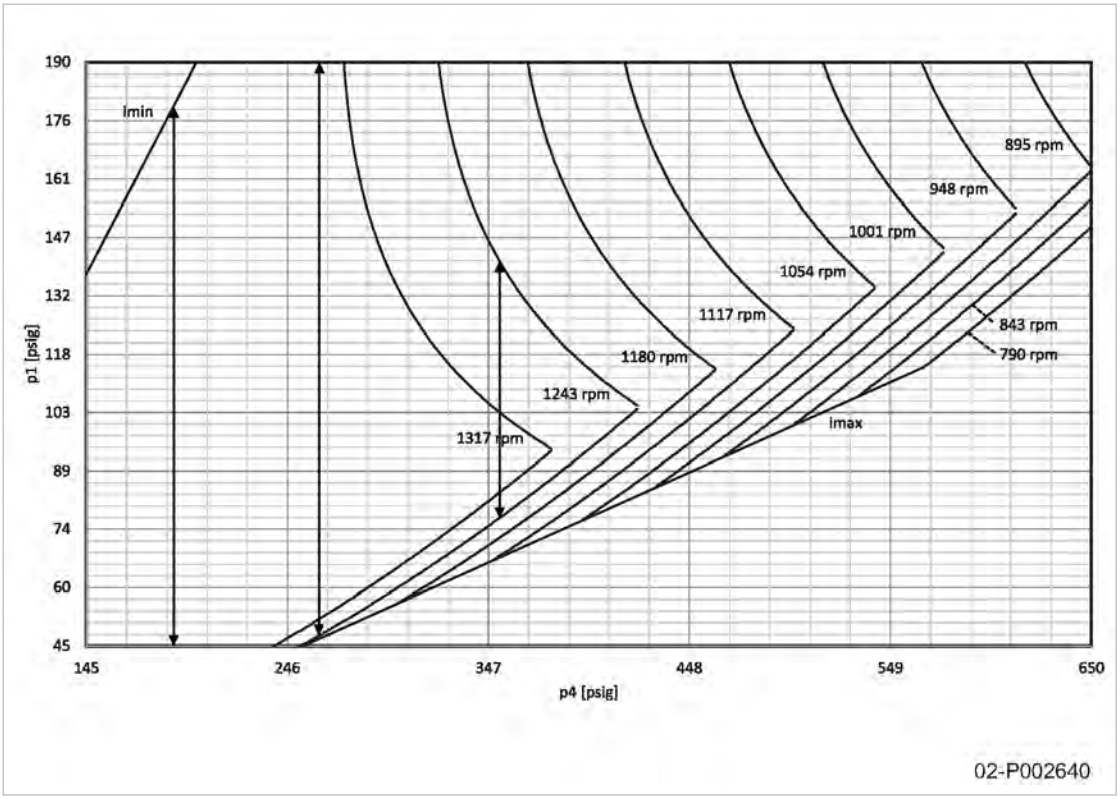


Fig. 1 Initial pressure diagram

Ⓐ p4=190 psi(g) 45 psi(g) ≤ p1 ≤ 178 psi(g) at all speeds
Ⓑ p4=260 psi(g) 50 psi(g) ≤ p1 ≤ 190 psi(g) at n= 1243 min^{-1}
Ⓒ p4=350 psi(g) 77 psi(g) ≤ p1 ≤ 140 psi(g) at n= 1243 min^{-1}

2.10 Calculating the configurable switching differential SD

Star-delta machine

$$SD = 14.5 \times \frac{Q}{4 \times \text{receiver size}} \text{ psi}$$

Condition SD < p4 – p1

Flow rate Q in cfm (as per ISO 1217:2009, Annex C)
Receiver size in ft^3
Switching differential SD in psi
Initial pressure p1 in [psi (g)]
Final pressure p4 in [psi (g)]

Example 1	
Machine flow rate Q	173 cfm
Receiver size	35 ft^3
Initial pressure p1	145 psi(g)
Final pressure p4	580 psi(g)

Tab. 13 Example 1

$$SD = 14.5 \times \frac{173}{4 \times 35} \text{ psi}$$

SD = 18 psi

Condition check:
p4 – p1 = 580 psi(g) – 145 psi(g) = 435 psi > switching differential SD 18 psi → Condition fulfilled

The setting for switching differential SD in the controller must not be lower than 18 psi.

Example 2	
Machine flow rate Q	219 cfm
Receiver size	9 ft³
Initial pressure p1	190 psi(g)
Final pressure p4	217 psi(g)

Tab. 14 Example 2

$$SD = 14.5 \times \frac{219}{4 \times 9} \text{ psi}$$

SD = 88 psi
Condition check:
p4 – p1 = 217 psi(g) – 190 psi(g) = 27 psi < switching differential SD 88 psi → Condition **not** fulfilled

Receiver is too small.
Selected new receiver size → 35 ft³

$$SD = 14.5 \times \frac{219}{4 \times 35} \text{ psi}$$

SD = 23 psi
Condition check:
p4 – p1 = 217 psi(g) – 190 psi(g) = 27 psi > switching differential SD 23 psi → Condition fulfilled

The setting for switching differential SD in the controller must not be lower than 23 psi.

2.11 Noise emissions [dB(A)]

Main frequency	CN 7 C	CN 11 C	CN 15 C	CN 22 C
60 Hz	72	74	75	76
Noise pressure level as per ISO 2151 and basic standard ISO 9614-2, operating at maximum gauge working pressure and maximum speed; tolerance: ±3 dB(A)				

Tab. 15 Noise emissions [dB(A)]

2.12 Motors and performance

2.12.1 Compressor motor

Mains frequency: 60 Hz

	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Rated speed [rpm]	3600	3600	3600	3600
Enclosure protection	TEFC	TEFC	TEFC	TEFC
Motor bearing regreasing interval [h]	8000	8000	8000	8000
Grease required per bearing [g]	10	10	10	10
h = operating hours				

Tab. 16 Compressor motor (60Hz)

2.12.2 Option K1 Fan motor

Mains frequency: 60 Hz

	CN 7 C - CN 22 C
Rated power [hp]	1.68
Rated speed [rpm]	1030
Enclosure protection	TEFC
h = operating hours	

Tab. 17 Fan motor (60Hz)

2.13 Compressor oil recommendation

For the nitrogen compression, the ISO320N compressor oil has been filled.

Information regarding ordering of compressor oil is found in chapter 11.

Oil type	ISO320N
Description	Synthetic oil
Application	Standard oil for all applications in nitrogen compression except food processing.

Tab. 18 Compressor oil recommendation

2.13.1 Compressor oil charge quantity

Type	Total charge [quarts]	Topping off volume [qt] (minimum–maximum)
N 253	2.3	0.2

Type	Total charge [quarts]	Topping off volume [qt] (minimum–maximum)
N 502	4.8	0.39

Tab. 19 Compressor oil charge quantity

2.14 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 such as a three phase WYE system with center point not solidly grounded or three-phase (open) delta.

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

Other power supplies are not suitable.

Fig. 2 Three-phase star (wye); 4 wire; center point solidly grounded

Fig. 3 Three-phase star (wye); 3 wire; center point solidly grounded

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

The electrical diagram 13.3 contains further specifications for electrical connection.

2.14.1 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.

Rated power supply: 208V / 3ph / 60Hz

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Pre-fuse [A]	45	70	90	125
Supply per phase and ground (75 °C)	AWG 8	AWG 4	AWG 3	AWG 1
Consumption [A]	31.9	45.6	60.1	82.7

Tab. 20 Supply 208V / 3ph / 60Hz

Rated power supply: 230V / 3ph / 60Hz

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Pre-fuse [A]	45	60	80	110
Supply per phase and ground (75 °C)	AWG 8	AWG 6	AWG 4	AWG 2
Consumption [A]	29.5	42.3	56.3	75.7

Tab. 21 Supply 230V / 3ph / 60Hz

Rated power supply: 380V / 3ph / 60Hz

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Pre-fuse [A]	25	40	50	70
Supply per phase and ground (75 °C)	AWG 10	AWG 8	AWG 8	AWG 4
Consumption [A]	17.8	25.6	34.2	45.7

Tab. 22 Supply 380V / 3ph / 60Hz

Rated power supply: 460V / 3ph / 60Hz

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Pre-fuse [A]	20	30	45	50

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Supply per phase and ground (75 °C)	AWG 12	AWG 10	AWG 8	AWG 6
Consumption [A]	15.1	21.5	28.5	38.2

Tab. 23 Supply 460V / 3ph / 60Hz

Rated power supply: 575V / 3ph / 60Hz

Type	CN 7 C	CN 11 C	CN 15 C	CN 22 C
Rated power [hp]	10	15	20	30
Pre-fuse [A]	15	25	35	45
Supply per phase and ground (75 °C)	AWG 14	AWG 10	AWG 10	AWG 8
Consumption [A]	12.1	17.2	22.9	30.5

Tab. 24 Supply 575V / 3ph / 60Hz

2.15 Machine duty cycle

The machine control guarantees a 100% duty cycle.

3 Safety and Responsibility

3.1 Basic instructions

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

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

⚠ Disregard of warning or safety instructions can cause serious injuries!

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

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

3.2 Specified use

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

➢ Comply with the instructions in this service manual.

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

3.3 Improper use

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

➢ Only use the machine as intended.

➢ Never direct compressed nitrogen 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 operate the machine in areas in which specific requirements with regard to explosion protection are in force.

3.4 User's responsibilities

3.4.1 Observe statutory and universally accepted regulations

These are, for example, nationally implemented European directives and/or applicable national legislation, safety and accident prevention regulations.

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

3.4.2 Qualified personnel

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

Authorized operators possess the following qualifications:

- are of legal age,
- are conversant with and adhere to the safety instructions and sections of the service manual relevant to operation,
- have received adequate training and authorization to safely handle electrical and nitrogen devices.

Authorized installation and maintenance personnel have the following qualifications:

- are of legal age,
- must have read, be conversant with and adhere to the safety instructions and sections of the operating manual applicable to installation and maintenance,
- are fully conversant with the safety concepts and regulations of electrical and nitrogen engineering,
- are able to recognize the possible dangers of electrical and nitrogen devices and take appropriate measures to safeguard persons and property,
- have received adequate training in and authorization for the safe installation and maintenance of this machine.

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

3.4.3 Complying with inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

➢ The user must ensure that, for compressors with motor power above 0.5 hp, safety devices are inspected for their proper function at least annually.
The user must ensure that compressors used for compressing gasses with hazardous properties are checked for leakage at recurring intervals after maintenance work that may affect their tightness. This also applies to pipe that are parts of compressors, as far as these pipes may contain or discharge gasses with hazardous properties.

➢ Keep to inspection intervals in accordance with the Ordinance on Industrial Health and Safety.

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 check that no voltage is present.
- ➢ Switch off any external power sources.
  These could be connections to floating relay contacts or electrical machine heating, for example.
- ➢ Use fuses corresponding to machine power.
- ➢ Check regularly that all electrical connections are tight and in proper condition.

Forces of compression

Compressed nitrogen 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 nitrogen 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.

Spring forces

Springs under tension or compression store energy. Uncontrolled release of this energy can cause serious injury or death.
Check valves, solenoid valves and inlet valves are powerfully spring-loaded.

- ➢ Do not open or dismantle any valves.

Rotating components

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

- ➢ Do not open the enclosure while the machine is switched on.
- ➢ Switch off and lock out the power supply disconnecting device, and verify the absence of any 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 blocks, pressure lines, coolers, motors and machine heaters.
- ➢ Wear protective clothing.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.

Noise

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

- ➢ Operate the machine only with intact sound insulation.
- ➢ Wear hearing protection if necessary.
  The 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 and vapors.
- ➢ 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 pressure components.

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 nitrogen station

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

- ➢ When extending or modifying the nitrogen system.
  Check the blow-off capacity of safety relief valves on receivers and nitrogen lines before installing a new machine.
- ➢ If the blow-off capacity is insufficient:
  Install safety relief valves with larger blow-off capacity.

3.5.2 Safe machine operation

The following information will provide you with the necessary rules to ensure 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 (protective glasses)
- Ear protection

Transport

In order to prevent accidents, the weight and size of the machine require safety measures to be taken during its transport.

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

Assembly

➢ Use only electrical cables that are suitable and approved for the surroundings and electrical loads applied.
➢ Lay electrical cables and pressure lines properly to avoid the potential for catching, tripping or falls.
➢ Never install/dismantle compressed air pipes until they are fully vented.
➢ Only use pressure lines that are suitable and approved for the maximum gauge 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.

Installation

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

➢ Install the machine in a suitable compressor room.
➢ Install and regularly check the nitrogen warning system for correct function.
➢ Ensure sufficient and suitable lighting such that the display can be read without glare and that work can be carried out comfortably and safely.

- ➢ Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.
- ➢ If installed outdoors, the machine must be protected from frost, direct sunlight, dust, rain, and splashing water.
- ➢ Do not operate in areas in which specific requirements with regard to explosion protection are in force.
- ➢ Ensure adequate ventilation.
- ➢ Place the machine in such a manner that the working conditions in its environment are not impaired.
- ➢ Comply with limit values for ambient temperatures 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 media 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.

- ➢ Work should be carried out by authorized personnel only.
- ➢ Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- ➢ Switch off and lock out / tag out the power supply disconnecting device and verify that no voltage is present.
- ➢ Check that there is no voltage on floating contacts.
- ➢ Close shut-off valves or otherwise isolate the machine from the distribution network to ensure that no nitrogen can flow back into the machine.
- ➢ Depressurize all pressurized components and enclosures. Verify the vented state.
- ➢ Allow the machine to cool down.
- ➢ Do not open the housing while the machine is switched on.
- ➢ Do not open or dismantle any valves.
- ➢ Use only spare parts approved by KAESER for use in this machine.
- ➢ Carry out regular inspections:
  for visible damage,
  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 exposed 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.

Decommissioning/storage/disposal

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

- ➢ Drain off fluids and dispose of them according to applicable environmental regulations. These include, for example, compressor oil and cooling water.
- ➢ Have refrigerant (if applicable) disposed of by authorized bodies only.
- ➢ Dispose of the machine in accordance with local environmental regulations.

3.5.3 Organizational Measures

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

3.5.4 Danger areas

The table gives information on areas dangerous to personnel.

Only authorized personnel may enter these areas.

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

Tab. 25 Danger areas

3.6 Safety devices

Various safety devices ensure safe working with the machine.

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

Further information More information on safety devices is contained in chapter 4, section 4.3.

3.7 Service life of safety functions

Pursuant to ISO 13849-1: 2015, the category and Performance Level (PL) of the machine's safety functions have been analyzed and assessed:

Safety function	Category	Performance level
EMERGENCY STOP push button	1; 3	c

Safety function	Category	Performance level
Cooler nitrogen inlet temperature switch	1; 3	c

Tab. 26 Category and Performance Level

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

The following components are affected:

- EMERGENCY STOP push button
- Main contactor
- Cooler nitrogen inlet temperature switch

1. Have the components of the safety functions replaced after a service life of 20 years by an authorized KAESER service representative.
2. Have the reliability of the safety functions checked by an authorized KAESER service representative.

3.8 Safety signs

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

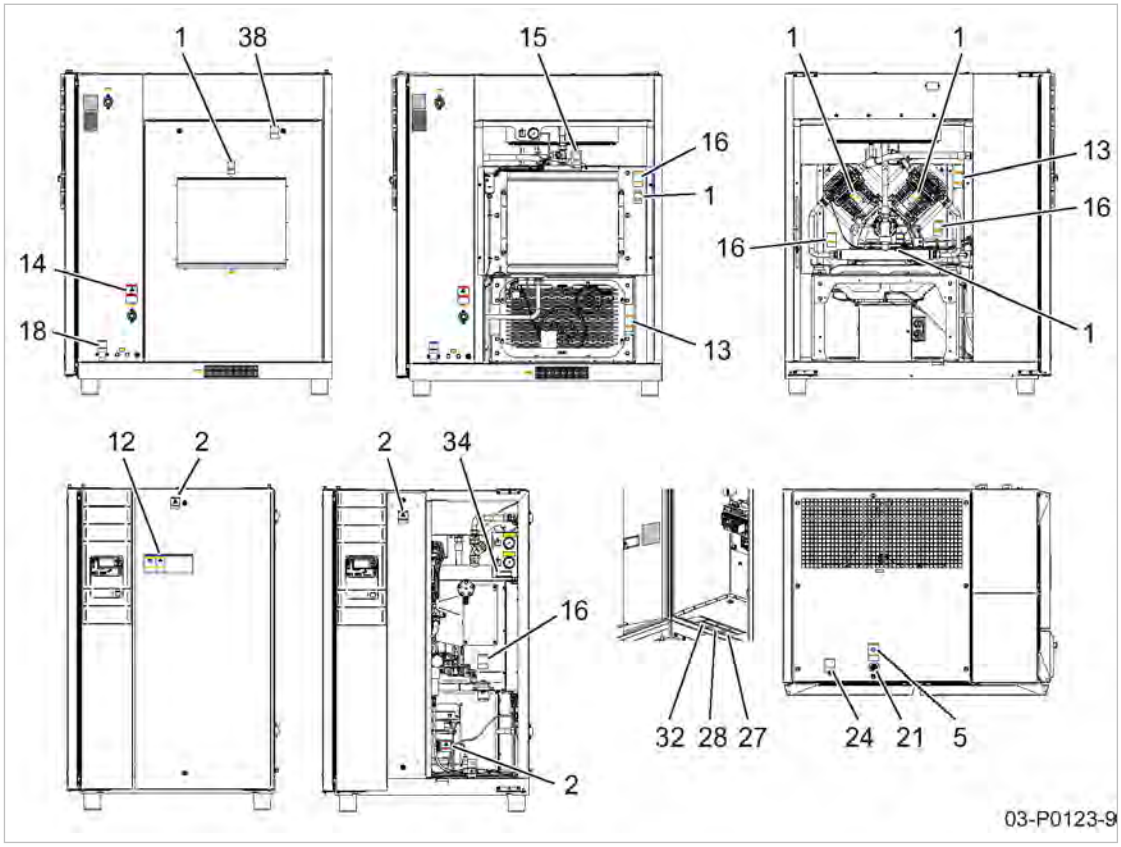


Fig. 4 Location of safety signs

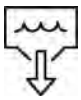
Item	Symbol	Meaning
1		Hot surface can cause burns! ➢ Let the machine cool down. ➢ Work carefully. ➢ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
2		HAZARDOUS VOLTAGE! Touching electrically live components can cause serious injury or death. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out). ➢ Check that no voltage is present.
5		Flying debris! Severe injury, especially of the eyes, could result while the fan is rotating. ➢ Prevent all materials from falling into the fan guard. ➢ Never work over the running machine. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out).
8		Danger of falling or damage to the machine! ➢ Do not sit or walk on the enclosure. ➢ Do not place or store any load on the enclosure.
12		Injury and/or machine defects caused by improper use! ➢ 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.
		Machine starts automatically! Severe injury could result from rotating components, electrical voltage and air pressure. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out). ➢ Check that no voltage is present.
13	 	Severe injury could result from touching the fan blades while it is rotating! ➢ Never switch the machine on without guard in place over the fan blade. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out).
14		Injury and/or contamination can result from breathing nitrogen! Contamination of food can result from using untreated nitrogen for food processing! ➢ Never breathe untreated nitrogen. ➢ Air from this compressor must meet OSHA 29 CFR1910.134 and FDA 21 CFR178.3570 standards, if used for breathing or food processing. ➢ Use proper nitrogen treatment. Food grade coolant must be used for food processing.

Item	Symbol	Meaning
15		Loud noise when safety relief valve opens! Ear damage and burns can occur. ➢ Wear ear protection and protective clothing. ➢ Close all maintenance doors and cover panels.
16		Serious injury or death can result from loosening or opening component under pressure! ➢ Isolate the machine from the nitrogen system. ➢ Depressurize all pressurized components and enclosures. ➢ Ensure that the machine remains depressurized. ➢ Check that machine is depressurized.
18		Bearing damage due to re-greasing in standstill! ➢ Re-grease the bearings only with the motor running. ➢ Use only ESSO UNIREX N3 bearing grease. ➢ For lubrication interval and volume required, please refer to service manual.
24		Risk of hand injury without safety guard! ➢ Never switch the machine on without guard in place over the fan blade.
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.
32		EXTERNAL VOLTAGE! Touching electrically live components can cause serious injury or death. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out). ➢ Check that no voltage is present.
34		Serious injury can result from compressed nitrogen. ➢ Do not direct nitrogen stream at body.
38		Risk of hand injury during machine run-on! ➢ Wait at least 1 minute following machine shutdown before opening enclosure.

Tab. 27 Safety signs

3.9 Operating information signs

The table lists the various information signs used and their meanings.

Symbol	Meaning
	Service the air filter regularly.
	Drain the condensate daily. If fitted: Check the automatic condensate drain at regular intervals.
	Regularly check the oil level and change the oil at the intervals specified.

Tab. 28 Operating information signs

3.10 Emergency situations

3.10.1 Correct fire fighting

Suitable measures

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

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

Extinguishing substances

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

3.10.2 Treating injuries from handling cooling oil

Eye contact:

Compressor oil can cause irritation.

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

Skin contact:

Compressor oil may irritate after prolonged contact.

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

Inhalation:

Oil mist may make breathing difficult.
➢ Clear air passages of oil mist.
➢ Seek medical help if difficulty with respiration continues.

Ingestion:

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

3.11 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.

3.12 Environmental protection

The operation of this machine may cause dangers for the environment.
➢ Do not allow compressor oil to escape into the environment or into the sewage system.
➢ Store and dispose of operating materials and replaced parts in accordance with local environmental protection regulations.
➢ Observe national regulations.
This applies particularly to parts contaminated with compressor oil.

4 Design and Function

4.1 Enclosure

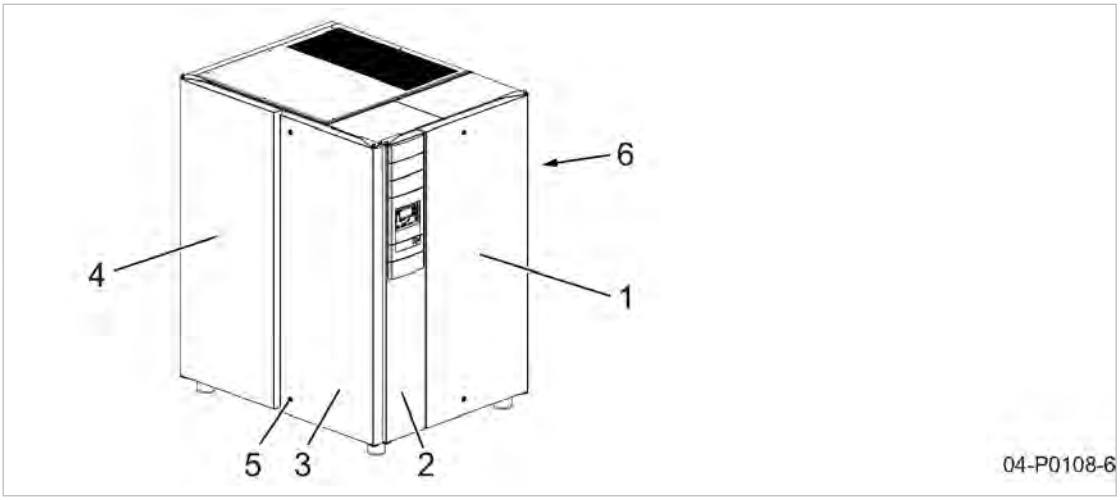


Fig. 5 Enclosure overview

[1]	Maintenance door (side)	[4]	Maintenance door (left)
[2]	Control cabinet door	[5]	Latch
[3]	Maintenance door (right)	[6]	Removable access panel

When closed, the housing serves various functions:

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

The housing is not suitable for the following purposes:

- 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 when the housing is closed.

Access doors are hinged to swing open, removable panel must be lifted off.
The latches are released by means of a key supplied with the machine.

4.2 Machine function

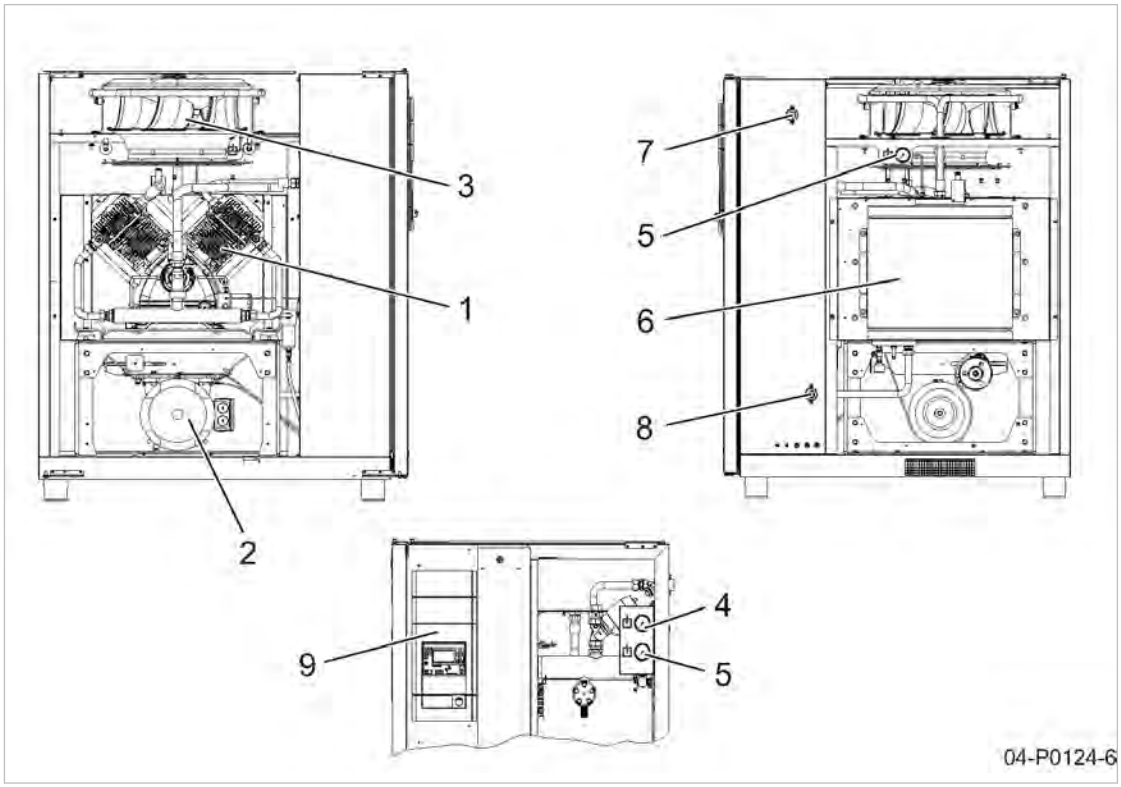


Fig. 6 Machine overview

[1]	Compressor block	[6]	Air cooler
[2]	Compressor motor	[7]	Nitrogen inlet
[3]	Fan motor	[8]	Nitrogen outlet
[4]	Network pressure gauge (initial pressure)	[9]	Control cabinet
[5]	Network pressure gauge (final pressure)		

4.2.1 Brief description

An electric motor drives the compressor block via a V-belt.

The block is equipped with two cylinders.

The cooling fins on the cylinder and cylinder head serve to dissipate the heat, which is then conveyed outside the machine by a fan.

When operating in LOAD mode, the inlet valve is open and the safety relief valve closed.
The recovery valve is also closed. The pre-compressed nitrogen is drawn into the compressor block through the open inlet valve and then conveyed into the high-pressure network via the open check valve and the cooler.
During this process, the cooler serves to cool down the compressed nitrogen.

4.3 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 is stopped. The pressure system is vented.

- Safety relief valve:
  The safety relief valve protects the system against impermissible pressure rise. It is factory-set.
- Enclosure and covers for moving parts and electrical connections:
  Used for protection against unintentional contact.
- Temperature sensors:
  Trigger machine shut down if impermissible high temperatures occur.
- Cooler nitrogen inlet temperature switch:
  A fault message is displayed if the machine exceeds the nitrogen inlet temperature at the cooler.
- Pressure transducers:
  Monitor the pressure conditions at various locations in the machine.

The operator is responsible for the provision of the following safety equipment:

- Nitrogen warning system:
  To monitor the breathing air in the machine room and to warn of low oxygen content.
- Safety signs for nitrogen:
  Identify the installation room with "Nitrogen" safety sign at the outside.

4.4 Operating panel SIGMA CONTROL 2

Keys

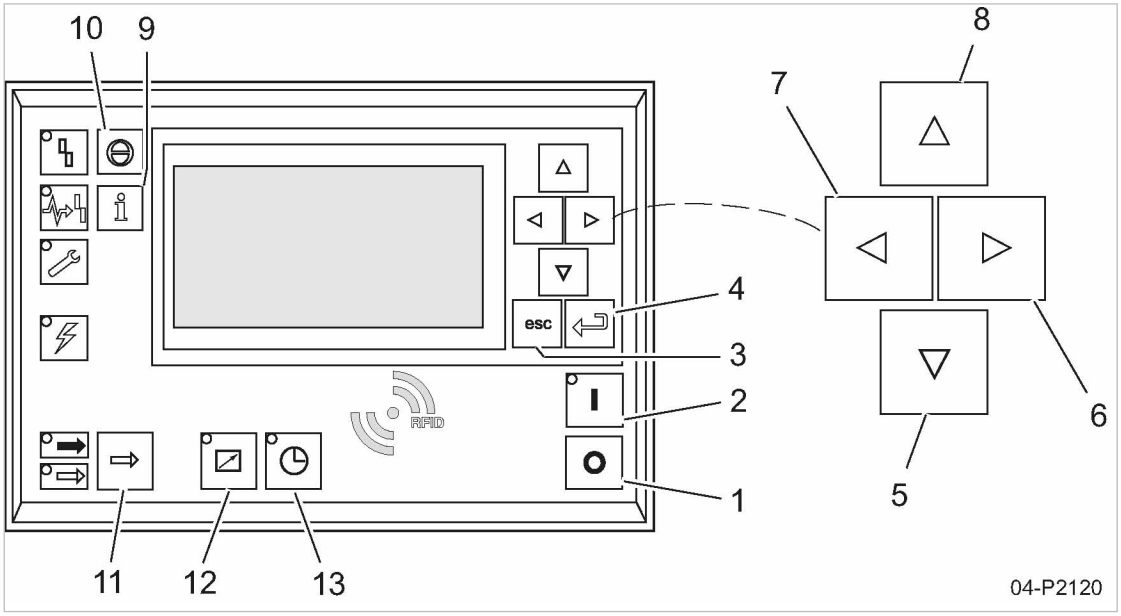


Fig. 7 Keys – overview

Item	Name	Function
1	«OFF»	Switches the machine off.
2	«ON»	Switches the machine on.
3	«Escape»	Returns to the next higher menu option level. Exits the edit mode without saving.

Item	Name	Function
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. Moves the cursor position to the next right field.
7	«Left»	Jumps to the left. Moves the cursor position to the next left field.
8	«Up»	Scrolls up the menu options. Increases a parameter value.
9	«Events & Information»	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 operating modes.
12	«Remote control»	Switches the remote control on and off.
13	«Timer control»	Switches the timer control on and off.

Tab. 29 Keys

LEDs

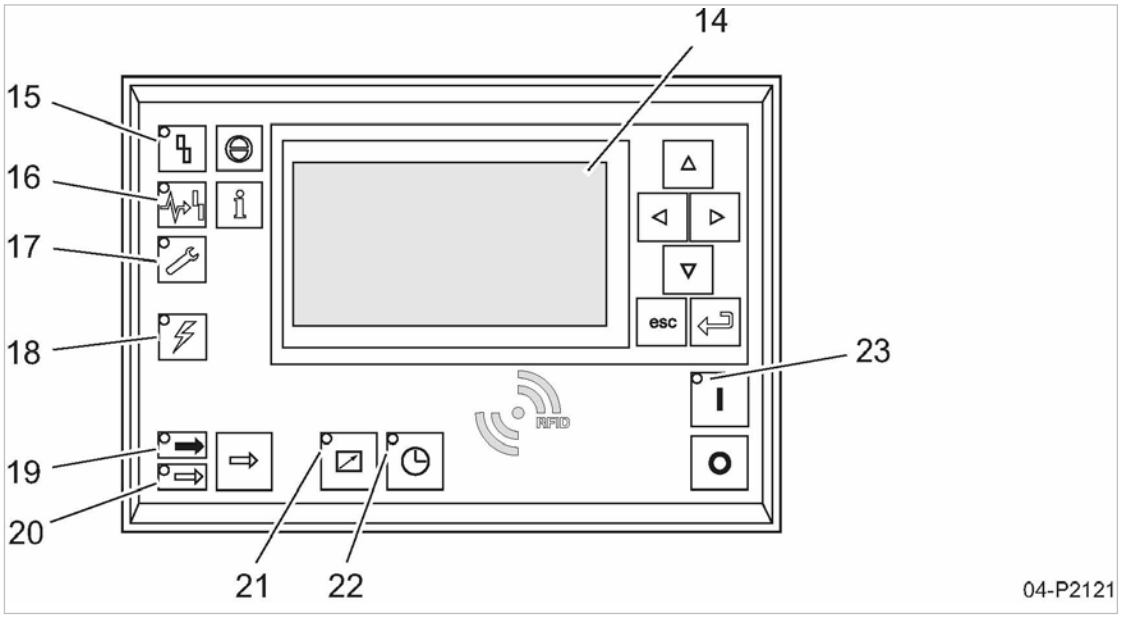


Fig. 8 Indicators – overview

Item	Name	Function
14	Indicator field or display	Graphic display with 8 lines and 30 characters per line.

Item	Name	Function
15	*Fault*	Flashes red to indicate a machine fault. Continuous red light after acknowledgement.
16	*Communication*	Continuous red illumination if a communication connection (Ethernet, USS, COM modules) has a fault.
17	*Warning*	Flashes in yellow in the following events: ■ Maintenance work due ■ Warning message Lights yellow continuously when acknowledged.
18	*Control voltage*	Lights green when the power supply is switched on.
19	*LOAD*	Lights green when the compressor is running under LOAD.
20	*IDLE*	Lights green when the compressor is running in IDLE. Flashes when the «LOAD/IDLE» toggle key is pressed.
21	*Remote control*	The LED lights when the machine is in remote control.
22	*Timer control*	The LED lights when the machine is in clock control (timer).
23	*Machine ON*	Lights green when the machine switched on.

Tab. 30 Indicators

RFID sensor field

RFID is the abbreviation for “**R**adio **F**requency **I**dentification” and makes possible to identify persons and 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 KAESER RFID Equipment Card. Two of them have been provided with the machine.

Typical application:

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

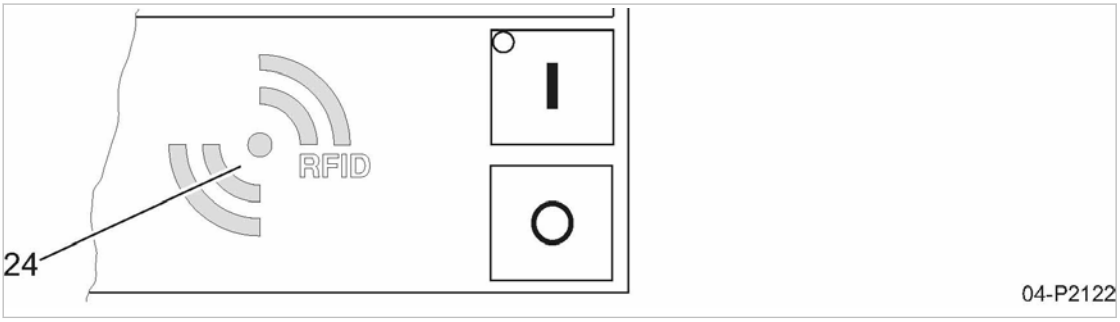


Fig. 9 RFID sensor field

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

Tab. 31 RFID sensor field

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

4.5 Operating modes and control modes

4.5.1 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 inlet control valve is closed.
- The venting valve is open.
- The return valve is closed.
- The check valve upstream of the cooler prevent the compressed nitrogen from flowing back from the high-pressure side into the compression stage.

The compressor motor starts as soon as system pressure is lower than the setpoint pressure (cut-out pressure).
In addition, timing and/or remote control may affect the start of the motor.

LOAD

The compressor motor runs under load.

- The inlet valve is open.
- The venting valve is closed.
- The return valve is closed.
- The airend delivers compressed nitrogen to the distribution network.

IDLE

The compressor motor runs unloaded with low power consumption.

- The inlet valve is closed.
- The inlet control valve is closed.
- The venting valve is closed.
- The return valve is open.

Upon expiration of a defined time, the return valve is closed and the machine switches to LOAD.

4.5.2 Control modes

Using the selected control mode, the controller switches the machine between its various operational states in order to compensate for nitrogen being drawn off by consumers and maintain system pressure between the set minimum and maximum values. The control mode also rules the degree of energy efficiency of the machine.

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

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

- DUAL
- QUADRO
- DYNAMIC
- VARIO

Energy-efficient control modes for various applications:

Application	Recommended control mode
Nitrogen station with one machine or several machines with comparable delivery	VARIO
Machine for peak load in a nitrogen station	VARIO
Machine for intermediate load in a nitrogen station	DYNAMIC*
Machine for basic load in a nitrogen station	DYNAMIC*
* At exceedingly high pressure fluctuations or frequent drive motor starts (current peaks), switch from DYNAMIC to VARIO.	

Tab. 32 Energy-efficient control modes

The SIGMA CONTROL 2 controller is factory set to DYNAMIC control mode unless specifically ordered otherwise.

DUAL

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

The *idling time* is factory preset according to the maximum starting frequency of the compressor motor. The shorter the *idling time* setting, the sooner (and more frequently) the drive motor is stopped.

QUADRO

In contrast to the DUAL regulating mode, the machine will switch from LOAD to READY in QUADRO mode after periods with low nitrogen consumption.

After periods with a high nitrogen consumption, the machine will switch from LOAD to READY after passing through IDLE.

In this control mode, the controller requires two specified times: The *running time* and the *idle/standstill time*.

The shorter these times are set, the sooner (and more frequently) the motor is stopped.

DYNAMIC

In contrast to the DUAL regulating mode, the machine will switch from LOAD to READY in DYNAMIC mode at low drive motor temperature.

And from LOAD via IDLE to READY at a high drive motor temperature.

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

VARIO

The VARIO mode is based on the DUAL control mode. The difference to DUAL is that the *idling time* is automatically lengthened or shortened to compensate for higher or lower machine starting frequencies.

4.6 Oil level monitoring

SIGMA CONTROL 2 will issue a warning when the oil level is too low.

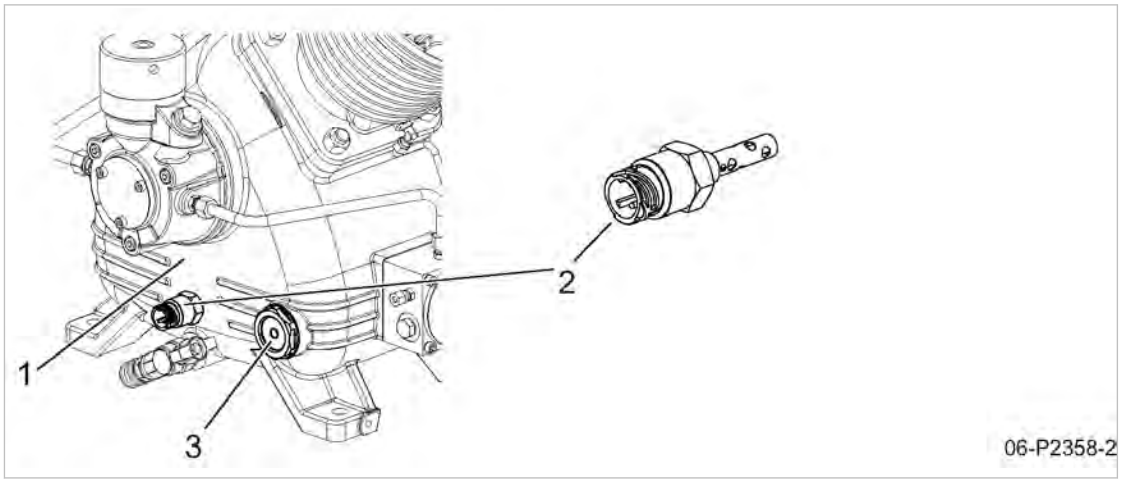


Fig. 10 Oil level monitoring

1 Compressor block
2 Oil level sensor
3 Oil sight glass

➢ Regular visual check of the oil level is necessary despite oil level monitoring.

4.7 Floating relay contacts

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

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

4.8 Options

The options available for your machine are described below.

4.8.1 Option F15 KAESER FILTER KD

- KAESER FILTER KD removes solid particles from the intake nitrogen.

The manual condensate drain serves only for the purposes of monitoring, since no liquid is removed from the nitrogen stream. Only in the event of a fault will oil or an oil-water mixture be discharged.

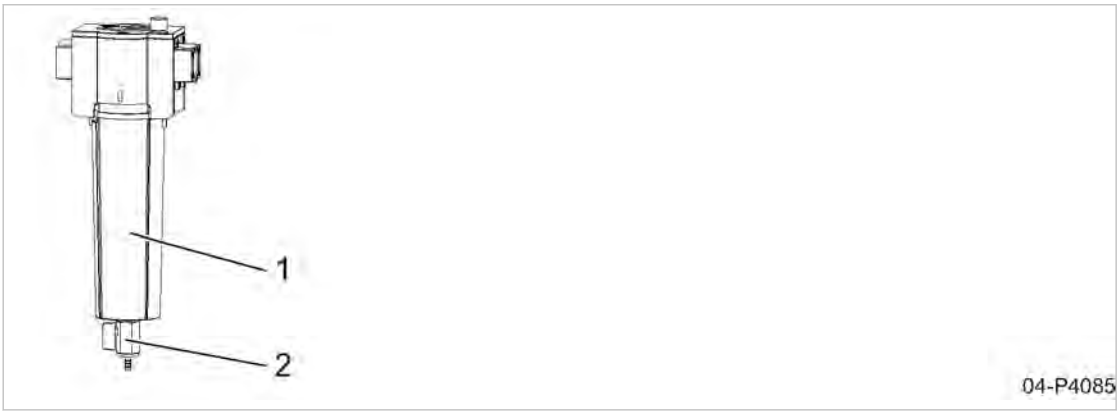


Fig. 11 Option F15 KAESER FILTER KD

[1] KAESER FILTER KD
[2] Manual condensate drain (shut-off valve)

Further information A description of the option codes can be found in chapter 2.2.

4.8.2 Option H1 Machine mountings

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

Fig. 12 Machine mountings

4.8.3 Option H4 Oil collection tray

Any leaks occurring at the machine are captured by the oil collection tray.

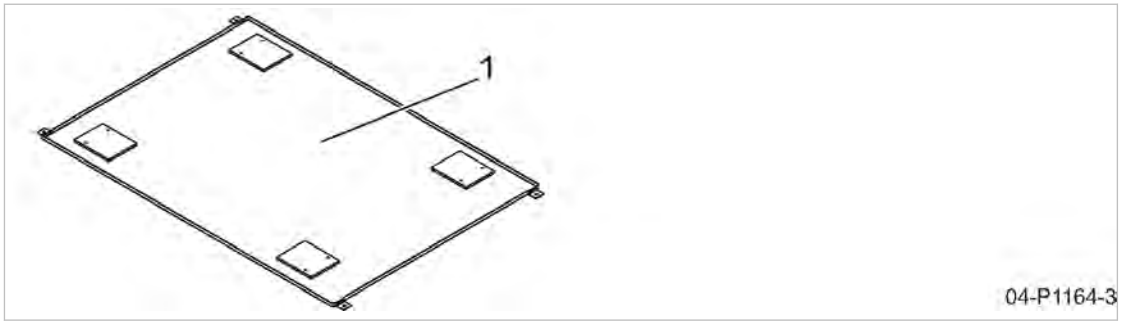


Fig. 13 Oil collection tray

[1] Oil collection tray

5 Installation and Operating Conditions

5.1 Ensuring safety

The conditions in which the machine is installed and operated have a decisive effect on safety.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

- ➢ Strictly forbid fire, open flame, and smoking.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.
- ➢ Do not store inflammable material in the vicinity of the machine.
- ➢ The machine is not explosion-proof:
  Do not operate in areas in which specific requirements with regard to explosion protection are in force.
- ➢ Ensure sufficient and suitable lighting such that the display can be read and work carried out comfortably and safely.
- ➢ Use a duct to discharge the machine exhaust air to the outside. Exhaust air openings must not be closed.
- ➢ Ensure that a nitrogen warning system is installed in the installation location of the nitrogen compressor to alert when oxygen levels are insufficient and to prevent a risk of asphyxiation.
- ➢ 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, fibres, 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 the installation location and clearances

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

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

- ➢ In the event that these cannot be complied with, please consult an authorized KAESER service representative for further advice.

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

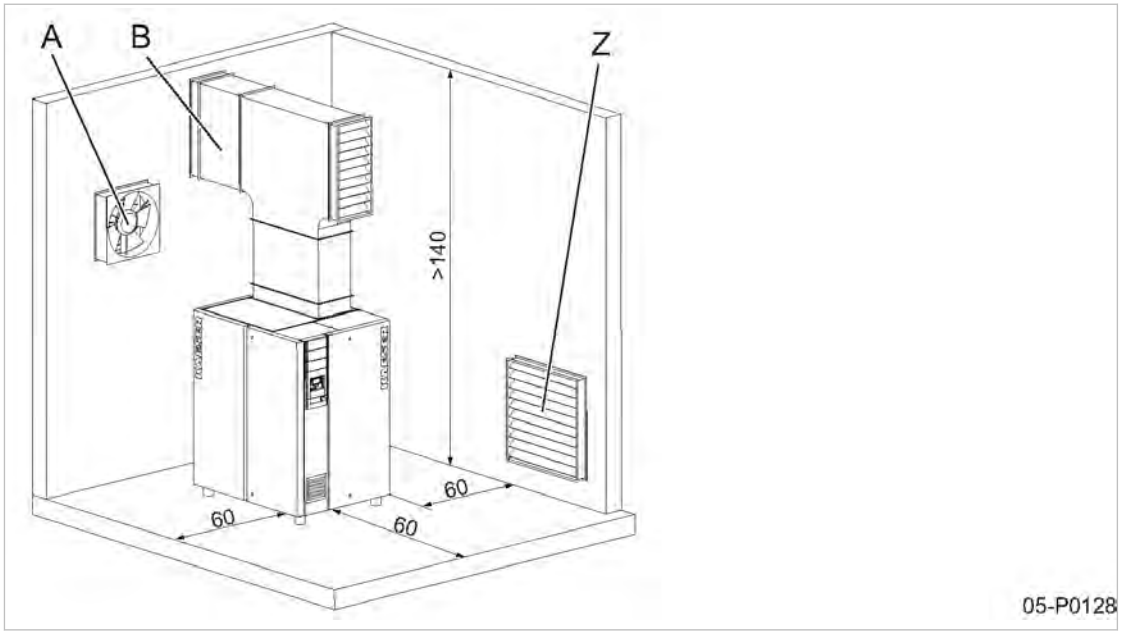


Fig. 14 Recommended installation, distances [in.]

Ⓐ Exhaust fan
Ⓑ Exhaust air duct
Ⓩ Ventilation inlet air opening

1. **NOTICE** *Ambient temperature too low!*
   Frozen condensate and highly viscous compressor oil 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 auxiliary 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 the indicators 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 openings in the enclosure remain open.
5. Observe additional clearances in accordance with local occupational safety and building regulations, so as to ensure that escape and rescue routes can be reached safely even when the machine housing is open.

If the machine is installed in a location containing other equipment (compressors, refrigerated dryers, etc.), then **under no circumstances** may hot exhaust air be directed towards the cooling air inlet side of the machine.
Hot exhaust air can cause damage to the machine.

5.2.2 Ensuring adequate machine room ventilation

In the absence of an exhaust air duct, a high-performance exhaust fan must be installed at the user-end (see chapter 2.6).

Adequate ventilation of the machine room fulfils several functions:

- It conveys 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 an authorized KAESER service representative for further advice.

1. Ensure that the volume of air flowing into the machine room is at least equivalent to that being removed from it by the machine and exhaust fan.
2. Ensure that the machine and exhaust fan can only be operated when the air inlet opening is open.
3. Keep the inlet and exhaust openings 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.

Further information See chapter 13.2 for dimensions of air inlet and exhaust air openings.

5.2.3 Installing a nitrogen warning system

The operator must ensure that a nitrogen warning system is installed in the machine room containing the nitrogen compressor, in order to raise the alarm should oxygen levels become insufficient and thereby prevent any risk of asphyxiation.

➤ Check the nitrogen warning system regularly to ensure reliable operation.

5.2.4 Exhaust air ducting design

The exhaust air duct serves to convey away the cooling air, which results in the room heating up less than it would otherwise (lower air inlet requirement).

On the air inlet and exhaust air side, the machine can only overcome the air resistance stipulated within its design specifications. Any additional air resistance will reduce the airflow and negatively affect cooling of the machine.

Consult an authorized KAESER service representative before determining:

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

➤ Consult an authorized KAESER service representative for advice.

5.3 Operating the machine in a nitrogen network

When the machine is connected to a nitrogen system, the network working pressure may not exceed the permissible final pressure of the machine.

When charging a fully vented nitrogen network there is generally a very flow speed through the nitrogen treatment devices. These conditions are detrimental to correct air treatment. Nitrogen quality suffers.
To ensure the desired nitrogen quality when charging a vented air network, we recommend the installation of a main charging system to fill the empty nitrogen network under controlled conditions.

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

6 Installation

6.1 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety 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.

Working on live components

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

- ➢ Work on electrical equipment may only be carried out by authorized electricians.
- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Check that the floating relay contacts are voltage-free.

Working on the compressed air system

Compressed nitrogen 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.

- ➢ Isolate the machine from the nitrogen network by closing the user's nitrogen inlet and discharge shut-off valves.
- ➢ Depressurize all pressurized components and enclosures (see chapter 10.10).
- ➢ Do not open or dismantle any valves.

When working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan while the machine is running can result in serious injury.

- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Do not open the cabinet while the machine is switched on.

Further information

Details of authorized personnel are found in chapter 3.4.2.

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

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 to the nitrogen network

Install flexible compressed air lines that run as directly as possible to the low-pressure and high-pressure sides of the machine. If the lines are directed upwards, 90 ° bends may be required.

Use a swan neck pipe to connect to the low-pressure and high-pressure networks.

Condensate in the nitrogen network can damage the piping:

- ➢ Only use corrosion-resistant piping.
- ➢ Use fluoroelastomers as the material for the seals.
- ➢ Take the electrochemical series into account.
- ➢ Consult KAESER regarding suitable materials for the nitrogen network.
- ➢ Do not introduce or discharge any forces to/from the machine for which the compressive forces must be compensated by bracing.

Precondition Fully vent the nitrogen network (see chapter 10.10).

⚠ WARNING

High pressure!
High, pulsating and rising pressures.

- ➢ *Avoid compressive forces entering/exiting the machine by using appropriate bracing (fixed point) for the compressed air lines.*

6.3.1 Connecting the machine to the low-pressure network

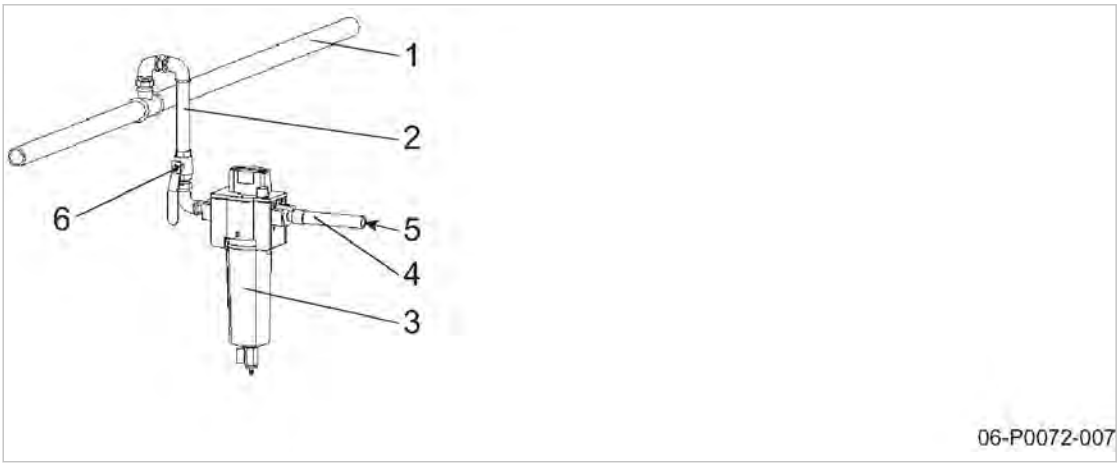


Fig. 15 Low-pressure network connection

[1] Nitrogen line
[2] Low-pressure network
[3] KAESER FILTER KD
[4] Flexible compressed air line
[5] Machine (low-pressure nitrogen inlet)
[6] User-end shut-off valve
[7] Electronic condensate drain

➢ Install a KAESER FILTER KD to ensure reliable operation of the machine (when Option F15 is selected, a KAESER FILTER KD is not required at the user-end).

1. **⚠ WARNING** *Serious injury can result from loosening or opening components under pressure!*
   ➢ *Fully vent all pressurized components and enclosures.*
   ➢ *A shut-off valve must be installed by the user in the connecting line.*
2. Connect the machine to the low-pressure network using a flexible compressed air line.

6.3.2 Connecting the machine to the high-pressure network

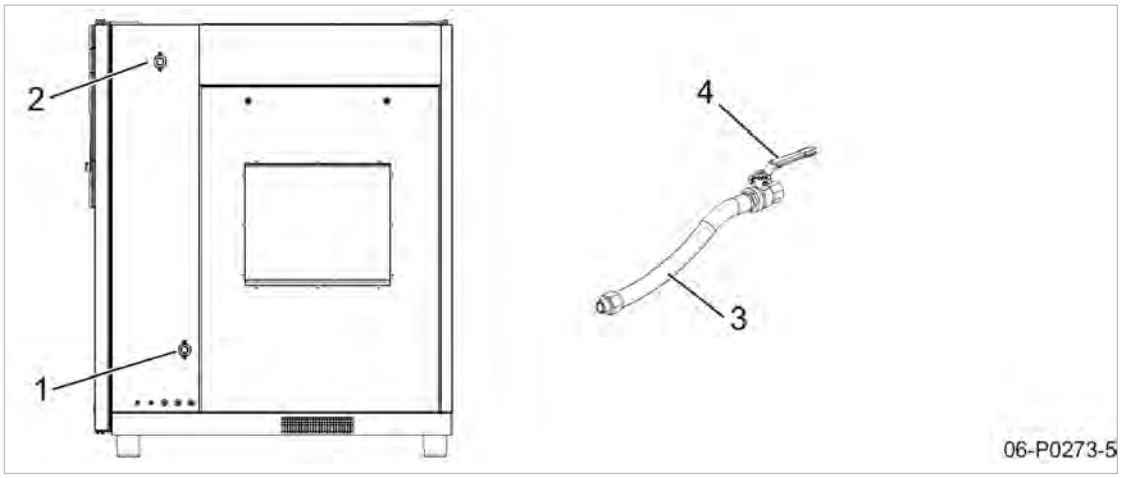


Fig. 16 High-pressure network connection

1	Machine (nitrogen outlet)	3	Flexible compressed air line
2	Machine (nitrogen inlet)	4	User-end shut-off valve

➢ Install an electronic condensate drain to prevent condensate from flowing back into the machine.

1. **⚠ WARNING** *Serious injury can result from loosening or opening components under pressure!*
   ➢ *Fully vent all pressurized components and enclosures.*
2. A shut-off valve must be installed by the user in the connecting line.

➢ Connect the machine to the high-pressure network using a flexible compressed air line.

Further information For the size and positions of the nitrogen connections, see the dimensional drawing in chapter 13.2.

Piping example

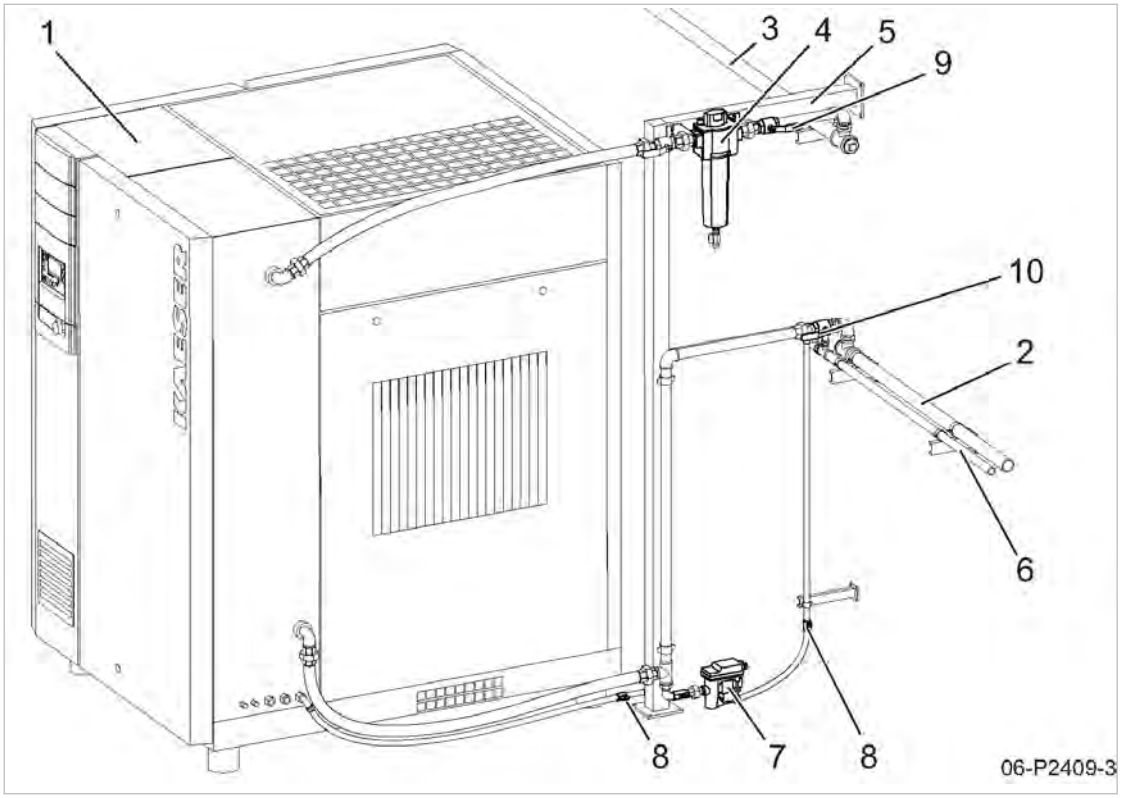


Fig. 17 Piping example

1	Booster	6	Condensate line
2	High-pressure network	7	Electronic condensate drain (high pressure)
3	Low-pressure network	8	User-end shut-off valve (condensate line)
4	KAESER FILTER KD	9	User-end shut-off valve (initial pressure)
5	Fixed point	10	User-end shut-off valve (final pressure)

- ➢ A shut-off valve must be installed in the condensate line at the user-end.
- ➢ Install the electronic condensate drain (high pressure) as a water trap in the nitrogen outlet line.

When Option F15 is selected, a KAESER FILTER KD is not required at the user-end.

6.4 Installation example

The following installation example is a suggestion only and does not relate to an actual application.

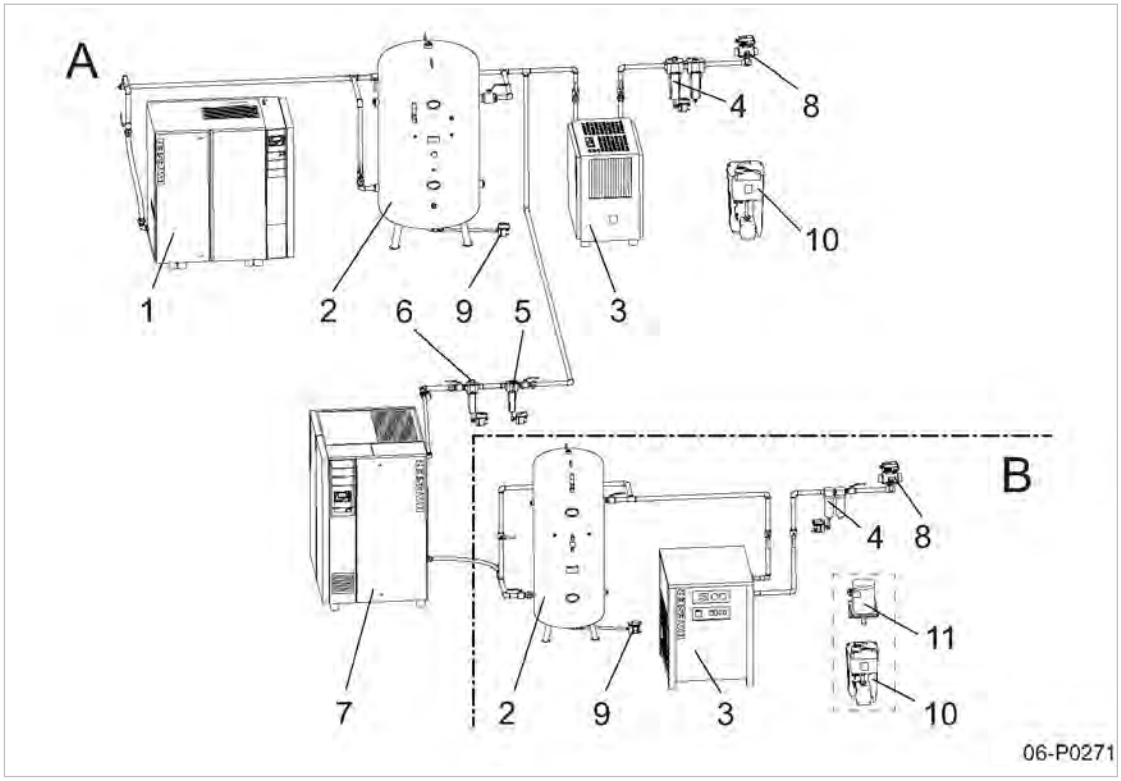


Fig. 18 Installation example (suggestion)

- [A] Low-pressure network
- [B] High-pressure network
- [1] Rotary screw compressor
- [2] Air receiver
- [3] Refrigerated dryer
- [4] KAESER FILTER, e.g. KE/KA
- [5] KAESER FILTER KC (Option)
- [6] KAESER FILTER KD
- [7] Booster
- [8] Air-main charging system
- [9] Condensate drain
- [10] Condensate treatment system
- [11] High-pressure venting chamber

6.5 Connecting the condensate drain

A threaded connection is provided for attaching a condensate line.

The condensate must be able to drain off freely.

➢ Only a condensate collection line with a minimum permissible gauge working pressure of 910 psi may be connected to the machine.

Fig. 19 illustrates a recommended installation.
Condensate flows downwards into the condensate collection line. This prevents condensate from flowing back into the machine.

If condensate flows into the condensate collection line at several points, shut-off valves must be installed in the condensate lines so as to be able to shut off the lines before commencing any maintenance work.

Condensate line

Characteristic	Value
Max. length[1)] [ft]	50
Max. delivery head [ft]	16
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Hose line
[1)] For longer lengths, please contact the manufacturer before installation.	

Tab. 33 Condensate line

Condensate collection line

Characteristic	Value
Gradient [%]	≥3
Max. length[1)] [ft]	65
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Hose line
[1)] For longer lengths, please contact an authorized KAESER service representative before installation	

Tab. 34 Condensate collection line

Nitrogen flow rate[1)] [cfm]	Line cross-section [”]
<350	3/4
350 – 700	1
701 – 1400	1 1/2
>1400	2
[1)] Use the nitrogen flow rate as a guide for the expected condensate volume	

Tab. 35 Condensate collection line: Line cross-section

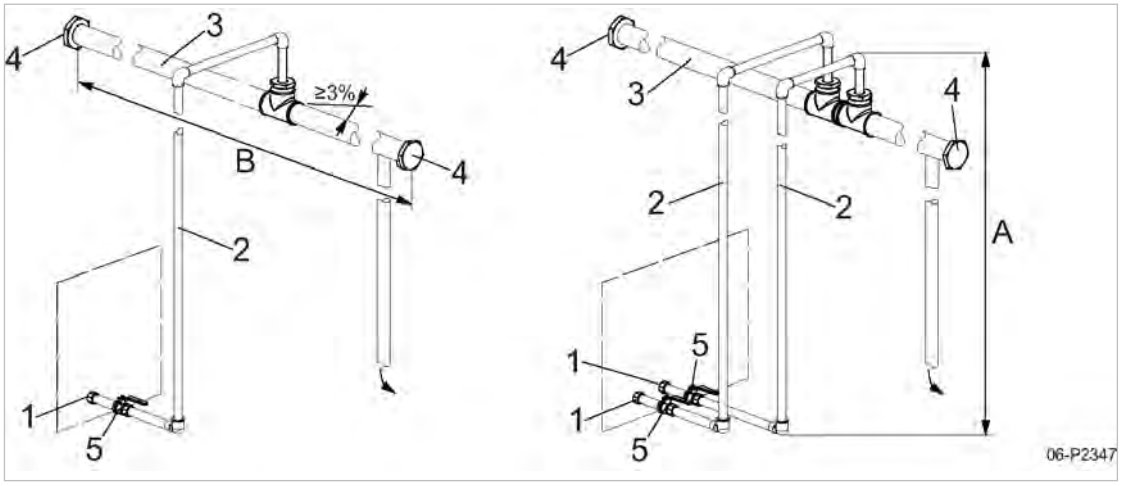


Fig. 19 Connecting the condensate drain

[1] Threaded connection
[2] Condensate line
[3] Condensate collection line
[4] Screw plug
[5] Shut-off valve
[A] Delivery head
[B] Length of condensate collection line

Depending on the version of the machine, you may require multiple condensate drains.

➢ Connect each condensate drain directly to the condensate collection line.

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

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

6.6 Connecting the machine to a power supply network

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

The tolerance limits of the power supply network are within the permissible tolerance limits of the rated machine voltage.

1. The power supply must only be established by authorized installation personnel or authorized, certified electricians.
2. Observe required safety measures as stipulated in the applicable regulations and in national accident prevention regulations. Also observe the regulations of the local electricity supplier.
3. Select supply cable cross-sections and overcurrent protective devices (backup fuses) in accordance with local regulations.
4. Test the overload protective device to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
5. The user is required to fit the machine with a lockable power supply disconnecting device in accordance with local regulations.
   This could be, for example, a load disconnecting switch with fused input. If a circuit breaker is used, it must be suitable for the applicable motor starting characteristics.
6. Check that the control voltage transformer connections are in accordance with the power supply.
   If necessary, reconnect the control transformer to suit the power supply.

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

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

6.7 Options

6.7.1 Option H1 Anchoring the Machine

Fig. 20 Machine mountings

- ➢ 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.

6.7.2 Option H4 Oil collection tray

Any leaks occurring at the machine are captured by the oil collection tray.

Precondition Installation site is level
Sufficient space for the assembly
Suitable hoisting gear

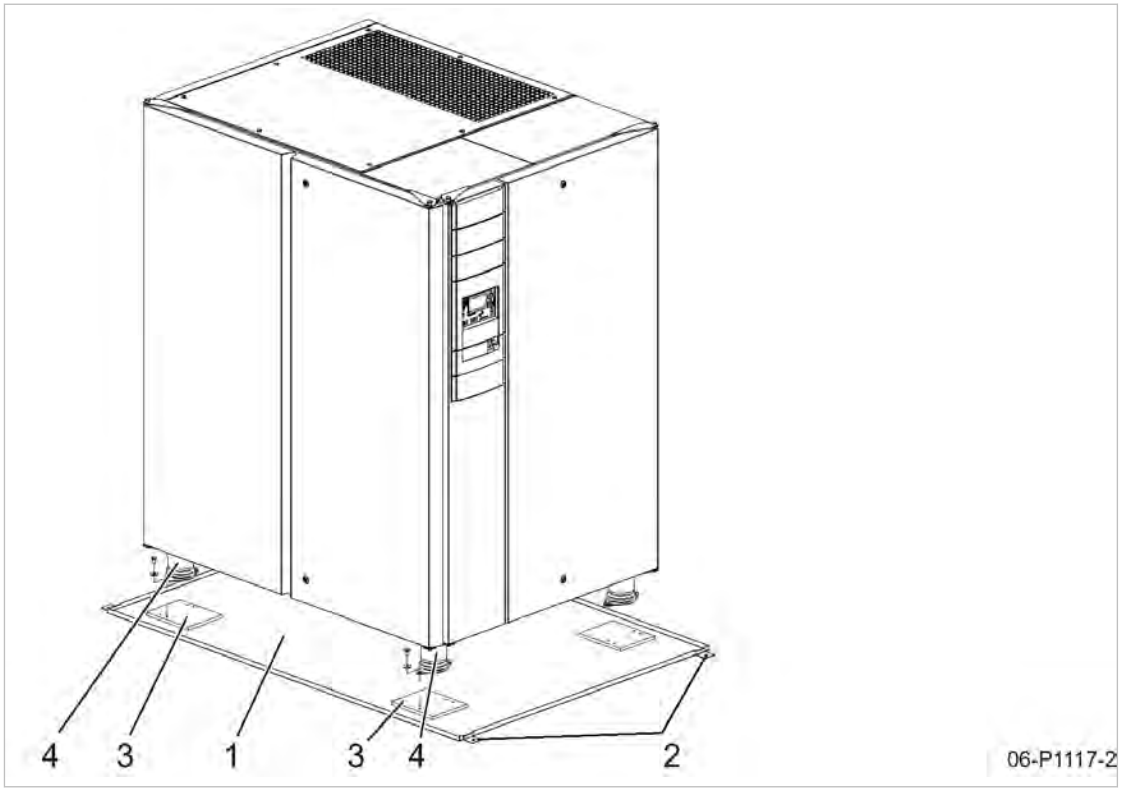


Fig. 21 Oil collection tray

1	Oil collection tray	3	Support plate for mounting feet
2	Fixing points	4	Mounting feet

➢ Horizontally align the oil collection tray on the ground and fasten at the fixing points.

➢ Use suitable hoisting gear to place the machine on the oil collection tray in such a manner that the mounting feet stand securely on the support plates.

➢ Screw the mounting feet onto the support plates.

7 Initial Start-up

7.1 Ensuring safety

Here you will find instructions for a safe commissioning of the machine.
Warning instructions are located before a potentially dangerous task.

⚠ Disregard of warning instructions can cause serious injuries!

Complying with safety 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.

Working on live components

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

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

Working on the compressed air system

Compressed nitrogen 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.

- ➢ Isolate the machine from the nitrogen network by closing the user's nitrogen inlet and discharge shut-off valves.
- ➢ Depressurize all pressurized components and enclosures (see chapter 10.10).
- ➢ Do not open or dismantle any valves.

Working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan while the machine is running can result in serious injury.

- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Do not open the cabinet while the machine is switched on.

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

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/standstill

Storage period/ standstill longer than	Measure
12 months	➢ Change the compressor oil.
36 months	➢ Have the overall technical condition checked by an authorized KAESER service representative.

Tab. 36 Re-commissioning after storage/standstill

7.3 Checking installation and operating conditions

➢ Check and confirm all the items on the checklist before commissioning the machine:

Check:	See chapter	Confirmed?
➢ Are the operators completely familiar with the applicable safety regulations?	–	
➢ Have all of the installation conditions been fulfilled?	5	
➢ Has a lockable power supply disconnecting device been installed at the user-end?	6.6	
➢ Are the tolerance limits of the power supply network within the permissible tolerance limits of the rated machine voltage? (see nameplate in the control cabinet)	2.1	
➢ Are the cable cross-sections and fuse ratings sufficient?	2.14.1	
➢ Is the compressor motor overload relay appropriate for the mains voltage?	7.4	
➢ Is the fan motor protection switch appropriate for the power supply voltage?	7.4	
➢ Have all electrical connections been checked for tightness? ➢ Has the inspection been repeated after 50 operating hours following the initial commissioning?	–	
➢ Have the connections to the low-pressure network and high-pressure network been established using a shut-off valve and flexible pressure line?	6.3	
➢ Has the belt tension been checked? ➢ Has it been rechecked after 24 operating hours following initial commissioning?	10.21	
➢ Is there sufficient oil in the compressor block housing? (with the machine switched off, the oil level should be 0.2 – 0.3 inches above the sight glass red zone)	10.11	
➢ Has an external condensate line been connected?	–	
➢ Has it been verified that no other nitrogen components are located in the hot exhaust air flow exiting the machine?	5.2.4	

Check:	See chapter	Confirmed?
➢ Is the machine firmly anchored to the floor? (Option H1)	6.7.1	
➢ Are all maintenance doors closed and all removable panels secured in place?	–	

Tab. 37 Checklist for installation conditions

7.4 Setting the overload protection relay

Electrical diagram 13.3 gives the location of the overload relay.

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

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

➢ Check the overload protection relay setting.

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

➢ Contact an authorized KAESER service representative.

7.5 Checking the motor protection switch settings

Electrical diagram in chapter 13.3 gives the setting values for the motor overload protection switch.

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

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

➢ 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 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 nitrogen network.
2. Switch on the power supply disconnecting device.
   After the controller has carried out a self-test, the green *Controller on* LED is lit continuously.
3. If required:
   Change the display language as described in chapter 7.8.

4. Press the «ON» key.
   The compressor motor runs up and after a short time the machine switches to LOAD and delivers nitrogen.

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

Does the machine stop when the compressor motor rotates in the wrong direction?

- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Changeover phase lines L1 and L2.
- ➢ Acknowledge any existing alarm messages and switch the machine on again.

7.7 Inlet and discharge pressure

Inlet and discharge pressure are factory set.

An adjustment is possible to suit other individual operating conditions.

Do not set the machine's maximum working pressure higher than the maximum working pressure of the nitrogen system connected.

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

To improve the switching frequency:

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

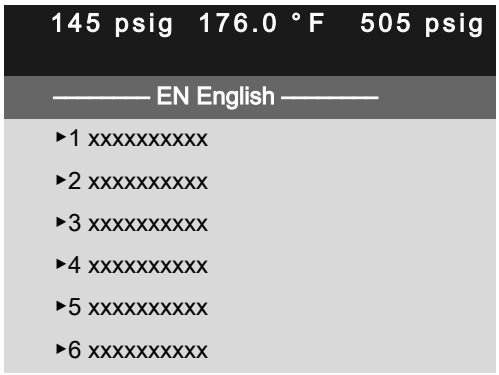
➢ Set the target pressure as described in the SIGMA CONTROL 2 service manual.

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 «Return» key.
2. Press the «UP» or «DOWN» keys until the current language is shown as active line (inverse):



Current language (active line)
Submenu
Submenu
Submenu
Submenu
Submenu
Submenu

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

5. Confirm the setting with the «Enter» key.
6. Press «Escape» repeatedly to return to the main menu.

Result The display texts are now in the selected language.

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

8 Operation

8.1 Switching on and off

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

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

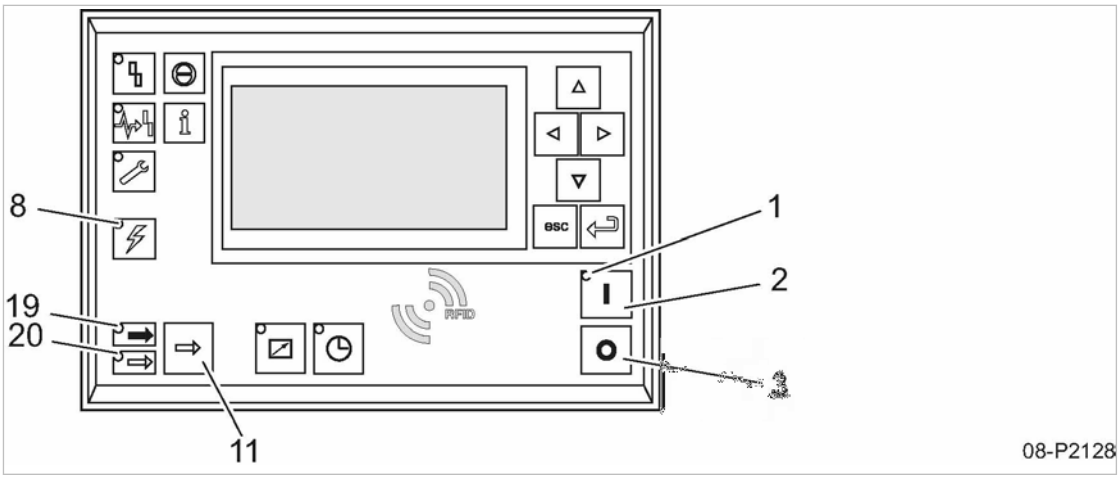


Fig. 22 Switching on and off

1 *Machine ON* LED
2 «ON» key
3 «OFF» key
8 *Controller voltage* LED
11 «LOAD/IDLE» toggle key
19 *LOAD* LED
20 *IDLE* LED

8.1.1 Switching on

Precondition No personnel are working on the machine.

All access doors and panels are closed and secure.

1. Switch on the power supply disconnecting device.
   The *Controller voltage* LED lights green.
2. Press the «ON» key.
   The *ON* LED lights green.

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

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

8.1.2 Switching off

1. Press the «OFF» key.
   The machine switches to IDLE and the *IDLE* LED flashes. The SIGMA CONTROL 2 displays *Stopping*. The *ON* LED extinguishes as soon as the automatic shut-off action is completed.
2. Switch off and lock out the power supply disconnecting device.

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

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.

8.2 Switching off in an emergency and switching on again

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

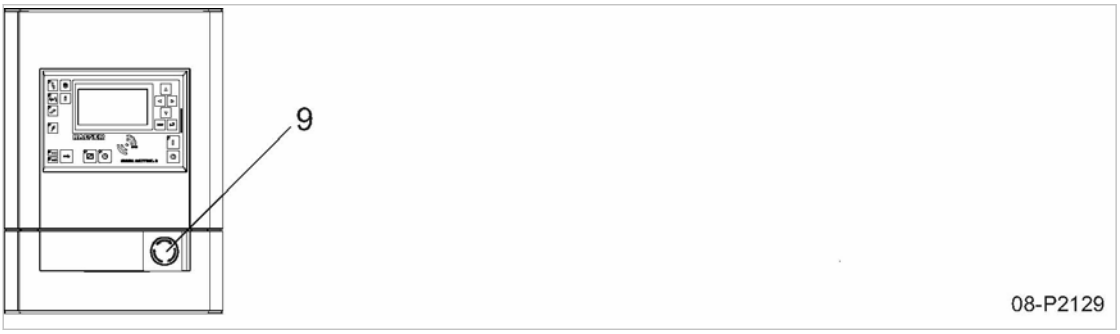


Fig. 23 Switching off in an emergency

9 EMERGENCY STOP push button

Switching off

➢ EMERGENCY STOP push button actuated.

Result The EMERGENCY STOP device remains latched after actuation.

The compressor's pressure system is vented and the machine is prevented from automatically re-starting.

Switching on

Precondition The fault has been rectified

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

Result The machine can now be started again.

8.3 Using the remote control for switching on and off

Precondition A link to the remote control center exists.

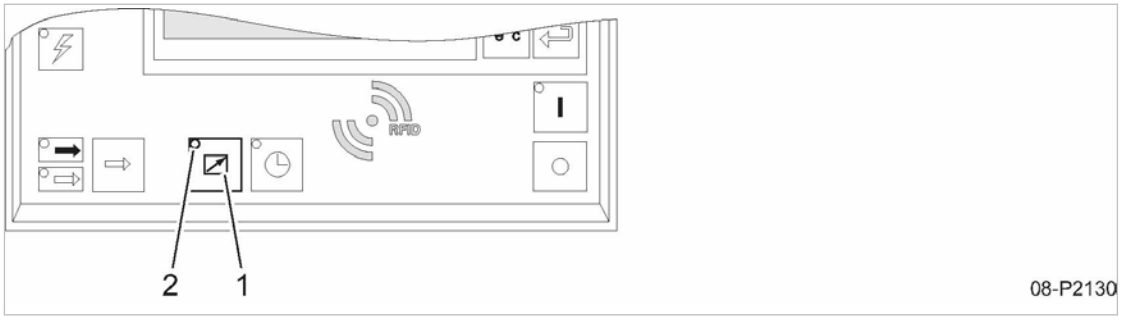


Fig. 24 Using the remote control for switching on and off

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: Risk of injury caused by unexpected starting!

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

Tab. 38 Machine identification

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

⚠ WARNING

Remote control: Risk of injury caused by unexpected starting!

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

Tab. 39 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 clock

Precondition The clock is programmed.

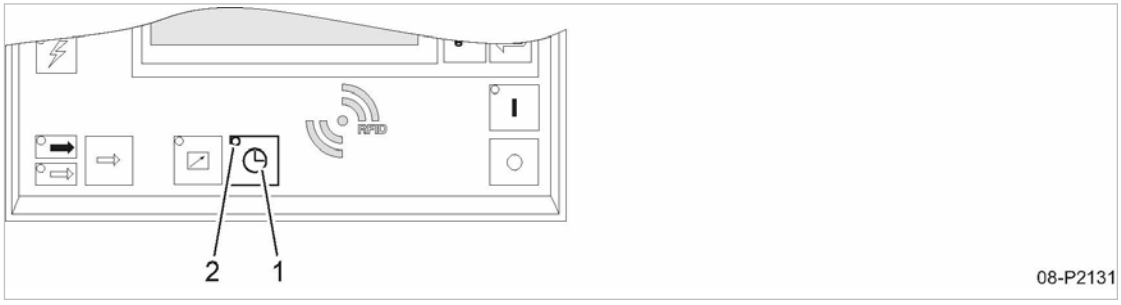


Fig. 25 Switching on and off with the clock

1 «Clock» key
2 *Clock* LED

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

⚠ WARNING

Clock control: danger of unexpected starting!

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

Tab. 40 Machine identification

2. Press the «clock» key.
   The *clock* LED lights. The machine is switched on and off by the 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 B.

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

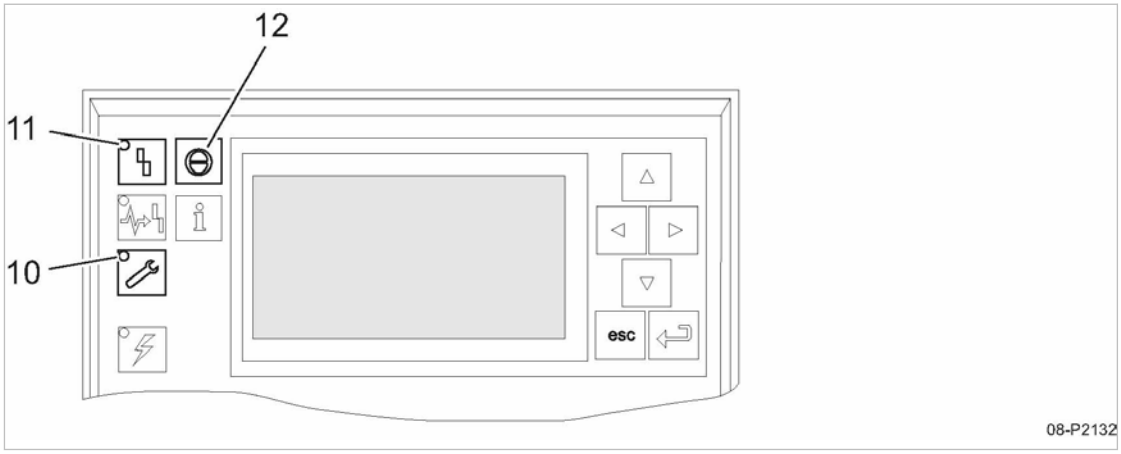


Fig. 26 Acknowledging messages

[10] *Warning* LED (yellow)
[11] *Alarm* LED (red)
[12] Key «Acknowledge»

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 again ready for operation.

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

➢ Unlatch the EMERGENCY STOP push 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 passed,
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 3 types of fault:

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

The messages valid for your machine are dependent on how the individual machine is equipped.

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 SIGMA CONTROL 2.

9.2 Other faults

Fault	Possible cause	Remedy
Machine runs but does not produce nitrogen.	Inlet valve not opening or only opening partially.	Contact authorized KAESER Service representative.
	Venting valve not closing.	Contact authorized KAESER Service representative.
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose connections.
	Nitrogen consumption is greater than the capacity of the compressor.	Check for nitrogen leaks. Shut down consumer(s).
Compressor switches between LOAD and IDLE more than twice per minute.	Receiver too small.	Increase size of receiver.
	Flow into the nitrogen network restricted.	Increase the nitrogen line diameters. Checking the filter elements.
	The differential between cut-in and cut-out pressure too is small.	Check switching differential.

Fault	Possible cause	Remedy
Cooling oil into the machine.	Hose coupling or maintenance hose still plugged into the quick-release coupling on the compressor block. Ball valve at the compressor block is not closed.	Remove the hose coupling/ maintenance hose. Close the ball valve.
	Oil pump leaking.	Contact authorized KAESER Service representative.
	Leaking pipe joints.	Tighten pipe joints. Replace seals.
Cooling oil consumption too high.	Unsuitable compressor oil	Use recommended compressor oils.
	Piston rings worn or broken.	Contact authorized KAESER Service representative.
	Micro-filter element in the crankcase venting contaminated.	Renew the micro-filter element in the crankcase venting.

Tab. 41 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

Disregard of safety warnings can cause unforeseeable dangers!

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

Sign	Meaning
	Don't activate the machine.
	Warning: The machine is being serviced.

Tab. 42 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.

Working on live components

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

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

Working on the compressed air system

Compressed nitrogen 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.

- ➢ Isolate the machine from the nitrogen network by closing the user's nitrogen inlet and discharge shut-off valves.
- ➢ Depressurize all pressurized components and enclosures (see chapter 10.10).
- ➢ Do not open or dismantle any valves.

Working on the drive system

Touching voltage carrying components can result in electric shocks, burns or death.
Touching the fan wheel, the coupling or the belt drive while the machine is switched on can result in serious injury.

- ➢ Switch off and lock out the power supply disconnecting device and check that no voltage is present.
- ➢ Do not open the cabinet while the machine is switched on.

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

10.2 Following the maintenance plan

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, e.g.:

- high temperatures
- much 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 list is given in chapter 10.23.

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 is shown on SIGMA CONTROL 2.

Precondition Maintenance performed and
maintenance message acknowledged.

- ➢ Reset the maintenance interval counter as described in the SIGMA CONTROL 2 operating manual.

10.2.3 Regular maintenance and service work

The following table provides an overview of the various maintenance intervals for the machine.
Selected maintenance intervals for the machine can be displayed via the SIGMA CONTROL 2 controller.

Maintenance interval	Short description
Weekly	Week
Yearly	Year
SIGMA CONTROL 2: Maintenance package A (Every 1000 operating hours; at least every 1 years)	Package A
SIGMA CONTROL 2: Maintenance package B (Every 2000 operating hours; at least every 2 years)	Package B
SIGMA CONTROL 2: Maintenance package C (Every 12000 operating hours; at least every 6 years)	Package C
SIGMA CONTROL 2: Maintenance package D (Every 24000 operating hours; at least every 12 years)	Package D
SIGMA CONTROL 2: Belt inspection (Every 500 operating hours)	Belt
SIGMA CONTROL 2: Hose lines (Every 24000 operating hours; Interval dependent on the number of load changes for the machine)	Lines
SIGMA CONTROL 2: Air cooler (Interval dependent on the number of load changes for the machine)	Cooler
SIGMA CONTROL 2: Electrical system (Every 9000 operating hours)	Electrical system
At least after 20 years	20 years

Tab. 43 Maintenance intervals, regular maintenance and service work

The following table gives an overview of the regular maintenance and service work required.

1. Maintenance and service work should be carried out in a timely manner, taking local ambient and operating conditions into account.
2. Replace maintenance parts and operating fluids in accordance with their respective service lives.

10.2.3.1 Machine maintenance and service schedule

➢ Tasks indicated with “KS” may only be carried out by an authorized KAESER service representative.

➢ Carry out maintenance and service work in accordance with the following table and at the times specified:

Task	Week	Year	Package A	Package B	Package C	Package D	Belt	Lines	Cooler	Electrical system	20 years	See Chapter	Note
Safety functions:													

KS = Contact KAESER SERVICE; CE = Contact certified electrician

[1] Adjust interval as necessary, see Table 45.

[2] Interval dependent on the number of load changes for the machine.

Task	Week	Year	Package A	Package B	Package C	Package D	Belt	Lines	Cooler	Electrical system	20 years	See Chapter	Note
Check the safety relief valve.		X										10.6	
Check the excess temperature safety shutdown function.		X										10.7	
Check the EMERGENCY STOP push button.		X										10.8	
Check the temperature shut-down function on the cooler ni-trogen inlet.		X										10.9	
Replace safety-relevant compo-nents for safety functions.											X	—	KS
Compressor block:													
Check the compressor oil level.	X											10.11	
Change the compressor oil[1)].				X	X	X						10.13	
Replace the oil filter.				X	X	X						10.15	
Service the dirt trap.			X	X	X	X						10.16	
Crankcase ventilation: Replace the filter element.				X	X	X						10.14	
Replace the hydraulic bearing.						X						—	KS
Motor and bearings:													
Service the motor anti-friction bearing.				X	X	X						10.5	
Check the drive belt tension.							X					10.21	
Replace the drive belt.					X	X						—	KS
Check the belt tensioning lever.					X	X						—	KS
Replace the fan motor.						X						—	KS
Valves:													
Service the housing ventilation check valve.				X	X	X						10.17.1	
Service the safety relief check valve.				X	X	X						10.17.2	
Replace the solenoid valve.				X	X	X						10.18	
Replace the safety relief valve.				X	X	X						—	KS
Service the control valve.				X	X	X						—	KS
Service the inlet valve.				X	X	X						—	KS
Service the venting valve.					X	X						—	KS

KS = Contact KAESER SERVICE; CE = Contact certified electrician

[1)] Adjust interval as necessary, see Table 45.

[2)] Interval dependent on the number of load changes for the machine.

Task	Week	Year	Package A	Package B	Package C	Package D	Belt	Lines	Cooler	Electrical system 20 years	See Chapter	Note
Venting line: Replace the filter element.					X	X					—	KS
Heat exchanger:												
Check the cooler for leaks.		X									10.3	
Replace the cooler[2)].									X		10.4	KS
Pipe and hose lines:												
Replace the hose lines[2)].					X	X		X			—	KS
Replace the control lines[2)].					X	X		X			—	KS
Electrical connections:												
Check that all electrical and screw connections are sufficiently tightened.		X								X	—	KS; CE
Options:												
Option F15: Check the filter for condensate.	X										10.19	
Option F15: Replace the filter element.			X	X	X	X					10.20	

KS = Contact KAESER SERVICE; CE = Contact certified electrician

[1)] Adjust interval as necessary, see Table 45.

[2)] Interval dependent on the number of load changes for the machine.

Tab. 44 Regular machine maintenance and service work

10.2.3.2 Compressor oil: Change interval

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

Advice can be obtained from an authorized KAESER service representative regarding suitable oil change intervals.

➢ Check operating conditions and adjust intervals as necessary; log the results in table 45 for future reference.

	Maximum permissible oil change interval [operating hours/years]	
Compressor oil	Favorable operating conditions [1)]	My operating conditions
ISO320N	2000/1	
—	—	

[1)] Cool to moderate ambient temperatures, low humidity, moderate to high duty cycle.

Tab. 45 Compressor oil: Change intervals

10.3 Option K1 Cooler maintenance

Regularly clean the cooler. This ensures reliable cooling of the machine and the nitrogen. The frequency is mainly dependent on local operating conditions.

A leaking cooler causes nitrogen loss.

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

➢ Have an authorized KAESER service representative clean the cooling air ducts.

Material: Brush and vacuum cleaner
Face mask (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.

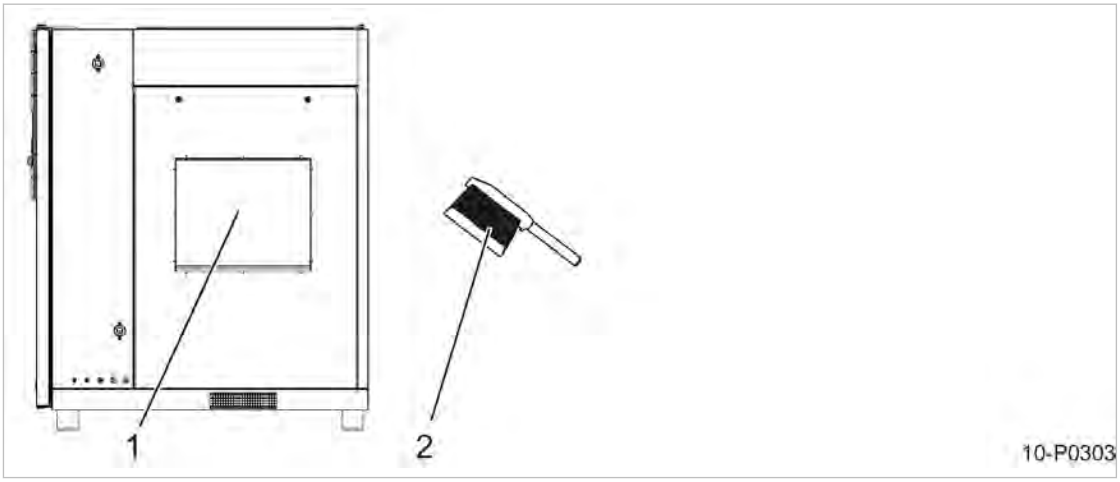


Fig. 27 Cleaning the cooler

[1] Cooler
[2] Brush

Cleaning the cooler

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

Avoid creating clouds of dust.

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

The cooler can't be cleaned thoroughly?

➢ Have stubborn clogging removed by an authorized KAESER service representative.

Check the cooler for leaks

➢ Carry out visual inspection: Did condensate escape?

Is the cooler leaking?

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

10.4 Option K1 Changing the cooler

The maintenance interval for replacement of the air-cooled nitrogen aftercooler is dependent on the number of load changes for the machine.

1. **⚠ WARNING** *Danger of serious injury from the nitrogen aftercooler bursting!*
   ➢ *Observe maintenance intervals for the nitrogen aftercooler!*
2. Replacement intervals will be displayed by the controller.
3. Arrange for the nitrogen aftercooler to be replaced without delay by an authorized KAESER service representative.

10.5 Motor maintenance

The compressor motor is equipped with bearings featuring a re-greasing facility. The grease fittings are located on the outside of the machine. The grease lines are pre-filled at the factory.

Only use UNIREX N3 high-temperature grease for the motor bearings. Damage to bearings resulting from the use of alternative brands of grease is excluded from the warranty.

Material Grease gun with UNIREX N3 bearing grease
Cleaning cloth

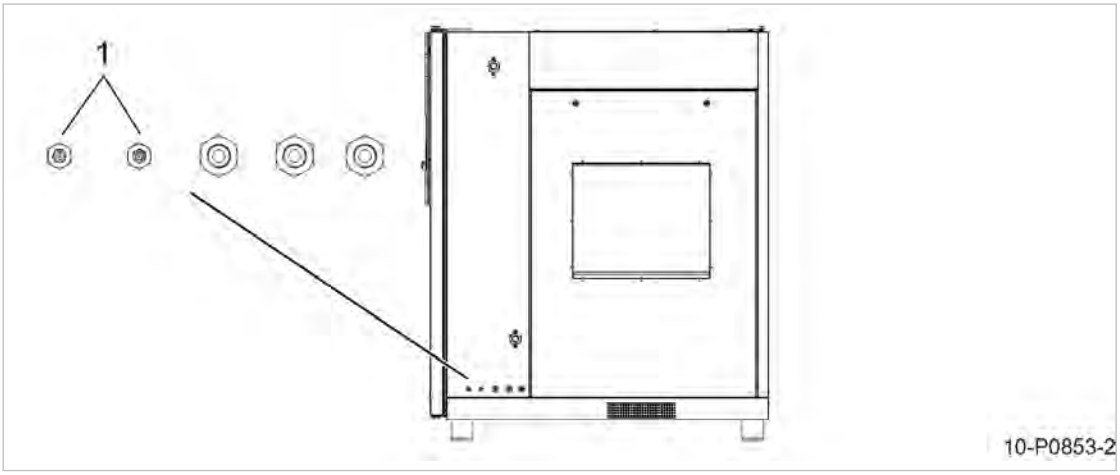


Fig. 28 Motor maintenance
[1] Compressor motor grease fitting

Compressor motor:

The quantity of grease required is provided on the nameplate of the compressor motor, see chapter 2.12.1

Precondition Compressor motor is running

1. Clean the grease fitting with a cleaning cloth.
2. Lubricate both motor bearings using a grease gun.
3. Reset the maintenance counter.

10.6 Testing the safety relief valve

The safety relief valve test consists of two steps:

1. Testing the safety relief valve on the cooler.
2. Testing the safety relief valve on the distribution tank.

10.6.1 Cooler safety relief valve

To test the safety relief valve, raise the gauge working pressure of the machine above the opening pressure differential of the safety relief valve.

Network pressure monitoring is switched off during the test. In normal operation, the blow-off protection will switch the machine off before the safety relief valve is actuated. During the test, the blow-off protection will switch the machine off only when the opening pressure differential of the safety relief valve has been exceeded by 14.5 psi.

- ➢ Follow the detailed description of this procedure in the SIGMA CONTROL 2 operating manual
- ➢ Never operate the machine without a properly functioning safety relief valve.
- ➢ Arrange for defective safety relief valves to be replaced immediately.

⚠ WARNING

Risk of hearing damage when safety relief valve blows off!

- ➢ *Close all maintenance doors, replace and secure all removable panels.*
- ➢ *Always wear ear protection.*

Precondition The machine is switched off.

1. Close the user-end shut-off valve at the nitrogen outlet.
2. Read off the actuating pressure on the safety relief valve.
   (The actuating pressure is usually to be found at the end of the part identification label)
3. Log in to the SIGMA CONTROL 2 with access level 2.
4. Observe the pressure display in the SIGMA CONTROL 2 and call up the test function.
5. **⚠ WARNING** *Risk of burning from nitrogen when the safety relief valve blows off!*
   - ➢ *Close all maintenance doors, replace and secure all removable panels.*
   - ➢ *Wear eye protection.*
6. End the test as soon as the safety relief valve blows off or the gauge working pressure exceeds the opening pressure differential of the safety relief valve by almost 14.5 psi.
7. If necessary, vent the machine and replace the defective safety relief valve.
8. Deactivate the test function.
9. Open the user-end shut-off valve on the nitrogen outlet.

10.6.2 Distribution tank safety relief valve

➢ To check the actuating pressure of the safety relief valve, it must be removed from the machine by an authorized KAESER service representative and installed on a test rig.

Further information For the actuating pressure of the safety relief valve, see chapter 2.7.

Activating the safety relief valve

In order to prevent the seat of the safety relief valve from sticking, it must be actuated at regular intervals: once per year at a minimum.

In the event that the permissible working pressure is exceeded, the safety relief valve will open to protect the machine.

➢ Never operate the machine without a properly functioning safety relief valve.

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

Precondition Machine is running under LOAD.

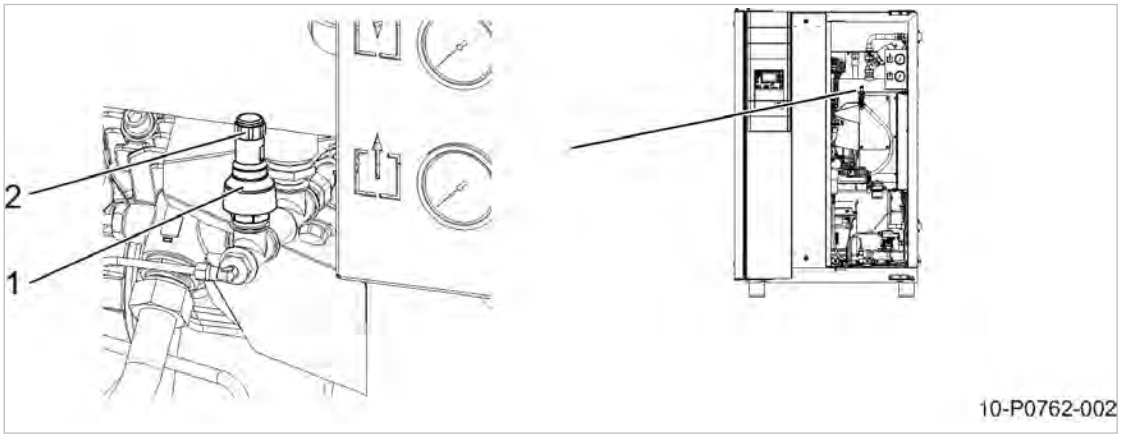


Fig. 29 Testing the safety relief valve

[1] Distribution tank safety relief valve
[2] Knurled screw

1. **⚠ WARNING** *safety relief valve blowing off!*
   Excessive noise when the safety relief valve blows off.
   Risk of injury from bursting components and compressed fluid.
   ➢ *Wear ear and eye protection.*
2. Turn the knurled screw counter-clockwise until compressed fluid blows off.
3. Turn the knurled screw back to its original position.

Do not turn the knurled screw too far.

➢ Arrange for defective safety relief valves to be replaced by KAESER SERVICE.

10.7 Checking the overheating safety shutdown function

The machine should shut down if the block discharge temperature (ADT) reaches a maximum of 425°F.

➢ Check the safety shutdown function as described in the SIGMA CONTROL 2 operating manual.

The machine does not shut down?

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

10.8 Checking the EMERGENCY STOP push button

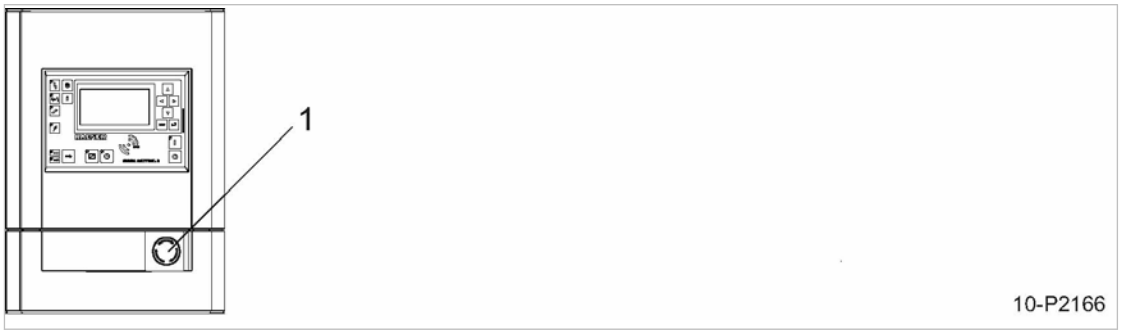


Fig. 30 Checking the EMERGENCY STOP push button

[9] EMERGENCY STOP push button

Precondition Compressor motor running

1. EMERGENCY STOP push button actuated.

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

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.

10.9 Nitrogen inlet temperature switch, cooler

Should the machine exceed the nitrogen inlet temperature at the cooler (Option K1 ≥ 311 °F), an alarm message will be displayed on the SIGMA CONTROL 2 (see operating manual for the SIGMA CONTROL 2).

Arrange for the shutdown function of the temperature switch to be checked by an authorized KAESER service representative.

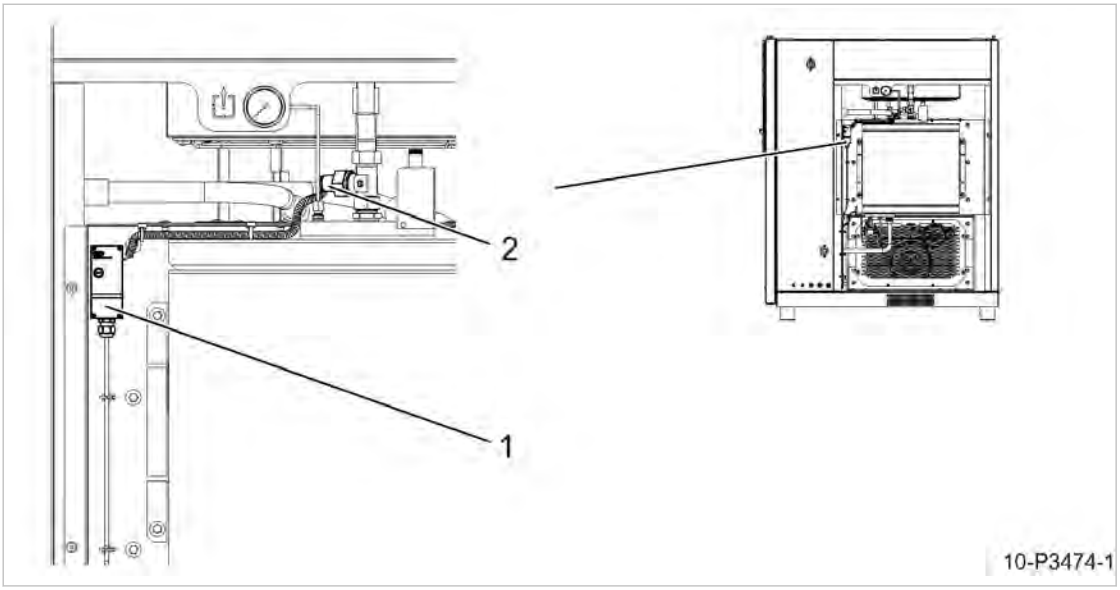


Fig. 31 Nitrogen inlet temperature switch

[1] Temperature switch
[2] Temperature sensor

➢ The temperature switch is non-adjustable.

Unlocking the temperature switch

Should the nitrogen inlet temperature fall below the set value, the temperature switch must be unlocked manually.

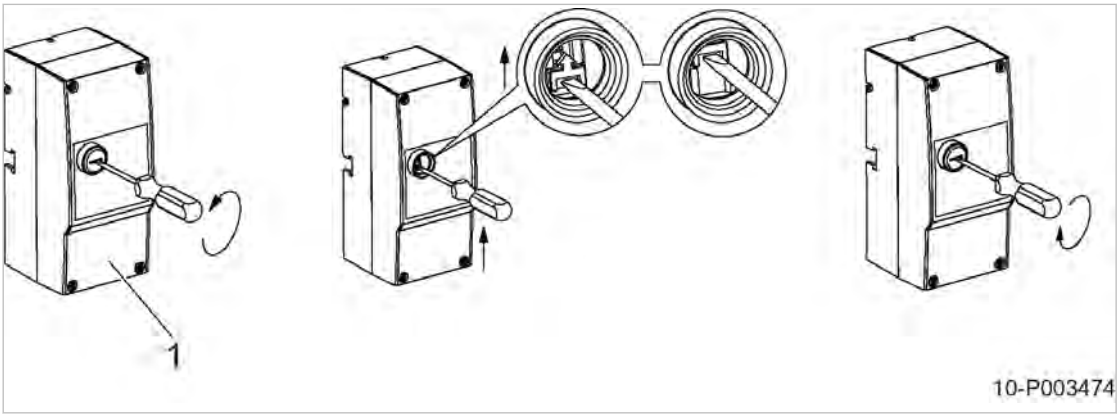


Fig. 32 Unlocking the temperature switch

[1] Temperature switch

1. Open the cover.
2. Unlock the snap-action switch by pulling it upwards.
3. Close the cover
4. Acknowledge the alarm message.

10.10 Venting the machine (depressurizing)

Venting takes place in three stages:

- Isolating the machine from the nitrogen system.
- Venting the cooler.
- Discharging the compressed air manually from behind the network pressure (initial pressure) gauge (behind side maintenance door).

⚠ The machine must be isolated from the nitrogen network and completely vented before undertaking any work that entails opening the pressure system.

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

⚠ CAUTION

Compressed nitrogen!
Compressed nitrogen and pressurized components can cause injury or death if the energy contained within is released suddenly.

➢ *Fully vent all pressurized components and enclosures.*

Isolating the machine from the nitrogen system

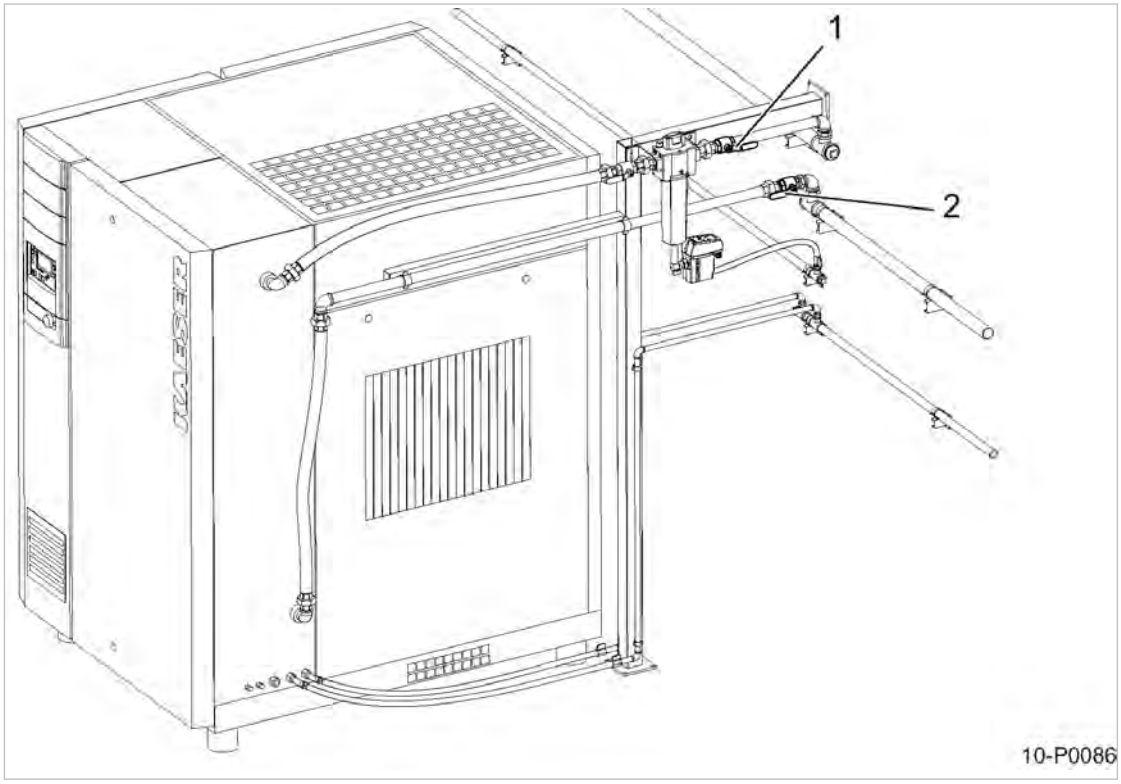


Fig. 33 Install user-end shut-off valves

1 User-end shut-off valve (initial pressure)
2 User-end shut-off valve (final pressure)

➢ Close the user-end shut-off valves (initial and final pressure).

In the event that no shut-off valves have been installed by the user, the entire nitrogen network must be vented.

Venting the cooler

Precondition Access panel removed (see chapter 4.1).

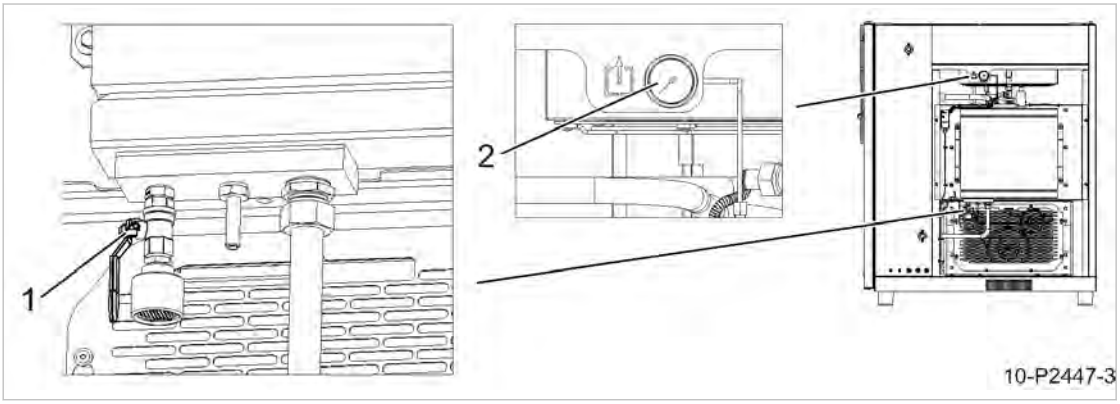


Fig. 34 Venting the cooler

[1] Shut-off valve
[2] Network pressure gauge (final pressure)

➢ Slowly open the shut-off valve [1] and check that the network pressure gauge (final pressure) [2] reads 0 psig.

Should the network pressure gauge (final pressure) not read 0 psig after automatic venting:

➢ Ensure that the shut-off valve [1] is open or that the entire nitrogen network is vented.
➢ Slowly open the shut-off valve [1] to release the pressure.
➢ If manual venting does not achieve depressurization: Contact an authorized KAESER service representative.

Venting the initial pressure side

Precondition Side maintenance door open (see chapter 4.1).

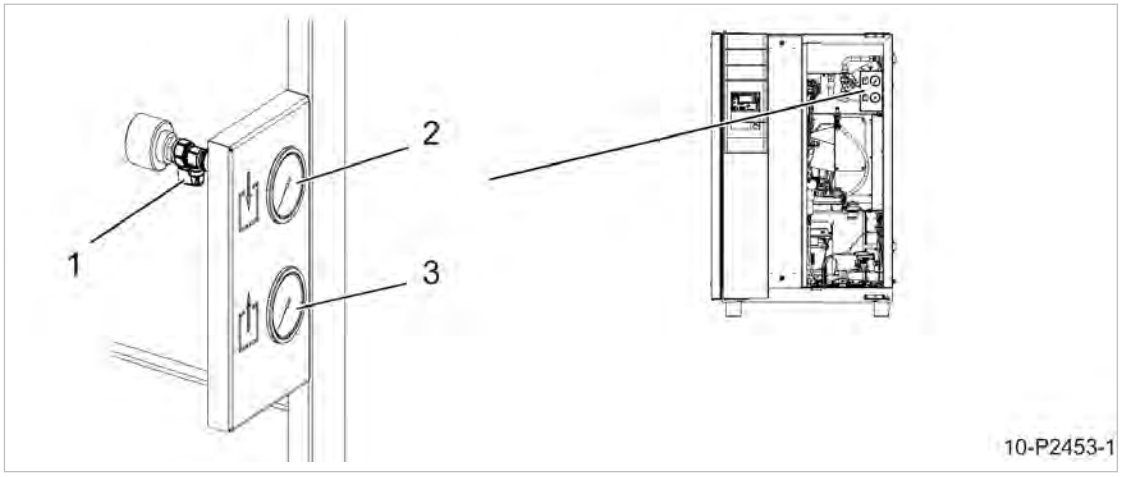


Fig. 35 Venting the initial pressure side

1 Shut-off valve
2 Network pressure gauge (initial pressure)
3 Network pressure gauge (final pressure)

➢ Slowly open the shut-off valve 1 and check that the network pressure gauge (initial pressure) 2 reads 0 psig.

Should the network pressure gauge (initial pressure) not read 0 psig after automatic venting:

➢ Ensure that the shut-off valve is open or that the entire nitrogen system is vented.

➢ Slowly open the shut-off valve 1 to release the pressure.

➢ If manual venting does not achieve depressurization: Contact an authorized KAESER service representative.

10.11 Checking the oil level

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

Precondition The machine is running under LOAD.

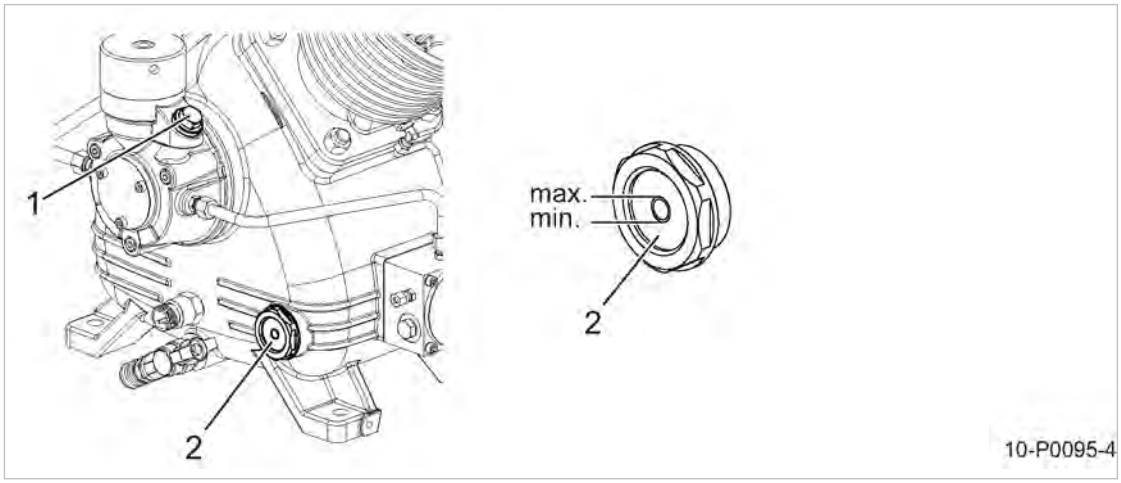


Fig. 36 Checking the oil level

1 Oil filler plug
2 Oil sight glass

1. **⚠ CAUTION**
   Danger of burning - hot surfaces!
   ➢ *Wear long-sleeved clothing and protective gloves.*
2. Check the compressor cooling oil level with machine running under LOAD.

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

10.12 Topping off the compressor oil

Material Compressor oil

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

Vent all pressurized components and enclosures (see chapter 10.10).

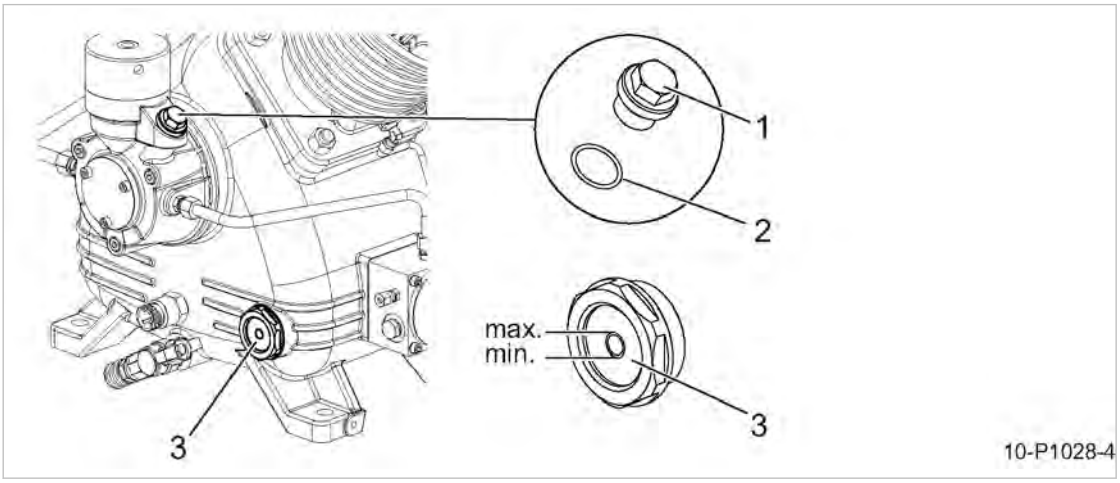


Fig. 37 Topping off the compressor oil

[1] Screw plug
[2] O-ring
[3] Oil sight glass

1. **NOTICE** *The machine can be damaged by unsuitable oil.*
   ➢ *Never mix different types of oil.*
   ➢ *Never top off with a different type of oil to that already used in the machine.*
2. Slowly unscrew the filler plug.
3. Top off to bring the oil to the correct level.
4. If necessary, replace the O-ring of the screw plug and screw the plug into the filler port.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valves at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device.

5. Switch on the machine, after approx. 2 minutes of operation: Check the cooling oil level and top off if necessary.
6. Switch off the machine and visually check for leaks.

10.13 Changing the compressor oil

The initial fill of compressor oil should be changed as specified in Table 45.
Drain all of the oil from the compressor block.

Should it become milky in appearance, change the compressor oil immediately.
This means that it is contaminated with condensate.

Contact an authorized KAESER service representative should condensate be detected in the compressor oil. It is necessary to adapt the block discharge temperature to the individual ambient conditions.

The machine must be isolated from the nitrogen network and completely vented before undertaking any work that entails opening the pressure system.

Material
Compressor oil
Oil receptacle

The required male hose coupling with shut-off valve and maintenance hose is stowed behind the left-hand maintenance door.

Precondition
The machine has been running for at least 5 minutes in LOAD. The power supply disconnecting device is switched off,
lock out and tag out the device,
the absence of any voltage has been verified.

Fully vent all pressurized components and enclosures (see chapter 10.10).

⚠ CAUTION

Danger of burns from hot components and compressor oil.

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

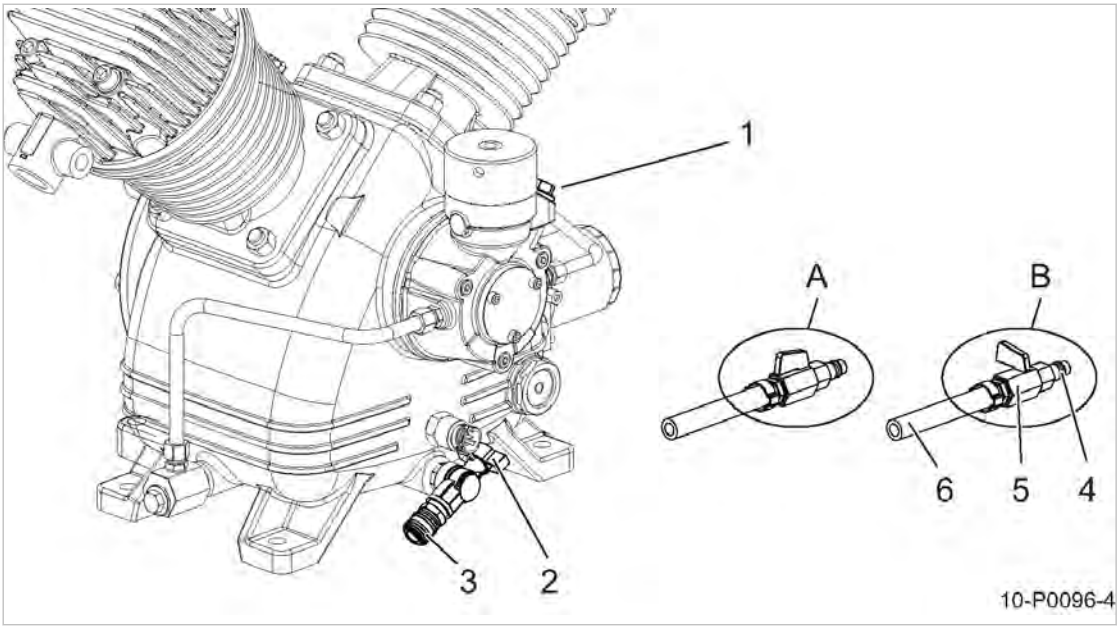


Fig. 38 Changing the compressor oil

[1]	Screw plug	[5]	Shut-off valve
[2]	Shut-off valve (oil drain)	[A]	Shut-off valve open
[3]	Hose coupling	[B]	Shut-off valve closed
[4]	Male hose coupling	[6]	Maintenance hose

1. Prepare an oil receptacle.
2. With the shut-off valve closed, insert the male hose coupling [4] into the hose coupling [3].
3. Insert the maintenance hose [6] into the oil receptacle and secure it in place.
4. Open shut-off valve [2].
5. Slowly open shut-off valve [5] on the maintenance hose and allow the oil to drain completely.
6. Close shut-off valve [2] and remove the male hose coupling [4] from the hose coupling.

Result The cooling oil is drained from the compressor block.

Filling with compressor oil

1. Slowly open the screw plug [1] (Fig. 38).
2. Fill with compressor oil.
3. Check the screw plug O-ring for external damage and then return the screw plug to the filler neck.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve on the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Switch on the machine, run for approx. 2 minutes and then check the compressor oil level again. Top off if necessary.
6. Switch off the machine and visually check for leaks.

➢ Dispose of old compressor oil in accordance with applicable environmental protection regulations.

10.14 Changing the micro-filter element in the crankcase vent

Material: Micro-filter element

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.

Vent all pressurized components and enclosures (see chapter 10.10).

⚠ CAUTION

Danger of burning from hot components and scalding from escaping oil.

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

Do not use the machine without a vent cap.

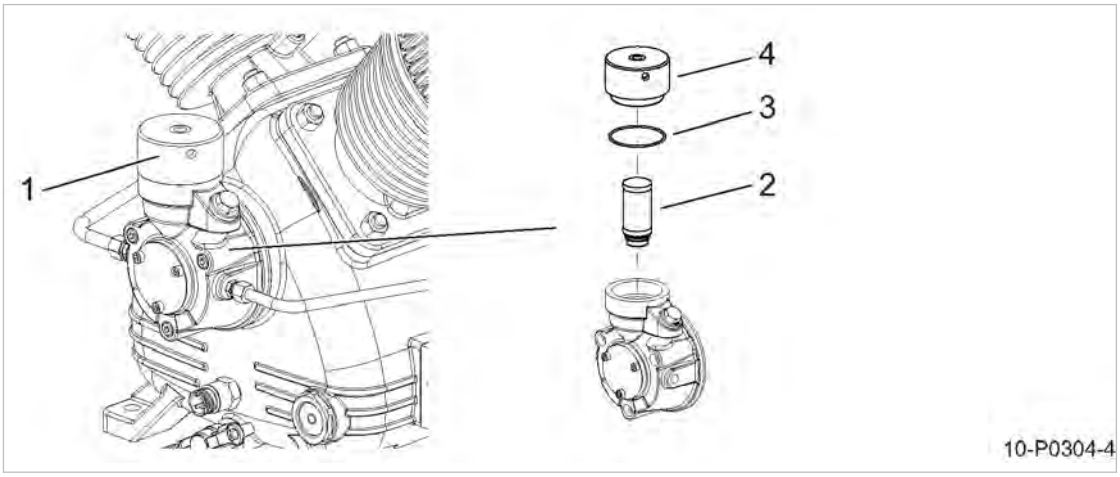


Fig. 39 Changing the micro-filter element in the crankcase vent

[1] Crankcase venting
[2] Micro-filter element
[3] O-ring
[4] Venting cap

1. Unscrew the vent cap from the crankcase vent.
2. **⚠ CAUTION** *Escaping oil mist is damaging to health.*
   ➢ *Do not inhale oil mist and vapors.*
   ➢ *Avoid contact with skin and eyes.*
3. Pull out the micro-filter element.

Dispose of micro-filter element in accordance with environmental protection regulations.

4. Insert a new micro-filter element.
5. Replace the cap in the crankcase vent and check that the O-ring is properly seated.

Starting the machine and performing a trial run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.15 Changing the crankcase oil filter

Material
Oil filter
Oil receptacle
Cleaning cloth

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.

Vent all pressurized components and enclosures (see chapter 10.10).

1. **⚠ CAUTION** *Danger of burns from hot components and compressor oil.*
   - ➢ *Wear long-sleeved clothing and protective gloves.*
2. Change the oil filter when indicated on SIGMA CONTROL 2.

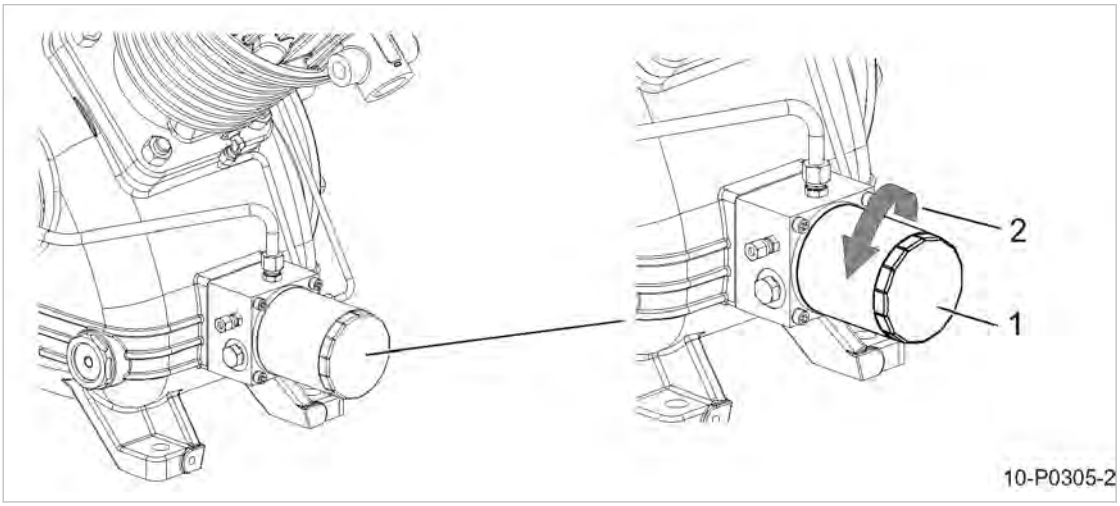


Fig. 40 Changing the crankcase oil filter
[1] Oil filter
[2] Direction of rotation to unscrew the filter

1. **⚠ CAUTION** *Escaping oil mist is damaging to health.*
   - ➢ *Do not inhale oil mist and vapors.*
   - ➢ *Avoid contact with skin and eyes.*
2. Unscrew the oil filter counter-clockwise; catch oil spillage and dispose of according to environmental regulations.
3. Clean sealing faces with a clean cloth.
4. Lightly oil the gasket of the new filter.

5. Manually turn the oil filter clockwise to tighten. Do not use any tool.
6. Check the oil level.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve on the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Switch the machine on and run it for around 2 minutes, then shut it down and perform a visual inspection.

10.16 Dirt trap maintenance

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

Material: Compressed air for blowing out
Cleaning agent

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.

Vent all pressurized components and enclosures (see chapter 10.10).

10.16.1 Dirt trap in the inlet line

ⓘ When a fault occurs in IDLE.

➢ Clean the dirt trap strainer.

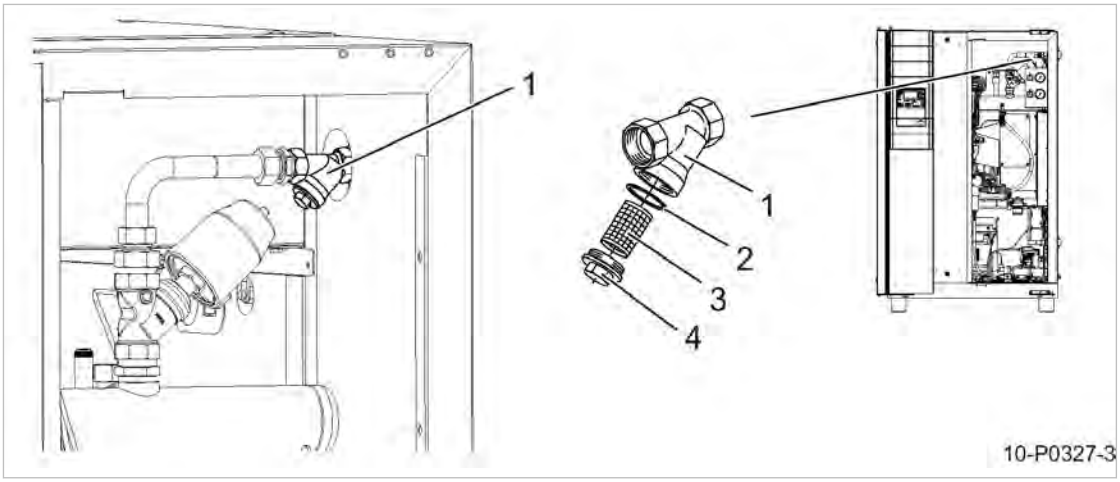


Fig. 41 Dirt trap in the inlet line

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

1. **⚠ CAUTION** *Fatal injury caused by components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen system.*
   - ➢ *Vent (depressurize) the machine completely.*
   - ➢ *Verify the absence of pressure.*
2. Remove the cover plate.
3. Remove the plug and clean the gasket or O-ring.
4. Remove the dirt trap strainer and blow clean.
5. Re-assemble all parts with gasket or O-ring.
6. Install the cover plate.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valves at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.16.2 Dirt trap in the crankcase

If a fault occurs because of insufficient oil pressure.
- ➢ Clean the dirt trap strainer.

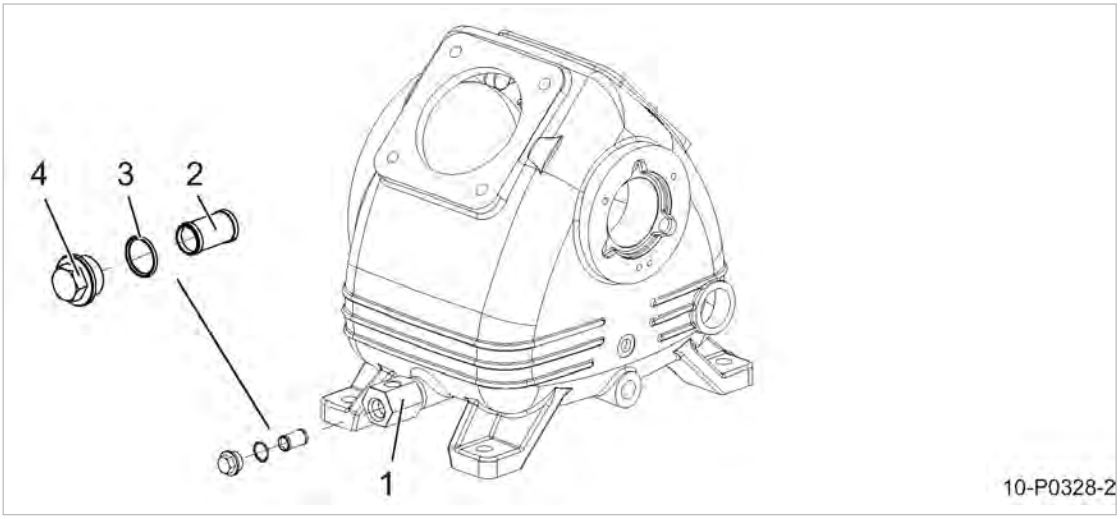


Fig. 42 Dirt trap in the crankcase

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

1. **⚠ CAUTION** *Danger of burns from hot components!*
   - ➢ *Wear long-sleeved clothing and protective gloves.*
2. Remove the plug and clean the O-ring.
3. Remove the dirt trap strainer and blow clean.
4. Re-assemble the dirt trap and plug with the O-ring.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valves at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.16.3 Dirt trap in the filter

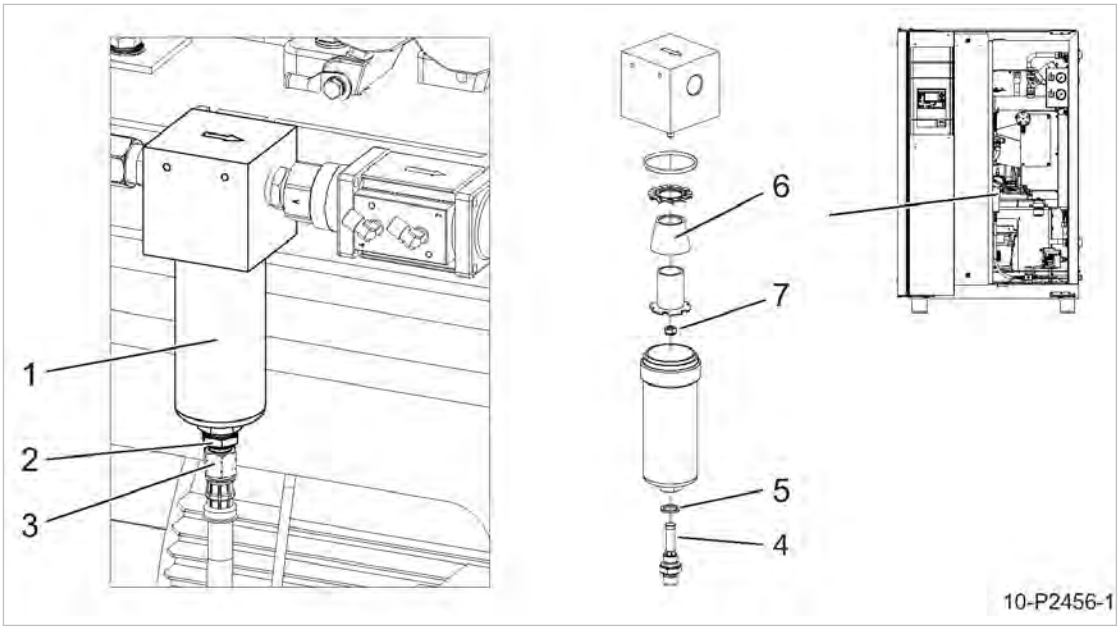


Fig. 43 Dirt trap in the filter

[1] Filter housing
[2] Double-ended male stud fitting
[3] Condensate drain hose
[4] Dirt trap with double fitting
[5] Seal
[6] Silencer insert
[7] Nut

1. **⚠ CAUTION** *Fatal injury caused by components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen system.*
   - ➢ *Vent (depressurize) the machine completely.*
   - ➢ *Verify the absence of pressure.*
2. Loosen the condensate hose
3. Unscrew the double fitting with dirt trap strainer from the filter housing.
4. Unscrew the filter housing and rinse with warm water.
5. Blow out the dirt trap strainer and filter housing to clean the units.
6. Remove the retaining nut and the silencer insert.
7. Blow the silencer insert clean from inside to outside.
8. Reassemble in reverse order.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.

2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.16.4 Dirt trap in the return line

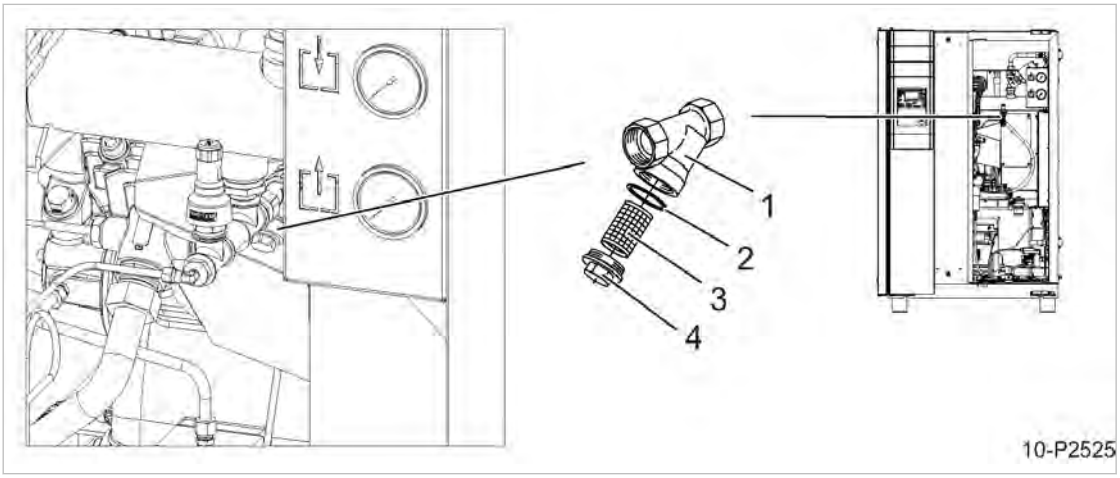


Fig. 44 Dirt trap in the return line

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

1. **⚠ CAUTION** *Fatal injury caused by components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen system.*
   - ➢ *Vent (depressurize) the machine completely.*
   - ➢ *Verify the absence of pressure.*
2. Remove the plug and clean the gasket or O-ring.
3. Remove the dirt trap strainer and blow clean.
4. Re-assemble all parts with gasket or O-ring.

Starting the machine and performing a test run

1. Close all access doors, replace and secure all removable panels.
2. Open the user's nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve at the cooler and network pressure gauge (inlet pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Start the machine and run it for 2 minutes, then stop it and visually check for leaks.

10.17 Check valve maintenance

⚠ The machine must be isolated from the nitrogen network and completely vented before undertaking any work that entails opening the pressure system. Both network pressure gauges (initial and final pressure) read 0 psig.

Material
Compressed air for blowing out
Cleaning cloth
Service KIT (if 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.

Vent all pressurized components and enclosures (see chapter 10.10).

10.17.1 Housing ventilation check valve

The check valve is fitted to the housing vent. It protects the housing from excessive internal pressure while the machine is operating. When the machine is shut down, the check valve prevents air from entering the interior of the housing.

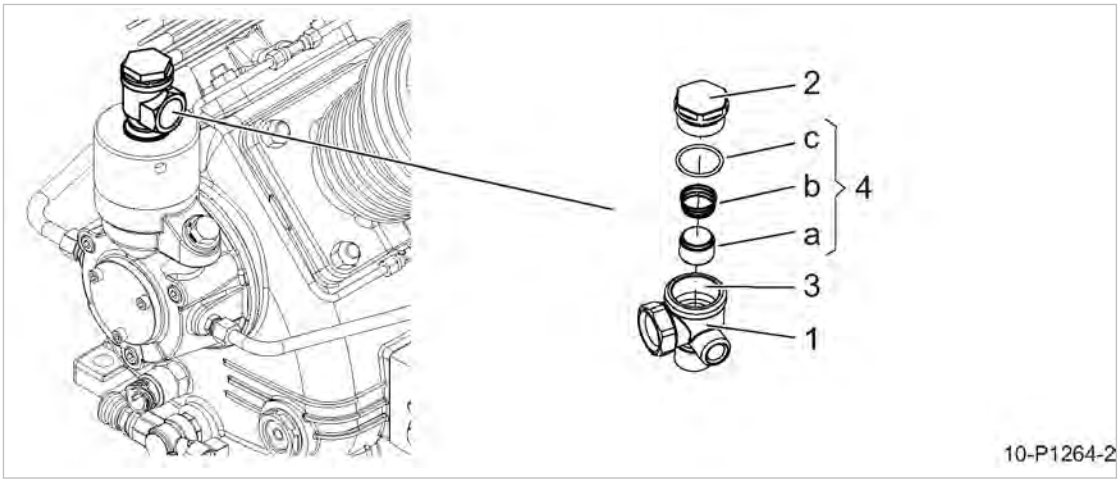


Fig. 45 Housing ventilation check valve

[1] Check valve
[2] Screw plug
[3] Valve seat
[4] Service KIT
[a] Valve cone
[b] Spring
[c] O-ring

1. **⚠ WARNING** *Risk of fatal injury from components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen network.*
   - ➢ *Vent the machine completely.*
   - ➢ *Verify the absence of pressure.*
2. Open the screw plug.
3. Clean the valve seat and valve cone with a cleaning cloth or blow out with dry compressed air (<30 psig!).

Should the valve seat show severe wear or damage, the check valve must be replaced by an authorized KAESER service representative.

If required, replace the valve cone, spring and O-ring (Service KIT).

4. Insert the O-ring into the groove on the screw plug.
5. Insert the valve cone with spring into the screw plug.
6. Close the check valve using the screw plug.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve on the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device.
5. Switch the machine on and run it for around 2 minutes, then shut it down and visually check for leaks.

10.17.2 Unloading the check valve

The check valve is fitted downstream of the safety relief valve. It prevents air from entering the machine after the machine has been vented or shut down.

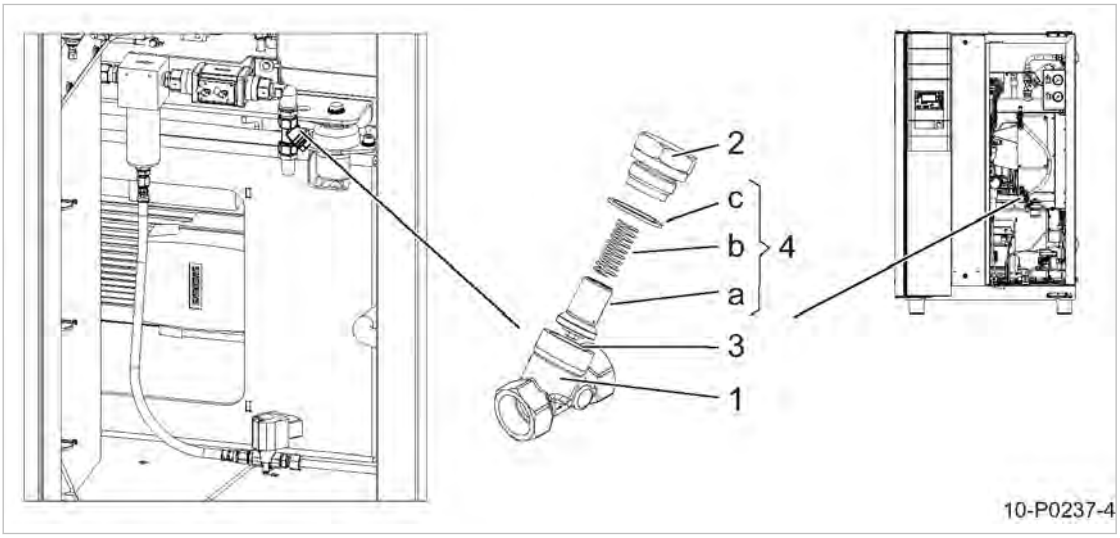


Fig. 46 Relieving the check valve

[1]	Check valve	[a]	Valve cone
[2]	Screw plug	[b]	Spring
[3]	Valve seat	[c]	O-ring
[4]	Service KIT		

1. **⚠ WARNING** *Risk of fatal injury from components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen network.*
   - ➢ *Vent the machine completely.*
   - ➢ *Verify the absence of pressure.*
2. Open the screw plug.
3. Clean the valve seat and valve cone with a cleaning cloth or blow out with dry compressed air (<30 psig!).

Should the valve seat show severe wear or damage, the check valve must be replaced by an authorized KAESER service representative.

If required, replace the valve cone, spring and O-ring (Service KIT).

4. Insert the O-ring into the groove on the screw plug.
5. Insert the valve cone and spring into the housing.
6. Close the check valve using the screw plug.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve on the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device.
5. Switch the machine on and run it for around 2 minutes, then shut it down and visually check for leaks.

10.18 Replacing the condensate drain solenoid valve

Ingress of dirt during operation can cause the solenoid valve to leak. For operational safety reasons, replace the condensate drain solenoid valve when the SIGMA CONTROL 2 controller displays the corresponding message.

Material Spare part

Precondition The machine is switched off.

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

Vent all pressurized components and enclosures (see chapter 10.10).

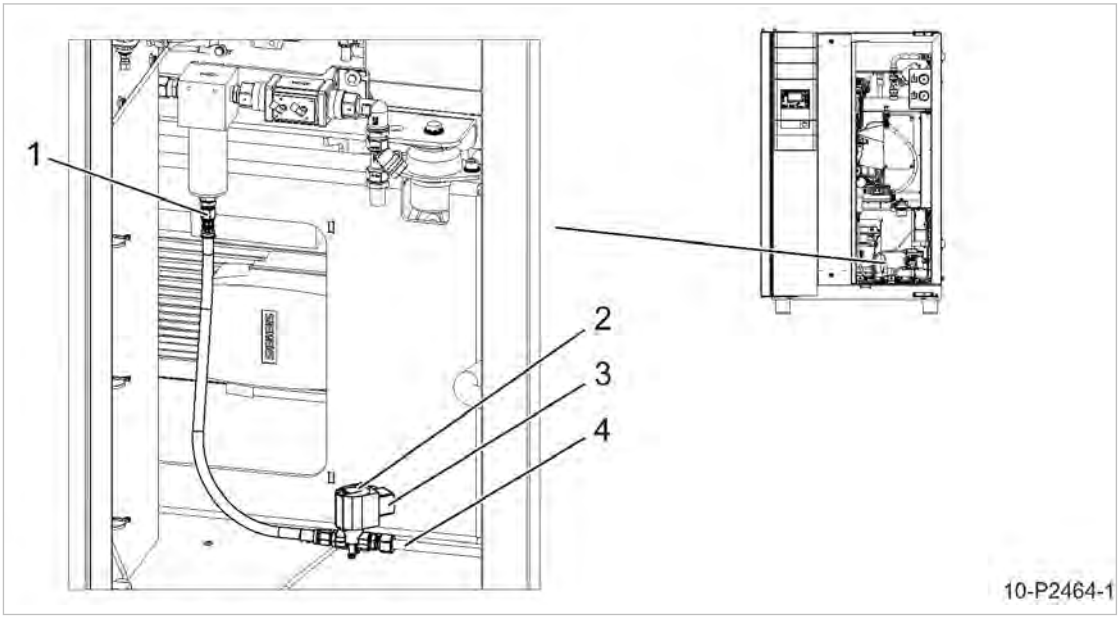


Fig. 47 Replacing the condensate drain solenoid valve

[1] Union screw connection
[2] Condensate drain solenoid valve
[3] Connecting socket
[4] Condensate outlet pressure line

1. **⚠ WARNING** *Risk of fatal injury from components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen system.*
   - ➢ *Fully vent the machine.*
   - ➢ *Verify the absence of pressure.*
2. Remove the connecting socket from the solenoid valve.

3. Remove the union screw connection from the filter.
4. Remove the hose from the condensate outlet.
5. Remove the pressure lines from the condensate drain solenoid valve.
6. Install the new condensate drain solenoid valve and reattach the pressure hoses.
7. Secure the connecting socket.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve at the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Switch the machine on and run it for around 2 minutes, then shut it down and perform a visual inspection.

10.19 Option K15 Checking the filter for condensate

Precondition The filter housing is pressurized.

Wear safety glasses.

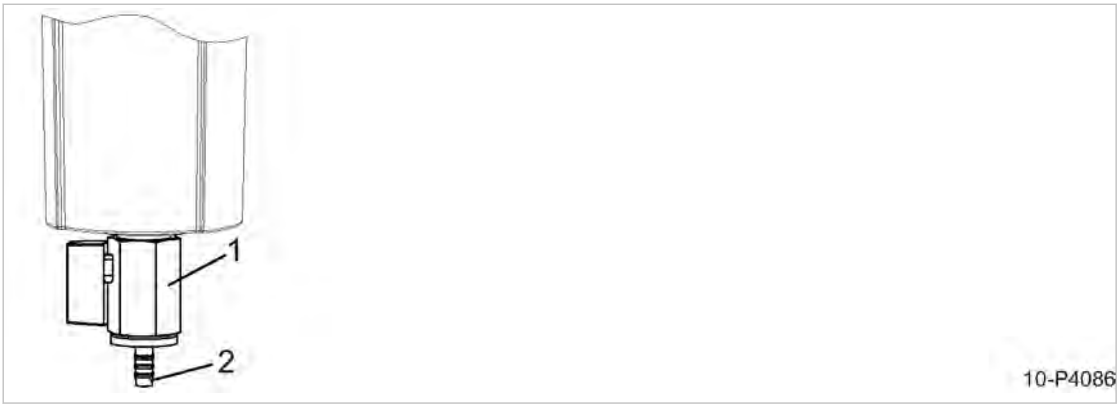


Fig. 48 Checking the filter for condensate

[1] Shut-off valve
[2] Male hose coupling

1. Place a suitable receptacle beneath the condensate drain.
2. Attach a sufficiently long, transparent, and pressure-resistant hose line to the male hose coupling and the receptacle.
3. Carefully open the shut-off valve and close it again immediately as soon as only condensed fluid escapes.

In the event that oil or an oil-water mixture is discharged first:

➢ Rectify the cause of this fault.

10.20 Option F15 Replacing the filter element

➢ To avoid damage, handle all components with care and install without the use of tools. This is particularly important when it comes to the frontal sealing surfaces.

The machine must be isolated from the nitrogen network and completely vented before undertaking any work that entails opening the pressure system. Both network pressure gauges (initial and final pressure) read 0 psi.

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 has cooled down.

Fully vent all pressurized components and enclosures (see chapter 10.10).

10.20.1 Removing the filter element

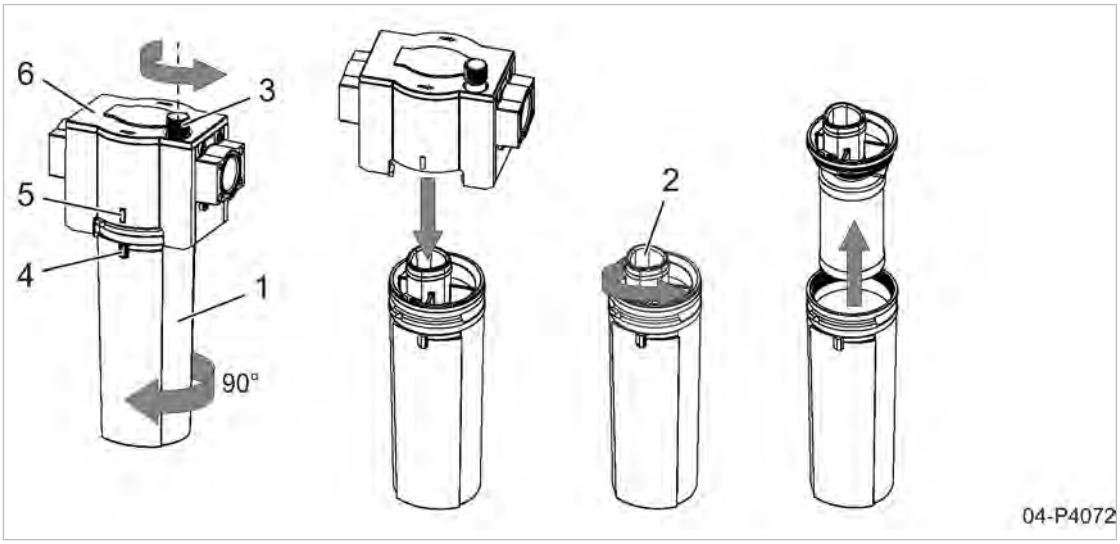


Fig. 49 Removing the filter element

1 Filter housing
2 Filter element
3 Locking screw (secured against complete removal)
4 Installation mark on the filter housing
5 Installation mark on the filter head
6 Filter head

1. **⚠ WARNING** *Risk of fatal injury from components under high pressure!*
   - ➢ *Isolate the machine from the nitrogen network.*
   - ➢ *Vent the machine completely.*
   - ➢ *Verify the absence of pressure.*

2. Loosen the locking screw [3] by hand until you can feel resistance again.
   If the filter was pressurized, the residual nitrogen will escape.

If you can hear a continuous whistling sound:
The filter remains under pressure!
➢ Disconnect the filter from the nitrogen network, or vent the entire network.

3. Jiggle the filter housing [1] gently and then rotate by 90° until the installation marks on the filter housing [4] and the filter head [5] are facing one another.
4. Remove the filter housing together with the screwed-in filter element vertically downwards.
5. Unscrew the filter element [2] from the filter housing (approx. 1 1/2 rotations required).
6. If required: Drain and dispose of any condensate.
7. Check the filter housing for corrosion.

If the filter housing is noticeably corroded:
➢ Determine the cause (e.g. composition of the nitrogen, prevailing operating conditions)
➢ Completely replace the filter.

Dispose of the contaminated filter element in accordance with environmental regulations.

10.20.2 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 housing are clean.

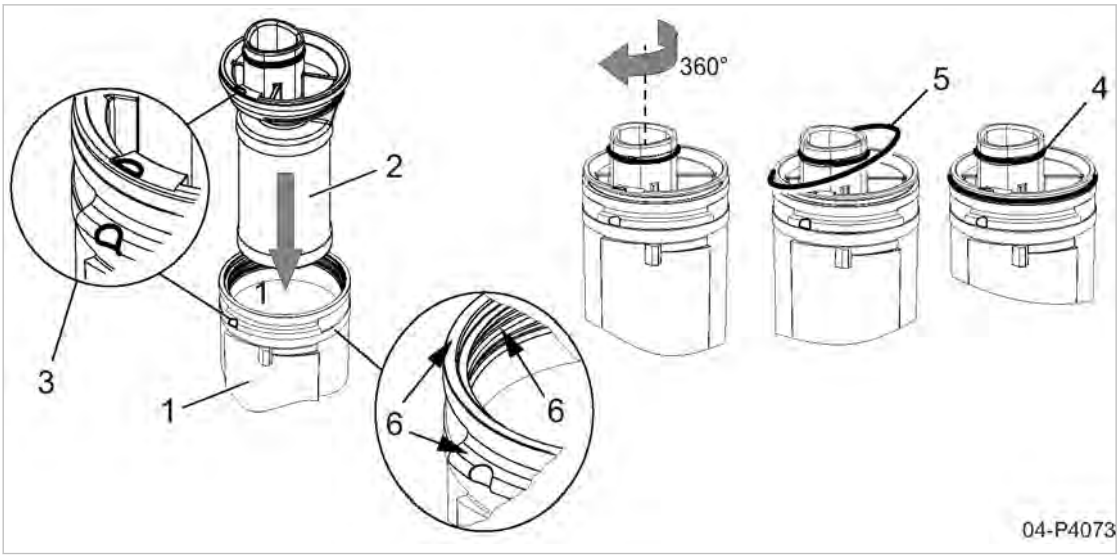


Fig. 50 Installing the filter element

[1] Filter housing
[2] Filter element
[3] Installation marks
[4] O-ring
[5] O-ring
[6] Surface to be greased

1. Grease the thread, front surface and bayonet catch of the filter housing (Pos. [6]).
2. Push the filter element [2] into the filter housing [1] so that the installation marks [3] are aligned with one another.

3. Screw the filter element into the filter housing (one rotation required).
4. Fully grease the O-ring [5] and insert between the filter element and the filter housing.
5. Grease the O-ring [4].

10.20.3 Installing the filter housing

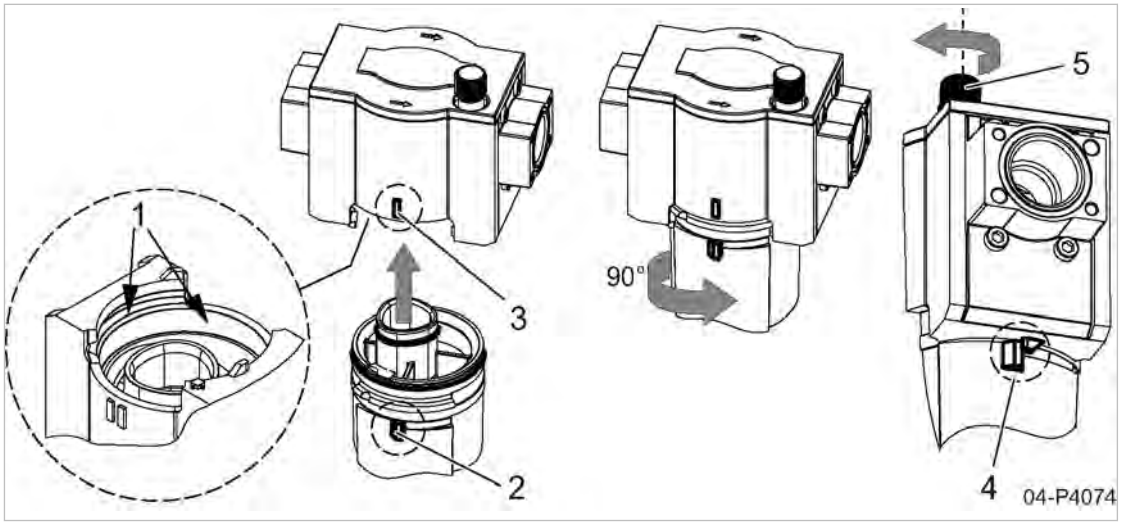


Fig. 51 Installing the filter housing

[1] Surface to be greased
[2] Installation mark on the filter housing
[3] Installation mark on the filter head
[4] Limit stop on the filter head
[5] Locking screw

1. Grease the inner surface of the filter head (Pos. [1]).
2. Align the installation marks ([2] and [3]) on the filter housing and head with one another.
3. Insert the filter housing into the filter head.
4. Rotate the filter housing through 90° as far as the limit stop [4].
5. Manually tighten the locking screw [5].

If the locking screw cannot be tightened:
The bayonet catch on the filter housing is not fully closed.
➢ Rotate the filter housing as far as the limit stop.

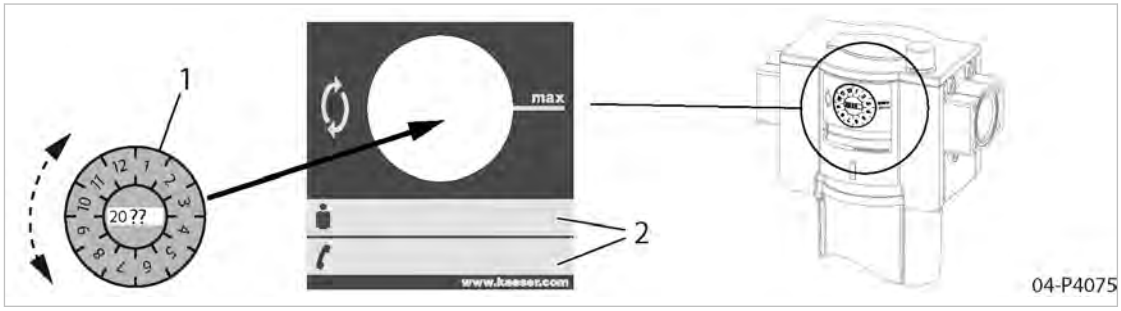


Fig. 52 Filling out the maintenance sticker

[1] Maintenance sticker
[2] Service contact information

6. Fill out the maintenance sticker with the year in which the next maintenance falls due.
7. Attach the maintenance sticker so that the *max* mark is pointing to the month in which the next maintenance falls due.

10.20.4 Pressurizing the filter

A high fluid flow rate may damage the filter material.

1. Check that the locking screw has been tightened properly by hand.
2. Slowly open the user-end shut-off valve (initial pressure).
3. Slowly open the user-end shut-off valve (final pressure).

10.21 Drive belt maintenance

Only use KAESER drive belts. They are 100% oil-resistant.

Material: Drive belt (if 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.

Fully vent all pressurized components and enclosures (see chapter 10.10).

⚠ WARNING

Injury to hands from machine running on!

➢ *Wait at least 1 minute after switching off the machine before opening the removable access panel.*

Visual check for damage

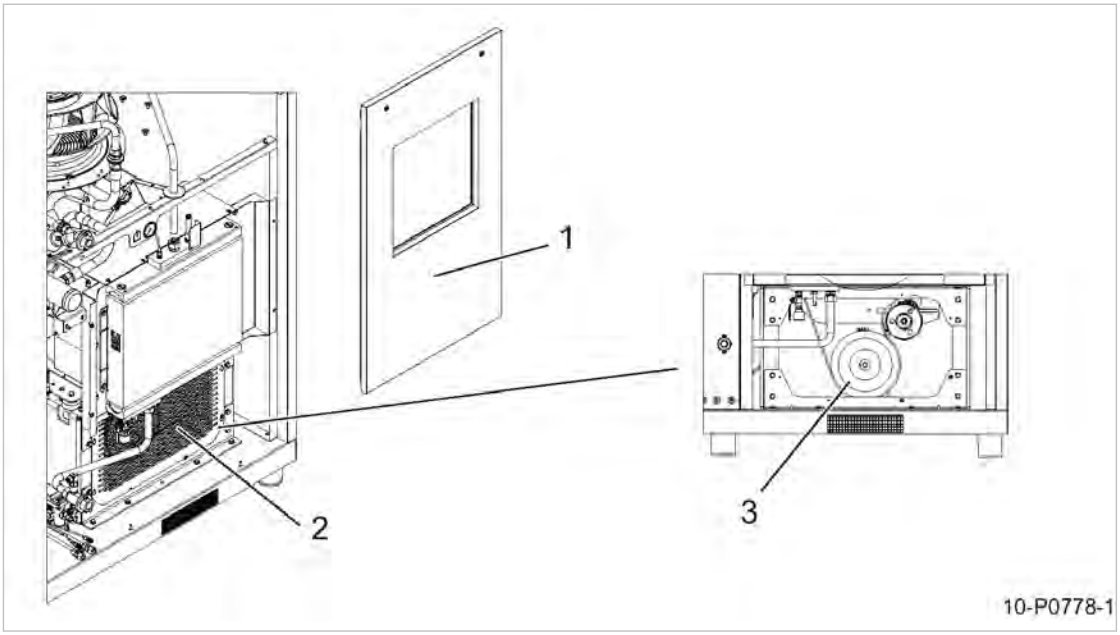


Fig. 53 Visual check for damage

[1] Removable access panel
[2] Belt guard
[3] Motor pulley

1. Remove the access panel.
2. Remove the belt guard.
3. Turn the drive belt on the motor pulley by hand and inspect it for damage.
4. In case of damage: Arrange for the drive belt to be replaced immediately by KAESER SERVICE .

Checking and adjusting the belt tension

The drive belt is equipped with an automatic belt-tensioning device. This ensures that the belt tension remains constant while the machine is in operation. The tension can be read off from the front position tab.

➢ Adjustment is required when the front position tab is congruent with the rear position tab.

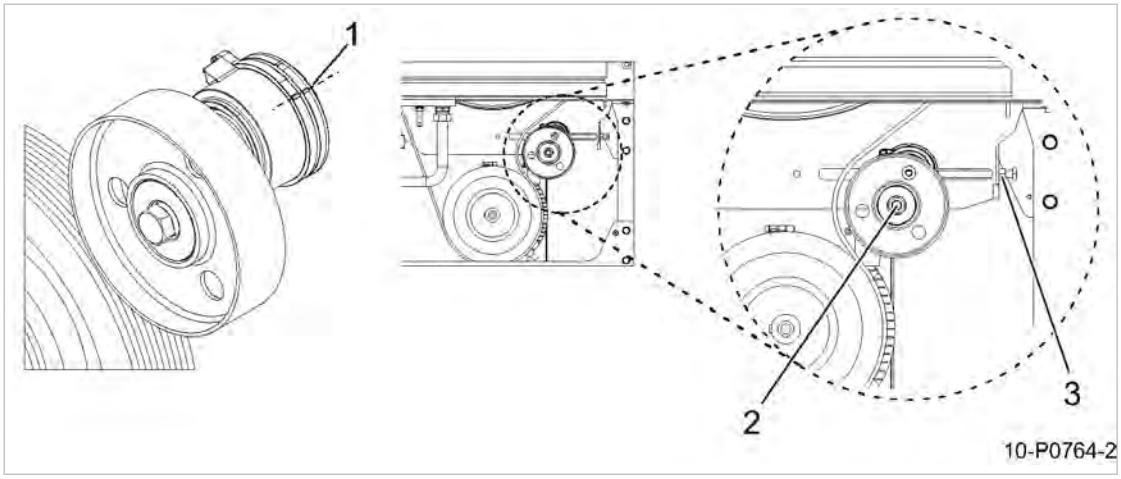


Fig. 54 Adjusting the drive belt

[1] Front and rear position tabs
[2] Cheese head screw with hexagon socket
[3] Hex nut

1. Remove the belt guard.
2. Loosen the cheese head screw with hexagon socket [2]
3. Loosen the hex nut [3].

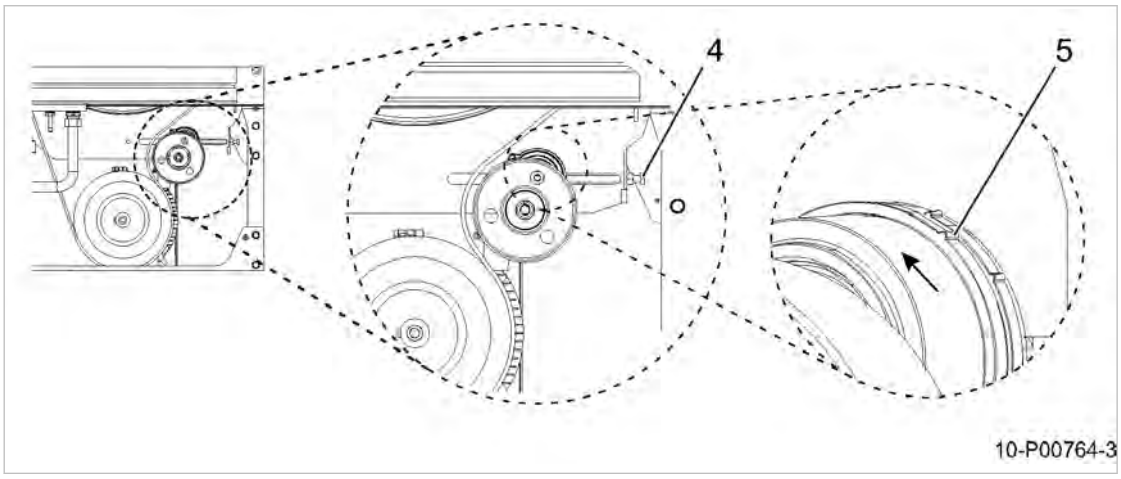


Fig. 55 Adjusting the drive belt

[4] Hex-head bolt
[5] Front position tab

1. Screw in the hex head bolt [4], slowly turning the fan wheel by hand as you do so. The front position tab [5] on the tensioning lever gradually moves to the left.

The front position tab cannot be moved over the fixed upper position tab. The automatic tensioning device is sufficiently pre-tensioned when the distance to the upper position tab is less than that to the lower position tab.

2. Retighten the cheese head screw with hexagon socket [2] and hex nut [3].
3. Refit the belt guard.

Starting the machine and performing a test run

1. Close all maintenance doors, replace and secure all removable panels.
2. Open the user-end nitrogen inlet and outlet shut-off valves.
3. Close the shut-off valve at the cooler and network pressure gauge (initial pressure).
4. Switch on the power supply disconnecting device and reset the maintenance counter.
5. Switch the machine on and run it for around 2 minutes, then shut it down and perform a visual inspection.

10.22 Cylinder head and valves

➢ Maintenance and service work on the cylinder head and valves should be performed ***only*** by an authorized KAESER service representative.

10.23 Documenting maintenance and service work

Machine number:

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

Date	Maintenance task carried out	Operating hours	Signature

Tab. 46 Logged maintenance tasks

11 Spares, Operating Materials, Service

11.1 Note the nameplate

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

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

11.2 Ordering consumable parts and operating fluids/materials

KAESER consumable parts and operating fluids/materials are genuine parts. They are specifically designed for use in KAESER machines.
Unsuitable or poor-quality maintenance parts and operating fluids/materials may result in damage to the machine or significantly impair its proper function.
Damage can result in injury to personnel.

⚠ WARNING

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

➢ *Only use genuine parts and operating fluids/materials.*

➢ *Arrange for an authorized KAESER service representative to carry out regular maintenance.*

Machine

Designation	Number
Oil filter	1200
Housing ventilation filter	1570
Drive belt	1800
Compressor oil	1600
Filter element (Option F15)	1550

Tab. 47 Machine maintenance 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 nitrogen 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!
Your advantage:
Lower costs and higher nitrogen availability.

11.4 Spares for service and repair

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

12 Decommissioning, Storage and Transport

12.1 Decommissioning

Decommissioning is necessary under circumstances such as the following:

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

Temporary decommissioning

Precondition The machine can be started at regular intervals.

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

Long-term de-commissioning

➢ In this case, please contact an authorized KAESER service representative.

12.2 Packing

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

Other measures must be taken for the transport of machines by sea or air. Please contact an authorized KAESER service representative for more information.

Material Desiccant
Plastic sheeting
Wooden crate

Precondition The machine is decommissioned.

Machine is dry and cooled down.

1. Wrap the machine fully in plastic sheeting.
2. Place sufficient desiccant (e.g. silica gel) inside the plastic sheeting.
3. Protect the machine in a wooden crate against mechanical damages.

12.3 Storage

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

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

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

1. **NOTICE** *Moisture and frost can damage the machine!*
   - ➢ *Prevent ingress of moisture and formation of condensation.*
   - ➢ *Maintain a storage temperature of >32°F.*
2. Store the machine in a dry, frost-proof room.

12.4 Transport

12.4.1 Safety

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

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

Precondition Transport only by forklift truck or suitable load-carrying equipment and only by personnel trained in the safe transportation of loads.

➢ Ensure the danger area is cleared of personnel.

12.4.2 Transporting by forklift truck

Precondition The whole machine must be standing over the forks.

Fig. 56 Transporting with a forklift truck

1. Pay attention to the center of gravity.
2. Drive the forks completely under the machine or pallet and lift carefully.

12.4.3 Transporting with a hoist

Only suitable and approved load-carrying and lifting equipment can ensure proper transportation of the machine with a hoist (e.g. crane). Suitable crossbeams ensure there is sufficient distance between the lifting equipment and the machine housing so as to prevent damage.

The machine is not equipped with load-fastening points.

Examples of unsuitable load-fastening points:

- Pipe sockets
- Attached components such as centrifugal separators, condensate drains or compressed air filters.

➢ 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 hoist, load-carrying, and lifting equipment or the raised machine do not endanger any personnel.

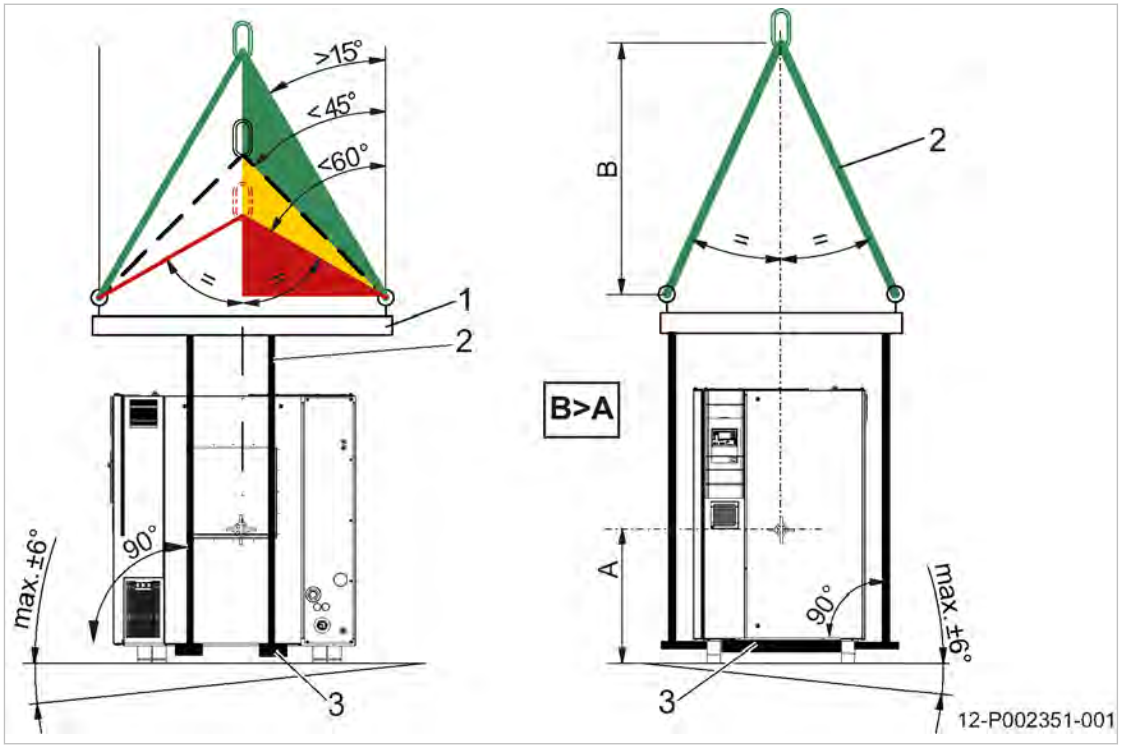


Fig. 57 Transporting by crane

1 Load-carrying equipment
2 Sling
3 Crossbeam

1. **⚠ WARNING** *Risk of accident caused by incorrect use of load-carrying and lifting equipment!*
   - ➢ *Comply with permissible load limits.*
   - ➢ *Comply with the specific safety information for the load-carrying and lifting equipment.*
2. Use load-carrying and lifting equipment correctly:
   - Ensure proper distribution of the load-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.
     - – Tilt angles above 60° are prohibited.
   - Ensure a maximum horizontal tilt of 6° for the machine.
   - Ensure sufficient distance between the lifting equipment and the machine.
   - Ensure a positive stability height: Degree B **>** Degree A
   - Do not attach the lifting equipment to any of the machine's components.
3. Conduct a lifting test:
   Slightly lift the machine to check whether it remains horizontal and does not swing.
4. Transport the machine only after a successful lifting test.

12.5 Disposal

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

Precondition The machine is decommissioned.

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

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

12.5.1 Battery disposal

Batteries contain substances that are harmful to living beings and the environment. For this reason, batteries must not be disposed of with unsorted residential waste. They must be disposed of in accordance with local environmental regulations. This procedure facilitates the handling and recycling of batteries.

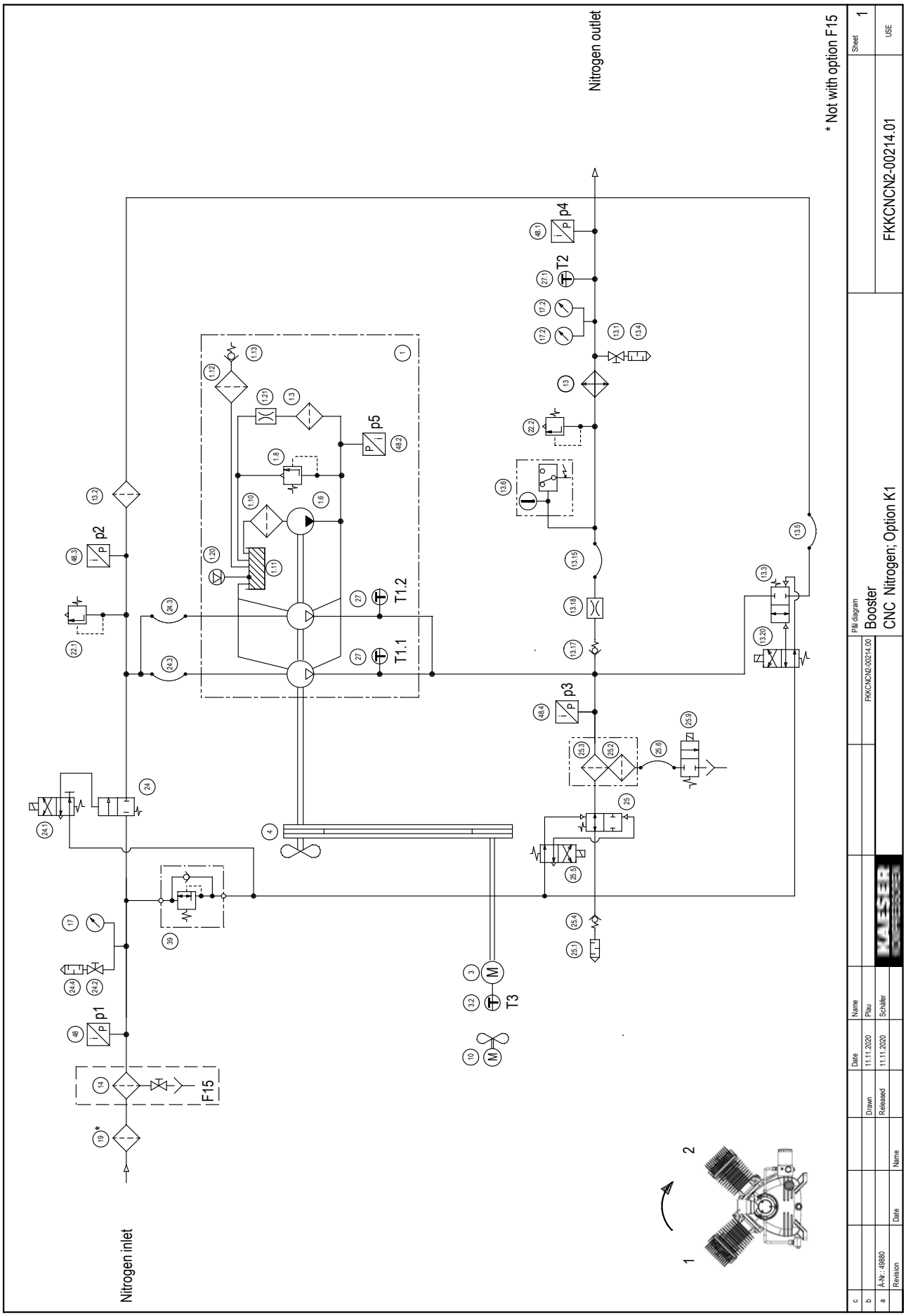
Fig. 58 Battery disposal

[1] Do not dispose of batteries with residential waste
[2] Battery contains lead (if applicable)

➢ Dispose of batteries in accordance with local environmental regulations.

13 Annex

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


Nitrogen outlet
* Not with option F15
Nitrogen inlet
p1
p2
p3
p4
p5
T1.1
T1.2
T2
T3
F15
1
2
P&I diagram
Booster
CNC Nitrogen; Option K1
FKKCNCN2-00214.00
Sheet 1
USE
Drawn
Released
Name
Date
Revision
A-Nr.: 49660
11.11.2020
Plau
Schaller

1	Compressor block
1.3	Oil filter
1.6	Oil pump
1.8	Bypass valve
1.10	Dirt trap (Compressor block)
1.11	Crankcase
1.12	Filter (Crankcase venting)
1.13	Check valve (Compressor block)
1.20	Oil level sensor (switching)
1.21	Nozzle
3	Compressor motor
3.2	Temperature Compressor motor [T3]
4	V-belt pulley
10	Fan motor
13	Compressed air aftercooler
13.1	Shut-off valve (Condensate outlet Compressed air aftercooler)
13.2	Dirt trap (Return line)
13.3	Recovery valve
13.4	Silencer
13.5	Hose line
13.6	Temperature switch
13.15	Hose line (Discharge side)
13.17	Check valve (Discharge side)
13.18	Nozzle Pulsation dampening (Discharge side)
13.20	Control valve for return valve
14	KAESER FILTER KD
17	Pressure gauge Network pressure (Initial pressure)
17.2	Pressure gauge Network pressure (Final pressure)
19*	Dirt trap (Suction side)
22.1	Safety relief valve (Suction side)
22.2	Safety relief valve (Nitrogen outlet)
24	Inlet valve
24.1	Inlet control valve
24.2	Shut-off valve Ventilation (Suction side)
24.3	Hose line (Suction side)
24.4	Silencer
25	Unloading valve
25.1	Silencer (Pressure relief)
25.2	Dirt trap
25.3	Filter (Pressure relief)
25.4	Check valve (Pressure relief)
25.5	Unloading control valve
25.6	Hose line
25.9	Automatic condensate drain: Solenoid valve
27	Pt100 temperature sensor - Airend discharge temperature (Cylinder 1, 2) [T1.1, T1.2]
27.1	Pt100 temperature sensor - Nitrogen outlet [T2]
39	Pressure regulating valve
48	Pressure transducer - Nitrogen inlet [p1]
48.1	Pressure transducer - Nitrogen outlet [p4]
48.2	Pressure transducer - Oil pressure [p5]
48.3	Pressure transducer - Suction side [p2]
48.4	Pressure transducer - Discharge side [p3]

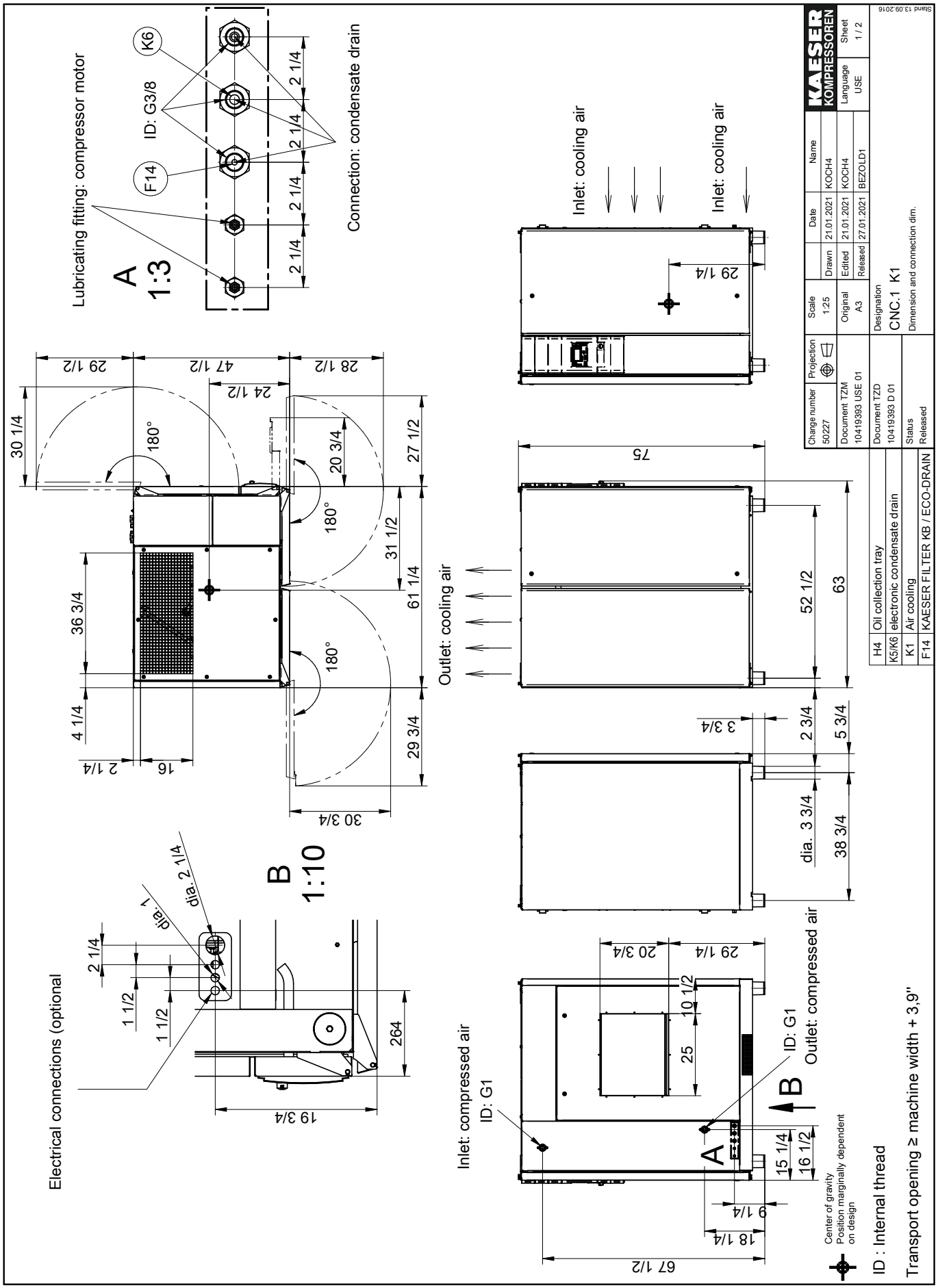
Option

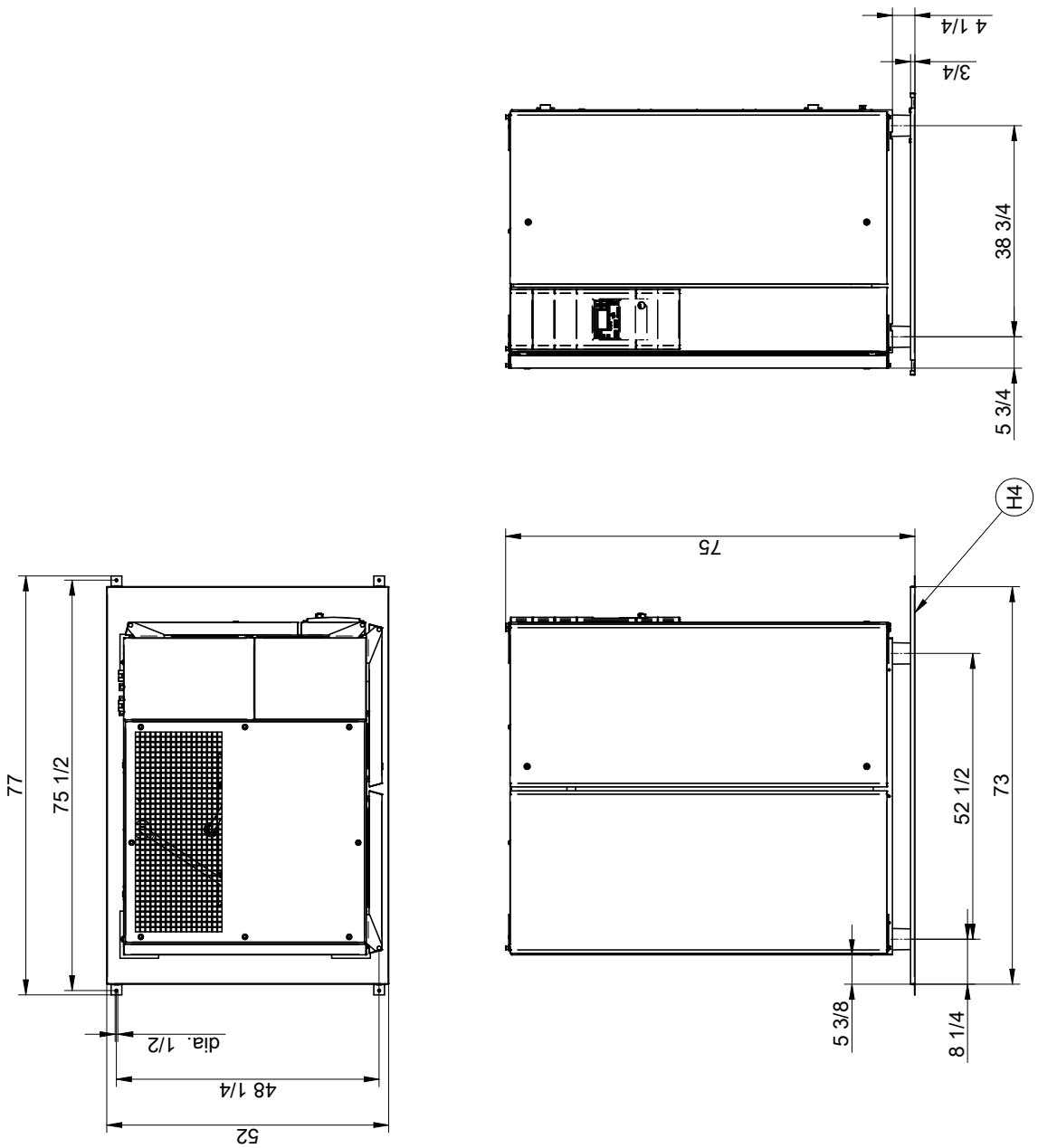
F15	KAESER FILTER KD
K1	Air cooling
K6	Electronic condensate drain

* Not with option F15

c					Date	Name				P&I diagram		Sheet 2
b				Drawn	11.11.2020	Plau			FKKCNCN2-00214.00	Booster		
a				Released	11.11.2020	Schäfer	KAESER KOMPRESSOREN			CNC Nitrogen; Option K1	FKKCNCN2-00214.01	USE
	Revision	Date	Name									

13.2 Dimensional Drawing





Change number 50227	Projection	Scale 1:25		Date	Name	KAESER KOMPRESSOREN	
Document TZM 10419393 USE 01		Original A3	Drawn	21.01.2021	KOCH4		Language USE
			Edited	21.01.2021	KOCH4		
			Released	27.01.2021	BEZOLD1		Sheet 2 / 2

Designation: CNC.1 K1
Dimension and connection dim.

Document TZD	H4	Oil collection tray
10419393 D 01	K5/K6	electronic condensate drain
Status	K1	Air cooling
Released	F14	KAESER FILTER KB / ECO-DRAIN

Stand 13.09.2016

13.3 Electrical Diagram

Wiring Diagram

booster compressor CN7C/CN11C/CN15C/CN22C

air cooled

208V±10% 3ph 60Hz
230V±10% 3ph 60Hz
380V±10% 3ph 60Hz
460V±10% 3ph 60Hz
575V±10% 3ph 60Hz

Power supply:
WYE system with center point solidly grounded

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

manufacturer: KAESER COMPRESSORS
96450 Coburg
GERMANY

c				Date	25.01.2021 USE				=	
b				Drawn	Sitter				+	
a				Released	Büchner					
A	Change	Date	Name						SC2 MCS	DKK-U3030.01	page 1 / 1 Sht.

cover page
booster compressor

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page			DKK-U3030.01	1	
2	list of contents			ZKK-U3030.01	1	
3	general instructions			UKK-U3030.01	1	
4	electrical equipment identification			UKK-U3030.01	2	
5	electrical component parts list			UKK-U3030.01	3	
6	electrical component parts list			UKK-U3030.01	4	
7	electrical component parts list			UKK-U3030.01	5	
8	electrical component parts list			UKK-U3030.01	6	
9	electrical component parts list			UKK-U3030.01	7	
10	wiring diagram	power supply/power unit		SKK-U3030.01	1	
11	wiring diagram	compressor motor		SKK-U3030.01	2	
12	wiring diagram	vent motor		SKK-U3030.01	3	
13	wiring diagram	control voltage tapping		SKK-U3030.01	4	
14	wiring diagram	safety chain		SKK-U3030.01	5	
15	wiring diagram	power supply unit		SKK-U3030.01	6	
16	wiring diagram	IO-module/configuration		SKK-U3030.01	7	
17	wiring diagram	sensors/actuators		SKK-U3030.01	8	
18	wiring diagram	sensors/actuators		SKK-U3030.01	9	
19	wiring diagram	sensors/actuators		SKK-U3030.01	10	
20	wiring diagram	volt-free contacts		SKK-U3030.01	11	
21	wiring diagram	inputs-/outputs IOM3		SKK-U3030.01	12	
22	wiring diagram	digital inputs - option C40		SKK-U3030.01	13	
23	wiring diagram	inputs/outputs - option C40		SKK-U3030.01	14	
24	wiring diagram	transformer diagrams		SKK-U3030.01	15	
25	wiring diagram	Handling: Terminals		SKK-U3030.01	16	
26	wiring diagram	Feed line connection		SKK-U3030.01	17	
27	wiring diagram	Feed line connection		SKK-U3030.01	18	
28	terminal connection	terminal strip -X0,-X11,-X12		KKK-U3030.01	1	
29	lay-out	Switchboard		AKK-U3030.01	1	

c				Date	25.01.2021	KAESER KOMPRESSOREN	list of contents	=	
b				Drawn	Sitter		booster compressor	+	
a				Released	Büchner			SC2 MCS	ZKK-U3030.01	page 1
B	Change	Date	Name							1 Sht.

1	2	3	4	5	6	7	8

general instructions

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

control cabinet wiring for non-designated conductors

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

option C40 = Nitrogen version

option K6 = Electronic condensate drain

option F14 = KAESER FILTER KB

c				Date	25.01.2021		KAESER KOMPRESSOREN	general instructions		=	
b				Drawn	Sitter			booster compressor		+	
a				Released	Büchner				SC2 MCS	UKK-U3030.01	page 1
C	Change	Date	Name								7 Sht.

electrical equipment identification

general components

-B25	overload relay, compressor motor
-K50	coupling relay, temperature Compressed air aftercooler
-F4	circuit breaker, vent motor
-1FU,-2FU	primary control fuse
-3FU	secondary control fuse
-M1	compressor motor
-M4	vent motor
-Q1	main contactor
-Q2	delta contactor
-Q3	wye contactor
-Q4	starter vent motor
-S1	EMERGENCY STOP pushbutton
-T11	control transformer
-T21,-T22	power unit

terminal strips

-X0	terminal strip, power supply
-X11	terminal strip, control
-X12	terminal strip, control 24VDC

control

-K20	*Main Control System SC2MCS*
-X1	Ethernet
-X2	IO-Bus
-X3	RS485-FC (USS)
-X4	communication module (Bus)
-X5	SD card slot
-X6	ground connection
-K21	*IO-module SC2IOM-3*
	inside
-X1	IO-Bus, input
-X2	IO-Bus, output
-X3	analog input, Pt100
-X4	power supply unit, digital outputs
-X5,-X9	Relay outputs
-X6	analog input, analog output 4-20mA
-X8	digital inputs
	external
-X11...-X14	analog inputs, 4-20mA
-X15	analog output
-X18,-X19	digital inputs
-X20,-X21	digital outputs
-X22...-X32	analog inputs, Pt100
-K22	*IO-module SC2IOM-1*
	inside
-X1	IO-Bus, input
-X2	IO-Bus, output
-X3,-X8	digital inputs
-X4	power supply unit, digital outputs
-X5,-X9	Relay outputs
-X6	analog input, 4-20mA
-X7	analog input, Pt100
	external
-X11...-X13	analog inputs, 4-20mA
-X14...-X17	analog inputs, Pt100
-X18...-X29	digital inputs
-X30...-X32	digital outputs

sensors/actuators

-B1	pressure transducer, Compressed air outlet
-B2	pressure transducer, Compressed air inlet
-B3	pressure transducer, oil pressure
-B4	pressure transducer, Pressure side return circuit
-B5	pressure transducer, Intake side return circuit
-B40.1	temperature probe, airend discharge temperature 1
-B40.2	temperature probe, airend discharge temperature 2
-B42	temperature probe, compressed air outlet temperature
-B50	temperature switch Compressed air aftercooler
-B60	temperature probe, compressor motor
-B70	oil level switch
-K1	Inlet control valve
-K2	Return valve
-K3	Relief control valve
-K10	condensate drain filter
-K11	condensate drain Compressed air outlet
-K12	condensate drain Prefilter

c				Date	25.01.2021	KAESER KOMPRESSOREN	electrical equipment identification	=	
b				Drawn	Sitter		booster compressor	+	
a				Released	Büchner			SC2 MCS	UKK-U3030.01	page 2
C	Change	Date	Name							7 Sht.

model		electrical component parts list CN 7.5 C	CN 11 C	CN 15 C	CN 22 C
machine power supply		**208 V ±10 %, 60 Hz**	**208 V ±10 %, 60 Hz**	**208 V ±10 %, 60 Hz**	**208 V ±10 %, 60 Hz**
motor	**-M1**	10 hp	15 hp	20 hp	30 hp
motor	**-M4**	1.3 kW	1.3 kW	1.3 kW	1.3 kW
lay-out		fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1
supply terminals	**-X0:U1/V1/W1**	7.3140.05080	7.3140.05070	7.3140.05070	7.3140.05070
	Siemens	3RV2925-5EB	3RV2935-5E	3RV2935-5E	3RV2935-5E
	Torque	36 lb-in	53 lb-in	53 lb-in	53 lb-in
	Stripped length	10 mm	25 mm	25 mm	25 mm
	-X0:GRD	7.3149.02460	7.3291.00010	7.3291.00010	7.3149.01660
	Wieland	WKFN16SL/35	WKN35SL/U	WKN35SL/U	WKN70SL/U
	Torque	---	36 lb-in	36 lb-in	150 lb-in
	Stripped length	16 mm	20 mm	20 mm	24 mm
	Handling	fig. 2, Sht. 16	---	---	---
supply	**connection**	fig. 10, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17
terminal strip	**-X0**	7.6836.00170 Wieland	7.6836.00430 Wieland	7.6836.00430 Wieland	---
terminal strip	**-X11**	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland
	Handling	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16
contactor	**-Q1/-Q2**	7.8740.00380	7.8740.00400	7.8740.00410	7.8740.00430
		3RT2027-1AK60	3RT2035-1AK60	3RT2036-1AK60	3RT2038-1AK60
interference suppressor		7.8740.05140	7.8740.05150	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00	3RT2936-1CC00
auxiliary switch	**-Q1**	7.8740.05010	7.8740.05010	7.8740.05010	7.8740.05010
		3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11
contactor	**-Q3**	7.8740.00370	7.8740.00400	7.8740.00400	7.8740.00410
		3RT2026-1AK60	3RT2035-1AK60	3RT2035-1AK60	3RT2036-1AK60
interference suppressor		7.8740.05140	7.8740.05150	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00	3RT2936-1CC00
contactor	**-Q4**	7.8740.00340	7.8740.00340	7.8740.00340	7.8740.00340
		3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05140
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00
coupling relay	**-K50**	7.3149.01670	7.3149.01670	7.3149.01670	7.3149.01670
	Wieland	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F
overload relay	**-B25**	7.8741.00070	7.8741.00150	7.8741.00090	7.8741.00100
		3RB3026-1QB0 (6-25 A)	3RB3036-2UB0 (12-50 A)	3RB3036-1UB0 (12-50 A)	3RB3036-1WB0 (20-80 A)
		setting: 15 A	setting: 23 A	setting: 31 A	setting: 43 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
	Siemens	setting: 17 A	setting: 25 A	setting: 35 A	setting: 48 A
fuses	**-1FU...-3FU**	7.3313.1	7.3313.1	7.3313.1	7.3313.1
	Gould	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)
fuse socket	**-1FU...-3FU**	7.3320.00060	7.3320.00060	7.3320.00060	7.3320.00060
	Wöhner	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH
circuit breaker	**-F4**	7.8742.01170	7.8742.01170	7.8742.01170	7.8742.01170
		3RV2021-1GA10 (4.5-6.3 A)	3RV2021-1GA10 (4.5-6.3 A)	3RV2021-1GA10 (4.5-6.3 A)	3RV2021-1GA10 (4.5-6.3 A)
		setting: 4.4 A	setting: 4.4 A	setting: 4.4 A	setting: 4.4 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
		setting: 5.0 A	setting: 5.0 A	setting: 5.0 A	setting: 5.0 A
terminal block		7.3140.05090	7.3140.05090	7.3140.05090	7.3140.05090
		3RV2928-1H	3RV2928-1H	3RV2928-1H	3RV2928-1H
auxiliary switch		7.8742.05000	7.8742.05000	7.8742.05000	7.8742.05000
	Siemens	3RV2901-1E	3RV2901-1E	3RV2901-1E	3RV2901-1E
transformer	**-T11**	7.7569.0	7.7569.0	7.7569.0	7.7569.0
		B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)
	Block	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15
power supply	**-T21/-T22**	7.7605P0	7.7605P0	7.7605P0	7.7605P0
	Prodrive	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5
connection	**-W11**	---	---	---	---
connection	**-W13**	7.6861.0	7.3140.05270	7.3140.05270	7.3140.05270
		3RV1915-1AB	3RA2933-3FA00	3RA2933-3FA00	3RA2933-3FA00
connection	**-W14**	14 AWG black	7.3140.05270	7.3140.05270	7.3140.05270
		600 V, 90°C	3RA2933-3FA00	3RA2933-3FA00	3RA2933-3FA00
cables	**-W19.1/.2**	4G12 AWG	4G8 AWG	4G8 AWG	4G6 AWG
		600 V, 90°C	600 V, 90°C	600 V, 90°C	600 V, 90°C
compressor control	**-K20**	7.7601.0	7.7601.0	7.7601.0	7.7601.0
	Prodrive	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS
IO-module	**-K21**	7.7604.1	7.7604.1	7.7604.1	7.7604.1
	Prodrive	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3
IO-module	**-K22**	7.7602.1	7.7602.1	7.7602.1	7.7602.1
option C40	**Prodrive**	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1
EMERGENCY STOP pushbutton	**-S1**	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
auxiliary contact	**Schlegel**	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO

= + page 3 7 Sht.

UKK-U3030.01

SC2 MCS

electrical component parts list

booster compressor

KAESER KOMPRESSOREN

	Change	Date	Name
c			
b			
a			
C		Date	Name
	Drawn	25.01.2021	Sitter
	Released		Büchner

model		electrical component parts list CN 7.5 C	CN 11 C	CN 15 C	CN 22 C
machine power supply		**230 V ±10 %, 60 Hz**	**230 V ±10 %, 60 Hz**	**230 V ±10 %, 60 Hz**	**230 V ±10 %, 60 Hz**
motor	**-M1**	10 hp	15 hp	20 hp	30 hp
motor	**-M4**	1.25 kW	1.25 kW	1.25 kW	1.25 kW
lay-out		fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1
supply terminals	**-X0:U1/V1/W1**	7.3140.05080	7.3140.05070	7.3140.05070	7.3140.05070
	Siemens	3RV2925-5EB	3RV2935-5E	3RV2935-5E	3RV2935-5E
	Torque	36 lb-in	53 lb-in	53 lb-in	53 lb-in
	Stripped length	10 mm	25 mm	25 mm	25 mm
	-X0:GRD	7.3149.02460	7.3291.00010	7.3291.00010	7.3149.01660
	Wieland	WKFN16SL/35	WKN35SL/U	WKN35SL/U	WKN70SL/U
	Torque	---	36 lb-in	36 lb-in	150 lb-in
	Stripped length	16 mm	20 mm	20 mm	24 mm
	Handling	fig. 2, Sht. 16	---	---	---
supply	**connection**	fig. 10, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17
terminal strip	**-X0**	7.6836.00170 Wieland	7.6836.00430 Wieland	7.6836.00430 Wieland	---
terminal strip	**-X11**	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland
	Handling	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16
contactor	**-Q1/-Q2**	7.8740.00380	7.8740.00400	7.8740.00410	7.8740.00430
		3RT2027-1AK60	3RT2035-1AK60	3RT2036-1AK60	3RT2038-1AK60
interference suppressor		7.8740.05140	7.8740.05150	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00	3RT2936-1CC00
auxiliary switch	**-Q1**	7.8740.05010	7.8740.05010	7.8740.05010	7.8740.05010
		3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11
contactor	**-Q3**	7.8740.00370	7.8740.00400	7.8740.00400	7.8740.00410
		3RT2026-1AK60	3RT2035-1AK60	3RT2035-1AK60	3RT2036-1AK60
interference suppressor		7.8740.05140	7.8740.05150	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00	3RT2936-1CC00
contactor	**-Q4**	7.8740.00340	7.8740.00340	7.8740.00340	7.8740.00340
		3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05140
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00
coupling relay	**-K50**	7.3149.01670	7.3149.01670	7.3149.01670	7.3149.01670
	Wieland	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F
overload relay	**-B25**	7.8741.00070	7.8741.00150	7.8741.00090	7.8741.00100
		3RB3026-1QB0 (6-25 A)	3RB3036-2UB0 (12-50 A)	3RB3036-1UB0 (12-50 A)	3RB3036-1WB0 (20-80 A)
		setting: 13 A	setting: 20 A	setting: 28 A	setting: 39 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
	Siemens	setting: 15 A	setting: 23 A	setting: 32 A	setting: 44 A
fuses	**-1FU...-3FU**	7.3313.1	7.3313.1	7.3313.1	7.3313.1
	Gould	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)
fuse socket	**-1FU...-3FU**	7.3320.00060	7.3320.00060	7.3320.00060	7.3320.00060
	Wöhner	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH
circuit breaker	**-F4**	7.8742.01160	7.8742.01160	7.8742.01160	7.8742.01160
		3RV2021-1FA10 (3.5-5 A)	3RV2021-1FA10 (3.5-5 A)	3RV2021-1FA10 (3.5-5 A)	3RV2021-1FA10 (3.5-5 A)
		setting: 3.9 A	setting: 3.9 A	setting: 3.9 A	setting: 3.9 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
		setting: 4.4 A	setting: 4.4 A	setting: 4.4 A	setting: 4.4 A
terminal block		7.3140.05090	7.3140.05090	7.3140.05090	7.3140.05090
		3RV2928-1H	3RV2928-1H	3RV2928-1H	3RV2928-1H
auxiliary switch		7.8742.05000	7.8742.05000	7.8742.05000	7.8742.05000
	Siemens	3RV2901-1E	3RV2901-1E	3RV2901-1E	3RV2901-1E
transformer	**-T11**	7.7569.0	7.7569.0	7.7569.0	7.7569.0
		B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)
	Block	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15
power supply	**-T21/-T22**	7.7605P0	7.7605P0	7.7605P0	7.7605P0
	Prodrive	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5
connection	**-W11**	---	---	---	---
connection	**-W13**	7.6861.0	7.3140.05270	7.3140.05270	7.3140.05270
		3RV1915-1AB	3RA2933-3FA00	3RA2933-3FA00	3RA2933-3FA00
connection	**-W14**	14 AWG black	7.3140.05270	7.3140.05270	7.3140.05270
		600 V, 90°C	3RA2933-3FA00	3RA2933-3FA00	3RA2933-3FA00
cables	**-W19.1/.2**	4G12 AWG	4G8 AWG	4G8 AWG	4G6 AWG
		600 V, 90°C	600 V, 90°C	600 V, 90°C	600 V, 90°C
compressor control	**-K20**	7.7601.0	7.7601.0	7.7601.0	7.7601.0
	Prodrive	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS
IO-module	**-K21**	7.7604.1	7.7604.1	7.7604.1	7.7604.1
	Prodrive	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3
IO-module	**-K22**	7.7602.1	7.7602.1	7.7602.1	7.7602.1
option C40	**Prodrive**	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1
EMERGENCY STOP pushbutton	**-S1**	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
auxiliary contact	**Schlegel**	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO

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UKK-U3030.01

SC2 MCS

electrical component parts list

booster compressor

KAESER KOMPRESSOREN

	Change	Date	Name
c			
b		Drawn	Slter
a		Released	Büchner
		25.01.2021	

model		electrical component parts list CN 7.5 C	CN 11 C	CN 15 C	CN 22 C
machine power supply		**380 V ±10 %, 60 Hz**	**380 V ±10 %, 60 Hz**	**380 V ±10 %, 60 Hz**	**380 V ±10 %, 60 Hz**
motor	**-M1**	10 hp	15 hp	20 hp	30 hp
motor	**-M4**	1.25 kW	1.25 kW	1.25 kW	1.25 kW
lay-out		fig. 2, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1
supply terminals	**-X0:U1/V1/W1**	7.3149.02000	7.3140.05080	7.3140.05070	7.3140.05070
		WKFN16D1/2/35 (Wieland)	3RV2925-5EB (Siemens)	3RV2935-5E	3RV2935-5E (Siemens)
	Torque	---	36 lb-in	53 lb-in	53 lb-in
	Stripped length	16 mm	10 mm	25 mm	25 mm
	-X0:GRD	7.3149.02020	7.3149.02460	7.3291.00010	7.3291.00010
	Wieland	WKFN16D1/2/SL/35	WKFN16SL/35	WKN35SL/U	WKN35SL/U
	Torque	---	---	36 lb-in	36 lb-in
	Stripped length	16 mm	16 mm	20 mm	20 mm
	Handling	fig. 2, Sht. 16	fig. 2, Sht. 16	---	---
supply	**connection**	fig. 12, Sht. 18	fig. 10, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17
terminal strip	**-X0**	7.6836.00641 Wieland	7.6836.00170 Wieland	7.6836.00430 Wieland	7.6836.00430 Wieland
terminal strip	**-X11**	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland
	Handling	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16
contactor	**-Q1/-Q2**	7.8740.00360	7.8740.00380	7.8740.00400	7.8740.00400
		3RT2025-1AK60	3RT2027-1AK60	3RT2035-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00
auxiliary switch	**-Q1**	7.8740.05010	7.8740.05010	7.8740.05010	7.8740.05010
		3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11
contactor	**-Q3**	7.8740.00350	7.8740.00370	7.8740.00400	7.8740.00400
		3RT2024-1AK60	3RT2026-1AK60	3RT2035-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00
contactor	**-Q4**	7.8740.00340	7.8740.00340	7.8740.00340	7.8740.00340
		3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05140
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00
coupling relay	**-K50**	7.3149.01670	7.3149.01670	7.3149.01670	7.3149.01670
	Wieland	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F
overload relay	**-B25**	7.8741.00060	7.8741.00170	7.8741.00090	7.8741.00090
		3RB3026-1SB0 (3-12 A)	3RB3026-2QB0 (6-25 A)	3RB3036-1UB0 (12-50 A)	3RB3036-1UB0 (12-50 A)
		setting: 8 A	setting: 12 A	setting: 17 A	setting: 23 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
	Siemens	setting: 9 A	setting: 14 A	setting: 19 A	setting: 26 A
fuses	**-1FU/-2FU**	7.3316.1	7.3316.1	7.3316.1	7.3316.1
	Gould	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)
fuses	**-3FU**	7.3313.1	7.3313.1	7.3313.1	7.3313.1
	Gould	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)
fuse socket	**-1FU...-3FU**	7.3320.00060	7.3320.00060	7.3320.00060	7.3320.00060
	Wöhner	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH
circuit breaker	**-F4**	7.8742.01140	7.8742.01140	7.8742.01140	7.8742.01140
		3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)
		setting: 2.3 A	setting: 2.3 A	setting: 2.3 A	setting: 2.3 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
		setting: 2.6 A	setting: 2.6 A	setting: 2.6 A	setting: 2.6 A
terminal block		7.3140.05090	7.3140.05090	7.3140.05090	7.3140.05090
		3RV2928-1H	3RV2928-1H	3RV2928-1H	3RV2928-1H
auxiliary switch		7.8742.05000	7.8742.05000	7.8742.05000	7.8742.05000
	Siemens	3RV2901-1E	3RV2901-1E	3RV2901-1E	3RV2901-1E
transformer	**-T11**	7.2239.20080	7.2239.20080	7.2239.20080	7.2239.20080
		USTE250 (250 VA)	USTE250 (250 VA)	USTE250 (250 VA)	USTE250 (250 VA)
	Block	diagram 2, Sht. 15	diagram 2, Sht. 15	diagram 2, Sht. 15	diagram 2, Sht. 15
power supply	**-T21/-T22**	7.7605P0	7.7605P0	7.7605P0	7.7605P0
	Prodrive	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5
connection	**-W11**	10 AWG black 600 V, 90°C	---	---	---
connection	**-W13**	10 AWG black	7.6861.0	7.3140.05270	7.3140.05270
		600 V, 90°C	3RV1915-1AB	3RA2933-3FA00	3RA2933-3FA00
connection	**-W14**	14 AWG black	14 AWG black	7.3140.05270	7.3140.05270
		600 V, 90°C	600 V, 90°C	3RA2933-3FA00	3RA2933-3FA00
cables	**-W19.1/.2**	4G12 AWG 600 V, 90°C	4G12 AWG 600 V, 90°C	4G10 AWG 600 V, 90°C	4G8 AWG 600 V, 90°C
compressor control	**-K20**	7.7601.0	7.7601.0	7.7601.0	7.7601.0
	Prodrive	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS
IO-module	**-K21**	7.7604.1	7.7604.1	7.7604.1	7.7604.1
	Prodrive	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3
IO-module	**-K22**	7.7602.1	7.7602.1	7.7602.1	7.7602.1
option C40	**Prodrive**	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1
EMERGENCY STOP pushbutton	**-S1**	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
auxiliary contact	**Schlegel**	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO

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UKK-U3030.01

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electrical component parts list

booster compressor

KAESER KOMPRESSOREN

	Date	Name
c		
b	25.01.2021	Sitter
a	Drawn	Büchner
C	Released	
Change		Date

model		electrical component parts list CN 7.5 C	CN 11 C	CN 15 C	CN 22 C
machine power supply		**460 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**
motor	**-M1**	10 hp	15 hp	20 hp	30 hp
motor	**-M4**	1.35 kW	1.35 kW	1.35 kW	1.35 kW
lay-out		fig. 2, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1
supply terminals	**-X0:U1/V1/W1**	7.3149.02000	7.3140.05080	7.3140.05070	7.3140.05070
		WKFN16D1/2/35 (Wieland)	3RV2925-5EB (Siemens)	3RV2935-5E	3RV2935-5E (Siemens)
	Torque	---	36 lb-in	53 lb-in	53 lb-in
	Stripped length	16 mm	10 mm	25 mm	25 mm
	-X0:GRD	7.3149.02020	7.3149.02460	7.3291.00010	7.3291.00010
	Wieland	WKFN16D1/2/SL/35	WKFN16SL/35	WKN35SL/U	WKN35SL/U
	Torque	---	---	36 lb-in	36 lb-in
	Stripped length	16 mm	16 mm	20 mm	20 mm
	Handling	fig. 2, Sht. 16	fig. 2, Sht. 16	---	---
supply	**connection**	fig. 12, Sht. 18	fig. 10, Sht. 17	fig. 11, Sht. 17	fig. 11, Sht. 17
terminal strip	**-X0**	7.6836.00641 Wieland	7.6836.00170 Wieland	7.6836.00430 Wieland	7.6836.00430 Wieland
terminal strip	**-X11**	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland
	Handling	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16
contactor	**-Q1/-Q2**	7.8740.00360	7.8740.00380	7.8740.00400	7.8740.00400
		3RT2025-1AK60	3RT2027-1AK60	3RT2035-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00
auxiliary switch	**-Q1**	7.8740.05010	7.8740.05010	7.8740.05010	7.8740.05010
		3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11
contactor	**-Q3**	7.8740.00350	7.8740.00370	7.8740.00400	7.8740.00400
		3RT2024-1AK60	3RT2026-1AK60	3RT2035-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05150	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00	3RT2936-1CC00
contactor	**-Q4**	7.8740.00340	7.8740.00340	7.8740.00340	7.8740.00340
		3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05140
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00
coupling relay	**-K50**	7.3149.01670	7.3149.01670	7.3149.01670	7.3149.01670
	Wieland	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F
overload relay	**-B25**	7.8741.00060	7.8741.00170	7.8741.00090	7.8741.00090
		3RB3026-1SB0 (3-12 A)	3RB3026-2QB0 (6-25 A)	3RB3036-1UB0 (12-50 A)	3RB3036-1UB0 (12-50 A)
		setting: 7 A	setting: 10 A	setting: 14 A	setting: 19 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
	Siemens	setting: 7 A	setting: 11 A	setting: 16 A	setting: 22 A
fuses	**-1FU...-3FU**	7.3313.1	7.3313.1	7.3313.1	7.3313.1
	Gould	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)
fuse socket	**-1FU...-3FU**	7.3320.00060	7.3320.00060	7.3320.00060	7.3320.00060
	Wöhner	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH
circuit breaker	**-F4**	7.8742.01140	7.8742.01140	7.8742.01140	7.8742.01140
		3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)	3RV2021-1DA10 (2.2-3.2 A)
		setting: 2.3 A	setting: 2.3 A	setting: 2.3 A	setting: 2.3 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
		setting: 2.6 A	setting: 2.6 A	setting: 2.6 A	setting: 2.6 A
terminal block		7.3140.05090	7.3140.05090	7.3140.05090	7.3140.05090
		3RV2928-1H	3RV2928-1H	3RV2928-1H	3RV2928-1H
auxiliary switch		7.8742.05000	7.8742.05000	7.8742.05000	7.8742.05000
	Siemens	3RV2901-1E	3RV2901-1E	3RV2901-1E	3RV2901-1E
transformer	**-T11**	7.7569.0	7.7569.0	7.7569.0	7.7569.0
		B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)	B0601024 (250 VA)
	Block	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15	diagram 1, Sht. 15
power supply	**-T21/-T22**	7.7605P0	7.7605P0	7.7605P0	7.7605P0
	Prodrive	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5
connection	**-W11**	10 AWG black 600 V, 90°C	---	---	---
connection	**-W13**	10 AWG black	7.6861.0	7.3140.05270	7.3140.05270
		600 V, 90°C	3RV1915-1AB	3RA2933-3FA00	3RA2933-3FA00
connection	**-W14**	14 AWG black	14 AWG black	7.3140.05270	7.3140.05270
		600 V, 90°C	600 V, 90°C	3RA2933-3FA00	3RA2933-3FA00
cables	**-W19.1/.2**	4G12 AWG	4G12 AWG	4G10 AWG	4G10 AWG
		600 V, 90°C	600 V, 90°C	600 V, 90°C	600 V, 90°C
compressor control	**-K20**	7.7601.0	7.7601.0	7.7601.0	7.7601.0
	Prodrive	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS
IO-module	**-K21**	7.7604.1	7.7604.1	7.7604.1	7.7604.1
	Prodrive	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3
IO-module	**-K22**	7.7602.1	7.7602.1	7.7602.1	7.7602.1
option C40	**Prodrive**	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1
EMERGENCY STOP pushbutton	**-S1**	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
auxiliary contact	**Schlegel**	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO

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SC2 MCS

electrical component parts list

booster compressor

KAESER KOMPRESSOREN

	Date	Name
c		
b	25.01.2021	Sitter
a	Drawn	Büchner
C Change	Released	Date

model		electrical component parts list CN 7.5 C	CN 11 C	CN 15 C	CN 22 C
machine power supply		**575 V ±10 %, 60 Hz**	**575 V ±10 %, 60 Hz**	**575 V ±10 %, 60 Hz**	**575 V ±10 %, 60 Hz**
motor	**-M1**	10 hp	15 hp	20 hp	30 hp
motor	**-M4**	1.35 kW	1.35 kW	1.35 kW	1.35 kW
lay-out		fig. 2, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1	fig. 1, Sht. 1
supply terminals	**-X0:U1/V1/W1**	7.3149.02000	7.3140.05080	7.3140.05080	7.3140.05070
		WKFN16D1/2/35 (Wieland)	3RV2925-5EB (Siemens)	3RV2925-5EB (Siemens)	3RV2935-5E (Siemens)
	Torque	---	36 lb-in	36 lb-in	53 lb-in
	Stripped length	16 mm	10 mm	10 mm	25 mm
	-X0:GRD	7.3149.02020	7.3149.02460	7.3149.02460	7.3291.00010
	Wieland	WKFN16D1/2/SL/35	WKFN16SL/35	WKFN16SL/35	WKN35SL/U
	Torque	---	---	---	36 lb-in
	Stripped length	16 mm	16 mm	16 mm	20 mm
	Handling	fig. 2, Sht. 16	fig. 2, Sht. 16	fig. 2, Sht. 16	---
supply	**connection**	fig. 12, Sht. 18	fig. 10, Sht. 17	fig. 10, Sht. 17	fig. 11, Sht. 17
terminal strip	**-X0**	7.6836.00641 Wieland	7.6836.00170 Wieland	7.6836.00170 Wieland	7.6836.00430 Wieland
terminal strip	**-X11**	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland	7.7113.00101 Wieland
	Handling	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16	fig. 1, Sht. 16
contactor	**-Q1/-Q2**	7.8740.00360	7.8740.00380	7.8740.00390	7.8740.00400
		3RT2025-1AK60	3RT2027-1AK60	3RT2028-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00
auxiliary switch	**-Q1**	7.8740.05010	7.8740.05010	7.8740.05010	7.8740.05010
		3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11	3RH2911-1HA11
contactor	**-Q3**	7.8740.00350	7.8740.00370	7.8740.00370	7.8740.00400
		3RT2024-1AK60	3RT2026-1AK60	3RT2026-1AK60	3RT2035-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05150
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2936-1CC00
contactor	**-Q4**	7.8740.00340	7.8740.00340	7.8740.00340	7.8740.00340
		3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60	3RT2023-1AK60
interference suppressor		7.8740.05140	7.8740.05140	7.8740.05140	7.8740.05140
	Siemens	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00	3RT2926-1CC00
coupling relay	**-K50**	7.3149.01670	7.3149.01670	7.3149.01670	7.3149.01670
	Wieland	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F	flare 110 V-1W-250 V6 A-F
overload relay	**-B25**	7.8741.00060	7.8741.00170	7.8741.00070	7.8741.00090
		3RB3026-1SB0 (3-12 A)	3RB3026-2QB0 (6-25 A)	3RB3026-1QB0 (6-25 A)	3RB3036-1UB0 (12-50 A)
		setting: 5 A	setting: 8 A	setting: 11 A	setting: 16 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
	Siemens	setting: 6 A	setting: 9 A	setting: 13 A	setting: 17 A
fuses	**-1FU/-2FU**	7.3316.1	7.3316.1	7.3316.1	7.3316.1
	Gould	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)	ATQR 1 1/2 (1.5 A, 600 V)
fuses	**-3FU**	7.3313.1	7.3313.1	7.3313.1	7.3313.1
	Gould	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)	ATQR 2 1/2 (2.5 A, 600 V)
fuse socket	**-1FU...-3FU**	7.3320.00060	7.3320.00060	7.3320.00060	7.3320.00060
	Wöhner	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH	AMBUS EASYSWITCH
circuit breaker	**-F4**	7.8742.01130	7.8742.01130	7.8742.01130	7.8742.01130
		3RV2021-1CA10 (1.8-2.5 A)	3RV2021-1CA10 (1.8-2.5 A)	3RV2021-1CA10 (1.8-2.5 A)	3RV2021-1CA10 (1.8-2.5 A)
		setting: 1.8 A	setting: 1.8 A	setting: 1.8 A	setting: 1.8 A
		NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental	NEC 430.32(C) incremental
		setting: 2.1 A	setting: 2.1 A	setting: 2.1 A	setting: 2.1 A
terminal block		7.3140.05090	7.3140.05090	7.3140.05090	7.3140.05090
		3RV2928-1H	3RV2928-1H	3RV2928-1H	3RV2928-1H
auxiliary switch		7.8742.05000	7.8742.05000	7.8742.05000	7.8742.05000
	Siemens	3RV2901-1E	3RV2901-1E	3RV2901-1E	3RV2901-1E
transformer	**-T11**	7.2239.20080	7.2239.20080	7.2239.20080	7.2239.20080
		USTE250 (250 VA)	USTE250 (250 VA)	USTE250 (250 VA)	USTE250 (250 VA)
	Block	diagram 2, Sht. 15	diagram 2, Sht. 15	diagram 2, Sht. 15	diagram 2, Sht. 15
power supply	**-T21/-T22**	7.7605P0	7.7605P0	7.7605P0	7.7605P0
	Prodrive	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5	PSDC24/2.5
connection	**-W11**	10 AWG black 600 V, 90°C	---	---	---
connection	**-W13**	10 AWG black	7.6861.0	7.6861.0	7.3140.05270
		600 V, 90°C	3RV1915-1AB	3RV1915-1AB	3RA2933-3FA00
connection	**-W14**	14 AWG black	14 AWG black	14 AWG black	7.3140.05270
		600 V, 90°C	600 V, 90°C	600 V, 90°C	3RA2933-3FA00
cables	**-W19.1/.2**	4G12 AWG 600 V, 90°C	4G12 AWG 600 V, 90°C	4G10 AWG 600 V, 90°C	4G10 AWG 600 V, 90°C
compressor control	**-K20**	7.7601.0	7.7601.0	7.7601.0	7.7601.0
	Prodrive	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS	SIGMA CONTROL 2 MCS
IO-module	**-K21**	7.7604.1	7.7604.1	7.7604.1	7.7604.1
	Prodrive	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3	SIGMA CONTROL 2 IOM-3
IO-module	**-K22**	7.7602.1	7.7602.1	7.7602.1	7.7602.1
option C40	**Prodrive**	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1	SIGMA CONTROL 2 IOM-1
EMERGENCY STOP pushbutton	**-S1**	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV
auxiliary contact	**Schlegel**	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO	7.3218.0 / MHTOO

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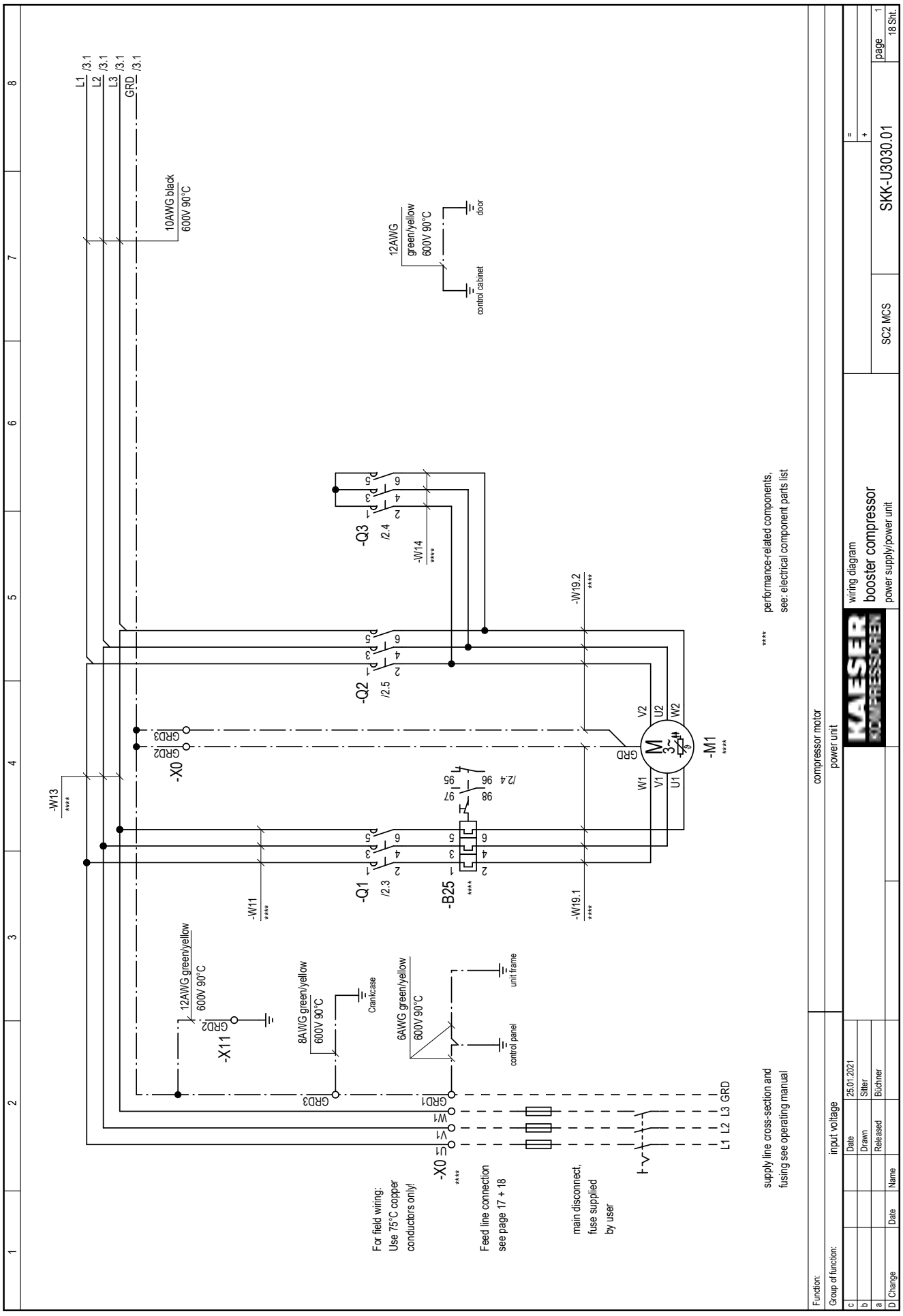
electrical component parts list

booster compressor

KAESER KOMPRESSOREN

	Change	Date	Name
c			
b		25.01.2021	
a		Date	
	Drawn	Sitter	
	Released	Büchner	


L1 /3.1
L2 /3.1
L3 /3.1
GRD /3.1
10AWG black 600V 90°C
12AWG green/yellow 600V 90°C
door
control cabinet
-Q3 /2.4
-W14 ****
-Q2 /2.5
-W19.2 ****
-X0
GRD2
GRD3
-M1 ****
V2 U2 W2
W1 V1 U1
GRD
-W13 ****
-W11 ****
-Q1 /2.3
-B25 ****
/2.4
-W19.1 ****
12AWG green/yellow 600V 90°C
-X11
GRD2
8AWG green/yellow 600V 90°C
Crankcase
6AWG green/yellow 600V 90°C
unit frame
control panel
GRD3
GRD1
W1
V1
U1
-X0 ****
L1 L2 L3 GRD
**** performance-related components, see: electrical component parts list
supply line cross-section and fusing see operating manual
main disconnect, fuse supplied by user
Feed line connection see page 17 + 18
For field wiring: Use 75°C copper conductors only!
Function:
compressor motor
Group of function:
power unit
input voltage
Date 25.01.2021
Drawn Sitter
Released Büchner
Name
Date
D Change
wiring diagram
booster compressor
power supply/power unit
SC2 MCS
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page 1
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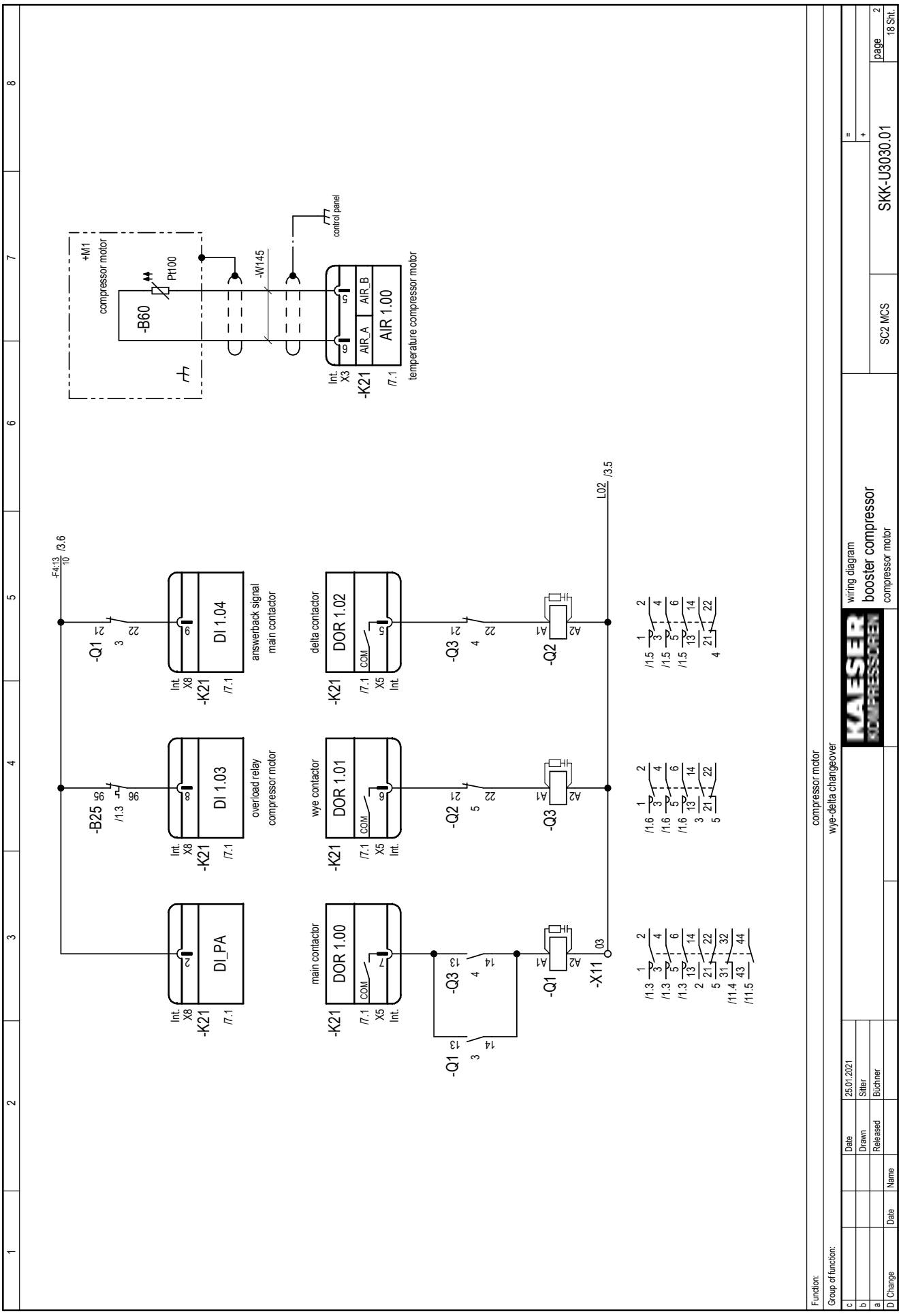
+M1
compressor motor
-B60
Pt100
-W145
control panel
-K21
AIR 1.00
AIR_A
AIR_B
temperature compressor motor
-F4.13
/3.6
-Q1
DI 1.04
answerback signal
main contactor
delta contactor
DOR 1.02
-Q3
-Q2
L02
/3.5
-B25
DI 1.03
overload relay
compressor motor
wye contactor
DOR 1.01
DI_PA
main contactor
DOR 1.00
-X11
compressor motor
wye-delta changeover
wiring diagram
booster compressor
compressor motor
SC2 MCS
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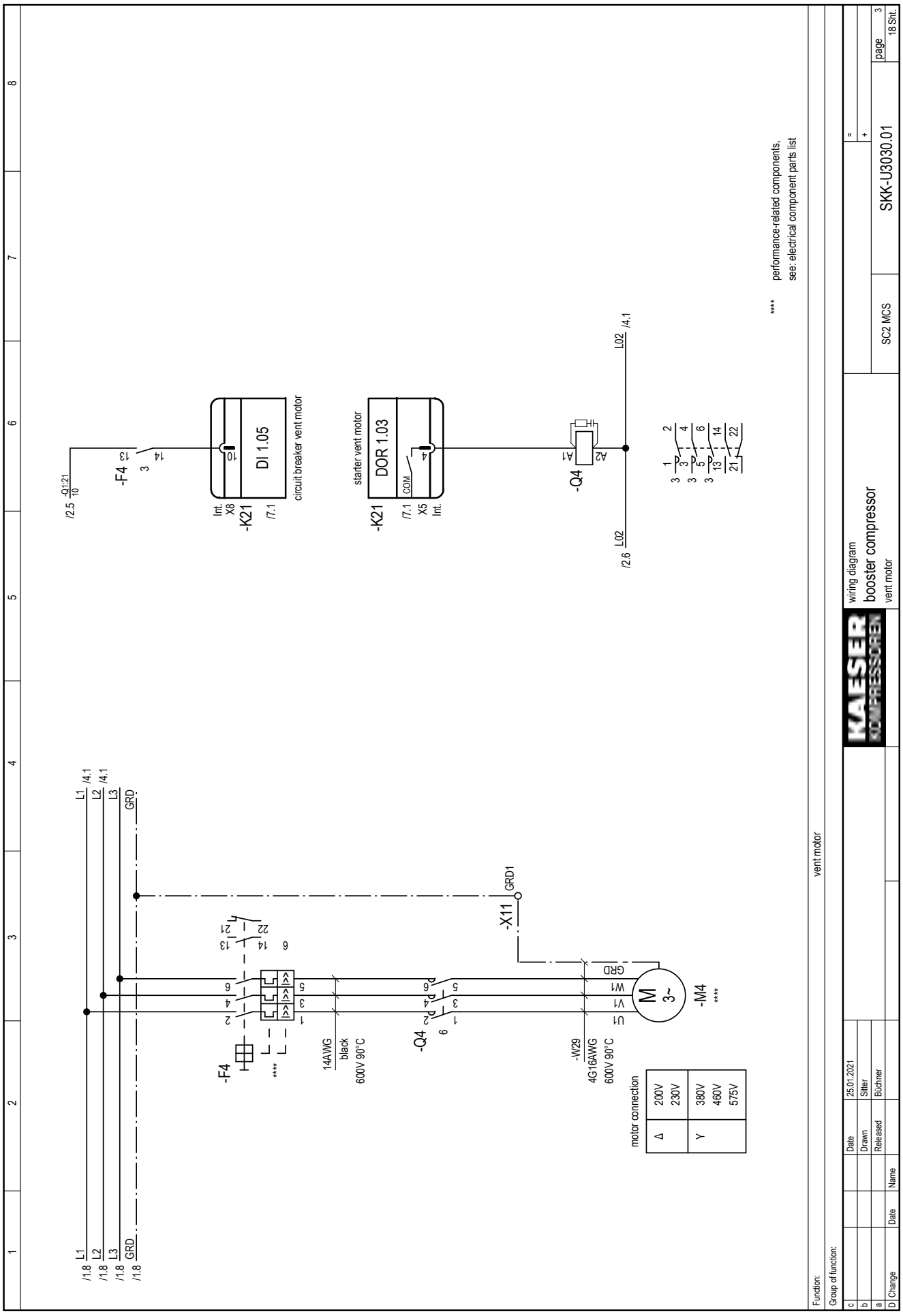
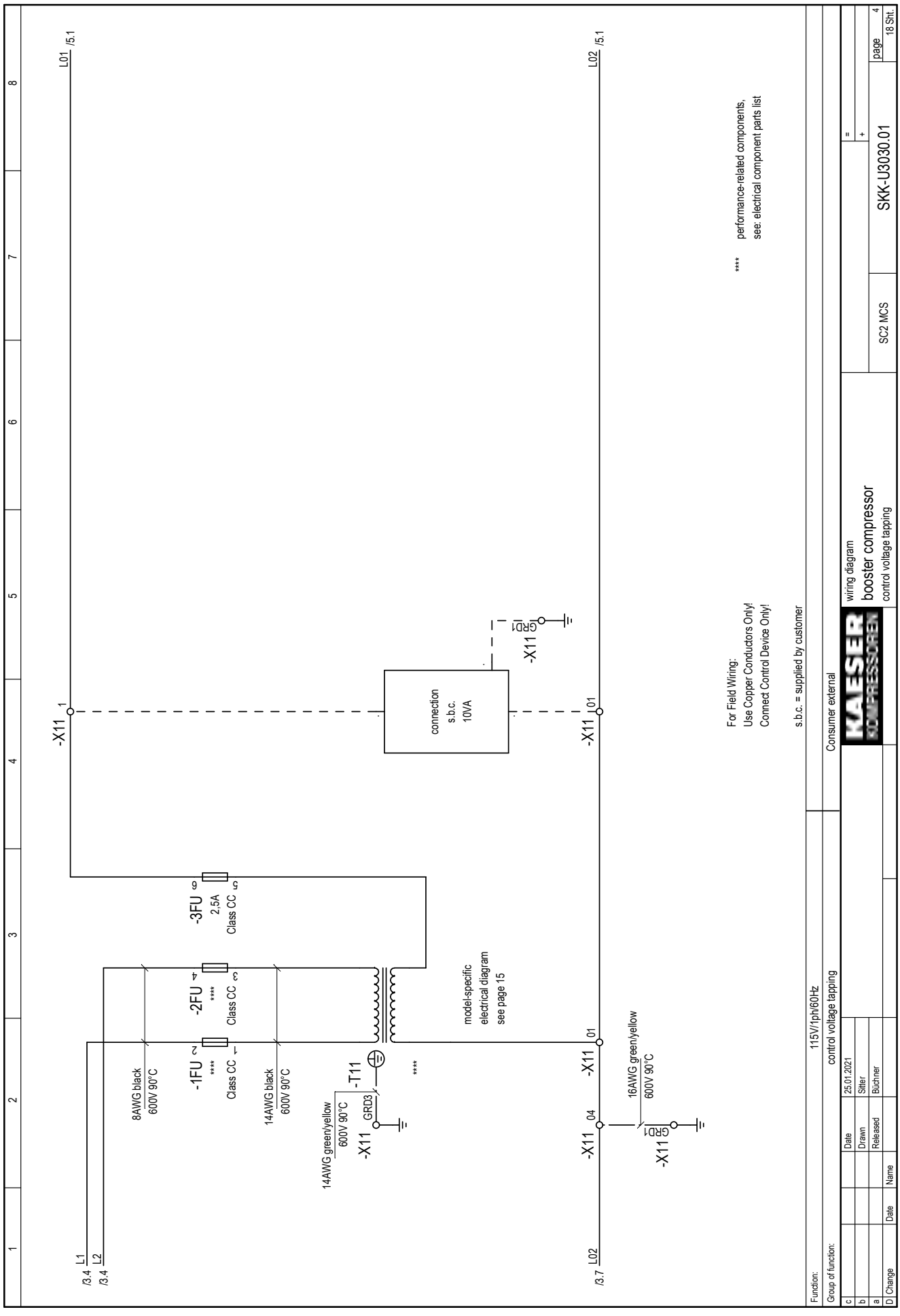
page 2
18 Sht.


L1 /1.8
L2 /1.8
L3 /1.8
GRD /1.8
L1 /4.1
L2 /4.1
L3
GRD
-F4
-Q4
-K21
DI 1.05
DOR 1.03
circuit breaker vent motor
starter vent motor
-X11
GRD1
-M4
M 3~
-W29
14AWG black 600V 90°C
4G16AWG 600V 90°C
motor connection
Δ 200V 230V
Y 380V 460V 575V
**** performance-related components, see: electrical component parts list
Function: vent motor
Group of function:
wiring diagram
booster compressor
vent motor
SC2 MCS
SKK-U3030.01
page 3
18 Sht.


L01 /5.1
L02 /5.1
-X11
connection
s.b.c.
10VA
-X11 GRD1
-3FU 2,5A Class CC
-2FU **** Class CC
-1FU **** Class CC
8AWG black 600V 90°C
14AWG black 600V 90°C
14AWG green/yellow 600V 90°C
-X11 GRD3
-T11
****
model-specific electrical diagram see page 15
-X11 01
-X11 04
16AWG green/yellow 600V 90°C
-X11 GRD1
L1 /3.4
L2 /3.4
L02 /3.7
**** performance-related components, see: electrical component parts list
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
s.b.c. = supplied by customer
Function: 115V/1ph/60Hz
Group of function: control voltage tapping
Consumer external
KAESER KOMPRESSOREN
wiring diagram
booster compressor
control voltage tapping
SC2 MCS
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page 4
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Date 25.01.2021
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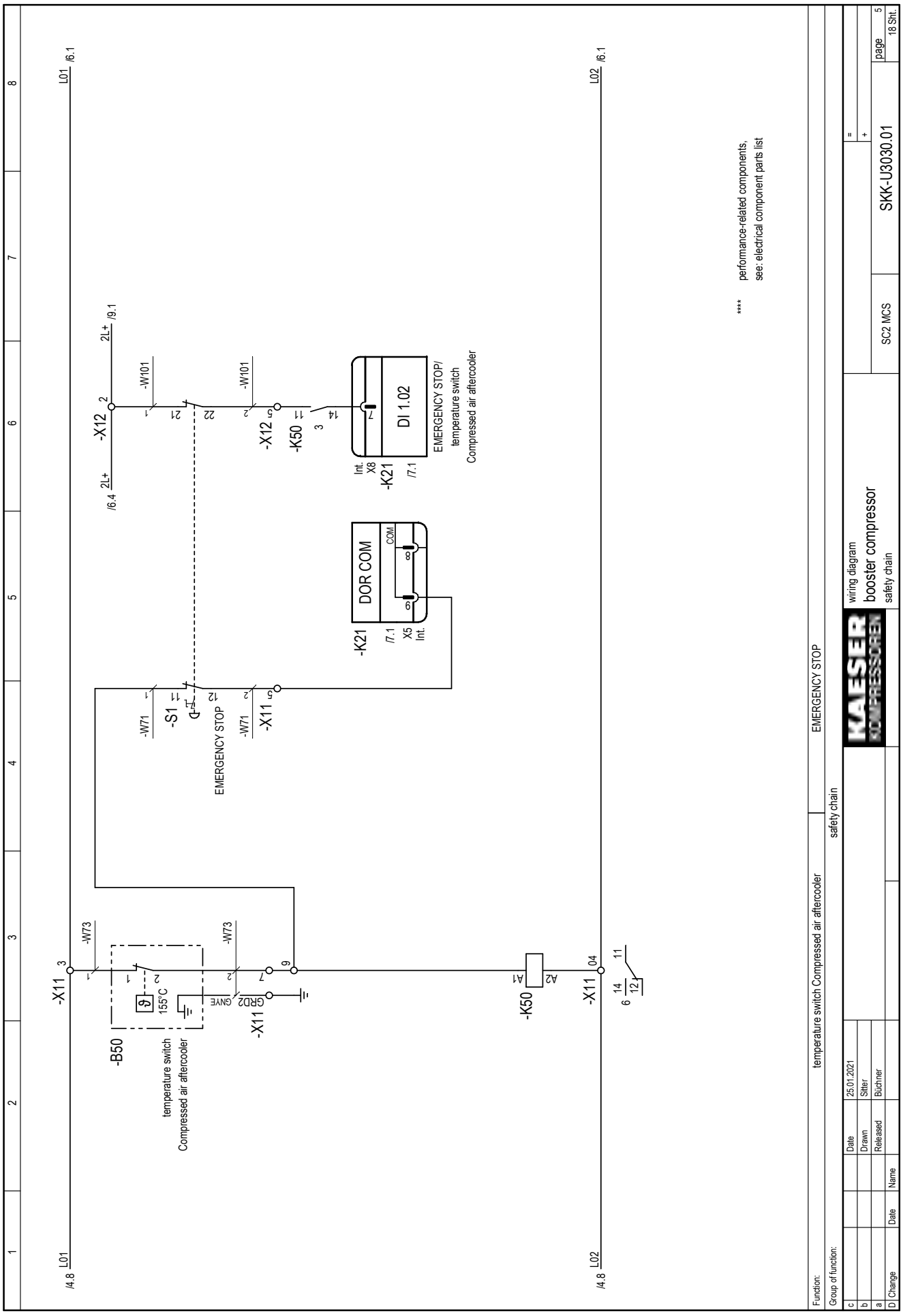
Released Büchner
Name
Date
Change


L01 /6.1
L02 /6.1
-X12 2 2L+ /9.1
/6.4 2L+
-W101
-X12 5
-K50 11 14 3
-K21 Int. X8 /7.1 DI 1.02
EMERGENCY STOP/ temperature switch Compressed air aftercooler
-K21 /7.1 X5 Int. DOR COM COM
-S1 11 12 EMERGENCY STOP
-W71
-X11 5
-W73
-X11 3
-B50 155°C
temperature switch Compressed air aftercooler
GRD2 GNYE
-X11 7 9
-K50 A1 A2
-X11 04
6 14 12 11
/4.8 L01
/4.8 L02
**** performance-related components, see: electrical component parts list
Function: temperature switch Compressed air aftercooler
EMERGENCY STOP
Group of function: safety chain
Date 25.01.2021
Drawn Sitter
Released Büchner
Name
Change
wiring diagram
booster compressor
safety chain
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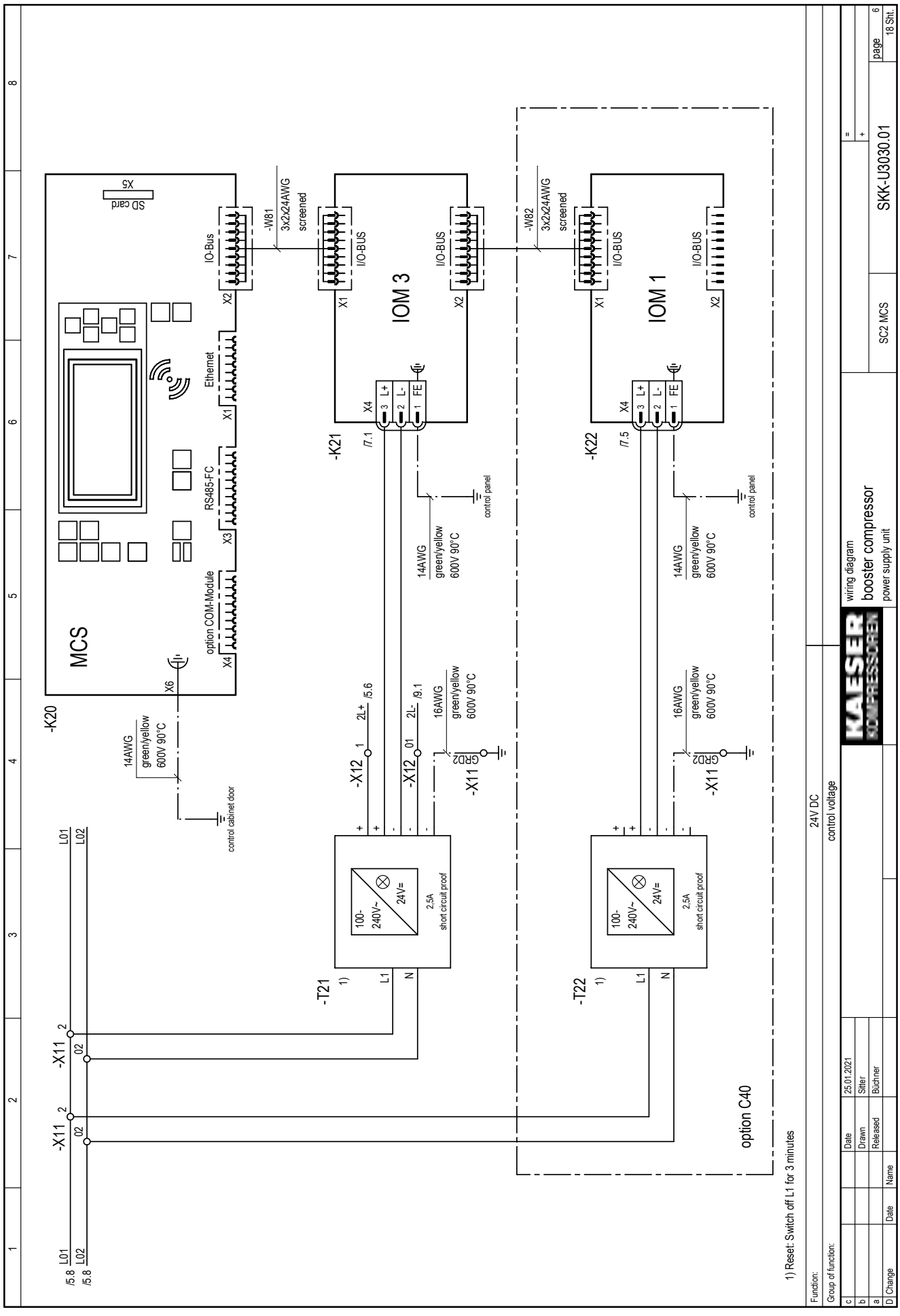
MCS
-K20
SD card
X5
X6
option COM-Module
X4
RS485-FC
X3
Ethernet
X1
IO-Bus
X2
-W81
3x2x24AWG
screened
-W82
3x2x24AWG
screened
IOM 3
IOM 1
I/O-BUS
X1
X2
-K21
-K22
/7.1
/7.5
X4
3 L+
2 L-
1 FE
14AWG
green/yellow
600V 90°C
control cabinet door
control panel
-X12
2L+ /5.6
2L- /9.1
16AWG
-X11
GRD
-T21
-T22
100-240V~
24V=
2,5A
short circuit proof
L1
N
-X11
L01
L02
/5.8
option C40
1) Reset: Switch off L1 for 3 minutes
24V DC
control voltage
Function:
Group of function:
wiring diagram
booster compressor
power supply unit
SC2 MCS
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Drawn
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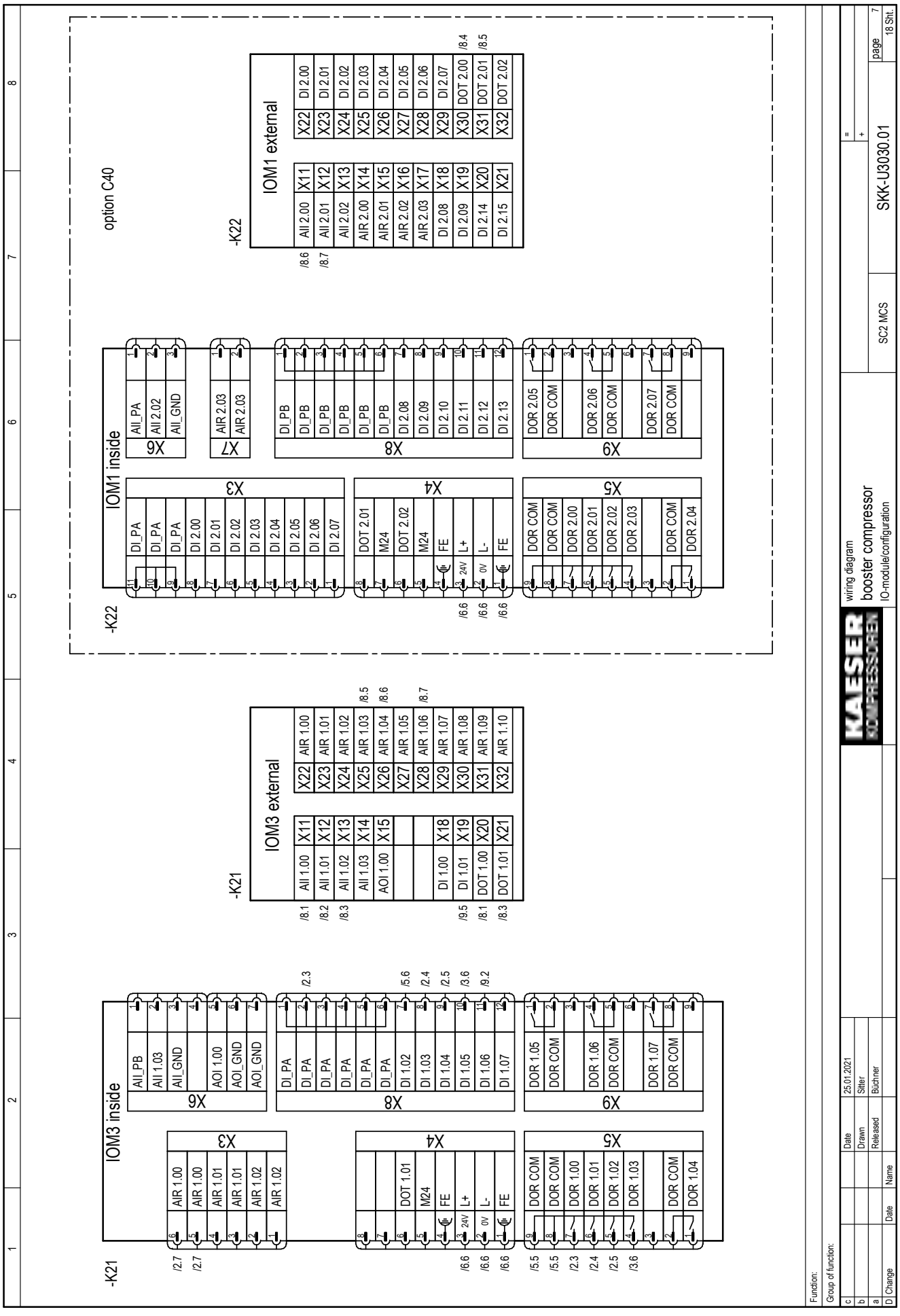
Name
25.01.2021
Sitter
Büchner


option C40
-K22
IOM1 external
X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21
X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32
AII 2.00 AII 2.01 AII 2.02 AIR 2.00 AIR 2.01 AIR 2.02 AIR 2.03 DI 2.08 DI 2.09 DI 2.14 DI 2.15
DI 2.00 DI 2.01 DI 2.02 DI 2.03 DI 2.04 DI 2.05 DI 2.06 DI 2.07 DOT 2.00 DOT 2.01 DOT 2.02
IOM1 inside
X6 AII_PA AII 2.02 AII_GND
X7 AIR 2.03 AIR 2.03
X8 DI_PB DI 2.08 DI 2.09 DI 2.10 DI 2.11 DI 2.12 DI 2.13
X9 DOR 2.05 DOR COM DOR 2.06 DOR COM DOR 2.07 DOR COM
X3 DI_PA DI 2.00 DI 2.01 DI 2.02 DI 2.03 DI 2.04 DI 2.05 DI 2.06 DI 2.07
X4 DOT 2.01 M24 DOT 2.02 M24 FE 24V L+ 0V L- FE
X5 DOR COM DOR 2.00 DOR 2.01 DOR 2.02 DOR 2.03 DOR COM DOR 2.04
-K21
IOM3 external
X11 X12 X13 X14 X15 X18 X19 X20 X21
X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32
AII 1.00 AII 1.01 AII 1.02 AII 1.03 AOI 1.00 DI 1.00 DI 1.01 DOT 1.00 DOT 1.01
AIR 1.00 AIR 1.01 AIR 1.02 AIR 1.03 AIR 1.04 AIR 1.05 AIR 1.06 AIR 1.07 AIR 1.08 AIR 1.09 AIR 1.10
IOM3 inside
X6 AII_PB AII 1.03 AII_GND AOI 1.00 AOI_GND AOI_GND
X8 DI_PA DI 1.02 DI 1.03 DI 1.04 DI 1.05 DI 1.06 DI 1.07
X9 DOR 1.05 DOR COM DOR 1.06 DOR COM DOR 1.07 DOR COM
X3 AIR 1.00 AIR 1.00 AIR 1.01 AIR 1.01 AIR 1.02 AIR 1.02
X4 DOT 1.01 M24 FE 24V L+ 0V L- FE
X5 DOR COM DOR COM DOR 1.00 DOR 1.01 DOR 1.02 DOR 1.03 DOR COM DOR 1.04
wiring diagram
booster compressor
IO-module/configuration
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18 Sht.
Function:
Group of function:
Date 25.01.2021
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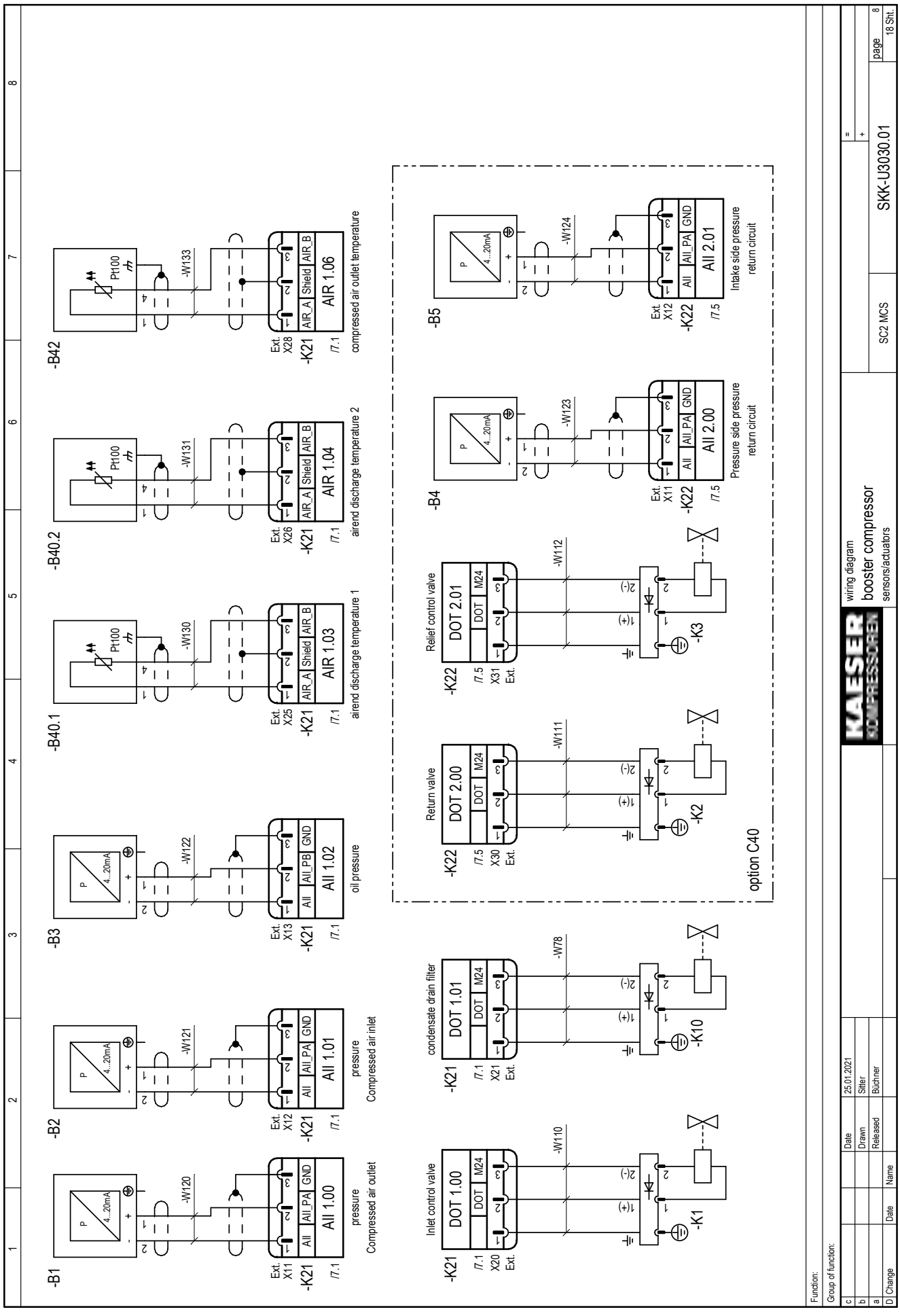
Released Büchner
Name
Change


-B1
-B2
-B3
-B40.1
-B40.2
-B42
-B4
-B5
-W120
-W121
-W122
-W130
-W131
-W133
-W123
-W124
-W110
-W111
-W112
-W78
-K1
-K2
-K3
-K10
-K21
-K22
DOT 1.00
DOT 1.01
DOT 2.00
DOT 2.01
All 1.00
All 1.01
All 1.02
AIR 1.03
AIR 1.04
AIR 1.06
All 2.00
All 2.01
Inlet control valve
condensate drain filter
Return valve
Relief control valve
pressure
Compressed air outlet
Compressed air inlet
oil pressure
airend discharge temperature 1
airend discharge temperature 2
compressed air outlet temperature
Pressure side pressure return circuit
Intake side pressure return circuit
option C40
wiring diagram
booster compressor
sensors/actuators
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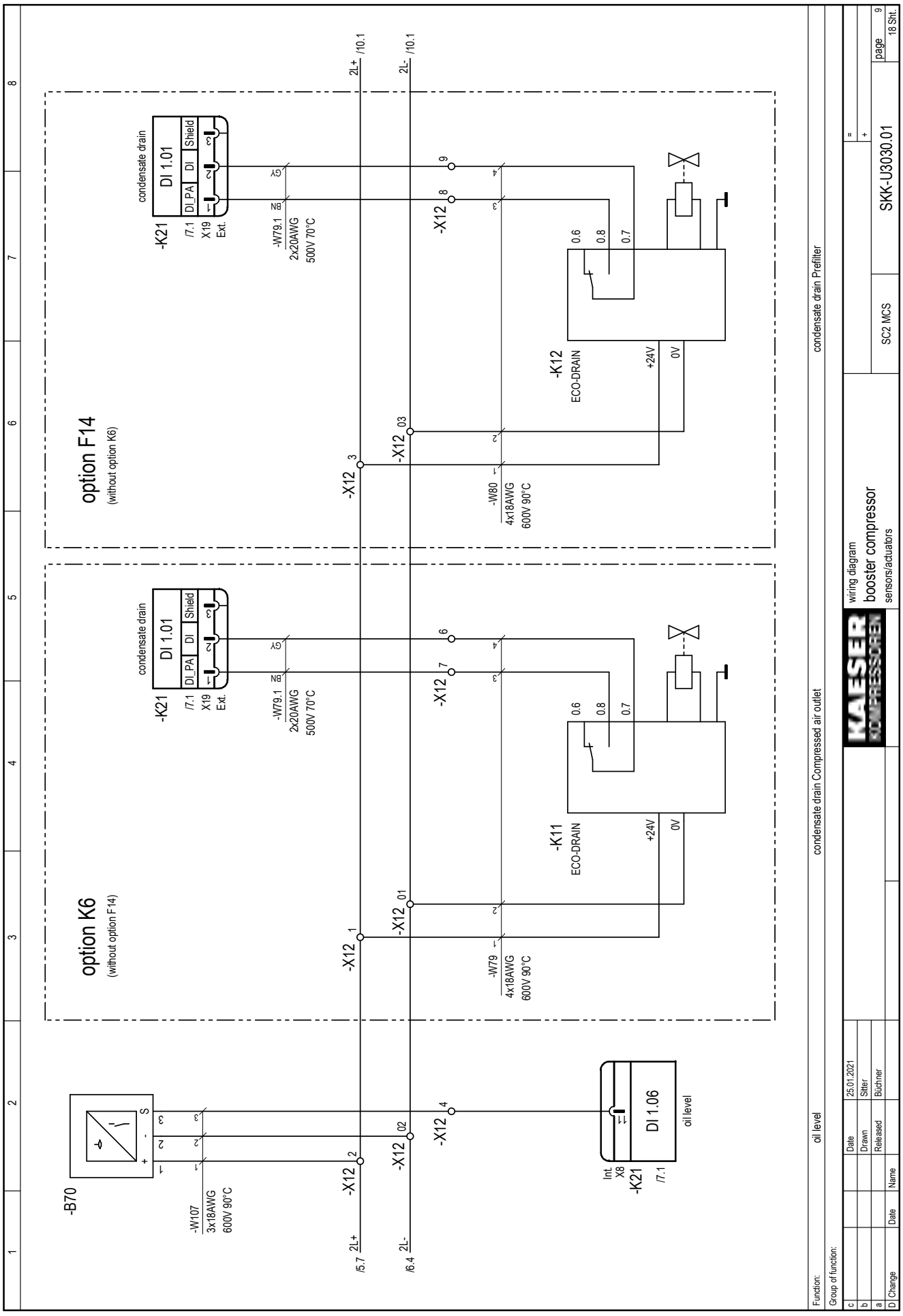
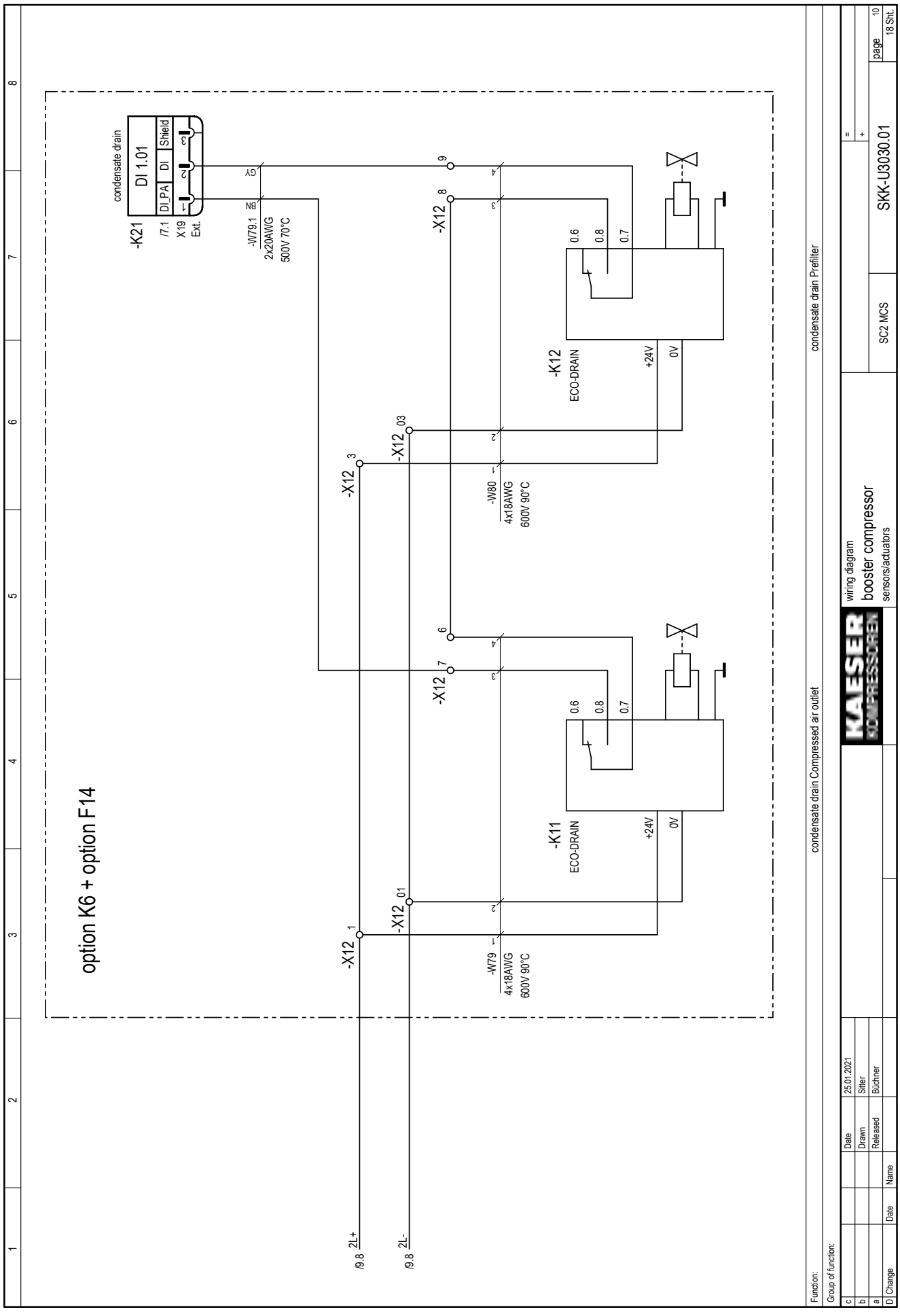
18 Sht.
Function:
Group of function:
Date
Drawn
Released
Name
25.01.2021
Sitter
Büchner
Change


option F14
(without option K6)
option K6
(without option F14)
condensate drain
DI 1.01
DI_PA
DI
Shield
-K21
/7.1
X19
Ext.
-W79.1
2x20AWG
500V 70°C
-W80
4x18AWG
600V 90°C
-W79
-K12
ECO-DRAIN
-K11
+24V
0V
-X12
2L+ /10.1
2L- /10.1
-B70
-W107
3x18AWG
600V 90°C
/5.7 2L+
/6.4 2L-
DI 1.06
oil level
Int.
X8
Function: oil level
condensate drain Compressed air outlet
Group of function:
condensate drain Prefilter
wiring diagram
booster compressor
sensors/actuators
SC2 MCS
SKK-U3030.01
page 9
18 Sht.
Date 25.01.2021
Drawn Sitter
Released Büchner
D Change Date Name


option K6 + option F14
condensate drain
DI 1.01
DI_PA
DI
Shield
-K21
/7.1
X19
Ext.
-W79.1
2x20AWG
500V 70°C
GY
BN
-X12 9
-X12 8
-X12 03
-X12 3
-X12 6
-X12 7
-X12 01
-X12 1
-W80
4x18AWG
600V 90°C
-W79
4x18AWG
600V 90°C
-K12
ECO-DRAIN
-K11
ECO-DRAIN
+24V
0V
0.6
0.8
0.7
2L+
/9.8
2L-
/9.8
Function:
condensate drain Compressed air outlet
condensate drain Prefilter
Group of function:
wiring diagram
booster compressor
sensors/actuators
SC2 MCS
SKK-U3030.01
page 10
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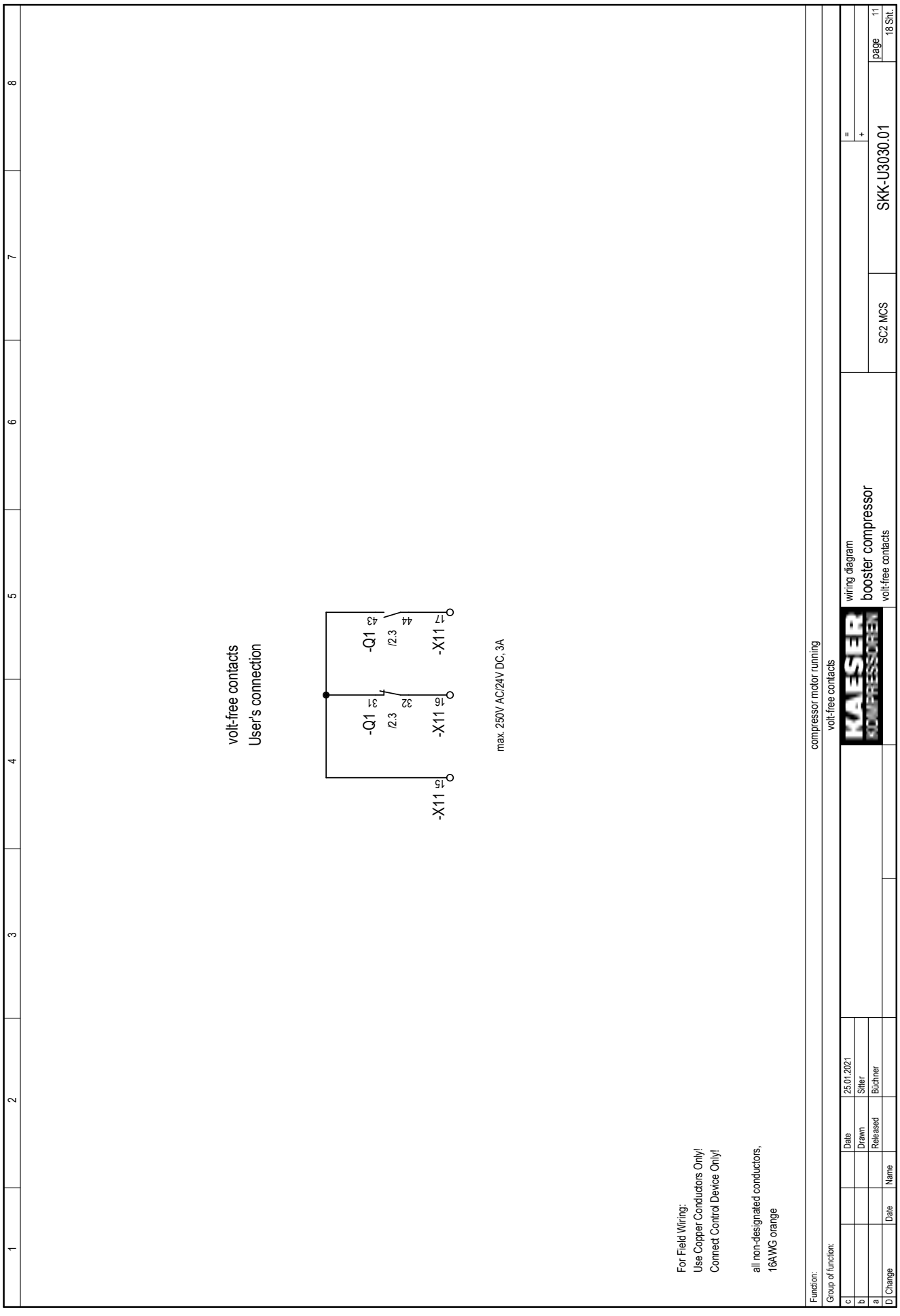
Büchner
Name
Change


volt-free contacts
User's connection
-X11 15
-Q1 31
/2.3
32
-X11 16
-Q1 43
/2.3
44
-X11 17
max. 250V AC/24V DC, 3A
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
all non-designated conductors,
16AWG orange
Function:
compressor motor running
Group of function:
volt-free contacts
KAESER KOMPRESSOREN
wiring diagram
booster compressor
volt-free contacts
SC2 MCS
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c
b
a
D Change
Date
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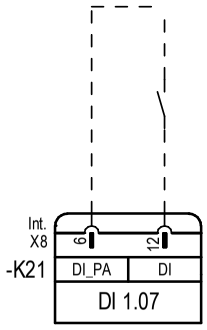
Date 25.01.2021
Drawn Sitter
Released Büchner

1	2	3	4	5	6	7	8

** pre-allocated
*** available for use

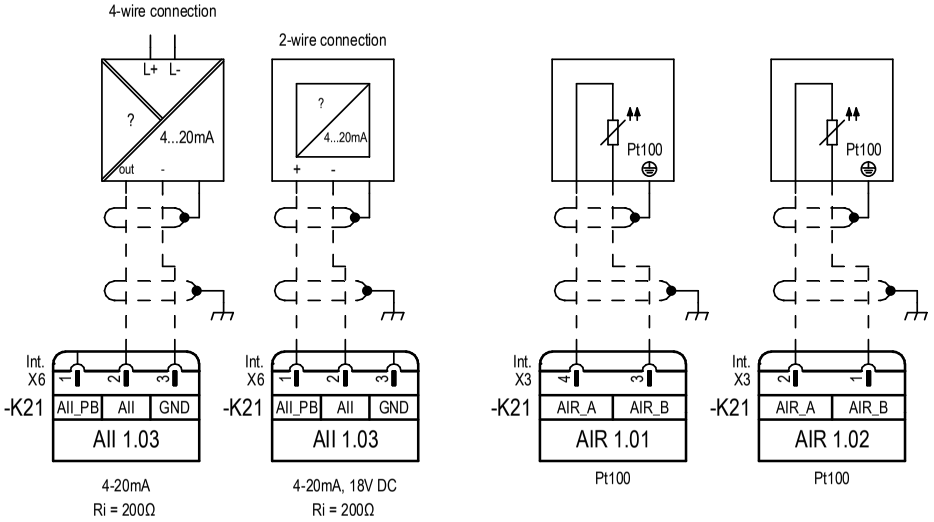
Inputs/outputs for use by others
example connections



load/idling **

digital inputs, User's connection
18V DC/7mA
max. cable length 100m

possible connections for AII 1.03



4-20mA
Ri = 200Ω

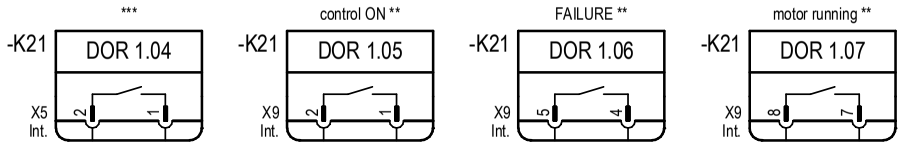
4-20mA, 18V DC
Ri = 200Ω

Pt100

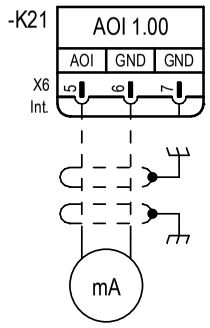
Pt100

analog inputs, User's connection
max. cable length 30m

digital output, User's connection
max. 250V AC/24V DC, 1A
max. cable length 100m



analog output, User's connection
4-20mA, max. 450Ω
max. cable length 30m

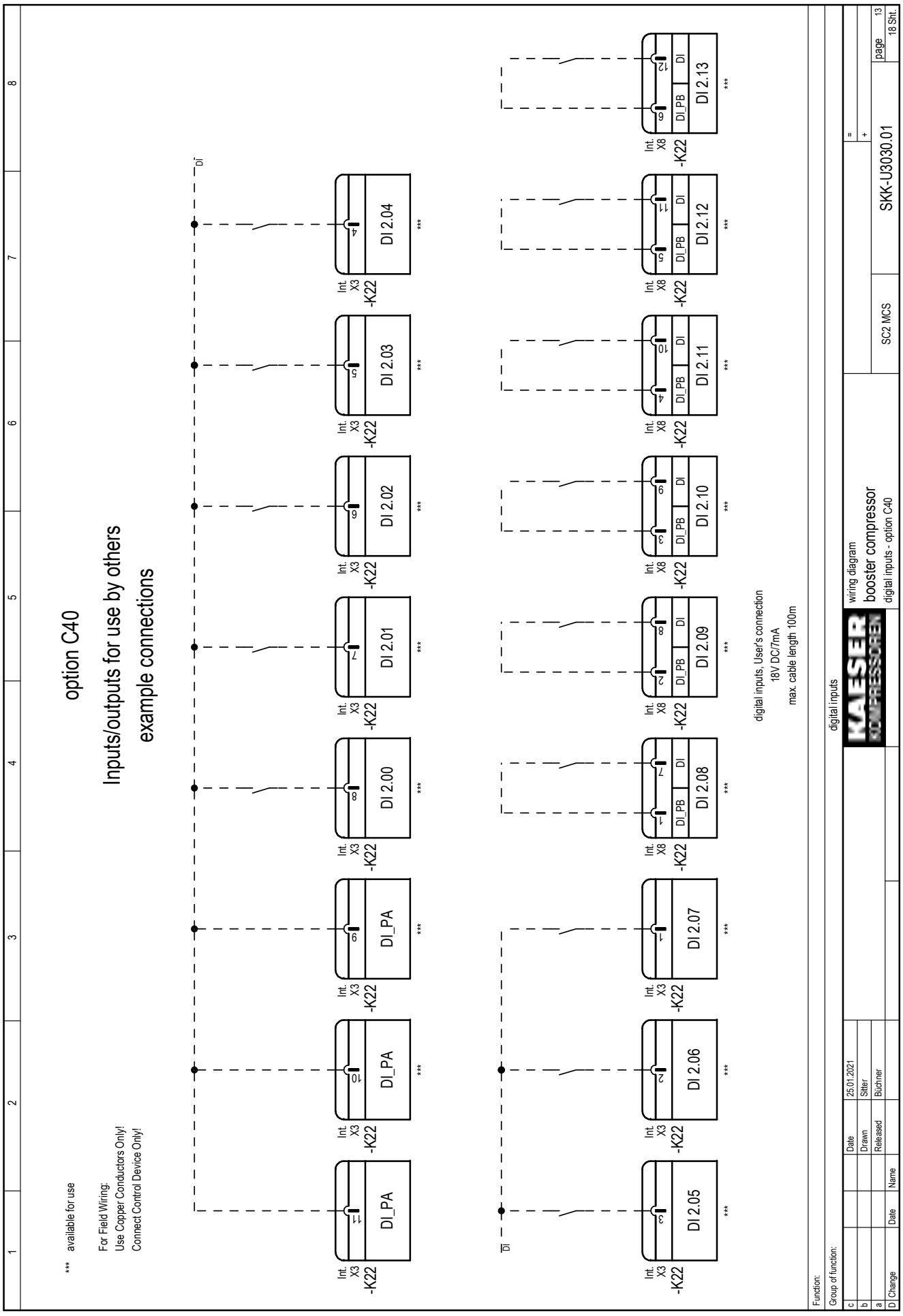


For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!

Function:

Group of function:

c				Date	25.01.2021	KAESER KOMPRESSOREN	wiring diagram		=	
b				Drawn	Sitter		booster compressor		+	
a				Released	Büchner		inputs-/outputs IOM3	SC2 MCS	SKK-U3030.01	page 12 / 18 Sht.
D	Change	Date	Name							


option C40
Inputs/outputs for use by others
example connections
*** available for use
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
digital inputs, User's connection
18V DC/7mA
max. cable length 100m
DI 2.00
DI 2.01
DI 2.02
DI 2.03
DI 2.04
DI 2.05
DI 2.06
DI 2.07
DI 2.08
DI 2.09
DI 2.10
DI 2.11
DI 2.12
DI 2.13
DI_PA
DI_PB
-K22
Int. X3
Int. X8
Function:
Group of function:
digital inputs
wiring diagram
booster compressor
digital inputs - option C40
SC2 MCS
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18 Sht.
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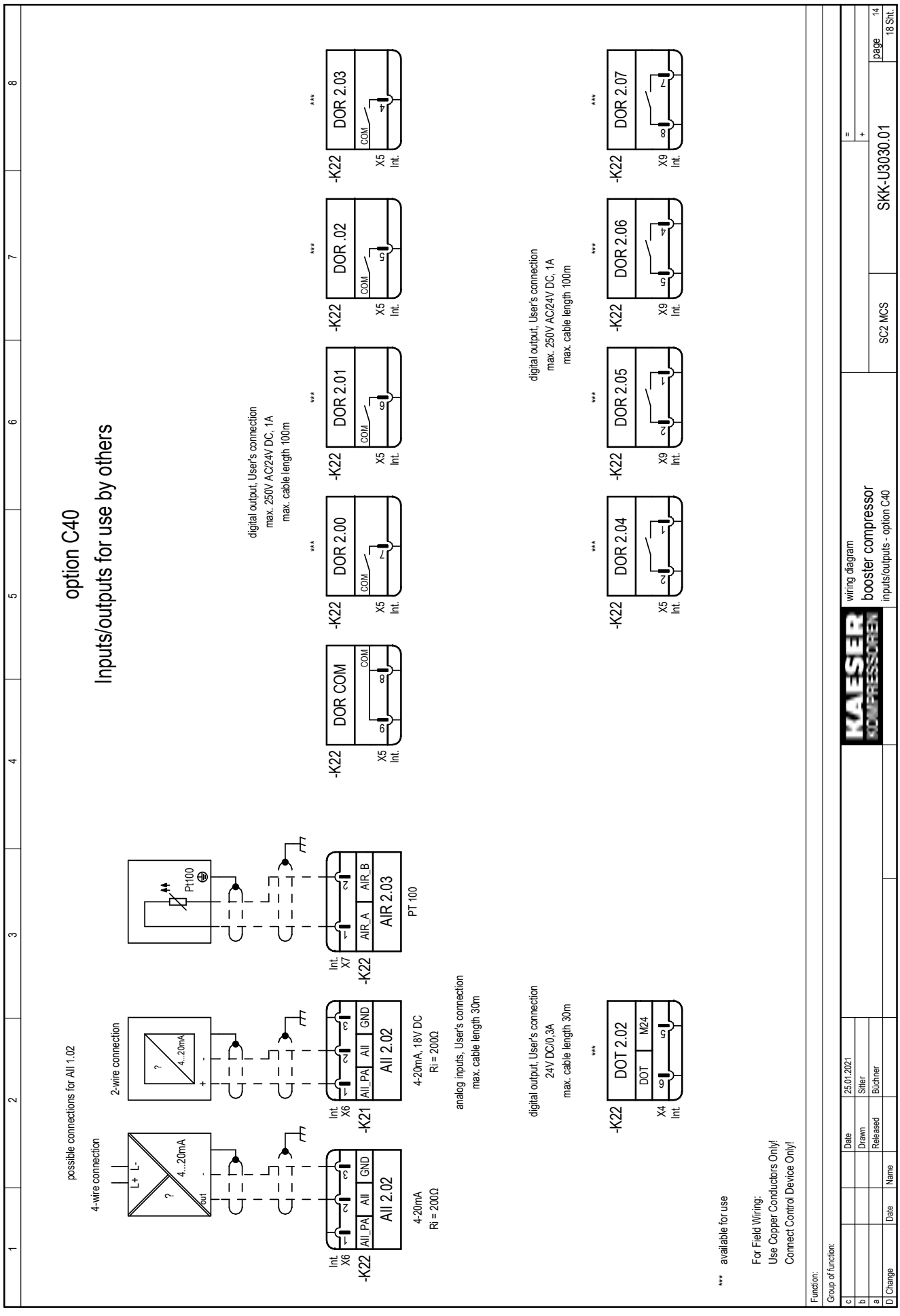
Drawn
Released
Name
Change


option C40
Inputs/outputs for use by others
possible connections for AII 1.02
4-wire connection
2-wire connection
L+ L-
4...20mA
out
Pt100
AII 2.02
AIR 2.03
DOT 2.02
DOR COM
DOR 2.00
DOR 2.01
DOR .02
DOR 2.03
DOR 2.04
DOR 2.05
DOR 2.06
DOR 2.07
-K21
-K22
X4
X5
X6
X7
X9
Int.
4-20mA
Ri = 200Ω
4-20mA, 18V DC
Ri = 200Ω
analog inputs, User's connection
max. cable length 30m
PT 100
digital output, User's connection
max. 250V AC/24V DC, 1A
max. cable length 100m
digital output, User's connection
24V DC/0,3A
max. cable length 30m
*** available for use
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
Function:
Group of function:
wiring diagram
booster compressor
inputs/outputs - option C40
SC2 MCS
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18 Sht.
Date 25.01.2021
Drawn Sitter
Released Büchner
Name
Date
Change

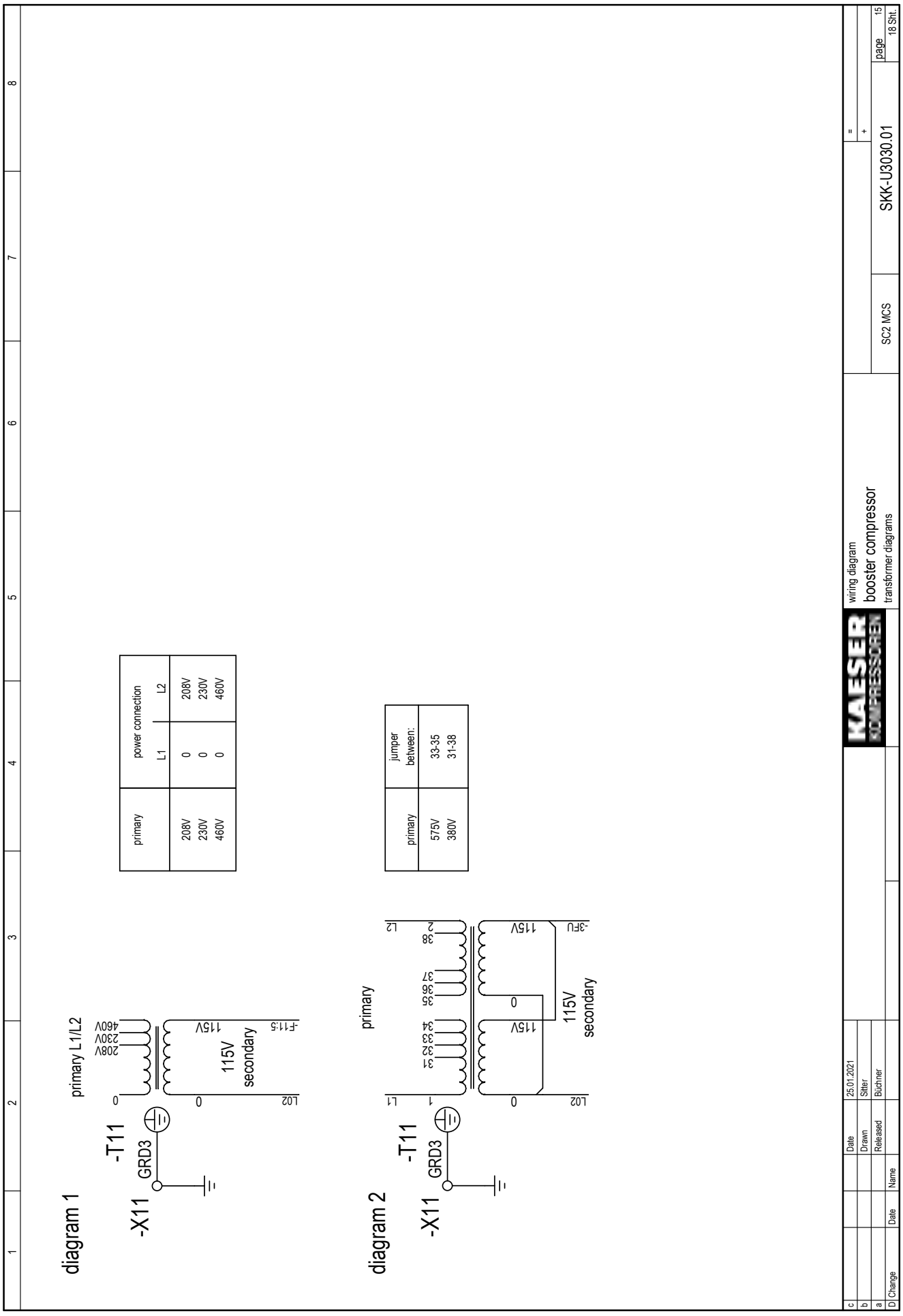
diagram 1
primary L1/L2
208V
230V
460V
0
-T11
GRD3
-X11
-F11:5
115V
secondary
L02
0
primary
power connection
L1
L2
208V
230V
460V
jumper
between:
33-35
31-38
575V
380V
diagram 2
L1
L2
1
2
31
33
34
35
36
37
38
-3FU
wiring diagram
booster compressor
transformer diagrams
SC2 MCS
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Date
Drawn
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25.01.2021
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Büchner
Change
Name

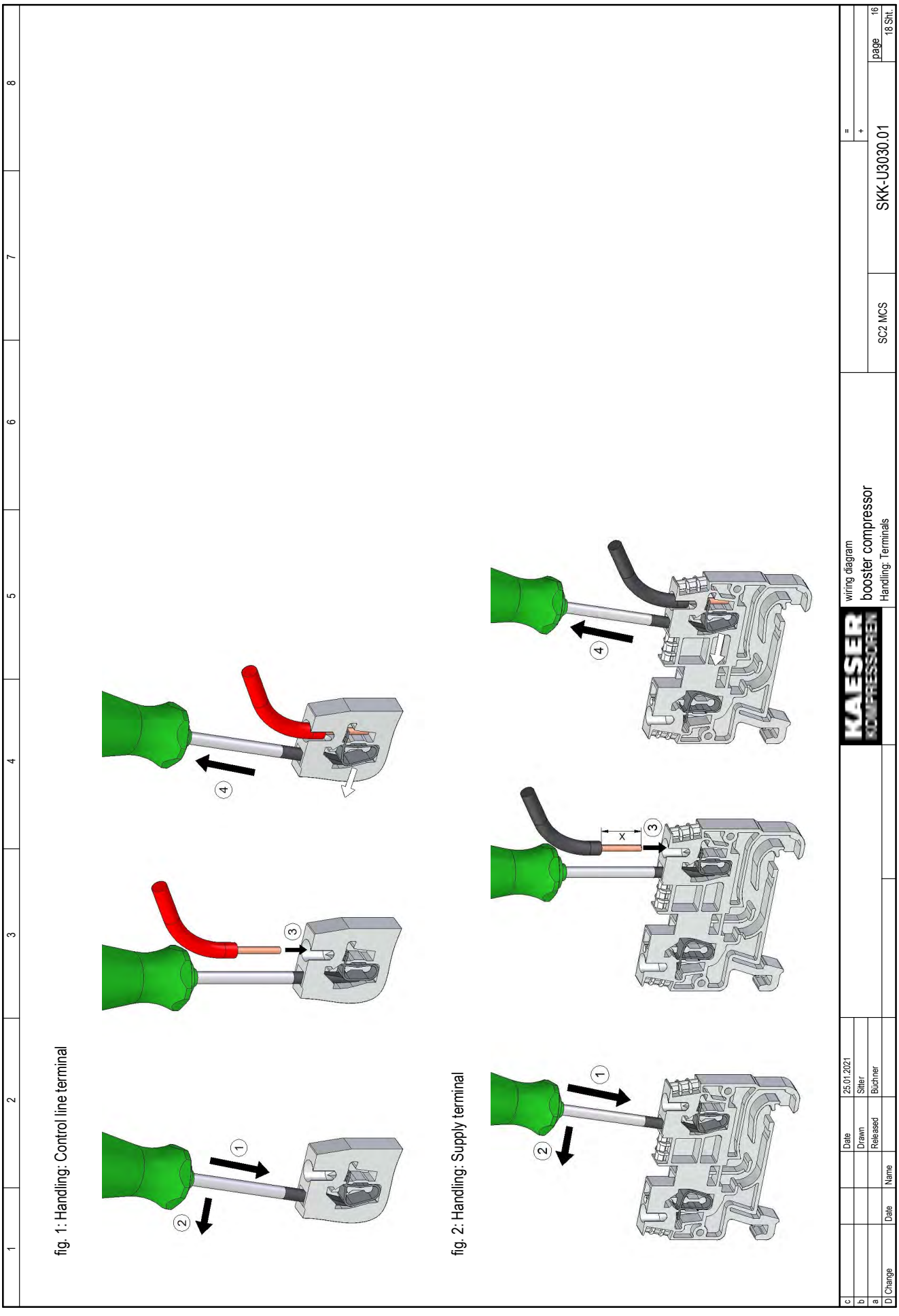

fig. 1: Handling: Control line terminal

fig. 2: Handling: Supply terminal

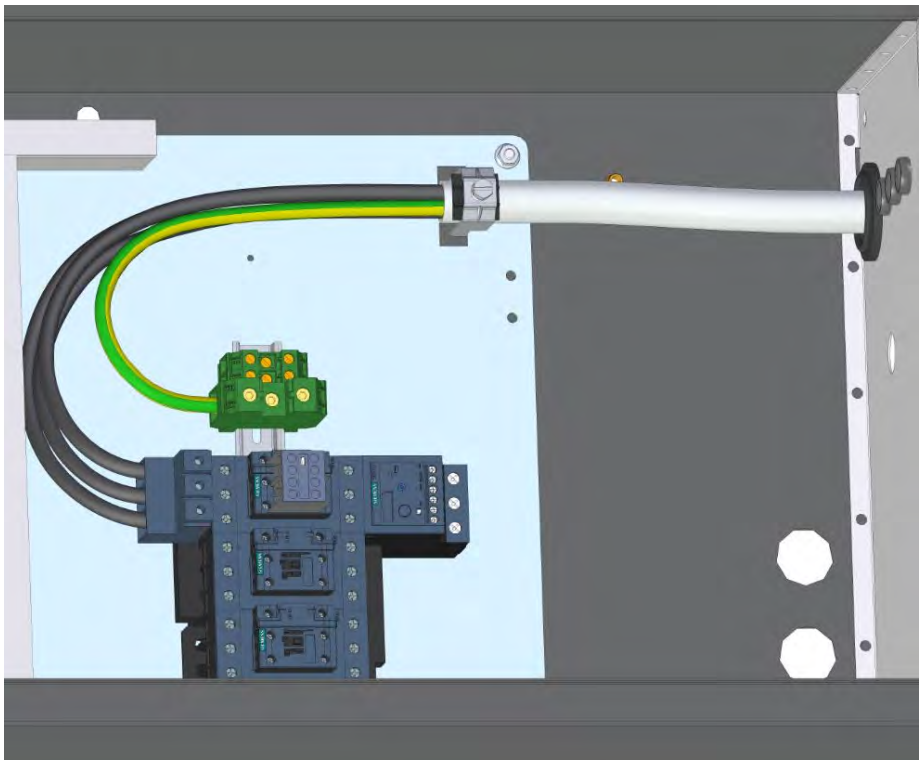

fig. 11: Feed line connection

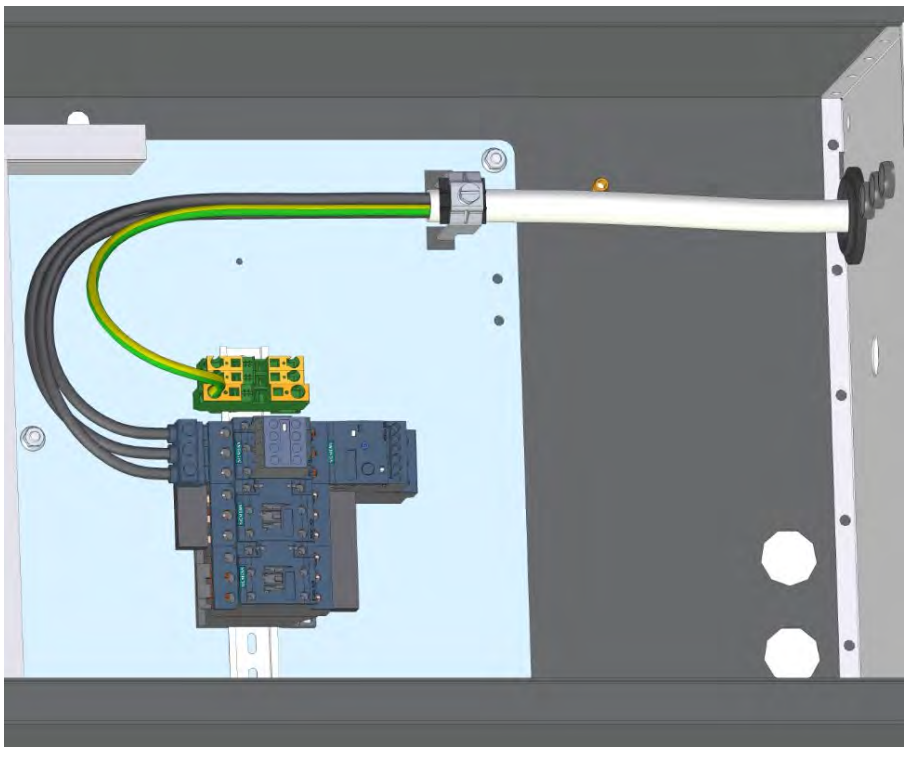

fig. 10: Feed line connection

wiring diagram
booster compressor
Feed line connection
SC2 MCS
SKK-U3030.01
page 17
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		Date	Name
D	Change	Date	
a		Released	Büchner
b		Drawn	Sitter
c		Date	25.01.2021

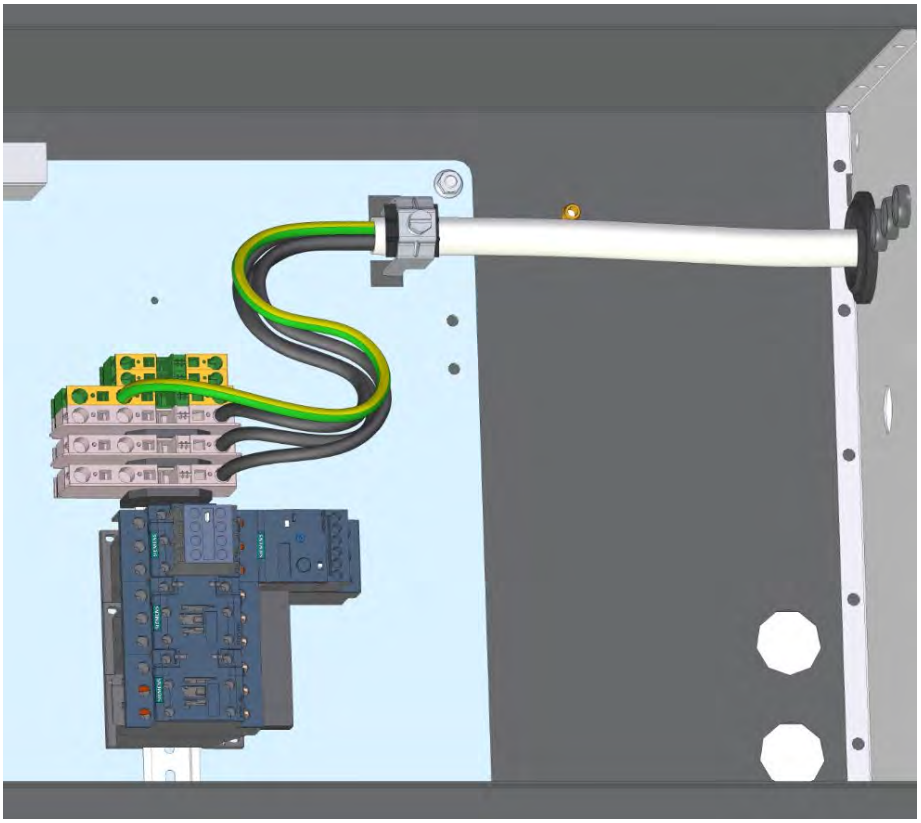
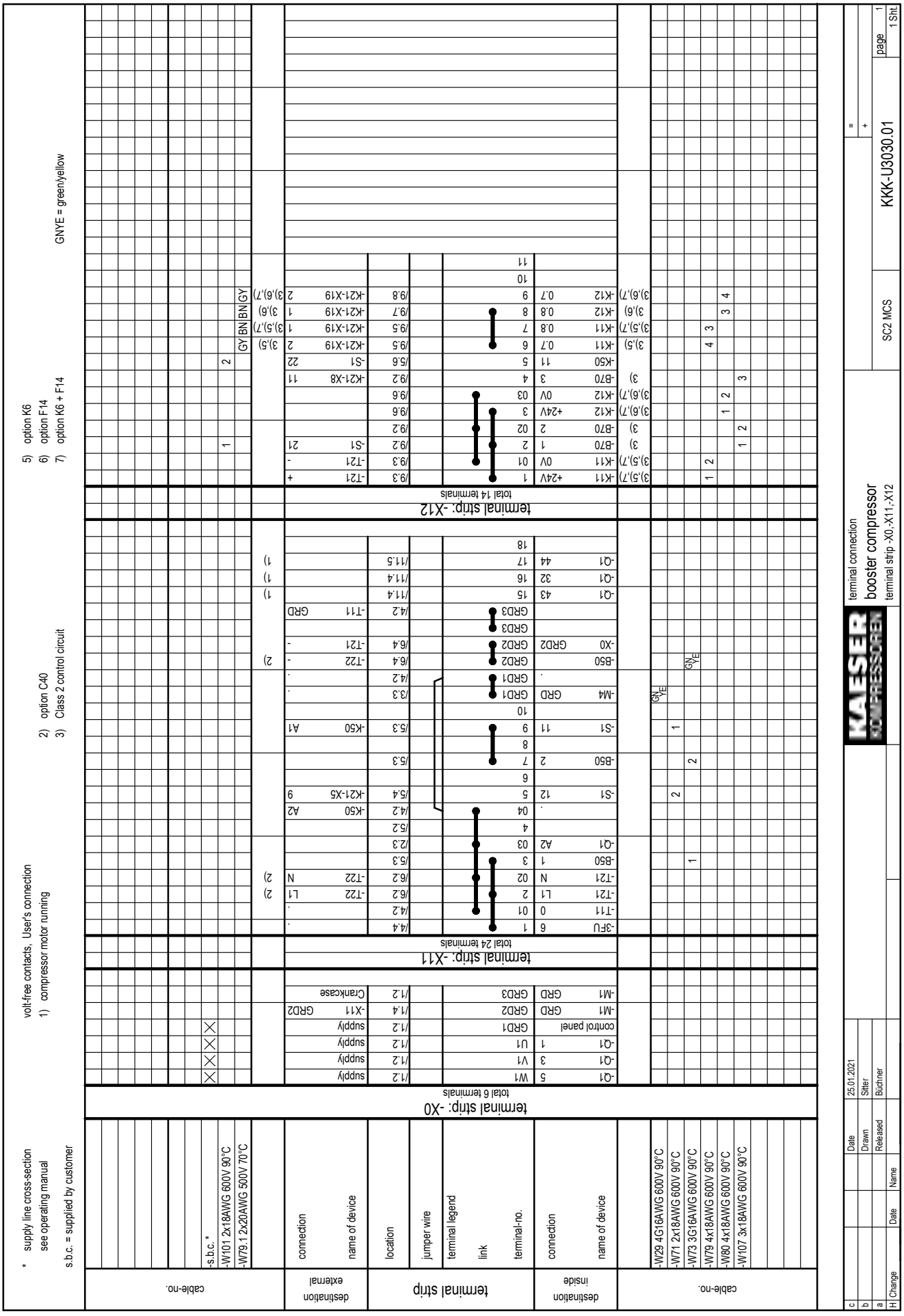
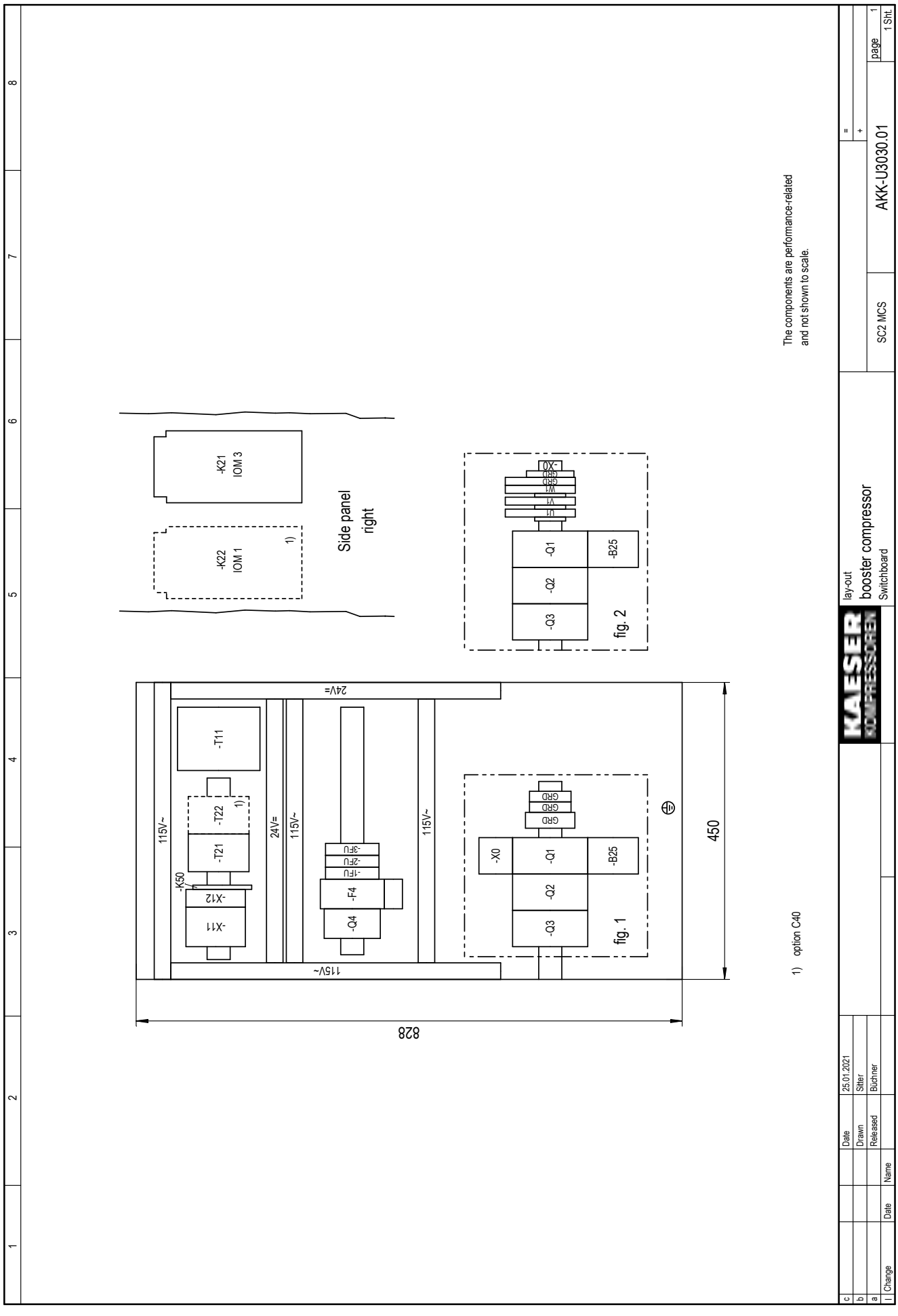


fig. 12: Feed line connection

c								=	
b								+	
a				Date	25.01.2021	KAESER KOMPRESSOREN	wiring diagram	page	18
D	Change	Date	Name	Drawn	Sitter		booster compressor	SC2 MCS	SKK-U3030.01	18 Sht.
				Released	Büchner		Feed line connection		


terminal connection
booster compressor
terminal strip -X0,-X11,-X12
SC2 MCS
KKK-U3030.01
page 1
1 Sht.
terminal strip: -X0
total 6 terminals
terminal strip: -X11
total 24 terminals
terminal strip: -X12
total 14 terminals
cable-no.
destination inside
terminal strip
destination external
connection
name of device
terminal-no.
link
terminal legend
jumper wire
location
volt-free contacts, User's connection
1) compressor motor running
2) option C40
3) Class 2 control circuit
5) option K6
6) option F14
7) option K6 + F14
GNYE = green/yellow
s.b.c. = supplied by customer
see operating manual
supply line cross-section

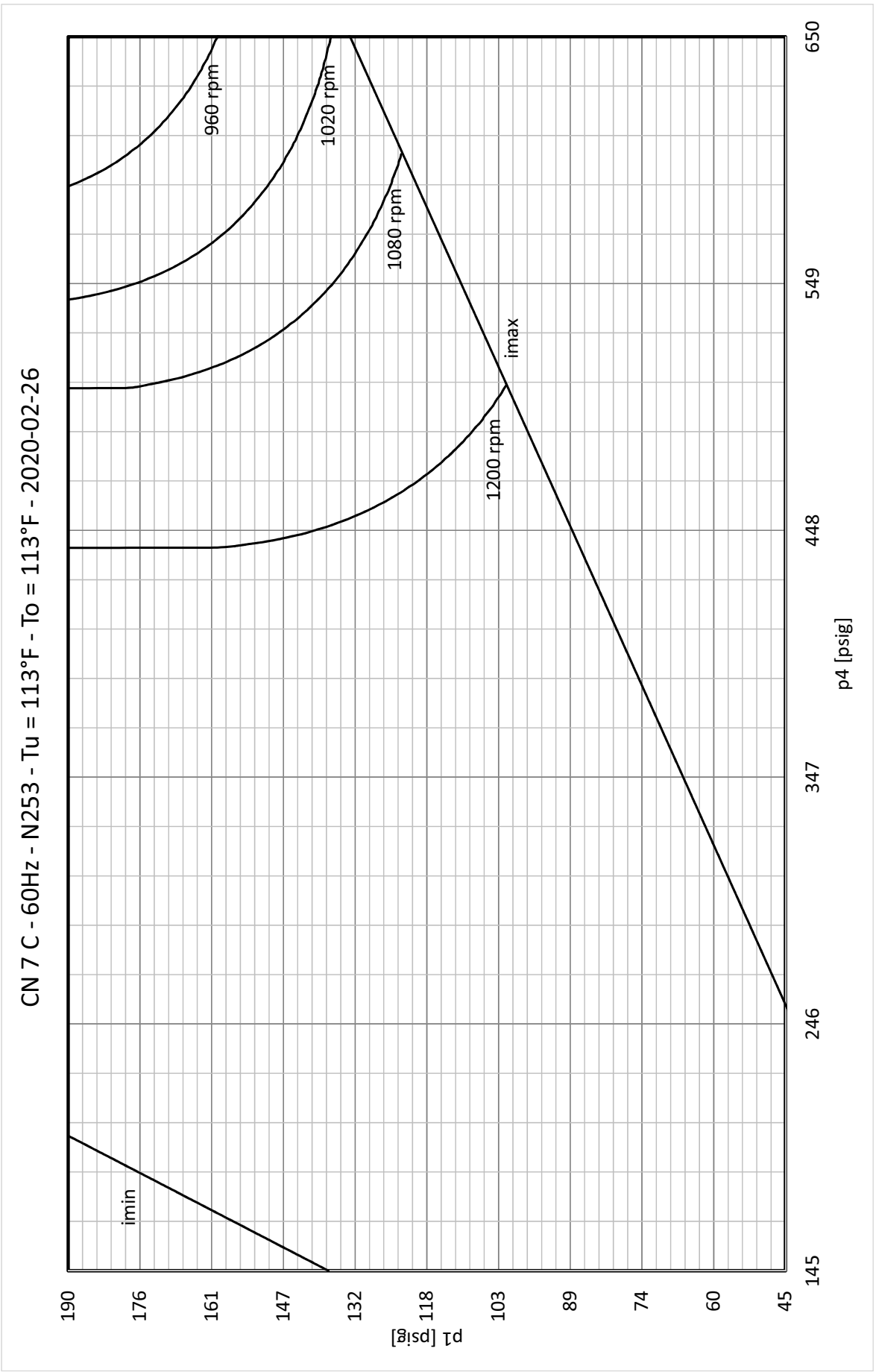

-K21 IOM 3
-K22 IOM 1
1)
Side panel right
-XO
GRD
GRD
W1
V1
U1
-Q1
-B25
-Q2
-Q3
fig. 2
24V=
-T11
-T22
-T21
-K50
-X12
-X11
115V~
24V=
115V~
115V~
-1FU
-2FU
-3FU
-F4
-Q4
GRD
GRD
GRD
-X0
-Q1
-B25
-Q2
-Q3
fig. 1
450
828
The components are performance-related and not shown to scale.
1) option C40
lay-out
booster compressor
Switchboard
SC2 MCS
AKK-U3030.01
page 1
1 Sht.
Change
Date
Name
Date
Drawn
Sitter
25.01.2021
Released
Büchner

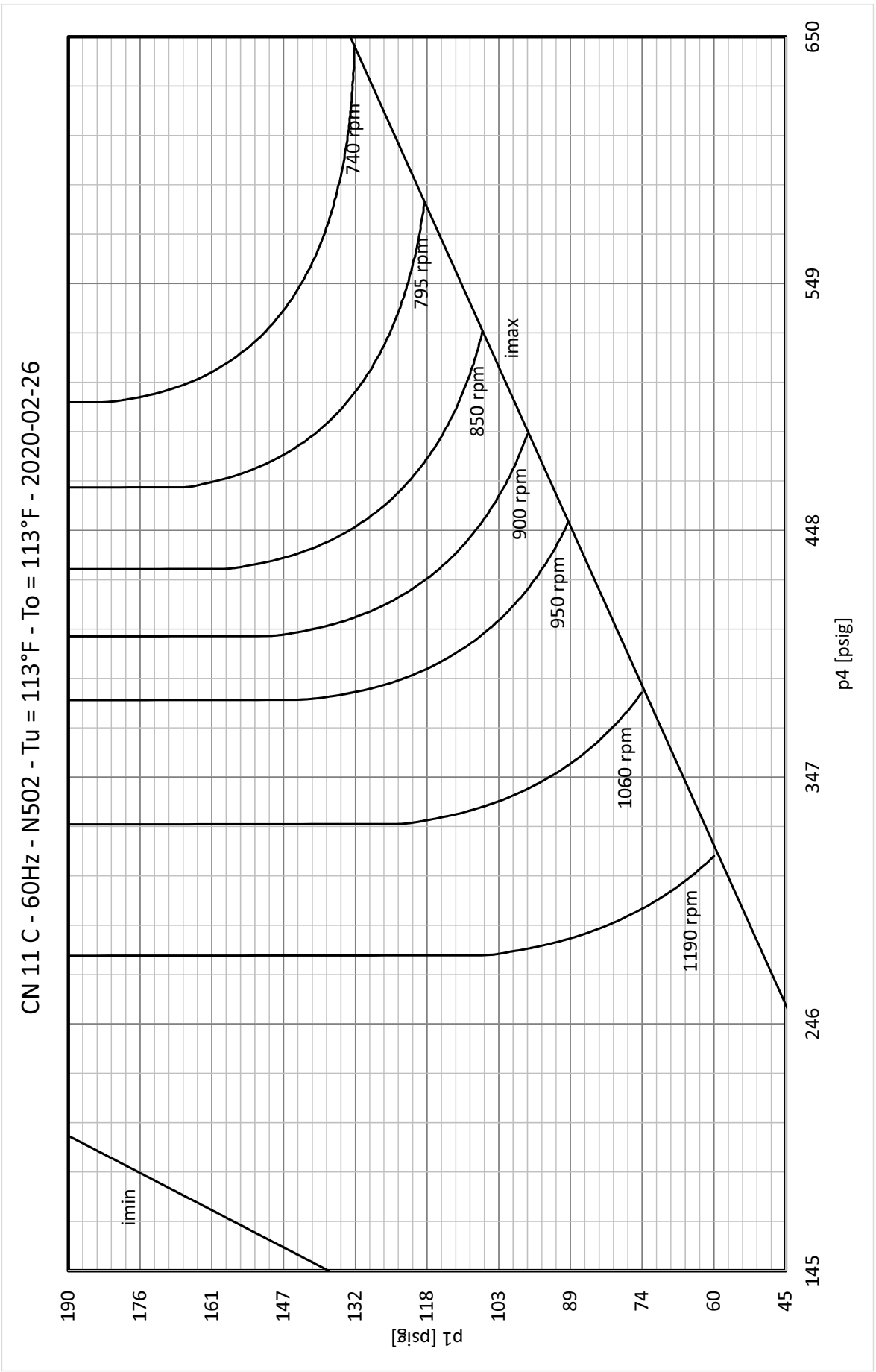
13.4 Determining the permissible initial pressure

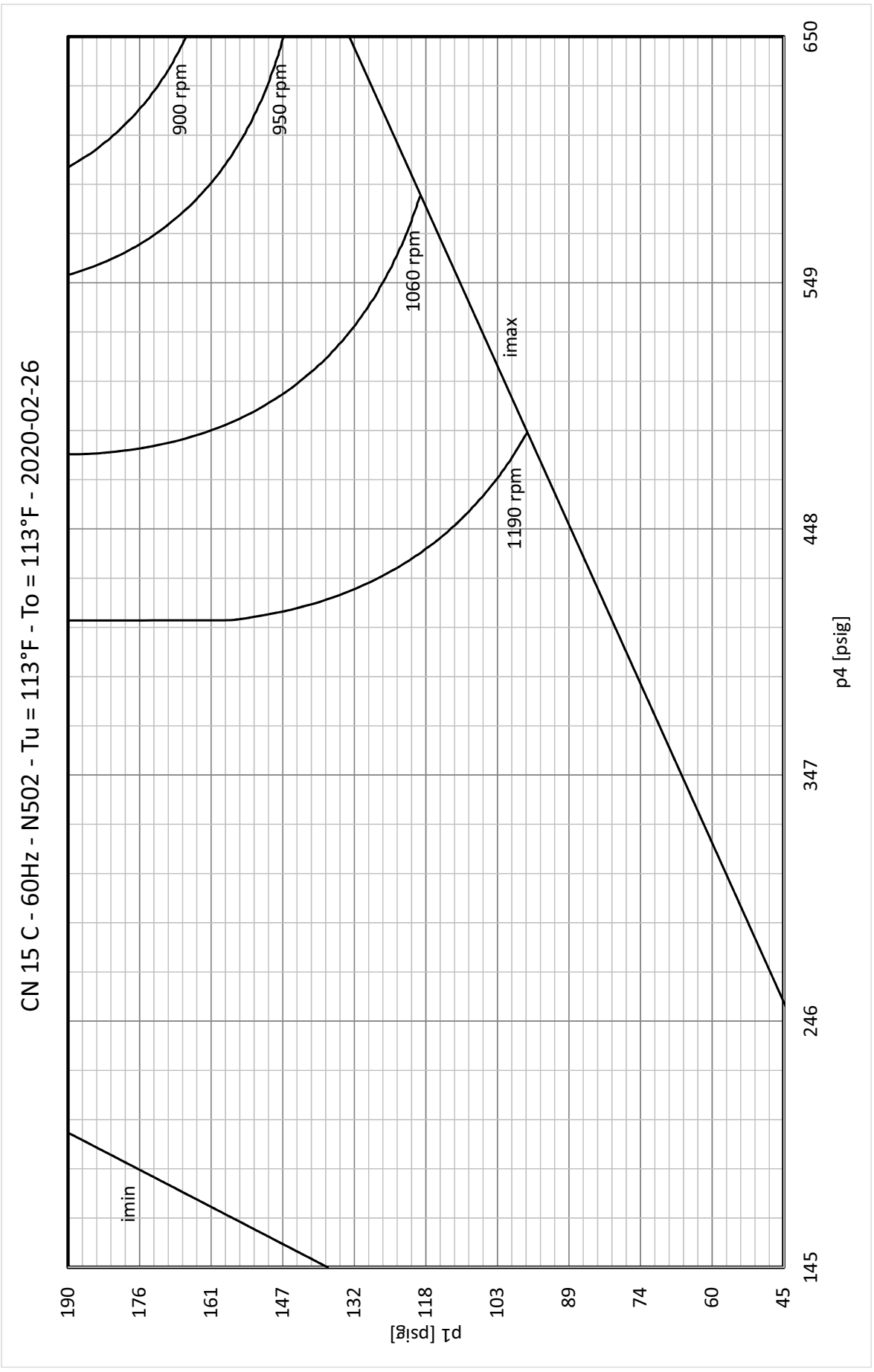
Use the following diagrams to determine the permissible initial pressure.

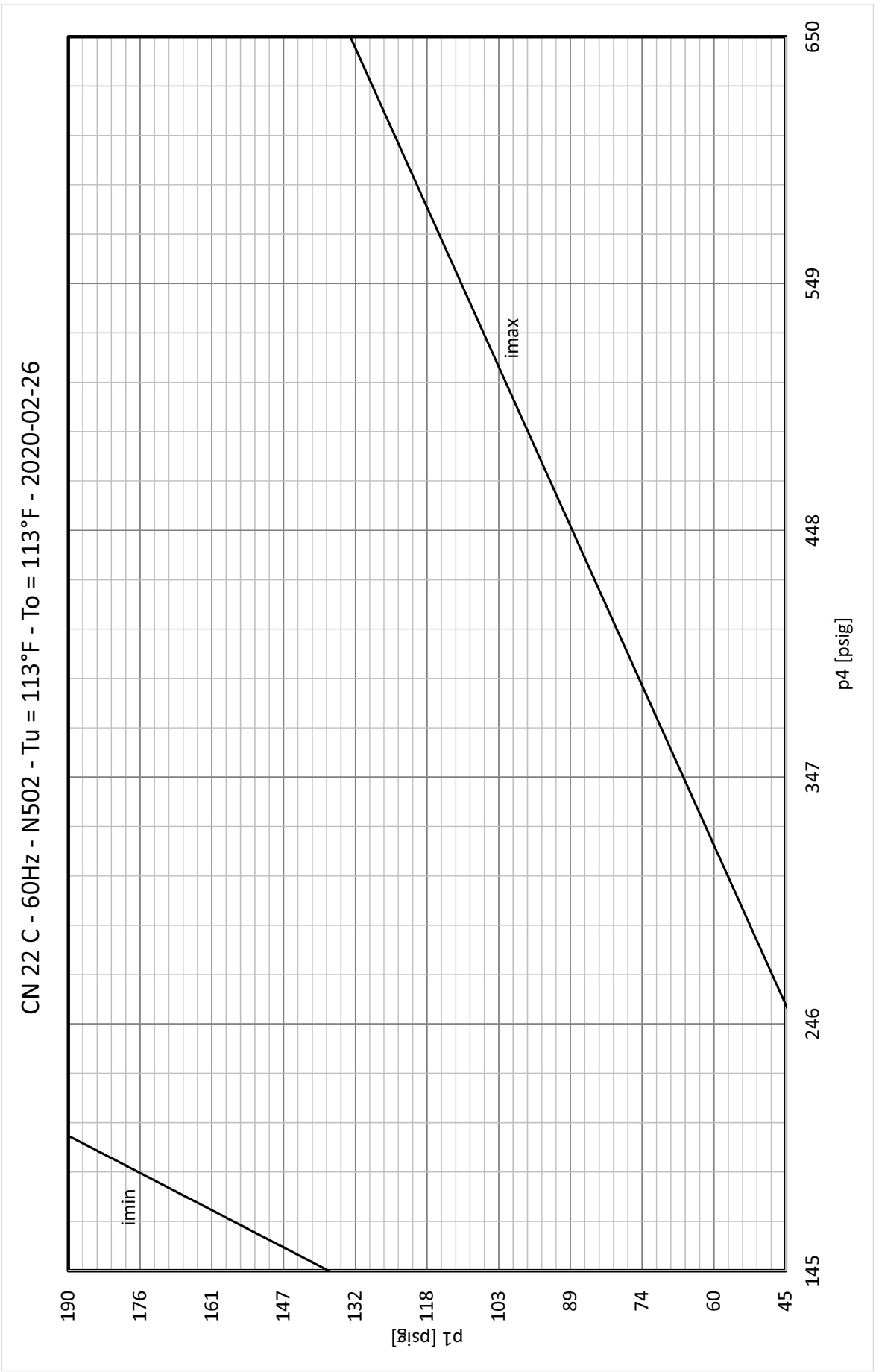
The following data can be found in the diagrams:

- Type
- Compressor block
- Main system frequency
- Unit of pressure
- Block speed
- imin = Minimal permissible compression ratio of the machine
- imax = Maximal permissible compression ratio of the machine
- To = Intake temperature
- Tu = Ambient temperature
- p1 = Initial pressure
- p4 = Discharge pressure


CN 7 C - 60Hz - N253 - Tu = 113°F - To = 113°F - 2020-02-26
960 rpm
1020 rpm
1080 rpm
1200 rpm
imax
imin
p1 [psig]
190
176
161
147
132
118
103
89
74
60
45
p4 [psig]
650
549
448
347
246
145
Version 1
TB/Hollauer


CN 11 C - 60Hz - N502 - Tu = 113°F - To = 113°F - 2020-02-26
Version 1
740 rpm
795 rpm
850 rpm
imax
900 rpm
950 rpm
1060 rpm
1190 rpm
imin
p1 [psig]
190
176
161
147
132
118
103
89
74
60
45
p4 [psig]
650
549
448
347
246
145
TB/Hollauer


CN 15 C - 60Hz - N502 - Tu = 113°F - To = 113°F - 2020-02-26
900 rpm
950 rpm
1060 rpm
1190 rpm
imax
imin
p1 [psig]
190
176
161
147
132
118
103
89
74
60
45
p4 [psig]
650
549
448
347
246
145
Version 1
TB/Hollauer


CN 22 C - 60Hz - N502 - Tu = 113°F - To = 113°F - 2020-02-26
imax
imin
p1 [psig]
190
176
161
147
132
118
103
89
74
60
45
p4 [psig]
650
549
448
347
246
145
Version 1
TB/Hollauer

13.5 Safety relief valve data sheet

13.5.1 Data Sheet 1 of 3

Safety valves

Type SVW/SVWN/SVWC	DN 8	PN 50	-25 to 180 °C	type tested CE 0036

Use area:

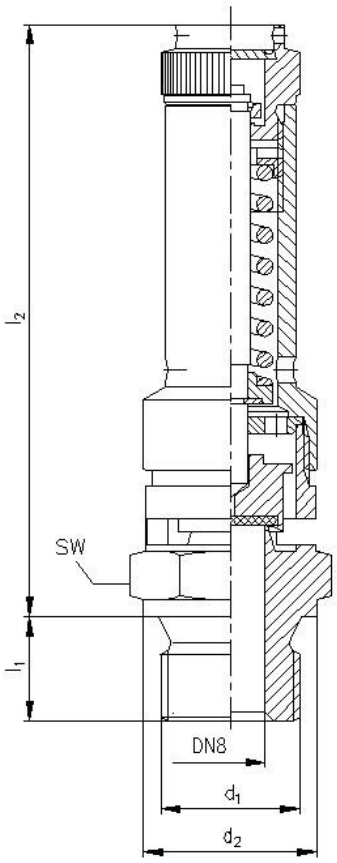
⇨ for compressed air and other gases of the fluid group 2;

⇨ blow-off freely, therefore not suitable for fluids and steam.

Models

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

Characteristics:
open types +++ elastic valve seat seal (Viton) +++ compression spring stainless steel +++ ventilate with knurled thumb screw +++ connection with spigot +++ product-mark TÜV and GL +++ TÜV- and GL-individual inspection +++ certificates according to EN 10204 possible.



connection-tap (d_1)	area of differential test pressure [bar]	d_2 [mm]	l_1 [mm]	l_2 [mm]	SW	
					SVW	SVWN SVWC
M16x1,5	0,2 – 14,20	20	12	63	20	22
	14,21 – 39,90			75		
	39,91 – 50,00			82		
G1/4 A	0,2 – 14,20	18	10	63		
	14,21 – 39,90			75		
	39,91 – 50,00			82		
G3/8 A	0,2 – 14,20	20	12	63		
	14,21 – 39,90			75		
	39,91 – 50,00			82		
G1/2 A	0,2 – 14,20	24	14	63	24	24
	14,21 – 39,90			75		
	39,91 – 50,00			82		

Order description: (Please pay attention to the indication on the back sheet)

e.g. SVW 8 – 11 bar – G ¼ A – ...

- ... special wishes
- G ¼ A spigot
- 11 bar differential test pressure
- 8 nominal size
- SVW type

Changes in the sense of the technical progress reserve.

Armaturen- und Metallwerke Zöblitz GmbH
Bahnhofstraße 16, 09496 Marienberg Tel. 037363 480-0 / Fax 037363 480-90
Internet: www.armaturen-zoeblitz.de e-mail: info@armaturen-zoeblitz.de

Safety valves

Type SVW/SVWN/SVWC	DN 8	PN 50	-25 to 180 °C	type tested CE 0036

blow-off value

p_e [bar]	qm [m³/h] at 0°C/760 Torr	p_e [bar]	qm [m³/h] at 0°C/760 Torr	p_e [bar]	qm [m³/h] at 0°C/760 Torr
0,2	13,6	14	356,4	33	811,2
0,8	19,3	15	380,4	34	835,1
0,9	37,6	16	404,3	35	859,0
1,4	48,1	17	428,2	36	883,0
1,9	58,6	18	452,2	37	906,9
2	69,2	19	476,1	38	930,8
2,5	81,2	20	500,0	39	954,8
3	93,2	21	524,0	40	978,7
3,5	105,1	22	547,9	41	1.002,6
4	117,1	23	571,8	42	1.026,6
5	141,0	24	595,8	43	1.050,5
6	165,0	25	619,7	44	1.074,4
7	188,9	26	643,6	45	1.098,4
8	212,8	27	667,6	46	1.122,3
9	236,4	28	691,5	47	1.146,3
10	260,7	29	715,4	48	1.170,2
11	284,6	30	739,4	49	1.194,1
12	308,6	31	763,3	50	1.218,1
13	332,5	32	787,2		

The showed blow-off values will be reached at an increase of pressure of 10% above the differential test pressure.

Indication:

Safety valves of model SVWC are only suitable for temperatures between –10 and 180°C .
Valves are adjusted and supplied leaded. Special variants (other spigot, nickel plated or similar) on request.
Delivery with knurled thumb screw is possible.
We ask for indication of the medium and the operating temperature in order
Please find safety references and the guidance of maintenance on the back sheet of our inspection certificate or on inquiry.

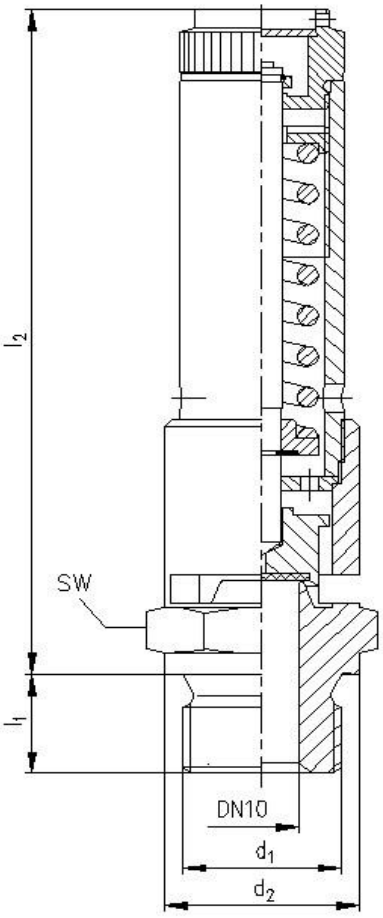
Changes in the sense of the technical progress reserve.

Armaturen- und Metallwerke Zöblitz GmbH
Bahnhofstraße 16, 09496 Marienberg Tel. 037363 480-0 / Fax 037363 480-90
Internet: www.armaturen-zoeblitz.de e-mail: info@armaturen-zoeblitz.de

13.5.2 Data Sheet 2 of 3

Safety valves

Type SVW/SVWN/SVWC	DN 10	PN 50	-25 till 180 °C	type tested CE 0036



Use area:

- ⇨ for compressed air other gases of the fluid group 2;
- ⇨ blow-off freely,
- ⇨ therefore not suitable for fluids and steam

Models

SVW ⇨ 2.0401 / C38500 (brass)
SVWC ⇨ 1.4401 / A316 (stainless steel)
SVWN ⇨ 1.4571 / A316Ti (stainless steel)

Characteristics:

open type +++ elastic valve seat seal (Viton) +++
compression spring of stainless steel +++
ventilate with knurled thumb screw +++
connection with spigot +++ product-mark TÜV and GL +++
TÜV- and GL - individual inspection +++
certificates according to EN 10204 possible

connection tap (d_1)	area of differential test pressure [bar]	d_2 [mm]	l_1 [mm]	l_2 [mm]	SW
G3/8 A	0,20 - 8,50	22	12	75	27
	08,51 - 40,00			95	
	40,01 - 50,00			120	
G1/2 A	0,20 – 8,50	26	14	75	
	08,51 - 40,00			95	
	40,01 - 50,00			120	
G3/4 A	0,20 - 8,50	32	16	75	32
	08,51 - 40,00			95	
	40,01 - 50,00			120	

Order description:

e.g. SVW 10 – 11 bar – G 3/8 A – ...

- ... special wishes
- G 3/8 A spigot
- 11 bar differential test pressure
- 10 nominal size
- SVW type

(Please pay attention to the indication on the back-sheet.)

Changes in the sense of the technical progress reserve.

Armaturen- und Metallwerke Zöblitz GmbH
Bahnhofstraße 16, 09496 Marienberg Tel. 037363 480-0 / Fax 037363 480-90
Internet: www.armaturen-zoeblitz.de e-mail: info@armaturen-zoeblitz.de

Safety valves

Type SVW/SVWN/SVWC	DN 10	PN 50	-25 till 180 °C	type tested CE 0036

Blow-off value

p_e [bar]	qm [m³/h] at 0°C/760 Torr	p_e [bar]	qm [m³/h] at 0°C/760 Torr	p_e [bar]	qm [m³/h] at 0°C/760 Torr
0,2	24,0	15	649,2	34	1.425,3
0,8	59,4	16	690,0	35	1.466,2
1,3	76,9	17	730,8	36	1.507,0
1,8	94,5	18	771,7	37	1.547,8
2,3	112,1	19	812,6	38	1.588,7
2,8	129,5	20	853,4	39	1.629,5
3,3	147,1	21	894,3	40	1.670,4
3,8	164,1	22	935,1	41	1.711,3
4	199,8	23	975,9	42	1.752,1
5	240,7	24	1.016,8	43	1.792,9
6	281,5	25	1.057,7	44	1.833,8
7	322,4	26	1.098,5	45	1.874,6
8	363,3	27	1.139,4	46	1.919,5
9	404,0	28	1.180,2	47	1.956,4
10	444,9	29	1.221,1	48	1.997,2
11	485,8	30	1.261,9	49	2.038,1
12	526,6	31	1.302,7	50	2.078,9
13	567,5	32	1.343,6		
14	608,3	33	1.384,5		

The showed blow-off values will be reached at an increase of pressure of 10% above the differential test pressure.

Indication:

Valves are adjusted and supplied leaded. Special variants (other spigot, nickel-plated or similar) on request.
Delivery with jet deflection ring is possible.
We ask for indication of the medium and the operating temperature in order.
Please find safety references and the guidance of maintenance on the back sheet of our inspection certificate or on inquiry.

Changes in the sense of the technical progress reserve.

Armaturen- und Metallwerke Zöblitz GmbH
Bahnhofstraße 16, 09496 Marienberg Tel. 037363 480-0 / Fax 037363 480-90
Internet: www.armaturen-zoeblitz.de e-mail: info@armaturen-zoeblitz.de

13.5.3 Data Sheet 3 of 3

TÜV/CE atmospheric discharge safety valves for industrial applications

→ Series 810

4.2

810

Safety valves made of brass, atmospheric discharge, with threaded connections

UV

MATERIAL

SPECIFICATION

1/4" – 1"	– 60°C to + 270°C depending on version	0,2 – 50 bar

SUITABLE FOR

Air, gases and vapours neutral

EXAMPLES OF USE

For the protection of:
- pressure tanks and
- pressure systems

for air and other neutral, non-poisonous and non-flammable gases which can be freely discharged into the environment.
Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- compressors
- pressure booster plants air-side
- paint spray shops
- pneumatic control units
- transport- and railway applications

Safety valves are set and sealed at the factory.

APPROVALS

TÜV Type test approval 2055	**D/G**
ASME	**G**
EC type examination	**S/G**
TSG ZF001-2006	**D/G (S/G)**
KGS	**G**
TR ZU 032/2013 - TR ZU 010/2011	**D/G (S/G)**
Type approval Deutsche Bahn	
Requirements	
AD 2000 Data sheet A2 DIN EN ISO 4126-1 PED 2014/68/EU	ASME-Code Sec. VIII Div. 1 KGS AA 319
Classification society	
Germanischer Lloyd	GL
Lloyd's Register EMEA	LR EMEA
Bureau Veritas	BV
American Bureau of Shipping	ABS
Det Norske Veritas	DNV
Russian Maritime Register of Shipping	RS

MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Brass	CW617N	CW617N
Outlet body	Brass	CW617N	CW617N
Internal parts	Brass	CW617N	CW617N
Spring	Stainless steel	1.4568	631

Series 810 ■ VALVE VERSION

s	Standard	cylindrical form, atmospheric discharge, for air and similar neutral, non-toxic and non-flammable gases that can be freely discharged into the atmosphere.

■ MEDIUM

G	gaseous	Air and similar neutral gases

■ TYPE OF LIFTING MECHANISM

K	Standard with twist-type lifting mechanism

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN	**8**	**10**	**15**	**20**	**25**
Inlet	1/4" (8)	3/8" (10)	1/2" (15)	3/4" (20)	1" (25)
Atmospheric discharge via outlet apertures	■	■	■	■	■

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

m / –	Standard	Male thread BSP-P / –	DIN EN ISO 228-1 / –
Against surcharge			
BSP-Tm / –	On request	Male thread BSP-T / –	DIN EN 10226, ISO 7-1 / –
NPT-m / –	On request	Male thread NPT-m / –	ANSI B1.20.1 / –

■ SEALS

FKM	Fluorocarbon	Elastomere flat seal 0,2 – 25 bar	–20°C to +200°C
FKM VI	Fluorocarbon	Elastomere flat seal	–46°C up to +230°C in case of blowing of up to +270°C
PTFE	Polytetrafluoroethylene	Flat seal 25,1 – 50 bar	–60°C to +225°C
Against surcharge			
PTFE	Polytetrafluoroethylene	Flat seal 0,2 – 25 bar	–60°C to +225°C

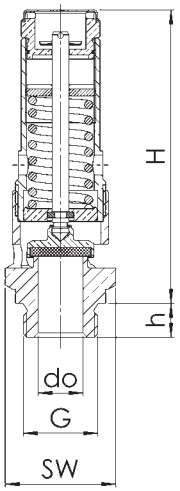
■ OPTIONS

Special versions on request.

NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 810: Connection, installation dimensions, ranges of adjustment									
Nominal diameter	DN	8	10		15		20		25
Connection DIN EN ISO 228	G	1/4" (8)	3/8" (10)		1/2" (15)		3/4" (20)		1" (25)
Installation dimensions in mm	H	60	65	78	66	79	94	104	111
	h	10	10	10	12	12	12	12	14
	SW	19	24	24	27	27	34	34	41
	do	7,5	10	10	11	11	16	16	20
Weight	kg	0,1	0,14	0,16	0,17	0,19	0,35	0,4	0,6
Range of adjustment	bar	0,2-50	0,2-9	9,1-50	0,2-7	7,1-50	0,2-9	9,1-50	0,2-50
Range of adjustment ASME	psi	15-725	15-130	131-725	15-102	103-725	15-130	131-725	15-725

MAIN DIMENSIONS, INSTALLATION DIMENSIONS



INDIVIDUAL SELECTION / VALVE CONFIGURATION

Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
810	s	G	K	*10*	*m*	–	*10*	–	*FKM*		*11,5*	*50*
810	s	G	K			–		–				
810	s	G	K			–		–				
810	s	G	K			–		–				

In this table you can configure a valve according to your individual requirements (similar to the *example* shown, which should be deleted before you enter your own data). Please complete the table by hand using the abbreviations in this datasheet and then fax it to: +49(0)7141.4889488
Please do not forget to add your personal data so that our sales team can contact you.

Name

First Name

Company

Telephone

E-Mail

■ CAPACITY TABLE

Series 810: Blowing-off rates at 10% above set pressure						
Nominal diameter DN		8	10	15	20	25
Set pressure bar						
	0,2	20	35	46	100	133
Air	0,3	25	45	54	119	144
Nm³/h	0,4	29	52	67	137	167
	0,5	32	58	74	158	185
	0,6	35	64	82	172	211
	0,7	37	70	87	187	235
	0,8	41	74	95	200	260
	0,9	43	80	101	213	282
	1	46	85	107	227	305
	1,5	60	108	137	286	408
	2	73	132	166	346	506
	3	100	182	222	465	699
	4	125	228	279	584	889
	5	151	274	336	703	1070
	6	176	321	393	821	1251
	7	201	367	450	940	1432
	8	227	414	507	1059	1613
	9	252	460	564	1178	1794
	10	278	507	621	1297	1975
	11	303	553	678	1416	2156
	12	329	599	735	1535	2337
	13	354	646	791	1654	2518
	14	380	692	848	1773	2700
	15	405	739	905	1891	2881
	16	431	785	962	2010	3062
	17	456	832	1019	2129	3243
	18	482	878	1076	2248	3424
	19	507	925	1133	2367	3605
	20	533	971	1190	2486	3786
	21	558	1017	1247	2605	3967
	22	584	1064	1304	2724	4148
	23	609	1110	1361	2843	4329
	24	635	1157	1417	2961	4510
	25	660	1203	1474	3080	4691
	26	685	1250	1531	3199	4872
	27	711	1296	1588	3318	5053
	28	736	1342	1645	3437	5234
	29	762	1389	1702	3556	5415
	30	787	1435	1759	3675	5597
	31	813	1482	1816	3794	5778
	32	838	1528	1873	3913	5959
	33	864	1575	1930	4031	6140
	34	889	1621	1986	4150	6321
	35	915	1667	2043	4269	6502
	36	940	1714	2100	4388	6683
	37	966	1760	2157	4507	6864
	38	991	1807	2214	4626	7045
	39	1017	1853	2271	4745	7226
	40	1042	1900	2328	4864	7407
	41	1068	1946	2385	4983	7588
	42	1093	1993	2442	5101	7769
	43	1119	2039	2499	5220	7950
	44	1144	2085	2556	5339	8131
	45	1170	2132	2612	5458	8313
	46	1195	2178	2669	5577	8494
	47	1220	2225	2726	5696	8675
	48	1246	2271	2783	5815	8856
	49	1271	2318	2840	5934	9037
	50	1297	2364	2897	6053	9218

■ CAPACITY TABLE ASME

Series 810: Blowing-off rates at 10% above set pressure						
	Nominal diameter DN	8	10	15	20	25
	Set pressure bar psi(g)					
	15	31	55	67	142	221
Air	30	45	81	98	207	323
SCFM	40	56	99	120	254	397
	50	66	118	143	302	472
	60	77	137	165	350	546
	70	87	155	188	397	621
	87	105	187	226	478	747
	90	108	192	233	493	770
	100	119	211	255	540	844
	110	129	230	278	588	919
	120	140	248	300	636	993
	130	150	267	323	683	1068
	140	161	286	345	731	1142
	150	171	304	368	779	1217
	160	182	323	391	826	1291
	170	192	341	413	874	1366
	180	203	360	436	922	1440
	190	213	379	458	969	1515
	200	223	397	481	1017	1589
	210	234	416	503	1065	1663
	220	244	434	526	1112	1738
	230	255	453	548	1160	1812
	240	265	472	571	1208	1887
	250	276	490	593	1255	1961
	260	286	509	616	1303	2036
	270	297	528	638	1351	2110
	280	307	546	661	1398	2185
	290	318	565	683	1446	2259
	300	328	583	706	1494	2334
	320	349	621	751	1589	2483
	340	370	658	796	1684	2632
	360	391	695	841	1780	2781
	380	412	732	886	1875	2929
	400	433	770	931	1970	3078
	420	454	807	976	2066	3227
	440	475	844	1021	2161	3376
	460	496	881	1066	2256	3525
	480	517	919	1111	2351	3674
	500	538	956	1157	2447	3823
	520	559	993	1202	2542	3972
	540	580	1030	1247	2637	4121
	560	600	1067	1292	2733	4270
	580	621	1105	1337	2828	4419
	600	642	1142	1382	2923	4568
	620	663	1179	1427	3019	4717
	640	684	1216	1472	3114	4866
	660	705	1254	1517	3209	5015
	680	726	1291	1562	3305	5164
	700	747	1328	1607	3400	5313
	725	773	1375	1663	3519	5499