Operator Manual

Screw Compressor

CSG-2 SFC W

902383 04 USE

Read this manual before using this product.

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

Manufacturer:

KAESER KOMPRESSOREN SE

96410 Coburg • PO Box 2143 • GERMANY • Tel. +49-(0)9561-6400 • Fax +49-(0)9561-640130

www.kaeser.com

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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:

- Operating manual for SIGMA CONTROL 2

Missing documents can be requested from KAESER.

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

1.3 Copyright

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

1.4 Symbols and labels

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

1.4.1 Warnings

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

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

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

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

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

⚠ DANGER

The type and source of the imminent danger is shown here!
The possible consequences of ignoring a warning are shown here.
If you ignore the warning notice, the "DANGER" signal word indicates a lethal or severe injury will occur very likely.

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

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

Example:

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

1.4.2 Potential damage warnings

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

Warning notices for damages are identified by their signal term.

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

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

Example:

NOTICE

The type and source of the imminent danger is shown here!
Potential effects when ignoring the warning are indicated here.

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

➢ Carefully read and fully comply with warnings against damages.

1.4.3 Other alerts and their symbols

This symbol identifies particularly important information.

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

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

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

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

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

Further information — Further subjects are introduced here.

2 Technical Data

2.1 Nameplate

The machine's nameplate provides the model designation and important technical information.
The nameplate is located at the machine's front below the SIGMA CONTROL 2 display.

➢ Enter here the nameplate data as a reference:

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

Tab. 3 Nameplate

2.2 Options

The table contains a list of possible options.

➢ Enter options here as a reference:

Option	Option code	Available?
SIGMA CONTROL 2: Connection to control technology available	C3	✓
Rotation dryer	D1	—
Heat exchanger downstream of rotary dryer: Finned-block cooler	D2	—
Heat exchanger downstream of rotary dryer: Plate-type heat exchanger	D3	—
Pressure dew point measuring	D8	—
Pressure dew point adjustment	D9	—
Pressure dew point control	D10	—

Option	Option code	Available?
Bolt-down machine mounts	H1	
Inlet air silencer	H7	—
Hot air outlet with regulation	H23	
Air cooling	K1	—
Cooling air filter mat	K3	—
Auxiliary heat exchanger, second stage: Plate-type heat exchanger	K10	
Water cooling: Shell-and-tube and plate-type heat exchanger	K11	✓
Heat recovery system with water pump	W5	
Heat recovery system without water pump	W6	

Provided: ✓

Not provided: —

Tab. 4 Options

2.3 Weight

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

	—	CSG 70-2	CSG 90-2
Weight [lb.]	—	5203	5203
	CSG 120-2	CSG 130-2	—
Weight [lb.]	5291	5467	—

Tab. 5 Weight

2.4 Temperature

	CSG 70-2 – CSG 130-2
Minimum cut-in temperature [°F]	40

Tab. 6 Temperature

1st stage airend - airend temperature

	CSG 70-2 – CSG 130-2
Typical airend discharge temperature during operation [°F]	285 – 420

	CSG 70-2 – CSG 130-2
Maximum airend discharge temperature (automatic safety shut-down) [°F]	480

Tab. 7 1st stage airend - airend temperature

2nd stage airend - airend temperature

	CSG 70-2 – CSG 130-2				
Maximum working gauge pressure [psig]	60	90	115	130	145
Typical airend discharge temperature during operation [°F]	210 – 300	265 – 355	320 – 410	340 – 445	375 – 480
Maximum airend discharge temperature (automatic safety shut-down) [°F]	520	520	520	520	520

Tab. 8 2nd stage airend - airend temperature

2.5 Ambient conditions

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

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

Tab. 9 Ambient conditions

2.6 Ventilation

The specified values are guidelines.

	—	CSG 70-2	CSG 90-2
Inlet aperture (free cross-section) Ⓩ [sq.ft.], see figure 21	—	5.4	5.4
Usable volumetric flow rate in hot air [cfm]		2354	2354
	CSG 120-2	**CSG 130-2**	**—**
Inlet aperture (free cross-section) Ⓩ [sq.ft.], see figure 21	5.4	5.4	—
Usable volumetric flow rate in hot air [cfm]	2354	2354	—

Tab. 10 Ventilation

2.7 Pressure

Maximum working pressure: (see nameplate)

1st stage safety relief valve activating pressure

	CSG 70-2 – CSG 130-2
Activating pressure [psig]	52

Tab. 11 1st stage safety relief valve activating pressure

2nd stage safety relief valve activating pressure

	CSG 70-2 – CSG 130-2				
Maximum working pressure [psig]	60	90	115	145	—
Activating pressure [psig]	145	145	145	164	—

Tab. 12 2nd stage safety relief valve activating pressure

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

The illustration below shows the control range of the flow rate ①, dependant on all current pressure conditions at the compressed air outlet of the machine (local network pressure p100) ⑤.

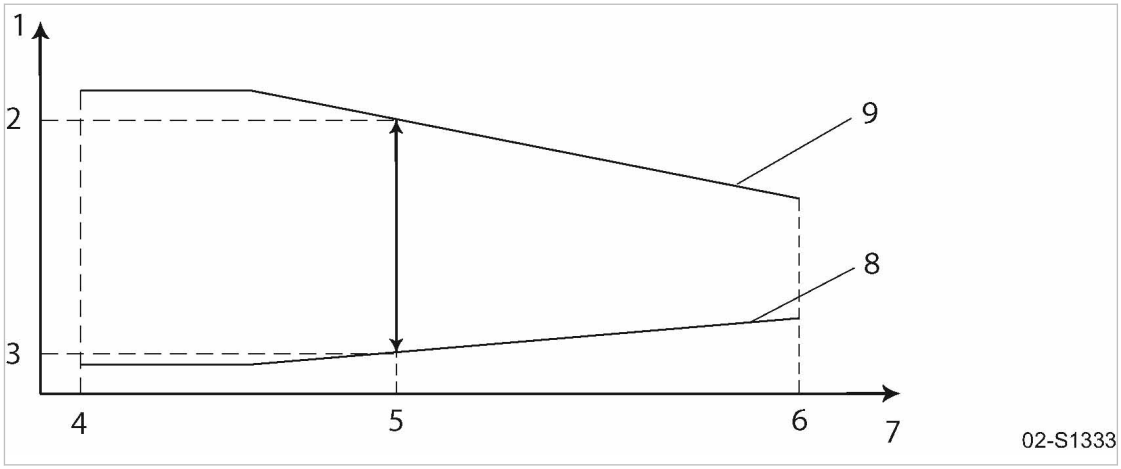


Fig. 1 Flow rate and control range

1. **Q**
   Flow rate
2. **Q_{max}**
   Maximum flow rate (p100)
3. **Q_{min}**
   Minimum flow rate (p100)
4. **pA_{min}**
   minimum selectable system target pressure (parameter-dependent)
5. **p100**
   Local network pressure at the compressed air outlet
6. **pA_{max}**
   Maximum selectable network target pressure
7. **p**
   Pressure
8. **Q_{min} (p)**
   Minimum flow rate
9. **Q_{max} (p)**
   Maximum flow rate

2.8.1 Rated voltage 380V / 3 / 60Hz

Flow rate Q [cfm] at maximum working pressure 145 psig:

p100 [psig]	CSG 70-2	
	Q_{min}	Q_{max}
pA_{min}	107	321
60	107	321
100	107	265
115	107	246
130	119	229
145 (pA_{max})	131	211
Flow rate as per ISO 1217:2009. Annex E		

Tab. 13 Flow rate 380 V / 145 psig

Flow rate Q [cfm] at maximum working pressure 145 psig:

p100 [psig]	CSG 90-2		CSG 120-2		CSG 130-2	
	Q_{min}	Q_{max}	Q_{min}	Q_{max}	Q_{min}	Q_{max}
pA_{min}	133	308	148	465	155	482
60	—	—	148	465	155	482
100	133	308	148	411	151	477
115	136	289	149	392	150	476
130	138	271	149	374	149	457
145 (pA_{max})	140	253	149	355	148	439
Flow rate as per ISO 1217:2009. Annex E						

Tab. 14 Flow rate 380 V / 145 psig

Flow rate Q [cfm] at maximum working pressure 90 psig:

p100 [psig]	CSG 90-2		CSG 120-2		CSG 130-2	
	Q_{min}	Q_{max}	Q_{min}	Q_{max}	Q_{min}	Q_{max}
pA_{min}	123	370	—	—	—	—
60	123	370	—	—	—	—
90 (pA_{max})	128	331	—	—	—	—
Flow rate as per ISO 1217:2009. Annex E						

Tab. 15 Flow rate 380 V / 90 psig

2.8.2 Rated voltage 460 V / 3 / 60 Hz

Flow rate Q [cfm] at maximum working pressure 145 psig:

p100 [psig]	CSG 70-2	
	Q_{min}	Q_{max}
pA_{min}	107	3.49
60	107	3.49
100	107	292
115	107	274
130	119	256
145 (pA_{max})	131	238
Flow rate as per ISO 1217:2009. Annex E		

Tab. 16 Flow rate 460 V / 145 psig

Flow rate Q [cfm] at maximum working pressure 145 psig:

p100 [psig]	CSG 90-2		CSG 120-2		CSG 130-2	
	Q_{min}	Q_{max}	Q_{min}	Q_{max}	Q_{min}	Q_{max}
pA_{min}	133	365	148	472	155	482
60	—	—	148	472	155	482
100	133	365	145	471	151	480
115	136	345	145	461	150	479
130	138	327	147	442	149	479
145 (pA_{max})	140	309	149	424	148	478
Flow rate as per ISO 1217:2009. Annex E						

Tab. 17 Flow rate 460 V / 145 psig

Flow rate Q [cfm] at maximum working pressure 90 psig:

p100 [psig]	CSG 90-2		CSG 120-2		CSG 130-2	
	Q_{min}	Q_{max}	Q_{min}	Q_{max}	Q_{min}	Q_{max}
pA_{min}	123	420	—	—	—	—
60	123	420	—	—	—	—
90 (pA_{max})	128	389	—	—	—	—
Flow rate as per ISO 1217:2009. Annex E						

Tab. 18 Flow rate 460 V / 90 psig

2.9 Cooling oil recommendation (gear)

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

Cooling oils for general applications

	SIGMA FLUID	
	G-460	G-680
Description	Synthetic oil	Synthetic oil
Application	Standard oil for all applications except in connection with processing of food products.	Especially for machines with heat recovery, high temperatures in the water systems and with high ambient temperatures.
Viscosity at 40°C (104°F)	46.4 mm^2/s (0.07 in^2/s) (ASTM D445)	64.7 mm^2/s (0.10 in^2/s) (ASTM D445)
Viscosity at 100°C (212°F)	8.2 mm^2/s (0.01 in^2/s) (ASTM D445)	10.3 mm^2/s (0.02 in^2/s) (ASTM D445)
Flash point	266°C (510°F) (ASTM D92)	280°C (536°F) (ASTM D92)

	SIGMA FLUID	
	G-460	G-680
Density at 15°C (59°F)	0.98 g/cm³ (61 lb/ft³) (ASTM D1298)	0.983 g/cm³ (61 lb/ft³) (ASTM D1298)
Pour point:	-58°C (-72°F) (ASTM D97)	-48°C (-54°F) (ASTM D97)

Tab. 19 Cooling oil recommendation

Cooling oils for applications in food processing

	SIGMA FLUID	
	FG-460	FG-680
Description	Synthetic oil	Synthetic oil
Application	Specifically for machines in applications where the compressed air may come into contact with food products.	Especially for machines with heat recovery, high temperatures in the water systems and with high ambient temperatures. Specifically for machines in applications where the compressed air may come into contact with food products.
Approval	USDA H1, NSF Approved for applications where contact with food products may sporadically or incidentally be possible.	USDA H1, NSF Approved for applications where contact with food products may sporadically or incidentally be possible.
Viscosity at 40°C (104°F)	46 mm²/s (0.07 in²/s) (ASTM D445)	68 mm²/s (0.11 in²/s) (ASTM D445)
Viscosity at 100°C (212°F)	8.0 mm²/s (0.01 in²/s) (ASTM D445)	10.5 mm²/s (0.02 in²/s) (ASTM D445)
Flash point	246°C (475°F) (ASTM D92)	238°C (460°F) (ASTM D92)
Density at 15°C (59°F)	0.842 g/cm³ (53 lb/ft³) (ASTM D1298)	0.854 g/cm³ (53.3 lb/ft³) (ASTM D1298)
Pour point:	–39°C (-38.2°F) (ASTM D97)	–39°C (-38.2°F) (ASTM D97)

Tab. 20 Cooling oil recommendation (food processing)

2.10 Cooling oil charge (gearbox)

	CSG 70-2 – CSG 130-2
Total charge [gal]	9.2

Tab. 21 Cooling oil charge

2.11 Motors and power

Compressor motor

	—	CSG 70-2	CSG 90-2
Rated power [kW]	—	55	55
Enclosure protection	—	TEFC	TEFC
Re-greasing interval [h]*	—	3000	3000
Grease requirement, each anti-friction bearing [g]	—	20	20
	CSG 120-2	**CSG 130-2**	**—**
Rated power [kW]	75	90	—
Enclosure protection	TEFC	TEFC	—
Re-greasing interval [h]*	3000	3000	—
Grease requirement, each anti-friction bearing [g]	20	20	—

* Operating hours

Tab. 22 Motor data, compressor motor

Fan motor

	—	CSG 70-2	CSG 90-2
Rated power [kW]	—	0.55	0.55
Rated speed [rpm]	—	1145	1145
Enclosure protection	—	TEFC	TEFC
Re-greasing interval [h]*	—	—	—
Grease requirement, each anti-friction bearing [g]	—	—	—
	CSG 120-2	**CSG 130-2**	**—**
Rated power [kW]	0.55	0.55	—
Rated speed [rpm]	1145	1145	—
Enclosure protection	TEFC	TEFC	—
Re-greasing interval [h]*	—	—	—
Grease requirement, each anti-friction bearing [g]	—	—	—

* Operating hours

Tab. 23 Motor data, fan motor

2.12 Sound emission

	—	CSG 70-2	CSG 90-2
Sound emission [1] [dB(A)]	—	66[2]	67[2]
	CSG 120-2	CSG 130-2	—
Sound emission [1] [dB(A)]	68[2]	69[2]	—

[1] without inlet and exhaust ducting

[2] Sound pressure level in operation at maximum gauge working pressure and maximum attainable speed as per ISO 2151 and the basic standard ISO 9614-2, uncertainty: ±3 dB(A)

Tab. 24 Sound emission

2.13 Water systems

The following water systems are available:

- Water-cooling (Option K11) without Option W5/W6/K10: Only primary water system available for cooling
- Water-cooling with at least one of Option W5/W6/K10:
  - Primary water system: Water system with higher outlet temperature for purposes of exhaust heat utilization or internal circuit in the case of separate systems
  - Secondary water system: Cold water system (e.g. cooling water) with following functions:
  - With Option W5/W6: to convey away excess heat
  - With Option K10: to reduce the compressed air discharge temperature

With Option K10, an end-user series connection is also possible, so that the water first flows through the secondary water system with K10 and then the preheated water is passed through the primary water system.

Cooling oil may contaminate the cooling water in the event of a leak.

➢ A suitable heat exchanger must be used for heating up drinking water.

The addition of antifreeze to the cooling water changes its physical properties. Suitable antifreeze agents only develop the protective effect against corrosion when at a sufficient concentration.

➢ Match the parameters of the water system to the properties of the cooling water.

➢ Consult an authorized KAESER service representative to ensure optimum performance of the cooling system.

➢ Adhere to the specified minimum requirements for the cooling water to avoid malfunctions due to corrosion, calcification and contamination.

➢ Design the water systems so that total power consumption of the machine can be dissipated at all times.

➢ Comply with the instructions provided by the anti-freeze agent manufacturer.

In order to ensure the flow through the primary and secondary water systems, it is imperative that end-user supplied water pumps be installed for Option W6.
Circulation of the water in the secondary water system, if present and required, must be implemented by the end-user.
As a general rule, circulation of the water in the primary water system must also be implemented by the end-user.
With Option W5, circulation of the water in the primary water system may be executed via the internal pump. Should external pressure losses be too high, an internal bypass will open.

Sufficiently high differential pressure ensures better regulating behavior: Under these conditions, the valves will only open completely when actually required to do so.

It is imperative that measures for cooling water treatment and filtration are stipulated and implemented.

KAESER can provide the contact details of companies specializing in cooling water analysis and the supply of suitable equipment for cooling water treatment.

Water system specifications

The values specified are minimum guideline values and relate to closed water circuits:

	Primary water system	Primary water system	Secondary water system
	Without Option W5/W6	With Option W5/W6	With Option W5/W6/K10
Minimum permissible inlet temperature [°F]	41	41	41
Maximum permissible inlet temperature[2] [°F]	113	158	104
Maximum permissible discharge temperature [°F]	230	230	230
Continuously achievable discharge temperature [°F]	185	185	—
Internal safety relief valve [psi]	145	145	—
End-user safety relief valve [psi]	—	—	≤ 145
Minimum permissible water pressure p14[1] up to 140 °F peak temperature [psi]	15	15	15
Minimum permissible water pressure p14[1] up to 230 °F peak temperature [psi]	40	40	—

[1] p14 = water pressure displayed on SIGMA CONTROL 2, measured upstream of control valve V14 and downstream of the heat exchangers; see chapter 13.1, P&I diagram.

[2] higher values possible in individual cases

	Primary water system	Primary water system	Secondary water system
	Without Option W5/W6	With Option W5/W6	With Option W5/W6/K10
Recommended water pressure p14[1] with Option W5 (heat recovery system not operating; machine cold) [psi]	—	75	—
Max. permissible differential pressure with closed valves [psi]	50	50	50
Maximum permissible flow rate[2] [gpm]	140	120	120

[1] p14 = water pressure displayed on SIGMA CONTROL 2, measured upstream of control valve V14 and downstream of the heat exchangers; see chapter 13.1, P&I diagram.

[2] higher values possible in individual cases

Tab. 25 Water system requirements

Water quality specifications

Water is generally used as the heat transfer medium. The following recommendation is a guideline.

Use closed water circuits to minimize oxygen ingress. In a closed water circuit, the cooling water does not come into contact with ambient air. It cannot be contaminated by the atmosphere or become concentrated with oxygen.

➢ The operator is responsible for any corrosion damage or residue in the water systems.

Contact an authorized KAESER service representative if:

- You wish to use an alternative heat transfer medium
- You do not wish to evaluate the quality of the water yourself.

Characteristics/content	Explanation	Value
pH value (pH)	Indicates acidic (pH 0 - 6), neutral (pH 7) or alkaline (pH 8 - 14) state.	7.5 – 9
Electrical conductivity [µS/cm]	Measure for the salts dissolved in the water (at reference temperature +68 °F)	10 – 800[1)]
Total hardness (= TH) [°dH]	Measure for the alkaline earths dissolved in the water (at reference temperature +68 °F)	0 – 20[2)]
Carbonate hardness (= CH) [°dH]	Measure for the stability of the pH value	<20
Chlorides (Cl) [mg/l]	Corrosion build-up at higher concentrations	<100[3)]
Free chlorine (Cl_2) [mg/l]	Corrosion risk at higher concentrations	<1
Sulfide [mg/l]	Corrosion build-up at higher concentrations	<1
Iron (Fe), dissolved [mg/l]	Corrosion build-up at higher concentrations	<0.5
Sulfate (SO_4) [mg/l]	Corrosion of copper at higher concentrations	<100
Ratio HCO_3/SO_4	At a ratio of <1: Copper corrosion	>1

[1)] Higher values possible with specialist treatment/consultation.

[2)] The permissible hardness reduces at higher water temperatures:
0 - 20 °dH at <140 °F water temperature
0 - 14 °dH at 140 °F – 158 °F water temperature
0 - 8 °dH at >158 °F water temperature.

[3)] The permissible chloride content reduces at higher water temperatures:
<100 mg/l chloride at <158 °F water temperature
<10 mg/l chloride at 158 °F – 194 °F water temperature.

[4)] When exposed to oxygen, ammonia corrodes copper, is highly volatile and can be detected more easily than ammonium.

[5)] Technical specifications valid only for cooling water without glycol.

[6)] CFU = colony-forming unit.

Characteristics/content	Explanation	Value
Ammonium (NH_4^+) [4][mg/l]	In combination with oxygen: Copper corrosion	<1
Manganese (Mn), dissolved [mg/l]	Corrosion build-up at higher concentrations	<0.1
Glycol [%]	Concentration in water	0 or 20 - 40[5]
Solids, particle size [mm]	Abrasion and contamination hazard	<0.1
Bacterial content [CFU[6]/ml]	Abrasion and contamination hazard	<10000
Suspended solids [ppm]	Concentration of undissolved material	<20

[1] Higher values possible with specialist treatment/consultation.

[2] The permissible hardness reduces at higher water temperatures:
0 - 20 °dH at <140 °F water temperature
0 - 14 °dH at 140 °F – 158 °F water temperature
0 - 8 °dH at >158 °F water temperature.

[3] The permissible chloride content reduces at higher water temperatures:
<100 mg/l chloride at <158 °F water temperature
<10 mg/l chloride at 158 °F – 194 °F water temperature.

[4] When exposed to oxygen, ammonia corrodes copper, is highly volatile and can be detected more easily than ammonium.

[5] Technical specifications valid only for cooling water without glycol.

[6] CFU = colony-forming unit.

Tab. 26 Water quality

Heat exchanger specifications

	CSG 70-2 – CSG 130-2
Material	1.4401
Solder	Copper (Cu)
Unsuitable heat transfer media	Sea water Always consult KAESER regarding the suitability of cooling water solutions

Tab. 27 Oil cooling heat exchanger specifications

	CSG 70-2 – CSG 130-2
Material: Tube bundle	CuNi or stainless steel
Material: Jacket (water side)	Steel
Material: Connection pieces (air side)	Stainless steel

	CSG 70-2 – CSG 130-2
Unsuitable heat transfer media	Sea water Always consult KAESER regarding the suitability of cooling water solutions

Tab. 28 Heat exchanger specifications, stage 1 and stage 2 (primary water system)

	CSG 70-2 – CSG 130-2
Material	1.4401
Solder	Copper (Cu)
Unsuitable heat transfer media	Sea water Always consult KAESER regarding the suitability of cooling water solutions

Tab. 29 Heat exchanger specifications (secondary water system)

2.14 Option W5/W6 Heat recovery

This is a typical layout example. Conditions for each individual installation could vary from these guidelines.

The reasons may be (examples):

- Fluctuating condensate flow
- Working pressure
- Inlet conditions
- Ambient conditions
- Machine settings

The specified flow rate relates to the maximum available heat capacity.

➢ If required, enter your individual values in the prepared table.

➢ If the design data differs, request that the settings in SIGMA CONTROL 2 are checked by an authorized KAESER service representative.

Individual design data

	My value
Heating from [°F]	
Heating to [°F]	
Temperature difference (ΔT) [°F]	
Maximum available heat output [hp] (relative to ___ psig working pressure)	
Flow rate [cfm]	

	My value
Pressure drop [psi]	

Tab. 30 Individual design data

Heat capacity for heating from 113°F to 158°F (equivalent to ΔT = 45ºF)

Type	—	CSG 70-2	CSG 90-2
Max. heat capacity available [KW]	—	40	50
Type	**CSG 120-2**	**CSG 130-2**	**—**
Max. heat capacity available [KW]	67	80	—

Tab. 31 Heat capacity for heating from 113°F to 158°F

Flow rate for heating from 113°F to 158°F (equates to ΔT = 45ºF)

Type	—	CSG 70-2	CSG 90-2
Flow rate [gpm]	—	6.2	7.5
Type	**CSG 120-2**	**CSG 130-2**	**—**
Flow rate [gpm]	10.1	11.9	—

Tab. 32 Flow rate for heating from 113°F to 158°F

2.15 Power Supply

Basic requirements

The machine is designed for an electrical supply according to National Electric Code (NEC), edition 2020, particularly article 670 and NFPA 79, edition 2018, particularly section 4.3. In the absence of any user-specified alternatives, the limits given in these standards must be adhered to. Consult manufacturer for any other specific power supply.

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

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

Three-phase

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

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

Other power supplies are not suitable.

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

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

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

2.16 Power supply specifications

The following multi-strand copper core wires are given according to 2020 NEC 310.15 and table 310.15(B)(16) adjusted for 40 °C ambient temperature.

If other local conditions prevail, like for example high temperature, the cross section should be checked and adjusted according to 2020 NEC 110.14(C), 220.3, 310.15, table 310.15(B)(2)(a), table 310.15(B)(3)(a), 430.6, 430.22, 430.24, 430.122, 670.4(A) and other local codes.

Dual element time delay fuses are selected according to 2020 NEC 240.6, 430.52, 430.130, 430.131 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.

If the recommended wire size in the table below is size 6 AWG or smaller, the ground conductor MUST be a minimum size of 6 AWG.

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

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

	—	CSG 70-2	CSG 90-2
Pre-fuse [A]	—	125	150
Supply cable [AWG / MCM]	—	1x 4xAWG1	1x 4xAWG2/0
Current consumption [A]	—	88	106
	CSG 120-2	CSG 130-2	—
Pre-fuse [A]	200	250	—
Supply cable [AWG / MCM]	1x 4xAWG4/0	1x 4xMCM250	—
Current consumption [A]	142	174	—

Tab. 33 Power supply details 380V/3/60Hz

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

	—	CSG 70-2	CSG 90-2
Pre-fuse [A]	—	125	150
Supply cable [AWG / MCM]	—	1x 4xAWG1	1x 4xAWG1/0
Current consumption [A]	—	86	104
	CSG 120-2	**CSG 130-2**	**—**
Pre-fuse [A]	200	225	—
Supply cable [AWG / MCM]	1x 4xAWG3/0	1x 4xAWG4/0	—
Current consumption [A]	140	159	—

Tab. 34 Power supply details 460V/3/60Hz

3 Safety and Responsibility

3.1 Basic instructions

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

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

⚠ DANGER

Disregard of warning or safety instructions can cause serious injuries!

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

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

3.2 Specified use

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

➢ Keep to the specifications listed in this service manual.

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

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

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

3.3 Improper use

➢ Never direct compressed air at persons or animals.

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

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

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

➢ Hearing protection must be worn before entering a zone or room in which the sound pressure level may reach or exceed 85 dB(A).

3.4 User's responsibilities

3.4.1 Observe statutory and universally accepted regulations

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

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

3.4.2 Qualified personnel

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

Authorized operators possess the following qualifications:

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

Authorized installation and maintenance personnel have the following qualifications:

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

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

3.4.3 Complying with inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

➢ Ensure that local inspection schedules are adhered to.

3.5 Dangers

Basic instructions

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

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

Warning instructions are found before a potentially dangerous task.

3.5.1 Safely dealing with sources of danger

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

Electricity

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

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

Forces of compression

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

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

Compressed air quality

The composition of the compressed air must be suitable for the actual application in order to preclude health and life-threatening dangers.
Proper operation and maintenance of the machine ensures that the compressed air cannot be contaminated with oil or oil mists from the machine.

- ➢ Never directly inhale compressed air.
- ➢ If there is oil or oil vapor in the intake air, use appropriate systems for air treatment before using the compressed air from this machine as breathing air and/or for the processing of foodstuffs.

Spring forces

Springs under tension or compression store energy. Uncontrolled release of this energy can cause serious injury or death.
The safety relief valve and the inlet valve control cylinder are under powerful spring loading.

- ➢ Do not open or dismantle any valves.

Rotating components

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

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

Temperature

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

- ➢ Avoid contact with hot components.
  These include, for example, compressor airends, compressed air, water and oil lines, heat exchanger, snubber, motors and machine heaters.
- ➢ Wear protective clothing.
- ➢ If welding is carried out on or near the machine, take adequate measures to prevent sparks or heat from igniting oil vapors or parts of the machine.
- ➢ Clearly identify all high-temperature pipelines.
- ➢ Provide pipelines, user's water pipelines or other components with surface temperatures above 167°F, should be covered in protective guarding or insulated.

Noise

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

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

Operating fluids/materials

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

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

Unsuitable spare parts

Unsuitable spare parts compromise the safety of the machine.

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

Conversion or modification of the machine

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

➢ Do not convert or modify the machine!

➢ Obtain written approval by the manufacturer prior to any technical modification or expansion of the machine, the controller, or the control programs.

Extending or modifying the compressed air station

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

➢ When extending or modifying the compressed air station
Check the blow-off capacity of safety relief valves on air receivers and compressed air lines before installing a new machine.

➢ If the blow off capacity is too low or the activating pressure is unsuitable:
Replace any pressure relief valves with correctly selected valves.

3.5.2 Safe machine operation

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

Personal protective equipment

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

➢ Wear protective clothing as necessary.

Suitable protective clothing (examples):

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

Transport

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

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

➢ Allow transportation only by personnel trained in the safe movement of loads.

➢ Attach lifting gear only to suitable lifting points.

➢ Be aware of the center of gravity to avoid tipping.

➢ Make sure the danger zone is clear of personnel.

➢ Do not step onto machine components to climb on the machine.

Assembly

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

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

Positioning

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

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

Commissioning, operation and maintenance

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

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

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

Decommissioning, storage and disposal

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

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

3.5.3 Organizational measures

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

3.5.4 Danger areas

The table below gives information on areas dangerous to personnel.

Only authorized personnel may enter these areas!

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

Tab. 35 Danger areas

3.6 Safety devices

Various safety devices ensure safe working with the machine.

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

Further information More information on safety devices is contained in chapter 4, section 4.2.4.

3.7 Service life of safety functions

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

The following components are affected:

- Resistance thermometer (Pt100 sensor for measuring safety-relevant temperatures)
- EMERGENCY STOP push button
- Frequency converter

1. The components of the safety functions must be replaced by an authorized KAESER service representative after a working life of 20 years.
2. Have an authorized KAESER service representative check the reliability of the safety functions.

3.8 Safety signs

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

Safety signs outside

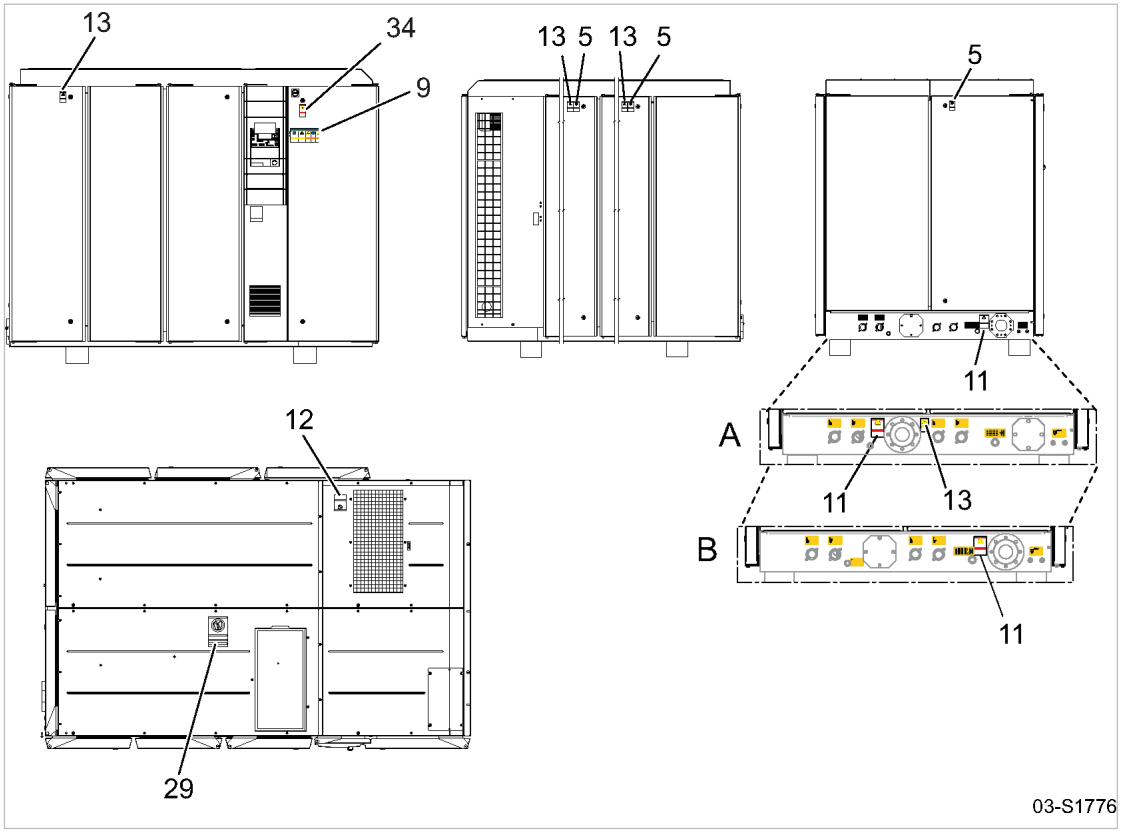


Fig. 4 Location of safety signs outside

Item	Sign	Meaning
A		Machine with option H23
B		Machine with option W5/W6
5		Loud machine noise! Serious ear damage can occur. ➢ Wear adequate ear protection. ➢ Never operate the unit without the enclosure.

Item	Sign	Meaning
9		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 can result from rotating components, electrical voltage, and air pressure. ➢ Switch off and lock out the power supply disconnecting device and verify the absence of any voltage before opening any machine enclosures or guard.
		Hot surface (≤ 464 °F) can cause serious burns! ➢ Let the machine cool down. ➢ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
		Loud machine noise! Serious ear damage can occur. ➢ Wear adequate ear protection. ➢ Never operate the unit without the enclosure.
		Serious injury or death can result from loosening or opening component under pressure! ➢ Depressurize all pressurized components and enclosures. ➢ Ensure that that the machine remains depressurized. ➢ Check that machine is depressurized.
11		Compressed air quality! Injury and/or contamination can result from breathing compressed air. Contamination of food can result from using untreated compressed air for food processing! ➢ Never breath untreated compressed air! ➢ Air from this compressor must meet OSHA 29CFR1910.134 and FDA 21CFR178.3570 standards, if used for breathing or food processing. Use proper compressed air treatment. ➢ Food grade coolant must be used for food processing.
12		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).
13		Hot surface (≤ 464 °F) can cause serious burns! ➢ Let the machine cool down. Work carefully. Wear protective clothing and gloves.
29		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.

Item	Sign	Meaning
34		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. ➢ Before starting work on the frequency converter or intermediate circuit capacitors, wait at least 5 minutes!

Tab. 36 Safety signs outside

Safety signs front side

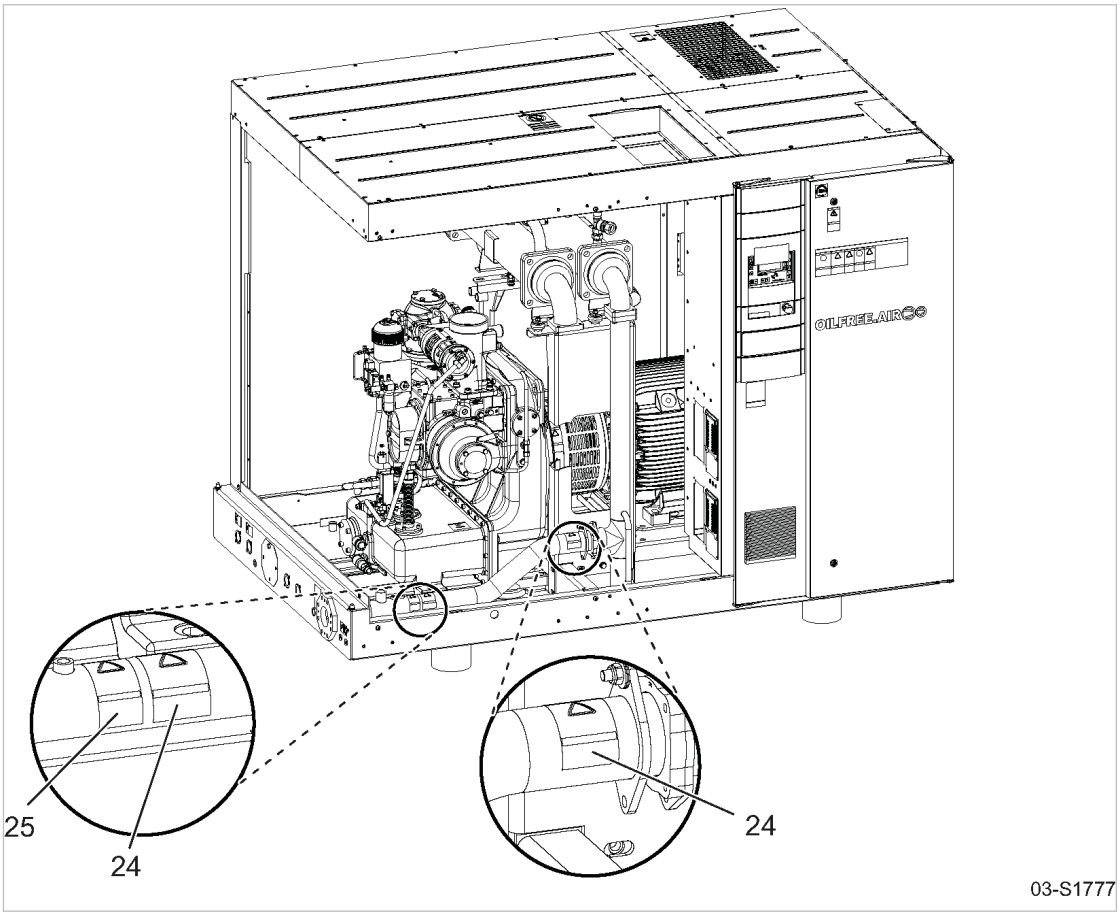


Fig. 5 Location of safety signs front side

24		Serious injury or death can result from loosening or opening component under pressure! ➢ Depressurize all pressurized components and enclosures. ➢ Ensure that that the machine remains depressurized. ➢ Check that machine is depressurized.

25		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.

Tab. 37 Safety signs front side

Safety signs rear side

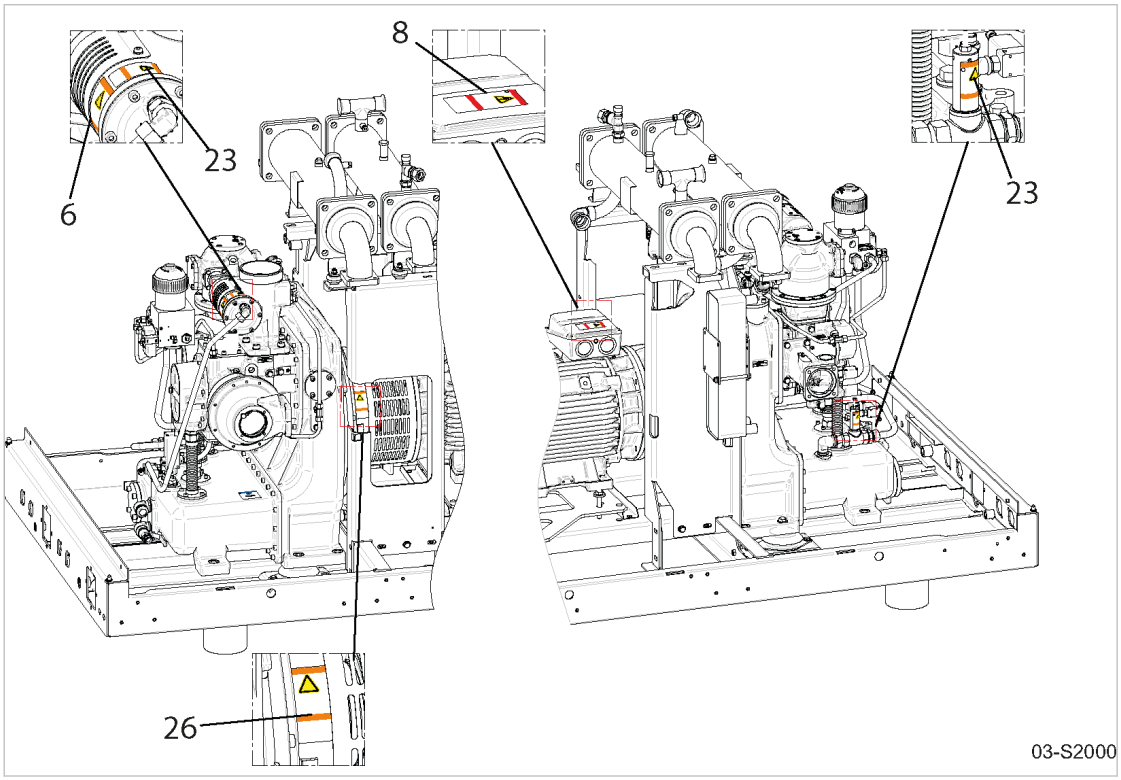


Fig. 6 Location of safety signs rear side

Item	Sign	Meaning
6		Severe injury could result from touching the actuator while it is in motion! ➢ Never switch the machine on without the guard in place over the actuator. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out).
8		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.
23		Serious injury or death can result from tampering with this component! ➢ Never open (dismantle) valves. ➢ Contact authorized KAESER distributor.

Item	Sign	Meaning
26		Severe injury could result from touching the coupling while it is rotating! ➢ Never switch the machine on without the guard in place over the coupling. ➢ Isolate completely from the power supply (all conductors) and ensure the supply cannot be switched on again (lock out).

Tab. 38 Safety signs rear side

Safety signs with W5 option

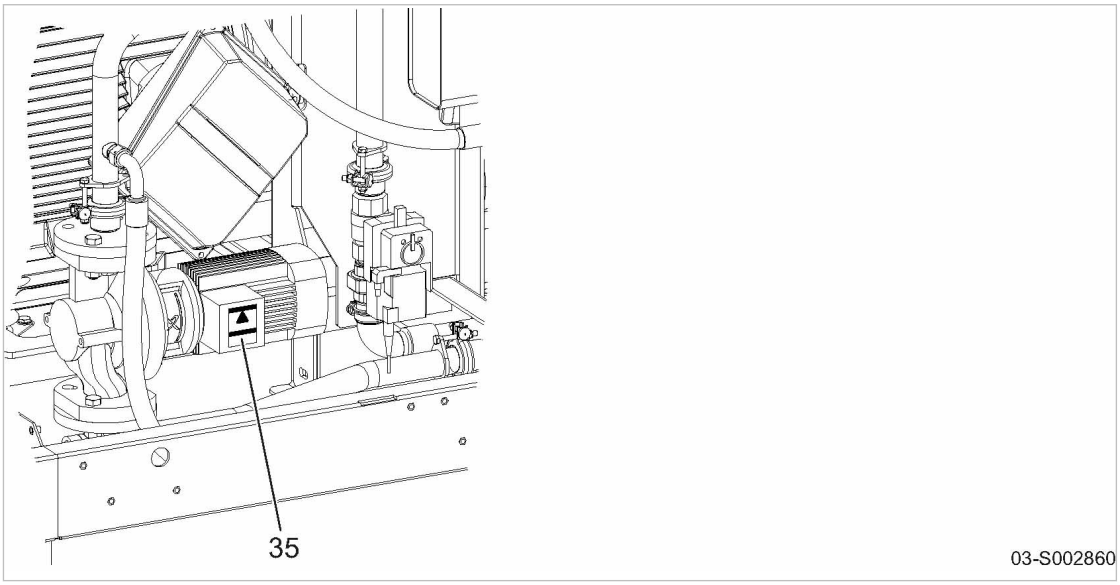


Fig. 7 Location of safety signs with W5 option

Item	Sign	Meaning
35		HAZARDOUS VOLTAGE! Touching electrically live components can cause serious injury or death. ➢ Isolate all conductors and lock out. ➢ Check that no voltage is present.

Tab. 39 Safety signs with W5 option

Safety signs control cabinet

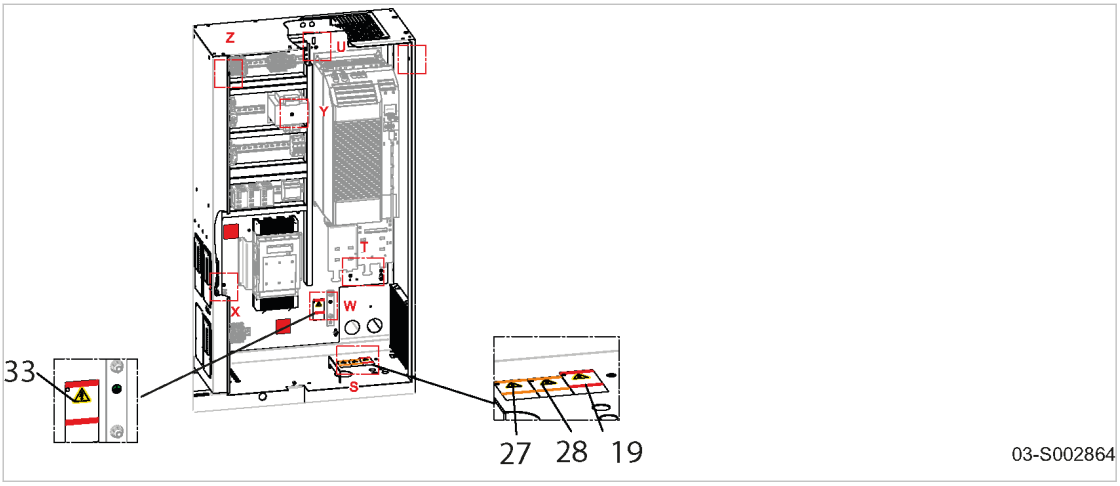


Fig. 8 Location of safety signs in the control cabinet

Item	Sign	Meaning
19		HAZARDOUS EXTERNAL VOLTAGE! Touching electrically live components can cause serious injury or death. ➢ 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.
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.
33		High protective conductor current! 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) ➢ Wait at least 5 minutes. ➢ Check that no voltage is present.

Tab. 40 Safety signs control cabinet

3.9 Emergency situations

3.9.1 Correct fire fighting

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

1. Keep calm.
2. Give the alarm.

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

3.9.2 Treating injuries from handling cooling oil

Eye contact:
Cooling oil can cause irritation.

➢ Rinse eyes thoroughly for a few minutes under running water.

➢ Seek medical help if irritation persists.

Skin contact:
Cooling oil may irritate skin after prolonged contact.

➢ Wash thoroughly with skin cleaner, then with soap and water.

➢ Contaminated clothing should be dry-cleaned before reuse.

Inhalation:
Cooling oil mist may make breathing difficult.

➢ Clear air passages of oil mist.

➢ Seek medical help if difficulty with respiration continues.

Ingestion:

➢ Wash out mouth immediately.

➢ Do not induce vomiting.

➢ Seek medical aid.

3.10 Warranty

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

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

In addition, we accept no warranty obligation for:

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

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

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

3.11 Environmental protection

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

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

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

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

4 Design and Function

4.1 Enclosure

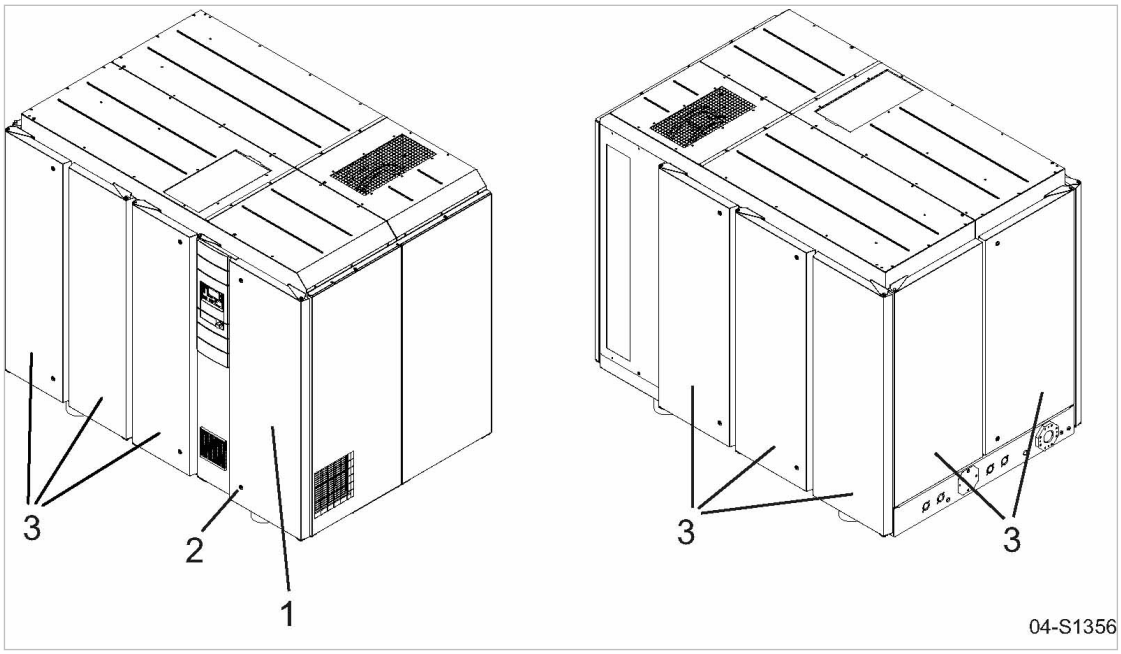


Fig. 9 Enclosure overview

1 Control cabinet door
2 Latch
3 Access door

When closed, the enclosure serves various functions:

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

The enclosure is not suitable for the following:

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

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

Access doors are hinged to swing open and removable panels can be lifted off.
The snap fasteners should be opened using the supplied key.

4.2 Machine function

Air system

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

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

Condensate drainage system

Two condensate separators are installed:
One is located downstream of the heat exchanger for the air cooling of the first stage airend. It prevents the entry of condensate in the second stage airend.
The other is located downstream of the heat exchanger for the air cooling of the second stage airend. It prevents the entry of condensate into the compressed air outlet pipe.

The collected condensate is removed via automatic drains.

Water system

Water-cooled machines are equipped with one primary water system that removes all heat of compression. Water-cooled machines equipped with heat recovery systems (option W5/W6, see chapter 4.5.5) use this primary water system for heat recovery. The secondary water cooling system is connected to a heat exchanger removing any other residual heat.

Oil system

An oil pump delivers the cooling oil from the oil pan in the transmission box, and lubricates the bearings, the main gear, and the synchronization gears. If required, the cooling oil is cooled via a heat exchanger. Oil filters ensure the reliable function.

Machine overview

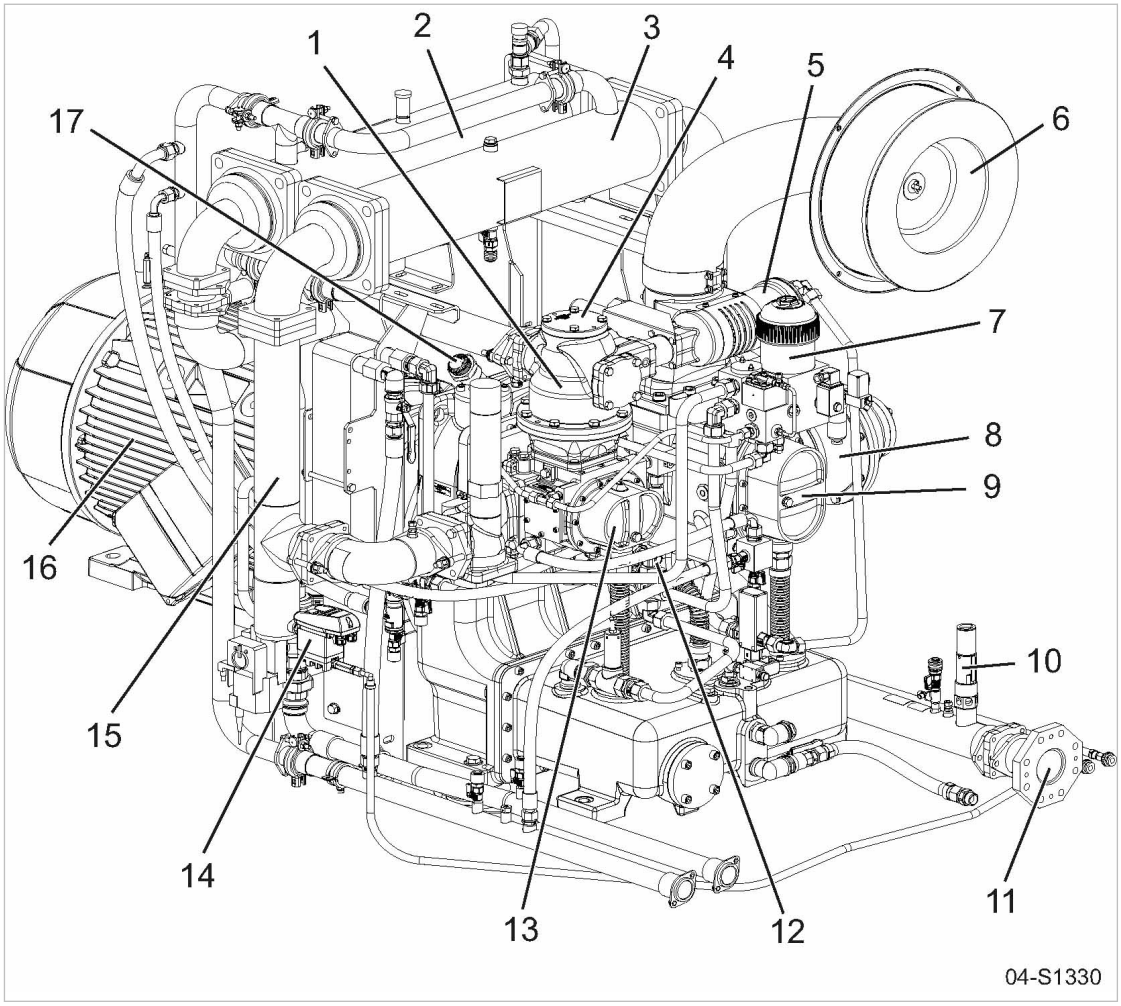


Fig. 10 Machine overview (View 1)

1. Pulsation damper, second stage airend
2. Heat exchanger, air cooling of the second stage airend
3. Heat exchanger, air cooling of the first stage airend
4. Check valve
5. Inlet valve
6. Air filter
7. Oil filter (cooling oil)
8. Pulsation damper, first stage airend
9. First stage airend
10. Safety relief valve, second stage airend
11. Compressed air outlet
12. Recirculating pump for cooling oil
13. Second stage airend
14. Condensate drain, first stage airend
15. Condensate separator, first stage airend
16. Drive motor
17. Oil filler port

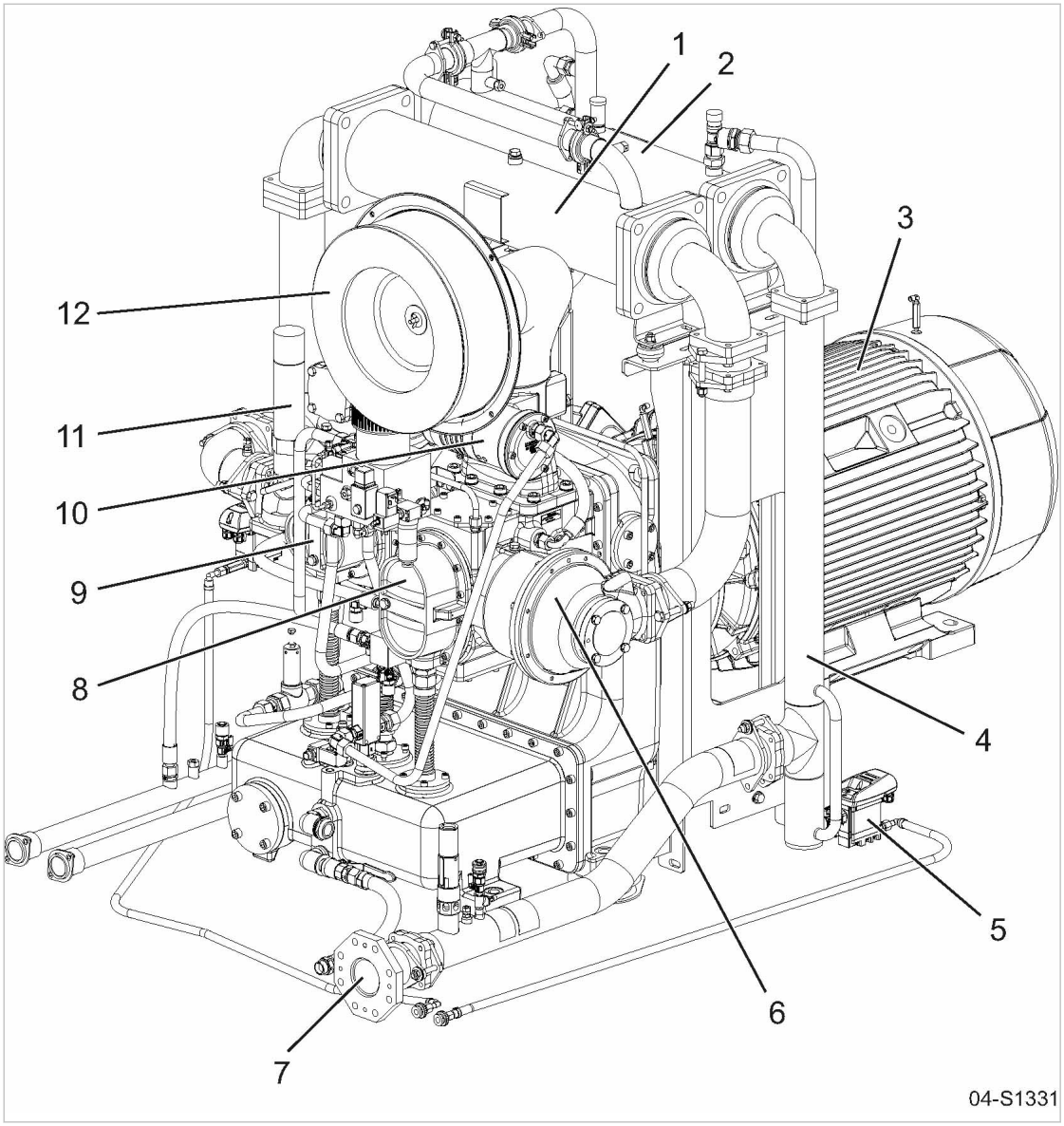


Fig. 11 Machine overview (View 2)

1. Heat exchanger, air cooling of the first stage airend
2. Heat exchanger, air cooling of the second stage airend
3. Drive motor
4. Condensate separator, second stage airend
5. Condensate drain, second stage airend
6. Pulsation damper, first stage airend
7. Compressed air outlet
8. First stage airend
9. Second stage airend
10. Inlet valve
11. Safety relief valve, first stage airend
12. Air filter

4.2.1 Water system functionality

The machine is equipped with a cooling circuit – the primary water system – which serves to dissipate the heat energy accumulated during operation of the compressor. If the machine is equipped with Option W5 or W6, both of which are primarily designed for the utilization of this accumulated heat energy, a second cooling circuit is also installed: the secondary water system.

In order to ensure the required continuous flow of water, a water pump must be installed by the user in both the primary and secondary water systems for circulating the water in each circuit (not mandatory in the primary water system with Option W5 when heat recovery is not utilized).

4.2.1.1 Primary water system

Measuring points for temperatures and pressures in the compressed air path, primary water system, oil cooling.

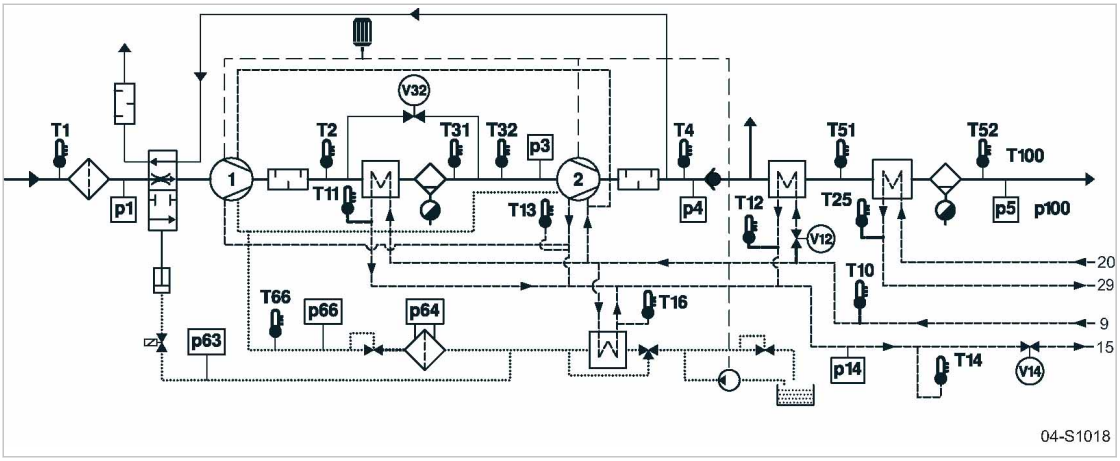


Fig. 12 Primary water system (schematic diagram)

- 1 First stage airend
- 2 Second stage airend
- 9 Cooling water inlet: Primary water system
- 15 Cooling water outlet: Primary water system
- 20 Cooling water inlet: Secondary water system
- 29 Cooling water outlet: Secondary water system
- T1 Temperature of the ambient air to be compressed
- p1 Air pressure at the machine's inlet (downstream of the air filter)
- T2 Temperature of the compressed air after leaving the first stage airend
- T31 Temperature of the cooled air when entering the second stage airend
- T32 Temperature of the compressed air when entering the second stage airend
- V32 Bypass control valve
- p3 Pressure of the compressed air when entering the second stage airend
- T4 Temperature of the compressed air after leaving the second stage airend
- p4 Pressure of the compressed air after leaving the second stage airend
- T51 Heat exchanger stage 2: Air temperature at outlet
- T52 Auxiliary heat exchanger (Option K10): Air temperature when leaving the second stage airend
- p5 Heat exchanger: Air pressure when leaving the second stage airend
- T10 Only in machines without Option W5/W6: Water temperature at primary water system inlet (downstream of the heat exchanger)
- T11 Primary water system: Water temperature at outlet, heat exchanger first compression stage
- T12 Primary water system: Water temperature at outlet, heat exchanger of second compression stage
- V12 Primary water system: Heat exchanger control valve downstream of second stage airend
- T13 Water temperature at airend cooling outlet, first and second compression stage
- T14 Primary water system: Water temperature at outlet
- p14 Primary water system: Water pressure
- V14 Primary water system: Control valve
- T16 Water temperature at outlet of the heat exchanger oil cooling
- T25 Water temperature at outlet of the second stage auxiliary heat exchanger
- p63 Cooling oil pressure upstream of the oil filter
- p64 Differential pressure at the oil filter
- T66 Temperature of the cooling oil prior to entering the bearing lubrication of both airends
- p66 Cooling oil pressure prior to entering the bearing lubrication of both airends
- p100 Air pressure at outlet
- T100 Air temperature at outlet

The cooling water is distributed to 4 parallel heat exchangers:

- Air cooling after first compression stage

- Air cooling after second compression stage
- Cooling the cooling oil
- Block cooling airends, first and second stage

In certain cases, it may be necessary to alter the distribution of the flow rate to the individual heat exchangers. Adjusting elements are provided in the four branches of the primary water system to reduce the flow volume to the individual cooling circuits.
A corresponding adjustment can affect the regulating behavior of the entire cooling system for the machine. Please consult an authorized KAESER service representative before adjusting the flow volumes (hydraulic adjustment).

The water temperatures are continuously monitored at various points and can be read off from the SIGMA CONTROL 2.

When inlet temperatures are high and/or flow rates low in the primary water system, leading to high discharge temperatures, the compressed air discharge temperature will rise, as will the value T51 (see Fig. 13).

In this connection, please also observe the note following table 25.

➢ Take this into account when designing downstream components.

➢ Use external compressed air aftercoolers in the event that the compressed air discharge temperature is too high.

➢ Limit values for fault and alarm messages should be adjusted only by an authorized KAESER service representative.

Cooling of the machine has priority over the adjustable setpoints for the primary water system.

The machine is equipped with quick-release couplings for measuring pressures in the primary water system.

Flow rate in the primary water system

The flow rate of the water in the primary water system is regulated across the entire machine by the control valve V14, which can be actuated via the SIGMA CONTROL 2. The system uses the flow rate to regulate the discharge temperature to an adjustable setpoint value.
The control valve V14 can be set to close automatically when cooling is not required and to open when the machine is running (for the cooling water stop function, see chapter 4.5.5).

Temperature regulation

Various measuring sensors determine the temperature conditions in the primary water system (see figure “Primary water system (schematic diagram)”).

The outlet temperature from the primary water system can be controlled via V14.

Constant conditions over a longer period of time are needed in order to regulate temperatures in the primary water system to the required target values.
The regulator remains active even at IDLE, however the available power is so low that regulation is limited. For reasons of efficiency, IDLE should be used as infrequently as possible and only for short periods.
In the event of load changes (LOAD/IDLE) or differing speeds (as in machines operating with frequency converters), significant intermittent deviations in temperature within the primary water system must be accepted. External disturbances will also lead to deviations in the regulating behavior. Small deviations are present on a continuous basis.

4.2.1.2 Secondary water system (only with Options W5 or W6)

Measuring points for temperatures and pressures in the compressed air path, water systems and oil cooling

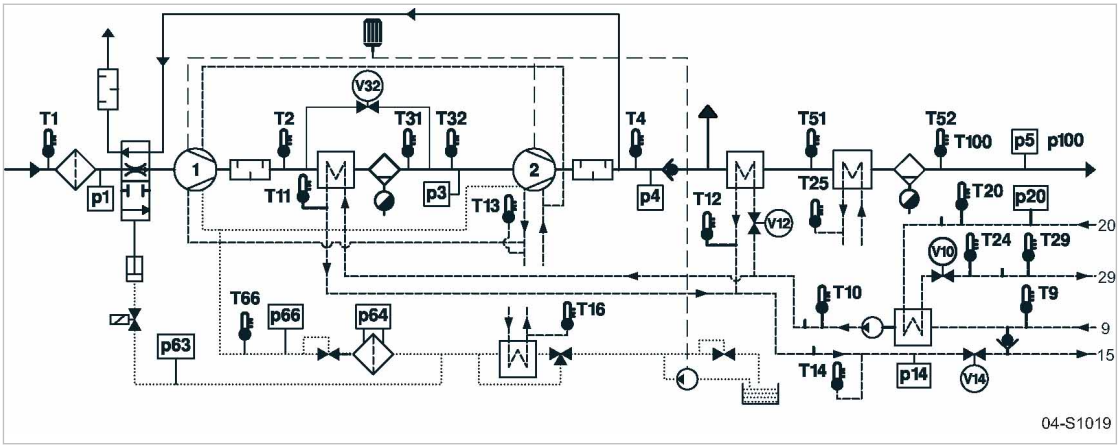


Fig. 13 Primary and secondary water system (schematic diagram)

- [1] First stage airend
- [2] Second stage airend
- [9] Cooling water inlet: Primary water system
- [15] Cooling water outlet: Primary water system
- [20] Cooling water inlet: Secondary water system
- [29] Cooling water outlet: Secondary water system
- [T1] Temperature of the ambient air to be compressed
- [p1] Air pressure at the machine's inlet (downstream of the air filter)
- [T2] Temperature of the compressed air after leaving the first stage airend
- [T31] Temperature of the cooled air when entering the second stage airend
- [T32] Temperature of the compressed air when entering the second stage airend
- [V32] Bypass control valve
- [p3] Pressure of the compressed air when entering the second stage airend
- [T4] Temperature of the compressed air after leaving the second stage airend
- [p4] Pressure of the compressed air after leaving the second stage airend
- [T51] Temperature of the cooled air at the compressed air outlet
- [T52] Auxiliary heat exchanger (Option K10): Air temperature when leaving the second stage airend
- [p5] Heat exchanger: Air pressure when leaving the second stage airend
- [T9] Primary water system: Water temperature at inlet
- [T10] Primary water system: Inlet temperature (downstream of the heat exchanger)
- [T11] Primary water system: Water temperature at heat exchanger outlet downstream of the first compression stage
- [V10] Secondary water system: Control valve
- [T12] Primary water system: Water temperature at heat exchanger outlet downstream of second compression stage
- [V12] Primary water system: Heat exchanger control valve downstream of second stage airend
- [T13] Water temperature at airend cooling outlet, first and second compression stage
- [T14] Primary water system: Water temperature at outlet
- [p14] Primary water system: Water pressure at outlet
- [V14] Primary water system: Control valve
- [T16] Water temperature at outlet, oil cooling heat exchanger
- [p20] Secondary water system: Water pressure
- [T20] Secondary water system: Water temperature at inlet
- [T24] Secondary water system: Water temperature at outlet, water/water heat exchanger
- [T25] Water temperature at outlet, auxiliary heat exchanger
- [T29] Secondary water system: Water temperature at outlet
- [p63] Oil system: Oil pressure for inlet valve
- [p64] Differential pressure at the oil filter
- [T66] Temperature of the cooling oil prior to entering the bearing lubrication of both airends
- [p66] Cooling oil pressure prior to entering the bearing lubrication of both airends
- [T100] Air temperature at outlet
- [p100] Air pressure at outlet

With Options W5 or W6, a second closed cooling circuit is provided: the secondary water system, which serves to cool the water from the primary water system if required. Here, flow through a heat exchanger (V10) is opened up for the secondary water system. This removes heat energy from the primary water system within the heat exchanger to a level where the re-entry temperature into the primary water system is sufficiently low to cool the compressor.
There will be no mixing of the two separate water circuits if the control valves and the changeover valves have been set precisely.

Closed water circuits reduce the risk of residue build-up in the water systems. This is particularly important at higher inlet temperatures.

In automatic mode, the control valve [V10] regulates the flow rate in the secondary water system according to the inlet temperature (downstream of the heat exchanger) in the primary water system [T10]. By default, it closes completely when water-cooling via the secondary water system is not required (special settings are possible).

Depending on their specific requirements, operators can achieve an optimum balance between efficient cooling performance and efficient utilization of heat energy for the heat recovery system. In the event that cooling is adversely affected, the setpoint values must be adjusted accordingly.

With Option W5/W6, airend cooling and the cooling oil heat exchanger can be connected either to the primary or the secondary water system and can be switched using changeover valves (see chapter 7.10).
If the airend and/or cooling oil are cooled via the secondary water system, cooling water flows through the secondary water system even when the control valve [V10] is closed and no cooling is required. This can be prevented by means of a user-end shut-off valve or deactivation of the user-end pump. The user-end shut-off valve (or pump) can then be controlled using the floating contact “Water-cooling valve V14 closed”.

4.2.1.3 Cooling variants for cooling oil, airend, Option K10

The connection options for cooling of the cooling oil, the airend and the heat exchanger for Option K10 are illustrated and described separately in the following diagrams and the corresponding tables.

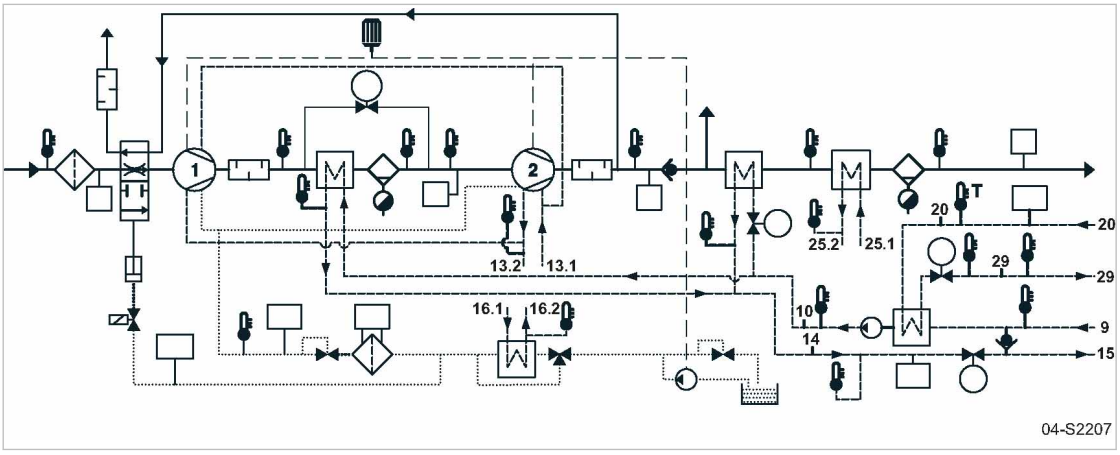


Fig. 14 Options for the primary and secondary water system (schematic diagram)

[1] First stage airend
[2] Second stage airend
[9] Cooling water inlet: Primary water system
[15] Cooling water outlet: Primary water system
[20] Cooling water inlet: Secondary water system
[29] Cooling water outlet: Secondary water system

Adjusting the oil cooling with a changeover valve*

Changeover valve	From position	To position
Cooling via the primary water system	10	16.1
	16.2	14
Cooling via the secondary water system	20	16.1
	16.2	29

* For a description and graphic representation, see Fig. 32

Tab. 41 Oil cooling in primary or secondary water system

Adjusting the airend cooling with a changeover valve*

Changeover valve	From position	To position
Cooling via the primary water system	10	13.1
	13.2	14
Cooling via the secondary water system	20	13.1
	13.2	29

* For a description and graphic representation, see Fig. 31

Tab. 42 Airend cooling in primary or secondary water system

Option K10: Hose connection

Option K10 includes an auxiliary heat exchanger downstream of the second stage airend. Cooling water for Option K10 is supplied via hose connections.

Please contact an authorized KAESER service representative should you wish to use an alternative connection for the hose connections to supply cooling water for Option K10.

Connection options for Option K10

Hose connection	From position	To position
Standard	20	25.1
	25.2	29
Alternative connection	10	25.1
	25.2	14

Tab. 43 Connection options for Option K10

4.2.2 Frequency converter

The machine is equipped with a frequency converter that controls motor speed in proportion to the air demand.

You can achieve optimum pressure control performance by starting up the machine with an external pressure transducer.

The external pressure transducer is connected to an appropriate point in the compressed air system and adjusts control performance according to network pressure.

Your authorized KAESER service representative will be glad to provide support regarding planning and implementation of a solution that suits your individual needs.

4.2.3 Floating contacts

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

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

4.2.4 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 valves of both airends and in the water circuit (145 psi safety relief valve in the primary water system):
  Safeguard the pressure system against impermissible pressure rise. They are factory set.
- Resistance thermometer:
  Triggers machine shutdown at excessively high temperatures.
- Pressure transducer:
  Monitors the pressure conditions at various locations in the machine.
- Enclosures and guards of moving parts and electrical connections:
  Protect against accidental contact.

4.3 Operating panel SIGMA CONTROL 2

Keys

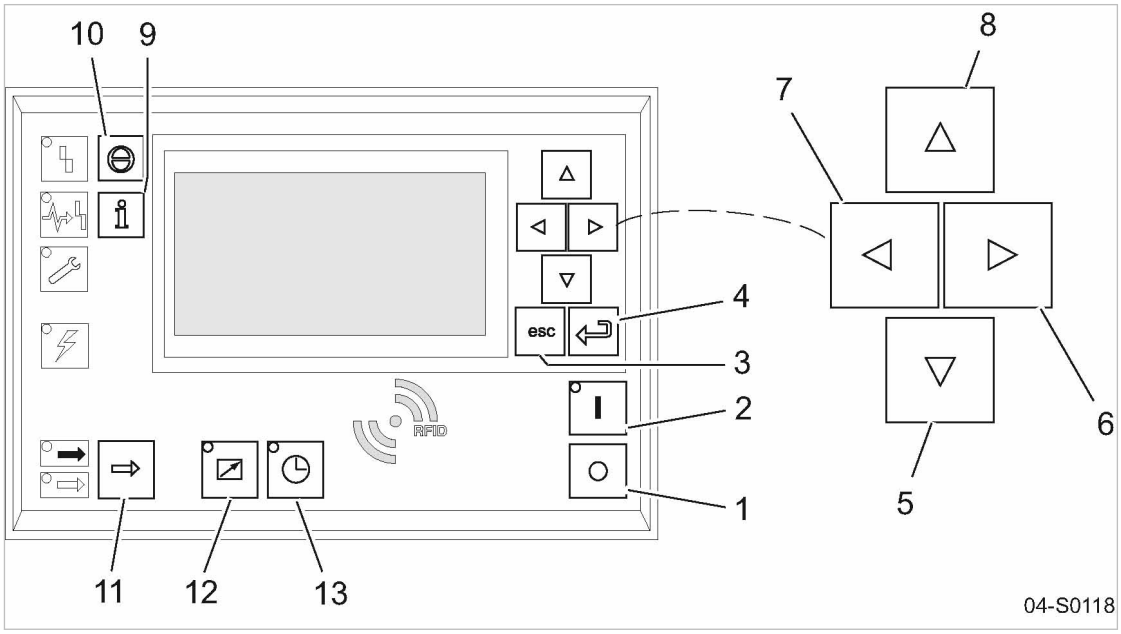


Fig. 15 Keys – overview

Position	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.
4	«Enter»	Jumps to the selected menu option. Exits the edit mode and saves.
5	«Down»	Scrolls down the menu options. Reduces a parameter value.
6	«Right»	Jumps to the right.
7	«Left»	Jumps to the left.
8	«Up»	Scrolls up the menu options. Increases a parameter value.
9	«Information»	Operating mode: Displays the event memory.
10	«Acknowledge»	Confirms/acknowledges alarms and warning messages. If permissible: Resets the fault counter (RESET).
11	«LOAD/IDLE»	Key deactivated! Toggling the compressor between LOAD and IDLE is not possible.
12	«Remote control»	Switches the remote control on and off.
13	«Timer control»	Switches the time control on and off.

Tab. 44 Keys

LEDs

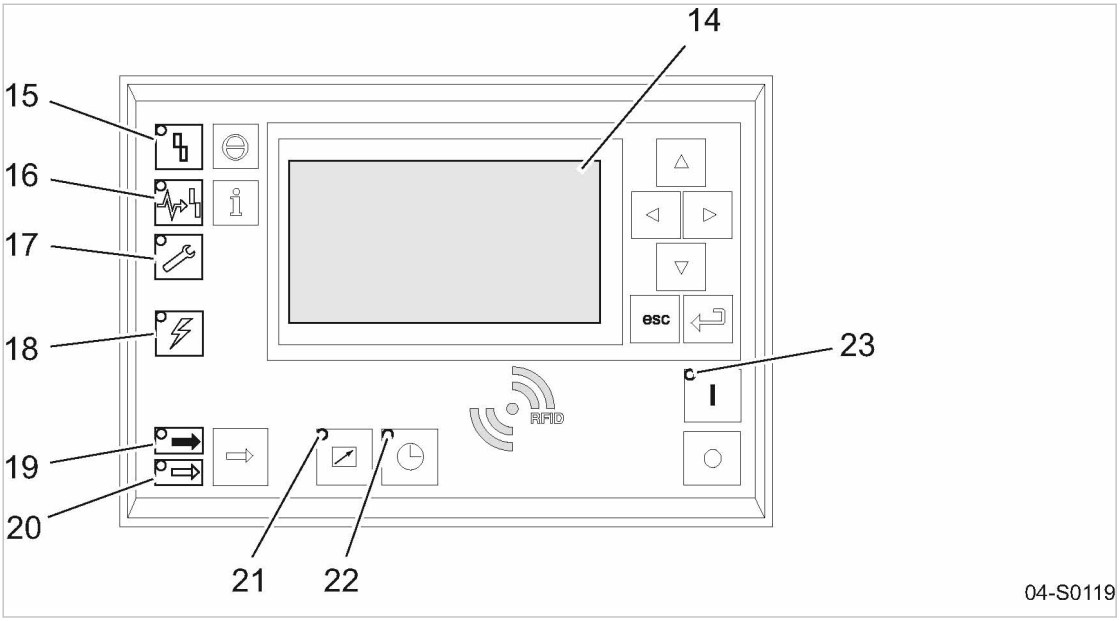


Fig. 16 Indicators – overview

Position	Name	Function
14	Indicator field or display	Graphic display with 8 lines and 30 characters.
15	*Fault*	Flashes red when an alarm occurs. Lights continuously when acknowledged.
16	*Communications error*	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 continuously when acknowledged.
18	*Controller voltage*	Lights green when the power supply is switched on.
19	*LOAD*	Continuous green light when the machine is running in LOAD.
20	*IDLE*	Lights green when the compressor is running in IDLE mode. Flashes when the «LOAD/IDLE» toggle key is pressed.
21	*Remote control*	The LED lights when the machine is in remote control.
22	*Time control*	The LED lights when the machine is in timer control.
23	*ON*	Lights green when the machine switched on.

Tab. 45 Indicators

RFID reader

RFID is the abbreviation for "**R**adio **F**requency **I**dentification" and enables the identification of persons or objects.
Placing a suitable transponder in front of the RFID reader of the controller will automatically activate the communication between transponder and SIGMA CONTROL 2.

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

Typical application:

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

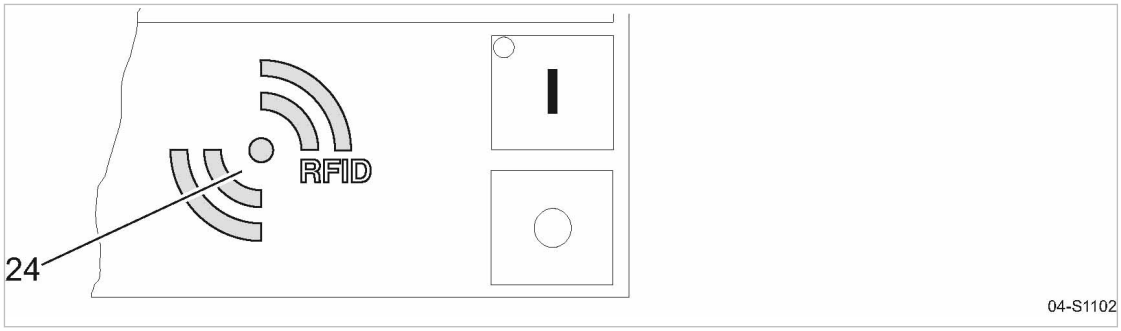


Fig. 17 RFID reader

Item	Designation	Function
24	RFID	RFID reader for the communication with a suitable RFID transponder.

Tab. 46 RFID reader

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

4.4 Machine operating modes

- STOP
  The machine is connected to the power supply.
  The 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 inlet valve is closed.
  - The drive motor is stopped.
  - The venting valve is open.
- LOAD
  The compressor motor runs under load.
  - The inlet valve is open.
  - The venting valve coupled to the inlet valve is closed.
  - The airends deliver compressed air to the system.
  - The drive motor runs under full load.

4.4.1 Frequency-controlled drive (SFC)

When the machine runs in LOAD , the ACTUAL value is compared with the TARGET value for the network pressure. Depending on the pressure differential, the system controls the speed of the compressor motor and, thus, the airend.
The speed of the airend determines the delivered compressed air flow rate and the working pressure.

These changes in speed match the delivered compressed air flow rate to the air consumption and keep the system pressure as constant and as close as possible to the SETPOINT pressure.

This functions within the control range of the machine between the minimum and maximum flow rate (V_{min} and V_{max}).

If the compressed air demand falls below the minimum flow rate of the compressor (V_{min}) the system pressure will continue to rise.
The machine switches to IDLE or STANDSTILL, at the latest when the pressure at the machine's compressed air outlet rises above the adjustable pressure rise value (pA). The pressure rise value above network set-point pressure (pA) can be set from 3–30 psig.

Regardless of the set pressure rise value, the machine will switch to operating point READY at 6 psig above maximum gauge working pressure at the latest.
This increase in pressure is to be taken into account in the design of the overall compressed air supply system.

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

4.5 Options

The options available for your machine are described below.

4.5.1 Option C3 Controller SIGMA CONTROL 2: Connection to control technology

Connection to various control technology systems is possible.

SIGMA CONTROL 2
Main **C**ontrol **S**ystem (MCS): ■ Slot for a communication module to connect to a control technology system.

SIGMA CONTROL 2
Input-**O**utput-**M**odule (IOM): ■ Module with digital and analogue inputs and outputs.

Tab. 47 Components

4.5.2 Option H1 Machine mountings

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

Fig. 18 Machine mountings

4.5.3 Option H23 Hot-air outlet with regulation

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

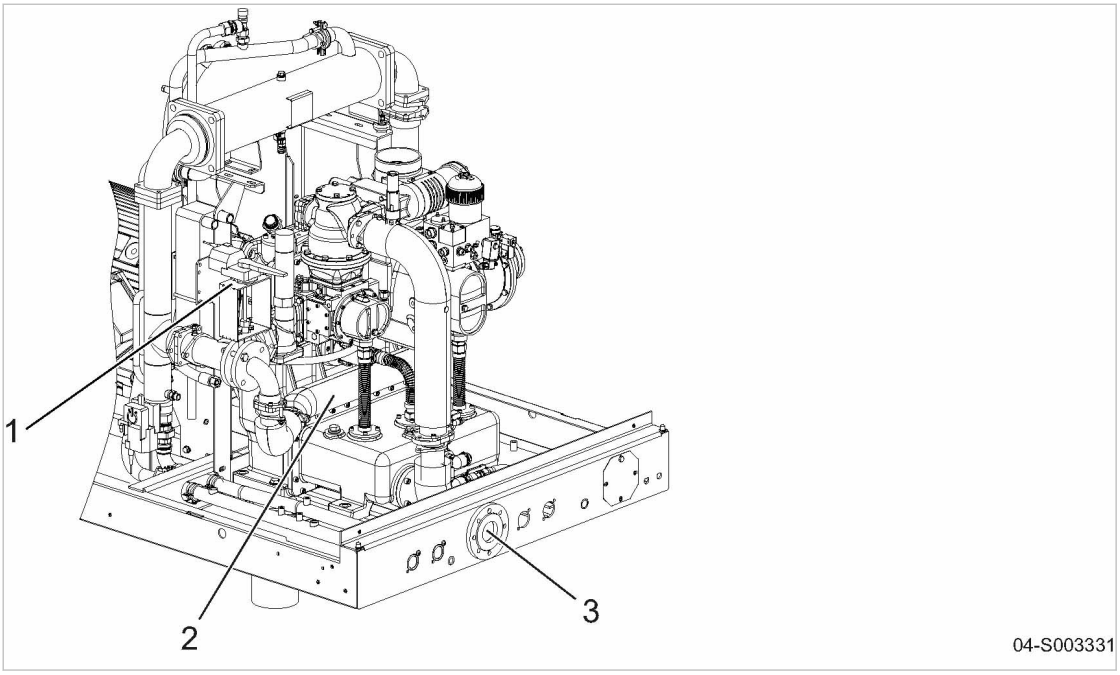


Fig. 19 Conceptual sketch (flow diagram)

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

4.5.4 Option K10
Auxiliary heat exchanger, second stage: Plate-type heat exchanger

The plate-type heat exchanger installed with Option K10 further cools the compressed air downstream of the second stage heat exchanger. A condensate separator downstream of the plate-type heat exchanger removes condensate from the cooled compressed air.

The condensate separator downstream of this plate-type heat exchanger replaces the unit usually installed downstream of the second stage heat exchanger in standard machines.

See the P&I diagram in chapter 13.1 for the exact position of the plate-type heat exchanger.

4.5.5 Option W5/W6 Heat recovery

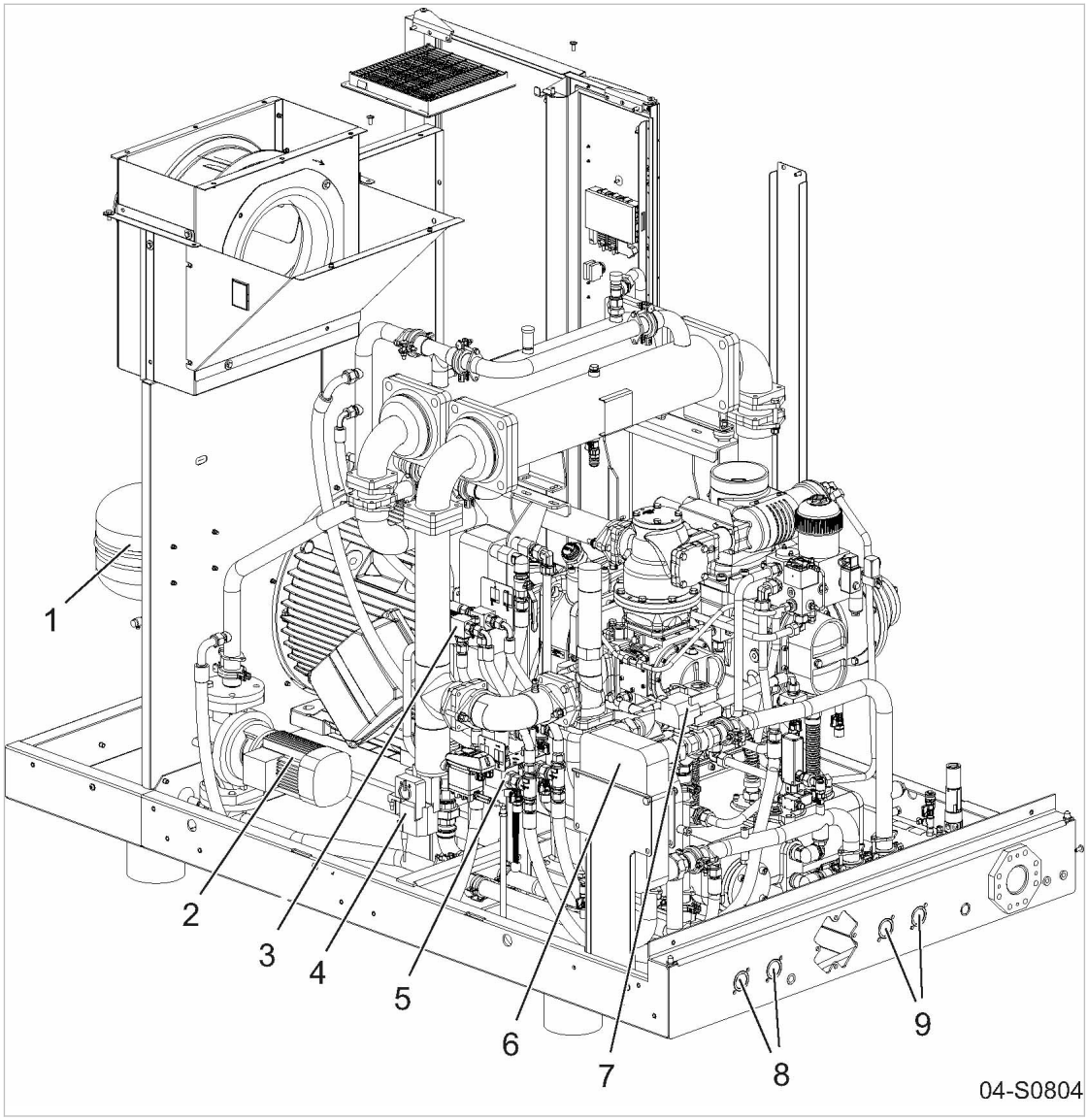


Fig. 20 Internal heat recovery system (HRS) with water pump

1. Membrane pressure expansion tank
2. Water pump
3. Changeover valve (cooling first and second stage)
4. Control valve V14
5. Changeover valve (oil cooling)
6. Heat exchanger
7. Control valve V10
8. Primary water system
9. Secondary water system

With options W5 or W6, a secondary water system is provided in addition to the primary one. In a standard application, the user-supplied heat recovery system removes thermal energy incurred in the primary water system when cooling the compressed air.

Only at the time, when the thermal energy no longer is completely and continuously removed, the secondary water system assumes the cooling function in order to ensure a constant re-entry temperature of the water within the primary water system.

For this purpose, the control valve V10 automatically opens the flow through a heat exchanger for the secondary water system, where the thermal energy of the primary water system is removed.

If the machine is insufficiently cooled, the V10 control valve will open before the system returns a warning or alarm message.

Changeover valve for the cooling of the airends

The two airends may be cooled in either the primary or the secondary water system.

A manually operated valve (4.26, see P&I diagram in chapter 13.1) switches the airend cooling from the primary to the secondary water system and vice versa.

The control valve must be set exactly! Avoid intermediate settings!

This is the only way to ensure that the two water systems remain separated and the different water qualities cannot mix.

If the **primary** water system is used, the usable heat for heat recovery will increase.

If the **secondary** water system is used, the specific output of the machine decreases.

Changeover valve for the oil cooling

The oil can be cooled in either the primary or the secondary water system.

Take into account that the cooling oil may need to be cooled down to lower temperatures than the water in the primary water system, in particular in systems with heat recovery.

A manually operated valve (11.20, see P&I diagram in chapter 13.1) switches the heat exchanger for the oil cooling from the primary to the secondary water system and vice versa.

If the **primary** water system is used, the usable heat for heat recovery will increase.
An increase in the thermal output of the machine will ensure an increase in the thermal quantity for the heat recovery as long as the primary water system is capable of completely removing the heat, i.e., as long as the secondary water system does not need to be activated for cooling.

The connection of the oil cooling to the **secondary** water system then contributes to an increase in the energy yield for the heat recovery from the primary water system if a cooling of the primary water system with the secondary water system can be avoided.

Because the heating power for the compressed air (heat exchanger after the airends and the block cooling) is approximately 90% of the overall heating power, it can be very efficient to separately cool the cooling oil in the secondary water system to the required lower level.

Cooling water stop function

The control valves V14 and V10 must be set to AUTOMATIC mode and the target values must be adjusted if regulation or stop water function is required. (The machine is shipped with the control valves fully open and deactivated.)

Cooling water stop function:
Regulating valves V10 and V14 will close at STANDSTILL if cooling is not required.

Cooling water stop function of the primary water system:
If the cooling oil and/or the airends are cooled in the primary water system:
Control valve V14 is closed completely. No water flows through the primary water system.
Temperature sensor T13 continues to monitor the temperature development.
If the residual heat of the hot compressor components excessively heats the remaining cooling water in the compressor, the control valve slightly opens to admit some cooling water. Control valve V14 is then again fully closed.

Cooling water stop function of the secondary water system:
If the cooling oil and/or the airends are cooled in the secondary water system:
Control valve V10 is closed completely. Cooling water still flows through heat exchanger for cooling the cooling oil and the block jackets (airend cooling).
The cooling water flow with closed control valve V10 can only then fully stopped if the user installs a stop valve. For this application, use a floating relay contact of the machine.

Option W5 Internal heat recovery system (HRS) with internal water pump

The user must provide a water pump each for the primary and the secondary water system in order to use the heat recovery system.
The internal water pump of option W5 and a by pass circulate only the internal cooling water quantity of the primary water system. It is intended for emergency operation if the user's pump for heat recovery is turned off (e.g. due to maintenance or construction work, for instance).

The heat-recovery system is connected to the primary water system.

The machine can be cooled solely via the primary water system as long as the user's heat recovery system fully removes the heat, i.e., the temperature at the measuring point T10 remains sufficiently low to provide the required cooling power.
If this is no longer the case, the surplus heat is automatically removed via the secondary water system.
For this purpose, the control valve V10 for the secondary water system opens the flow across a plate-type heat exchanger taking thermal energy from the primary water system (the secondary water system must be cooler than the primary one in this event). This plate-type heat exchanger forms the interface between the secondary water system and the primary water system. In this case, the primary water system passes thermal energy to the secondary water system.

For the machine operation without HRS, the primary water system with a membrane pressure expansion tank, a connection for topping off, a water pump and an automatic bypass is provided. In this operating mode, the entire heat is discharged from the primary water system over the plate-type heat exchanger, i.e., the primary water system is fully cooled by the secondary water system.

If the temperature at the measuring point T9 is too high to sufficiently cool the machine, a portion of the heat must be removed from the primary water system (heat recover) through the cooler secondary water system. With this method, the temperature at the measuring point T10 maintains a lower value to be able to sufficiently cool the compressor and/or the compressed air.
If the temperature at measuring point T66 is limiting (non-binding approximate value: T10 <113°F in S460 and T10 <131°F in G680 to cool the oil through the primary water system), the oil cooling can be switched to the colder secondary water system. The system returns a corresponding operational message.
Thus, the machine can be operated at a higher temperature at measuring point T10, in particular at low pressure at measuring point p52.

Further information

Your authorized KAESER service representative will support you in ensuring the reliable operation of your machine.

Alternative utilization is possible with Option W5, such as a complete separation of the cooling circuits of the primary and the secondary water system due to different water qualities (without the objective of heat recovery).

Option W6 Internal heat recovery system without internal water pump

As option W5, but without internal water pump, expansion tank, connection for topping off, and automatic bypass.

To operate the machine, the primary water system must always be circulated with a user-supplied water pump.

The machine cannot be operated if the circulation of the primary water system is interrupted (due to maintenance or construction work or switching to Summer operation, for example) or if the pump fails.

5 Installation and Operating Conditions

5.1 Ensuring safety

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

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

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

Required ambient conditions may be:

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

5.2 Installation conditions

5.2.1 Determining location and clearances

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

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

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

When installing an exhaust air duct, do not connect it rigidly to the machine (use canvas connectors).

The exhaust air duct must be installed in such a way that exhaust air cannot re-enter the inlet.

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

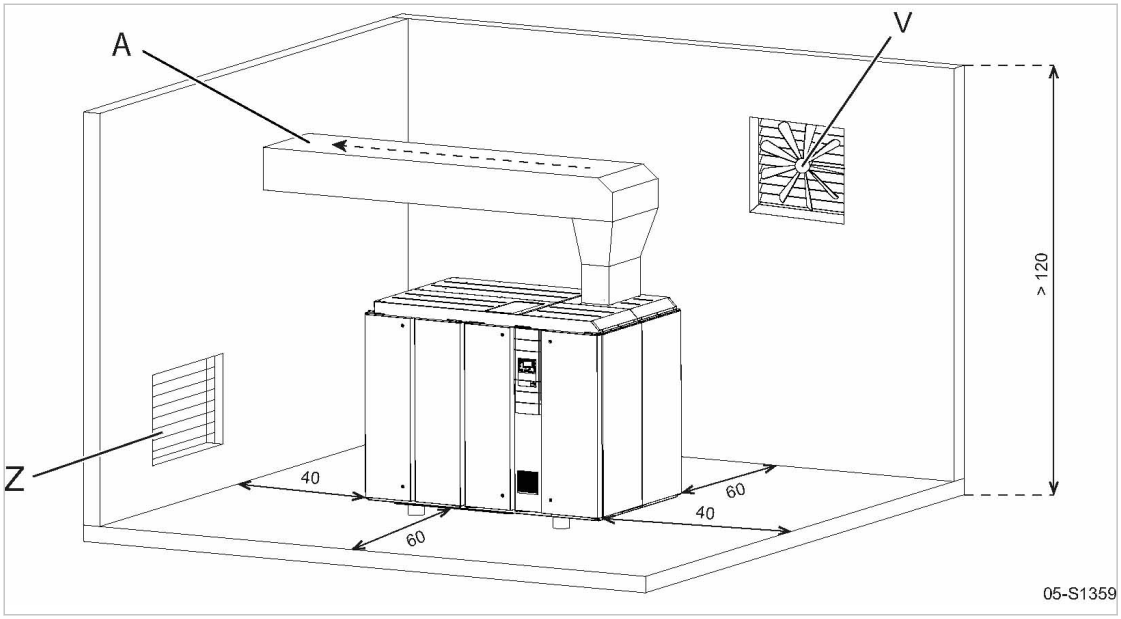


Fig. 21 Recommended installation, dimensions [in.]

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

1. **NOTICE** *Ambient temperature too low!*
   Frozen condensate and highly viscous cooling 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 an 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 all displays can be read without glare and that the controller display cannot be damaged by direct sunlight (UV radiation).
4. Ensure that all air inlet and exhaust air openings in the enclosure remain open.
5. Observe any additional clearances that may be specified in local occupational health & safety and building regulations, so that escape and rescue routes may safely be accessed, even when the machine enclosure is open.
6. For installation outdoors, the machine must be protected from frost, direct sunlight, dust and rain.

5.2.2 Ensuring adequate machine room ventilation

Adequate ventilation of the machine room fulfils several functions:

- It prevents a vacuum from arising in the machine room.
- 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 flow rate of fresh air is at least the same as the flow rate taken in by the machine and exhaust fan from the machine room.
2. Ensure that the machine and exhaust fan can only be operated when the air inlet 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.

5.2.3 Inlet and exhaust air ducting

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

Further information — Further information regarding the design of exhaust air ducting can be found in chapter 13.2.

5.3 Using the compressor to supply a compressed air system

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

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

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

➢ Please allow KAESER to advise on this subject.

6 Installation

6.1 Ensuring safety

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

Warning instructions are located before a potentially dangerous task.

⚠ Disregard of warning instructions can cause serious injuries!

Complying with safety notes

Disregard of safety notes can cause unforeseeable dangers!

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

When working on live components

Touching voltage carrying components can result in electric shocks, burns, or death.
Dangerous voltages persist in the frequency converter and intermediate circuit capacitors for some time after power is switched off.
Live components are exposed when the frequency converter cabinet is opened.

- ➢ Work on electrical equipment may only be carried out by authorized electricians.
- ➢ Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- ➢ Before starting work on the frequency converter or intermediate circuit capacitors, wait at least 5 minutes.
- ➢ Check that there is no voltage on floating relay contacts.
- ➢ Before starting work on the frequency converter or intermediate circuit capacitors, wait at least 5 minutes.
- ➢ In addition to this manual, pay attention to the operating instructions delivered with the frequency converter.

When working on the compressed air system

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

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

When working on the drive system

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

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

Further information

Details of authorized personnel are found in chapter 3.4.2.

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

6.2 Reporting transport damage

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

6.3 Connecting the machine with the compressed air network

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

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

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

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

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

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

Precondition

The compressed air system is vented completely to atmospheric pressure.

⚠ WARNING

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

- ➢ *Depressurize all pressurized components and enclosures.*

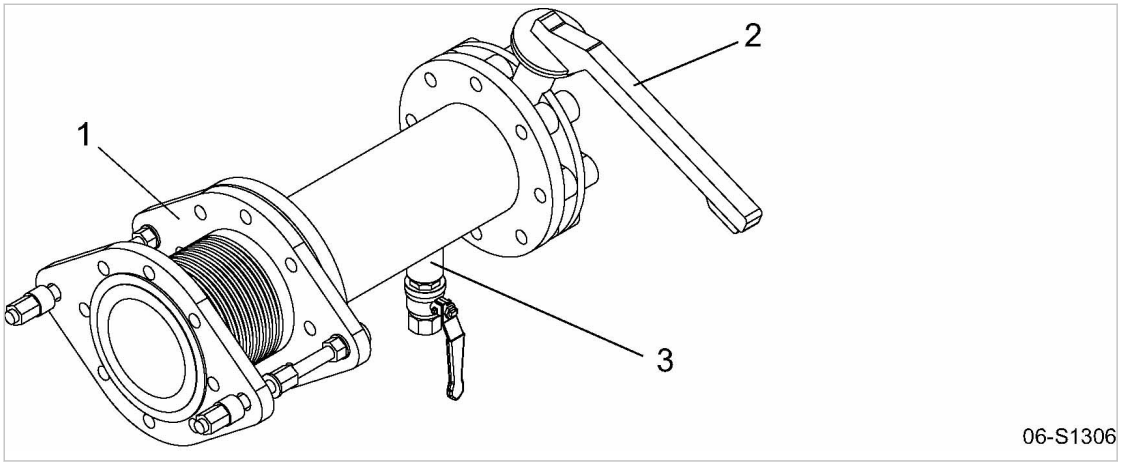


Fig. 22 Compressed air connection

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

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

6.4 Connecting the power supply

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

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

1. The power supply must only be connected by authorized installation personnel or an authorized electrician.
2. Carry out safety measures as stipulated in relevant regulations and in national accident prevention regulations . In addition, observe the regulations of the local electricity supplier.
3. Test the overload protection cut-out to ensure that the time it takes to disconnect in response to a fault is within the permitted limit.
4. Select supply cable conductor cross-sections and fusing in accordance with local regulations.
5. The user must provide the machine with a lockable power supply disconnecting device. This could be, for example, a load disconnect switch with fused input. If a circuit breaker is used it must be suitable for the motor starting characteristics.
6. Check that the tappings on the control voltage transformer are connected according to the power supply voltage.
   If not, change the tappings to suit the power supply voltage.

7. **⚠ DANGER** *Danger of fatal injury from electric shock!*
   - ➢ *Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.*
8. Connect the machine to the power supply.
9. Ensure that the cabinet complies with the requirements of degree of protection IP54.

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

6.5 Connecting the external pressure transducer

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

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

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

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

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

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

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

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

   - ➢ Connect as large an area of the screening as possible to the mounting plate in the control cabinet or use an EMC fitting to make contact.
3. When commissioning the machine with SIGMA CONTROL 2, select the *<Network actual pressure>* setting in the *<All>* menu.
4. Select and activate the used analog input (AII).

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

6.6 Connecting the water-cooling

The cooling water is connected to the following water systems:

- Secondary water system on machines **with** Option W5/W6
- Primary water system on machines **without** Option W5/W6

- ➢ Choose suitable materials for the water connections, taking the electrochemical series into account.
- ➢ Minimize the effect of pressure surges on the heat exchanger as far as possible.
- ➢ Avoid pressure surges! If this is not possible, take appropriate countermeasures.
- ➢ Avoid a low inlet temperature for the cooling water, as this may cause condensation. If required, contact KAESER for advice regarding suitable insulation measures.

Floating relay contacts are provided for control of a water pump installed at the user-end.

Only water pumps with the following properties may be used:

- Differential pressure-controlled pump
- Pump with a suitable characteristic curve

- ➢ Consult KAESER for advice on how to ensure the cooling water supply by means of a suitable water pump.

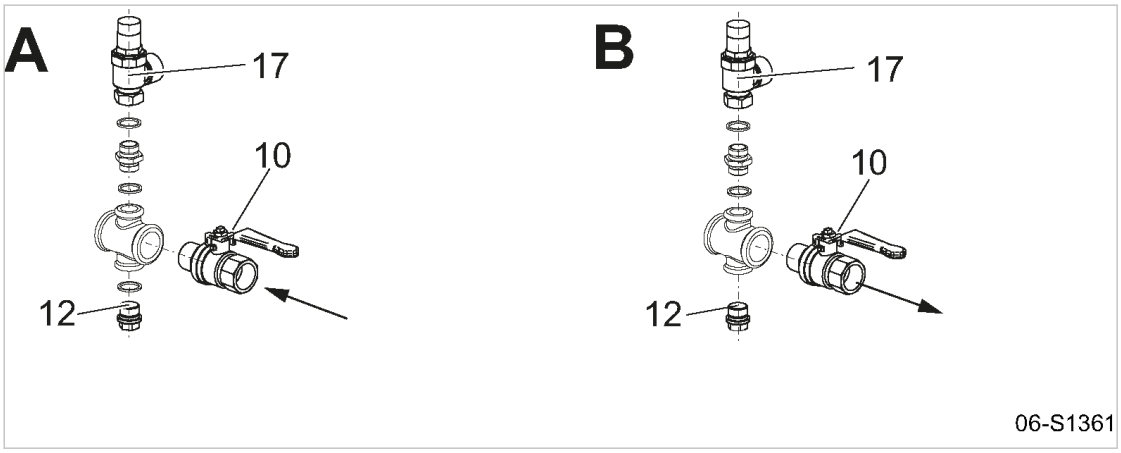


Fig. 23 Connecting the water-cooling (secondary water system with Option W5/W6)

- [A] Cooling water inlet
- [B] Cooling water outlet
- [10] Shut-off valve
- [12] Connection port with sealing plug
- [17] Safety relief valve

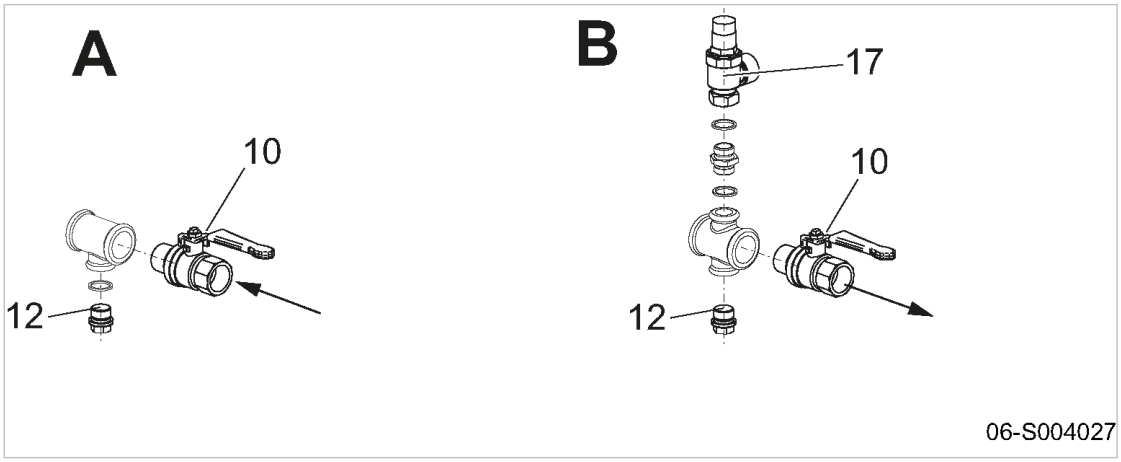


Fig. 24 Connecting the water-cooling (secondary water system with Option K10, without Option W5/W6)

- [A] Cooling water inlet
- [B] Cooling water outlet
- [10] Shut-off valve
- [12] Connection port with sealing plug
- [17] Safety relief valve

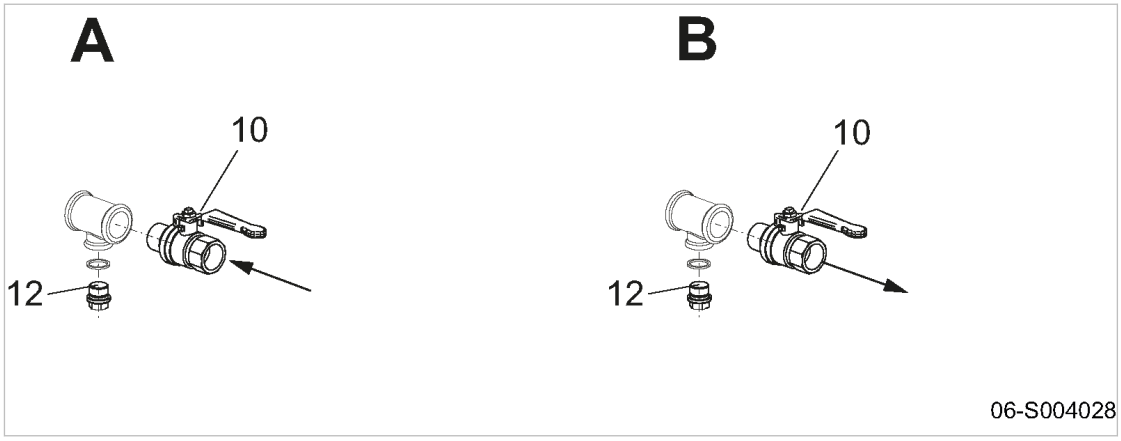


Fig. 25 Connecting the water-cooling (primary water system)

[A] Cooling water inlet
[B] Cooling water outlet
[10] Shut-off valve
[12] Connection port with sealing plug

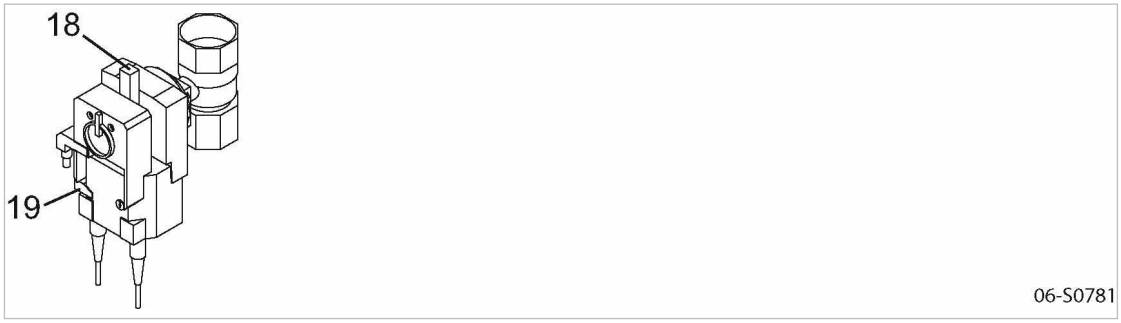


Fig. 26 Control valve

[18] Position indicator
[19] Unlock key

1. The following fittings are to be provided at the user-end:
   - Dirt trap with max. 0.1 mm mesh size.
   - Shut-off valves [10] and connection ports [12] for maintenance and venting.
   - Safety relief valve [17] (actuating pressure ≤ 145 psi) to prevent impermissible pressure rise.
     Actuating pressure and blow-off capacity of the safety relief valve should be based on the user-end installation design. The technical specification of the heat exchanger must be taken into account.
   - Use suitable devices to limit the differential pressure in closed valves within the water system, e.g.
     - Overflow valve
     - Differential pressure-controlled pump
   - Suitable devices to balance changes in flow rate due to thermal strain, e.g. membrane pressure compensation tanks
2. Connect the cooling water lines to the fittings.

3. Ensure that control valves V12 and V14, as well as V10, are open.
   If control voltage is present, open the valves via the SIGMA CONTROL 2. If opening the valves manually, hold down the unlock key (19) and simultaneously set the position indicator (18) parallel to the direction of flow.

When opening the valves manually, it must be taken into account that the controller may automatically re-close them.

4. Open the shut-off valve at the cooling water outlet (B).
5. Slowly open the shut-off valve at the cooling water inlet (A) and gradually fill the heat exchanger with cooling water.
6. To bleed the cooling-water lines:
   - Fully open control valves V12 and V14, as well as V10 if required.
   - If the power supply is connected, open the valves via the SIGMA CONTROL 2, or open them manually.

6.6.1 Connecting a user-end water pump

A floating relay contact is provided for control of the user-end water supply.

➢ Connect the user-end water pump to the contacts “Water-cooling valve V14 closed”.

Further information

The dimensional drawing in chapter 13.2 provides the flow direction, size and location of the connection ports.

The positions of the valves for the water system are given in the P&I diagram in chapter 13.1.

Information on the locations, capacities and functions is provided in the wiring diagram in chapter 13.3.

6.7 Control valve in the primary water system: V14

The control valve is factory set.
V14 is motor-actuated but may be closed and opened manually, if necessary.

The required outlet temperature can be set in SIGMA CONTROL 2.

With a cooling water outlet temperature ≤140°F, a water pressure p14 of 14.5 psig is required, at >140°F a water pressure p14 of 40.5 psig (p14 displayed in SIGMA CONTROL 2, measured upstream of control valve V14 downstream of the heat exchangers); see Chapter 13.1, P&I diagram.

➢ Ensure the water quality.

Consult an authorized KAESER service representative if higher water outlet temperatures are required for heat recovery systems.

Setting the control valve in the primary water system

The valve is regulated via the operating modes *automatic, open, off*, and *closed*.

In *automatic* mode, the water outlet temperature of the compressor under LOAD is regulated to the set value. Machine-internal temperature limits have priority over the set target value

In READY mode, the machine valves close fully and open for a short period, if necessary.

The control valve can be manually opened and closed, if necessary.

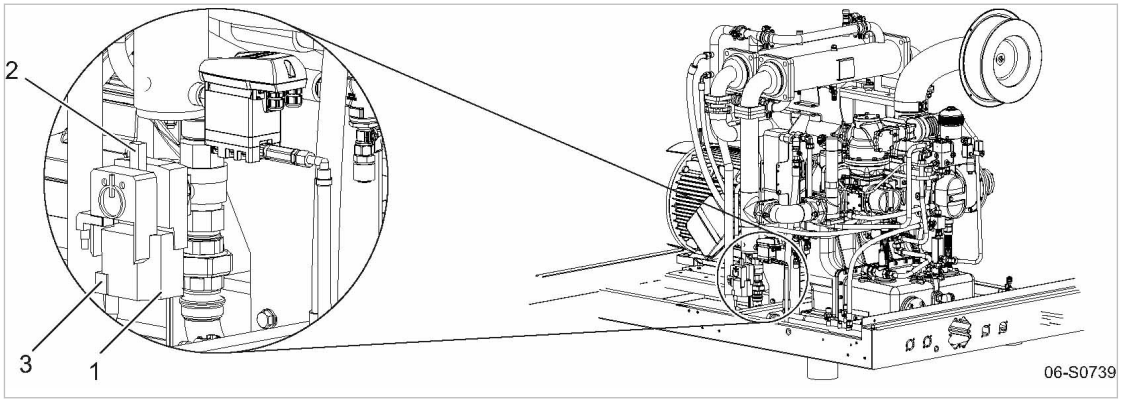


Fig. 27 Control valve

[1] Control valve
[2] Position indicator
[3] Manual unlocking button

1. Set the control valve's operating mode in SIGMA CONTROL 2.
2. If necessary, manually actuate the control valve:
   - Keep the unlock button pressed.
   - Actuating the control valve:
     - Position indicator in parallel to the flow direction: Control valve open
     - Position indicator vertical to the flow direction: Control valve closed
   - Release the unlock button.

6.8 Option W5/W6 Connecting the heat recovery to the primary water system

Machines with option W5/W6 can in principle be operated without heat recovery. In this case, certain points must be taken into account during commissioning (see chapter 7.11).

Take the following points into account when connecting the heat recovery:

➢ Choose suitable materials for the connecting lines, taking the electrochemical series into account.

➢ Minimize the effect of pressure surges on the heat exchanger as far as possible.

➢ Adhere to the maximum permissible differential pressure.

➢ Avoid very low inlet temperatures for the heat transfer medium, as this may cause condensate If required, contact KAESER for advice regarding suitable insulation measures.

Floating contacts are provided for control of a pump installed at the user-end.

➢ Install and connect the heat exchanger in accordance with the guidelines from KAESER.

6.8.1 Connecting the internal heat recovery

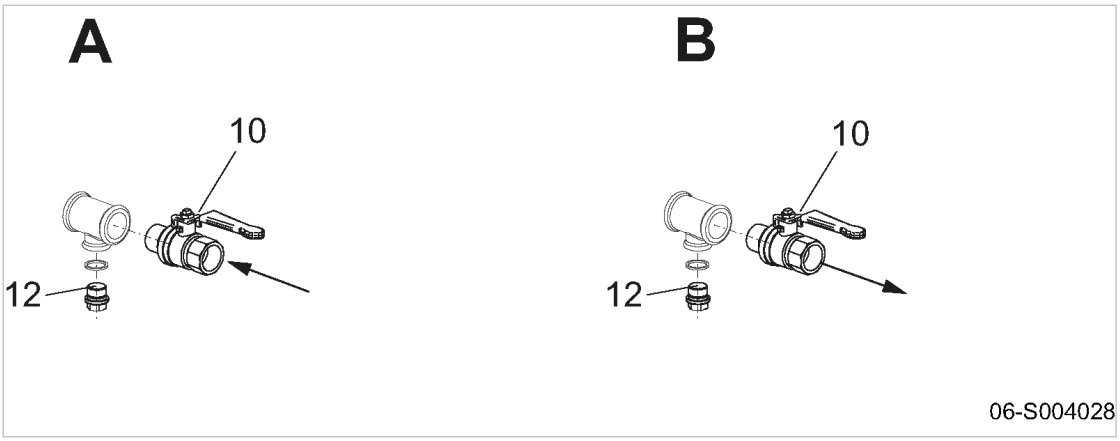


Fig. 28 Connecting the heat recovery system

[A] Inlet
[B] Outlet
[10] Shut-off valve
[12] Connection port with sealing plug (refill connection)

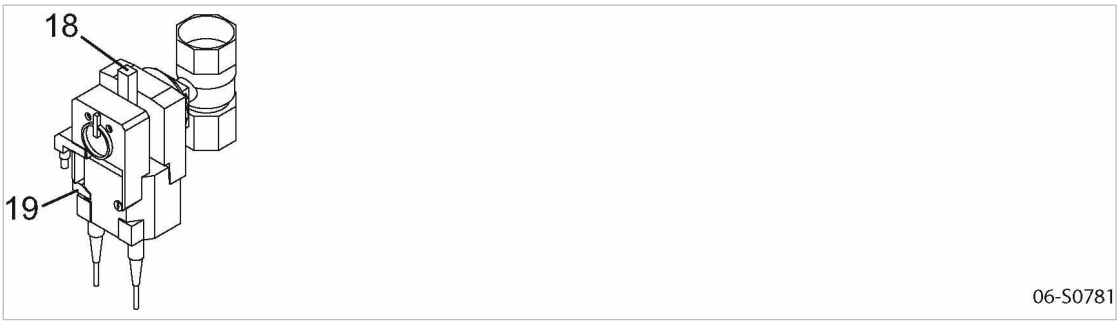


Fig. 29 Control valve

[18] Position indicator
[19] Unlock key

1. The following fittings are to be provided at the user-end:
   - Dirt trap with max. 0.1 mm mesh size.
   - Shut-off valves [10] and connection ports [12] for maintenance and venting (with option W6, for refill connection as well). (With option W5, a refill connection is provided on the machine.)
   - If required: Safety relief valve (actuating pressure ≤ 145 psi) to prevent impermissible pressure rise.
     Actuating pressure and blow-off capacity of the safety valve should be based on the user-end installation design. The primary water system is protected internally with a 10 bar safety valve. The technical specification of the heat exchanger must be taken into account.
   - Use suitable devices to limit the differential pressure in closed valves within the water system, e.g.
     - Overflow valve
     - Differential pressure-controlled pump.
   - Suitable devices to balance changes in flow rate due to thermal strain, e.g. membrane pressure compensation tanks
2. Connect the cooling water lines to the fittings.

3. Ensure that control valves V10, V12 and V14 are open.
   Which of these valves is actually fitted will depend on the individual machine configuration.
   It is preferable to open the valves via the SIGMA CONTROL 2. If opening the valves manually, hold down the unlock key [19] and simultaneously set the position indicator [18] parallel to the direction of flow.
4. Open the shut-off valve [10] at the cooling water outlet [B].
5. Slowly open the shut-off valve [10] at the cooling water inlet [A] and gradually fill the heat exchanger with cooling water.
6. Bleed any air from the cooling water lines.
   Fully open control valves V12 and V14, as well as V10 if required.

6.8.2 Connecting a user-end water pump or stop valve

➢ Connect a user-end water pump or stop valve to the contacts “Water-cooling valve V14 closed”.

➢ If a secondary water system is fitted, the contacts “Water-cooling valve V10 closed” can be used for the water pump in this secondary system, provided that the airend and the cooling oil are cooled via the primary water system.

Should multiple compressors need to be supplied with cooling water simultaneously:

➢ Contact an authorized KAESER service representative for the design of the cooling water supply when there are multiple compressors to be supplied.

Further information

The dimensional drawing in chapter 13.2 provides the flow direction, size, and location of the connection ports.

The positions of the valves for the water system are given in the P&I diagram in chapter 13.1.

Information on the locations, capacities, and functions is provided in the wiring diagram in chapter 13.3.

6.9 Connecting the condensate drain

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

The condensate must be able to drain freely.

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

Fig. 30 illustrates the recommended installation.
Condensate flows downward in the collecting line. This prevents condensate flowing back to the compressor.

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

Condensate line

Feature	Value
Max. length[1)] [ft]	50
Max. delivery head [ft]	<13

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

Feature	Value
Material (pressure-resistant, corrosion-proof)	Copper Stainless steel Plastics Hose line
[1] For longer lengths, please contact the manufacturer before installation.	

Tab. 48 Condensate line

Condensate collecting line

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

Tab. 49 Condensate collecting line

Compressed air flow rate[1] [cfm]	Line cross-section ["]
<350	3/4
350 – 700	1
701 – 1400	1 1/2
>1400	2
[1] Compressed air flow rate as guide for the condensate volume to be expected	

Tab. 50 Condensate collecting line: Line cross-section

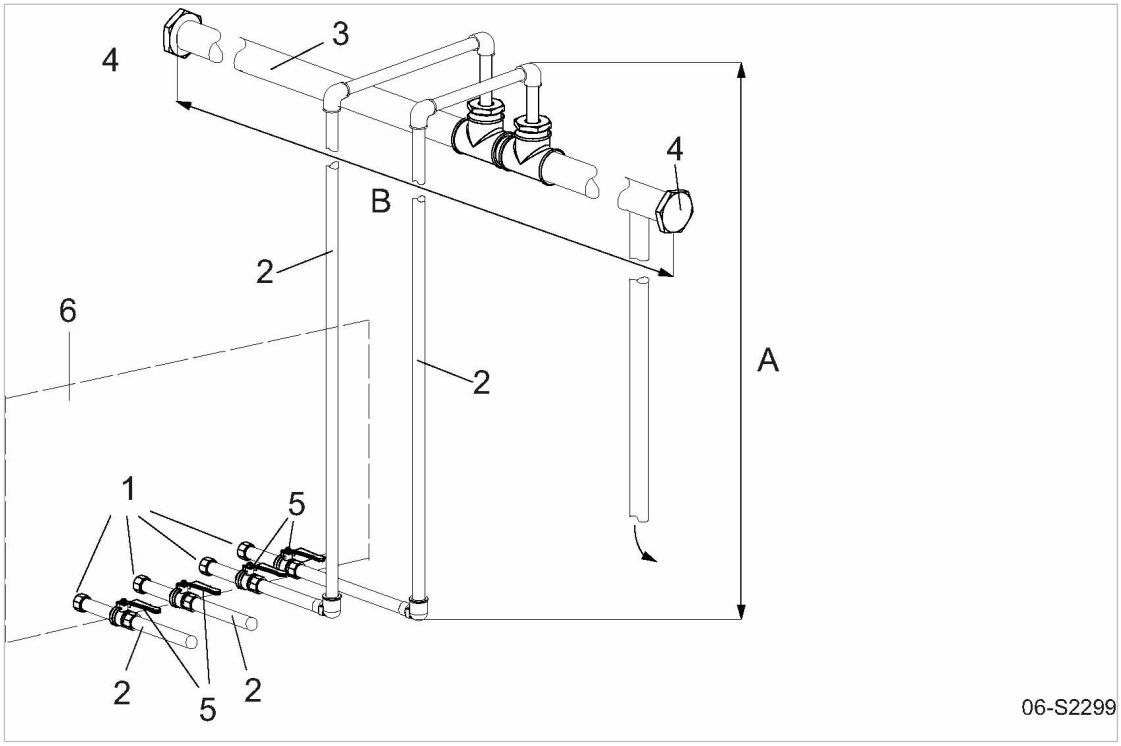


Fig. 30 Connecting the condensate drain

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

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

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

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

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

6.10 Options

6.10.1 Option H1 Anchoring the machine

➢ Use appropriate fixing bolts to anchor the machine.

Further information Details of the fixing holes are contained in the dimensional drawing in chapter 13.2.

7 Initial Start-up

7.1 Ensuring safety

Follow the instructions below for safe commissioning.

Warning instructions are located before a potentially dangerous task.

⚠ Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety warnings can cause unforeseeable dangers!

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

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.
Dangerous voltages persist in the frequency converter and intermediate circuit capacitors for some time after power is switched off.
Live components are exposed when the frequency converter cabinet is opened.

- ➢ Work on electrical equipment may only be carried out by authorized electricians.
- ➢ Switch off and lock out the power supply disconnecting device and verify the absence of voltage.
- ➢ Before starting work on the frequency converter or intermediate circuit capacitors, wait at least 5 minutes.
- ➢ Check that there is no voltage on floating relay contacts.

When working on the compressed air system

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

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

When working on the drive system

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

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

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

7.2 Instructions to be observed before commissioning

Incorrect or improper commissioning can cause injury to persons and damage to the machine.
➢ Commissioning may be carried out only by authorized installation and service personnel who have been trained on this machine.

Special measures for recommissioning after storage

Storage period longer than:	Measure:
12 months	➢ Change the oil filter. ➢ Change the gearbox oil. ➢ Have the frequency converter intermediate circuit capacitor formed (refreshed) by an authorized KAESER service representative.
36 months	➢ Have the overall technical condition checked by an authorized KAESER service representative.

Tab. 51 Recommissioning after storage

7.3 Checking installation and operating conditions

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

To be checked	See chapter	Confirmed?
➢ Are the operators completely familiar with the safety regulations?	—	
➢ Has all packaging material been removed after transport?	—	
➢ Have all the installation conditions been fulfilled?	5	
➢ Is a user-provided lockable power supply disconnecting device installed?	6.4	
➢ Does the existing power supply voltage / frequency conform to the specifications on the nameplate?	2.1	
➢ 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)	13.3	
➢ Are the power supply cable conductor cross-sections and fuse ratings adequate?	2.16	
➢ Have all electrical connections been checked for tightness? ➢ Has the inspection been repeated after 50 operating hours following the initial commissioning?	—	

To be checked	See chapter	Confirmed?
➢ Is a shut-off valve fitted to the compressed air outlet?	6.3	
➢ Has the connection to the air network been made with a flexible pressure hose or compensator?	6.3	
➢ Is the motor overload protection switch set correctly according to the power supply voltage?	7.5	
➢ Is there sufficient cooling oil in the gearbox oil pan? (Cooling oil in the upper half of the oil sight glass)	10.13	
➢ Is the machine firmly anchored to the floor without stress? (Option H1)	4.5.2	
➢ Has the direction of rotation been checked?	7.6	
➢ Is the supply of cooling water ensured? e. g., control valves V12,V14 (if applicable V10) set to "Auto" or sufficiently opened? Are the pumps operating? Is sufficient water pressure provided?	6.6	
➢ Is the water system for cooling the airend and the heat exchanger set to oil cooling? (Option W5/W6) ➢ Has it been checked in Load under working pressure whether the hydraulic adjustment matches?	7.10	
➢ Are all access doors closed and latched and removable panels in place and secured?	—	

Tab. 52 Installation conditions checklist

7.4 Commissioning the frequency converter

The frequency converter parameters are preset. Adjustment of parameters to suit operating conditions on site is done by trained and authorized personnel.

Changes to the factory settings may influence the whole machine. The machine may break down or be damaged.

➢ Allow only trained and authorized personnel to make parameter changes.

7.5 Setting the motor overload protection relay

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

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

➢ Check the motor overload protection switch setting.

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

➢ Contact an authorized KAESER SERVICE representative.

7.6 Checking the direction of rotation

The machine is designed for a clockwise phase sequence.

Material Phase sequence indicator

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

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

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

7.7 Starting the machine for the first time

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

1. Open the shut-off valve to the air network.
2. Switch on the power supply disconnecting device.
   After the controller has carried out a self-test, the green *Controller voltage* LED is lit continuously.
3. If required:
   Change the display language as described in chapter 7.8.
4. Press the «ON» key.
   The drive motor runs up and after a short time the machine switches to LOAD and delivers compressed air.

➢ Watch for any faults occurring in the first hour of operation.

➢ Check the oil level when the compressor is running, as described in chapter 10.13.

➢ After the first 50 operating hours, check all electrical connections and tighten where necessary.

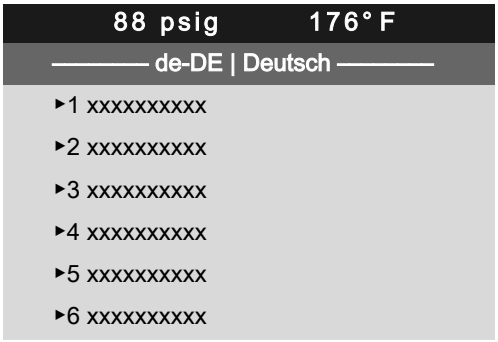
7.8 Setting the display language

The controller can display text messages in several languages.

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

1. In operating mode, switch to the main menu with the «Enter» key.

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



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

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

Result — The display texts are now in the selected language.

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

7.9 Setting the set point pressure

The system pressure pA is factory set to the highest possible value.

Adjustment is necessary for individual operating conditions.

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

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

To reduce the cycling (toggling) frequency:

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

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

➢ Set the set point pressure as described in the SIGMA CONTROL 2 operating manual.

7.10 Option W5/W6 Setting water systems

For cooling the airends, you switch between primary and secondary water system using a change-over valve which can be set manually.

During the switch-over process, both water systems are connected temporarily. Thus, if the secondary water system contains, e.g., an antifreeze agent, small quantities of the same may enter the primary water system. This could affect the corrosion protection in the primary water system.

➢ Avoid intermediate settings.

Setting the water system for cooling the airends

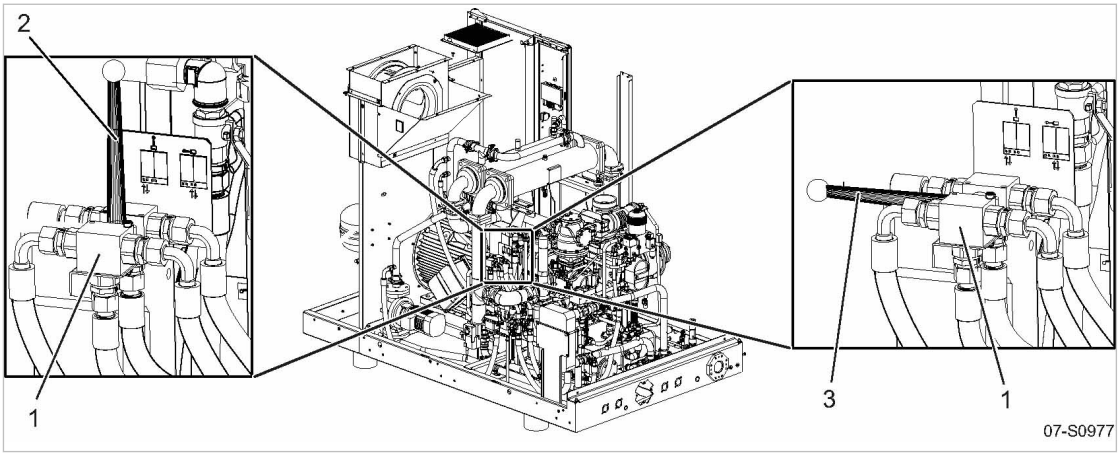


Fig. 31 Setting the water system for cooling of the airends

[1] Switch-over valve
[2] Setting: Primary water system
[3] Setting: Secondary water system

➢ Set the lever of the switch-over valve according to the water system desired for cooling the airends.

Setting the water system for cooling the cooling oil

For cooling the cooling oil, you switch between primary and secondary water system using a changeover valve which can be set manually.

If the cooling oil heat exchanger is connected to the primary water system and the controller frequently displays the message "Oil temperature too high", you should switch the cooling oil heat exchanger to the cold secondary water system.

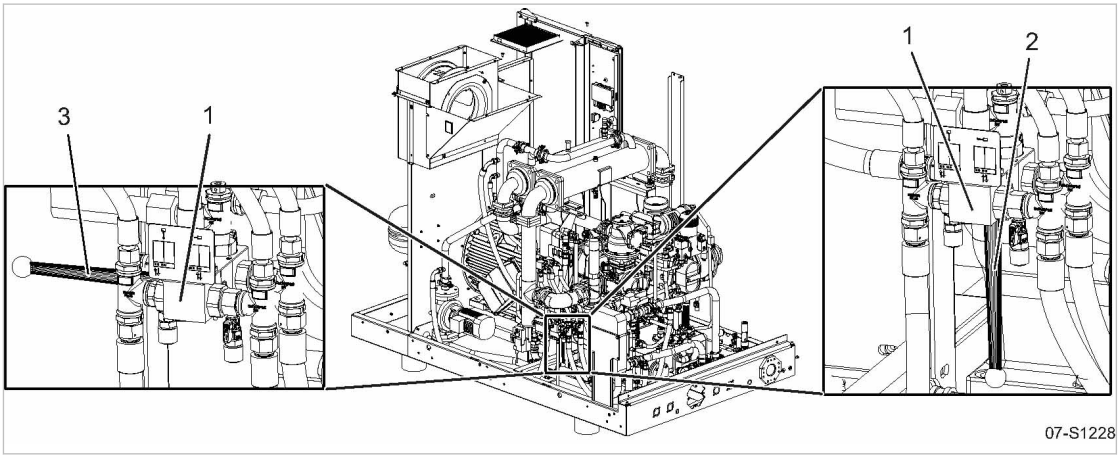


Fig. 32 Setting the water system for cooling the cooling oil

[1] Switch-over valve
[2] Setting: Primary water system
[3] Setting: Secondary water system

➢ Set the lever of the switch-over valve according to the water system desired for cooling the cooling oil.

7.11 Option W5/W6 Operating the machine without heat recovery system

Please note the following recommendation when you intend to operate the machine without heat recovery.

Machines with Options W5 or W6 can be cooled completely via the primary or the secondary water system.

In Option W6, please note that the water of the primary water system must be circulated by a user-installed device.

In all cases, the primary water system must be filled with water and be subject to a specified minimum pressure (see chapter 2.13).

7.11.1 Cooling the machine with the primary water system

The entire heat output of the machine must be removed via the primary water system.

Precondition Control valve V14 is sufficiently opened.

1. With the machine cooled down, fill the primary water system to at least the pressure recommended in chapter 2.13.
2. Vent the primary water system by user.
3. Ensure that, during operation, the cooling water is continuously pumped through the user's circulating pump in the primary water system.
4. Set the lowest possible set point value for V14 (heat is not utilized).
5. Regularly check the water pressure and add more water, when required.
6. Set both changeover valves so that the airends and the cooling oil are cooled only by the primary water system.

Further information See chapter 7.10 for setting the changeover valves.

7.11.2 Option W5 Cooling the machine with the secondary water system

Activating the primary water system

1. With the machine cooled down, fill the primary water system to at least the pressure recommended in chapter 2.13.
2. Ensure that, during operation, the water is continuously pumped in the primary water system (internal or user pump).
3. Set the lowest possible set point value for V14.
4. Regularly check the water pressure and add more water, when required.
   The factory setting for the internal membrane pressure expansion tank is 58 psi.

Activating the secondary water system

The entire heat output of the machine must be removed via the secondary water system.

The water is continuously circulated through the internal or the external water pump in the closed primary water system.

Precondition The primary water system is filled and is under sufficient pressure.

The control valve V10 is sufficiently opened when the machine is running.

1. Fill the secondary water system and ensure required minimum pressure in the secondary water system see chapter 2.13. Add water as required.
2. Ensure the control valve V10 is sufficiently opened.

Ensure the lowest possible set point value for control valve V10 for the secondary water system (e.g., 68°F).

3. Ensure a meaningful setting for both changeover valves!

Further information See chapter 7.10 for setting the changeover valves.

7.11.3 Option W6
Cooling the machine with the secondary water system

The entire heat output of the machine must be removed via the secondary water system.

➢ Ensure that the user has installed a complete cooling circuit for the machine.

The cooling circuit contains, for example

- The recirculation of the water with a pump:
  The required flow is only ensured when a sufficient differential pressure is present throughout the entire water system.
- An air main charging system:
  Static pressure must be maintained within the permissible limits in all operating states.
- A safety relief valve
- Dirt trap
- A venting system:
  Water should be free of gas bubbles.

7.12 Option H23
Hot air outlet with regulation

Option H23 causes the T4 discharge temperature of the second stage airend to raise when the bypass to circumvent the heat exchanger of the first stage airend is (partially) opened.

The adjustable target value T4w affects the actual value T4 using the valve V32.

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

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

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

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

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

8 Operation

8.1 Switching on and off

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

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

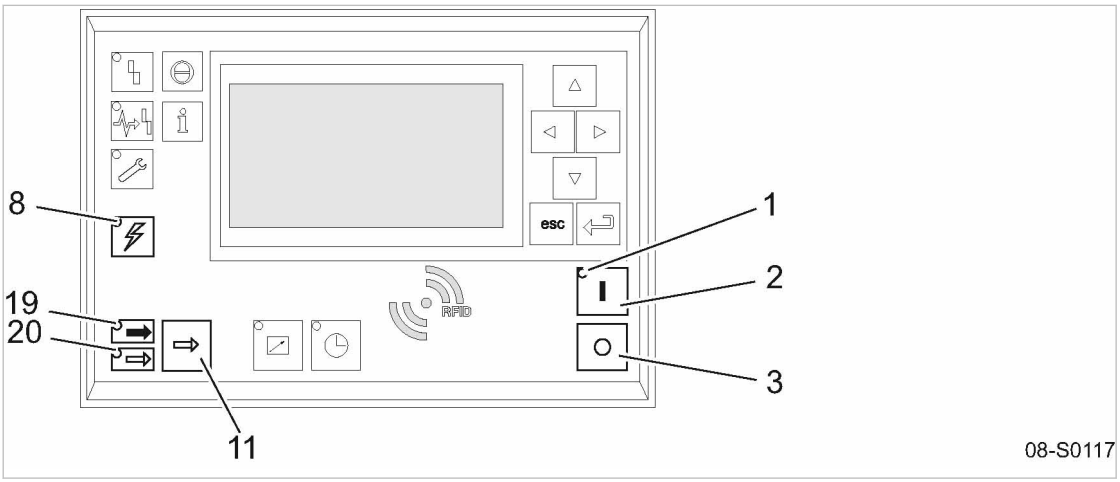


Fig. 33 Switching on and off

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

The machine temperature has reached at least 37°F.

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

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

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

8.1.2 Switching off

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

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

1. Press the «OFF» key once.

   The *Machine ON* LED flashes.

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

➢ Press «OFF» once again.

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

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

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

8.2 Switching off in an emergency and switching on again

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

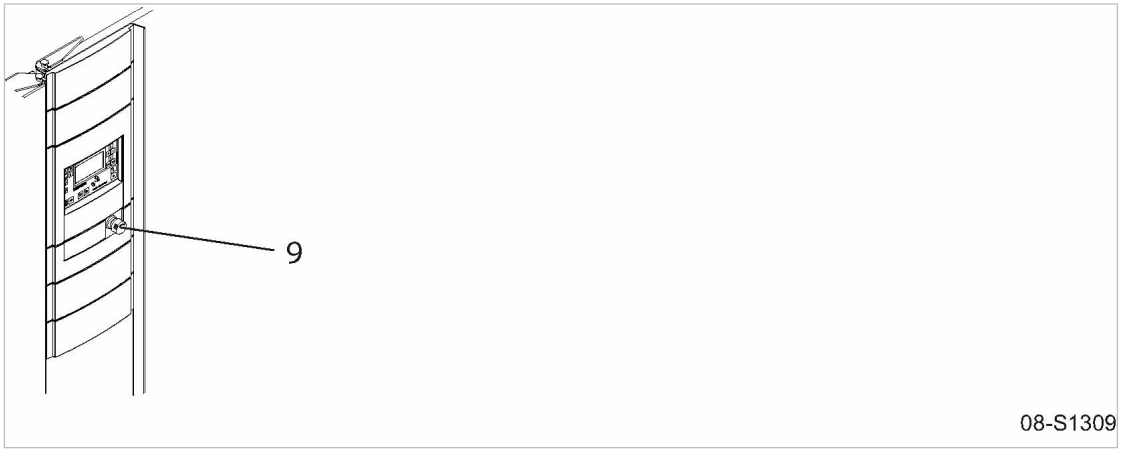


Fig. 34 Switching off in an emergency

[9] EMERGENCY STOP push-button

Switching off

➢ Press the EMERGENCY STOP push-button.

The EMERGENCY STOP button remains latched after actuation.

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

Switching on

Precondition The fault has been rectified

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

8.3 Switching on and off from a remote control center

Precondition A link to the remote control center exists.

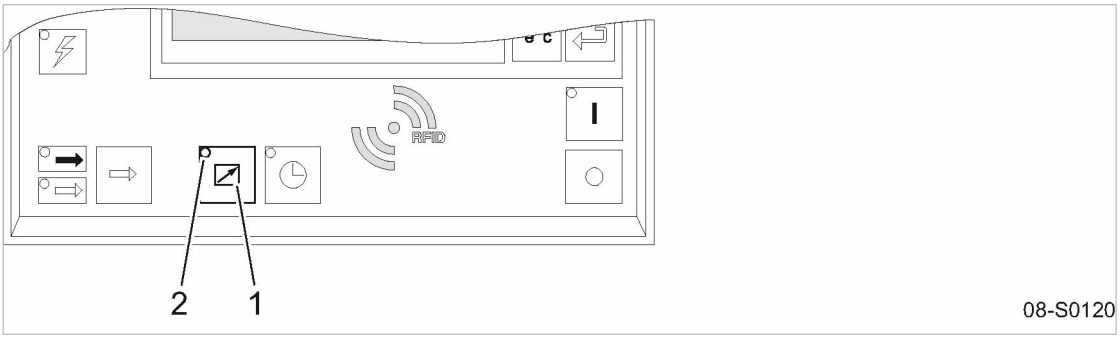


Fig. 35 Switching on and off from a remote control center

[1] «Remote control» key
[2] *Remote control* LED

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

⚠ WARNING

Remote control: Danger of unexpected starting!

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

Tab. 53 Machine identification

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

⚠ WARNING

Remote control: Danger of unexpected starting!

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

Tab. 54 Remote control identification

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

8.4 Switching on and off with the shift clock

Precondition The shift clock is programmed.

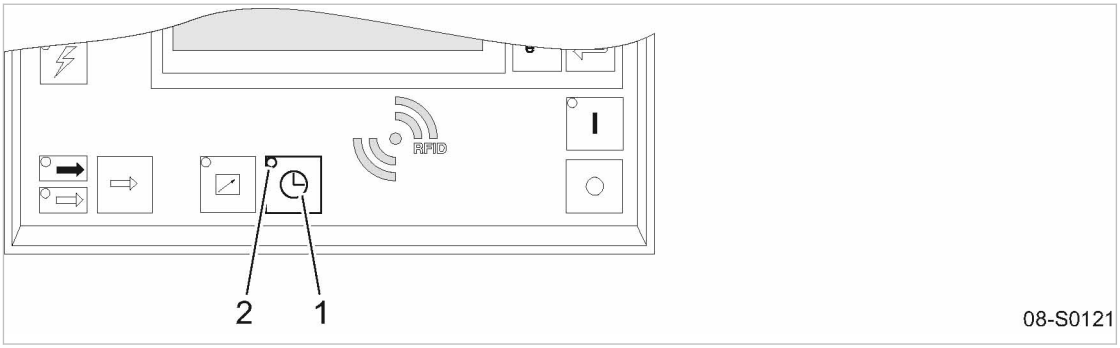


Fig. 36 Switching on and off with the shift clock

[1] «Shift clock» key
[2] *Shift clock* LED

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

⚠ WARNING

Time control: Danger of unexpected starting!

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

Tab. 55 Machine identification

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

8.5 Interpreting operation messages

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

Operating messages are identified with the letter O.

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

8.6 Acknowledging alarm and warning messages

Messages are displayed on the "new value" principle:

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

or

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

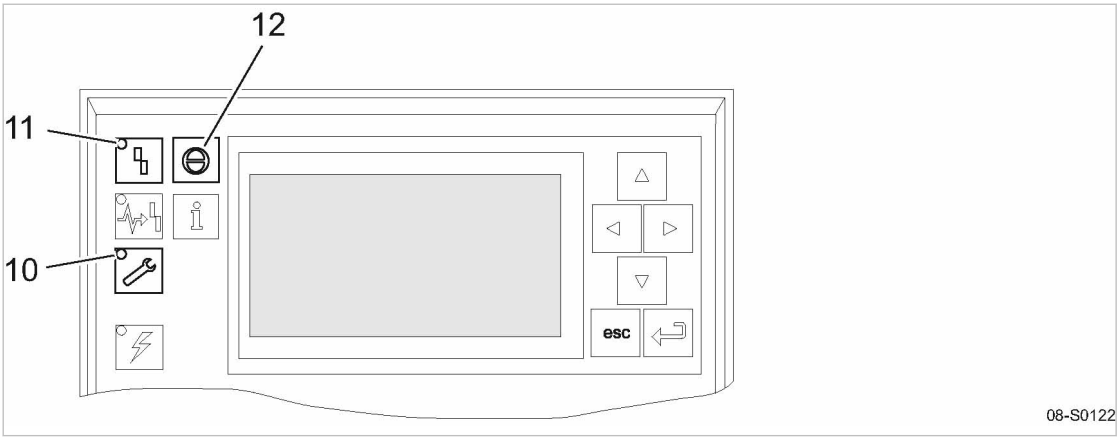


Fig. 37 Acknowledging messages

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

Alarm message

An alarm shuts the machine down automatically. The red *Alarm* LED flashes.

The system displays the appropriate message.

Precondition The fault has been rectified

➢ Acknowledge the message with the «Acknowledge» key.

Alarm LED extinguishes.

The machine is ready for operation again.

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

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

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

Warning message

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

The system displays the appropriate message.

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

➢ Acknowledge the message with the «Acknowledge» key.

The *Warning* LED extinguishes.

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

9 Fault Recognition and Rectification

9.1 Basic instructions

There are three types of fault:

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

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

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

Further information

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

9.2 Other faults

Fault	Possible cause	Remedy
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	Contact an authorized KAESER service representative.
	Venting valve not closing.	Contact an authorized KAESER service representative.
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose connections.
	Air consumption is greater than the capacity of the compressor.	Check the air system for leaks. Shut down consumer(s).
Cooling oil leaking into the machine.	Leaking pipe joints.	Tighten pipe joints. Replace seals.
	Heat exchanger for cooling oil leaks.	Contact an authorized KAESER service representative.
Cooling oil leaking next to the fine filter.	Solenoid valve defective.	Replace the solenoid valve.
	Vacuum intake nozzle clogged.	Clean the vacuum intake nozzle.
	Fine filter clogged.	Replace the filter element.
	Main pressure p5 too low during operation.	Contact an authorized KAESER service representative.

Fault	Possible cause	Remedy
Cooling oil in the exhaust ducting.	Solenoid valve defective.	Contact an authorized KAESER service representative.
	Ultra-fine filter defective.	

Tab. 56 Other faults and remedies

10 Maintenance

10.1 Ensuring safety

Follow the instructions below to ensure safe machine maintenance.
Warning instructions are displayed prior to a potentially dangerous task.

⚠ Disregarding warning instructions can cause serious injuries!

Complying with safety instructions

Ignoring safety instructions can cause unforeseeable dangers.

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

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

Tab. 57 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.

When working on live components

Touching voltage carrying components can result in electric shocks, burns or death.
Dangerous voltages persist in the frequency converter and intermediate circuit capacitors for some time after power is switched off.
Live components are exposed when the frequency converter cabinet is opened.

- ➢ Work on electrical equipment may be carried out only by authorized electricians.
- ➢ Switch off and lock out / tag out the power supply disconnecting device and verify the absence of voltage.
- ➢ Check that the floating relay contacts are voltage-free.
- ➢ Before starting work on the frequency converter or intermediate circuit capacitors, wait at least 5 minutes.

When working on the compressed air system

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

- ➢ Close shut-off valves or otherwise isolate the machine from the compressed air network to ensure that no compressed air can flow back into the machine.

➢ Fully vent all pressurized components and enclosures.
➢ Check all hose couplings in the compressed air system with a hand-held pressure gauge to ensure that they all read 0 psig.
➢ Do not open or dismantle any valves.

When working on the drive system

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

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

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

10.2 Maintenance schedule

10.2.1 Logging maintenance work

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

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

Adverse conditions are, for example.:

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

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

➢ Document all maintenance and service work.
This enables the frequency of individual maintenance tasks and deviations from our recommendations to be determined.

Further information A prepared list is provided in chapter 10.20.

10.2.2 Resetting maintenance interval counters

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

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

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

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

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

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

10.2.3 Regular maintenance tasks

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

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

Interval	Maintenance task	See chapter
Weekly	Check for leaks.	10.3
	Ventilation: Check filter mats	10.6
	Control cabinet: Check filter mats	10.5
	Check the condensate drain.	10.18
Display: SIGMA CONTROL 2	Motor maintenance.	10.8
	Check the coupling.	10.9
Up to 6000 h At least annually	Check the cooling oil level.	10.13
	Clean the heat exchanger.	10.7
	Ventilation: Change the filter mats.	10.6
	Control cabinet: Change the filter mats.	10.5
Up to 6000 h At least every 2 years	Maintaining the condensate drain: Change the service UNIT.	10.18.3
Display: SIGMA CONTROL 2 Up to 6000 h At least every 2 years	Service the air filter.	10.4
Display: SIGMA CONTROL 2 Maintenance intervals, see table 59	Gear: Change the cooling oil.	10.14
Display: SIGMA CONTROL 2 Up to 12000 h At least every 4 years	Gear: Change the oil filter.	10.15
Up to 12000 h At least every 4 years	Gear ventilation: Change the filter element.	10.16
	Change the control air filter.	10.19

h = operating hours

Interval	Maintenance task	See chapter
Annually	Check all electrical connections for tightness.	–
	Check the safety relief valves.	10.12
	Check safety shut-down devices in the event of excessive airend discharge temperatures or cooling water outlet temperatures.	10.10
	Check the EMERGENCY STOP push button.	10.11
h = operating hours		

Tab. 58 Regular maintenance tasks

10.2.4 Cooling oil: Change interval

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

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

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

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

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

Tab. 59 Cooling oil: Change intervals

10.2.5 Regular maintenance tasks

The table below lists necessary maintenance tasks.

➢ Have an authorized KAESER service representative carry out maintenance tasks.

➢ Always perform maintenance tasks promptly, taking ambient and operating conditions into account:

Interval	Maintenance task
Up to 6000 h At least every 2 years	Service check valve at condensate outlet stage 1.
Up to 12000 h At least every 4 years	Service the following valves: ■ Check valve at pulsation dampener ■ Overflow valve
h = operating hours	

Interval	Maintenance task
Up to 18000 h At least every 6 years	Service the following valves: ■ Inlet valve ■ Solenoid valve ■ Combination valve (oil temperature regulator) ■ Pressure control valve ■ Check valve condensate outlet stage 2
Up to 18000 h At least every 4 years	Fan motor: Replace anti-friction bearings with permanent lubrication.
Up to 36000 h At least every 6 years	Replace plastic piping and hose lines.
Up to 36000 h At least every 8 years	Compressor motor: Replace the anti-friction bearing. Fan motor: Replace anti-friction bearings with re-greasing device.
At least every 20 years	Replace safety-relevant components of the safety functions (see chapter 3.7).
h = operating hours	

Tab. 60 Regular service tasks

10.3 Checking the machine for leaks

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

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

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

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

The machine leaks?

➢ Contact an authorized KAESER service representative.

10.4 Air filter maintenance

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

If the warning message *0113* is displayed on the SIGMA CONTROL 2, change the prefilter at the earliest opportunity (see chapter 10.4.1).
Change the filter mat [2] at the same time, see chapter 10.6.

If the warning message *0013* or fault message *0114* is displayed, change the air filter together with the prefilter (see Chapter 10.4.2).
Change the filter mat [2] at the same time, see chapter 10.6.

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

The machine has cooled down.

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

10.4.1 Replacing the prefilter

Material Prefilter

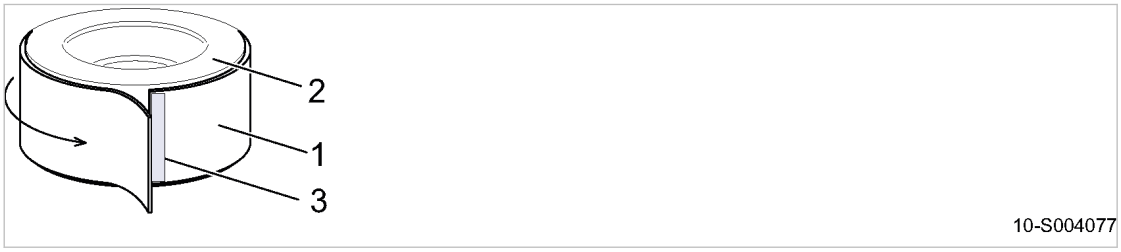


Fig. 38 Replacing the prefilter

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

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

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

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

   The maintenance message is acknowledged.

10.4.2 Replacing the air filter

All sealing surfaces have been designed to match each other. The use of unsuitable air filters can permit dirt to enter the pressure system, thus causing damage to the machine.

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

Material Air filter (incl. prefilter)

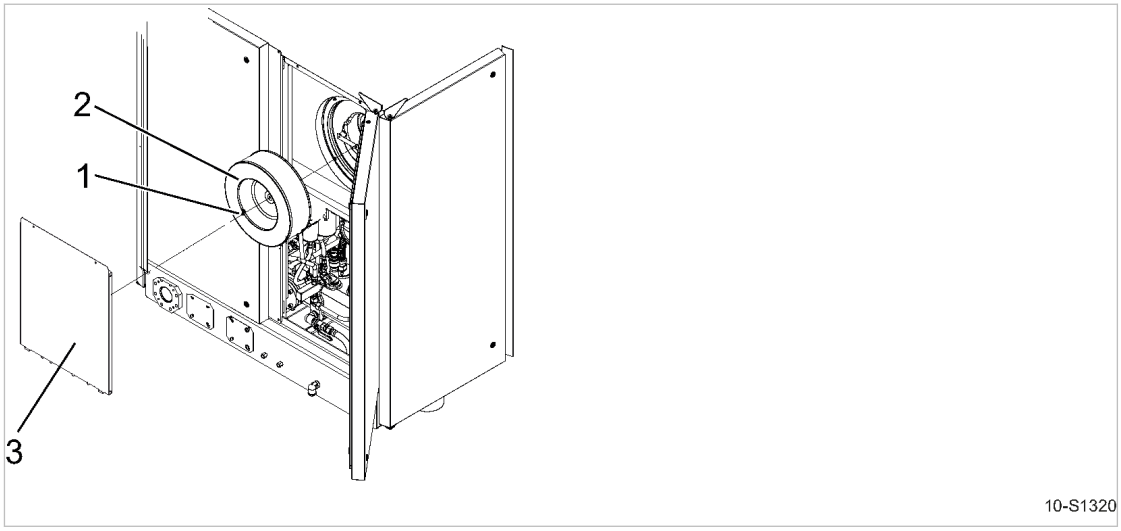


Fig. 39 Replacing the air filter (incl. prefilter)

[1] Wing nut
[2] Air filter
[3] Cover

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

10.5 Control cabinet: Clean or replace the filter mats

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

Material Warm water and household detergent

Spare parts (as required)

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

The machine is cooled down.

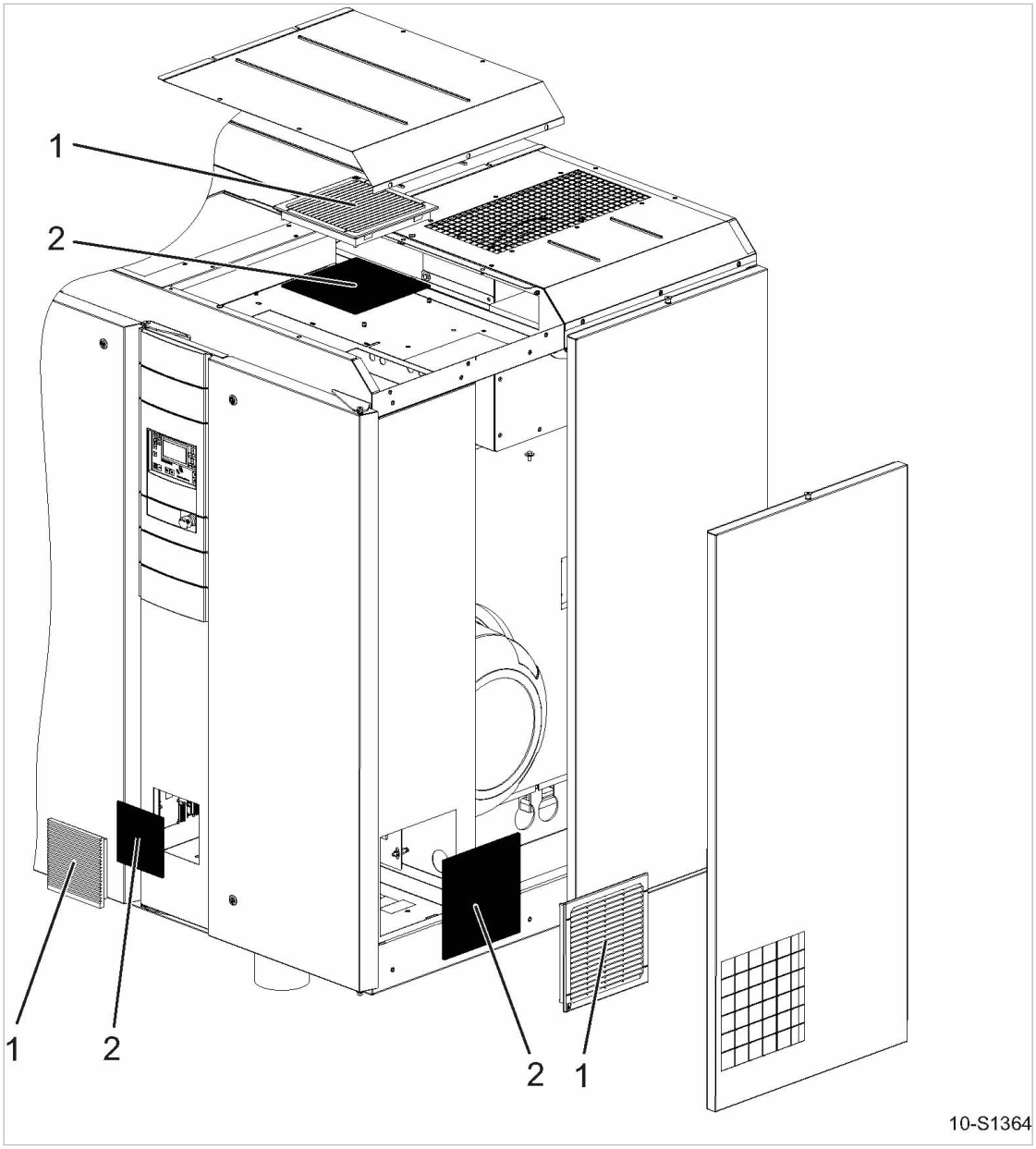


Fig. 40 Switching cabinet ventilation

[1] Ventilation grill
[2] Filter mat

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

10.6 Machine ventilation: Clean or replace the filter mats

Filter mats protect the machine against dirt accumulation A sufficient ventilation of the machine is no longer ensured, when the filter mats are soiled.

Material Warm water with household detergent.
Spare parts (as required).

Precondition The machine is switched off.

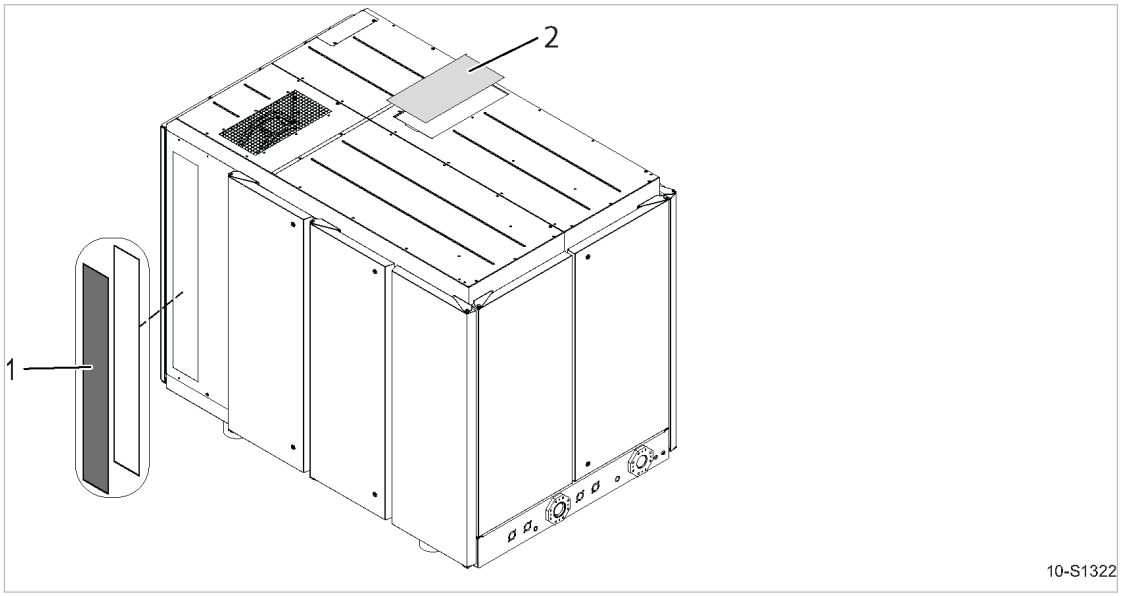


Fig. 41 Cleaning the filter mats
[1] Filter mat (ventilation)
[2] Filter mat (intake air)

In order to increase the effectiveness of the filter mat [1], a filter mat with coarse structure is placed upstream of a filter mat with a finer structure. The thinner, white filter mat in the interior is held by the external black filter mat.

1. Carefully remove the filter mat [1] from the retaining frame.
2. Beat black and white filter mats or use a vacuum cleaner to remove loose dirt. If necessary, wash with lukewarm water and household detergent and allow to dry before inserting.
3. Replace the filter mats if cleaning is not possible or if the change interval has expired.
4. Carefully insert the filter mat [1] in the retaining frame.

The filter mat [2] cannot be cleaned and must be replaced if required or when the change interval has expired.

1. Remove and dispose of the filter mat [2].
2. Carefully insert the new filter mat in the retaining frame.

10.7 Cleaning the heat exchanger

Heat exchanger clogging causes overheating and machine damage. The temperature values will rise at the beginning only gradually in practice. This rise accelerates with increased clogging. This is a sure sign that the heat exchangers require cleaning.

➢ Monitor the following temperature values in order to early detect a temperature rise.

- T31 – T10 (T31 minus T10)
- T51 – T10 (T51 minus T10)
- Alarm message for T66
- T13

Check the heat exchanger regularly for leaks and contamination.

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

Checking for leaks

Pressure in the cooling oil circuit is generally higher than that in the cooling water system. If a leak occurs, cooling oil will run into the cooling water.

1. Check the heat exchanger visually for leaks.
2. An authorized KAESER service representative should check the heat exchanger for internal leaks at least once a year.

Cleaning

The cleaning frequency strongly depends on the following factors (examples):

- Cooling water composition
- Temperature values
- Open or closed water system
- Flow rate

1. Request a cleaning of the heat exchanger by an authorized KAESER service representative when you detect a considerable rise of the aforementioned temperatures.

10.8 Motor maintenance

In motors with anti-friction bearings with re-greasing facility, the grease fittings are located at the outside of the machine. The grease lines are filled at the factory.

➢ Use only the high temperature grease UNIREX N3 for the anti-friction bearings. Damage to bearings caused by the use of other brands of grease is excluded from the warranty.

➢ The required grease quantity is shown in the tables in chapter 2.11.

Material Bearing grease: UNIREX N3
Cleaning cloth

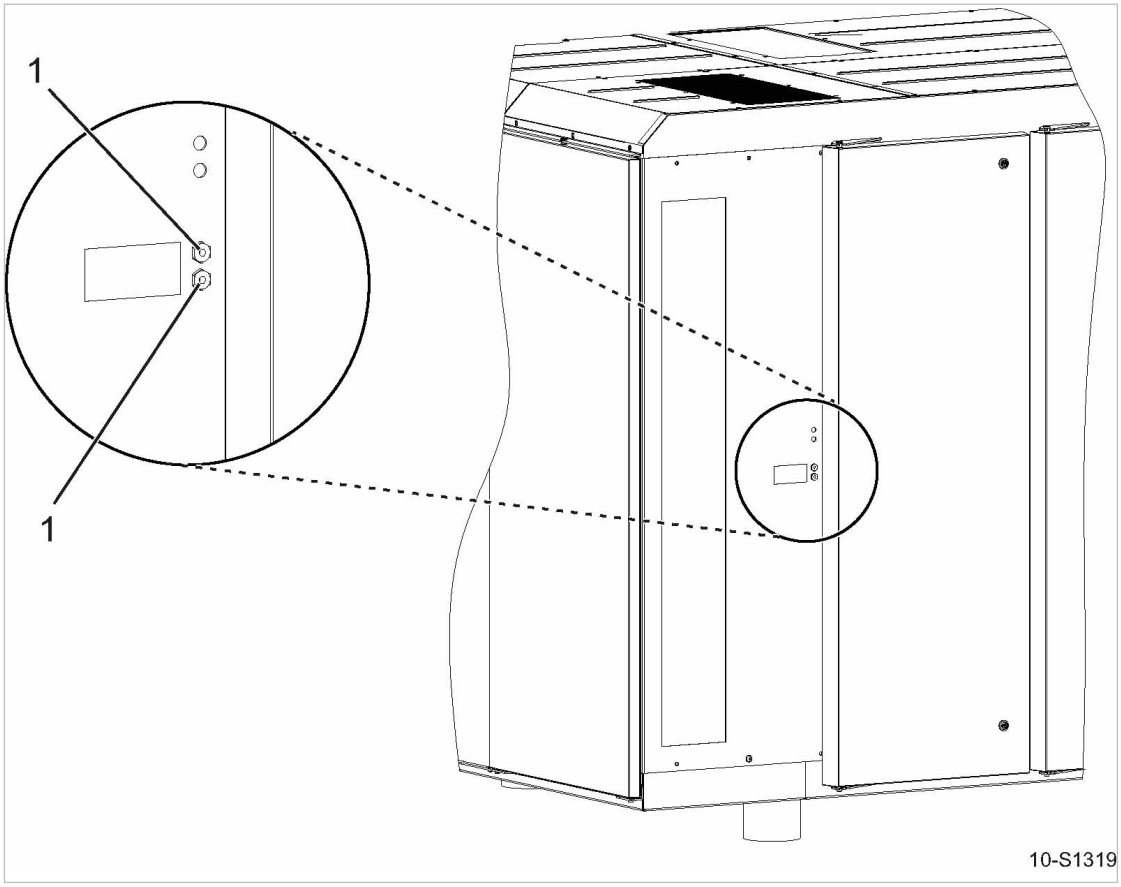


Fig. 42 Motor maintenance
[1] Grease fitting (compressor motor)

Compressor motor:

Precondition Compressor motor running

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

Fan motor:

➢ Have the fan motor checked by a KAESER service representative during the course of a maintenance call.

10.9 Checking the coupling

A defective coupling is recognizable by:

- noisy running
- surface cracks
- color change.

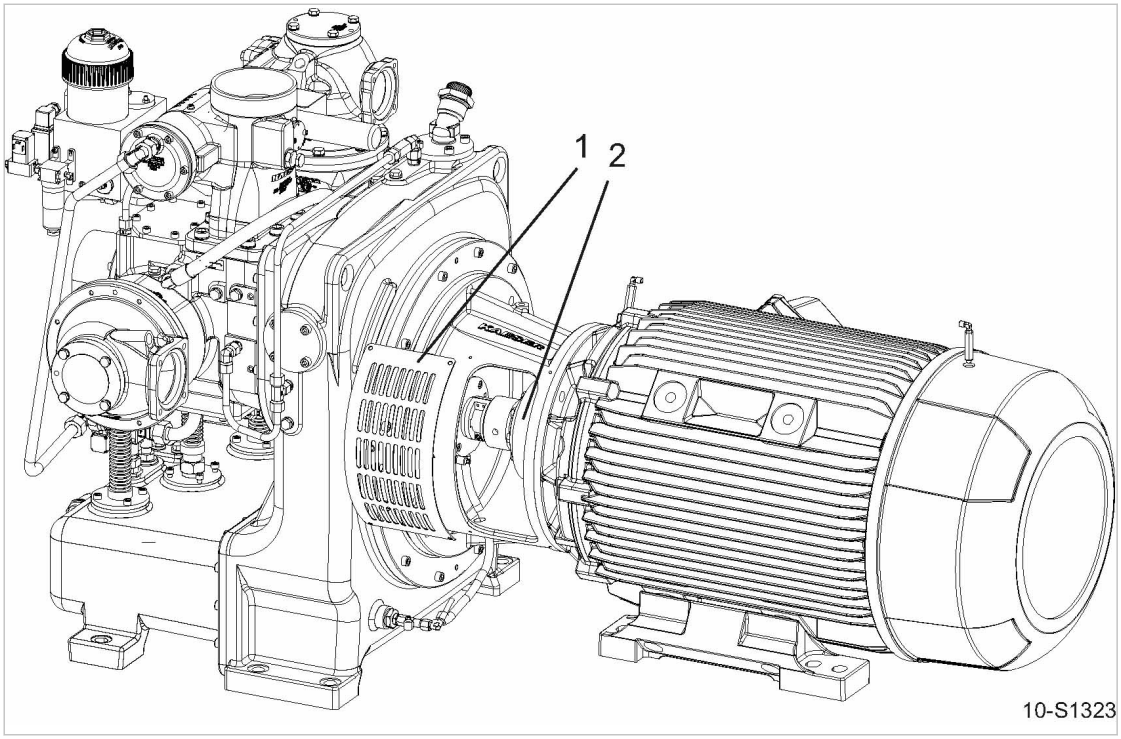


Fig. 43 Checking the coupling

[1] Safety screen
[2] Coupling

Checking for uneven or noisy running

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

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

Visually check for damages

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

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

? Does the coupling have cracks or changes in color?
➢ Have a damaged coupling changed by an authorized KAESER service representative.

10.10 Checking the overheating safety shutdown function

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

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

The machine does not shut down?

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

10.11 Check the EMERGENCY STOP push button

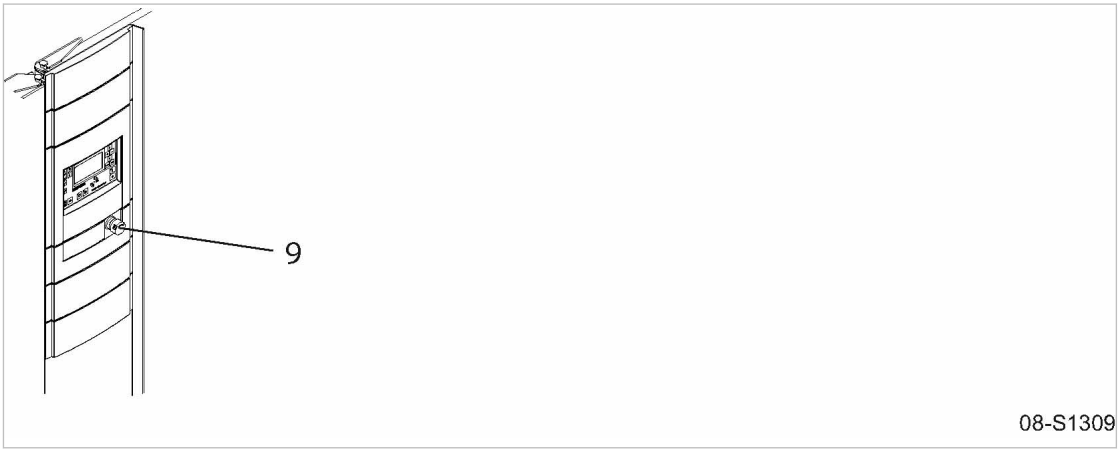


Fig. 44 Check the EMERGENCY STOP push button

[9] EMERGENCY STOP push button

Precondition The compressor motor is running

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

The compressor motor does not stop?

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

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

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

10.12 Testing the safety relief valves

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

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

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

Perform an internal inspection only in the following situations:

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

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

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

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

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

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

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

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

⚠ WARNING
High noise level when doors are open!
Risk of hearing damage.
➢ *Always wear ear protection.*

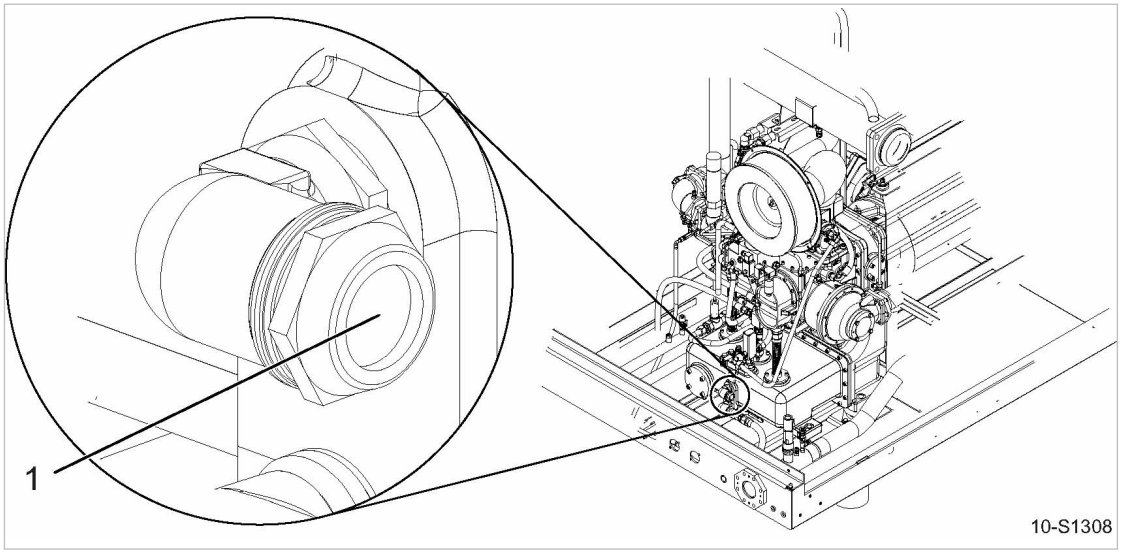


Fig. 45 Checking the cooling oil level
[1] Oil sight glass

Checking the cooling oil level

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

Escaped oil indicates a leak.
- ➢ Eliminate the cause of the leak before reactivating the machine.

Replenish cooling oil

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

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

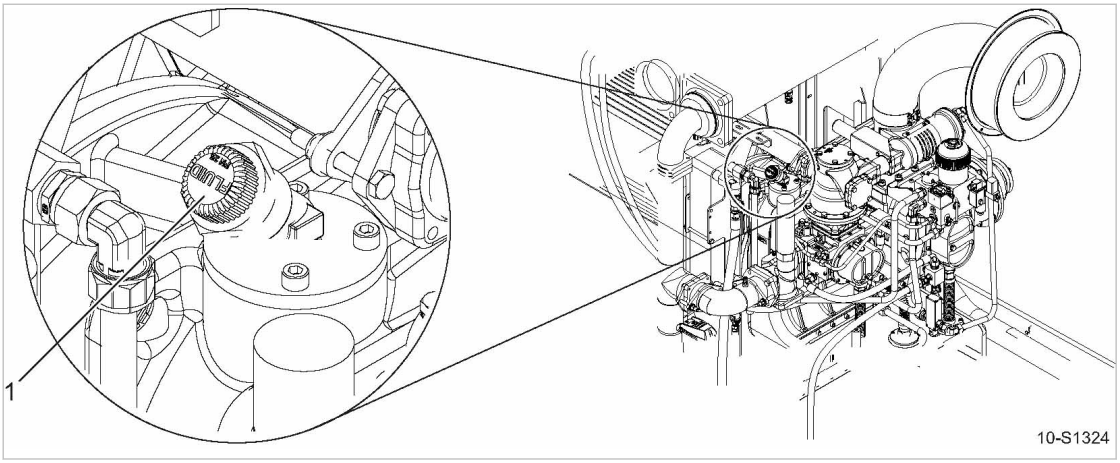


Fig. 46 Replenish cooling oil
[1] Screw plug

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

Starting the machine and performing a test run

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

10.14 Changing the cooling oil (gear)

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

Material Cooling oil
Cooling oil receptacle

Precondition You can drain the cooling oil faster when it is warm (T66 >130 °F) and thus less viscous.
The power supply disconnecting device is switched off,
lock out and tag out the device,
verify the absence of voltage

⚠ WARNING

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

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

Drain cooling oil from the transmission pan

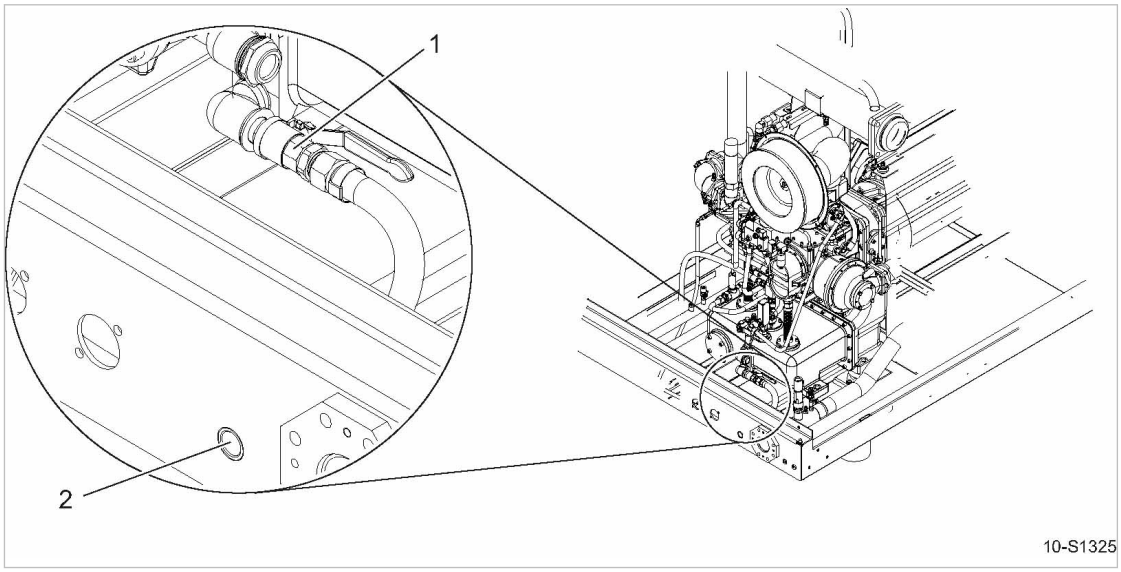


Fig. 47 Draining cooling oil from the transmission pan

[1] Shut-off valve
[2] Drain hole

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

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

Draining the cooling oil from the heat exchanger for oil cooling

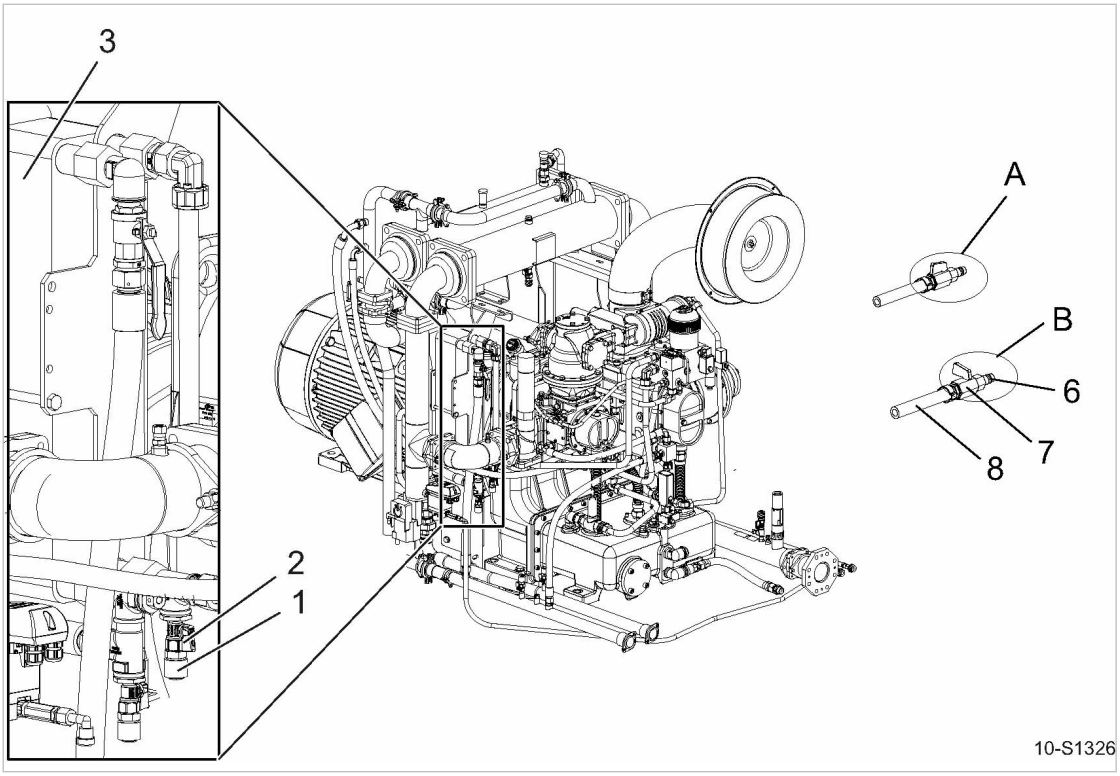


Fig. 48 Draining the cooling oil from the heat exchanger for oil cooling

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

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

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

Filling with cooling oil

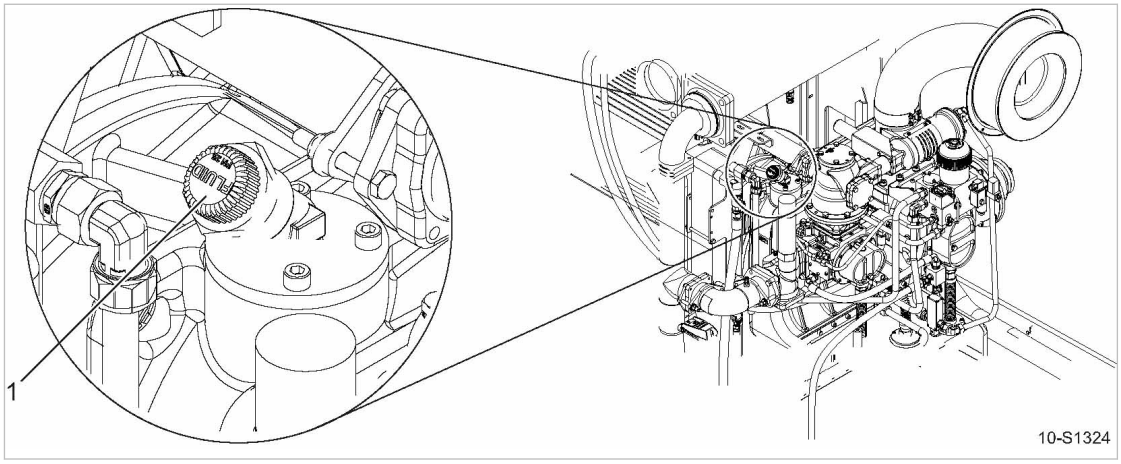


Fig. 49 Filling with cooling oil
[1] Screw plug

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

Starting the machine and performing a trial run

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

10.15 Changing the oil filter

Material Spare part
Cooling oil receptacle

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

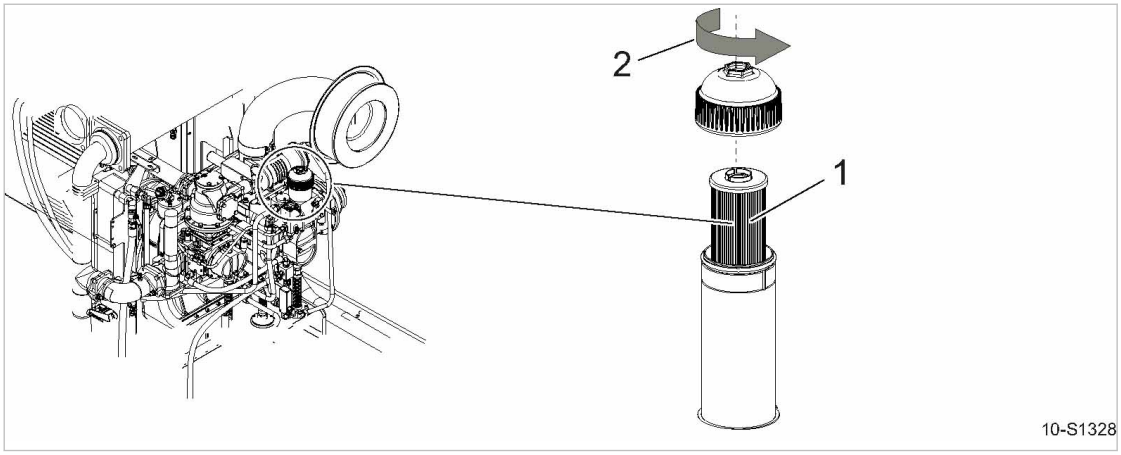


Fig. 50 Changing the oil filter

[1] Oil filter
[2] Direction of rotation for opening the filter housing

Changing the oil filter

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

The required torque is indicated on the cover.

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

Starting the machine and performing a test run

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

10.16 Compressed air filter: Changing the filter element for gear ventilation

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

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

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

10.16.1 Removing the filter element

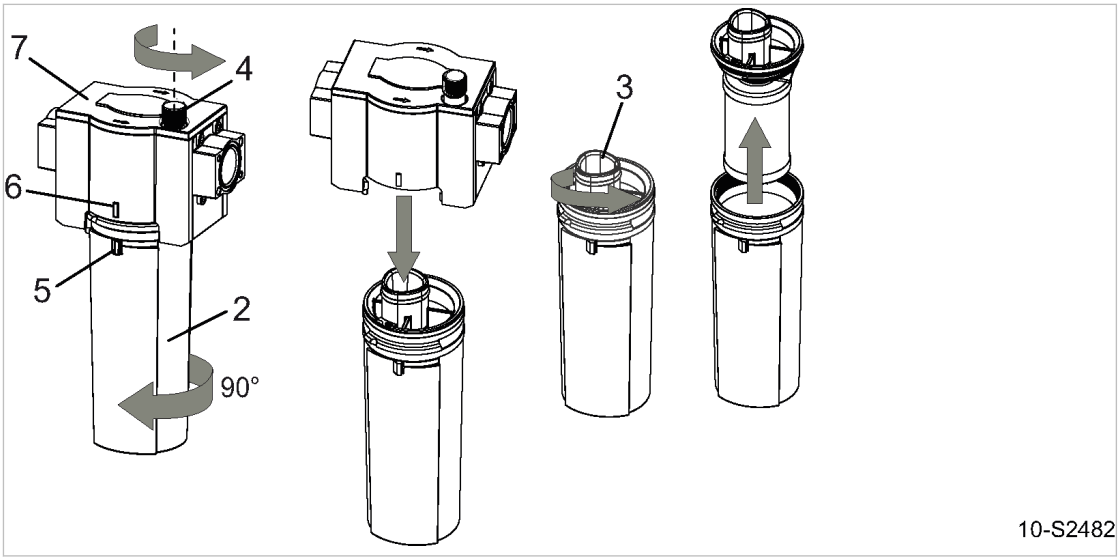


Fig. 51 Removing the filter element

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

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

The equipment emits persistent whistling?
The compressed air filter is pressurized!
➢ Disconnect the compressed air filter from the air network, or de-pressurize the entire air network.

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

The filter bowl is clearly corroded?
➢ Determine the cause (e.g., composition of the compressed air, operating conditions).
➢ Replace the compressed air filter completely.

Dispose of the contaminated filter element according to environmental regulations.

10.16.2 Installing the filter element

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

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

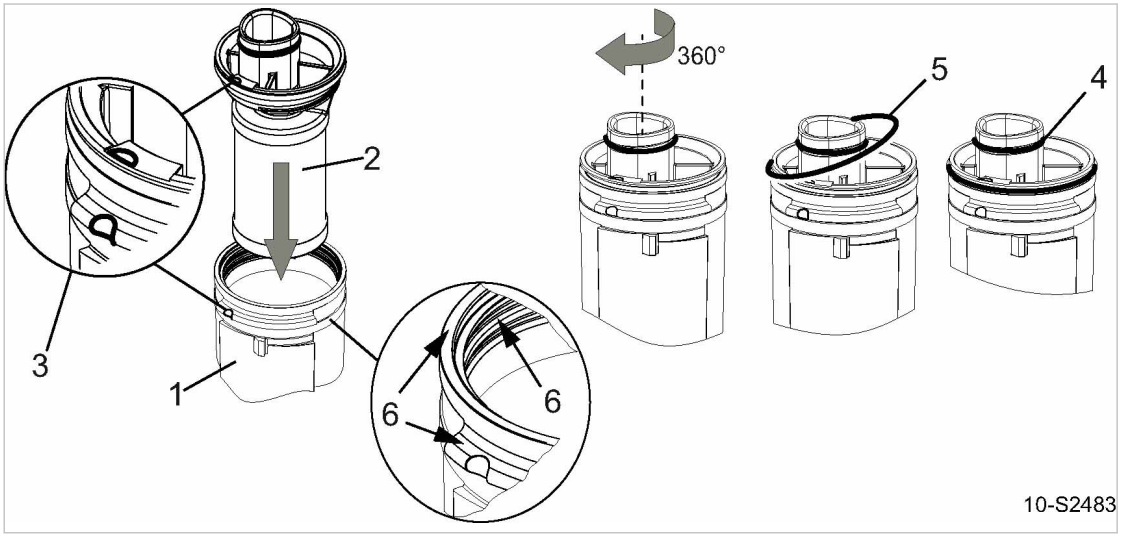


Fig. 52 Installing the filter element

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

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

10.16.3 Installing the filter bowl

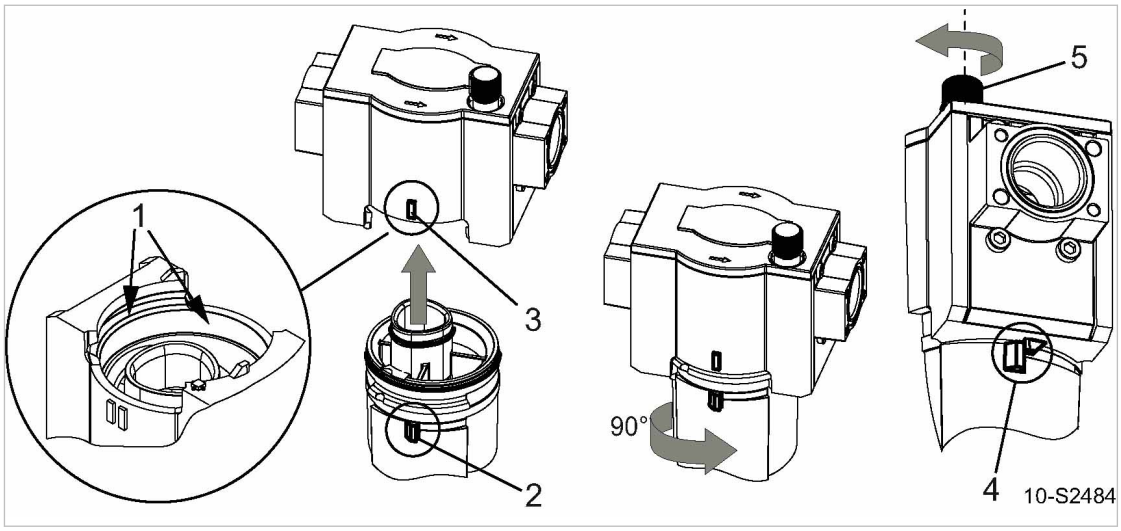


Fig. 53 Installing the filter bowl

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

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

You cannot tighten the locking screw?

The bayonet catch of the filter bowl is not fully closed.

➢ Turn the filter bowl to the stop.

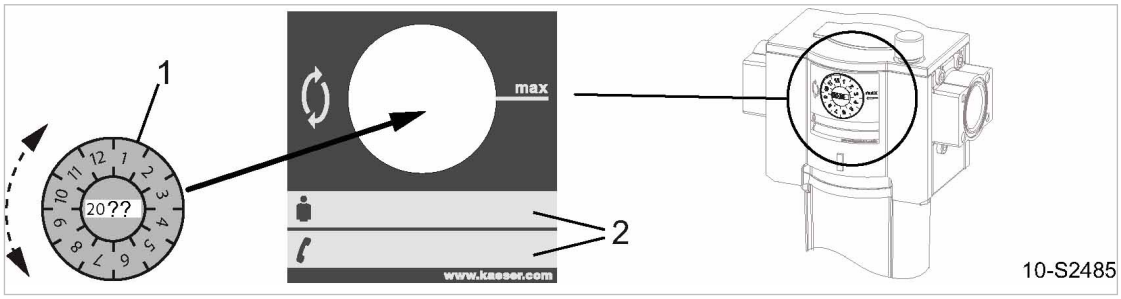


Fig. 54 Amend the maintenance sticker.

1 Maintenance sticker
2 Service contact information

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

10.17 Venting the machine (depressurizing)

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

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

Venting takes place in two steps:

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

Material: Male hose fitting with shut-off valve and maintenance hose

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

⚠ WARNING

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

➢ *Depressurize all pressurized components and enclosures.*

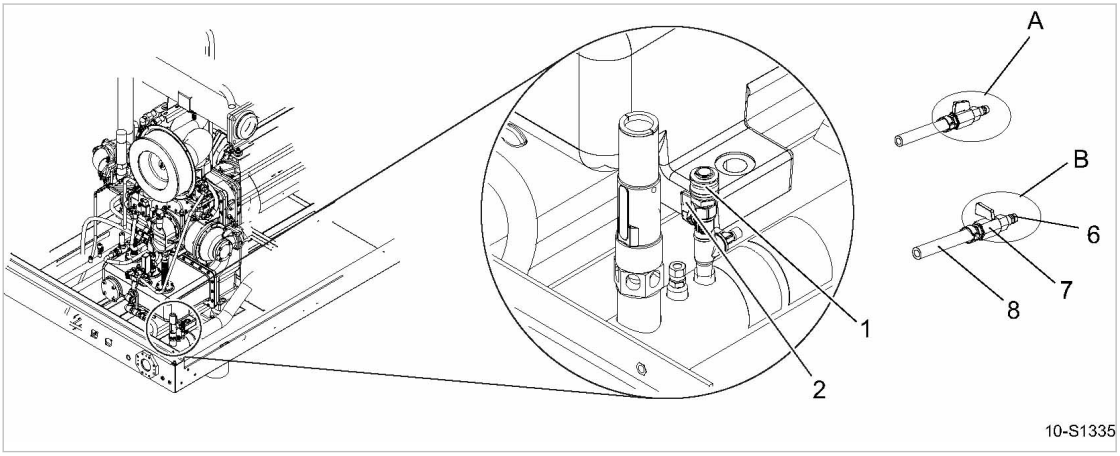


Fig. 55 Venting the machine

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

Isolating the machine from the air system

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

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

Manually draining the compressed air

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

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

10.18 Condensate drain maintenance

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

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

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

10.18.1 Checking the condensate drain downstream from stage 1

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

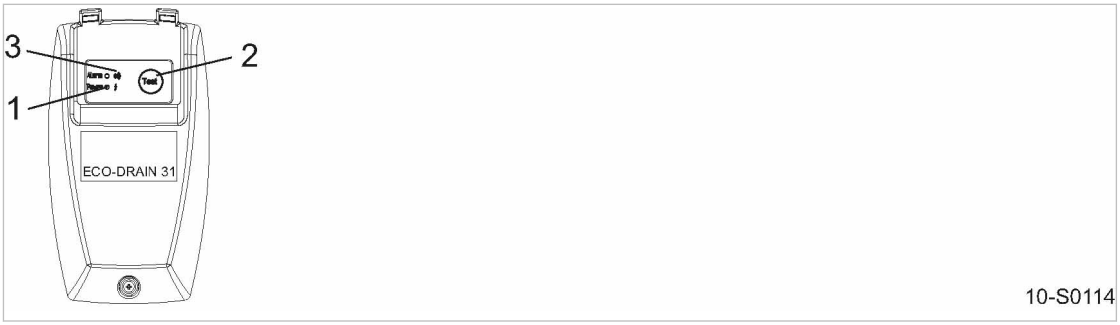


Fig. 56 Checking the condensate drain

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

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

Result As soon as the condensate drain opens, you will feel a short pressure surge in the condensate line.

In the event that you do **not** feel any pressure surge during the manual test, replace the service unit.

10.18.2 Checking the condensate drain downstream from stage 2

Precondition The machine is switched off.

The *Power* LED is illuminated.

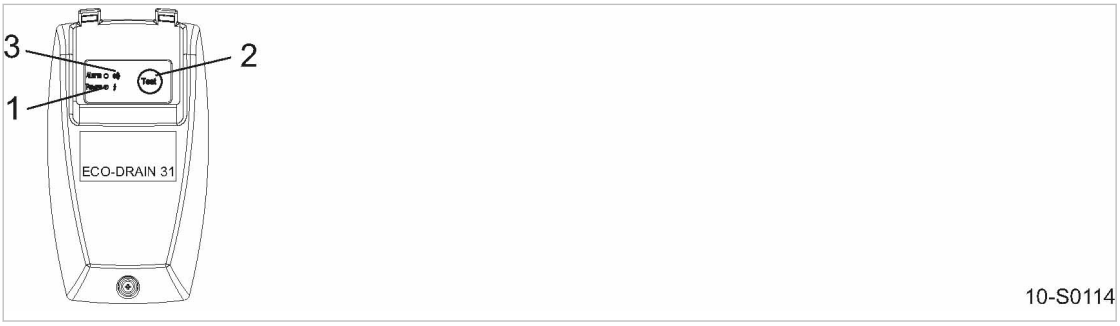


Fig. 57 Checking the condensate drain

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

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

Result As soon as the condensate drain opens, you will feel a short pressure surge in the condensate line.

In the event that you do **not** feel any pressure surge during the manual test, replace the service unit.

10.18.3 Replacing the service unit

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

Material Sealing tape for sealing the screw-in part

If required: O-ring 16x2 (5.1519.0)

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

The machine is fully vented.

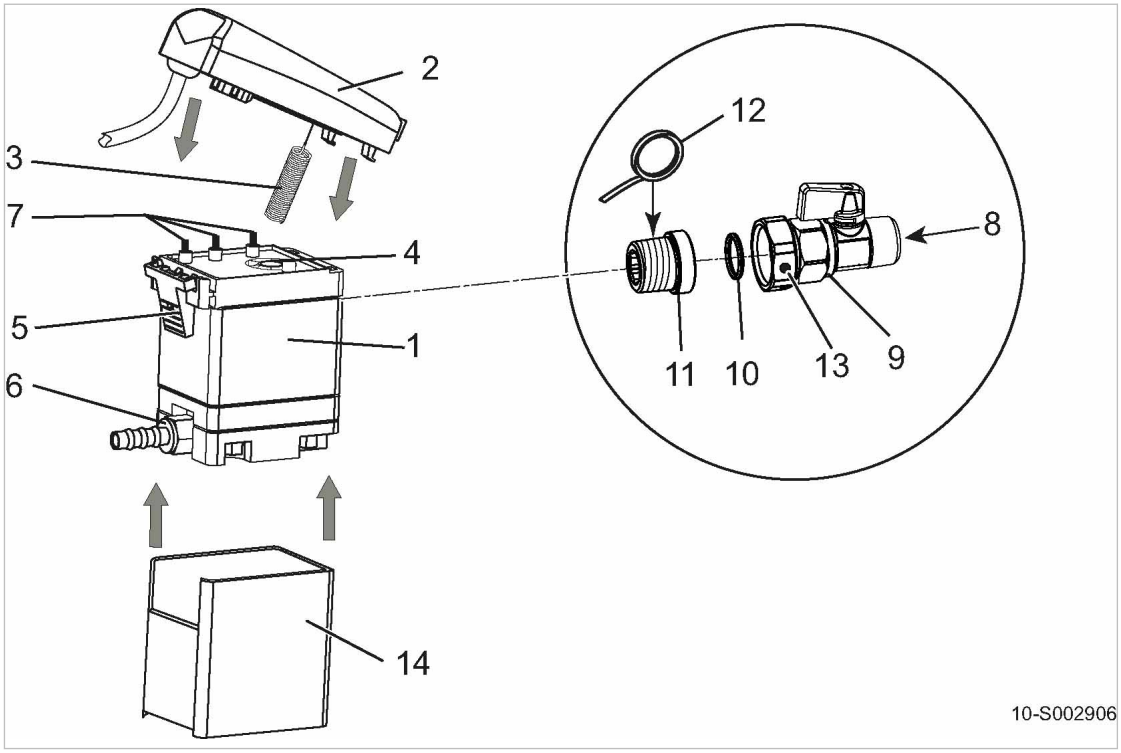


Fig. 58 Replacing the service unit

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

Removing the service unit

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

Installing the service unit

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

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

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

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

10.19 Changing the control air filter

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

➢ Do not use tools to open the filter housing.

Material Filter element

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

⚠ WARNING

Danger of burns from hot components.

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

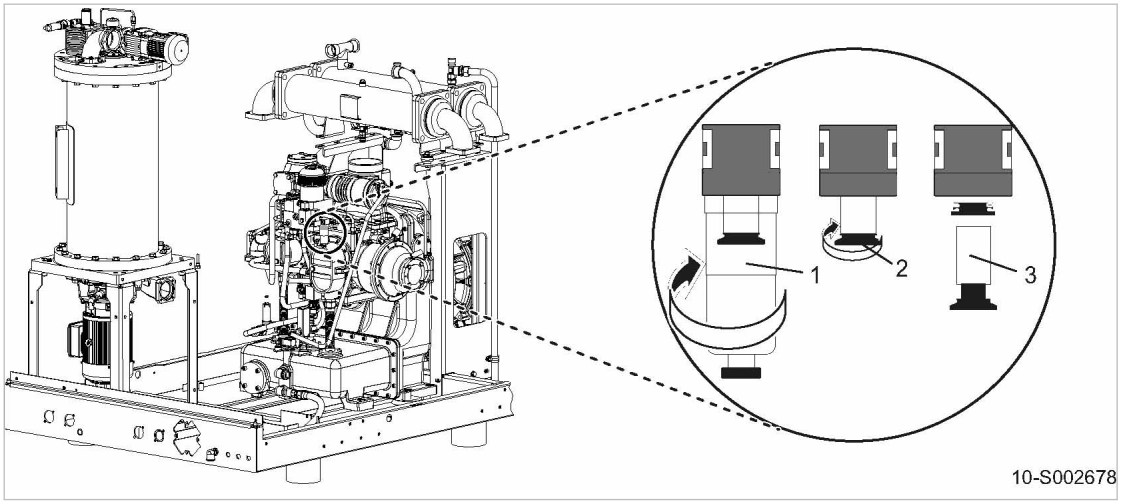


Fig. 59 Changing the control air filter

[1] Filter bowl
[2] Filter element bracket
[3] Filter element

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

10.20 Documenting maintenance and service work

Equipment number:

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

Date	Maintenance task carried out	Operating hours	Signature

Tab. 61 Logged maintenance tasks

11 Spares, Operating Materials, Service

11.1 Note the nameplate

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

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

11.2 Ordering spare parts and operating fluids/materials

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

⚠ WARNING

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

➢ *Use only original parts and operating fluids/materials.*

➢ *Have an authorized KAESER service representative carry out regular maintenance.*

Machine

Name	Number
Prefilter (air filter)	1249
Air filter	1250
Filter element (gearing ventilation)	1551
Filter element (control air filter)	1556
Cooling-air filter mat	1051
Filter mat (control cabinet)	1106
Filter mat (control cabinet frequency converter)	1150
Filter mat (intake air)	1053
Oil filter (gear)	1200
Service Unit condensate drain	9602
Cooling oil	1610
Bearing grease [g]	
100	9.0915.0
400	6.3234.0

Tab. 62 Spare parts

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

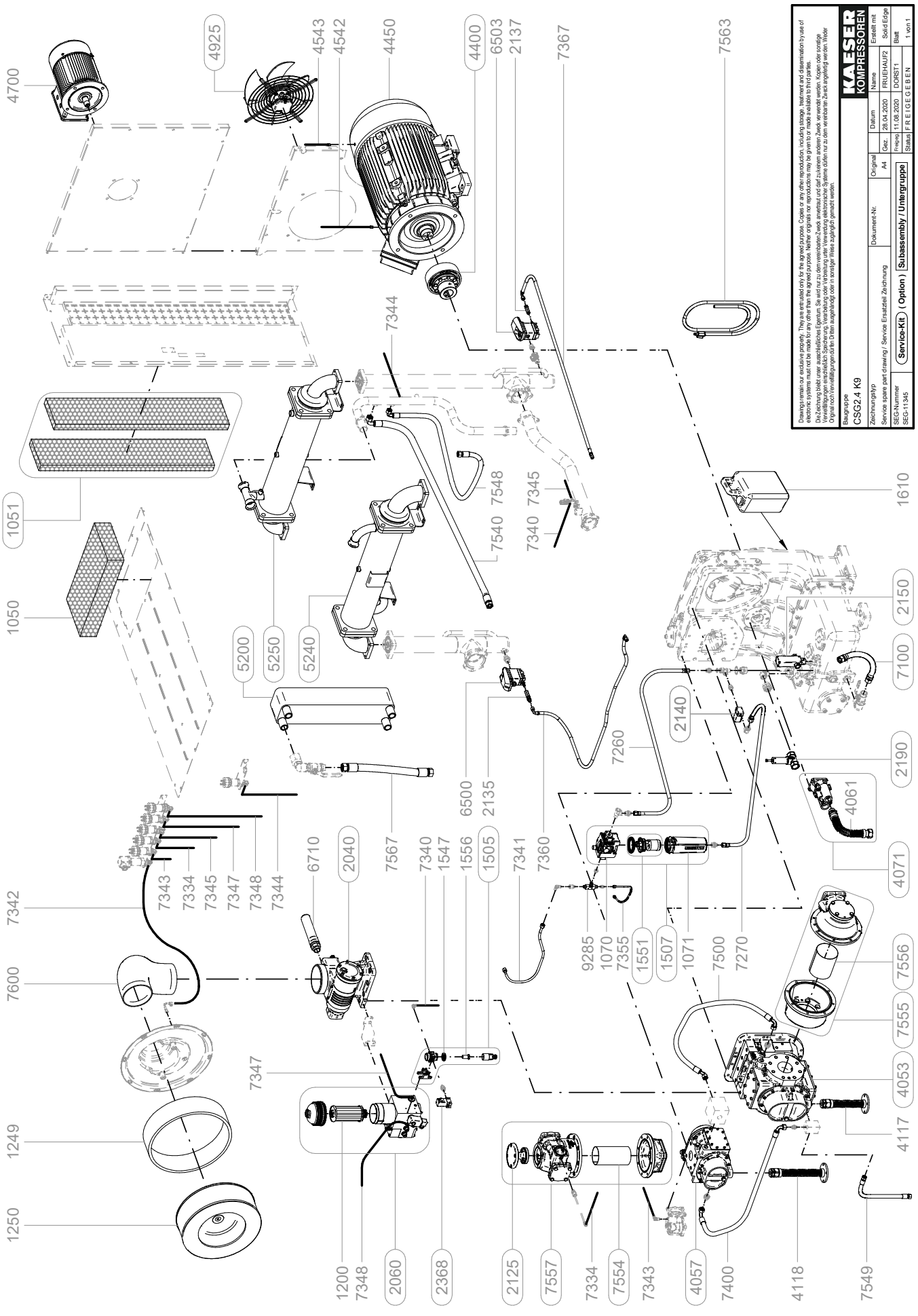
➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

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

11.4 Replacement parts for service and repair

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

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



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KAESER KOMPRESSOREN

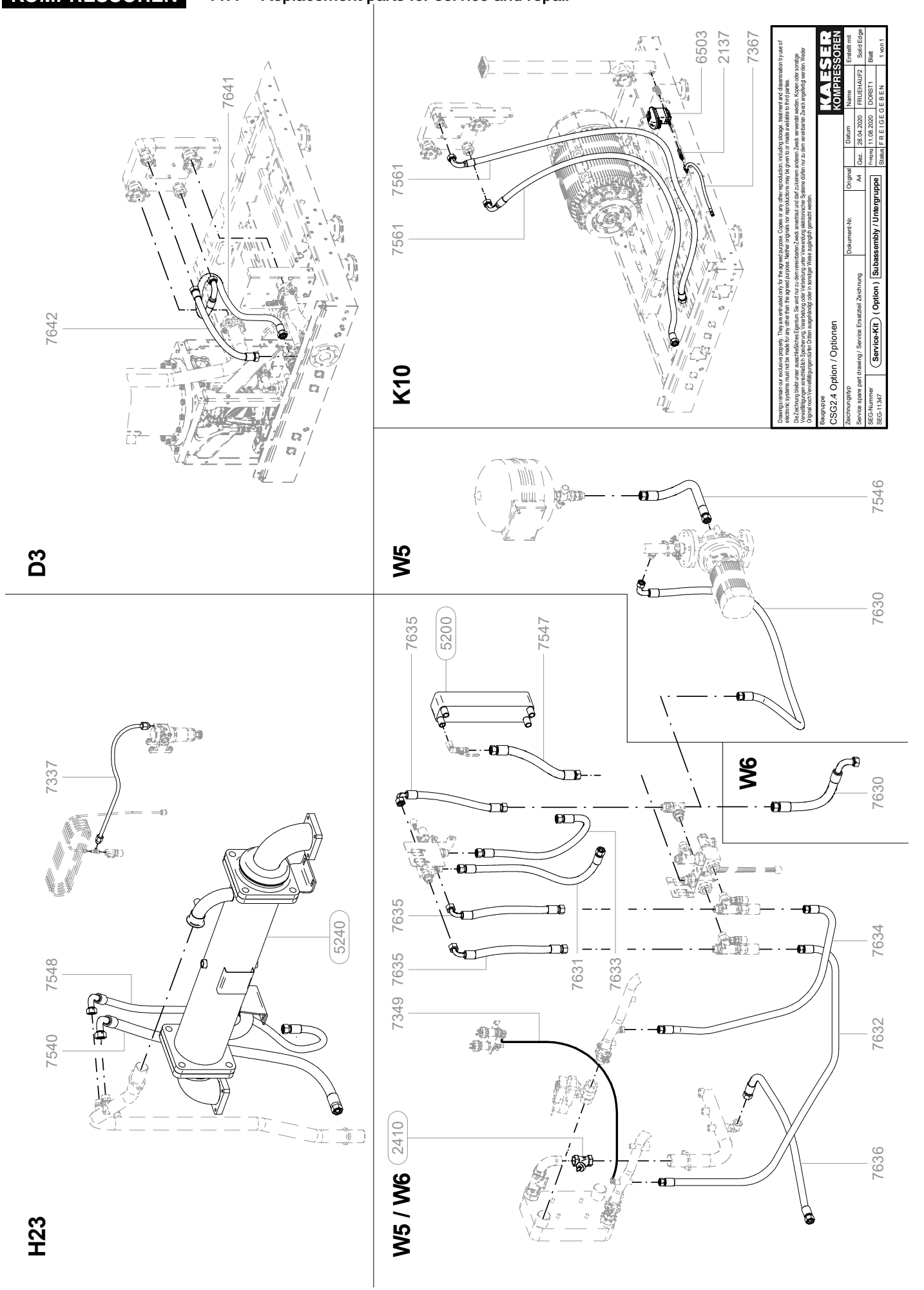
Baugruppe	Dokument-Nr.	Original	Datum	Name	Erstellt mit
CSG2.4 K9					
Zeichnungstyp		A4	Gez.	28.04.2020	FRUEHAUF2
Service spare part drawing / Service Ersatzteil Zeichnung			Freigib.	11.08.2020	DORST1
SEG-Nummer	Service-Kit (Option)	Subassembly / Untergruppe	Status	F R E I G E G E B E N	Blatt
SEG-11345					1 von 1

Legend	KAESER KOMPRESSOREN
CSG K11	SEL-4492_01 E

Item	Description	Option
1050	Filter mat, cooling air	
1051	Filter mat, cooling air kit	
1249	Prefilter fleece	
1250	Air filter insert	
1505	Control air filter	
1547	Casing gasket	
1556	Control air filter element	
1507	Gear vent damp-filter	
1070	Filter head	
1071	Filter bowl	
1551	Microfilter element	
1610	SIGMA FLUID	
2040	Inlet valve	
2042	Maintenance kit, inlet valve	
2044	Overhaul kit, inlet valve	
2060	Combination valve	
1200	Oil filter	
2062	Maintenance kit, comb. valve	
2064	Overhaul kit, comb. valve	
2135	Check valve, Condensate drain	
2137	Check valve, Condensate drain	
2140	Control valve	
2144	Control valve solenoid	
2150	Control valve	
2190	Overflow valve, pump	
2192	Maintenance kit, overfl. valve	
2194	Overhaul kit, Overflow valve	
2368	Control valve	
2144	Control valve solenoid	
4053	Exchange LP-Stages	
4057	Exchange HP-Stages	
4071	Oil pump	
4061	Oil suction hose	
4117	Oil drain pipe LP-Stages	
4118	Oil drain pipe HP-Stages	
4400	Drive coupling	
4405	Coupling element elastic	
4450	Drive motor	
4451	Drive motor bearing kit	
4542	Lubricant line	
4543	Lubricant line	
4700	Fan motor	
4701	Fan motor bearing kit	
4925	Exhauster, unit	
5200	Oil cooler	
5240	Compressed air cooler	
5250	Compressed air cooler	
5444	Ball valve	
5448	Ball valve	
6500	Condensate drain	
9602	Condensate drain service-unit	
6503	Condensate drain	
9602	Condensate drain service-unit	
6710	Venting silencer	
7100	Hose line	
7260	Hose line	
7270	Hose line	
7334	Control line	
7340	Control line	
7341	Control line	
7342	Control line	
7343	Control line	
7344	Control line	
7345	Control line	
7347	Control line	
7348	Control line	
7355	Control line	
7360	Condensate drain line kit	
7367	Condensate drain line	
7400	Hose line	
7500	Hose line	
7540	Hose line	
7548	Hose line	
7555	Pulse damper, step 1	
7556	Strainer kit, pulse damper	
7549	Hose line	
7557	Pulse damper, step 2	
2125	Check valve, pulse damper	
7554	Strainer kit, pulse damper	
7563	Hose line	
7567	Hose line	
7563	Hose line	
7600	Inlet hose	
9285	Vacuum suction nozzle	

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

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


D3
7641
7642
K10
6503
2137
7367
7561
7561
W5
7546
7630
W6
7630
W5 / W6
7635
5200
7547
7635
7635
7631
7633
7634
7632
7636
7349
2410
H23
7337
7548
7540
5240
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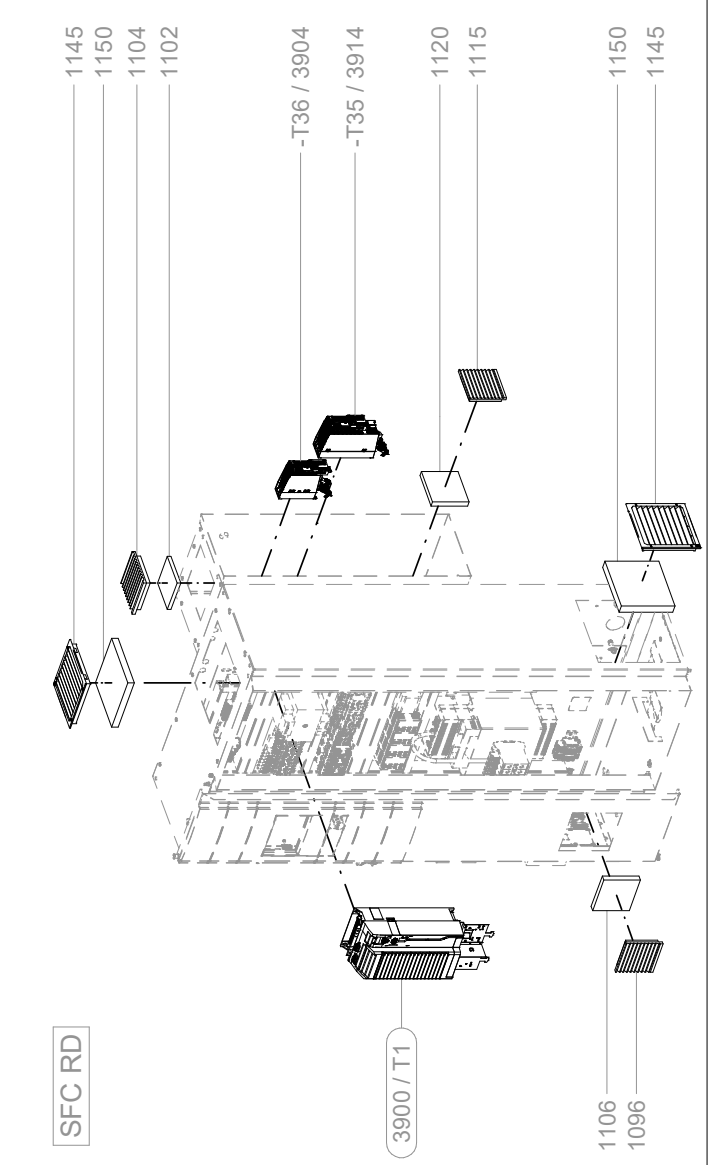
KAESER KOMPRESSOREN
Baugruppe
CSG2.4 Option / Optionen
Zeichnungstyp
Service spare part drawing / Service Ersatzteil Zeichnung
SEG-Nummer
SEG-11347
Service-Kit (Option) Subassembly / Untergruppe
Dokument-Nr.
Original
A4
Datum
Gez. 28.04.2020
Freigib 11.08.2020
Status F R E I G E G E B E N
Name
FRUEHAUF2
DORST1
Erstellt mit
Solid Edge
Blatt
1 von 1

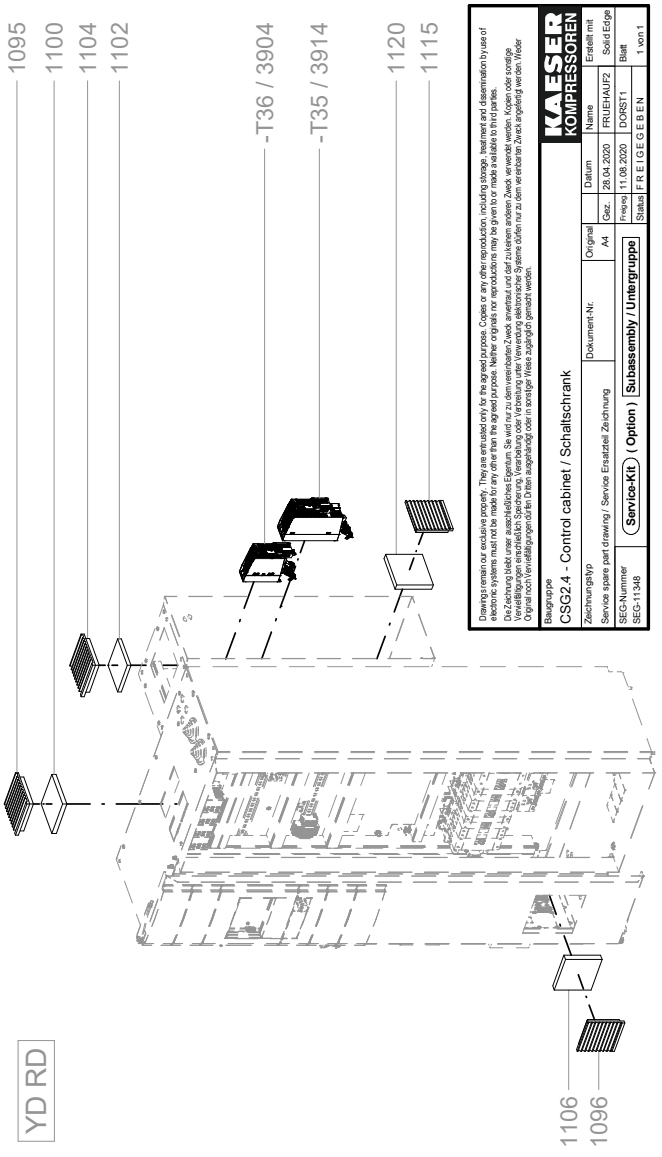
Legend		KAESER KOMPRESSOREN
	CSG Option K9	SEL-4494_01 E

Item	Description	Option
2137	Check valve, Condensate drain	x
2410	Check valve	x
4033	Intermediate flange	x
5200	Oil cooler	x
5240	Compressed air cooler	x
5415	Actuator	x
5449	Ball valve	x
6503	Condensate drain	x
9602	Condensate drain service-unit	x
7337	Control line	x
7349	Control line	x
7367	Condensate drain line	x
7540	Hose line	x
7546	Hose line	x
7547	Hose line	x
7548	Hose line	x
7561	Hose line	x
7630	Hose line	x
7631	Hose line	x
7632	Hose line	x
7633	Hose line	x
7634	Hose line	x
7635	Hose line	x
7636	Hose line	x
7642	Hose line	x

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

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


1145
1150
1104
1102
-T36 / 3904
-T35 / 3914
1120
1115
1150
1145
SFC RD
3900 / T1
1106
1096


1095
1100
1104
1102
-T36 / 3904
-T35 / 3914
1120
1115
YD RD
1106
1096
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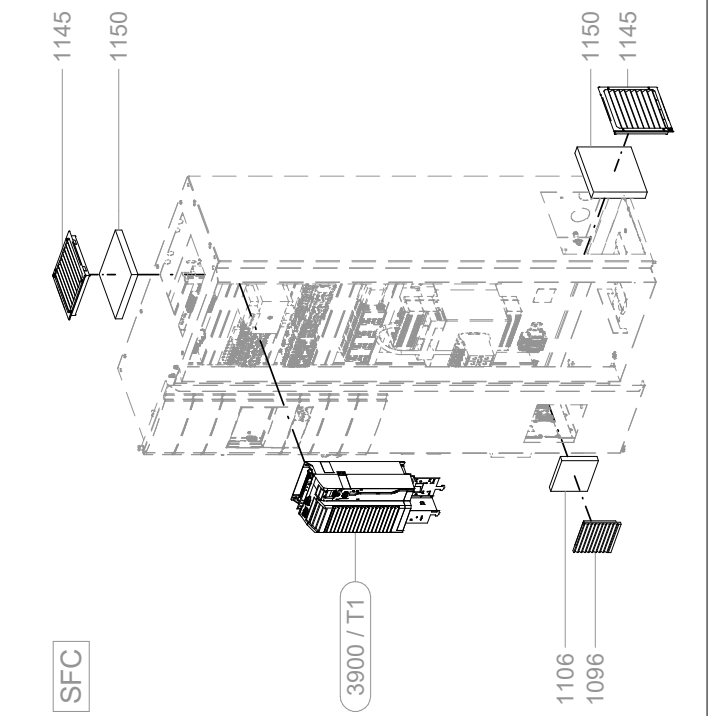
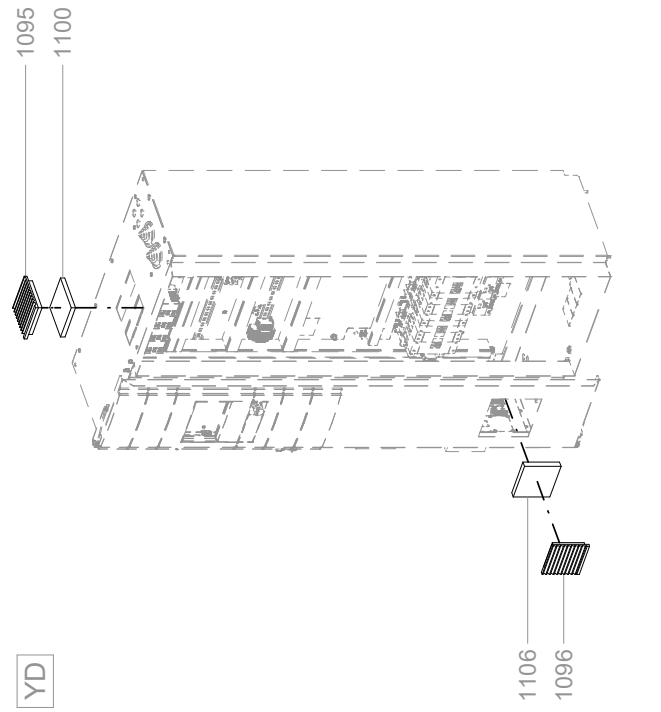
KAESER KOMPRESSOREN
Baugruppe
CSG2.4 - Control cabinet / Schaltschrank
Zeichnungstyp
Service spare part drawing / Service Ersatzteil Zeichnung
Dokument-Nr.
Original
A4
Datum
Name
Erstellt mit
Gez. 28.04.2020 FRUEHAUF2 Solid Edge
Freigg. 11.08.2020 DORST1 Blatt
Status F R E I G E G E B E N 1 von 1
SEG-Nummer
SEG-11348
Service-Kit (Option) Subassembly / Untergruppe


1145
1150
1150
1145
SFC
3900 / T1
1106
1096


1095
1100
YD
1106
1096

Legend		KAESER KOMPRESSOREN
	CSG Schaltschrank YD/ SFC	SEL-4495_01 E

Item	Description	Option
1095	Control cabinet breather	
1096	Control cabinet breather	
1100	Filter mat, control cabinet	
1102	Filter mat, control cabinet	
1104	Control cabinet breather	
1106	Filter mat, control cabinet	
1115	Converter cabinet breather	
1120	Filter mat, outlet air	
1145	Converter cabinet breather	
1150	Filter mat, converter cabinet	
3900	Frequency converter	
3476	FC-fan motor	
3904	Frequency conv. wormdrivemotor	
3490	FC-fan motor	
3914	Frequency conv., blower motor	
3490	FC-fan motor	

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

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

12 Decommissioning, Storage and Transport

12.1 Decommissioning

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

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

Temporary decommissioning

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

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

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

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

1. Still during the last LOAD operation, press the «TEST» button of the condensate drain at the first stage for a few seconds. Following this, immediately press the “OFF” button 1x.

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

Long-term decommissioning

Precondition Condensate is purged from all available condensate drains.

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

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

1. Switch control valves V10 (if applicable), V12 and V14 to operating mode "Open".
2. Switch off and lock out the power supply disconnecting device.

3. Verify the absence of any voltage.
4. Allow the machine to completely cool down.
5. Vent the machine to atmosphere and check that it is completely depressurized.
6. Detach the power supply and connecting line to the compressed air network.
7. Ensure that the control valves V12 and V14 are open. If necessary, open manually.
   Detach the connecting lines of the cooling water system and use compressed air (< 45 psig) to blow out the primary water system until liquid no longer escapes.
8. Option W5/W6 (if available):
   Ensure that the control valve V10 is open. If necessary, open manually if necessary.
   Detach the connecting lines and use compressed air (< 45 psig) to blow out the secondary water system until liquid no longer escapes.
9. Option K10 (if available and separately connected):
   Detach the connecting lines of the secondary heat exchanger after second stage and use compressed air (< 45 psig) to blow it out until liquid no longer escapes.
10. Properly close all open connecting ports.

12.2 Packing

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

Consult KAESER SERVICE for advice concerning sea or air transport.

Material
Desiccant
Plastic sheeting
Wooden transport crate

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

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

12.3 Storage

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

Frozen moisture can damage components, valve diaphragms and gaskets.

The following measures also apply to machines not yet commissioned.

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

NOTICE

Moisture and frost can damage the machine!

- ➢ *Prevent ingress of moisture and formation of condensation.*
- ➢ *Maintain a storage temperature of >32 °F.*

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

12.4 Transporting

12.4.1 Safety

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

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

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

➢ Make sure the danger area is clear of personnel.

12.4.2 Transport with a forklift truck

Precondition The forks are fully under the machine.

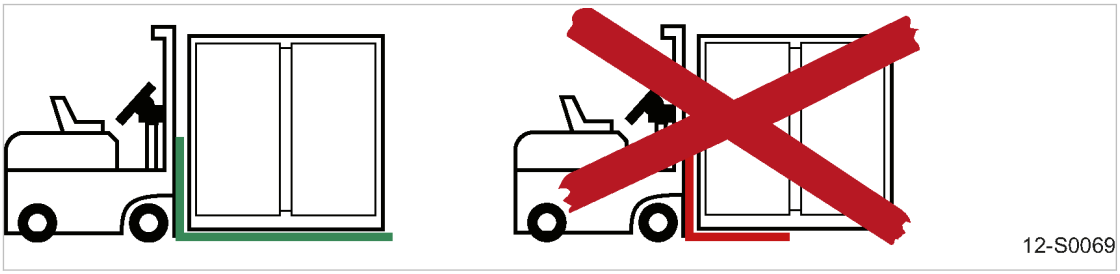


Fig. 60 Transport with a forklift truck

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

12.4.3 Transport with a crane

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

The machine is not equipped with fastening points.

Examples of unsuitable fastening points:

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

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

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

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

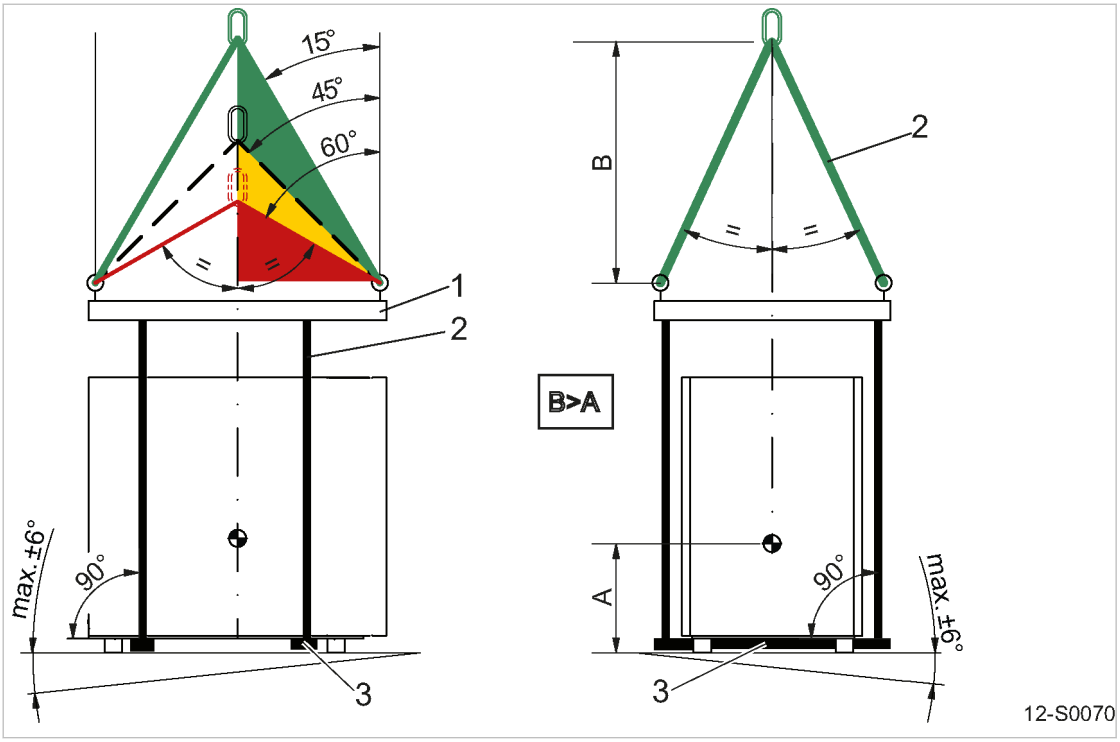


Fig. 61 Transport with a crane

[1] Load carrying devices
[2] Attachment resources
[3] Crossbeam

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

12.5 Disposal

12.5.1 Dispose of the machine in accordance with local environmental regulations

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

Precondition The machine is decommissioned.

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

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

12.5.2 Battery disposal in accordance with environmental guidelines

Batteries contain substances that are harmful to living beings and the environment. For this reason, batteries must not be disposed of with unsorted municipal waste. They must be delivered to the national battery collection system. This procedure facilitates the handling and recycling of batteries.

The SIGMA CONTROL 2 controller's housing contains a battery.

Fig. 62 Battery labelling

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

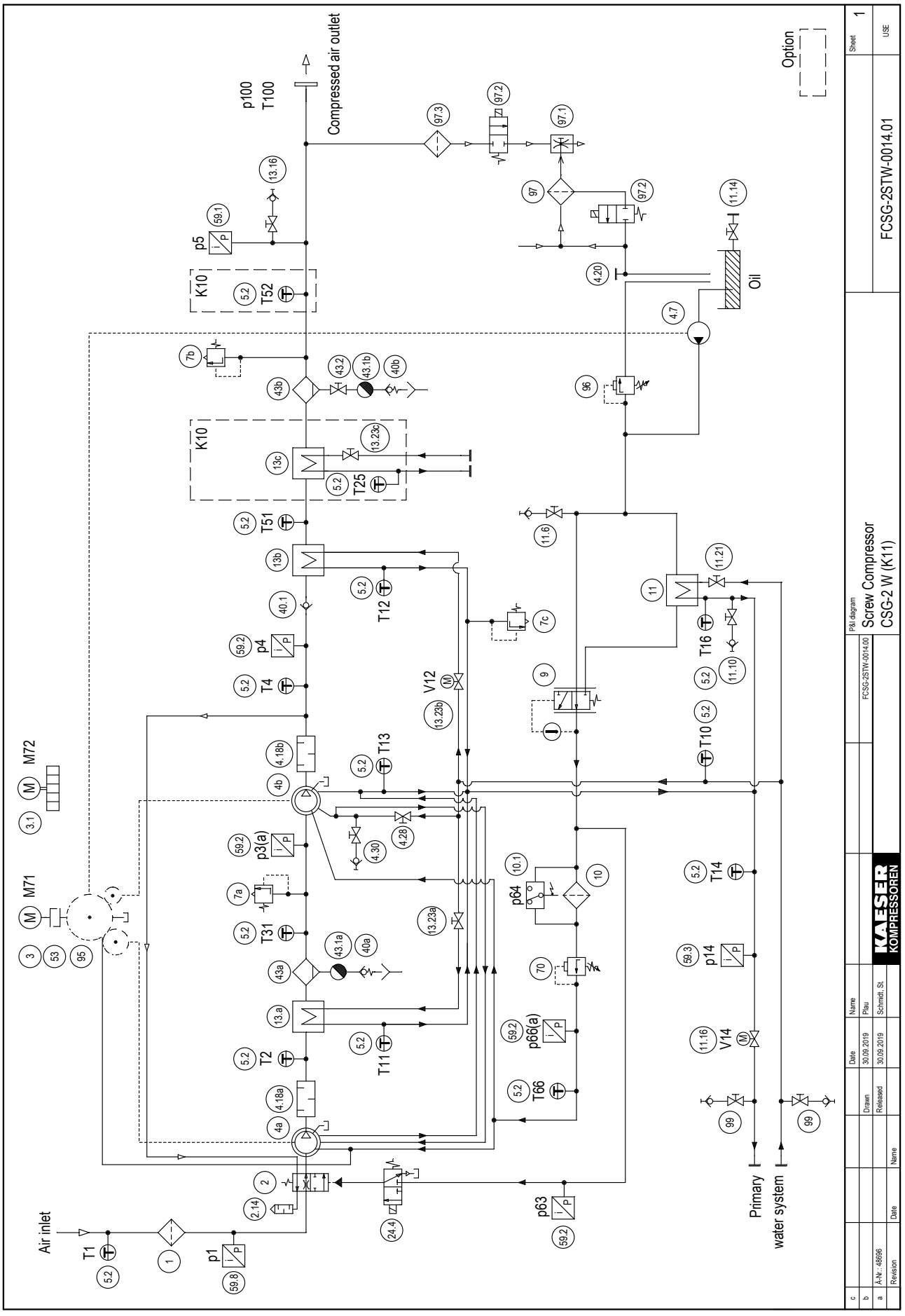
➢ Comply with national disposal regulations and dispose of batteries in an environmentally-friendly manner.

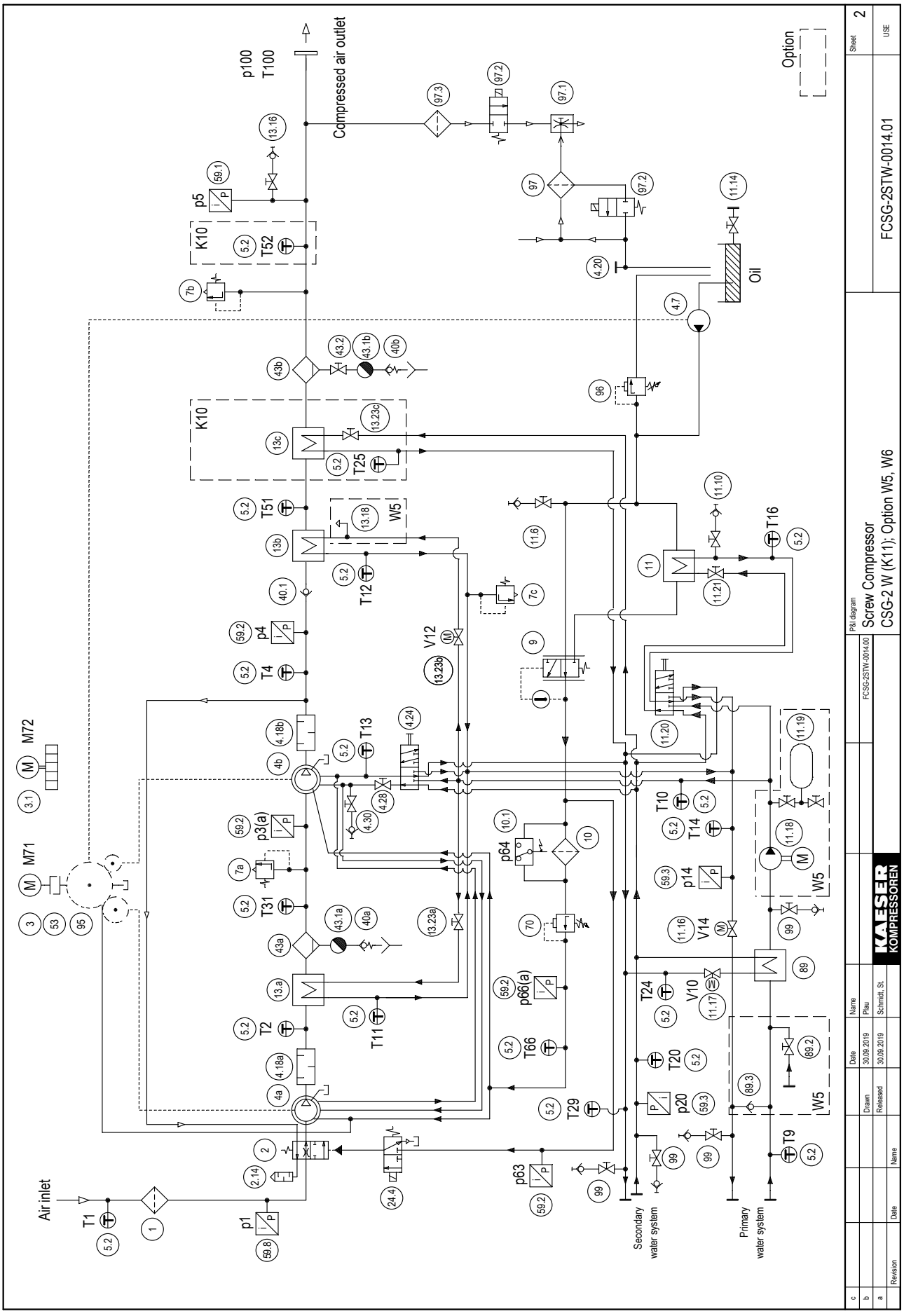
You actively contribute to the protection of our environment when you take used batteries to the appropriate recycling system.

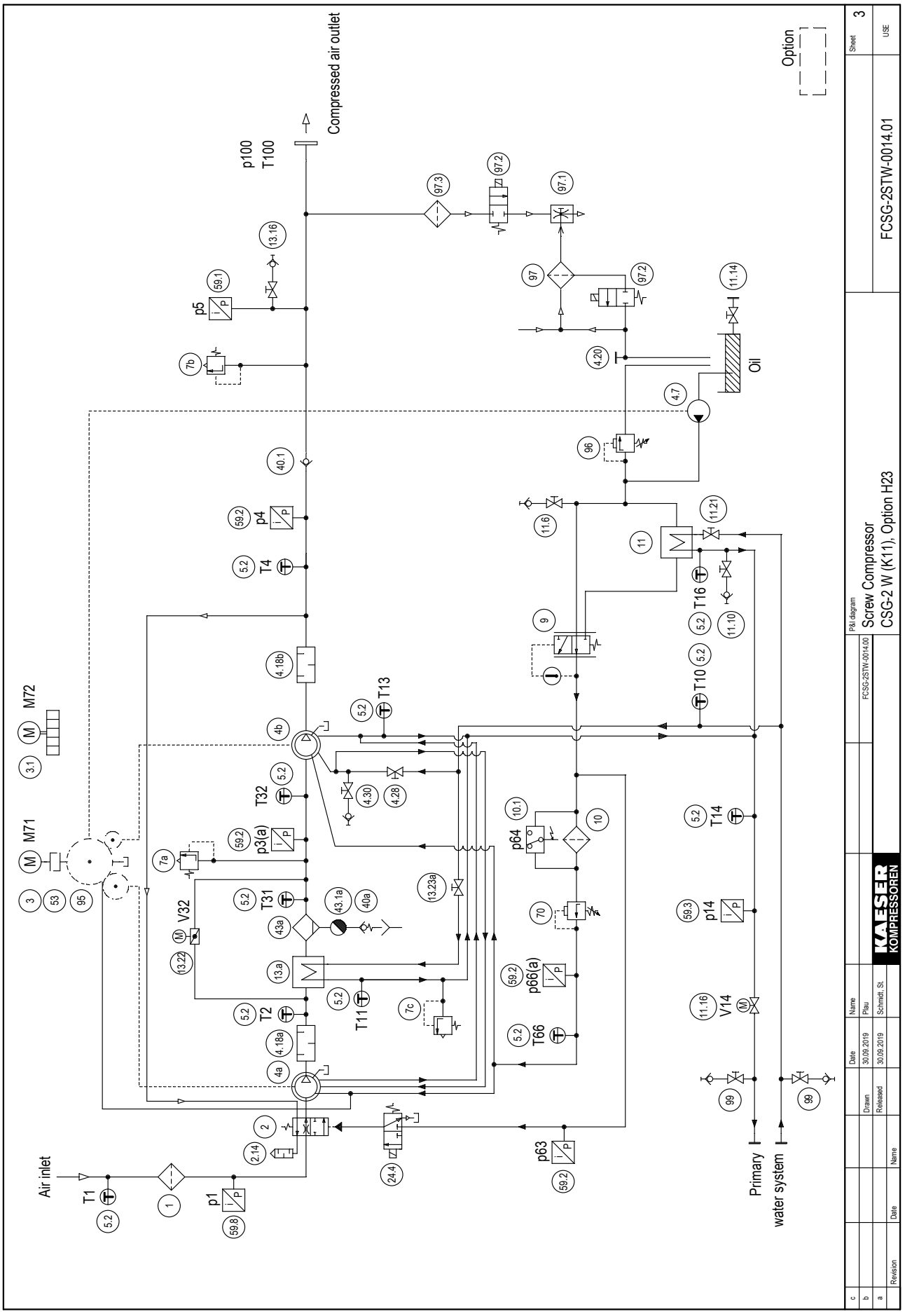
Further information Refer to the SIGMA CONTROL 2 User Manual for details regarding battery removal.

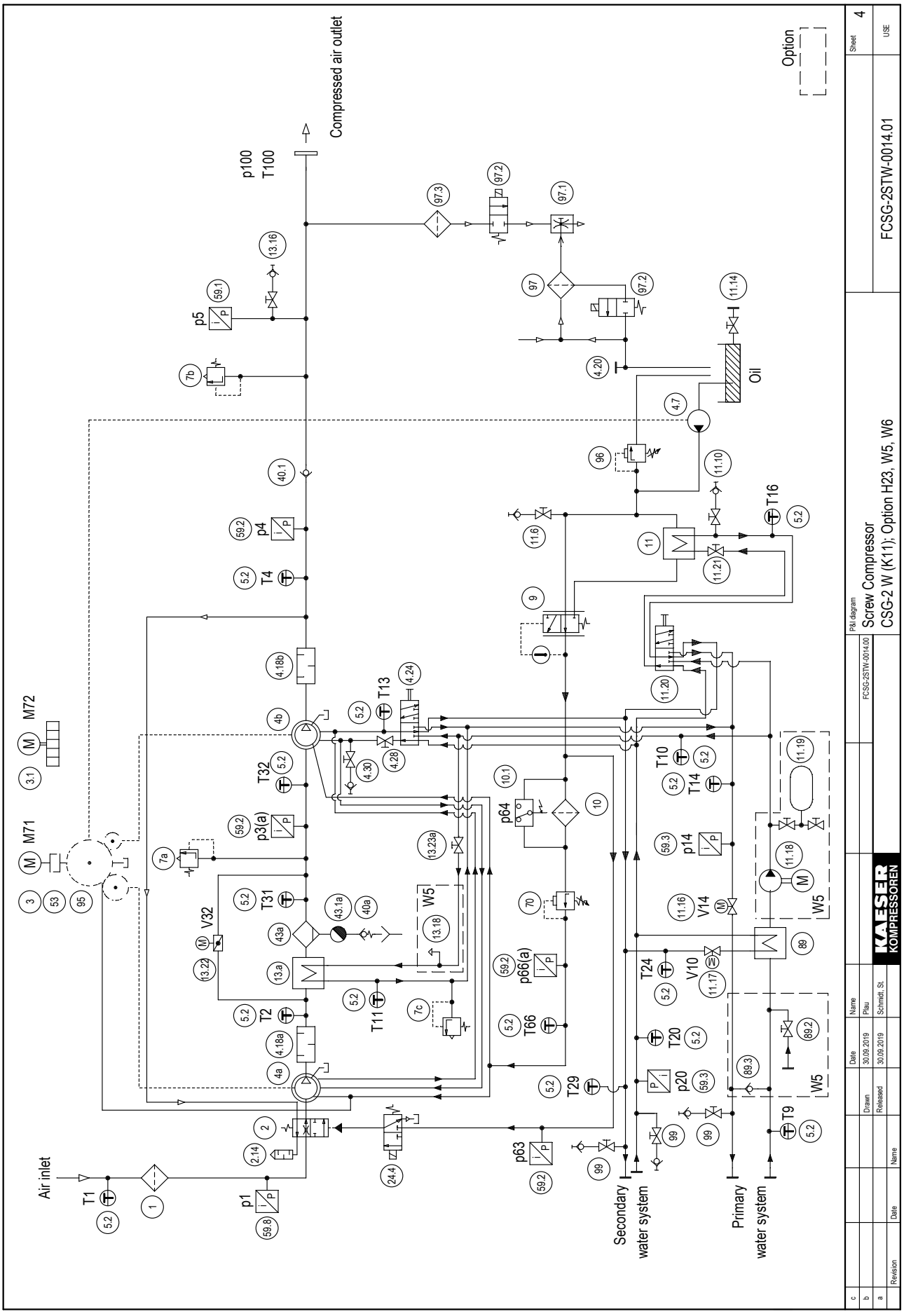
13 Annex

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


Compressed air outlet
p100
T100
Option
Oil
Air inlet
Primary water system
Screw Compressor
CSG-2 W (K11)
FCSG-2STW-0014.01
P&I diagram
FCSG-2STW-0014.00
KAESER KOMPRESSOREN
Sheet 1
USE
Drawn
Released
Name
Date
Revision
A-Nr.: 48696


Compressed air outlet
p100
T100
Option
Oil
Air inlet
Secondary water system
Primary water system
P&I diagram
Screw Compressor
CSG-2 W (K11); Option W5, W6
FCSG-2STW-0014.01
FCSG-2STW-0014.00
KAESER KOMPRESSOREN
Sheet 2
USE


Compressed air outlet
Option
Oil
Air inlet
Primary water system
Screw Compressor
CSG-2 W (K11), Option H23
FCSG-2STW-0014.01
P&I diagram
FCSG-2STW-0014.00
KAESER KOMPRESSOREN
Sheet 3
USE
Drawn
Released
Date
Name
Revision


Compressed air outlet
Option
Oil
Air inlet
Secondary water system
Primary water system
P&I diagram
Screw Compressor
CSG-2 W (K11); Option H23, W5, W6
FCSG-2STW-0014.01
FCSG-2STW-0014.00
KAESER KOMPRESSOREN
Sheet 4
USE

1	Air filter
2	Combined inlet/venting valve
2.14	Venting silencer
3	Compressor motor
3.1	Fan motor
4a	Rotary screw airend - Stage 1
4b	Rotary screw airend - Stage 2
4.7	Oil pump
4.18a	Snubber - Stage 1
4.18b	Snubber - Stage 2
4.20	Oil filler with screw plug
4.24	Changeover valve for airend cooling
4.28	Airend cooling line regulation valve
4.30	Shut-off valve with hose coupling - Water draining device
5.2	Pt100 temperature sensor
7a	Safety relief valve - Stage 1
7b	Safety relief valve - Final pressure
7c	Safety relief valve - Primary water system
9	Oil temperature controller
10	Oil filter
10.1	Differential pressure switch - Oil filter
11	Heat exchanger oil cooling
11.6	Shut-off valve with hose coupling - Oil drain device
11.10	Shut-off valve with hose coupling - Water draining device
11.14	Shut-off valve - Oil drain device
11.16	Control valve V14
11.17	Control valve V10
11.18	Water pump
11.19	Membrane pressure compensating tank
11.20	Changeover valve for oil cooling
11.21	Phase regulating valve for oil cooling
13a	Heat exchanger air cooling - Stage 1
13b	Heat exchanger air cooling - Stage 2
13c	Auxiliary heat exchanger, stage 2
13.16	Shut-off valve with quick disconnect for venting
13.18	Automatic venting valve
13.22	Throttle valve, bypass line, heat exchanger stage 1
13.23a	Phase regulating valve for air cooling - Stage 1
13.23b	Phase regulating valve for air cooling - Stage 2
13.23c	Phase regulating valve for air cooling - Auxiliary heat exchanger, stage 2
24.4	3/2-way solenoid valve for inlet valve control
40a, b	Check valve - Condensate outlet
40.1	Check valve downstream stage 2
43a	Condensate separator - Stage 1
43b	Condensate separator - Stage 2
43.1a	Electronic condensate drain (Condensate separator - Stage 1)
43.1b	Electronic condensate drain (Condensate separator - Stage 2)
43.2	Shut-off valve, condensate drain connection

c					Date	Name				P&I Diagram legend		Sheet 5
b				Drawn	30.09.2019	Plau			FCSG-2STW-0014.00	Screw Compressor		
a	Pos.13.20, raus	14.08.2020	PI/Au	Released	30.09.2019	Schmidt, St.	KAESER KOMPRESSOREN			CSG-2 W (K11)	FCSG-2STW-0014.01	USE
	Revision	Date	Name									

53	Coupling
59.1	Pressure transducer - Network pressure
59.2	Pressure transducer - Internal pressure
59.3	Pressure transducer - Water pressure
59.8	Pressure transducer - Pressure at stage 1 inlet
70	Pressure regulating valve
89	Water/water heat exchanger
89.2	Shut-off valve for make-up connection
89.3	Check valve - Heat recovery Bypass line
95	Transmission
96	Bypass valve
97	Compressed air filter
97.1	Ejector
97.2	Solenoid valve (Closed when de-energized)
97.3	Prefilter
99	Measuring point connection - Water pressure

Option

H23	Hot-air outlet with regulation
K10	Auxiliary heat exchanger, stage 2: Plate-type heat exchanger
K11	Water cooling: Shell-and-tube and plate-type heat exchanger
W5	Heat recovery system with water pump
W6	Heat recovery system withhout water pump

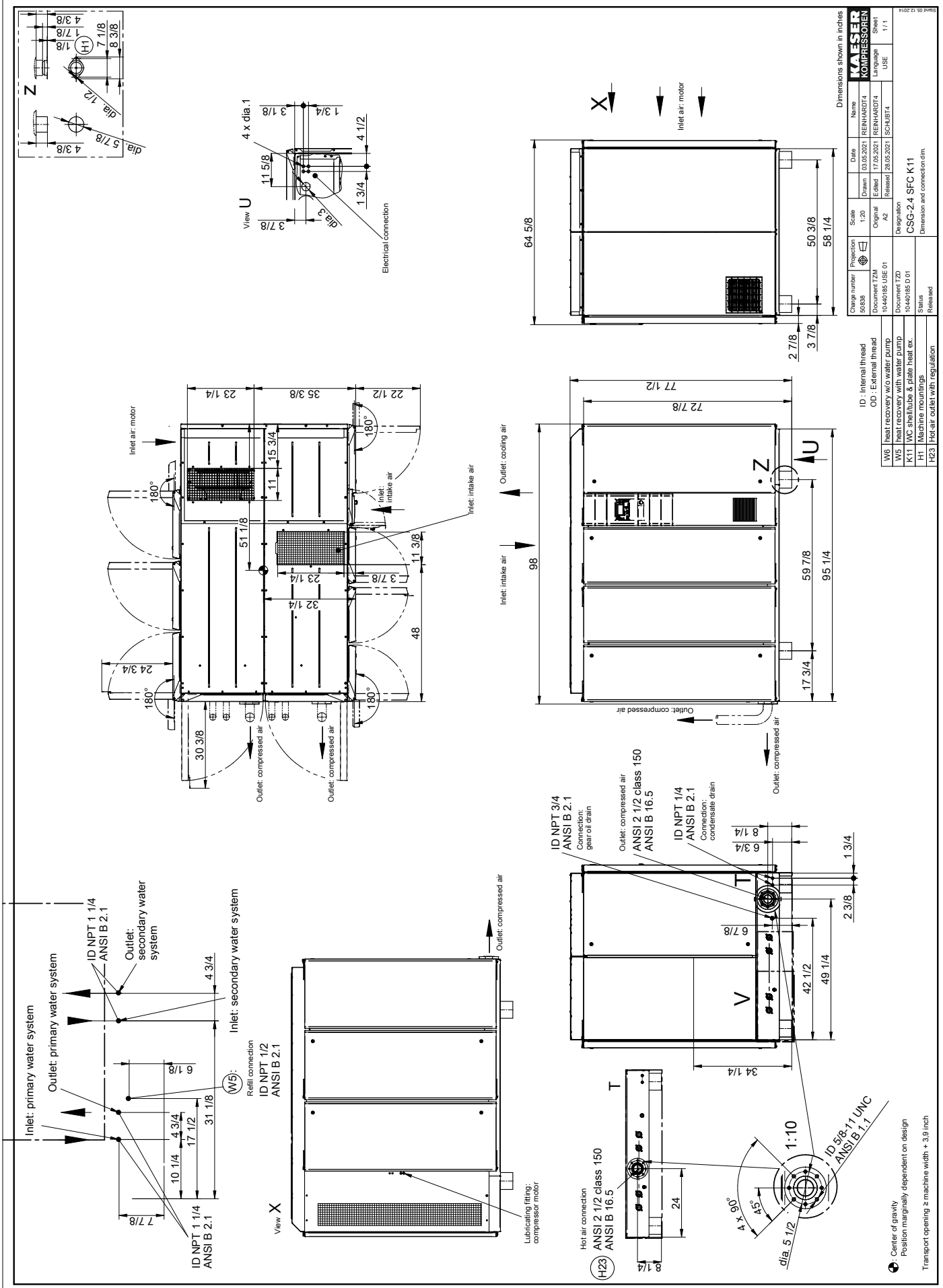
c					Date	Name				P&I Diagram legend		Sheet 6
b				Drawn	30.09.2019	Plau			FCSG-2STW-0014.00	Screw Compressor		
a	Pos.59.8a raus	14.08.2020	PI/Au	Released	30.09.2019	Schmidt, St.	KAESER KOMPRESSOREN			CSG-2 W (K11)	FCSG-2STW-0014.01	USE
	Revision	Date	Name									

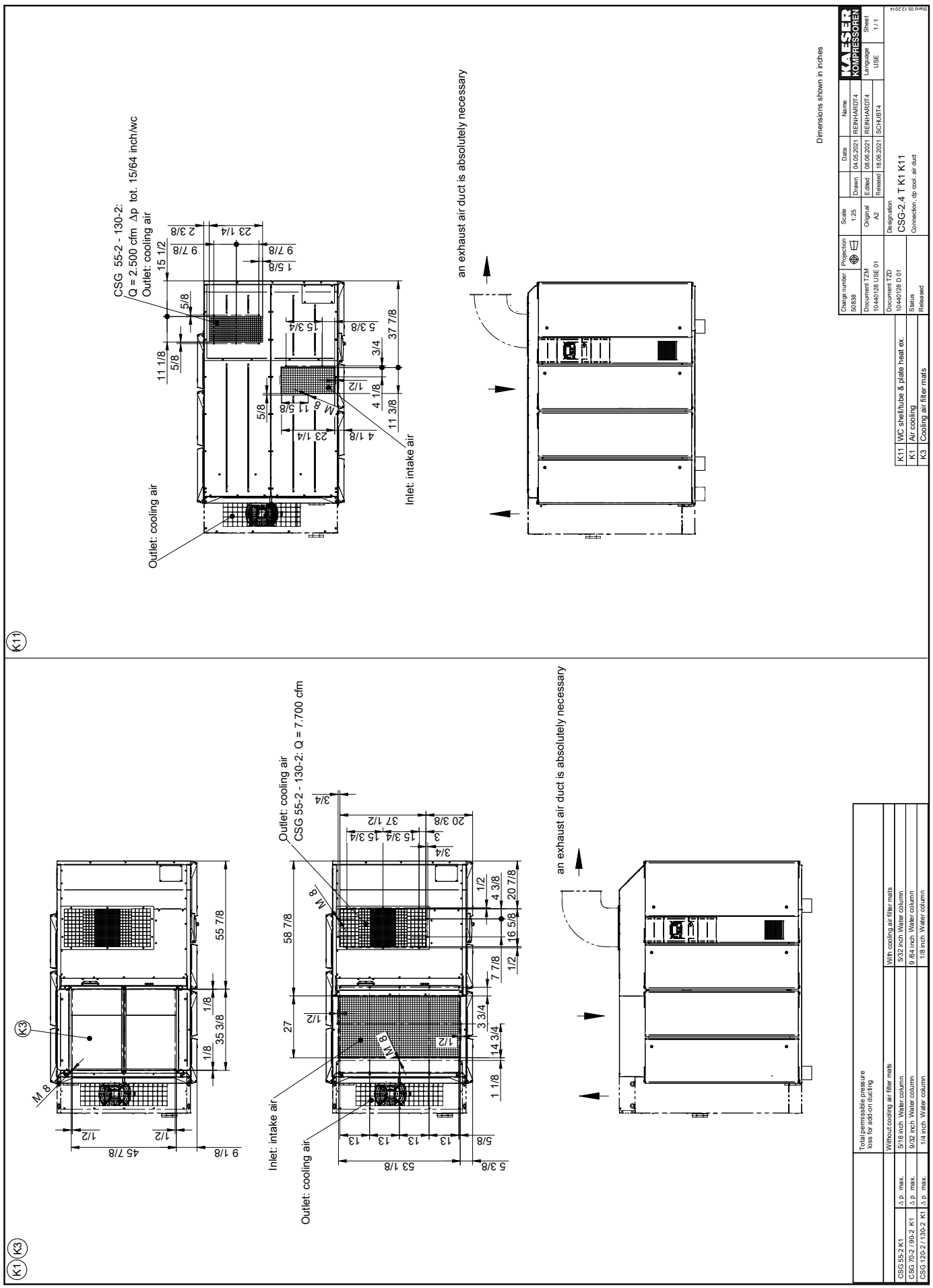
T1	Stage 1: air temperature, inlet
p1	Stage 1: air pressure inlet
T2	Stage 1: air temperature, outlet
T31	Heat exchanger stage 1: air temperature, outlet
T32	Stage 2: air temperature, inlet (H23)
p3	Stage 2: air pressure, inlet
p3a	Stage 2: air pressure inlet (absolute)
T4	Stage 2: air temperature, outlet
p4	Stage 2: air pressure, outlet
T51	Stage 2 heat exchanger: Air temperature at the outlet
T52	Auxiliary heat exchanger, stage 2: Air temperature at the outlet
p5	Stage 2 heat exchanger: Air pressure at the outlet
T9	Primary water system: Water temperature at the inlet
T10	Primary water system: Inlet temperature, heat exchanger, compressor cooling
T11	Primary water system: Water temperature at the outlet of stage 1 heat exchanger
T12	Primary water system: Water temperature at the outlet of stage 2 heat exchanger
T13	Stage 2: Water temperature at the outlet
T14	Primary water system: Water temperature at the outlet
p14	Primary water system: Water pressure
T16	Water temperature at outlet of the heat exchanger oil cooling
T20	Secondary water system: Water temperature at the inlet (W5/W6)
T24	Secondary water system: Water temperature at the outlet, water/water heat exchanger (W5/W6)
T25	Auxiliary heat exchanger, stage 2: Water temperature at the outlet (K10)
T29	Secondary water system: Water temperature at the outlet (W5/W6)
p20	Secondary water system: Water pressure (W5W6)
p63	Oil system: Oil pressure for inlet valve
p64	Oil system: Differential pressure, oil filter
T66	Oil system: Oil temperature, inlet, lubrication
p66	Oil system: Oil pressure, inlet, lubrication
p66a	Oil system: oil pressure, inlet lubrication (absolute)
T100*	Machine: Air temperature at the outlet
p100*	Machine: Air pressure at the outlet

* Measurement value of the last sensor before the compressed air outlet

c				Date	Name				P&I Diagram legend		Sheet 7
b			Drawn	30.09.2019	Plau			FCSG-2STW-0014.00	CSG-2 W (K11)		
a			Released	30.09.2019	Schmidt, St.	KAESER KOMPRESSOREN			Measurement point identifiers	FCSG-2STW-0014.01	USE
	Revision	Date	Name								

13.2 Dimensional drawing




CSG 55-2 - 130-2:
Q = 2.500 cfm Δp tot. 15/64 inch/wc
Outlet: cooling air
Outlet: cooling air
Inlet: intake air
an exhaust air duct is absolutely necessary
Dimensions shown in inches
(K11)
(K1) (K3)
Outlet: cooling air
CSG 55-2 - 130-2: Q = 7.700 cfm
Inlet: intake air
Outlet: cooling air
an exhaust air duct is absolutely necessary
(K3)
M 8
K11 WC shell/tube & plate heat ex.
K1 Air cooling
K3 Cooling air filter mats
Change number 50838
Projection
Scale 1:25
Original A2
Document TZM 10440128 USE 01
Document TZD 10440128 D 01
Status Released
Designation CSG-2,4 T K1 K11
Connection, dp cool. air duct
Drawn 04.05.2021 REINHARDT4
Edited 08.06.2021 REINHARDT4
Released 18.06.2021 SCHUBT4
Name
Language USE
Sheet 1 / 1
Stand 05.12.2014
KAESER KOMPRESSOREN
Total permissible pressure loss for add-on ducting
Without cooling air filter mats
With cooling air filter mats
CSG 55-2 K1 Δp max. 5/16 inch Water column 5/32 inch Water column
CSG 70-2 / 90-2 K1 Δp max. 9/32 inch Water column 9 /64 inch Water column
CSG 120-2 / 130-2 K1 Δp max. 1/4 inch Water column 1/8 inch Water column
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Neither originals nor reproductions may be given to or made available to third parties.
Subject to development-related changes.
Drawing may be altered only via CAD!

13.3 Electrical Diagram

Wiring Diagram

compressor CSG SFC

air cooled or water cooled

380V±10% 60Hz
460V±10% 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	09.02.2021 USE	KAESER KOMPRESSOREN	cover page		=	
b				Drawn	Sitter		compressor CSG SFC		+	
a				Released	Geiger			SC2 MCS	DCSG.F-U3063.02	page 1
A	Change	Date	Name							1 Sht.

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page			DCSG.F-U3063.02	1	
2	list of contents			ZCSG.F-U3063.02	1	
3	general instructions			UCSG.F-U3063.02	1	
4	electrical equipment identification			UCSG.F-U3063.02	2	
5	electrical equipment identification			UCSG.F-U3063.02	3	
6	electrical component parts list			UCSG.F-U3063.02	4	
7	electrical component parts list			UCSG.F-U3063.02	5	
8	electrical component parts list			UCSG.F-U3063.02	6	
9	electrical component parts list			UCSG.F-U3063.02	7	
10	wiring diagram	power supply / power unit		SCSG.F-U3063.02	1	
11	wiring diagram	vent motor / option K1		SCSG.F-U3063.02	2	
12	wiring diagram	vent / option K11		SCSG.F-U3063.02	3	
13	wiring diagram	control voltage tapping		SCSG.F-U3063.02	4	
14	wiring diagram	power supply unit		SCSG.F-U3063.02	5	
15	wiring diagram	power supply unit		SCSG.F-U3063.02	6	
16	wiring diagram	IO-module / configuration		SCSG.F-U3063.02	7	
17	wiring diagram	IO module / configuration / option K11		SCSG.F-U3063.02	8	
18	wiring diagram	sensors / actuators		SCSG.F-U3063.02	9	
19	wiring diagram	sensors / actuators / option K11		SCSG.F-U3063.02	10	
20	wiring diagram	sensors / actuators		SCSG.F-U3063.02	11	
21	wiring diagram	sensors / actuators		SCSG.F-U3063.02	12	
22	wiring diagram	condensate drain		SCSG.F-U3063.02	13	
23	wiring diagram	option Heat recovery		SCSG.F-U3063.02	14	
24	wiring diagram	sensors / actuators / option H23		SCSG.F-U3063.02	15	
25	wiring diagram	frequency converter		SCSG.F-U3063.02	16	
26	wiring diagram	volt-free contacts		SCSG.F-U3063.02	17	
27	wiring diagram	digital inputs		SCSG.F-U3063.02	18	
28	wiring diagram	analog inputs		SCSG.F-U3063.02	19	
29	wiring diagram	digital outputs		SCSG.F-U3063.02	20	
30	wiring diagram	digital/analog outputs		SCSG.F-U3063.02	21	
31	wiring diagram	Handling: Terminals / Feed line connection		SCSG.F-U3063.02	22	
32	wiring diagram	Feed line connection		SCSG.F-U3063.02	23	
33	terminal connection	terminal strip -X0		KCSG.F-U3063.02	1	
34	terminal connection	terminal strip -X2		KCSG.F-U3063.02	2	
35	terminal connection	terminal strip -X11,-X12		KCSG.F-U3063.02	3	
36	lay-out	Switchboard		ACSG.F-U3063.02	1	

c				Date	09.02.2021	KAESER KOMPRESSOREN	list of contents compressor CSG SFC	=	
b				Drawn	Sitter			+	
a				Released	Geiger			SC2 MCS	ZCSG.F-U3063.02	page 1 1 Sht.
B	Change	Date	Name						

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 ungrounded:	red, 18AWG UL-Style 1015, CSA-TEW
control voltage AC 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 K1 = air cooling

option K11 = water cooling

option K10 = Additional heat exchanger downstream from stage 2

option W6 = Heat recovery system without water pump

option H23 = Hot air outlet with regulation

c				Date	09.02.2021	KAESER KOMPRESSOREN	general instructions compressor CSG SFC	=	
b				Drawn	Sitter			+	
a				Released	Geiger			SC2 MCS	UCSG.F-U3063.02 page 1 / 7 Sht.
C	Change	Date	Name						

1	2	3	4	5	6	7	8

general components

-1FU,-2FU	primary control fuse
-3FU	secondary control fuse
-F4	circuit breaker, vent motor
-F5	circuit breaker, option K1
	Auxiliary fan/water cooling pump
-K53,-K58	coupling relay
-K59	coupling relay, option K1
-M1	compressor motor
-M4,-M5	vent motor
-M24	Bypass heat exchanger downstream from stage 1
	valve V32
-M26	water cooling valve V14
-M27	water cooling valve V10
-M28	water cooling pump
-M29	water cooling valve V12
-Q4	motor starter
-Q5	motor starter, option K1
	Auxiliary fan/water cooling pump
-R3	ferrit bead
-S1	EMERGENCY STOP pushbutton
-T1	frequency converter
-T11	control transformer
-T21,-T22,-T27	power unit
-T23	power unit, option K11

control

-K20	*Main Control System SC2 MCS*
-X1	Ethernet
-X2	IO-Bus
-X3	RS485-FC (USS)
-X4	communication module (Bus)
-X5	SD card slot
-X6	ground connection
-K21,-K24	*IO-module SC2 IOM-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
-K22,-K23	*IO-module SC2 IOM-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

terminal strips

-X2	terminal strip, 24V
-X11,-X12	terminal strip, control 115V

c				Date	09.02.2021		
b				Drawn	Sitter		
a				Released	Geiger		
C	Change	Date	Name				

KAESER KOMPRESSOREN

electrical equipment identification
compressor CSG SFC

SC2 MCS | UCSG.F-U3063.02 | page 2 / 7 Sht.

1	2	3	4	5	6	7	8

sensors/actuators

differential pressure switch

-B3 Oil system: Differential pressure, oil filter dp64

pressure transducer

-B1 Heat exchanger Stage 2: Air pressure, outlet p5
-B7 Stage 1: Air pressure inlet p1
-B15 Stage 2: Air pressure inlet p3
-B16 Stage 2: Air pressure, outlet p4
-B17 Oil system: Oil pressure, inlet lubrication p66
-B18 Oil system: Oil pressure for inlet valve p63
-B19 Primary water system: Water pressure p14
-B20 Secondary water system: Water pressure p20

temperature probe

-B60 compressor motor: temperature winding T711
-B81 Stage 1: Air temperature, inlet T1
-B82 Stage 1: Air temperature, outlet T2
-B83 Heat exchanger Stage 1: Air temperature, outlet T31
-B84 Stage 2: Air temperature, outlet T4
-B85 Heat exchanger Stage 2: Air temperature, outlet T51
-B86 Oil system: Oil temperature, inlet lubrication T66
-B87 Primary water system:
Compressor cooling heat exchanger inlet temperature T10
-B88 Primary water system:
Water temperature, outlet heat exchanger Stage 1 T11
-B89 Primary water system:
Water temperature, outlet heat exchanger Stage 2 T12
-B90 Stage 2: Water temperature, outlet T13
-B91 Primary water system: Water temperature, outlet T14
-B92 Water temperature, outlet heat exchanger, oil-cooling T16
-B94 Water temperature, outlet Auxiliary heat exchanger, Stage 2 T25
-B96 Primary water system: Water temperature, inlet T9
-B97 Secondary water system: Water temperature, inlet T20
-B98 Secondary water system:
Water temperature, outlet water/water heat exchanger T24
-B99 Secondary water system: Water temperature, outlet T29
-B101 Stage 2: Air temperature, inlet T32
-B304 Auxiliary heat exchanger, Stage 2: Air temperature, outlet T52

-K1 control valve
-K2 solenoid valve Scavenging
-K3 solenoid valve Oil return
-K11 condensate drain, aftercooler
-K12 condensate drain, intercooler

c				Date	09.02.2021	KAESER KOMPRESSOREN	electrical equipment identification	=	
b				Drawn	Sitter		compressor CSG SFC	+	
a				Released	Geiger			SC2 MCS	UCSG.F-U3063.02	page 3
C	Change	Date	Name							7 Sht.

Package model		performance-related components CSG 70-2 SFC + CSG 90-2 SFC			
machine power supply		**380 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**		
control voltage		**115 V**	**115 V**		
frequency converter	**-T1**	120 hp	120 hp		
compressor motor	**-M1**	75 hp	75 hp		
vent motor	**-M4 (option K1)**	3.0 hp	3.0 hp		
	-M5 (option K1)	0,2 hp	0,2 hp		
	-M4 (option K11)	0.75 hp	0.75 hp		
supply	**connection**	fig. 10, Sht. 23	fig. 11, Sht. 23		
supply terminals	**-X0: U1/V1/W1**	3x 894385.0	3x 894385.0		
	Wago	285-195	285-195		
	Stripped length X	35 mm	35 mm		
	Handling	fig. 2, Sht. 22	fig. 2, Sht. 22		
	GRD rail	7.8952.00010	7.8952.00010		
	IHI	S300-41-44	S300-41-44		
	Torque	fig. 20, Sht. 22	fig. 20, Sht. 22		
	Stripped length	minimal 26 mm	minimal 26 mm		
frequency converter	**-T1**	7.8833.01190	7.8833.01190		
		6SL3210-1PE31-8AL0	6SL3210-1PE31-8AL0		
		90 kW, 380-480 V	90 kW, 380-480 V		
Control Unit		7.7830.00710	7.7830.00710		
		6SL3244-0BB12-1BA1	6SL3244-0BB12-1BA1		
		CU240E-2	CU240E-2		
Basic Operator Panel		7.7830.00100	7.7830.00100		
	Siemens	6SL3255-0AA00-4CA1	6SL3255-0AA00-4CA1		
circuit breaker	**-F4**	7.8742.01180	7.8742.01180		
	(option K1)	3RV2021-1HA10	3RV2021-1HA10		
		5.5-8.0 A	5.5-8.0 A		
		setting: 7.3 A	setting: 6.0 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 8.0 A	setting: 6.7 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
circuit breaker	**-F4**	7.8742.01130	7.8742.01120		
	(option K11)	3RV2021-1CA10	3RV2021-1BA10		
		1.8-2.5 A	1.4-2.0 A		
		setting: 2.0 A	setting: 1.5 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 2.2 A	setting: 1.6 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q4**	7.8740.00340	7.8740.00340		
		3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
circuit breaker	**-F5**	7.8742.00060	7.8742.00060		
	(option K1)	3RV2011-0FA10	3RV2011-0FA10		
		0.35-0.5 A	0.35-0.5 A		
		setting: 0.39 A	setting: 0.39 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 0.44 A	setting: 0.44 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q5**	7.8740.00340	7.8740.00340		
	(option K1)	3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
transformer	**-T11**	7.2292.10050	7.2292.10050		
		USTE 1000/2X115	USTE 1000/2X115		
	Block	1000 VA	1000 VA		
fuses	**-1FU/-2FU**	7.3161.00141	7.3161.00141		
	Ferraz	ATQR 4 (4 A, 600 V)	ATQR 4 (4 A, 600 V)		
fuse	**-3FU**	7.3161.00200	7.3161.00200		
	Ferraz	ATQR 10 (10 A, 600 V)	ATQR 10 (10 A, 600 V)		
fuse socket	**-1FU/-2FU/-3FU**	7.3320.00060	7.3320.00060		
		AMBUS EASYSWITCH	AMBUS EASYSWITCH		
	Wöhner	3-pole Class CC	3-pole Class CC		
power wiring	**-W280**	3x1x2/0 AWG	3x1x2/0 AWG		
		600 V, 90°C, black	600 V, 90°C, black		
motor cable	**-W19**	9YSLCY-JB	9YSLCY-JB		
		4G95 mm²	4G95 mm²		
Tape-wound core	**-R3**	7.8538.00020	7.8538.00020		
	Magnetec	M113	M113		

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page 4
7 Sht.
UCSG.F-U3063.02
SC2 MCS
electrical component parts list
compressor CSG SFC
KAESER KOMPRESSOREN

	Date	Drawn	Released	Name	Date
c					
b	09.02.2021	Sitter	Geiger		
a					
C	Change				

Package model		performance-related components CSG 120-2 SFC			
machine power supply		**380 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**		
control voltage		**115 V**	**115 V**		
frequency converter	**-T1**	150 hp	150 hp		
compressor motor	**-M1**	100 hp	100 hp		
vent motor	**-M4 (option K1)**	3.0 hp	3.0 hp		
	-M5 (option K1)	0,2 hp	0,2 hp		
	-M4 (option K11)	0.75 hp	0.75 hp		
supply	**connection**	fig. 11, Sht. 23	fig. 11, Sht. 23		
supply terminals	**-X0: U1/V1/W1**	6x 895545.0	6x 895545.0		
	Wago	285-1185	285-1185		
	Stripped length X	45 mm	45 mm		
	Handling	fig. 2, Sht. 22	fig. 2, Sht. 22		
	GRD rail	7.8952.00010	7.8952.00010		
	IHI	S300-41-44	S300-41-44		
	Torque	fig. 20, Sht. 22	fig. 20, Sht. 22		
	Stripped length	minimal 26 mm	minimal 26 mm		
frequency converter	**-T1**	7.8833.01200	7.8833.01200		
		6SL3210-1PE32-1AL0	6SL3210-1PE32-1AL0		
		110 kW, 380-480 V	110 kW, 380-480 V		
Control Unit		7.7830.00710	7.7830.00710		
		6SL3244-0BB12-1BA1	6SL3244-0BB12-1BA1		
		CU240E-2	CU240E-2		
Basic Operator Panel		7.7830.00100	7.7830.00100		
	Siemens	6SL3255-0AA00-4CA1	6SL3255-0AA00-4CA1		
circuit breaker	**-F4**	7.8742.01180	7.8742.01180		
	(option K1)	3RV2021-1HA10	3RV2021-1HA10		
		5.5-8.0 A	5.5-8.0 A		
		setting: 7.3 A	setting: 6.0 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 8.0 A	setting: 6.7 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
circuit breaker	**-F4**	7.8742.01130	7.8742.01120		
	(option K11)	3RV2021-1CA10	3RV2021-1BA10		
		1.8-2.5 A	1.4-2.0 A		
		setting: 2.0 A	setting: 1.5 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 2.2 A	setting: 1.6 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q4**	7.8740.00340	7.8740.00340		
		3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
circuit breaker	**-F5**	7.8742.00060	7.8742.00060		
	(option K1)	3RV2011-0FA10	3RV2011-0FA10		
		0.35-0.5 A	0.35-0.5 A		
		setting: 0.39 A	setting: 0.39 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 0.44 A	setting: 0.44 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q5**	7.8740.00340	7.8740.00340		
	(option K1)	3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
transformer	**-T11**	7.2292.10050	7.2292.10050		
		USTE 1000/2X115	USTE 1000/2X115		
	Block	1000 VA	1000 VA		
fuses	**-1FU/-2FU**	7.3161.00141	7.3161.00141		
	Ferraz	ATQR 4 (4 A, 600 V)	ATQR 4 (4 A, 600 V)		
fuse	**-3FU**	7.3161.00200	7.3161.00200		
	Ferraz	ATQR 10 (10 A, 600 V)	ATQR 10 (10 A, 600 V)		
fuse socket	**-1FU/-2FU/-3FU**	7.3320.00060	7.3320.00060		
		AMBUS EASYSWITCH	AMBUS EASYSWITCH		
	Wöhner	3-pole Class CC	3-pole Class CC		
power wiring	**-W280**	3x2x2/0 AWG	3x2x2/0 AWG		
		600 V, 90°C, black	600 V, 90°C, black		
motor cable	**-W19**	9YSLCY-JB	9YSLCY-JB		
		2x 4G50 mm²	2x 4G50 mm²		
Tape-wound core	**-R3**	7.8538.00010	7.8538.00010		
	Magnetec	M116	M116		

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7 Sht.
UCSG.F-U3063.02
SC2 MCS
electrical component parts list
compressor CSG SFC
KAESER KOMPRESSOREN

	Date	Name
c		
b	09.02.2021	Sitter
a	Drawn	Geiger
C Change	Released	Date

Package model		performance-related components CSG 130-2 SFC			
machine power supply		**380 V ±10 %, 60 Hz**	**460 V ±10 %, 60 Hz**		
control voltage		**115 V**	**115 V**		
frequency converter	**-T1**	175 hp	175 hp		
compressor motor	**-M1**	125 hp	125 hp		
vent motor	**-M4 (option K1)**	3.0 hp	3.0 hp		
	-M5 (option K1)	0,2 hp	0,2 hp		
	-M4 (option K11)	0.75 hp	0.75 hp		
supply	**connection**	fig. 11, Sht. 23	fig. 11, Sht. 23		
supply terminals	**-X0: U1/V1/W1**	6x 895545.0	6x 895545.0		
	Wago	285-1185	285-1185		
	Stripped length X	45 mm	45 mm		
	Handling	fig. 2, Sht. 22	fig. 2, Sht. 22		
	GRD rail	7.8952.00020	7.8952.00020		
	IHI	S500-53-63	S500-53-63		
	Torque	fig. 21, Sht. 22	fig. 21, Sht. 22		
	Stripped length	minimal 32 mm	minimal 32 mm		
frequency converter	**-T1**	7.8833.01210	7.8833.01210		
		6SL3210-1PE32-5AL0	6SL3210-1PE32-5AL0		
		132 kW, 380-480 V	132 kW, 380-480 V		
Control Unit		7.7830.00710	7.7830.00710		
		6SL3244-0BB12-1BA1	6SL3244-0BB12-1BA1		
		CU240E-2	CU240E-2		
Basic Operator Panel		7.7830.00100	7.7830.00100		
	Siemens	6SL3255-0AA00-4CA1	6SL3255-0AA00-4CA1		
circuit breaker	**-F4**	7.8742.01180	7.8742.01180		
	(option K1)	3RV2021-1HA10	3RV2021-1HA10		
		5.5-8.0 A	5.5-8.0 A		
		setting: 7.3 A	setting: 6.0 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 8.0 A	setting: 6.7 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
circuit breaker	**-F4**	7.8742.01130	7.8742.01120		
	(option K11)	3RV2021-1CA10	3RV2021-1BA10		
		1.8-2.5 A	1.4-2.0 A		
		setting: 2.0 A	setting: 1.5 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 2.2 A	setting: 1.6 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q4**	7.8740.00340	7.8740.00340		
		3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
circuit breaker	**-F5**	7.8742.00060	7.8742.00060		
	(option K1)	3RV2011-0FA10	3RV2011-0FA10		
		0.35-0.5 A	0.35-0.5 A		
		setting: 0.39 A	setting: 0.39 A		
		NEC 430.32(C) incremental	NEC 430.32(C) incremental		
		setting: 0.44 A	setting: 0.44 A		
auxiliary switch		7.8742.05000	7.8742.05000		
	Siemens	3RV2901-1E	3RV2901-1E		
contactor	**-Q5**	7.8740.00340	7.8740.00340		
	(option K1)	3RT2023-1AK60	3RT2023-1AK60		
interference suppressor		7.8740.05140	7.8740.05140		
	Siemens	3RT2926-1CC00	3RT2926-1CC00		
transformer	**-T11**	7.2292.10050	7.2292.10050		
		USTE 1000/2X115	USTE 1000/2X115		
	Block	1000 VA	1000 VA		
fuses	**-1FU/-2FU**	7.3161.00141	7.3161.00141		
	Ferraz	ATQR 4 (4 A, 600 V)	ATQR 4 (4 A, 600 V)		
fuse	**-3FU**	7.3161.00200	7.3161.00200		
	Ferraz	ATQR 10 (10 A, 600 V)	ATQR 10 (10 A, 600 V)		
fuse socket	**-1FU/-2FU/-3FU**	7.3320.00060	7.3320.00060		
		AMBUS EASYSWITCH	AMBUS EASYSWITCH		
	Wöhner	3-pole Class CC	3-pole Class CC		
power wiring	**-W280**	3x2x2/0 AWG	3x2x2/0 AWG		
		600 V, 90°C, black	600 V, 90°C, black		
motor cable	**-W19**	9YSLCY-JB	9YSLCY-JB		
		2x 4G70 mm²	2x 4G70 mm²		
Tape-wound core	**-R3**	7.8538.00010	7.8538.00010		
	Magnetec	M116	M116		

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7 Sht.

UCSG.F-U3063.02

SC2 MCS

electrical component parts list
compressor CSG SFC

KAESER KOMPRESSOREN

	Date	Drawn	Released	Name	Date	Change
c						
b	09.02.2021	Sitter	Geiger			
a						

model	Common parts CSG2.4 SFC
machine power supply	**380 V±10 %, 60 Hz** **460 V±10 %, 60 Hz**
control voltage	**115 V**
terminal strip **-X2/ -X11**	7.6632.00300
-X12 (option K11/H23)	7.6632.00310
Handling	fig. 1, Sht. 22
compressor control **-K20**	7.7601.0
Prodrive	SIGMA CONTROL 2 MCS
IO-module **-K21**	7.7602.1
Prodrive	SIGMA CONTROL 2 IOM-1
IO-module **-K22**	7.7604.1
Prodrive	SIGMA CONTROL 2 IOM-3
IO-module **-K23**	7.7604.1
(option K11) **Prodrive**	SIGMA CONTROL 2 IOM-3
power supply **-T21, -T22, -T27**	7.7605P0
Prodrive	PSDC24/2.5
power supply **-T23**	7.7605P0
(option K11) **Prodrive**	PSDC24/2.5
coupling relay **-K53, -K58**	7.3149.00660
Wieland	FLARE-24DC-1W-250V6A
coupling relay **-K59**	7.3149.00660
(option K1) **Wieland**	FLARE-24DC-1W-250V6A
EMERGENCY STOP pushbutton **-S1**	7.3217.0
	QRUV
bracket + auxiliary contact	7.3218.0
	MTHOO
auxiliary contact	7.3219.0
Schlegel	MTO
outlet filter	7.2752.00050
Rübsamen&Herr	GV700
control cabinet **KAESER**	227732.0
control panel **KAESER**	230457.0

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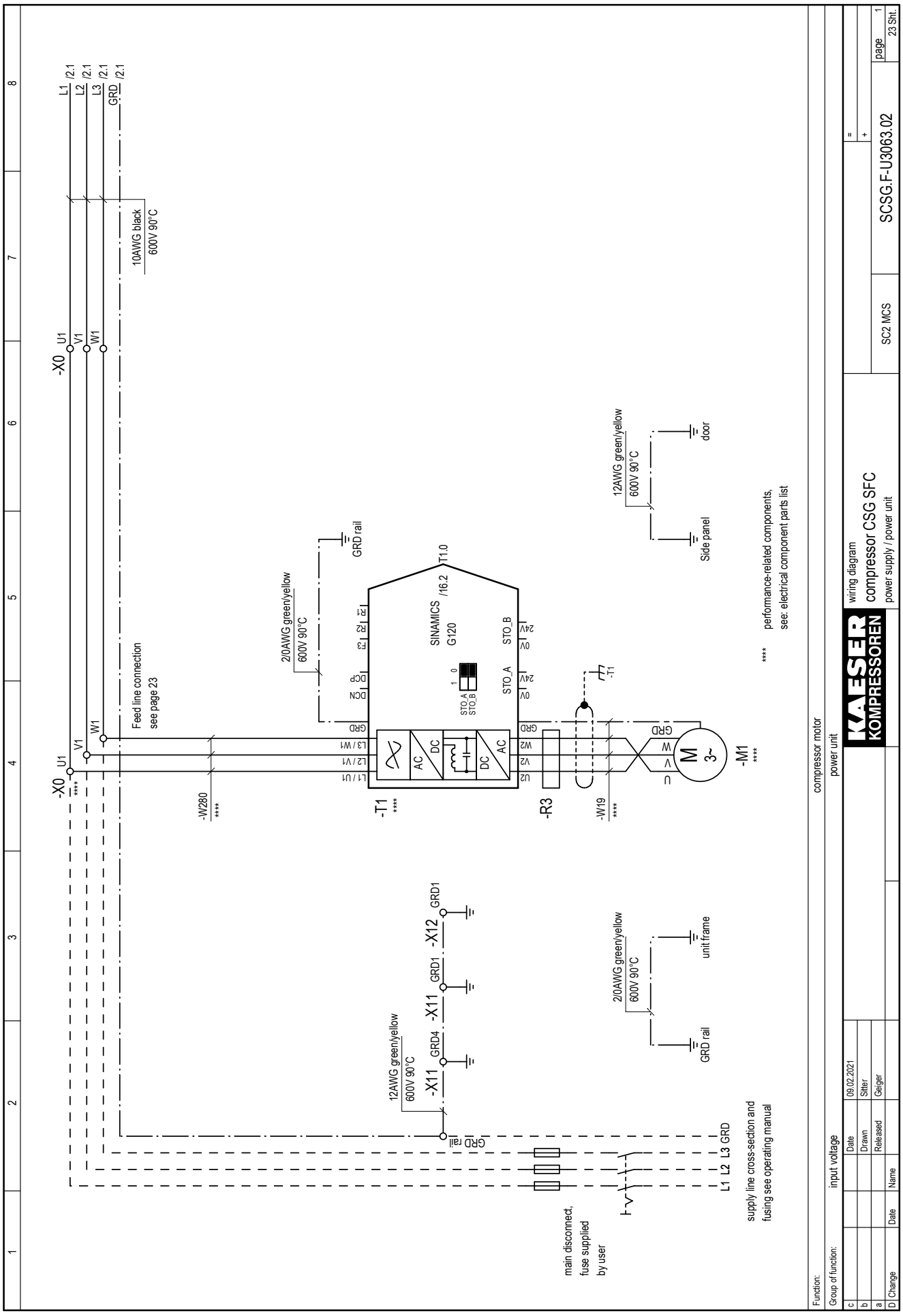
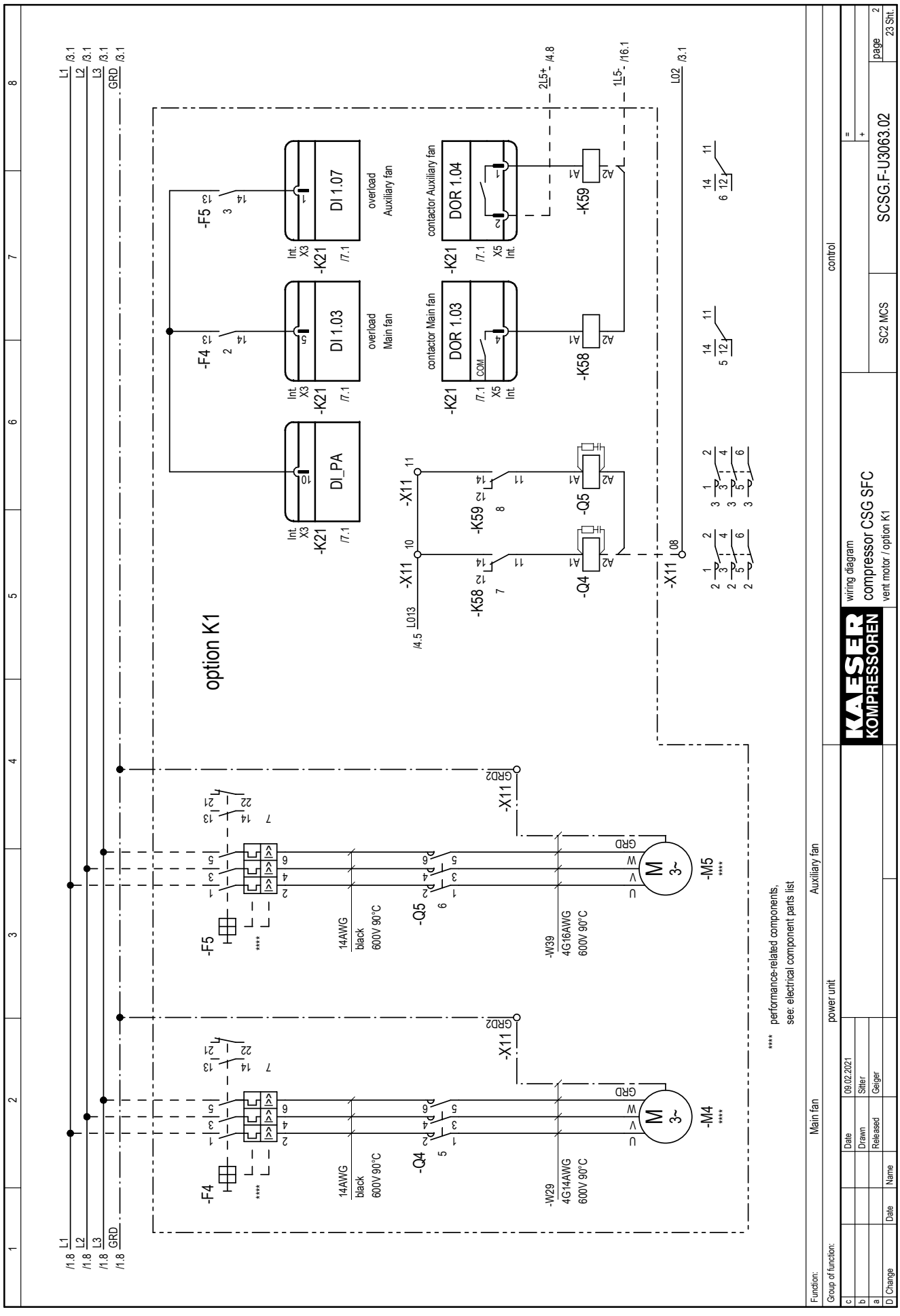
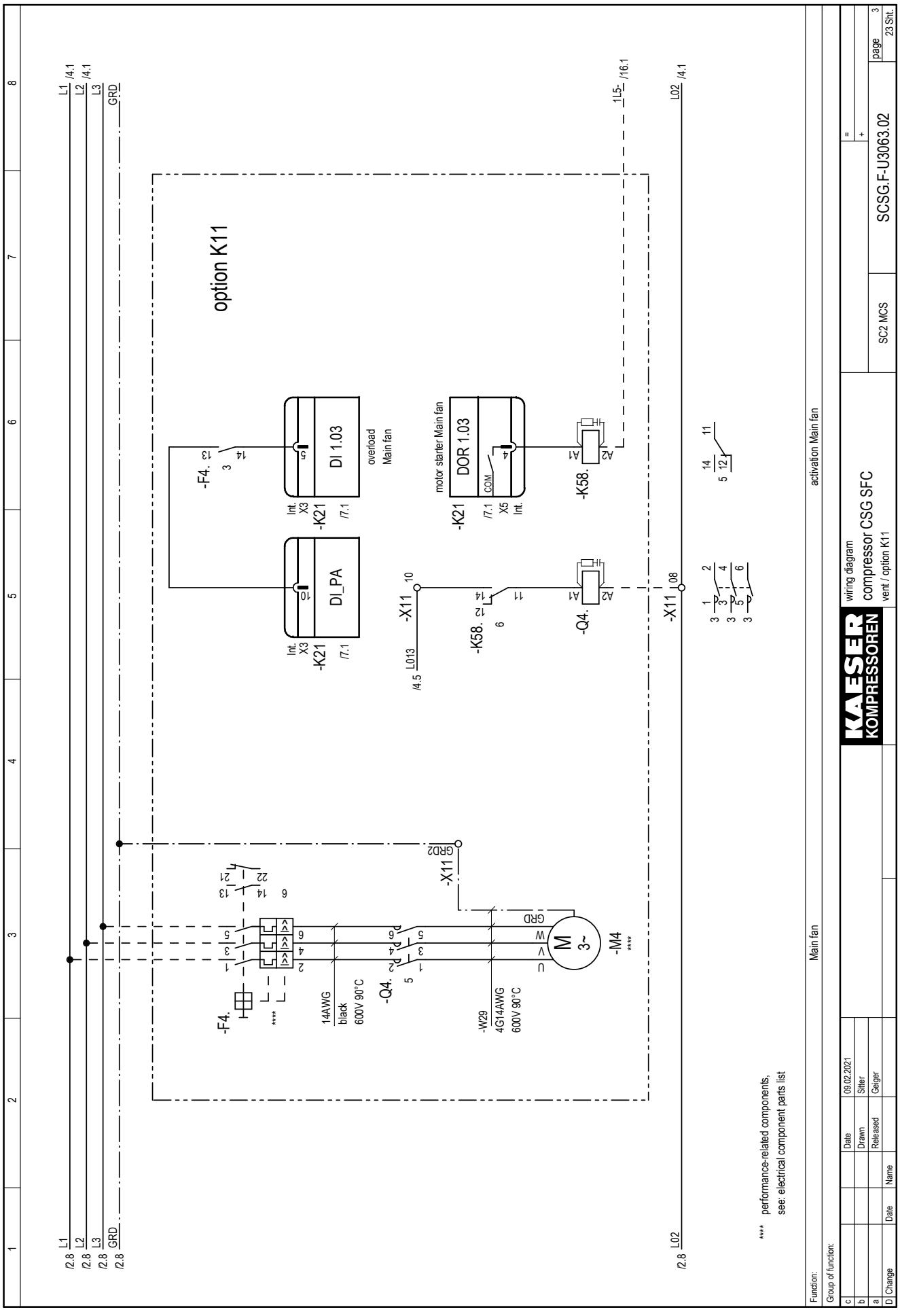
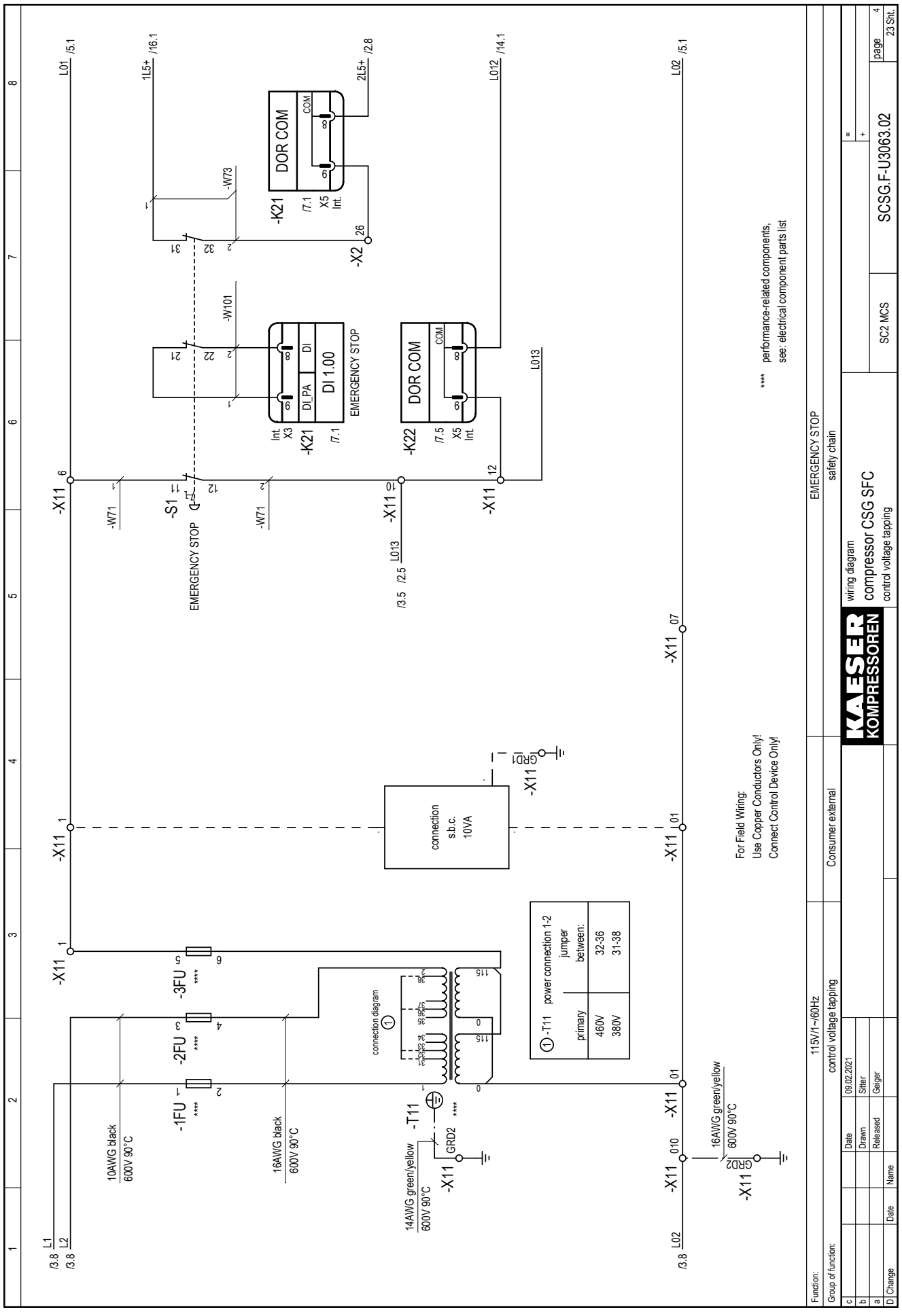
7 Sht.
UCSG.F-U3063.02
SC2 MCS
electrical component parts list
compressor CSG SFC
KAESER KOMPRESSOREN

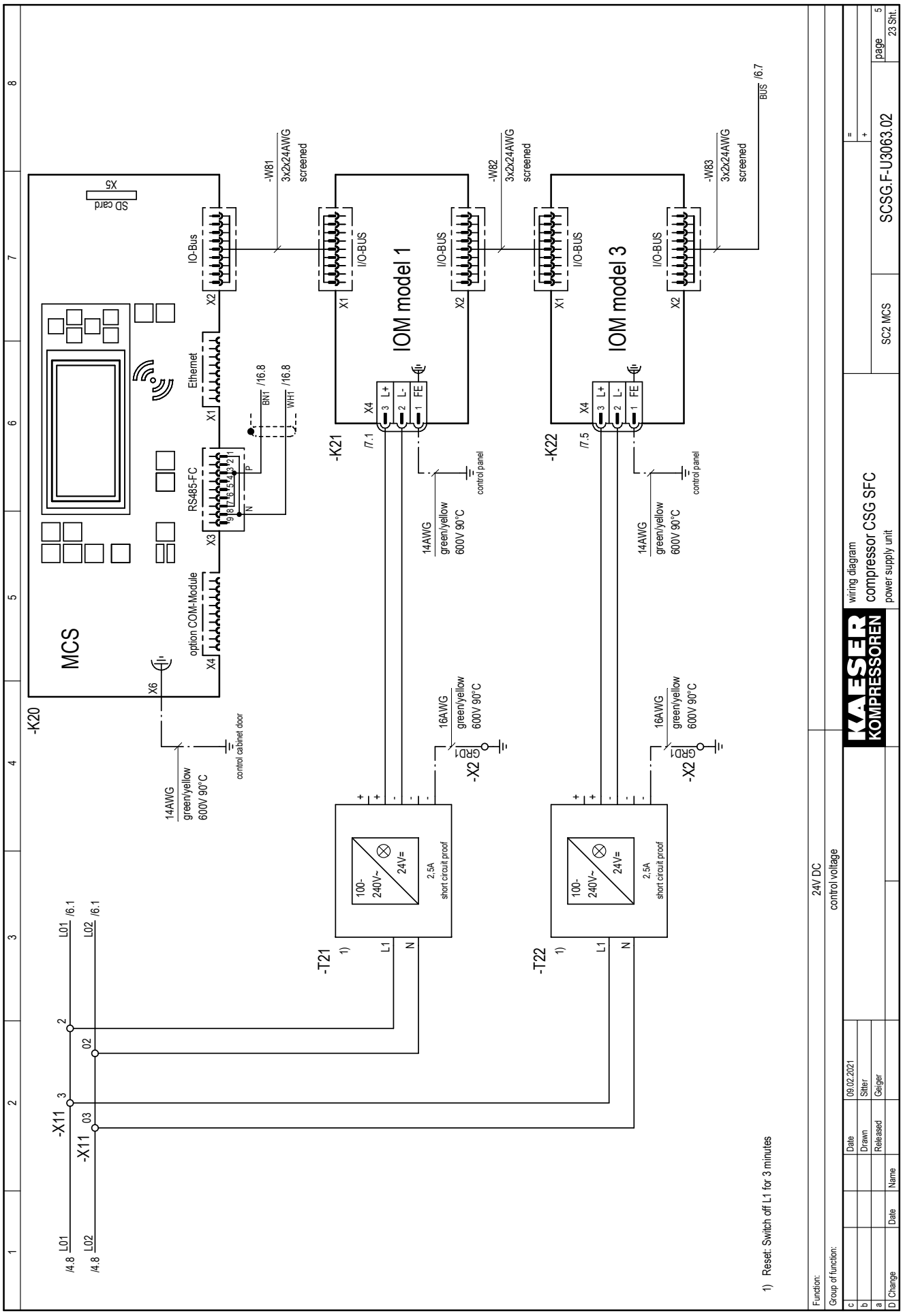
		Date	Name
c			
b	Drawn	09.02.2021	Sitter
a	Released		Geiger
C	Change	Date	Name


L1 /2.1
L2 /2.1
L3 /2.1
GRD /2.1
10AWG black
600V 90°C
-X0 U1
V1
W1
Feed line connection
see page 23
2/0AWG green/yellow
600V 90°C
GRD rail
T1.0
SINAMICS /16.2
G120
STO_A
STO_B
24V
0V
DCN
DCP
R1
R2
R3
L1 / U1
L2 / V1
L3 / W1
U2
V2
W2
GRD
-T1 ****
-W280 ****
-R3
-W19 ****
-M1 ****
12AWG green/yellow
600V 90°C
door
Side panel
**** performance-related components,
see: electrical component parts list
-X11 GRD4
-X12 GRD1
unit frame
GRD rail
GRD rail
main disconnect,
fuse supplied
by user
supply line cross-section and
fusing see operating manual
L1 L2 L3 GRD
Function:
compressor motor
Group of function:
input voltage
power unit
KAESER KOMPRESSOREN
wiring diagram
compressor CSG SFC
power supply / power unit
SC2 MCS
SCSG.F-U3063.02
page 1
23 Sht.
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Change


option K1
Main fan
Auxiliary fan
power unit
control
wiring diagram
compressor CSG SFC
vent motor / option K1
SC2 MCS
SCSG.F-U3063.02
page 2
23 Sht.
KAESER KOMPRESSOREN
-F4
-F5
-Q4
-Q5
-K58
-K59
-K21
-M4
-M5
-W29
-W39
-X11
DI 1.03
DI 1.07
DI_PA
DOR 1.03
DOR 1.04
overload Main fan
overload Auxiliary fan
contactor Main fan
contactor Auxiliary fan
14AWG black 600V 90°C
4G14AWG 600V 90°C
4G16AWG 600V 90°C
**** performance-related components, see: electrical component parts list


option K11
-F4.
DI 1.03
overload
Main fan
-K21
DI_PA
motor starter Main fan
DOR 1.03
-K58.
-X11
-Q4.
-M4
-W29
4G14AWG
600V 90°C
14AWG
black
600V 90°C
GRD2
L1
L2
L3
GRD
L02
1L5-
/16.1
/4.1
/2.8
/4.5
L013
wiring diagram
compressor CSG SFC
vent / option K11
SC2 MCS
SCSG.F-U3063.02
page 3
23 Sht.
Function: Main fan
Group of function: activation Main fan
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Change
performance-related components,
see: electrical component parts list


L01 /5.1
1L5+ /16.1
2L5+ /2.8
L012 /14.1
L02 /5.1
-W73
-K21 DOR COM
/7.1 X5 Int.
COM
-X2 26
-W101
Int. X3
-K21 DI 1.00
DI_PA DI
/7.1
EMERGENCY STOP
-K22 DOR COM
/7.5 X5 Int.
L013
-X11 6
-W71
-S1
EMERGENCY STOP
-X11 10
-X11 12
/3.5 /2.5 L013
-X11 1
-X11 07
-X11 01
-X11 010
-X11 GRD1
connection s.b.c. 10VA
-1FU
-2FU
-3FU
-T11
connection diagram
① -T11 power connection 1-2 jumper
primary
460V
380V
between:
32-36
31-38
10AWG black 600V 90°C
16AWG black 600V 90°C
14AWG green/yellow 600V 90°C
16AWG green/yellow 600V 90°C
GRD2
-X11 GRD2
L1 /3.8
L2 /3.8
L02 /3.8
**** performance-related components, see: electrical component parts list
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
Function: 115V/1~/60Hz
Group of function: control voltage tapping
EMERGENCY STOP
Consumer external
safety chain
KAESER KOMPRESSOREN
wiring diagram
compressor CSG SFC
control voltage tapping
SC2 MCS
SCSG.F-U3063.02
page 4
23 Sht.
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Date
D Change
a
b
c


MCS
-K20
SD card
X5
X6
option COM-Module
X4
RS485-FC
X3
Ethernet
X1
IO-Bus
X2
-W81
3x2x24AWG
screened
IOM model 1
I/O-BUS
X1
X2
-K21
/7.1
-W82
3x2x24AWG
screened
IOM model 3
-K22
/7.5
-W83
3x2x24AWG
screened
BUS
/6.7
BN1
WH1
/16.8
/16.8
L+
L-
FE
14AWG
green/yellow
600V 90°C
control panel
control cabinet door
16AWG
green/yellow
600V 90°C
GRD1
-X2
-T21
-T22
1)
100-
240V~
24V=
2,5A
short circuit proof
L1
N
-X11
L01
L02
/4.8
/6.1
02
03
1) Reset: Switch off L1 for 3 minutes
Function:
24V DC
Group of function:
control voltage
KAESER KOMPRESSOREN
wiring diagram
compressor CSG SFC
power supply unit
SC2 MCS
SCSG.F-U3063.02
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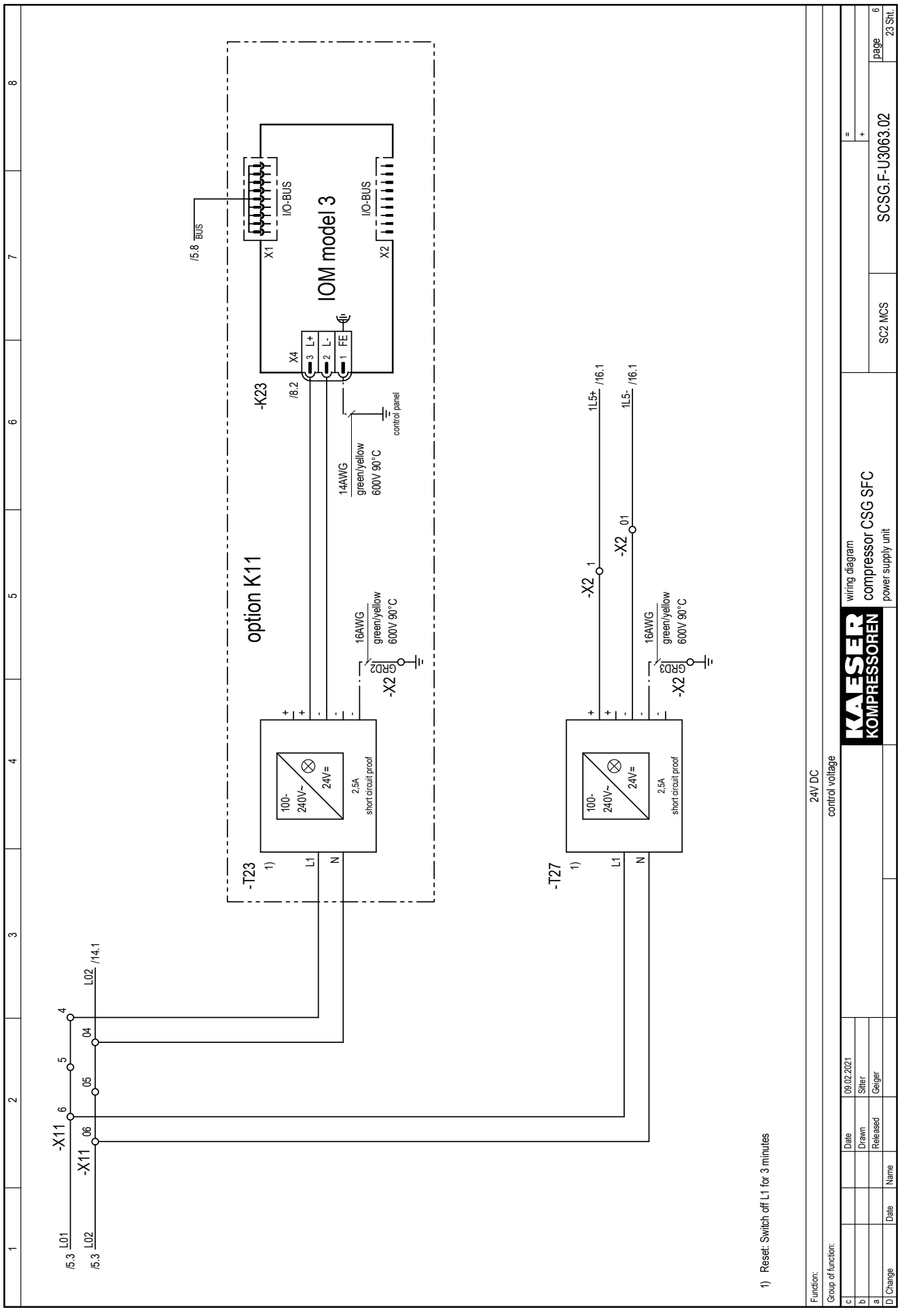
23 Sht.
Date
09.02.2021
Drawn
Sitter
Released
Geiger
Name
Change


option K11
IOM model 3
-K23
-T23
-T27
-X11
-X2
-X2
-X2
I/O-BUS
I/O-BUS
BUS
/5.8
X1
X2
X4
L+
L-
FE
/8.2
14AWG
green/yellow
600V 90°C
control panel
16AWG
green/yellow
600V 90°C
16AWG
green/yellow
600V 90°C
GRD2
GRD3
100-
240V~
24V=
2,5A
short circuit proof
L1
N
1L5+
1L5-
/16.1
/16.1
L01
L02
/5.3
/5.3
L02
/14.1
04
05
06
01
1)
1) Reset: Switch off L1 for 3 minutes
24V DC
control voltage
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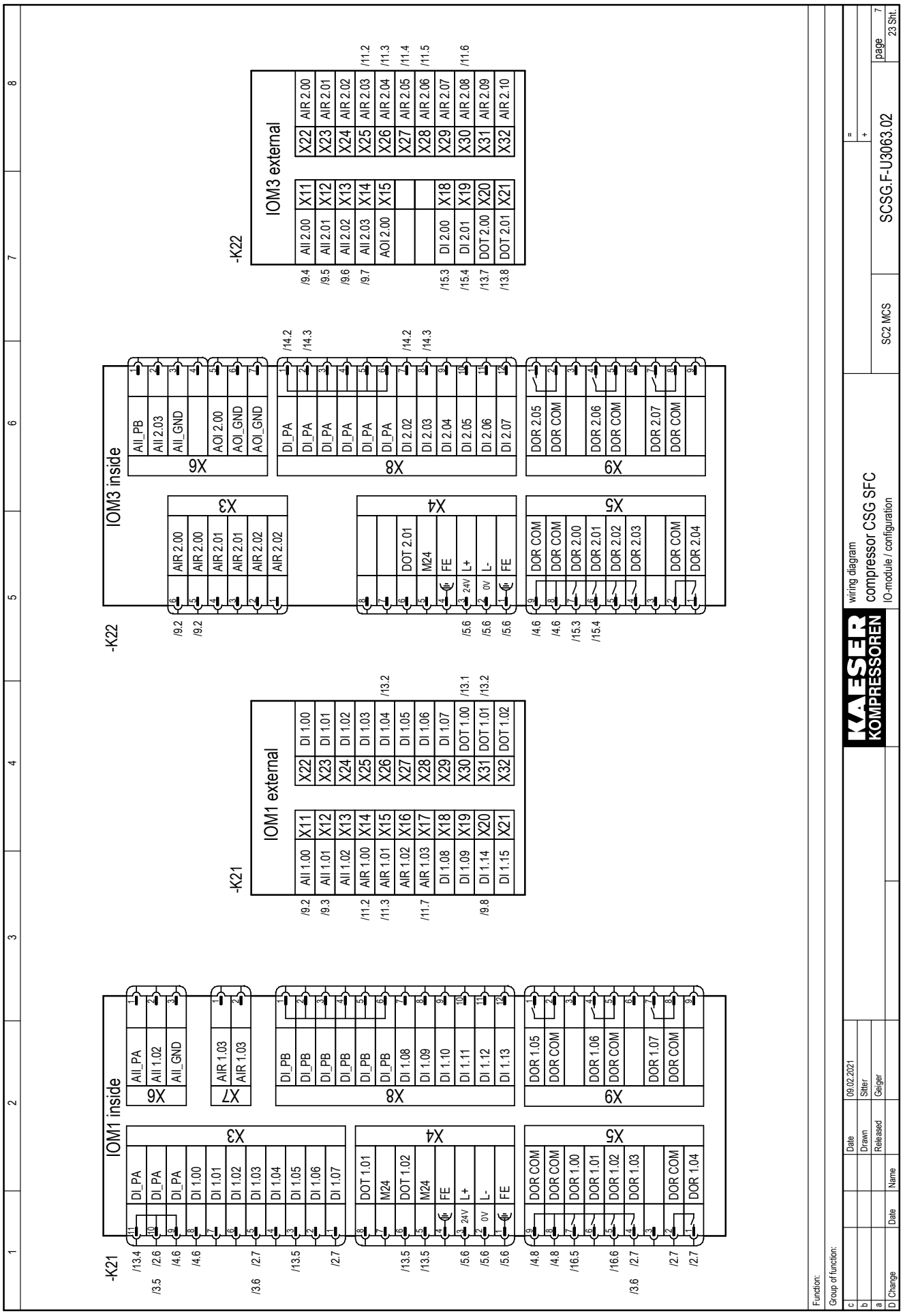
IOM1 inside
IOM3 inside
IOM1 external
IOM3 external
-K21
-K22
X3
X4
X5
X6
X7
X8
X9
wiring diagram
compressor CSG SFC
IO-module / configuration
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KAESER KOMPRESSOREN
Function:
Group of function:
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Released
Name
09.02.2021
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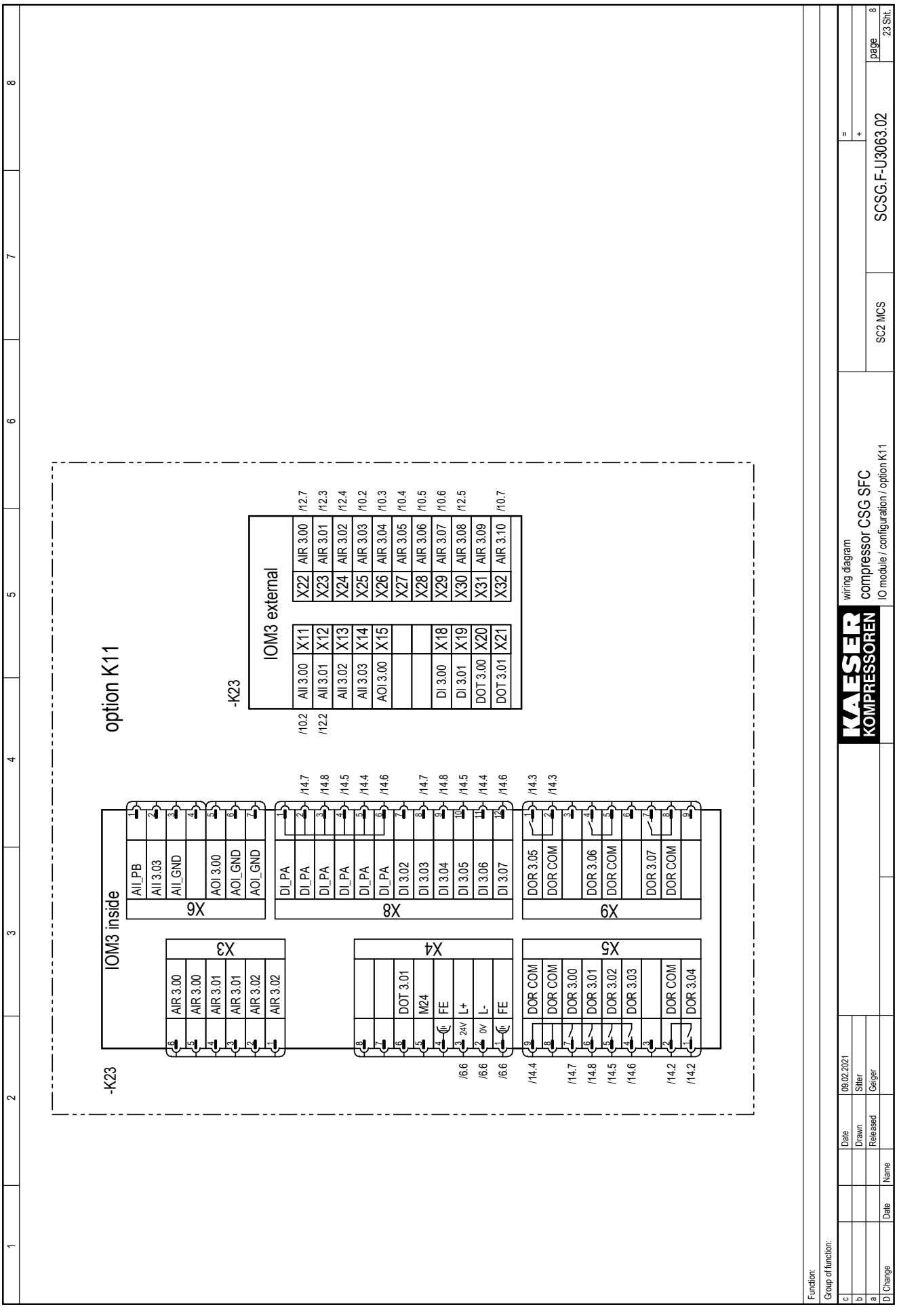
option K11
IOM3 inside
-K23
X6
AII_PB
AII 3.03
AII_GND
AOI 3.00
AOI_GND
AOI_GND
X8
DI_PA
DI 3.02
DI 3.03
DI 3.04
DI 3.05
DI 3.06
DI 3.07
X9
DOR 3.05
DOR COM
DOR 3.06
DOR COM
DOR 3.07
DOR COM
X3
AIR 3.00
AIR 3.00
AIR 3.01
AIR 3.01
AIR 3.02
AIR 3.02
X4
DOT 3.01
M24
FE
L+
24V
L-
0V
FE
X5
DOR COM
DOR COM
DOR 3.00
DOR 3.01
DOR 3.02
DOR 3.03
DOR COM
DOR 3.04
-K23
IOM3 external
All 3.00
All 3.01
All 3.02
All 3.03
AOI 3.00
DI 3.00
DI 3.01
DOT 3.00
DOT 3.01
X11
X12
X13
X14
X15
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
AIR 3.00
AIR 3.01
AIR 3.02
AIR 3.03
AIR 3.04
AIR 3.05
AIR 3.06
AIR 3.07
AIR 3.08
AIR 3.09
AIR 3.10
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IO module / configuration / option K11
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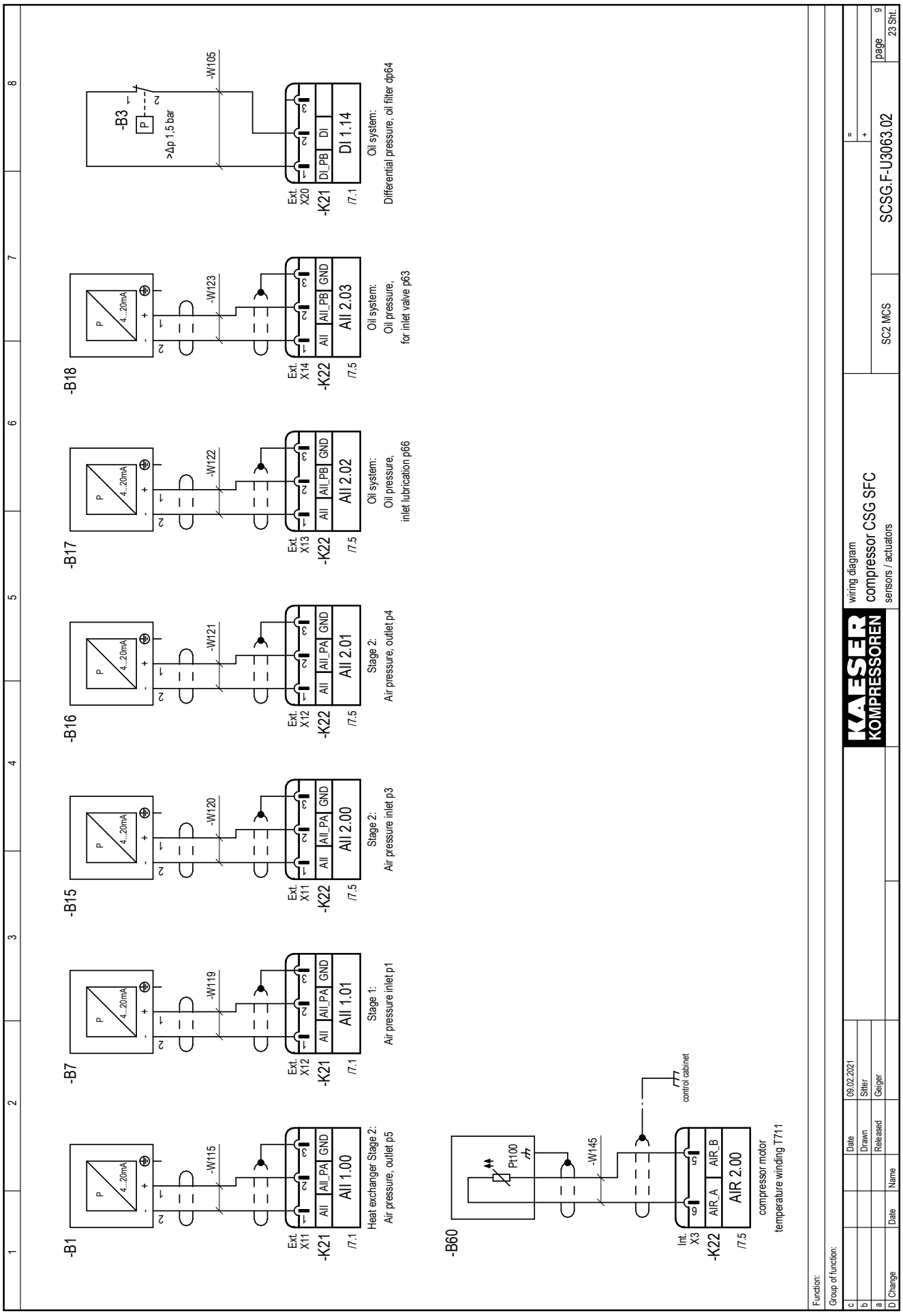
Function:
Group of function:
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Change


-B1
-W115
Ext. X11
-K21
AII 1.00
Heat exchanger Stage 2:
Air pressure, outlet p5
-B7
-W119
Ext. X12
-K21
AII 1.01
Stage 1:
Air pressure inlet p1
-B15
-W120
Ext. X11
-K22
AII 2.00
Stage 2:
Air pressure inlet p3
-B16
-W121
Ext. X12
-K22
AII 2.01
Stage 2:
Air pressure, outlet p4
-B17
-W122
Ext. X13
-K22
AII 2.02
Oil system:
Oil pressure,
inlet lubrication p66
-B18
-W123
Ext. X14
-K22
AII 2.03
Oil system:
Oil pressure,
for inlet valve p63
-B3
>Δp 1,5 bar
-W105
Ext. X20
-K21
DI 1.14
Oil system:
Differential pressure, oil filter dp64
-B60
Pt100
-W145
control cabinet
Int. X3
-K22
AIR 2.00
compressor motor
temperature winding T711
Function:
Group of function:
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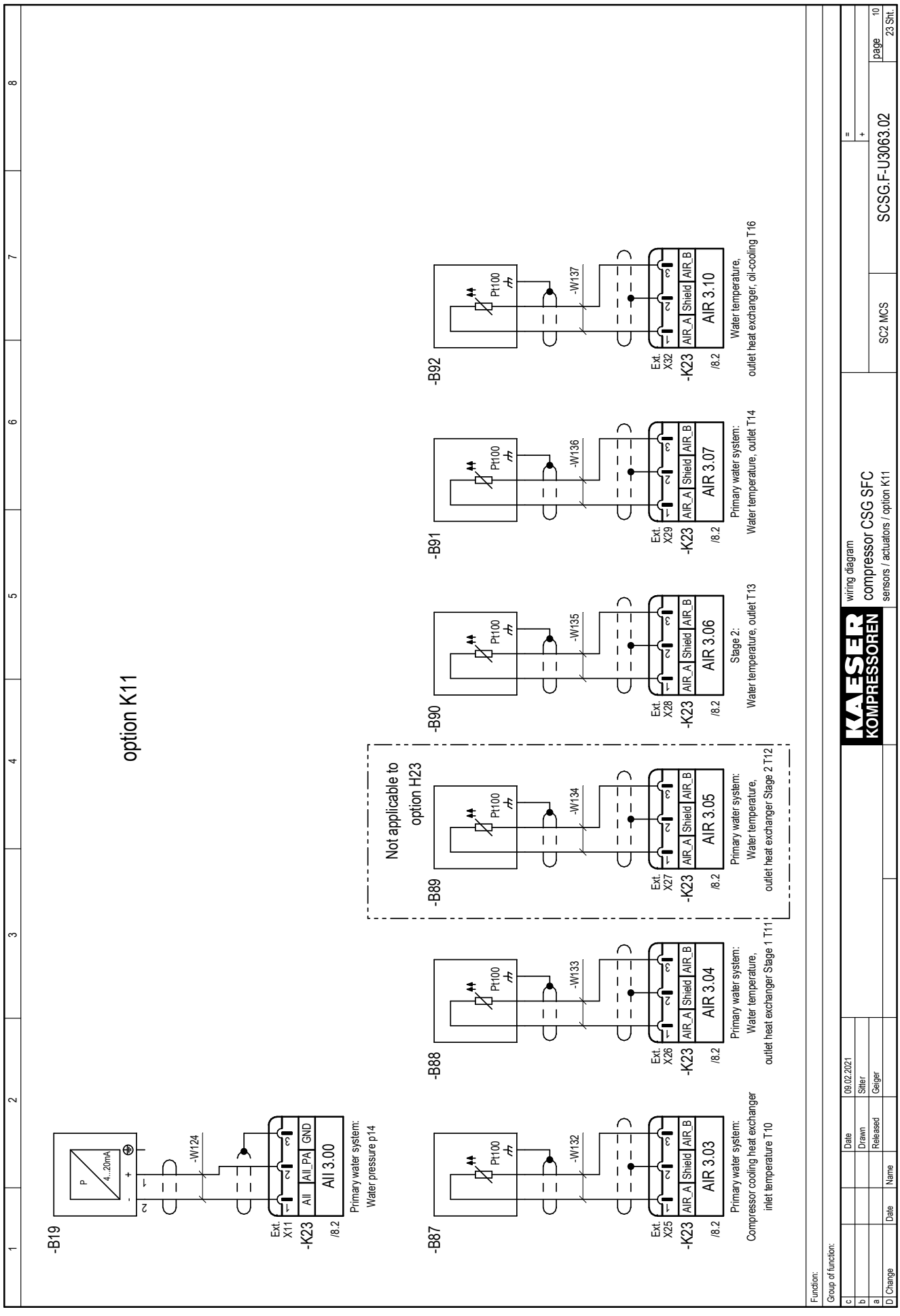
option K11
-B19
P
4...20mA
-W124
Ext. X11
-K23
All
All_PA
GND
All 3.00
/8.2
Primary water system:
Water pressure p14
-B87
Pt100
-W132
AIR_A
Shield
AIR_B
AIR 3.03
Primary water system:
Compressor cooling heat exchanger
inlet temperature T10
-B88
-W133
AIR 3.04
Primary water system:
Water temperature,
outlet heat exchanger Stage 1 T11
Not applicable to
option H23
-B89
-W134
AIR 3.05
Primary water system:
Water temperature,
outlet heat exchanger Stage 2 T12
-B90
-W135
AIR 3.06
Stage 2:
Water temperature, outlet T13
-B91
-W136
AIR 3.07
Primary water system:
Water temperature, outlet T14
-B92
-W137
AIR 3.10
Water temperature,
outlet heat exchanger, oil-cooling T16
Function:
Group of function:
Date
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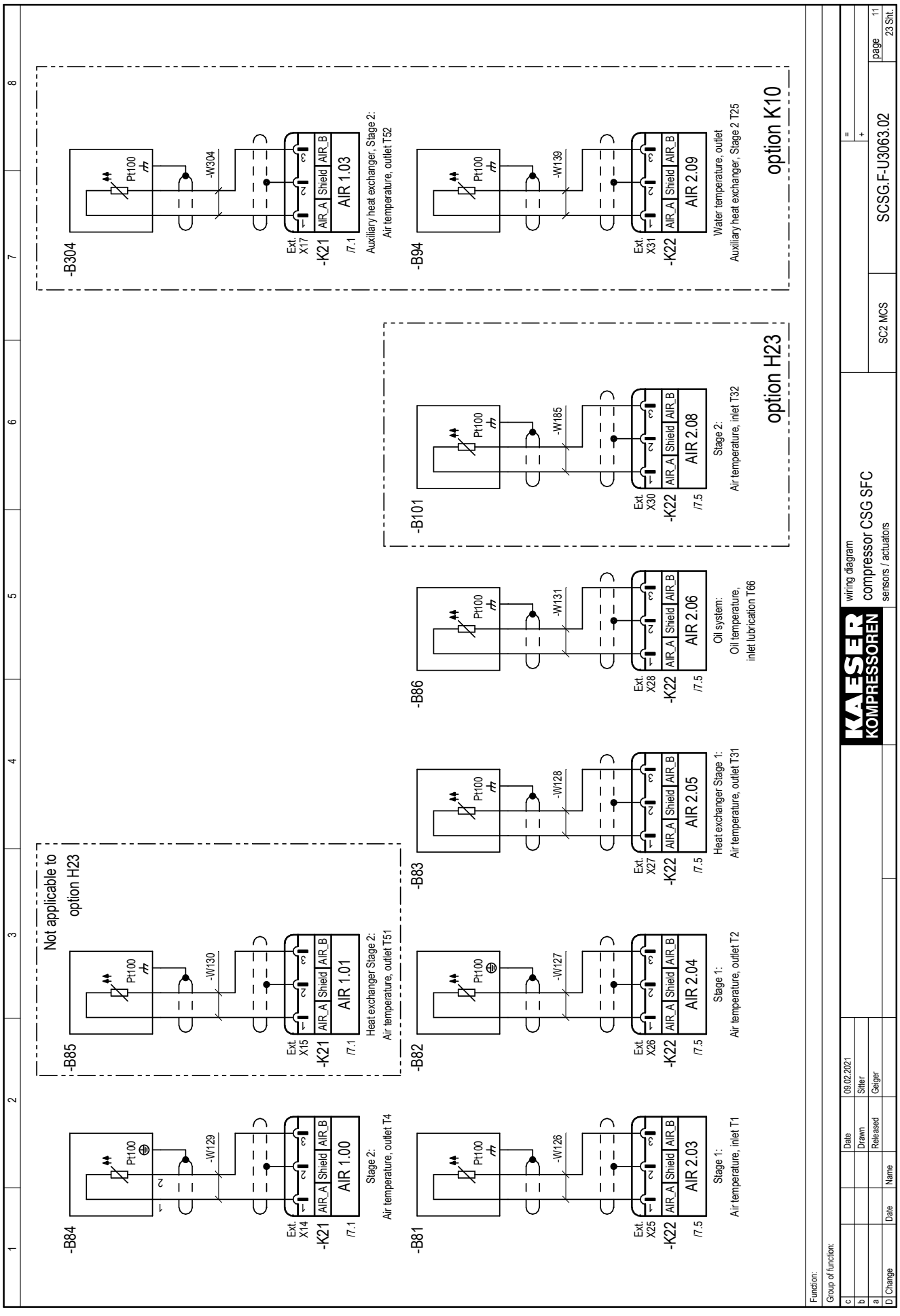
-B304
Pt100
-W304
Ext. X17
-K21
AIR_A Shield AIR_B
AIR 1.03
/7.1
Auxiliary heat exchanger, Stage 2:
Air temperature, outlet T52
-B94
Pt100
-W139
Ext. X31
-K22
AIR_A Shield AIR_B
AIR 2.09
Water temperature, outlet
Auxiliary heat exchanger, Stage 2 T25
option K10
-B101
Pt100
-W185
Ext. X30
-K22
AIR_A Shield AIR_B
AIR 2.08
/7.5
Stage 2:
Air temperature, inlet T32
option H23
-B86
Pt100
-W131
Ext. X28
-K22
AIR_A Shield AIR_B
AIR 2.06
/7.5
Oil system:
Oil temperature,
inlet lubrication T66
-B83
Pt100
-W128
Ext. X27
-K22
AIR_A Shield AIR_B
AIR 2.05
/7.5
Heat exchanger Stage 1:
Air temperature, outlet T31
-B85
Pt100
-W130
Ext. X15
-K21
AIR_A Shield AIR_B
AIR 1.01
/7.1
Heat exchanger Stage 2:
Air temperature, outlet T51
Not applicable to option H23
-B82
Pt100
-W127
Ext. X26
-K22
AIR_A Shield AIR_B
AIR 2.04
/7.5
Stage 1:
Air temperature, outlet T2
-B84
Pt100
-W129
Ext. X14
-K21
AIR_A Shield AIR_B
AIR 1.00
/7.1
Stage 2:
Air temperature, outlet T4
-B81
Pt100
-W126
Ext. X25
-K22
AIR_A Shield AIR_B
AIR 2.03
/7.5
Stage 1:
Air temperature, inlet T1
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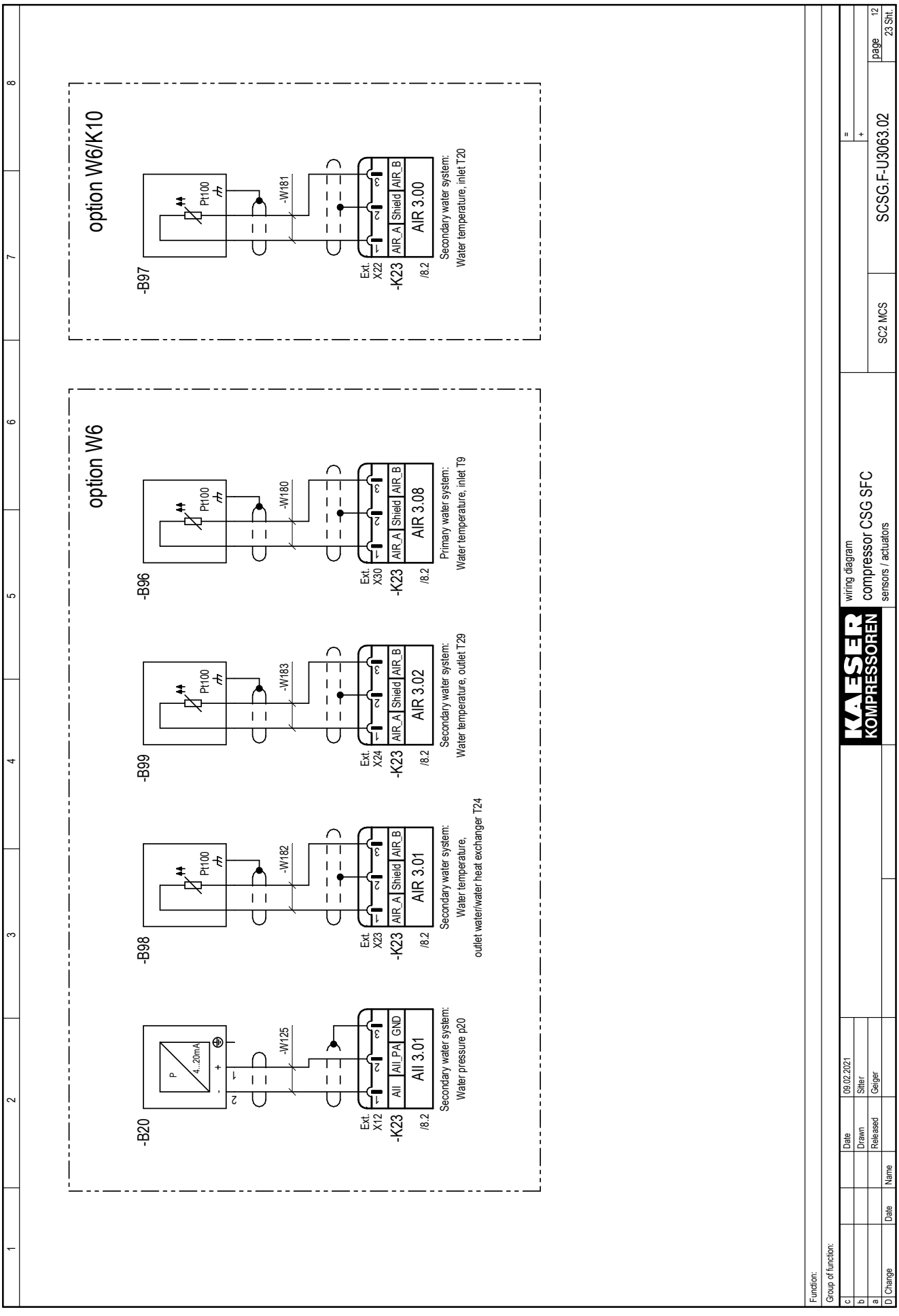
option W6/K10
-B97
Pt100
-W181
Ext. X22
-K23
AIR_A | Shield | AIR_B
AIR 3.00
/8.2
Secondary water system:
Water temperature, inlet T20
option W6
-B96
Pt100
-W180
Ext. X30
-K23
AIR_A | Shield | AIR_B
AIR 3.08
/8.2
Primary water system:
Water temperature, inlet T9
-B99
Pt100
-W183
Ext. X24
-K23
AIR_A | Shield | AIR_B
AIR 3.02
/8.2
Secondary water system:
Water temperature, outlet T29
-B98
Pt100
-W182
Ext. X23
-K23
AIR_A | Shield | AIR_B
AIR 3.01
/8.2
Secondary water system:
Water temperature,
outlet water/water heat exchanger T24
-B20
P
4...20mA
-W125
Ext. X12
-K23
AII | AII_PA | GND
AII 3.01
/8.2
Secondary water system:
Water pressure p20
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Sitter
Released
Geiger
Name
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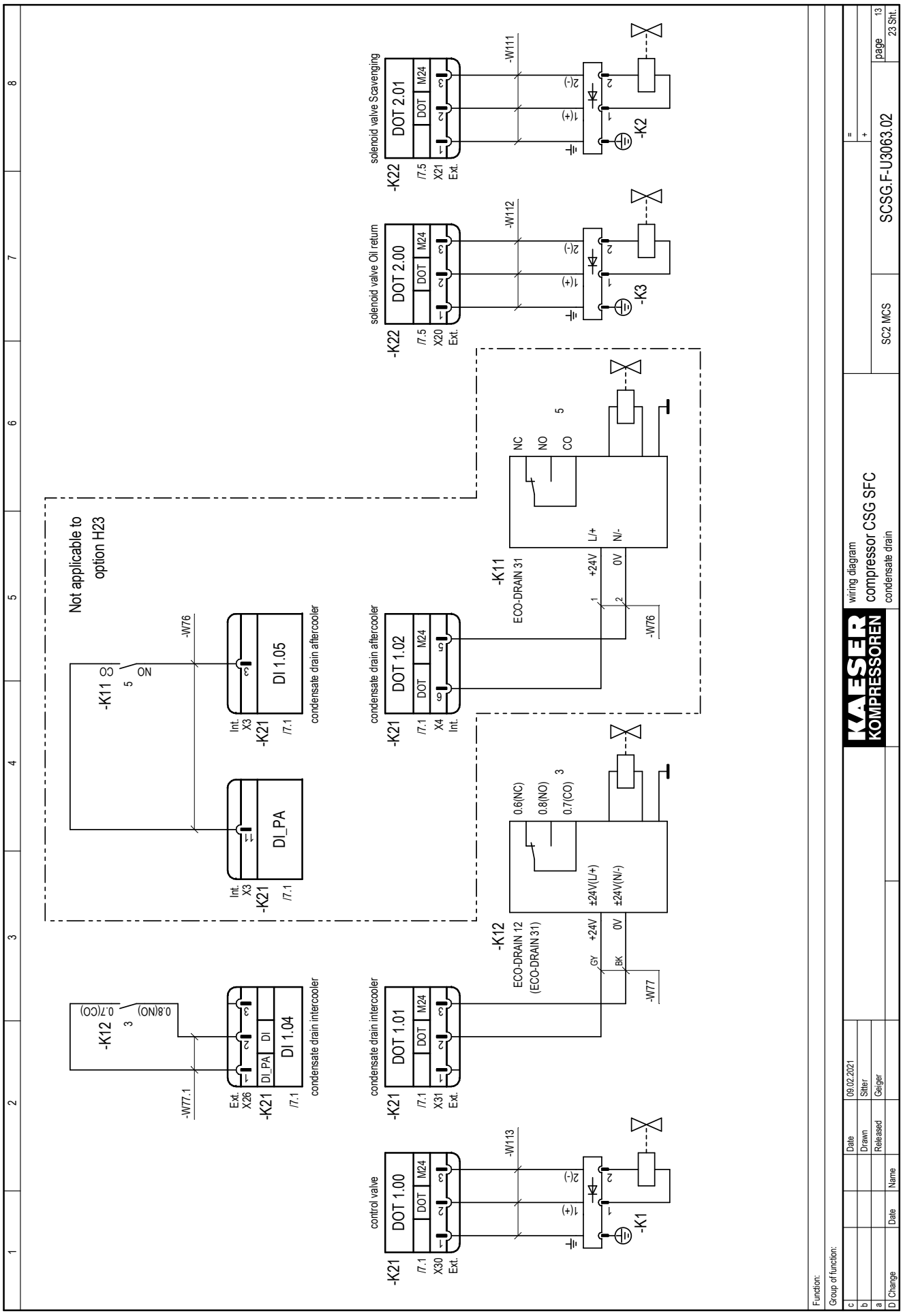
solenoid valve Scavenging
DOT 2.01
-K22
-W111
-K2
solenoid valve Oil return
DOT 2.00
-K22
-W112
-K3
Not applicable to option H23
-K11
-W76
DI 1.05
-K21
condensate drain aftercooler
DI_PA
condensate drain aftercooler
DOT 1.02
-K21
-K11
ECO-DRAIN 31
NC
NO
CO
L/+
N/-
+24V
0V
-W76
-K12
3
0.8(NO)
0.7(CO)
DI 1.04
-K21
condensate drain intercooler
-W77.1
condensate drain intercooler
DOT 1.01
-K21
-K12
ECO-DRAIN 12
(ECO-DRAIN 31)
±24V(L/+)
±24V(N/-)
GY
BK
-W77
control valve
DOT 1.00
-K21
-W113
-K1
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wiring diagram
compressor CSG SFC
condensate drain
SC2 MCS
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Group of function:
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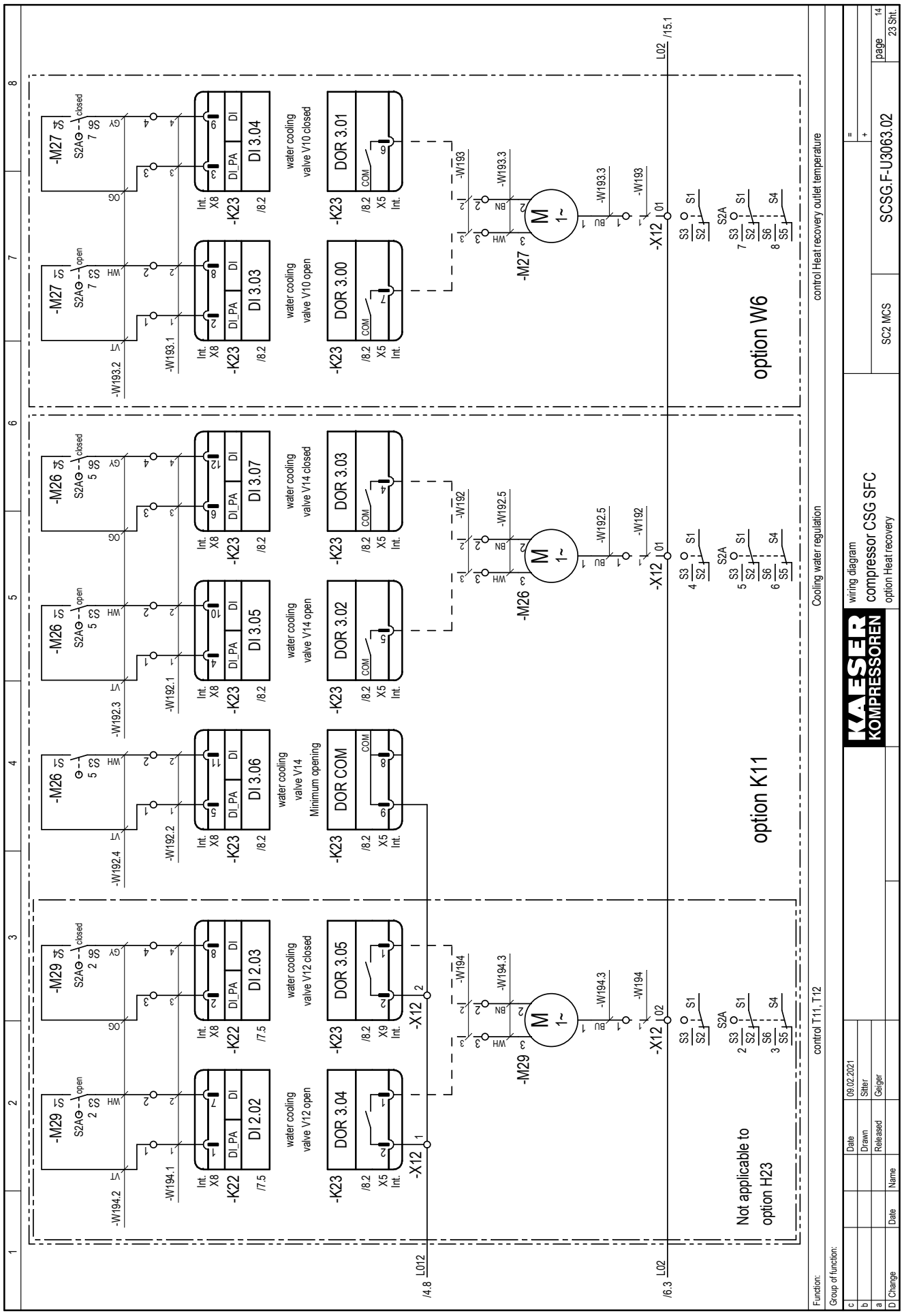
Change


option K11
option W6
Not applicable to option H23
control T11, T12
Cooling water regulation
control Heat recovery outlet temperature
KAESER KOMPRESSOREN
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compressor CSG SFC
option Heat recovery
SC2 MCS
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Released
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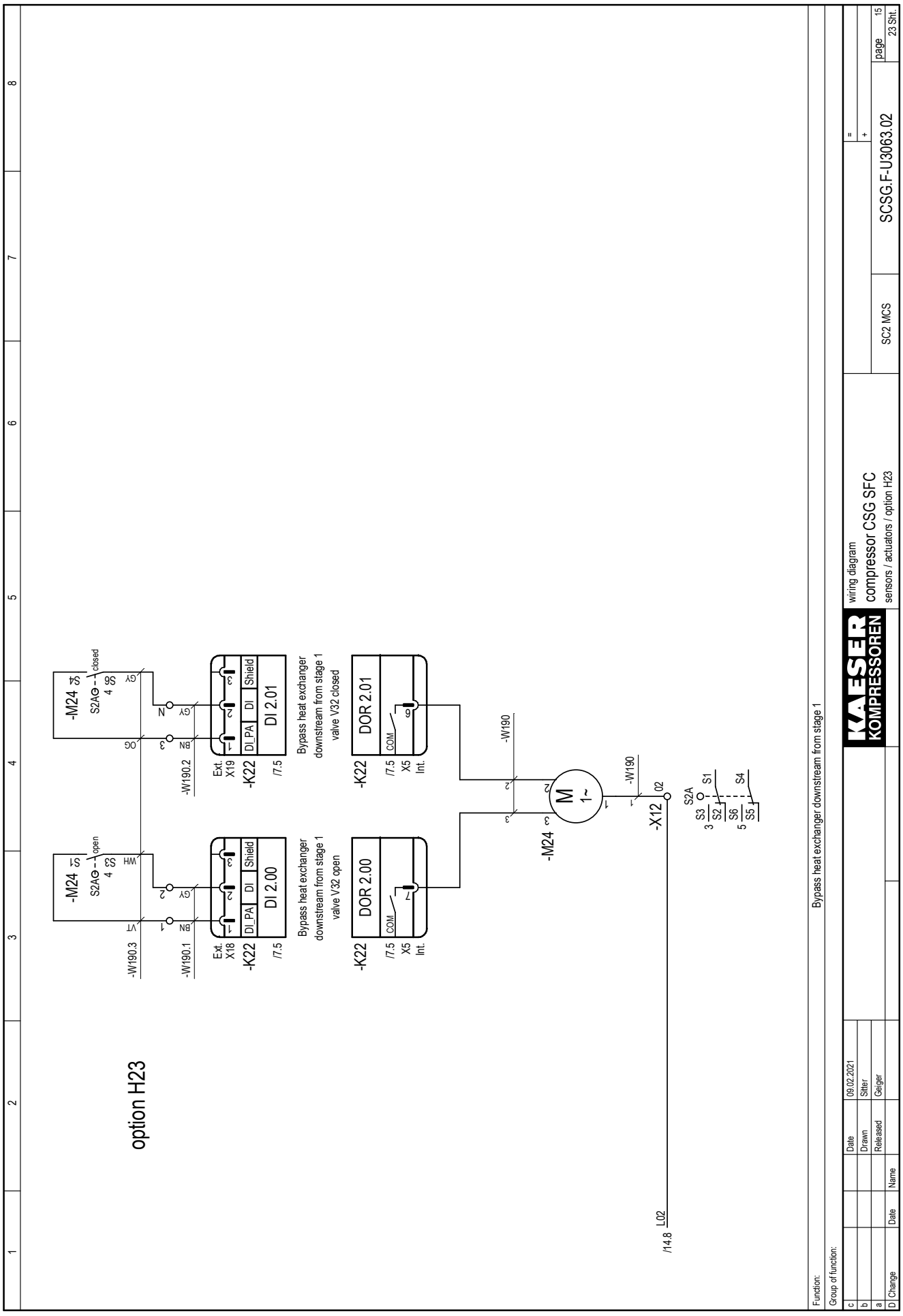
option H23
-M24
S2A
S1
S3
S6
open
closed
-W190.3
-W190.1
-W190.2
Ext. X18
Ext. X19
-K22
DI PA
DI
Shield
DI 2.00
DI 2.01
Bypass heat exchanger downstream from stage 1 valve V32 open
Bypass heat exchanger downstream from stage 1 valve V32 closed
DOR 2.00
DOR 2.01
COM
X5 Int.
-W190
M 1~
-X12
/14.8 L02
S2A
S3
S2
S1
S6
S5
S4
Function:
Bypass heat exchanger downstream from stage 1
Group of function:
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sensors / actuators / option H23
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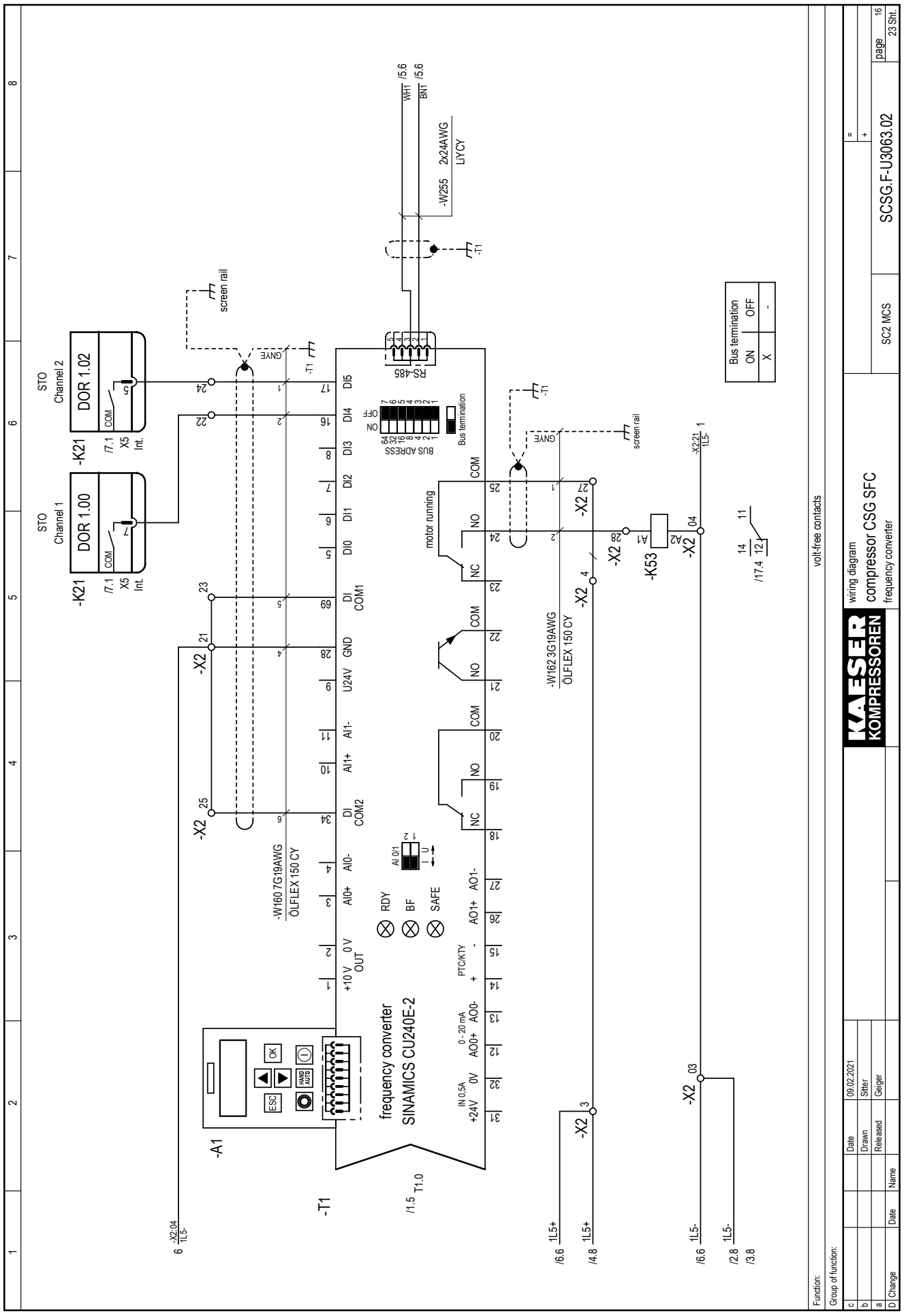
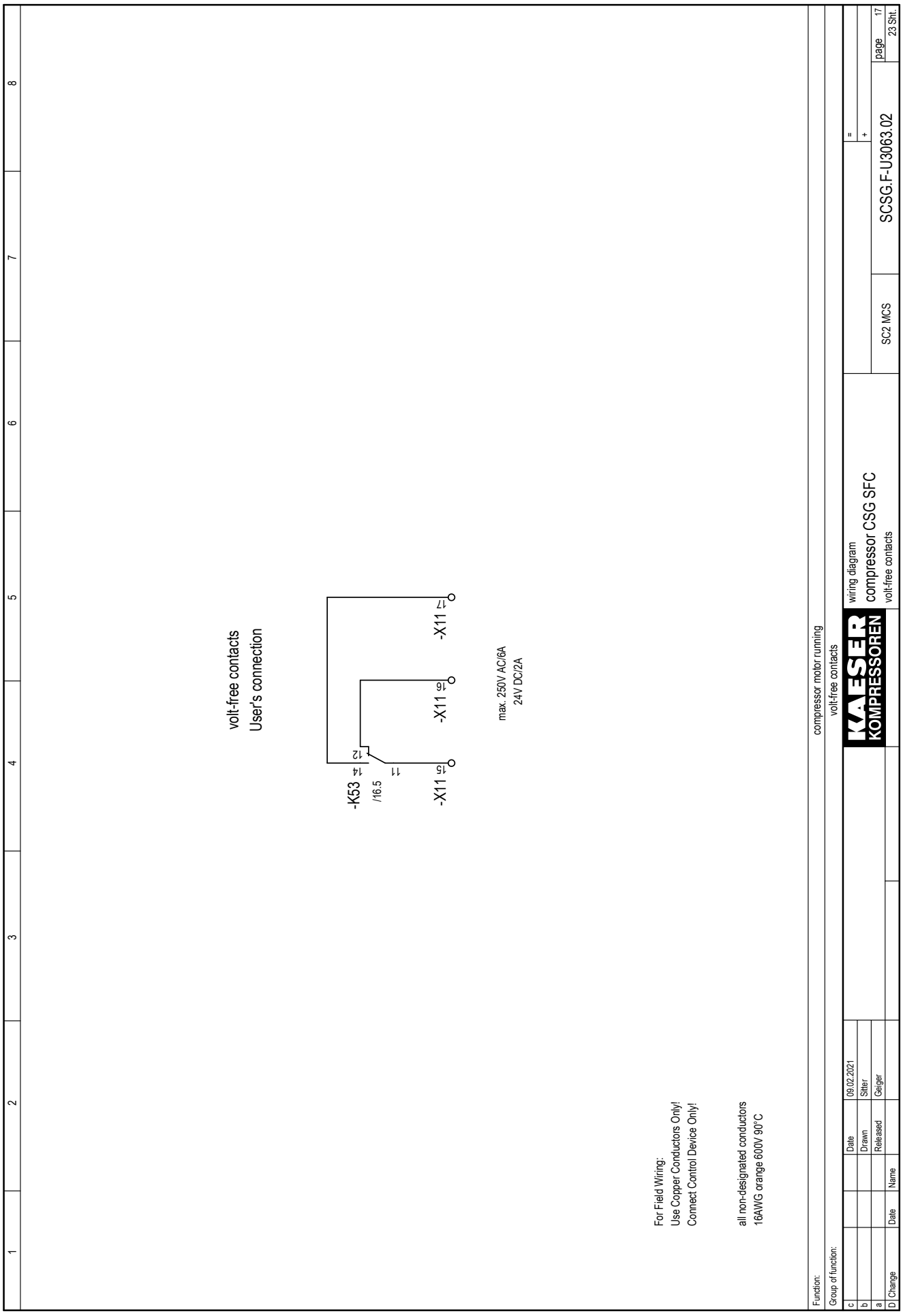

wiring diagram
compressor CSG SFC
frequency converter
SCSG.F-U3063.02
SC2 MCS
volt-free contacts
frequency converter
SINAMICS CU240E-2
-A1
-T1
-K21
DOR 1.00
DOR 1.02
STO
Channel 1
Channel 2
screen rail
-W160 7G19AWG
ÖLFLEX 150 CY
-W162 3G19AWG
ÖLFLEX 150 CY
-W255 2x24AWG
LiYCY
RS-485
BUS ADRESS
Bus termination
motor running
-K53
-X2
RDY
BF
SAFE
Bus termination
ON
OFF


volt-free contacts
User's connection
-K53
/16.5
14
12
11
-X11
15
-X11
16
-X11
17
max. 250V AC/6A
24V DC/2A
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
all non-designated conductors
16AWG orange 600V 90°C
Function:
compressor motor running
Group of function:
volt-free contacts
KAESER KOMPRESSOREN
wiring diagram
compressor CSG SFC
volt-free contacts
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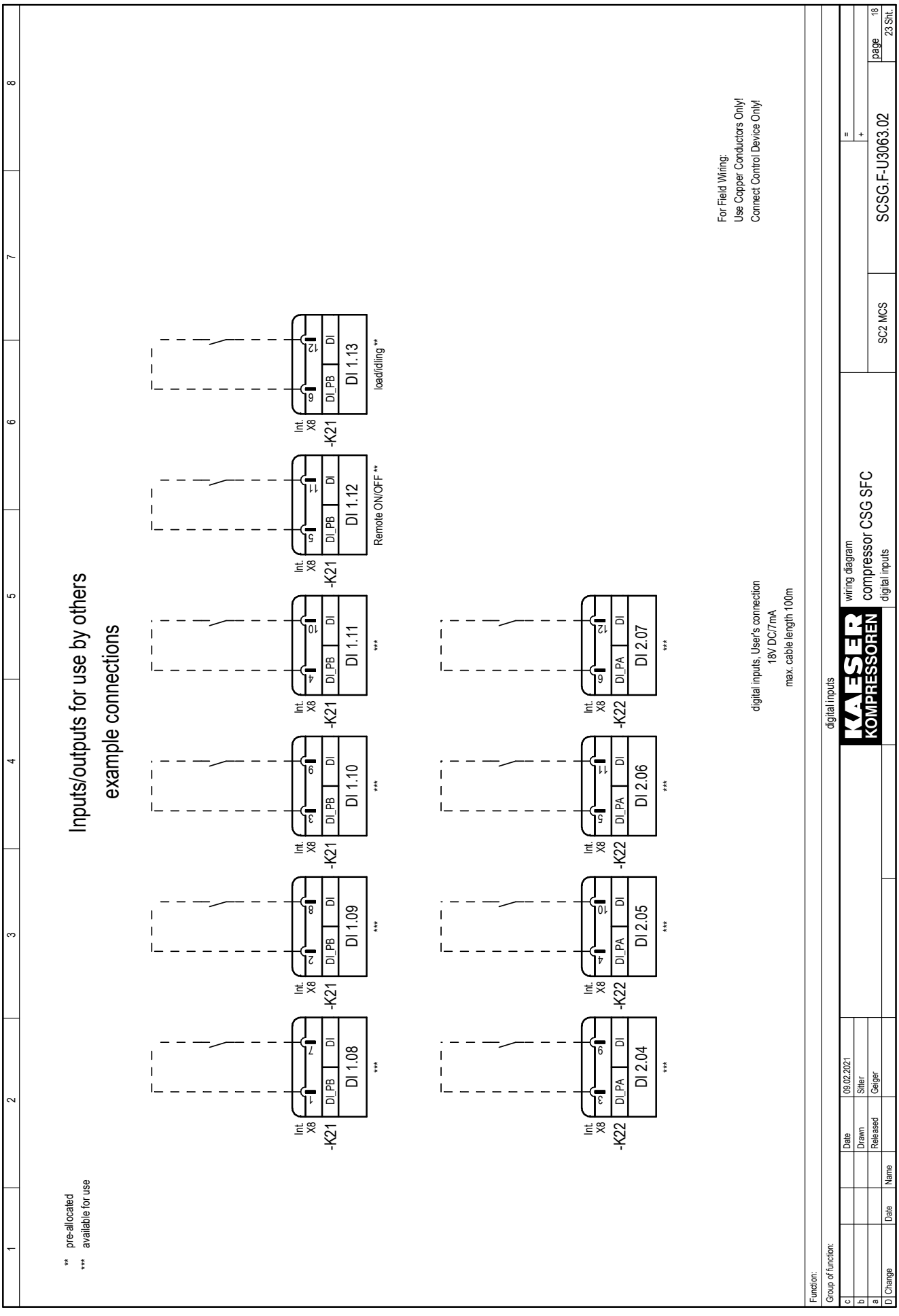
Inputs/outputs for use by others
example connections
** pre-allocated
*** available for use
-K21
-K22
Int. X8
DI_PB
DI_PA
DI
DI 1.08
DI 1.09
DI 1.10
DI 1.11
DI 1.12
DI 1.13
DI 2.04
DI 2.05
DI 2.06
DI 2.07
Remote ON/OFF **
load/idling **
***
digital inputs, User's connection
18V DC/7mA
max. cable length 100m
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
Function:
digital inputs
Group of function:
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digital inputs
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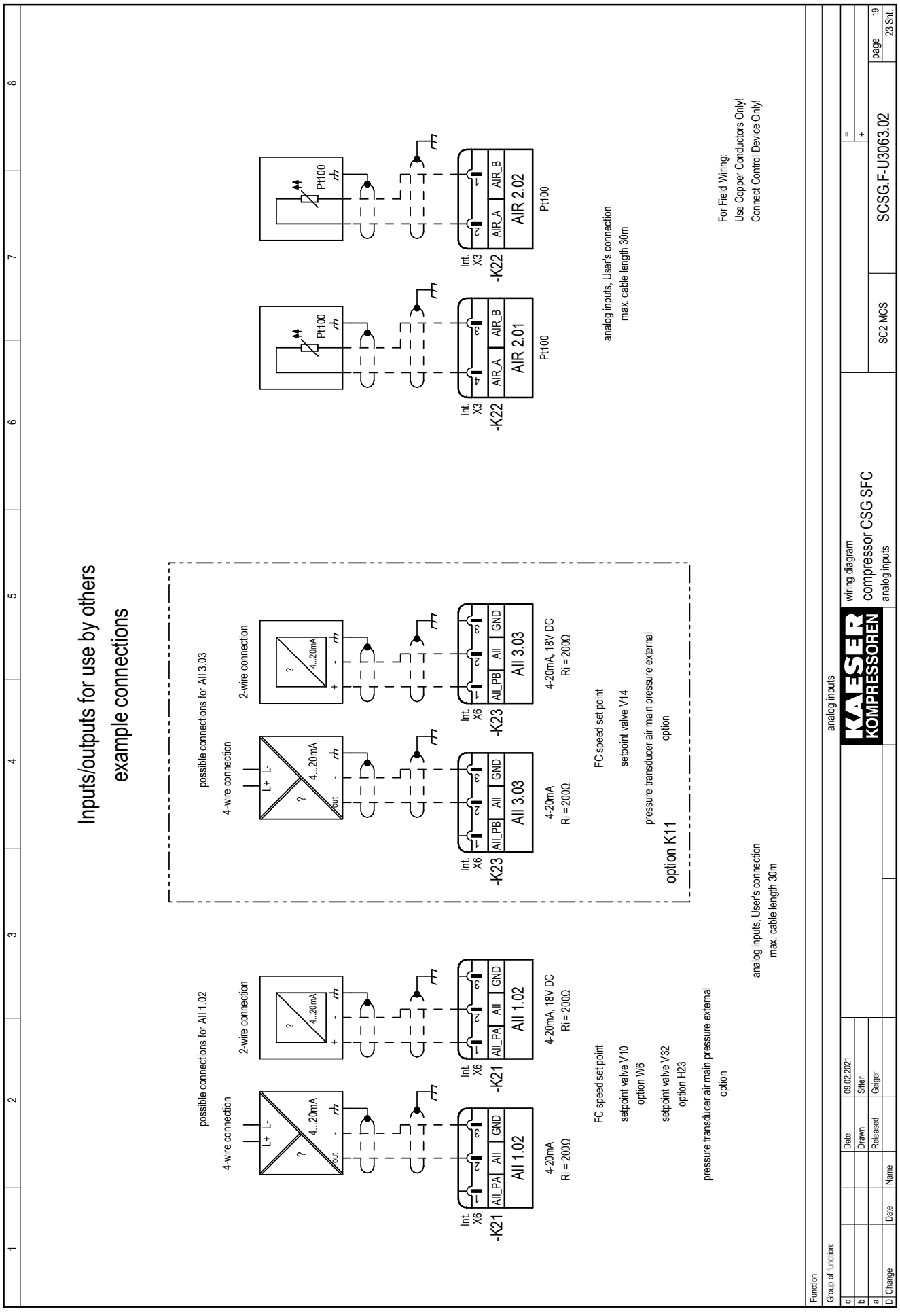
Inputs/outputs for use by others
example connections
possible connections for AII 1.02
4-wire connection
2-wire connection
L+ L-
4...20mA
Int. X6
-K21
AII_PA
AII
GND
AII 1.02
4-20mA
Ri = 200Ω
4-20mA, 18V DC
Ri = 200Ω
FC speed set point
setpoint valve V10
option W6
setpoint valve V32
option H23
pressure transducer air main pressure external
option
analog inputs, User's connection
max. cable length 30m
possible connections for AII 3.03
option K11
-K23
AII_PB
AII 3.03
pressure transducer air main pressure external
option
Int. X3
-K22
AIR_A
AIR_B
AIR 2.01
AIR 2.02
Pt100
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
Function:
Group of function:
analog inputs
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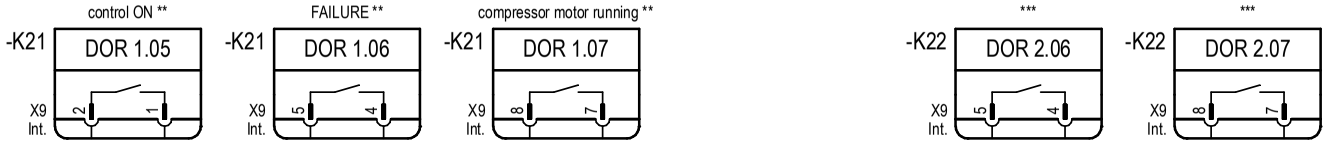
Inputs/outputs for use by others
example connections

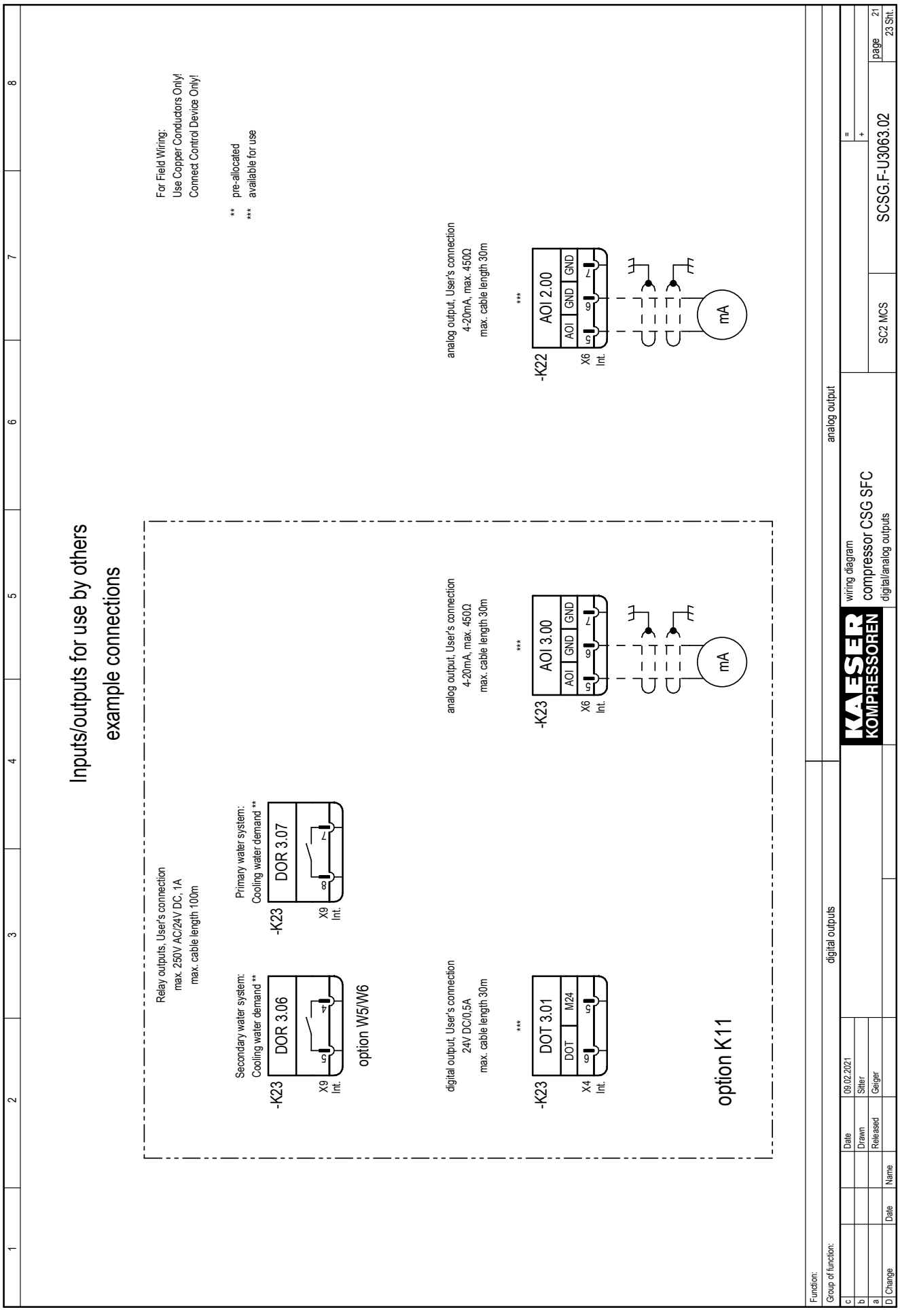
Relay outputs, User's connection
max. 250V AC/24V DC, 1A
max. cable length 100m



** pre-allocated
*** available for use

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

Function:									
Group of function:					digital outputs				
c				Date	09.02.2021	KAESER KOMPRESSOREN	wiring diagram	=	
b				Drawn	Sitter		compressor CSG SFC	+	
a				Released	Geiger		digital outputs	SC2 MCS	SCSG.F-U3063.02	page 20 / 23 Sht.
D	Change	Date	Name						


Inputs/outputs for use by others
example connections
Relay outputs, User's connection
max. 250V AC/24V DC, 1A
max. cable length 100m
Secondary water system:
Cooling water demand **
-K23
DOR 3.06
X9
Int.
option W5/W6
Primary water system:
Cooling water demand **
-K23
DOR 3.07
X9
Int.
digital output, User's connection
24V DC/0,5A
max. cable length 30m
***
-K23
DOT 3.01
DOT
M24
X4
Int.
option K11
analog output, User's connection
4-20mA, max. 450Ω
max. cable length 30m
***
-K23
AOI 3.00
AOI
GND
X6
Int.
mA
analog output, User's connection
4-20mA, max. 450Ω
max. cable length 30m
***
-K22
AOI 2.00
AOI
GND
X6
Int.
mA
For Field Wiring:
Use Copper Conductors Only!
Connect Control Device Only!
** pre-allocated
*** available for use
Function:
Group of function:
digital outputs
analog output
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Date

fig. 1: Handling: Control line terminal

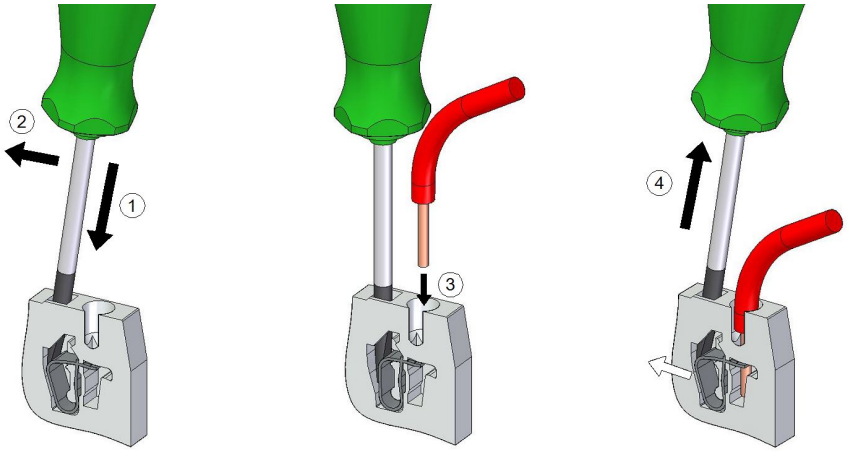


fig. 2: Handling: Supply terminal Wago

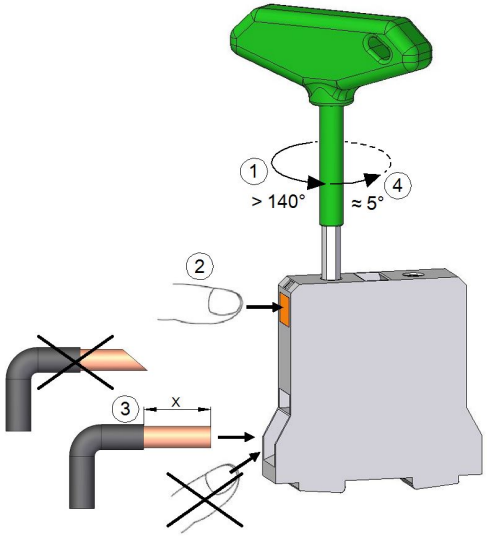


fig. 20: Feed line connection

GRD 7.8952.00010

terminal model IHI Connectors	Wire Size Copper (solid to semirigid stranded) AWG / MCM	Wire Size Copper flexible * AWG / MCM	Torque lb - in	Stripped length mm
S300-41-44	300 - 2	4/0 - 2	375	26
S300-41-44	2 - 6	2 - 6	275	26

* Stranding classes G, H, I/DLO, Metric class 5 and K/MTW

fig. 21: Feed line connection

GRD 7.8952.00020

terminal model IHI Connectors	Wire Size Copper (solid to semirigid stranded) AWG / MCM	Wire Size Copper flexible * AWG / MCM	Torque lb - in	Stripped length mm
S500-53-63	500 - 4	350 - 4	500	32

* Stranding classes G, H, I/DLO, Metric class 5 and K/MTW

c				Date	09.02.2021	KAESER KOMPRESSOREN	wiring diagram		=
b				Drawn	Sitter		compressor CSG SFC		+
a				Released	Geiger		Handling: Terminals / Feed line connection	SC2 MCS	SCSG.F-U3063.02	page 22 / 23 Sht.
D	Change	Date	Name							

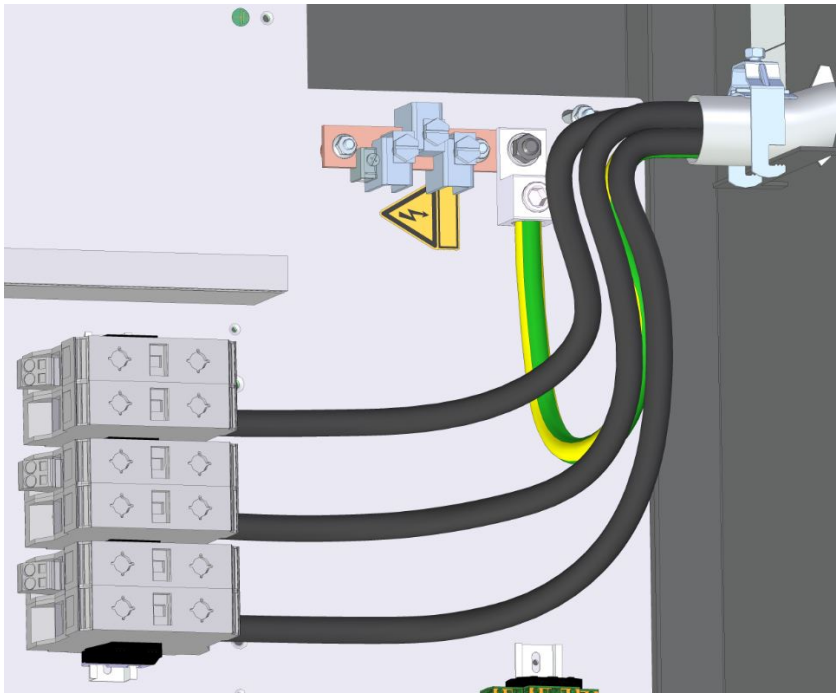


fig. 11: Feed line connection

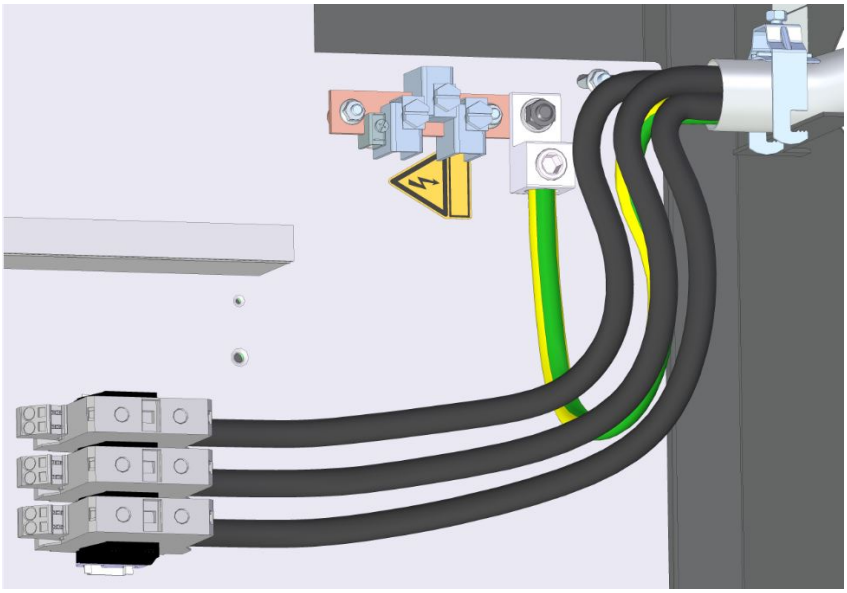
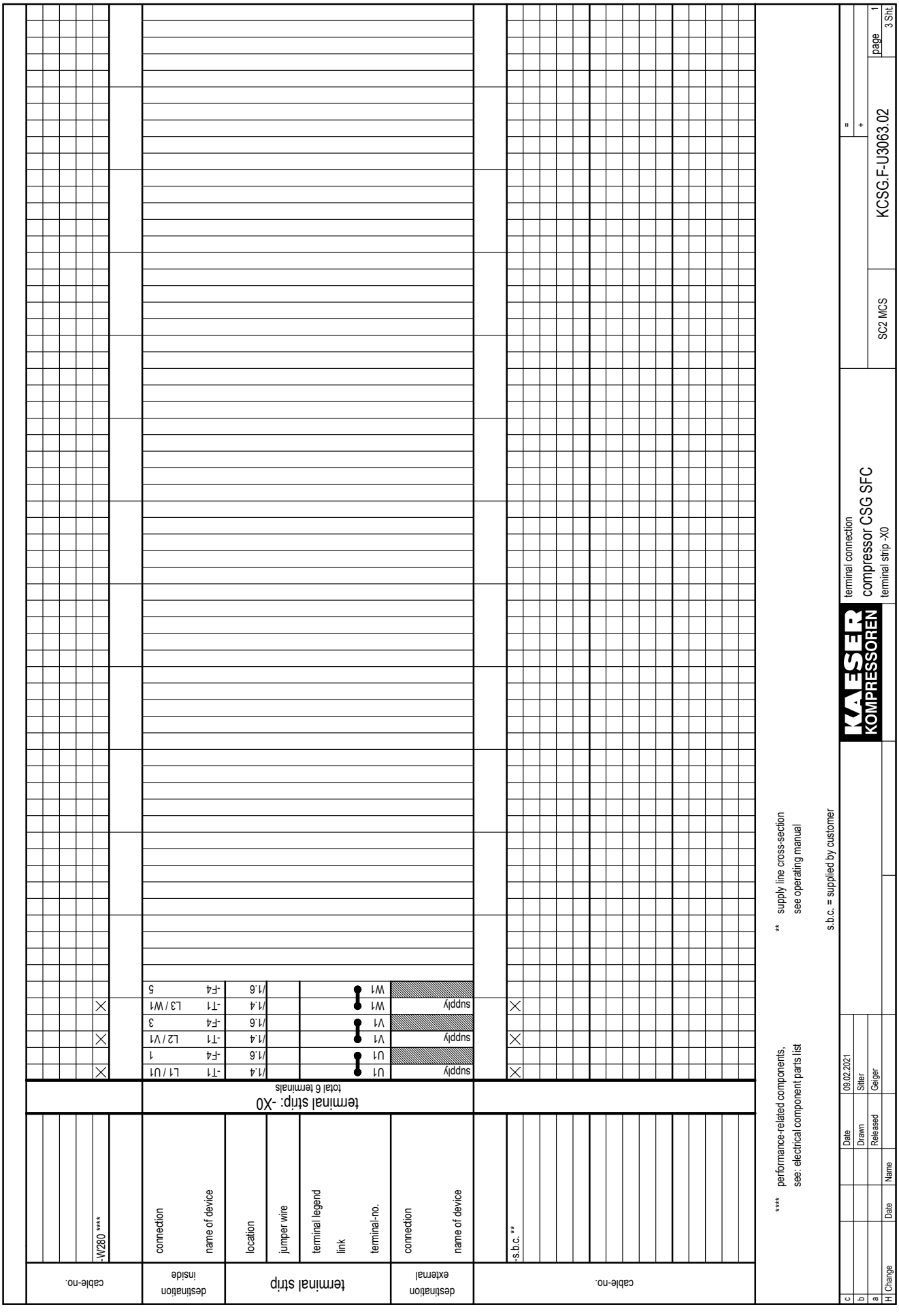
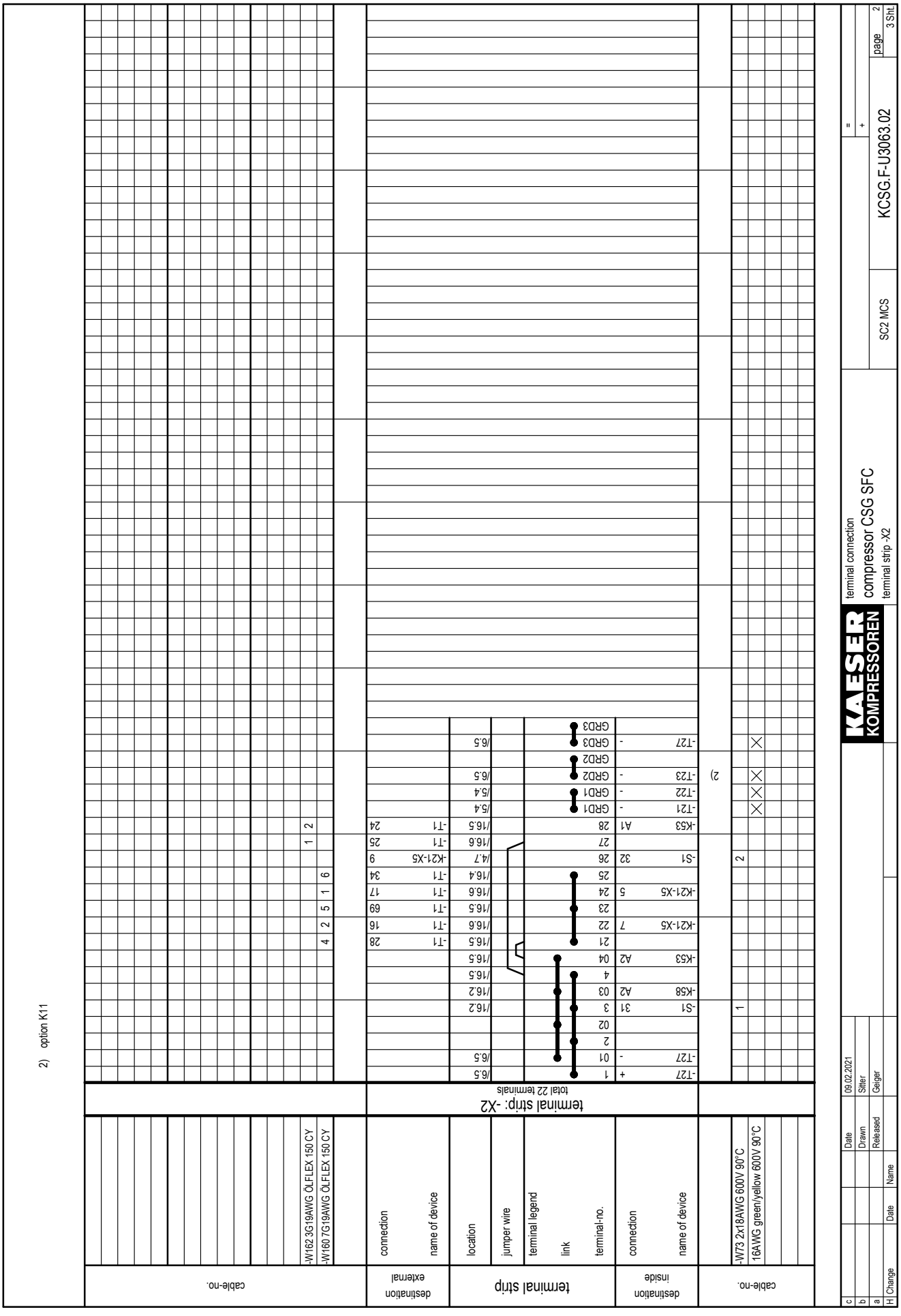
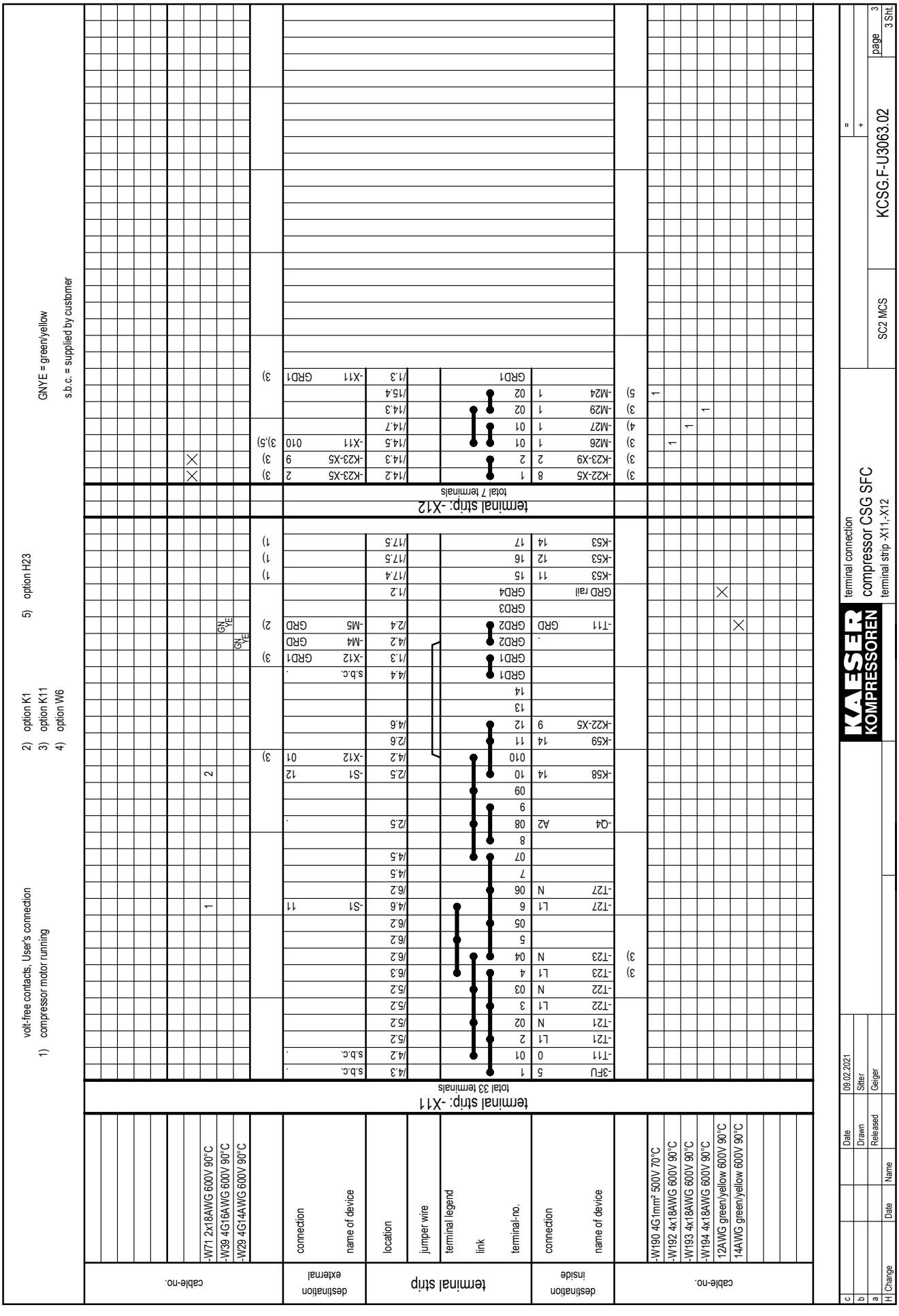


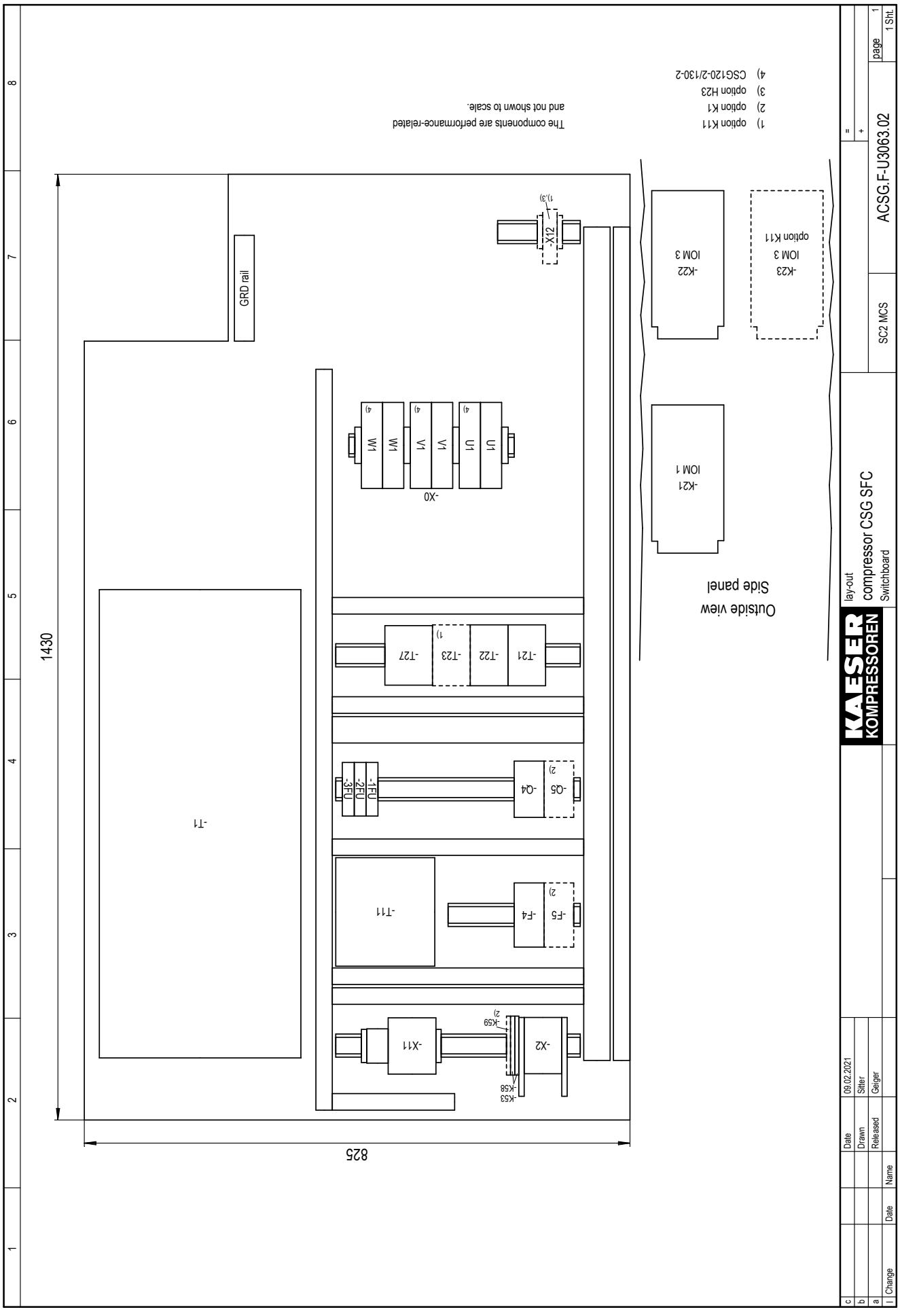
fig. 10: Feed line connection

KAESER KOMPRESSOREN
wiring diagram
compressor CSG SFC
Feed line connection
SC2 MCS
SCSG.F-U3063.02
page 23
23 Sht.
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Date
D Change


cable-no.
destination inside
terminal strip
destination external
cable-no.
-W280 ****
connection
name of device
location
jumper wire
terminal legend
link
terminal-no.
connection
name of device
s.b.c. **
terminal strip: -X0
total 6 terminals
L1 / U1
-T1
/1.4
-F4
1
supply
U1
/1.6
L2 / V1
-T1
/1.4
-F4
3
supply
V1
/1.6
L3 / W1
-T1
/1.4
-F4
5
supply
W1
/1.6
**** performance-related components,
see: electrical component parts list
** supply line cross-section
see operating manual
s.b.c. = supplied by customer
KAESER KOMPRESSOREN
terminal connection
compressor CSG SFC
terminal strip -X0
SC2 MCS
KCSG.F-U3063.02
page 1
3 Sht.
Date
09.02.2021
Drawn
Sitter
Released
Geiger
Name
Date
Change


2) option K11
cable-no.
destination external
terminal strip
destination inside
cable-no.
connection
name of device
location
jumper wire
terminal legend
link
terminal-no.
terminal strip: -X2
total 22 terminals
-W162 3G19AWG ÖLFLEX 150 CY
-W160 7G19AWG ÖLFLEX 150 CY
-W73 2x18AWG 600V 90°C
16AWG green/yellow 600V 90°C
-T27
-S1
-K58
-K53
-K21-X5
-T1
-T21
-T22
-T23
-T27
-K53
-S1
-K21-X5
-T1
GRD1
GRD2
GRD3
KAESER KOMPRESSOREN
terminal connection
compressor CSG SFC
terminal strip -X2
SC2 MCS
KCSG.F-U3063.02
page 2
3 Sht.
09.02.2021
Date
Drawn
Released
Name
Change
Sitter
Geiger


volt-free contacts, User's connection
1) compressor motor running
2) option K1
3) option K11
4) option W6
5) option H23
GNYE = green/yellow
s.b.c. = supplied by customer
terminal strip: -X11
total 33 terminals
terminal strip: -X12
total 7 terminals
cable-no.
destination inside
terminal strip
destination external
-W190 4G1mm² 500V 70°C
-W192 4x18AWG 600V 90°C
-W193 4x18AWG 600V 90°C
-W194 4x18AWG 600V 90°C
12AWG green/yellow 600V 90°C
14AWG green/yellow 600V 90°C
-W71 2x18AWG 600V 90°C
-W39 4G16AWG 600V 90°C
-W29 4G14AWG 600V 90°C
name of device
connection
terminal-no.
link
terminal legend
jumper wire
location
-3FU
-T11
-T21
-T22
-T23
-T27
-Q4
-K58
-K59
-K22-X5
-K53
GRD rail
-K22-X5
-K23-X9
-M26
-M29
-M27
-M24
-K23-X5
-T11
-M4
-M5
-S1
-X11
-X12
terminal connection
compressor CSG SFC
terminal strip -X11,-X12
KAESER KOMPRESSOREN
SC2 MCS
KCSG.F-U3063.02
page 3
3 Sht
Date
Drawn
Sitter
Released
Geiger
Name
Change


1430
825
-T1
-T11
-X2
-X11
-X12
-X0
-K53
-K58
-K59
-T21
-T22
-T23
-T27
-Q4
-Q5
-1FU
-2FU
-3FU
-F4
-F5
-K21 IOM 1
-K22 IOM 3
-K23 IOM 3 option K11
GRD rail
Outside view
Side panel
The components are performance-related and not shown to scale.
1) option K11
2) option K1
3) option H23
4) CSG120-2/130-2
KAESER KOMPRESSOREN
layout
compressor CSG SFC
Switchboard
SC2 MCS
ACSG.F-U3063.02
page 1
1 Sht.
Date 09.02.2021
Drawn Sitter
Released Geiger
Name
Change