

C-1: Kaeser Service Manual – Screw Compressor, Model: BSD



SERVICE MANUAL

Screw Compressor

Model: BSD

No.: 9_5708_04USE



1	Regarding this Document	1 – 1
1.1	Using the Document	1 – 1
1.2	Further Documents	1 – 1
1.3	Copyright	1 – 1
1.4	Symbols and Identification	1 – 1
1.4.1	Warnings	1 – 1
1.4.2	Other notices and symbols	1 – 2
2	Technical Specification	2 – 3
2.1	Weight	2 – 3
2.2	Temperature	2 – 4
2.3	Ambient Conditions	2 – 4
2.4	Pressure	2 – 4
2.5	Delivery (FAD)	2 – 5
2.6	Sound Pressure Level	2 – 5
2.7	Motors and Performance	2 – 5
2.7.1	Compressor motor	2 – 5
2.7.2	Fan Motor	2 – 5
2.8	Cooling oil	2 – 6
2.8.1	General Information	2 – 6
2.8.2	Cooling oil quantity	2 – 7
2.9	Electrical Connections	2 – 7
2.9.1	Power supply	2 – 7
2.9.2	Power supply specifications	2 – 8
2.10	Water cooling (option K2)	2 – 9
2.10.1	Design data	2 – 9
2.10.2	Cooling Water Quality	2 – 10
2.11	Heat Recovery	2 – 10
2.11.1	Prepared for heat recovery (option W1)	2 – 10
2.11.2	Internal Heat Recovery (option W2 / W3)	2 – 11
3	Safety and Responsibility	3 – 13
3.1	Specified Use	3 – 13
3.2	Unspecified Use	3 – 13
3.3	User's Responsibilities	3 – 13
3.3.1	Qualified personnel	3 – 13
3.3.2	Adherence to inspection schedules and accident prevention regulations	3 – 14
3.4	Dangers	3 – 14
3.4.1	Awareness of danger sources	3 – 14
3.4.2	Safe machine operation	3 – 16
3.4.3	Organizing	3 – 17
3.4.4	Danger zones	3 – 18
3.5	Safety Devices	3 – 18
3.6	Safety Signs	3 – 18
3.7	Emergency	3 – 20
3.7.1	Fire fighting	3 – 20
3.7.2	Cooling oil	3 – 21
3.8	Environmental Protection	3 – 21
3.9	Warranty	3 – 21

4	Design and Function	4 – 22
4.1	Machine Overview	4 – 22
4.1.1	Cabinet	4 – 22
4.1.2	Function	4 – 23
4.1.3	Volt-free Contacts	4 – 23
4.2	Options	4 – 24
4.2.1	Machine mountings (option H1)	4 – 24
4.2.2	Filter mat panels (option K3)	4 – 24
4.2.3	Water cooling (option K2)	4 – 24
4.2.4	Heat recovery	4 – 24
4.3	Operating States and Control Modes	4 – 25
4.3.1	Operating states	4 – 25
4.3.2	Controller Operation	4 – 25
4.3.3	Control Modes	4 – 25
4.3.4	Modulation Control (option C1)	4 – 26
4.4	Safety Devices	4 – 26
4.5	SIGMA CONTROL Keys and Indicators	4 – 27
5	Installation and Operating Conditions	5 – 29
5.1	Surroundings	5 – 29
5.2	Installation Conditions	5 – 29
5.2.1	Place of installation and space required	5 – 29
5.2.2	Ventilation	5 – 30
5.2.3	Operating in a compressed air system	5 – 31
6	Installation	6 – 32
6.1	Safety	6 – 32
6.2	Report Transport Damage	6 – 32
6.3	Install the Compressed Air Connection	6 – 32
6.4	Electrical Connection	6 – 33
6.5	Options	6 – 33
6.5.1	Mounting (option H1)	6 – 33
6.5.2	Water cooling connection (option K2)	6 – 33
6.5.3	Heat recovery system connection	6 – 34
7	Initial Start-up	7 – 36
7.1	Safety	7 – 36
7.2	Before Every Initial Start-up	7 – 36
7.3	Checking Installation and Operating Conditions	7 – 37
7.4	Setting the overload protection cut-out	7 – 37
7.5	Motor Protection Switch Setting	7 – 37
7.6	Pour cooling oil into the airend	7 – 37
7.7	Checking Direction of Rotation	7 – 38
7.8	Initial Start-up	7 – 39
7.9	Setting System Pressure	7 – 40

8	Operation	8 – 41
8.1	Switching On and Off	8 – 41
8.1.1	Switching on	8 – 41
8.1.2	Automatic restart	8 – 41
8.1.3	Switching Off	8 – 42
8.2	Switching Off in an Emergency and Switching On Again	8 – 42
8.3	Remote On and Off Switching	8 – 42
8.4	Switching on and off with the Clock	8 – 43
8.5	Acknowledging and Resetting Warning and Alarm Messages	8 – 43
8.5.1	Resetting alarm messages	8 – 44
8.5.2	Resetting warning messages	8 – 44
9	Event Recognition and Fault Rectification	9 – 45
9.1	Alarm messages to the controller (machine shut-down, red LED blinking)	9 – 45
9.2	Warning messages on the controller (yellow LED flashes)	9 – 48
9.3	Other Alarms	9 – 51
10	Maintenance	10 – 53
10.1	Safety	10 – 53
10.2	Maintenance Schedule	10 – 54
10.2.1	Resetting maintenance interval counters	10 – 54
10.2.2	Regular maintenance work	10 – 55
10.2.3	Oil change intervals	10 – 56
10.2.4	Regular service work	10 – 56
10.3	Cooler Maintenance	10 – 57
10.3.1	Air cooling (option K1)	10 – 57
10.3.2	Filter mat maintenance (option K3)	10 – 57
10.3.3	Water cooling maintenance (option K2)	10 – 58
10.4	Internal Heat Recovery Maintenance (option W2 / W3)	10 – 59
10.5	Air Filter Maintenance.	10 – 59
10.6	Filter mat maintenance (control cabinet)	10 – 61
10.7	Electric motor maintenance	10 – 61
10.8	Checking the Coupling	10 – 62
10.9	Checking the Safety Relief Valve.	10 – 63
10.10	Checking the Overheating Safety Shutdown Function	10 – 64
10.11	Venting the Machine Manually	10 – 64
10.12	Checking and Topping up the Cooling Oil	10 – 66
10.12.1	Check cooling oil level.	10 – 66
10.12.2	Topping up the cooling oil	10 – 66
10.13	Changing the Cooling Oil	10 – 68
10.13.1	Draining the oil from the separator tank:	10 – 70
10.13.2	Draining the oil from the cooler:	10 – 70
10.13.3	Draining the oil from the airend:	10 – 71
10.13.4	Draining oil from the oil tank (Option K2 only):	10 – 72
10.13.5	Draining oil from the heat recovery system (Option W1/W2/W3):	10 – 72
10.13.6	Filling with cooling oil:	10 – 73
10.13.7	Starting the machine and carrying out a test run:	10 – 73

	Chapter – page
10.14 Oil filter maintenance	10 – 74
10.15 Changing the Oil Separator Cartridge	10 – 75
10.16 Logging Maintenance Work	10 – 77
11 Spares, Operating Materials, Service	11 – 78
11.1 Note the nameplate	11 – 78
11.2 Ordering Maintenance Parts and Operating Materials	11 – 78
11.3 Maintenance Agreement	11 – 78
11.4 Service Addresses	11 – 78
11.5 Spare Parts for Service and Repair	11 – 79
12 De–commissioning, Storage and Transport	12 – 84
12.1 De–commissioning	12 – 84
12.2 Packing	12 – 84
12.3 Storage	12 – 85
12.4 Transporting	12 – 85
12.4.1 Safety	12 – 85
12.4.2 Transverse beams	12 – 86
12.5 Disposal	12 – 86
13 Annex	13 – 87
13.1 Diagrams and Drawings	13 – 87
13.1.1 Pipeline and instrument flow diagram (P&I diagrams)	13 – 87
13.1.2 Pipeline and instrument flow diagram (option C1)	13 – 93
13.1.3 Dimensional drawing	13 – 99
13.1.4 Electrical diagram	13 – 105

Fig. 1	Maximum relative humidity	2 – 4
Fig. 2	Three–phase star (wye); four wire; earthed neutral	2 – 7
Fig. 3	Three–phase star (wye); three wire; earthed neutral	2 – 7
Fig. 4	Location of safety signs	3 – 20
Fig. 5	Cabinet	4 – 22
Fig. 6	Air–cooled machine	4 – 23
Fig. 7	Filter mat panel	4 – 24
Fig. 8	Water cooling	4 – 24
Fig. 9	Internal heat recovery	4 – 25
Fig. 10	SIGMA CONTROL keys	4 – 27
Fig. 11	SIGMA CONTROL indicators	4 – 28
Fig. 12	Installation recommendation, dimensions [in]	5 – 30
Fig. 13	Compressed Air Connection	6 – 32
Fig. 14	Water cooling connection	6 – 34
Fig. 15	Heat recovery	6 – 35
Fig. 16	Inlet valve oil filling port	7 – 38
Fig. 17	Coupling	7 – 38
Fig. 18	Label: Setting the language	7 – 39
Fig. 19	Switching On and Off	8 – 41
Fig. 20	Switching off in an emergency	8 – 42
Fig. 21	Acknowledging and Resetting Warning and Alarm Messages	8 – 43
Fig. 22	Cleaning the cooler	10 – 57
Fig. 23	Cooler filter mats	10 – 58
Fig. 24	Air filter maintenance	10 – 60
Fig. 25	Control cabinet ventilator	10 – 61
Fig. 26	Compressor motor maintenance	10 – 62
Fig. 27	Checking the Coupling	10 – 63
Fig. 28	Vent the machine.	10 – 65
Fig. 29	Check cooling oil level.	10 – 66
Fig. 30	Topping up the cooling oil	10 – 67
Fig. 31	Changing the Cooling Oil, Oil Separator Tank	10 – 69
Fig. 32	Changing the Cooling Oil, Oil Cooler	10 – 70
Fig. 33	Changing the Cooling Oil, Airend	10 – 71
Fig. 34	Turn the coupling	10 – 71
Fig. 35	Changing Cooling Oil, Oil Tank (Option K2)	10 – 72
Fig. 36	Changing the Cooling Oil, Internal Heat Recovery	10 – 73
Fig. 37	Changing the Oil Filter	10 – 74
Fig. 38	Changing the Oil Separator Cartridge	10 – 75
Fig. 39	Transport by fork truck	12 – 85
Fig. 40	Transport with lifting cradle	12 – 86

Tab. 1	Nameplate	2 – 3
Tab. 2	Options	2 – 3
Tab. 3	Machine weight	2 – 3
Tab. 4	Machine temperatures	2 – 4
Tab. 5	Ambient Conditions	2 – 4
Tab. 6	Safety relief valve setting	2 – 4
Tab. 7	FAD	2 – 5
Tab. 8	Sound Pressure Level	2 – 5
Tab. 9	Compressor motor data	2 – 5
Tab. 10	Fan motor data (option K1)	2 – 5
Tab. 11	Fan motor data (option K2)	2 – 5
Tab. 12	Cooling oil volume	2 – 7
Tab. 13	Supply 208V/3/60Hz	2 – 8
Tab. 14	Supply 230V/3/60Hz	2 – 8
Tab. 15	Supply 380V/3/60Hz	2 – 8
Tab. 16	Supply 460V/3/60Hz	2 – 8
Tab. 17	Supply 575V/3/60Hz	2 – 9
Tab. 18	Water cooling design data (30 ° F)	2 – 9
Tab. 19	Water cooling design data (70 ° F)	2 – 9
Tab. 20	Cooler specification; water cooling	2 – 9
Tab. 21	Cooling Water Quality	2 – 10
Tab. 22	Heat capacity (option W1)	2 – 10
Tab. 23	Water Quality Specification	2 – 11
Tab. 24	General specification of the heat exchanger	2 – 11
Tab. 25	Flow rate and heat available (option W2)	2 – 12
Tab. 26	Flow rate and heat available (option W3)	2 – 12
Tab. 27	Danger zones	3 – 18
Tab. 28	Safety signs	3 – 20
Tab. 29	SIGMA CONTROL keys	4 – 28
Tab. 30	SIGMA CONTROL indicators	4 – 28
Tab. 31	Ventilation (Option K1)	5 – 30
Tab. 32	Ventilation (Option K2)	5 – 31
Tab. 33	Installation conditions checklist	7 – 37
Tab. 34	Alarm messages and actions	9 – 48
Tab. 35	Warning messages and actions	9 – 51
Tab. 36	Other faults and actions	9 – 52
Tab. 37	Regular maintenance work	10 – 55
Tab. 38	Oil change intervals lubricants	10 – 56
Tab. 39	Oil change intervals speciality lubricants	10 – 56
Tab. 40	Regular service work intervals	10 – 56
Tab. 41	Maintenance log	10 – 77
Tab. 42	Machine maintenance parts	11 – 78

1 Regarding this Document

1.1 Using the Document

The service manual is part of the machine.

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

1.2 Further Documents

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

- certificate of acceptance / operating instructions for the pressure vessel,
 - SIGMA CONTROL service manual.
- ☞ Make sure all documents are complete and take notice of their contents.

Request the supply of any missing documents from KAESER.
Make sure you give the data from the nameplate.

1.3 Copyright

This service manual is copyright protected. Inquiries regarding use or duplication of the documentation should be referred to KAESER.

1.4 Symbols and Identification

1.4.1 Warnings



DANGER

Here are given the type and source of the danger.

The possible consequences of ignoring a hazard warning are shown here. The word 'DANGER' means that death or severe injury can result if the warning notice is ignored.

- ☞ Here are given the measures to protect yourself from the danger.
- ☞ Always read and comply with warning notices.

Danger levels

Warning notices indicate three levels of danger identified by the signal word under the danger symbol.

Signal word	Meaning	Consequences of ignoring
DANGER	Warning of an imminent threat of danger	Death or serious injury may result.
WARNING	Warning of possible danger	Death or severe injury or serious damage to the machine is possible.
CAUTION	Warning of a possibly dangerous situation.	Light injury or material damage is possible.

1.4.2 Other notices and symbols

This symbol indicates a task to be carried out.



This symbol identifies environmental protection measures.



This symbol indicates particularly important information.

2 Technical Specification

Model designation and important technical information is found on the machine's nameplate. The nameplate is located on the outside of the machine:

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

✎ Please enter here the data from the nameplate:

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

Tab. 1 Nameplate

A summary of the included options helps to relate the service manual information to your machine.

Please enter details of options>

Option	Code	Exists
Air cooled	K1	
Water cooled	K2	
Filter mat panels	K3	
Machine mountings	H1	
Prepared for heat recovery	W1	
Internal heat recovery $\Delta T = 25K$	W2	
Internal heat recovery $\Delta T = 55K$	W3	
Modulation control	C1	
Transformer power supply for refrigeration dryer	T2	

Tab. 2 Options

2.1 Weight

Maximum weight is shown. Actual weight of individual machine is dependent on equipment fitted.

	BSD 40	BSD 50	BSD 60
Weight [lb]	2270	2350	2540

Tab. 3 Machine weight

2.2 Temperature

	BSD 40	BSD 50	BSD 60
Minimum cut-in temperature [° F]	40	40	40
Typical airoend discharge temperature during operation [° F]	167 – 200	167 – 200	167 – 200
Max. airoend discharge temp. (auto-matic shut-down) [° F]	230	230	230

Tab. 4 Machine temperatures

2.3 Ambient Conditions

	BSD 40	BSD 50	BSD 60
Maximum elevation [ft]	3000	3000	3000
Ambient temperature [° F]	40 – 115	40 – 115	40 – 115
Inlet air / cooling air temperature [° F]	40 – 115	40 – 115	40 – 115
Humidity of the inlet air	See Fig. 1	See Fig. 1	See Fig. 1

* Higher elevation permissible only after consultation with the manufacturer

Tab. 5 Ambient Conditions

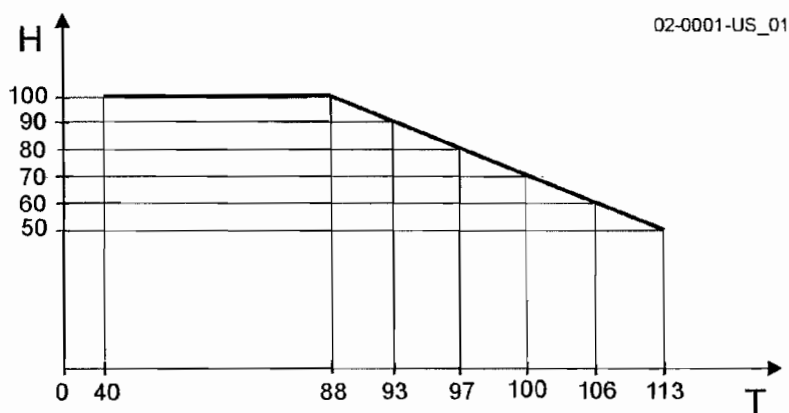


Fig. 1 Maximum relative humidity

T Intake air temperature [° F]

H Maximum relative humidity [%]

2.4 Pressure

See nameplate for maximum working pressure.

Maximum working pressure [psig]	Blow-off setting of the safety relief valve [psig]		
	BSD 40	BSD 50	BSD 60
125	155	155	155
175	230	230	230
217	–	230	230

Tab. 6 Safety relief valve setting

2.5 Delivery (FAD)

Free Air Delivery [cfm]:

Maximum working pressure [psig]	BSD 40	BSD 50	BSD60
125	195	241	295
175	162	192	230
217	—	158	185

Tab. 7 FAD

2.6 Sound Pressure Level

Operational state

- under load at rated speed, rated delivery and rated pressure.

Measuring conditions:

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

	BSD 40	BSD 50	BSD 60
Sound pressure level [dB(A)]	68	69	71

Tab. 8 Sound Pressure Level

2.7 Motors and Performance**2.7.1 Compressor motor**

	BSD 40	BSD 50	BSD60
Rated power [Hp]	40	50	60
Rated speed [rpm]	3565	3565	3570
Enclosure protection	TEFC	TEFC	TEFC
Motor bearing greasing [operating hours]	2000	2000	2000
Grease requirement, each bearing [oz.]*			

* Transfer data from motor nameplate to the table

Tab. 9 Compressor motor data

2.7.2 Fan Motor**Air cooling (option K1)**

	BSD 40	BSD 50	BSD 60
Rated power [HP]	1.2	1.2	1.2
Rated speed [rpm]	1120	1120	1120
Enclosure protection	TEFC	TEFC	TEFC

Tab. 10 Fan motor data (option K1)

Water cooling (option K2)

	BSD 40	BSD 50	BSD 60
Rated power [HP]	0.13	0.13	0.13
Rated speed [rpm]	2700	2700	2700
Enclosure protection	TEFC	TEFC	TEFC

Tab. 11 Fan motor data (option K2)

2.8 Cooling oil

Ordering: see 'Spare Parts, Operating Materials, Service' chapter 11.

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

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

2.8.1 General Information

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

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

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

Regardless of the lubricant selected, the KAESER Sigma lubricants will separate readily from water. If condensate occurs it can easily be removed. Let the compressor sit so that any water can drain back to the separator tank and separate to the bottom. See chapter 10.13 proper draining procedure.

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

M-SERIES SEMI-SYNTHETIC LUBRICANTS

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

S-SERIES SYNTHETIC LUBRICANTS

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

Specialty KAESER LUBRICANTS

- S-680 lubricant may be used when ambient temperatures are always between 70 ° F and 105 ° F.

- FG-460 synthetic hydrocarbon based food grade lubricant is designed for use in rotary screw compressors in the application where incidental food contact may occur with the discharge air. This lubricant meets the requirements of the FDA Regulation 21 CFR §178.3570 and is USDA H-1 approved and NSF certified. FG-460 is approved for canning, food packing, meat and poultry processing and other applications where incidental food contact may occur.

2.8.2 Cooling oil quantity

	BSD 40	BSD 50	BSD 60
Total charge [gal] (option K1)	6.9	6.9	6.9
Total charge [gal] (option K2)	8.2/5.3**	8.2/5.3**	8.2/5.3**
Top-up volume [gal] (minimum–maximum)	1.1	1.1	1.1
Additional volume [gal] (option W2)	1.1	1.1	1.1
Additional volume [gal] (option W3)	0.4	0.4	0.4
Additional volume [gal] (option W1) *			

* Input the additional volume corresponding to your heat recovery system.

** With heat recovery system (W1/W2/W3)

Tab. 12 Cooling oil volume

2.9 Electrical Connections

See electrical diagrams in chapter 13.1.4.

2.9.1 Power supply

The machine is designed for an electrical supply according to National Electric Code (NEC) NEC-670, particularly NFPA 79, section 5.7. In the absence of any user-specified alternatives, the limits given in these standards must be adhered to. Consult manufacturer for any other specific power supply.

Three-phase

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

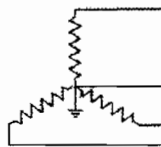


Fig. 2 Three-phase star (wye); four wire; earthed neutral

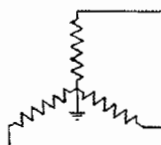


Fig. 3 Three-phase star (wye); three wire; earthed neutral

The machine requires a symmetrical three-phase power supply transformer with a WYE configuration output as shown in Fig. 2 and Fig. 3.

In a symmetrical three phase supply the phase angles and voltages are all the same.

Other power supplies are not suitable. Please contact authorized KAESER distributor for options.

2.9.2 Power supply specifications

The following multi-strand copper core wires are given according to 2002 NEC 310–15, Table 310–16 for 40 °C ambient temperature.

If other local conditions prevail, like for example high temperature, the cross section should be checked and adjusted according to 2002 NEC 110–14©, 220–3, 310–15, Table 310–16, 430–6, 430–22, 430–24 and other local codes.

Dual element time delay fuses are selected according to 2002 NEC 240–6, 430–52 and tables 430–52, 430–148 and 430–150.

We strongly suggest using a separate copper conductor for the equipment GROUNDING. NEC Table 250.122 will point out the "minimum size", however, we recommend a ground conductor the same size as the power leads, if local codes allow.

Rated power supply 208V ±10%, 3–ph, 60Hz

	BSD 40	BSD 50	BSD 60
Pre–fuse [A]	175	200	–
Supply	4x AWG2/0*	4x AWG4/0*	–
Consumption [A] (Option K1)	121	146	–
Consumption [A] (Option K2)	116	141	–

* 75 °C

Tab. 13 Supply 208V/3/60Hz

Rated power supply 230V ±10%, 3–ph, 60Hz

	BSD 40	BSD 50	BSD 60
Pre–fuse [A]	150	175	–
Supply	4x AWG2/0*	4x AWG3/0*	–
Consumption [A] (Option K1)	108	131	–
Consumption [A] (Option K2)	105	128	–

* 75 °C

Tab. 14 Supply 230V/3/60Hz

Rated power supply 380V ±10%, 3–ph, 60Hz

	BSD 40	BSD 50	BSD 60
Pre–fuse [A]	90	110	125
Supply	4x AWG1	4x AWG1*	4x AWG1/0*
Consumption [A] (Option K1)	66	81	100
Consumption [A] (Option K2)	64	79	98

* 75 °C

Tab. 15 Supply 380V/3/60Hz

Rated power supply 460V ±10%, 3–ph, 60Hz

	BSD 40	BSD 50	BSD 60
Pre–fuse [A]	80	100	110
Supply	4x AWG2	4x AWG1	4x AWG2*
Consumption [A] (Option K1)	56	67	82
Consumption [A] (Option K2)	54	66	81

* 75 °C

Tab. 16 Supply 460V/3/60Hz

Rated power supply 575V $\pm 10\%$, 3-ph, 60Hz

	BSD 40	BSD 50	BSD 60
Pre-fuse [A]	60	80	90
Supply	4x AWG4	4x AWG3	4x AWG1
Consumption [A] (Option K1)	43	54	66
Consumption [A] (Option K2)	42	53	65

Tab. 17 Supply 575V/3/60Hz

2.10 Water cooling (option K2)

2.10.1 Design data

Cooling water temperature rise 30 ° F

	BSD 40	BSD 50	BSD 60
Max. permissible inlet temperature [° F]	90	90	90
Min. cooling water flow [gpm]	12.8	15.9	19.4
Water pressure drop [psig]	10.0	16.0	24.7

Tab. 18 Water cooling design data (30 ° F)

Cooling water temperature rise 70 ° F

	BSD 40	BSD 50	BSD 60
Max. permissible inlet temperature [° F]	50	50	50
Min. cooling water flow [gpm]	4.4	5.3	6.6
Water pressure drop [psig]	7.3	7.3	7.3

Tab. 19 Water cooling design data (70 ° F)

Cooler specification

Material of manufacture	1.4401
Solder	Copper
Maximum working pressure (cooling water end) [psig]	145
Unsuitable cooling medium	Seawater Consult KAESER before using cooling water solutions
Max. permissible discharge temperature [° F]	158

Tab. 20 Cooler specification; water cooling

2.10.2 Cooling Water Quality



Only heat drinking water using a suitable heat exchanger. Otherwise, oil may contaminate the cooling water if a leak occurs.

The specific heat capacity and required flow volume of the cooling water changes if antifreeze is added.

☞ Consult your authorized KAESER distributor to ensure optimum cooling-system performance.

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

The addresses of companies specialising in cooling-water analysis and the supply of suitable equipment for cooling-water treatment can be obtained from KAESER.

To avoid system failures caused by corrosion or contamination, the cooling water must meet the following requirements:

pH value	7.5 to 9.0
Hardness [° dH]	4.0–8.5
Chloride (Cl) [mg/l]	< 150
Free chlorine gas (Cl ₂) [mg/l]	< 1
Sulphate (SO ₃) [mg/l]	< 1
Dissolved iron (Fe) [mg/l]	< 0.2
Hydrogen carbonate (HCO ₃) [mg/l]	70–300
Sulphate (SO ₄) [mg/l]	< 70
HCO ₃ / SO ₄	> 1
Electrical conductivity [μS/cm]	10–500
Ammonia (NH ₃) [mg/l]	< 2
Dissolved manganese (Mn) [mg/l]	< 0.1
Dissolved aluminium (Al) [mg/l]	< 0.2
Nitrate (NO ₃), dissolved [mg/l]	< 100
Hydrogen sulphide (H ₂ S) [mg/l]	< 0.05
Free aggressive carbon dioxide (CO ₂) [mg/l]	< 5
Glycol [%]	< 50
Solids (particle size) [mm]	< 0.1
Algae	not permitted

Tab. 21 Cooling Water Quality

2.11 Heat Recovery

2.11.1 Prepared for heat recovery (option W1)

Connections for an external heat recovery system are provided.

Heat capacity

	BSD 40	BSD 50	BSD60
Max. heat capacity available [kW]	27.0	33.3	40.8
Max. heat capacity available [MJ/h]	97	120	147
Max. heat capacity available [kcal/h]	23216	28616	35082

Tab. 22 Heat capacity (option W1)

2.11.2 Internal Heat Recovery (option W2 / W3)

A soldered, plate heat exchanger is installed for heat recovery.

Generally water is used as the heat transfer medium. This must conform to the specification given below.



The water may not be used as drinking water.

If a leak occurs, oil can contaminate the cooling water.

The manufacturer should be consulted before another type of heat transfer medium is used.

Water Quality Specification

pH value	7.5 to 9.0
Hardness [°dH]	4.0–8.5
Chloride (Cl) ⁻ [mg/l]	< 150
Free chlorine gas (Cl ₂) [mg/l]	< 1
Sulphate (SO ₃) [mg/l]	< 1
Dissolved iron (Fe) [mg/l]	< 0.2
Hydrogen carbonate (HCO ₃) [mg/l]	70–300
Sulphate (SO ₄) [mg/l]	< 70
HCO ₃ / SO ₄	> 1
Electrical conductivity [ms/cm]	10–500
Ammonia (NH ₃) [mg/l]	< 2
Dissolved magnesium (Mn) [mg/l]	< 0.1
Dissolved aluminium (Al) [mg/l]	< 0.2
Nitrate (NO ₃), dissolved [mg/l]	< 100
Hydrogen sulphate (SO ₂) [mg/l]	< 0.05
Free aggressive carbon dioxide (CO ₂) [mg/l]	< 5
Glycol [%]	< 50
Solids (particle size) [mm]	< 0.1
Algae	not permissible

Tab. 23 Water Quality Specification



If the heat transfer medium outlet temperature is to be kept constant, the user must install an appropriate regulating device.

	BSD 40	BSD 50	BSD 60
Maximum working pressure of the heat transfer medium [psig]	145	145	145
Pressure drop [psig]	< 1.5	< 1.5	< 1.5
Plate material	1.4401	1.4401	1.4401
Solder	Cu	Cu	Cu
Maximum permissible temperature of the heat transfer medium [°F]	210	210	210

Tab. 24 General specification of the heat exchanger

Flow rate and heat capacity by heating from 110 °F to 160 °F (equivalent to $\Delta T = 25$ K), (option W2)

	BSD 40	BSD 50	BSD 60
Flow rate [gpm]	4.0	5.3	6.2
Max. heat capacity available [kW]	27.0	33.3	40.8

	BSD 40	BSD 50	BSD60
Max. heat capacity available [MJ/h]	97	120	147
Max. heat capacity available [kcal/h]	23216	28616	35082

Tab. 25 Flow rate and heat available (option W2)

**Flow rate and heat capacity by heating from 60 ° F to 160 ° F (equivalent to $\Delta T=55$ K),
(option W3)**

	BSD 40	BSD 50	BSD60
Flow rate [gpm]	1.8	2.2	2.6
Max. heat capacity available [kW]	27.0	33.3	40.8
Max. heat capacity available [MJ/h]	97	120	147
Max. heat capacity available [kcal/h]	23216	28616	35082

Tab. 26 Flow rate and heat available (option W3)

3 Safety and Responsibility



Disregard of these instructions can result in serious injury.

DANGER

- ☞ Read the service manual carefully and take notice of the contents for safe machine operation.

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

- Danger to life and limb of the operator or third parties
 - Detrimental to the machine and property.
- ☞ Use this machine only if it is in a technically perfect condition and only for the purpose for which it is intended, observing all safety measures and the instructions in the service manual.
 - ☞ In particular, immediately rectify (have rectified) any faults that could be detrimental to safety.

3.1 Specified Use

- The machine is intended solely for industrial use in generating compressed air. Any other use is considered incorrect. The manufacturer is not liable for any damages resulting from such unspecified use or application. The risk involved in such unspecified use is taken solely by the user.
 - Specified use also includes compliance with the instructions in this manual.
- ☞ Operate the machine only within its performance limits and under the permitted ambient conditions.

3.2 Unspecified Use

- ☞ Never direct compressed air at persons or animals.
- ☞ Do not use untreated compressed air for breathing purposes.
- ☞ Do not use untreated compressed for any application that will bring it into direct contact with foodstuffs.
- ☞ Cooling air, warmed after passing through the machine, may be used for heating purposes but only when it poses no health risk to humans or animals. If necessary, the warmed cooling air should be treated to render it harmless.
- ☞ Do not allow the machine to take in toxic, acidic, flammable or explosive gases or vapors.
- ☞ Do not operate the machine in areas in which specific requirements with regard to explosion protection are applied.

3.3 User's Responsibilities

Observe statutory and accepted regulations

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

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

3.3.1 Qualified personnel

Ensure that operating, installation and maintenance personnel are qualified and authorized for their tasks.

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

Operating personnel

Authorized operating personnel:

- must be adult,
- must be conversant with and adhere to the safety instructions and sections of the service manual relevant to operation of the machine,
- must have received adequate training and authorization to operate electrical and compressed air devices
- in the case of machines with refrigeration dryers, they must have training and qualification for safe operation of refrigeration devices.

Installation and maintenance personnel

Authorized installation and maintenance personnel:

- must be adult,
- must have read, be conversant with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- must be fully conversant with the safety concepts and regulations of electrical and compressed air engineering.
- in the case of machines with refrigeration dryers, must be conversant with safety concepts and regulations relating to refrigeration equipment,
- must be able to recognize the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
- in the case of machines with refrigeration dryers, must be able to recognize the possible dangers of refrigeration devices and take appropriate measures to safeguard persons and property,
- must have received adequate training and authorization for the safe installation and maintenance on this machine.

3.3.2 Adherence to inspection schedules and accident prevention regulations

The machine is subject to local inspection schedules.

3.4 Dangers

The general safety instructions in this chapter indicate the possible dangers and how to deal with them.

Special safety instructions are found in this service manual at the beginning of each chapter or directly before handling instructions.

3.4.1 Awareness of danger sources

Here are to be found the various types of danger that can arise in connection with machine operation.

Electricity

- ☞ Allow only qualified electricians or trained personnel under the supervision of a qualified electrician to work on electrical equipment according to electrical engineering regulations.
- ☞ Before initial start-up, make sure that adequate protection against electric shock from direct or indirect contact with the machine is installed and checked.

- ✎ Isolate all phases of the main power supply.
- ✎ Check that there is no voltage present.
- ✎ Switch off any external power sources.
These can be, for example, power supplied through a volt-free (dry) contact or electrical machine heating.
- ✎ Use fuses corresponding to the machine power.
- ✎ Regularly check that all electrical connections are tight.

Pressure forces

Compressed air is a contained force. Uncontrolled release of this energy can cause serious injury or death.

Before all work on a pressure system:

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

Compressed air quality

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

Spring forces

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

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

- ✎ Do not open or dismantle valves.

Rotating components

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

- ✎ Do not open the enclosure while the machine is switched on.
- ✎ Isolate all phases of the main power supply.
- ✎ Check that there is no voltage present.
- ✎ Wear close-fitting clothes and a hair net if necessary.
- ✎ Make sure all covers and safety guards are in place and secured before switching on.

Temperature

- ✎ Avoid contact with hot components.
These include, for example, compressor airends or blocks, oil and compressed air lines, coolers, oil separator tanks, motors and machine heaters.
- ✎ Wear protective clothing.

- ☞ When welding is taking place on or near the machine take adequate measures to ensure that no parts of the machine or any oil vapors can ignite because of sparks or heat.

Noise

- ☞ Operate the machine only with soundproofing in place.
- ☞ Wear hearing protection if necessary.
The safety relief valve blowing off can be particularly loud.

Operating materials

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

Unsuitable spare parts

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

Conversion or modification of the machine

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

Extension or modification of the compressed air station

- ☞ If a compressed air installation is to be extended or modified, check the blow-off capacity of the safety relief valves on air receivers and pipelines before installing the new machines.
- ☞ Safety relief valves of insufficient blowoff capacity must be replaced by valves with a higher capacity.

3.4.2 Safe machine operation

Here is found information to support safe conduct with the machine.

Transport

- ☞ Use suitable lifting gear that conforms to local safety regulations.
- ☞ Attach lifting gear only to the designated points on the machine.
- ☞ Make sure the center of gravity is correctly positioned to avoid the machine tipping.
- ☞ Make sure the danger zone is clear.

Installation

- ☞ Make sure no power is applied when electrical connections are made.
- ☞ Only use only electrical cables that are suitable and approved for the the loads applied.
- ☞ Install or remove pressure lines only when they are in the depressurized condition.

- ☞ Only use pressure lines that are suitable and approved for the maximum working pressure and medium used.
- ☞ Do not allow connecting pipes to be under mechanical stress.
- ☞ Do not step onto machine components to climb the machine.

Location

- ☞ Install the machine in a suitable room.
If installed outdoors, the machine must be protected from frost, direct sunlight, dust and rain.
- ☞ The machine is not explosion-proof.
Do not operate in areas in which specific requirements with regard to explosion protection are applied.
- ☞ Ensure adequate ventilation.
- ☞ Observe the required ambient conditions:
 - ambient temperature and humidity,
 - clean inlet air with no damaging contaminants,
 - inlet air free of explosive or chemically unstable gases or vapors,
 - inlet air free of acid-forming substances, particularly ammonia, chlorine or hydro-sulphide.
- ☞ Do not position the machine in the warm exhaust air from other machines.
- ☞ Ensure accessibility so that all work on the machine can be carried out without danger or hindrance.

Operation

- ☞ Keep the machine enclosure closed for safety and correct cooling function.
- ☞ Carry out regular inspections:
 - for damage,
 - of the safety devices,
 - of the EMERGENCY STOP function,
 - of components needing to be monitored.
- ☞ Machines drawing in air from the surroundings should not be operated without an air filter.

Maintenance

- ☞ Make sure the machine is disconnected from electrical power, is voltage-free and de-pressurised before commencing any maintenance work.
- ☞ Wear close-fitting, flame-resistant clothing. Wear protective clothing as necessary.
- ☞ Do not leave any loose components, tools or cleaning rags on the machine.
- ☞ Components removed from the machine can still be dangerous.
Do not open or destroy removed components as some (inlet valves, for instance) are powerfully spring-loaded.

Decommissioning / disposal

- ☞ Drain all fluids from the machine, e.g. cooling oil and water, and dispose of in accordance with local environmental regulations.
- ☞ Give refrigerant only to authorized bodies for disposal.
- ☞ Dispose of the machine in accordance with local environmental regulations.

3.4.3 Organizing

- ☞ 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.

3.4.4 Danger zones

The table gives information on the zones dangerous to personnel.

Only authorized personnel may enter these zones.

Activity	Danger zone	Authorized personnel
Transport	10 ft radius from the machine	Installation or transport personnel. All personnel excluded during transport.
	Beneath the lifted machine.	All personnel excluded!
Installation	Within the machine. 3 ft radius of the machine and power lines.	Installation personnel
Operation	3 ft radius from the machine 6 ft radius from the cooling air discharge.	Operating personnel
Maintenance	Within the machine. 3 ft radius from the machine	Maintenance personnel

Tab. 27 Danger zones

3.5 Safety Devices

Do not change, bypass or disable safety devices.



Do not remove or obliterate labels and notices.









Ensure that labels and notices are clearly legible.




More information on safety devices is contained in chapter 4 'Design and Function', section 4.4 'Safety Devices'.

3.6 Safety Signs

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

Location	Sign	Meaning
8		Voltage! Touching electrically live components can cause serious injury or death. ☞ Isolate completely from power supply (all conductors) and ensure the supply cannot be switched on again (lock off). ☞ Check that no voltage is present.
9		Automatic starting Severe injury could result from rotation components, electrical voltage and air pressure. ☞ Isolate completely from power supply (all conductors) and ensure the supply cannot be switched on again (lock off). ☞ Check that no voltage is present.

Location	Sign	Meaning
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. <ul style="list-style-type: none"> ☞ Never breathe untreated compressed air! ☞ Air from this compressor must meet OSHA 29CFR1910.134 and FDA 21CFR178.3570 standards, if used for breathing or food processing. ☞ Use proper compressed air treatment. ☞ Food grade coolant must be used for food processing.
12		Rejected parts Severe injury, especially of the eyes, could result while the fan is rotating. <ul style="list-style-type: none"> ☞ Prevent all materials from falling into the fan guard. ☞ Never work over the running machine.
13		Hot surface can cause burns <ul style="list-style-type: none"> ☞ Let the machine cool down. ☞ Wear long-sleeved garments (not synthetics such as polyester) and protective gloves.
16		Wrong cooling oil level Risk of machine defects or rising oil consumption (oil content for pure air). <ul style="list-style-type: none"> ☞ Check cooling-oil level regularly. ☞ Run the machine only with proper cooling-oil level.
19		Voltage! Touching electrically live components can cause serious injury or death. <ul style="list-style-type: none"> ☞ Isolate completely from power supply (all conductors) and ensure the supply cannot be switched on again (lock off). ☞ Check that no voltage is present.
23		Pressure and spring force Serious injury or death can result from loosening of opening component that is under pressure and heavily spring loaded. <ul style="list-style-type: none"> ☞ Never open (dismantle) valve. ☞ Contact authorized KAESER distributor.
24		Compressed air Serious injury or death can result from loosening or opening component under pressure. <ul style="list-style-type: none"> ☞ De-pressurize all pressurized components and enclosures. ☞ Secure that machine keeps de-pressurized. ☞ Check that machine is de-pressurized.
25		Loud noise and oil mist when safety relief valve opens Ear damage and burns can result. <ul style="list-style-type: none"> ☞ Wear ear protection and protective cloths. ☞ Close all maintenance doors and cover panels.

Location	Sign	Meaning
26		Rotating coupling 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 power supply (all conductors) and ensure the supply cannot be switched on again (lock off).
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 manufacturer's instructions for setting the interrupter must be followed to reduce the risk of fire or electric shock.

Tab. 28 Safety signs

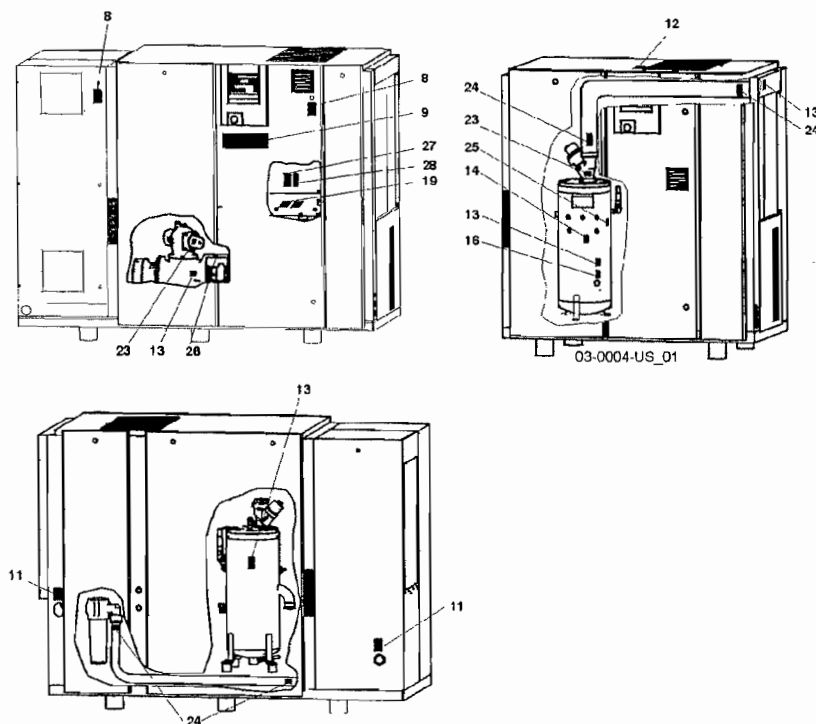


Fig. 4 Location of safety signs

3.7 Emergency

3.7.1 Fire fighting

- ☞ Immediately disconnect the machine's voltage supply.
- If applicable:
 - ☞ Cooling water: Shut-off cooling water supply.
 - ☞ Heat recovery system: Shut-down external heating circulation.

Suitable extinguishing agents:

- Foam
- Powder
- Carbon dioxide
- Sand or earth

Unsuitable or unsafe extinguishing agents:

- Intense water jet.

3.7.2 Cooling oil**Skin contact:**

☞ wash off immediately

Eye contact:

☞ rinse thoroughly with lukewarm water and seek medical assistance.

3.8 Environmental Protection

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

Store and dispose of used materials and replaced parts in accordance with local environment protection regulations. Observe national regulations. This applies particularly to parts contaminated with cooling oil.

3.9 Warranty

This service manual contains no independent warranty commitment.

Our general terms and conditions of business apply with regard to warranty.

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

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

☞ Obtain confirmation from the manufacturer that the machine is suitable for your specific application.

Furthermore, 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 genuine KAESER spare parts and operating materials.

4 Design and Function

4.1 Machine Overview

4.1.1 Cabinet

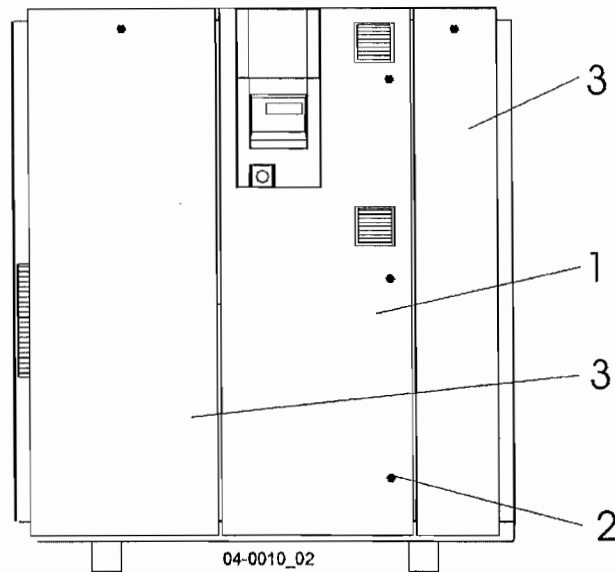


Fig. 5 Cabinet

- 1 Control cabinet door*
- 2 Latch*
- 3 Removable panel*

The cabinet, when closed, serves various purposes:

- Sound damping
- Protection
- Cooling air flow control

Safe and reliable operation can only be ensured with the cabinet closed.

Latches are released by a key supplied with the machine.

Access doors are hinged to swing open, removable panels must be lifted off.

4.1.2 Function

An air-cooled machine serves to illustrate function.

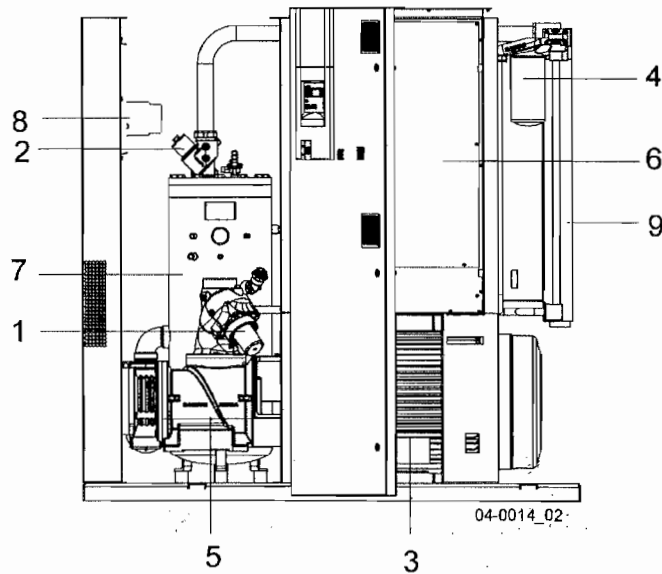


Fig. 6 Air-cooled machine

- | | |
|--------------------------------|----------------------|
| 1 Inlet valve | 6 Control cabinet |
| 2 Minimum pressure/check valve | 7 Oil separator tank |
| 3 Compressor motor | 8 Air filter |
| 4 Oil filter | 9 Oil / air cooler |
| 5 Airend | |

Machine

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

The air is then compressed in the airend (5).

The airend is driven by an electric motor (3).

Cooling oil is injected into the airend. It lubricates moving parts and forms a seal between the rotors themselves and between them and the airend casing. The cooling effect directly within the compression chamber ensures a low airend discharge temperature.

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

Compressed air, freed of its oil content in the separator tank (7), flows through the minimum pressure/check valve (2) into the aftercooler (9). The minimum pressure/check valve ensures there is always sufficient internal pressure to maintain cooling oil circulation.

The aftercooler brings down the compressed air temperature to 5 to 10 K above ambient. Most of the moisture carried in the air is removed in the aftercooler.

4.1.3 Volt-free Contacts

Volt-free contacts are provided for passing messages.

Information on location, load and type of message is to be found in the electrical diagram.



If the volt-free contacts are connected to an external power source they may be under power even when the machine is isolated from the supply.

4.2 Options

4.2.1 Machine mountings (option H1)

The machine mountings enable the machine to be anchored to the floor.

4.2.2 Filter mat panels (option K3)

Mats filter the cooling air and keep the cooler surface clean.

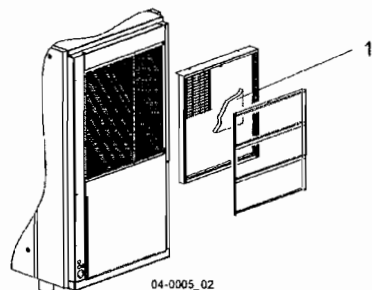


Fig. 7 Filter mat panel

1 Cooling air filter mat

4.2.3 Water cooling (option K2)

Plate heat exchangers in stainless steel are used for water-cooled machines.

An additional container supplements the oil circuit.

This is not needed when the machine is equipped with a heat recovery system (option W1/W2/W3).

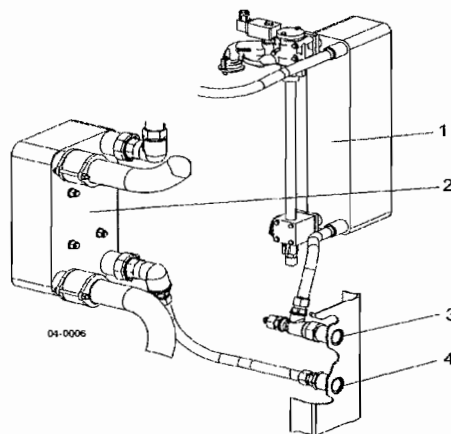


Fig. 8 Water cooling

1 Oil cooler

2 Compressed air aftercooler

3 Cooling water connection

4 Cooling water connection

4.2.4 Heat recovery

External heat recovery (option W1)

Connections are provided and bridged.

An external heat recovery system can be retro-fitted at any time.

Internal heat recovery (option W2 / W3)

A plate heat exchanger (1) is installed for heat recovery.

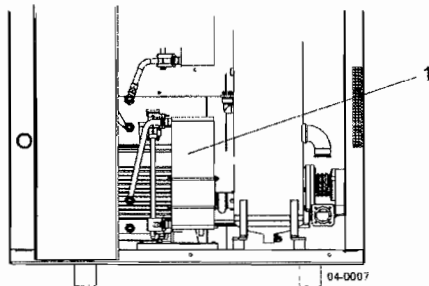


Fig. 9 Internal heat recovery

1 Plate heat exchanger

4.3 Operating States and Control Modes

4.3.1 Operating states

There are three operating states:

- **LOAD:** the inlet valve is open. The airend delivers compressed air to the system. The compressor motor runs under full load.
- **IDLING:** The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the air system. The oil separator tank is vented. A small volume of air circulates through the bleed hole in the inlet valve, through the airend and back to the inlet valve via the venting valve. The compressor motor runs without load and draws little current.
- **STANDSTILL:** The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the air system. The oil separator tank is vented. The compressor motor is stopped.
- **MODULATION CONTROL (option C1):** The proportional controller continuously varies the degree of opening of the inlet valve, and thereby the delivery rate of the compressor, in response and in proportion to the air demand. The airend delivers compressed air to the system. The load and power consumption of the compressor motor rises and falls with the air demand. The regulating valve is factory set. Consult with KAESER Service before changing.

4.3.2 Controller Operation

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

According to the individual compressed air demand one of the various control modes available will provide the optimum duty cycle for the machine.

4.3.3 Control Modes

The controller can operate in the following modes:

- DUAL
- VARIO
- QUADRO

DUAL

In the DUAL control mode, the compressor is switched back and forth between LOAD and IDLE to maintain system pressure between the set minimum and maximum values. When the maximum pressure is reached the machine switches to idle running. When the preset *idling time* has elapsed the machine is STOPPED.

The shorter the *idling time* setting, the sooner and more frequently the motor is stopped.

VARIO

The VARIO control mode is an extension of DUAL control. The difference from DUAL being that under VARIO control the *idling time* is automatically increased or decreased corresponding to the increased or decreased switching frequency of the drive motor.

QUADRO

In QUADRO control mode the machine switches from LOAD to IDLE during periods of high air demand and directly from LOAD to STANDSTILL during periods of low air demand.

This mode of control requires two pre-set time periods: the *running time* and the *idle/standstill time*. The shorter these time settings, the sooner and more frequently the motor is stopped.

4.3.4 Modulation Control (option C1)

The modulating control mode is an extension of DUAL control. The difference being that, in this mode, the delivery of the compressor is steplessly varied within the control range of the machine.

- Increasing air demand

The machine operates between PARTIAL LOAD and LOAD.

- Falling air demand

The machine operates between PARTIAL LOAD, IDLE RUNNING and STANDSTILL.

4.4 Safety Devices

The following safety devices are provided and may not be changed:

- EMERGENCY STOP button
The EMERGENCY STOP button shuts down the compressor immediately. The motor remains still. The pressure system is vented.
- Safety relief valve
The safety relief valve protects the system from excessive pressure. This is factory set.
- Housing and covers for moving parts and electrical connections.
Protection from accidental contact.

4.5 SIGMA CONTROL Keys and Indicators

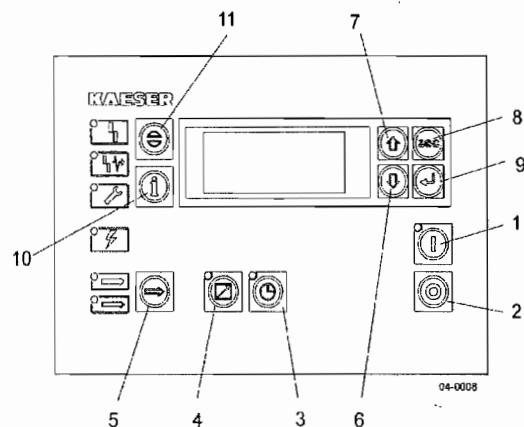




Fig. 10 SIGMA CONTROL keys

Symbol	Item	Description	Function
	1	ON (I)	Switch the machine on. Programmed operating mode is active.
	2	OFF (0)	Switch the machine off.
	3	Operating mode: Clock	Switching clock—control on and off. The LED lights when the machine is under clock control.
	4	Operating mode: Remote control	Switching remote control on and off. The LED illuminates when the machine is under remote control.
	5	Operating mode: LOAD / IDLE	Toggles the machine between LOAD and IDLE.
	6	Arrow key	Scrolls down menu. Reduces a parameter value.
	7	Arrow key	Scrolls menu up. Increases a parameter value.
	8	Escape	Returns to the next higher menu level. Exits the edit mode without saving. Returns to the main menu when held down at least 10 seconds.
	9	Return/enter/save key	Only affects the message in the third line of the display (12). Returns to the selected submenu. Saves and leaves the edit mode.

Symbol	Item	Description	Function
	10	Events and information key	Displays the event memory. Selection from every menu. Returns together with 'esc' key (8).
	11	Acknowledge (re-set) key	Acknowledges (re-sets) messages and resets the event memory (if permitted).

Tab. 29 SIGMA CONTROL keys

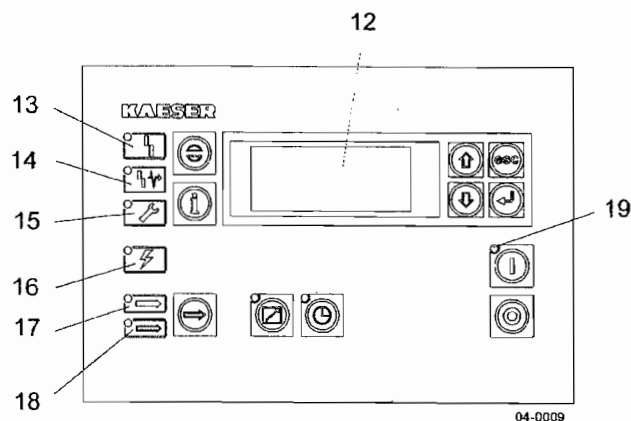
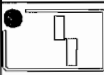
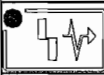
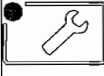






Fig. 11 SIGMA CONTROL indicators

Symbol	Item	Description	Function
	12	Display	Alphanumeric display with 4 lines.
	13	Alarm	Blinks red when an alarm occurs. Lights continuously when acknowledged.
	14	Communication	Lights red if communication via the Profibus is interrupted.
	15	Service/warning LED	Blinks yellow for: – maintenance work required – warning message
	16	Controller power ON	Lights green when the power supply to the controller is switched on.
	17	LOAD	Lights green when the machine is in the operating state LOAD
	18	Operating mode IDLE	Lights green when the machine is in the IDLE mode. Blinks green if the manualLOAD/IDLING changeover key (5) is used.
	19	Machine ON	The machine is switched on.

Tab. 30 SIGMA CONTROL indicators

5 Installation and Operating Conditions

5.1 Surroundings

- ☞ Strictly forbid fire, open flame and smoking.
- ☞ When welding is taking place on or near the machine take adequate measures to ensure that no parts of the machine or any oil vapors can ignite because of sparks or heat.
- ☞ The machine is not explosion-proof.
Do not operate in areas in which specific requirements with regard to explosion protection are applied.
- ☞ Observe the required ambient conditions:
 - ambient temperature and humidity,
 - clean inlet air with no damaging contaminants,
 - inlet air free of explosive or chemically unstable gases or vapours,
 - inlet air free of acid-forming substances, particularly ammonia, chlorine or hydro-sulphide.
- ☞ suitable fire extinguishing material at hand.

5.2 Installation Conditions

5.2.1 Place of installation and space required

Pre-condition: The floor must be level, firm and capable of bearing the weight of the equipment.



The spacings given are recommended and ensure unhindered access to all machine parts.
Please consult KAESER if they cannot be achieved.

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

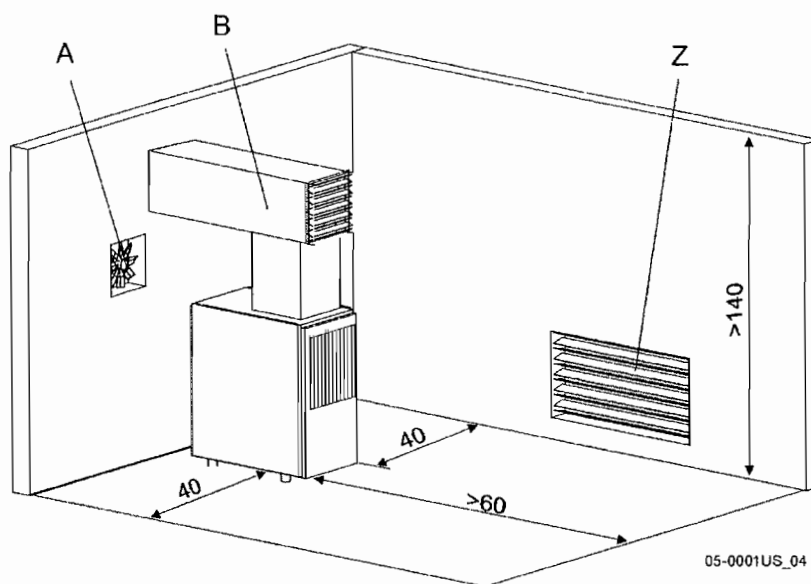


Fig. 12 Installation recommendation, dimensions [in]

- A Exhaust fan
 B Exhaust air duct
 Z Inlet air opening

5.2.2 Ventilation

Values given are minimum guidelines.



If the inlet aperture is insufficient a dangerous vacuum can be created in the compressor room.

- ☞ Ensure that the volume of air flowing into the compressor room is at least equivalent to that being removed from it by the compressor and exhaust fan.
- ☞ Make sure that the machine and exhaust fan can only operate when the inlet aperture is actually open.

Option K1

	BSD 40	BSD 50	BSD 60
Inlet opening [sq.ft.]	8.6	10.8	12.9
Forced ventilation with exhaust ventilator: Flow rate [cfm] at 0.4 in wc	6474	7946	9712
Exhaust air duct: Dimensions [in]	27 1/2 x 27 1/2	27 1/2 x 27 1/2	27 1/2 x 27 1/2

Tab. 31 Ventilation (Option K1)

Option K2

	BSD 40	BSD 50	BSD 60
Inlet opening [sq.ft.]	2.2	2.2	2.2
Forced ventilation with exhaust ventilator: Flow rate [cfm] at 0.4 in wc	942	1177	1471
Exhaust air duct: Dimensions [in]	27 1/2 x 27 1/2	27 1/2 x 27 1/2	27 1/2 x 27 1/2

*Tab. 32 Ventilation (Option K2)***Exhaust ducting**

Consult the manufacturer on the design of the ducting, length, number of bends, etc.

Further information on exhaust air ducts can be found in chapter 13.1.3.

5.2.3 Operating in a compressed air system

When the machine is connected to an air system, the operating pressure must not exceed 230 psig.

Initial filling of a fully vented air system generally creates a very high rate of flow through air treatment devices. These conditions are detrimental to correct air treatment. Air quality can be degraded.

To ensure maintenance of desired air quality when filling a vented air system we recommend the installation of an air main charging system.

Please contact KAESER for assistance in selecting and installing an air main charging system.

6 Installation

6.1 Safety



DANGER

Voltage!

Contact with live electric components can cause serious injury or death.

- ☞ Isolate completely from the mains supply (switch off the main isolator)
- ☞ Ensure that the power supply cannot be switched on again (lock off).
- ☞ Check that no voltage is present.



WARNING

Uncontrolled pressure release!

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

- ☞ De-pressurize all pressurized components and enclosures.



WARNING

Minimum pressure/check valve, safety relief valve and inlet valve are heavily spring-loaded.

Fatal injury may occur from incorrect opening of spring-loaded components.

- ☞ Do not open or dismantle valves.
- ☞ Contact authorized KAESER distributor, if a fault occurs.



Installation work may only be carried out by authorized personnel!

All functioning parts are factory set.

Changes may not be made without the permission of the manufacturer.

6.2 Report Transport Damage

- ☞ Check the machine for visible and hidden transport damage.
- ☞ Inform the carrier and the manufacturer in writing of any damage.

6.3 Install the Compressed Air Connection

Pre-condition: air system completely vented.

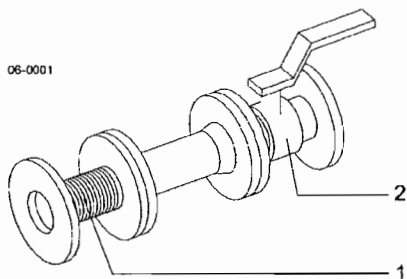


Fig. 13 Compressed Air Connection

- 1 Axial compensator or flexible hose
- 2 Shut-off valve

- ☞ Shut-off valve (2) to be installed by the user in the connection line. ✓
- ☞ Make the compressed air connection with a flexible hose (1) or an axial compensator (1). ✓

6.4 Electrical Connection

Main power supply and overcurrent protection must be installed by a qualified electrician in accordance with NEC, OSHA, and any applicable local codes.

Use wire conductor dimensions and fuse ratings in accordance with local regulations. Guide values are given in chapter 2.9.

- ☞ The user must provide the machine with a lockable supply–disconnecting device. This could be, for example, a disconnect switch with fuses. If a circuit breaker is used it must be suitable for the motor starting characteristics.

Before initial start–up

- ☞ The control transformer in the control cabinet has connections for various supply voltages. Check that the correct connections are made for the supply voltage provided for the machine. If necessary, re–connect the transformer using the $\pm 5\%$ taps to match the supply voltage.
- ☞ Connect the machine to the main power supply in accordance with the electrical diagram in chapter 13.1.4.

6.5 Options

6.5.1 Mounting (option H1)

If the machine is supplied with mountings, these can be used to anchor it to the floor. Details of the mounting holes are contained in the dimensional drawing in chapter 13.1.3.

- ☞ Use appropriate bolts to anchor the machine.

6.5.2 Water cooling connection (option K2)

The dimensional drawing in chapter 13.1.3 gives the flow direction, size and position of the cooling water connection ports.

Use connecting lines made of the appropriate material for the water system. Take into account the effect of electro–chemical reaction.

Keep the effect of pressure surge on the cooler as low as possible.

Where pressure surges are unavoidable provide an expansion tank to damp pulsations.

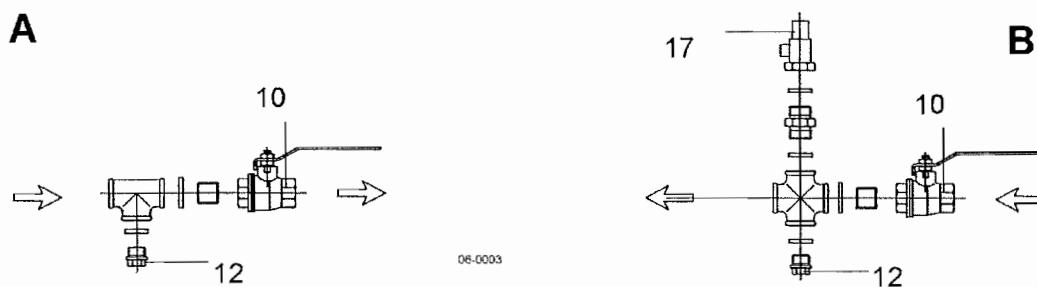


Fig. 14 Water cooling connection

- | | | | |
|---|----------------------|----|------------------------------|
| A | Cooling water outlet | 10 | Shut-off valve |
| B | Cooling water inlet | 12 | Connection port with stopper |
| | | 17 | Safety relief valve |

The user is to provide the following fittings:

- Dirt trap with max. 0.1 mm strainer mesh.
- Shut-off valves (10) and connection ports (12) for maintenance and venting.
- Safety relief valve (17) prevents build-up of excessive pressure.

i

Blowoff pressure and capacity are related to the user's installation design.
 Keep to the cooler technical specification.

- ☞ Connect the cooling water line to the fitting.
- ☞ Open the shut-off valve on the cooling water outlet (A).
- ☞ Slowly open the cooling water inlet shut-off valve (B) to gradually fill the cooler with water.
- ☞ Vent the water lines.

6.5.3 Heat recovery system connection

6.5.3.1 Internal heat recovery (option W2, W3)

The dimensional drawing in chapter 13.1.3 gives the flow direction, size and position of the connection ports.

Use connecting lines of suitable material. Take into account the effect of electro-chemical reaction.

Keep the effect of pressure surge on the heat exchanger as low as possible.

Where pressure surges are unavoidable provide an expansion tank as a damper.

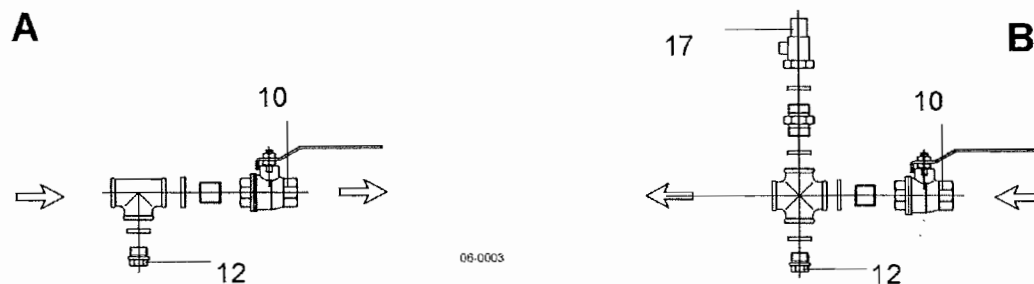


Fig. 15 Heat recovery

A	Outlet	10	Shut-off valve
B	Inlet	12	Connection port with stopper
		17	Safety relief valve

The user is to provide the following fittings:

- Dirt trap with max. 0.1 mm strainer mesh.
- Shut-off valves (10) and connection ports (12) for maintenance and venting.
- Safety relief valve (17) on the inlet (B) prevents build-up of excessive pressure.



Blowoff pressure and capacity are related to the user's installation design.
 Keep to the heat exchanger technical specification.

- ☞ Connect the water lines to the fittings.
- ☞ Open the shut-off valve on the outlet (A).
- ☞ Slowly open the inlet (B) shut-off tap to gradually fill the heat exchanger with water.
- ☞ Vent the lines.

6.5.3.2 External heat recovery system (option W1)

The dimensional drawing in chapter 13.1.3 gives the flow direction, size and position of the connection ports.

- ☞ Follow the manufacturer's instructions on connecting the external heat exchanger.

7 Initial Start-up

7.1 Safety



DANGER

Voltage!

Contact with live electric components can cause serious injury or death.

- ☞ Isolate all phases of the main power supply.
(switch off the main isolator)
- ☞ Ensure that the power supply cannot be switched on again (lock off).
- ☞ Check that no voltage is present.



WARNING

Uncontrolled pressure release!

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

- ☞ Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
- ☞ De-pressurize all pressurized components and enclosures.
- ☞ Check all machine hose connectors with a hand-held pressure gauge to ensure that all read zero.



Initial start-up may only be carried out by authorized personnel!

Before switching on ensure that:

- no one is working on the machine,
- all panels are in place and secured,
- all access doors are closed.

7.2 Before Every Initial Start-up

Initial start-up of the machine may only be carried out by trained and authorized installation or maintenance personnel.

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

Special measures on re-starting after storage:

Storage period longer than...	Action to take
12 months	<ul style="list-style-type: none">☞ Change the oil filter.☞ Change the oil separator cartridge.☞ Change the cooling oil.☞ Have the motor bearings checked by an authorized KAESER distributor.
36 months	<ul style="list-style-type: none">☞ Have the overall technical condition checked by an authorized KAESER distributor.

7.3 Checking Installation and Operating Conditions

Carry out all the items in the checklist before starting the machine.

	To be checked	Chapter	Done?
1	<input checked="" type="checkbox"/> Are all the conditions for installation fulfilled?	5	✓
2	<input checked="" type="checkbox"/> User's lockable supply disconnecting device installed?	6.4	
3	<input checked="" type="checkbox"/> Is the power supply as specified on the nameplate?	2	✓
4	<input checked="" type="checkbox"/> Supply cable section and fuse rating adequate?	2.9.2	✓
5	<input checked="" type="checkbox"/> All electrical connections checked for tightness?		SS
6	<input checked="" type="checkbox"/> Shut-off valve fitted to compressed air outlet?	6.3	SS
7	<input checked="" type="checkbox"/> Connection made to air main with hose or axial compensator?	6.3	SS
8	<input checked="" type="checkbox"/> Is there sufficient cooling oil in the separator tank? (cooling oil indicator outside the red zone?)		DS/PS
9	<input checked="" type="checkbox"/> Required quantity of cooling oil poured into the airend?	7.6	✓
10	<input checked="" type="checkbox"/> Motor protection relay set correctly with regard to the power supply?	7.5	7
11	<input checked="" type="checkbox"/> Are the operators fully conversant with safety regulations?		✓
12	<input checked="" type="checkbox"/> Supply of cooling water ensured? (option K2)	6.5.2	N/A
13	<input checked="" type="checkbox"/> Machine anchored to the floor? (option H1)	6.5.1	✓
14	<input checked="" type="checkbox"/> Are all access doors closed and latched and all removable panels in place and secured?	4.1.1	✓

PD 10-5-07

SS

PD 10-5-07

Tab. 33 Installation conditions checklist

7.4 Setting the overload protection cut-out

Compressor motor:

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

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

7.5 Motor Protection Switch Setting

Fan motor

In direct on-line start the starting current 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). It should be $1.2 \times \text{FLA}$.

7.6 Pour cooling oil into the airend.

Equipment: 1 quart cooling oil

The airend must be manually filled with cooling oil before initial start-up and after being out of use for more than 3 months.



Use the same type of oil.

A sticker giving the type of oil used is found near the oil separator tank filling port.

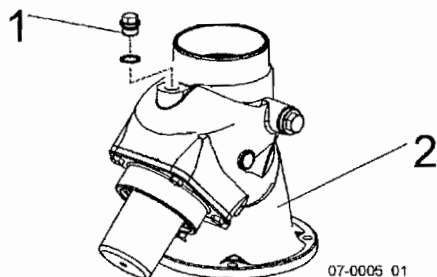


Fig. 16 Inlet valve oil filling port

- 1 Screw plug
- 2 Inlet valve

- ✎ Remove the plug (1) from the inlet valve (2).
- ✎ Pour cooling oil into the airend.

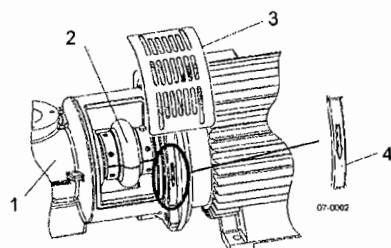


Fig. 17 Coupling

- | | |
|------------|------------------------------|
| 1 Airend | 3 Cover |
| 2 Coupling | 4 Rotational direction arrow |

- ✎ Remove the cover (3).
- ✎ Note the rotational direction arrow (4).
- ✎ Grasp the coupling (2) and turn it and the airend shaft (1).
- ✎ Replace the coupling cover (3).

7.7 Checking Direction of Rotation

The machine is designed for a clockwise field.

- ✎ Check the supply with a phase sequence indicator.
- ✎ If the compressor motor turns in the wrong direction, change the motor supply phases L1 and L2.



Alternatively, the direction of rotation can be checked by briefly switching the machine on and off again.

- ✎ Switch the machine off as soon as the direction of rotation is seen and compare it with the direction arrows on the motor and airend.

7.8 Initial Start-up

- ☞ Open the shut-off valve to the air network.
- ☞ Switch on at the main supply isolator.

After the controller has carried out a self-test, the green 'Power ON' LED illuminates.

Changing the display language

The controller can display text messages in several languages:

Bulgarian	Finnish	Portuguese
Chinese	French	Romanian
Chinese (Taiwan)	French (Canada)	Russian
Croatian	Greek	Swedish
Czech	Indonesian	Slovenian
Danish	Italian	Spanish
Dutch	Japanese	Spanish (Mexico)
English	Korean	Turkish
English (USA)	Norwegian	...
Estonian	Polish	

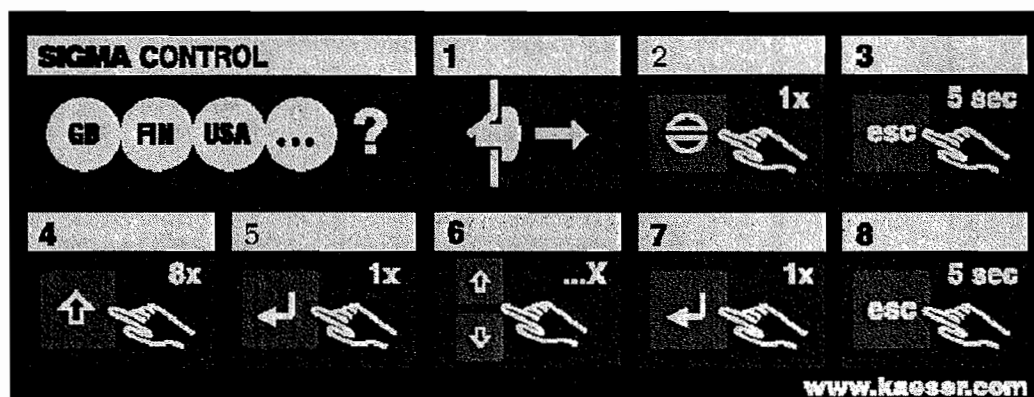


Fig. 18 Label: Setting the language

1	☞ If required: Deactivate EMERGENCY STOP	5	☞ Press the <i>return</i> key to enter the language selection menu.
2	☞ If required: Acknowledge alarm message.	6	☞ Press the <i>UP</i> or <i>Down</i> keys as required until the desired language selection is shown.
3	☞ Keep the <i>Escape</i> key pressed for 5 seconds to change to the standard menu.	7	☞ Press the <i>return</i> key to select the desired language.
4	☞ Press the <i>UP</i> key 8 times.	8	☞ Keep the <i>Escape</i> key pressed for 5 seconds to change to the standard menu.

You can remove the label after you have set the language.

Switching the machine on

☞ Press the 'LOAD/IDLE mode' key.

☞ Press the ON key.

The green 'Machine ON' LED illuminates.

☞ Allow the machine to idle for at least one minute.

This ensures that cooling oil is distributed throughout the system.

☞ Press the 'LOAD/IDLE mode' key.

The machine switches to LOAD status and delivers compressed air.



Keep an eye on the machine during the first few hours of operation to ensure that it is operating correctly.

After the first 50 operating hours carry out the following:

☞ Check that all electrical connections are secure.

7.9 Setting System Pressure

The system pressure p_1 is factory set to the highest possible value.

Adjustment is necessary for individual operating conditions.

☞ System pressure setting is described in the SIGMA CONTROL service manual.



The machine may toggle a maximum of twice per minute between LOAD and IDLE.

Reducing starting frequency:

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

☞ Add an air receiver downstream to increase buffer capacity.

8 Operation

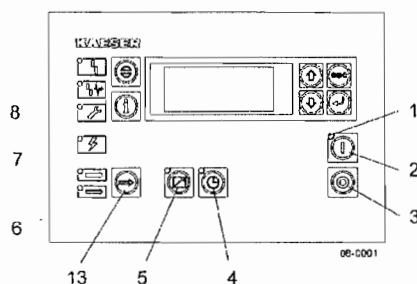


Fig. 19 Switching On and Off

- | | |
|----------------------------|---------------------------|
| 1 'Machine ON' LED (green) | 5 'Remote' key |
| 2 'ON' key ('I') | 6 'LOAD' LED |
| 3 OFF key ('O') | 7 'IDLE' LED |
| 4 'Clock' key | 8 'Power ON' LED (green) |
| | 13 LOAD / IDLE toggle key |

8.1 Switching On and Off



Compressed air!

WARNING

Serious injury is possible.

✎ Never direct compressed air at persons or animals.

Always switch the machine on and off with the 'ON' and 'OFF' keys.

The supply disconnecting device is installed by the user.

8.1.1 Switching on

✎ Ensure that:

- no one is working on the machine,
- all panels are in place,
- all access doors are closed,
- no parts of the machine are colder than + 37 ° F.

✎ Switch on at the main supply isolator.

The controller makes a self-test and the green LED 'Power ON' (8) lights.

✎ Press the 'ON' key (2).

The green LED 'Machine ON' lights (1).

The compressor motor runs, assuming the system pressure is lower than the cut-out pressure.

8.1.2 Automatic restart

Pre-condition: System pressure is lower than cut-out pressure.

Automatic restart is factory-set.

The machine restarts automatically when power is resumed after a power cut.

8.1.3 Switching Off

- ☞ Press the 'LOAD/IDLE' toggle key (13).
- The machine switches to IDLE and the LED (7) blinks.
- ☞ After running in idle for 20 seconds, press the OFF key (3).
- The 'Machine ON' LED goes out (1).
- ☞ Switch off and lock out the main supply isolator.

8.2 Switching Off in an Emergency and Switching On Again

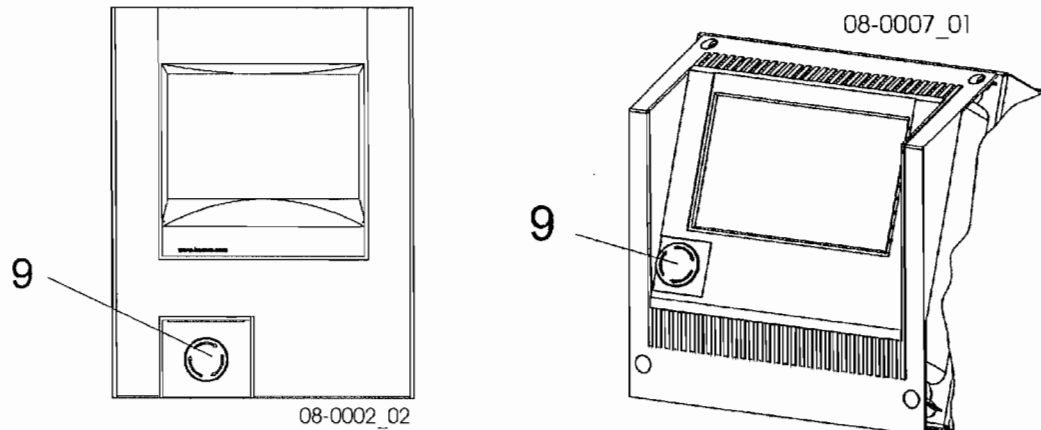


Fig. 20 Switching off in an emergency

9 EMERGENCY STOP button

Switching off

- ☞ Press the 'EMERGENCY STOP' button (9)
- The 'EMERGENCY STOP' remains latched in.
- The machine pressure system is vented and the machine is prevented from re-starting.

Starting again

Pre-condition: Fault rectified.

- ☞ Turn the 'EMERGENCY STOP' button in the direction of the arrow to unlatch it.
- ☞ Press the 'Reset' key (11).
- ☞ Switch the machine on.

8.3 Remote On and Off Switching

Pre-condition: Connection to a remote control device.



Apply the remote warning label to the machine where it is plainly visible.
BEWARE! This machine is remotely controlled and can start at any time.

Label the remote control device accordingly:

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

- ✎ Press the 'Remote' key (5).

The LED in the corner of the key lights. The remote control device has control of the machine.

The machine can still be switched on and off by the 'ON' and 'OFF' keys (2 and 3) if required.

8.4 Switching on and off with the Clock

Pre-condition: Clock programmed



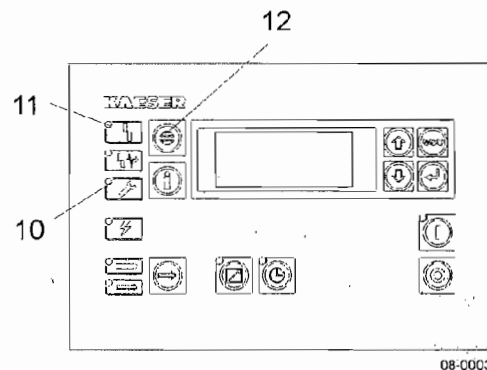
Apply the time-controlled warning label to the machine where it is plainly visible.

BEWARE! This machine is clock-controlled and can start at any time.

- ✎ Press the 'Clock' key (4).

The LED in the corner of the key lights. The integrated clock has control of the machine.

8.5 Acknowledging and Resetting Warning and Alarm Messages



08-0003

Fig. 21 Acknowledging and Resetting Warning and Alarm Messages

- 10 'Warning' LED (yellow)
- 11 'Alarm' LED (red)
- 12 'Acknowledge' (reset) key

Alarm

An alarm shuts the machine down automatically. The red 'Alarm' LED blinks (11).

Faults are displayed on the "New value" principle:

Alarm is triggered	LED blinks
Alarm is acknowledged	LED illuminates
Alarm deletes	LED out

or

Alarm is triggered	LED blinks
Alarm deletes	LED blinks
Alarm is acknowledged	LED out

Warning

The display shows a maintenance or warning message.

The yellow warning LED (10) flashes, for example, if a maintenance task is due.

8.5.1 Resetting alarm messages

Pre-condition: Fault rectified.

☞ Press the 'Acknowledgement (reset)' key (12).

The alarm LED (red) goes out (11).

The machine is now ready to start again.

8.5.2 Resetting warning messages

Pre-condition: The cause of the warning eliminated.
Maintenance task completed.

☞ Press the 'Acknowledgement (reset)' key (12).

The warning LED (yellow) goes out (10).

9 Event Recognition and Fault Rectification

Inform KAESER service if the event cannot be rectified by the action suggested.

Do not attempt rectifications other than those given in this manual.

The measures valid for your machine are dependant on the individual equipment.

There are three types of event:

Description	Indicated by	see chapter
An event that triggers an alarm (with automatic shut-down)	Blinking red LED	9.1
An event that triggers a warning (no shut-down)	Blinking yellow LED	9.2
Miscellaneous events (faults)	No indication	9.3

9.1 Alarm messages to the controller (machine shut-down, red LED blinking)

Message	Possible cause	Remedy
access doors	Door open with the machine running.	Close the door(s).
ADT \uparrow	Maximum airend discharge temperature exceeded.	Ensure adequate ventilation. Ensure that the permissible room temperature is not exceeded. Clean the cooler. Cooling air outlet of the machine too near a wall. Check the cooling oil level.
ADT dT/dt	Maximum rise rate of airend discharge temperature (ADT) exceeded.	Check airend and piping to airend. Check the cooling oil level. Check oil circulation.
AI 3/AI 4 error	Line-break between the analog input and the sensor. Short circuit to earth.	Check transducer connections and wiring.
AI 7/AI 8 error	Line-break between the analog input and the sensor. Short circuit to earth.	Check transducer connections and wiring.
air filter dp \uparrow	Air filter clogged.	Clean or renew the filter element.
airend rotation	The drive motor is turning in the wrong direction.	Change over phase lines L1 and L2.
backpressure	Back pressure in the oil separator tank caused by poor venting.	Check venting line.
blowoff prot.	The activating pressure of the safety valve on the oil separator tank has been exceeded.	Change the oil separator cartridge. Open the shut-off valve in the venting line.

Message	Possible cause	Remedy
Buscontroller	Bus link via the Profibus DP interface	Check line and settings.
Condensate drain	Fault in condensate drainage.	Check condensate drainage.
coolingwater low	Cooling water pressure too low.	Check cooling water supply. Check the cooling water stop valve position.
DO 0.6/DO 0.7	Short circuit in the line between DO 0.6 / DO 0.7 outputs and a consumer.	Check line and connections.
DO 1.6/DO 1.7	Short circuit in the line between DO 1.6 / DO 1.7 outputs and a consumer.	Check line and connections.
ext. message 0	Customer specific: No data	
...		
ext. message 5		
EMERGENCY-STOP	Emergency-stop-button pressed.	Unlatch the pushbutton.
fan M2 I ↑	Shutdown of 1 st fan motor because of overload.	Investigate cause of shutdown. Reset overload trip.
fan M3 I ↑	Shutdown of 2 nd fan motor because of overload.	Investigate cause of shutdown. Reset overload trip.
fan M4 I ↑	Shutdown of 3 rd fan motor because of overload.	Investigate cause of shutdown. Reset overload trip.
RD compr. p ↑	Pressure switch for the refrigerant compressor has activated.	Ensure adequate ventilation. Clean the refrigerant condenser. Clean the cooler.
HT cell	Fault in the high tension cell.	Contact authorized KAESER distributor.
mains cont. on?	The mains contactor does not pull in despite ON command.	Check mains contactor and wiring.
mains cont. off?	The mains contactor does not drop out despite OFF command.	Check mains contactor and wiring.
mains monitor	Fault in mains power supply.	Have the mains power supply checked.
mains voltage ↓	2 nd power failure	Check power supply voltage. Check door interlock.
Model	Machine model uncertain	Contact authorized KAESER distributor.

Event Recognition and Fault Rectification

Message	Possible cause	Remedy
motor I ↑	Drive motor has been shut-down because of overload.	Change the oil separator cartridge. Check minimum pressure/ check valve. Investigate cause of shut-down.
motor T ↑	Drive motor overheated.	Ensure adequate ventilation. Install an extractor. Clean the motor.
motor bearings	Drive motor bearings overheated.	Grease the motor bearings with the greasing device.
Neutral p-switch	Customer specific: No data.	
Neutral T-switch	Customer specific: No data.	
no press.buildup	Machine produces no compressed air. Working pressure stays below 50 psig within a preset period.	Check the machine for leaks. Check coupling / V-belts Contact authorized KAESER distributor.
oil p ↓	No changeover to load as long as the minimum oil pressure is not reached.	Check oil circulation. Check pressure switch, line and connection.
PD temperature ↓	Package discharge temperature too low.	Contact authorized KAESER distributor.
PD temperature ↑	Package discharge temperature too high.	Check the fan motor. Clean the cooler. Check the cooling oil level.
pRV ↑	The activating pressure of the safety valve on the oil separator tank has been exceeded.	Replace the safety valve.
RD compr. T ↑	Temperature in the refrigerant dryer too high.	Clean the refrigerant condenser. Ensure adequate ventilation. Install an extractor fan. Clean the cooler.
RD compr. T ↓	Temperature in refrigeration dryer too low.	Contact authorized KAESER distributor.
separator dp ↑	Oil separator cartridge clogged.	Replace the oil separator cartridge.
separator T ↑	Maximum air temperature on oil separator tank outlet exceeded.	Check the line to the trip relay.
SFC	Frequency converter faulty.	Contact authorized KAESER distributor.

Message	Possible cause	Remedy
sh.cct.AI 1/AI 2	The connection between the sensor and the analog input is shorted.	Check transducer connections and wiring.
sh.cct.AI 5/AI 6	The connection between the sensor and the analog input is shorted.	Check transducer connections and wiring.
SIGMA CONTROL T ↑	Maximum permissible temperature in SIGMA CONTROL housing exceeded.	Ensure adequate ventilation. Ensure that the permissible room temperature is not exceeded. Check control cabinet ventilator (filter mats).
soft start	Fault in the soft start equipment.	Contact authorized KAESER distributor.
Start ↓	Airend discharge temperature (ADT) too low. Ambient temperature below + 40° F.	Heat the compressor room.
V-belts broken	The V-belts parted during operation.	Replace the belts.

Tab. 34 Alarm messages and actions

9.2 Warning messages on the controller (yellow LED flashes)

Message	Possible cause	Remedy
access doors	Doors opened with the machine shut down.	Close access doors.
ADT ↑	Maximum airend discharge temperature will soon be reached.	Ensure sufficient ventilation Clean the cooler. The machine's cooling air outlet is too near a wall. Check the cooling oil level. Replace the oil filter.
air filter dp ↑	The pressure drop across the air filter is too high. Air filter element clogged.	Clean/replace the air filter element.
air filter h ↑	The interval for the air filter element check has expired.	Clean/replace the air filter element.
annual maint.	The maintenance interval counter was not reset within a year.	Carry out necessary maintenance and reset one of the following maintenance interval counters: oil filter, oil separator, oil change or air filter.
bearing maint. h ↑	The maintenance interval for greasing the bearings has expired.	Grease the motor bearings.

Message	Possible cause	Remedy
blowoff prot.	Warning The blowoff pressure of the safety relief valve will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
blt.coup.insp.h ↑	The maintenance interval for V-belt tension / coupling inspection has expired.	Visually inspect and tension the V-belts.
blt.coup.chng. h ↑	V-belts / coupling worn.	Change belts / coupling.
Buffer battery	Battery for retention of data is discharged.	Replace the battery
bus alarm	Bus link via Profibus DP interface interrupted	Check bus highway and plug.
Condensate drain	Fault in condensate drainage.	Check condensate drain and lines.
elect. equip. h ↑	The service interval for checking electrical equipment and installation has expired.	Reset the service interval counter.
error: RS 485	Wrong configuration or transmission error.	Check the link/interface connections between the two controllers. Check maximum cable length and screening. 1 master and 1 slave configured.
ext.load signal?	Dubious external load signal Increased cut-out pressure exceeded. The external load control has not switched to idle (off load).	Check settings of the external controller. Take the pressure drops across filters and dryer into account.
ext. message 0	Customer specific: No data	
...		
ext. message 5		
flash memory	Internal controller memory error.	Contact KAESER service.
FC mains	Failure of power supply to the frequency converter.	Check power supply.
mains voltage ↓	1. power failure: Machine was re-started automatically.	Check power supply voltage. Check door interlock.
modem problem	SIGMA CONTROL does not recognise the modem.	Check the link between SIGMA CONTROL and the modem.
motor T ↑	Drive motor overheating.	Ensure adequate ventilation. Install an extractor. Clean the motor.

Message	Possible cause	Remedy
motorstarts /h ↑	The permissible number of motor starts was exceeded during the last 60 minutes.	Extend the idle period. Increase capacity of air receiver. Increase cross-section of piping between compressor and air receiver.
motorstarts /d ↑	The permissible number of motor starts was exceeded during the last 24 hours.	Extend the idle period. Increase capacity of air receiver. Increase cross-section of piping between compressor and air receiver.
motor bearings h ↑	The service interval for the motor bearing change has expired.	Have an authorized KAESER technician replace the motor bearings.
Neutral p-switch	Customer specific: No data	
Neutral T-switch	Customer specific: No data	
no press.buildup	The compressor cannot build-up to working pressure.	Check for air leaks. Check the value for internal pressure given in the "analog data" menu with the reading on the oil separator tank pressure gauge.
oil filter dp ↑	Oil filter clogged.	Oil filter replacement
oil filter h ↑	The interval for the next oil filter check has expired.	Oil filter replacement
oil level ↓	Oil level too low.	Top up the cooling oil.
oil T ↓	Cooling oil temperature too low.	Increase room temperature. Check the oil circuit. Check temperature switch, line and connection.
oil change h ↑	The service interval for the oil change has expired.	Change the cooling oil.
oil content ↑	Warning The oil content limit for pure air will soon be reached.	Check the scavenge tube in the oil separator cartridge. Check the dirt trap strainer in the scavenge line. Check air treatment upstream of the measurement.
oil content ↑	The oil content limit for pure air has been exceeded.	Check the scavenge tube in the oil separator cartridge. Check the dirt trap strainer in the scavenge line. Check air treatment upstream of the measurement.

Message	Possible cause	Remedy
PD temperature ↓	Warning Compressor outlet (package discharge) temperature is low.	Contact KAESER service.
PD temperature ↑	Warning Compressor outlet (package discharge) temperature too high.	Clean the cooler. Check the cooling oil level.
RAM	Internal RAM defective.	Contact KAESER service.
set output	The 'set output' test function is activated.	Stop the "set output" mode.
separator dp ↑	Oil separator cartridge clogged.	Change the oil separator cartridge.
separator h ↑	The interval for the next oil separator cartridge check has expired.	Change the oil separator cartridge.
system press. ↓	System pressure has fallen below the "sys.press. low" value. Air consumption too high.	Check air demand. Check transducer connections and wiring. Check "sys.press. low" setting.
system press. ↑ (vacuum machines only)	System pressure is above the "sys.press. high" value.	Check for air leaks. Check "sys.press. high" setting. Check if the machine switches to LOAD.

Tab. 35 Warning messages and actions

9.3 Other Alarms

Fault	Possible cause	Remedy
Drive motor overload protection cutout has tripped.	Overload protection cutout is defective or incorrectly set.	Check setting.
	Oil separator cartridge clogged.	Check pressure drop across the separator cartridge. Change the oil separator cartridge if necessary.
	The pressure system does not vent.	Open the shut-off valve in the venting line.
	Motor defective; bearing damage or windings shorted.	
	Airend defective.	

Fault	Possible cause	Remedy
Machine runs but produces no compressed air.	Inlet valve not opening or only opening partially.	
	Venting valve not closing.	
	Leaks in the pressure system.	Check pipework and connections for leaks and tighten any loose fittings.
	Air consumption is greater than the capacity of the compressor.	Check compressed air network for leaks. Shut down the consumer(s).
	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
Cooling oil runs out of the air filter.	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Inlet valve defective.	
Compressor switches between load and idle (off load) more than twice per minute.	Air receiver too small.	
	Flow into the compressed air network restricted.	Increase air pipe diameters. Check filter elements. Switching difference too small (e.g. p1 SD)
Cooling oil leaking into the floor pan.	Hose coupling or maintenance hose still plugged into the quick-release coupling on the oil separator tank.	Remove coupling or maintenance hose.
	Oil cooler leaking	
	Connections leaking.	Tighten connection fittings. Replace seals.
Cooling oil consumption too high.	Unsuitable oil is being used.	Use SIGMA FLUID cooling oil.
	Oil separator cartridge split.	Change the oil separator cartridge.
	Oil level in the oil separator tank too high.	Drain off oil until the correct level is reached.
	Oil return line clogged.	Check dirt trap in the oil return line.

Tab. 36 Other faults and actions

10 Maintenance

10.1 Safety

Any disregard of these instructions and/or incorrect handling may result in serious injuries.



DANGER

Voltage!

Touching electrically energized components can cause serious injury or death.

- ☞ Isolate completely from the power supply (all conductors) (switch off at the main isolator)
- ☞ Ensure the supply cannot be switched on again (lock off).
- ☞ Check that no voltage is present.



Volt-free contacts may be under power from an external source even when the machine is isolated from the main power supply.



WARNING

Minimum pressure/check valve, safety relief valve and inlet valve are heavily spring-loaded.

Fatal injury may occur from incorrect opening of spring-loaded components.

- ☞ Do not open (dismantle) valves.
- ☞ Contact authorized KAESER distributor, if a fault occurs.



WARNING

Uncontrolled pressure release!

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

- ☞ Close shut-off valves or otherwise isolate the machine from the compressed air system to ensure that no compressed air can flow back into the machine.
- ☞ De-pressurize all pressurized components and enclosures.
- ☞ Check all machine hose connectors with a hand-held pressure gauge to ensure that all read zero.



CAUTION

Leakage

Leaks result in loss of oil and reduced performance.
Damage or complete breakdown can result.

- ☞ Test run on completion of maintenance work.
- ☞ Carry out a visual check of the machine.



Maintenance work may only be carried out by authorized personnel!

Before switching on again ensure that:

- no one is working on the machine,
- all panels are in place and secured,
- all access doors are closed.

10.2 Maintenance Schedule



Maintenance intervals are recommendations only and should be adjusted to suit the installation and operating conditions.

According to the way a machine is equipped, sensors and/or maintenance interval counters monitor the operational state of important functional devices. Necessary maintenance tasks are signalled by SIGMA CONTROL.

☞ Keep a log of all service work.

This enables the frequency of individual maintenance tasks to be compared with KAESER's recommendations. A list is given in chapter 10.16.

10.2.1 Resetting maintenance interval counters

Maintenance interval counters indicate the operating hours between maintenance tasks.

When a maintenance task is completed, reset the corresponding counter to its original value.

See the SIGMA CONTROL service manual.

Pre-condition: Maintenance task completed.
Service message reset.
Activate password level 4.

- ☞ Select the appropriate entry from the maintenance menu.
- ☞ Select 'reset' and 'y' and confirm with the enter key.

10.2.2 Regular maintenance work
i

When operating conditions are unfavorable (e.g. dusty atmosphere) or when the equipment is heavily utilized, maintenance tasks must be carried out more frequently (shorter intervals).

- ☞ Heed controller maintenance messages.
- ☞ Have KAESER service adjust the maintenance interval counters to suit operating conditions.

Interval	Maintenance tasks	see chapter
Weekly	Check cooling oil level.	10.12.1
	Clean or renew the filter mats.	10.3.2 / 10.6
Every 1000 h	Oil and air cooler maintenance.	10.3
	Heat recovery system maintenance.	10.4
Indicated by SIGMA CONTROL	Air filter maintenance.	10.5
Indicated by SIGMA CONTROL but at least annually.	Change the oil filter.	10.14
Indicated by SIGMA CONTROL but at least every 3 years.	Change the oil separator cartridge.	10.15
Every 2000 h, but at least annually.	Grease the motor bearings.	10.7
Every 3000 h	Check the coupling.	10.8
Variable (see chapter 10.2.3)	Change the cooling oil.	10.13
Annually	Check that all electrical connections are tight.	
	Check the safety relief valve.	10.9
	Check the overheating safety shutdown function	10.10
	Check the oil and air coolers for leaks.	10.3

h = operating hours

Tab. 37 Regular maintenance work

10.2.3 Oil change intervals

The duty cycle and ambient conditions are important criteria for the number and length of the change intervals.

KAESER LUBRICANTS			
SIGMA LUBRICANT	DESCRIPTION	MAXIMUM RECOMMENDED CHANGE INTERVAL*	
		First Oil Change	Subsequent Oil Change
M-460	ISO 46 Semi-Synthetic Lubricant	2000 Hours	3000 Hours
S-460	ISO 46 Synthetic Lubricant	6000 Hours	8000 Hours

* Cool to moderate ambient temperatures, low humidity, high duty cycle

Tab. 38 Oil change intervals lubricants

SPECIALTY KAESER LUBRICANTS			
(Refer to product information to determine suitability.)			
SIGMA LUBRICANT	DESCRIPTION	MAXIMUM RECOMMENDED CHANGE INTERVAL*	
		First Oil Change	Subsequent Oil Change
S-680	ISO 68 Synthetic Lubricant	6000 Hours	8000 Hours
FG-460	ISO 46 Food Grade Synthetic Fluid	2000 Hours	3000 Hours

* Cool to moderate ambient temperatures, low humidity, high duty cycle

Tab. 39 Oil change intervals speciality lubricants

10.2.4 Regular service work



Only authorized KAESER service agents should carry out service work.

When operating conditions are unfavorable (e. g. dusty atmosphere) or when the equipment is heavily utilized, service work must be carried out more frequently.

Interval	Maintenance tasks
up to 12000 hours	Check valves.
Up to 12000 hours, at the latest every 3 years	Change the fan motor bearings or the motor complete.
Up to 36000 hours, at the latest every 8 years	Change the drive motor bearings.
	Change the coupling.
	Change the hose lines.

h = operating hours

Tab. 40 Regular service work intervals

10.3 Cooler Maintenance

10.3.1 Air cooling (option K1)

Equipment: brush
vacuum cleaner

Pre-condition: Machine switched off.
Main disconnect locked out.
Machine cooled down.

Check the cooler regularly for contamination. Frequency is mainly dependant on local operating conditions.



Contamination causes overheating and machine damage.

Avoid dust disturbance. Wear breathing apparatus if necessary.

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

A severely contaminated cooler should be cleaned by a KAESER service agent.

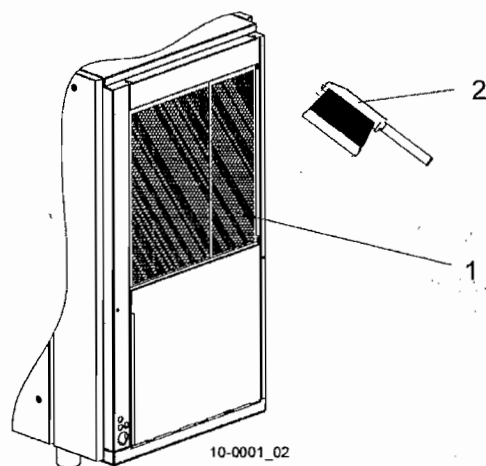



Fig. 22 Cleaning the cooler

- 1 Cooler
- 2 Brush

 Dry brush the cooler (1) and use a vacuum cleaner to suck up the dirt.

10.3.2 Filter mat maintenance (option K3)

Equipment: Warm water and household detergent
Spare parts (as required)

Pre-condition: Machine switched off.
Main disconnect locked out.
Machine cooled down.

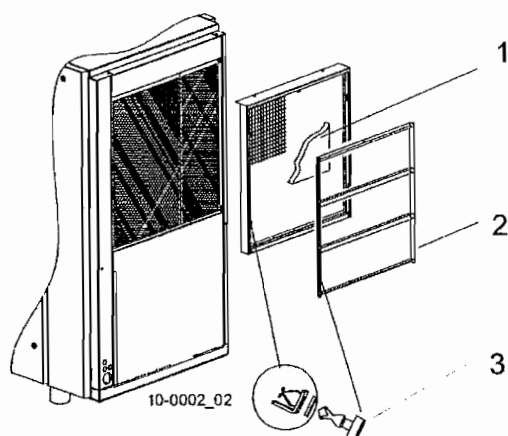


Fig. 23 Cooler filter mats

- 1 Filter mat
- 2 Retaining frame
- 3 Fixing

Removal

- ✎ Unlock the fixings (3).
Use a screwdriver to turn the fixing 90° anti-clockwise.
- ✎ Remove the frame (2).

Cleaning

- ✎ Beat the mat (1) or use a vacuum cleaner to remove loose dirt. If necessary, wash the mat in lukewarm water and household detergent then rinse thoroughly.



Replace the mat if cleaning is not possible or has already been carried out five times.

Replacing

- ✎ Replace the frame and close the fixings.
Press and turn the fixings 90° clockwise until they latch.

10.3.3 Water cooling maintenance (option K2)

Pre-condition: Machine switched off.
Main isolator locked off
Machine cooled down.

Check the cooler regularly for leaks and contamination. Frequency of checking is dependant on the characteristics of the cooling water.



Contamination causes overheating and machine damage.

- ✎ Observe the airend discharge temperature to detect any tendency to rise.

Cleaning:

- ✎ An authorized KAESER service agent should clean the cooler when the airend discharge temperature is 50 ° F above the annual average.

Leakage

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

- ☞ Check the cooler visually for leaks.
- ☞ Have an authorized KAESER service agent check the cooler for internal leaks at least once a year.

10.4 Internal Heat Recovery Maintenance (option W2 / W3)

Pre-condition: Machine switched off.
Main isolator locked off
Machine cooled down.

Deposits in the heat exchanger in machines with heat recovery systems can adversely affect heat transfer.

Check the heat exchanger regularly for leaks and contamination. Frequency of checking is dependant on the characteristics of the heat transfer medium.

Contamination

- ☞ Have an authorized KAESER service agent clean the heat exchanger as soon as a pressure drop in the heat transfer medium is detected.

Leakage

If a leak occurs, cooling oil can flow into the heat transfer medium as pressure the cooling oil circuit is generally higher.

- ☞ Check the heat exchanger visually for leaks.
- ☞ Have an authorized KAESER service agent check the heat exchanger for internal leaks at least once a year.

10.5 Air Filter Maintenance.

Equipment: Compressed air
Spare parts (as required)

Pre-condition: Machine switched off
Main isolator locked off
Machine cooled down.

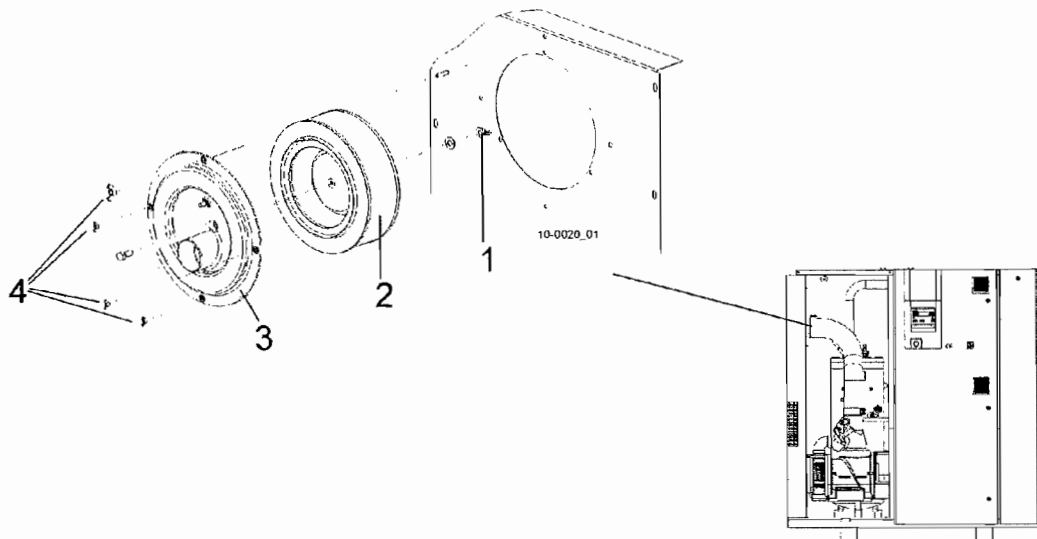


Fig. 24 Air filter maintenance.

- | | |
|------------------------|---------|
| 1 Nut | 3 Cover |
| 2 Air filter cartridge | 4 Nut |

Open the air filter housing:

- ☞ Unscrew the nuts (4) and lift out the cover (3) together with the air filter cartridge (2).
- ☞ Unscrew the nut (1) and remove the air filter cartridge.



Do not clean the air filter cartridge with liquids.

All sealing surfaces are matched to each other.

The use of unsuitable air filter cartridges can permit dirt to ingress into the pressure system and cause damage to the machine.

Clean the air filter cartridge by tapping

Renew the air filter cartridge after two years at the latest or after it has been cleaned five times.

- ☞ Tap the cartridge at the end a number of times with the palm of the hand.

Cleaning the air filter cartridge with compressed air:

- ☞ Use dry compressed air (< 70 psig!) to blow dirt from the air filter cartridge at a slant from the inside to the outside.

Close the air filter housing

- ☞ Clean all parts and sealing surfaces.
- ☞ Insert the air filter cartridge in the cover and affix with the nut (1).
- ☞ Affix the cover in the machine with the nuts (4).
- ☞ Close all access doors and replace all cover panels.
- ☞ Switch on the power supply and reset the maintenance interval counter.

10.6 Filter mat maintenance (control cabinet)

Equipment: Warm water and household detergent
Spare parts (as required)

Pre-condition: Machine switched off.
Main isolator locked off
Machine cooled down.

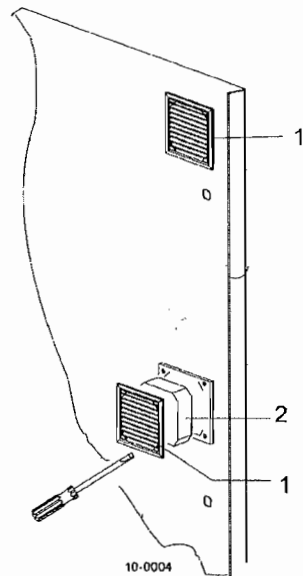


Fig. 25 Control cabinet ventilator

- 1 Ventilator grill
- 2 Filter mat

Removal

- ☞ Remove the ventilator grill (1) and the filter mat (2).

Cleaning

- ☞ Beat the mat or use a vacuum cleaner to remove loose dirt. If necessary, wash the mat in lukewarm water and household detergent then rinse thoroughly.
Replace the mat if cleaning is not possible or has already been carried out five times.

Replacing

- ☞ Lay the filter mat in the frame and push on the grill to latch.

10.7 Electric motor maintenance

Equipment: Bearing grease
Cleaning rags

Pre-condition: Machine running.



CAUTION

Hot components – danger of burning

- ☞ Wear long-sleeve clothing and gloves.
- ☞ Work carefully.

Compressor motor

The motor bearings are fitted with grease nipples.



High-temperature grease ESSO UNIREX N3 should be used for re-greasing the motor bearings. Bearing damages caused by the use of other brands of grease are excluded from the warranty.

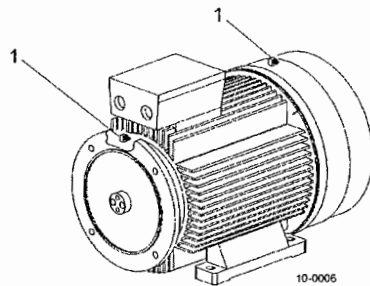


Fig. 26 Compressor motor maintenance

1 Grease nipple

☞ Clean the grease nipple (1) with a rag.

Apply the quantity of grease as given on the motor nameplate.

☞ Grease both bearings.

☞ Close all access doors; replace and secure all removable panels.

☞ Reset the maintenance interval counter.

Fan motor

Fan motor bearings are permanently greased and need no further greasing.

10.8 Checking the Coupling**Danger of injury from rotating coupling!****WARNING**

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.

The coupling must be carefully inspected at regular intervals.

A defective coupling is recognizable by:

- noisy operation,
- surface cracks,
- color change.

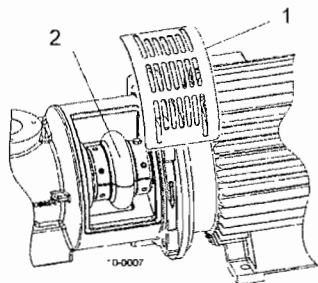


Fig. 27 Checking the Coupling

- 1 Safety screen
- 2 Coupling

Check for uneven or noisy operation

- ☞ Switch the machine on.
- ☞ Check the coupling (2) for noisy or uneven operation.

Check for damage

Pre-condition: Machine switched off.
 Main isolator locked off
 Machine cooled down.

- ☞ Remove the fixing screws from the safety screen (1).
- ☞ Turn the coupling by hand and look for damage or color change.
- ☞ Have a damaged coupling changed by an authorized KAESER service agent.
- ☞ Refit the safety screen.
- ☞ Close all access doors and replace all cover panels.

10.9 Checking the Safety Relief Valve.

Pre-condition: Machine switched off.
 Activate password level 4.

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



WARNING

Safety relief valve blows off.

Excessive noise is caused when the safety relief valve blows off.
There is danger of scalding from hot oil.
There is danger of injury from bursting components and compressed air.

- ☞ Close all access doors; replace and secure all removable panels.
- ☞ Wear ear and eye protection.
- ☞ Abort the test if the working pressure reaches 10% above the blowoff pressure of the valve.



Carry out the test exactly as described in the SIGMA CONTROL manual.

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

The machine may only be operated with a correctly functioning safety relief valve.

- ☞ Close the user's shut-off valve between the machine and the compressed air system.
- ☞ Read the blowoff pressure on the valve. (the blow-off pressure is usually to be found at the end of the part identification)
- ☞ Observe the pressure indicator on the SIGMA controller and call up the test function.
- ☞ Stop the test as soon as the safety relief valve blows off or working pressure reaches 10% above the blowoff set point.
- ☞ If necessary, vent the machine and replace the safety relief valve.
- ☞ Deactivate the test function.
- ☞ Open the user's shut-off valve between the machine and the compressed air system.

10.10 Checking the Overheating Safety Shutdown Function

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

A detailed description of the checking procedure is to be found in the SIGMA CONTROL service manual.

10.11 Venting the Machine Manually

Pre-condition: Machine switched off.
Main disconnect locked out.
Machine cooled down.



WARNING

Compressed air can cause injury or death.

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

After shutting down the compressor and venting the oil separator tank there is still pressure on the check valve from the air system.

- ☞ Close the shut-off valve provided by the user to isolate the machine from the air system.
- ☞ Vent the oil separator tank.
- ☞ Vent the air aftercooler to completely depressurize the system between the user's shut-off valve and the minimum pressure/check valve.



CAUTION

Escaping oil mist is damaging to health.

- ☞ Do not direct the maintenance hose at a person while venting.
- ☞ Do not inhale oil mist or vapor.
- ☞ Avoid contact with skin and eyes.

Before undertaking any maintenance or service work on the pressure system the machine must be isolated from the air system and completely vented.

The machine is vented in three stages:

- the oil circuit vents automatically when the machine is switched off,
- air is vented manually from the oil separator tank,
- air is vented manually from the air cooler.

Venting

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



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

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

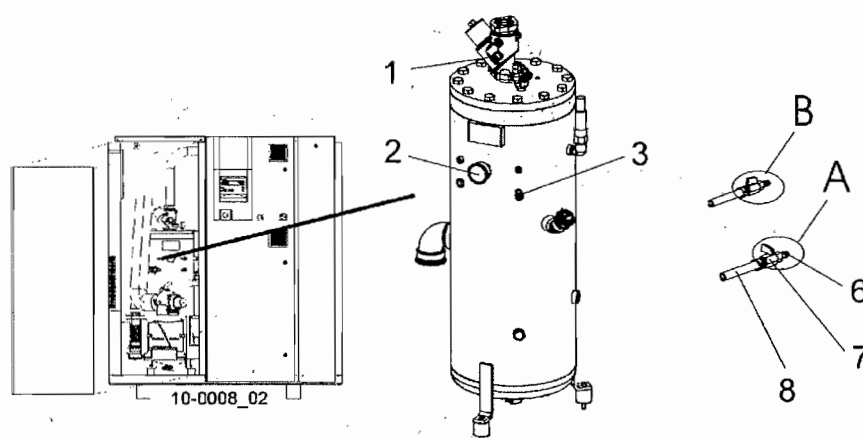


Fig. 28 Vent the machine.

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

☞ Check that the oil separator tank pressure gauge reads zero.



After automatic venting the pressure gauge does not read zero?

- ☞ Make sure that the shut-off valve is closed.
- ☞ If manual venting does **not** bring the oil separator tank pressure gauge to zero, call KAESER service.

Manually venting the oil separator tank

- ☞ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (3).
- ☞ Open the shut-off valve (7) slowly to release pressure.
- ☞ Withdraw the male hose fitting and close the shut-off valve.

Manually venting the compressed air cooler

- ✎ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (1).
- ✎ Open the shut-off valve (7) slowly to release pressure.
- ✎ Withdraw the male hose fitting and close the shut-off valve.

10.12 Checking and Topping up the Cooling Oil
10.12.1 Check cooling oil level.

Pre-condition: Machine has been running at least five minutes under load.
 (minimum 50 Hz for machines under frequency control).


CAUTION

Danger of burning from hot surfaces!

Skin burns are possible.

- ✎ Wear long-sleeve garments and protective gloves.
- ✎ Work carefully.

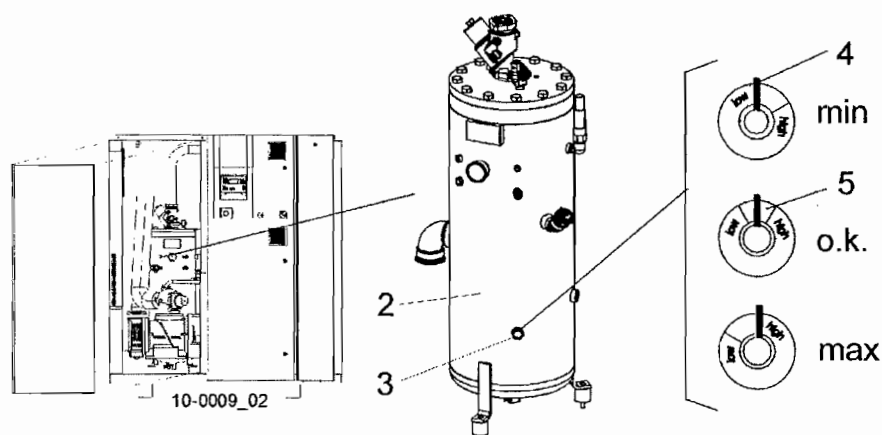


Fig. 29 Check cooling oil level.

2	Oil separator tank	min	Minimum oil level
3	Oil level indicator	OK	Oil level optimum
4	Indicator markings	max	Oil level maximum
5	Green zone		

- ✎ Readout oil level.

When the indicator shows minimum level, top up the oil.

10.12.2 Topping up the cooling oil

Equipment: Cooling oil

Pre-condition: Machine switched off
 Main disconnect locked out.
 Machine cooled down.


WARNING

Danger of explosion from oils and lubricants!

Danger of explosion from oil mist and vapors.

☞ Fire, open flame and smoking are forbidden!


CAUTION

Damage to the machine from unsuitable oil

☞ Never mix different types of oil.

☞ Top up only with the same type of oil as already in the machine.

Venting

☞ Close the user's shut-off valve between the machine and the air main.



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

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

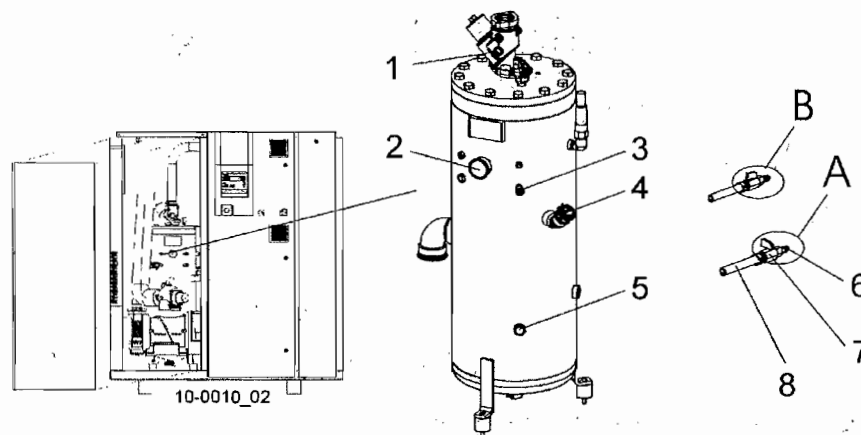


Fig. 30 Topping up the cooling oil

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

☞ Check that the oil separator tank pressure gauge (2) reads zero.



After automatic venting the pressure gauge does not read zero?

☞ Make sure that the shut-off valve is closed.

☞ If manual venting does **not** bring the oil separator tank pressure gauge to zero, call KAESER service.

Manually venting the oil separator tank

☞ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (3).

☞ Open the shut-off valve (7) slowly to release pressure.

☞ Withdraw the male hose fitting and close the shut-off valve.

Manually venting the compressed air cooler

- ✎ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (1).
- ✎ Open the shut-off valve (7) slowly to release pressure.
- ✎ Withdraw the male hose fitting and close the shut-off valve.

Topping up the cooling oil

- ✎ Open the filler plug (4) slowly.
- ✎ Top up the cooling oil.
- ✎ Replace the plug gasket if necessary and re-insert the plug.

Start the machine and carry out a test run

- ✎ Close all access doors; replace and secure all removable panels.
- ✎ Open the user's shut-off valve between the machine and the compressed air system.
- ✎ Start the machine and allow it to idle for at least one minute. Then switch to LOAD.
- ✎ After about five minutes, check the oil level and top up if necessary.
- ✎ Carry out a visual check for leaks.

10.13 Changing the Cooling Oil

Equipment: Cooling oil
Cooling-oil container

**CAUTION**

Risk of burns from hot components and oil!

- ✎ Wear long-sleeved clothing and gloves.
- ✎ Work with caution.



Dispose of the old oil in accordance with local environment protection regulations.

Drain all cooling-oil from:

- Oil separator tank
- Oil cooler
- Airend
- Oil container (only Option K2)
- Heat recovery system (if applicable)

Compressed air helps to expel the oil.

This pressure can be generated by the machine itself.

Alternatively, an external source of compressed can be used.

External air is necessary when:

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

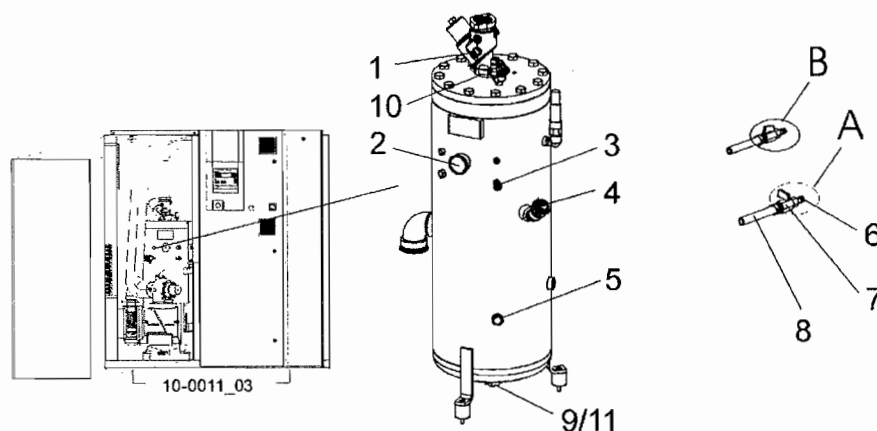


Fig. 31 Changing the Cooling Oil, Oil Separator Tank

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

Oil changing using internal pressure

Pre-condition: Machine has been running at least 5 minutes under LOAD.
Machine is switched off.
Machine fully vented (no pressure).
Pressure gauge on the oil separator tank indicates 0 psig.

- ☞ Close the shut-off valve (10) in the venting line.
- ☞ Start the machine in IDLE and watch the oil separator tank pressure gauge (2) until it reads 40–70 psig.
- ☞ Switch the machine off.
- ☞ Switch off and lock out the main supply isolator.
- ☞ Wait at least 2 minutes for oil to flow back to the separator tank.

Alternative: Oil changing using an external pressure source

Pre-condition: Machine switched off.
Mains disconnect locked out.
Machine fully vented (no pressure).
Pressure gauge on the oil separator tank indicates 0 psig.
External source of compressed air available.

- ☞ Close the shut-off valve (10) in the venting line.
- ☞ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (3).

- ✎ Connect the maintenance hose to an external air supply.
- ✎ Open the shut-off valve (7) until the pressure gauge on the oil separator tank reads 40–70 psig.
- ✎ Close the shut-off valve (7) and remove the male hose fitting from the coupling.

10.13.1 Draining the oil from the separator tank:



Contact KAESER service if condensate is detected in the oil.
It is necessary to adjust the airend discharge temperature to suit operating conditions.

- ✎ Have the oil container ready.
- ✎ With the shut-off valve closed, insert the male hose fitting (6, Fig. 31) into the hose coupling (9, Fig. 31).
- ✎ Place the end of the maintenance hose in the oil container and secure it in place.
- ✎ Open the shut-off valve (11, Fig. 31).
- ✎ Slowly open the maintenance hose shut off valve (7, Fig. 31), drain oil and immediately close valve when air starts to escape.
- ✎ Close the shut-off valve (11, Fig. 31) and unplug the hose.

10.13.2 Draining the oil from the cooler:

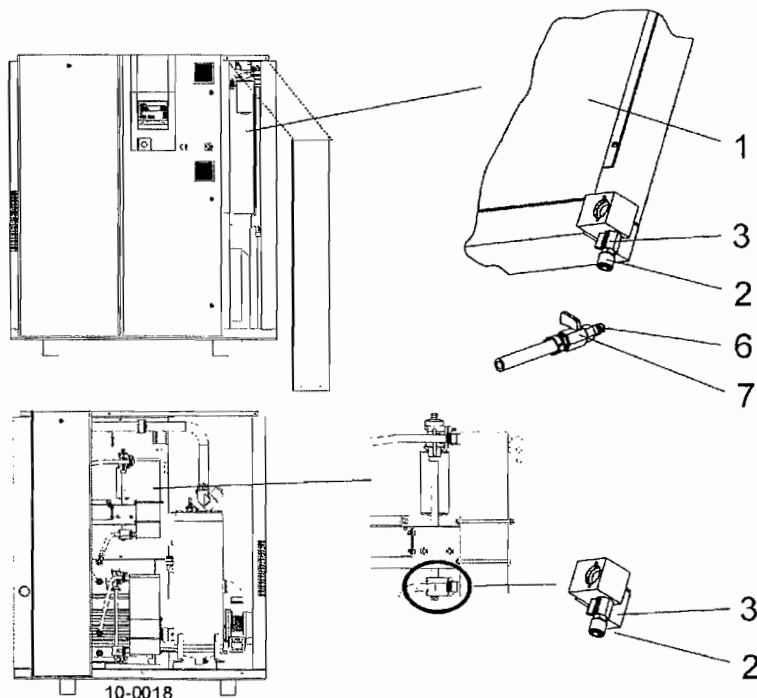


Fig. 32 Changing the Cooling Oil, Oil Cooler

- | | |
|-----------------------------|------------------------------|
| 1 Oil cooler | 6 Male hose coupling/fitting |
| 2 Hose coupling (oil drain) | 7 Shut-off valve |
| 3 Shut-off valve | |

- ☞ Have the oil container ready.
- ☞ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (2).
- ☞ Place the end of the maintenance hose in the oil container and secure it in place.
- ☞ Open the shut-off valve (3).
- ☞ Slowly open the shut-off valve (7) and allow oil and air to drain completely.
- ☞ Check that the oil separator tank pressure gauge reads 0 bar.
- ☞ Close the shut-off valve (3) and unplug the hose.

10.13.3 Draining the oil from the airend:

Pre-condition: Machine fully vented (no pressure).
 Pressure gauge on the oil separator tank indicates 0 psig.

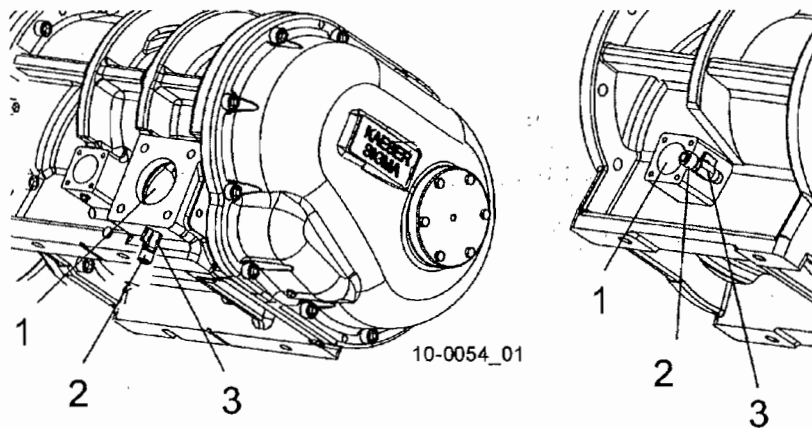


Fig. 33 Changing the Cooling Oil, Airend

- 1 Compressed air outlet on airend
- 2 Hose coupling (oil drain)
- 3 Shut-off valve

- ☞ Have the oil container ready.
- ☞ With the shut-off valve closed, insert the male hose fitting (6, Fig. 32) into the hose coupling (2).
- ☞ Place the end of the maintenance hose in the oil container and secure it in place.
- ☞ Open shut-off valve (3) and (7, Fig. 32).

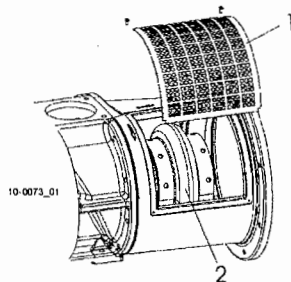


Fig. 34 Turn the coupling

- 1 Safety screen
- 2 Coupling

- ✎ Remove safety screen (1, Fig. 34) and turn the coupling (2, Fig. 34) at least 5 times by hand until the cooling oil is completely drained.
- ✎ Put the safety screen (1, Fig. 34) back in place.
- ✎ Close the shut-off valve (3) and unplug the hose.

A small amount of cooling oil may flow back into the oil cooler and oil separator tank as a result of turning the coupling

- ✎ Drain oil from the oil separator tank via hose coupling/oil drain (9, Fig. 31).
- ✎ Drain oil from the oil cooler via hose coupling/oil drain (2, Fig. 32).

10.13.4 Draining oil from the oil tank (Option K2 only):

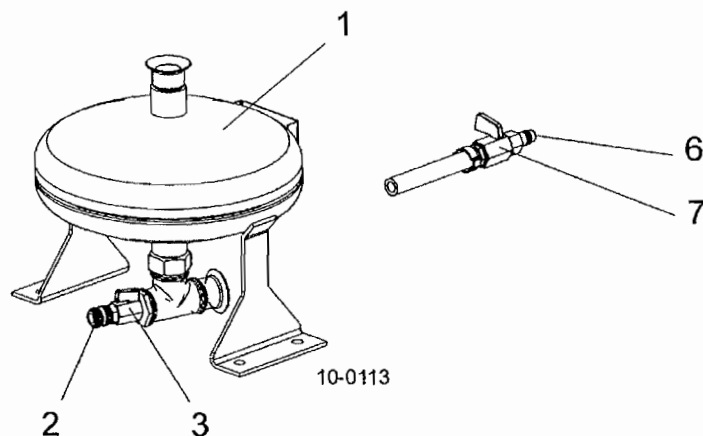


Fig. 35 Changing Cooling Oil, Oil Tank (Option K2)

- | | | | |
|---|---------------------------|---|----------------------------|
| 1 | Oil tank | 6 | Male hose coupling/fitting |
| 2 | Hose coupling (oil drain) | 7 | Shut-off valve |
| 3 | Shut-off valve | | |

- ✎ Have the oil container ready.
- ✎ With the shut-off valve closed, insert the male hose fitting (6) into the hose coupling (2).
- ✎ Place the end of the maintenance hose in the oil container and secure it in place.
- ✎ Open the shut-off valve (3).
- ✎ Slowly open the shut-off valve (7) and allow oil to drain completely.
- ✎ Close the shut-off valve (3) and unplug the hose.

10.13.5 Draining oil from the heat recovery system (Option W1/W2/W3):

Pre-condition: Machine fully vented (no pressure).
Pressure gauge on the oil separator tank indicates 0 psig.

This procedure varies according to the heat recovery system installed.

Internal heat recovery (option W2 / W3)

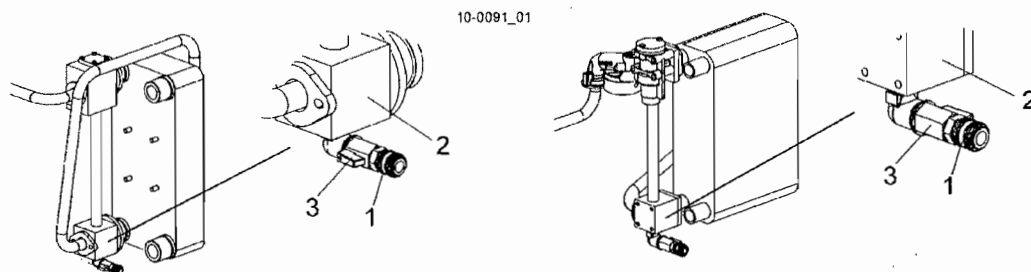


Fig. 36 Changing the Cooling Oil, Internal Heat Recovery

- 1 Hose coupling
- 2 Thermostatic valve
- 3 Shut-off valve

- ☞ Have the oil container ready.
- ☞ With the shut-off valve closed, insert the male hose fitting (6, Fig. 32) into the hose coupling (1) on the thermostatic valve (2).
- ☞ Place the end of the maintenance hose in the oil container and secure it in place.
- ☞ Open shut-off valve (3) and (7, Fig. 32) and wait until the oil has drained.
- ☞ Close the shut-off valve (3) and unplug the hose.

Prepared for heat recovery system (Option W1):

- ☞ Have the oil container ready.
- ☞ Using the maintenance hose, drain the oil at a suitable point from the external heat recovery system.

10.13.6 Filling with cooling oil:

- ☞ Slowly open filler plug (4, Fig. 31).
- ☞ Fill with oil.



Machines with heat recovery systems require a corresponding additional volume of oil.

- ☞ Check the plug and gasket for damage and re-insert the plug.

10.13.7 Starting the machine and carrying out a test run:

- ☞ Open the shut-off valve (10, Fig. 31) in the vent line.
- ☞ Close all access doors; replace and secure all removable panels.
- ☞ Open the user's shut-off valve between the machine and the air main.
- ☞ Switch on the power supply and reset the maintenance interval counter.
- ☞ Allow the machine to IDLE for at least 1 minute. Then switch to LOAD.
- ☞ After approx. 10 minutes, check the oil level and top up if necessary.
- ☞ Carry out a visual check for leaks.

10.14 Oil filter maintenance

Equipment: Spare parts
Have the oil container ready.

Pre-condition: Machine switched off
Main disconnect locked out.
Machine fully vented (no pressure).
Pressure gauge on the oil separator tank indicates zero.

**CAUTION**

Danger of burning from hot components and oil.

- ☞ Wear long-sleeve clothing and gloves.
- ☞ Work carefully.

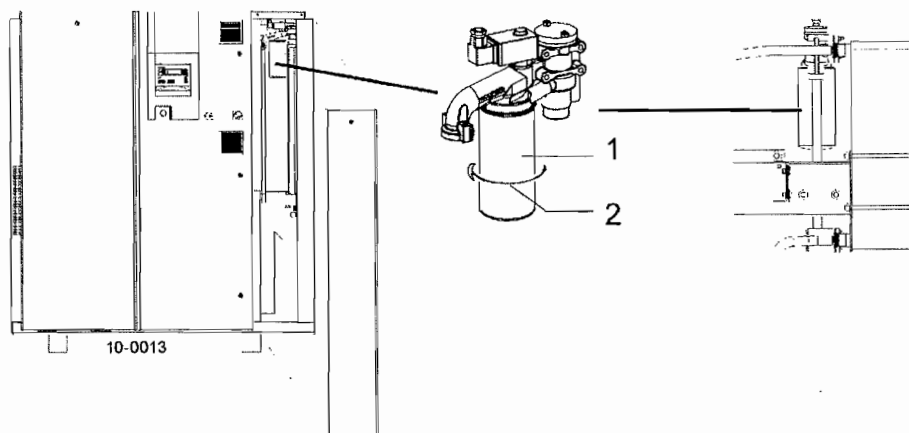


Fig. 37 Changing the Oil Filter

- 1 Oil filter
- 2 Direction to unscrew



Dispose of parts and materials contaminated with oil in accordance with local environment protection regulations.

- ☞ Unscrew the oil filter counter-clockwise, catch oil spillage and dispose of correctly.
- ☞ Lightly oil the new oil filter gasket.



Screw on the new filter using hand pressure only. Do not use any tool.

- ☞ The oil filter is turned clockwise to tighten.

Start the machine and carry out a test run

- ☞ Close all access doors; replace and secure all removable panels.
- ☞ Open the user's shut-off valve between the machine and the air main.
- ☞ Switch on the power supply and reset the maintenance interval counter.
- ☞ Allow the machine to idle for at least one minute. Then switch to LOAD.
- ☞ After about five minutes, check the oil level and top up if necessary.
- ☞ Carry out a visual check for leaks.

10.15 Changing the Oil Separator Cartridge

Equipment: Spare parts
Cleaning rags

Pre-condition: Machine switched off.
Main disconnect locked out.
Machine fully vented (no pressure).
Pressure gauge on the oil separator tank indicates zero.
Machine cooled down.

The life of the oil separator cartridge is influenced by:

- contamination in the air drawn into the compressor,
- adherence to the schedule of oil and air filter changes,

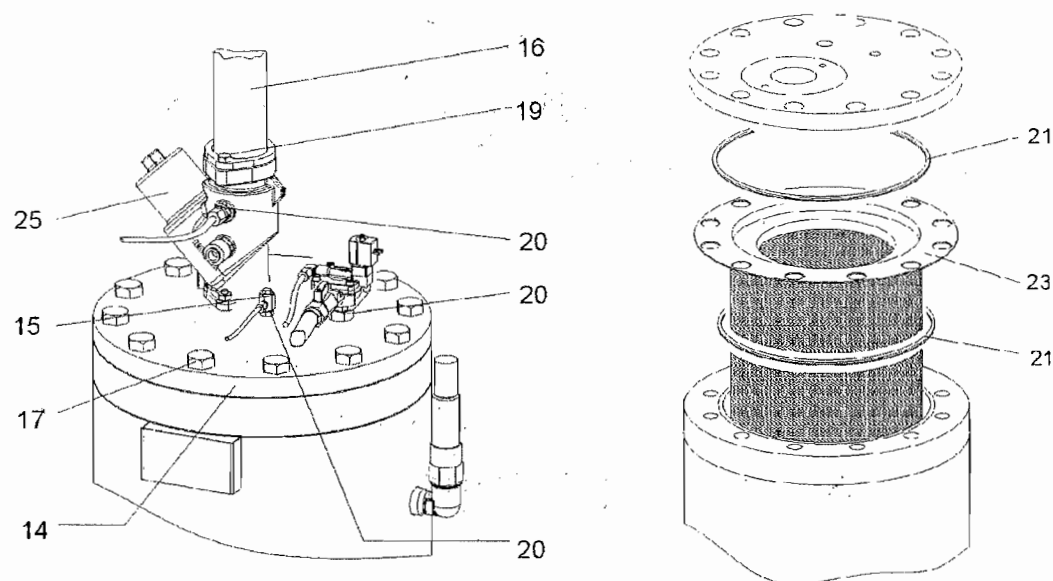


Fig. 38 Changing the Oil Separator Cartridge

14	Cover	19	Pipe fitting
15	Dirt trap	20	Fitting
16	Air pipe	21	Gasket
17	Retaining bolt	23	Oil separator cartridge
		25	Minimum pressure/check valve

- ✚ Unscrew the fitting (20) and carefully put the parts to one side; pull out the copper pipe at item (15).
- ✚ Unscrew the fittings (19) from the ends of the air pipe (16).
- ✚ Withdraw the air pipe from the minimum pressure/check valve (25) and push carefully to one side.
- ✚ Remove the cover retaining bolts (17) and carefully lift the cover (14).



The oil separator element cannot be cleaned.



Dispose of parts and materials contaminated with oil in accordance with local environment protection regulations.

- ✎ Take out the used oil separator element (23) together with the gaskets (21) and dispose of according to environmental regulations.
- ✎ Wipe all sealing faces with a cleaning rag.
- ✎ Insert the new oil separator cartridge with gaskets and re-fix the cover.
- ✎ Renew the dirt trap (15) strainer and O-ring.
- ✎ Connect the air pipe to the minimum pressure/check valve.
- ✎ Replace and tighten all fittings.

Start the machine and carry out a test run

- ✎ Close all access doors; replace and secure all removable panels.
- ✎ Open the user's shut-off valve between the machine and the air main.
- ✎ Switch on the power supply and reset the maintenance interval counter.
- ✎ Allow the machine to idle for at least one minute. Then switch to LOAD.
- ✎ Carry out a visual check for leaks.

10.16 Logging Maintenance Work

Machine number:

[illegible]

Tab. 41 Maintenance log

11 Spares, Operating Materials, Service

11.1 Note the nameplate

Please quote the data on the nameplate for all enquiries and spare parts orders.

11.2 Ordering Maintenance Parts and Operating Materials



CAUTION

Personal injury or machine damage may result from the use of unsuitable spare parts or operating materials.

Unsuitable or poor quality maintenance parts and operating materials may damage the machine or impair its proper function.

Damage to the machine can also result in personal injury.

- ☞ Use only genuine spare parts and authorized operating materials.
- ☞ Have an authorized KAESER service agent carry out regular maintenance.

KAESER maintenance parts and operating materials correspond to the original. These are correct for use in our machines.

Machine

Name	Quantity	Number
Air filter cartridge	1	1250
Filter mat (control cabinet fan)	2	1100
Filter mat (cooler)	1	1050
Oil filter	1	1200
Oil separator cartridge	1	1450
Cooling oil	1	1600
Bearing grease [g]	100	9.0915.0
	400	6.3234.0

Tab. 42 Machine maintenance parts

11.3 Maintenance Agreement

- ☞ Concluding a SIGMA AIR SERVICE maintenance agreement.

Benefits to you:

lower costs and assured availability of compressed air.

SIGMA AIR SERVICE offers you:

- authorized service technicians with KAESER factory training,
- increased operational security by preventive maintenance,
- energy savings by elimination of pressure losses,
- optimum conditions for operation of the compressed air supply system,
- the security of genuine KAESER spare parts.
- increased legal security as all regulations are observed,

11.4 Service Addresses

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

11.5 Spare Parts for Service and Repair

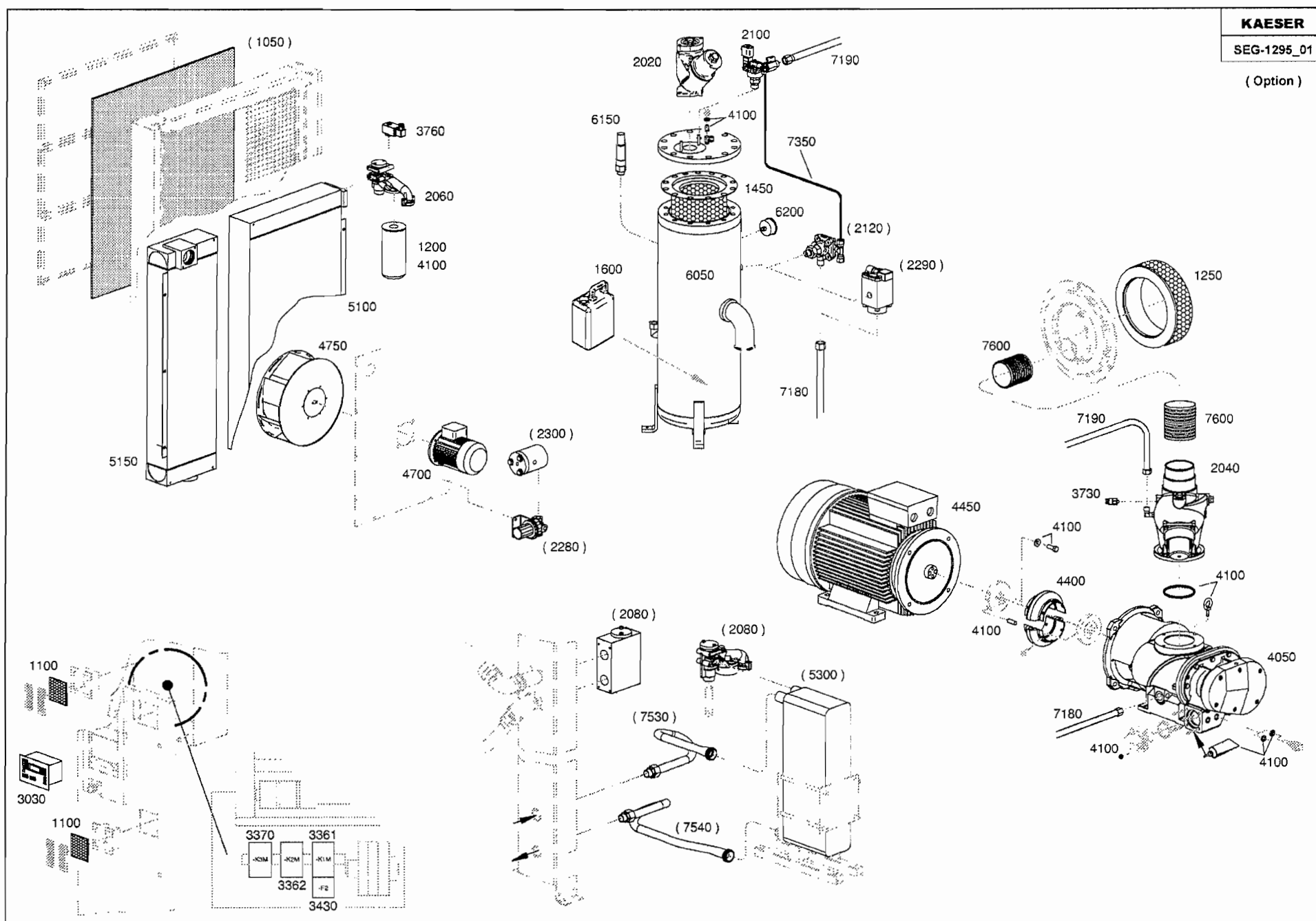
Any inspection, maintenance or repair tasks not described in this manual should be carried out only by an authorized KAESER distributor.

With the help of this parts list you can obtain in advance the spares you need in accordance with your operating conditions.

KAESER

SEG-1295_01

(Option)



Legend	KAESER
BSD - (K1)	SEL-1440_01USE

Item	Quantity	Description	Option	Maintenance interval
1050	1	Filter mat	X	1000 h
1100	1	Filter mat		1000 h
1200	1	LONGLIFE oil filter		6000 h
1250	1	Air filter		3000 h
1450	1	Oil separator cartridge		3000 h
1600	1	Sigma Fluid *)		3000 – 9000 Bh
2020	1	Minimum Pressure/Check Valve		
2022	1	Maintenance kit, MP/C valve		12000 h
2024	1	Overhaul kit, MP/C valve		36000 h
2040	1	Inlet valve		
2042	1	Maintenance kit, inlet valve		12000 h
2044	1	Overhaul kit, inlet valve		36000 h
2060	1	Thermostatic valve		
2062	1	Maintenance kit, therm. valve		12000 h
2064	1	Overhaul kit, therm. valve		36000 h
2080	1	Thermostatic valve	X	
2082	1	Maintenance kit, therm. valve		12000 h
2084	1	Overhaul kit, therm. valve		36000 h
2100	1	Venting control valve		
2102	1	Maintenance kit, VC valve		12000 h
2104	1	Overhaul kit, VC valve		36000 h
2120	1	Venting valve	X	
2122	1	Maintenance kit, venting valve		12000 h
2280	1	Proportional controller	X	
2290	1	Proportional valve	X	
2292	1	Maintenance kit, proportional valve		12000 h
2300	1	Pneumatic valve	X	
2302	1	Maintenance kit, pneum. valve		12000 h
3030	1	SIGMA controller		
3361	1	Contacteur		
3362	1	Contacteur		
3370	1	Contacteur		
3430	1	Overload protection cutout		
3730	1	Safety pressure switch		
3732	1	Protective cap		
3760	1	Pressure differential switch		
4050	1	SIGMA aircend		
4100	1	Aircend installation kit		
4400	1	Drive coupling		36000 h
4450	1	Motor		
4451	1	Motor bearing kit		36000 h
4700	1	Motor		
4701	1	Motor bearing kit		12000 h
4750	1	Fan wheel		
5100	1	Oil cooler		
5150	1	Compressed air cooler		
5300	1	Power saving heat exchanger	X	
6050	1	Oil separator tank		
6150	1	Pressure relief valve		
6200	1	Pressure display		
7180	1	Hose		
7190	1	Hose		36000 h
7350	1	Control line kit		
7530	1	Hose	X	36000 h
7540	1	Hose	X	36000 h
7600	1	Inlet hose		36000 h

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

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

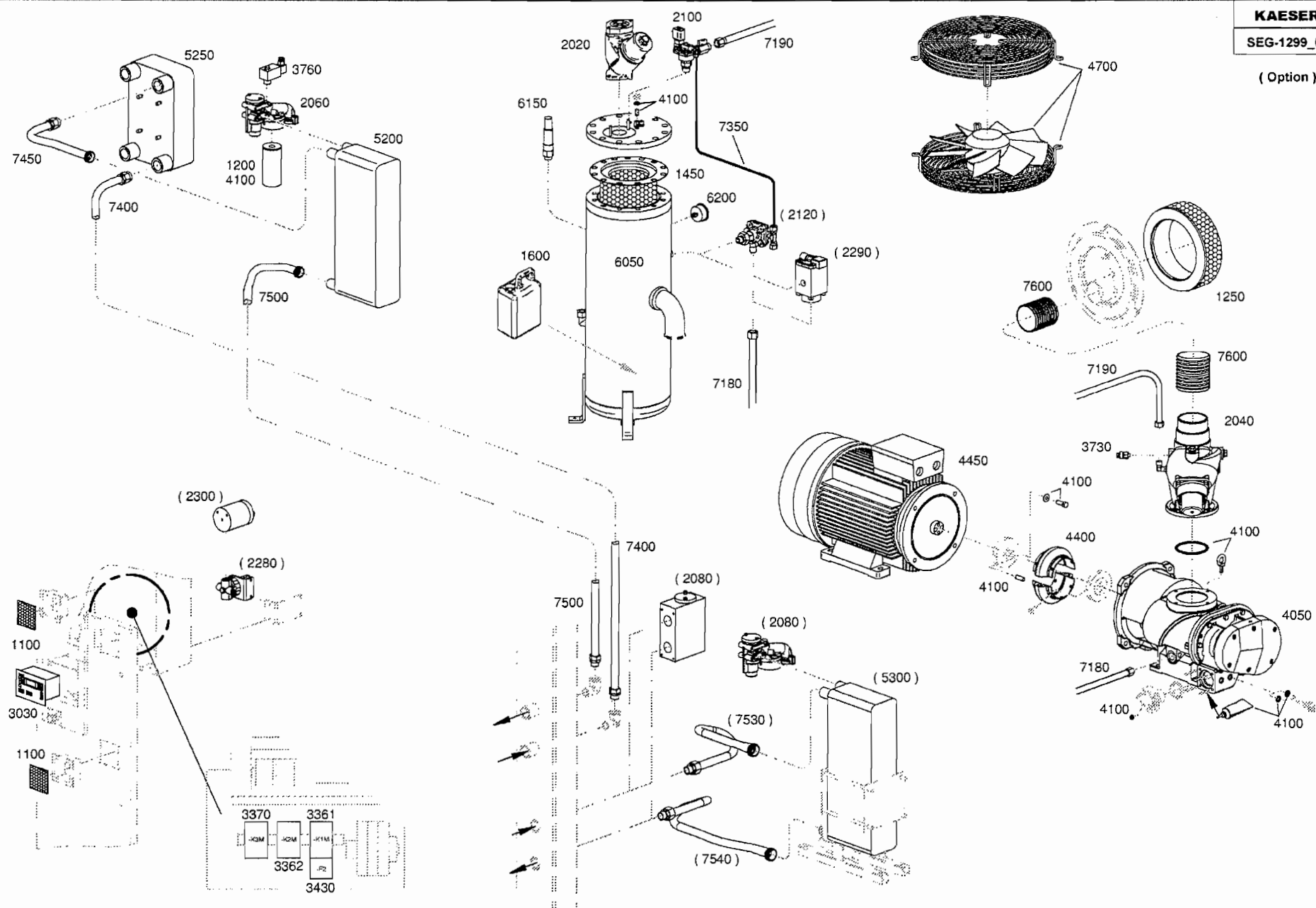
Maintenance intervals under good ambient and operating conditions, such as low to moderate ambient temperature and dry, clean inlet air.

Maintenance intervals may decrease due to ambient and operating conditions.

*) see cooling fluid recommendations

h. = Operating hours

(Option)



Legend	KAESER
BSD - (K2)	SEL-1448_01USE

Item	Quantity	Description	Option	Maintenance interval
1100	1	Filter mat		1000 h
1200	1	LONG LIFE oil filter		6000 h
1250	1	Air filter		3000 h
1450	1	Oil separator cartridge		3000 h
1600	1	Sigma Fluid *)		3000 – 9000 Bh
2020	1	Minimum Pressure/Check Valve		
2022	1	Maintenance kit, MP/C valve		12000 h
2024	1	Overhaul kit, MP/C valve		36000 h
2040	1	Inlet valve		
2042	1	Maintenance kit, inlet valve		12000 h
2044	1	Overhaul kit, inlet valve		36000 h
2060	1	Thermostatic valve		
2062	1	Maintenance kit, therm. valve		12000 h
2064	1	Overhaul kit, therm. valve		36000 h
2080	1	Thermostatic valve	X	
2082	1	Maintenance kit, therm. valve		12000 h
2084	1	Overhaul kit, therm. valve		36000 h
2100	1	Venting control valve		
2102	1	Maintenance kit, VC valve		12000 h
2104	1	Overhaul kit, VC valve		36000 h
2120	1	Venting valve	X	
2122	1	Maintenance kit, venting valve		12000 h
2280	1	Proportional controller	X	
2290	1	Proportional valve	X	
2292	1	Maintenance kit, proportional valve		12000 h
2300	1	Pneumatic valve	X	
2302	1	Maintenance kit, pneum. valve		12000 h
3030	1	SIGMA controller		
3361	1	Contact		
3362	1	Contact		
3370	1	Contact		
3430	1	Overload protection cutout		
3730	1	Safety pressure switch		
3732	1	Protective cap		
3760	1	Pressure differential switch		
4050	1	SIGMA aircend		
4100	1	Aircend installation kit		
4400	1	Drive coupling		36000 h
4450	1	Motor		
4451	1	Motor bearing kit		36000 h
4700	1	Motor		
4701	1	Motor bearing kit		12000 h
5200	1	Oil cooler		
5250	1	Compressed air cooler		
5300	1	Power saving heat exchanger	X	
6050	1	Oil separator tank		
6150	1	Pressure relief valve		
6200	1	Pressure display		
7180	1	Hose		
7190	1	Hose		36000 h
7350	1	Control line kit		
7400	1	Hose		36000 h
7450	1	Hose		36000 h
7500	1	Hose		36000 h
7530	1	Hose	X	36000 h
7540	1	Hose	X	36000 h
7600	1	Inlet hose		36000 h

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

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

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

Maintenance intervals may decrease due to ambient and operating conditions.

*) see cooling fluid recommendations

h. = Operating hours

12 De-commissioning, Storage and Transport

12.1 De-commissioning

De-commissioning is necessary when:

- the machine will not be needed for some time,
- the machine is to be moved to another location,
- the machine is no longer needed,
- the machine is to be scrapped.

Temporarily out of service

Pre-condition: The machine can be started at regular intervals.

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

Out of service for a considerable period

Pre-condition: Before taking out of service the machine should have run under load for at least 30 minutes.

Machine switched off and fully vented.

Main supply isolator switched off and locked.

- ☞ Allow the machine to cool down completely.
- ☞ In water-cooled machines, disconnect the water supply and drain all water from the machine.
- ☞ Disconnect all air and electrical connections.

12.2 Packing

Equipment: Desiccant
Plastic sheeting
Wooden transport crate

Pre-condition: Machine is de-commissioned.
Machine dry and cool.

- ☞ Place desiccant inside the machine cabinet.
- ☞ Wrap the machine in plastic sheeting.

Transport packing

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

Consult an authorized KAESER service agent for advice on packing for sea or air transport.

12.3 Storage

Pre-condition: The machine is adequately packed.



CAUTION

Moisture and frost

Machine damage possible.

- ☞ Store the machine in a dry, frost-free room.
- ☞ Prevent ingress of moisture and condensation.



Advice can be obtained from KAESER on suitable storage and initial start-up.

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

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

12.4 Transporting

12.4.1 Safety

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



The water cooling system of water-cooled machines must be drained completely if there is danger of frost.

- ☞ Take weight and centre of gravity into consideration. The centre of gravity is shown in the drawing in chapter 13.1.3.
- ☞ Make sure the danger zone is clear of personnel during transporting.

Fork truck

Pre-condition: The whole machine is over the forks.

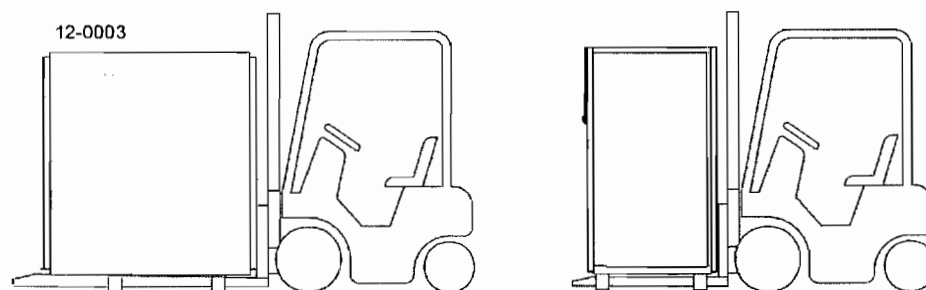


Fig. 39 Transport by fork truck

12.4.2 Transverse beams

Pre-condition: The lifting cradle complies with local safety regulations.
No pressure bears on the sides of the machine cabinet.

**CAUTION**

Incorrect application of the lifting cradle can damage the machine.

- ☞ Do not attach the lifting cradle to any of the machine components.
- ☞ The machine manufacturer can advise on application of a suitable lifting cradle.

Examples of unsuitable fixing points:

- pipe supports
- flanges
- attached components such as centrifugal separators, condensate drains or filters
- rain protection covers

The diagram shows how the machine should be lifted by a cradle.

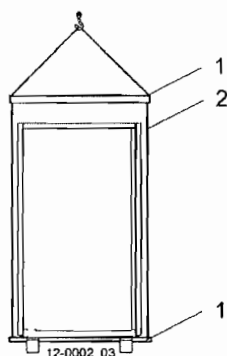


Fig. 40 *Transport with lifting cradle*

- 1 *Transverse beams*
- 2 *Straps*

12.5 Disposal

Pre-condition: Machine is de-commissioned.

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



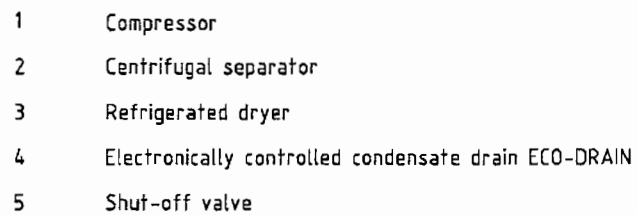
Parts contaminated with cooling oil must be disposed of in accordance with local environment protection regulations.

- ☞ Completely drain the cooling oil from the machine.
- ☞ Remove used oil filter and separator cartridge.
- ☞ Hand the machine over to an authorized disposal expert.

13 Annex

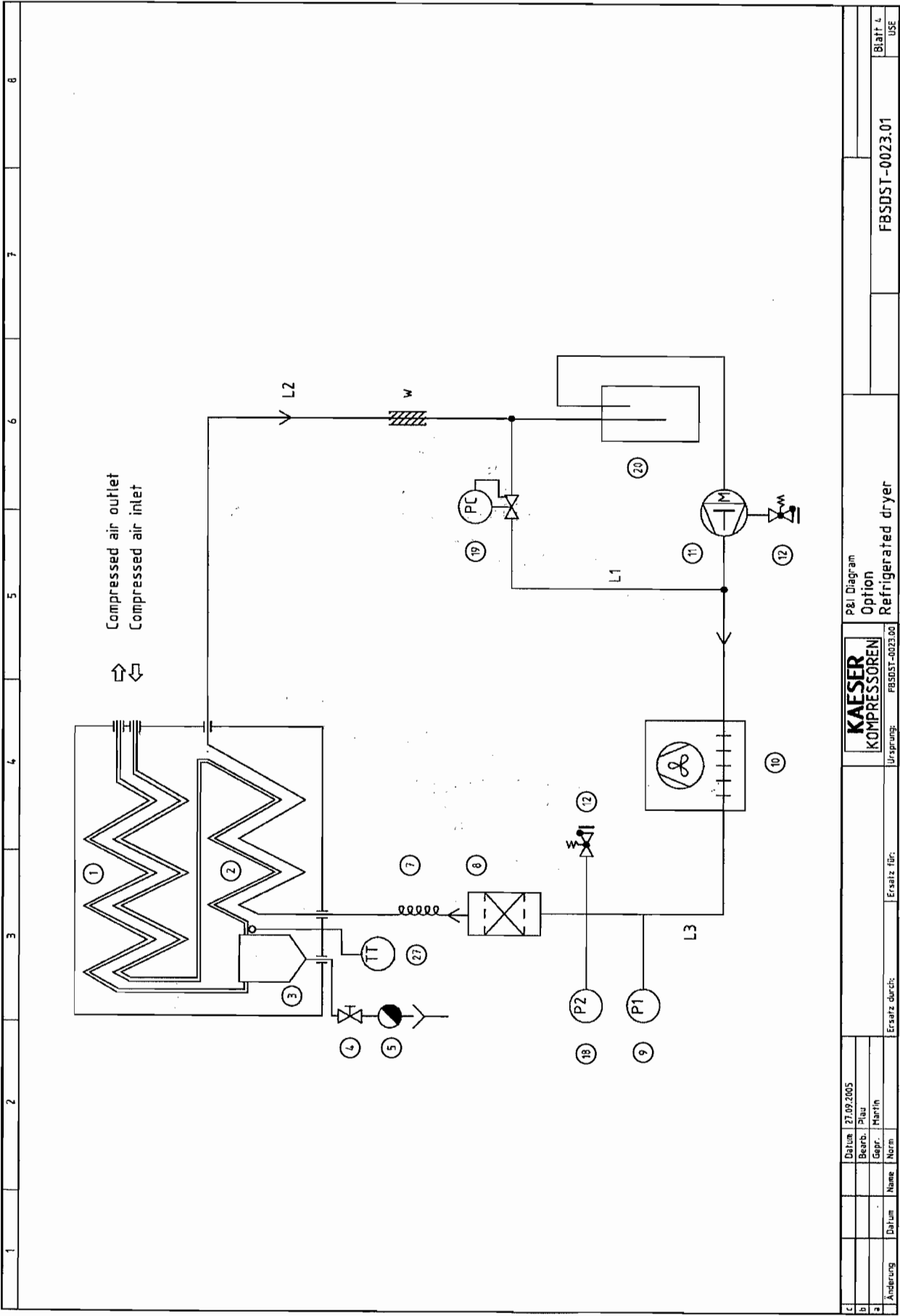
13.1 Diagrams and Drawings

13.1.1 Pipeline and instrument flow diagram (P&I diagrams)





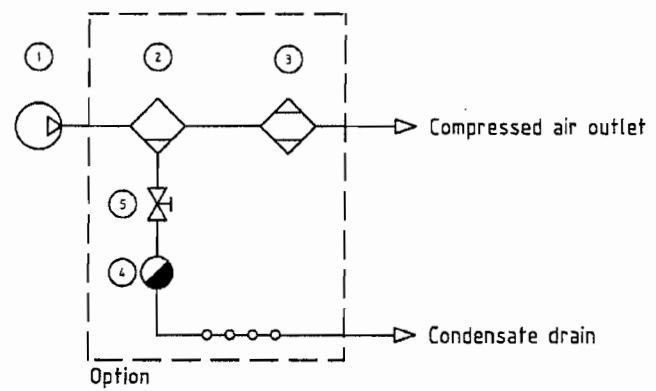
1	2	3	4	5	6	7	8
1	Air filter			11.6	Shut-off valve with hose coupling - Oil drain		
1.1	Vacuum switch - Air filter			12	Minimum pressure check valve		
1.2	Dust collector			13	Air aftercooler		
2	Inlet valve			13.1	Hose coupling		
2.1	Oil filler port with screw plug			16	Dirt trap		
3	Drive motor			17	Nozzle		
3.1	Fan motor			18/19	Combined control/venting valve		
4	Airend			18	Control valve		
4.2	Pressure switch - Wrong direction of rotation			19	Venting valve		
5.2	PT100-sensor			20	Shut-off valve - Venting line		
6	Oil separator tank			21	Silencer		
6.1	Pressure gauge			25	Oil temperature thermostat for heat recovery system		
6.2	Hose coupling (oil side)			25.1	Hose line		
6.3	Hose coupling (air side)			26	Heat recovery system		
6.6	Shut-off valve with hose coupling - Oil drain			26.4	Shut-off valve with hose coupling - Oil drain		
6.13	Oil level indicator			53	Drive coupling		
6.24	Oil tank			59.1	Pressure transducer - System pressure		
7	Safety relief valve			59.2	Pressure transducer - Internal pressure		
8	Oil separator cartridge						
9	Oil temperature controller			Option			
10	Oil filter			K1	air-cooled		
10.1	Differential pressure switch - Oil filter			K2	water-cooled		
10.3	Anti rumble valve			W1	Heat recovery system, external		
11	Oil cooler			W2/W3	Heat recovery system, internal		
c			Datum	27.09.2005			
b			Bearb.	Plau			
a	A-Nr.: 13182		Gepr.	Martin			
	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung: FBSDST-0023.00
					<div> <div>KAESER</div> <div>KOMPRESSOREN</div> </div>		P&I Diagram legend BSD
						FBSDST-0023.01	Blatt 3 USE



c		Datum	27.09.2005	P&I Diagram		FBS DST-0023.01		Blatt 4	USE
b		Bearb.	Plau	Option					
a		Gepr.	Marlin	Refrigerated dryer					
Änderung		Datum	Name	Ersatz für:	Ursprung:	FBS DST-0023.00			
				KAESER KOMPRESSOREN					

13.1.2 Pipeline and instrument flow diagram (option C1)

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---



- 1 Compressor
- 2 Centrifugal separator
- 3 Refrigerated dryer
- 4 Electronically controlled condensate drain ECO-DRAIN
- 5 Shut-off valve

c			Datum	28.09.2005		KAESER KOMPRESSOREN	P&I Diagram / P&I Diagram legend Compressor Package				
b			Bearb.	Plau							
a			Gepr.	Martin							
	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	FBSDTL-0025.00	FBSDTL-0025.01	Blatt 1 USE



1	2	3	4	5	6	7	8
1	Air filter		17	Nozzle			
1.1	Vacuum switch - Air filter		18/19	Combined control/venting valve			
1.2	Dust collector		18	Control valve			
2	Inlet valve		19	Venting valve			
2.1	Oil filler port with screw plug		20	Shut-off valve - Venting line			
3	Drive motor		21	Silencer			
3.1	Fan motor		24	Proportional controller			
4	Airend		24.1	Shut-off valve open: machine in modulating control			
4.2	Pressure switch - Wrong direction of rotation			Shut-off valve closed: package running in DUAL-/QUADRO or VARIO mode			
5.2	PT100-sensor		24.2	Nozzle			
6	Oil separator tank		24.4	3/2-Directional control valve			
6.1	Pressure gauge			(amplifies volume of control air for the inlet valve)			
6.2	Hose coupling (oil side)		24.10	Oil flow regulating valve (proportionally controlled)			
6.3	Hose coupling (air side)		25	Oil temperature thermostat for heat recovery system			
6.6	Shut-off valve with hose coupling - Oil drain		25.1	Hose line			
6.13	Oil level indicator		26	Heat recovery system			
6.24	Oil tank		26.4	Shut-off valve with hose coupling - Oil drain			
7	Safety relief valve		53	Drive coupling			
8	Oil separator cartridge		59.1	Pressure transducer - System pressure			
9	Oil temperature controller		59.2	Pressure transducer - Internal pressure			
10	Oil filter						
10.1	Differential pressure switch - Oil filter						
11	Oil cooler						
11.6	Shut-off valve with hose coupling - Oil drain		Option				
12	Minimum pressure check valve		K1	air-cooled			
13	Air aftercooler		K2	water-cooled			
13.1	Hose coupling		W1	Heat recovery system, external			
16	Dirt trap		W2/W3	Heat recovery system, internal			



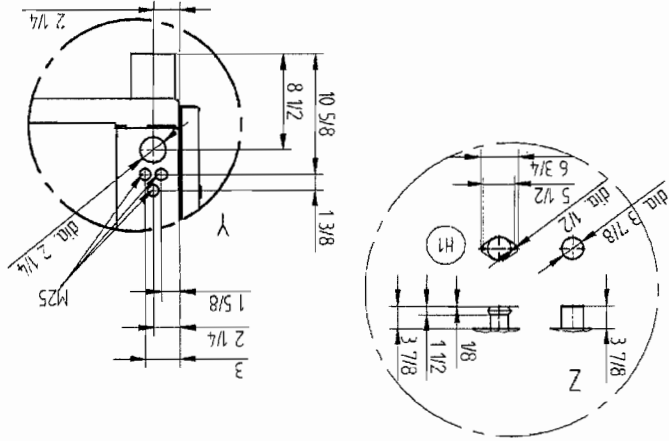
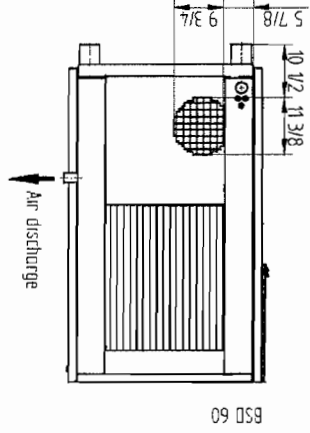
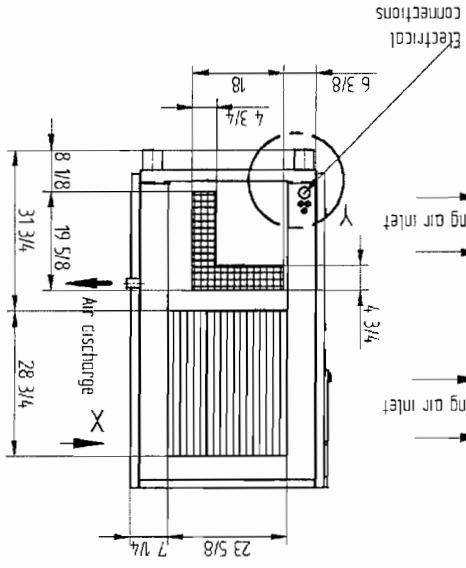
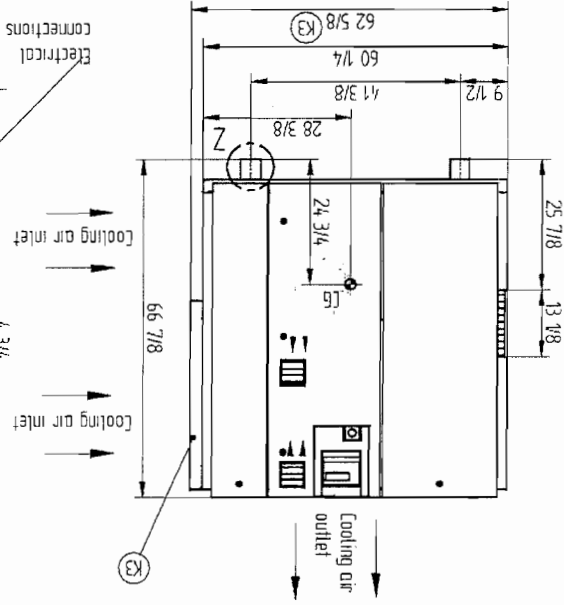
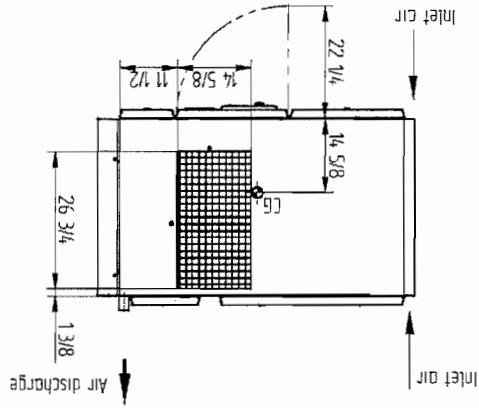
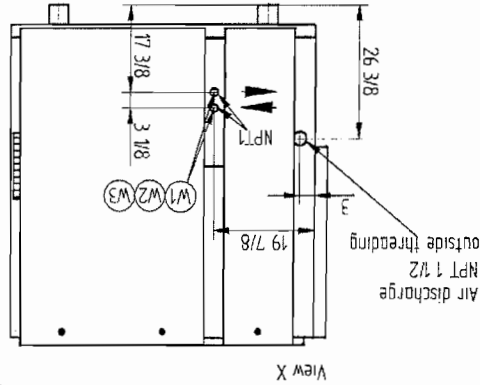
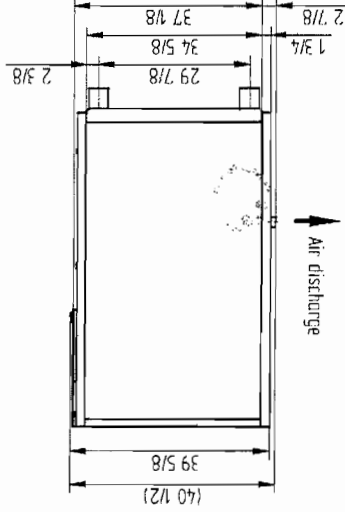
13.1.3 Dimensional drawing

13.1.3.1 Air cooling (option K1)

Diese Zeichnung ist unser Eigentum und darf gemäss Urheberrecht ohne unsere vorherige schriftliche Genehmigung nicht vervielfältigt oder Dritten zugänglich gemacht werden.

Einwirkungsbedingte Änderungen vorbehalten. Zeichnung darf nur über CAD geändert werden.

Option	
Machine mountings	H1
Air cooling	K1
Cooling air filter mat	K3
Prepared for heat recovery	W1
Internal heat recovery $\Delta T=25K$	W2
Internal heat recovery $\Delta T=55K$	W3



CG Centre of gravity
position marginally dependent on design
Allow 4" clearance in narrow passages and doorways
Crating has not been considered
ATTENTION!

All dimensions are in inches!

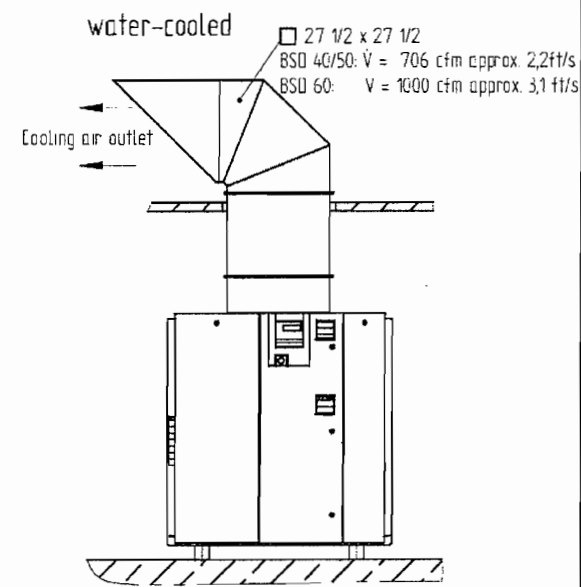
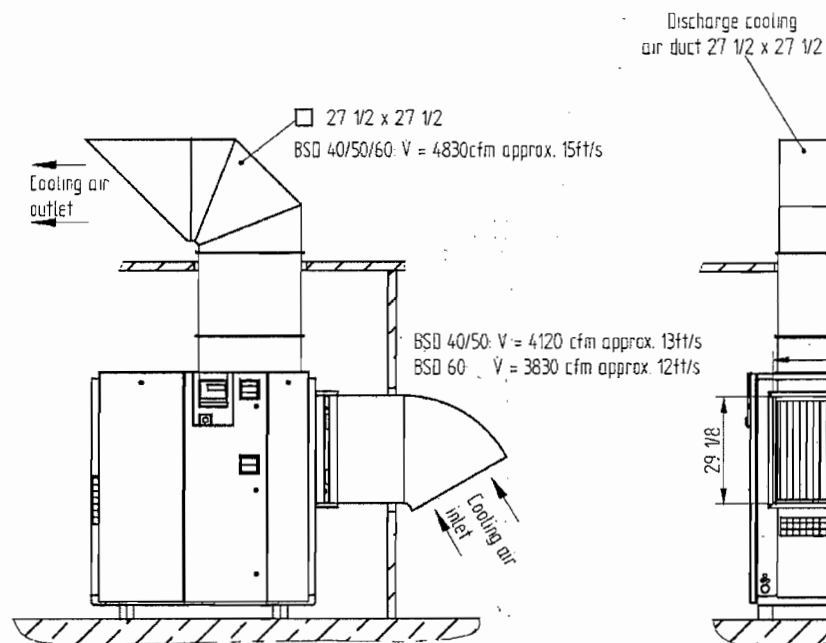
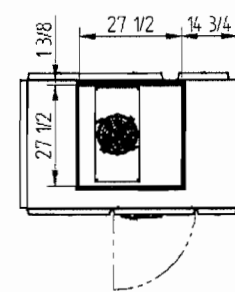
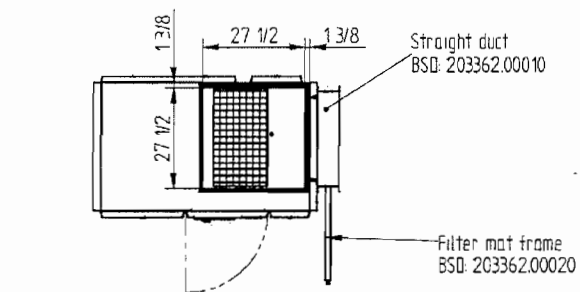
Eng	Marpe
Gez.	(7.0.12.005) Dia. 1/2"
Boor	
Fräsdia.	14.012005
Material	Alu. 6063-T6

BSD K1

KAESER
KOMPRESSOREN
T 10363.01 USE
A-11-036
02

Einführungslänge Ausrüstungen vordefiniert. Zeichnung für Standard (40) genannt werden

Die Zeichnung stellt eine beispielhaftes, jedoch nicht verbindliche Darstellung dar. Es ist zu beachten, dass die Angaben nur für die in der Zeichnung dargestellten Ausführungen gelten. Für andere Ausführungen sind separate Zeichnungen zu erstellen. Die Zeichnung ist als Vorlage für die Fertigung zu verwenden. Die Zeichnung ist nicht für die Montage zu verwenden. Die Zeichnung ist nicht für die Montage zu verwenden.



Total permissible pressure loss for installed ducting

		without filter	with filtermats
BSD 40/50/60 aircooled	$\Delta p_{tot.} =$	4/16 inch/wc	4/32 inch/wc
BSD 40/50/60 watercooled	$\Delta p_{tot.} =$	3/16 inch/wc	—

All dimensions are in inches!

Ing	Name
Gez.	05.05.04
Gepr.	Thürmer
Freigegeben	10.05.2004 Schubert, P
Masstab	

BSD
Total permissible pressure
loss for installed ducting
Erstellt für

KAESER
KOMPRESSOREN
T10018.02 USE
00

13.1.3.2 Water cooling (option K2)

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

general instructions

ATTENTION !!!
Install supplies, grounding and shock protection
to local safety regulations.
Control circuits are single-end-grounded;
operate with insulation monitoring only.
Do not make or break
live plug-in connectors.

control cabinet wiring for non-designated conductors
primary circuits: black
control voltage AC: red 18 AWG UL-Style 1015, CSA-TEW
control voltage DC: blue 18 AWG UL-Style 1015, CSA-TEW
external voltage: orange 16 AWG UL-Style 1015, CSA-TEW
measuring circuits: violet 18 AWG UL-Style 1015, CSA-TEW
ground conductor: green/yellow

option K1 = air cooling
option K2 = water cooling

c			Datum	02.06.2004	KAESER KOMPRESSOREN			block diagram compressor series BSD				=	
b			Bearb.	Sitter								-	
a			Gepr.	Büchner									
C	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung:			UBSD-U2000.00		Blatt 1 Bl.	

Lfd. Nr. No.	Bearbeitung Name	Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page		DBSD-U2000.00	1	
2	list of contents		ZBSD-U2000.00	1	
3	block diagram		UBSD-U2000.00	1	
4	block diagram		UBSD-U2000.00	2	
5	block diagram	performance-related components	UBSD-U2000.00	3	
6	block diagram	performance-related components	UBSD-U2000.00	4	
7	block diagram	performance-related components	UBSD-U2000.00	5	
8	block diagram		UBSD-U2000.00	6	
9	wiring diagram	power unit	SBSD-U2000.00	1	
10	wiring diagram	control voltage tapping/vent	SBSD-U2000.00	2	
11	wiring diagram	power supply unit	SBSD-U2000.00	3	
12	wiring diagram	mother board/inputs	SBSD-U2000.00	4	
13	wiring diagram	mother board/inputs	SBSD-U2000.00	5	
14	wiring diagram	mother board/inputs	SBSD-U2000.00	6	
15	wiring diagram	mother board/outputs	SBSD-U2000.00	7	
16	wiring diagram	mother board/outputs	SBSD-U2000.00	8	
17	wiring diagram	volt-free contacts	SBSD-U2000.00	9	
18	wiring diagram	transformer diagrams	SBSD-U2000.00	10	
19	terminal connection	terminal strip -X0	KBSD-U2000.00	1	
20	terminal connection	terminal strip -X2,-X11	KBSD-U2000.00	2	
21	terminal connection	terminal strip -X14,-X15	KBSD-U2000.00	3	
22	lay-out	control panel	ABSD-U2000.00	1	

c		Datum	02.06.2004	<div> <div>KAESER</div> <div>KOMPRESSOREN</div> </div> <div>list of contents</div> <div>compressor series BSD</div>		<div> <div>ZBSD-U2000.00</div> <div>Blatt 1</div> </div>	
b		Bearb.	Sitter				
a		Gepr.	Büchner				
B	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung:

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

Wiring Diagram

compressor series BSD

air cooled or water cooled

208V±10% 3Ø 60CY

230V±10% 3Ø 60CY

380V±10% 3Ø 60CY

460V±10% 3Ø 60CY

575V±10% 3Ø 60CY

TT/TN power supply with common point grounding

ATTENTION !!!

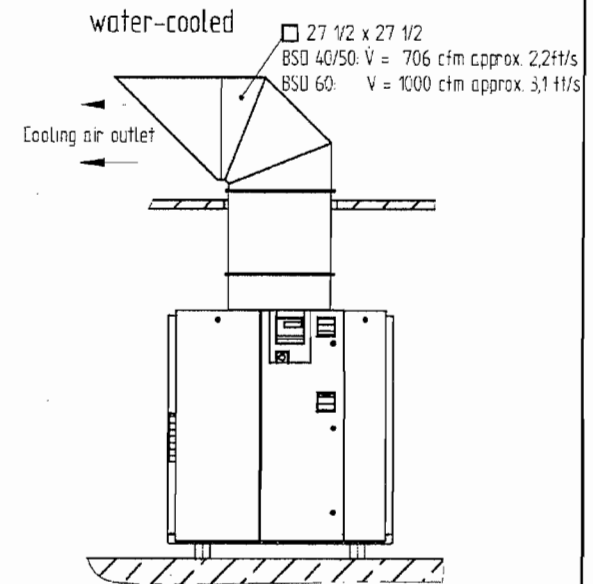
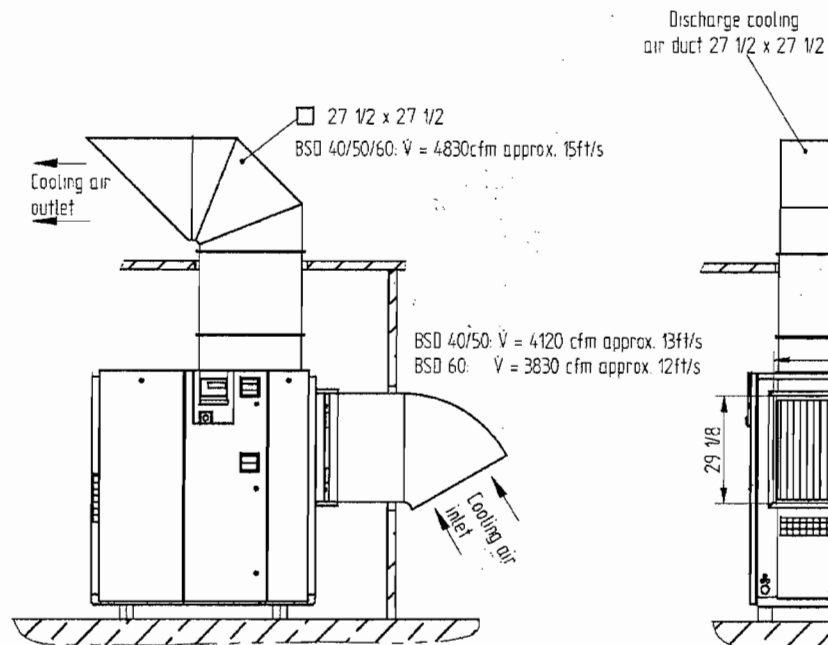
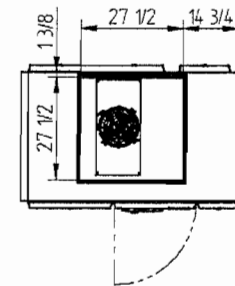
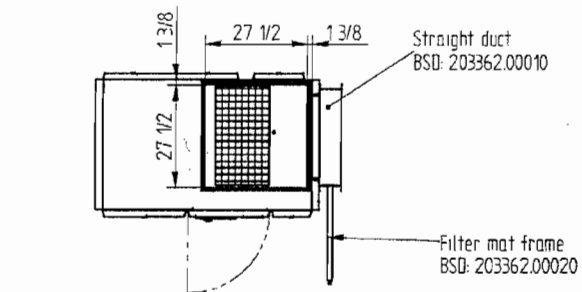
The document gives collective information on power supply voltages and frequencies for all machines. The voltage and frequency and local conditions under which any particular machine may be used are given on the nameplate of the machine and in the accompanying service manual.

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

The drawings remain our exclusive property. The are entrusted only for the agreed purpose. Copies or any other reproductions, including storage, treatment and dissemination by use of electronic systems must not be made for any other than the agreed purpose. Neither originals nor reproductions must be forwarded or otherwise made accessible to third parties.

c			Datum	02.06.2004	USE	KAESER KOMPRESSOREN	cover page compressor series BSD			=		
b			Bearb.	Siffler						+		
a	AN. 9947	29.06.04	BG/SI	Gepr.	Büchner							
A	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	UCSU2000_00			
									SIGMA CONTROL	DBSD-U2000.00		Blatt 1

13.1.4 Electrical diagram

[illegible]

All dimensions are in inches!

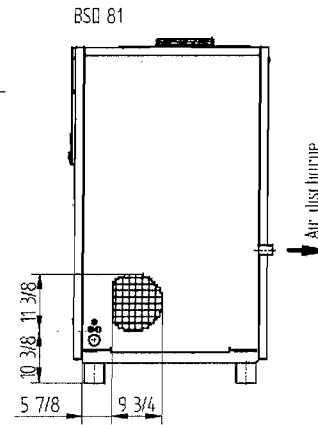
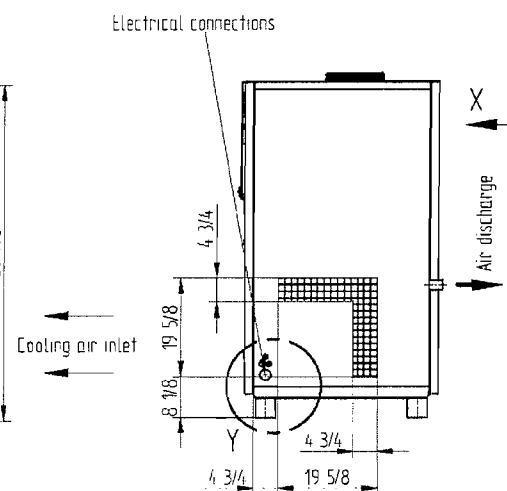
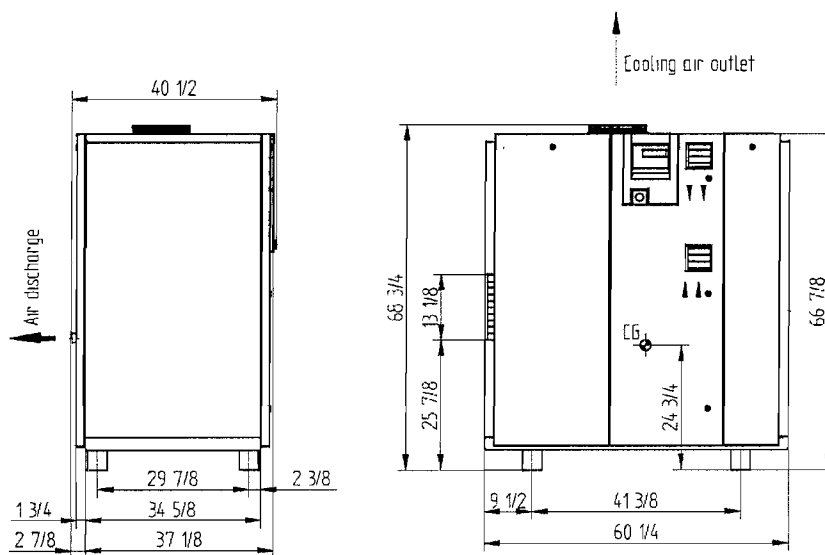
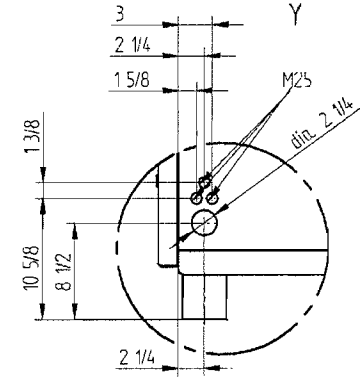
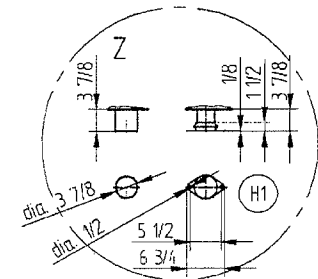
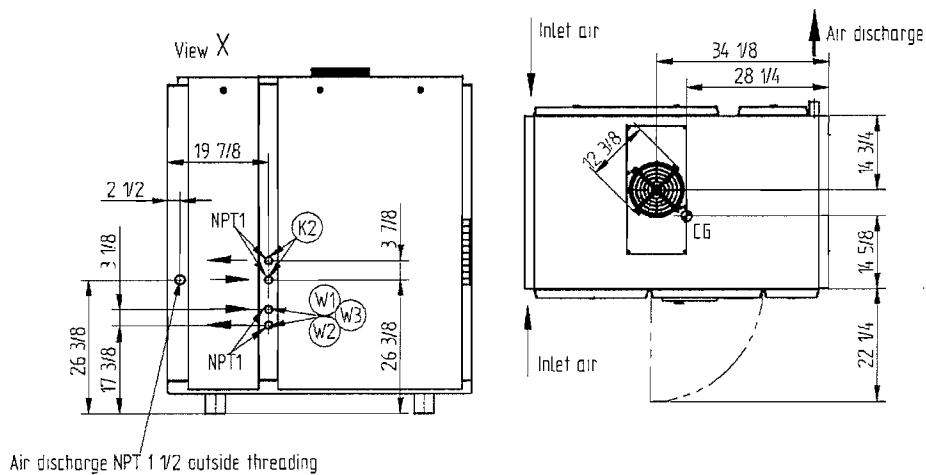
Total permissible pressure loss for installed ducting

		without filter	with filter
BSD 40/50/60 aircooled	$\Delta p_{tot.}$ =	4/16 inch/wc	4/32 inch/wc
BSD 40/50/60 watercooled	$\Delta p_{tot.}$ =	3/16 inch/wc	_____

Ing	Name	BSD Total permissible pressure loss for installed ducting	KAESER KOMPRESSOREN		
Bez.	PLZ/St.			T10018.02 use	
Ort					A-11105 00
Freigez.	10.05.2004 Schubert, P				
Maßstab	Erstellt für				

KAESER
KOMPRESSORENT10018.02_{USE}

00



ALL dimensions are in inches!

Option:	Code
Machine mountings	H1
Water cooling	K2
Prepared for heat recovery	W1
Internal heat recovery $\Delta t=25K$	W2
Internal heat recovery $\Delta t=55K$	W3

CG Centre of gravity
position marginally dependent on design

ATTENTION!
Allow 4" clearance in narrow passages and doorways. Crating has not been considered

	Ing	Name
Gez.	05.01.2005	Timothy
Gedr.		
Freigegeben	12.01.2005	Schulz, P.
Modifiziert		

BSD (K2)

Erstellt für

KAESER
KOMPRESSOREN

T10365.01 use

A-Index
01

America

Argentina

KAESER Compresores de Argentina S.R.L.
Av. Crisólogo Larralde 1197 (Ruta 197)
B1648GJA - Tigre
Provincia de Buenos Aires

Tel.: 0054/11 4 731-0707
Fax: 0054/11 4 731-0909
E-mail: info.argentina@kaeser.com

Brazil

KAESER Compressores do Brasil Ltda
Av. Rio Bonito, 287 - Bairro Socorro
04776-000 - São Paulo - SP

Tel.: 0055/11 5681-5600
Fax: 0055/11 5681-5900
E-mail: info.brasil@kaeser.com

Canada

KAESER Compressors, Inc.
3760 La Vérendrye
Boisbriand, QC J7H 1R5

Tel.: 001/450-971 14 14
Fax: 001/450-971 14 15
E-mail: info.canada@kaeser.com

Chile

KAESER Compresores Chile Ltda.
Cerro Portezuelo 9817-A
749-0460 Quilicura
Santiago de Chile

Tel.: 0056/2-747-14146
Fax: 0056/2-747-14 25
E-mail: info.chile@kaeser.com

Colombia

KAESER Compresores de Colombia Ltda.
Calle 15 No. 62-10/18
Bogotá D.C.

Tel.: 0057/1-447-7177
Fax: 0057/1-260 8414
E-mail: info.colombia@kaeser.com

Costa Rica

Equipos Neumaticos S.A.
Del Colegio Marista 100mts. Este
200 Sur y 25 Este Urb. Ciruelas
Alajuela

Tel.: 00506/440-2393
Fax: 00506/441-1657
E-mail: enemat@racsa.co.cr

Ecuador

CMG Distribuciones
Los Rios 2728 y Calicuchima
Guayaquil

Tel.: 00593/4-371-804
Fax: 00593/4-373-934
E-mail: cmgca@impsat.net.ec

El Salvador

KAESER Compresores
de El Salvador, Ltda. de C.V.
1ª, Calle Poniente y 61 Av. Norte #3150
San Salvador

Tel.: 00503/2260-5168 + 5169
Fax: 00503/2260-5147
E-mail: info.elsalvador@kaeser.com

Guatemala

KAESER Compresores
de Guatemala y Cia. Ltda.
19 Avenida 16-56 Zona 10, Bodega No. 5
01010 Guatemala

Tel.: 00502/2412-6000
Fax: 00502/2412-6060
E-mail: info.guatemala@kaeser.com

Honduras

Please contact Guatemala office

Mexico

KAESER COMPRESORES de México
S. de R.L. de C. V.
Calle 2 No. 123
Parque Industrial Jurica
76100 Querétaro, Qro

Tel.: 0052/442-218 6448
Fax: 0052/442-218 6449
E-mail: info.mexico@kaeser.com

Panama

Neumatica y Control S.A.
Centro Comercial Multimax, Local 19-20
Via Ricardo J. Alfaro
Panama

Tel.: 00507/236-2419
Fax: 00507/236-3259
E-mail: alfreeman@cableonda.net

USA

KAESER Compressors, Inc.
511 Sigma Drive
Fredericksburg, VA 22408
P.O. Box 946/Fredericksburg VA 22404

Tel.: 001/540-898.5500
Fax: 001/540-898.5520
E-mail: info.usa@kaeser.com

Africa

Egypt

El Haggat Compressors Co.
Engineering Agents
83-87 El Sabteya St.
PO Box 2 Sabteya
Cairo

Tel.: 0020/2-5766 266
Fax: 0020/2-5773020
E-mail: elhaggat@intouch.com

Kenia

Spiralflo LTD
P.O. Box 18682
Nairobi

Tel.: 000-254-2-5562622
Fax: 000-254-2-545051/651806
E-mail: metflex@africaonline.co.ke

Morocco

Techni Dispo
Commercial Department
N°2, Angle Rue 2
Bd Ibnou Tachfine
Casablanca

Tel.: 00212/2-44.74-01
Fax: 00212/2-44.74-37
E-mail: technidispo@iam.net.ma

South Africa

Sigma Compressor Services cc
P.O. Box 145131
Bracken Gardens 1452
Alberton North

Tel.: (011) 900-2771
Fax: (011) 900-2718
E-mail: sigma@icon.co.za

Asia

Bangladesh

New Asia Ltd.
Comilla Garden
50 New Eskaton Road
GPO Box 931 Dhaka - 1000

Tel.: 00880/2-8313 016 + 8313 065
Fax: 00880/2-8313 526
E-mail: altabj@bangla.net

China

KAESER Kompressoren Co. Ltd.
Shanghai Representative Office
Flat GH, 12 Floor, No 9 Lane
1720 Hongqiao Road
Shanghai 200336

Tel.: 0086/21-627 066 53
Fax: 0086/21-627 066 54
E-mail: kaesersh@uninet.com.cn

India

KAESER Compressors (India) Pvt. Ltd.
S.No. 255/1, Hinjewadi, Tal. Mulshi,
Dist. Pune - 411 027

Tel.: 0091/20-2934610
Fax: 0091/20-2934648
E-mail: info.india@kaeser.com

Indonesia

PT Indo Kompresigma
Gedung Kawan Lama, 6th Floor
Jl. Puri Kencana No. 1
Meruya Kembangan
Jakarta 11610

Tel.: 0062/21-582 33 33
Fax: 0062/21-582 39 33
E-mail: iksjkt@idola.net.id

Japan

KAESER Kompressoren Co.,Ltd.
Kaigan 3-31-1
Minato-ku
Tokyo 108-0022

Tel.: 0081/3-345 275 71
Fax: 0081/3-345 275 88
E-mail: info.japan@kaeser.com

Korea

KAESER Kompressoren Co Ltd.
Sunnyoung B/D 5F, 1362-16
Seocho-Dong, Seocho-Gu
Seoul 137-130

Tel.: 0082/2-597-6296
Fax: 0082/2-598-6365
E-mail: info.korea@kaeser.com

Malaysia

KAESER Kompressoren SDN BHD
No. 18 Jalan Astaka U8/82
Bukit Jelutong
40150 Shah Alam, Selangor

Tel.: 0060/3-78452791
Fax: 0060/3-78457790
E-mail: info.malaysia@kaeser.com

Philippines

KAESER Kompressoren Philippines
Unit 103/104 Ground Floor
Cedar Executive Building II
No. 26 Timog Avenue
Corner Scout Tobias Street
Quezon City, 1103 Philippines

Tel.: 0063/2-372 6642
Fax: 0063/2-372 6643
E-mail: kaeserph@skynet.net

Singapore

KAESER Kompressoren Pte. Ltd.
81 Tech Park Crescent
Tuas Tech Park
Singapore 638067

Tel.: 0065/6885-7733
Fax: 0065/6885-7700
E-mail: info.singapore@kaeser.com

Sri Lanka

Nikini Automation Systems Limited.
247 High Level Road, Colombo 5
Sri Lanka

Tel.: 0094 1 826 894
Fax: 0094 1 826 252
E-mail: nikini@mail.slt.lk

Taiwan R.O.C

KAESER Kompressoren Pte. Ltd.
No. 52, Kuo Sheng Street 2
Taoyuan

Tel.: 00886/3-378 75 89
Fax: 00886/3-344 12 43
E-mail: kaeser@gcn.net.tw

Thailand

Apha Enterprise Co., Ltd.
180, Moo 5, Suksawad Road
Ratburana, Bangkok 10140

Tel.: 0066/2-818-2980
Fax: 0066/2-818-2985
E-mail: apha@anet.net.th

Master Com Engineering Co. Ltd.
53/239 Moo 6 Akekachai 87
Akekachai Rd. Bangborn
Bangkok 10300

Tel.: 0066/2-896-3630
Fax: 0066/2-887-5781
E-mail: mascom@asiaaccess.net.th

Australia

Australia

KAESER Compressors Australia Pty. Ltd.
Locked Bag 1406
Dandenong South, Vic. 3164
45 Zenith Road
Dandenong, Vic. 3175

Tel.: 0061/3-9791-5999
Fax: 0061/3-9791-5733
E-mail: info.australia@kaeser.com

Europe

Austria

KAESER Kompressoren Ges.m.b.H.
Niederlassung Österreich
Dallingerstr. 8
PO Box 70
4031 Linz

Tel.: 0043/70-38 60 51-0
Fax: 0043/70-38 67 80
E-mail: info.austria@kaeser.com

Belgium

KAESER Kompressoren B.V.B.A.
Heiveldekens 7A
2550 Kontich

Tel.: 0032/3-326 39 62+63
Fax: 0032/3-326 39 73
E-mail: info.belgium@kaeser.com

Bulgaria

Mava Industrial S.A.
BUSINESS PARK SOFIA
255, Okolovrasten pat blvd.
Sofia 1715

Tel.: 00359/2 974 2040
Fax: 00359/2 974 2004
E-mail: mavaindustrial@intech.bg

Croatia

KAESER Kompressoren d.o.o.
Žitnjak bb (dvoriste „Munje“)
10000 Zagreb

Tel.: 00385 (0)1-2405-551
Fax: 00385 (0)1-2405-566
E-mail: kaeser-kompressoren1@ri.tel.hr

Czech Republic

KAESER Kompressoren. s.r.o.
Klobouková 75
148 00 Praha 4 - Chodov

Tel.: 00420/2-67 91 18 83
Fax: 00420/2-67 91 18 84
E-mail: info.czech@kaeser.com

Denmark

KAESER Kompressorer A/S
Skruengangen 7
2690 Karlslunde

Tel.: 0045/46 15 43 34
Fax: 0045/46 15 43 35
E-mail: info.denmark@kaeser.com

England

HPC Engineering PLC
Victoria Gardens
Burgess Hill
West Sussex RH15 9RQ

Tel.: 0044/1444-24 16 71
Fax: 0044/1444-24 73 04
E-mail: geoffhoulgate@hpcplc.co.uk

Estonia

KAESER Kompressorid
Viljandi mnt. 25 D
11218 Tallinn

Tel.: 00372/651 4000
Fax: 00372/651 4007
E-mail: info@kaeser.ee

Finland

KAESER Kompressorit Oy
Pyymsantie 7
01720 Vantaa

Tel.: 00358/9-41 32 04 00
Fax: 00358/9-41 32 04 50
E-mail: info.finland@kaeser.com

France

KAESER Compresseurs S.A.
3. av. du Bataillon-Carmagnole Liberté
69518 Vaulx-en-Velin Cedex

Tel.: 0033/4 72 37 44 10
Fax: 0033/4 78 26 49 15
E-mail: info.france@kaeser.com

Germany

KAESER KOMPRESSOREN GmbH
PO Box 2143
96410 Coburg

Tel.: 0049/9561-640-0
Fax: 0049/9561-640-130
E-mail: produktinfo@kaeser.com

Greece

Vamvacas Industrial Equipment S.A.
D.I.M. Moutsopoulou 103
185 41 Kaminia - Piraeus

Tel.: 0030/2-10 08 700
Fax: 0030/2-10 09 517
E-mail: info@vamvacas.gr

Hungary

KAESER Kompressoren Kft.
Gyár u. 2.
2040 Budaörs

Tel.: 0036/23 445 300
Fax: 0036/23 445 301
E-mail: info.hungary@kaeser.com

Ireland

KAESER Compressors Ltd.
Unit 43/44 Western Parkway
Business Park
Ballymount Road
Dublin 12

Tel.: 00353/1-456 54 33
Tel.: 1850/369400 (National)
Fax: 00353/1-456 73 28
E-mail: info.ireland@kaeser.com

Italy

KAESER Compressori s.r.l.
Via del Fresatore, 5
Zona Ind. Roveri
40138 Bologna

Tel.: 0039/051-60 09 011
Fax: 0039/051-53 86 11
E-mail: info.italy@kaeser.com

Lithuania

Rylvita
J. Basanaviciaus g 4
4270 Vilkauskas

Tel.: 0037/042 52365
Fax: 0037/042 60043
E-mail: kaeser.lt@post.omnitel.net

Luxembourg

Reinert S.à.r.l.
48, Z.I., rue de la Poudrière
Loudelange
BP 1312
1013 Luxembourg

Tel.: 00352/37 90 37 0
Fax: 00352/37 90 37 90

The Netherlands

Gietart B.V.
Fruisische Veldweg 20
Postbus 3
7550 AA Hengelo OV

Tel.: 0031/74-245 24 52
Fax: 0031/74-245 22 13
E-mail: info@gietart.nl

Norway

KAESER Kompressorer AS
Verpetveien 38
1540 Vestby

Tel.: 0047/64-98 34 00
Fax: 0047/64-98 34 01
E-mail: info.norway@kaeser.com

Poland

KAESER Kompressoren Sp.z.o.o.
Ul. Taneczna 82
02-829 Warszawa

Tel.: 0048/22-322 86 65
Fax: 0048/22-322 86 66
E-mail: info.poland@kaeser.com

Portugal

Motivartécnica
Rua dos Correios. 164
Apartado 77
4796-908 Vila das Aves

Tel.: 00351/252-82 03 40
Fax: 00351/252-82 03 47
E-mail: kaeser@motivartecnica.pt

Romania

KAESER Kompressoren S.r.l.
B-dul Ion Mihalache. Nr. 179
01181 Bucharest. Sector 1

Tel.: 0040/21-2245681+ 2245688
Fax: 0040/21-2245602
E-mail: info.romania@kaeser.com

Россия

ШНОРР фон КАРОЛЬСФЕЛЬД
Промышленные установки ГМБХ
121248 Москва а/я 37

тел.: 095 240 04 19 + 095 937 30 32
факс: 095 926 52 99
E-mail: info@carolsfeld.ru

Slovakia

AIR CONSULTING spo. s r. o.
Janetova 15
841 05 Bratislava

Tel.: 00421-2-4524 3565
Fax: 00421-2-4552 4380
E-mail: info@airconsulting.sk

Slovenia

KAESER Kompressoren
Produžnica Maribor
Cankarjeva ul. 33
2000 Maribor

Tel.: 00386/2-23-45-240. -242
Fax: 00386/2-23-45-242
E-mail: kaeser.kompressoren@siol.net

Spain

KAESER Compresores S.L.
P.I. Malpica Sta. Isabel C/E. parcela 70
50016 Zaragoza

Tel.: 0034/976-46 51 45
Fax: 0034/976-46 51 51
E-mail: info.spain@kaeser.com

Sweden

KAESER Kompressorer AB
Linjalvägen 6
Box 7329
18714 Täby

Tel.: 0046/8-544 44 330
Fax: 0046/8-630 10 65
E-mail: info.sweden@kaeser.com

Swiss

KAESER Kompressoren AG
Großackerstr. 15
PO Box Watt
8105 Regensdorf

Tel.: 0041/1-87163-63
Fax: 0041/1-87163-90
E-mail: info.swiss@kaeser.com

Turkey

Topkapi Endüstri
Mallari Ticaret A.S.
Millet Cad No. 180-184
34270 Topkapi-Istanbul

Tel.: 0090/212-534 04 10
Fax: 0090/212-524 58 46
E-mail: alpzor@topkapigroup.com.tr

Ukraine

CORSICA
Desnianskaja str 19
252 058 Kiev

Tel.: 0038/044-241 91 98
FAX: 0038/044-241 91 97
E-mail: kaeser-ukr@mbox.com.ua

Middle East

Bahrain

Abdulla Ahmed Nass & Sons
PO Box 669
Manama, Bahrain

Tel.: 00973 703 123
Fax: 00973 703 090
E-mail: mkapoor@aanass.com

Oman

Pipeline Supply Establishment
PO Box 1896
Postal Code 112
Muscat

Tel.: 00968/592 517
Fax: 00968/592 516
E-mail: pseoman@mantel.net.com

Saudi Arabia

ARCOMA
Arabia Commercial Agency Co. Ltd.
Technical Division
PO Box 811
Jeddah 21421

Tel.: 00966/2-644 42 12
Fax: 00966/2-642 09 75
E-mail: mobajammal@yahoo.com

Syria

Yusr Trading
PO Box 14256
Damascus

Tel.: 00963/11-212 34 86
Fax: 00963/11-212 95 11
E-mail: yusr@net.sy

U.A.E.

KAESER Kompressoren FZE
PO Box 17485
Jebel Ali Free Zone
Dubai

Tel.: 00971/4-8838 363
Fax: 00971/4-8838 324
E-mail: kaeser@emirates.net.ae

Bhatia Brothers

PO Box 1275
Dubai

Tel.: 00971/4-333 05 65
Fax: 00971/4-333 79 66
E-mail: bbisddxb@emirates.net.ae

Technical Oilfield Supplies Center

PO Box 2647
Abu Dhabi

Tel.: 00971/2-723 863
Fax: 00971/2-779 935
E-mail: toasca@emirates.net.ae

1	2	3	4	5	6	7	8
electrical equipment identification							
general components				terminal strips/plug-in connections		malfunction indicators	
-A10 SIGMA CONTROL				SIGMA CONTROL		automatic shutdown and indicating function:	
-A10.1...-A10.5 mother board, inputs/outputs				connector strip, mother board		-B2 safety air pressure switch-direction of rotation	
-1FU,-2FU primary control fuse				connector strip interface		-B11 temperature probe	
-3FU secondary control fuse				connector plug		airend discharge temperature	
-G1 power unit				adapter		-F2 overload relay	
-K1M main contactor				connector strip, inside		compressor motor	
-K2M delta contactor				connector strip, inside		-M6 compressor unit ventilator-overload protection	
-K3M wye contactor				connector plug, inside		-Q4 circuit breaker	
-M1 compressor motor				connector plug, inside		vent motor	
-M2 vent motor				connector strip, external		-S3 emergency stop pushbutton	
-M5 controller ventilator				connector plug, external			
-T1 control transformer				transfer module		indicating function:	
-Y1 control valve				terminal strip, digital inputs		-B1 pressure transducer, air main pressure	
				connector strip digital inputs		-B3 high oil filter pressure	
				connector plug		-B4 pressure transducer, package internal pressure	
				-X0 terminal strip, power supply		-B5 high air filter pressure	
				-X11 terminal strip, control			
				-X2 terminal strip, outputs, volt-free contacts			
				-X02 connector plug, outputs/volt-free contacts			

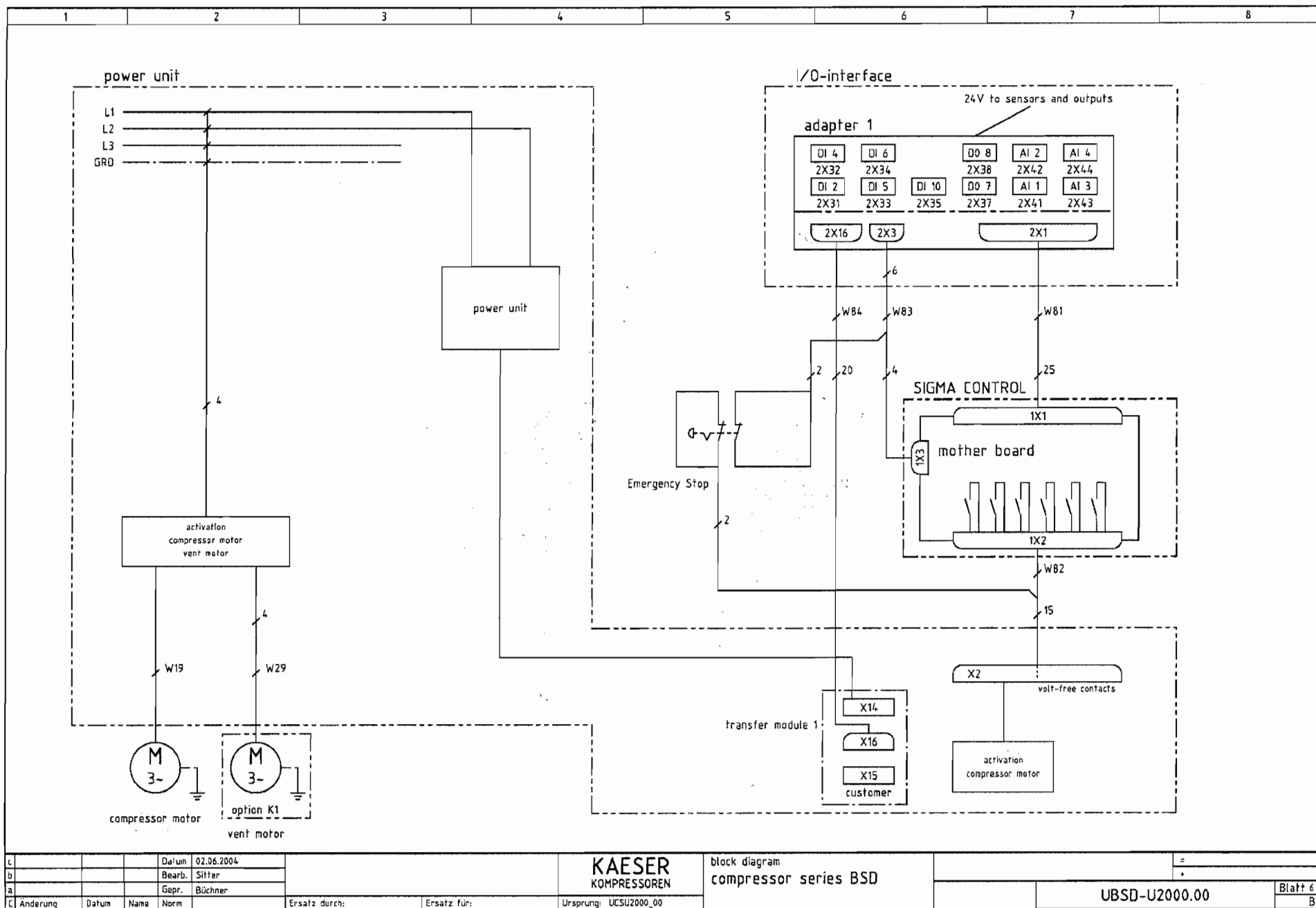
		performance-related components								Blatt 3	
model		BSD 40								UBSD-U2000.00	
machine power supply		208V ±10% 60 CY	230 V ±10% 60 CY	380 V ±10% 60 CY	460 V ±10% 60 CY	575 V ±10% 60 CY					
motor	-M1	40 hp	40 hp	40 hp	40 hp	40 hp					
motor	-M2	1 hp	1 hp	1 hp	1 hp	1 hp					
terminal strip	-X0	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland					
terminal strip	-X2/X11	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland					
transfer module	-X14/X15/X16	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland					
adapter	-2X...	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland					
contactor	-K1M	7.6872.00010 3RT1046-1AK60	7.6871.00010 3RT1045-1AK60	7.6869.00010 3RT1036-1AK60	7.6868.00010 3RT1035-1AK60	7.6867.00010 3RT1034-1AK60					
auxiliary switch		7.3140.02230 3RH1921-1XA20-0PA0	7.3140.02230 3RH1921-1XA20-0PA0	3x 7.3140.01690 3RH1921-1CA10	3x 7.3140.01690 3RH1921-1CA10	3x 7.3140.01690 3RH1921-1CA10					
auxiliary switch		7.3140.02200 3RH1921-1DA11	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3140.02050 Siemens 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00					
contactor	-K2M	7.6872.00010 3RT1046-1AK60	7.6871.00010 3RT1045-1AK60	7.6869.00010 3RT1036-1AK60	7.6868.00010 3RT1035-1AK60	7.6867.00010 3RT1034-1AK60					
auxiliary switch		7.3140.02200 3RH1921-1DA11	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3140.02050 Siemens 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00					
contactor	-K3M	7.6869.00010 3RT1036-1AK60	7.6868.00010 3RT1035-1AK60	7.6867.00010 3RT1034-1AK60	7.6866.00010 3RT1026-1AK60	7.6865.00010 3RT1025-1AK60					
auxiliary switch		7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10					
auxiliary switch		7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3140.02050 Siemens 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02040 3RT1926-1CC00	7.3140.02040 3RT1926-1CC00					
overload relay	-F2	7.6873.00050 Siemens 3RB1046-1EB0	7.6873.00050 3RB1046-1EB0	7.6873.00030 3RB1036-1UB0	7.6873.00030 3RB1036-1UB0	7.6873.00030 3RB1036-1UB0					
fuses	-1FU/-2FU	2x 7.3161.00141 ATQR 4 Gould 4 A, 600 V	2x 7.3317.1 ATQR 3 3 A, 600 V	2x 7.3313.1 ATQR 2 1/2 2.5 A, 600 V	2x 7.3312.1 ATQR 1 1/4 1.25 A, 600 V	2x 7.3312.1 ATQR 1 1/4 1.25 A, 600 V					
fuses	-3FU	7.3302.0 TRM 2 1/2 Gould 2.5 A, 250 V	7.3302.0 TRM 2 1/2 2.5 A, 250 V	7.3302.0 TRM 2 1/2 2.5 A, 250 V	7.3302.0 TRM 2 1/2 2.5 A, 250 V	7.3302.0 TRM 2 1/2 2.5 A, 250 V					
fuse socket	-1FU/2FU/3FU	7.3320.00010 Gould USM 3	7.3320.00010 USM 3	7.3320.00010 USM 3	7.3320.00010 USM 3	7.3320.00010 USM 3					
circuit breaker	-Q4	7.6860.00170 3RV1011-1GA10 4,5-6,3 A	7.6860.00160 3RV1011-1FA10 3,5-5 A	7.6860.00150 3RV1011-1EA10 2,8-4 A	7.6860.00140 3RV1011-1DA10 2,2-3,2 A	7.6860.00150 3RV1021-1CA10 1,8-2,5 A					
auxiliary switch		7.3140.01890 Siemens 3RV1901-1E	7.3140.01890 3RV1901-1E	7.3140.01890 3RV1901-1E	7.3140.01890 3RV1901-1E	7.3140.01890 3RV1901-1E					
transformer	-T1	7.2239.20070 USTE400 400 VA Block diagram 2, Sht. 10	7.2222.1 B9602090 320 VA diagram 1, Sht. 10	7.2239.20070 USTE400 400 VA diagram 2, Sht. 10	7.2222.1 B9602090 320 VA diagram 1, Sht. 10	7.2237.1 B0204028 320 VA diagram 3, Sht. 10					
power supply	-G1	7.7025.1 Siemens 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A					
connection	-W11 / W13	UL-AWM1015 black 6x1x4 AWG	UL-AWM1015 black 6x1x4 AWG	UL-AWM1015 black 6x1x8 AWG	UL-AWM1015 black 6x1x8 AWG	UL-AWM1015 black 6x1x8 AWG					
connection	-W14	UL-AWM1015 black 3x1x4 AWG	UL-AWM1015 black 3x1x4 AWG	UL-AWM1015 black 3x1x10 AWG	UL-AWM1015 black 3x1x10 AWG	UL-AWM1015 black 3x1x10 AWG					
cables	-W19.1V.2	NYSLY0-J 2x4x35 mm²	NYSLY0-J 2x4x25 mm²	NYSLY0-J 2x4x10 mm²	NYSLY0-J 2x4x10 mm²	H07RN-F 2x4x10 mm²					
compressor control	-A10	7.7000.0 Siemens SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1					
emergency stop pushbutton	-S3	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV					
auxiliary contact	Schlegel	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00					
controller ventilator	-M5	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200					
sealing frame		7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200					
outlet filter	Rübsamen&Herr	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200					
control cabinet	KAESER	7.7377.0	7.7377.0	7.7377.0	7.7377.0	7.7377.0					
control panel	KAESER	207367.0	207367.0	207367.0	207367.0	207367.0					

block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ursprung:		Ersatz für:	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00	
UBSD-U2000.00		UBSD-U2000.00		UBSD-U2000.00		UBSD			

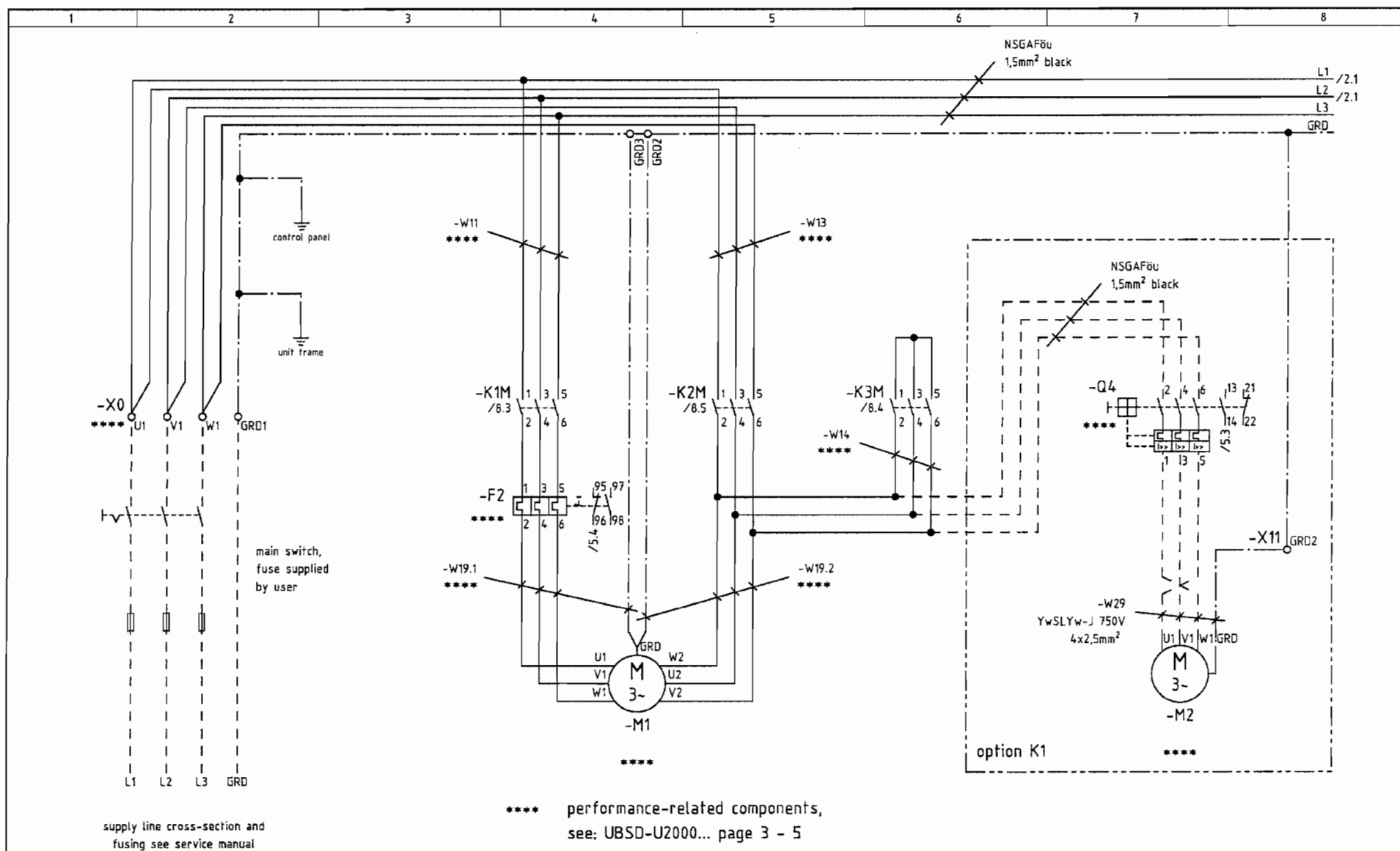
		performance-related components							Blatt 2		
model		BSD 50							UBSD-U2000.00		
machine power supply		208V ±10% 60 CY	230 V ±10% 60 CY	380 V ±10% 60 CY	460 V ±10% 60 CY	575 V ±10% 60 CY					
motor -M1		50 hp	50 hp	50 hp	50 hp	50 hp					
motor -M2		1 hp	1 hp	1 hp	1 hp	1 hp					
terminal strip -X0		3x 7.3600.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland					
terminal strip -X2/X11		7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland					
transfer module -X14/X15/X16		7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland					
adapter -2X...		7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland					
contactor -K1M		7.4831.00030 A110-30-00-89 / ABB	7.4831.00030 A110-30-00-89 / ABB	7.6870.00010 3RT1044-1AK60	7.6869.00010 3RT1036-1AK60	7.6868.00010 3RT1035-1AK60					
auxiliary switch		3x 7.4834.0 CA5-10 / ABB	3x 7.4834.0 CA5-10 / ABB	7.3140.02230 3RH1921-1XA20-0PA0	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10					
auxiliary switch		7.4835.0 CA5-01 / ABB	7.4835.0 CA5-01 / ABB	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3946.00050 Siemens RC5-2/250 / ABB	7.3946.00050 Siemens RC5-2/250 / ABB	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00					
contactor -K2M		7.4831.00030 A110-30-00-89 / ABB	7.4831.00030 A110-30-00-89 / ABB	7.6870.00010 3RT1044-1AK60	7.6869.00010 3RT1036-1AK60	7.6868.00010 3RT1035-1AK60					
auxiliary switch		7.4835.0 CA5-01 / ABB	7.4835.0 CA5-01 / ABB	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3946.00050 Siemens RC5-2/250 / ABB	7.3946.00050 Siemens RC5-2/250 / ABB	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00					
contactor -K3M		7.5284.00010 A75-30-22-89 / ABB	7.5284.00010 A75-30-22-89 / ABB	7.6867.00010 3RT1034-1AK60	7.6867.00010 3RT1034-1AK60	7.6866.00010 3RT1026-1AK60					
auxiliary switch		---	---	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10					
auxiliary switch		---	---	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01					
interference suppressor		7.3946.00050 Siemens RC5-2/250 / ABB	7.3946.00050 Siemens RC5-2/250 / ABB	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00					
overload relay -F2		7.4833.0 TA110-0U110	7.4833.0 TA110-0U110	7.6873.00050 3RB1046-1EB0	7.6873.00030 3RB1036-1UB0	7.6873.00030 3RB1036-1UB0					
fuses -1FU/-2FU		80-110 A Gould 2x 7.3161.00141 ATQR 4 4 A, 600 V	80-110 A Gould 2x 7.3317.1 ATQR 3 3 A, 600 V	25-100 A Gould 2x 7.3312.1 ATQR 2 1/2 2,5 A, 600 V	13-50 A Gould 2x 7.3312.1 ATQR 1 1/4 1,25 A, 600 V	13-50 A Gould 2x 7.3312.1 ATQR 1 1/4 1,25 A, 600 V					
fuses -3FU		7.3302.0 TRM 2 1/2 Gould 2,5 A, 250 V	7.3302.0 TRM 2 1/2 Gould 2,5 A, 250 V	7.3302.0 TRM 2 1/2 Gould 2,5 A, 250 V	7.3302.0 TRM 2 1/2 Gould 2,5 A, 250 V	7.3302.0 TRM 2 1/2 Gould 2,5 A, 250 V					
fuse socket -1FU/2FU/3FU		7.3320.00010 Gould USM 3	7.3320.00010 Gould USM 3	7.3320.00010 Gould USM 3	7.3320.00010 Gould USM 3	7.3320.00010 Gould USM 3					
circuit breaker -Q4		7.6860.00170 3RV1011-1GA10 4,5-6,3 A	7.6860.00160 3RV1011-1FA10 3,5-5 A	7.6860.00150 3RV1011-1EA10 2,8-4 A	7.6860.00140 3RV1011-1DA10 2,2-3,2 A	7.6860.00130 3RV1011-1CA10 1,8-2,5 A					
auxiliary switch		7.3140.01890 Siemens 3RV1901-1E	7.3140.01890 Siemens 3RV1901-1E	7.3140.01890 Siemens 3RV1901-1E	7.3140.01890 Siemens 3RV1901-1E	7.3140.01890 Siemens 3RV1901-1E					
transformer -T1		7.2239.20070 USTE400 400 VA diagram 2, Sht. 10	7.2222.1 B9602090 320 VA diagram 1, Sht. 10	7.2239.20070 USTE400 400 VA diagram 2, Sht. 10	7.2222.1 B9602090 320 VA diagram 1, Sht. 10	7.2237.1 B0204028 320 VA diagram 3, Sht. 10					
power supply -G1		7.7025.1 Siemens 230VAC/24VDC 1,3A	7.7025.1 Siemens 230VAC/24VDC 1,3A	7.7025.1 Siemens 230VAC/24VDC 1,3A	7.7025.1 Siemens 230VAC/24VDC 1,3A	7.7025.1 Siemens 230VAC/24VDC 1,3A					
connection -W11 / W13		UL-AWM1015 black 6x1x2 AWG	UL-AWM1015 black 6x1x2 AWG	UL-AWM1015 black 6x1x6 AWG	UL-AWM1015 black 6x1x6 AWG	UL-AWM1015 black 6x1x6 AWG					
connection -W14		UL-AWM1015 black 3x1x6 AWG	UL-AWM1015 black 3x1x6 AWG	UL-AWM1015 black 3x1x8 AWG	UL-AWM1015 black 3x1x8 AWG	UL-AWM1015 black 3x1x8 AWG					
cables -W19.1/.2		H07RN-F 7x1x35 mm²	NYSLYÖ-J 2x4x35 mm²	NYSLYÖ-J 2x4x16 mm²	NYSLYÖ-J 2x4x16 mm²	H07RN-F 2x4x16 mm²					
compressor control -A10		7.7000.0 Siemens SIGMA CONTROL TYP1	7.7000.0 Siemens SIGMA CONTROL TYP1	7.7000.0 Siemens SIGMA CONTROL TYP1	7.7000.0 Siemens SIGMA CONTROL TYP1	7.7000.0 Siemens SIGMA CONTROL TYP1					
emergency stop pushbutton -S3		7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV	7.3217.0 / QRUV					
auxiliary contact -M5		7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00					
controller ventilator		7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200					
sealing frame		7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200					
outlet filter Rüksamen&Herr		7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200					
control cabinet KAESER		7.7377.0	7.7377.0	7.7377.0	7.7377.0	7.7377.0					
control panel KAESER		207367.0	207367.0	207367.0	207367.0	207367.0					

block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block diagram		compressor series BSD		KAESER KOMPRESSOREN		Ersatz für:	
block							

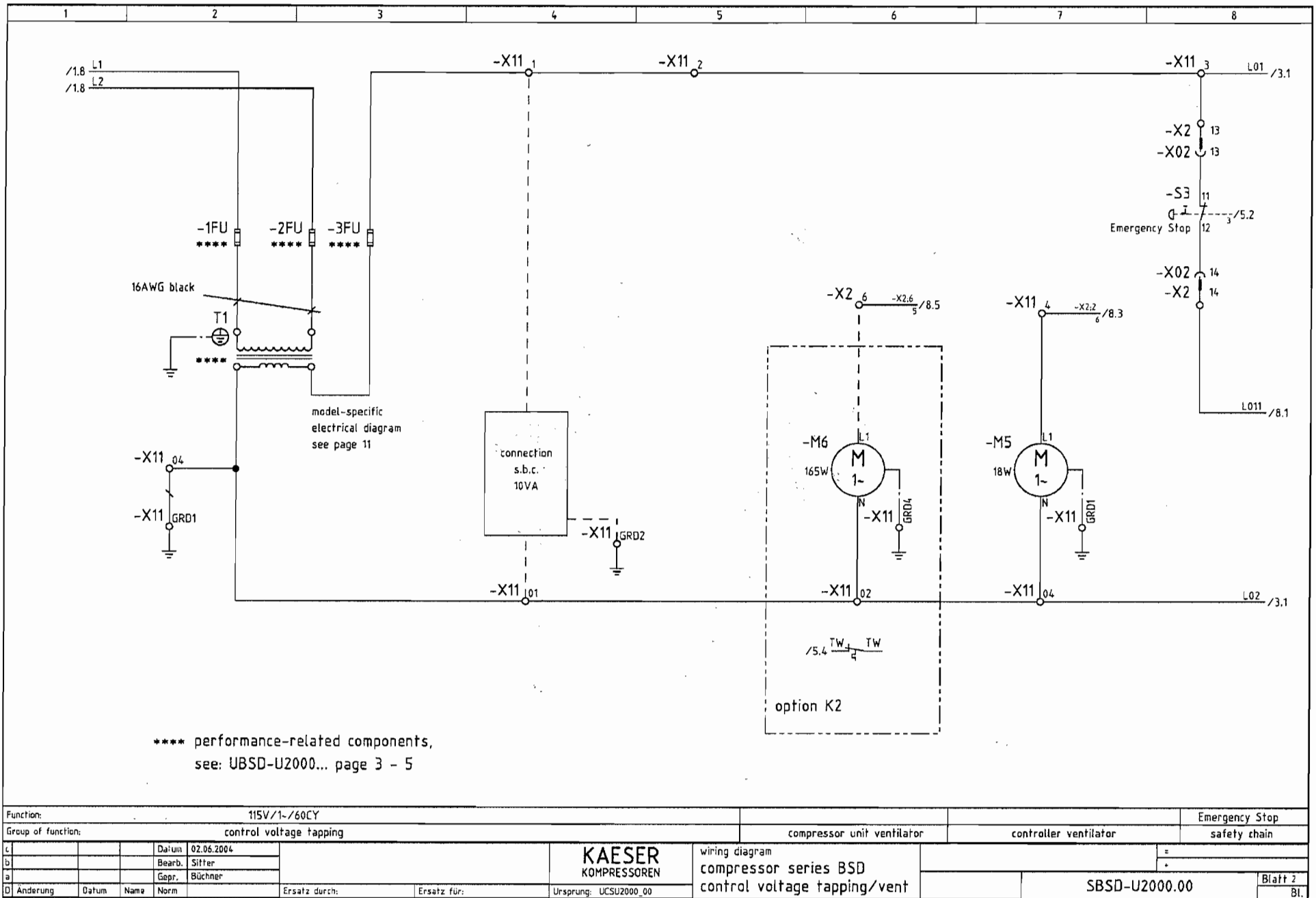
		performance-related components					Blatt 5	
model		BSD 60					Bl.	
machine power supply		380 V ±10% 60 CY	460 V ±10% 60 CY	575 V ±10% 60 CY				
motor	-M1	60 hp	60 hp	60 hp				
motor	-M2	1 hp	1 hp	1 hp				
terminal strip	-X0	7.3227.0 Wieland	7.3227.0 Wieland	7.3227.0 Wieland				
terminal strip	-X2/X11	7.7113.00050 Wieland	7.7113.00050 Wieland	7.7113.00050 Wieland				
transfer module	-X14/X15/X16	7.7012.1 Wieland	7.7012.1 Wieland	7.7012.1 Wieland				
adapter	-2X...	7.7010.0 Wieland	7.7010.0 Wieland	7.7010.0 Wieland				
contactor	-K1M	7.6870.00010 3RT1044-1AK60	7.6870.00010 3RT1044-1AK60	7.6869.00010 3RT1036-1AK60				
auxiliary switch		7.3140.02230 3RH1921-1XA20-0PA0	7.3140.02230 3RH1921-1XA20-0PA0	3x 7.3140.01690 3RH1921-1CA10				
auxiliary switch		7.3140.02200 3RH1921-1DA11	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01				
interference suppressor		7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00				
	Siemens							
contactor	-K2M	7.6870.00010 3RT1044-1AK60	7.6870.00010 3RT1044-1AK60	7.6869.00010 3RT1036-1AK60				
auxiliary switch		7.3140.02200 3RH1921-1DA11	7.3140.02200 3RH1921-1DA11	7.3140.02030 3RH1921-1CA01				
interference suppressor		7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00				
	Siemens							
contactor	-K3M	7.6868.00010 3RT1035-1AK60	7.6867.00010 3RT1034-1AK60	7.6867.00010 3RT1034-1AK60				
auxiliary switch		7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10	7.3140.01690 3RH1921-1CA10				
auxiliary switch		7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01	7.3140.02030 3RH1921-1CA01				
interference suppressor		7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00	7.3140.02050 3RT1936-1CC00				
	Siemens							
overload relay	-F2	7.6873.00050 3RB1046-1EB0	7.6873.00050 3RB1046-1EB0	7.6873.00030 3RB1036-1UB0				
	Siemens							
fuses	-1FU/-2FU	2x 7.3313.1 ATQR 2 1/2	2x 7.3312.1 ATQR 1 1/4	2x 7.3312.1 ATQR 1 1/4				
	Gould	2,5 A, 600 V	1,25 A, 600 V	1,25 A, 600 V				
fuses	-3FU	7.3302.0 TRM 2 1/2	7.3302.0 TRM 2 1/2	7.3302.0 TRM 2 1/2				
	Gould	2,5 A, 250 V	2,5 A, 250 V	2,5 A, 250 V				
fuse socket	-1FU/2FU/3FU	7.3320.00010 USM 3	7.3320.00010 USM 3	7.3320.00010 USM 3				
	Gould							
circuit breaker	-Q4	7.6860.00150 3RV1011-1EA10	7.6860.00140 3RV1011-1DA10	7.3140.01950 3RV1021-1CA10				
		2,8-4 A	2,2-3,2 A	1,8-2,5 A				
auxiliary switch		7.3140.01890 3RV1901-1E	7.3140.01890 3RV1901-1E	7.3140.01890 3RV1901-1E				
	Siemens							
transformer	-T1	7.2239.20070 USTE400	7.2222.1 B9602090	7.2237.1 B0204028				
		400 VA	320 VA	320 VA				
	Block	diagram 2, Sht. 10	diagram 1, Sht. 10	diagram 3, Sht. 10				
power supply	-G1	7.7025.1 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A	7.7025.1 230VAC/24VDC 1,3A				
	Siemens							
connection	-W11 / W13	UL-AWM1015 black 6x1x6 AWG	UL-AWM1015 black 6x1x6 AWG	UL-AWM1015 black 6x1x6 AWG				
connection	-W14	UL-AWM1015 black 3x1x8 AWG	UL-AWM1015 black 3x1x8 AWG	UL-AWM1015 black 3x1x8 AWG				
cables	-W19.1/2	NYSLYÖ-J 2x4x25 mm ²	NYSLYÖ-J 2x4x25 mm ²	H07RN-F 2x4x16 mm ²				
compressor control	-A10	7.7000.0 SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1	7.7000.0 SIGMA CONTROL TYP1				
	Siemens							
emergency stop pushbutton	-S3	7.3217.0 / ORUV	7.3217.0 / ORUV	7.3217.0 / ORUV				
auxiliary contact	Schlegel	7.3218.0 / MHT00	7.3218.0 / MHT00	7.3218.0 / MHT00				
controller ventilator	-M5	7.2751.00150 / LV200	7.2751.00150 / LV200	7.2751.00150 / LV200				
sealing frame		7.3350.00020 / D200	7.3350.00020 / D200	7.3350.00020 / D200				
outlet filter	Rübsamen&Herr	7.2752.00060 / GV200	7.2752.00060 / GV200	7.2752.00060 / GV200				
control cabinet	KAESER	7.7377.0	7.7377.0	7.7377.0				
control panel	KAESER	207367.0	207367.0	207367.0				

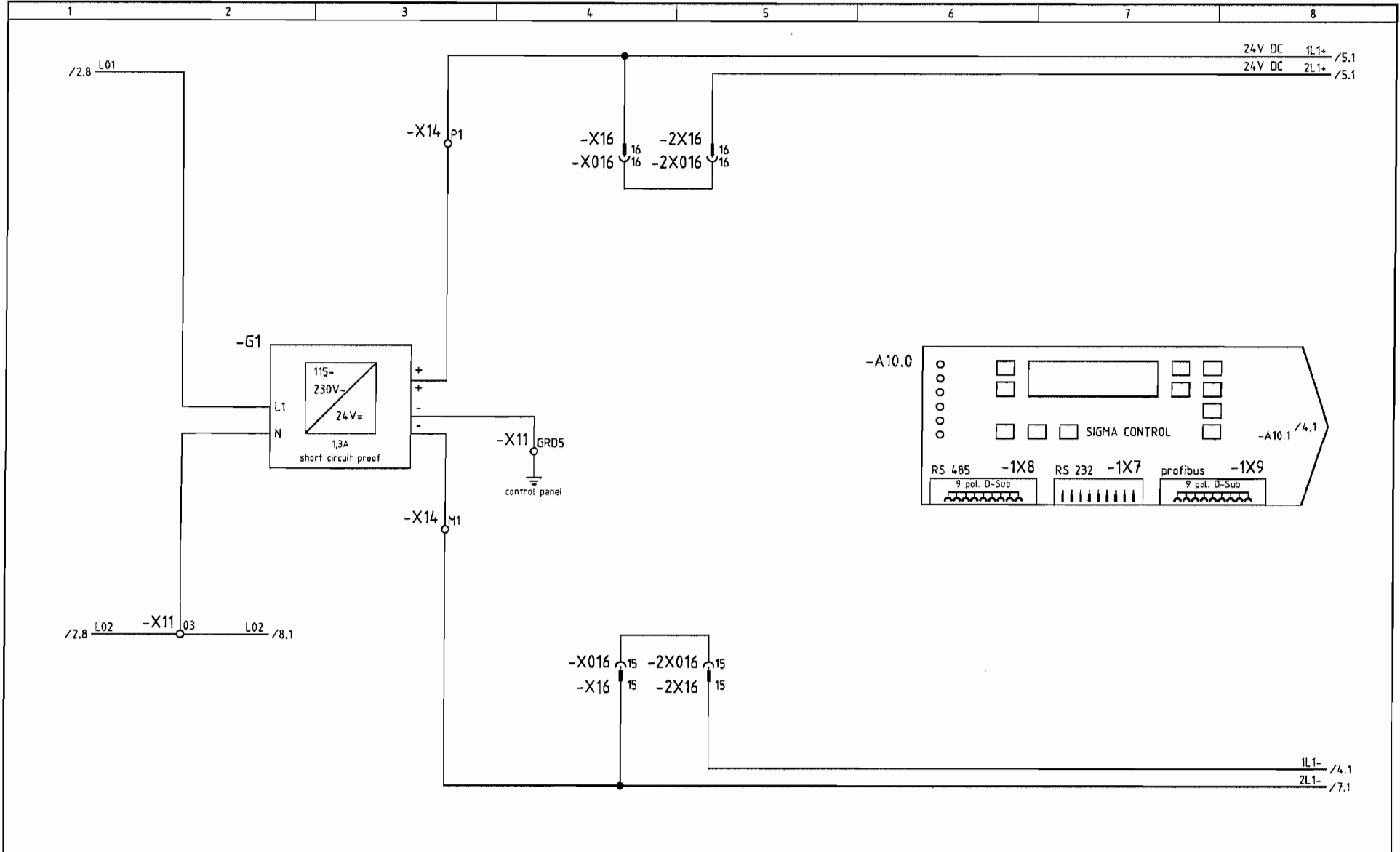


c			Datum	02.06.2004	KAESER KOMPRESSOREN	block diagram compressor series BSD				=
b			Bearb.	Sittler						+
a			Gepr.	Büchner						
c	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung:	UCSU2000_00	UBSD-U2000.00	Blatt 6 B



Function:				compressor motor										vent motor							
Group of function:				input voltage				power unit													
c			Datum	02.06.2004		KAESER KOMPRESSOREN				wiring diagram compressor series BSD power unit				=							
b			Bearb.	Sitter														=			
a			Gepr.	Büchner																	
0	Änderung	Datum	Name	Norm	Ersatz durch:		Ersatz für:		Ursprung:		SBSD-U2000.00				Blatt 1						
														Bl.							





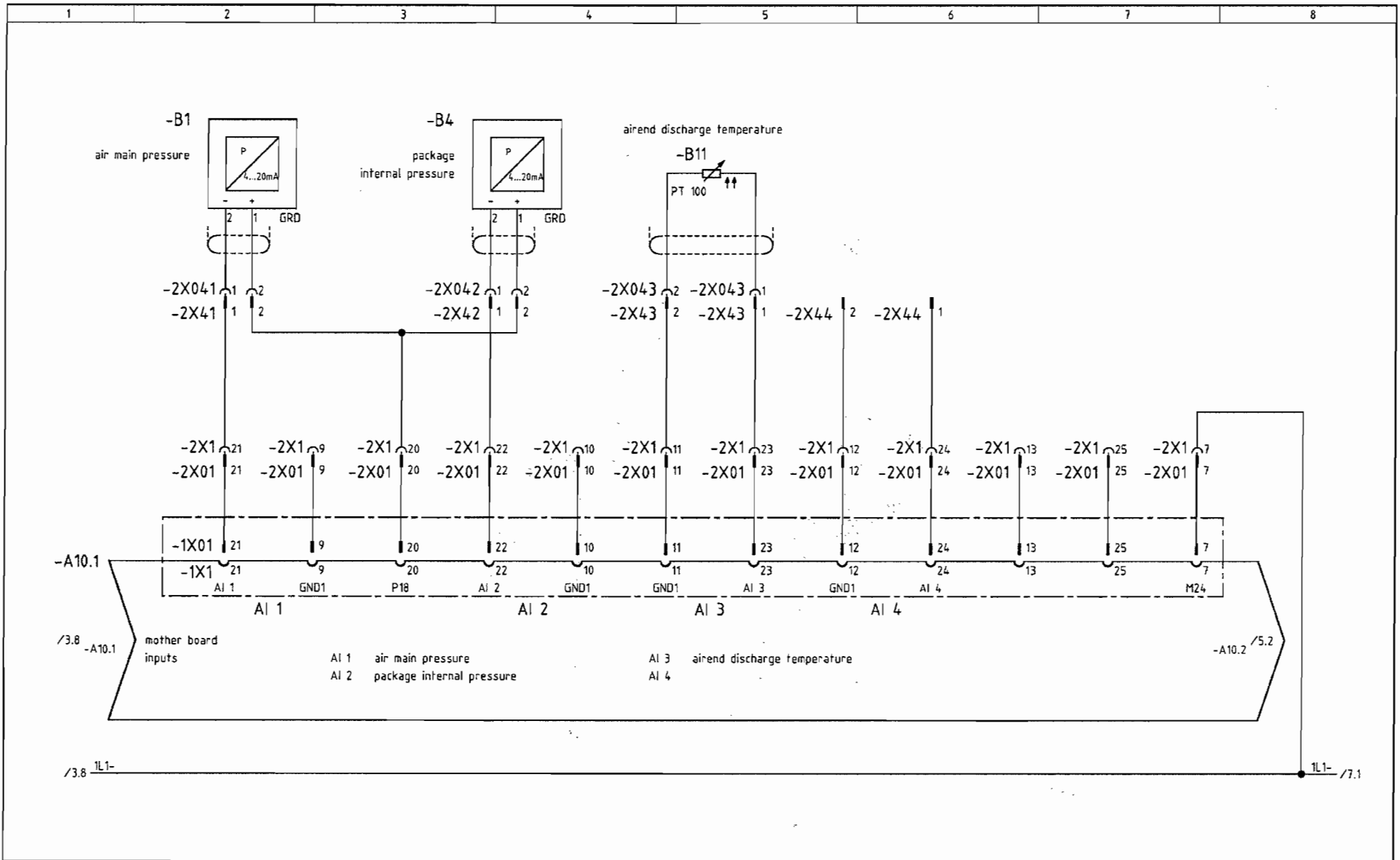
Function:				24V DC			
Group of functions:				control voltage tapping			
c			Datum	02.05.2004			
b			Bearb.	Sifler			
a			Gepr.	Büchner			
D	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung: UCSU2000_00

KAESER
KOMPRESSOREN

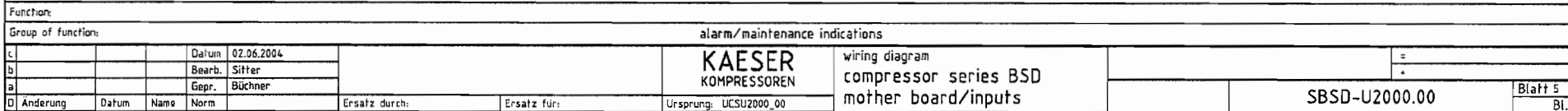
wiring diagram
compressor series BSD
power supply unit

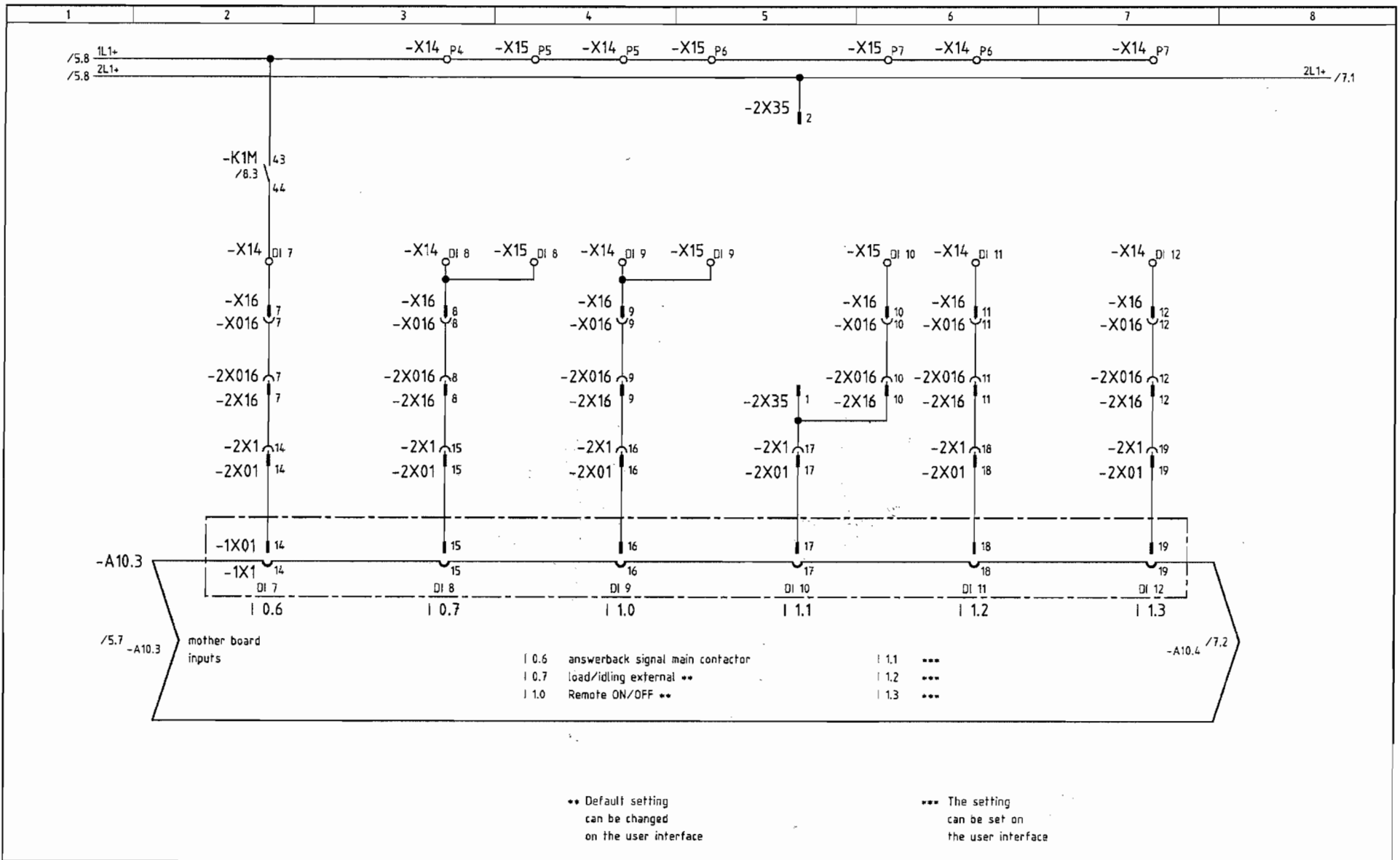
SBSD-U2000.00

Blatt 3
Bl.

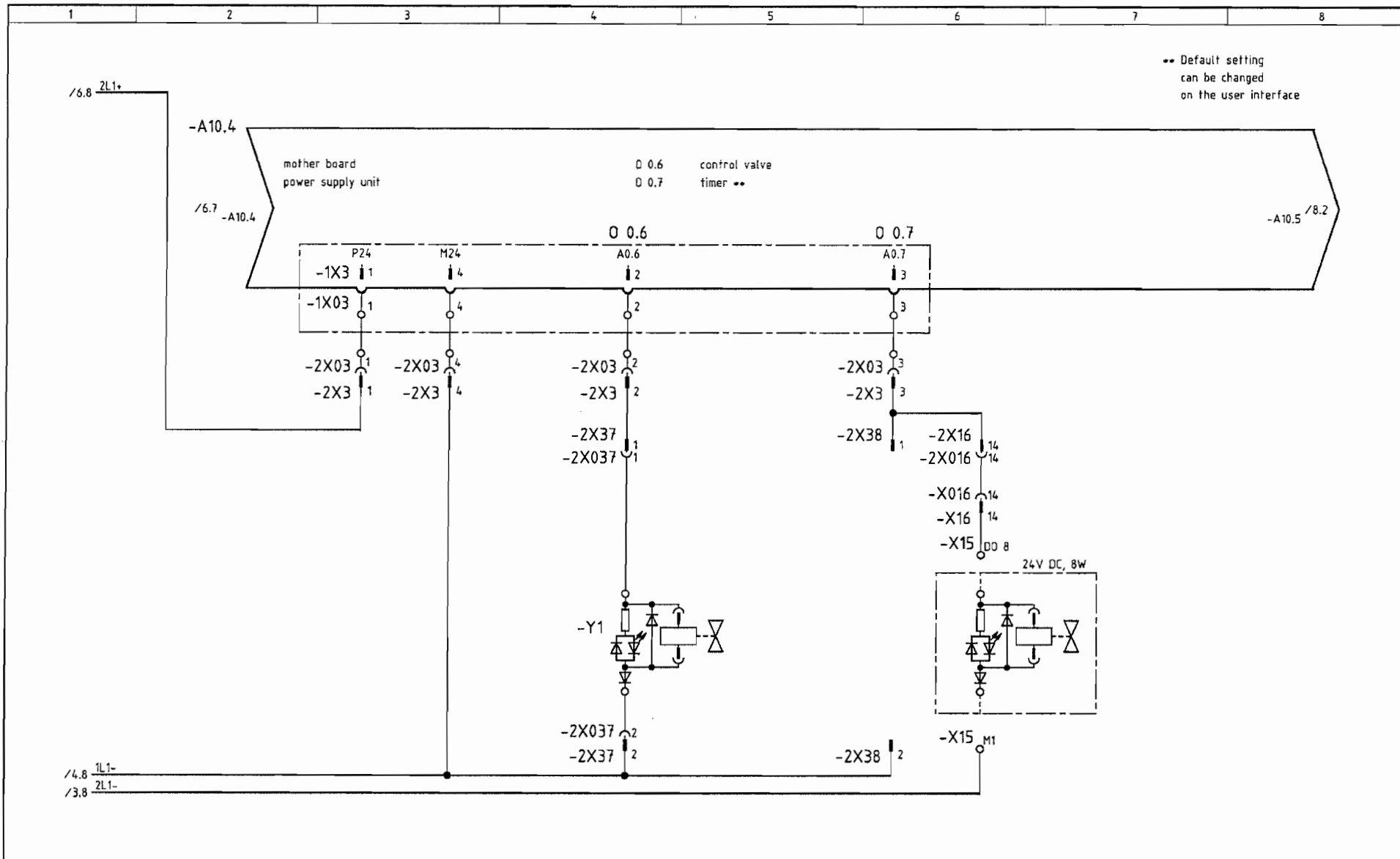


Function:									
Group of function: pressure control									
c			Datum	02.06.2004	KAESER KOMPRESSOREN		wiring diagram		
b			Bearb.	Siffler			compressor series BSD		
a			Gepr.	Büchner			mother board/inputs		
B	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung: UCSU2000_00	SBSD-U2000.00	Blatt 4 Bl.

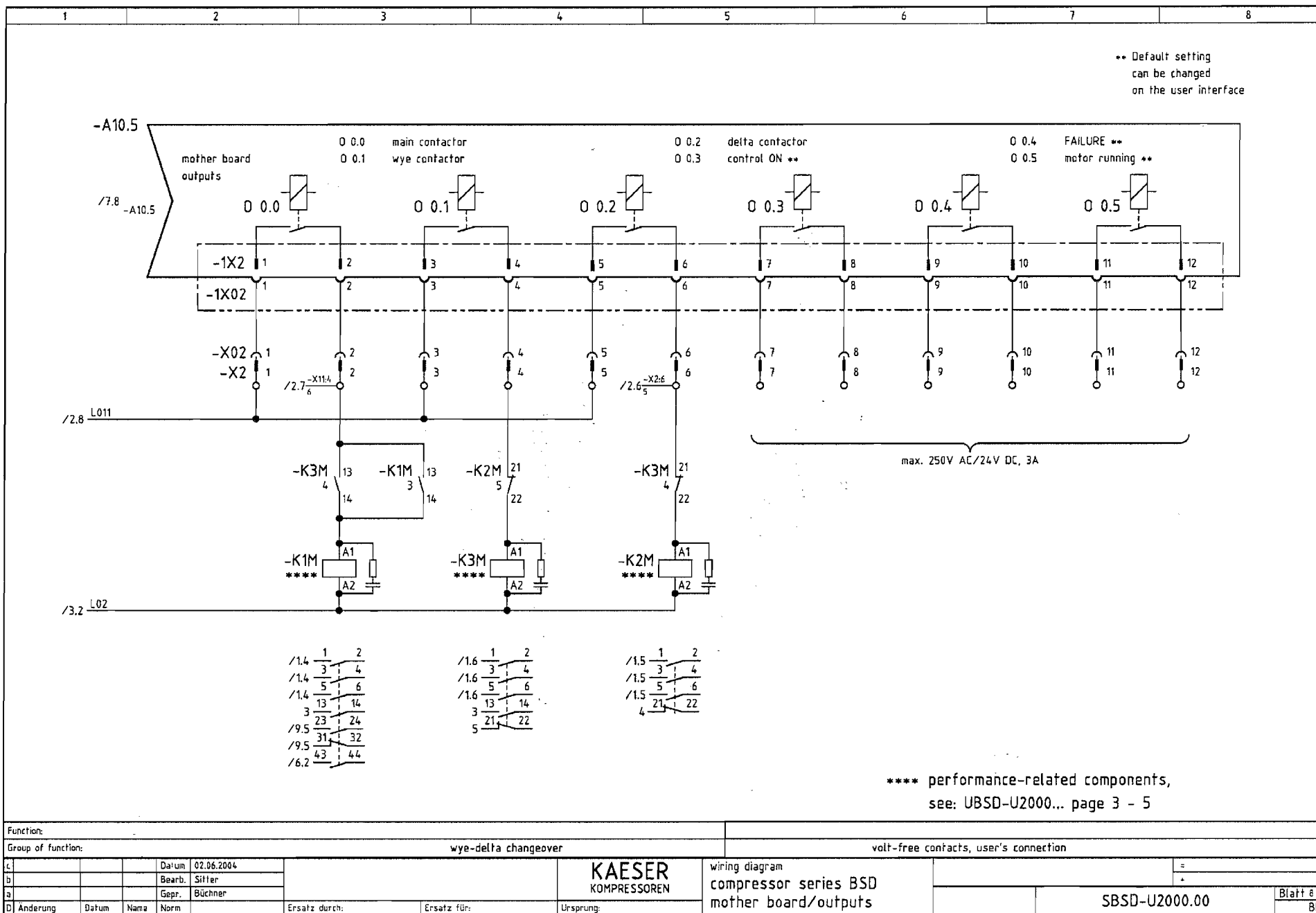




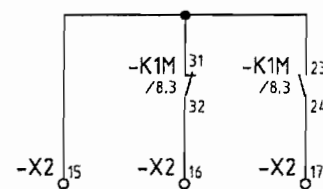
Function:				alarm/maintenance indications			
Group of function:							
l		Datum	02.06.2004	KAESER KOMPRESSOREN		wiring diagram compressor series BSD mother board/inputs	
b		Bearb.	Sittler				
a		Gepr.	Büchner				
Q	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung: UCSU2000_00
					SBSD-U2000.00		Blatt 6 Bl.



Function:				combined control/vent valve				condensate drain, User's connection			
Group of function:				mother board							
l			Datum	02.06.2004	KAESER KOMPRESSOREN			wiring diagram compressor series BSD mother board/outputs			
b			Bearb.	Sitter							
a			Gepr.	Büchner							
D Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	UCSU2000_00	SBSD-U2000.00		Blatt 7 Bl.



volt-free contacts User's connection

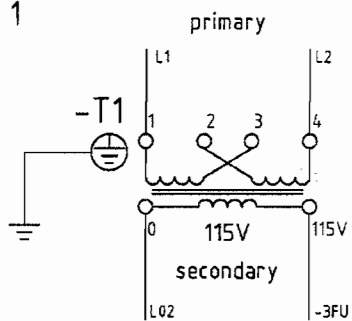


max. 250V AC/24V DC, 3A

all non-designated conductors,
16AWG orange

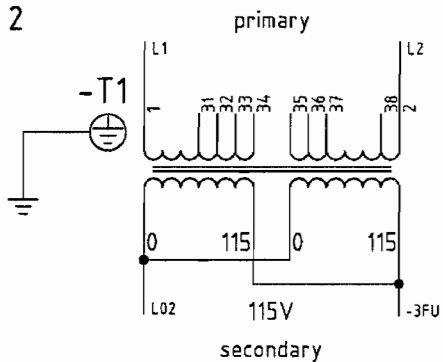
Function:				motor running			
Group of function:				volt-free contacts			
c			Datum	02.06.2004	KAESER KOMPRESSOREN	wiring diagram compressor series BSD volt-free contacts	=
b			Bearb.	Sitter			•
a			Gepr.	Büchner			
0	Änderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung:
					SBSD-U2000.00		Blatt 9 Bl.

diagram 1



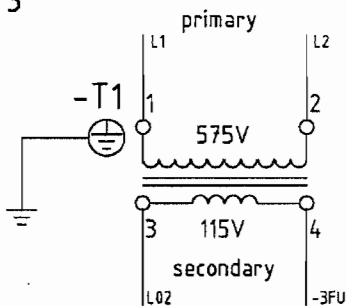
primary	jumper between:
460V	2-3
230V	1-2/3-4

diagram 2



primary	jumper between:
380V	31-38
208V	1-37/2-31

diagram 3

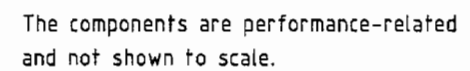


primary
575V

5) option K2

c			Datum	02.06.2004	<div>KAESER KOMPRESSOREN</div>	terminal connection compressor series BSD terminal strip -X2,-X11			=
b			Bearb.	Siffer					+
a			Gepr.	Büchner					
H	Anderung	Datum	Name	Norm	Ersatz durch:	Ersatz für:	Ursprung:		
								KBSD-U2000.00	Blatt 2 8

[illegible]

[illegible]