Service manual

Master controller

SIGMA AIR MANAGER 8/8 ≥ 1.10

Number: 9_5719 04 E

Manufacturer:

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Original instructions
/KKW/CSAM 1.02 en SBA-SIGMA-AIR-MANAGER 8_8

KAESER KOMPRESSOREN

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1 Regarding this document

1.1 Using the document

This service manual is part of the controller.

An outline of the keys and the menu tree is found in the fold-out of this service manual.

1. Keep the service manual available as long as you work with the controller.
2. Pass the manual on to the next owner/user of the machine.
3. Make sure that every subsequent modification to the controller is also entered in the service manual.

1.2 Copyright

1.3 Licensed brands and trademarks

All licensed brands and trademarks and brands and trademarks licensed to third parties mentioned in this service manual are subject without restriction to the legislation for the brand and trademark rights concerned and the ownership rights of the licensed owner in each case. The mere mention of a trademark alone does not allow the conclusion to be drawn that a trademark is not protected by the rights of a third party.

1.4 Symbols and markings

1.4.1 Warnings

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

- DANGER
- WARNING
- CAUTION

1. **DANGER!**
   These show the kind of danger and its source.
   The possible consequences of ignoring a warning are shown here.
   The signal word "DANGER" indicates that death or severe injury can result from ignoring the warning.
   ➢ The measures required to protect yourself from danger are shown here.
2. Always read and comply with warning instructions.

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

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

Tab. 1 The levels of danger and their meaning

1.4.2 Other instructions and symbols

This symbol refers to particularly important information.

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

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

➢ This symbol is is placed by lists of actions comprising one stage of a task.
In lists of actions with several stages the sequence of actions is numbered.

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

This symbol refers to important information or measures concerning environmental protection.

Further information Here, your attention is drawn to further topics.

2 Technical Specification

2.1 Master controller models

The first number in the model name shows the number of machines that can be linked to the master controller concerned. The second number stands for the number of machines without SIGMA CONTROL that can be directly linked.

The master controllers dealt with in this manual are called SIGMA AIR MANAGER and SAM for short.

The following SIGMA AIR MANAGER models are available:

- 4/4
- 8/4
- 8/8
- 16/8

➢ Please enter the system data of your SIGMA AIR MANAGER here:

System data	
Material number	
serial number	
Software	
Operating system	

Tab. 2 System data

Call up the software version and serial number as follows:

➢ Menu *<Settings«F1»System«F1»System information«F6»>*

2.2 Connection possibilities

Maximum number of machines controlled:

Model	4/4	8/4	8/8	16/8
SIGMA CONTROL	4	8	8	16
I/O via Profibus expander	4	8	8	16
I/O directly to the master controller	4	4	8	8

Tab. 3 Connection possibilities

2.3 Inputs and outputs

- In principle, every input and output is freely assignable.
- The number of inputs and outputs can be increased using Profibus expanders (see chapter 2.9)
- Details on assignable and assigned inputs and outputs can be found in the circuit diagrams in the attachment.

Model	4/4	8/4	8/8	16/8
Digital inputs (DI) for floating relay signals	4	4	24	48
Floating relay digital outputs (DO) (as changeover contact, 230 V, 3 A)	5	5	24	32
Analog inputs (AI) 0(4)-20 mA	1	1	2	4
Analog inputs (AI) PT100	0	0	2	4
Analog outputs (AO) (0-20 mA, load max. 300 Ω)	1	1	1	2

Tab. 4 Inputs and outputs

2.4 Electrical data

Model	4/4	8/4	8/8	16/8
Mains voltage/phase/network frequency [V//Hz]	100–240/1/50–60			
Rated current [A]	0.7–0.35		1.22–0.66	
User's fusing [A]	10–16			
Power cable core cross-section [mm^2]	3x1.5			
Equipotential bond connection [mm^2]	1x16			
Enclosure protection	IP54 to IEC 529			
Buffer battery [V] / [Ah]	3.6/1.8			

Tab. 5 Electrical data

Battery life

Model	4/4	8/4	8/8	16/8
Life [in years] without power supply	3	3	3	3
Life [in years] with power supply	10	10	10	10

Tab. 6 Buffer battery life

2.5 Hardware

2.5.1 Industrial computer

- Industrial computer with Pentium® class processor
- Analog inputs and outputs (0-20 mA)
- 230/115 V relay outputs (floating contacts)
- 24 V common negative rail digital inputs
- Internal under-voltage monitoring of 24 V supply
- Internal temperature monitoring
- Buffer battery for RAM and real-time clock

2.5.2 Interfaces

The SIGMA AIR MANAGER has the following interfaces:

- RS 232 for SIGMA AIR CONTROL visualization and interface converter
- Profibus DP Master (187.5 kbit/s) for KAESER PBE and SIGMA CONTROL
- Ethernet for visualization and central control systems
- PCMCIA slot for KAESER storage module, KAESER modem and updates

2.5.2.1 RS 232

- no potential isolation
- max. 38.4 kbit/s
- 9-pin sub-D connection (master controller: pin and socket)
- 4-40 UNC screw locking
- Mating connector (screened housing)
- Screened connector cable
- See attachment for pin assignments

2.5.2.2 Ethernet

- 10 Base T (Industrial Twisted Pair)
- Potential isolation
- max. 10 kbit/s
- 8-pin RJ-45 connection (master controller plug and socket)

2.6 Software

- RMOS real-time operating system
- Controller software
- Visualization software
- Data base

2.7 Pressure transducer

Models I und II pressure transducers

Model	I	II
Measurement range [bar]	0–1	0–6/10/16/20/32
Overload limit [bar]	3.5	double final pressure
Deviation of characteristic from final value Limit setting [%]	≤ 0.5	≤ 0.5 (0.25 typical)
Air connection. male thread	G 1/2 B DIN 16288 Stainless steel	G 1/4 A DIN 3852 Stainless steel Viton seals
Rated temperature range [°C]	–20...+80	–25...+85
Rated temperature range [K]	253...353	248...358

Model	I	II
Mean temperature range [°C]	–30...+100	–40...+100
Mean temperature range [K]	243...373	233...373
Storage temperature range [°C]	–40...+100	–40...+100
Storage temperature range [K]	233...373	233...373
Temperature influence / 10 K at zero [%]	± 0.2	± 0.15
Temperature influence / 10 K over the range [%]	± 0.2	± 0.15
Output signal (two-wire technique) [mA]	4–20	4–20
Power supply connection (plug to EN 175301-803)	PG 11	PG 9
Enclosure	stainless steel	stainless steel
Enclosure protection	IP 65	IP 65
Tightening torque [Nm]	17–20	17–20

Tab. 7 Models I und II pressure transducers

Pressure transducer model III and vacuum

Model	III	Vacuum pumps
Measurement range [bar]	0–16	–
Measurement range. absolute [bar]	–	0–1
Overload limit [bar]	32	3
Deviation of characteristic from final value Limit setting [%]	≤ 1 (0.5 typical)	≤ 1 (0.5 typical)
Air connection. male thread	G 1/2 A	G 1/2 A
Air connection. male thread	G 1/8 A	G 1/8 A
Rated temperature range [°C]	–25...+80	–25...+85
Rated temperature range [K]	248...358	248...358
Mean temperature range [°C]	–30...+100	–30...+100
Mean temperature range [K]	243...373	243...373
Storage temperature range [°C]	–40...+100	–40...+100
Storage temperature range [K]	233...373	233...373
Temperature influence / 10 K at zero [%]	± 0.4	± 0.4
Temperature influence / 10 K over the range [%]	± 0.4	± 0.4
Output signal (two-wire technique) [mA]	4–20	4–20
Power supply connection (plug to EN 175301-803)	PG 9	PG9
Enclosure	brass	brass
Enclosure protection	IP 65	IP 65
Tightening torque [Nm]	17–20	17–20

Tab. 8 Models III und vacuum pressure transducers

Assignment of pressure transducer to the master controller

Model	4/4	8/4	8/8	16/8
II		x	x	x
III	x			

Tab. 9 Pressure transducers for standard master controllers

2.8 Control cabinet

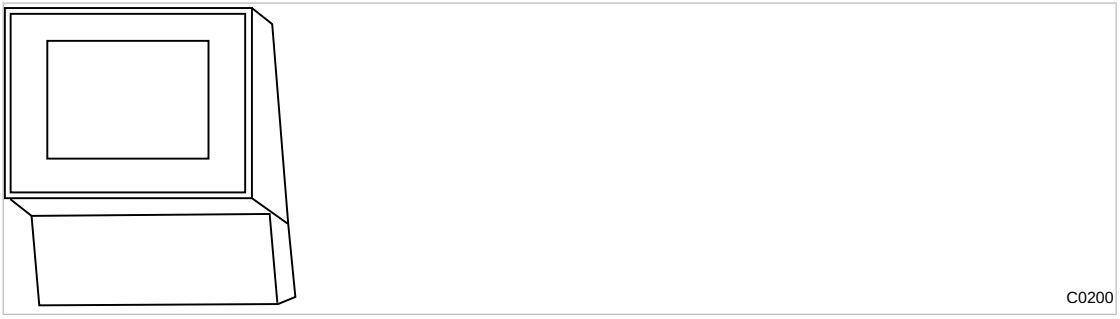


Fig. 1 Control cabinet for models 4/4 and 8/4

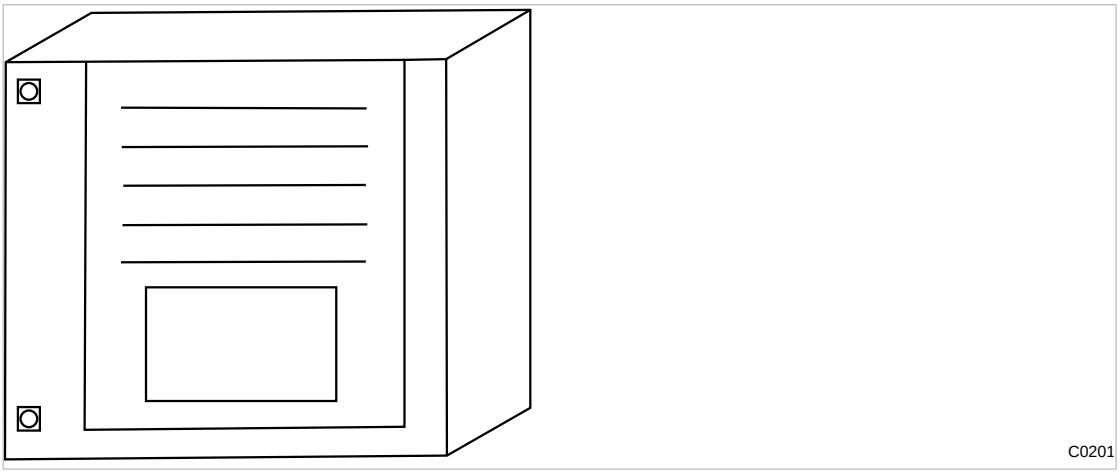


Fig. 2 Control cabinet for models 8/8 and 16/8

Model	4/4	8/4	8/8	16/8
Material	1)	1)	1)	1)
Width [mm]	380	380	500	800
Height [mm]	527	527	700	1200
Depth [mm]	220	220	250	300
Weight [kg]	15	15	40	150

1) Sheet metal, painted RAL 7035 light-grey

Tab. 10 Cabinet dimensions

2.9 Profibus expander (PBE)

Profibus expanders can be used if:

- there are not enough inputs available in the master controller for messages from the machine,
- cables exceed permissible lengths.

Only Profibus expanders from KAESER and any combinations thereof that are listed below may be used:

Model Profibus Expander (PBE)	PBU 8	PBU 8 K	PBU 8 R	PBU 32	PBU 4+4	PBU 4T
Digital inputs/outputs (DI/DO)	8	8	8	32/0	–	–
Integrated output coupling relay	–	–	4	–	–	–
Analog inputs and outputs (AI/AO 0–20 mA)	–	–	–	–	4/4	–
Analog inputs (AI PT100)	–	–	–	–	–	4
Maximum number of linked Profibus expanders	8	8	8	2	2	2
Maximum number of inputs and outputs created by linking several PBEs	64 DI / DO			64 DI	8 AI 8 AO	8 AI

Tab. 11 Profibus expander models

All Profibus expanders are equipped with their own housing (exception: PBU 8 K) with integrated power unit and require a power supply (115/230V). They have to be registered on the master controller (see chapter 7.3.3).

Profibus expander (PBE) uses

- PBE 8:
  - Additional connection of up to eight digital inputs or outputs for further signals, for example, from air treatment components, signal sensors or output signals from user's components.
- PBE 8 K:
  - As for PBE 8, however, without housing. It can be integrated in machines or refrigeration dryers.
- PBE 8 R:
  - Typical application: LOAD/IDLE signal via coupling relay, "motor running" feedback signal via digital inputs. Only one PBE with a cable connection (bus cable) to the master controller is required for control of up to four conventional compressors (in one room).
- PBE 32:
  - Additional connection of up to 32 digital inputs for further signals to the master controller, for example from air treatment components, conventional compressors, other sensors.
- PBE 4 + 4:
  - The additional connection of up to four analog inputs and outputs, for example system pressure to the master controller, forwarding of the required pressure to user's components.
- PBU 4T:
  - Additional connection of up to 4 analog, two, three or four-line PT100 inputs, e.g. for sensing room temperature, cooling water temperature or the temperatures of other user's devices.

3 Safety and Responsibility

3.1 Basic instructions

DANGER
Disregard of these instructions can result in serious injury.

➢ To operate the master controller safely, read the service manual carefully and take notice of its contents.

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

- danger to life and limb of the operator or third parties,
- Impairment of the master controller and other property.

➢ Therefore, observe the following:
  - Use the controller only if it is in a technically perfect condition and only for the purpose for which it is intended; observe all safety measures and the instructions in the service manual.
  - In particular, immediately rectify (have rectified) any faults that could be detrimental to safety.

3.2 Specified use

Specified use also includes compliance with the instructions in this manual.

The master controller is intended exclusively for the operation of compressors, blowers and vacuum systems in industrial fields and may only be operated within its associated control cabinet.

Any other use is considered incorrect.

The manufacturer is not liable for any damages that may result there from. The user alone is liable for any risks incurred.

➢ Adhere to the specified use given in this manual.

3.3 Improper use

Specified use also includes compliance with the instructions in this manual.

Converting or changing the master controller constitutes improper use. The manufacturer's warranty is made invalid in such cases.

1. Adhere to the specifications in the service manual.
2. Do not allow conversions or changes.

3.4 User's responsibilities

3.4.1 Observe statutory and universally accepted regulations

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

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

3.4.2 Defining personnel

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

Authorised operators possess the following qualifications:

- are of legal age,
- are conversant with and adhere to the safety instructions and sections of the service manual relevant to operation,
- have received adequate training and authorisation to operate electrical and compressed air devices.

Authorized installation and maintenance personnel have the following qualifications:

- are of legal age,
- have read, are conversant with and adhere to the safety instructions and sections of the service manual applicable to installation and maintenance,
- are fully conversant with the safety concepts and regulations of electrical and compressed air engineering,
- are able to recognise the possible dangers of electrical and compressed air devices and take appropriate measures to safeguard persons and property,
- they have received adequate training in and authorization for the safe installation and maintenance of this master controller.

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

3.5 Dangers

The general safety instructions in this chapter describe 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 a task instruction.

➢ Take full heed of all safety instructions.

3.5.1 Safely dealing with sources of danger

Electricity

➢ Disconnect the machine from all power supply phases.

➢ Switch off any external power sources.

External voltage is still present on the marked terminals (orange or labelled) in the master controller when the power supply is switched off.

➢ Check and ensure that no power is present.

- ➢ Before switching on again make sure that
  - no maintenance personnel are working,
  - all panels are in place,
  - all access doors are closed.
- ➢ Allow only qualified electricians or trained personnel under the supervision of a qualified electrician to carry out work on electrical equipment according to electrical engineering regulations.
- ➢ Observe all accepted safety regulations and national legislation applicable to all work carried out on the master controller.
- ➢ Use fuses corresponding to machine power.
- ➢ Make electrical connections only with power removed and check regularly for tightness and condition.
- ➢ Only use only electrical cables that are suitable and approved for the surroundings and electrical loads applied.
- ➢ Before every start-up by the user of machines that are linked to the master controller, make sure there is adequate protection against electric shock from direct or indirect contact and check regularly.

3.5.2 Using the master controller safely

Pay attention to the following points to avoid damage to the master controller:

- ➢ Do not remove any plugs on the master controller while the compressed air system is in operation.
- ➢ Operate the master controller only when all supplies are connected.
- ➢ Do not short circuit the supply pins of the Profibus interface.

A short circuit can cause irreversible damage to the Profibus interface.

- ➢ Never modify, bypass or disable safety devices.
- ➢ Do not remove or obliterate labels and notices.
- ➢ Use only spare parts that have been approved by the manufacturer for this master controller.

3.6 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 the specified use of the master controller under observation of the specific operating conditions.
Due to the large number of possible applications, it is incumbent on the user to determine whether the master controller can be used for any specific application.

Furthermore, we accept no warranty obligation for:

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

Correct maintenance and repair means the use of genuine Kaeser spare parts.

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

4 Design and Function

4.1 Overview

The SIGMA AIR MANAGER master controller is designed for the control of compressor stations with several compressors. The master controller reacts flexibly to fluctuating compressed air demand, so reducing energy consumption. In addition, it allows the use of various monitoring functions.

The master controller consists of the following components:

- The central pressure transducer measures the pressure in the air main and passes the value on to the arithmetical unit.
- The arithmetical unit decides according to default parameters, which machines are switched to load to keep the pressure in the air main constant. It also makes possible evaluation, visualization and archiving of the data.
- The display and control panel gives information on actual pressure and other parameters and offers various possibilities for individual settings.
- The SIGMA AIR CONTROL *basic* software makes possible the visualization of important data on an external PC.
- The optional software SIGMA AIR CONTROL *plus* makes possible an evaluation and storage of the data on an external PC.
- The short message (SMS) option offers the possibility of sending alarm and service messages.
- The optional send/receive protocol allows the master controller to be linked to a user's central control system via Ethernet.
- Network section control allows the control of a network that is divided into two sections.

Both compressors with SIGMA CONTROL and those with conventional controllers can be linked to the master controller.

4.2 Control panel

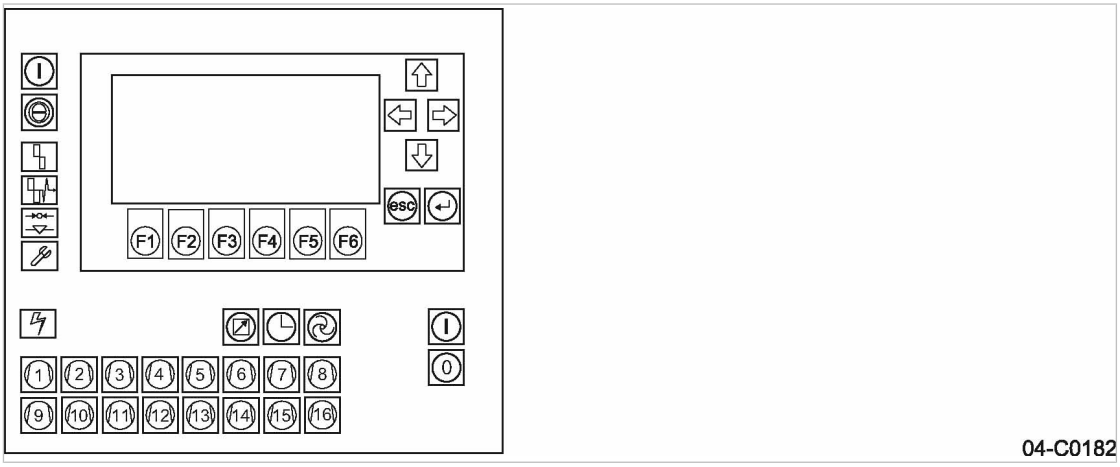
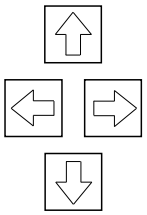
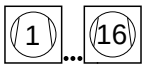
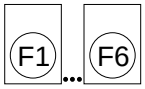


Fig. 3 Control panel model 16/8

4.2.1 Keys

Symbol	Key	Function
	«Arrow keys»	Move the cursor (depending on operational situation either field-wise or entry-wise to the left, right, up or down).
	«escape»	Jump back to the next higher menu level. Exit edit mode without saving the edited parameter.
	«Enter»	Exit edit mode saving the edited parameter.
	«ON»	Switch on the compressor station.
	«OFF»	Switch off the compressor station (no compressed air demanded).
	«Automatic mode»	Switch the station between manual and automatic mode.
	«Shift clock»	Switch the clock on or off
	«Remote »	Switch the station on or off from a control centre.
	«Machine selection»	Delete from or add individual machines to the selection.
	«Function keys»	Select displayed functions.
	«Acknowledgement»	Confirm messages and reset the event memory (if permissible).
	«Information»	Display help and explanatory text.

Tab. 12 Function keys

4.2.2 Table of light emitting diodes

Symbol	Name	Meaning
	Compressor station ON	The compressor station is switched on.
	Automatic mode	The station runs in automatic mode.
	Shift clock operation	The station is controlled by the shift clock.

Symbol	Name	Meaning
	Remote mode	The station can be controlled by a control centre.
1 ... 16	Machine selection	This machine is selected (is available to the master controller).
	Alarm	Flashing: fault on a station component. Illuminated: the alarm has been acknowledged, but the fault has not yet been removed.
	Communication alarm	Communication via a data interface is interrupted Fault between the master controller and compressor or between the master controller and another controller.
	Pressure low	Network pressure has fallen below the setpoint.
	Maintenance and warning indicator	Flashing: Maintenance work necessary. Illuminated: Maintenance indication acknowledged, but maintenance not yet carried out.
	Controller power ON	Power supply to the master controller is present.
i	Help key	Additional information on the actual program function is available.

Tab. 13 Light emitting diodes

4.2.3 Display

The display is arranged as follows:

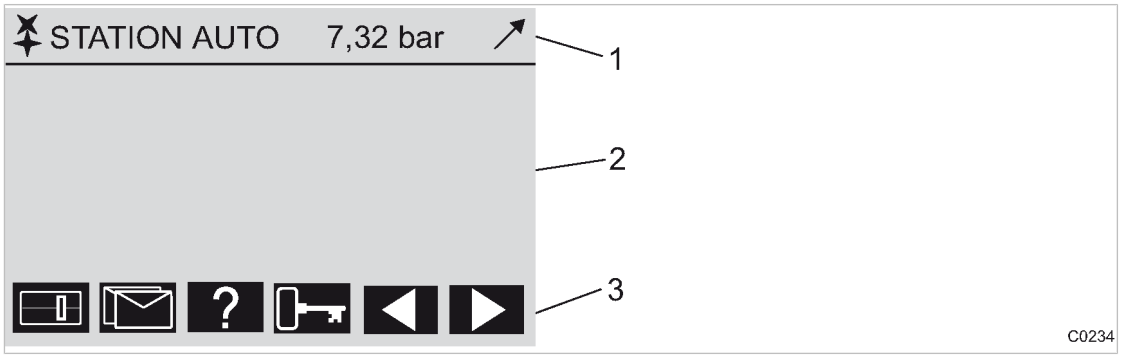


Fig. 4 Display arrangement

1 Header
2 Main field: machine status / message texts / settings
3 Menu selection footer (example)

The following information is displayed from left to right in the header 1 :

- System running: represented by a rotating symbol.
- Mode: station in automatic mode, manual mode or shut down.
- Pressure indication: shows the momentary network pressure.
- Tendency: the arrow shows whether pressure is rising, is constant, or falling.

Main display area 2: depending on operational state and setup, various events and settings are shown.

Footer 3: the functions and menu options that can be called up with the keys «F1» to «F6» are shown.

4.2.4 Password protection

Access to the master controller is controlled by four levels of authority that are protected by password.

When the master controller is switched on, the lowest level of access (Level 0) is activated. In Level 0 parameters can be displayed and some of these can be edited.

The password sets itself back to Level 0 if no entries are made over a period of 5 minutes.

The level of authority required will be quoted in this manual for every function.

4.3 List of menus

An overview of the main menu is provided at the end of this manual.

4.3.1 Main menu level

Normally, the main menu with current information on the compressed air system is displayed. These are distributed over numerous display frames that can be scrolled with the «F5» and «F6» keys.

- Large type-size display of pressure
- Pressure/time diagram
- Overall FAD
- Machine overview
- Operating data
- Maximal, mean and minimal working pressure

See chapter 8.1 for further information on these displays.

4.3.2 Menu tree

Use the «F1» to «F4» keys to select the following menu options:

Navigation (menu)	Symbol	Sub-menu options	Chapter
«F1»: Settings		■ «F1»: System	7.2
		■ «F2»: Control	7.4
		■ «F3»: Compressor	7.3
		■ «F4»: Compressed air system	7.5
		■ «F5»: Shift clock	7.6
		■ «F6»: Periphery	7.7

Navigation (menu)	Symbol	Sub-menu options	Chapter
«F2»: Messages function key		■ «F1»: Alarm, service and warning messages	9.2
		■ «F2»: Operational Messages	8.2.1
		■ «F3»: SMS status	8.2.2
		■ «F4»: SAC *plus* status	8.2.3
		■ «F5»: System status	8.2.4
		■ «F6»: Memory access	8.2.4
«F3»: Choice of language		■ «F1»+«F6»: Choice of language	7.2.2
		■ «F3»: Notes	
«F4»: Password		■ «F1»: Logout	7.2.6.1
		■ «F2»: Password list	7.2.6.2
		■ «F3»: Key lock	7.2.6.3
		■ «F4»: Password allocation	7.2.6.4

Tab. 14 Main menu

Menu options for F1 (Settings)

Menu option	Sub-menu options		
«F1»: System	«F1»: General settings	■ «F1»: Date and time	
		■ «F2»: Summer / winter	
		■ «F3»: Country-specific settings	
		■ «F4»: Operating panel	■ «F1»: Lamps test ■ «F2»: Keys test ■ «F3»: Display test ■ «F4»: Display settings
	«F3»: Interfaces	■ «F1»: Profibus ■ «F2»: RS 232 ■ «F3»: Modem ■ «F4»: Ethernet	
	«F4»: Input/output states	■ «F1»–«F4»: Digital and analog inputs and outputs	
	«F5»: Communication	■ «F1»: Short Message System (SMS) ■ «F2»: SIGMA AIR CONTROL *plus* ■ «F3»: SEND / RECEIVE	
	«F6»: System information		
«F2»: Control	«F1»: Further settings		
	«F2»: Control dynamics		

Menu option	Sub-menu options	
«F3»: Compressor	«F1»: Connection	
	«F2»: Hours	
	«F3»: FC characteristic	
	«F4»: Further settings	
«F4»: Compressed air system	«F1»: Required pressure	
	«F2»: Network pressure	
	«F3»: Restart	
	«F4»: Further settings	
	«F5»: Section control	
«F5»: Shift clock		
«F6»: Periphery	«F1:» Alarm/Warning/ external service	■ «F1»: Defined messages ■ «F2»: Definable messages (alarms) ■ «F3»: Definable messages (service / warning)
	«F4:» Further input functions	■ «F1»: Digital inputs ■ «F2»: Analog inputs setting ■ «F3»: Display of analog inputs
	«F5:» Further output functions	■ «F1»: Digital outputs ■ «F2»: Analog outputs
	«F6:» Profibus expander	■ «F1»: Digital (8 I/O) ■ «F2»: Digital (32 I) ■ «F3»: Analog (4 I/4 O) ■ «F4»: PT100 (4 I)

Tab. 15 Menu option settings F1

Menu options for Messages (F2)

Menu	Submenu
«F1»: Alarm, service and warning messages	■ «F1»: Current messages ■ «F2»: Event history
«F2»: Operational Messages	■ «F1»: Current messages ■ «F2»: Event history
«F3»: SMS status	
«F4»: SAC *plus* status	
«F5»: System status	
«F6»: Memory access	

Tab. 16 Menu option messages

4.4 Operation and function

The master controller was designed and developed for a number of applications. Generally, most of the default settings can be kept or have to be changed only slightly.

4.4.1 Adaptive 3D control

The adaptive 3D control minimises the energy requirements of the compressed air station by automatically adapting to the operating conditions.
It automatically adapts the selection of the compressors to be activated and deactivated as well as the cut-out and cut-in pressures for the selected compressors to the current operating conditions of the compressed air station.

4.4.2 Base load sequence

The controller will equally use machine of the same size. The standard for comparison is the number of operating hours.
The machine with the least number of operating hours is used the most.

4.4.3 Shift clock mode

The compressed air system can be operated from a shift clock. There are 32 switching points per week available.

Further information See chapter 7.6 for programming the clock.

4.4.4 Power limiting

If the power limiting function is activated, the system will add compressors only to the point where the overall load capacity of the running compressors exceeds the specified power limit.

Further information See chapter 7.5.4 for further information on power limiting settings.

4.4.5 Air main charging

After the activation of the compressed air station, the air network is charged at the specified network charging speed.

Further information Air main charging, see chapter 7.5.3.

4.4.6 EMERGENCY operation

A compressed air station can run EMERGENCY operation if each compressor has its own system pressure switch or electronic controller. This is always the case with rotary screw compressors.

Compressed air systems with rotary blowers or reciprocating air compressors may or may not have machines provided with their own system pressure switches.

Air stations comprising machines that do not contain their own system pressure switches cannot run in EMERGENCY operation. These compressed air systems cannot deliver compressed air without a master controller.

Compressor stations with EMERGENCY mode (manual mode)

EMERGENCY mode can cause large pressure swings in the air main.

The air compressors linked to the master controller are automatically switched to emergency mode if power is lost to the master controller while it is switched on (LED "Station ON" is illuminated), if the connection to the pressure transducer is interrupted or the master controller itself fails. The compressors then run under their internal controllers, independent of the master controller.

The machines can be manually switched to EMERGENCY operation (manual mode) for test purposes.

Compressor stations without EMERGENCY mode capability

Without a master controller no compressed air can be delivered.

The output relays trip if power to the master controller is lost, if the connection to the pressure transducer is interrupted or the controller itself fails. This causes air compressors linked to the master controller to switch to idle or off. The compressed air system no longer delivers compressed air.

4.4.7 Visualization with SIGMA AIR CONTROL basic

Data from the master controller can be visualised on an external PC with SIGMA AIR CONTROL. A web browser is used for the visualization.

The data include:

- Status of the compressor station and/or individual machines
- Alarm, service and warning messages
- Minimal. maximal and momentary system pressure, required pressure and FAD
- Graphic representation of the pressure band over time

Further information — For linking a PC to the SIGMA AIR MANAGER, see chapter 7.9.

5 Installation and Operating Conditions

5.1 Surroundings

Temperature range

Ambient temperatures	
Ambient temperature	0 to 40 °C
Storage temperature	-25 to +55 °C

Tab. 17 Ambient temperatures

Note permissible ambient temperatures

1. Check ambient temperature.
2. Adjust equipment location to suitable ambient temperature range.

Note storage temperature

1. Check temperature of storage location.
2. Adjust storage temperature to suitable range.

5.2 Installation conditions

Installation conditions for master controllers 4/4 and 8/4

Models 4/4 and 8/4 master controllers may be operated under general or industrial conditions.

➢ Install the master controller as appropriate.

Installation conditions for master controllers 8/8 and 16/8

Models 8/8 and 16/8 master controllers may only be operated in industrial areas that are supplied from their own supply transformer. This transformer may not supply power to a residential area outside the industrial area.

➢ Install the master controller as appropriate.

Certain conditions for the installation location must be fulfilled:

- Free access to the control cabinet.
- Fully opening control cabinet door.
- A free escape route must be maintained (also with the control cabinet door fully open).
- Protection from direct sunlight, rain, splashed water or excessive dust build up must be provided.

6 Installation

6.1 Installation

Link	SIGMA CONTROL	Conventional	Chapter
Installing the control cabinet	x	x	See 6.4
Identifying the machines	x	x	See 6.5
Connecting the pressure transducer	x	x	See 6.6
Planning caballing	x	x	See 6.7
Laying cables	x	x	See 6.8
Building up the Profibus network	x	–	See 6.8.1
Building up the compressor station via floating relay contacts	–	x	See 6.8.2
Lead in the cables and connect to the master controller	x	x	See 6.9
Setting up the machines	x	x	See 6.11

Tab. 18 Installation

6.2 Reporting transport damage

1. **CAUTION!**
   Incorrect transport
   Machine damage
   ➢ Protect the equipment against vibration and shock.
2. Check the master controller for visible and hidden transport damage.
3. Inform the carrier and the manufacturer in writing of any damage without delay.

6.3 Compressed air supply during installation

➢ Check the compressor station emergency operating characteristics.
- See chapter 6.3.1 for stations with EMERGENCY mode.
- See chapter 6.3.2 for stations without EMERGENCY mode.

6.3.1 Station with emergency operating mode

It is possible to install and start up the master controller without shutting down the complete air system.

DANGER
Mortal danger from electric current
➢ The machine must be free of voltage before work commences.

1. Isolate the machine from all sources of voltage.
2. Make sure the machine is voltage-free.
3. Connect the machine to the master controller see chapter 6.7 to 6.10).
4. Put the machine back into operation.
5. Repeat steps 1 to 3 for any further machines.
6. Carry out settings as detailed in chapter 7.
7. Do not switch the master controller from manual to automatic mode until these settings have been completed.

   The master controller then takes over control of the machines.

Further information See chapter 4.4.6 for emergency operation.

6.3.2 Stations without emergency operating mode

The master controller is required for the supply of compressed air. The compressed air system is not operational until initial start-up of the master controller is completed.

➢ Switch on the compressor station after commissioning the master controller.

Further information See chapter 4.4.6 for emergency operation.

6.4 Installing the control cabinet

A solid, vibration-free and load-bearing wall is required for the control cabinet.

Pay attention to the following when fitting the control cabinet:

- The display must be level with the eyes to ensure good readability.
- The fixing materials must be compatible with the type of wall and the weight of the control cabinet.
- A template for the boreholes is to be found in the annex.
- Pay attention to the installation conditions (see chapter 5.2)

➢ Mount the control cubicle on the wall.

6.5 Identifying the machines

Same model machines have to be identified as well, because the internal pressure regulation can be set differently.

➢ Give the machines individual numbers.

The source of alarm and service messages displayed on the master controller can be assigned to the correct machine.

Machine and controller marking when in remote mode

The machines and controller must carry a warning notice when they are in remote mode.

- Warning notice to indicate the machines.
  - WARNING: This machine is remotely controlled and can start automatically at any time.
- Warning notice to indicate the master controller.
  - Before starting, make sure that no one is working on the machines and that they can be started safely.

Place the notices so they are highly visible.

1. Place warning notices on the machine.
2. Place warning notices on the master controller.

6.6 Connecting the pressure transducer

Precondition The connection point is not under pressure.

CAUTION
Network pressure too high
Damage to the pressure transducer

➢ Never connect the pressure transducer to a pressurized network having a maximum pressure exceeding the rated pressure of the pressure transducer.

1. Check the maximum network pressure.
2. Check the nominal network pressure.

6.6.1 Mechanical connection

The pressure transducer graphic (illustration 5) shows the correct position for the transducer.

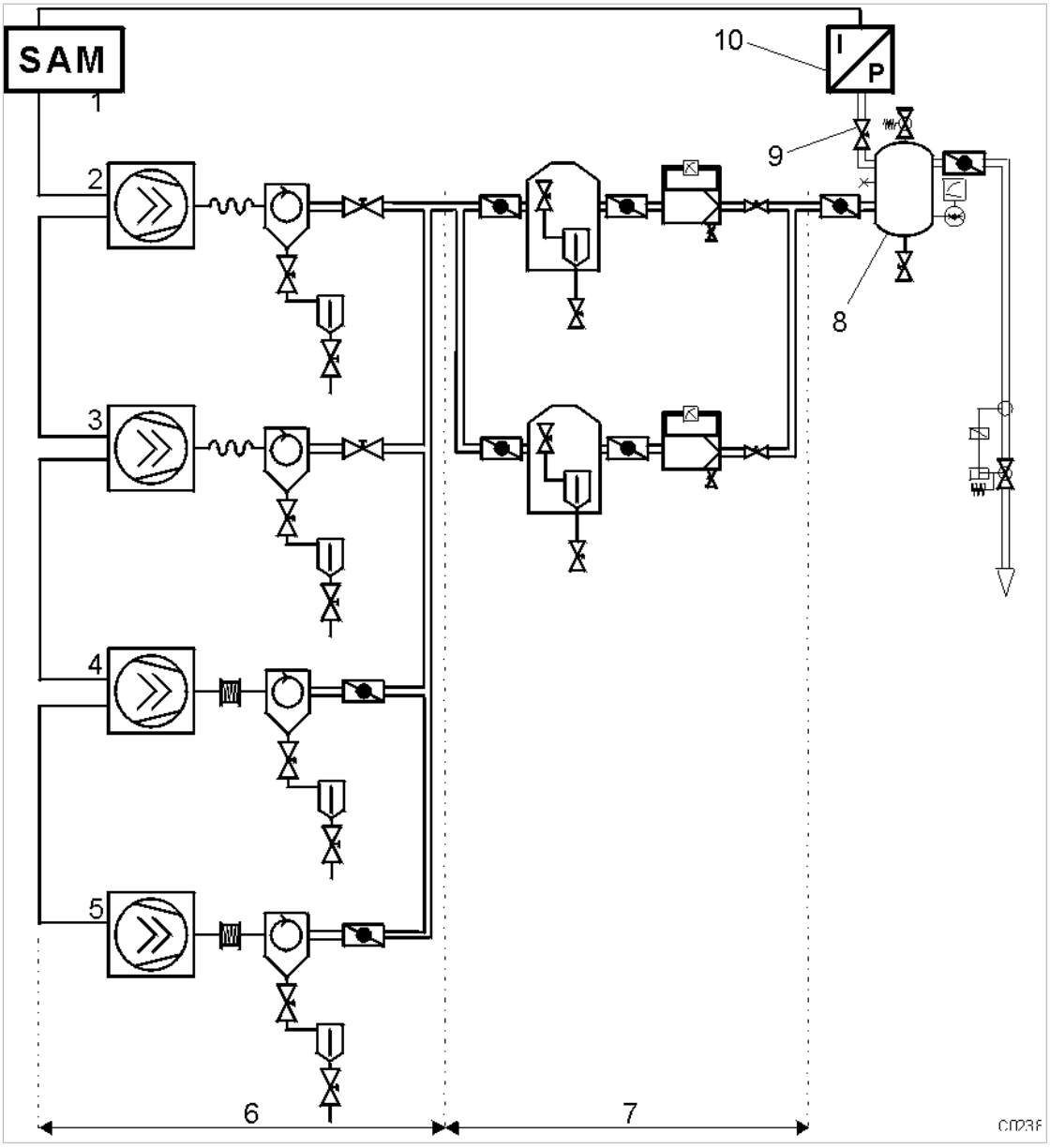


Fig. 5 Pressure transducer position

1 SIGMA AIR MANAGER
2 Machine 1
3 Machine 2
4 Machine 3
5 Machine 4
6 Compressed air production
7 Compressed air treatment
8 Air receiver
9 Shut-off valve
10 Pressure transducer

➢ Pay attention to the following when connecting the pressure transducer:
- Connect the pressure transducer either to the side or the top of the air receiver so that no condensate can settle.
- If the pressure transducer is connected to the main collector pipe, fit a small, additional air receiver (item 8 order separately, see chapter 13.10 for the material number).
- Fit the pressure transducer downstream of the air treatment components because pressure losses caused by air treatment components or pipework can occur between the machine and the point of measurement.
- The airflow at the point of measurement must not pulsate.
- Pay attention to the installation depth.
- Fit a shut-off valve between the air receiver and the pressure transducer. This allows replacement of the pressure transducer without having to vent the air receiver. Do not close the shut-off valve during operation.
- A kit of parts for the air connection is available separately (see chapter 13.10 for the material number).

6.6.2 Power supply

Avoid signal corruption.

1. Use two conductor screened cable with minimum section 0.75 mm^2.
2. The pressure transducer must be earthed.
   - Earth by metallic contact with the air receiver or
   - via a separate equipotential bond with minimum section 1 x 10 mm^2 (e.g. an earth clamp (G3/4) on the transducer housing).
3. Connect the SIGMA AIR MANAGER and the pressure transducer to the same equipotential bond. The potential difference between both earthing points must be zero.
4. Connect the cable screening to earth on the pressure transducer and to a screening connection in the control cabinet.
5. Maintain a separation of at least 10 cm between connecting cables and power cables.

6.7 Planning caballing

There are two methods of linking the machines to the master controller:

- via Profibus
  (for machines with SIGMA CONTROL or machines that are connected to a Profibus expander (see chapter 6.8.1)
- via floating relay contacts
  (for conventional machines without SIGMA CONTROL; see chapter 6.8.2).

These two methods can be mixed, that is, some of the machines can be linked via a Profibus and some via floating contacts.

Instructions on the electrical installation

A supply disconnecting device to EN 60204 must be installed by the user. On model 16/8 this device is included as standard.
The maximum lengths for digital input and output cables are listed listed below.

Model	4/4 and 8/4	8/8 and 16/8	Profibus expander
Maximum cable length [m]	100	30	30

Tab. 19 Cable lengths

- Use galvanic isolation on cables laid outside the building to ensure lightning protection (preferably fibre optic cable).
- See circuit diagrams in the annex for cable types, cross-sections and cable selection. Use flexible cables as far as is possible. Flexible cables must be used in the control cabinet on models 4/4 and 8/4, except power supplies, equipotential bonds and Profibus.
- Suppress inductive loads connected to the relay outputs of the master controller on models 4/4 and 8/4, see chapter 6.8.2.
- If the SMS option is chosen, fit and connect a KAESER modem, see SMS instruction memorandum.

6.7.1 Accessories needed for the link via Profibus

The following accessories are required for the construction of a Profibus network (see annex 13.10)

- Profibus cables
- Profibus plug for SIGMA AIR MANAGER (already supplied with model 16/8)
- Profibus plug set for SIGMA CONTROL

6.7.2 Requirements for a link via a floating relay contact

The connection to the floating relay output of the master controller is in series with the system pressure switch in the machine.

Required contacts for machines to be connected to the SIGMA AIR Manager.

Models 4/4 and 8/4

- an external load control input
- a floating "motor running" relay contact (normally open)

Models 8/8 and 16/8

- A "manual/automatic mode" / ""load/idle" control input with a system pressure switch in manual mode"B1.1
  and
  - a safety pressure switch for master controller operation B1 or
  - a blowoff protection pressure relief valve pressure switch B6
- a floating "motor running" relay contact (normally open)
- a floating "ON and no alarm" contact (normally open).

If a machine is not prepared for connection to a master controller, it can be retrofitted. Documents and parts for the retrofit are available separately.

6.8 Laying cables

DANGER
Contact with live electric components can cause serious injury or death.
➢ Isolate the master controller and external sources from all voltage.

1. Switch off all phases of the controller and external power sources.
2. lock them out,
3. Observe all accepted safety regulations and national legislation applicable to all work carried out on the master controller.
4. Have the master controller connected to the power supply by an authorized and qualified electrician to national legislation and the regulations of the electricity company concerned.

The terminals in the master controller that could be supplied by an external voltage source are marked:

Markings
- Orange or
- Label

5. Make the connections to the power supply, to the individual machines and to the pressure transducer as detailed in the circuit diagrams.

6.8.1 Building up the Profibus network

The links to Profibus subscribers are series-connected, i.e, they are connected one after the other. The master controller is the last in the series.

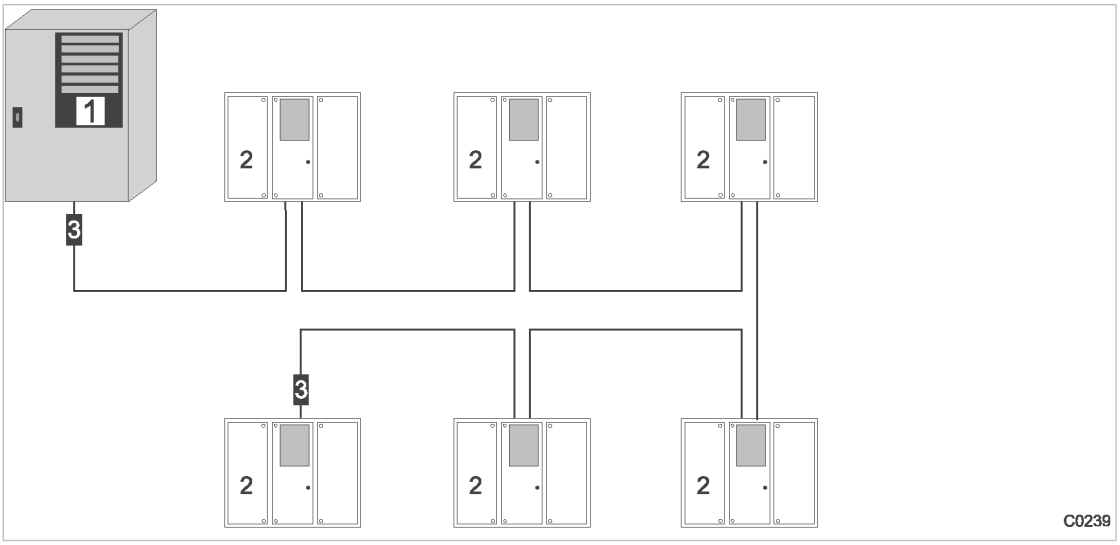


Fig. 6 Building up the Profibus network
[1] Master controller
[2] Machine with SIGMA CONTROL
[3] Terminating resistor

1. Switch in the terminating resistor[3] at both ends of the cable.
2. See circuit diagrams in the annex for cable types, cross-sections and maximum cable lengths.

6.8.1.1 Connecting the Profibus

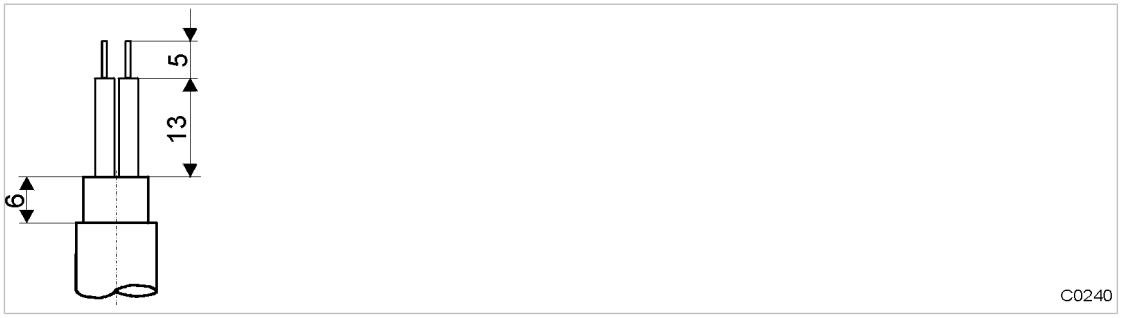


Fig. 7 Stripping back the Profibus cable

1. Strip back the Profibus cable as shown in fig. 7.
2. Connect the green core to the green terminal (A) in the Profibus plug.
3. Connect the red core to the red terminal (B) in the Profibus plug.

6.8.1.2 Connecting the Profibus plugs

CAUTION
Too tight a bend radius can cause a defect in the Profibus cable.
➢ Do not kink Profibus cables.

Subscribers in the middle of a Profibus network:
Connecting a Profibus expander to a connected subscriber in a Profibus network:

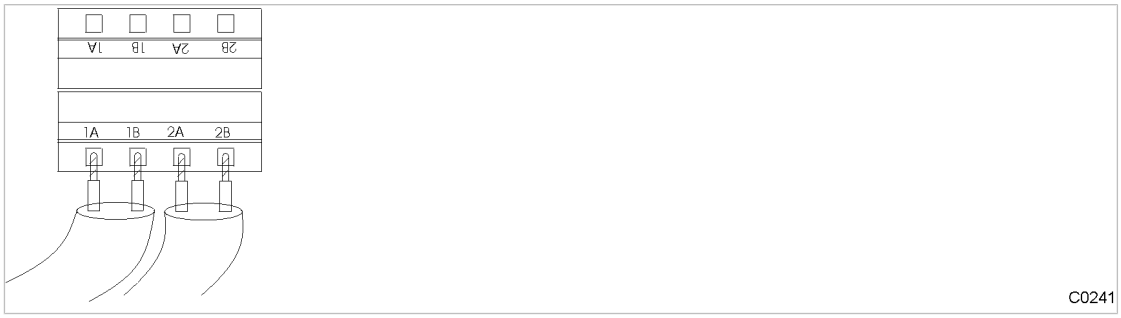


Fig. 8 Connection of an inline Profibus plug

1. Connect two Profibus cables (input and output)
2. Set the switch on the Profibus plug to OFF to deactivate the terminating resistor.

Subscribers at the end of the Profibus network
Connect the Profibus plug at the end subscriber and the master controller:

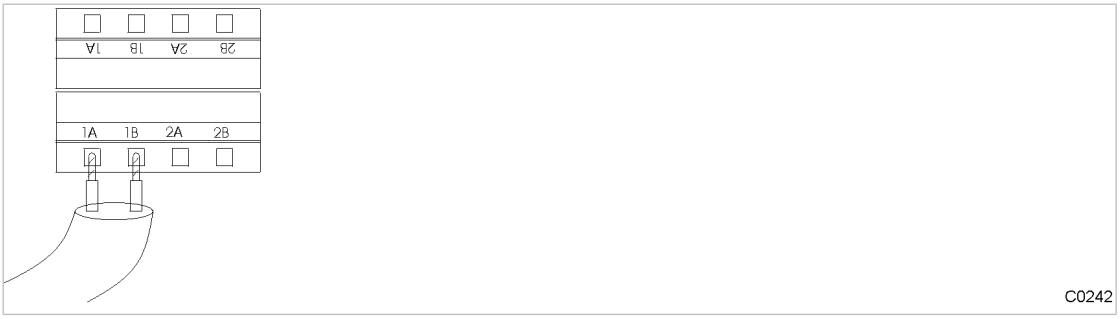


Fig. 9 Connection of an end of line Profibus plug

1. Connect one Profibus cable (input only).
2. Set the switch on the Profibus plug to ON to activate the terminating resistor.

6.8.2 Building up the compressor station via floating relay contacts

The connection of the machines via floating contacts is in the form of a star, i.e. each individual machine is connected directly to the master controller.

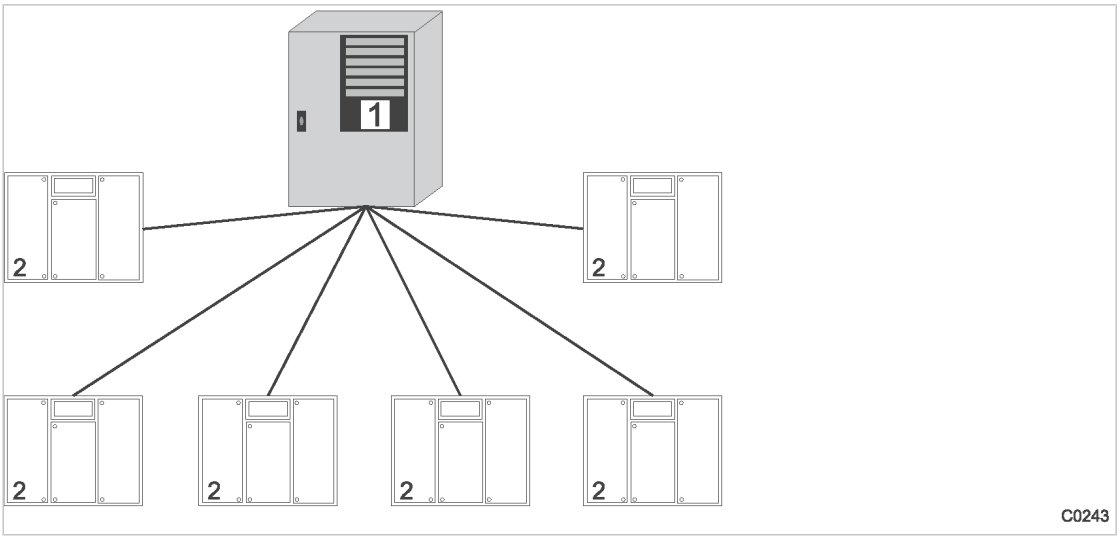


Fig. 10 Configuration of the network with floating relay contacts

[1] Master controller
[2] Machine without SIGMA CONTROL

1. Use conventional wiring.
2. Connect each machine directly with the master controller.

6.8.2.1 Wiring changes on the machines when connecting to models 4/4 and 8/4

Interruptions to the air supply caused by unsuppressed inductive loads connected to the relay outputs of the master controller, such as auxiliary contactors or solenoid valves.

1. Suppress inductive loads with an RC interference suppressor.

2. Connect the interference suppressor in parallel with the coil (connections A1–A2). If the connections are inaccessible, e.g. solenoid valves, the suppressor can also be connected to the corresponding terminals on the terminal strip.
3. Use an RC interference suppressor suited to the coil voltage and apparent holding power, see chapter 13.10.

KAESER machines from 1990 onwards (with terminal 32W)

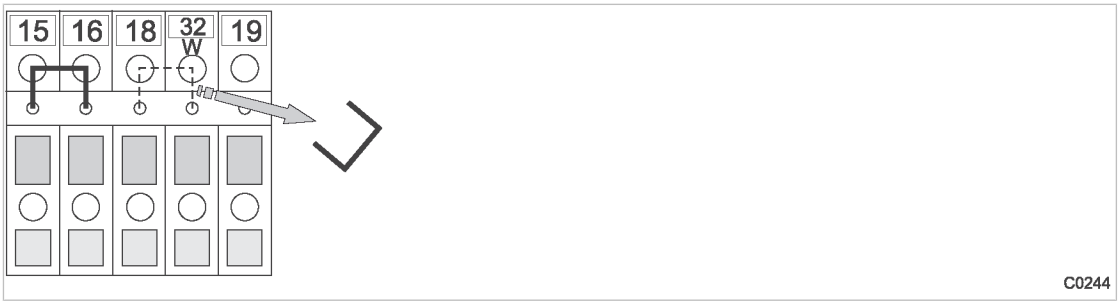


Fig. 11 Wire jumper removal

➢ Remove the jumper between the terminals (terminals 32W and 21 or 18) to allow sequencing.

Machines without terminal 32W

1. Fit terminal 32W in the terminal strip.
2. Disconnect the conductor in the cable from the network pressure switch that is connected to terminal 21 or 18.
3. Connect the conductor to terminal 32W.

6.8.2.2 Wiring changes on the machines when connecting to models 8/8 and 16/8

KAESER machines from 1990 onwards

If a jumper is connected between the terminals for manual operation [-X1 (W) 20 or 17 and -X1 (W) 24 (W)] on the terminal strip for connection of the master controller, then it must be removed. A more precise designation of the terminals is given in the electrical diagrams for the machine.

➢ Remove wire jumper if necessary.

6.9 Connecting the cables to the master controller

6.9.1 Connecting the equipotential bond

1. Connect the master controller housing to the user's equipotential bond with the marked bolts.
2. Keep the connection as short as possible.
3. Use an earth strap or cable with a cross-section of at least 16 mm^2.

6.9.2 Leading in cables and connecting the screening

6.9.2.1 Models 4/4 and 8/4

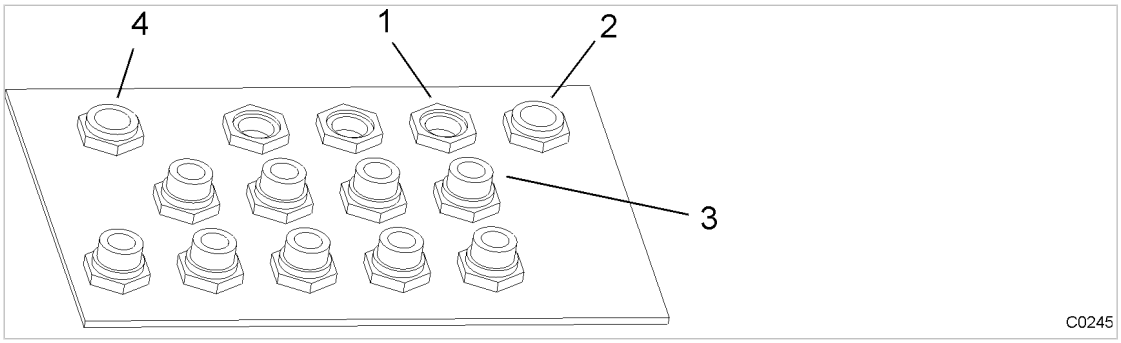


Fig. 12 Cable glands with and without ferrite suppressors

1	Cable glands for screened cables	3	Cable glands for non-screened cables
2	Cable gland for power supply cable	4	Cable gland for Ethernet

1. Lead non-screened cables (for digital inputs and relay outputs) through the front cable glands fitted with ferrite suppressors to protect them against electromagnetic interference.
2. Lead screened cables (for pressure transducer, analog outputs, Profibus and Ethernet) and the power supply cables through the rear cable glands without ferrite suppressors.

Connecting the screening (all cables except Ethernet)

At the control cabinet:

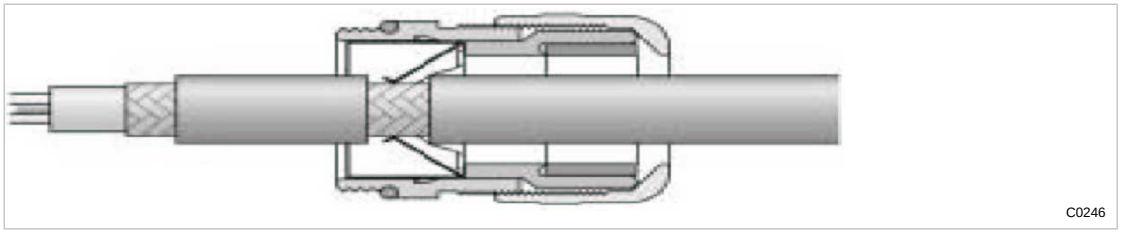


Fig. 13 Connecting the screening

1. Strip off the cable insulation by about 1 cm where the cable passes through the cable gland.
2. Push the cable through the metal cable gland on the control cabinet until the stripped section snaps in and contacts the earth clamp in the cable gland.

At the master controller:

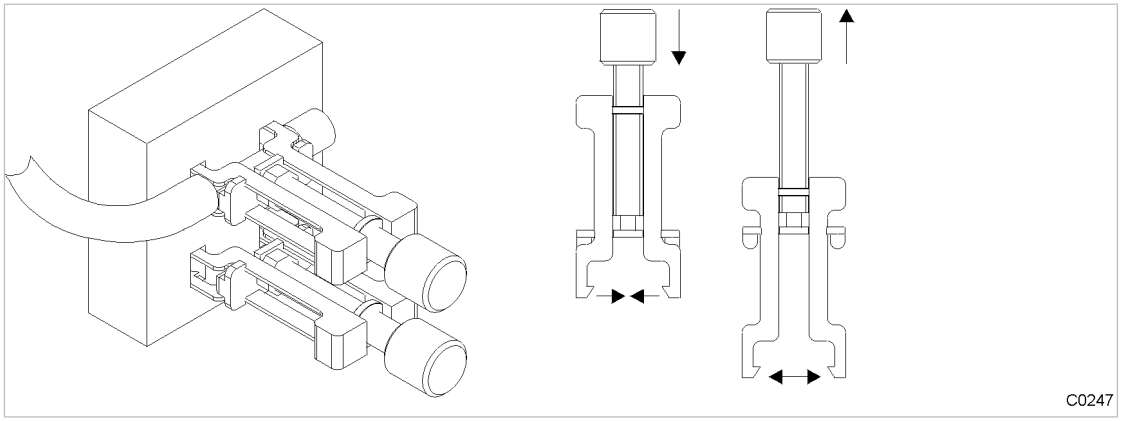


Fig. 14 Cable screening clamps

1. Strip off the cable insulation by about 2 cm at the terminal.
2. Unscrew the spindle of the cable screening clamp completely.
3. The screening connects to the controller via the housing.
4. Use a cable screening clamp to secure the screening.

Connect the Ethernet cable screening

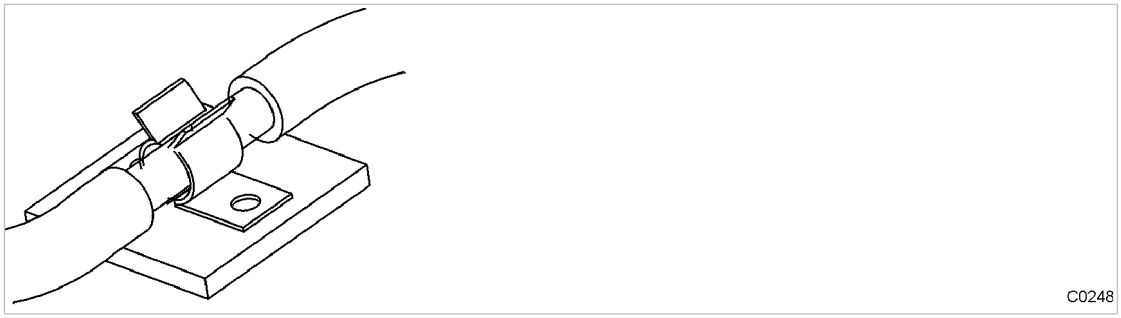


Fig. 15 Ethernet cable screening

1. Strip off the cable insulation by about 1 cm at the terminal.
2. Ensure electrical contact of the cable screening with the screening clamp next to the power supply unit.

6.9.2.2 Models 8/8 and 16/8

1. Lead the cable through a suitable cable gland on the lower side of the control cabinet.
2. Strip the insulation off the cable screening at the clamping point for a length of 2 cm.
3. Ensure electrical contact of the cable screening to the screening rail using a screening clamp.

6.9.3 Laying the cables in the control cabinet

Models 4/4 and 8/4

1. Bundle and bind cables carrying digital signals.
2. Bundle and bind cables connecting the compressors.

Models 8/8 and 16/8

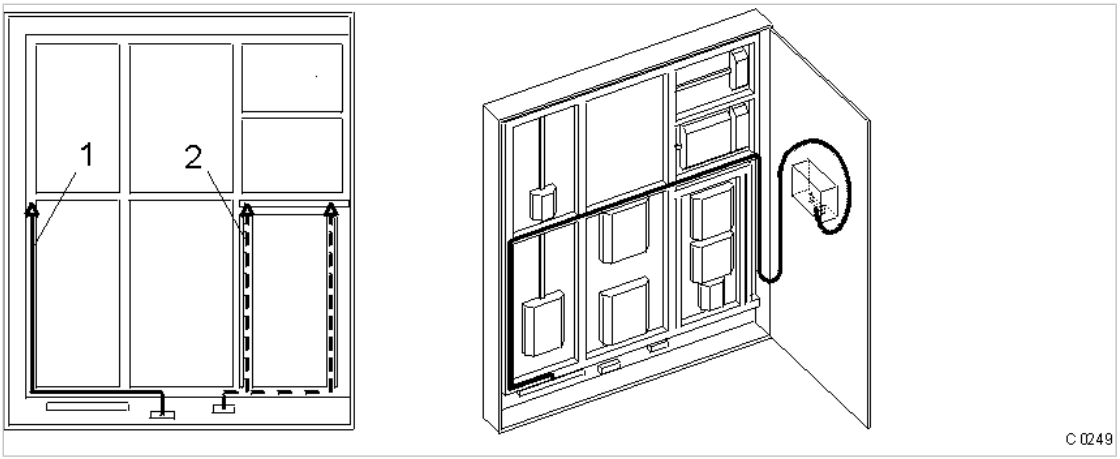


Fig. 16 Cable routing in the control cabinet
[1] 24 V DC
[2] 115/230 V AC

1. Route 24 V DC cables into the control cabinet through the left-hand duct [1].
2. Route 115/230 V AC cables into the control cabinet through the right-hand duct [2].
3. Route cables leading to the master controller (Profibus, Ethernet, RS232, modem cables) through to the cabinet door, as shown in the illustration.

6.9.4 Connecting the cables

1. Make the connections to terminals and interfaces as detailed in the attached electrical diagram.
2. Fit the Profibus plug, see chapter 6.8.1.

6.10 Connecting floating relay contact signals for sensors

➢ Connect sensors according to the electrical diagram in the annex.

6.11 Setting up the machines

CAUTION
Damage to drive motors can occur when the permissible motor starting frequency is exceeded on machines without idle control (piston compressors, blowers).

➢ Set the SIGMA AIR MANAGER pressure band to a width which ensures that the motor switching frequency is not exceeded.

➢ If necessary, increase the capacity of the air receiver.

Precondition The settings described in this section must be entered in full for every machine to ensure faultless operation under control of the master controller. Make sure that the compressed air system remains in operation should the master controller fail.

➢ Carry out settings as detailed in this manual.

6.11.1 Link via Profibus

The correct procedure for setting up SIGMA CONTROL machines is described in the SIGMA CONTROL service manual.

Note the settings made in the appropriate form in the attachment.

The master controller software for SIGMA CONTROL was optimised as of version 72.00.

The slave number has to be the machine number +2. Either the wrong machine or no machine at is controlled if a incorrect slave number is entered.

1. Enter pressure set point p_2 and set as default for "Manual mode pressure". In manual mode, the pressure set point of each machine should be offset by 0.3 bar to prevent all machines starting together. The offset time for station operation must be set. Suggestions for these settings are found in the annex (see chapter 13.8.2).
2. Activate and adjust the automatic restart after a power failure.
3. Configure Profibus operation.

   The following settings are recommended as parameters for bus alarms:

   - Start td: 40.0 s
     (maximum period that the machine waits for a signal from the Profibus after return of the power supplies. If no signal arrives before the period ends, the machine switches to self-control).
   - Time-out: 5.00 s
     (Period after which the machine switches to self-control if a fault occurs in the master controller).
   - Restart: auto
     auto = the machine automatically reconnects when the Profibus runs again after a bus alarm.
   - Restart: man
     After a bus alarm, the machine remains under its own internal control until it is connected to the bus again when the «remote» key is pressed.
4. Repeat steps 1 to 3 for any further machines.

6.11.2 Linking via floating relay contact

Precondition The machines are provided with the relay contacts required and they are wired up (see chapter 6.7.2).

➢ Note the settings made here in the table in the annex (see chapter 13.8)

Screw compressors always have an emergency mode. Piston compressors and blowers may or may not have this emergency facility.

6.11.2.1 Stations with emergency mode facility

- In automatic mode the master controller takes over LOAD/IDLE control.
- In manual mode the machines run under the control of their own system pressure switches.

Models 4/4 and 8/4

When the machine is linked, the system pressure switch (-B1) remains in operation. This has the function of an additional safety pressure switch. The system automatically runs in EMERGENCY mode via these pressure switches should power to the master controller fail or the master controller itself malfunction, ensuring a further supply of compressed air.

➢ Set the pressure switch.

Further information Setting recommendation for the pressure switch: See annex in chapter 13.8.1.

Models 8/8 and 16/8

A "blow off protection pressure relief valve" pressure switch (-B6) or a "master controller operation safety pressure switch" (-B1) is fitted in the machines to prevent:

- machine overloading, or
- relief valve blow off because of
  - switching points set too high,
  - defective master controller,
  - excessive pressure loss between the machine and the compressed air transducer connection to the master controller.

➢ Set the safety pressure switch (-B1). Recommended settings: See annex in chapter 13.8.1.

➢ The internal pressure switches for manual mode (-B1.1) must offset so that the machines switch on one after the other.

Further information Recommended settings: See annex in chapter 13.8.2.

6.11.2.2 Stations without emergency mode capability

On such air systems, blowers and reciprocating compressors are not fitted with a pressure switch that could ensure EMERGENCY operation.

When these machines are connected, the LOAD/IDLE switching is controlled by the master controller.

These stations will stop delivering compressed air if the master controller fails.

➢ Take suitable application-specific measures.

6.12 Setting the slave address on the Profibus expander

If more than one Profibus expander is used, each must be assigned its own slave address.

Precondition Profibus expanders have the required power supply and are wired according to their electrical diagram.

Profibus expander 4+4

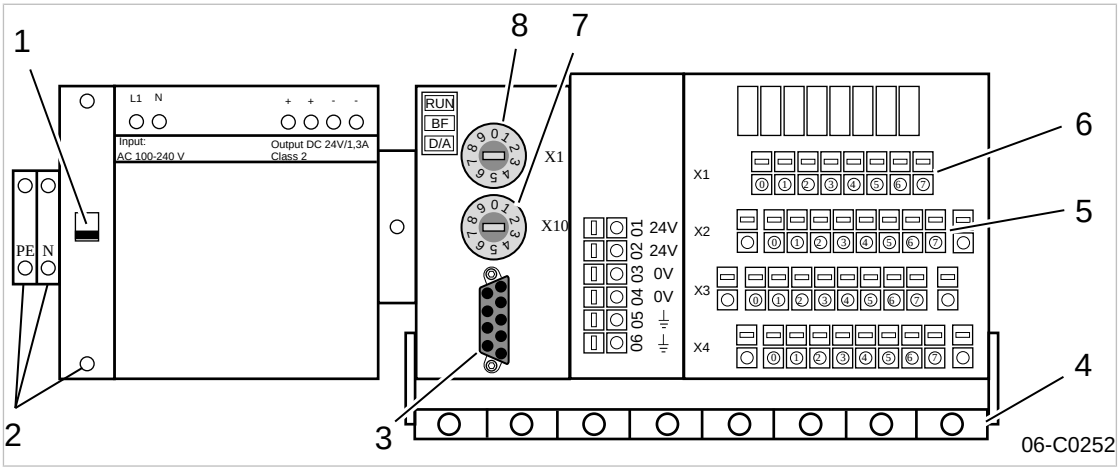


Fig. 17 PBU 4+4

1. Safety cut-out
2. Power supply terminals
3. Socket for the Profibus plug
4. Screening rail
5. Terminal strip X2 for analog outputs
6. Terminal strip X1 for analog inputs
7. Setting wheel for slave address X10
8. Setting wheel for slave address X1

1. Switch off the Profibus expender via the safety cut-out 1.
2. Set a valid slave address by means of a screwdriver on the two setting wheels.
   e.g. slave address 36:
   - Set wheel 7 to «3».
   - Set wheel 8 to «6».
     (See 7.3.3 to assign slave addresses).
3. Insert the Profibus plug into the socket 3.
4. Switch on the Profibus expander by means of the safety cut-out 1.

Profibus expander 4T

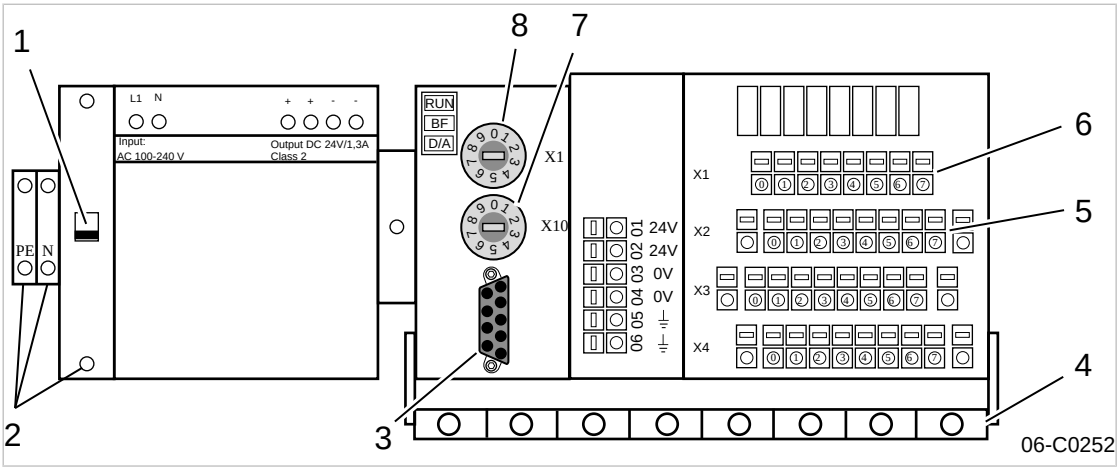


Fig. 18 PBU 4T

[1]	Safety cut-out	[5]	Termional strip X2 for PT100 inputs
[2]	Power supply terminals	[6]	Termional strip X1 for PT100 inputs
[3]	Socket for the Profibus plug	[7]	Setting wheel for slave address X10
[4]	Screening rail	[8]	Setting wheel for slave address X1

1. Switch off the Profibus expender via the safety cut-out [1].
2. Set a valid slave address by means of a screwdriver on the two setting wheels.
   e.g. slave address 36:
   - Set wheel [7] to «3».
   - Set wheel [8] to «6».
     (See 7.3.3 to assign slave addresses).
3. Insert the Profibus plug into the socket [3].
4. Switch on the Profibus expander by means of the safety cut-out [1].

Profibus expander 8

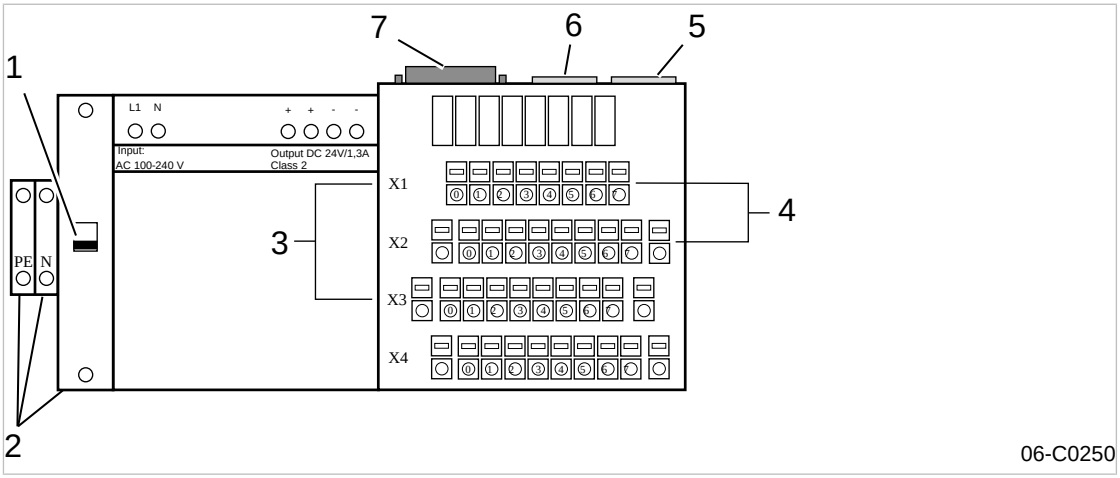


Fig. 19 PBU 8

1 Safety cut-out
2 Power supply terminals
3 Terminal strip X1 / X3 for digital outputs
4 Terminal strip X1 / X2 for digital inputs
5 Slave address setting wheels
6 Slave address setting wheels
7 Socket for the Profibus plug

1. Switch off the Profibus expender via the safety cut-out 1.
2. Set a valid slave address by means of a screwdriver on the two setting wheels.
   e.g. slave address 21:
   - Set wheel 6 to «2».
   - Set wheel 5 to «1».
     (See 7.3.3 to assign slave addresses).
3. Insert the Profibus plug into the socket 7.
4. Switch on the Profibus expander by means of the safety cut-out 1.

Profibus expander 32

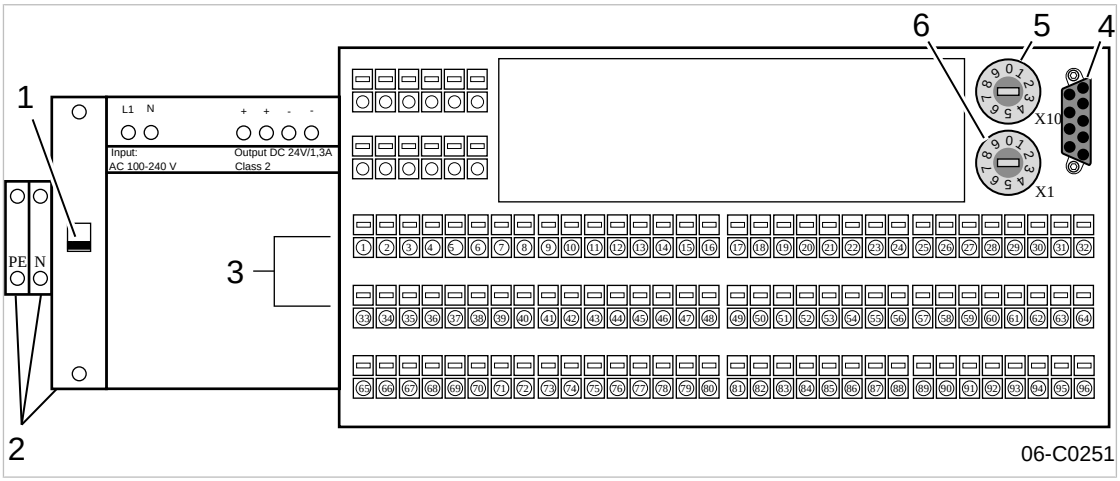


Fig. 20 PBU 32

1 Safety cut-out
2 Power supply terminals
3 Terminal strip for digital inputs
4 Socket for the Profibus plug
5 Setting wheel for slave address X10
6 Setting wheel for slave address X1

1. Switch off the Profibus expender via the safety cut-out [1].
2. Set a valid slave address by means of a screwdriver on the two setting wheels.
   e.g. slave address 28:
   - Set wheel [5] to «2».
   - Set wheel [6] to «8».
     (See 7.3.3 to assign slave addresses).
3. Insert the Profibus plug into the socket [4].
4. Switch on the Profibus expander by means of the safety cut-out [1].

7 Initial Start-up

7.1 Overview

The master controller was designed and developed for a number of applications. Thus, a great variety of settings is possible.

Prior to delivery, the master controller is preconfigured with a standard configuration. Generally, most of these settings can be used for many applications or need only minor modifications. Thus, not all the steps listed below may be required for the initial start-up, depending on the application involved.

Subjects discussed:

- 7.2 Configuring the master controller
- 7.3 Connecting the machines to the master controller
- 7.4 Setting the group sequence and required pressure
- 7.5 Setting the parameters for the compressor station
- 7.6 Programming the clock
- 7.7 Configuring the peripheral devices
- 7.8 Commissioning the master controller
- 7.9 Connecting an external PC to the master controller
- 7.10 Communication

7.2 Configuring the master controller

The keys and LED indications are shown in the fold-out to this service manual and in the chapter Design and Function.

➢ Become familiar with the function keys.

7.2.1 Switching on the master controller

The master controller starts booting when the power supply is switched on. The boot-up is finished when the large-font display of pressure appears (after about 25 seconds).

If nothing appears on the display, press and hold the «info »key and the «up »arrow key simultaneously.

CAUTION
The compressed air supply may be damaged from premature changeover to automatic mode.
➢ Do not press the «Automatic »mode key until all the settings in this chapter have been made.

1. Press the «ON »key.
2. Make sure that the compressor station is in manual mode.
3. If the automatic mode LED is illuminated, press the «automatic mode» key.

- Compressor stations without emergency facility will not be delivering compressed air.
- In compressor stations with emergency operation capability, the machines run under their own internal control.

7.2.2 Changing the display language

1. Press«F3» in the main menu.
2. Set the required language with «F1 »and «F6».
3. Press the«esc key» to return to the main menu.

7.2.3 Selecting menu options

Menu options are displayed either as an icon in the menu bar at the bottom of the display or as text in the display.

➢ Select the required menu option with the «F1» to «F6» keys.

7.2.4 Entering characters

If characters have to be entered, a display frame opens with numbers, letters and special characters. It is divided into several sections that can be accessed with the arrow keys.

If only numerals are to be entered, a smaller display frame opens in which only numerals, a comma, a minus sign and the C and E functions can be selected. The procedure is the same as for character entry.

1. Use the arrow keys to select the desired characters and confirm with the «enter» key.
2. Repeat step 1 until all characters are entered.
3. To delete a character use the arrow keys to move the cursor to C on the right of the display frame and confirm with «Enter».
4. When all characters are entered, use the arrow keys to move the cursor to E on the right of the display frame and confirm with «Enter».
5. Entry of characters can be cancelled with the «esc »key.

7.2.5 Selection lists

Some settings can be made using selection lists.

1. If a selection list is displayed, select the required setting with the arrow keys.
2. Confirm the setting with the «Enter» key.

If there are only two selections, no list is displayed. The other relevant setting is immediately activated and does not have to be confirmed.

➢ Press the «Enter» key to switch between possible settings.

7.2.6 Password level and key lock

In this manual, the password level required will be quoted for every function.

The following passwords are entered in the master controller on delivery:

- Password for level 1: 11
- Password for level 2: 12
- Password for level 3: 13

➢ Further information is given in the following chapters.

7.2.6.1 Log-off

The password sets itself back to level 0 if no entries are made over a period of five minutes.

Alternatively, the password can be manually reset as follows:

1. Call up *<Password «F4» >* in the main menu.
2. Press «F1» (logoff).
3. Press «esc» to return to the main menu.

7.2.6.2 Password list

A list of the passwords together with the related password levels is displayed.

1. Call up the menu option *<Password«F4» Password list«F2» >*.
2. If required, enter password for level 3.
3. Press the «esc» key to close the list.

7.2.6.3 Key lock

The following keys can be locked:

- «Remote»
- «Shift clock»
- «Automatic mode»
- «ON»
- «Machine selection»

1. Call up the menu option *<Password«F4» Key lock«F3» >*.
2. If required, enter password for level 2.
3. Select the required key with the arrow keys.
4. Press the «enter» key until "locked" is displayed.
5. Press the «escape» key to return to the next higher level.

7.2.6.4 Assigning passwords

Assign level 0 to delete a password.

1. Call up the menu option *<Password«F4» Assign password«F4» >*.
2. If required, enter password for level 3.
3. Enter the password and the appropriate level.
4. Press the «escape» key to return to the next higher level.

7.2.7 Checking/Setting time and date

If the clock is turned back more than 24 hours SIGMA AIR CONTROL *plus* is automatically deactivated.

Automatic de-activation of SIGMA AIR CONTROL *plus* prevents:

- unintentional time resetting,
- loss of SIGMA AIR CONTROL *plus* data saved during the reset time.

➢ Correctly set and regularly check the clock before activating SIGMA AIR CONTROL *plus*; see chapter 7.10.2.

Check/set time and date.

1. Select the menu option *<Settings «F1» System «F1» General settings «F1» Date and time «F1» >*.
2. Select date or time with the arrow keys.
3. Press «Enter».
4. If required, enter password for level 2.
5. Enter date and/or time (see chapter7.2.4 for entering characters).
6. When the date and time is correct press the«esc key» to return to the next higher level.

If the machine is being operated with a clock program, check the time at regular intervals for discrepancies (generally once per year).

7.2.8 Setting summer / winter

1. Select the menu option *<Settings «F1» System «F1» General settings «F1» Summer/winter «F2» >*.
2. Use the arrow keys to select the individual settings and confirm with the«enter» key.
3. If required, enter password for level 2.
4. Set the options for automatic changeover.
5. When the settings are complete, press the«esc key» to return to the next higher level.

7.2.9 Country-specific settings

The units of measure and time and date format are standardised for the language selected, but can be changed, if required.

1. Select the menu option *<Settings «F1» System «F1» General settings «F1» Country-specific settings «F3» >*.
2. Use the arrow keys to select the individual settings and confirm with the«enter» key.
3. If required, enter password for level 1.
4. Set the language, units of measure and date and time formats.
5. Press the «escape» key to return to the next higher level.

7.2.10 Setting up the display

1. Select the menu option *<Settings «F1» System «F1» General settings «F1» Control panel «F4» Display defaults «F4» >*.
2. Set up the:
   - Lighting
   - Lighting time delay
   - Contrast

7.3 Connecting the compressors to the master controller

➢ In the main menu, call up *<Settings «(F1)» Compressor« (F3)» >*.

7.3.1 Connecting the machines

There are three screens for each machine that can be selected with the«F1 »and «F2» keys. The number of each machine is displayed at the top right. The machines can be selected with the«F5» and «F6» keys.

Precondition The electrical and mechanical connections to the machine are concluded.

The *<Settings «F1» Compressor «F3» >* menu is selected.

➢ Select menu option Connect «F1».

Enter the following settings for each machine connected to the master controller:

1. Connection type
2. FAD
3. Power consumption
4. Reference pressure for power consumption
5. Idling power consumption
6. Compressor: Set controller or monitoring. (a machine that is monitored is regulated by its internal controller)
7. For machines with a conventional connection, the input and output addresses have to be assigned.

Conventional connection

The employment of a Profibus expander can be necessary or provide a considerable advantage under certain local conditions (see chapter 6.11.1).

Precondition Menu point *<Settings «F1» Compressor «F3» Connection «F1» >* is selected.

1. Select inputs and outputs for conventional connection with the «F1» key.
2. If required, enter password for level 3.
3. Set and activate the addresses of the inputs and outputs used according to the connections selected in the electrical diagram.

Symbol	State
✓	Active
x	Inactive

Tab. 20 Activating addresses

4. Ignore unused inputs and outputs.

The meaning of the letter in front of the 'load' output address:

- "n" is the standard setting for models 4/4 and 8/4
- "p" is the standard setting for models 8/8 and 16/8

If these standard settings are used and the machine is connected according to the circuit diagram in the annex (EMERGENCY mode), then an EMERGENCY mode is ensured. Contact KAESER SERVICE if the standard settings are not used.

7.3.2 Settings for machines with frequency-controlled drive (FC)

Setting the FC characteristic

If the machine has frequency-controlled drive, the input values for FAD and power consumption at a given speed must be entered. These values are used to project an approximation curve to estimate the FAD and power consumption of the FC machine. In this way, the machine's duty cycle can be determined.

The value of the settings for the FC machine are recorded in a data sheet that can be requested. An example is found in the annex. In order to display the FAD, software from version 72.30 or 80.xx must be installed on the SIGMA CONTROL Contact KAESER Service for advice.

Precondition The *<Settings «F1» Compressor «F3» >* menu is selected.

1. Select the menu option FC characteristic «F3».
2. If required, enter password for level 3.
3. Enter the following values, starting in the"max" line.
   - Maximum speed
   - Corresponding FAD at maximum working pressure (see nameplate)
   - Corresponding power consumption at maximum working pressure (see nameplate)
4. Repeat step 2 for lower speeds.
5. Press the «escape» key to return to the next higher level.

The individual VFD characteristics can be selected with the «F5» and «F6» keys.

The characteristic FC curve entered is automatically added to the 0/0/0 point (speed 0 min^{-1}, FAD 0 m^3/min, power 0 kW).

Assigning the FC machine

The characteristic set above can now be assigned to the FC machine.

Precondition FC characteristic is set.
The *<Settings «F1» Compressor «F3» >* menu is selected.

1. Select the menu option Connection «F1».
2. Press the «F1» key twice to open the screen for the FC machines.
3. If required, enter password for level 3.
4. Select yes for the FC machine.
5. Select the characteristic number.

6. Make the following settings for conventional links:
   - Select the relevant input (the «F3» key displays a list of the analog inputs).
   - Normalize the input.
7. Press the «escape» key to return to the next higher level.

7.3.3 Registering the Profibus expander

Precondition Profibus expanders are linked and configured (see chapter 6.11).

1. In the main menu, select *<Settings «F1» Periphery «F6» Profibus expander «F6» >*.
2. Selecting the linked Profibus expander:
   - Profibus expander with eight digital channels (PBE 8, PBE 8K, PBE 8R): press «F1».
   - Profibus expander with 32 digital channels (PBE 32): press «F2».
   - Profibus expander with four analog inputs and four analog outputs (PBE 4+4): press «F3».
   - Profibus expander with four PT100 inputs (PBU 4T): press «F4».
3. If required, enter password for level 3.
4. Activate the Profibus expander.

Only for Profibus expanders with eight digital channels (PBE 8, PBE 8K, PBE 8R):

- Individual channels are marked as input I or output O.
- For digital outputs O, the slave address must be at least 24.
- Further slave addresses can be selected with «F1 »and «F2».

7.3.4 Activating Profibus interface

The Profibus interface may only be activated when all the settings for this interface have been made.

When a Profibus is used, the matching interface has to be activated.

1. Call up menu option *<Settings «F1» System «F1» Interfaces «F3» Profibus «F1» >*.
2. If required, enter password for level 3.
3. Press the «enter» key until "Interface active: yes" is displayed.

7.3.5 Setting the operating hours and maintenance interval counters

Machines with a conventional connection

Machines with SIGMA CONTROL do not require settings to be specified.

Precondition The *<Settings «F1» Compressor «F3» >* menu is selected.

1. Call up the menu option Hours «F2».
   Every machine has its own screen, with the corresponding machine number displayed at the top right. Use the «F5» and «F6» keys to move between the machines.

2. Make the following settings for each machine:
   - If required, enter password for level 3.
   - Enter the total hours and load hours for the machine.
   - Enter SIGMA AIR MANAGER as the hours source.
   - Activate the maintenance interval counter
   - Enter the default interval hours.
     The hours are now counted further by the master controller.

On conventionally linked machines that are connected to the master controller without the "motor running" feedback signal, the total hours are counted when the master controller switches to the load mode.

7.4 Setting the required pressure

The required pressure is the pressure required by the consumers in the compressed air network (pressure-measuring transducers).
The controller will usually maintain the required pressure with a maximum deviation of 0.1 bar.

For energetic reasons, the operating pressure is to be set as low as possible, i.e., not higher as required for the consumers within the compressed air network.

Precondition Menu point *<Settings «F1» >* is selected.

1. Select menu option *<Controller «F2» >*.
2. If required, enter password for level 1.
3. Specify the required pressure
4. Press the «escape» key to return to the next higher level.

Further information The required pressure can also be set in the list of machines displayed in the *Machine overview* window (see chapter 8.1).

7.5 Setting the station parameters

➢ In the main menu, select *<Settings «F1» Station «F4» >*.

7.5.1 Setting the parameters for the required pressure

Precondition The menu option *<Settings «F1» Station «F4» >* is selected.

1. Select menu option Required pressure «F1».
2. If required, enter password for level 2.
3. Specify the maximum required pressure.
4. Specify the minimum required pressure.

Optionally, an external analog input for required pressure can be configured:

1. If required, enter password for level 3.
2. Enter the input number.
3. Set the input current for 0 bar.
4. Set the pressure for an input current of 20 mA.

5. Activate the analog input:

Symbol	State
✓	Active
x	Inactive

Tab. 21 Activating analog input

6. Activate remote mode with the «remote» key.

7.5.2 Setting network pressure

A wrong entry of the pressure transducer's final pressure can lead to problems in the network.

Precondition The menu option *<Settings «F1» Station «F4» >* is selected.

1. Select menu option Network pressure «F2».
2. If required, enter password for level 3.
3. Select and activate analog input sensor1.
4. If required, select and activate analog input sensor 2.
5. Determine the weighting of sensor 1 and sensor 2.
6. Enter the pressure transducer final pressure.
7. Enter the actual pressure value damping period (the period over which pressure value readings are averaged).

Problems when converting to 45 bar measure transducers?

➢ In the main menu, proceed as follows:

1. Delete all switching points for the shift clock (menu *< «F1» – «F5» – «F1» >*, see chapter 7.6.2)
2. Set the minimum required pressure to 1.0 bar (menu *< «F1» – «F4» – «F1» >*, see chapter 7.5.1)
3. Set the required pressure to 3.0 bar (menu *< «F1» – «F2» >*, see chapter 7.4)
4. Set the maximum required pressure to 4.0 bar (menu *< «F1» – «F4» – «F1» >*, see chapter 7.5.1)
5. In order to set the final pressure for the measuring transducer 45 bar, use the «UP arrow» for the specification in the selection list.

7.5.3 Configuring the restart and charging the compressed air network

Automatic restart of the machines and recharge of the compressed air network after a power failure is configured in this menu option.

An automatic restart after a power failure is only possible if a SIGMA CONTROL software version 0.70 or later is installed. In earlier software versions the machines run in manual mode when the power supply returns. Contact KAESER SERVICE for advice.

Precondition The menu option *<Settings «F1» Station «F4» >* is selected.

1. Select menu option Restart «F3».
2. If required, enter password for level 2.
3. Activate automatic restart.

4. Enter the delay period for restart.
5. Enter the air network charging speed (speed of pressure rise when charging).

   Upon activation of the compressed air station («ON» , «Remote ON/OFF» or «Shift clock»), the compressed air network is filled at the specified charging speed. The controller will use as many compressors as required.
6. Specify whether minimum pressure should be monitored when the compressor station is off.

7.5.4 Further settings

Various parameters of the compressed air station can be specified in the menu option *<Further settings>*.

- Monitoring period for motor running: the period that elapses from the absence of a motor feedback signal until an alarm is triggered.
  It is recommended that the default settings are used.
  Contact KAESER SERVICE beforehand if the standard settings are not used.
- Power limiting: If the power limiting function is activated, the system will add machines only to the point where the overall load capacity of the running machines exceeds the specified power limit.
- Switching compressors online:
  - first: The controller will always activate these machine first and deactivate them last.
    This function may be used, for instance, for machines with heat recovery.
  - last: The controller will always activate this machines last.
    Their deactivation is governed by the consumption, if the machine is no longer required for the compressed air delivery.
    This function may be used for machines to be deployed as standby systems only.
    Ensure that these machines are sufficiently in use, by, e.g., activating them via the shift clock channel A once a week for one hour as primary machines; see also chapters 7.6 and 13.9.5.

Precondition The menu option *<Settings «F1» Station «F4» >* is selected.

1. Select the menu option *<Further settings «F4» >*.
2. If required, enter password for level 2.
3. Enter the maximum load power consumption and activate the function.
4. Select the compressors to be activated first.
5. Select the compressors to be activated last.

7.6 Programming the shift clock

Shift operation of the compressed air system can be set in the shift clock menu option.

In all, 32 switching points are available.

- The required pressure can be changed for defined periods of time.
- The entire compressed air system can be switched on or off.
- Specific machines can be taken off the compressed air supply.
- Up to 5 channels (outputs 1-4, channel A) can be selected.
  Channel A will "first" use the machines entered "last" in menu 4.4. See also chapter 7.5.4.

The switching points entered are repeated weekly. During non-standard periods such as company holidays, the compressed air system has to be switched manually.

➢ In the main menu, select *<Settings «F1» Shift clock «F5» >*.

7.6.1 Setting the switching points

The number of unassigned and assigned switching points is shown at the top left. The switching point number is shown at the top right. A frame around the weekday indicates that it is selected. You can select several weekdays at once.

1. If required, enter password for level 2.
2. Selecting the weekday:
   - Use the arrow keys to move the cursor to the required weekday.
   - Press «Enter».
3. Enter the switching time.
4. Enter the required pressure.
5. Specify the channels (outputs, channel A).
6. Specify the used compressors.
7. To shut down the compressed air system, enter # # # # # # # for the compressors.
8. Press«F2» key to save the switching point.
9. Repeat steps 1 through 8 to set additional switching points.
   All settings apply until the next switching point is reached.

Further information See chapter 13.9.1 for examples of switching point setting.

7.6.2 Deleting a switching point

Only the settings displayed in the menu option are deleted. If several days of the week are selected, the respective switching points for all these days are deleted.

1. Select the switching points to be deleted with the«F5 »and «F6» keys.
2. If required, enter password for level 2.
3. If necessary, cancel the selection of individual weekdays.
4. Delete the selected switching point with the«F1» key.

7.6.3 Activating the clock

➢ Press the «shift clock» key.
The shift clock mode LED illuminates.

7.7 Configuring peripheral devices

➢ Activate/configure messages, input and output functions.

7.7.1 Configuring alarm/warning and service messages

The settings described in this section only become effective when the menu option is exited.

➢ On the main level, select the *<Settings menu, «F1» Periphery, «F6» External alarms, warning and service messages«F1» >*.

7.7.1.1 Activate predefined messages

See chapter 13.7.2 for a list of predefined messages.

Precondition The *<Settings menu, «F1» Periphery «F6» External alarms, warnings and maintenance messages «F1» >* is selected.

1. Select menu option «F1» Predefined messages.
2. Searching for a message:
   - «F1» and «F2»: scroll through the message blocks
   - «F5» and «F6»: scroll through individual messages
3. If required, enter password for level 3.
4. Activate the message.
5. Set the time delay to prevent messages being triggered by short interference pulses.
6. Enter the input to which the message signal is connected.
7. Specify whether the message is to be triggered by open contact 0V or closed contact 24V.

7.7.1.2 Defining own messages

External alarm and warning messages do not initiate a station shutdown.

Definable message texts can be entered in this menu option. It is differentiated between alarm and maintenance/warning messages.

Precondition The *<Settings menu, «F1» Periphery «F6» External alarms, warnings and maintenance messages «F1» >* is selected.

1. Select either Definable messages (alarm) with«F2» or Definable messages (maintenance/warning) with «F3».
2. If required, enter password for level 3.
3. Enter the message text. (see chapter 7.2.4 for entering characters).
4. Activate the message.
5. If required, select "maintenance" or "warning" type of message.
6. Set the time delay to prevent messages being triggered by short interference pulses.
7. Enter the input to which the message signal is connected.
8. Specify whether the message is to be triggered by open contact 0V or closed contact 24V.

7.7.2 Configuring further input functions

➢ Configure external machine selection, digital inputs and outputs.

7.7.2.1 Configuring machine selection

The machines can also be preselected from a remote control centre.

If machines are externally preselected, the machine selection keys on the master controller are inactive. If they are pressed, a message is displayed. The LEDs in the selection keys also indicate which machines are preselected. External preselection cannot function when the "Send/Receive" preselection option is active.

There is a screen for every machine with the machine number at the top right. The machines can be selected with the«F5» and «F6» keys.

Precondition The external controller must be connected to the digital inputs of the master controller (see circuit diagram in the annex).

1. Select *<Settings, «F1» Compressor «F3», Further settings «F5» >*.
2. If required, enter password for level 3.
3. Enter the address of the external preselection input.
4. Activate the input (can be activated in password level 2)

Symbol	State
✓	Active
x	Inactive

Tab. 22 Activation input

5. Negate the input as required (n = 0 V; p = 24 V).
6. Repeat steps 2 to 4 for any further machines.
7. Press the «remote» key to activate remote mode.

7.7.2.2 Configuring the digital inputs

The following functions can be configured via further external inputs in this menu option:

- Remote OFF/ON: When this function is activated, the master controller can be switched off and on from a remote contact.
- Remote MANUAL/AUTO: When this function is activated, the master controller can be switched between manual and automatic mode from a remote contact.
- Remote shift clock: When this function is activated, clock operation in the master controller can be switched on or off from a remote contact.
- Switching compressors online: When this function is activated and the input signal changes, the system will add the next possible machine, regardless of the network pressure.
- Decrease required pressure: When this function is activated and the input signal is given, the system will decrease the required pressure at a constant upper limit of the pressure range. Please contact KAESER SERVICE for more information.

1. Select menu option *<Settings «F1» Periphery «F6» Further input functions «F4» digital inputs «F1» >*.
2. Select the required function with keys «F5 »and «F6».
3. If required, enter password for level 3.
4. Activate the function.

5. Enter the input to which the message signal for this function is connected.
6. Specify whether the message is to be triggered by open contact 0V or closed contact 24V.

7.7.2.3 Configuring analog inputs

Analog inputs can be freely configured. They can be used for the following applications:

- The functional values of analog components can be displayed on the master controller.
- If a value exceeds a preset threshold value, a message can be triggered. Inputs 16.0–16.7 and 17.0–17.7 and outputs 16.0–16.7 and 17.0–17.7 are available. Outputs are directly linked in the software to the inputs, e.g. output 16.0 to input 16.0.
- If a value exceeds a preset threshold value, a binary output signal can be outputted to light, for example, a remote control lamp.

Input values at 4–20 mA and PT100 are monitored for open and short circuit.

At 4–20 mA:

- open circuit: < 3 mA
- short circuit: > 21 mA

1. Select menu option *<Settings «F1» Periphery «F6» Further input functions «F4» Setting analog inputs «F2» >*.
2. If required, enter password for level 3.
3. Enter description / message text (24 characters).
4. Select analog input.
5. Activate the the input.
6. Enter unit of measure (8 characters).
7. For AI: Enter value at 0/4 mA, (range +/-10000 x factor (1/0.1/0.01/0.001).
8. For AI: Enter value at 20 mA, (range +/-10000 x factor (1/0.1/0.01/0.001).
9. For PT: Enter line compensation for two-line sensors in Ohm.

Line compernsation = resistance of the line from the master controller to the PT100 sensor and back.

- Example:
  - Line 2 x 1.0 mm^2
  - Material: copper
  - 60 m long (single length from the master controller to the PT100 sensor)
  - Line compensation =

    $((0.0178\ Ohm\ mm^2\ /\ m\ x\ 2\ x\ 60\ m)\ /\ 1.0\ mm^2)\ =\ 2.14\ Ohm$

Line compensation is not needed for three and four-line sensors and the value remains at 0 Ohm.

10. Configure threshold values 1 and 2:
    - Select the comparison "smaller/larger".
    - Assign the comparison to the the digital output to which the comparison result is assigned.

Example:

An alarm is to be displayed on the master controller when a dew point exceeds 5°C. The dew point sensor is connected to analog input 1 and has a measurement range of –5°C to 35°C. Proceed as follows:

1. Enter the designation "dew point".
2. Enter unit of measurement °C.
3. Activate the the input.
4. Select analog address AI 1.
5. Enter value for 4 mA: "−5 x 1".
6. Enter value for 20 mA: “35 x 1”.
7. Select comparison ">"
8. Enter threshold value "5 x 1"
9. Enter output address 16.0.
10. Activate output.
11. Select menu option defined messages (alarm) (press *<esc–esc–«F1»–«F2» >*).
12. Search for an unallocated message number with «F5» and «F6».
13. Enter the message text "dew point over 5 °C".
14. Activate the message.
15. Enter time delay 1.
16. Enter input address 16.0.

7.7.3 Configuring further output functions

➢ Configure digital output and analog input signals.

7.7.3.1 Forwarding the signals "load" and "group alarm"

The signals "load" and "group alarm" can be assigned to a digital output for every machine to allow them to be forwarded to other equipment.

There is a screen for every machine with the machine number at the top right. The machines can be selected with the«F5» and «F6» keys.

1. Select *<Settings, «F1» Compressor «F3» Further settings «F5» >*.
2. If required, enter the password for level 3 (password level two is sufficient to activate or deactivate outputs).
3. Enter a free address for the load output and activate it.
4. Enter a free address for the group alarm output and activate it.
5. Negate the outputs, as required:
   - n = relay closes at an event
   - p = relay drops out at an event
6. Repeat steps 2 to 4 for any further machines.

7.7.3.2 Configuring digital outputs

Free digital outputs can be assigned the following functions in this menu option:

- Group alarm
- Controller operational
- Group maintenance/group warning
- External alarm
- External maintenance/warning
- Compressor alarm

- Compressor maintenance / warning
- Minimum pressure
- Dryer group alarm 1-8
- Shift clock channel 1
- Shift clock channel 2
- Shift clock channel 3
- Shift clock channel 4
- REMOTE mode
- CLOCK mode
- AUTOMATIC mode
- Compressor station ON
- No compressor preselected
- Group alarm (pulse)
- Pressure high

1. Select menu option *<Settings «F1» Periphery «F6» Further output functions «F5» digital outputs «F1» >*.
2. Select the required function with keys «F5 »and «F6».
3. If required, enter password for level 3.
4. Activate the function.
5. Enter a free output address (see circuit diagram in the annex).
6. Decide whether the output should be open or closed when the function is active.

7.7.3.3 Configuring analog outputs

Free analog outputs can be assigned the following functions in this menu option:

- Network pressure
- Required pressure
- Delivery
- FC set point pressure

1. Select menu option *<Settings «F1» Periphery «F6» Further output functions «F5» Analog outputs «F2» >*.
2. Select the required value with the «F5 »and «F6» keys.
3. If required, enter password for level 3.
4. Activate output.
5. Select analog output.
6. Normalise the output.

7.8 Master controller commissioning

Precondition No one is working on the machine.
All enclosure panels are in place and secured.
The temperature of the machines is not below +3 °C.
All access doors on the machines are closed.
There is no bus error.

WARNING
Risk of injury during an automatic machine start.
- ➢ Before switching on, make sure that all conditions are met.
- ➢ Compare the settings for initial start-up of the master controller with those listed in the service manual.

➢ Use the commissioning checklist.

To be checked	Chapter	Complied?
date and time is set	7.2.7	
machines are set up	6.11	
machines are connected	7.3.1	
Required pressure is set	7.4	

Tab. 23 Commissioning

Precondition All points in the checklist are complied with, see table 23.

➢ Press the «machine preselect» key for the required machines on the master controller.

Result The green «preselect» key LED lights up.

Stations with emergency mode facility	Stations without emergency operating mode
1. Set the machines to remote mode. 2. Press the «automatic mode» key on the master controller.	1. Switch on the machines. 2. Start the compressed air supply by pressing the «automatic» key on the master controller.

Result The master controller assumes control of the machines.

7.9 Connecting a PC to the master controller

To be able to use SIGMA AIR CONTROL, a PC and the master controller must be connected. There are three methods of creating this connection:

- through a local network (Ethernet), see chapter 7.9.2
- with a modem through an analog phone connection, see chapter 7.9.3
- directly to an RS 232 interface via a null modem cable, see chapter 7.9.4

Precondition The machines are in manual mode.

➢ Note system requirements.

7.9.1 System requirements

The following system requirements have to be met to allow visualisation with SIGMA AIR CONTROL:

- Unicode-capable operating system recommended is Microsoft Windows XP Professional Service Pack 3 or Microsoft Windows 7 Enterprise.
- Support of the UTF 8-character coding and the Java plug-in interface from Sun via the browser.
- Sun Java plug-in JRE 6 Update 20 (1.6.0_20) is installed.

➢ Check the list.

The current Java plug-in can be downloaded from the Sun homepage under http://java.sun.com/javase/downloads/index.jsp. Older versions are archived in http://java.sun.com/products/archive/ . Download the plug-in (JRE) for your operating system. This is required only once for each browser computer. We recommend Microsoft Internet Explorer 7, Microsoft Internet Explorer 8, and Mozilla Firefox 3.6 as browsers. They support the aforementioned prerequisites. The use of Internet Explorer version 5.5 is not recommended.

➢ Download required files.

The full functional capability of SIGMA AIR CONTROL can only be guaranteed for a Microsoft Windows XP Professional Service Pack 3 or Microsoft Windows 7 Enterprise operating system with Microsoft Internet Explorer 7 or 8 or Mozilla Firefox V3.6 and Java plug-in JRE 6.0 Update 20. Although special emphasis was placed on independent browser and operating system use during the development of SIGMA AIR CONTROL, some functions may be impaired when it is used with systems other than those mentioned above.

➢ Avoid function impairment.

7.9.2 Connecting the master controller through a local network

➢ Connect hardware and determine settings.

7.9.2.1 Hardware interfacing

➢ Connect the master controller (0X4 Ethernet interface) to the local network:
- through a 10Base T (industrial twisted pair) cable with a RJ45 plug or
- through a point-to-point Ethernet connection with a crosslink cable.

7.9.2.2 Master controller settings

The IP address and the subnet mask have to be determined by the network administrator.

1. Call up menu option *<Settings«F1» System«F1» Interfaces«F3» Ethernet «F4» >*.
2. If required, enter password for level 3.
3. Enter the IP address of the master controller.
4. Enter the subnet mask.
5. If a router is used, enter the IP address of the relevant router.
6. Exit the selection window by pressing «esc».
7. Wait for the message "0624 write EPROM is finished". Wait for Restart needed (H).
8. Press the «Acknowledge» key twice until the messages disappear from the display.
9. Switch the master controller off and on again to accept the settings.

7.9.2.3 Settings on the PC

No further settings need to be made on the PC.

➢ Retain settings on the PC.

7.9.2.4 Dialling into SIGMA AIR CONTROL

The user name "Kaeser1" and password "11" are preset in the shipped system. If the password is changed, switch the master controller off and on again to make the change effective for the SIGMA AIR CONTROL as well.

1. Start the browser and enter the master controller's Ethernet IP address.
2. Confirm with «Enter».

   The SIGMA AIR CONTROL home page appears; call up further pages with the links in the navigation bar.
3. Enter user name and password as quoted above in the user name and password fields; use correct upper and lower cases.

Result SIGMA AIR CONTROL can now be used.

7.9.3 Connecting the master controller through a modem (option)

Precondition A PCMCIA modem is installed in the controller in slot 2.

A modem connected to the phone network is installed in the PC.

➢ Check the requirements.

7.9.3.1 Master controller settings

The IP address has to be determined by the network administrator. Take note of the user information for the modem retrofit kit.

1. Call up menu option *<Settings «F1» System «F1» Interfaces «F3» Modem «F3» >*.
2. If required, enter password for level 3.
3. For a PC modem card PzP coupling select "PPP modem PC Card COM 3", and for a GSM modem PzP coupling select "PPP GSM modem COM 1".
4. Enter the PPP IP address, e.g.: 192.168.212.251
5. Exit the selection window by pressing «esc».
6. Wait for the message "0624 write EPROM is finished". Wait for Restart needed (H).
7. Press the «Acknowledge» key twice until the messages disappear from the display.
8. Switch the master controller off and on again to accept the changed settings.

7.9.3.2 Setting up the dial-up connection with modem on the PC

The dial-up connection for the following operating systems will be described:

- Microsoft Windows XP
- Microsoft Windows 2000

Precondition Administrator rights are available on the PC.

➢ Authorise the suitable person.

Configuring a dial-up network connection in Microsoft Windows XP

Meanings of control symbols:

Symbol	Meaning
⊙	Radio button activated
○	Radio button passive
☑	Check box activated
☐	Check box passive

Tab. 24 Control symbol

1. In the start menu, call up the Connect with command:
   < Start Connect with Show all connections Network specification Create new connection >
2. When the *<New Connection Wizard>* appears, click on Next.
3. Settings in the dialog window *<New connection wizard – Network Connection Type>*
   - Activate the connection to the network with ⊙ .
   - Click Next.
4. Settings in the dialog window *<New connection wizard – Network connection>*
   - Activate the data connection with ⊙ .
   - Click Next.
5. Settings in the dialog window *<New connection wizard – Connection name>*
   - Enter the connection name, e.g. SAM.
   - Click Next.
6. Settings in the dialog window *<New connection wizard – Number to be dialled>*
   - For the provided telephone connection to SIGMA AIR MANAGER:
     - Enter the dialling number in the appropriate field.
     - Click Next.
7. Settings in the dialog window *<New connection wizard – Connection availability>*
   Activate the connection either for:
   - All users with the corresponding ⊙ or
   - This user only with the corresponding ⊙ .
   - Click Next.
8. Settings in the dialog window *<New connection wizard – Completing the network connection>*
   - Click Finish .

Result The dial-up network connection will be configured. The connection can be called up from the start menu with *< Start Connect with Connection name >*, e.g. “SAM”.

Establishing the connection

To establish the connection to the master controller the user name "kaeser" and the password "sam" are needed. These are default system settings and cannot be changed by the user.

1. Establishing the connection in the start menu: *< Start Connect with Connection name >*, e.g., “SAM”.

2. In the *<Create connection with SAM >*dialog window, activate Properties.
   The *<SAM Properties>* dialog window opens.
   It contains the following tab pages:
   - General
   - Option
   - Security
   - Network
   - Common use
3. Enter the following settings in the "General" tab:
   - Click on the "General" tab.
   - Activate the field “Connection via”:
     modem model with ☑.
   - Select All devices and activate the same number with ☑.
   - Activate modem configuration with Configure.
     - Select 115200 as the "maximum transfer rate (Bit/s)".
     - Activate Hardware flow control with ☑.
     - Activate Modem error check with ☑.
     - Activate Modem compression with ☑.
     - Activate Use modem loudspeaker with ☑.
     - Activate the corresponding modem configuration with OK.
   - Check the dialling number and re-enter if necessary.
4. You can leave the default settings in the register tab for options and safety.
5. Enter the following settings in the Network tab:
   - Click on the "Network" tab.
   - Activate the Internet protocol (TCP/IP) with ☑.
   - Click Properties.
     - Activate "Use following IP address" with ⊙.
     - Enter the IP address: Copy the first three digits of the IP address from the master controller. Use a different number (0-255) for the last number than that of the master controller. Example: The IP address in the master controller is 192.168.212.251, the IP address here could be 192.168.212.252.
     - Click OK.
6. You can leave the default settings in the register tab for common use.
7. Accept the settings in the *<“SAM Properties">* window with OK.
8. Enter the following in the *<Connect with SAM>* dialog window:
   (case sensitive!)
   - Enter "kaeser" as user name.
   - Enter "sam" as password.
9. Click Select.

Result The dial-up network connection will be started.

Configuring a dial-up network connection in Microsoft Windows 2000

Meanings of control symbols:

Symbol	Meaning
◉	Radio button activated
○	Radio button passive
☑	Check box activated
☐	Check box passive

Tab. 25 Control symbol

1. In the start menu, call up the Create new connection command:
   < Start Settings Network and data connections Create new connection >
2. In the *<Network connection wizard>*, click Next .
3. Settings in *<Network connection wizard – network connection type>*
   - Select "Private network" with ◉.
   - Click Next.
4. Settings in *<Network connection wizard – Number to dial>*
   - Activate "Use dialling rules" with ☑.
   - For the provided telephone connection to SIGMA AIR MANAGER:
     - Enter the area code.
     - Enter the number.
     - Enter the country code.
     - Click Next.
5. Settings in *<Network connection wizard – Connection availability>*
   For the connection you may choose either
   - "For all users" with the corresponding ◉, or
   - "This user only" with the corresponding ◉.
   - Click Next.
6. Settings in *<Network connection wizard – Finishing>*
   - Enter the name of the connection, e.g. SAM, in the appropriate field.
   - Click Finish .

Result The dial-up network connection will be configured. The connection can be called up from the start menu with *< Start Settings Network and data connections Connection name >*, e.g. “SAM”.

Establishing the connection

To establish the connection to the master controller the user name "kaeser" and the password "sam" are needed. These are default system settings and cannot be changed by the user.

1. Establish the connection in the start menu: *< Start Settings Network and data connections Create new connection >*

2. In the *<Create connection with SAM>* window, click Properties .
   The *<SAM Properties>* dialog window opens.
   It contains the following tab pages:
   - General
   - Option
   - Security
   - Network
   - Common use
3. Enter the following settings in the "General" tab:
   - Click on the "General" tab.
   - Activate the field “Connection via”:
     modem model with ☑.
   - Select All devices and activate the same number with ☑.
   - Activate modem configuration with Configure.
     - Select 115200 as the "maximum transfer rate (Bit/s)".
     - Activate Hardware flow control with ☑.
     - Activate Modem error check with ☑.
     - Activate Modem compression with ☑.
     - Activate Use modem loudspeaker with ☑.
     - Activate the corresponding modem configuration with OK.
   - Check the dialling number and correct if necessary.
4. You can leave the default settings in the register tabs Options and Security.
5. Enter the following settings in the Network tab:
   - Click on the "Network" tab.
   - Activate the Internet protocol (TCP/IP) with ☑.
   - Click Properties.
     - Activate "Use following IP address" with ⊙.
     - Enter the IP address: Copy the first three digits of the IP address from the master controller. Use a different number (0-255) for the last number than that of the master controller. Example: The IP address in the master controller is 192.168.212.251, the IP address here could be 192.168.212.252.
     - Click OK.
6. You can leave the default settings in the register tab for common use.
7. Accept the settings in the *<“SAM Properties”>* window with OK.
8. Enter the following in the dialog window *<Connect with SAM>*:
   (case sensitive!)
   - Enter "kaeser" as user name.
   - Enter "sam" as password.
9. Click Connect .

Result The dial-up connection will be started.

7.9.3.3 Dialling into SIGMA AIR CONTROL

The user name "Kaeser1" and password "11" are preset in the shipped system. If the password is changed, switch the master controller off and on again to make the change effective for the SIGMA AIR CONTROL as well.

1. Start the browser and enter the master controller's Ethernet IP address.
2. Confirm with «Enter».
   The SIGMA AIR CONTROL home page appears; call up further pages with the links in the navigation bar.
3. Enter user name and password as quoted above in the user name and password fields; use correct upper and lower cases.

Result SIGMA AIR CONTROL can now be used.

7.9.4 Connecting the master controller through a null modem cable

Precondition The master controller (0X2 RS232 interface) and the PC must be connected with a null modem cable.

➢ Check the requirements.

The null modem cable connections are listed in the annex chapter 13.6. The connection can be established only with a fully wired null modem cable.

7.9.4.1 Master controller settings

The parameters to be set have to be determined by the network administrator. Settings changed in the Modem menu option are not active until the menu option has been exited and the master controller has been restarted.

1. Call up menu option *<Settings «F1» System «F1» Interfaces «F3» Modem «F3» >*.
2. If required, enter password for level 3.
3. Select "PPPNull ModemCOM 1" for ptp link.
4. Enter the PPP IP address, e.g.: 192.168.212.251
5. Exit the selection window by pressing «esc».
6. Wait for the message "0624 write EPROM is finished". Wait for Restart needed (H).
7. Press the «Acknowledge» key twice until the messages disappear from the display.
8. Switch the master controller off and on again to accept the changed settings.

7.9.4.2 Setting up the dial-up connection with null modem on the PC

The dial-up connection for the following operating systems will be described:

- Microsoft Windows XP
- Microsoft Windows 2000

Precondition Administrator rights are necessary on the PC.

➢ Authorise the suitable person.

Configuring a dial-up network connection in Microsoft Windows XP

Meanings of control symbols:

Symbol	Meaning
⊙	Radio button activated
○	Radio button passive
☑	Check box activated
☐	Check box passive

Tab. 26 Control symbol

1. In the start menu, call up the Connect with command:
   < Start Connect with Show all connections Network specification Create new connection >
2. When the *<New Connection Wizard – Welcome>* appears, click on Next.
3. Settings in *<New connection wizard – Network connection type>*
   - Activate “Create additional connection” with ⊙.
   - Click Next.
4. Settings in the dialog window *<New connections wizard – Advanced connection options>*
   - Activate "Create direct connection with another computer" with ⊙.
   - Click Next.
5. Settings in the dialog window *<New connections wizard – host or guest?>*
   - Activate "Guest" with ⊙.
   - Click Next.
6. Settings in the dialog window *<New connection wizard – Connection name>*
   - Enter the connection name, e.g. SAM.
   - Click Next.
7. Settings in the dialog window *<New connection wizard – Select device>*
   - Select "Communication cable between 2 computers (COM1)" in the device selection field.
   - Click Next.
8. Settings in the dialog window *<New connection wizard – Connection availability>*
   Activate the connection either as:
   - "All users" with ⊙, or
   - "This user only" with ⊙.
   - Click Next.
9. Settings in the dialog window *<New connection wizard – Completing the network connection>*
   - Click Finish .

Result The dial-up network connection will be configured. The connection can be called up from the start menu with *< Start Connect with Connection name >*, e.g. “SAM”.

Establishing the connection

To establish the connection to the master controller the user name "kaeser" and the password "sam" are needed. These are default system settings and cannot be changed by the user.

1. Establishing the connection in the start menu: *< Start Connect with Connection name >*, e.g., “direct with SAM”.

2. In the *<Create direct connection to SAM >*dialog windows, click on Properties.
   The *<SAM direct properties>* dialog window will open.
   It contains the following tab pages:
   - General
   - Options
   - Security
   - Network
   - Common use
3. Enter the following settings in the "General" tab:
   - Click on the "General" tab.
   - Select "Communication cable between 2 computers (COM1)" in the device selection field.
   - Activate modem configuration with Configure.
     - Select 115200 as the "maximum transfer rate (Bit/s)".
     - Activate Hardware flow control with ☑.
     - Activate the corresponding null modem configuration with OK.
4. You can leave the default settings in the register tabs Options and Security.
5. Enter the following settings in the Network tab:
   - Click on the "Network" tab.
   - Activate the Internet protocol (TCP/IP) with ☑.
   - Click Properties.
     - Activate "Use following IP address" with ⊙.
     - Enter the IP address: Copy the first three digits of the IP address from the master controller. Use a different number (0-255) for the last number than that of the master controller. Example: The IP address in the master controller is 192.168.212.251, the IP address here could be 192.168.212.252.
     - Click OK.
6. You can leave the default settings in the register tab for common use.
7. Accept the settings in the dialog window *<SAM direct properties>* with OK.
8. Enter the following information in the *<Create direct connection with SAM>* :
   (case sensitive!)
   - Enter "kaeser" as user name.
   - Enter "sam" as password.
9. Click select.

Result The dial-up connection will be started.

Configuring a dial-up network connection in Microsoft Windows 2000

Meanings of control symbols:

Symbol	Meaning
⊙	Radio button activated
○	Radio button passive
☑	Check box activated
☐	Check box passive

Tab. 27 Control symbol

1. In the start menu, call up the Create new connection command:
   < Start Settings Network and data connections Create new connection >
2. Click Next in the Network connection wizard.
3. Settings in *<Network connection wizard – network connection type>*
   - Activate "Connect directly to another computer" with ⊙.
   - Click Next.
4. Settings in the dialog window *<Network connection wizard – host or guest>*
   - Activate "Guest" with ⊙.
   - Click Next.
5. Settings in the *<Network connection wizard – select device>*
   - Select "Communication cable between 2 computers (COM1)" in the device selection field.
   - Click Next.
6. Settings in *<Network connection wizard – Connection availability>*

   Activate the connection either as:
   - "For all users" with the corresponding ⊙, or
   - "This user only" with the corresponding ⊙.
   - Click Next.
7. Settings in *<Network connection wizard – Finishing>*
   - Enter the name of the connection, e.g. "SAM direct", in the appropriate field.
   - Click Finish .

Result The dial-up network connection will be configured. The connection can be called up from the start menu with *< Start Settings Network and data connections Connection name >*, e.g. “SAM direct”.

Establishing the connection

To establish the connection to the master controller the user name "kaeser" and the password "sam" are needed. These are default system settings and cannot be changed by the user.

1. Establishing the connection in the start menu: *< Start Settings Network and data connections Create new connection >*, e.g., "SAM direct".
2. In the *<Create direct connection to SAM >*dialog windows, click on Properties.
   The *<SAM direct properties>* dialog window opens.

   It contains the following tab pages:
   - General
   - Options
   - Security
   - Network
   - Common use
3. Enter the following settings in the "General" tab:
   - Click on the "General" tab.
   - Select "Communication cable between 2 computers (COM1)" in the device selection field.
   - Activate modem configuration with Configure.
     - Select 115200 as the "maximum transfer rate (Bit/s)".
     - Activate Hardware flow control with ☑.
     - Activate the corresponding null modem configuration with OK.
4. You can leave the default settings in the register tabs Options and Security.

5. Enter the following settings in the Network tab:
   - Click on the "Network" tab.
   - Activate the Internet protocol (TCP/IP) with ☑.
   - Click Properties.
     - Activate "Use following IP address" with ◉.
     - Enter the IP address: Copy the first three digits of the IP address from the master controller. Use a different number (0-255) for the last number than that of the master controller. Example: The IP address in the master controller is 192.168.212.251, the IP address here could be 192.168.212.252.
     - Click OK.
6. You can leave the default settings in the register tab for common use.
7. Accept the settings in the *<"SAM direct Properties">* window with OK.
8. Enter the following information in the *<Create direct connection with SAM>* :
   (case sensitive!)
   - Enter "kaeser" as user name.
   - Enter "sam" as password.
9. Click Connect .

Result The dial-up connection will be started.

7.9.4.3 Dialling into SIGMA AIR CONTROL

The user name "Kaeser1" and password "11" are preset in the shipped system. If the password is changed, switch the master controller off and on again to make the change effective for the SIGMA AIR CONTROL as well.

1. Start the browser and enter the master controller's Ethernet IP address.
2. Confirm with the «Enter» key.
   The SIGMA AIR CONTROL home page appears; call up further pages with the links in the navigation bar.
3. Enter user name and password as quoted above in the user name and password fields; use correct upper and lower cases.

Result SIGMA AIR CONTROL can now be used.

7.10 Communication

The functions in the Communication menu are optionally available.

➢ Select from the main menu *<settings«F1»system«F1»communication«F5» >*.

7.10.1 Setting the short message (option)

Short messages can be sent to a service technician with the short message (SMS) option.

Precondition Either a KAESER PC card modem or a KAESER GSM modem is installed in the master controller.

➢ See service manual "SIGMA AIR MANAGER SMS".

Further information Modem retrofit kits are available. See annex in chapter 13.10, table 96.

7.10.2 Registering and activating SIGMA AIR CONTROL (option)

Precondition A KAESER PC card with SIGMA AIR CONTROL software installed in the master controller and the release code to hand.

Detailed information on installation, operation and registration is found in the SIGMA AIR CONTROL *plus* service manual.

Data loss from switching off the controller power supply or setting back the clock.

➢ The SIGMA AIR CONTROL *plus* must be deactivated before taking these actions.

1. Deactivate the SIGMA AIR CONTROL *plus* before interrupting the power supply.
2. Deactivate the SIGMA AIR CONTROL *plus* before setting back the clock.

Further information SIGMA AIR CONTROL *plus* as retrofit kit, see annex in chapter 13.10, table 96.

7.10.3 Activating send/receive Ethernet layer 4 (option)

The master controller can send and receive data via Ethernet, making a link to a user's control centre possible.

Precondition Release code for send/receive to hand.

➢ See service manual "SIGMA AIR MANAGER send/receive".

Further information Send/Receive Ethernet Layer 4 is optionally available see annex in chapter 13.10, table 96.

8 Operation

8.1 Displaying operating data

The current data of the compressed air system is shown in the main menu. These are distributed over six display windows that can be scrolled with the «F5» and «F6» keys.

Precondition The basic settings of the main menu are specified.

1. Select large font display of pressure.
   The current system pressure is displayed in large font.
2. Select the "pressure/time diagram".
   A profile of system pressure over the preceding 15 minutes is displayed graphically.
3. Select "Overall FAD".

The values in this display are not measured values, they are computed values.

In conventional connections, only machines with the "motor running" feedback signal are shown.

The following values are displayed:

- The overall power consumption of the machines in the compressed air station since the last reset.
- The overall delivery of the machines in the compressed air station since the last reset.
- The specific capacity of all machines in the compressed air station since the last reset.
- Date and time of the last reset in the line above the word "Reset".

The display of these three values can be reset at the same time, by using "Reset" and the password.

4. Select "List of machines".
   In this display, the required pressure can be set and the computed momentary FAD of the compressor station is shown. (these two figures are shown in the "Operational data" display on model 16/8).
   The status of the machines is shown in the "List of machines". The following symbols are used:

Symbol	Meaning
1	Machine 1 is preselected
[4]	Machine 4 is activated last
2	Machine 2 is only monitored, load and idle are internally controlled.
~~1~~	Machine 1 is not available to the master controller.
Remote/clock/location	Type of deselection:
	Remote: remote contact, for example, a control centre. Clock: operated with shift clock, machine has been deselected Location: machine itself (local mode)
	Machine running under load
	Machine running in idle mode
	Machine ready for operation, waiting for command

Symbol	Meaning
	Compressor has a fault

Tab. 28 Machine list symbol

5. Select "Current operating data".

The values in this display are not measured values, they are computed values. In conventional connections, only machines with the "motor running" feedback signal are shown.

Displayed are:

- Type 16/8 only: Required pressure
- Power: the current power consumption of the machines
- Delivery: the current delivery of the machines
- Specific: the current specific power consumption of the station's running machines
- Switchings: idle/load swtichings of the station's machines (moving average of the last 7 days)
- Consumption: the current compressed air consumption of the station

6. Select "Pressure values"

   The following values are displayed:

   - Maximum system pressure, together with the respective time of occurrence
   - Mean system pressure since last reset
   - Minimum system pressure, together with the respective time of occurrence
   - Date and time of the last reset in the line above the word "Reset".
   - The display of these three values can be reset at the same time, by using "Reset" and the password (password level 2).

8.2 Displaying messages

➢ Note the list of messages in the annex.

8.2.1 Displaying operational messages

Operational messages are stored in the master controller's event memory.
They do not have to be acknowledged.

A differentiation is made between the following messages:

- Current messages
- Event memory (the last 100 messages are stored)

1. Call up menu option *<message«F2»– operational messages«F2» >*.

2. Select a menu option:
   - Current messages «F1»
   - event memory «F2»
     The events (messages) are shown with the following data:
     - message (event) number
     - Message coming K, KG or message gone G
     - Time and date of the event.
     - Message text
     - Type of message (O = operational message)
3. If needed, scroll through the events with the arrow keys.

8.2.2 Show SMS status

When the short message (SMS) option is activated the current status a an SMS is shown.

➢ Call up menu option *<message«F2»– SMS status«F3» >*.

The following data are shown:

- SMS in progress: yes or no
- Active SMS channel
- Error code (hexadecimal)
- message (event) number
- Type of event: alarm/warning or service
- Message from slave (slave 2 = master controller; slaves 3-18 = machines 1-16)

8.2.3 Show SIGMA AIR CONTROL plus status

When the SIGMA AIR CONTROL *plus* option is activated, the current status of SIGMA AIR CONTROL *plus*is shown in this window.

➢ Call up menu option *<message«F2»– SAC plus status«F4» >*.

The following data are shown:

- SAC *plus* active: yes or no
- Remaining memory
- Circular buffer mode: yes or no
- Error code (hexadecimal)

8.2.4 Show system status and memory access

System internal information is shown in these displays that may only be used by authorised KAESER SERVICE technicians.

Precondition Authorised KAESER Service Personal

➢ Call up pictures if required.

8.3 Show input and output states

The states of the digital and analog inputs and outputs are shown in the inputs/outputs menu option.

➢ Select from the main menu *<settings«F1»system«F1»inputs and outputs«F4» >*.

Show digital inputs

➢ Select menu option *<digital inputs«F1» >*.
The states of the digital inputs are shown.
This allows the correct wiring of the floating relay inputs to be checked.
- "0": no volts
- "1": 24 volts

Show digital outputs

➢ Select menu option *<digital outputs«F2» >*.
The states of the digital outputs are shown. This checks whether an output is activated or not.

Show analog inputs

➢ Select menu option *<analog inputs«F3» >*.
The analog values in digits are shown.

Analog value of 0 to 20 mA inputs.	Indication
Direct on the master controller (AI0, AI1, AI16, AI17)	0 is equivalent to 0 mA
	3276 is equivalent to 20 mA
On a Profibus expander (AI36-AI50)	0 is equivalent to 0 mA
	4096 is equivalent to 20 mA

Tab. 29 Display of analog inputs

➢ Display the analog values of the PT100 inputs.

Analogue values of the PT100 inputs.	Indication
Direct on the master controller (PT0, PT1, PT8, PT9)	−2000 in equivalent to −200.0 °C
	+2300 is equivalent to 230.0 °C
To a Profibus expander (PT52-PT66)	−2000 in equivalent to −100.0 °C
	+4500 is equivalent to +450.0 °C

Tab. 30 Display of analogue values of the PT100 inputs.

Show analog outputs

➢ Select menu option *<analog outputs «F4» >*.
The analog values in digits and mA are shown:

Analog values of outputs	Indication
Direct on the master controller (AO0, AO8):	0 is equivalent to 0 mA
Models 4/4 and 8/4	1023 is equivalent to 20 mA
Models 8/8 and 16/8	4096 is equivalent to 20 mA
On a Profibus expander (AO36-AO50)	0 is equivalent to 0 mA
	4096 is equivalent to 20 mA

Tab. 31 Display of analog output values

8.4 Calling up system information

➢ Select from the main menu *<settings«F1»system«F1»system information«F6» >*.
The following data are shown:

- Material number
- serial number
- Details of the software used
- Details of the operating system used.

9 Fault Recognition and Rectification

9.1 KAESER SERVICE

The messages valid for your master controller are dependent on how the compressor station is equipped. Self-definable messages (see chapter7.7.1) cannot be considered in this overall description.

1. Do not attempt fault rectification measures other than those given in this manual.
2. Inform KAESER SERVICE if the fault cannot be rectified by the measures suggested.

9.2 Alarm, service and warning messages

Alarm, service and warning messages are displayed on the master controller and stored in the event memory. The messages are displayed in a display frame (message window) that overlays the current displayed information. The messages are identified by a *Δ* at the top left of the message window.

New messages that are not acknowledged are displayed together with the following data:

- Message (event) number
- Date and time
- Message text
- Type of message:
  - A=Alarm
  - S=Service
  - W=Warning
  - N=Note

Messages must be acknowledged.

➢ Use the «acknowledgement» key to acknowledge messages.

A differentiation is made between events (messages) that are current and the event memory in in which the last 100 events are saved.

1. Select menu option *<message«F2»alarm, service and warning messages«F1» >*.
2. Select a menu option:
   - Current messages «F1» or
   - event memory «F2»
     Every message is displayed with three time stamps:
   - first time stamp: message coming
   - second time stamp: message acknowledged
   - third time stamp: message gone
     The following data are shown in addition:
   - message (event) number
   - message has come (C, CG or CGQ), message acknowledged (Q) or message gone (G)
   - date and time
   - message text
   - type of message (A, S, W, N)
3. Use the arrow keys to scroll through the events.

9.2.1 Controller messages

The following messages can appear on the master controller (in the master controller's message text x represents a number).

Message numbers 191–256 and 369–384 can be activated or deactivated (see chapter 7.7.1)

Interruption of air supplies

Switching the power supply to the master controller off and on again will interrupt the compressed air supply on compressor stations without emergency mode for about 40 seconds.

With most events, the master controller continues running in its current operating mode. If the message has an asterisk (*) however, machines with EMERGENCY mode switch to their own internal control. Machines without EMERGENCY mode do not supply compressed air if these messages appear.

9.2.2 Alarm indications

No.	Message	Possible cause	Remedy
1–16	Compressor x bus alarm (diagnosis)	Profibus line or plug defective; incorrect slave number; machine without power.	■ Check bus cable/bus plug. ■ Check machine slave number. ■ Check power supply to the machine.
17–32	Compressor x bus alarm (from SC)	Profibus line or plug defective; incorrect slave number; machine without power.	■ Check bus cable/bus plug. ■ Check machine slave number. ■ Check power supply to the machine.
33–46	Bus expander slave x bus alarm (diagnosis)	Profibus line or plug defective; incorrect slave number; expander without power.	■ Check bus cable/bus plug. ■ Check machine slave number. ■ Check power supply to the expander.
49	Profibus DP not running		Consult KAESER service.
50	Profibus DP Planning error		Consult KAESER service.
57	SMS could not be sent (CODE)		■ Check phone connection. ■ Check SMS settings (see chapter7.10.1) ■ Always quote the code number when inquiring at KAESER. ■ Acknowledge message
58	SAC plus group error	Code not equal to 80: Internal error	■ Consult KAESER service. ■ Acknowledge the message.
58	SAC plus group error (80)	Code 80 = buffer overflow: System heavily overloaded with simultaneous demand for large amounts of data via SAC *plus*	■ Acknowledge message ■ Re-activate SAC *plus*. ■ Contact KAESER Service Centre if this error occurs repeatedly.

No.	Message	Possible cause	Remedy
59	SND / RCV alarm	Communication via the send/receive protocol is faulty	Check Ethernet connection.
60	SAC plus storage medium (CODE)	Storage medium defective or nonexistent	■ Acknowledge message ■ Replace storage medium.
61	SAC plus drive fault (DWNo.;CODE)	Storage medium not from KAESER; defective or not installed.	■ Acknowledge message ■ Replace storage medium.
62	GSM modem alarm or incorrect PIN.	Modem not operational (no power; no connection to the master controller; no reception). Master controller PIN incorrect.	■ Put the modem in operation. ■ Correct the PIN in the master controller. ■ Acknowledge the message and reactivate "send GSM PIN"
65–80	Compressor x Group alarm	Machine not ready for operation.	■ Remove fault on the machine. ■ For conventional connection: Check the cable
81–96	Compressor x does not switch to load.	"motor running" or "load" feedback signals from the machine not switching correctly. Possible causes: Feedback contact or cable defective. Machine not starting, e.g. because of backpressure or active idle key.	■ Check feedback contact and wiring. ■ Remove reason for the machine not starting.
99	Highest pressure exceeded.	The set highest pressure ph was exceeded for longer than the set time tph.	Find and remove the cause of pressure undercut.
100	Summer/winter system changeover faulty.	An error occurred during internal clock reset from summer to winter or vice versa.	■ Check clock time and correct if necessary. ■ Consult KAESER service. ■ Acknowledge message
101	System EEPROM read error	An error occurred while reading from the EEPROM.	■ Consult KAESER service. ■ Acknowledge message
102	System EEPROM write faulty.	An error occurred when writing to the EEPROM.	■ Consult KAESER service. ■ Acknowledge message

No.	Message	Possible cause	Remedy
113 + 115 (*)	Pressure transducer x open circuit	The connection to the pressure transducer is interrupted.	■ Remove the cause of the interruption. ■ Acknowledge message ■ Switch the station back to automatic mode or switch on again.
114 + 116 (*)	Pressure transducer x short circuit	The connection to the pressure transducer is short circuited.	■ Remove the cause of the short circuit. ■ Acknowledge message ■ Switch the station back to automatic mode or switch on again.
117	Minimum pressure under cut.	Pressure was less than minimum pressure pt for a longer period than set for time tpt.	Find and remove the cause of pressure undercut.
118 (*)	No pressure transducer activated.	No pressure transducer assigned to an analog input.	■ Connect at least one transducer to an analog input in the network pressure menu (see chapter 7.5.2). ■ Acknowledge alarm message. ■ Switch the station back to automatic mode or switch on again.
119	FC compressor speed open circuit		Check the cable at the respective analog input.
120	FC compressor speed short circuit		Check the cable at the respective analog input.
121	Required pressure from AI open circuit		■ Check the cable at the respective analog input. ■ Acknowledge message
122	Required pressure from AI short circuit		■ Check the cable at the respective analog input. ■ Acknowledge message
123	Input value X from AI open circuit		Check the cable at the respective analog input.
124	Input value X from AI short circuit		Check the cable at the respective analog input.
125	Input value X from PT Sensor fault.		Check line to the PT100 input.
127	Network section Valve does not open.	Valve control, the valve itself or position sensing contact. Timeout for the valve function set too short.	■ Check valve control, the valve itself or position sensing contact. ■ Change the timeout setting for the valve function.

No.	Message	Possible cause	Remedy
128	Network section Valve does not close.	Valve control, the valve itself or position sensing contact. Timeout for the valve function set too short.	■ Check valve control, the valve itself or position sensing contact. ■ Change the timeout setting for the valve function.
130 (*)	System FLASH error	An error occurred in the master controller's internal FLASH memory.	■ Switch the master controller's power supply off. ■ Leave the power supply off. ■ Consult KAESER service.
131 (*)	System RAM error	An error occurred in the master controller's internal RAM memory.	■ Switch the master controller's power supply off. ■ Leave the power supply off. ■ Consult KAESER service.
132 (*)	System Temperature too high.	The master controller's ambient temperature has exceeded the permissible 40°C.	■ Maintain ambient temperature below 40 °C. ■ Acknowledge message ■ Switch the station back to automatic mode or switch on again.
133 (*)	System Temperature too low.	The master controller's ambient temperature has undercut the permissible 0 °C.	■ Maintain ambient temperature above 0 °C. ■ Acknowledge message ■ Switch the station back to automatic mode or switch on again.
135 (*)	System HEAP error	There is not enough internal memory for the master controller program.	■ Switch the master controller's power supply off and on again. ■ Consult KAESER service. ■ Acknowledge message
136 (*)	System TRAP error	An error occurred in the master controller's program.	■ Switch the master controller's power supply off. ■ Leave the power supply off. ■ Consult KAESER service.
137	System PC card slots deactivated.	The PCMCIA slots were deactivated because temperature was either too high or too low.	■ Maintain ambient temperature between 0 and 40 °C. ■ Switch the master controller's power supply off and on again. ■ Consult KAESER service. ■ Acknowledge message
138 (*)	System GDT fault	There is not enough internal resource for the master controller program.	■ Switch the master controller's power supply off. ■ Leave the power supply off. ■ Consult KAESER SERVICE.

No.	Message	Possible cause	Remedy
139	System application error. (DW No.; CODE)	There is a problem in a subroutine in the master controller's program.	■ Note the complete message, especially the numbers in the brackets. ■ Consult KAESER SERVICE. ■ Acknowledge message
140 (*)	System application error. (DW No.; CODE)	There is a problem in a subroutine in the master controller's program.	■ Note the complete message, especially the numbers in the brackets. ■ Consult KAESER SERVICE. ■ Acknowledge message
141	System output test Card 1 with error	The relays on outputs 0.0 to - 0.7 defective at the coil end (open circuit or short circuit).	■ Check relay connections. ■ Acknowledge message ■ Switch the master controller's power supply off and on again.
143	System output test Card 3 with error	The relays on outputs 8.0 to - 8.7 defective at the coil end (open circuit or short circuit).	■ Check relay connections. ■ Acknowledge message ■ Switch the master controller's power supply off and on again.
161–176	*Message text may be defined.*	Component connected reports a fault.	Remove the fault in the connected component.
191	UPS battery	Battery soon discharged.	Ensure power supply is available.
		Battery defective.	Replace battery.
192	Power failure	Power supply has failed. SAM is working from the battery.	
193–208	Cyclone separator x condensate drain	Cyclone separator reports fault.	Remove the fault on the condensate drain.
209–216	Dryer x High dew point.	Dryer reports a fault.	Remove the fault in the dryer.
217–224	Dryer x Fault	Dryer reports a fault.	Remove the fault in the dryer.
225–240	Dryer x Condensate drain x	Dryer reports a fault.	Remove the fault in the dryer.
241–242	Air receiver x condensate drain	Air receiver reports a fault.	Remove the fault on the condensate drain.
243–250	Filter x Condensate drain	Filter reports a fault.	Remove the fault on the condensate drain.
251–256	Condensate treatment x	Connected component reports a fault.	Remove the fault in the connected component.

Tab. 32 Alarm indications

9.2.3 Service and warning messages

No.	Message	Possible cause	Action
257–272	Compressor x Group maintenance	Machine reports service message	see machine / machine maintenance instructions Acknowledge message.
273–288	Compressor x Carry out maintenance.	The maintenance interval entered in the master controller for the machine has expired.	Carry out maintenance on the machine. Reset maintenance interval counters (see 7.3.5).
289	System Change the SAM buffer battery.	The buffer battery in the master controller is discharged.	Change the buffer battery soonest (see chapter 10.3).
369–384	Filter x Pressure differential x	Connected component reports maintenance.	Carry out maintenance according to manual.
385–400	Compressor x Group warning	Machine reports service message.	see machine / machine service manual. Acknowledge message.
401–416	Compressor x Not in REMOTE mode.		Press the remote key on the machine again.
417–432	Compressor x Data incomplete.	Machine power or FAD not entered.	Enter power and FAD.
481–488	Message text may be defined.	Connected component initiates a service message.	Carry out maintenance according to manual.

Tab. 33 Service and warning messages

9.2.4 Notes

No.	Message	Possible cause	Remedy
579	Input already assigned.		Select a spare input from the DI list.
580	Delay period too long. (0s to 999s)	The period entered is too long and cannot be accepted by the master controller.	Enter an acceptable period.
581	Input nonexistent.		Select a spare input from the DI list.
583	Output nonexistent.		Select a spare output from the DO list.
584	Output already assigned.		Select a spare output from the DO list.
585	Output nonexistent.		Select a spare output from the DO list.
586	Input nonexistent.		Select a spare input from the DI list.

No.	Message	Possible cause	Remedy
591	Slave cannot be activated because the Profibus is inactive.		Activate Profibus (see chapter 7.3.4).
592	Deactivation not possible. Slave is in use.		Deactivate all the slave's inputs and outputs.
593	Deactivation not possible. At least 1 slave is active.		Deactivate all slaves.
594	Analog input nonexistent.		Select a spare input from the AI list.
595	Undiscovered compile time error.	An error occurred in the master controller's program.	Consult KAESER SERVICE.
596	Values must be different.	Two equal values have been entered; they must differ. The master controller cannot accept these values.	Enter acceptable values.
597	Value below lower limit! Minimum: <###> bar	The value entered is too small and cannot be accepted by the master controller.	Enter an acceptable value.
609	No weekdays selected.	The switching point cannot be saved as no weekday has been defined.	Select weekday(s).
610	Given switching time not entered.	The switching point to be deleted is nonexistent.	Acknowledge message
611	Not enough spare switching points.	All 32 shift clock switching points have been assigned.	Set up the shift clock so that the maximum of 32 switching points are used.
612	Time reset to summer time.	Time switches from winter to summer time automatically.	Acknowledge message
613	Time reset to winter time.	Time switches from summer to winter time automatically.	Acknowledge message
614	Keys locked.	The depressed key is locked.	Unlock key (see chapter 7.2.6.3).
615	Compressor non-existent	The «machine preselect »key has not been assigned to a machine.	See menu Connect to compressors (chapter 7.3.1).
616	Compressor preselection Controlled by REMOTE	«Machine preselection» by key is currently not possible as remote preselection via a relay contact or control centre is active.	■ Check if the remote key can be deactivated. ■ Use the preselection key as required
617	No switching points entered	An attempt is made to activate the shift clock although no switching points have been set up.	Set up switching points (see chapter 7.6).

No.	Message	Possible cause	Remedy
618	Manual/Automatic Controlled by REMOTE	Manual/Automatic is currently not possible as remote Manual/Automatic is active via a relay contact or control centre	■ Check if the «Remote »key can be deactivated. ■ Use the «Automatic» key as required.
619	OFF/ON Controlled by REMOTE	ON or OFF by key is currently not possible as remote ON/OFF is active via a relay contact or control centre	■ Check if the «Remote »key can be deactivated. ■ Use «ON» or «OFF» keys as required.
620	Shift clock Controlled by REMOTE	The shift clock cannot be activated/deactivated by the «clock» key because the clock is active via a floating relay contact or control centre.	■ Check if the «Remote »key can be deactivated. ■ Use the «clock» key as required.
621	SMS will be sent (CODE)		Acknowledge the message.
622	SMS channel 2 activated.	SMS couldn't be transmitted on channel 1 Channel 2 was used	■ Check settings for SMS channel 1. ■ Possibly temporary problems at the provider.
623	Write EEPROM running. Do not switch off!	The master controller is saving data to the internal EEPROM memory. Switching off will cause data loss.	Acknowledge message and wait till message 624 is displayed.
624	Write EEPROM finished. Power off/on	See also message 623 Data save complete. Switch the master controller off and on again to accept the data.	■ Switch to manual operation. ■ Switch the power supply off and on again. ■ Switch to automatic mode again.
625	SAC plus invalid registration code.	A false registration code was entered for SIGMA AIR CONTROL *plus* .	Use the specific registration code of the master controller.
626	SAC plus is deactivated. Shutdown is possible.	See also message 629 Data saving on SAC *plus* storage medium is finished. The master controller can be switched off if necessary.	Acknowledge message
627	SAC plus Free memory less than 30%	Save SAC *plus* data if desired.	Acknowledge message
628	SAC plus circular buffer active.	Save SAC *plus* data if desired. Oldest data is deleted.	Acknowledge message
629	SAC plus is deactivated. Do not switch off!	The master controller is saving data to the SAC*plus* storage medium. Switching off will cause data loss.	Acknowledge message and wait till message 626 is displayed.

No.	Message	Possible cause	Remedy
630	SAC plus is deactivated. Clock set back!	The master controller clock was set back by more than 24 hours. SIGMA AIR CONTROL *plus* will be deactivated to prevent the accidental deletion of data.	■ Acknowledge message If the clock was set back accidentally, correct and re-activate SIGMA AIR CONTROL *plus*. ■ Re-activate SAC*plus* if the set back of time was deliberate. Recent data will be deleted.
633	SND/RCV registration code invalid.	A false registration code was entered for the send/receive protocol option.	Use the specific registration code of the master controller.
636	SMS will be deactivated (KLink connection)	After setting up modem communication to KLink the SMS function will be automatically deactivated. Only SMS or KLink can be used through a modem.	Acknowledge message
637	Required pressure from AI invalid	A required pressure read off from an analog input is outside the permissible range.	■ Check external source of required pressure. ■ For limits, see "Required pressure" menu (chapter 7.5.1).
638	Current pressure remains constant.	An error occurred in the master controller's program.	■ Switch the master controller's power supply off. ■ Leave the power supply off. ■ Consult KAESER SERVICE.

Tab. 34 Notes

9.3 B&B messages (operation & observation)

Messages concerning operation and observation are displayed on the master controller, but not stored in the event memory. The messages are identified by a ! at the top left of the message window. They have to be acknowledged with the «escape »key. Mostly, they refer to either too large or too small entry value.

➢ Acknowledge messages with the «Escape» key.

9.4 System messages

A message with text similar to the following is shown across the complete display: *"critical system error occurred... system halted"*

- The complete master controller system is stopped, all outputs are deactivated.
- On compressor stations with emergency operation capability, the machines run under their own internal control.
- Stations without this capability cannot supply compressed air.

1. If such a message appears, write it down in full and then contact KAESER SERVICE.
2. Leave the station running in emergency mode.
3. On stations without an emergency mode capability, try to remove the fault by switching the power supply to the master controller off and then on again.

10 Maintenance

10.1 Maintenance tasks on electrical equipment

Maintenance talks on electrical equipment may only be carried out by the following persons:

- trained technicians
- by technicians trained to maintain the master controller and by service personnel instructed by and under the supervision of such a trained technician
- authorised KAESER Service personnel.

1. Check personnel for specialized suitability.
2. Assign suitable personnel to maintenance tasks.
3. Instruct on correct maintenance procedures in accordance with the service manual.
4. Document maintenance tasks carried out.

Enter completed maintenance tasks in the list in the service manual.

10.2 Testing the control panel

The LEDs, keys and the display can be checked for correct function.

1. Select menu *<settings«F1»system«F1»general settings«F1»control panel«F4» >*.
2. Press the «F1» key to carry out the LED test; if required, enter the password for Level 1.

   All LEDs on the master controller will light up for approximately five seconds. Any unlit lamps are defective.
3. To carry out the key test, press the «F2» key and then the key to be tested; if required, enter the password for Level 2.

   An image of the key that has been pressed appears on the display. The actual key function is not triggered. The arrow keys cannot be tested.
4. To test the display, press and hold «F3».

   As long as «F3 » is pressed the display turns black and defective pixels can be recognised.

10.3 Changing the buffer battery

➢ Follow instructions carefully.

10.3.1 Danger from batteries

WARNING
There is danger of acid burns if batteries are overheated or damaged.

➢ Store the battery in a cool and dry place.

➢ Dispose of damaged buffer batteries correctly.

10.3.2 Battery life

Under normal operating conditions the buffer battery in the master controller has a life of approximately 10 years. Unused buffer batteries can be stored for five years.

CAUTION
Data loss from flat battery
- ➢ Heed warning messages from the controller concerning the buffer battery charge level.
- ➢ Exchange the buffer battery only when the master controller is switched on.

If the battery is discharged and a power failure occurs the event memory settings and clock time are lost after approximately one hour.

- ➢ Heed the charging time for unused buffer batteries.

10.3.3 Battery changing sequence

CAUTION
Cable crack from incorrect handling.
- ➢ Never remove the battery plug from its socket by pulling on the cable.

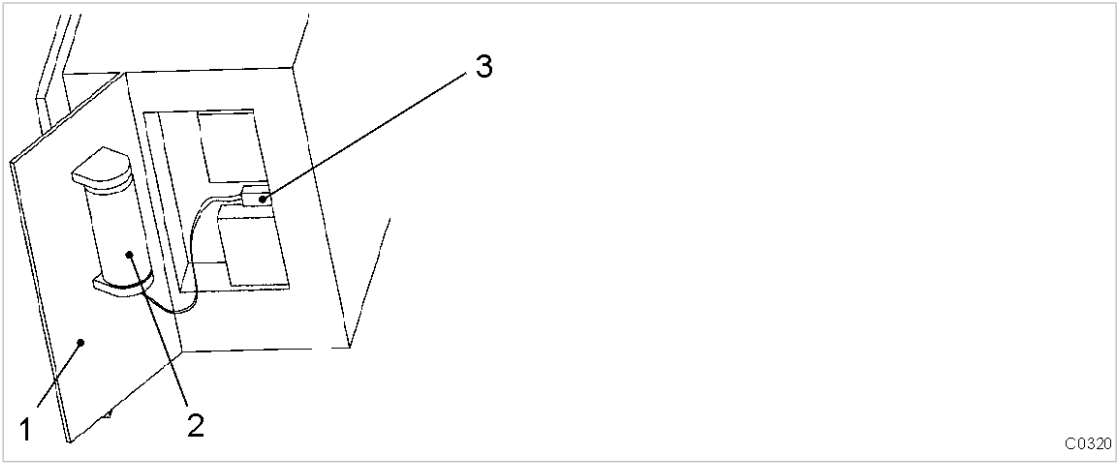


Fig. 21 Buffer battery location
[1] Side cover
[2] Buffer battery
[3] Battery cable plug

Precondition New battery to hand.
The master controller is switched on.

1. Remove the securing pins on the side cover [1] of the master controller with a screwdriver.
2. Remove the side cover [1]. The battery [2] is fixed to the side cover.
3. Carefully withdraw the plug on the battery cable [3] from the socket.
4. Remove the battery [2] from the fixing.
5. Insert a new battery.

6. Plug the battery cable [3] into the socket:
   - Blue cable (-) above
   - Red cable (+) below
7. Push extra cable into the master controller's housing.
8. Replace the cover and fix with the securing pins.
9. Check date, time and settings, correcting if required. (see chapters 7.2.7 to 7.2.9)

Used batteries are hazardous waste

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

11 Spares, Operating Materials, Service

11.1 Note the Nameplate

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

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

11.2 Spare parts

Name	Voltage [V]	Capacity [Ah]	Order number
Lithium buffer battery	3,6	1,8	7.7704.0

Tab. 35 Spare buffer battery

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

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

11.4 Displaying version and serial number

➢ Select menu *<settings«F1»system«F1»system information«F6» >*

12 Decommissioning, Storage and Transport

12.1 De-commissioning

De-commissioning is necessary, for example, under the following circumstances:

- The master controller is temporarily not needed,
- The master controller is to be moved to another location,

1. Isolate the master controller (power supply disconnecting device) from all power phases.
2. Switch off external power sources.

12.2 Disposal

Precondition The master controller is decommissioned.

1. The master controller is completely disconnected.
2. The battery has been removed (see 10.3) and properly disposed of.
3. Hand the master controller over to an authorized disposal expert.

13 Annex

13.1 Anchor holes for the control cabinet

See instructions in chapter 6.4

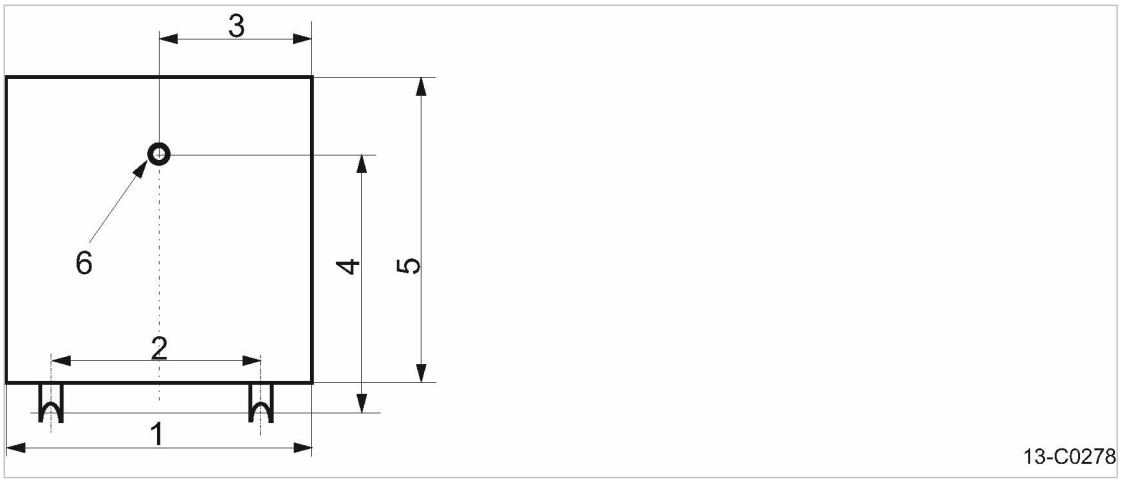


Fig. 22 Anchor holes for model 4/4 and 8/4 cabinets

1	380 mm	4	304 mm
2	340 mm	5	339 mm
3	190 mm	6	∅ 8 mm

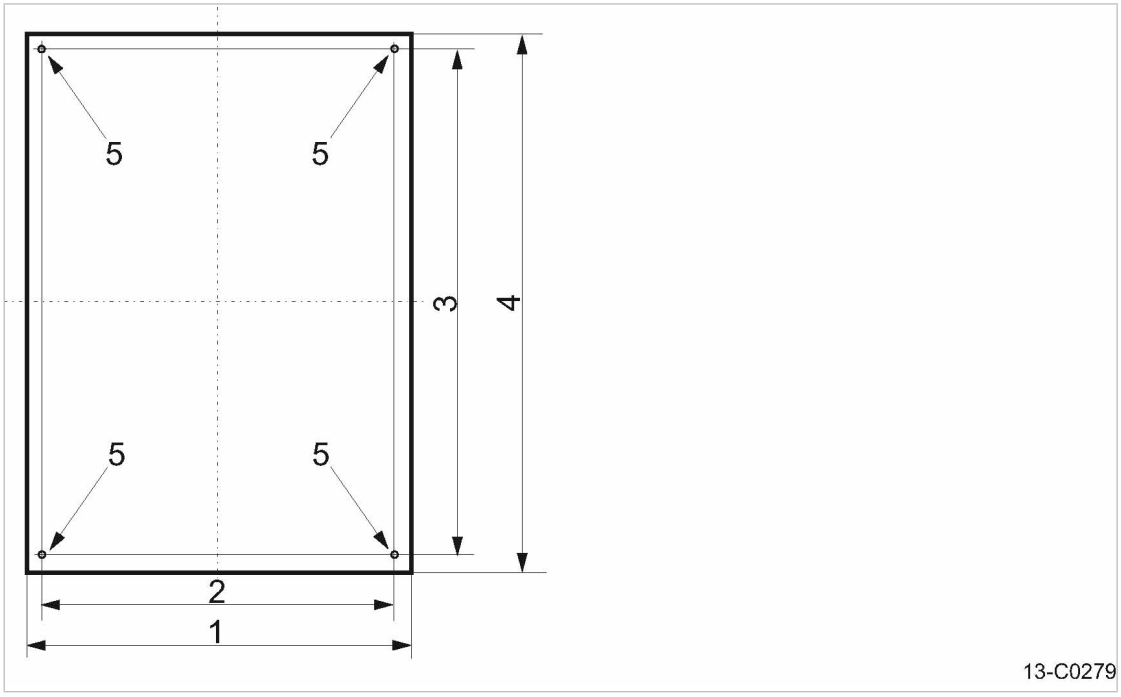


Fig. 23 Anchor holes for model 8/8 cabinet

1	500 mm	4	700 mm
2	460 mm	5	∅ 8 mm
3	660 mm		

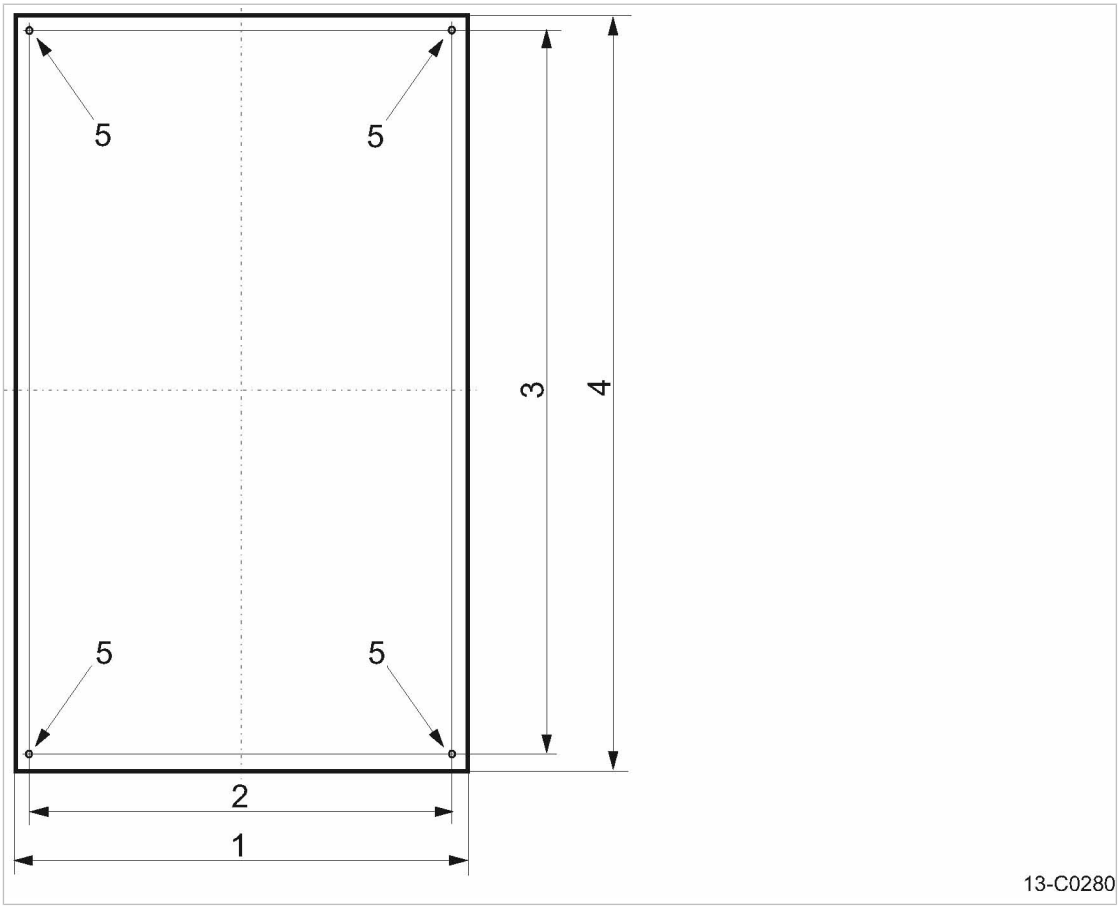


Fig. 24 Anchor holes for model 16/8 cabinet

1 800 mm
2 760 mm
3 1160 mm
4 1200 mm
5 ∅ 8 mm

13.2 Machine assignment

No.	Model	Machine number	Year of manufacture	Electrical diagram number	Bus address / slave number
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

No.	Model	Machine number	Year of manufacture	Electrical diagram number	Bus address / slave number
12					
13					
14					
15					
16					

Tab. 36 Machine assignment

13.3 Profibus expander

See instructions in chapter 7.3.3

The following Profibus expanders are connected to the master controller:

Model	Material number	Profibus address

Tab. 37 Profibus expander

13.4 Master controller settings

The master controller factory settings are listed below. Enter alterations in the empty fields.

➢ Enter changes in the prepared list.

Result These entries simplify the task, particularly of external Service Technicians, in determining the cause of problems arising.

13.4.1 Profibus expander

See instructions in chapter 7.3.3

13.4.1.1 Profibus expander with 8 channels

	active	XX.0	XX.1	XX.2	XX.3	XX.4	XX.5	XX.6	XX.7
Slave 20	–	I	I	I	I	I	I	I	I
Slave 21	–	I	I	I	I	I	I	I	I
Slave 22	–	I	I	I	I	I	I	I	I
Slave 23	–	I	I	I	I	I	I	I	I
Slave 24	–	I	I	I	I	O	O	O	O
Slave 25	–	I	I	I	I	O	O	O	O
Slave 26	–	I	I	I	I	O	O	O	O
Slave 27	–	I	I	I	I	O	O	O	O

+ ≙ Yes, – ≙ No, I ≙ Input, O ≙ Output

Tab. 38 Profibus expander with 8 channels

13.4.1.2 Profibus expander with 32 inputs

	active
Slave 28	–
Slave 32	–

+ ≙ Yes, – ≙ No

Tab. 39 Profibus expander with 32 inputs

13.4.1.3 Profibus expander with analog inputs and outputs

	active
Slave 36	–
Slave 44	–
Slave 52	–
Slave 60	–

+ ≙ Yes, – ≙ No

	active

+ ≙ Yes, – ≙ No

Tab. 40 Profibus expander with analog inputs and outputs

13.4.2 Summer/winter changeover

See instructions in chapter 7.2.8

Date / time			
Name	Factory settings		
Switchover active	+		
Hours offset (h)	1		
Winter → summer changeover			
Relative weekday	last		
Weekday	Sunday		
Month	March		
Time	2		
Summer → winter changeover			
Relative weekday	last		
Weekday	Sunday		
Month	October		
Time	3		

+ ≙ Yes, – ≙ No

Tab. 41 Summer/Winter changeover

13.4.3 Interface settings

Profibus			
Interface active	+		
RS 232			
Connections	–		
Bitrate	9.600		
Data format	D8/S1/P none		
Modem			
ptp link	PPP null modem COM1		
PPP-IP address	192.168.212.251		
Ethernet			
IP address	169.254.100.100		
Subnet mask	255.255.0.0		

+ ≙ Yes, – ≙ No

Profibus			
IP router address	0.0.0.0		
+ ≙ Yes, – ≙ No			

Tab. 42 Interface settings

13.4.4 Pressure regulation settings

13.4.4.1 Pressure parameters

See instructions in chapter 7.4

Date / time						
Name	Unit	Factory setting				
Required pressure	[bar]	7,00				
Minimum pressure						
Pressure low dpt	[bar]	0,50				
Pressure low dpt	[s]	10				
Pressure low dpt active		+				
Pressure low pt	[bar]	0,00				
Pressure low pt	[s]	10				
Pressure low pt active		–				
Pressure high						
Pressure high ph	[bar]	10 / 16				
Pressure high ph	[s]	60				
Pressure high ph active		–				

Tab. 43 Pressure parameters

13.4.4.2 System parameters

See instructions in chapter 7.5

Date / time					
Name	Unit	Factory setting			
Required pressure					
Maximum required pressure	[bar]	7,50			
Minimum required pressure	[bar]	4,00			
Analog input		1			
Required pressure 0 bar	[mA]	4			
+ ≙ Yes, – ≙ No					

Date / time					
Name	Unit	Factory setting			
Required pressure at 20 mA:	[bar]	16			
Network pressure					
Analog input 1		0			
Weighting	[%]	100			
Analog input 2		0			
Weighting	[%]	0			
Final pressure of pressure transducer	[bar]	10/16			
Actual pressure value damping	[s]	1			
Restart					
Automatic restart		+			
Delay period for restart	[s]	60			
Minimum pressure with air system OFF		Active –			
Network charging with	[bar/min]	1,00			
Further settings					
Monitoring period for motor running	[s]	60			
Power limiting	[kW]	500			
Power limiting active		–			
Activate compressors, first		#			
Activate compressors, first		#			
+ ≙ Yes, – ≙ No					

Tab. 44 System parameters

13.4.4.3 Shift clock

See instructions in chapter 7.6

Date / time					
Name					
Switching point	Weekday	Time	Pressure	Channel	Compressors

Date / time					
Name					
Switching point	Weekday	Time	Pressure	Channel	Compressors

Tab. 45 Shift clock settings

13.4.5 Linking the machines

See instructions in chapter 7.3.1

Factory settings for model x/4 / x/8

Machine	1	2	3	4
Connection				
None	X	X	X	X
SIGMA CONTROL	–	–	–	–
Conventional	–	–	–	–
Compressor				
Controlled	X	X	X	X
Monitored	–	–	–	–
Delivery[m^3/min]	0	0	0	0
Power consumption [kW]	0	0	0	0
at pressure [bar]	0	0	0	0
Idle consumption [kW]	0	0	0	0
Inputs				
Engine running	0.0 / 1.0	0.1 / 1.2	0.2 / 1.4	0.3 / 1.6
Active	–	–	–	–
No alarm	0.0 / 1.1	0.0 / 1.3	0.0 / 1.5	0.0 / 1.7
Active	–	–	–	–
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Outputs				
Load	0.1 / 4.5	0.2 / 4.6	0.3 / 4.7	0.4 / 4.0
Active	–	–	–	–
Negative	+ / –	+ / –	+ / –	+ / –
Automatic	0.0 / 4.1	0.0 / 4.2	0.0 / 4.3	0.0 / 4.4
Active	–	–	–	–
FC machine	–	–	–	–
Characteristic curve No.	–	–	–	–
Conventional connection				
Analog input	AI 0	AI 0	AI 0	AI 0
Active	–	–	–	–
Speed = 0 at [mA]	4	4	4	4
Speed at 20 mA	4000	4000	4000	4000
+ ≙ Yes, – ≙ No				

Tab. 46 Factory settings for machines 1,2,3 and 4

Machine	5	6	7	8
Connection				
+ ≙ Yes, – ≙ No				

Machine	5	6	7	8
None	X	X	X	X
SIGMA CONTROL	–	–	–	–
Conventional	–	–	–	–
Compressor				
Controlled	X	X	X	X
Monitored	–	–	–	–
Delivery[m^3/min]	0	0	0	0
Power consumption [kW]	0	0	0	0
at pressure [bar]	0	0	0	0
Idle consumption [kW]	0	0	0	0
Inputs				
Engine running	0.0 / 2.0	0.0 / 2.2	0.0 / 2.4	0.0 / 2.6
Active	–	–	–	–
No alarm	0.0 / 2.1	0.0 / 2.3	0.0 / 2.5	0.0 / 2.7
Active	–	–	–	–
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Outputs				
Load	0.0 / 12.5	0.0 / 12.6	0.0 / 12.7	0.0 / 12.0
Active	–	–	–	–
Negative	–	–	–	–
Automatic	0.0 / 12.1	0.0 / 12.2	0.0 / 12.3	0.0 / 12.4
Active	–	–	–	–
FC machine	–	–	–	–
Characteristic curve No.	–	–	–	–
Conventional connection				
Analog input	AI 0	AI 0	AI 0	AI 0
Active	–	–	–	–
Speed = 0 at [mA]	4	4	4	4
Speed at 20 mA	4000	4000	4000	4000
+ ≙ Yes, – ≙ No				

Tab. 47 Factory settings for machines 5,6,7 and 8

Machine	9	10	11	12
Connection				
None	X	X	X	X
SIGMA CONTROL	–	–	–	–
Conventional	–	–	–	–
+ ≙ Yes, – ≙ No				

Machine	9	10	11	12
Compressor				
Controlled	X	X	X	X
Monitored	–	–	–	–
Delivery[m^3/min]	0	0	0	0
Power consumption [kW]	0	0	0	0
at pressure [bar]	0	0	0	0
Power consumption in idle [kW]	0	0	0	0
Inputs				
Engine running	0.0	0.0	0.0	0.0
Active	–	–	–	–
No alarm	0.0	0.0	0.0	0.0
Active	–	–	–	–
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Outputs				
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Negative	–	–	–	–
Automatic	0.0	0.0	0.0	0.0
Active	–	–	–	–
FC machine	–	–	–	–
Characteristic curve No.	–	–	–	–
Conventional connection				
Analog input	AI 0	AI 0	AI 0	AI 0
Active	–	–	–	–
Speed = 0 at [mA]	4	4	4	4
Speed at 20 mA	4000	4000	4000	4000
+ ≙ Yes, – ≙ No				

Tab. 48 Factory settings for machines 9, 10, 11 and 12

Machine	13	14	15	16
Connection				
None	X	X	X	X
SIGMA CONTROL	–	–	–	–
Conventional	–	–	–	–
Compressor				
Controlled	X	X	X	X
+ ≙ Yes, – ≙ No				

Machine	13	14	15	16
Monitored	–	–	–	–
Delivery[m^3/min]	0	0	0	0
Power consumption [kW]	0	0	0	0
at pressure [bar]	0	0	0	0
Power consumption in idle [kW]	0	0	0	0
Inputs				
Engine running	0.0	0.0	0.0	0.0
Active	–	–	–	–
No alarm	0.0	0.0	0.0	0.0
Active	–	–	–	–
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Outputs				
Load	0.0	0.0	0.0	0.0
Active	–	–	–	–
Negative	–	–	–	–
Automatic	0.0	0.0	0.0	0.0
Active	–	–	–	–
FC machine	–	–	–	–
Characteristic curve No.	–	–	–	–
Conventional connection				
Analog input	AI 0	AI 0	AI 0	AI 0
Active	–	–	–	–
Speed = 0 at [mA]	4	4	4	4
Speed at 20 mA	4000	4000	4000	4000

+ ≙ Yes, – ≙ No

Tab. 49 Factory settings for machines 13, 14, 15 and 16

13.4.5.1 Personal settings

Settings for the machines 1, 2, 3, and 4

Machine	1	2	3	4
Date and time				
Connection				
None				
SIGMA CONTROL				
Conventional				
Compressor				

Machine	1	2	3	4
Date and time				
Controlled				
Monitored				
Delivery[m^3/min]				
Power consumption [kW]				
at pressure [bar]				
Idle consumption [kW]				
Inputs				
Engine running				
Active				
No alarm				
Active				
Load				
Active				
Outputs				
Load				
Active				
Negative				
Automatic				
Active				
FC machine				
Characteristic curve No.				
Conventional connection				
Analog input				
Active				
Speed = 0 at [mA]				
Speed at 20 mA				

Tab. 50 Settings for machines 1,2,3 and 4

Settings for the machines 5, 6, 7 and 8

Machine	5	6	7	8
Date and time				
Connection				
None				
SIGMA CONTROL				
Conventional				
Compressor				
Controlled				

Machine	5	6	7	8
Date and time				
Monitored				
Delivery[m^3/min]				
Power consumption [kW]				
at pressure [bar]				
Idle consumption [kW]				
Inputs				
Engine running				
Active				
No alarm				
Active				
Load				
Active				
Outputs				
Load				
Active				
Negative				
Automatic				
Active				
FC machine				
Characteristic curve No.				
Conventional connection				
Analog input				
Active				
Speed = 0 at [mA]				
Speed at 20 mA				

Tab. 51 Settings for machines 5,6,7 and 8

Settings for the machines 9, 10, 11 and 12

Machine	9	10	11	12
Date and time				
Connection				
None				
SIGMA CONTROL				
Conventional				
Compressor				
Controlled				
Monitored				

Machine	9	10	11	12
Date and time				
Delivery[m^3/min]				
Power consumption [kW]				
at pressure [bar]				
Idle consumption [kW]				
Inputs				
Engine running				
Active				
No alarm				
Active				
Load				
Active				
Outputs				
Load				
Active				
Negative				
Automatic				
Active				
FC machine				
Characteristic curve No.				
Conventional connection				
Analog input				
Active				
Speed = 0 at [mA]				
Speed at 20 mA				

Tab. 52 Settings for machines 9, 10, 11 and 12

Settings for machines 13, 14, 15 and 16

Machine	13	14	15	16
Date and time				
Connection				
None				
SIGMA CONTROL				
Conventional				
Compressor				
Controlled				
Monitored				
Delivery[m^3/min]				

Machine	13	14	15	16
Date and time				
Power consumption [kW]				
at pressure [bar]				
Idle consumption [kW]				
Inputs				
Engine running				
Active				
No alarm				
Active				
Load				
Active				
Outputs				
Load				
Active				
Negative				
Automatic				
Active				
FC machine				
Characteristic curve No.				
Conventional connection				
Analog input				
Active				
Speed = 0 at [mA]				
Speed at 20 mA				

Tab. 53 Settings for machines 13, 14, 15 and 16

13.4.6 FC characteristic

See instructions in chapter 7.3.2

FC characteristic 1

Plotting points	Speed [rpm]	FAD [m³/min]	Power [kW]
Factory settings	0	0.000	0.00
min			
2			
3			
4			
5			

Plotting points	Speed [rpm]	FAD [m³/min]	Power [kW]
6			
7			
max			

Tab. 54 FC characteristic 1

FC characteristic 2

Plotting points	Speed [rpm]	FAD [m³/min]	Power [kW]
Factory settings	0	0.000	0.00
min			
2			
3			
4			
5			
6			
7			
max			

Tab. 55 FC characteristic 2

13.4.7 Operating hours and maintenance intervals

See instructions in chapter 7.3.5

Date / time							
Name		Factory settings					
Machine 1							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 2							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					

Date / time							
Name		Factory settings					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 3							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 4							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 5							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 6							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					

Date / time							
Name		Factory settings					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 7							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 8							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 9							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 10							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					

Date / time							
Name		Factory settings					
Machine 11							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 12							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 13							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 14							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 15							
Source		SC					
Total hours:	[h]	0					

Date / time							
Name		Factory settings					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					
Machine 16							
Source		SC					
Total hours:	[h]	0					
Hours on load	[h]	0					
Preset (maintenance interval)	[h]	500					
Remaining (maintenance interval)	[h]	500					
Active	(y/n)	–					

Tab. 56 Operating and maintenance intervals

13.4.8 Further inputs

13.4.8.1 External machine selection

See instructions in chapter 7.7.2

Factory settings

Machine	all
External selection	0.0
Active	–
Negative	–

Tab. 57 Machine selection factory setting

Personal setting

Machine	1	2	3	4
Date and time				
External selection				
Active				
Negative				

Tab. 58 Settings for machines 1,2,3,4

Machine	5	6	7	8
Date and time				
External selection				
Active				
Negative				

Tab. 59 Settings for machines 5,6,7,8

Machine	9	10	11	12
Date and time				
External selection				
Active				
Negative				

Tab. 60 Settings for machines 9,10,11,12

Machine	13	14	15	16
Date and time				
External selection				
Active				
Negative				

Tab. 61 Settings for machines 13,14,15,16

13.4.8.2 Digital inputs

See instructions in chapter 7.7.2

	Factory settings		
Remote ON/OFF			
Function active	–		
Input	0.0		
Active at:	24 V		
Remote MANUAL/AUTO			
Function active	–		
Input	0.0		
Active at:	24 V		
Remote SHIFT CLOCK			
Function active	–		
Input	0.0		
Active at:	24 V		
Switching compressors online			
Function active	–		
Input	0.0		

	Factory settings		
Active at:	24 V		

Tab. 62 Digital inputs

13.4.8.3 Analog inputs

See instructions in chapter 7.7.2

Input value 1	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 63 Input value 1

Input value 2	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 64 Input value 2

Input value 3	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 65 Input value 3

Input value 4	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 66 Input value 4

Input value 5	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 67 Input value 5

Input value 6	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 68 Input value 6

Input value 7	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				

Input value 7	Unit	Active	Input	
Threshold value 2			Output	Active
Input value				

Tab. 69 Input value 7

Input value 8	Unit	Active	Input	
	At 0 mA		At 20 mA	
	Line compensation			
Threshold value 1			Output	Active
Input value				
Threshold value 2			Output	Active
Input value				

Tab. 70 Input value 8

13.4.9 Further outputs

13.4.9.1 Load and group alarm signals

See instructions in chapter 7.7.3

Factory setting

Machine	all
Load	0.0
Active	–
Negative	–
Group alarm	0.0
Active	–
Negative	–

Tab. 71 Factory setting (Load, Group alarm)

Personal setting

Machine	1	2	3	4
Date and time				
Load				
Active				
Group alarm				
Active				
Negative				

Tab. 72 Settings for machines 1,2,3,4

Machine	5	6	7	8
Date and time				
Load				
Active				
Group alarm				
Active				
Negative				

Tab. 73 Settings for machines 5,6,7,8

Machine	9	10	11	12
Date and time				
Load				
Active				
Group alarm				
Active				
Negative				

Tab. 74 Settings for machines 9,10,11,12

Machine	13	14	15	16
Date and time				
Load				
Active				
Group alarm				
Active				
Negative				

Tab. 75 Settings for machines 13,14,15,16

13.4.9.2 Digital outputs

See instructions in chapter 7.7.3

	Factory setting		
Group alarm			
Function active	–		
Output	0.0		
Active at:	24 V		
Controller operational			
Function active	–		
Output	0.0		
Active at:	24 V		
+ ≙ Yes, – ≙ No			

	Factory setting		
Group maintenance/group warning			
Function active	–		
Output	0.0		
Active at:	24 V		
External alarm			
Function active			
Output			
Active at:			
Maintenance/external warning			
Function active	–		
Output	0.0		
Active at:	24 V		
Compressor alarm			
Function active	–		
Output	0.0		
Active at:	24 V		
Compressor maintenance / warning			
Function active	–		
Output	0.0		
Active at:	24 V		
Minimum pressure			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 1			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 2			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 3			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 4			
+ ≙ Yes, – ≙ No			

	Factory setting		
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 5			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 6			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 7			
Function active	–		
Output	0.0		
Active at:	24 V		
Group alarm dryer 8			
Function active	–		
Output	0.0		
Active at:	24 V		
Timer channel 1			
Function active	–		
Output	0.0		
Active at:	24 V		
Timer channel 2			
Function active	–		
Output	0.0		
Active at:	24 V		
Timer channel 3			
Function active	–		
Output	0.0		
Active at:	24 V		
Timer channel 4			
Function active	–		
Output	0.0		
Active at:	24 V		
REMOTE mode			
Function active	–		
+ ≙ Yes, – ≙ No			

	Factory setting			
Output	0.0			
Active at:	24 V			
CLOCK mode				
Function active	–			
Output	0.0			
Active at:	24 V			
AUTOMATIC mode				
Function active	–			
Output	0.0			
Active at:	24 V			
Compressor station ON				
Function active	–			
Output	0.0			
Active at:	24 V			
No compressor preselected				
Function active	–			
Output	0.0			
Active at:	24 V			
Group alarm (pulse)				
Function active	–			
Output	0.0			
Active at:	24 V			
Pressure high				
Function active	–			
Output	0.0			
Active at:	24 V			
+ ≙ Yes, – ≙ No				

Tab. 76 Digital outputs

13.4.9.3 Analog outputs

See instructions in chapter 7.7.3

	Factory setting			
Network pressure				
Output active	+			
Analog output	0			
I = 0 mA	0.00 bar			
I = 20 mA	16.00 bar			
+ ≙ Yes, – ≙ No				

	Factory setting			
Required pressure				
Output active	–			
Analog output	0			
I = 0 mA	0.00 bar			
I = 20 mA	16.00 bar			
Delivery				
Output active	–			
Analog output	0			
I = 0 mA	0 m^3/min			
I = 20 mA	50 m^3/min			
+ ≙ Yes, – ≙ No				

Tab. 77 Analog outputs

13.4.10 Settings for SMS

See instructions in chapter 7.10.1

Date / time			
Name	Factory settings		
SMS active	–		
Language SMS	German		
Send air system data	–		
Call-repeat blocking time [min]	60		
Subsidiary	CBG		
Dial initialisation	ATX 3 DT0,		
Sender			
Telephone number Contact person			
SAM's phone number			
Send GSM PIN	–		
GSM PIN	–1		
Sign-of-life active	–		
Weekday			
Time of sending:			
Channel 1			
Protocol	TAP		
Auto re-dial	3		
Pause [min]	1		
+ ≙ Yes, – ≙ No			

Date / time			
Name	Factory settings		
Call-centre's phone number	01712521002		
Customer Service phone number	017118637270		
Channel 2			
Protocol	TAP		
Auto re-dial	3		
Pause [min]	1		
Call-centre's phone number	01712521001		
Customer Service phone number	017118637270		
+ ≙ Yes, – ≙ No			

Tab. 78 Short message setting

13.5 Technician's settings

Technician's settings			

Technician's settings			

Tab. 79 Technician's settings

13.6 Null modem pin connections

Plug: 2x9 pin sub-D (socket)

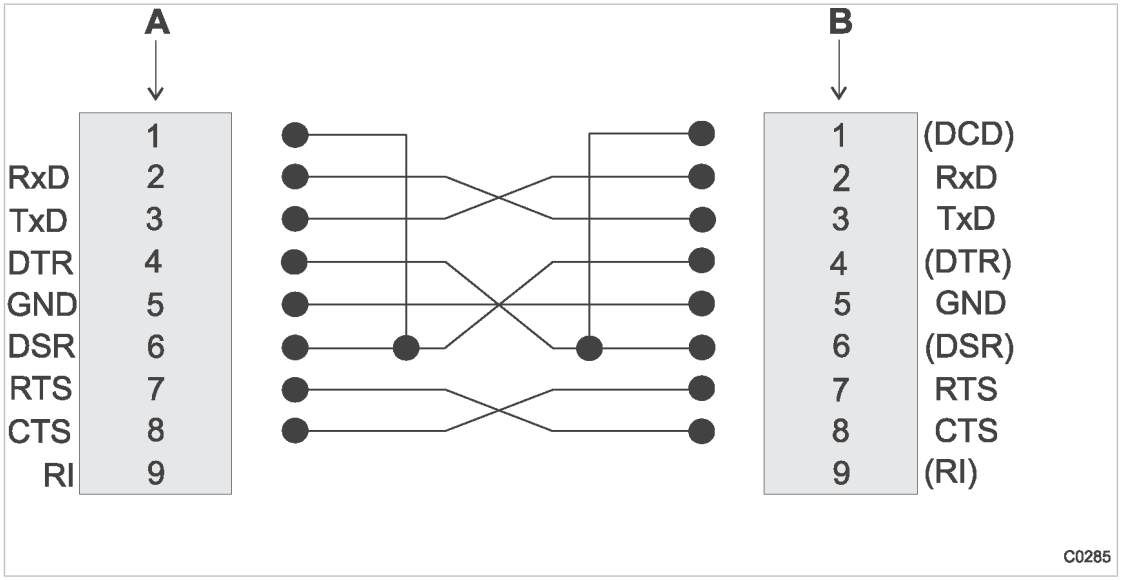


Fig. 25 Null modem cable pin connections
Ⓐ PC COM 1/2
Ⓑ Master controller RS232, 0x2

13.7 Master controller messages

13.7.1 Operational Messages

No.	message text	Remarks
1	Transmission test signal	The transmission test is sent through the SMS.
33	SAM OFF mode	The compressed air system is switched off. No compressed air is supplied.

No.	message text	Remarks
34	SAM MANUAL mode	Only on compressor stations with emergency mode capability The station is in emergency mode. The air compressors are controlled, independently of the master controller, by their own pressure regulation.
35	SAM AUTO mode	The compressed air system is operational, compressed air is being supplied. The master controller assumes control of the machines.
36	SAM start delay mode	The mains supply to the master controller has just returned. The air system is in start delay mode and is not yet supplying compressed air. When the "restart delay period" has expired, compressed air will be supplied again.
37	SAM air main charging mode	The air system has just been switched on. The air main will be charged. The compressed air supply is only used to charge the air main.
38	SAM shift clock mode	The required pressure and compressors in use are specified by the internal shift clock. They can change depending on the shift clock.
39	SAM remote mode	The following functions can be controlled in remote control operation: Remote ON/OFF Remote shift clock Remote manual/automatic
40	SAM power ON mode (CODE)	The master controller's power supply has been switched on. CODE = internal information for KAESER SERVICE
41	SAM network section control Both sections off	Both sections and the compressor station are off.
42	SAM network section control Section 1 in operation	Section 1 is operating; section 2 is switched off.
43	SAM network section control Section 2 is operating	Section 2 is operating; section 1 is switched off.
44	SAM network section control Both in operation.	Both sections are operating together.
49	SMS function activated	Short message system (SMS) option has been activated. The master controller can send short messages.
50	SAC *plus* activated	Data recording with SIGMA AIR CONTROL *plus* has been switched on and should be running.
51	SAC *plus* activated	SIGMA AIR CONTROL *plus* data recording is running.
52	SND / RCV activated	Send/receive protocol option has been switched on.
53	SND/RCV active and remote mode	Communication with the send/receive protocol and remote control (e.g. control centre) is running.
65–80	Compressor x deselected	The machine has been deselected by either the preselect key, the internal shift clock, the external preselect contact or the send/receive preselection (green LED off). It is neither controlled nor monitored by the master controller.

Tab. 80 Operational Messages

13.7.2 Defined messages

See instructions in chapter 7.7.1

No.	Message	Active	Time delay	Input	Active at:	
					Input	OFF
	Factory setting	–	0 s	0.0	0 V	yes
191	UPS battery (A)					
192	Power failure (A)					
193	Cyclone separator 1 condensate drain (A)					
194	Cyclone separator 2 condensate drain (A)					
195	Cyclone separator 3 condensate drain (A)					
196	Cyclone separator 4 condensate drain (A)					
197	Cyclone separator 5 condensate drain (A)					
198	Cyclone separator 6 condensate drain (A)					
199	Cyclone separator 7 condensate drain (A)					
200	Cyclone separator 8 condensate drain (A)					
201	Cyclone separator 9 condensate drain (A)					
202	Cyclone separator 10 condensate drain (A)					
203	Cyclone separator 11 condensate drain (A)					
204	Cyclone separator 12 condensate drain (A)					
205	Cyclone separator 13 condensate drain (A)					
206	Cyclone separator 14 condensate drain (A)					
207	Cyclone separator 15 condensate drain (A)					
208	Cyclone separator 16 condensate drain (A)					
209	Dryer 1 high dew point (A)					
210	Dryer 2 high dew point (A)					
211	Dryer 3 high dew point (A)					
212	Dryer 4 high dew point (A)					
213	Dryer 5 high dew point (A)					
214	Dryer 6 high dew point (A)					
215	Dryer 7 high dew point (A)					
216	Dryer 8 high dew point (A)					
217	Dryer 1 alarm (A)					
218	Dryer 2 alarm (A)					
219	Dryer 3 alarm (A)					
220	Dryer 4 alarm (A)					
221	Dryer 5 alarm (A)					
222	Dryer 6 alarm (A)					
223	Dryer 7 alarm (A)					

(A) ≙ alarm, (W) ≙ Warning

No.	Message	Active	Time delay	Input	Active at:	
					Input	OFF
	Factory setting	–	0 s	0.0	0 V	yes
224	Dryer 8 alarm (A)					
225	Dryer 1 condensate drain 1 (A)					
226	Dryer 1 condensate drain 2 (A)					
227	Dryer 2 condensate drain 1 (A)					
228	Dryer 2 condensate drain 2 (A)					
229	Dryer 3 condensate drain 1 (A)					
230	Dryer 3 condensate drain 2 (A)					
231	Dryer 4 condensate drain 1 (A)					
232	Dryer 4 condensate drain 2 (A)					
233	Dryer 5 condensate drain 1 (A)					
234	Dryer 5 condensate drain 2 (A)					
235	Dryer 6 condensate drain 1 (A)					
236	Dryer 6 condensate drain 2 (A)					
237	Dryer 7 condensate drain 1 (A)					
238	Dryer 7 condensate drain 2 (A)					
239	Dryer 8 condensate drain 1 (A)					
240	Dryer 8 condensate drain 2 (A)					
241	Air receiver 1 condensate drain (A)					
242	Air receiver 2 condensate drain (A)					
243	Filter 1 condensate drain (A)					
244	Filter 2 condensate drain (A)					
245	Filter 3 condensate drain (A)					
246	Filter 4 condensate drain (A)					
247	Filter 5 condensate drain (A)					
248	Filter 6 condensate drain (A)					
249	Filter 7 condensate drain (A)					
250	Filter 8 condensate drain (A)					
251	Condensate treatment 1 (A)					
252	Condensate treatment 2 (A)					
253	Condensate treatment 3 (A)					
254	Condensate treatment 4 (A)					
255	Condensate treatment 5 (A)					
256	Condensate treatment 6 (A)					
369	Filter 1 pressure drop 1 (W)					
370	Filter 1 pressure drop 2 (W)					

(A) ≙ alarm, (W) ≙ Warning

No.	Message	Active	Time delay	Input	Active at:	
					Input	OFF
	Factory setting	–	0 s	0.0	0 V	yes
371	Filter 2 pressure drop 1 (W)					
372	Filter 2 pressure drop 2 (W)					
373	Filter 3 pressure drop 1 (W)					
374	Filter 3 pressure drop 2 (W)					
375	Filter 4 pressure drop 1 (W)					
376	Filter 4 pressure drop 2 (W)					
377	Filter 5 pressure drop 1 (W)					
378	Filter 5 pressure drop 2 (W)					
379	Filter 6 pressure drop 1 (W)					
380	Filter 6 pressure drop 2 (W)					
381	Filter 7 pressure drop 1 (W)					
382	Filter 7 pressure drop 2 (W)					
383	Filter 8 pressure drop 1 (W)					
384	Filter 8 pressure drop 2 (W)					
(A) ≙ alarm, (W) ≙ Warning						

Tab. 81 Defined messages

13.7.3 Definable messages (alarms)

See instructions in chapter 7.7.1

	Active	Input	Text	Time delay	Active at:	
					Input	OFF
Factory setting	–	0.0		0 s	0 V	yes
Message 161						
Message 162						
Message 163						
Message 164						
Message 165						
Message 166						
Message 167						
Message 168						
Message 169						
Message 170						
Message 171						
Message 172						
Message 173						
Message 174						

	Active	Input	Text	Time delay	Active at:	
					Input	OFF
Factory setting	–	0.0		0 s	0 V	yes
Message 175						
Message 176						
Message 177						

Tab. 82 Definable messages (alarms)

13.7.4 Definable messages (service / warning)

See instructions in chapter 7.7.1

	Active	Input	Text	Model	Time delay	Active at:	
						Input	OFF
Factory setting	–	0.0		W	0 s	0 V	yes
Message 481							
Message 482							
Message 483							
Message 484							
Message 485							
Message 486							
Message 487							
Message 488							

Tab. 83 Definable messages (service / warning)

13.8 Machine settings

13.8.1 Safety pressure switch settings

See instructions in chapter 6.11.2

Suggestions for models 4/4 and 8/4 [bar]

The reference point is the maximum working pressure,

➢ Adjust the safety pressure switch (-B1) setpoints as follows:

Machine number	Cut-in pressure		Cut-out pressure	
Maximum working pressure 1 bar to 2.5 bar				
Machine 1/5	ON	– 0,10	OFF	+ 0,05
Machine 2/6	ON	– 0,15	OFF	+ 0,05
Machine 3/7	ON	– 0,20	OFF	+ 0,05
Machine 4/8	ON	– 0,25	OFF	+ 0,05
Maximum working pressure 2.5 bar to 6 bar				

Machine number	Cut-in pressure		Cut-out pressure	
Machine 1/5	ON	– 0,2	OFF	+ 0,2
Machine 2/6	ON	– 0,4	OFF	+ 0,2
Machine 3/7	ON	– 0,6	OFF	+ 0,2
Machine 4/8	ON	– 0,8	OFF	+ 0,2
Maximum working pressure 6 bar to 16 bar				
Machine 1/5	ON	– 0,4	OFF	+ 0,3
Machine 2/6	ON	– 0,7	OFF	+ 0,3
Machine 3/7	ON	– 1,0	OFF	+ 0,3
Machine 4/8	ON	– 1,3	OFF	+ 0,3
Maximum working pressure 16 bar to 32 bar				
Machine 1/5	ON	– 4,0	OFF	+ 1,0
Machine 2/6	ON	– 5,0	OFF	+ 1,0
Machine 3/7	ON	– 6,0	OFF	+ 1,0
Machine 4/8	ON	– 7,0	OFF	+ 1,0

Tab. 84 Suggestion: safety pressure switch 4/4 and 4/8

Suggestions for models 8/8 and 16/8 [bar]

The reference point is the maximum working pressure,

➢ Adjust the safety pressure switch (-B1) setpoints as follows:

Machine number	Cut-in pressure		Cut-out pressure	
Maximum working pressure 1 bar to 2.5 bar				
all	ON	– 0,10	OFF	+ 0,05
Maximum working pressure 2.5 bar to 6 bar				
all	ON	– 0,2	OFF	+ 0,2
Maximum working pressure 6 bar to 16 bar				
all	ON	– 0,4	OFF	+ 0,3
Maximum working pressure 16 bar to 32 bar				
all	ON	– 4,0	OFF	+ 1,0

Tab. 85 Suggestion: safety pressure switch 8/8 and 16/8

Personal settings

Date / time							
Switching point		ON	OFF	ON	OFF	ON	OFF
	Unit						
Machine 1	[bar]						
Machine 2	[bar]						
Machine 3	[bar]						
Machine 4	[bar]						

Date / time							
Switching point		ON	OFF	ON	OFF	ON	OFF
	Unit						
Machine 5	[bar]						
Machine 6	[bar]						
Machine 7	[bar]						
Machine 8	[bar]						
Machine 9	[bar]						
Machine 10	[bar]						
Machine 11	[bar]						
Machine 12	[bar]						
Machine 13	[bar]						
Machine 14	[bar]						
Machine 15	[bar]						
Machine 16	[bar]						

Tab. 86 Personal settings: safety pressure switch

13.8.2 Pressure range for manual operation

To avoid simultaneous cut-in of machines in manual mode, system pressure p2 and/or system pressure switch –B1.1 have to be set.

Suggested setting [bar]:

Machine number	Cut-in pressure		Cut-out pressure	
Maximum working pressure 1 bar				
Machine 1/5/9/13	ON	0,93	OFF	1,00
Machine 2/6/10/14	ON	0,91	OFF	0,98
Machine 3/7/11/15	ON	0,89	OFF	0,96
Machine 4/8/12/16	ON	0,87	OFF	0,94
Maximum working pressure 7.5 bar				
Machine 1/5/9/13	ON	7,0	OFF	7,5
Machine 2/6/10/14	ON	6,7	OFF	7,2
Machine 3/7/11/15	ON	6,4	OFF	6,9
Machine 4/8/12/16	ON	6,1	OFF	6,6
Maximum working pressure 10 bar				
Machine 1/5/9/13	ON	9,3	OFF	10,0
Machine 2/6/10/14	ON	9,0	OFF	9,7
Machine 3/7/11/15	ON	8,7	OFF	9,4
Machine 4/8/12/16	ON	8,4	OFF	9,1
Maximum working pressure 13 bar				

Machine number	Cut-in pressure		Cut-out pressure	
Machine 1/5/9/13	ON	12,3	OFF	13,0
Machine 2/6/10/14	ON	12,0	OFF	12,7
Machine 3/7/11/15	ON	11,7	OFF	12,4
Machine 4/8/12/16	ON	11,4	OFF	12,1
Maximum working pressure 25 bar				
Machine 1/5/9/13	ON	22	OFF	25
Machine 2/6/10/14	ON	21	OFF	24
Machine 3/7/11/15	ON	20	OFF	23
Machine 4/8/12/16	ON	19	OFF	22
Maximum working pressure 32 bar				
Machine 1/5/9/13	ON	27	OFF	32
Machine 2/6/10/14	ON	26	OFF	31
Machine 3/7/11/15	ON	25	OFF	30
Machine 4/8/12/16	ON	24	OFF	29

Tab. 87 Suggested settings: pressure range in manual mode

Personal settings

Date / time							
Switching point		ON	OFF	ON	OFF	ON	OFF
	Unit						
Machine 1	[bar]						
Machine 2	[bar]						
Machine 3	[bar]						
Machine 4	[bar]						
Machine 5	[bar]						
Machine 6	[bar]						
Machine 7	[bar]						
Machine 8	[bar]						
Machine 9	[bar]						
Machine 10	[bar]						
Machine 11	[bar]						
Machine 12	[bar]						
Machine 13	[bar]						
Machine 14	[bar]						
Machine 15	[bar]						
Machine 16	[bar]						

Tab. 88 Suggested settings: pressure range in manual mode

13.8.3 System offset for manual mode

tv = time delay for switching on machines after a power failure

Date / time						
Name						
Time delay	tv [s]	tv [s]	tv [s]	tv [s]	tv [s]	tv [s]
Machine 1						
Machine 2						
Machine 3						
Machine 4						
Machine 5						
Machine 6						
Machine 7						
Machine 8						
Machine 9						
Machine 10						
Machine 11						
Machine 12						
Machine 13						
Machine 14						
Machine 15						
Machine 16						

Tab. 89 Suggested settings: system offset (manual mode)

13.9 Examples and suggested settings

➢ Note suggested settings.

13.9.1 Example of switching point setting

See instructions in chapter 7.6.1

Guidelines for establishing the switching points

- The compressor station comprises the following machines:
  - 2 small machines (1, 2)
  - 2 mid-sized machines (3, 4)
  - 2 large machines (5, 6)
- Required pressure for the compressor station 6.7 bar

- Compressor station ON:
  - Weekdays 6:30–17:00
  - Fridays 6:30-15:00
- Compressor station OFF:
  - Saturday
  - Sunday
  - Midday 12:00–13:00

No.	Day	Time	Function	Compressors
1–5	Mon – Fri	06:30	ON	1-2-3-4-5-6-#-#
6–10	Mon – Fri	12:00	OFF	#-#-#-#-#-#-#
11–15	Mon – Fri	13:00	ON	1-2-3-4-5-6-#-#
16–19	Mon – Thu	17:00	OFF	#-#-#-#-#-#-#
20	Fri	15:00	OFF	#-#-#-#-#-#-#

Tab. 90 Example of a compressor station ON/OFF clock program

Precondition The menu item *<Settings «F1» – Shift clock «F5» >* is selected.

If a # is entered in the first place of a group sequence, the group sequence #-#-#-#-#-#-# is automatically set when the «F2 » key (new) is pressed.

➢ Enter password for level 2 if necessary.

Switching points 1-5

1. Select the days Mon, Tue, Wed, Thur and Fri.
2. Enter switching time 06:30:00.
3. Enter pressure setpoint 6.70.
4. Enter compressors 1-2-3-4-5-6–#-#.
5. Press «F2» to save the switching points.

Switching points 6-10

1. Enter switching time 12:00:00.
2. Enter compressors #-#-#-#-#-#-#.
3. Do not change the other settings.
4. Press «F2» to save the switching points.

Switching points 11-15

1. Enter switching time 13:00:00.
2. Enter compressors 1-2-3-4-5-6–#-#.
3. Do not change the other settings.
4. Press «F2» to save the switching points.

Switching points 16-19

1. Remove the check mark from Fri by placing the cursor over Fri and pressing «Enter». Only Mon to Thur are still selected.
2. Enter switching time 17:00.
3. Enter compressors #-#-#-#-#-#-#.
4. Press «F2» to save the switching points.

Switching point 20

1. Remove the selection for Mon to Thur.
2. Select Fri for the day.
3. Enter switching time 15:00:00.
4. Do not change the other settings.
5. Press«F2» key to save the switching point.

13.9.2 Linking two small and two large machines

Machine number	Small	Large	Connection
Machine 1		x	Profibus
Machine 2		x	Profibus
Machine 3	x		Profibus
Machine 4	x		Profibus

Tab. 91 Linking two small and two large machines

➢ Link every machine to the master controller (see 7.3).

13.9.3 Linking 8 equally-sized machines

See chapter 6 and 7 for instructions.

Keep the pressure switch settings for manual mode in mind.

Example:

There are 8 compressors of the same size, each with a 7.5 bar maximum pressure. Four are equipped with SIGMA CONTROL. The compressor station is made up as follows:

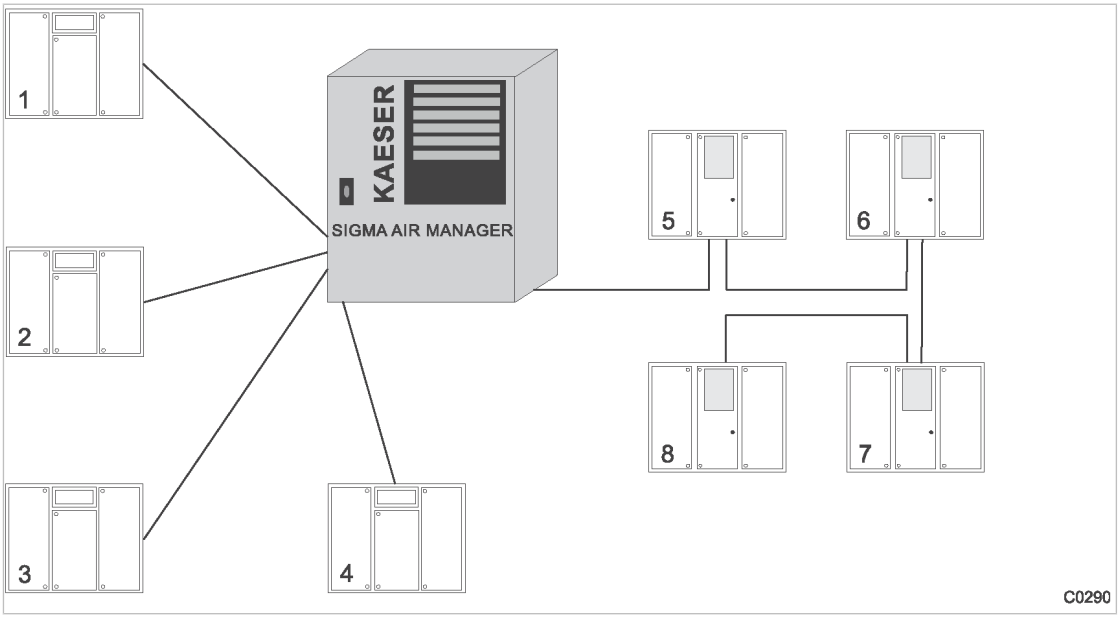


Fig. 26 Example of linking eight equally-sized machines

1 Machines without SIGMA CONTROL (conventional link)
2 Machines without SIGMA CONTROL (conventional link)
3 Machines without SIGMA CONTROL (conventional link)
4 Machines without SIGMA CONTROL (conventional link)
5 Machines with SIGMA CONTROL (Profibus link)
6 Machines with SIGMA CONTROL (Profibus link)
7 Machines with SIGMA CONTROL (Profibus link)
8 Machines with SIGMA CONTROL (Profibus link)

Overview: Linking the machines

Compressor, link	Profibus address	"Motor running" input	"No alarm" input	Output for load	Output for automatic
Machine 1; conventional	None	1.0	1.1	4.5	4.1
Machine 2; conventional	None	1.2	1.3	4.6	4.2
Machine 3; conventional	None	1.4	1.5	4.7	4.3
Machine 4; conventional	None	1.6	1.7	4.8	4.4
Machine 5; Profibus	7	None	None	None	None
Machine 6; Profibus	8	None	None	None	None
Machine 7; Profibus	9	None	None	None	None
Machine 8; Profibus	10	None	None	None	None

Tab. 92 Linking the machines

13.9.4 Linking 2 equally-sized machines and an FC machine

Software requirement:

- The SIGMA AIR MANAGER software must be at least version 0.18.
- The SIGMA AIR MANAGER software of the FC machine must be at least version 72.20.

Principle:

The FC machine receives the pressure set-point and current pressure value from the master controller.

in the event of a master controller break-down, the machines regulate themselves using their internal pressure transducers.

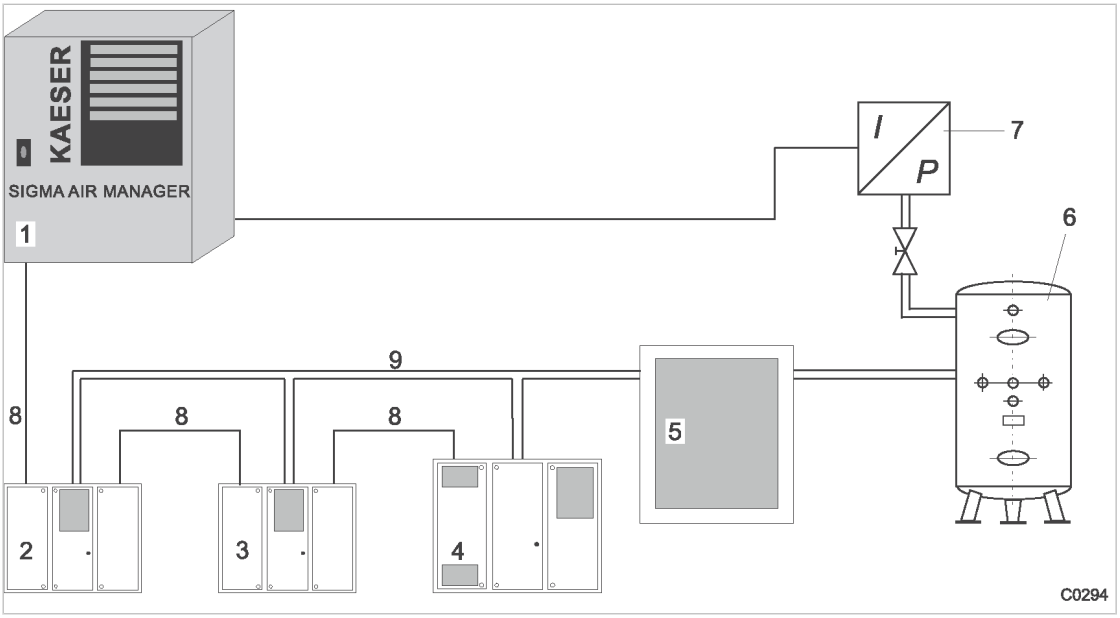


Fig. 27 Example for linking two equally-sized machines and a FC machine

1 SIGMA AIR MANAGER
2 Machine with SIGMA CONTROL
3 Machine with SIGMA CONTROL
4 Machine with SIGMA CONTROL and frequency converter (communication via USS protocol)
5 Air Treatment
6 Air receiver
7 Pressure transducer
8 Profibus cable
9 Compressed air line

1. Link every machine to the master controller. (see chapter 7.3)
2. Assign a characteristic to the FC machine. (see chapter 7.3.2)

13.9.5 Connection of 5 machines in total, one of which as reserve

See chapters 7.5.4 and 7.6.1 for instructions.

Setting parameters

- The compressor station comprises the following machines:
  - 4 new machines (1, 2, 3, 4)
  - One old machine to be used as reserve (5)
- In order for the reserve machine not be deactivated for a very long time, it is to be used every week on Friday between 10:00 and 12:00 AM.

Settings of the reserve machine

Precondition The menu option *<Settings «F1» Station «F4» – Other settings «F4» >* is selected.
Enter password for level 2 if necessary.

➢ Switching compressors online: Finally, enter #-#-#-#-5-#-#-#-#.

Setting the shift clock – switching points 1

Precondition The menu item *<Settings «F1» – Shift clock «F5» >* is selected.
Enter password for level 2 if necessary.

1. Select Fr for the day.
2. Enter switching time 10:00:00.
3. Enter channels #-#-#-#-A.
4. Enter compressors 1–2–3–4–5–6–#-#.
5. Press «F2» to save the switching points.

Setting the shift clock – switching points 2

1. Enter switching time 12:00:00.
2. Enter channels #-#-#-#-#.
3. Press «F2» to save the switching points.

13.9.6 Example of a FC characteristic

See chapter 7.3.2 for instructions.

Example of a compressor with SIGMA CONTROL:
CSD 102 SFC compressor, nominal pressure 7.5 bar.

Example: 6 bar

Pressure [bar]		Frequency range [Hz]					FAD (V_{max}-V_{min}) [m^3/min]
		15	25	35	50	65.5	
6	Free air delivery [m^3/min]	2.36	4.12	5.80	8.28	10.80	8.44
	Power [kW]	15.5	24.2	33.5	48.2	65.7	
	Specific power requirement [kW/(m^3/min)]	6.57	5.87	5.78	5.82	6.02	
	Speed [rpm]	900	1500	2100	3000	3930	

Tab. 93 FC characteristic (example: 6 bar)

Example: 7.5 bar

Pressure [bar]		Frequency range [Hz]					FAD (V_{max}-V_{min}) [m³/min]
		15	25	35	50	60.0	
7.5	FAD [m³/min]	2.33	4.09	5.77	8.25	9.90(**)	7.57
	Power [kW]	17.4	26.9	37.0	53.2	65.5(***)	
	Specific power requirement [kW/(m³/min)]	7.47	6.58	6.41	6.45	6.62	
	Speed [rpm]	900	1500	2100	3000	3600(*)	

(*) = highest speed. (**) = FAD at (*). (***) = power at (*)

Tab. 94 FC characteristic (example: 7.5 bar)

Example: 8.5 bar

Pressure [bar]		Frequency range [Hz]					FAD (V_{max}-V_{min}) [m³/min]
		15	25	35	50	57.0	
8.5	FAD [m³/min]	2.30	4.08	5.75	8.24	9.40	7.10
	Power [kW]	19.0	28.8	39.4	56.6	66.0	
	Specific power requirement [kW/(m³/min)]	8.25	7.06	6.94	6.87	7.02	
	Speed [rpm]	900	1500	2100	3000	3420	

Tab. 95 FC characteristic (example: 8.5 bar)

1. In the speed line of the table 94. start with the highest speed and enter the FAD and power at nominal pressure.
2. Enter the remaining values in relation to decreasing speed.
   The zero point is added automatically.

13.10 Installation accessories

SIGMA AIR CONTROL plus and communication

Name	Material number	Remarks
for model 4/4	7.7740.2	PCMCIA plug-in card (compact flash and adapter) with SAC plus and memory extension to be installed by the user (can be retrofitted).
for model 8/4	7.7741.2	
for model 8/8	7.7741.2	
for model 16/8	7.7742.2	

Name	Material number	Remarks
Modem kit for PCMCIA slot	7.7750.2	Analog 56k PC card modem, to be retrofitted by the user.
GSM modem kit	7.7752.0	GSM modem for retrofitting by the user to interface RS232.
Send/receive protocol (Ethernet layer 4)	7.7760.0	For link to external control centre

Tab. 96 Installation accessories for SIGMA AIR CONTROL plus and communication

Pressure transducer

Name	Material number	Pressure range
For model I	7.4599.0	0-1 bar
For model II	7.3397.1 7.2816.3 7.2817.3 7.4762.0 7.6689.0	0–6 bar 0–10 bar 0–16 bar 0–20 bar 0–32 bar
For model III	7.7040.1	0-16 bar
For vacuum	7.7041.1	0–1 bar (absolute)

Tab. 97 Pressure transducer

Pressure transducer fitting parts and lines

Name	Material number	Remarks
Fitting set straight, elbow G 1/4, G1/2 with shut-off valve and accessories		for air receiver connection
up to 16 bar	8.0484.10050	
up to 45 bar	8.0484.00090	
Fitting set G 1/4, G1/2 with shut-off valve and accessories		1 litre air receiver for connection to pipework
up to 15 bar	204465.0	
Connecting cable for pressure transducer	7.2679.0	Screened, 2 x 0.75 mm^2, for in-door installation, PVC sheath, grey, 6 mm diameter dia.

Tab. 98 Pressure transducer accessories

Profibus expander and compressor retrofit kit

Name	Material number	Remarks
PBU 4+4	7.7777.0	Scope of delivery: Sheet metal control cabinet Power supply: 115/230 V, 1-ph, 50-60 Hz
PBU 4T	7.7778.0	
PBU 8	7.7775.0	
PBU 8R	7.7775.00010	
PBU 8R/4+4	7.7779.0	
PBU 32	7.7776.0	
PBU 8K	on request	For installation in machines without SIGMA CONTROL
Retrofit kit for floating relay contacts	on request	For installation in machines without SIGMA CONTROL

Tab. 99 Profibus expander models

Profibus fitting parts and lines

Name	Material number	Remarks
Connecting cable for Profibus	7.4666.0	Screened, 1x2x0.64/2.55, for indoor installation, PVC sheath. violet, 8mm diameter.
Profibus connector plug for SIGMA AIR MANAGER	7.4664.20010	35° cable exit (not required for model 16/8)
Profibus connecting plug set for SIGMA CONTROL	7.5250.00300	For PG and M fittings including EMC fittings.

Tab. 100 Profibus fitting accessories

Load/idle control module

Name	Pressure	Material number	Remarks
Module for external load/idle control (7.7005.1 or 7.7005.2)	8 bar 11 bar 15 bar	7.7006.00003 7.7006.00013 7.7006.00023	Digital input for load control via SIGMA AIR MANAGER. For machines with SIGMA CONTROL BASIC (7.7005.1 or 7.7005.2) without frequency converter.
SFC module with external load/idle control.	8 bar	7.7706.00033	as 7.7006.00003 but for machines with frequency converter (SFC)
Module for external load/idle control (7.7005.3).	8 bar 11 bar 15 bar	7.7056.00001 7.7056.00011 7.7056.00021	Digital input for load control via SIGMA AIR MANAGER. For machines with SIGMA CONTROL BASIC (7.7005.3) without frequency converter.
SFC module with external load/idle control.	8 bar	7.7756.00031	as 7.7056.00001 but for machines with frequency converter (SFC)

Tab. 101 Load/idle module

RC interference suppressor

Name	Material number	Remarks
RC interference suppressor	7.2812.1	For suppression of inductive loads connected to the relay outputs of the master controller. Coil voltage: 110–230 V AC/DC Coil capacity: 15 VA

Tab. 102 RC interference suppressor

13.11 Exchanging the battery

Exchanging the battery				
Date / time				
Name				

Tab. 103 Changing the battery

13.12 Electrical Diagram

1	2	3	4	5	6	7	8

Electrical diagrams

Sequencer

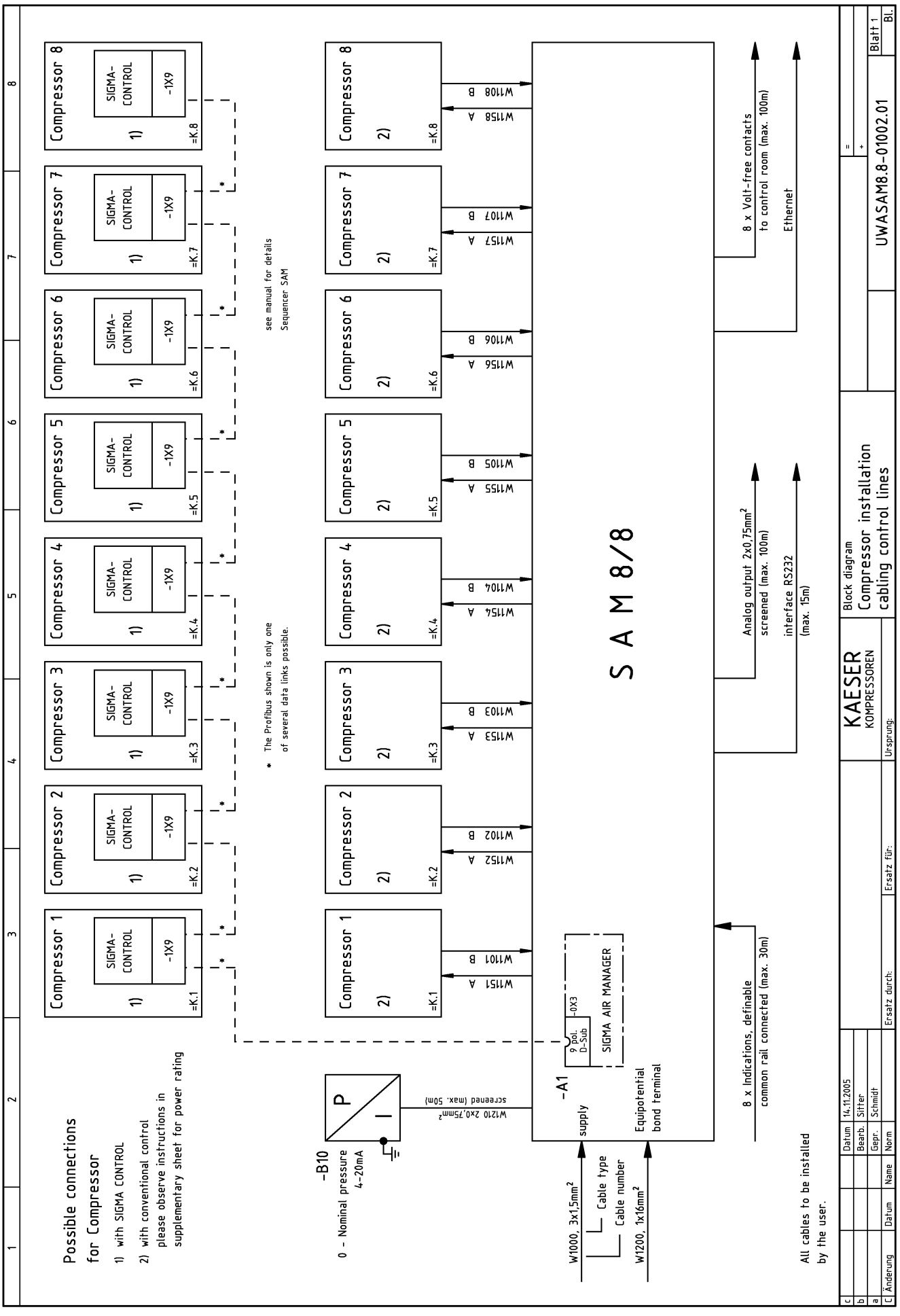
SAM 8/8

Manufacturer: KAESER KOMPRESSOREN GmbH
Postfach 2143
96410 Coburg

c				Datum	14.11.2005 E			KAESER KOMPRESSOREN	Cover page Sequencer SAM 8/8	=
b				Bearb.	Sitter					+
a	Spannungsänd.	27.11.08	Ob/Si	Gepr.	Schmidt					
A	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	DWASAM8.8-01002.01	Blatt 1 Bl.

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	Cover page	SAM 8/8		DWASAM8.8-01002.01	1	
2	List of contents			ZWASAM8.8-01002.01	1	
3	Block diagram	cabling control lines		UWASAM8.8-01002.01	1	
4	Block diagram	cabling control lines		UWASAM8.8-01002.01	2	
5	Circuit diagram	Power supply		SWASAM8.8-01002.01	1	
6	Circuit diagram	inputs DI 0.0 - 0.7		SWASAM8.8-01002.01	2	
7	Circuit diagram	outputs DO 0.0 - DO 0.7		SWASAM8.8-01002.01	3	
8	Circuit diagram	inputs DI 1.0 - DI 1.7		SWASAM8.8-01002.01	4	
9	Circuit diagram	inputs DI 2.0 - DI 2.7		SWASAM8.8-01002.01	5	
10	Circuit diagram	analog inputs		SWASAM8.8-01002.01	6	
11	Circuit diagram	analog inputs/outputs		SWASAM8.8-01002.01	7	
12	Circuit diagram	outputs DO 4.0 - 4.7		SWASAM8.8-01002.01	8	
13	Circuit diagram	outputs DO 12.0 - 12.7		SWASAM8.8-01002.01	9	
14	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	10	
15	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	11	
16	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	12	
17	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	13	
18	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	14	
19	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	15	
20	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	16	
21	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	17	
22	Circuit diagram	Volt-free contacts		SWASAM8.8-01002.01	18	
23	Electrical equipment identification			SWASAM8.8-01002.01	19	
24	Equipment parts list	Control cabinet		GWASAM8.8-01002.01	1	
25	Terminal schedule	Terminal strip -X0,-X10		KWASAM8.8-01002.01	1	
26	Terminal schedule	Terminal strip -X11		KWASAM8.8-01002.01	2	
27	Terminal schedule	Terminal strip -X11		KWASAM8.8-01002.01	3	
28	Terminal schedule	Terminal strip -X13		KWASAM8.8-01002.01	4	
29	Terminal schedule	Terminal strip -X14		KWASAM8.8-01002.01	5	
30	Terminal schedule	Terminal strip -X15		KWASAM8.8-01002.01	6	
31	Component layout	Mounting plate		AWASAM8.8-01002.01	1	

c				Datum	14.11.2005		KAESER KOMPRESSOREN	List of contents Sequencer	=	
b				Bearb.	Sitter				+	
a				Gepr.	Schmidt				ZWASAM8.8-01002.01	Blatt 1
B	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:			Bl.


Possible connections for Compressor
1) with SIGMA CONTROL
2) with conventional control please observe instructions in supplementary sheet for power rating
Compressor 1
Compressor 2
Compressor 3
Compressor 4
Compressor 5
Compressor 6
Compressor 7
Compressor 8
SIGMA-CONTROL
-1X9
=K.1
=K.2
=K.3
=K.4
=K.5
=K.6
=K.7
=K.8
see manual for details Sequencer SAM
* The Profibus shown is only one of several data links possible.
S A M 8/8
-B10
0 - Nominal pressure 4-20mA
W1210 2x0,75mm² screened (max. 50m)
-A1
9 pol. D-Sub -0X3
SIGMA AIR MANAGER
Equipotential bond terminal
W1000, 3x1,5mm²
Cable type
Cable number
W1200, 1x16mm²
8 x Indications, definable common rail connected (max. 30m)
Analog output 2x0,75mm² screened (max. 100m)
interface RS232 (max. 15m)
8 x Volt-free contacts to control room (max. 100m)
Ethernet
All cables to be installed by the user.
KAESER KOMPRESSOREN
Block diagram
Compressor installation
cabling control lines
UWASAM8.8-01002.01
Blatt 1
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Ersatz durch:
Ersatz für:
Ursprung:
Name
Norm

Control cabinet-summary

Power supply

L/PE/N 50/60Hz 100-240V
TN-power supply
rated power: ca. 150VA
rated current: ca. 0,9A/0,5A
supply: 3x1,5mm²
Main fuse: max. 16A

Control cabinet

Overall dimensions (HxWxD): 700x500x250 mm
Manufacturer: Rittal
model: AE 1057.600
enclosure protection: IP54
colour outside: RAL 7035
colour inside: RAL 7035

Power supply unit

main current: 100-240V/1/N/PE 50/60Hz
Control voltage: 24V DC
control: -
sensor: 16V DC

wiring colors

Control 230V AC: red
Control 24V AC: red
Control 24V DC: blue
external voltage: orange

All non-designated conductors
+24V DC: 0,5 mm² blue H05V-K

potentials

Load voltage 24V DC
Control voltage 24V DC

screen rail

dimension: 18x3 mm
construction: Mounting plate

terminal strips

X0	Power supply
X10	voltage potentials 24V DC
X11	Control voltage 24V DC, inputs
X12	Control voltage 24V DC, outputs
X13	analog signals
X14, X15	terminal strips, Volt-free contacts

core ident code to IEC 757 (DIN 47100)		
1	White	white
2	Brown	brown
3	Green	green
4	Yellow	yellow
5	Grey	grey
6	Pink	pink
7	Blue	blue
8	Red	red
9	Black	black
10	Violet	violet
11	Grey/Pink	grey/pink
12	Red/Blue	red/blue
13	White/Green	white/green
14	Brown/Green	brown/green
15	White/Yellow	white/yellow
16	Yellow/Brown	yellow/brown
17	White/Grey	white/grey
18	Grey/Brown	grey/brown
19	White/Pink	white/pink
20	Pink/Brown	pink/brown
21	White/Blue	white/blue
22	Brown/Blue	brown/blue
23	White/Red	white/red
24	Brown/Red	brown/red
25	White/Black	white/black

Do not make or break
live plug-in connectors.
Disconnecting -X14 or -X15 results in the shutdown
of the corresponding compressors.
All inputs and outputs are pre-allocated, as shown in the circuit diagram.
Their functions can be modified in the SIGMA AIR MANAGER.

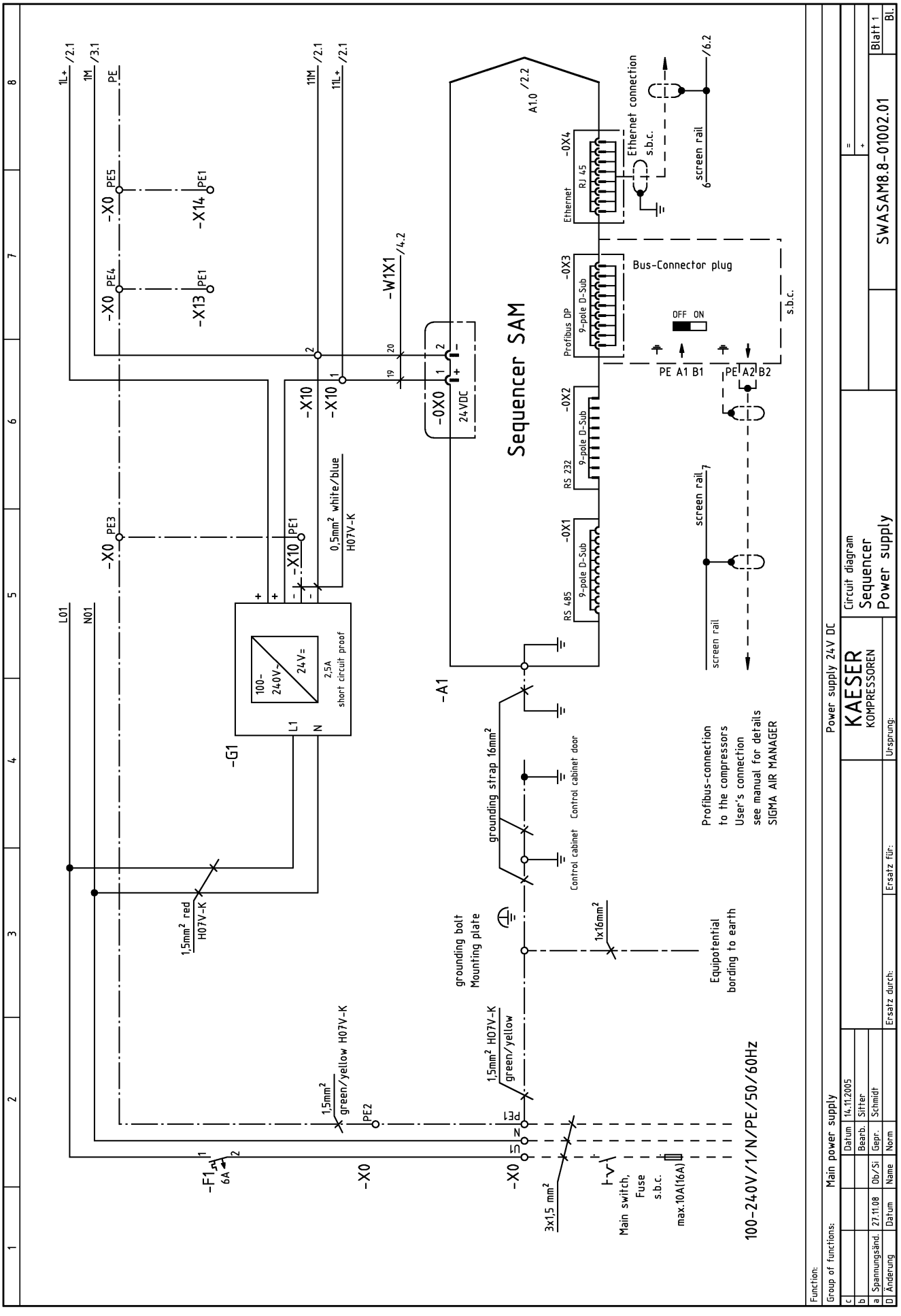
cable cross-section Sequencer SAM <---> Compressor

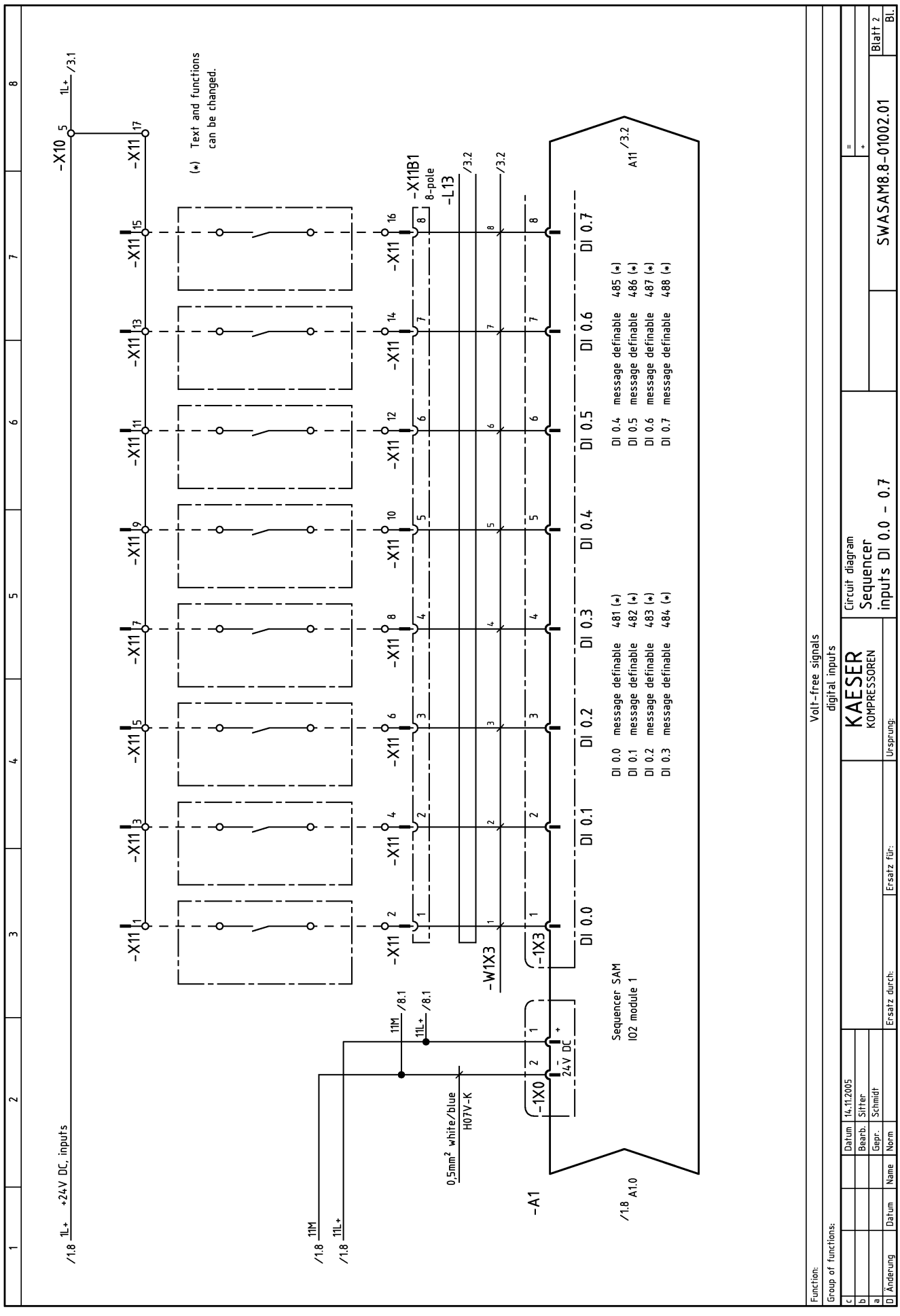
* Compressor Typ 1 — Compressors with SIGMA CONTROL and Profibus-connection
* Compressor Typ 2.1 — Compressors on which the changeover contact of main pressure switch is wired. SX,SM,SK,AS, generally BS,CS,DS(B),ES(B),FS(B),FSD,GS(B),HS(B) from 1990 on.
* Compressor Typ 2.2 — Compressors on which the normally closed contact of main pressure switch is wired. BS,CS,DS(B),ES(B),FS(B),FSD,GS(B),HS(B) up to 1989 inclusive.

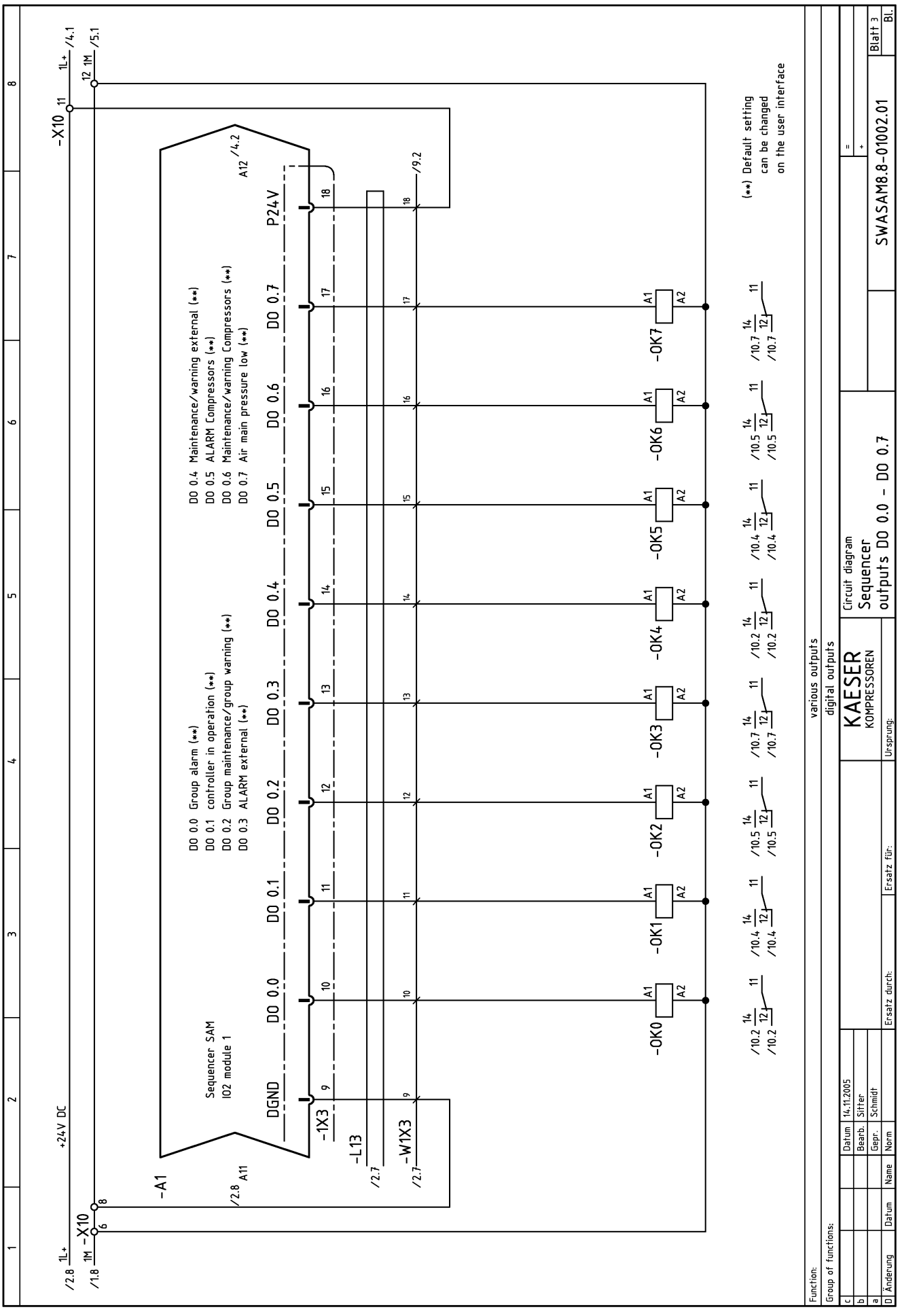
If the wiring of the air main pressure switch is in doubt see electrical diagram of the associated compressor.

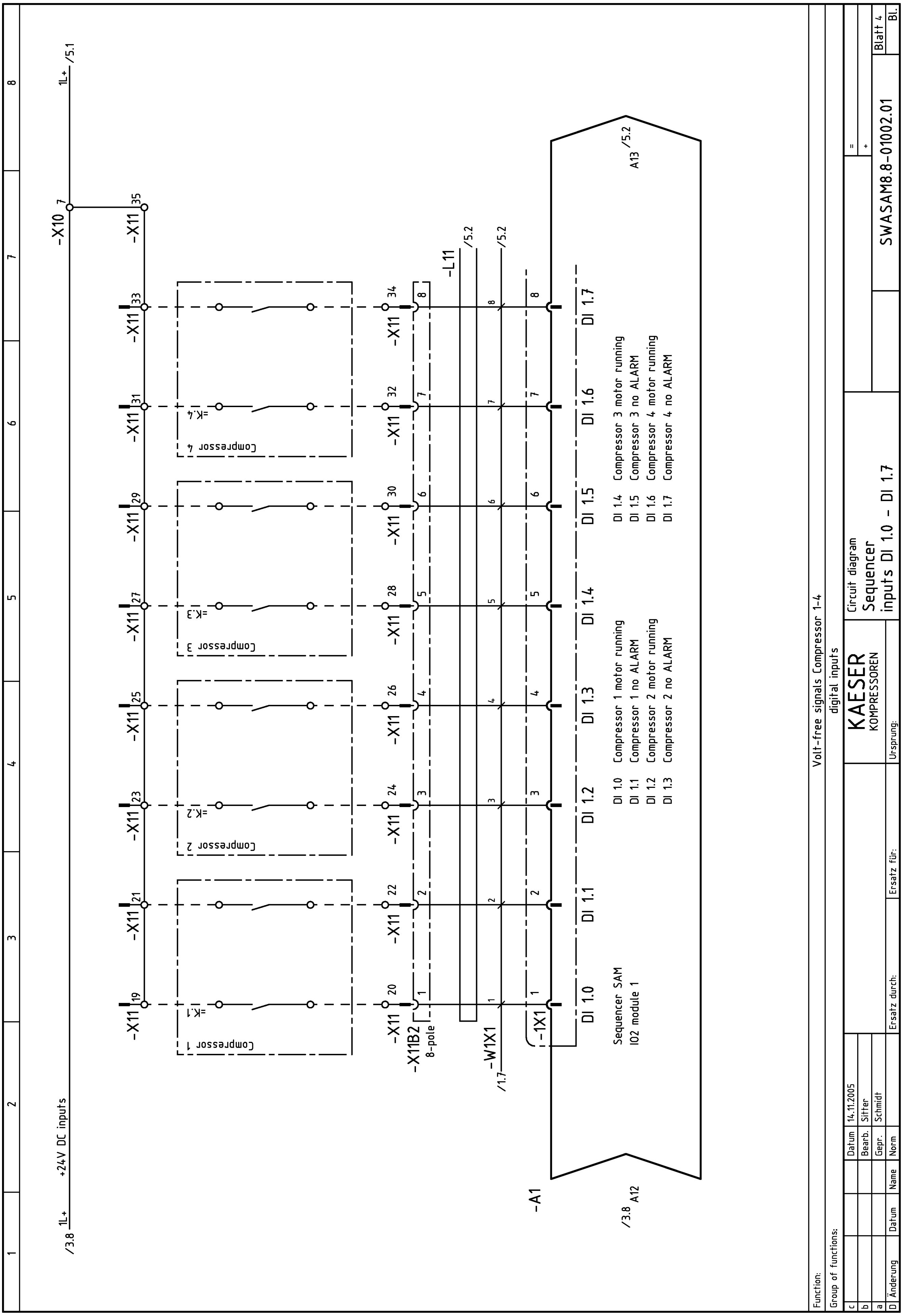
Compressor model		Cable type		max. length
1		Profibus cable 1x2x0,34mm²		800m by 187,5 kBit/s
2.1	2.2	A	B	30m
X		5x1,0mm²	5x1,0mm²	
	X	4x1,0mm²	5x1,0mm²	

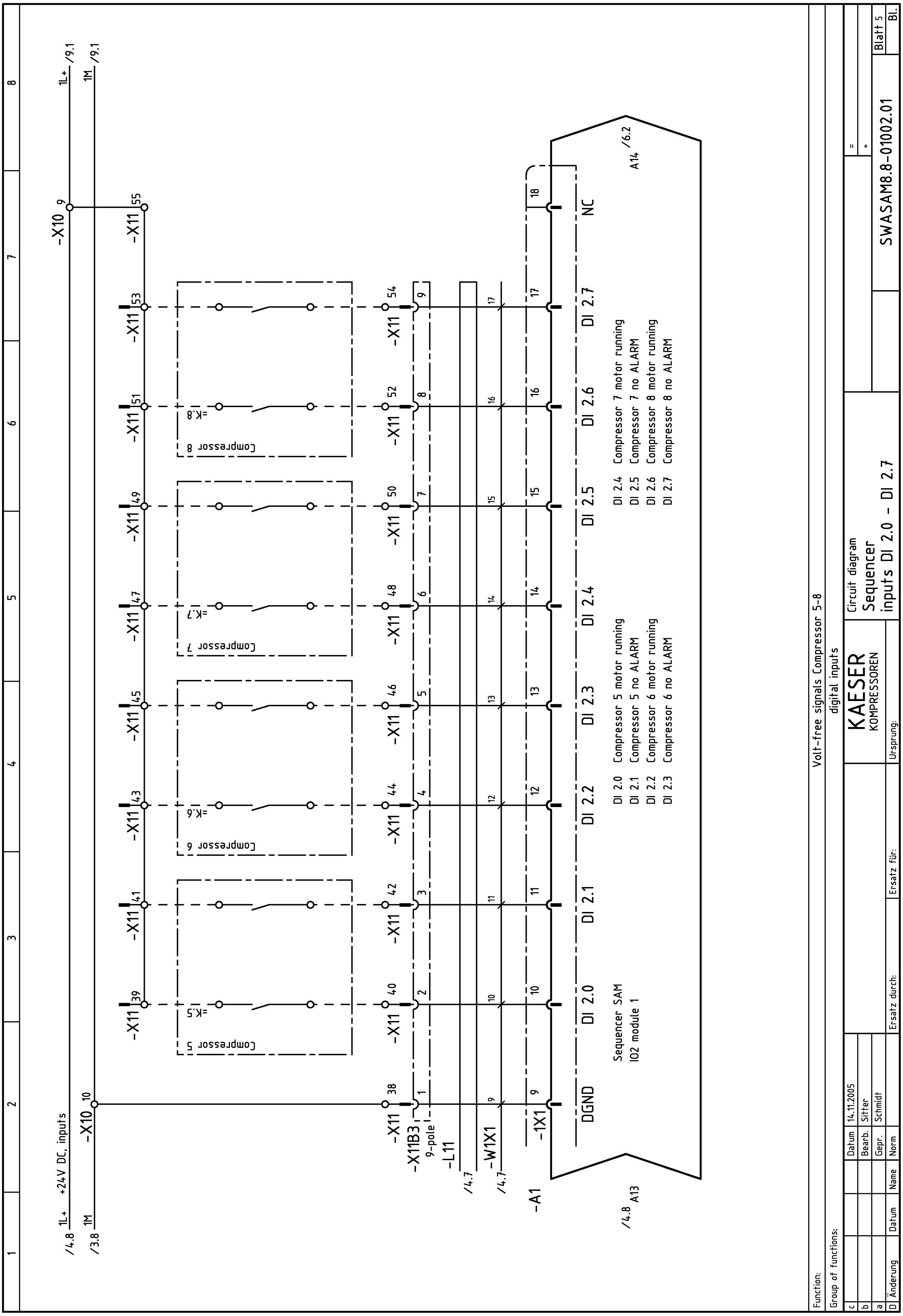
c				Datum	14.11.2005		KAESER KOMPRESSOREN	Block diagram Compressor installation cabling control lines
b				Bearb.	Sitter			
a	Spannungsänd.	27.11.08	Ob/Si	Gepr.	Schmidt			
C	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:	UWASAM8.8-01002.01 Blatt 2 Bl.

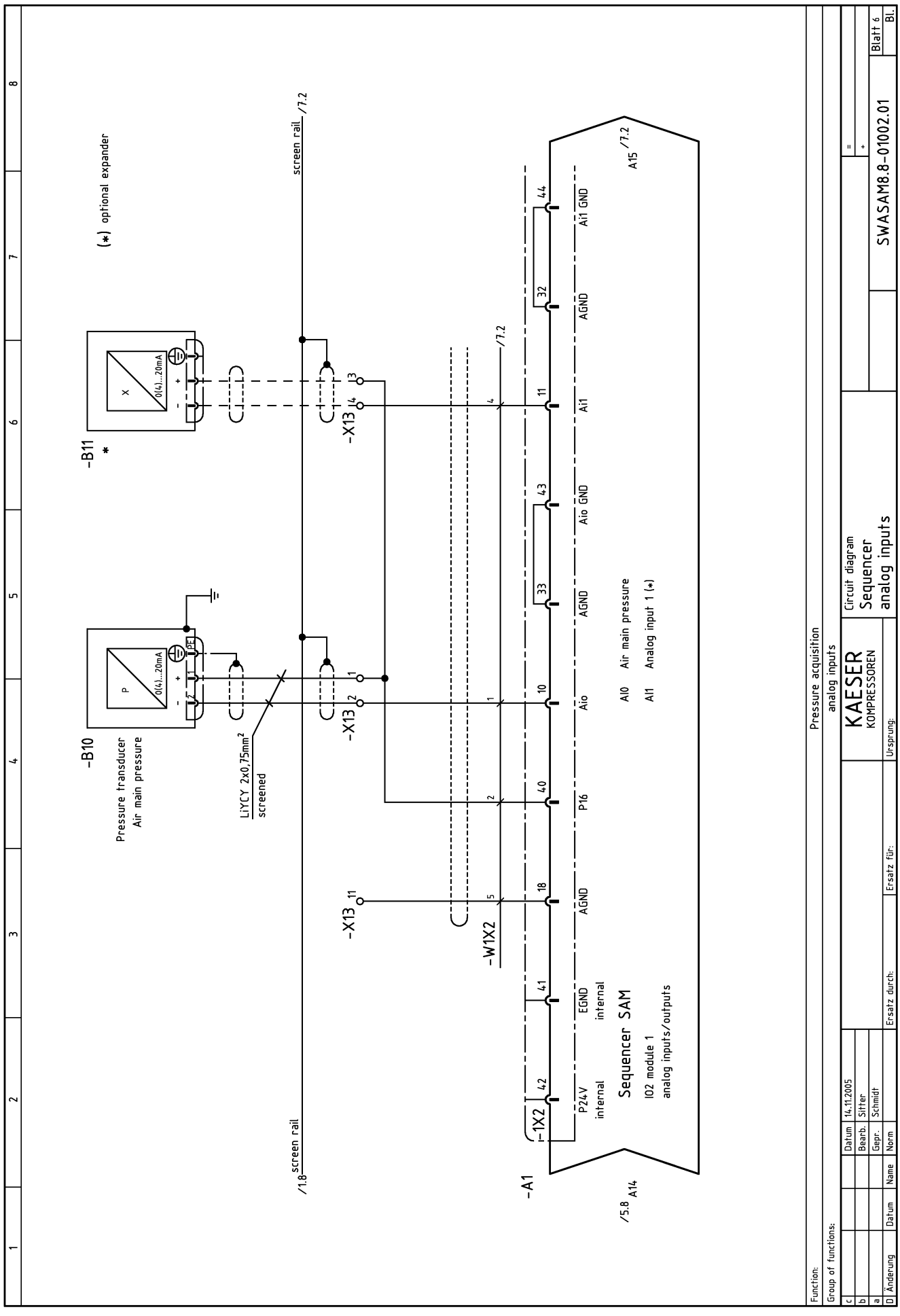

Sequencer SAM
A1.0 /2.2
-A1
-G1
-F1
6A
-X0
-X10
-X13
-X14
-W1X1 /4.2
-0X0
-0X1
-0X2
-0X3
-0X4
24VDC
100-240V~
24V=
2,5A
short circuit proof
RS 485
RS 232
Profibus DP
Ethernet
RJ 45
9-pole D-Sub
Bus-Connector plug
OFF ON
PE A1 B1
PE A2 B2
Ethernet connection
s.b.c.
screen rail
0,5mm² white/blue H07V-K
1,5mm² red H07V-K
1,5mm² green/yellow H07V-K
1,5mm² H07V-K green/yellow
grounding strap 16mm²
Control cabinet
Control cabinet door
grounding bolt
Mounting plate
1x16mm²
Equipotential bording to earth
3x1,5 mm²
Main switch, Fuse s.b.c. max.10A(16A)
Profibus-connection to the compressors
User's connection
see manual for details
SIGMA AIR MANAGER
100-240V/1/N/PE/50/60Hz
L01
N01
L1
N
1L+ /2.1
1M /3.1
PE
11M /2.1
11L+ /2.1
PE1
PE2
PE3
PE4
PE5
Function:
Group of functions: Main power supply
Power supply 24V DC
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Power supply
SWASAM8.8-01002.01
Blatt 1
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Name
Datum
Ob/Si
27.11.08
Spannungsänd.
Änderung

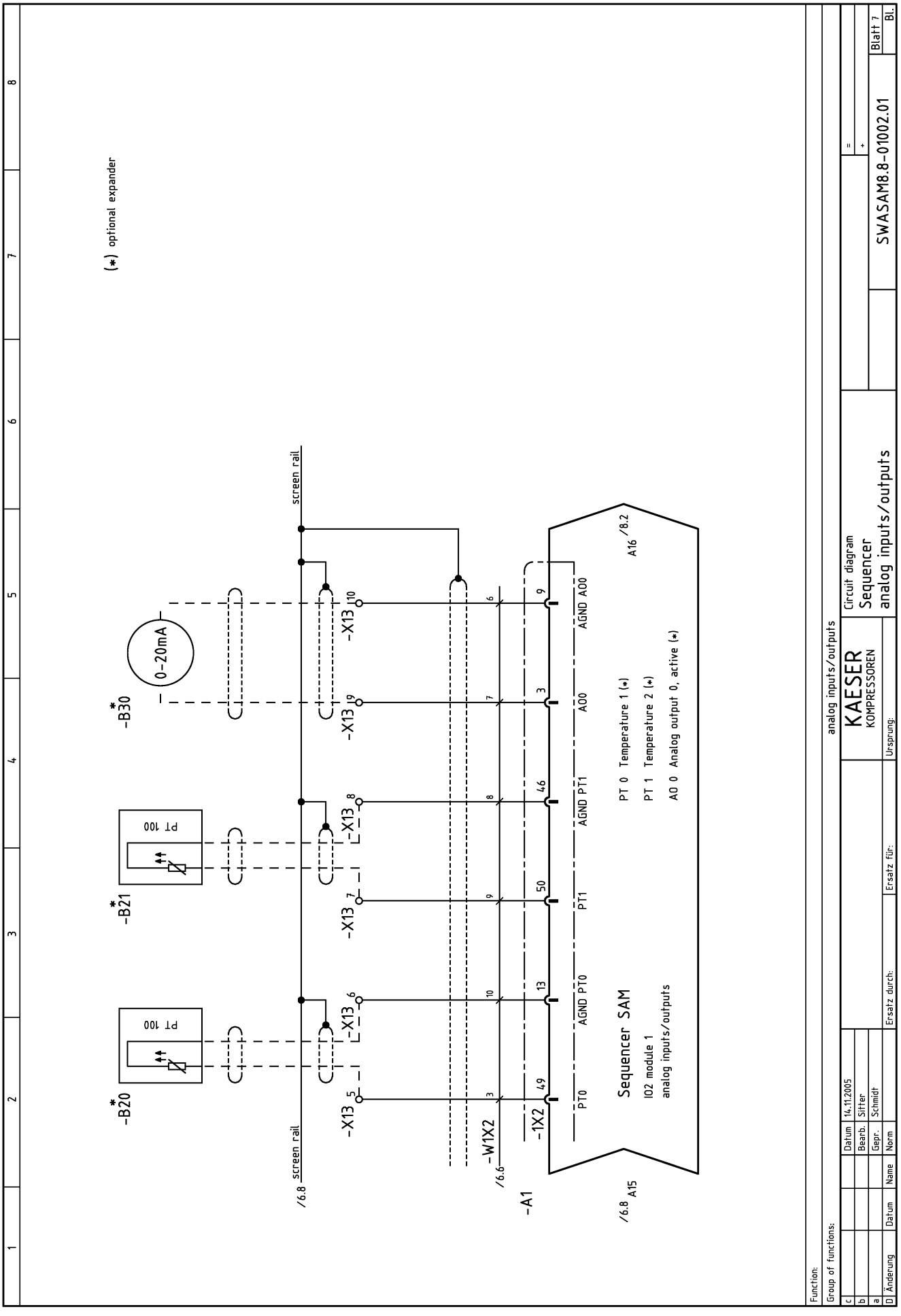

(*) Text and functions can be changed.
-X10
-X11
-X11B1
8-pole
-L13
-W1X3
-1X3
-1X0
-A1
Sequencer SAM
IO2 module 1
0,5mm² white/blue
H07V-K
24 V DC
DI 0.0 message definable 481 (*)
DI 0.1 message definable 482 (*)
DI 0.2 message definable 483 (*)
DI 0.3 message definable 484 (*)
DI 0.4 message definable 485 (*)
DI 0.5 message definable 486 (*)
DI 0.6 message definable 487 (*)
DI 0.7 message definable 488 (*)
+24V DC, inputs
Volt-free signals
digital inputs
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
inputs DI 0.0 - 0.7
SWASAM8.8-01002.01
14.11.2005
Sifter
Schmidt

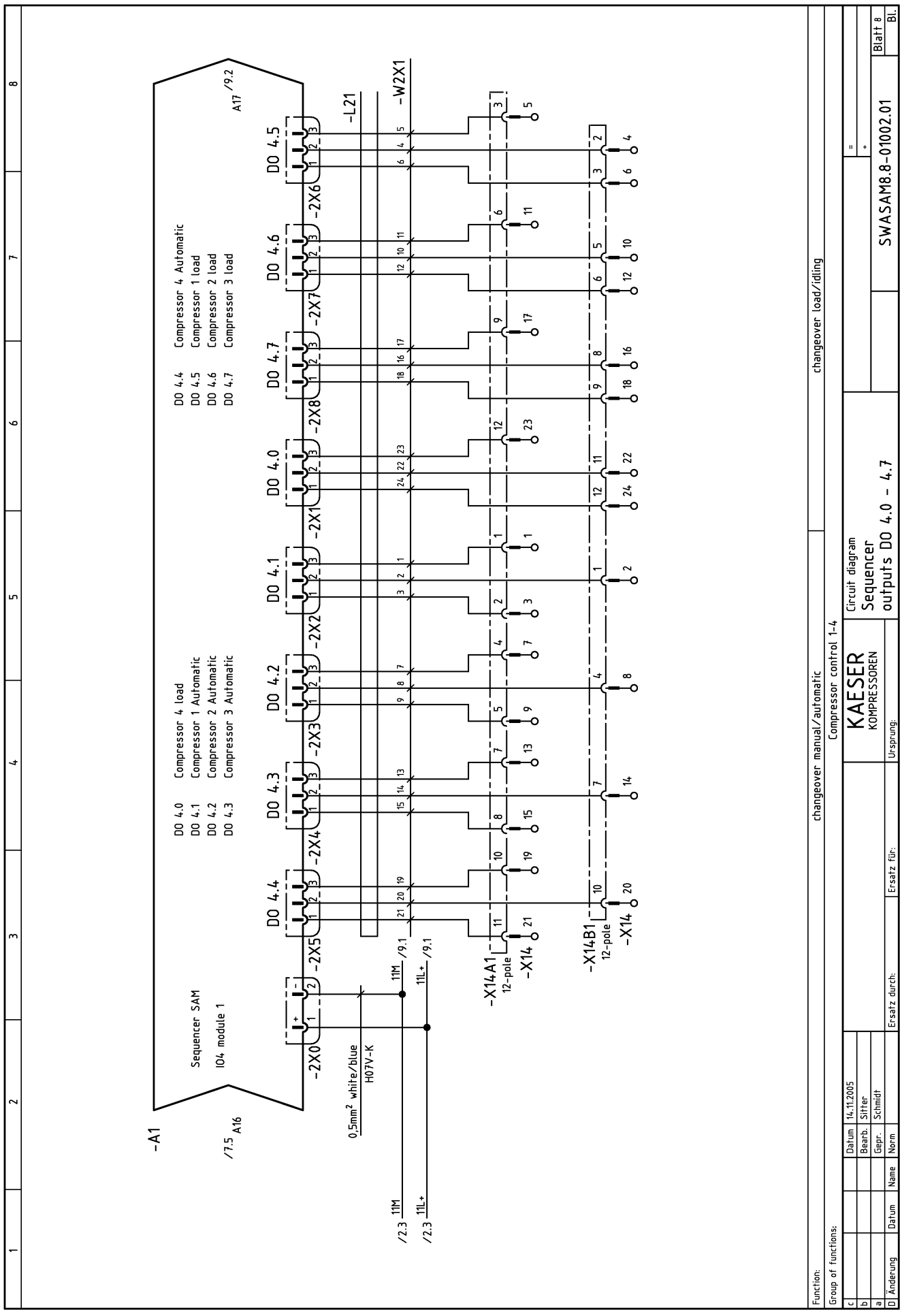

-X10
1L+ /4.1
1M /5.1
+24V DC
1L+ /2.8
1M -X10
/1.8
-A1
/2.8 A11
Sequencer SAM
IO2 module 1
DGND
DO 0.0
DO 0.1
DO 0.2
DO 0.3
DO 0.4
DO 0.5
DO 0.6
DO 0.7
P24V
-1X3
-L13
/2.7
-W1X3
/2.7
A12 /4.2
/9.2
DO 0.0 Group alarm (**)
DO 0.1 controller in operation (**)
DO 0.2 Group maintenance/group warning (**)
DO 0.3 ALARM external (**)
DO 0.4 Maintenance/warning external (**)
DO 0.5 ALARM Compressors (**)
DO 0.6 Maintenance/warning Compressors (**)
DO 0.7 Air main pressure low (**)
-0K0
-0K1
-0K2
-0K3
-0K4
-0K5
-0K6
-0K7
(**) Default setting
can be changed
on the user interface
Function:
Group of functions:
various outputs
digital outputs
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
outputs DO 0.0 - DO 0.7
SWASAM8.8-01002.01
Blatt 3
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Name
Norm

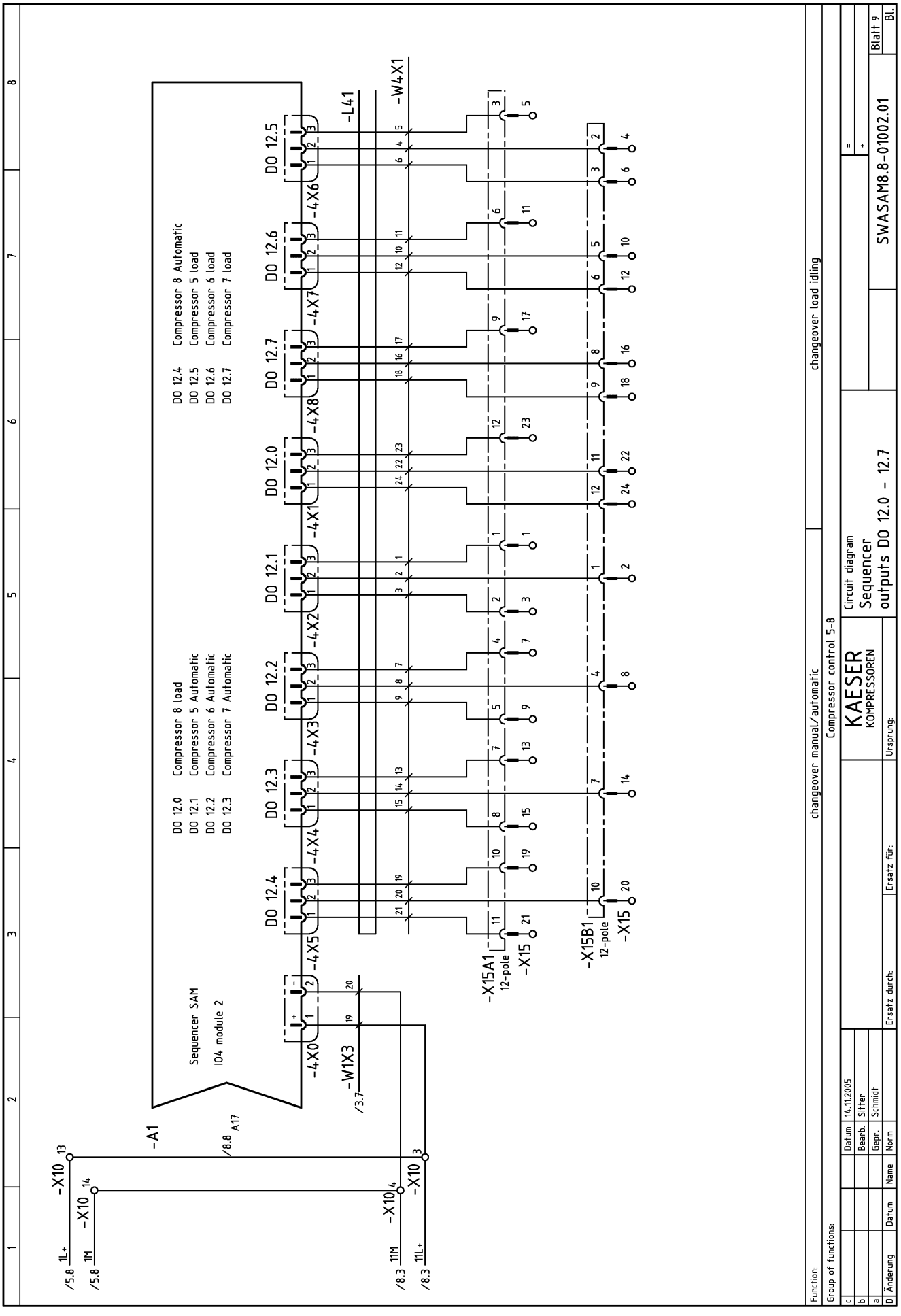

+24V DC inputs
1L+
/3.8
/5.1
-X10
-X11
-X11B2
8-pole
-W1X1
/1.7
-L11
/5.2
-1X1
-A1
/3.8 A12
A13 /5.2
Compressor 1
=K.1
Compressor 2
=K.2
Compressor 3
=K.3
Compressor 4
=K.4
DI 1.0
DI 1.1
DI 1.2
DI 1.3
DI 1.4
DI 1.5
DI 1.6
DI 1.7
Sequencer SAM
IO2 module 1
DI 1.0 Compressor 1 motor running
DI 1.1 Compressor 1 no ALARM
DI 1.2 Compressor 2 motor running
DI 1.3 Compressor 2 no ALARM
DI 1.4 Compressor 3 motor running
DI 1.5 Compressor 3 no ALARM
DI 1.6 Compressor 4 motor running
DI 1.7 Compressor 4 no ALARM
Function:
Group of functions:
Volt-free signals Compressor 1-4
digital inputs
Circuit diagram
Sequencer
inputs DI 1.0 – DI 1.7
KAESER
KOMPRESSOREN
SWASAM8.8-01002.01
Blatt 4
Bl.
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Änderung
Datum
Name
Ersatz durch:
Ersatz für:
Ursprung:

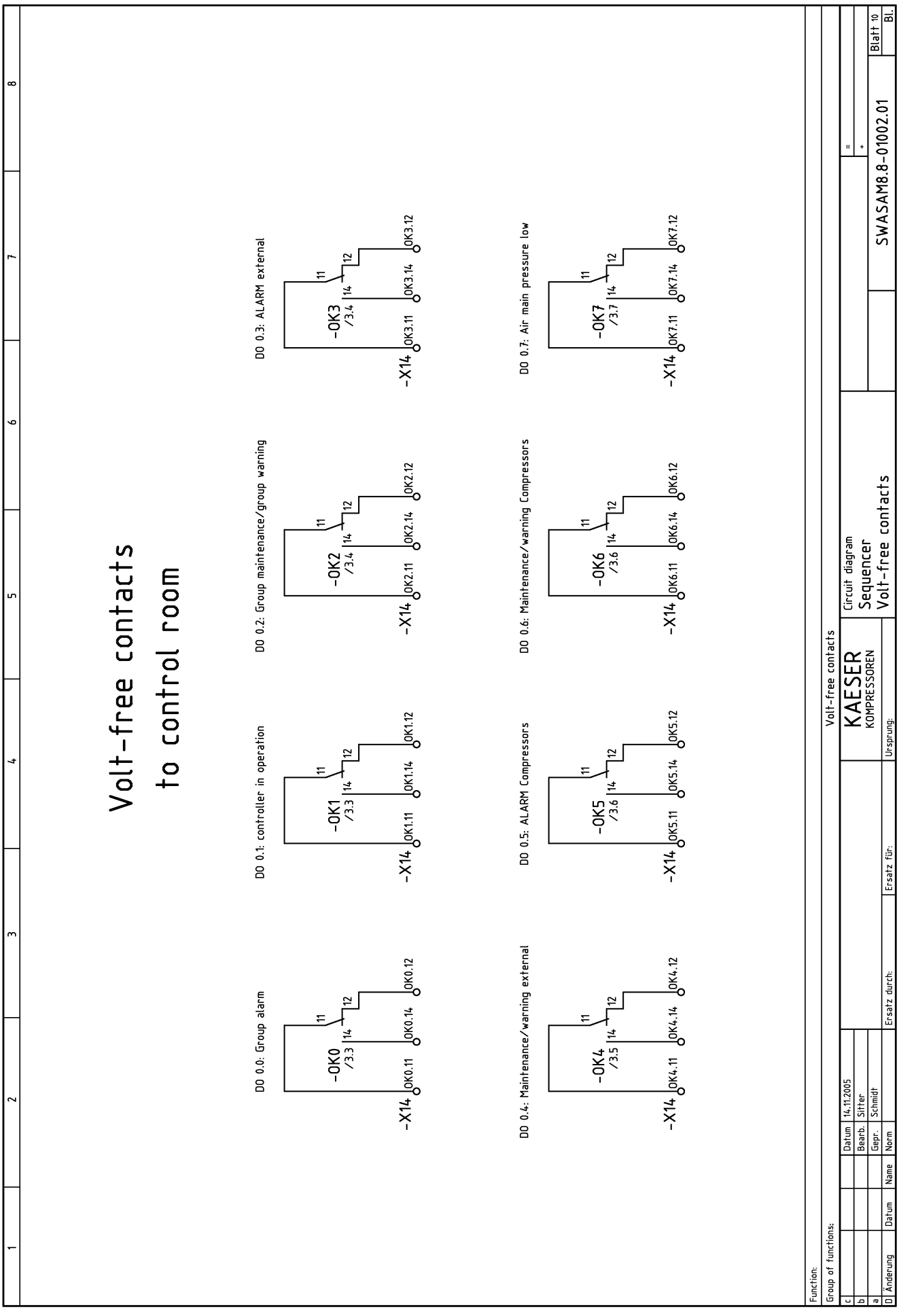

+24V DC, inputs
Compressor 5
Compressor 6
Compressor 7
Compressor 8
DGND
DI 2.0
DI 2.1
DI 2.2
DI 2.3
DI 2.4
DI 2.5
DI 2.6
DI 2.7
NC
Sequencer SAM
IO2 module 1
DI 2.0 Compressor 5 motor running
DI 2.1 Compressor 5 no ALARM
DI 2.2 Compressor 6 motor running
DI 2.3 Compressor 6 no ALARM
DI 2.4 Compressor 7 motor running
DI 2.5 Compressor 7 no ALARM
DI 2.6 Compressor 8 motor running
DI 2.7 Compressor 8 no ALARM
Volt-free signals Compressor 5-8
digital inputs
Circuit diagram
Sequencer
inputs DI 2.0 - DI 2.7
SWASAM8.8-01002.01
Blatt 5

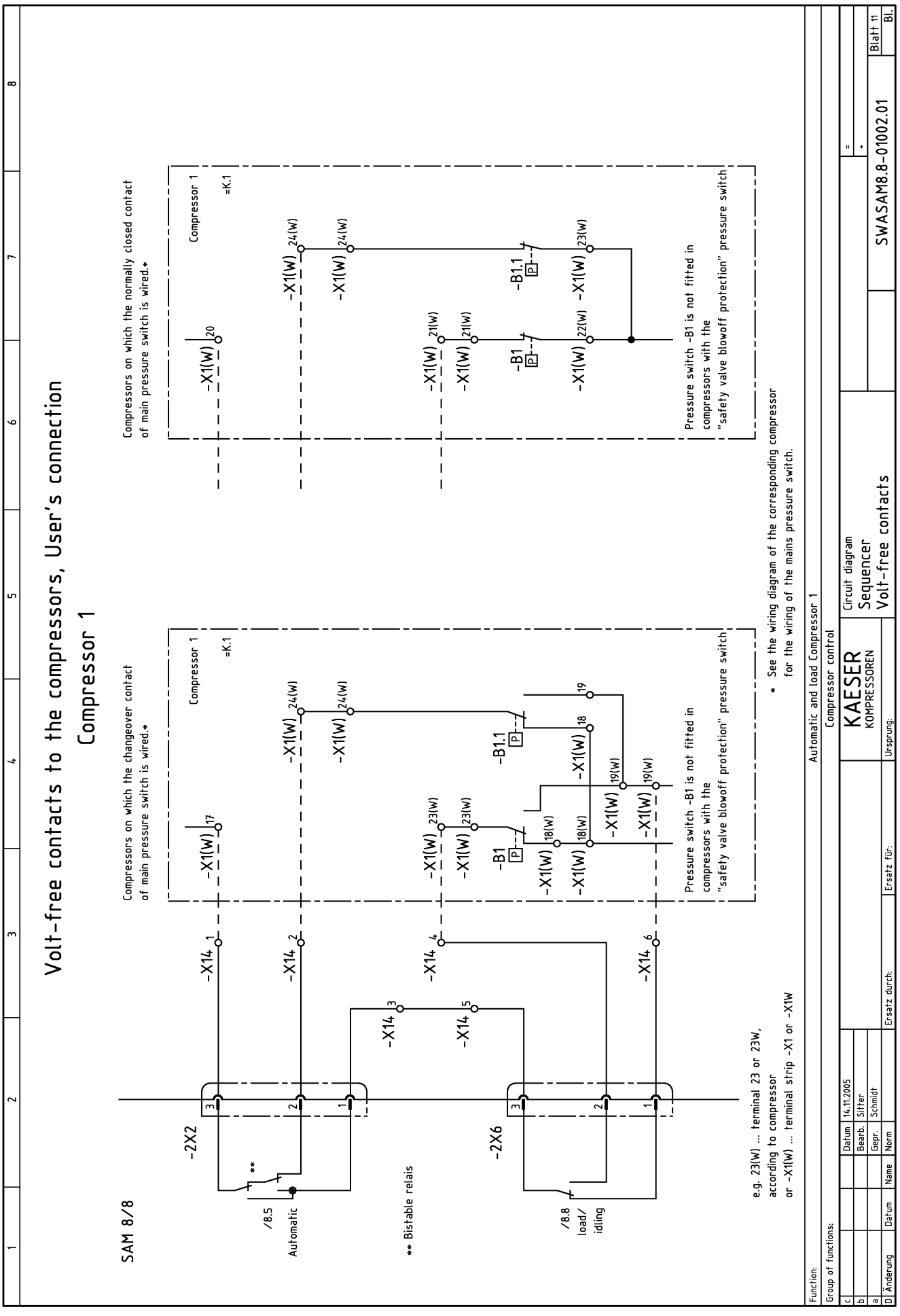

(*) optional expander
screen rail /7.2
-B11
*
0(4)...20mA
X
-X13
3
4
/7.2
-B10
Pressure transducer
Air main pressure
P
0(4)...20mA
PE
LiYCY 2x0,75mm²
screened
-X13
1
2
screen rail /1.8
-X13
11
-W1X2
-A1
-1X2
42
41
18
40
10
33
43
44
11
32
4
1
2
5
P24V
internal
EGND
internal
AGND
P16
Aio
AGND
Aio GND
AGND
Ai1
Ai1 GND
Sequencer SAM
IO2 module 1
analog inputs/outputs
/5.8 A14
A15 /7.2
AI0 Air main pressure
AI1 Analog input 1 (*)
Function:
Pressure acquisition
Group of functions:
analog inputs
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
analog inputs
SWASAM8.8-01002.01
Blatt 6
Bl.
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum

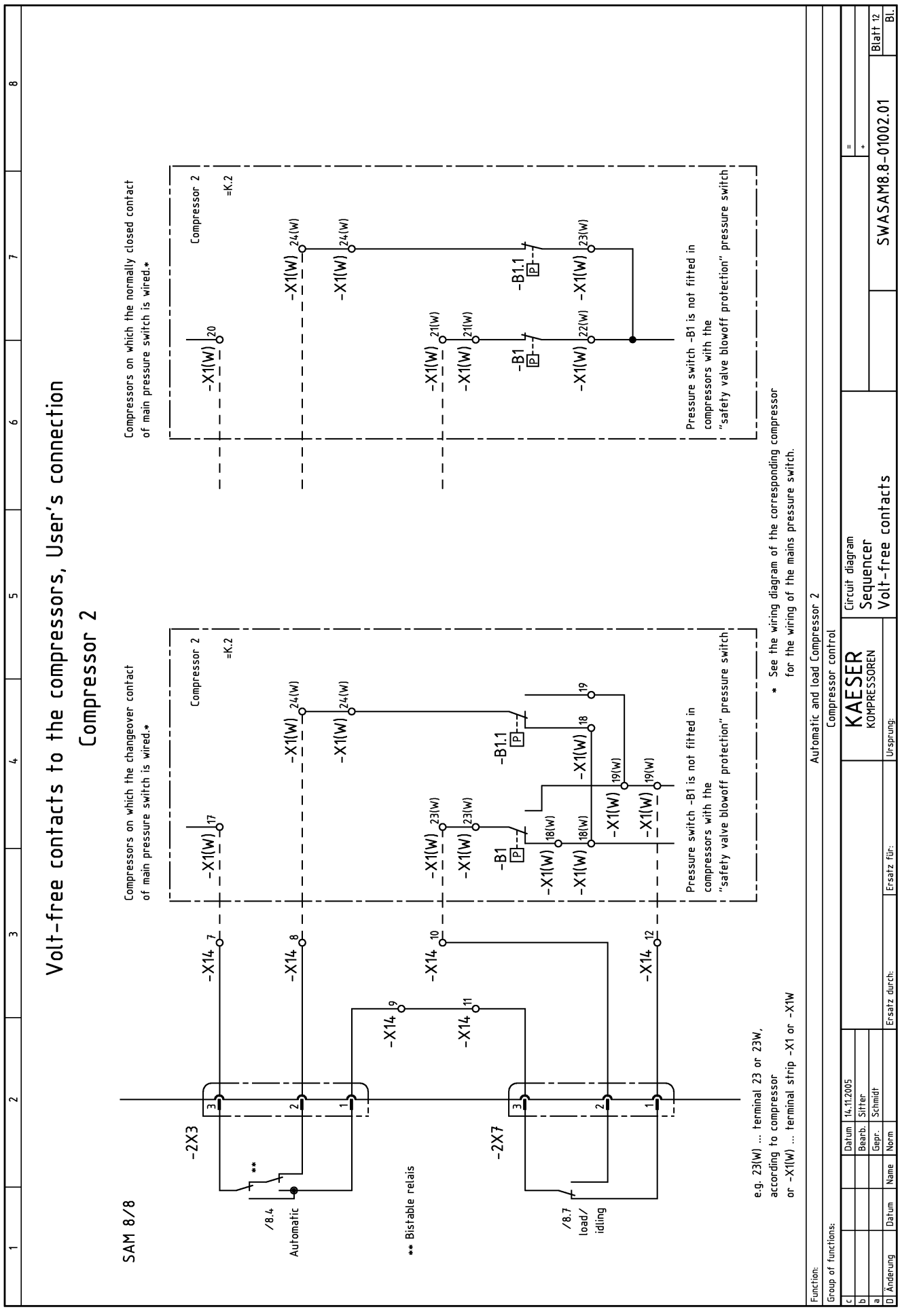

(*) optional expander
-B20
-B21
-B30
PT 100
PT 100
0-20mA
screen rail
screen rail
-X13
-X13
-X13
-X13
-W1X2
-1X2
-A1
Sequencer SAM
I02 module 1
analog inputs/outputs
PT0
AGND PT0
PT1
AGND PT1
AO0
AGND AO0
PT 0 Temperature 1 (*)
PT 1 Temperature 2 (*)
AO 0 Analog output 0, active (*)
/6.8 A15
/6.6
/6.8
/8.2 A16
Function:
Group of functions:
analog inputs/outputs
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
analog inputs/outputs
SWASAM8.8-01002.01
Blatt 7
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Name

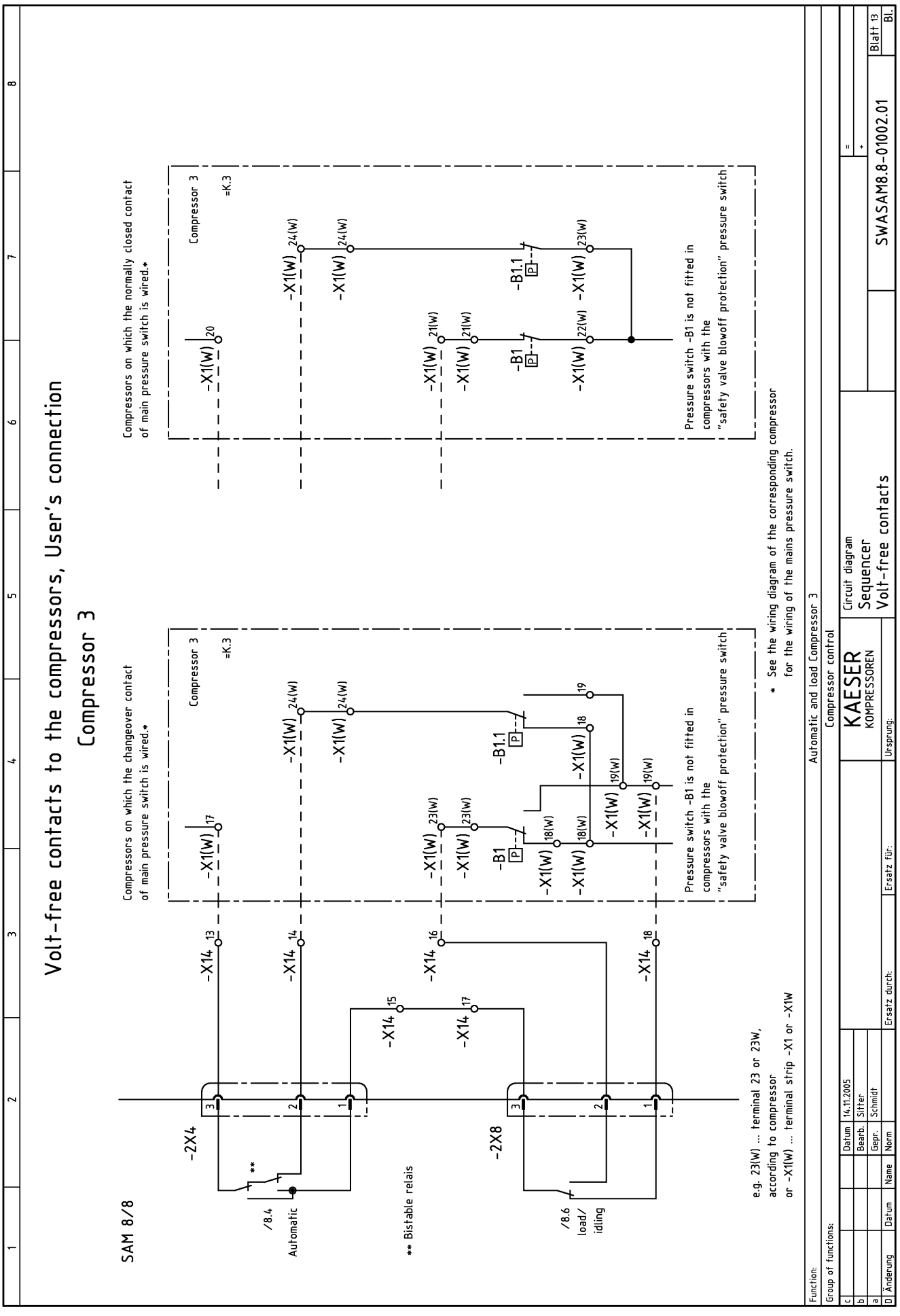

-A1
Sequencer SAM
104 module 1
/7.5 A16
A17 /9.2
DO 4.0 Compressor 4 load
DO 4.1 Compressor 1 Automatic
DO 4.2 Compressor 2 Automatic
DO 4.3 Compressor 3 Automatic
DO 4.4 Compressor 4 Automatic
DO 4.5 Compressor 1 load
DO 4.6 Compressor 2 load
DO 4.7 Compressor 3 load
-2X0
-2X5
-2X4
-2X3
-2X2
-2X1
-2X8
-2X7
-2X6
-L21
-W2X1
-X14A1
12-pole
-X14
-X14B1
12-pole
-X14
0,5mm² white/blue
H07V-K
11M /9.1
11L+ /9.1
/2.3 11M
/2.3 11L+
Function:
changeover manual/automatic
changeover load/idling
Group of functions:
Compressor control 1-4
Datum 14.11.2005
Bearb. Sifter
Gepr. Schmidt
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
outputs DO 4.0 - 4.7
SWASAM8.8-01002.01
Blatt 8
Bl.
Änderung

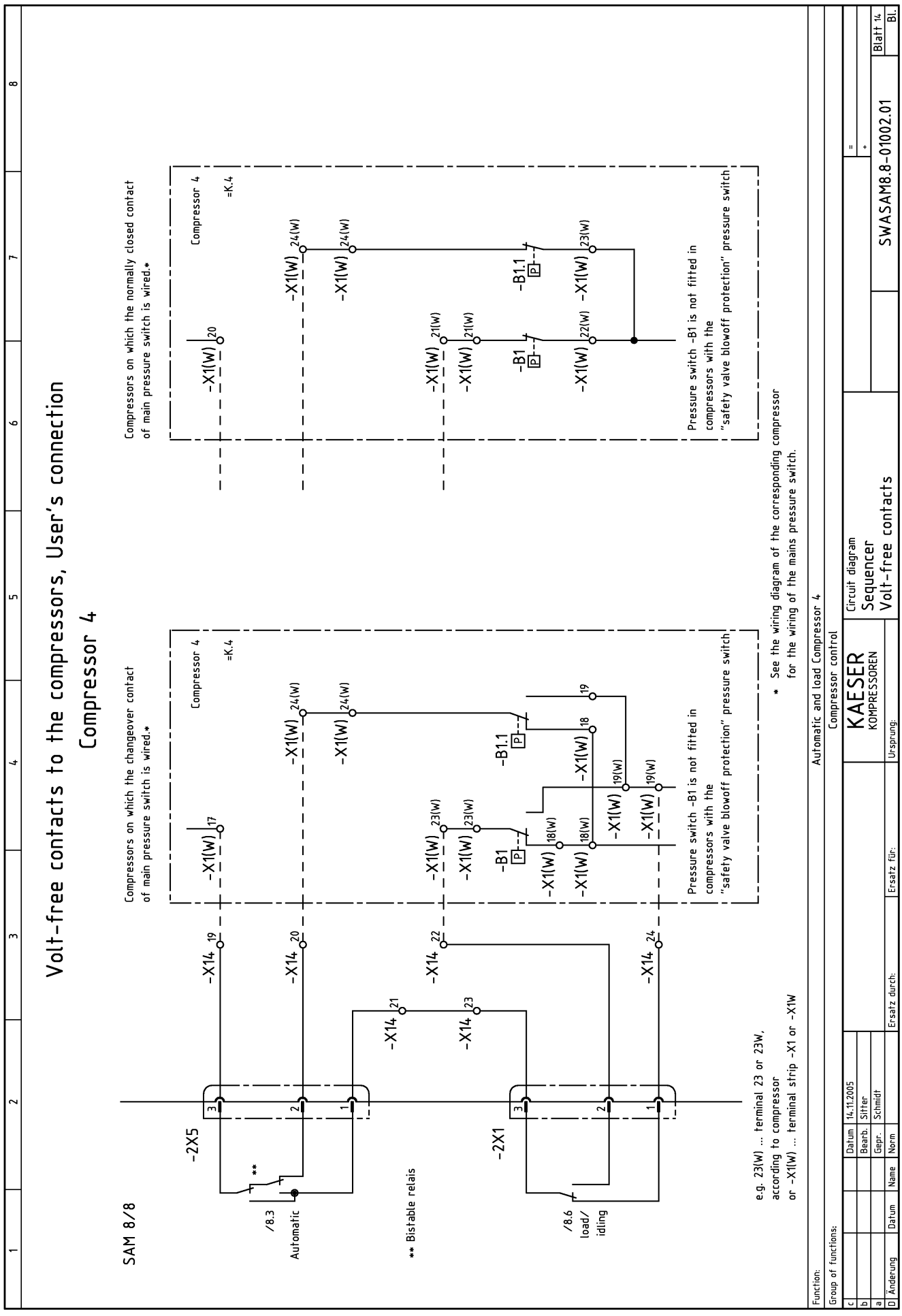

Sequencer SAM
104 module 2
-A1
/8.8 A17
-4X0
-W1X3
/3.7
DO 12.0 Compressor 8 load
DO 12.1 Compressor 5 Automatic
DO 12.2 Compressor 6 Automatic
DO 12.3 Compressor 7 Automatic
DO 12.4 Compressor 8 Automatic
DO 12.5 Compressor 5 load
DO 12.6 Compressor 6 load
DO 12.7 Compressor 7 load
DO 12.4
DO 12.3
DO 12.2
DO 12.1
DO 12.0
DO 12.7
DO 12.6
DO 12.5
-4X5
-4X4
-4X3
-4X2
-4X1
-4X8
-4X7
-4X6
-L41
-W4X1
-X15A1
12-pole
-X15
-X15B1
12-pole
-X15
-X10
-X10
-X10
-X10
1L+
1M
11M
11L+
/5.8
/5.8
/8.3
/8.3
changeover manual/automatic
changeover load idling
Compressor control 5-8
Function:
Group of functions:
Circuit diagram
Sequencer
outputs DO 12.0 - 12.7
SWASAM8.8-01002.01
KAESER KOMPRESSOREN
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:
Blatt 9
Bl.

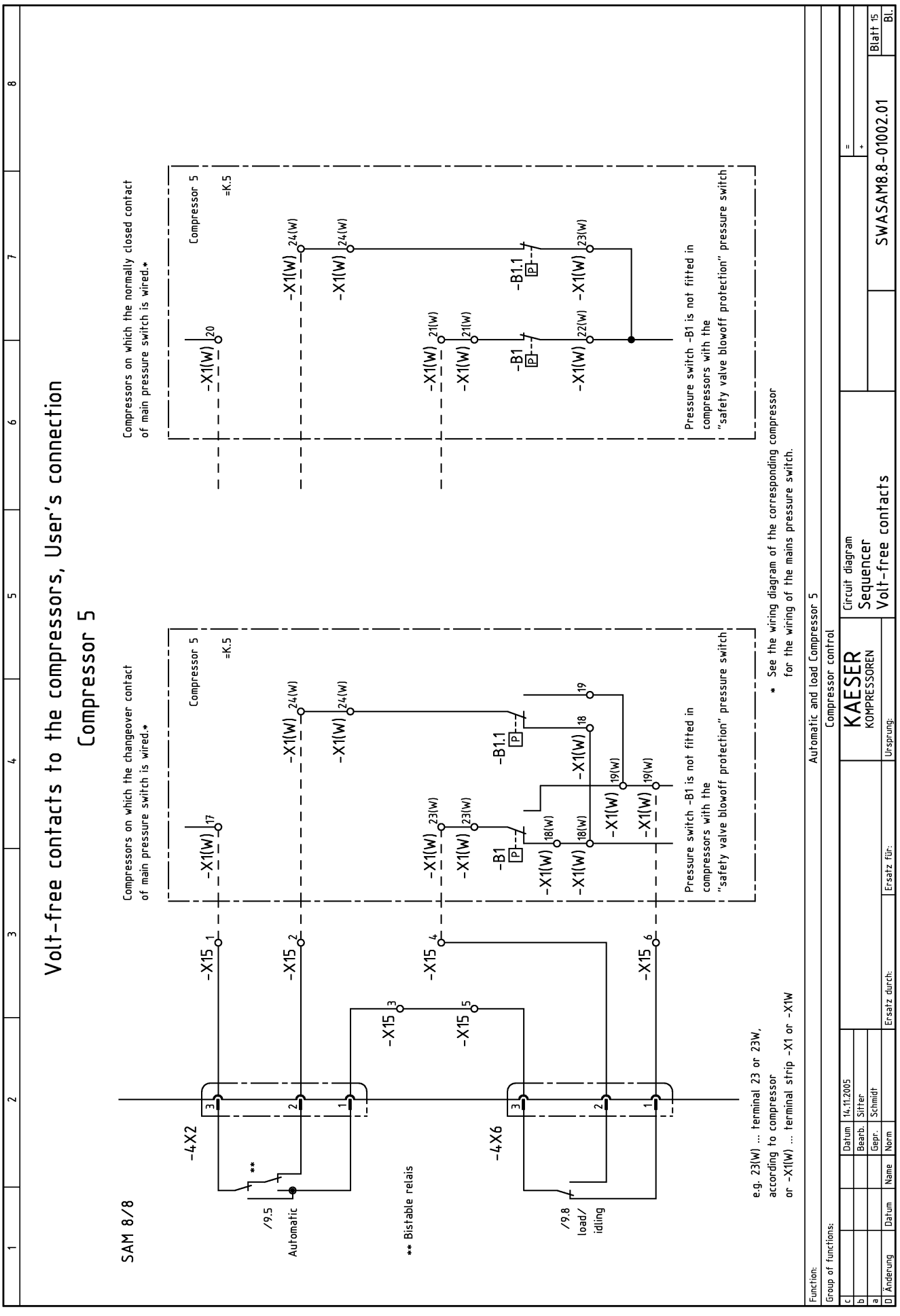

Volt-free contacts
to control room
DO 0.0: Group alarm
-OK0 /3.3
11
12
14
OK0.11
OK0.14
OK0.12
-X14
DO 0.1: controller in operation
-OK1 /3.3
OK1.11
OK1.14
OK1.12
DO 0.2: Group maintenance/group warning
-OK2 /3.4
OK2.11
OK2.14
OK2.12
DO 0.3: ALARM external
-OK3 /3.4
OK3.11
OK3.14
OK3.12
DO 0.4: Maintenance/warning external
-OK4 /3.5
OK4.11
OK4.14
OK4.12
DO 0.5: ALARM Compressors
-OK5 /3.6
OK5.11
OK5.14
OK5.12
DO 0.6: Maintenance/warning Compressors
-OK6 /3.6
OK6.11
OK6.14
OK6.12
DO 0.7: Air main pressure low
-OK7 /3.7
OK7.11
OK7.14
OK7.12
Function:
Group of functions:
Volt-free contacts
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Datum 14.11.2005
Bearb. Sifter
Gepr. Schmidt
Norm
Name
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:
Blatt 10

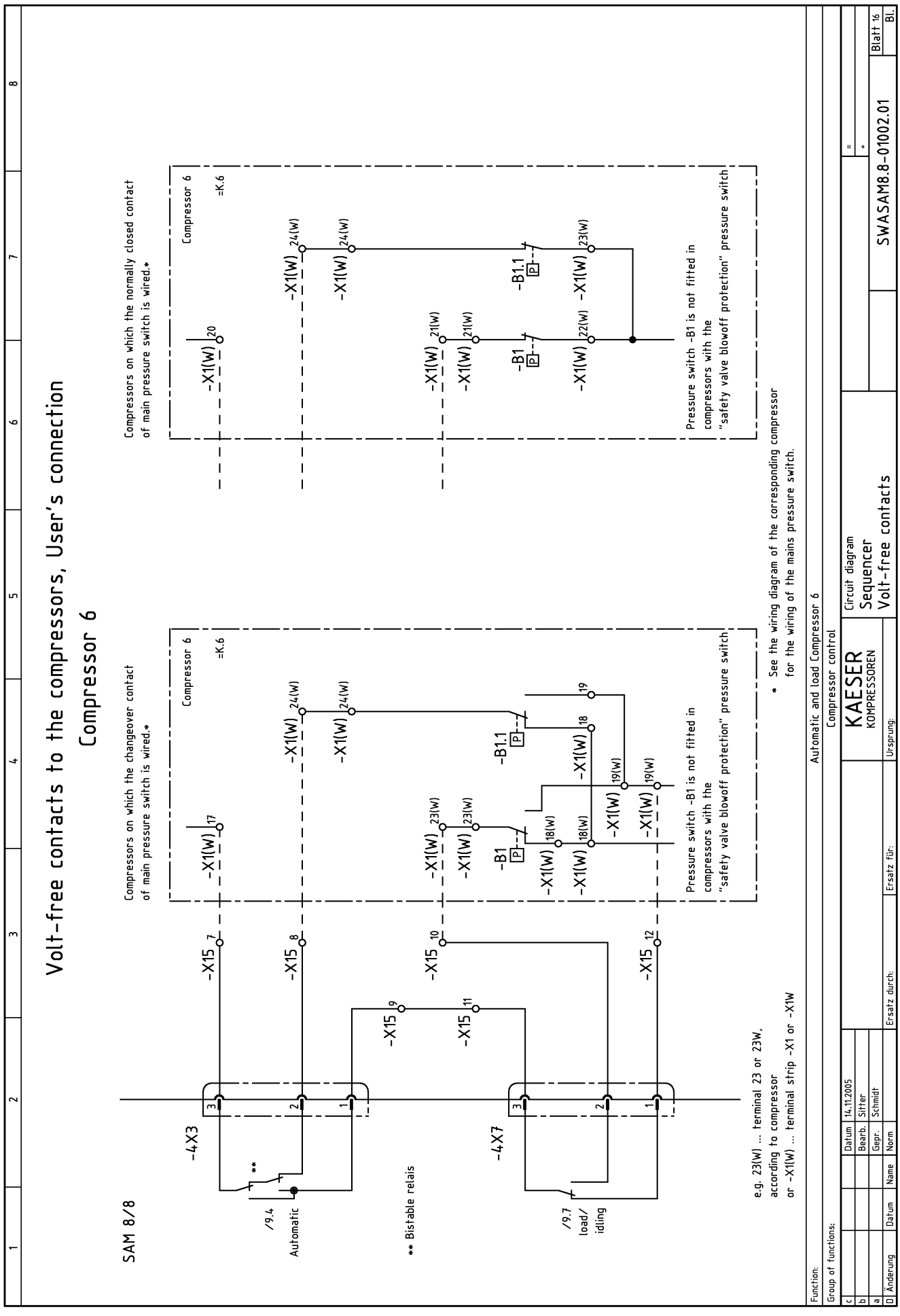

Volt-free contacts to the compressors, User's connection
Compressor 1
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 1
=K.1
-X1(W) 17
-X1(W) 20
-X1(W) 24(W)
-X1(W) 23(W)
-X1(W) 21(W)
-X1(W) 18(W)
-X1(W) 19(W)
-X1(W) 22(W)
-B1
-B1.1
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
-X14 1
-X14 2
-X14 3
-X14 4
-X14 5
-X14 6
-2X2
-2X6
/8.5
Automatic
/8.8
load/
idling
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W,
according to compressor
or -X1(W) ... terminal strip -X1 or -X1W
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
Function:
Automatic and load Compressor 1
Group of functions:
Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 11
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Name

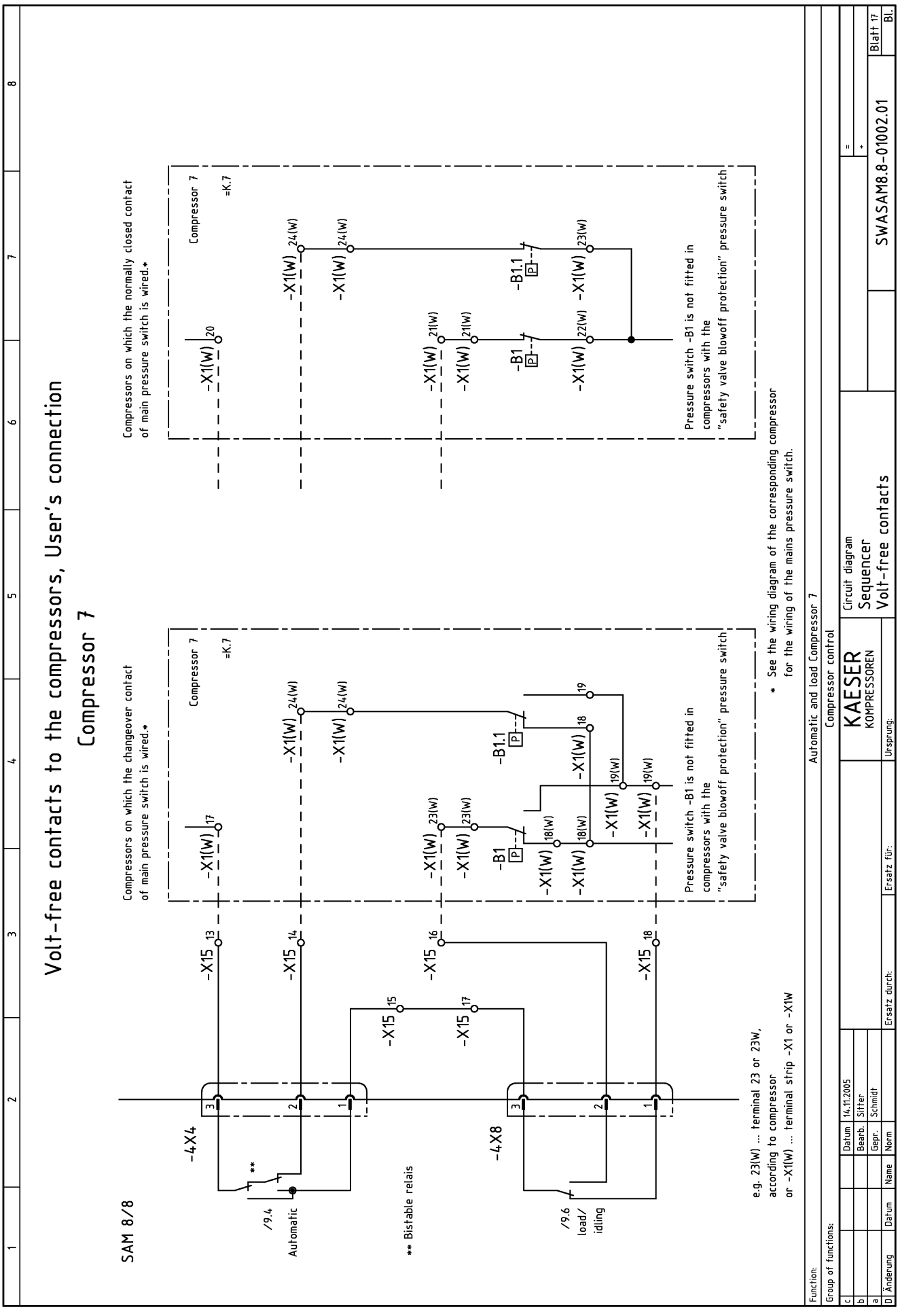

Volt-free contacts to the compressors, User's connection
Compressor 2
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 2
=K.2
-X1(W) 17
-X1(W) 20
-X14 7
-X14 8
-X14 9
-X14 10
-X14 11
-X14 12
-2X3
-2X7
-B1
-B1.1
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
/8.4 Automatic
/8.7 load/ idling
** Bistable relais
** See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
e.g. 23(W) ... terminal 23 or 23W, according to compressor or -X1(W) ... terminal strip -X1 or -X1W
Function: Automatic and load Compressor 2
Group of functions: Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 12
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Name Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

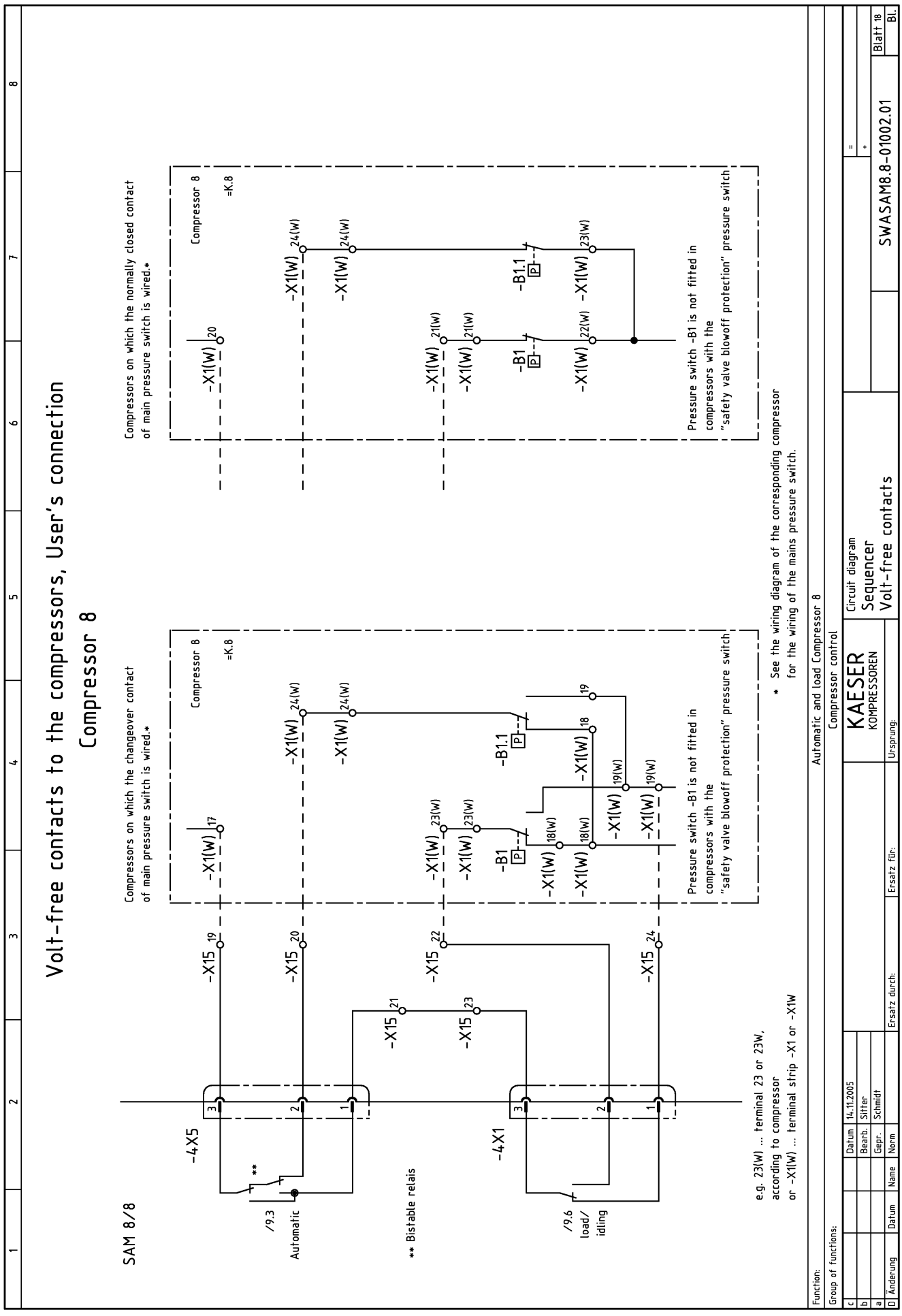

Volt-free contacts to the compressors, User's connection
Compressor 3
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressor 3
=K.3
-X1(W) 17
-X1(W) 24(W)
-X1(W) 24(W)
-X1(W) 23(W)
-X1(W) 23(W)
-B1 P
-B1.1 P
-X1(W) 18(W)
-X1(W) 18(W)
-X1(W) 19
-X1(W) 18
-X1(W) 19(W)
-X1(W) 19(W)
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 3
=K.3
-X1(W) 20
-X1(W) 24(W)
-X1(W) 24(W)
-X1(W) 21(W)
-X1(W) 21(W)
-B1 P
-B1.1 P
-X1(W) 22(W)
-X1(W) 23(W)
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
-X14 13
-X14 14
-X14 16
-X14 18
-X14 15
-X14 17
-2X4
-2X8
**
/8.4
Automatic
/8.6
load/
idling
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W,
according to compressor
or -X1(W) ... terminal strip -X1 or -X1W
Function:
Automatic and load Compressor 3
Group of functions:
Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 13
Bl.
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Name


Volt-free contacts to the compressors, User's connection
Compressor 4
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 4
=K.4
-X1(W) 17
-X1(W) 20
-X14 19
-X14 20
-X14 21
-X14 22
-X14 23
-X14 24
-X1(W) 24(W)
-X1(W) 23(W)
-X1(W) 21(W)
-X1(W) 22(W)
-X1(W) 18(W)
-X1(W) 19(W)
-B1
-B1.1
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
-2X5
-2X1
/8.3 Automatic
/8.6 load/ idling
** Bistable relais
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
e.g. 23(W) ... terminal 23 or 23W, according to compressor
or -X1(W) ... terminal strip -X1 or -X1W
Function: Automatic and load Compressor 4
Group of functions: Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 14
Datum 14.11.2005
Bearb. Sifter
Gepr. Schmidt
Name Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:


Volt-free contacts to the compressors, User's connection
Compressor 5
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 5
=K.5
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W, according to compressor or -X1(W) ... terminal strip -X1 or -X1W
-4X2
-4X6
-X15
-X1(W)
-B1
-B1.1
/9.5 Automatic
/9.8 load/ idling
Automatic and load Compressor 5
Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 15
Function:
Group of functions:
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Name
Datum


Volt-free contacts to the compressors, User's connection
Compressor 6
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 6
=K.6
-X1(W) 17
-X1(W) 20
-X1(W) 24(W)
-X1(W) 23(W)
-X1(W) 21(W)
-X1(W) 22(W)
-X1(W) 18(W)
-X1(W) 19(W)
-B1
-B1.1
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
-X15 7
-X15 8
-X15 9
-X15 10
-X15 11
-X15 12
-4X3
-4X7
/9.4 Automatic
/9.7 load/ idling
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W, according to compressor or -X1(W) ... terminal strip -X1 or -X1W
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
Function: Automatic and load Compressor 6
Group of functions: Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 16
Änderung Datum Name Norm Ersatz durch: Ersatz für: Ursprung:
14.11.2005 Sifter Schmidt


Volt-free contacts to the compressors, User's connection
Compressor 7
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressor 7
=K.7
-X1(W) 17
-X1(W) 24(W)
-X1(W) 24(W)
-X1(W) 23(W)
-X1(W) 23(W)
-B1 P
-B1.1 P
-X1(W) 18(W)
-X1(W) 18(W)
-X1(W) 19
-X1(W) 19(W)
-X1(W) 19(W)
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
Compressors on which the normally closed contact of main pressure switch is wired.*
Compressor 7
=K.7
-X1(W) 20
-X1(W) 24(W)
-X1(W) 24(W)
-X1(W) 21(W)
-X1(W) 21(W)
-B1 P
-B1.1 P
-X1(W) 22(W)
-X1(W) 23(W)
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
-X15 13
-X15 14
-X15 16
-X15 18
-X15 15
-X15 17
-4X4
-4X8
**
/9.4
Automatic
/9.6
load/
idling
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W,
according to compressor
or -X1(W) ... terminal strip -X1 or -X1W
Function:
Automatic and load Compressor 7
Group of functions:
Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 17
Bl.
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Ersatz durch:
Ersatz für:
Ursprung:
Norm
Name
Datum
Änderung


Volt-free contacts to the compressors, User's connection
Compressor 8
SAM 8/8
Compressors on which the changeover contact of main pressure switch is wired.*
Compressor 8
=K.8
-X1(W) 17
-X1(W) 24(W)
-X1(W) 23(W)
-B1
-B1.1
-X1(W) 18(W)
-X1(W) 19(W)
Pressure switch -B1 is not fitted in compressors with the "safety valve blowoff protection" pressure switch
Compressors on which the normally closed contact of main pressure switch is wired.*
-X1(W) 20
-X1(W) 21(W)
-X1(W) 22(W)
-X1(W) 23(W)
* See the wiring diagram of the corresponding compressor for the wiring of the mains pressure switch.
-X15 19
-X15 20
-X15 21
-X15 22
-X15 23
-X15 24
-4X5
-4X1
/9.3 Automatic
/9.6 load/ idling
** Bistable relais
e.g. 23(W) ... terminal 23 or 23W, according to compressor
or -X1(W) ... terminal strip -X1 or -X1W
Function: Automatic and load Compressor 8
Group of functions: Compressor control
KAESER KOMPRESSOREN
Circuit diagram
Sequencer
Volt-free contacts
SWASAM8.8-01002.01
Blatt 18
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Name Norm
Datum
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

1	2	3	4	5	6	7	8

-A1	Sigma Air Manager SAM 8	-X0	Terminal strip, Power supply
-B10	Pressure transducer	-X10	Terminal strip, Power supply unit 24V DC
-F1	fusing Power supply	-X11	Terminal strip, inputs
-G1	Power unit	-X13	Terminal strip, analog signals
-OK0...-OK7	Auxiliary relay Volt-free contacts	-X14,-X15	Terminal strip, Volt-free contacts
-L11,-L13,-L21,-L41	Ferrit bead		

Function:

Group of functions:

c				Datum	14.11.2005		KAESER KOMPRESSOREN	Electrical equipment identification	=	
b				Bearb.	Sitter			Sequencer	+	
a				Gepr.	Schmidt					
D	Änderung	Datum	Name	Norm		Ersatz durch: / Ersatz für:	Ursprung:		SWASAM8.8-01002.01	Blatt 19 / Bl.

1	2	3	4	5	6	7	8

A Stück-zahl Qty.	B Benennung und Verwendung Description and function	C Fabrikatsbezeichnung Typ; notwendige techn. Daten (z.B. Steuerspannung, Frequenz, Einstellbereich); Bestell-Nr.; Hersteller / Identification data Type; basic technical data (e.g. control voltage, frequency, adjustable range); order No.; manufacturer				D Lfd. Nr. Item	E Betriebsmittel-Kennz. nach DIN 40719, Teil 2 / Identifying symbol of device	F Stromlaufplan Planabschnitt / Circuit diagram sheet No.; section No.	G Einbauort / Location	Concerns only the manufacturer Wst.-Nr. H Schabl. Nr.	I BZ-Pos.	J VA Kz. *)	K Eingangs-vermerk
1	Control cabinet	AE1057.600	500x700x250mm	7.6525.00010	Rittal								
1	Electrical diagram case		234x255mm	7.1100.1	Rittal								
1	Sequencer	SAM 8/8	24 VDC	7.7702.0	Siemens		-A1						
1	Operating panel	SAM 8+16	629x360x16mm	5.3236.0	Kaeser								
1	Cut-out	S261-B6	6 A	7.6298.0	ABB		-F1						
1	Power supply	Logo-Power 2,5	24V - 2,5A	7.7030.1	Siemens		-G1						
1	Cable set Connecting cable SAM 8/8			7.7780.0	KAESER		-W1X1,-W1X2,-W1X3,						
							-W2X1,-W4X1						
8	Coupling relay	UC 24V FLARE	24V=/250V~ 6A	7.3149.00660	Wieland		-OK0...-OK7						
2	Ferrit bead		18,6x10,2x28,5mm	7.4890.00030			-L11,-L13						
2	Ferrit bead		28,6x18,0x28,5mm	7.4890.00040			-L21,-L41						
1	Terminal strip SAM 8/8			7.7793.0	KAESER		-X0						
1	Terminal strip SAM 8/8			7.7794.0	KAESER		-X13						
1	Terminal strip SAM 8/8			7.7795.0	KAESER		-X14,-X15						
1	Terminal strip SAM 8/8			7.7796.0	KAESER		-X10,-X11						
	outside the control cabinet, s.b.c.												
1*	Pressure transducer	*	4-20mA	*	*		-B10						
	* Alternative, according to compressor pressure range,												
	exact details are contained in the service manual												

Bei Nachbestellung von Geräten und Maschinen sind alle in den stark umrandeten Spalten B und C angegebenen Daten aufzuführen. Die Daten in den Spalten D bis G sind zusätzlich unter Nennung dieser Gerätestücklisten-Nummer anzugeben, soweit sie die Beantwortung technischer Rückfragen erleichtern. Für Ersatzteilbestellung ist zusätzlich die Angabe der Serialnummer erforderlich, falls diese auf dem Typenschild des Erzeugnisses genannt ist.

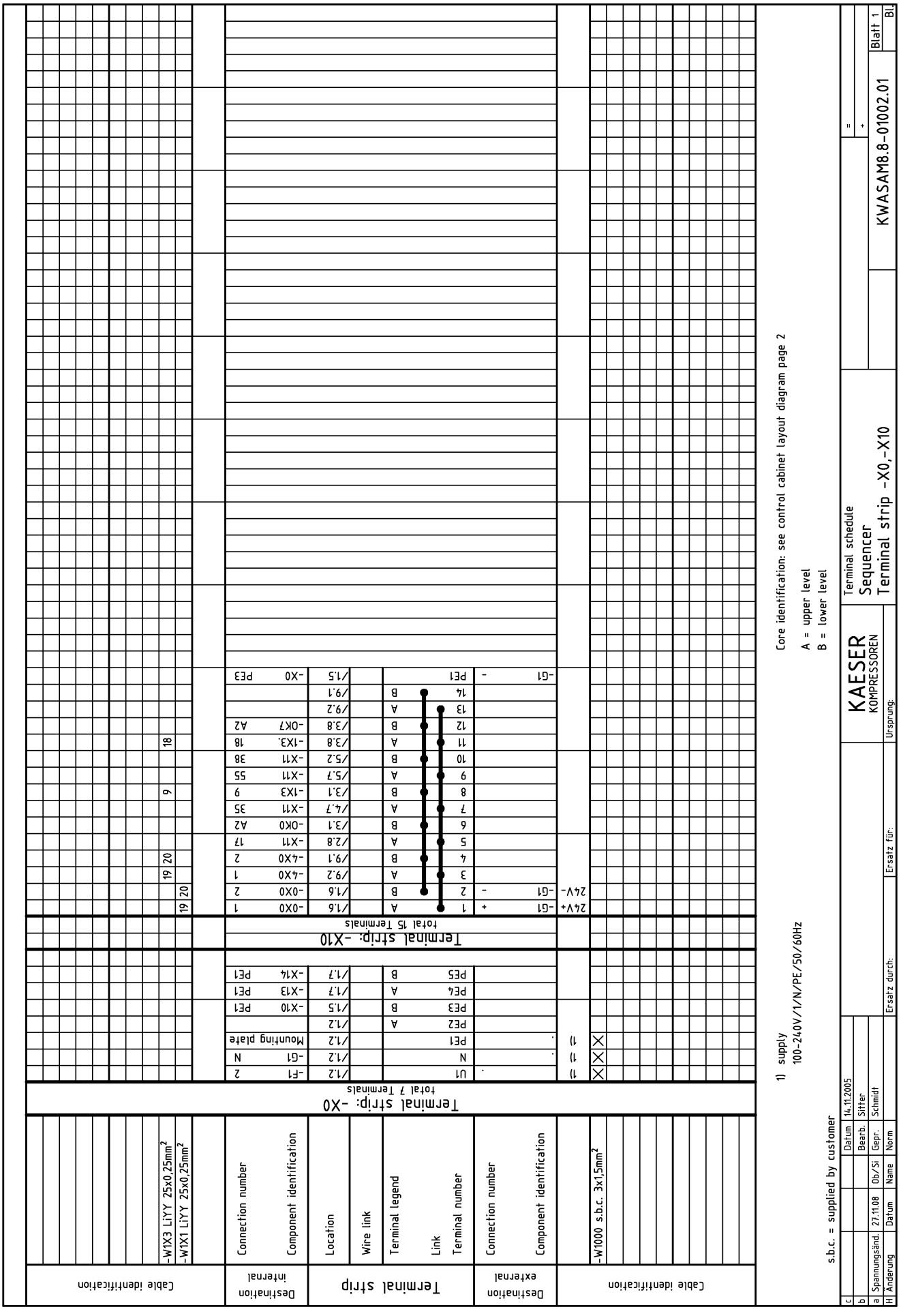
In Zweifelsfällen gilt die deutsche Fassung.

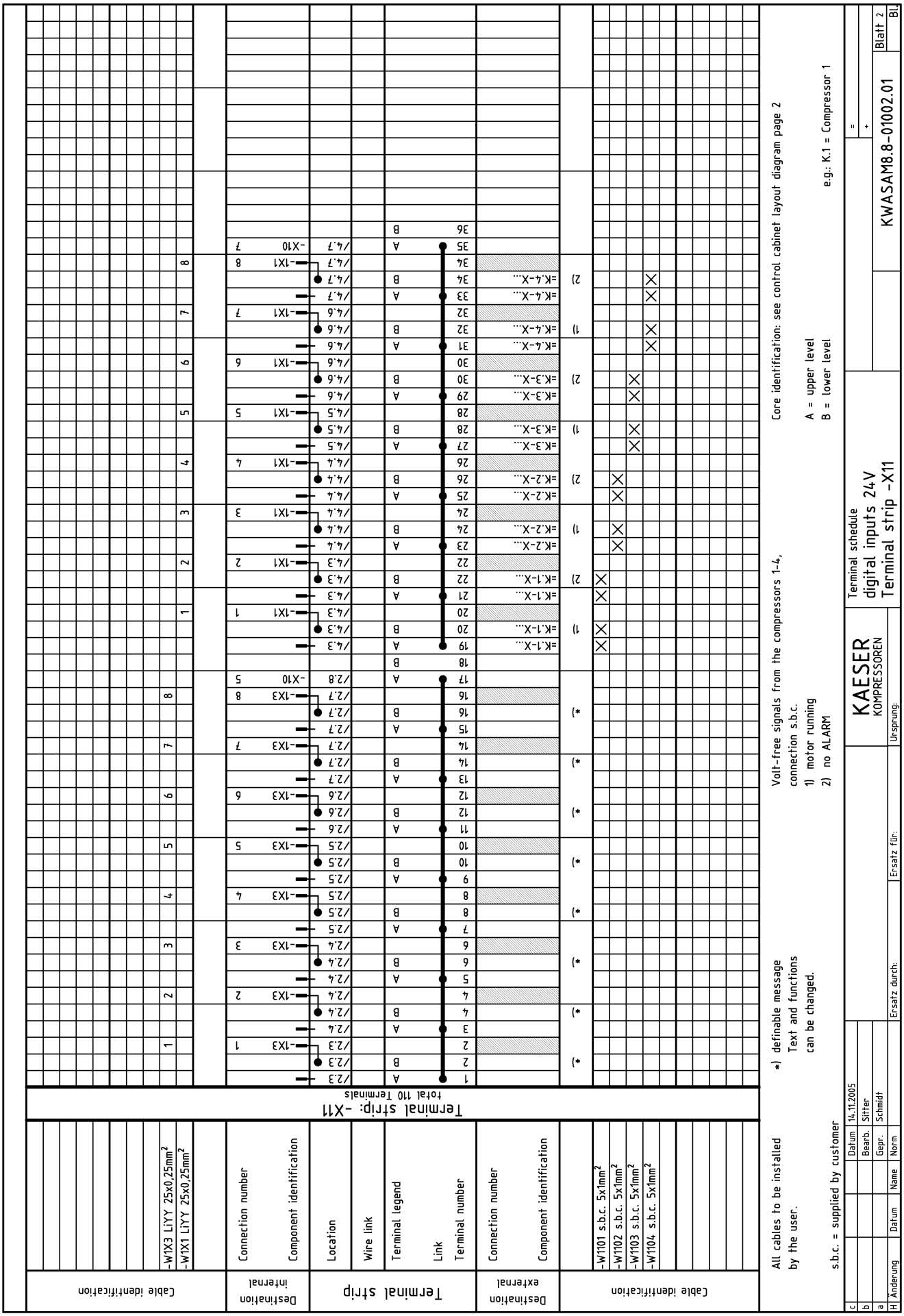
When reordering the equipment, all data enclosed by the heavy lines of columns B and C should be stated. In addition, the data in columns D to G should be given together with the No. of this list of equipment, insofar as they ar helpful in answering technical enquiries. When ordering spare parts, also quote the serial No. of the product if stated on the rating plate.

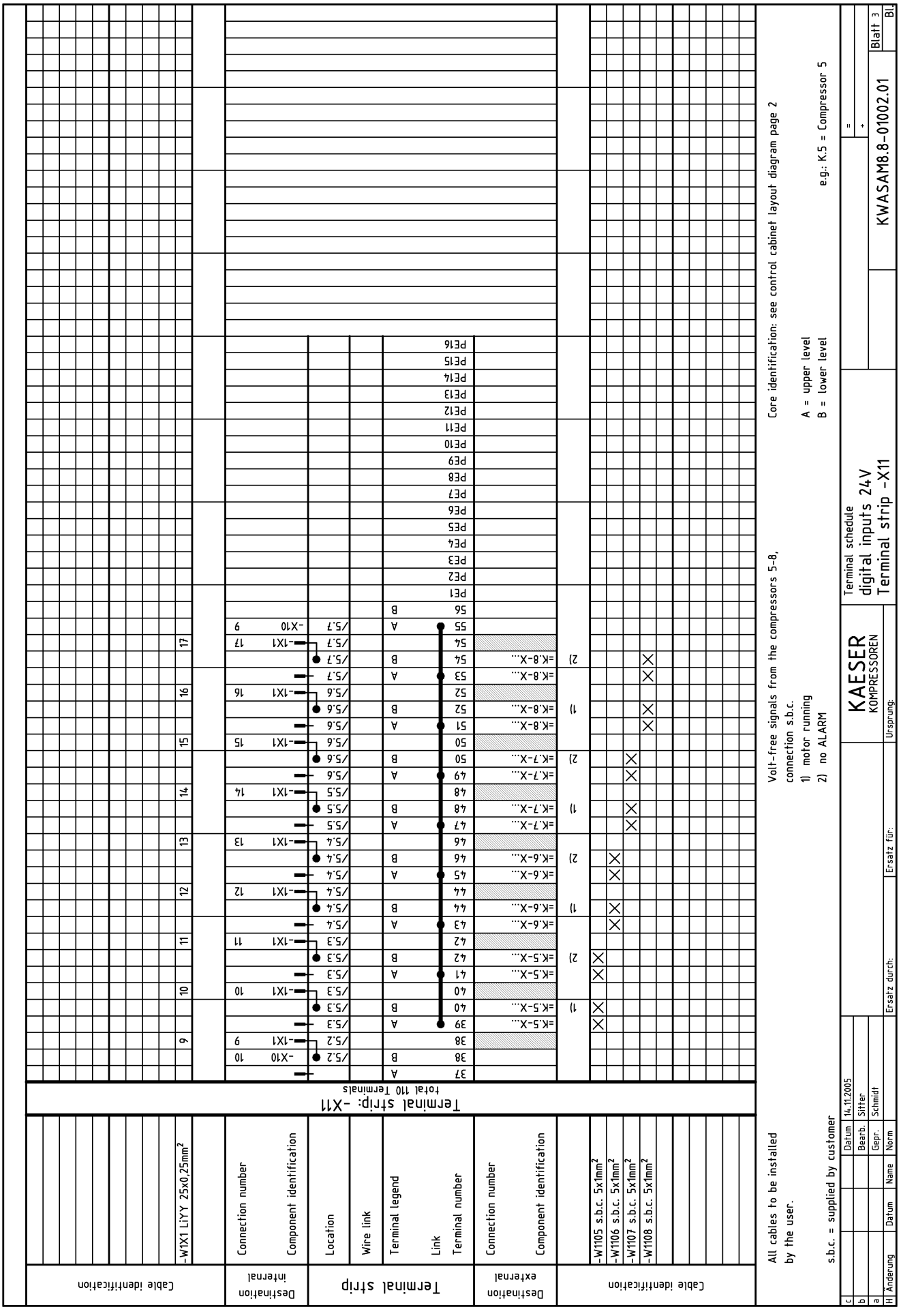
The German version applies in cases of doubt.

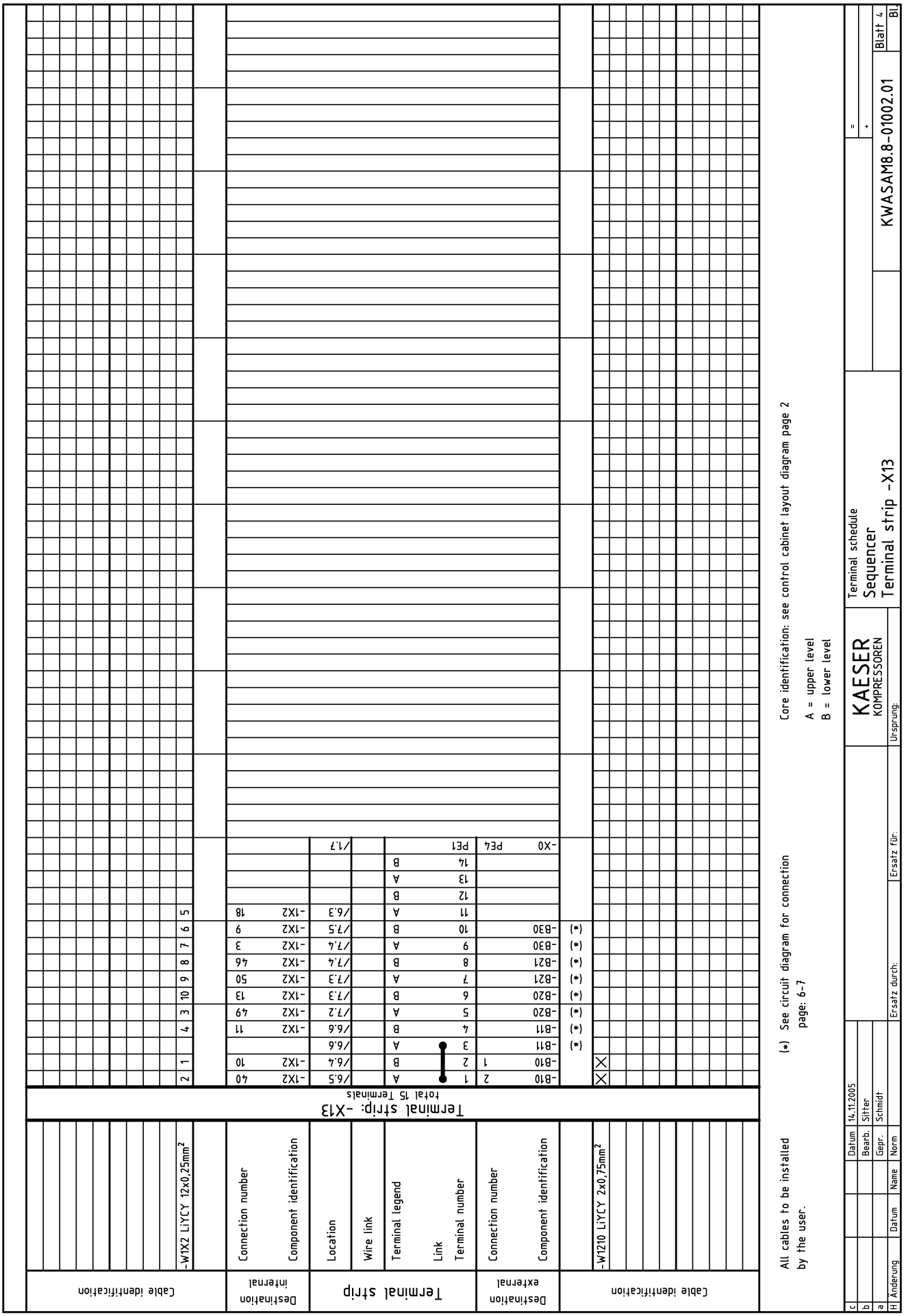
*) Versandanschrift – Kennzeichen

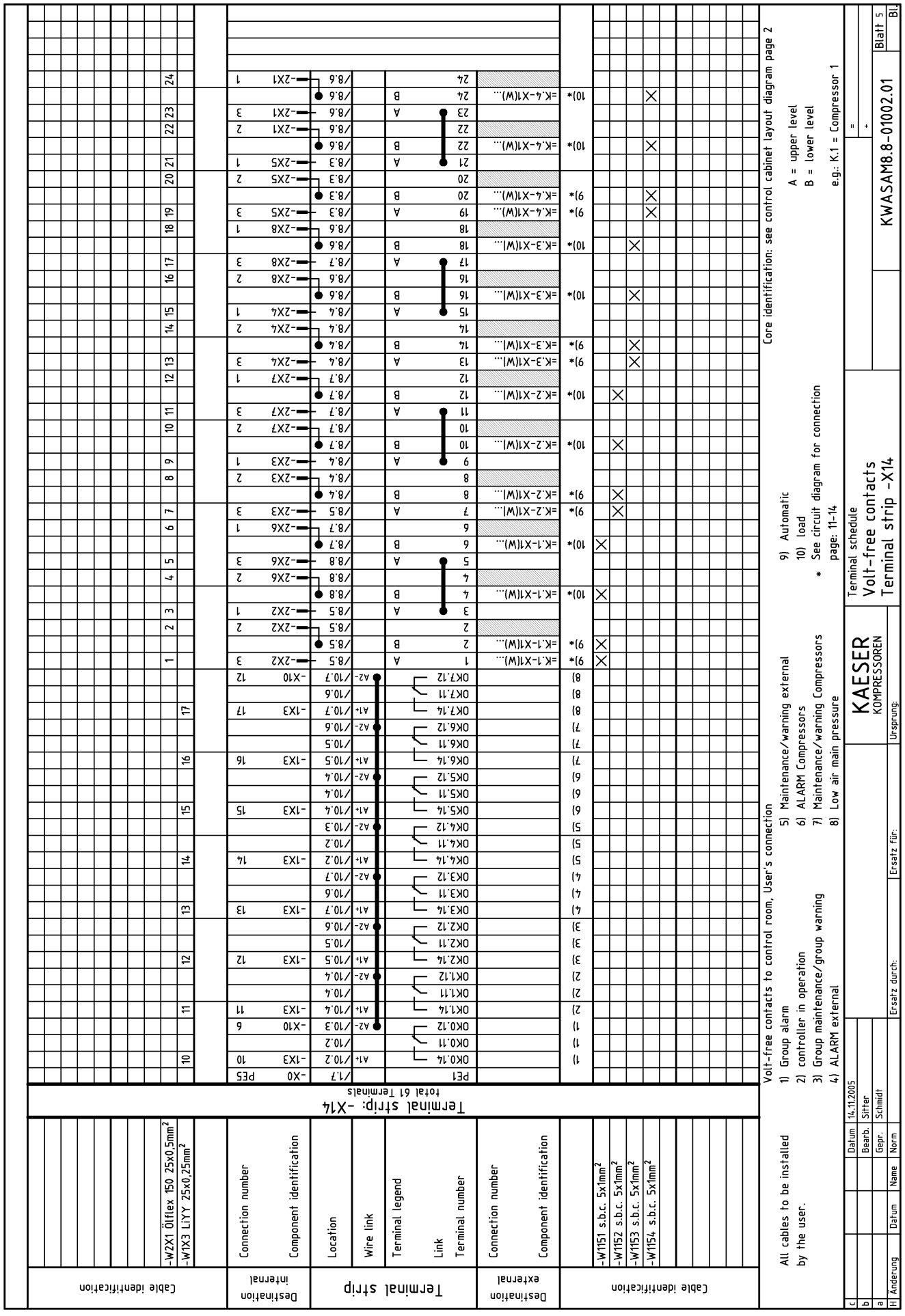
c				Datum	14.11.2005		KAESER KOMPRESSOREN	Equipment parts list Sequencer Control cabinet	=	
b				Bearb.	Sitter				+	
a				Gepr.	Schmidt					Blatt 1
F	Änderung	Datum	Name	Norm		Ersatz durch:	Ersatz für:	Ursprung:	GWASAM8.8-01002.01	Bl.

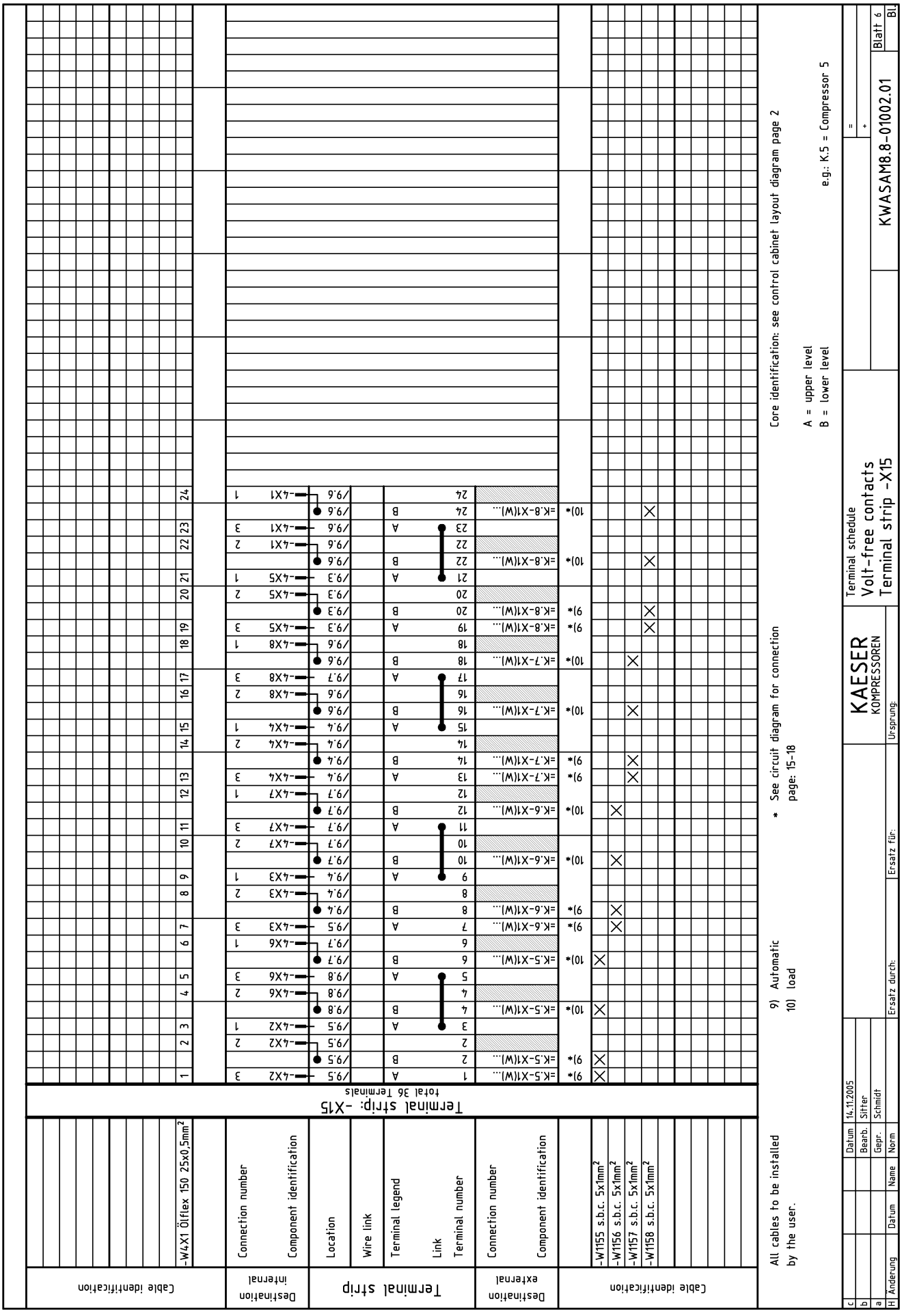

Terminal strip: -X0
total 7 Terminals
Terminal strip: -X10
total 15 Terminals
Cable identification
Destination internal
Terminal strip
Destination external
Cable identification
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
-W1X3 LiYY 25x0,25mm²
-W1X1 LiYY 25x0,25mm²
-W1000 s.b.c. 3x1,5mm²
Mounting plate
24V+
24V-
1) supply
100-240V/1/N/PE/50/60Hz
s.b.c. = supplied by customer
Core identification: see control cabinet layout diagram page 2
A = upper level
B = lower level
KAESER KOMPRESSOREN
Terminal schedule
Sequencer
Terminal strip -X0,-X10
KWASAM8.8-01002.01
Blatt 1
Datum 14.11.2005
Beartb. Sitter
Gepr. Schmidt
Ob/Si
Name
Norm
Spannungsänd. 27.11.08
Änderung
Ersatz durch:
Ersatz für:
Ursprung:

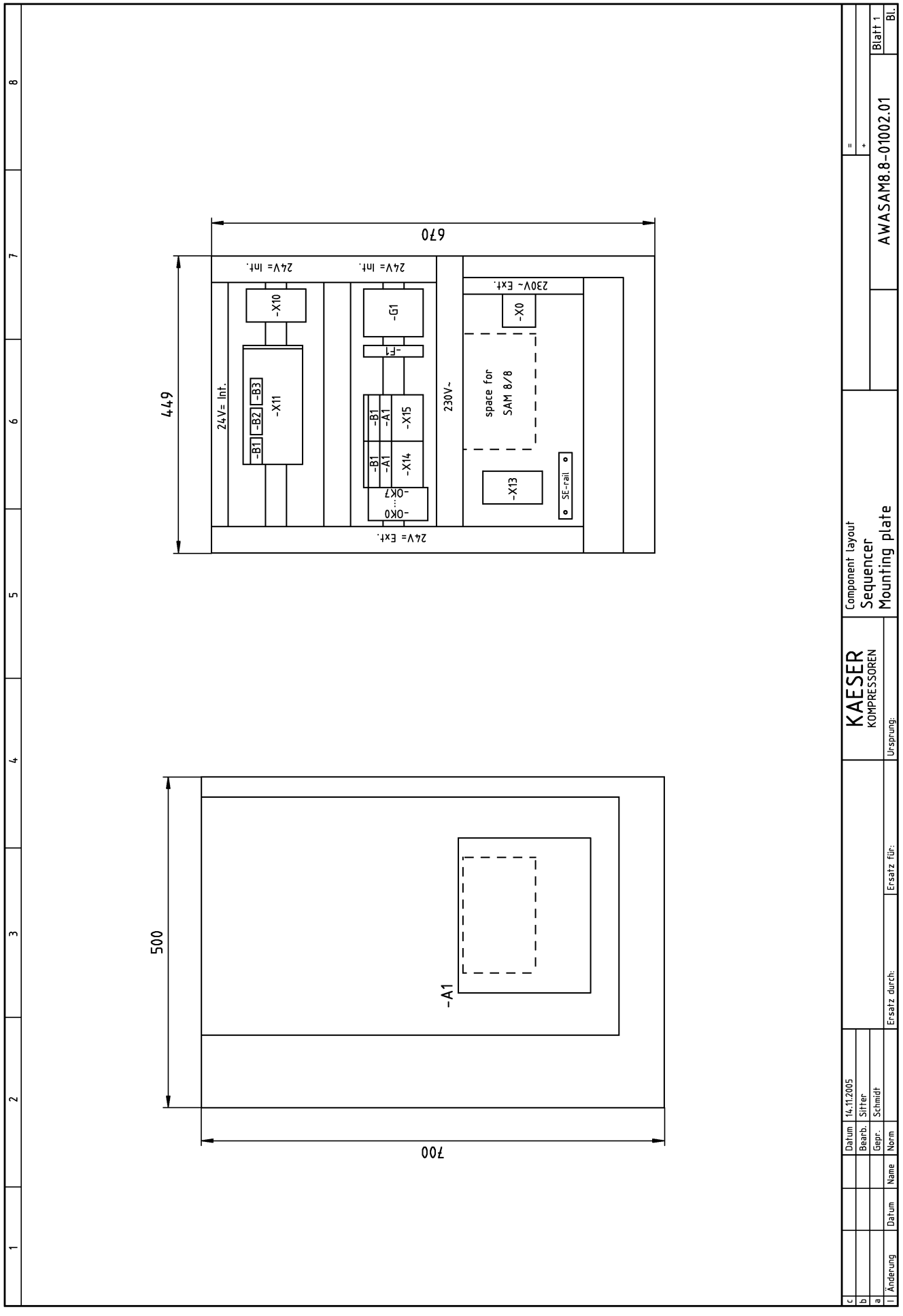

Terminal strip: -X11
total 110 Terminals
Cable identification
Destination external
Terminal strip
Destination internal
Cable identification
-W1X3 LiYY 25x0,25mm²
-W1X1 LiYY 25x0,25mm²
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
-W1101 s.b.c. 5x1mm²
-W1102 s.b.c. 5x1mm²
-W1103 s.b.c. 5x1mm²
-W1104 s.b.c. 5x1mm²
Core identification: see control cabinet layout diagram page 2
A = upper level
B = lower level
e.g.: K.1 = Compressor 1
Volt-free signals from the compressors 1-4, connection s.b.c.
1) motor running
2) no ALARM
*) definable message Text and functions can be changed.
All cables to be installed by the user.
s.b.c. = supplied by customer
KAESER KOMPRESSOREN
Terminal schedule
digital inputs 24V
Terminal strip -X11
KWASAM8.8-01002.01
Blatt 2
Änderung
Datum
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:
14.11.2005
Sifter
Schmidt


Terminal strip: -X11
total 110 Terminals
Cable identification
Destination internal
Terminal strip
Destination external
Cable identification
-W1X1 LiYY 25x0,25mm²
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
-W1105 s.b.c. 5x1mm²
-W1106 s.b.c. 5x1mm²
-W1107 s.b.c. 5x1mm²
-W1108 s.b.c. 5x1mm²
All cables to be installed by the user.
s.b.c. = supplied by customer
Volt-free signals from the compressors 5-8, connection s.b.c.
1) motor running
2) no ALARM
Core identification: see control cabinet layout diagram page 2
A = upper level
B = lower level
e.g.: K.5 = Compressor 5
KAESER KOMPRESSOREN
Terminal schedule
digital inputs 24V
Terminal strip -X11
KWASAM8.8-01002.01
Blatt 3
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Ersatz durch:
Ersatz für:
Ursprung:
Norm
Name
Datum
Änderung


Terminal strip: -X13
total 15 Terminals
Cable identification
Destination external
Terminal strip
Destination internal
Cable identification
-W1210 LiYCY 2x0,75mm²
-W1X2 LiYCY 12x0,25mm²
Component identification
Connection number
Terminal legend
Terminal number
Link
Location
Wire link
-X0 PE4 PE1
-B10 -B11 -B20 -B21 -B30
(*) See circuit diagram for connection page: 6-7
Core identification: see control cabinet layout diagram page 2
A = upper level
B = lower level
All cables to be installed by the user.
KAESER KOMPRESSOREN
Terminal schedule
Sequencer
Terminal strip -X13
KWASAM8.8-01002.01
Blatt 4
Datum 14.11.2005
Bearb. Sitter
Gepr. Schmidt
Ersatz durch:
Ersatz für:
Ursprung:
Name
Norm
Änderung


Terminal strip: -X14
total 61 Terminals
Terminal strip
Destination external
Cable identification
Destination internal
Terminal strip
Destination external
Cable identification
-W2X1 Ölflex 150 25x0,5mm²
-W1X3 LiYY 25x0,25mm²
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
Connection number
Component identification
-W1151 s.b.c. 5x1mm²
-W1152 s.b.c. 5x1mm²
-W1153 s.b.c. 5x1mm²
-W1154 s.b.c. 5x1mm²
Core identification: see control cabinet layout diagram page 2
Volt-free contacts to control room, User's connection
1) Group alarm
2) controller in operation
3) Group maintenance/group warning
4) ALARM external
5) Maintenance/warning external
6) ALARM Compressors
7) Maintenance/warning Compressors
8) Low air main pressure
9) Automatic
10) load
* See circuit diagram for connection page: 11-14
A = upper level
B = lower level
e.g.: K.1 = Compressor 1
All cables to be installed by the user.
KAESER KOMPRESSOREN
Terminal schedule
Volt-free contacts
Terminal strip -X14
KWASAM8.8-01002.01
Blatt 5
Datum 14.11.2005
Beartb. Sitter
Gepr. Schmidt
Name
Norm
Ersatz durch:
Ersatz für:
Ursprung:
Änderung
Datum
Name


Terminal strip: -X15
total 36 Terminals
Cable identification
Destination external
Terminal strip
Destination internal
Cable identification
-W4X1 Ölflex 150 25x0,5mm²
Connection number
Component identification
Location
Wire link
Terminal legend
Link
Terminal number
Connection number
Component identification
-W1155 s.b.c. 5x1mm²
-W1156 s.b.c. 5x1mm²
-W1157 s.b.c. 5x1mm²
-W1158 s.b.c. 5x1mm²
All cables to be installed by the user.
9) Automatic
10) load
* See circuit diagram for connection page: 15-18
Core identification: see control cabinet layout diagram page 2
A = upper level
B = lower level
e.g.: K.5 = Compressor 5
KAESER KOMPRESSOREN
Terminal schedule
Volt-free contacts
Terminal strip -X15
KWASAM8.8-01002.01
Blatt 6
Änderung
Datum
Name
Norm
Gepr.
Schmidt
Bearb.
Sitter
14.11.2005
Ersatz durch:
Ersatz für:
Ursprung:


670
449
24V= Int.
24V= Int.
24V= Int.
-X10
-X11
-B1
-B2
-B3
-G1
-F1
-B1
-A1
-X15
-B1
-A1
-X14
-OK0
-OK7
230V~
space for
SAM 8/8
-X0
-X13
SE-rail
24V= Ext.
230V~ Ext.
500
700
-A1
KAESER
KOMPRESSOREN
Component layout
Sequencer
Mounting plate
AWASAM8.8-01002.01
Blatt 1
Bl.
Datum
Name
Änderung
Datum
14.11.2005
Sitter
Schmidt
Norm
Ersatz durch:
Ersatz für:
Ursprung:

13.13 Menu option Settings – Overview

Menu option Settings «F1» to «F4»

Navigation (menu)	Symbol	Sub-menu options	Chapter
«F1»: Settings		«F1»: System	7.2
		«F2»: Control	7.4
		«F3»: Compressor	7.3
		«F4»: Compressed air system	7.5
		«F5»: Shift clock	7.6
		«F6»: Periphery	7.7
«F2»: Messages function key		«F1»: Alarm, service and warning messages	9.2
		«F2»: Operational Messages	8.2.1
		«F3»: SMS status	8.2.2
		«F4»: SAC plus status	8.2.3
		«F5»: System status	8.2.4
		«F6»: Memory access	8.2.4
«F3»: Choice of language		«F1»+«F6»: Choice of language	7.2.2
		«F3»: Notes	
«F4»: Password		«F1»: Log-off	7.2.6.1
		«F2»: Password list	7.2.6.2
		«F3»: Key lock	7.2.6.3
		«F4»: Password allocation	7.2.6.4

Tab. 104 Main menu