User Manual

SIGMA AIR MANAGEMENT SYSTEM

SIGMA AIR MANAGER 4.0 ≥ sam4.0_1.12.X

No.: 901735 10 USE

Manufacturer:

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1 Regarding this Document

1.1 Using this document

The operating manual contains important information to the entire life cycle of SIGMA AIR MANAGER 4.0.

The operating manual is a component of the product.

- ➢ Keep the manual in a safe place throughout the life of SIGMA AIR MANAGER 4.0.
- ➢ Pass the manual on to the next owner or user of the equipment.
- ➢ Ensure that any amendments received are inserted in the manual.
- ➢ The images shown are only examples. Menus or functions may be shown that are not available in the specific product or will be introduced at a later time only.

1.2 Copyright

1.3 Approvals

This product has the following approvals:

- This product is MIC approved. The approval number is: AC-14084. The radio waves used for this product may affect medical devices such as pacemakers.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
- This device complies with part 15 of the FCC rules. The operation is subject to the following two conditions:
  - This device may not cause harmful interference, and
  - this device must accept any interference received, including interference that may cause undesired operation.
- This device fulfils the provisions of the Industry Canada Licence, with the exception of the RSS rules. The operation is subject to the following two conditions:
  - This device may not cause harmful interference, and
  - this device must accept any interference received, including interference that may cause undesired operation.

In order to ensure permanent compliance with the FCC rules, unless explicitly approved by the authority responsible for compliance with the provisions, no changes must be carried out (for example: when connecting to computers or peripheral equipment use shielded cables only).

1.4 Software

The software used in SIGMA AIR MANAGER 4.0 contains copyright-protected software which is licensed by GNU General Public License in versions 2 and 3. A copy of these licenses can be found in SIGMA AIR MANAGER 4.0. Display the licenses by pointing your browser to the "COPYING" file in the root directory of SIGMA AIR MANAGER 4.0.
URL:
http://<Hostname SIGMA AIR MANAGER 4.0 >/COPYING
The licenses can also be found under this address:
http://www.gnu.org/licenses/gpl-2.0.txt
http://www.gnu.org/licenses/gpl.txt
Within three years from receipt of SIGMA AIR MANAGER 4.0, you may obtain the complete source code of the copyright-protected software packages by sending a corresponding order to the following address:

Technisches Büro Elektrokonstruktion
KAESER KOMPRESSOREN SE
96450 Coburg, Postfach 2143
Germany.

1.5 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.

1.6 Updating the operating manual

Go to our website http://www.kaeser.com/int-en/manuals/response.aspx to find the latest version of this manual. We recommend downloading the manual, for example when software updates are released, to ensure familiarity with new or upgraded functions.

When you open the *Contact* menu via KAESER CONNECT, a link to our website is displayed. See chapter 8.9.

➢ Download the desired operating manual from our server and forward it to your operators.

1.7 Symbols and labels

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

1.7.1 Warnings

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

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

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

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

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

⚠ DANGER

These show the kind of danger and its source.
The possible consequences of ignoring a warning are shown here.
If you ignore the warning notice, the "WARNING" signal word indicates a lethal or severe injury will occur.

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

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

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

1.7.2 Potential damage warnings

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

Warning notices for damages are identified by their signal term.

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

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

Example:

NOTICE

These show the kind of danger and its source.
Potential effects when ignoring the warning are indicated here.

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

➢ Carefully read and fully comply with warnings against damages.

1.7.3 Other alerts and their symbols

This symbol identifies particularly important information.

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

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

➢ This symbol denotes lists of actions comprising one stage of a task.
1. Instructions with several steps are numbered in the sequence of the operating steps.

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

This symbol identifies important information or measures concerning environmental protection.

Further information — Further topics are introduced here.

2 Technical Data

2.1 System data

➢ Enter the system data of this product in the following table.

System data	Value
Part number	
Serial number	

Tab. 3 System data

The part number and serial number is provided on the nameplate.

2.2 Electrical Data

Model	SIGMA AIR MANAGER 4.0 – 100-240 V AC	SIGMA AIR MANAGER 4.0 – 24 V DC
Power supply	Single-phase, L1/N, N grounded	–
Rated voltage [V]	100–240, 50–60 Hz	24
Rated current [A]	1.25-0.65	2.5
User fuses [A]	10/13/16	Max. 4
Power supply cable core cross-section [AWG]	3x16	
Equipotential bond connection [AWG]	1x16	
Enclosure protection	IP54 (IEC 529)	
Buffer battery		
Buffer battery [V]/[Ah]	3/0.12	
Life of buffer battery without power supply [years]	3	
Life of buffer battery with power supply [years]	10	

Tab. 4 Electrical Data

2.3 Versions and Options

SIGMA AIR MANAGER 4.0 is available in different variants and options:

- In principle, every input and output is freely assignable.
- The number of inputs and outputs can be increased using SBU (see chapter 4).
- Details on assignable and assigned inputs and outputs can be found in the circuit diagrams in the annex.

Type	SAM 4.0-4	SAM 4.0-8	SAM 4.0-16
Basic configuration			
Digital inputs (DI) for floating relay signals.	6		
Floating digital output relays (DOR) (as changeover contact, 230 V, 3 A)	5		
Analog inputs (AII) 0(4)-20 mA	4		
Free Ports: SIGMA NETWORK(Option: Ports)	1x E10: 7, 2x E10: 13, 1x E12: 4, E10 + E12: 10, 2x E12: 7		
Sequenced machines			
Maximum	4	8	16
Via SIGMA NETWORK directly to SIGMA AIR MANAGER 4.0	4 [7)]	8 [0)]	13 [2)3)]
I/O directly to SIGMA AIR MANAGER 4.0	4		
Options			
E1: PROFIBUS-Master [1)]	Complete SAM PROFIBUS network can be connected		
E9: Network Section Control	Network Section Control		
E10: RJ45 ports: SIGMA NETWORK	1x E10 7, 2x E10 13 [4)]		
E12: RJ45/FOC ports: SIGMA NETWORK	1x E12 3/1, 2x E12 5/2 [4)], E10+E12 9/1 [4)]		
E19: Single-mode FOC	Standard: Multimode, E19: Single mode		
E20: I/O block 6DI&6DOT&4AII	Available		
C41:PROFIBUS DP [5)]	PROFIBUS DP communication module		
C42: Modbus RTU [5)]	Modbus RTU communication module		
C44: Modbus TCP [5)]	Modbus TCP communication module		
C45: PROFINET IO [5)]	PROFINET IO communication module		
C50: EtherNet/IP [5)]	EtherNet/IP communication module		

[0)] With Option 2x E10 or E10 + E12

[1)] PROFIBUS master only once (SIGMA AIR MANAGER 4.0 or SBU)

[2)] With Option 2x E10: 13 ports: SIGMA NETWORK

[3)] Expandable to 16 with SBU, see chapter 4

[4)] Except for Option E1

[5)] Only one communication module possible

[7)] Except for Option 1x E12

Tab. 5 Versions and options

Enter the current technical equipment, built-in options, retrofits and other technical modifications for this device in the table in the annex (chapter 13.2).

2.4 Components within the control cabinet

2.4.1 I/O-Modules (SIGMA AIR MANAGER 4.0 and SBU)

The following technical data apply to the I/O block and the individual I/O modules used in SIGMA AIR MANAGER 4.0 and SBU:

- I/O block 6DI&6DOT&4AII
- Module 6DI – X20DI6371
- Module 6DOT – X20DO6322
- Module 4AII – X20AI4632-1

Technical data, all I/O modules

Feature	Value
Connection terminals	Push-in terminal
Connection cross-section	Copper wires
■ Wire/single-core [AWG]	■ AWG 28-14
■ Flex/fine-core [AWG]	■ AWG 24-14
■ Wire end ferrule [AWG]	■ AWG 24-16
■ Double wire-end ferrule [AWG]	■ 2x AWG 24-18
Display elements	Status LEDs

Tab. 6 Technical data, all I/O modules

Technical data, I/O-block and individual modules

Feature	Value
Bus Controller	**X20BC0087-C01**
Bus	KAESER SIGMA NETWORK
Transfer rate [MBit/s]	10/100
Characteristics	Auto crossing (Auto-MDI(X)), Auto negotiation
Connections	2 x -socket RJ45: SIGMA NETWORK, RJ45, 10/100Base-TX
Max. length of the line between SIGMA NETWORK two components [ft.]	328
Potential isolation SIGMA NETWORK I/O-module	Yes
24 V DC power supply	**X20PS9400**
Power supply [V DC], [A]	24 (-15% / +20%), max. 0.7
Potential isolation	—
■ Supply - internal bus	■ Yes
■ Supply - I/O module	■ No
Digital inputs (DI)	**Module 6DI – X20DI6371**
Input voltage [V DC]	24
Model Input current at 24 V DC [mA]	3.75
Switching threshold [V DC]	Low <5 , High >15

Digital inputs (DI)	Module 6DI – X20DI6371
Insulation voltage between channel and bus [V_{eff}]	500
Digital outputs (DOT)	**Module 6DOT – X20DO6322**
Output voltage [V DC]	24
Output current per output maximum (high voltage and short-circuit proof) [A]	0.5
Output protection	Thermal shut-down at high voltage or short-circuit, integrated protection for switching inductive loads
Insulation voltage between channel and bus [V_{eff}]	500
Analogue Inputs (AII)	**Module 4AII – X20AI4632-1**
Measuring range [mA]	0-20
Resolution [bit]	15
Connection type	Active and passive possible (2 conductor and 4 conductor technology)
Ohmic resistance (internal) [Ohm]	< 400
Input protection	Protection against supply voltage wiring
Maximum error in 77°F range from current measured value [%]	0.08
Maximum error in 77°F - offset from final value of measuring range [%]	0.02
Distribution 24 VDC	**Module 6x 24 VDC - X20PD2113**
Rated output voltage [V DC]	24
Output current, total [A]	6.0
Fusing (internal, replaceable) [A], [in.]	T6.3, 5x20mm (0.8 in.)

Tab. 7 Technical data, I/O-block and individual modules

2.4.2 Relay block

The relay block comprises of 5 relays (SIGMA AIR MANAGER 4.0) or 6 relays (SBU) with the following technical specifications:

Feature	Value	
Connection terminals	Push-in terminal	Screw terminal
Connection cross-section	Copper wires	Copper wires
■ Wire/single-core [AWG]	■ 0.14-1.5 / AWG 24-16	■ 0.5-4 / AWG 20-12
■ Braid/fine-core [AWG]	■ 0.14-1.5 / AWG 24-16	■ 0.5-2.5 / AWG 20-14
■ Wire ferrule [AWG]	■ 0.14-1.5 / AWG 24-16	■ 0.5-1.5 / AWG 20-16
■ Double wire ferrule	■ Not possible	■ 0.5-1.0
Stripping length [in]	0.31	0.28
Tightening torque	—	0.5–0.6 Nm / 4.4–5.3 lb-in
Indicator elements	Status LED	

Feature	Value
Coil voltage [V DC]	24
Output contact ■ Max. switching voltage [V AC/DC] ■ Min. switching voltage [V AC/DC] ■ Min. switching current [mA] ■ Max. continuous current [A] ■ Switching capacity IEC 60947 / DIN VDE 0660 24 V DC13 [A] 230 V AC15 [A]	1 changeover contact ■ 250 ■ 5 (at 100 mA) ■ 10 (at 12 V) ■ 6 ■ — 1 3
Inductive loads (e.g. auxiliary contactor, solenoid valve)	Connect to RC element
Rated isolation voltage [V AC]	250

Tab. 8 Relay block specifications

2.4.3 8-port RJ45 switch

Feature	Value
RJ45 ports: SIGMA NETWORK	8
Transfer rate [Mbps]	10/100
Transfer mode	Store-and-forward switching mode
Characteristics	Auto crossing (Auto-MDI(X)), Auto negotiation, Auto sensing
Connections	RJ45, 10/100Base-TX
Max. cable length between two SIGMA NETWORK components [ft]	328
Power supply [V DC]	9–48, @ 24 V DC/200 mA
Display elements	Status LEDs for voltage and each port

Tab. 9 Switch specifications

2.4.4 4-port RJ45 – 1-port FOC switch

Feature		Value
RJ45 port: SIGMA NETWORK		4
	Transfer rate [Mbps]	10/100
	Characteristics	Auto crossing (Auto-MDI(X)), Auto negotiation, Auto sensing
	Connections	RJ45, 10/100Base-TX
	Max. cable length between two SIGMA NETWORK components [ft]	328
Ports: FOC[1]: SIGMA NETWORK		1
	Transfer rate [Mbps]	100
	Fiber type	Multimode E19: Single mode
	Type	G50/125, G62.5/125 E19: E9/125
	Cable dimensions, core/cladding	62.5/125 µm
	Wavelength	1270 – 1360 nm
	Connections	2 x ST (BFOC) E19: 2 x SC 100Base-FX
	Max. cable length between two FOC components [ft]	9842 E19: 32808
Transfer mode		Store-and-forward switching mode
Power supply [V DC]		9-30, @ 24 V DC/300 mA
Indicator elements		Status LEDs for voltage and each port

[1] FOC: Fiber-optic cable

Tab. 10 FOC switch specifications

2.4.5 Protocol converter SIGMA NETWORK/ PROFIBUS master

Feature	Value
SIGMA NETWORK	—
■ Transfer rate	■ 10/100
■ Properties 1	■ Auto crossing
■ Properties 2	■ Auto negotiation
■ Max. conduit length between two components [ft.]	■ 325

Feature	Value
PROFIBUS DP ■ Transfer rate [kBit/s] ■ Interface ■ Connections ■ Max. conduit length for the entire bus length [ft.]	Master ■ 187.5 ■ RS486 floating ■ 9-pole SUB-D socket ■ 2625
Power supply [V DC]	24 +/-25 %, typ. @ 130 mA
Display elements	Status LED
Service interfaces	Mini USB, slot for MMC memory card, rotary switch

Tab. 11 Data, SNW/DP bus controller

2.4.6 SIGMA AIR MANAGER 4.0 terminal

2.4.6.1 Industrial computer

- Industrial computer with Quad core processor
- 2 GB RAM
- 16 GB flash memory
- Buffer battery for real-time clock
- Voltage and temperature monitoring
- Updateable via SD Card

2.4.6.2 Interfaces

The positions of the interfaces X1–X5 are marked on the rear of the SIGMA AIR MANAGER 4.0 terminal.

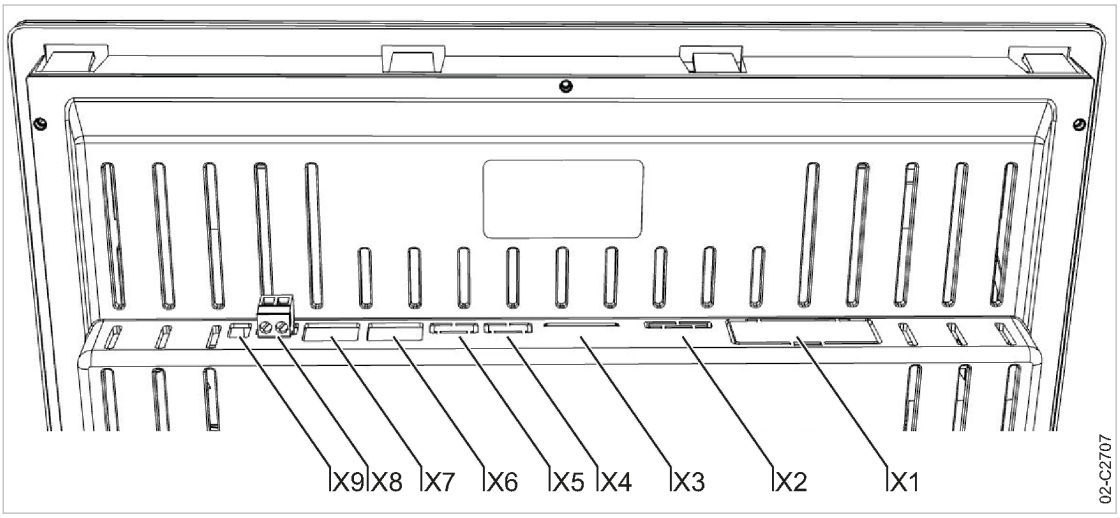


Fig. 1 Interfaces at the SIGMA AIR MANAGER 4.0 terminal

Marking	Interface	Connection
X1	Com-Module [1]	Slot for KAESER communication modules
X2	Battery [2]	For additional buffer battery
X3	SD Card	Slot for SD/SDHC/SDXC memory card
X4	USB2.0 [1]	For service purposes only
X5	USB3.0 [1]	For service purposes only
X6	SIGMA NETWORK	RJ485 socket (10/100Base T)
X7	Ethernet 1Gb	RJ45 socket (1000Base T)
X8	24 V DC Class 2 32VA	Power supply, protected against polarity reversal
X9	FE (functional earth(ground))	Equipotential bonding 6.3 mm (0.25 in.) flat plug

[1] Slot/interface covered: Remove the cover if a communication module is installed.

[2] Slit covered: Remove the cover if an additional buffer battery is installed (see chapter 10.4).

Tab. 12 Interfaces SIGMA AIR MANAGER 4.0

Identification with RFID Equipment Card

Feature	Value
Integrated hardware	RFID reader
Hardware (external)	RFID Equipment Card
Recognition in maximal distance [in.]	2
Frequency [MHz]	13.56
Emitted maximum transmitting power at 10 m (33 ft) distance [dB(µA/m)]	11

Tab. 13 RFID

The RFID read/write device transmits at a frequency of 13.56 MHz and is permitted for use in EU member states.

2.4.6.3 Display

Feature	Value
Display model	Color display with touch screen
Display resolution [px[1]]	1280 x 800
Format	12,1”; 16:10
Background lighting	LED
Model	LCD; industrial version
Touch operation	Capacitive

[1] px ≙ Pixel

Feature	Value
Sensor keys	4
[1] px ≙ Pixel	

Tab. 14 Display data

2.4.6.4 Software

SIGMA AIR MANAGER 4.0 terminal:

- Operating system: Linux
- KAESER controller software
- KAESER user interface

2.4.7 Communication modules

SIGMA AIR MANAGER 4.0 supports the following communication modules:

- PROFIBUS DP (option C41)
- Modbus RTU (option C42)
- Modbus TCP (option C44)
- PROFINET IO (option C45)
- EtherNet/IP (option C50)

2.4.7.1 PROFIBUS module

Communications module

Feature	Value	
Controller	SIGMA CONTROL 2	SIGMA AIR MANAGER 4.0
Bus	PROFIBUS DP-V0 Slave, RS485	
GSD file	KAES0CEC.gsd	KAKO0EFB.gsd
Baud rate	Automatic recognition, possible baud rates: [kbps]: 9.6/19.2/45.45/93.75/187.5/ 500 [Mbps]: 1.5/3/6/12	
Input data	64 byte	
Output data	128 byte	
Diagnostic data	31 byte	—
Data content, see	"Technical description SIGMA CONTROL 2 process image", document number 7_7601_PA.	"Technical description SIGMA AIR MANAGER 4.0 process image", document number 7_9696_PA.

Tab. 15 Technical specifications - PROFIBUS

Assignment of PROFIBUS interface (Sub-D port, 9 poles, screw locking)

Pin	Signal	Description
1, 2, 7, 9	—	—
3	B	RxD/TxD positive, RS485 Level

Pin	Signal	Description
4	RTS	Send request
5	GND	- for terminator, data delivery (isolated)
6	VP	+5 V for terminating resistor (isolated, short-circuit proof, max. 10 mA)
8	A	RxD/TxD negative, RS485 Level
Enclosure	Cable shield	Compliant with PROFIBUS standard, connected internally via filter to function ground (FE)

Tab. 16 Assignment of PROFIBUS interface

2.4.7.2 Modbus module

Communications module

Characteristic	Value	
Controller	SIGMA CONTROL 2	SIGMA AIR MANAGER 4.0
Bus	SIGMA AIR MANAGER 4.0 or ASCII, RS485 or RS232, galvanically isolated	
Baud rate [bps]	Adjustable, possible baud rates: 1200 / 2400 / 4800 / 9600 / **19200** / 38400 / 57600 / 76800 / 115200	
Stop bits	Possible settings **1** / 2	
Parity	Possible settings None / **Even** / Odd	
Time-out [ms]	Possible settings 0...**2000** ... 99999	
Data bits:	RTU: **8**, ASCII: 7	
Mode	Possible settings **RTU** / ASCII	
Input data [byte]	64	
Output data [byte]	128 (process data) and 42 (diagnostic data)	128 (process data)
Data content	"Technical description SIGMA CONTROL 2 process image", document number 7_7601xPA.	"Technical description SIGMA AIR MANAGER 4.0 process image", document number 7_9696_PA.
Bold elements: Factory setting		

Tab. 17 Technical Specifications - SIGMA AIR MANAGER 4.0 interface

Assignment of the SIGMA AIR MANAGER 4.0 interface

The Modbus interface is galvanically isolated and features RS485 and RS2232 signals. To use the RS232 interface, connect Pin 2 with Pin 3.

Pin	Direction	Signal	Description
1	—	GND C/C’	Data reference potential (isolated), RS485: Bus polarization, for terminating resistor (pull-down)
2	Output	VP	+5V DC (isolated, max. 10mA) RS485: Bus polarization, +5V for terminating resistor (pull-up)
3	Input	PMC	To use RS232, connect with Pin 2. To use RS485, keep open.

Pin	Direction	Signal	Description
5	Bi-directional	B/B’	RS485 B (RxD/TxD positive)
7	Input	RxD	RS232 Receive data
8	Output	TxD	RS232 Send data
9	Bi-directional	A/A’	RS485 A (RxD/TxD negative)
Enclosure	—	—	Internally connected to functional ground (FE)

Tab. 18 Assignment of the SIGMA AIR MANAGER 4.0 interface

2.4.7.3 Modbus TCP module

Modbus TCP interface

Feature	Value	
Controller	SIGMA CONTROL 2	SIGMA AIR MANAGER 4.0
Bus	Modbus TCP server (Slave)	
Connection	2x RJ45 ports (Cat5e, shielded), integrated 2-port switch, potential isolation	
Baud rate [Mbit/s]	10/100, full duplex or half duplex	
Input data [byte]	64	
Output data [byte]	128 (process data) and 42 (diagnostic data)	194 (process data)
Data content	"Technical description SIGMA CONTROL 2 process image", document number 7_7601xPA.	"Technical description SIGMA AIR MANAGER 4.0 process image", document number 7_9696_PA.

Tab. 19 Technical data Modbus TCP interface

Configuration of the Modbus TCP interface

Pin *	Signal	Conductor color	Description
1	TD+	Yellow	Send positive (positive transmit)
2	TD–	Orange	Send negative (negative transmit)
3	RD+	White	Positive receive
4, 5, 7, 8	—	—	—
6	RD-	Blue	Negative receive
Enclosure	Cable shield	—	High-impedance (1 MOhm/47 nF) connection with functional earthing (FE)

* Position of pins 1 through 8, see chapter 8

Tab. 20 Configuration of the Modbus TCP interface

Recommended conductors

Feature	Value
Conductor	Network conductor, CAT5 shielded, CU, for example: 7.7629.0
Plug	Bus plug RJ45, IP20, for example: 7.7628.0 or 7.7628.1

Feature	Value
Maximum cable length [ft.]	328

Tab. 21 Modbus TCP interface - recommended conductors

2.4.7.4 PROFINET module

PROFINET-interface

Feature	Value	
Controller	SIGMA CONTROL 2	SIGMA AIR MANAGER 4.0
Bus	SIGMA AIR MANAGER 4.0 device (Slave) with RT classification, conformity class B, topology detection (LLDP), network management (SNMP), redundancy, MRP protocol	
Connection	2x RJ45 ports (Cat5e), 2-port switch, potential isolation	
Baud rate [Mbit/s]	100, full duplex	
GSD file	GSDML-V2.25-Kaeser-SC2-20120203.xml	GSDML-V2.3-Kaeser-SAM2-20150112
Input data [byte]	64	
Output data [byte]	128 (process data)	
Data content, see Document No.	"Technical description SIGMA CONTROL 2 process image", document number 7_7601xPA.	"Technical description SIGMA AIR MANAGER 4.0 process image", document number 7_9696_PA.

Tab. 22 Technical Specifications - SIGMA AIR MANAGER 4.0 interface

Assignment of PROFINET interface

Pin *	Signal	Conductor color	Description
1	TD+	Yellow	Send positive (positive transmit)
2	TD–	Orange	Send negative (negative Transmit)
3	RD+	White	Positive receive
4, 5, 7, 8	—	—	—
6	RD-	Blue	Negative receive
Enclosure	Cable shield	—	High-impedance (1 MOhm/47 nF) connection with functional earthing (FE)

* Position of pins 1 through 8, see chapter 8

Tab. 23 Assignment of the SIGMA AIR MANAGER 4.0 interface

Recommended conductors

Feature	Value
Conductor	PROFINET conductor, CAT5 shielded, CU, for example: 7.7629.0

Feature	Value
Plug	Bus plug RJ45, IP20, for example: 7.7628.0 or 7.7628.1
Maximum cable length [ft.]	328

Tab. 24 Recommended conductors - SIGMA AIR MANAGER 4.0 interface

2.4.7.5 EtherNet/IP-Module

EtherNet/IP-Interface

Feature	Value	
Controller	SIGMA CONTROL 2	SIGMA AIR MANAGER 4.0
Bus	EtherNet/IP-Server (Slave)	
Connection	2x RJ45 ports (Cat5e, shielded), integrated 2-port switch, potential isolation	
Baud rate [Mbit/s]	10/100, full duplex or half duplex	
Input data [byte]	64	
Output data [byte]	128 (process data) and 42 (diagnostic data)	194 (process data)
Data content	"Technical description SIGMA CONTROL 2 process image", document number 7_7601xPA.	"Technical description SIGMA AIR MANAGER 4.0 process image", document number 7_9696_PA.

Tab. 25 Technical data EtherNet/IP-Interface

Configuration of the EtherNet/IP-Interface

Pin *	Signal	Conductor color	Description
1	TD+	Yellow	Send positive (positive transmit)
2	TD–	Orange	Send negative (negative transmit)
3	RD+	White	Positive receive
4, 5, 7, 8	—	—	—
6	RD-	Blue	Negative receive
Enclosure	Cable shield	—	High-impedance (1 MOhm/47 nF) connection with functional earthing (FE)

* Position of pins 1 through 8, see chapter 8

Tab. 26 Configuration of the EtherNet/IP-Interface

Recommended conductor

Feature	Value
Conductor	Network conductor, CAT5 shielded, CU, for example: 7.7629.0
Plug	Bus plug RJ45, IP20, for example: 7.7628.0 or 7.7628.1
Maximum cable length [ft.]	328

Tab. 27 EtherNet/IP-Interface - Cabling recommendation

2.5 Control cabinet

A dimensional drawing is found in the annex (see chapter 13.1).

Model	SAM 2-4	SAM 2-8	SAM 2-16
Material	Enclosure: Sheet metal, painted RAL 9007 grey Cover: Plastic, RAL 7016, anthracite grey		
Weight [lb]	44		
Enclosure protection	IP54		

Tab. 28 Control cabinet data

2.6 Pressure transducer

See chapter 13.5 Installation accessories for part numbers.

Models I and II pressure transducers

Type	I	II
Measuring range relative [psig]	0–14.5	0–87/145/652
Overload limit [psig]	72	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 EN 837 Stainless steel	G 1/4 A DIN 3852 Stainless steel FKM seal Viton seals
Rated temperature range [°F]	–4...+176	–13...+185
Fluid temperature range [°F]	–22...+212	–40...+212
Storage temperature range [°F]	–40...+212	–40...+212
Temperature influence / 18°F over the range [%]	± 0.2	± 0.15
Temperature influence / 18°F 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-A Form A)	PG 11	PG 9
Enclosure	Stainless steel	Stainless steel
Enclosure protection	IP 65	IP 65
Tightening torque [Nm]	17-20	20

Tab. 29 Models I and II pressure transducers

Pressure transducer model III and vacuum

Type	III	Vacuum pump
Measuring range relative [psig]	0-232/362/464	–
Measurement range, absolute [psig]	–	0–14.5

Type	III	Vacuum pump
Overload limit [psig]	2.5 x discharge pressure	2.5 x discharge pressure
Deviation of characteristic from final value Limit setting [%]	≤ 0.5	≤ 0.5
Air connection, male thread	G 1/2 B	G 1/2 B
Air connection female thread	G 1/8 B	G 1/8 B
Rated temperature range [°F]	–13...+185	–13...+185
Fluid temperature range [°F]	–22...+257	–22...+257
Storage temperature range [°F]	–58...+212	–58...+212
Temperature influence / 18°F over the range [%]	± 0.3	± 0.3
Temperature influence / 18°F over the range [%]	± 0.3	± 0.3
Output signal (two-wire technique) [mA]	4-20	4-20
Power supply connection (plug to EN 175301-803-A Form A)	PG 11	PG 11
Enclosure	brass	brass
Enclosure protection	IP 65	IP 65
Tightening torque [Nm]	30	30

Tab. 30 Models III and vacuum pressure transducers

3 Safety and Responsibility

3.1 Basic instructions

⚠ DANGER

Disregarding these instructions can result in serious injury.

➢ *To safely operate this product, carefully read the operating manual and take notice of its contents.*

The product SIGMA AIR MANAGER 4.0 is manufactured to the latest engineering standards and acknowledged safety regulations. Nevertheless, dangers can arise through its operation:

- Danger to life and limb of the operator or third parties,
- impairments to the SIGMA AIR MANAGER 4.0 and other material assets.

➢ Therefore, observe the following:
  - Use the product SIGMA AIR MANAGER 4.0 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 SIGMA AIR MANAGER 4.0 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 from incorrect use. The user alone is liable for any risks incurred.

➢ Adhere to the specified use given in this manual.

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

3.3 Improper use

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

Converting or changing the SIGMA AIR MANAGER 4.0 constitutes improper use. The manufacturer's warranty is made invalid in such cases.

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

➢ Use SIGMA AIR MANAGER 4.0 only as intended.

➢ Do not use SIGMA AIR MANAGER 4.0 to control other machines or products for which SIGMA AIR MANAGER 4.0 is not intended.

➢ Do not allow conversions or changes.

3.4 User's Responsibilities

3.4.1 Observe statutory and universally accepted regulations

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

3.4.2 Qualified personnel

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

Authorized operators possess the following qualifications:

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

Authorized installation and maintenance personnel have the following qualifications:

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

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

3.5 Safety signs

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

Sign	Meaning
	Danger of fatal injury from electric shock! ➢ Before starting any work on electrical equipment: Switch off and lock out the power supply disconnecting device and verify the absence of any voltage.

Tab. 31 Safety signs

3.6 Dangers

The general safety instructions contained in this chapter provide an overview of the possible dangers and general rules of conduct when dealing with them. Specific safety instructions can be found in this operating manual at the beginning of each chapter or directly before a task instruction.

➢ Fully observe all safety instructions!

3.6.1 Safely handling potential sources of danger

Electricity

➢ Shut off the power supply (all poles).

➢ Switch off any external power sources.

Voltage remains present at the correspondingly marked terminals (colored orange or labelled) on the SIGMA AIR MANAGER 4.0, even when the power supply is switched off.

➢ Check and ensure the absence of any voltage.

➢ Before switching on again, ensure that:

- no maintenance personnel are working on the machine,
- all cover panels are fixed in place,
- all maintenance doors are closed.

➢ Allow only qualified electricians or trained personnel under the supervision of a qualified electrician to carry out work on electrical equipment in accordance with electrical engineering regulations.

➢ Observe all recognized occupational safety regulations and legal requirements applicable when carrying out any work on the SIGMA AIR MANAGER 4.0.

➢ Use appropriate fusing for the current consumption (see chapter 2).

➢ Establish electrical connections only when the machine is in a voltage-free state and check them regularly for tightness and satisfactory condition.

➢ Only use electrical cables that are suitable and approved for the relevant surroundings and electrical loads.

➢ Before each commissioning of connected machines by the operator, establish and check protection against touch voltages that are dangerous in the event of direct or indirect contact.

3.6.2 Safely operating the SIGMA AIR MANAGER 4.0

The following points must be observed in order to avoid damage to the SIGMA AIR MANAGER 4.0:

⚠ WARNING

A short circuit can cause irreparable damage to the PROFIBUS interface.

➢ *Avoid short circuits to the power supply pins in the PROFIBUS interface for the PROFIBUS/SIGMA NETWORK converter.*

➢ Do not remove any plugs from the SIGMA AIR MANAGER 4.0 during operation of the compressed air station.

➢ Only operate the SIGMA AIR MANAGER 4.0 with all supply cables connected.

➢ Do not modify, bypass or disable the safety devices.

➢ Do not remove or render illegible any labels/information signs.

➢ Only use spare parts approved by the manufacturer for use with the SIGMA AIR MANAGER 4.0.

3.7 Warranty

This service manual does not contain any independent warranty commitment. Our general terms and conditions 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,
- unauthorized 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 4.0 is used for the control, regulation and monitoring of stations with multiple compressors, blowers or vacuum machines in a commercial environment. SIGMA AIR MANAGER 4.0 reacts flexibly to fluctuating compressed air demand and thus reduces energy consumption. The system takes into account machine run times and deployment priorities. Important parameters are clearly represented as colored graphic elements. The operating data can be displayed on a user-friendly, high-resolution touch screen. All important operating data is recorded in the internal long-term data memory.

SIGMA AIR MANAGER 4.0 is centrally configured with the "Engineering Base" planning tool. "Engineering Base" creates a configuration for easy import in SIGMA AIR MANAGER 4.0. No time-consuming commissioning and configuration on-site. Just a few settings such as date and time, must be entered at the SIGMA AIR MANAGER 4.0.

SIGMA AIR MANAGER 4.0 is offered as:

- SAM 4.0-4
- SAM 4.0-8
- SAM 4.0-16

They differ in the number of controllable machines (see chapter 2 "Design variants and options"). Using the SBU, you can flexibly expand the number of interfaces.

SIGMA AIR MANAGER 4.0 comprises the following components:

- The central pressure transducer measures the pressure in the air network and passes the value to SIGMA AIR MANAGER 4.0.
- The processing unit of the SIGMA AIR MANAGER 4.0 decides according to default parameters, which machines are switched to load to keep the pressure in the air main constant. All data are clearly graphically represented. You can analyze and archive the data provided.
- The display and control panel of the touch screen provides information on current pressure and other parameter values and offers various possibilities for individual settings.

Compressors with SIGMA CONTROL and SIGMA CONTROL 2 as well as those with conventional controllers can be linked to SIGMA AIR MANAGER 4.0.

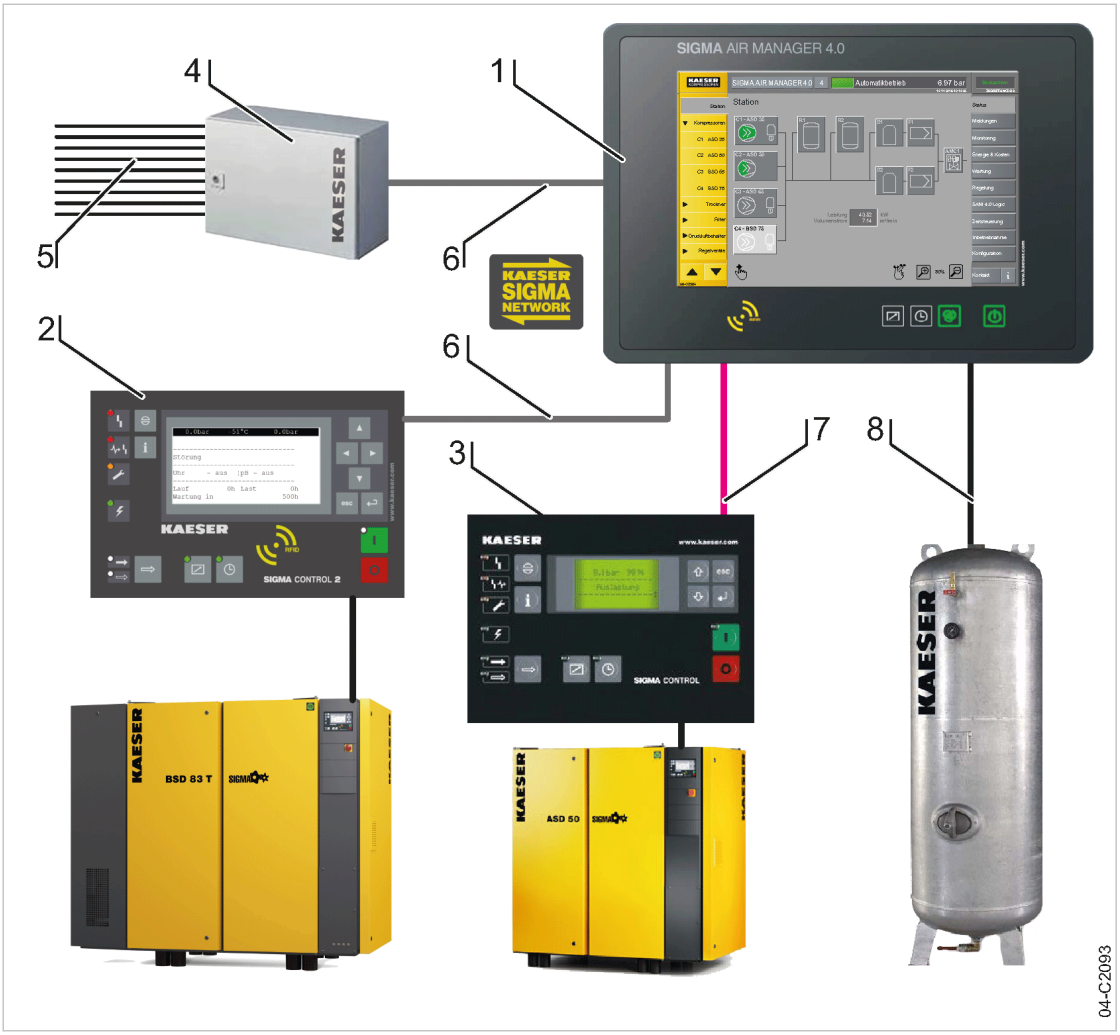


Fig. 2 SIGMA AIR MANAGER 4.0 – Standard design of a compressed air station

1. SIGMA AIR MANAGER 4.0
2. SIGMA CONTROL 2
3. SIGMA CONTROL
4. SBU
5. I/O lines to machines and sensors
6. SIGMA NETWORK
7. PROFIBUS
8. Analog input for pressure transducer

4.2 Operating panel

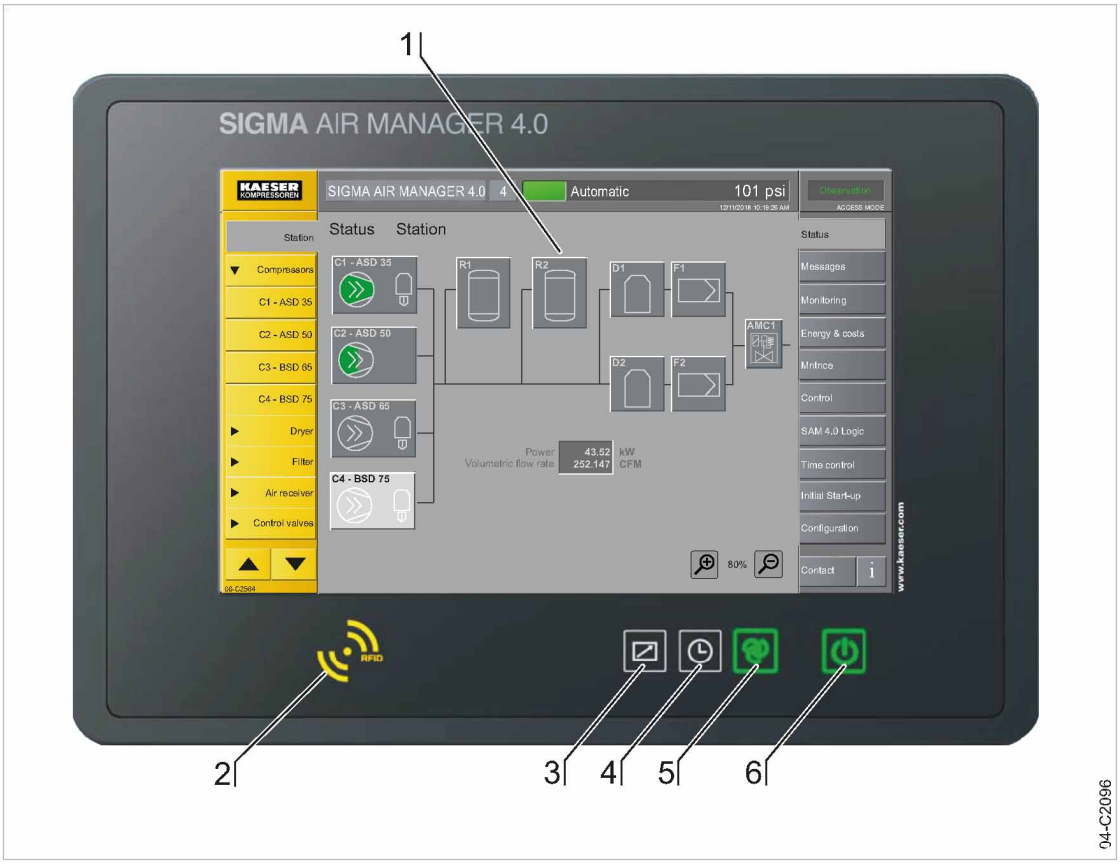


Fig. 3 SIGMA AIR MANAGER 4.0 operating panel

No.:	Sign	Operating element	Key illumination	Function	Description
1	—	Touch screen	—	Operation of SIGMA AIR MANAGER 4.0 functions.	Chapter 4.3 "Touch screen"
2	RFID	"RFID" reader	—	User log-in with RFID Equipment Card.	Chapter 4.4 "User log-in"
3		«Remote control» key	Green	Activation and deactivation of the remote operation.	Chapter 7.19 "Control technology"
4		«Timer control» key	Green	Switches the time control on or off.	Chapter 7.17 "Timer control"
5		«Automatic» key	Green	Switch the station between manual and automatic mode.	Chapter 7.20 "SIGMA AIR MANAGER 4.0" Activating Chapter 8.2 "Switching on and off"

No.:	Sign	Operating element	Key illumination	Function	Description
6		«Compressed air generation» key	Green/red	Compressed air station activation (air supply) or **deactivation (ATTENTION: no air supply!).**	Chapter 7.2 "First activation" Chapter 8.2 "Switching on and off"

Tab. 32 SIGMA AIR MANAGER 4.0 operating panel

4.3 Touch screen

The SIGMA AIR MANAGER 4.0 is controlled via an integrated touch screen. This intuitive, touch-sensitive operating element is incorporated into the color display. Operate the controller by touching the glass surface.

The touch screen menu is structured as follows:

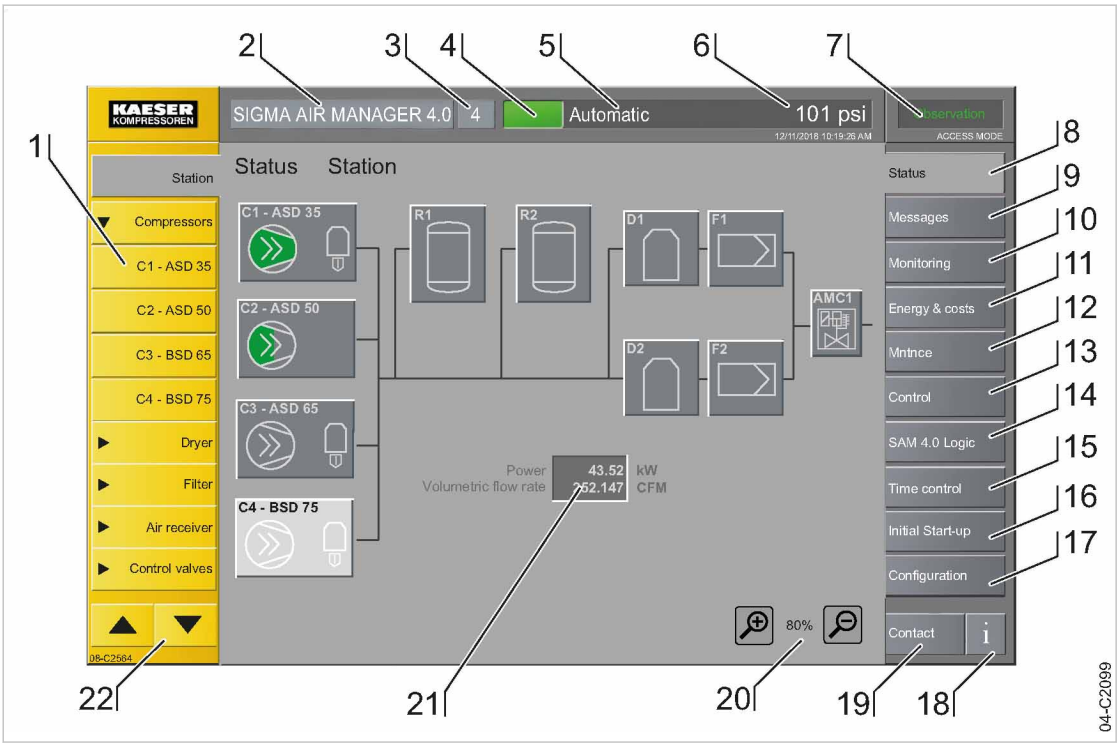


Fig. 4 Touchscreen menu

No.	Menu element	Function	Description
1	Device selection list	Selection of machines, individually or by groups	Chapter 8.5 "Selecting machines"
2	Product designation	—	—
3	SIGMA AIR MANAGER 4.0 version	e.g. SAM 4.0-4	—

[1] Please contact an authorized KAESER service representative for information about availability

No.	Menu element	Function	Description
4	System status	Traffic light function: Green: Operation Yellow: Maintenance/warning Red: Malfunction (compressor alarm!)	—
5	Operating mode	Displays selected operating mode	—
6	Pressure gauge	Display of current "system pressure"	—
7	Access mode	Displays current access mode: ■ — (logged out) ■ Configuration ■ Observation	Chapter 7.4 "User log-in"
8-17	Function selection bar	Selection of the individual function menus	Chapter 8.5 "Selecting machines"
8	Status	Open the *Status* menu	Chapter 8.4 "Status"
9	Messages	Open the *Messages* menu	Chapter 9.2 "Messages"
10	Monitoring	Open the *Monitoring* menu	Chapter 8.6 "Monitoring"
11	Energy & costs	Open the *Energy & costs* menu	Chapter 8.7 "Energy & costs"
12	Maintenance	Open the *Maintenance* menu	Chapter 1010.2.1 "Maintenance"
13	Control	Open the *Control* menu	Chapter 7.16 "Control"
14	SAM 4.0 Logic	Open the *SAM 4.0 Logic* menu	[1]
15	Timer control	Open the *Timer control* menu	Chapter 7.17 "Timer control"
16	Initial Start-up	Menus for commissioning the compressed air station	Chapter 7 "Initial Start-up"
17	Configuration	Configuration menus for SIGMA AIR MANAGER 4.0	Chapter 7 "Initial Start-up"
18	Info	Open the *Info* menu	Chapter 8.3 "Help function"
19	Contact	Open the *Contact* menu	Chapter 8.9 "Contact"
20	Zoom in /out	Menu commands to zoom in and out	—
21	Live data display	Displays current data and measurement values for the compressed air station	Chapter 8.4.7 "Station"
22	Device selection Up/ Down	Device selection list; scrollbar provided for more than 10 devices	Chapter 8.5 "Selecting machines"

[1] Please contact an authorized KAESER service representative for information about availability

Tab. 33 Touchscreen menu elements

This operating manual defines the touch screen operating elements as follows:

- “Key” (touch-sensitive key). Keys are usually labeled with text. Displayed in this operating manual as: Key.

- “Symbol” (key with graphic representing a specific function, for example: ⏻). These keys are labeled with a commonly understood symbol. The symbol is explained with a descriptive text when used for the first time.
- “Keyboard” (for the input of alphanumeric and special characters). When input is required, a virtual keyboard is displayed over the current menu.

Some menus support resizing of the menu display via a two-fingered pinch or stretch gesture (the 🔍/🔍 symbols are displayed). Place your fingers on the display and swipe in opposite directions to zoom in. The displayed elements can be moved horizontally or vertically by using one finger.

Some of the elements displayed are touch-sensitive. By tapping on these elements, corresponding menus can be opened, measured values displayed or the elements marked for further processing.

4.4 User log-in with RFID Equipment Card

The RFID Equipment Cards provide various functionalities:

- Switch between three operating modes:
  - Logged out
  - Observation
  - Configuration
- Encryption ensures security
- Different access levels for the customer (RFID Equipment Card) and Service (RFID Key)
  The system records which user is when logged on at SIGMA AIR MANAGER 4.0. You can thus determine who was logged on when specific messages or other events have occurred.

Fig. 5 User management with RFID

1 SIGMA AIR MANAGER 4.0
2 RFID Equipment Card
3 RFID Key

4.5 Menu structure

Menu element	Sub-menu element	Description
Status	■ "Overview" – "Pressure curve" – "Pressure display" – "Current values" – "History"	Chapter 8.4.1
	■ "Manual preselect"	Chapter 8.4.5
	■ "Sources" – "Pressure and power" – "Preselect" – "Priorities"	Chapter 8.4.6
	■ "Station"	Chapter 8.4.7
Messages	■ "Unacknowledged"	Chapter 9.2
	■ "Active"	Chapter 9.2
	■ "History"	Chapter 9.2
Monitoring	■ "Compressed air consumption"	Chapter 8.6.1
	■ "Specific power"	Chapter 8.6.2
	■ "Measurement data"	Chapter 8.6.3
	■ "Export"	Chapter 8.6.4
Energy & costs	■ "Table" – "Export"	Chapter 8.7.1 Chapter 8.7.2
	■ "Diagram"	Chapter 8.7.3
	■ "Period comparison"	Chapter 8.7.4
	■ "Tariff configuration"	Chapter 8.7.5
	■ "Report"	Chapter 8.7.6
Control	■ "Parameter" – "Constant pressure control" – "Pressure monitoring" – "Volume flow rate control"	Chapter 7.16
Timer control	■ "Overview"	Chapter 7.17
Initial Start-up	■ "SIGMA NETWORK I/O"	Chapter 7.13
	■ "PROFIBUS"	Chapter 7.14
	■ "SIGMA NETWORK"	Chapter 7.15
	■ "Control technology"	Chapter 7.19
	■ "Software update"	Chapter 10.3
	■ "Import configuration"	Chapter 7.5
	■ "Data backup"	Chapter 7.18

Menu element	Sub-menu element	Description
Configuration	■ "SAM 4.0 terminal" – "Serial data" – "Measurement data" – "X6 SIGMA NETWORK" – "X7 Ethernet 1 Gb"	Chapter 7.11
	■ "E-mail" – "Send options" – "General settings" – "Alive message" – "History"	Chapter 7.12
	■ "Units"	Chapter 7.7
	■ "Key lock"	Chapter 7.8
	■ "User administration"	Chapter 7.4.3
	■ "Date and time"	Chapter 7.6
	■ "Display"	Chapter 7.9
	■ "Menu behaviour"	Chapter 7.10
	■ "Language"	Chapter 7.3

Tab. 34 Menu structure

4.6 Operation and function

SIGMA AIR MANAGER 4.0 was designed and developed for a number of applications. Prior to commissioning, the "Engineering Base" planning tool is used to configure the application. Only some settings must be specified using the SIGMA AIR MANAGER 4.0 touch screen.

4.6.1 3-D^{advanced} Adaptive control

The adaptive 3-D^{advanced} control minimizes the energy requirements of the compressed air station by automatically adapting to the operating conditions.
It automatically adjusts machine activation/de-activation as well as the cut-out and cut-in pressures for the selected machines to the current operating conditions of the compressed air station.

4.6.2 Timer control

Using the timing control, you can set timers for various compressed air station parameters (such as required pressure and air delivery ON/OFF). Timers can be set for up to 99 tasks. Series tasks can be set up to take place weekly, for example.

Further information See Chapter 7.17 for information about timers.

4.6.3 Power limiting

If the power limiting function is activated, the system will add machines only as long as the overall load capacity of the running machines does not exceed the specified power limit. The nominal pressure and the maximum speed are used to calculate the overall load capacity.

4.6.4 Air main charging

After the activation of the compressed air station, the air network is gradually charged within the specified network charging time (e.g. 20 minutes). The air main charging process ends when the required working pressure is reached or when the air main charging time expires.

4.6.5 Manual

A compressed air station can run in the *Manual* operating mode if each machine has its own system pressure switch or pressure control system. This is always the case with KAESER rotary screw compressors. In compressed air stations with blowers or reciprocating compressors, machines may or may not be equipped with their own system pressure switches. Stations with machines without system pressure switches will deliver no compressed air in the *Manual* mode or if the SIGMA AIR MANAGER 4.0 fails.

Compressed air station with compressed air generation in the Manual operating mode

The *Manual* mode can cause large pressure swings in the compressed air system.

The connected machines are automatically switched to the *Local operation* mode:

- When the power supply SIGMA AIR MANAGER 4.0 fails with the station active (compressed air generation ON, Station ON key lights up green)
- When the connection to the pressure transducer is interrupted
- When SIGMA AIR MANAGER 4.0 itself fails

In the *Manual* operating mode, the machines run via their internal pressure control, independently of SIGMA AIR MANAGER 4.0. The machines can also be manually switched to *Manual* for test purposes.

Compressed air station without compressed air generation in the Manual operating mode

No compressed air is delivered without SIGMA AIR MANAGER 4.0.

The output relays switch off:

- When the power supply to SIGMA AIR MANAGER 4.0 fails with the station active (compressed air generation ON, Station ON key lights up green)
- When the connection to the pressure transducer is interrupted
- When SIGMA AIR MANAGER 4.0 itself fails

This causes the connected machines to switch to IDLE or OFF. The compressed air system no longer delivers compressed air.

4.6.6 KAESER CONNECT

The user interface of SIGMA AIR MANAGER 4.0 can be viewed on an external computer (PC, laptop, tablet). For this purpose, SIGMA AIR MANAGER 4.0 must be connected to the external computer via the X7 Ethernet 1 Gb, directly via a network cable or indirectly (network). A web browser is used for visualization (see chapter 8.8"KAESER CONNECT").

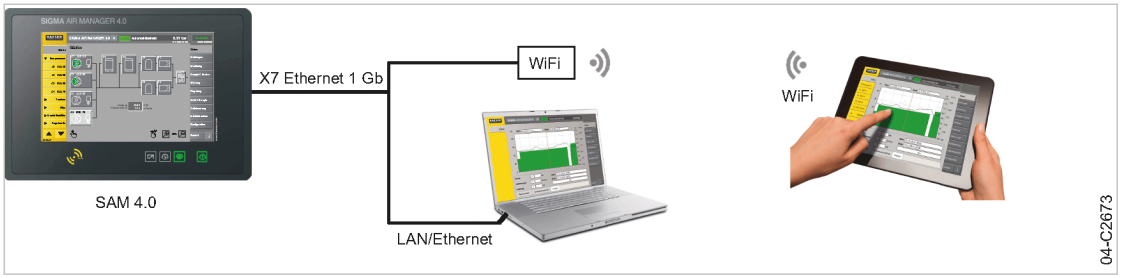


Fig. 6 KAESER CONNECT

4.6.7 KAESER IoT Client

The KAESER IoT Client is a data transmission component for SIGMA AIR MANAGER 4.0. It is arranged between SIGMA AIR MANAGER 4.0 and the KAESER data center. The X7 Ethernet 1 Gb interface is used to connect it to SIGMA AIR MANAGER 4.0 at one end and Ethernet to the user-provided LAN or Internet router on the other end. The data is secured with VPN and transmitted to the KAESER data center.

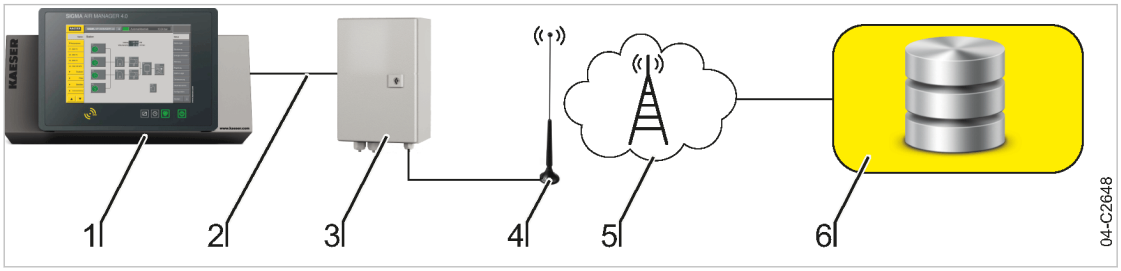


Fig. 7 Data transmission SIGMA AIR MANAGER 4.0 – KAESER data center

1. SIGMA AIR MANAGER 4.0
2. Ethernet
3. KAESER IoT Client
4. VPN[1)] via user-supplied LAN or Internet router
5. KAESER data center

[1)] Virtual Private Network built on public network infrastructure

5 Installation and Operating Conditions

5.1 Environment

Temperature range

Ambient temperatures	
Min. ambient temperature	Maximum ambient temperature
32 °F	113 °F

Tab. 35 Ambient temperatures

Storage temperatures	
Minimum storage temperature	Maximum storage temperature
−4°F	158°F

Tab. 36 Storage 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

See also chapter 1.3, "Approvals".

➢ Install SIGMA AIR MANAGER 4.0 as appropriate.

5.2.1 Operation in an industrial environment

SIGMA AIR MANAGER 4.0 is designed for the operation in an industrial environment with proprietary supply network separated from the public supply by a transformer or generator.

➢ Install and supply SIGMA AIR MANAGER 4.0 accordingly.

6 Installation

6.1 Installation

Connection	SIGMA CONTROL and SIGMA CONTROL 2	Conventional	Description
Ensuring safety	x	x	Chapter 6.2 "Ensuring safety"
Reporting transport damage	x	x	Chapter 6.3 "Reporting transport damage"
Compressed air supply during installation	x	x	Chapter 6.4 "Compressed air supply during installation"
Scope of delivery	x	x	Chapter 6.5 "Scope of delivery"
Installing the control cabinet	x	x	Chapter 6.6 "Installing the control cabinet"
Identifying the machines	x	x	Chapter 6.7 "Identifying the machines"
Connecting the pressure transducers	x	x	Chapter 6.8 "Connecting the pressure transducer"
Installing the communication module	x	x	Chapter 6.9 "Installing the communication module"
Planning the wiring	x	x	Chapter 6.10 "Planning the wiring"
Laying cables	x	x	Chapter 6.11 "Laying cables"
Creating SIGMA NETWORK	x	–	Chapter 6.11.1 Creating the "SIGMA NETWORK"
Creating the PROFIBUS network	x	–	Chapter 6.11.2 Creating the "PROFIBUS" network
Setting up the compressor station via floating relay contacts	–	x	Chapter 6.11.3 "Creating the compressor station via floating relay contacts"
Connecting the cables to SIGMA AIR MANAGER 4.0	x	x	Chapter 6.12 "Connecting cables"
Setting up the machines	x	x	Chapter 6.13 "Setting up the machines"

Tab. 37 Installation

6.2 Ensuring safety

Follow the instructions below for safe installation.

Warning instructions are located before a potentially dangerous task.

Disregard of warning instructions can cause serious injuries!

Complying with safety warnings

Disregard of safety notes can cause unforeseeable dangers!

- ➢ Comply with the instructions in chapter 3 Safety and Responsibility.
- ➢ This product may only be installed by a qualified person. See chapter 3, "Assigning personnel".

When working on live components

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

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

6.3 Reporting transport damage

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

6.4 Compressed air supply during installation

- ➢ Check the compressor station's EMERGENCY mode characteristics.
  - Compressed air station with compressed air generation in the *Manual* operating mode: Chapter 6.4.1
  - Compressed air station without compressed air generation in the *Manual* operating mode: Chapter 6.4.2

6.4.1 Compressed air station with compressed air generation in the Manual operating mode

It is possible to install and start up the SIGMA AIR MANAGER 4.0 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 SIGMA AIR MANAGER 4.0 (chapters 6.10 to 6.12).

4. Put the machine back into operation.
5. Repeat steps 1 to 3 for any further machines.
6. Carry out commissioning and settings in accordance with chapter 7.
7. Do not switch SIGMA AIR MANAGER 4.0 from *Manual* to *Automatic* mode until these settings have been completed.

   SIGMA AIR MANAGER 4.0 subsequently assumes control of the machines.

Further information See chapter 4.6.5 "Manual".

6.4.2 Compressed air station without compressed air generation in the Manual operating mode

SIGMA AIR MANAGER 4.0 is required for the supply of compressed air. The compressed air system is not operational until initial start-up of SIGMA AIR MANAGER 4.0 is completed.

➢ Switch on the compressor station after commissioning SIGMA AIR MANAGER 4.0.

Further information See chapter 4.6.5 "Manual".

6.5 Scope of delivery

This product comprises at least the following components (depending on the selected configuration, additional components may be provided):

Item	Material	Description
10	SAM2.1	SIGMA AIR MANAGER 4.0 (SAM 4.0-4, SAM 4.0-8 or SAM 4.0-16)
20	—	Pressure transducer (as configured)
30	—	2x RFID Equipment Card
40	—	Edge protection
50	—	This instruction

Tab. 38 Scope of delivery

6.6 Installing the control cabinet

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

Take the following criteria into consideration when selecting the installation location and the installation of the control cabinet:

- A dimensional drawing is found in the annex (see chapter 13.1).
- The fixing materials must be compatible with the type of wall and the weight of the control cabinet (chapter 2).
- The control cabinet must be fully accessible.
- Fully opening control cabinet door.
- A free escape route must be maintained (with the control cabinet door fully open).
- Protection from direct sunlight, rain, splashed water or excessive dust build up must be provided.

Material Switching cabinet key type: Two-way key 3 mm
Hexagon spanner, 4 mm width
Open-end spanner, 6 mm width

⚠ WARNING

Overheating from insufficient ventilation

➢ *The space between the wall and the rear of SIGMA AIR MANAGER 4.0 must remain clear to support ventilation!*

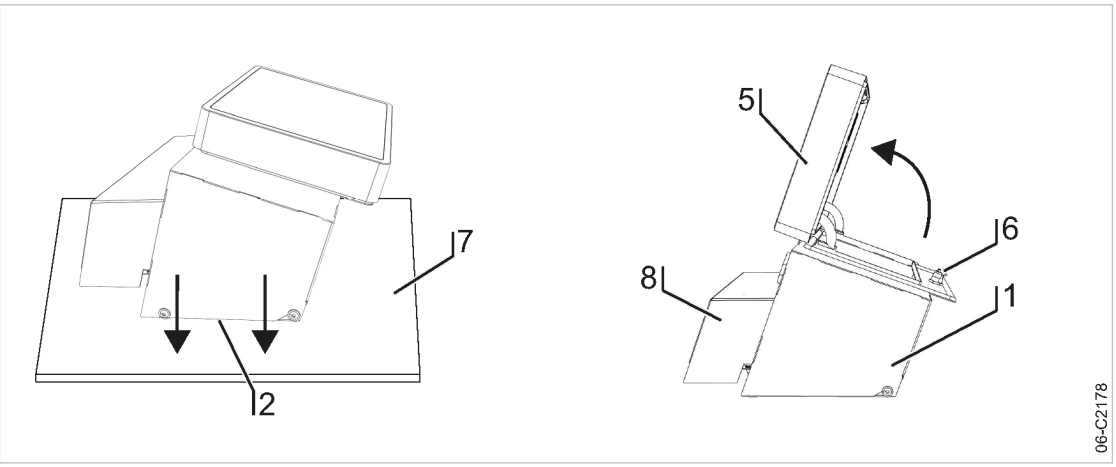


Fig. 8 Open the SIGMA AIR MANAGER 4.0 cover

[1] Control cabinet cover
[2] Base plate
[5] Cover with SIGMA AIR MANAGER 4.0 terminal
[6] Spagnolet
[7] Base
[8] Cable gland cover

1. Carefully unpack the control cabinet. Protect the sensitive surfaces (e.g., cover [5] with touch screen terminal) from damage.
2. Place the entire control cabinet onto a suitable surface [7] (protected from dirt and scratching) with the base plate [2] pointing downward.
3. Use the control cabinet key to unlock the spagnolet [6] at the control cabinet [1].
4. Open the cover [5] in arrow direction.
5. At the **terminal**, detach the cables which are connected from the modules on the base plate [2] with the terminal [5]. To detach the equipotential bonding connector (PE), press its latching clasp.
6. At the equipotential bonding connector (PE), detach the protective conductor connection between the terminal strip on the base plate [2] to the equipotential bonding connector (PE) in the control cabinet cover [1].

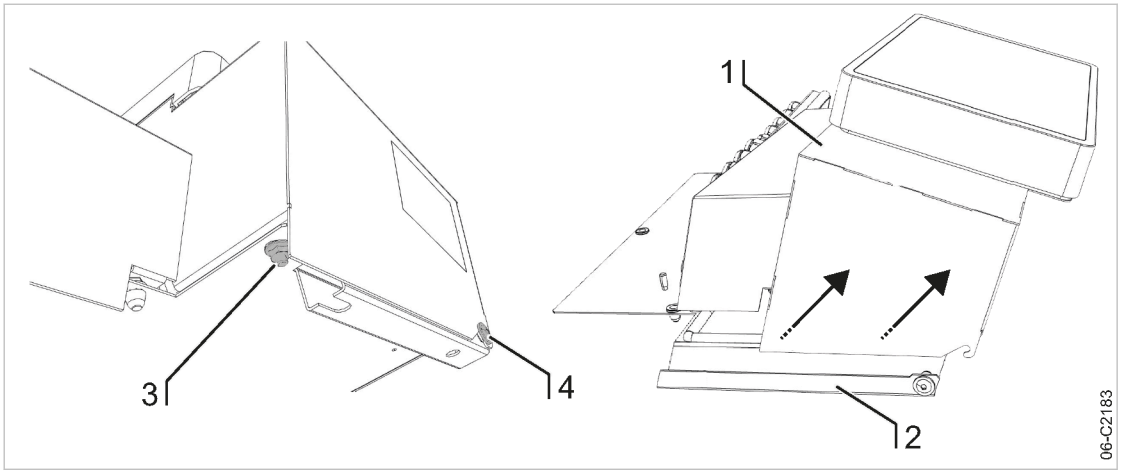


Fig. 9 Removing the control cabinet cover

[1]	Control cabinet cover	[3]	M 6x16, SW6 toothed nut
[2]	Base plate	[4]	M 6x16, SW4 flat mushroom-head screw with hexagon socket

7. Pull the cable gland cover [8] upward from the base plate and place on a suitable surface [7].
8. Separate the control cabinet cover [1] (enclosure cover with SIGMA AIR MANAGER 4.0 terminal) from the base plate [2] as follows.
9. First, use the SW4 spanner wrench to unscrew the two screws [3], then loosen the two screws [4] and carefully lift the control cabinet cover [1] in arrow direction (see Fig. 9).
10. Place the control cabinet cover [1] onto a suitable surface [7] (protected from dirt and scratching).
11. Properly attach the base plate [2] to the wall. A template for the bore holes is provided in the annex (see chapter 13.1).
12. Wire the control cabinet as described in chapter 6.12.

6.7 Identifying the machines

Machines with the same model type must be identified to allow for different internal pressure settings.

➢ Identify the machines as defined in the “Engineering Base” configuration.

The alarm and service messages displayed on SIGMA AIR MANAGER 4.0 can thus be matched with the correct machine.

Identification (machine and SIGMA AIR MANAGER 4.0) for remote control

The machines and SIGMA AIR MANAGER 4.0 must carry a warning notice when they are in remote mode.

- Warning notice for the machines
  - "WARNING": This machine is remotely controlled and can start automatically at any time.
- Warning notices for identification at SIGMA AIR MANAGER 4.0.
  - 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 SIGMA AIR MANAGER 4.0.

6.8 Connecting the pressure transducer

Precondition The connection point is not under pressure.

NOTICE

Network pressure too high
Damage to the pressure transducer can occur.

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

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

6.8.1 Mechanical connection

The pressure transducer diagram (illustration 10) shows the correct position for the transducer:

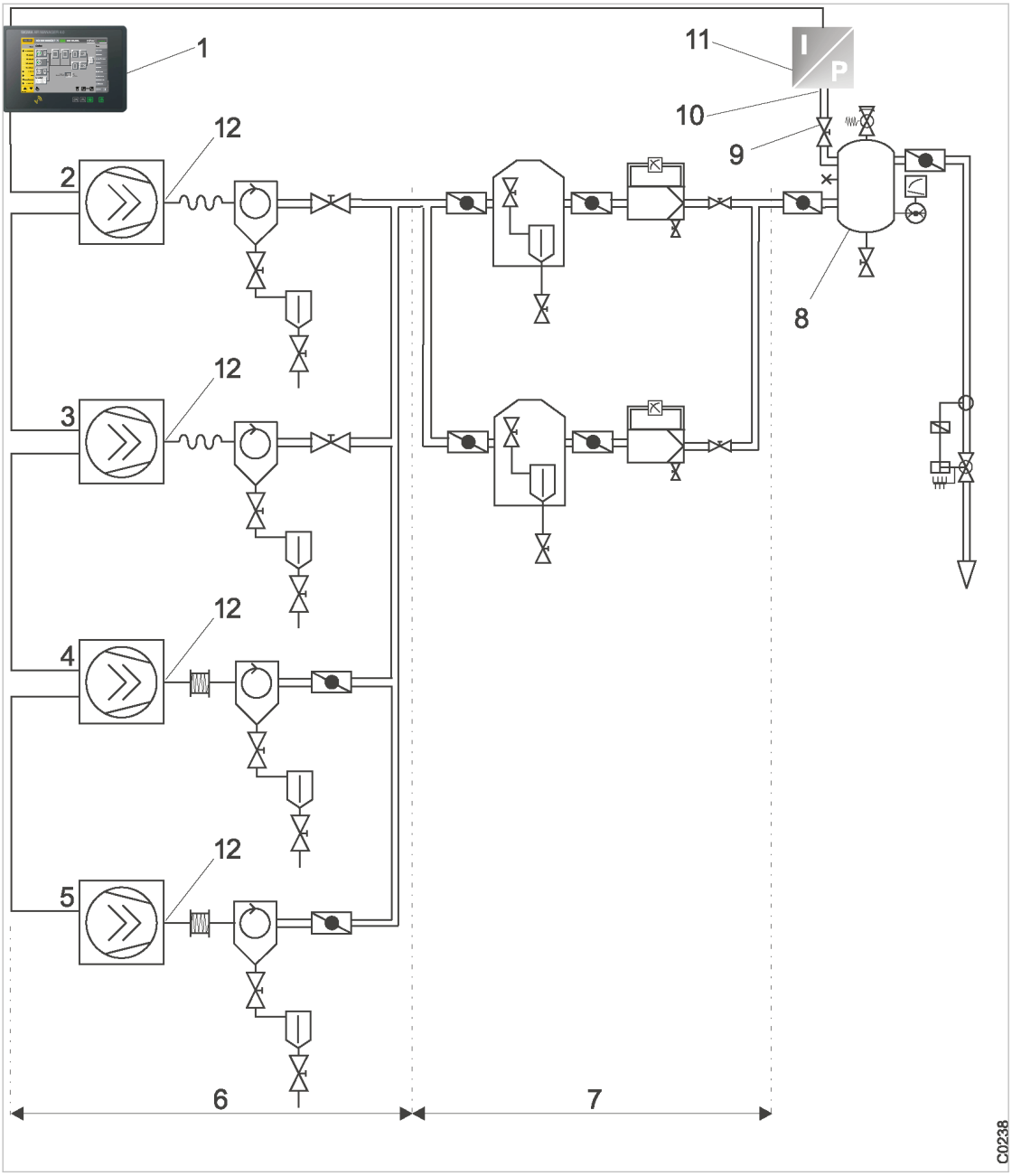


Fig. 10 Pressure transducer position

1	SIGMA AIR MANAGER 4.0	7	Compressed air treatment
2	Machine 1	8	Air receiver
3	Machine 2	9	Shut-off valve
4	Machine 3	10	Connection point pressure transducer
5	Machine 4	11	Pressure transducer
6	Compressed air production	12	Compressed air outlet

➢ 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 13.5 for the part 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 13.5 for the material number).

6.8.2 Power Supply

Avoid signal corruption.

1. Use two conductor screened cable with minimum section 18 AWG.
2. The pressure transducer must be grounded.
   - Ground by metallic contact with the air receiver or
   - Use a separate equipotential bonding conductor with a minimum cross-section 1 x 7 AWG (with, for example, a ground clamp (G 3/4) on the transducer housing).
3. Connect SIGMA AIR MANAGER 4.0 and the pressure transducer at the same equipotential bonding conductor. The potential difference between both grounding points must be zero.
4. Connect the cable shielding to ground on the pressure transducer and to a screening connection in the control cabinet.

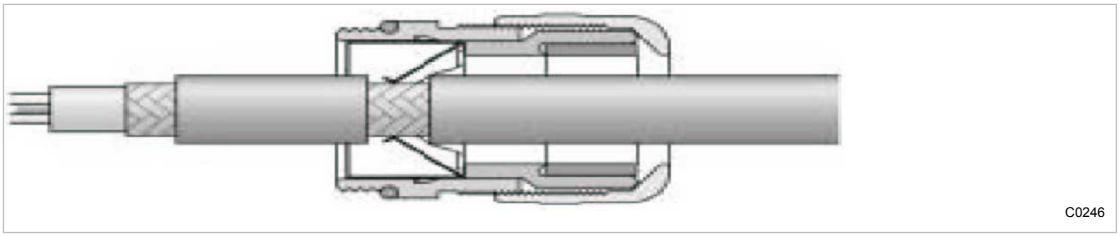


Fig. 11 Connecting the screening

5. Feed the conductor through an EMC cable gland into the control cabinet.
6. Maintain a separation of at least 4 in. between the connecting cable and power cables.

6.9 Installing the communication module

Material
SIGMA AIR MANAGER 4.0-supported KAESER communication module (see Chapter 2.3)
Slotted screwdriver: 2.5 – 3 mm blade width
Screwdriver (straight or offset), maximum length: 70 mm: Torx T9

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

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.6 "Installing the control cabinet").
   The bay for communication module installation is located at the rear of the SIGMA AIR MANAGER 4.0 terminal. It is marked "Com module X1" and is accessible from below.

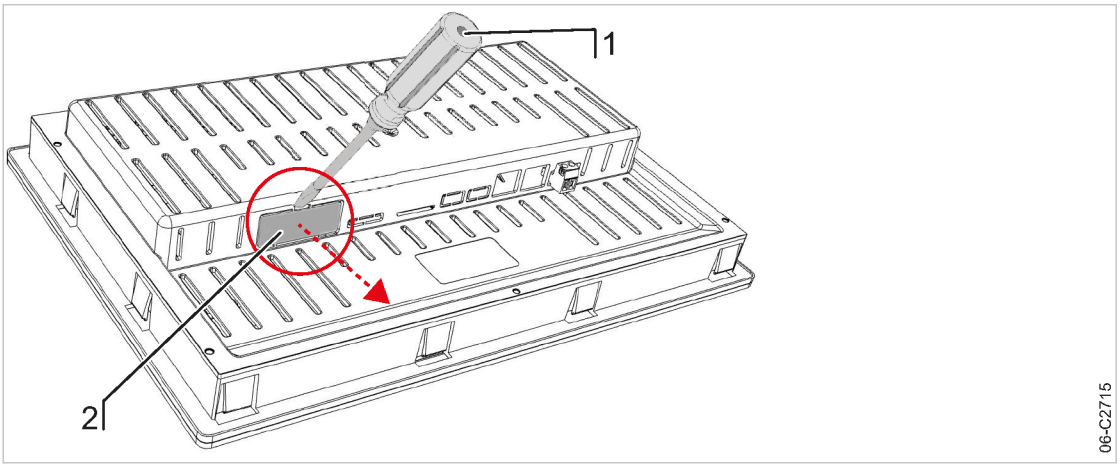


Fig. 12 Remove the plastic cover
[1] Slotted screwdriver
[2] Plastic cover

2. Use a slotted screwdriver to remove the plastic cover [2] of the module bay [1].

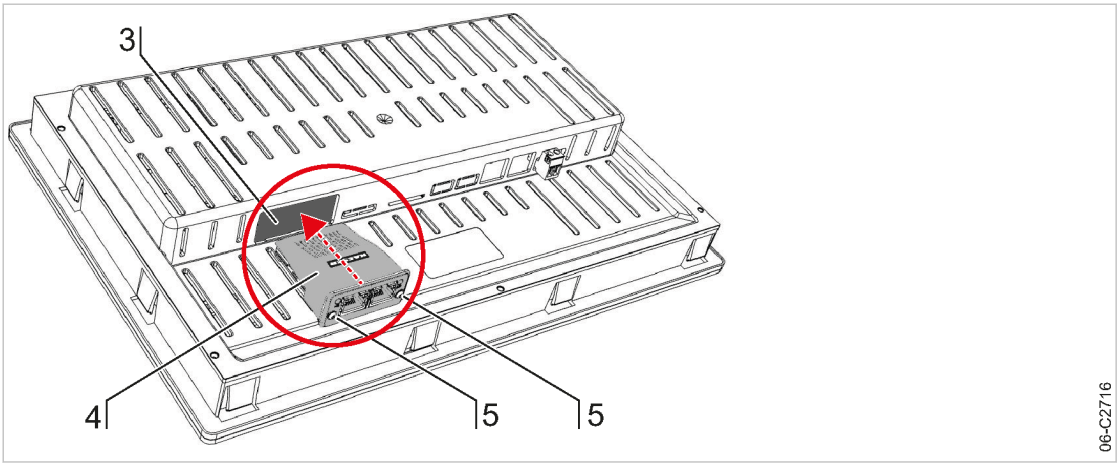


Fig. 13 Insert the communication module
[3] Module bay "Com-Module X1"
[4] Communication module
[5] Fixing screws

3. Push the communication module [4] into the module bay [3] from below until you feel it snap into place. The bus interface will face downward and the top of the module with the KAESER logo will be visible.
4. Use the Torx T9 screwdriver to screw in the fixing screws [5].

Result The module is correctly installed when the front plate is seated firmly in the recess of the module bay.

6.10 Planning the wiring

There are several methods of connecting the machines to SIGMA AIR MANAGER 4.0 or SBU:

- Using SIGMA NETWORK
  (for machines with SIGMA CONTROL 2), see chapter 6.11.1.
  Prerequisite: A port is available for each machine: SIGMA NETWORK in SIGMA AIR MANAGER 4.0 or SBU are available.
- PROFIBUS
  (when replacing a SIGMA AIR MANAGER with SIGMA AIR MANAGER 4.0 or for machines with SIGMA CONTROL), see chapter 6.11.2.
  Prerequisite: The option PROFIBUS master is available in the SIGMA AIR MANAGER 4.0 or SBU.
- Using floating relay contacts
  (for conventional machines without SIGMA CONTROL or SIGMA CONTROL 2; see chapter 6.11.3).
  Prerequisite: **A minimum of** one DOR I/O output is available in the SIGMA AIR MANAGER 4.0 or SBU for each machine. We recommend one DOR I/O port and one DI I/O port for each machine.

6.10.1 SIGMA NETWORK

The users are connected to SIGMA NETWORK in a star set-up. All lines start from a switch that is installed in the SIGMA AIR MANAGER 4.0 or SBU.

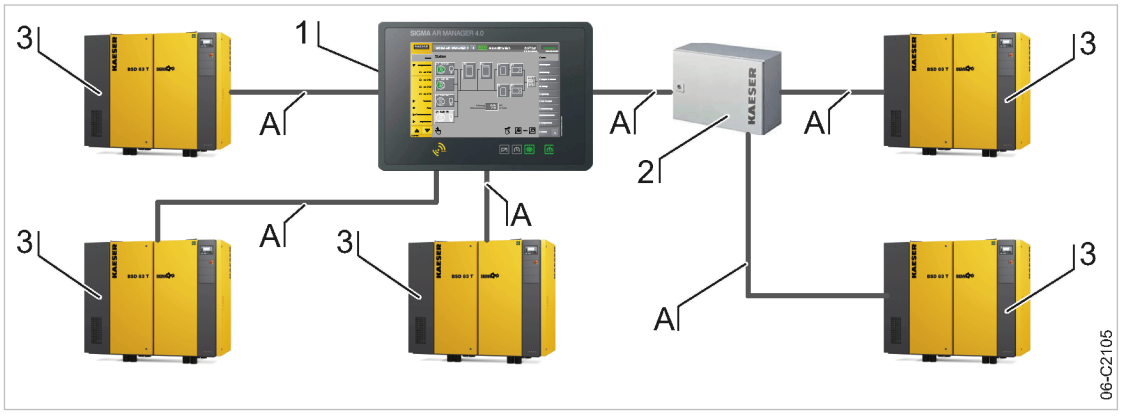


Fig. 14 SIGMA NETWORK design

[1] SIGMA AIR MANAGER 4.0
[2] SBU with option SIGMA NETWORK
[3] Machine with SIGMA CONTROL 2
[A] SIGMA NETWORK

6.10.2 PROFIBUS network

PROFIBUS wiring is used when a SIGMA AIR MANAGER is replaced by SIGMA AIR MANAGER 4.0 or in machines with SIGMA CONTROL. The PROFIBUS users are connected in series, that is, one after another. SIGMA AIR MANAGER 4.0 or SBU are located at the end of the bus.

A terminating resistor can be activated in every PROFIBUS connector. At the start and at the end of the bus cable, this resistor must be set to ON. In all other PROFIBUS connectors within the network, you must set the terminating resistors to OFF.

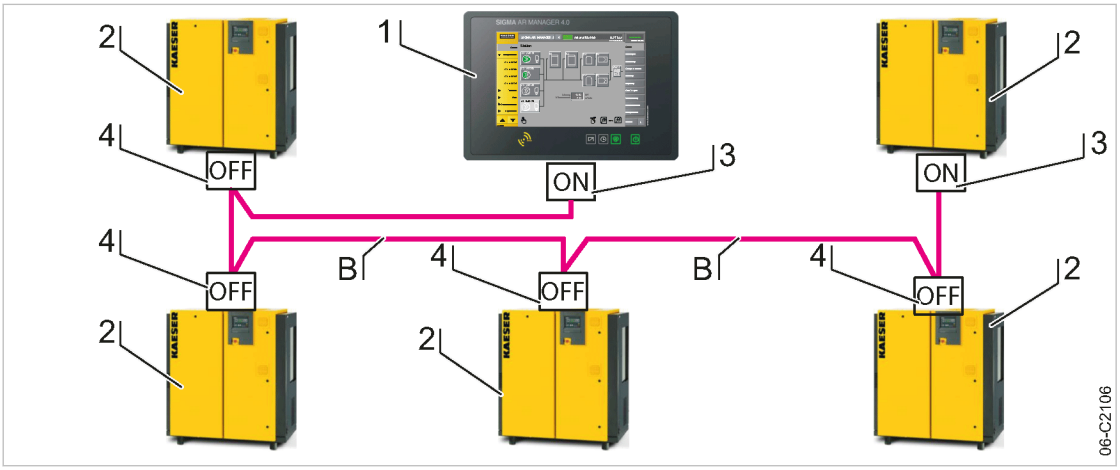


Fig. 15 Structure of a PROFIBUS network – SIGMA AIR MANAGER 4.0 with Option E1: PROFIBUS master

1. SIGMA AIR MANAGER 4.0
2. Machine with SIGMA CONTROL or SIGMA CONTROL 2
3. PROFIBUS connector with terminating resistor position: ON
4. PROFIBUS connector with terminating resistor position: OFF

B PROFIBUS

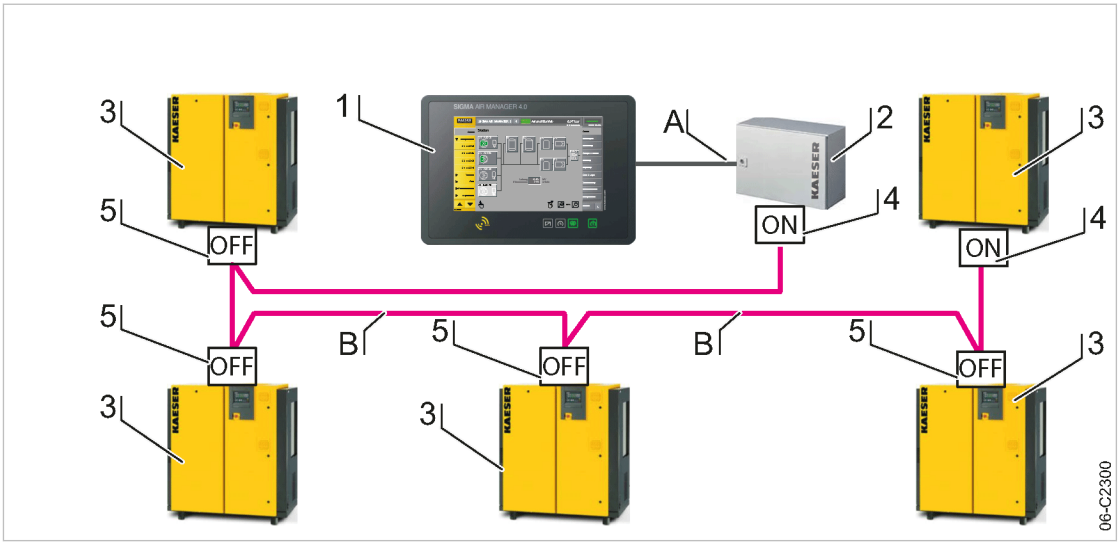


Fig. 16 Structure of a PROFIBUS network – SBU with Option E1: PROFIBUS master

1 SIGMA AIR MANAGER 4.0
2 SBU
3 Machine with SIGMA CONTROL or SIGMA CONTROL 2
4 PROFIBUS connector with terminating resistor position: ON
5 PROFIBUS connector with terminating resistor position: OFF
A SIGMA NETWORK
B PROFIBUS

6.10.3 Floating contacts

Machines with SIGMA CONTROL BASIC and conventional machines (without SIGMA CONTROL or SIGMA CONTROL 2) are connected as star using floating contacts. Each machine is directly connected to SIGMA AIR MANAGER 4.0 or SBU.

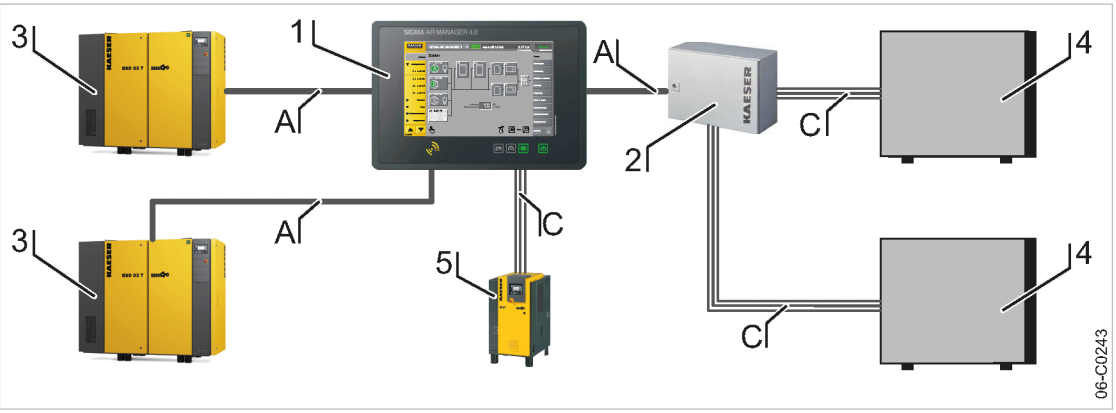


Fig. 17 Network structure with floating contacts

1 SIGMA AIR MANAGER 4.0
2 SBU
3 Machine with SIGMA CONTROL 2
4 Machine connected via floating relay contacts
5 Machine with SIGMA CONTROL BASIC
A SIGMA NETWORK
C Control line

6.10.4 Instructions on the electrical installation

- A power supply disconnecting device according to EN 60204-1: 2018 must be installed by the user.
- Do not exceed the following maximum values for the cable lengths:

Type	Maximum cable length [ft]	Remark
SIGMA NETWORK (copper)	328	Maximum conductor length between two devices at the SIGMA NETWORK.
SIGMA NETWORK FOC (fiber optic cable)	9842	Maximum cable length between two SIGMA NETWORK users with the FOC option (standard Multimode) or OLM version
	32808	Maximum cable length between two SIGMA NETWORK users with E19 Single mode FOC option
Digital transistor outputs	98	
Digital relay outputs	328	
Digital inputs	98	
Analogue inputs	98	Shielded
PROFIBUS	2625	Maximum cable length of the entire PROFIBUS.

Tab. 39 Maximum cable lengths

- Use galvanic isolation on cables laid outside the building to ensure increased lightning protection (preferably fiber optic cable).
- See chapter 2 for line types and cross-sections and the wiring diagram in chapter 13.7 for the cable layout. We recommend to use flexible braids if possible.
- Suppression of inductive loads connected to the relay outputs.

6.10.5 Prerequisites and accessories required for connection with SIGMA NETWORK

Prerequisite: For each SIGMA NETWORK device (SIGMA CONTROL 2 machine, SBU) a port is available: SIGMA NETWORK.

The following accessories are required for the construction of a SIGMA NETWORK (see chapter 13.5 for material numbers):

- Cable SIGMA NETWORK.
- For SIGMA AIR MANAGER 4.0: One RJ45 bus connector for every device to be connected to SIGMA NETWORK.
- For SBU: One RJ45 bus connector for every device to be connected to SIGMA NETWORK.
- For every SIGMA CONTROL 2 machine: LAN RJ45 retrofit kit.

6.10.6 Prerequisites and accessories connection with PROFIBUS

Prerequisite: Option PROFIBUS master in SIGMA AIR MANAGER 4.0 Type/Option DP in SBU

When replacing a SIGMA AIR MANAGER with a SIGMA AIR MANAGER 4.0, you can connect the existing PROFIBUS network to SIGMA AIR MANAGER 4.0 or SBU without additional accessories.

The following accessories are required for the connecting machines with SIGMA CONTROL (see chapter 13.5 for material numbers):

- PROFIBUS cable
- For SIGMA AIR MANAGER 4.0 or SBU: PROFIBUS connector
- For every machine with SIGMA CONTROL: PROFIBUS connector set for SIGMA CONTROL

6.10.7 Prerequisites for connection via floating relay contacts

Connect a floating output from SIGMA AIR MANAGER 4.0 or SBU in series with the existing pressure regulation (system pressure switch or electronic pressure regulation) of the machine.

Where compressors are connected via floating contacts, ensure the power supply is not overloaded by multiple units starting up simultaneously. You can stagger the start times by installing a timing relay in some compressors.

In compressed air stations with compressed air generation in operation mode *Manual*, compressors connected via floating relay contacts will start when the compressor pressure is below the compressor's cut-in pressure **and** one of the following conditions is met:

- The voltage supply at SIGMA AIR MANAGER 4.0 and the compressor cuts out and returns simultaneously.
- The voltage supply at SIGMA AIR MANAGER 4.0 cuts out, but not at the compressor.
- SIGMA AIR MANAGER 4.0 fails.

Required equipment for machines to be connected to SIGMA AIR MANAGER 4.0

SIGMA AIR MANAGER 4.0 version	Machine equipment
Up to 4 machines are connected via floating relay contacts to SIGMA AIR MANAGER 4.0 or SBU:	
SAM 4.0-4	One "external load control" input.
SAM 4.0-8 SAM 4.0-16	An additional “Motor running” floating relay contact (normally open contact) is recommended.
More than 4 machines are connected via floating relay contacts to SIGMA AIR MANAGER 4.0 or SBU:	
SAM 4.0-8 SAM 4.0-16	A "manual/automatic mode" / "LOAD/IDLE" control input with a system pressure switch in manual mode (-B1.1).
	A "pressure switch in series with SIGMA AIR MANAGER 4.0” (-B1) or a pressure switch blow-off protection safety relief valve (-B6).
	A “Motor running” floating relay contact (normally open contact).
	An “ON and no alarm” floating relay contact (normally open contact).

Tab. 40 Required equipment

If a machine is not prepared for connection to SIGMA AIR MANAGER 4.0, it may possibly be retrofitted. Documents and parts for the retrofit are available separately.

6.11 Wiring

⚠ DANGER

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

➢ *Ensure that the SIGMA AIR MANAGER 4.0/SBU and any external power sources are voltage-free.*

1. Switch off the SIGMA AIR MANAGER 4.0/SBU and any external power sources (all poles).
2. Lock them off.
3. Observe all recognized occupational safety regulations and applicable legal requirements when carrying out any work on the SIGMA AIR MANAGER 4.0/SBU.
4. Arrange for the SIGMA AIR MANAGER 4.0/SBU to be connected to a power supply only by an authorised and qualified electrician in accordance with the national regulations of the local electricity provider.

Terminals on the SIGMA AIR MANAGER 4.0/SBU that could still be subject to an external voltage, even when the power supply has been switched off, are to be marked as followed:

- Colored orange
- Label

5. Establish connections to the power supply, individual machines and devices in accordance with the wiring diagrams.

Avoid signal distortion by using suitable cabling and shielding.

- Ensure a minimum distance of 3.94 in between cables with voltages up to 24 V (digital inputs, analog inputs, SIGMA NETWORK, PROFIBUS and, if applicable, relay outputs [only SIGMA AIR MANAGER 4.0: cable to Com module and user-end LAN]) and power cables (voltages above 60 V).

SIGMA AIR MANAGER 4.0: The cover for the screw fixings (Fig. 5, (8)) features pre-punched passage options (right, left and bottom) for feeding the cables through. Attach cable ducts or trays in such a manner that these passage options may be utilized.

6.11.1 Creating the SIGMA NETWORK

1. Install the SIGMA NETWORK conductors.

If the bus connector and the SIGMA NETWORK cable do not match[1)], contact issues may occur. These issues can also occur at a later point in time and significantly interrupt the compressor station operation.

[1)] Example of connector/cable combination that is not compatible: Connection of an 8-core line on a connector that is only intended for a 4-core line.

➢ Use the connectors and lines as recommended by KAESER in chapter 6.10.5.

- For details to create the SIGMA NETWORK, see Fig. 14.
- For details of the connection at the machine, see the description for "LAN RJ45 retrofit kit".
- For details of the connection at SIGMA AIR MANAGER 4.0 or SBU, see chapter 6.12.

2. For maximal cable lengths, see chapter 6.10.4, "Notes to the electrical installation".

6.11.1.1 Installing the RJ45 bus connector

Material: Use a FastConnect stripper for industrial Ethernet FC cables (IE FC Stripping Tool) for easy stripping of the SIGMA NETWORK conductors and to improve the connection between the cable and the plug. An Ethernet cable stripping tool can be ordered from KAESER under the material number 8.8294.0.

To connect to SIGMA NETWORK, you must connect the network subscribers according to SIGMA NETWORK conductor.

- Feed the network cable to the SIGMA NETWORK devices on both sides through one EMC cable trench each.
- Use an RJ45 bus connector at both ends of the network cable.

Attaching the RJ45 connector

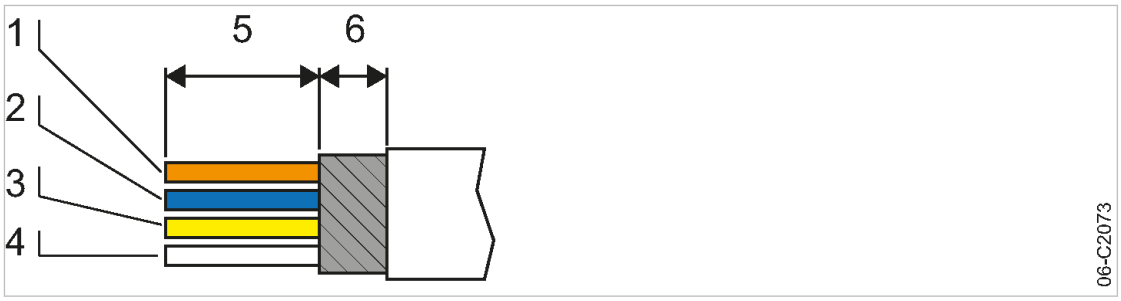


Fig. 18 Strip the insulation from the network cable

1	Orange	4	White
2	Blue	5	0.7 in
3	Yellow	6	0.2 in

1. Strip the insulation from the network cable (see Fig. 18).

Possible damage to the RJ45 connector and network cable if unlocked while under tension.

➢ Relieve tension on the RJ45 connector before unlocking.

2. Spread out the wires according to the color coding of the contact elements on the RJ45 connector (see Fig. 18).

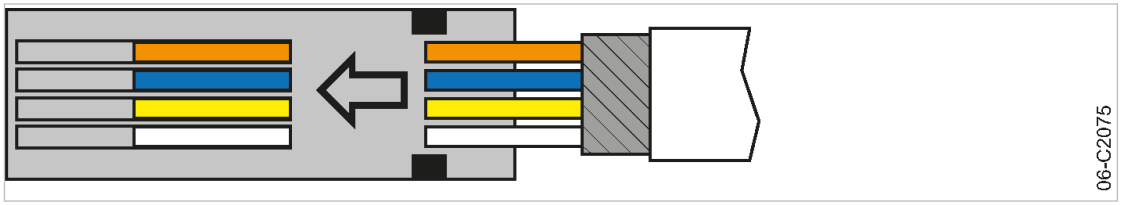


Fig. 19 Inserting the network cable wires

3. Insert the wires into the contact elements up to the limit stop.

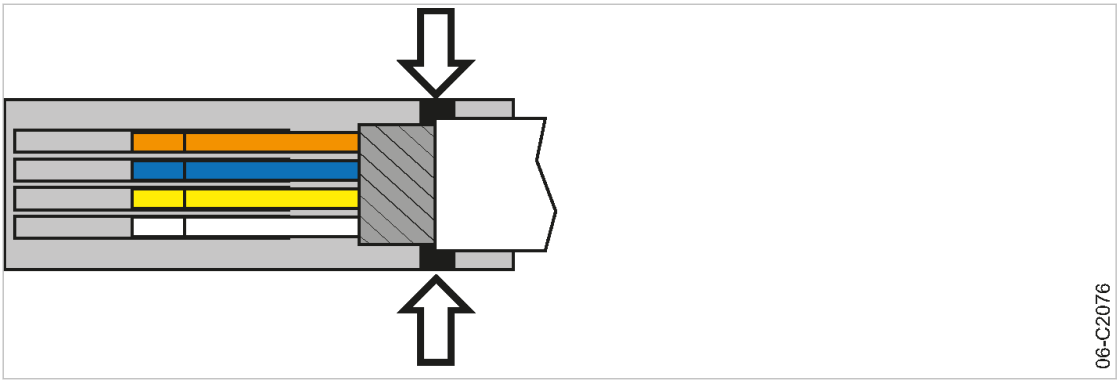


Fig. 20 Positioning the network cable

4. Position the network cable as shown (arrows, see Fig. 20).

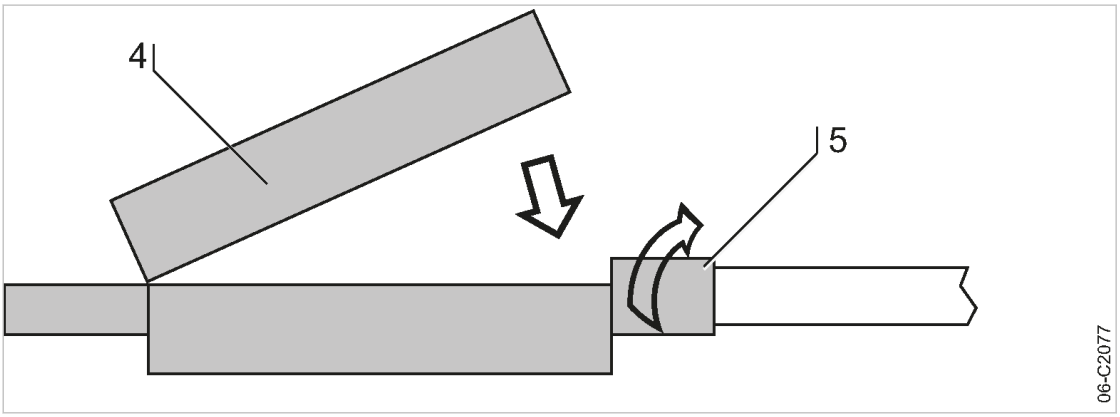


Fig. 21 Close the cover of the RJ45 connector

[4] RJ45 connector cover
[5] Rotatable locking piece

5. Close the cover and manually rotate the locking piece clockwise as far as possible.

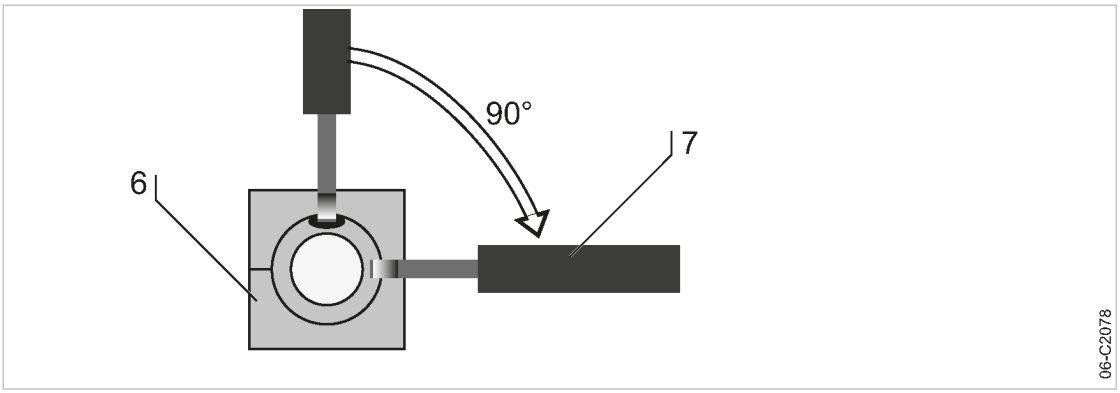


Fig. 22 Rotate the locking piece as far as the limit stop

[6] RJ45 connector (view from cable end)
[7] Screwdriver

6. Insert a screwdriver with 0.98 in blade width into the bore and rotate the locking piece clockwise until the limit stop.

In case of contact issues due to cable ends creating multiple contacts:

➢ Cut off contacting cable ends and strip the network cable again.

The insulation displacement connectors in the plug connector may be disconnected and re-contacted up to 10 times.

Result The RJ45 connector is correctly locked in place when the opening of the locking piece is aligned sideways and the side surfaces are flush with the plug.

6.11.2 Creating the PROFIBUS network

When replacing a SIGMA AIR MANAGER with a SIGMA AIR MANAGER 4.0 or SBU, you can connect the existing PROFIBUS network to the SIGMA AIR MANAGER 4.0 or SBU.

Material: Use a FastConnect stripper for PROFIBUS conductors (PROFIBUS FC Stripping Tool) for easy stripping of the PROFIBUS conductors and to improve the connection between the cable and the plug.

1. Install PROFIBUS cables.
   - See Fig. 15 for details about the creation of a PROFIBUS network.
   - See the installation instructions for the "PROFIBUS retrofit kit“ for details about the machine integration.
2. Switch the terminating resistor [3] (see Fig. 15) at both ends of the PROFIBUS to the ON position.
3. See the wiring diagrams in the annex for cable types, cross-sections and maximum cable lengths.

6.11.2.1 Connecting the PROFIBUS cable

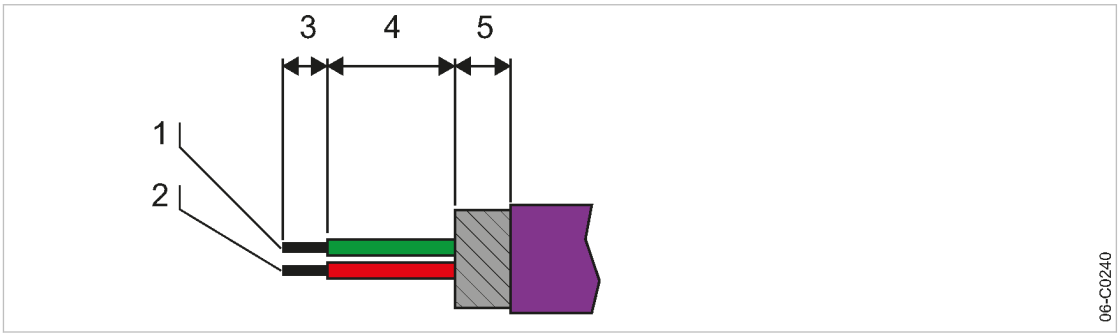


Fig. 23 Connecting the PROFIBUS cable

[1] Green conductor
[2] Red conductor
[3] 0.2 in.
[4] 0.5 in.
[5] 0.2 in.

1. Strip the isolation from the PROFIBUS cable as shown.
2. Connect the green conductor [1] to the green terminal “A” of the PROFIBUS plug.
3. Connect the red conductor [2] to the red terminal “B” of the PROFIBUS plug.

6.11.2.2 Installing the PROFIBUS plug

NOTICE

Too tight of a bend radius can cause a defect in the PROFIBUS cables.

➢ *Do not bend the PROFIBUS cable.*

Inline subscribers of a PROFIBUS network:

Install the PROFIBUS plug at one of the inline subscribers to the PROFIBUS network:

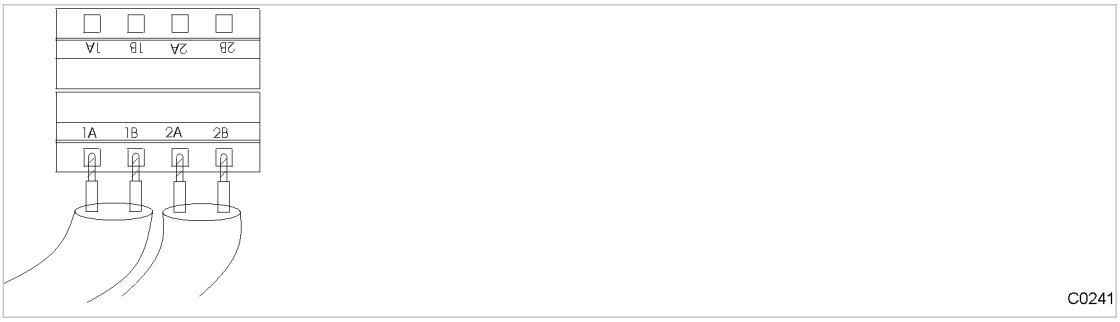


Fig. 24 Installing the PROFIBUS plug

1. Connect two PROFIBUS cables (input and output)
2. Set the terminating resistor in the PROFIBUS plug to OFF.

Subscribers at the end of the PROFIBUS network

Install the PROFIBUS plug at a terminating subscriber and at the SIGMA AIR MANAGER 4.0:

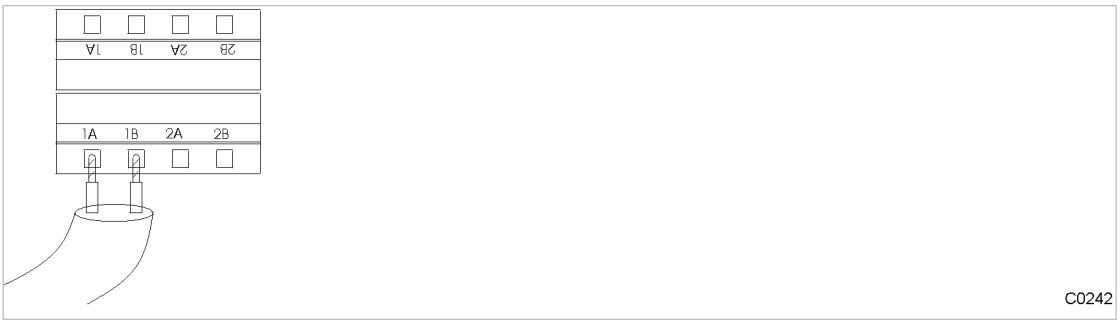


Fig. 25 Installing the terminating PROFIBUS plug

1. Connect one PROFIBUS cable (input only).
2. Set the terminating resistor in the PROFIBUS plug to ON.

6.11.3 Creating the compressor station via floating relay contacts

1. Use conventional wiring.
   - For details of creating a network with floating relay contacts, see Fig. 17.
2. Directly connect each machine with SIGMA AIR MANAGER 4.0 or SBU.

6.11.3.1 Wiring modifications to the machine

Interruptions to the air supply caused by unsuppressed inductive loads connected to the relay outputs of SIGMA AIR MANAGER 4.0 or SBU, such as auxiliary contactors or solenoid valves.

1. Suppress inductive loads with an RC interference suppressor.
2. Connect the interference suppressor in parallel directly at the coil (connections A1–A2). If the connections are inaccessible, in solenoid valves for example, 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 13.5.

Machine with "external load signal" control input

KAESER machines built in 1990 and after with terminal 32W:

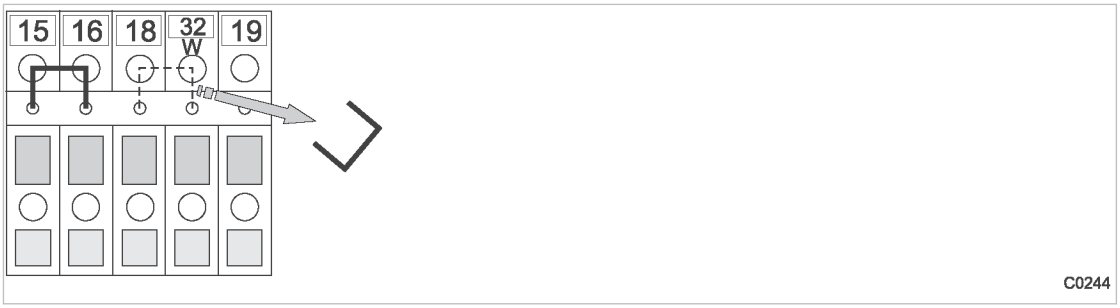


Fig. 26 Remove the wire jumper.

➢ 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 of the main pressure switch cable connected to terminal 18.
3. Disconnect the conductor of the main pressure switch cable connected to terminal 21.
4. Connect the conductor to terminal 32W.

6.11.3.2 Machine with one control input for "Operating mode Manual/Automatic" / LOAD/IDLE

KAESER machines built in 1990 and after

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 SIGMA AIR MANAGER 4.0 or SBU, 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.

6.12 Connecting lines

6.12.1 Wiring the control cabinet

Precondition The control cabinet is properly attached to the wall as described in chapter 6.6.
The base plate is freely accessible.

➢ Wire the control cabinet as described below.

6.12.2 Connecting the equipotential bonding

1. Connect the housing to user-supplied equipotential bonding at the corresponding equipotential bonding connection.
2. Keep the connection as short as possible.
3. Use a ground band or cable with a cross-section of at least 16 mm^2.

6.12.3 Feeding cables and connecting the shielding

Tips for connecting cables:

- As a first step, unscrew the coupling rings of all required cable glands and remove the plastic plugs. Keep the coupling rings nearby. For metal cable glands, remove the plastic inserts and place them nearby.
- Start from the rear (base plate) to place conductors into the cable glands.
- You need a conductor length of approx. 12 in. in the SIGMA AIR MANAGER 4.0 control cabinet (two fingers width longer than the front edge of the plate with the cable glands).
- After feeding each conductor, rotate the corresponding cable gland until the conductor is properly seated and the gland is sealed. The rotating becomes very difficult when many cable glands are filled.

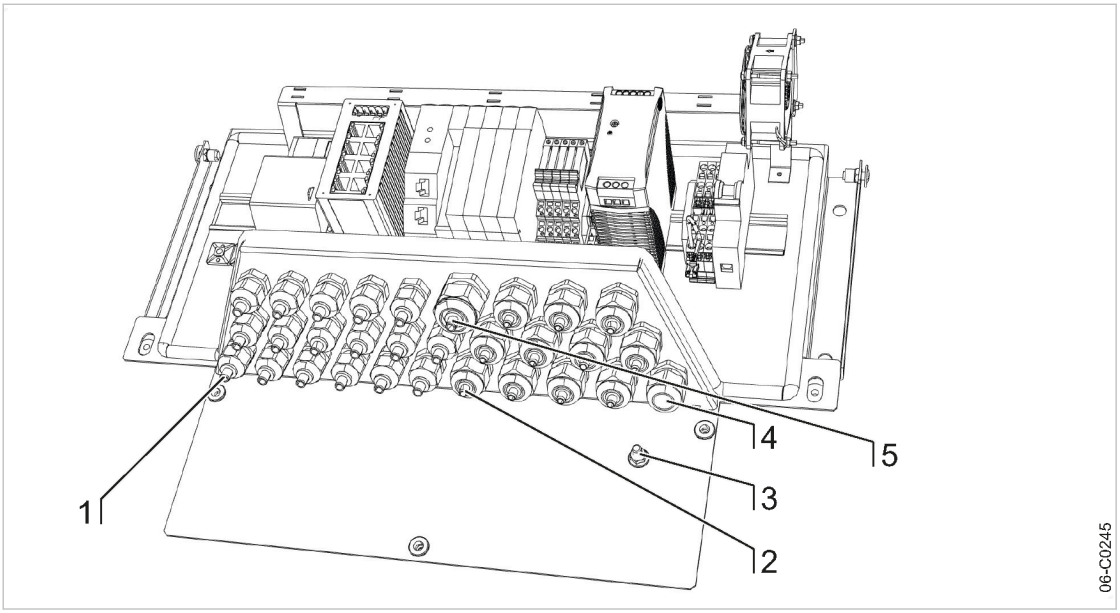


Fig. 27 Feeding cable and connecting the shielding

[1] Metallic cable glands for shielded cables (analog inputs, SIGMA NETWORK, PROFIBUS, cable to the COM module)
[2] Plastic cable glands for unshielded cables (digital inputs, digital outputs)
[3] Equipotential bond connection (stud)
[4] Network connecting line
[5] Conductor to user LAN
[6] Plastic cable glands for fiber optic cable (FOC) [only in option E4, E5, E6]

1. Feed shielded cables (analog inputs, SIGMA NETWORK, PROFIBUS, cables to the COM module) through the metallic cable glands [1]. Connect the shielding as described below.

2. fiber optic cable (FOC)
   Fiber optic cable without insertion tool: Feed the fiber-optic cable through the plastic cable gland [6].
   Fiber optic cable with insertion tool:
   - Remove plastic cable gland (6).
   - Unscrew the insertion tool from the divider of the fiber optic cable
   - Feed fiber optic cable and divider through the metal plate into the SAM 4.0 control cabinet
   - Attach divider with previously removed counter nut.
3. Feed the conductor to the user's LAN through the plastic cable gland with EMC brass brush [5]. Connect the shielding as described below.
4. Feed the network connecting line through the plastic cable gland [4].
5. Feed other unshielded cables (digital inputs, digital outputs) through the plastic cable glands [2].
6. After feeding the conductor, rotate each cable gland until the conductor is properly seated and the gland is sealed.

Connecting the shielding

At the control cabinet:

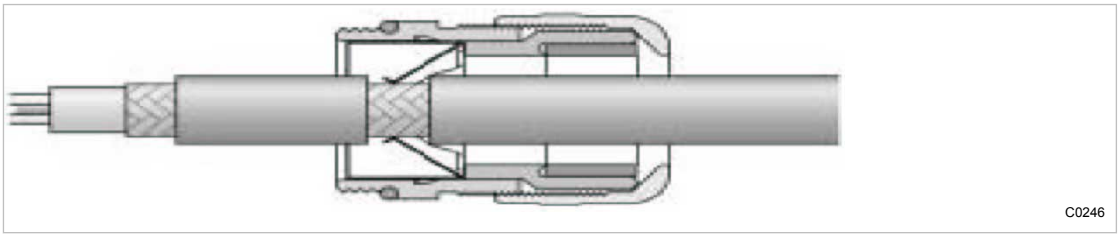


Fig. 28 Connecting the shielding

1. Strip off the cable insulation by about 0.4 in. 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 ground clamp in the cable gland.

Connecting the shielding for the user's LAN

1. Strip off the cable insulation by about 0.4 in.at the terminal.
2. Feed the conductor or patch cable (with plug) through the plastic cable gland with EMC brass brush (Fig. 27 [5]) until the stripped part of the conductor touches the brass brush.

6.12.4 Laying the cables in the control cabinet

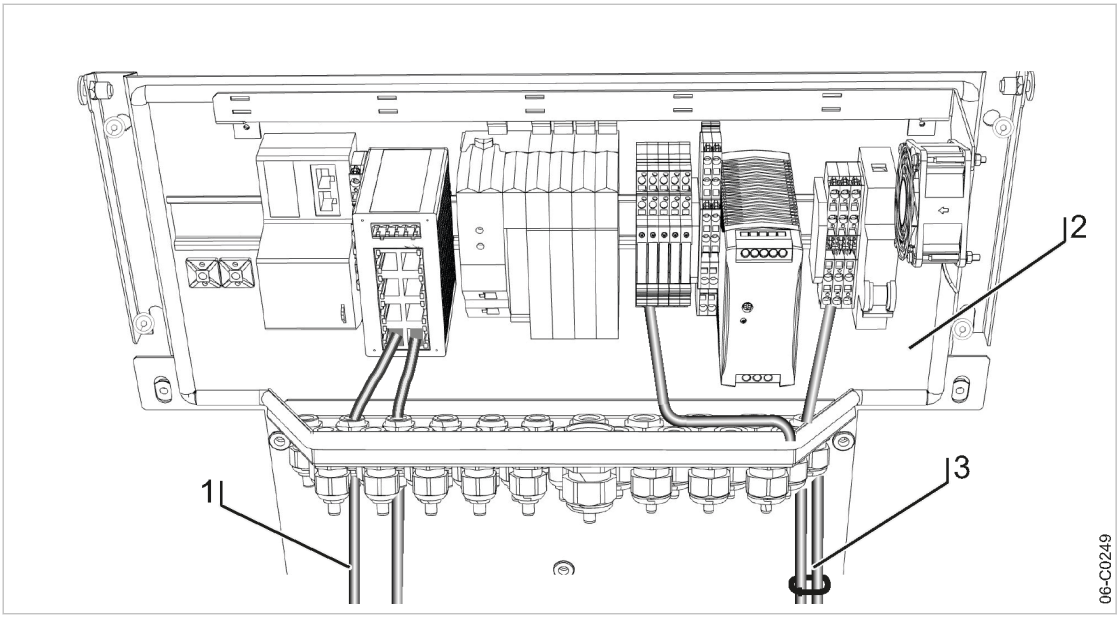


Fig. 29 Cable routing in the control cabinet

[1] Cables with voltages up to 24 V (digital inputs, analogue inputs, SIGMA NETWORK, PROFIBUS, cables to the COM module and the user's LAN, relay outputs, if provided)
[2] SIGMA AIR MANAGER 4.0 control cabinet
[3] Cables with 115/230 V AC voltage (common supply line, relay outputs, if provided)

1. Use cable ties to bundle all 115/230 V AC cables and keep them separate from all other cables.
2. Install the bus cables to the SIGMA AIR MANAGER 4.0 terminal so that they will not be kinked by opening and closing the cover.

6.12.5 Connecting the cables

1. Make the connections to terminals and interfaces as detailed in the attached wiring diagram.
2. Connect external sensors according to the wiring diagram in the annex.
3. For installing the RJ45 bus connector, see chapter 6.11.1.
   Insert RJ45 bus connectors on both sides of the connection into the corresponding socket until it locks into place.
4. For installing the the PROFIBUS plug, see chapter 6.11.2.
   Mount PROFIBUS plugs on both sides of the connection and fasten by screwing in the two screws.
5. Connect fiber optic cable (FOC):
   The fiber optic cable connection between the switches is a crossover connection.
   RX ------ fiber optic cable -1- -------- TX
   TX ------ fiber optic cable -2- -------- RX
   The number (-1- or -2-) is printed on the insulation of the fiber optic cable ends.

Connect fiber optic cable to both sides of the connection

1. Connect the first fiber optic cable as described below to the bottom socket "TX" on the switch.
2. Connect the second fiber optic cable as described below to the top socket "RX" on the switch.

Connect fiber optic cable by inserting the ST plug into the socket

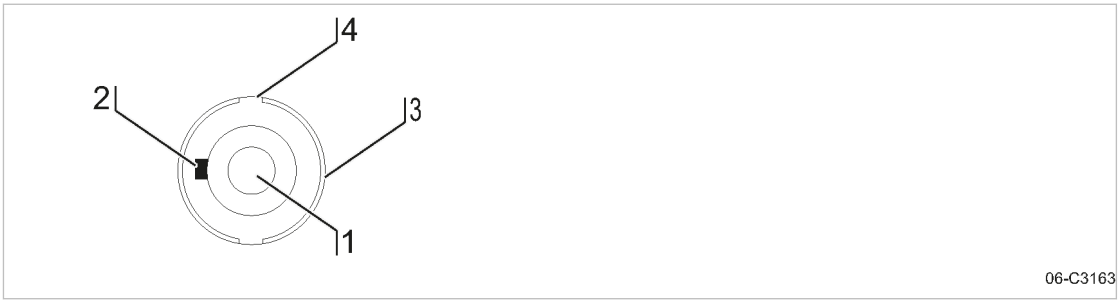


Fig. 30 ST plug with fiber optic cable

1. Remove the protective cap from the fiber optic cable.
2. Looking at the fiber optic cable [1] from the front, position the small nipple on the inner metal ring [2] on the left by turning the plug.
3. Position the grooves on the outer metal ring [4] at the top and at the bottom by turning the metal ring [3].
4. Attach the fiber optic cable. If the small nipple has been positioned correctly this should work quite easily.
5. Lock the outer metal ring [3] by sliding it to the front against the spring tension and turning it to the right. Once locked, the outer ring springs back.

6.12.6 Installing the control cabinet

Material
Control cabinet key type: Two-way key 3mm (0.12 in.)
Hexagon spanner, 4mm (0.16 in.) width
Open-end spanner, 6mm (0.24 in.) width
Diagonal cutter

Precondition
The base plate of the control cabinet is properly attached to the wall (see chapter 6.6).
The control cabinet is fully wired (see chapter 6.12).

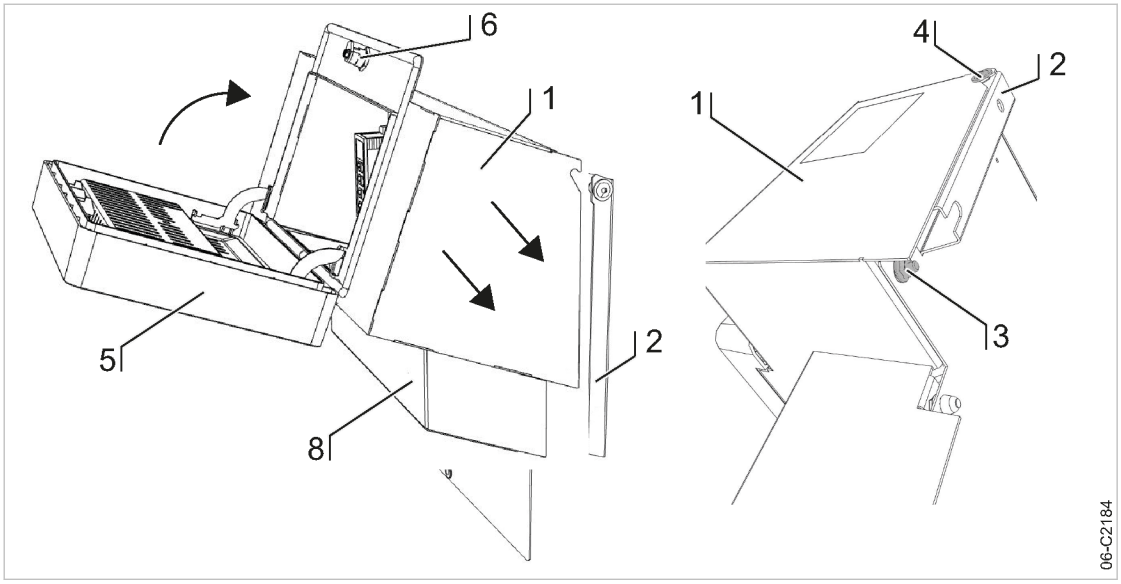


Fig. 31 Installing the control cabinet

1	Control cabinet cover	5	SIGMA AIR MANAGER 4.0 terminal
2	Base plate	6	Spagnolet
3	M 6x16, SW6 toothed nut	8	Cable gland cover
4	M 6x16, SW4 screw		

1. Attach the control cabinet cover 1 on the base plate 2 as shown below.
   - Fasten the cables leading from the base plate into the control cabinet cover (PE, SIGMA NETWORK, 24 VDC) to the base plate, ensuring that they are above the plate with the cable glands and do not protrude out the side or bottom.
   - Insert the control cabinet cover, moving it from the top and front towards the base plate and hanging it on the two screws 4.
   - Fold the control cabinet cover downward, ensuring that no cables are pinched.
2. Install the control cabinet cover 1 with two nuts 3 on the base plate 2.
3. Tighten both screws 4 and both nuts 3.
4. Connect the protective conductor attached to the terminal strip to the PE connector in the cable gland cover 1.
5. Ensure the proper seating of the protective conductor.
6. Connect the internal cables leading from the base plate 2 to the SIGMA AIR MANAGER 4.0 terminal 5. Place these conductors mostly parallel to the cover bottom side to ensure that they won't be pinched when the cover is closed.
7. Close the SIGMA AIR MANAGER 4.0 terminal 5.
8. Lock the spagnolet 6 at the cable gland cover 1 with the control cabinet key.

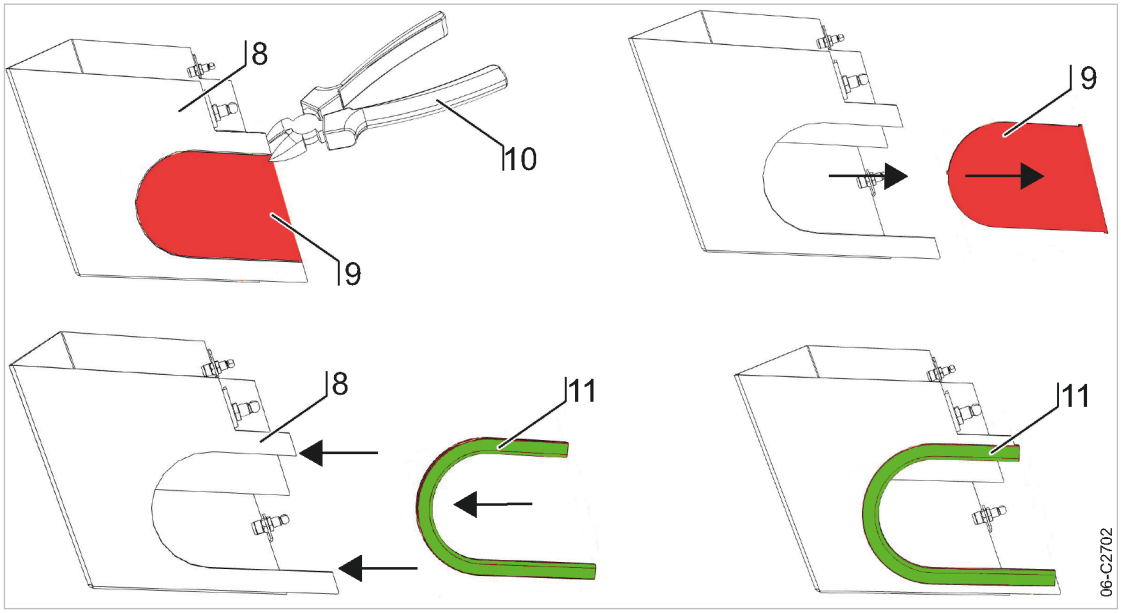


Fig. 32 Remove cable insert knock-outs / Attach edge protection

8	Cable gland cover	10	Diagonal cutter
9	Cable insert knock-outs	11	Edge protector

9. Remove cable insert knock-out(s) 9 from the cover 8. Use a diagonal cutter 10 to cut through the attachment point of the pre-stamped knock-outs and twist back and forth until the knock-out comes loose.
10. Position a piece of the supplied edge protector 11 over the resulting opening.
11. Push the cover for the cable glands 8 from the front into the rubber holes in the base plate.

6.13 Setting up the machines

NOTICE

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 4.0 pressure band to a width which ensures that the switching frequency is not exceeded.*
- ➢ *If necessary, increase the capacity of the air receiver.*
- ➢ *Note the settings made here in the table in the annex (see chapter 13.4).*

Precondition

The settings described in this section must be entered in full for every machine to ensure faultless operation. Make sure that the compressed air system remains in operation should the SIGMA AIR MANAGER 4.0 fail.

- ➢ Carry out settings as detailed in this manual.

6.13.1 Integration with SIGMA NETWORK

The prescribed procedure for the setting of SIGMA CONTROL 2 machines is described in the corresponding operating manuals.

Note the settings made here in the table in the annex (see chapter 13.4).

Only use the current software version for SIGMA CONTROL 2.

Set the IP address of the network subscribers as follows:
SIGMA AIR MANAGER 4.0: IP address = 169.254.100. “Machine number +102“

SIGMA AIR MANAGER 4.0 does **not** automatically assign the IP addresses to the network users. Either the wrong machine or no machine is controlled if an incorrect IP address is assigned.

1. Enter system pressure pB (p_2 and set as default for "Manual mode pressure".

Simultaneous activation of the machines in manual mode.

➢ In manual mode, the pressure set point of each machine should be staggered by 4.4 psi to prevent all machines from starting together. The stagger time for station operation must be set. Suggestions for these settings are found in the annex (see chapter 13.4.2).

2. Activate and setting up automatic restart after a power failure.
3. Configure the operation at the SIGMA NETWORK.

6.13.2 Integration with PROFIBUS

The correct procedure for setting up SIGMA CONTROL machines is described in the corresponding operating manuals.

Note the settings made here in the table in the annex (see chapter 13.4).

Set the slave numbers of the PROFIBUS devices as follows:

- SIGMA CONTROL Slave No. = Machine number +2
- SIGMA CONTROL 2: Slave No. = Machine number +102

Either the wrong machine or no machine is controlled if an incorrect slave number is entered.

1. Enter system pressure pB (p_2 and set as default for "Manual mode pressure".

Simultaneous activation of the machines in manual mode.

➢ In manual mode, the pressure set point of each machine should be staggered by 4.4 psi to prevent a simultaneous start of all machines. The stagger time for station operation must be set. Suggestions for these settings are found in the annex (see chapter 13.4.2).

2. Activate and set up automatic restart after a power failure.
3. Configure PROFIBUS operation (see Table: Parameters for bus faults).
4. Repeat steps 1 to 3 for any further machines.

The following settings are recommended as parameters for bus alarms:

Parameters	Value	Meaning
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.

Parameters	Value	Meaning
Time-out	5.00 s	Period after which the machine switches to self-control if a fault occurs in SIGMA AIR MANAGER 4.0.
Restart	Auto	Not at SIGMA CONTROL 2. The machine automatically connects again when the PROFIBUS runs again after a bus alarm.
Restart	Man.	Not at SIGMA CONTROL 2. After a bus alarm the machine remains under its own internal control until it is connected to the bus again when the «Remote control» key is pressed.

Tab. 41 Parameter for bus alarm

6.13.3 Linking via floating relay contact

Precondition The machines are provided with the floating relay contacts required and they are wired up (see chapter 6.10.7).

➢ Note the settings made here in the table in the annex (see chapter 13.4).

Rotary screw compressors always have an EMERGENCY mode. Piston compressors and blowers may or may not have this facility.

6.13.3.1 Compressed air station with compressed air generation in the Manual operating mode

- In the *Automatic* mode SIGMA AIR MANAGER 4.0 assumes the LOAD / IDLE control.
- In the *Manual* mode, the machines run via the internal pressure control.

Machine with "External load control" input

When the machine is linked, the machine pressure control (system pressure switch (-B1) or electronic pressure control) remains in operation. The system automatically runs in the *Local operation* mode via these pressure switches if power to the SIGMA AIR MANAGER 4.0 fails or the SIGMA AIR MANAGER 4.0 itself malfunctions, ensuring a further supply of compressed air.

➢ Set the pressure control.

Further information For more information about the suggested settings for the pressure control, see Annex, chapter 13.4.1.

Machine with one control input for "Operating mode Manual/Automatic" / LOAD/Idle

A "blow off protection safety relief valve" pressure switch (-B6) or a "pressure switch in series to the SIGMA AIR MANAGER 4.0 load output" (-B1) is fitted in the machines to prevent one of the following:

- The machine is overloaded.
- The safety relief valve responds due to:
  - switching points set too high
  - defective master controller
  - excessive pressure loss between the machine and the pressure transducer of SIGMA AIR MANAGER 4.0.

➢ Set the "pressure switch in series to the SIGMA AIR MANAGER 4.0 load output“ (-B1). See chapter 13.4.1 for recommended settings.

➢ Set the "pressure switch for manual operation (-B1.1) **in sequence** to ensure that the machines cut in after another. See chapter 13.4.2 in the Annex for recommended settings.

6.13.3.2 Compressed air station without compressed air generation in the Manual operating mode

Blowers and reciprocating compressors are not fitted with pressure switches that could ensure compressed air generation in the *Manual* mode.

When these machines are connected, the IDLE switching is controlled by SIGMA AIR MANAGER 4.0.

This station will stop delivering compressed air if SIGMA AIR MANAGER 4.0 fails.

➢ Take suitable application-specific measures.

7 Initial Start-up

7.1 Commissioning – overview

SIGMA AIR MANAGER 4.0 is centrally configured with the "Engineering Base" planning tool. "Engineering Base" creates a configuration for easy import in SIGMA AIR MANAGER 4.0. No time-consuming commissioning and configuration on-site. Just a few settings such as date and time, must be entered at the SIGMA AIR MANAGER 4.0.

topic	Description
First activation	Chapter 7.2 "First activation"
Setting the language	Chapter 7.3 "Language"
User log-in	Chapter 7.4 "User log-in"
Importing the configuration	Chapter 7.5 "Importing the configuration"
Setting the time zone, date and time	Chapter 7.6 "Date and time"
Setting the Units	Chapter 7.7 "Units"
Key lock	Chapter 7.8 "Key lock"
Setting up the display	Chapter 7.9 "Display"
Menu behaviour	Chapter 7.10 "Menu behaviour"
SAM 4.0 terminal settings	Chapter 7.11 "SAM 4.0 terminal"
E-mail settings	Chapter 7.12 "E-mail"
SIGMA NETWORK I/O	Chapter 7.13 "SIGMA NETWORK I/O"
PROFIBUS	Chapter 7.14 "PROFIBUS"
SIGMA NETWORK	Chapter 7.15 "SIGMA NETWORK"
Control	Chapter 7.16 "Control"
Timer control	Chapter 7.17 "Timer control"
Data backup	Chapter 7.18 "Data backup"
Control technology	Chapter 7.19 "Control technology"
Activating SIGMA AIR MANAGER 4.0	Chapter 7.20 "SIGMA AIR MANAGER 4.0" Activating

Tab. 42 Commissioning – overview

7.2 First activation

Precondition
No personnel are working on the machine.

All maintenance doors and removable panels are properly installed, closed, and secured.

All installation activities and wiring tasks have been properly and completely performed according to chapter 6"Installation"

The ambient conditions as described in Chapter 5 "Installation and Operating Conditions" are met.

NOTICE

There is risk of damage to the compressed air supply through premature changeover to automatic mode.

➢ *Press «Automatic» only when all settings required for set-up (see chapter 7 "Initial Start-up") have been made.*

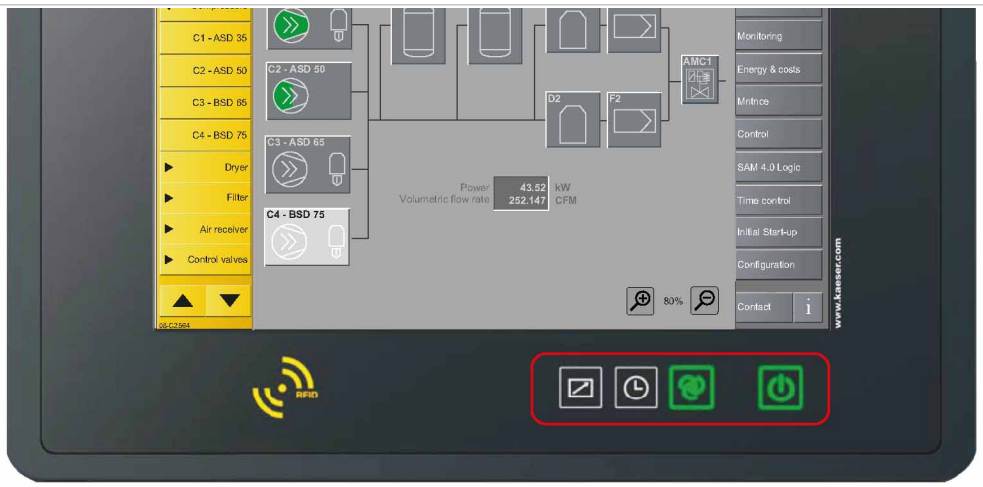


Fig. 33 Keys on the operating panel

1. Switch on the power supply for SIGMA AIR MANAGER 4.0 at the user's power supply disconnecting device.

   SIGMA AIR MANAGER 4.0 starts. The boot-up is finished when the "Status" menu appears (after about 3 minutes).

Sign	Operating element	Key illumination	Function
	«Remote control» key	Green	Activation and deactivation of the remote operation.
	«Timer control» key	Green	Switches the time control on or off.
	«Automatic» key	Green	Switch the station between manual and automatic mode.
	«Compressed air generation» key	Green/red	Compressed air station activation (air supply) or **deactivation (ATTENTION: no air supply!)**

Tab. 43 Keys on the SIGMA AIR MANAGER 4.0 operating panel

2. Press «Compressed air generation» key.

   The system returns a confirmation prompt.

3. Confirm with Yes.

   The «Compressed air generation» key lights up **green**.

4. Ensure that SIGMA AIR MANAGER 4.0 is set to *Manual* mode. The «Automatic» key does **not** illuminate.
5. If the «Automatic» key illuminates green, press again this key for the illumination to extinguish.

- Compressed air station without compressed air generation in the *Manual* operating mode do not deliver any compressed air (chapter 6.4 "Installation").
- Compressed air stations with compressed air generation in the *Manual* operating mode run via their internal pressure control (see Chapter 6.4 "Installation").

7.3 Language

You can choose and set the user interface language for the SIGMA AIR MANAGER 4.0.

Fig. 34 *Language* menu

1. Press the Configuration – Language key.
   The *Language* menu displays the currently set language.
2. Touch the symbol.
   The available languages are displayed in a list.
3. Select the desired *Language (country)* combination.
   SIGMA AIR MANAGER 4.0 loads and automatically displays the selected language.

When you set the language, you automatically adjust the display formats for date and time (see chapter 7.6 "Date and time") and the units (see chapter 7.7 "Units"). You can manually change these settings.

The user menus of SIGMA AIR MANAGER 4.0 are currently set to a language not understood by the user. For this reason, the user is unable find the Language Settings menu.

➢ The Configuration – Language keys are arranged at the bottom of the function selection list (keys on the right display side) (see illustration).

7.4 User log-in

With your SIGMA AIR MANAGER 4.0, you received two RFID Equipment Cards. They authorize the user to log on to SIGMA AIR MANAGER 4.0 and make or change settings.

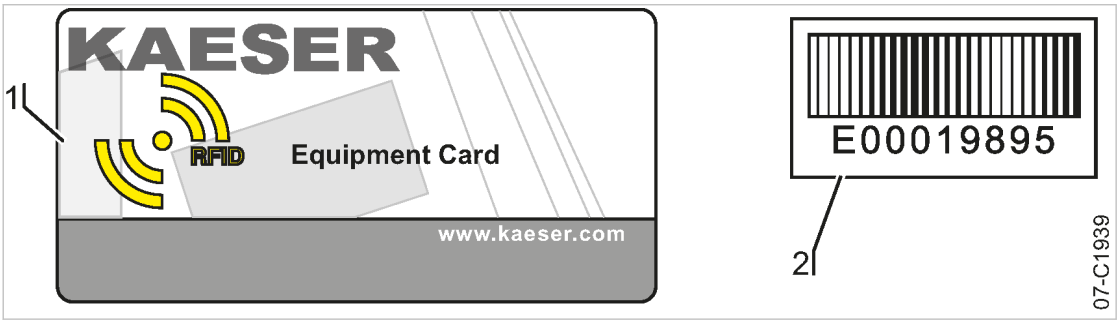


Fig. 35 RFID Equipment Card

[1] RFID Equipment Card
[2] Card number on the back

1. Remove the RFID Equipment Card from the plastic sleeve.
2. Record the number shown on the back of the RFID Equipment Card and keep it at a secure location.

7.4.1 Logging on with the RFID Equipment Card

Fig. 36 RFID reader

[1] RFID Equipment Card
[3] RFID reader
[4] Access Mode menu element

1. Hold the RFID Equipment Card [1] directly in front of RFID reader [3]. The log-on data are read.
   If the system recognizes the RFID Equipment Card, it returns a message [5]. The message contains information about User name and Access level.

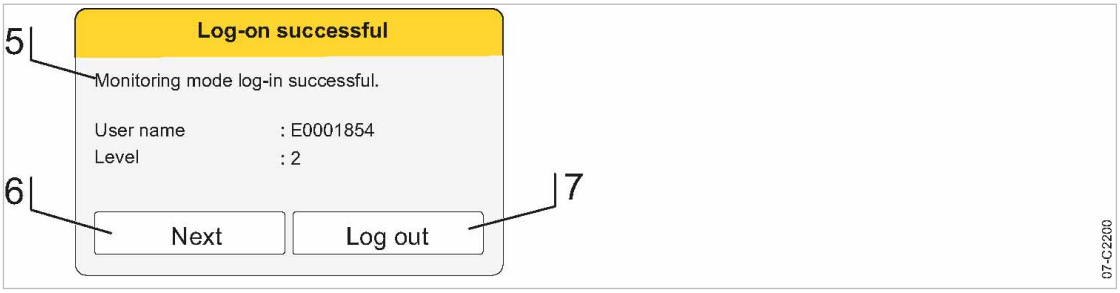


Fig. 37 Logged on

2. Press Next to confirm the prompt.
   The message window closes.
   The user is now logged on in the *Observation* mode. This is shown in the *Access Mode* [4] menu element.
3. To switch to the *Configuration* mode, repeat this process from Step 1.
   The user is now logged on in the *Configuration* mode. This is shown in the *Access Mode* [4] menu element.

7.4.2 User log out

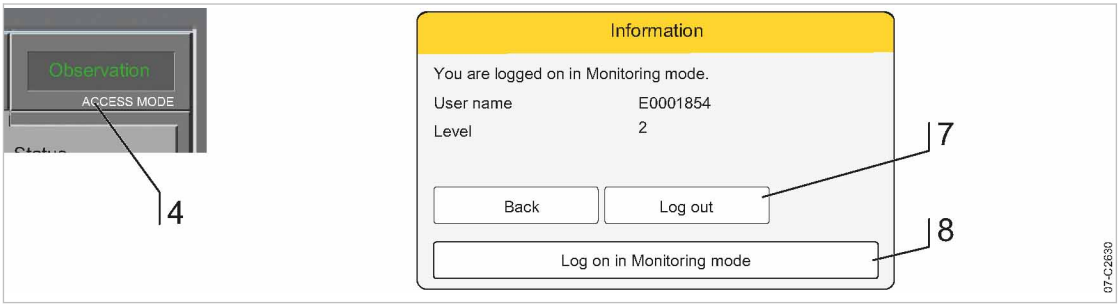


Fig. 38 *Information* menu

1. To log out, touch the Access Mode [4] menu element.
   A message is displayed.
2. Press Log out [7] to log out.

The access level will automatically return to "Logged out" after 10 minutes without user intervention. The time duration is set with the *Timeout for STANDBY* parameter in the menu "Configuration" – "Display".

7.4.3 User administration

Use the *User administration* menu to add or delete users, change passwords and edit the access levels of registered users.

7.4.3.1 User administration menu

The menu *User administration – User list* displays a list of all users registered in SIGMA AIR MANAGER 4.0.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section).

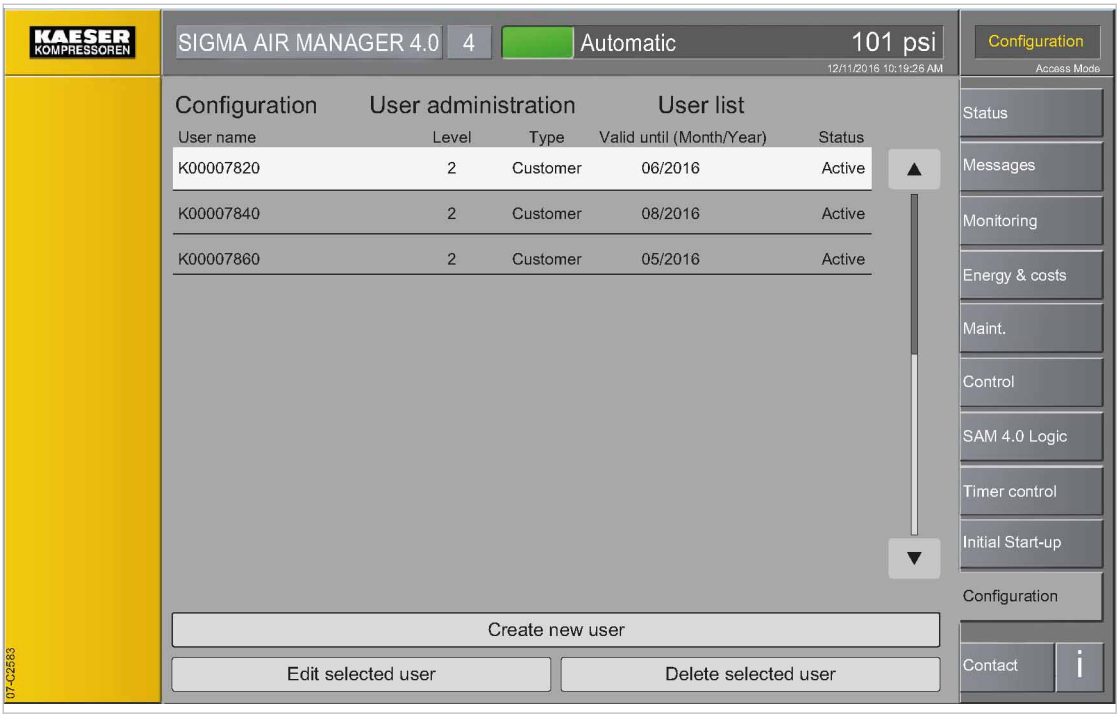


Fig. 39 Menu *User administration – User list*

1. Press the Configuration – User administration key.
   The menu *User administration – User list* displays the registered users in a table:

Parameter	Meaning
User name	The user name is determined by logging on with the RFID Equipment Card. It comprises of letters and digits, printed on the back of the RFID Equipment Card.
Level	Access level of the corresponding user account.
Type	*Customer* type user accounts can have maximum access level 2. They are created using RFID Equipment Cards or by other *Customer* type users and are valid without time limit.
Valid until (Month/Year)	When adding a user account, you usually specify a date of expiration for this account. *Customer* type user accounts however, remain valid without time limit.
Status	Indicates the *active* or *inactive* status of a user account.

Tab. 44 Menu *User administration – User list*

2. Select a user account by tapping it.
   The selected user account is highlighted.

7.4.3.2 Edit user

You can edit selected user accounts.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section).

1. Touch the desired user in the *User administration – User list* menu.
   The selected user account is highlighted.

2. Press the Edit selected user key.
   The menu *User administration – Edit selected user* is displayed:

Parameter	Meaning
User name	Name of the selected user account.
Type	For example, the type *Customer*
Expiry date (MM/YYYY)	Expiration date for the selected user account. User accounts of the *Customer* type however, remain valid without time limit.
New password	Enter your own password for the user log-on. For security reasons, you must enter the password twice.
Repeat new password	
Access level	Access level of the corresponding user account.
Status	By default, the user account is *Active*. However, you can set it to *Inactive*. In this case, the user no longer has any authorizations.

Tab. 45 Edit selected user

3. Enter a password in the *New password* field. The password must have between 6 and 16 characters. Possible characters are a…z, A…Z and 0…9.
4. Enter the same password in the *Repeat new password* field.
5. If required, set the status *Active* or *Inactive*.
6. Press the Accept changes key.

7.4.3.3 Creating a new user

An authorized user can add other users.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section).

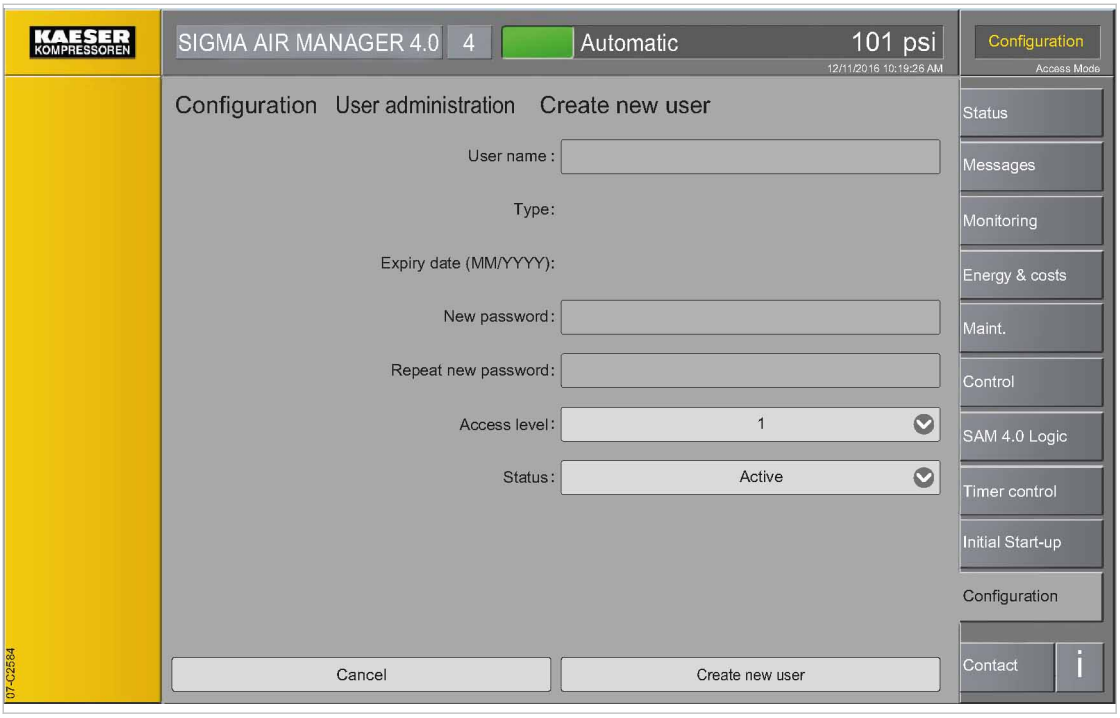


Fig. 40 *Create new user* menu

1. Press the Configuration – User administration key.
2. Press the Create new user key.
   The menu *User administration – Create new user* is displayed.
3. Touch the *User name* field. Use the virtual keyboard to enter the user name and confirm with *Accept*.
4. Enter a new password in the *New password* field. The password must have between 6 and 16 characters. Possible characters are a…z, A…Z and 0…9.
5. Enter the same password in the *Repeat new password* field.
6. Set the access level in the *Access level* field.
7. Set the status to *Active*.
8. Press the Create new user key.

7.4.3.4 Deleting a user

An authorized user can delete user accounts.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section).

1. Touch the desired user in the *User administration – User list* menu.
   The selected user account is highlighted.
2. Press the Delete selected user key.
   The selected user account is deleted.

7.4.3.5 Create the master RFID Equipment Card

If SIGMA AIR MANAGER 4.0 is controlling several KAESER machines with SIGMA CONTROL 2 it may make sense to create a master RFID Equipment Card with which you can log onto SIGMA AIR MANAGER 4.0 and all machines.

Precondition The RFID Equipment Card delivered with SIGMA AIR MANAGER 4.0 and at least one additional teachable RFID Equipment Card are available.

1. Hold the RFID Equipment Card [1] directly in front of RFID reader [3]. The log-on data are read.
   If the system recognizes the RFID Equipment Card, it returns a message [5].

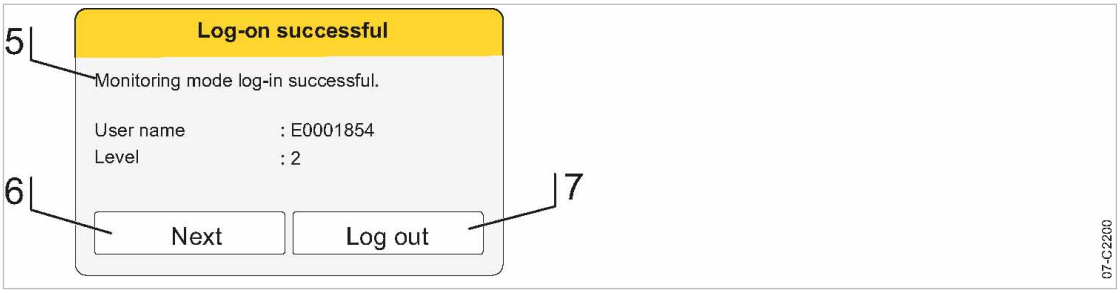


Fig. 41 Logged on

2. Press Next to confirm the prompt.
   The message window closes.
   The user is now logged on in the *Observation* mode.
3. Within 10 minutes, hold the master RFID Equipment Card to be taught directly in front of the RFID reader [3].
   If the system successfully recognizes the RFID Equipment Card, it displays a message that a new user has been registered.
4. Repeat the previous steps for all machines with SIGMA CONTROL 2.

7.5 Import configuration

SIGMA AIR MANAGER 4.0 is centrally configured with the "Engineering Base" planning tool. "Engineering Base" creates configuration files for easy import in SIGMA AIR MANAGER 4.0. No time-consuming commissioning and configuration on-site.

➢ Perform the following actions in the sequence described below:

7.5.1 Switching on manual operation

1. Ensure that SIGMA AIR MANAGER 4.0 is set to *Manual* mode. The «Automatic» key does not illuminate.
2. If the «Automatic» key illuminates **green**, press this key.

The *Manual* mode can cause large pressure swings in the compressed air system.
Stations with machines without system pressure switch will deliver no compressed air in the *Manual* mode or if the SIGMA AIR MANAGER 4.0 fails.

The system returns a confirmation prompt.

3. Confirm prompt with the Yes key.
   The «Automatic» key no longer illuminates in **green**.
   The machines are under the control of their own internal controllers.

7.5.2 Insert the SD card.

Precondition An SD card with the correct "Engineering Base" file for the commissioning of the relevant compressed air station is available.

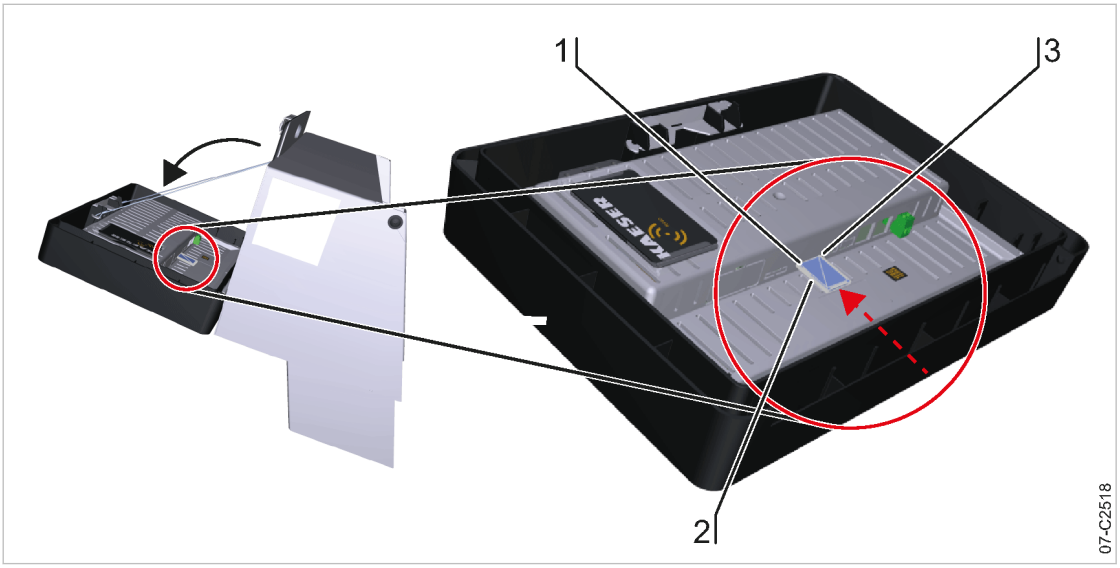


Fig. 42 Insert the SD card.

1 X3: Slot for SD card reader
2 SD card
3 Bevelled SD card edge

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.6 "Installing the control cabinet").
2. Push the SD card into the X3 slot until it latches. The bevelled edge of the card must point to the right side towards the terminal (see chapter 7.5"Inserting the SD card").
3. Close and latch the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.12.6).

7.5.3 Importing the configuration file

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section).

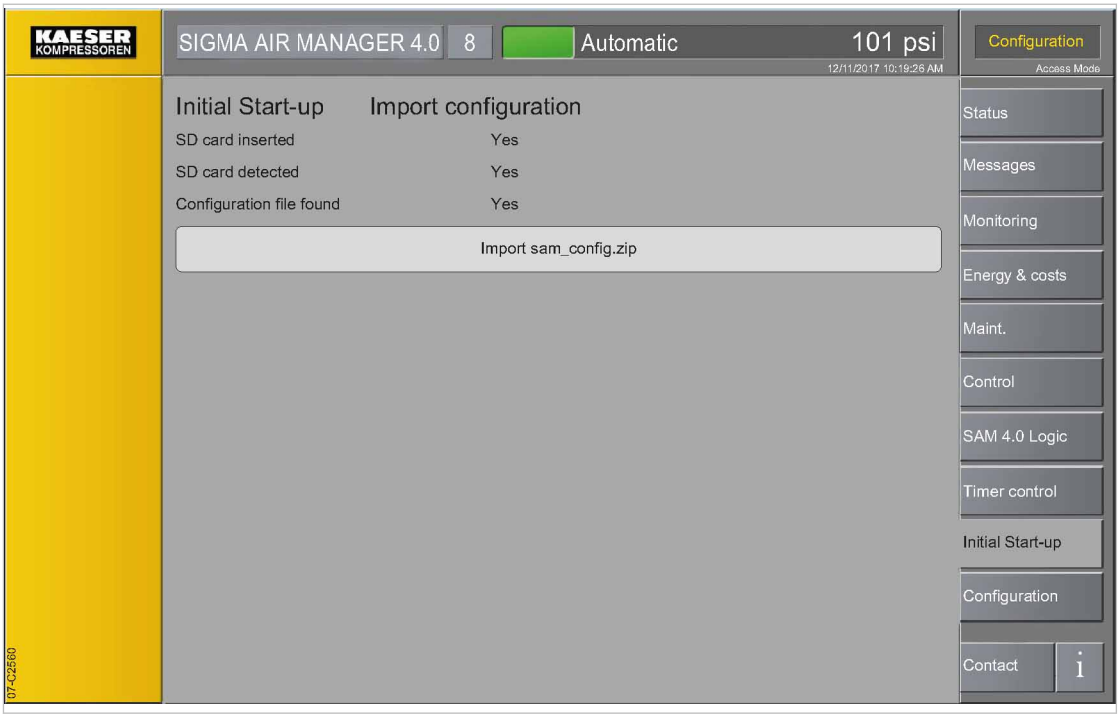


Fig. 43 *Import configuration* menu

1. Press the Initial Start-up – Import configuration key.
   The *Import configuration* menu displays the status as follows:
   - *SD card inserted* - An SD card has been physically inserted
   - *SD card detected* - An SD card has been electronically detected
   - *Configuration file found* - A valid "Engineering Base" configuration file has been detected
2. If *Yes* is displayed in all three lines, press Import sam_config.zip.
   SIGMA AIR MANAGER 4.0 imports the "Engineering Base" configuration file and reports completion.
3. Follow the instructions on the screen to activate the configuration.

After reading the configuration file, SIGMA AIR MANAGER 4.0 will automatically restart.

➢ Document the configuration file data in the “Engineering Base Configuration” table in the annex (see chapter 13.3.3"Engineering Base configuration").

7.5.4 Activating automatic mode

1. Press the «Automatic» key.
   The system returns a confirmation prompt.
2. Confirm prompt with the Yes key.
   The «Automatic» key lights up **green**.
   SIGMA AIR MANAGER 4.0 assumes control of the compressed air station.

7.6 Date and time

In SIGMA AIR MANAGER 4.0 you must set the time zone in which the device is located as well as the current date and time. This is required to ensure proper functioning of the machine controller, messages, logs, and analysis.

Precondition Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login")

➢ Enter the settings in the sequence described below:

7.6.1 Set the time zone

Set the time zone in which the device is located in SIGMA AIR MANAGER 4.0 to ensure that automatic changes, for example from standard time to daylight savings time, are executed properly.

1. Press the Configuration – Date and time key.
   The *Date and time* menu is displayed

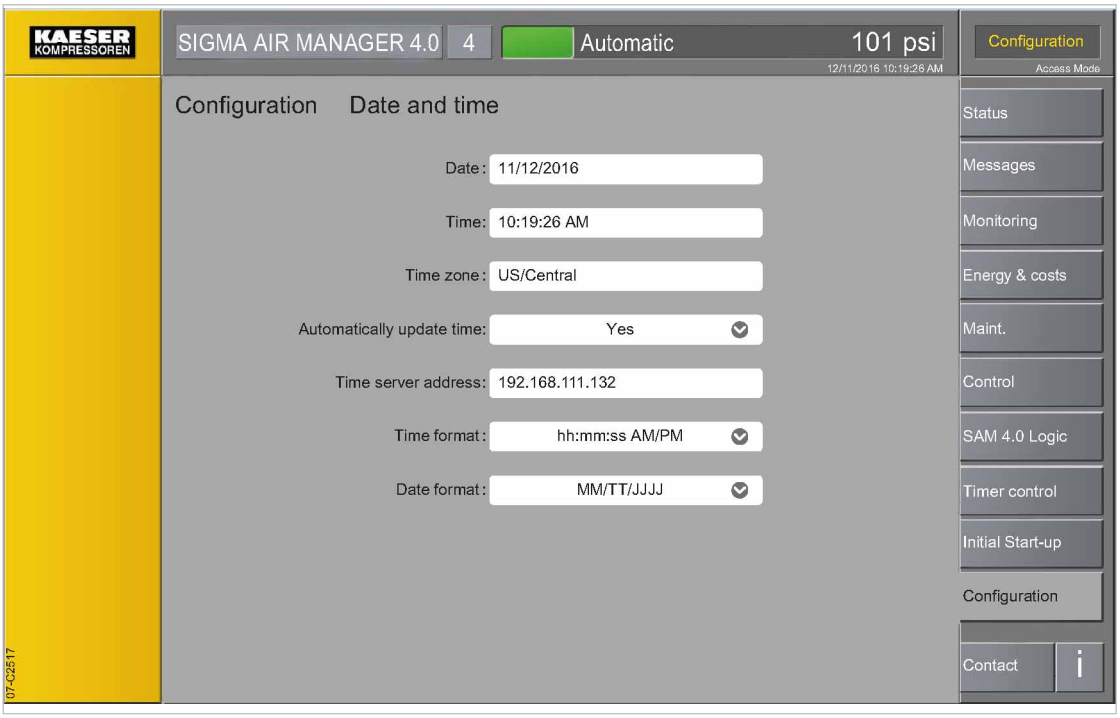


Fig. 44 *Date and time* menu

2. In the *Automatically update time*line, tap the ⌄ symbol.
3. Tap the *No* option.

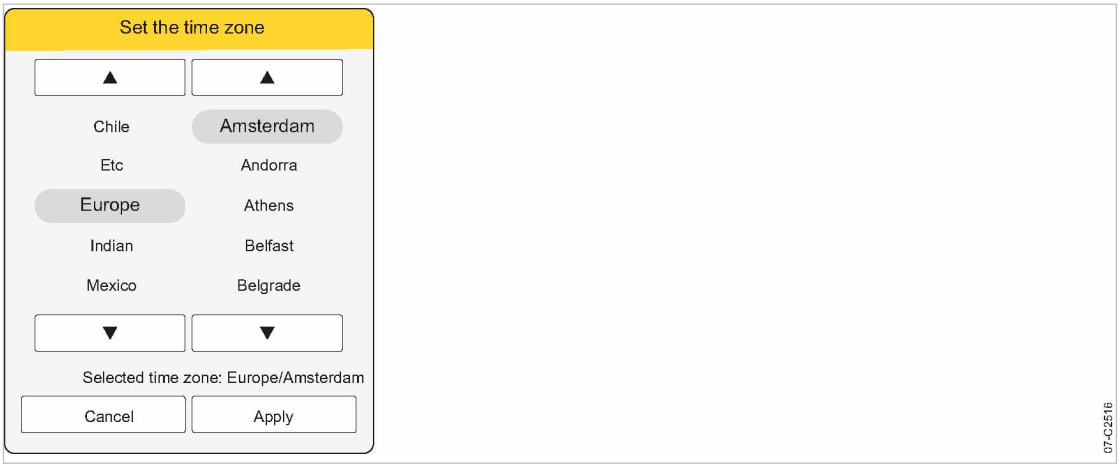


Fig. 45 *Set the time zone* menu

4. Tap the input field in line *Time zone*.
   The *Set the time zone* menu is displayed

Element	Meaning
Arrow keys	Move up/down in the list
Left column	List of time zones
Right column	List of places
Selected time zone	Selected time zone
Cancel	Settings **not** saved
Apply	Settings saved

Tab. 46 Meaning of the menu elements *Set the time zone*

5. Tap the left column to select the desired time zone. Use the arrow keys to scroll through the list.
6. Tap the right column to select the desired location. Use the arrow keys to scroll through the list.
   The currently selected time zone is displayed in the *Selected time zone* row.
7. Press Apply to apply the selected time zone.

The change between daylight savings time and standard time is automatic and follows the rules for the selected time zone.

From the list, select the location best matching the desired time zone.

Use the *Etc* option, to set the time zone in the range between GMT−14...+12.

7.6.2 Set the date

1. Press the Configuration – Date and time key.
   The *Date and time* menu is displayed
2. Tap the ⌄ symbol in the *Automatically update time* line.
3. Tap the *No* option.

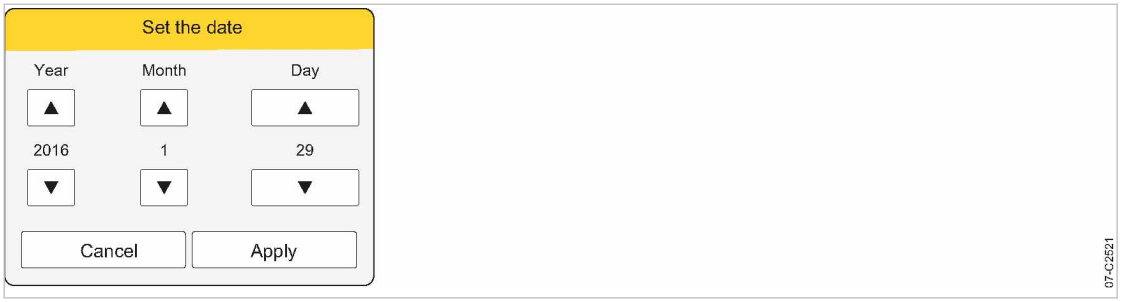


Fig. 46 *Set the date* menu

4. Tap the input field in line *Date*.
   The *Set the date* menu is displayed

Element	Meaning
Year	Set year
Month	Set month
Day	Set day
Arrow keys	Set value
Cancel	Settings **not** saved
Apply	Settings saved

Tab. 47 Meaning of the *Set the date* menu elements

5. Use the arrow keys to select the current date:
   - Year
   - Month
   - Day
6. Save the selected date using the Apply button.
   The *Date and time* menu displays the selected date for review.

7.6.3 Set the time

1. Press the Configuration – Date and time key.
   The *Date and time* menu is displayed
2. Tap the ⌄ symbol in the *Automatically update time* line.
3. Tap the *No* option.

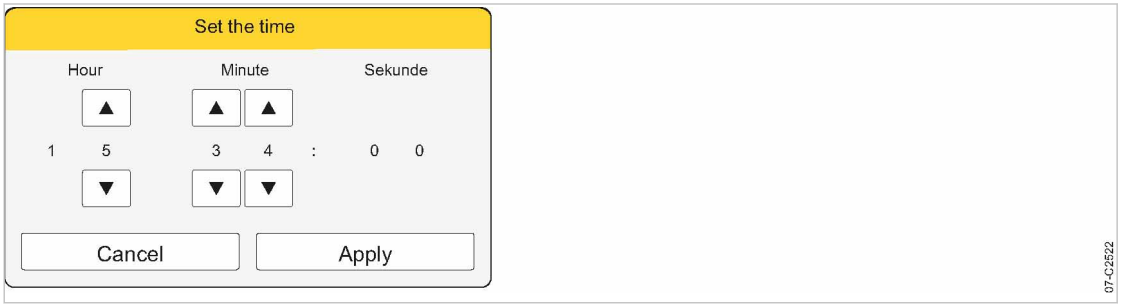


Fig. 47 *Set the time* menu

4. Tap the input field in line *Time*.
   The *Set the time* menu is displayed

Element	Meaning
Hour	Set hours
Minute	Set minutes
Second	Set seconds
Arrow keys	Set value
Cancel	Settings **not** saved
Apply	Settings saved

Tab. 48 Meaning of the menu elements *Set the time*

5. Use the arrow keys to set the current time:
   - Hour
   - Minute
6. Press Apply to save the selected time.
   The clock will run at the selected time setting and will be accurate to the second.
   The *Date and time* menu displays the set time for review.

Check the time for deviations on a regular basis (at least once a year) and make adjustments if necessary.
Document the time setting in the “Time settings” table in the annex (see chapter 13.3.4).

7.6.4 Automatically update time

If SIGMA AIR MANAGER 4.0 is connected to the customer network, you can set access to an SNTP time server available in the Internet or a local Intranet. SIGMA AIR MANAGER 4.0 then automatically imports the date and time settings and ensures continuous synchronization of the internal clock with the external time server.

Precondition Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login")
The time server's IP address is known. Request the required information from your IT department.

1. Press the Configuration – Date and time key.
   The *Date and time* menu is displayed
2. Tap the input field in line *Time server address*.
   A virtual keypad is displayed.
3. Enter the IP address of the time server.
4. Enter by tapping "✓“.
5. In the *Automatically update time*line, tap the ⌄ symbol.
6. Tap the *Yes* option.

Enter the IP address of the time server in the “Time settings” table in the annex (see chapter 13.3.4).

Result Access to the selected time server is active.
The internal clock of SIGMA AIR MANAGER 4.0 is synchronized.

7.6.5 Set display formats

Depending on the selected language, the system automatically sets the units and the time and date formats. You can manually change these settings.

Setting the time format

1. Press the Configuration – Date and time key.
   The *Date and time* menu is displayed
2. Tap the ⌄ symbol in the *Time format* line.
3. Tap the required option.

Time format	Example
HH:MM:SS	14:33:51
HH:MM:SS am/pm	2:33:51 PM

Tab. 49 Setting the *Time format*

Setting the date format

1. In the *Date format* line, tap the ⌄ symbol.
2. Tap the required option.

Date format	Example
YYYY-MM-DD	2016-09-26
MM/DD/YYYY	09/26/2016
DD.MM.YYYY	26.09.2016

Tab. 50 Setting the *Date format*

7.7 Units

You can adjust the units for some parameters in SIGMA AIR MANAGER 4.0 to the standards in the country of installation. The system automatically calculates and displays the correct units.

When you change the display language (see chapter 7.3 "Language"), the system automatically changes the unit settings matching the language.

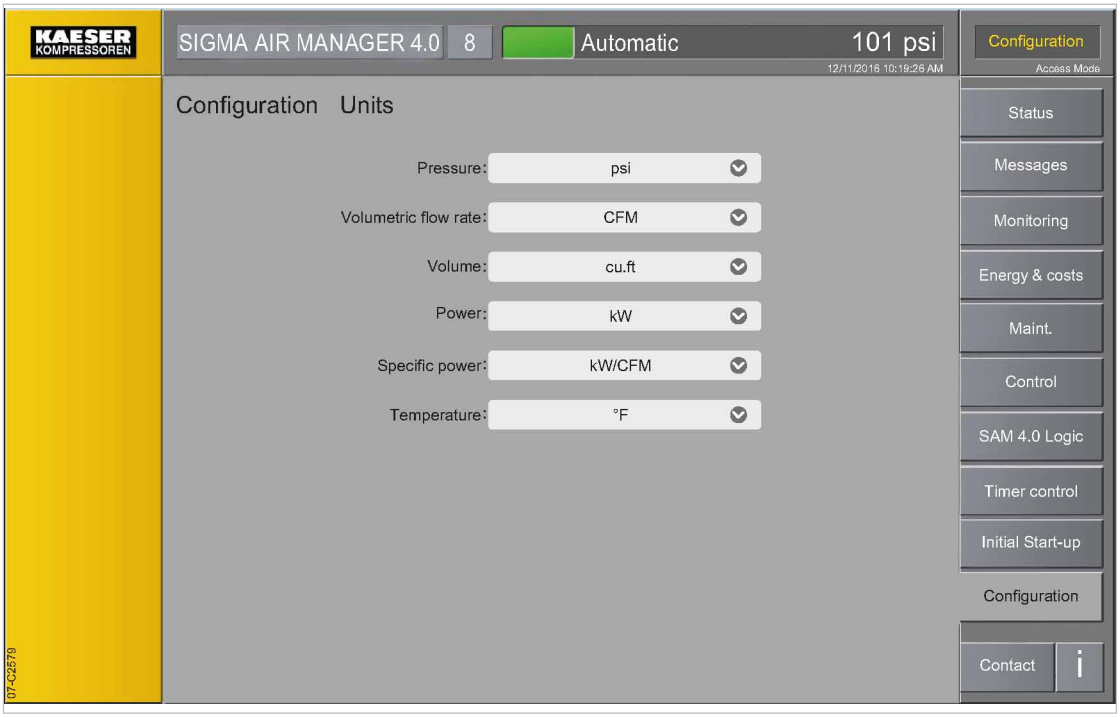


Fig. 48 *Units* menu

1. Press the Configuration – Units key.
   The *Units* menu displays the currently set units.

Parameter	Units
Pressure	bar, psi, MPa, mbar, at, “Hg
Volumetric flow rate	m^3/min, m^3/h, CFM
Volume	m^3, cu.ft, USgal
Power	kW, W
Specific power	kW/(m^3/min), kW/(100*CFM)
Temperature	°C, °F, K
The factory-set units depend on the "language" set.	

Tab. 51 Units

2. Touch the ⌄ symbol in the row of the parameter to be changed.
   The available units are displayed in a list.
3. Select the desired unit.
   SIGMA AIR MANAGER 4.0 saves the selected unit and uses it for all display values referenced.

7.8 Key lock

The four keys on the SIGMA AIR MANAGER 4.0 "operator panel" can be locked against unauthorized access.

Precondition Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login")

Fig. 49 *Key lock* menu

1. Press the Configuration – Key lock key.
   The locked/unlocked status of the four keys is displayed in the *Key lock* menu.
2. Touch the ⌄ symbol in the line of the key to be changed.
   The available options are displayed.
   – Unlocked
   – Key lock
3. Select the desired option.
   SIGMA AIR MANAGER 4.0 automatically saves the selected option.

If an attempt is made to actuate a locked key, a corresponding note is displayed.

7.9 Display

You can adjust the display brightness and the timing of the screen saver.

Precondition Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login")

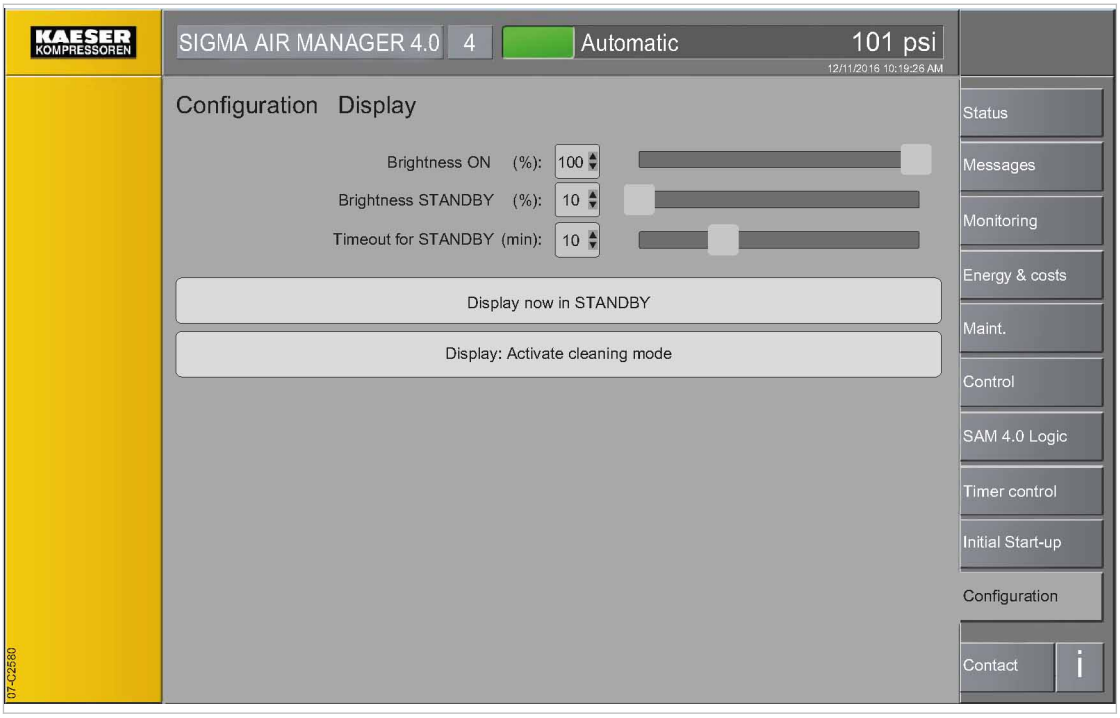


Fig. 50 *Display* menu

1. Press the Configuration – Display key.
   The *Display* menu is displayed

Parameter	Meaning
Brightness ON	Set display brightness in ON mode (10–100%)
Brightness STANDBY	Set display brightness for the screen saver (10–100%)
Timeout for STANDBY	Waiting time in minutes before the screen saver is activated

Tab. 52 Display

2. Use the slide controls to set the brightness and the waiting time.
3. Press the key Display now in STANDBY to check display brightness setting in standby mode.

Display: cleaning mode

To clean the touch screen, you can briefly disable the touch functionality. This will prevent the accidental selection of touch functions.

1. Press the Display: Activate cleaning mode key.
   The function *Display: cleaning mode* is active for 20 seconds. A countdown appears.
2. You can continue cleaning the screen as long as the countdown is visible.

7.10 Menu behaviour

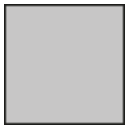
The status of the compressed air device can be displayed with symbols in the header. As a result, the current operating mode of the machines is visible at a glance in every SIGMA AIR MANAGER 4.0 menu.

Fig. 51 Menu behaviour menu

1. Press the Configuration – Menu behaviour key.
   The *Menu behaviour* menu is displayed
2. Tap the ⌄ symbol in the *Show air producers in header* line.

Fig. 52 Status display of the compressed air device in the header

3. Tap the *Yes* option.
   The header displays a symbol indicating the status of each compressed air device.

Symbol	Meaning
	Machine in READY mode
	Machine in IDLE mode

Symbol	Meaning
	Machine in LOAD mode
	Machine cannot be controlled remotely (local mode)
	Machine has fault messages
	Machine cannot be reached (communication malfunction)
Symbol greyed out	Machine is deselected.

Tab. 53 Meaning of symbols in the header

The number of the corresponding compressed air device is shown in the symbol representing it.

7.10.1 Set default display

After a while with no user input, a status menu appears. The desired menu can be configured.

Precondition The *Menu behaviour* menu is displayed locally

1. Tap the ⌄ symbol in the *Standard menu* line.
   The available options are displayed.
   - Status – Overview – Pressure curve
   - Status – Overview – Pressure display
   - Status – Station
   - Status – Manual preselect
2. Tap the required option.

Result After a while with no user input, the selected menu is automatically displayed. The time duration is set with the *Timeout for STANDBY* parameter in the menu "Configuration" – "Display".

7.10.2 Customized station name

A customized station name can be entered. It is shown in the header line in menu *StatusStation*.

Precondition The *Menu behaviour* menu is displayed locally

1. Tap the *Station name* field.

The customized station name can only be set locally at SIGMA AIR MANAGER 4.0. If you access via KAESER CONNECT the name is only displayed.

2. Use the virtual keyboard to enter a station name and confirm with *Accept*.

7.11 SAM 4.0 terminal

The *SAM 4.0 terminal* menu provides an overview of basic SIGMA AIR MANAGER 4.0 device data and several "Engineering Base" settings.
The parameters for the *X7 Ethernet 1 Gb* interface which serve to connect to the customer network can be configured at SIGMA AIR MANAGER 4.0.

The *SAM 4.0 terminal* menu has the following sub-menus:

- "Serial data"
- "Measurement data"
- "X6 SIGMA NETWORK"
- "X7 Ethernet 1 Gb"

➢ Check the displayed data and adjust the settings as required.

7.11.1 Serial data

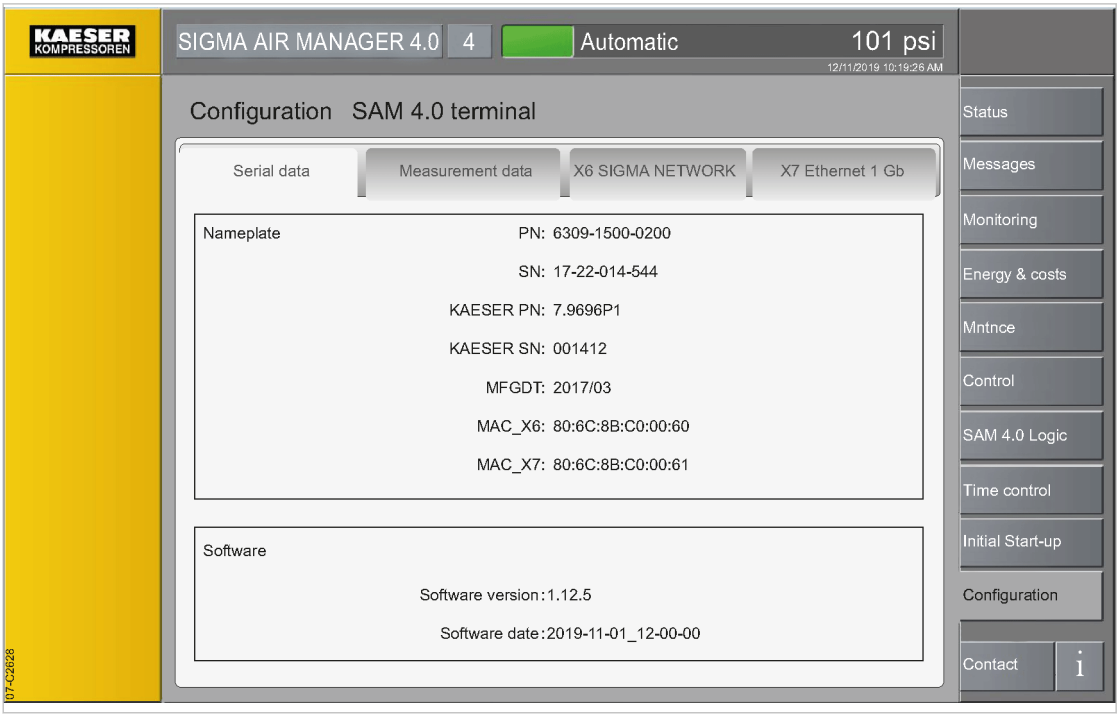


Fig. 53 *Serial data* menu

1. Press the Configuration – SAM 4.0 terminal key.
   The *SAM 4.0 terminal* menu is displayed.

2. Tap the *Serial data* tab,

The following data is displayed in the *Serial data* menu:

Menu level	Indication	Meaning
Nameplate	PN:	Controller manufacturer's Material No.
	SN:	Controller manufacturer's Serial No.
	KAESER PN:	KAESER Material No.
	KAESER SN:	KAESER Serial No.
	MFGDT:	Manufacturing date
	MAC_X6:	MAC address interface *X6 SIGMA NETWORK*
	MAC_X7:	MAC address interface *X7 Ethernet 1 Gb*
"Software"	Software version	SIGMA AIR MANAGER 4.0 software version display
	Software date	SIGMA AIR MANAGER 4.0 software version date

Tab. 54 *Serial data* menu

3. Check the displayed data.

7.11.2 Measurement data

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

1. Press the Configuration – SAM 4.0 terminal key.
   The *SAM 4.0 terminal* menu is displayed.
2. Tap the *Measurement data* tab,

The following data is displayed in the *Measurement data* menu:

Indication	Meaning
Temperature 1 (CPU) [1)]	Processor temperature
Fan	Operating mode of the integrated fan *Automatic* or *ON*
Fan on at temperature 1 (CPU)	Fan cut-in threshold
Fan off at temperature 1 (CPU)	Fan cut-out threshold
Temperature 2 (Board) [1)]	SIGMA AIR MANAGER 4.0 main circuit board temperature
Temperature 3 (Display) [1)]	Touch screen display temperature
Supply voltage	SIGMA AIR MANAGER 4.0 power supply voltage

[1)] The values are displayed in the set "unit".

Tab. 55 *Measurement data* menu

3. If necessary, set the operating mode of the integrated fan *Automatic* or *ON*.
4. Check the displayed data.

7.11.3 X6 SIGMA NETWORK

1. Press the Configuration – SAM 4.0 terminal key.
   The *SAM 4.0 terminal* menu is displayed.

2. Tap the *X6 SIGMA NETWORK* tab,

The following data is displayed in the *X6 SIGMA NETWORK* menu:

Indication	Meaning
IP address	IP address of the X6 SIGMA NETWORK interface
Net mask	SIGMA NETWORK subnet mask
Gateway	SIGMA NETWORK gateway address

Tab. 56 *X6 SIGMA NETWORK* menu

3. Check the displayed data.

7.11.4 X7 Ethernet 1 Gb

The parameters for the *X7 Ethernet 1 Gb* interface which are necessary for connection to the customer network can be set at SIGMA AIR MANAGER 4.0. This setting is required for using KAESER CONNECT and communication with the KAESER IoT Client.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)
The active operating mode is *Manual* (see 10.3.1 "Switch on manual operation" section)
The network parameters are known. Request the required information from your IT department

1. Press the Configuration – SAM 4.0 terminal key.
   The *SAM 4.0 terminal* menu is displayed.
2. Tap the *X7 Ethernet 1 Gb* tab.

The following parameters can be configured in the *X7 Ethernet 1 Gb* menu:

Parameters	Meaning
Interface	Activation status of the *X7 Ethernet 1 Gb* interface for the connection to the customer network
DHCP	DHCP option status. Checking this option box activates the automatic assignment of the IP address to an DHCP server in the customer network
IP address	IP address of X7 Ethernet 1 Gb interface. You are required to manually enter the IP address here if the DHCP option is inactive. The left side displays the current IP address. A new IP address can be entered in the input field on the right side (the IP address range 10.0.2.0 – 10.0.2.255 is excluded)
Net mask	Subnet mask of the customer network
Gateway	Gateway address of the customer network
Name server	DNS server address
Accept settings	Save the changed settings. The settings are automatically applied after voltage off/on of SIGMA AIR MANAGER 4.0
Network test	A ping message is sent to the IP address entered. If successfully received, the network device sends a response. This allows for checking of network settings and transfer via the network
Current	The currently active setting, provided the control field is active

Parameters	Meaning
New	New setting values are applied once the Accept settings key is pressed or when the supply voltage is switched off and then on again. It is only possible to apply the settings in the *Manual* operating mode. When applied, the SIGMA NETWORK connection is briefly interrupted

Tab. 57 *X7 Ethernet 1 Gb* menu

3. Enter the required settings.
4. Press the Accept settings key.
5. Switch off the SIGMA AIR MANAGER 4.0 power supply (miniature circuit breaker in the SIGMA AIR MANAGER 4.0 control cabinet or the user's power supply isolating device).
6. Wait for a few seconds.
7. Switch on the SIGMA AIR MANAGER 4.0 power supply (miniature circuit breaker in the SIGMA AIR MANAGER 4.0 control cabinet or the user's power supply isolating device).

Result SIGMA AIR MANAGER 4.0 is connected to the customer network. The KAESER CONNECT function can be used (see chapter 8.8 "KAESER CONNECT").

7.12 E-mail

The parameters of the e-mail function that has been integrated in SIGMA AIR MANAGER 4.0 can be set locally. The *E-mail* menu has the following sub-menus:

- "Send options"
- "General settings"
- "Alive message"
- "History"

Precondition Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login")
The e-mail parameters are known. Request the required information from the IT department

7.12.1 Send options

Use the *Send options* menu to set the parameters required for sending messages via e-mail.

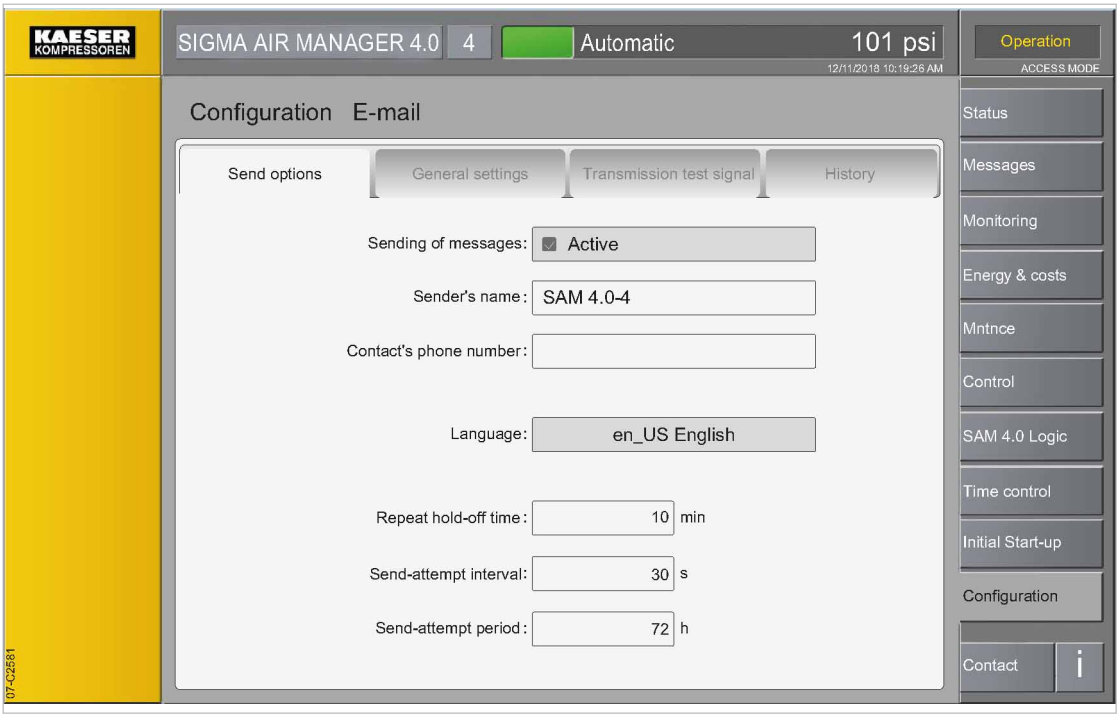


Fig. 54 *Send options* menu

1. Press the Configuration – E-mail key.
   Tap the *Send options* tab.

The *Send options* menu displays the following e-mail parameters:

Parameter	Meaning
Sending of messages	E-mail sending is activated if the *Active* checkbox is ticked off.
Sender's name	In this field you enter the name that appears as the sender of e-mails.
Contact's phone number	In this field, enter a telephone number under which the air station operator can be reached. This telephone number is sent with each e-mail.
Language	Language setting for sending e-mail.
Repeat hold-off time	The repeat lock time specifies the time interval during which a message cannot be resent if the same message has already been sent by e-mail. This prevents multiple sending operations of the same e-mail if a message trigger (e.g., a loose contact) occurs several times in a short period of time.
Send-attempt interval	In this field you enter the time in seconds for the system to wait after a failed e-mail sending operation before it attempts to resend the e-mail.
Send-attempt period	Use this setting to specify how long the system is to attempt to e-mail a message. In most cases (but not always), it is advisable to no longer send an old message since its cause has probably been remedied in the interim.

Tab. 58 Menu *E-mail – Send options*

2. Enter the required settings.

7.12.2 General settings

Use the *General settings* menu to set the communication parameters required for sending messages via e-mail.

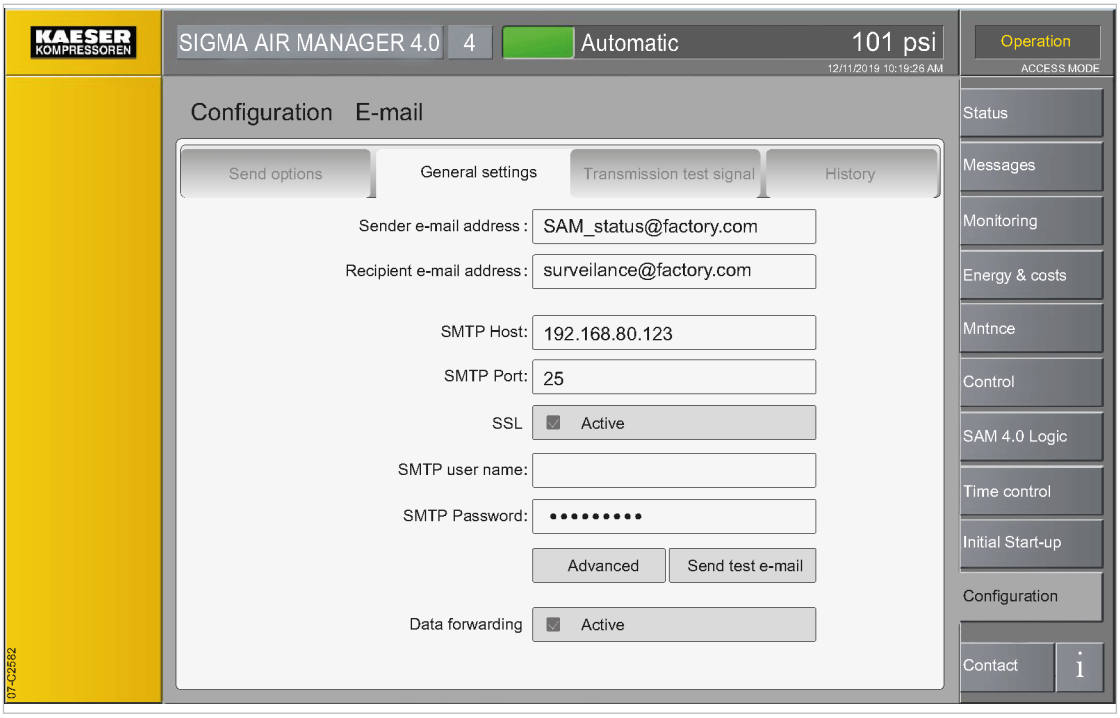


Fig. 55 *General settings* menu

1. Tap the *General settings* tab.

Parameter	Meaning
Sender e-mail address	The e-mail address to be used as sender address by SIGMA AIR MANAGER 4.0.
Recipient e-mail address	The e-mail address of the recipient.
SMTP Host	Domain name [1] or IP address of the SMTP e-mail server receiving and forwarding the messages.
SMTP Port	The port address of the SMTP e-mail server receiving and forwarding the messages.
SSL	E-mail sending is encrypted if the checkbox is ticked off.
SMTP user name	The log-in user name for logging on to the SMTP e-mail server.
SMTP Password	The log-in password for logging on to the SMTP e-mail server.
Advanced	Opens a menu where you can set the type of e-mail authentication.
Send test e-mail	Send a test e-mail to verify the settings.

[1] requires setting the DNS server with the parameter *Name server* in menu *Configuration – SAM 4.0 terminal*, see chapter 7.11.4 "X7 Ethernet 1 Gb"

Parameter	Meaning
Data forwarding	Forwarding of compressed air generator data from KAESER machines with SIGMA CONTROL 2 controller is activated if the checkbox is ticked off.

[1] requires setting the DNS server with the parameter *Name server* in menu *Configuration – SAM 4.0 terminal*, see chapter 7.11.4 "X7 Ethernet 1 Gb"

Tab. 59 Menu *E-mail – General settings*

2. Enter the required settings.

7.12.3 Test e-mail

You can send a local test e-mail to SIGMA AIR MANAGER 4.0 to verify the settings.

Precondition Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login")

➢ Press the Send test e-mail key.

Result The e-mail settings are correct when the recipient receives the test e-mail.

7.12.4 Alive message

SIGMA AIR MANAGER 4.0 features an option for sending a "sign of life" e-mail message once a day. The time can be defined. This message confirms that SIGMA AIR MANAGER 4.0 is in operation and that the e-mail function is working.

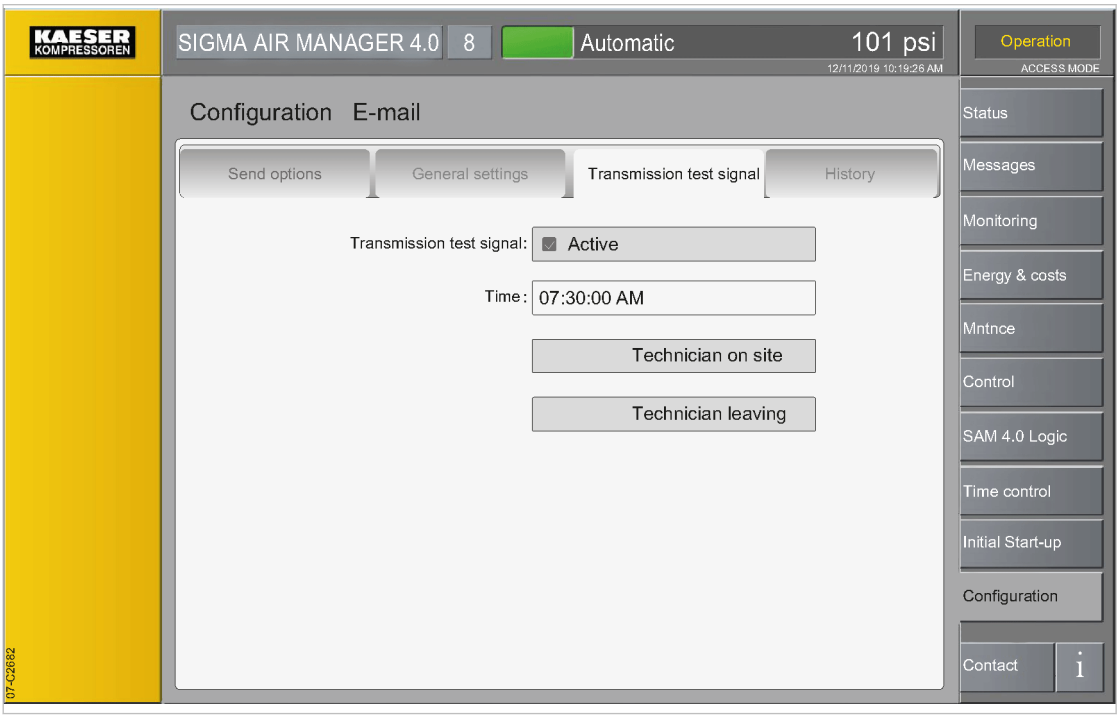


Fig. 56 *Alive message* menu

1. Tap the *Alive message* tab.

Parameter	Meaning
Alive message	Sign-of-life e-mail sending is activated if the *Active* checkbox is ticked off.
Time of day	Time of day for the daily sign-of-life message to be sent.
Technician on site	Key with which a message can be sent when a technician on site is working on the machine.
Technician leaving	Key with which a message can be sent when a technician on site has finished working on the machine.

Tab. 60 Menu *E-mail – Alive message*

2. Enter the required settings.

7.12.5 History

E-mail sending is logged in submenu *History*. If e-mail sending does not work properly, the *History* menu may prove helpful for troubleshooting.

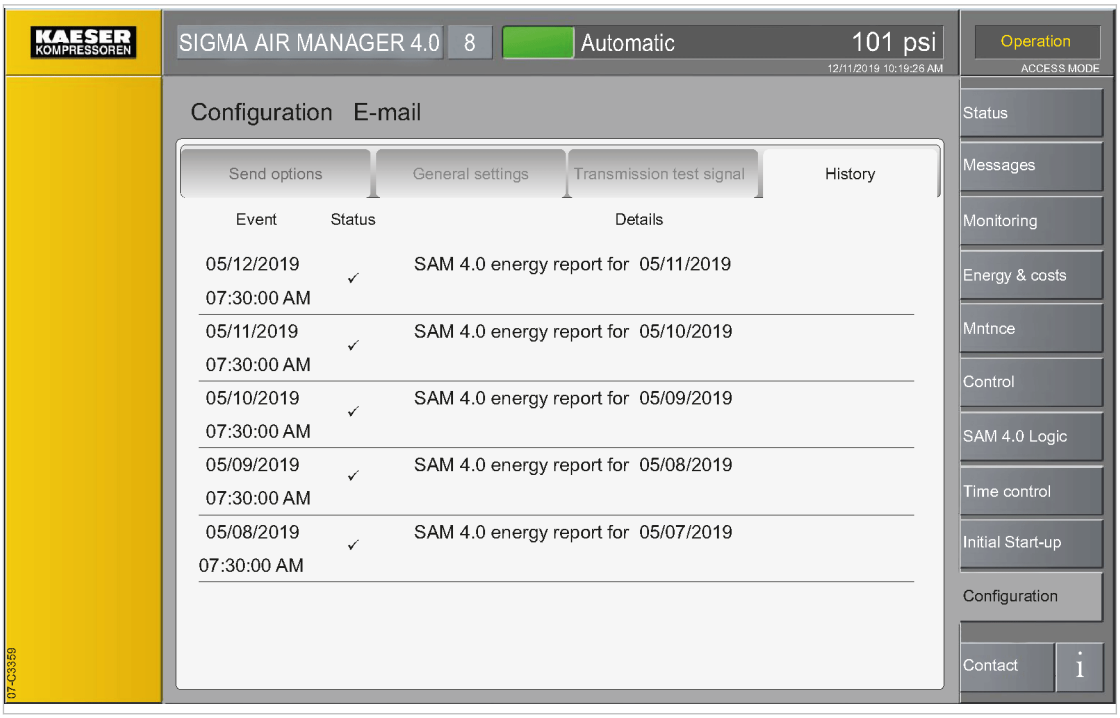


Fig. 57 Menu *E-mail – History*

➢ Tap the *History* tab.

Parameter	Meaning
Event	Date and time of event
Status	Status of e-mail sending
Details	Detailed information about the type of sent e-mails

Tab. 61 Menu *E-mail – History*

Result A list of sent e-mails is displayed.

7.13 SIGMA NETWORK I/O

Except for the IP address of the I/O block, "Engineering Base" is used for all communication settings in SIGMA NETWORK. You can check the settings in the SIGMA NETWORK I/O menu.

SIGMA AIR MANAGER 4.0 uses SIGMA NETWORK to communicate with machines with SIGMA CONTROL 2 and with the I/O blocks of the SIGMA NETWORK bus converters (SBU). An I/O block comprises of a bus controller (type: BC0087) and the available I/O modules (module positions: X0-X9). Any inputs and outputs that are present several times at an I/O module are called I/O channels. See Chapter 2.4 "Control cabinet components" for the technical data of potential I/O modules.

The individual I/O blocks are identified by IDs. One I/O block is provided in the SIGMA AIR MANAGER 4.0 control cabinet. Its factory-set ID is 65. 14 additional I/O blocks (SBU) are maximally possible.

Each I/O block uses SIGMA NETWORK to communicate with SIGMA AIR MANAGER 4.0 and is given a unique IP address for this purpose. This IP address is 169.254.100.**XX**, with **XX** being identical with the I/O block ID.
Example: The I/O block with ID 66 is given the IP address 169,254,100.66.

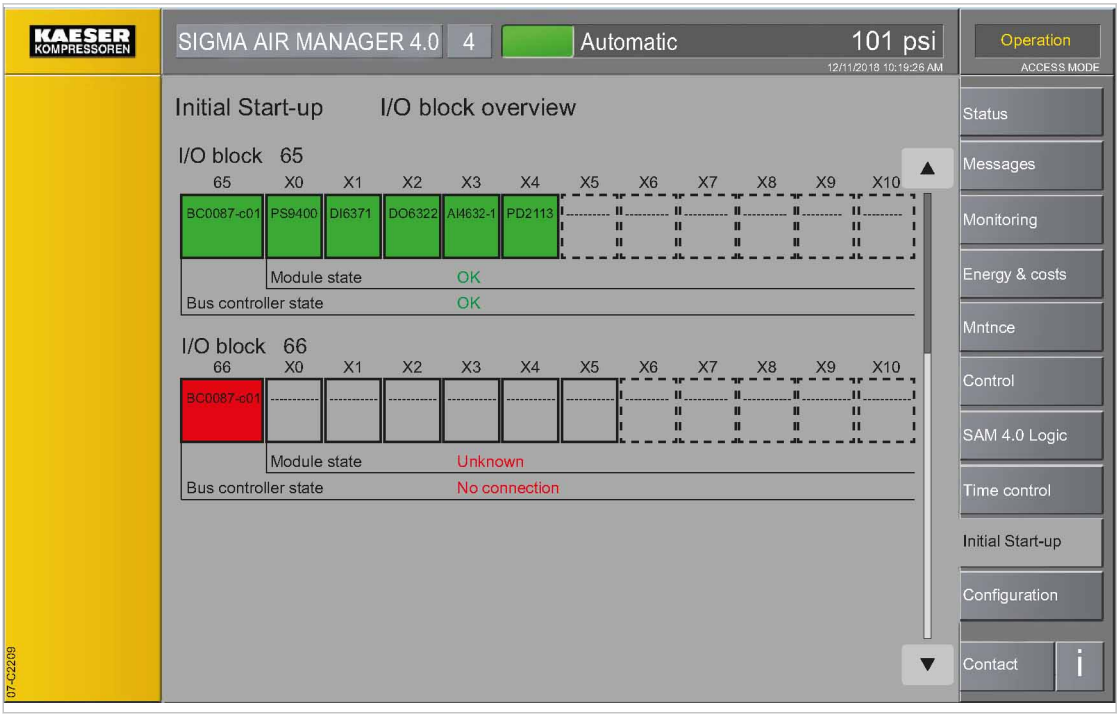


Fig. 58 I/O block overview (example with two I/O blocks)

Element	Meaning
I/O block 65	SIGMA AIR MANAGER 4.0 control cabinet with factory-set I/O block
X0–X10	I/O modules (module positions: X0-X10) Dashed frame: I/O block or module is not assigned
BC0087–c01	Bus controller with ID 65, 66, ...

Element	Meaning
Module state	Communication status of the I/O modules: *OK*: Bus communication OK *No connection*: Communication fault
Bus controller state	Bus controller communication status: *OK*: Bus communication OK *No connection*: Communication fault

Tab. 62 Meaning of the menu elements I/O block overview

The *I/O block overview* menu displays the I/O blocks or modules as symbols. Depending on the status, the I/O blocks or modules are identified as follows:

- Continuous frame: I/O block or module is parametrized.
- Interrupted frame: I/O block or module is not parametrized.
- Green: I/O block or module is active.
- Yellow: I/O block or module is available although it has not been (or has been differently) parametrized.
- Red: I/O block or module is not active.

For setting the I/O blocks, see Chapter 7.13.2 "I/O block".

For setting the I/O modules, see Chapter 7.13.3 "I/O module".

For setting the I/O signals, see Chapter 7.13.4 "I/O signals".

7.13.1 Starting the SBU

During the registration process, you can only register one SBU at SIGMA AIR MANAGER 4.0 at any time. If you want to register multiple SBU, you have to do this in sequence. Any SBU not yet registered must remain deactivated.

Follow the following sequence to ensure the proper commissioning of the SBU.

Precondition All installation activities and wiring tasks have been properly and completely performed according to chapter 6 "Installation".

The SIGMA AIR MANAGER 4.0 is switched on.

SBU is switched off at the power supply disconnecting device

1. Switch on the power supply switch for **one** new SBU.

   The L/A IF1 LED at the Bus Controller of the SBU illuminates green.
   A message box is displayed at the SIGMA AIR MANAGER 4.0:
2. Transfer IP address to block in the *I/O block XX - Bus controller BC0087* menu; see Chapter 7.13.2 "I/O block"
3. If you want to register other SBU at the SIGMA AIR MANAGER 4.0, you must follow the procedure described above from item 1. for every SBU.

7.13.2 I/O block

You can display the "Engineering Base" configuration of the I/O block in the *I/O block* menu.

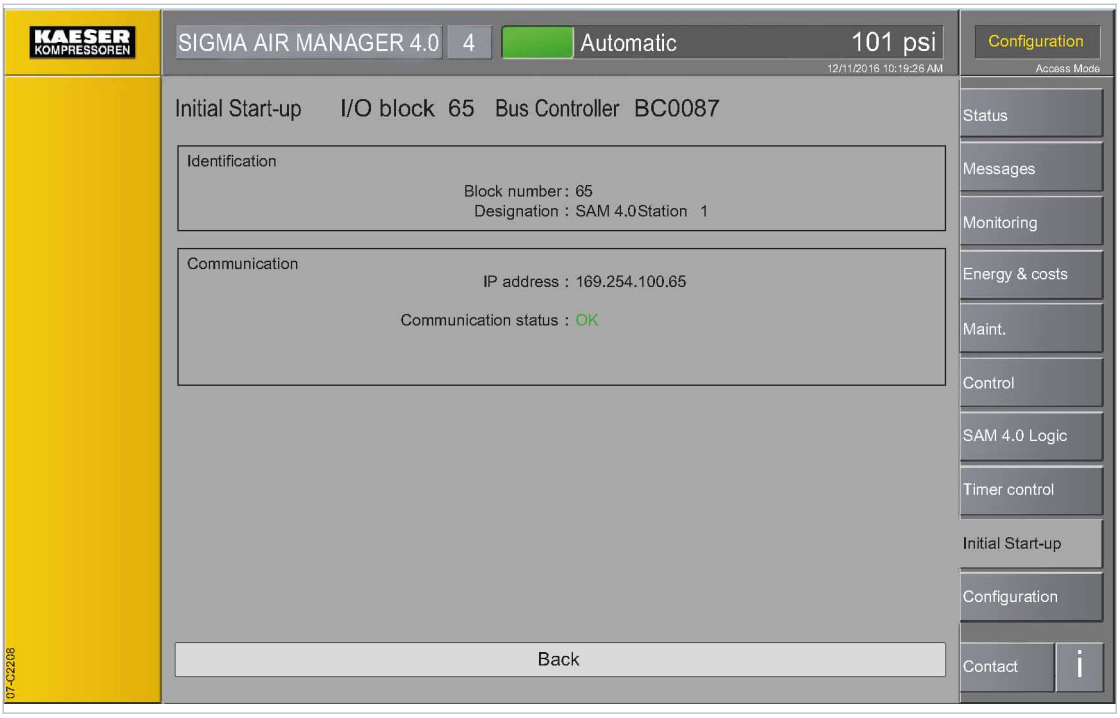


Fig. 59 *I/O block* menu

1. Press the Initial Start-up – SIGMA NETWORK key.
   The *I/O block* menu is displayed

Element	Meaning
Block number	The block number (ID) is displayed here.
Designation	The number of the I/O block is displayed here.
IP address	This field displays the IP address currently assigned to the I/O block.
Communication status	This field displays the current communication status: ■ *OK* - Bus communication is OK
	■ *No connection* - Communication fault

Tab. 63 Meaning of the menu elements I/O block

2. Touch the required I/O block (BC0087).
   The *I/O block XX - Bus controller BC0087* is displayed (XX: ID of the I/O bock).
3. Check the set parameters.

7.13.3 I/O module

You can display the "Engineering Base" configuration of the individual I/O modules in the *I/O block XX – Module configuration* menu.

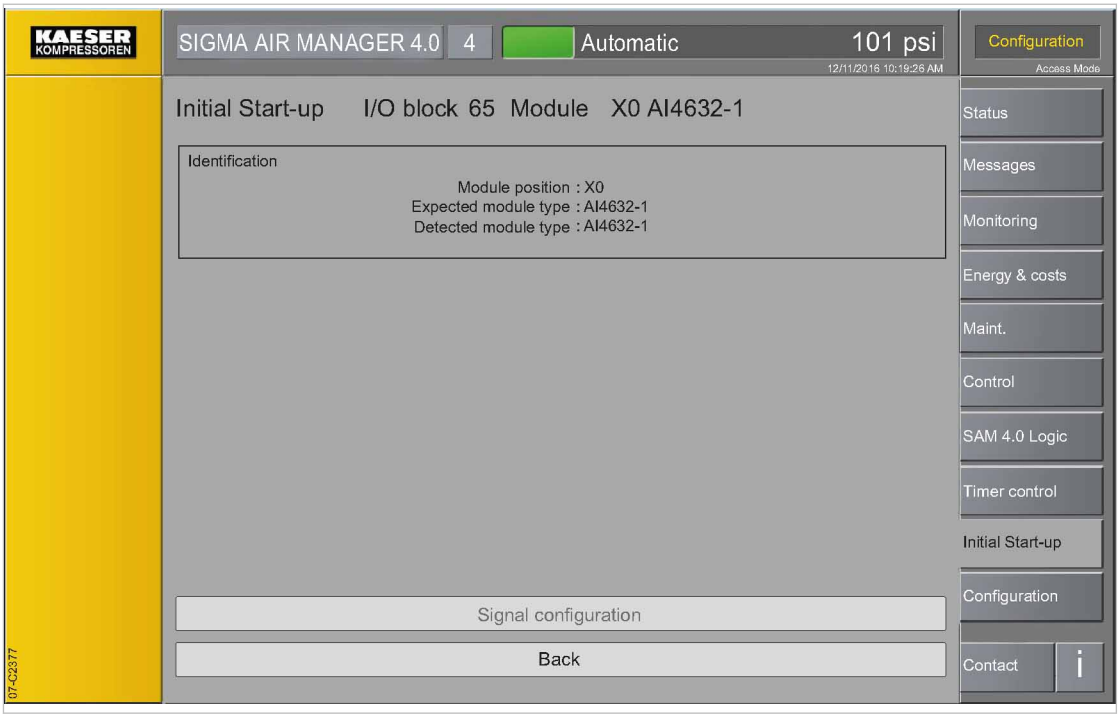


Fig. 60 *Module configuration* menu

1. Press the Initial Start-up – SIGMA NETWORK key.
   The *I/O block overview* menu is displayed

Element	Meaning
Module position	Displays the currently selected module position.
Expected module type	The expected module type is displayed. This is a useful feature for servicing, for example, when the module fails and the module type can no longer be automatically read and displayed as *Detected module type*.
Detected module type	Displays the automatically detected module type. If nothing or ----- is displayed, the system has not detected the module which is then shown in yellow or red in the I/O block overview.

Tab. 64 Meaning of the *Module configuration* menu elements

2. Touch the required I/O module (module positions: X0-X10).
   The *I/O block XX – module XY ZZZZ* is displayed (XY: module position, ZZZZ: module type).
3. Check the displayed settings.

7.13.4 I/O signals

If supported by the selected module type, you can display the "Engineering Base" configuration of the individual I/O signals of the currently selected I/O module.

Fig. 61 Example: Signal configuration, analog input

1. Press the Initial Start-up – SIGMA NETWORK key.
   The *I/O block overview* menu is displayed.

Element	Meaning
I/O signal	Selecting the I/O signal sub-menu.
Signal name	This field displays the name of the signal. This name is used by SIGMA AIR MANAGER 4.0 for the display of the processed measured values and for *SAM 4.0 Logic*.
Connected	■ *Yes*: SIGMA AIR MANAGER 4.0 uses this I/O signal.
	■ *No*: This I/O signal is deactivated and is not used.
Signal logic	■ *Positive*: The signals are processed 1:1.
	■ *Negative*: The signals are processed inverted.

Tab. 65 Meaning of the menu elements I/O signals

2. Touch the required I/O module (module positions: X0-X9).
   The *I/O block XX – module XY ZZZZ* is displayed (XY: module position, ZZZZ: module type).
3. Press the Signal configuration key.
   The *I/O block XX – module XY ZZZZ* - channels is displayed (XY: module position, ZZZZ: module type). If the currently selected I/O module has multiple I/O signals, they are shown in sub-menus such as X3.1-X3.4.
4. Select the required I/O signal.
5. Check the displayed settings.

7.14 PROFIBUS

The communication at PROFIBUS is set with "Engineering Base". The *PROFIBUS* menu is used to check the settings.

SIGMA AIR MANAGER 4.0 uses the PROFIBUS to communicate with the machines (SIGMA CONTROL or SIGMA CONTROL 2) and Profibus converters (PBU). For this, you must have installed the PROFIBUS master option in SIGMA AIR MANAGER 4.0 or SBU .

The SIGMA NETWORK / PROFIBUS master (Option PROFIBUS master) protocol converter uses SIGMA NETWORK to communicate with SIGMA AIR MANAGER 4.0 but, as master, it uses PROFIBUS for the communication with SIGMA CONTROL, SIGMA CONTROL 2 and the PBUs. In the SIGMA NETWORK, it has the ID 98 (IP address: 169.254.100.98). In the PROFIBUS network, it has the PROFIBUS address 2 as master. The PROFIBUS converters (PBUs) are PROFIBUS I/Os from SIGMA AIR MANAGER 4.0 with the following PROFIBUS slave addresses:

- PBU 8/8: Slave addresses 20-27
- PBU 32: Slave addresses 28/32
- PBU 4+4: Slave addresses 36/44
- PBU PT100/PT1000: Slave addresses 52/60

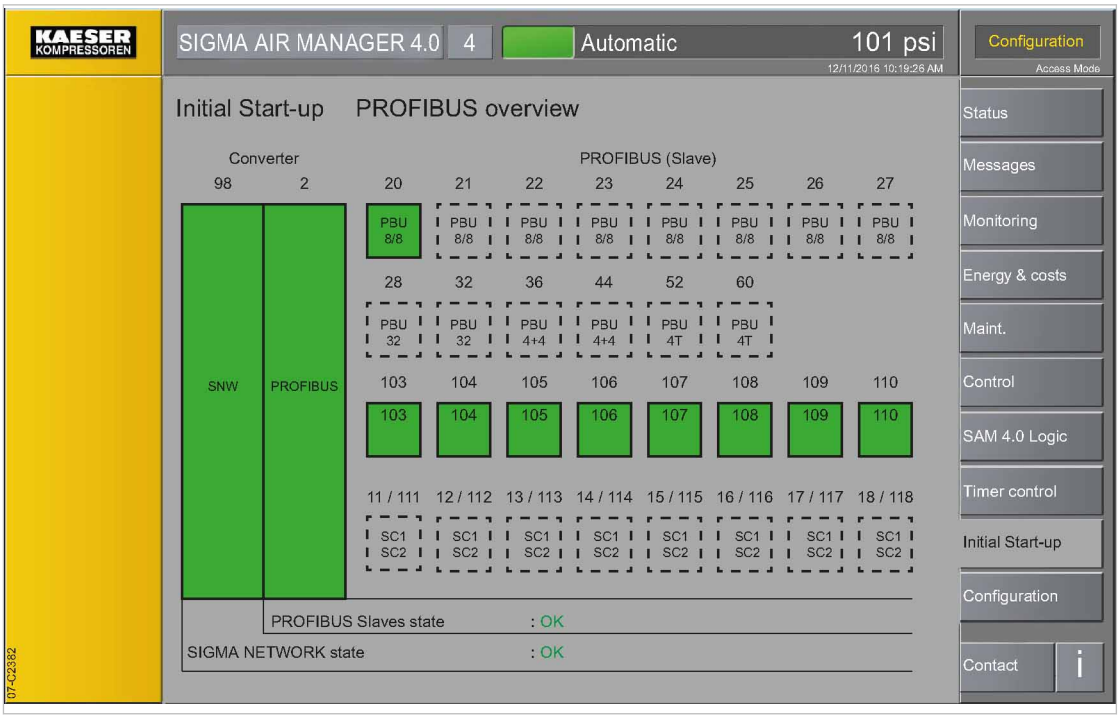


Fig. 62 *PROFIBUS I/O overview* menu

Element	Meaning
SNW/PROFIBUS Master converter	Protocol converter SIGMA NETWORK / PROFIBUS master, abbreviated to Converter ■ Green symbol: Bus communication okay ■ Red symbol: Communication fault
SNW	Communication status at SIGMA NETWORK of the converter
PROFIBUS	Communication status of the PROFIBUS I/O slaves

Element	Meaning
Converter : 98	SIGMA NETWORK address
Converter : 2	PROFIBUS Slave address
PROFIBUS Slaves state	■ Green symbol: Bus communication okay ■ Red symbol: Communication fault ■ Dashed frame: Converter not configured

Tab. 66 Meaning of the PROFIBUS I/O overview menu elements

You can display the PROFIBUS master settings as shown in Chapter 7.14.1 "SNW/PROFIBUS Master converter".

You can display the PBU (slaves) settings as shown in Chapter 7.14.2 "PROFIBUS Slave".

7.14.1 SNW/PROFIBUS Master converter

You can display the "Engineering Base" settings for the PROFIBUS master.

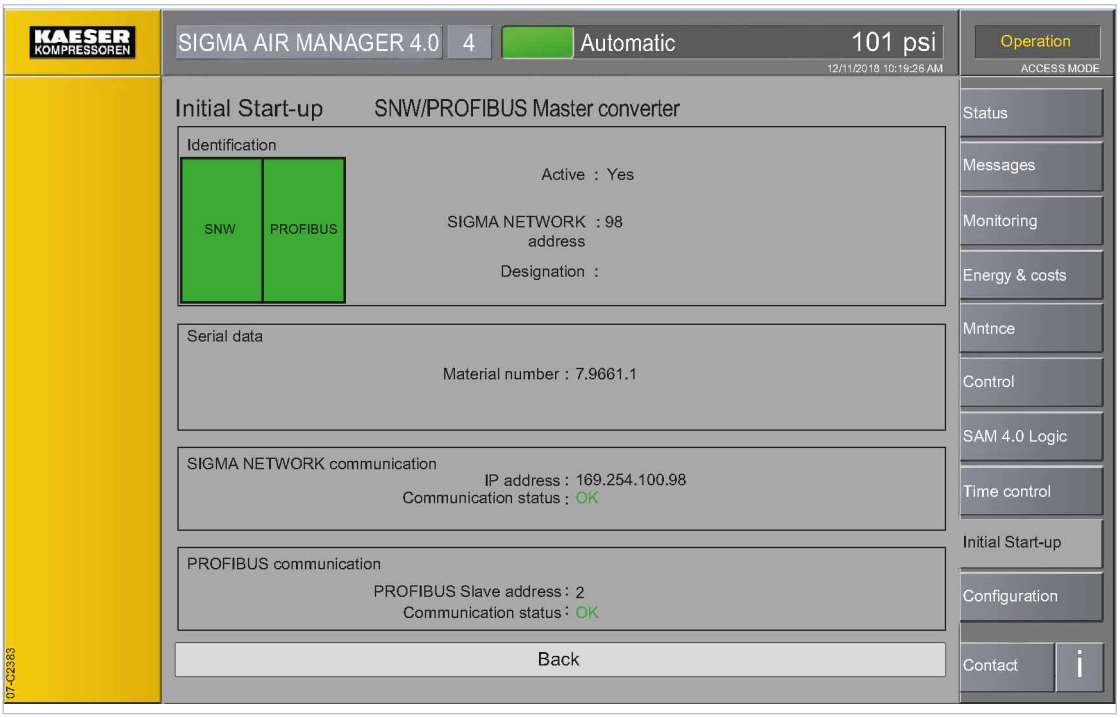


Fig. 63 *SNW/PROFIBUS Master converter* menu

1. Press the Initial Start-up – PROFIBUS key.
   The *SNW/PROFIBUS Master converter* menu is displayed.

Element	Meaning
Active	Indicates whether the converter is or is not activated.
SIGMA NETWORK address	SIGMA NETWORK address

Element	Meaning
Designation	This field displays a name for the master (for example, “SNW/PROFIBUS Master converter SIGMA AIR MANAGER 4.0”).
Part number	If possible, the material number is retrieved from the master and displayed here.
IP address	This field displays the SIGMA NETWORK IP address currently assigned to SNW/PROFIBUS Master converter.
Communication status	This field displays the current SIGMA NETWORK communication status: ■ *OK*: Bus communication okay ■ *No connection*: Communication fault
PROFIBUS Slave address	This field displays the PROFIBUS IP address assigned to the master.
Communication status	This field displays the current PROFIBUS I/O communication status: ■ *OK*: Bus communication okay ■ *No connection to slave XX*: Communication to slave XX faulty

Tab. 67 Meaning of the menu elements SNW/PROFIBUS Master converter

2. Touch SNW/PROFIBUS Master converter.
   The *SNW/PROFIBUS Master converter* menu is displayed.
3. Check the displayed settings.

7.14.2 PROFIBUS Slave

You can display the "Engineering Base" settings of the individual I/O signals of the currently selected PROFIBUS slaves. The type and number of the possible parameters depend on the used slave type.

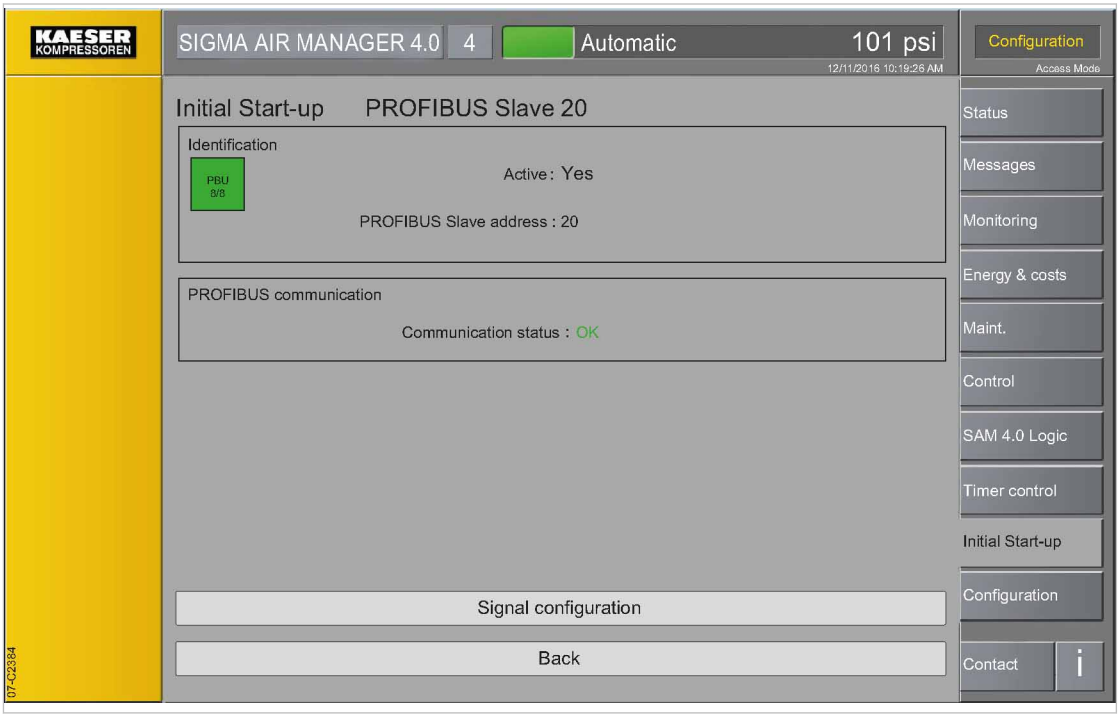


Fig. 64 Example PROFIBUS Slave 20

1. Press the Initial Start-up – PROFIBUS key.
   The *PROFIBUS Slave* menu is displayed.

Element	Meaning
Active	Indicates whether the slave is or is not activated.
PROFIBUS Slave address	PROFIBUS Slave address
Communication status	This field displays the current PROFIBUS communication status: ■ *OK*: Bus communication okay ■ *No connection*: Communication fault
Signal configuration	Display the individual signals of selected I/O modules here

Tab. 68 Meaning of the menu elements *PROFIBUS Slave*

2. Touch the required PROFIBUS Slave.
   The menu *PROFIBUS SlaveXY* (XY: slave address) is displayed.
3. Tap Signal configuration.
   The *Signals* menu is displayed.

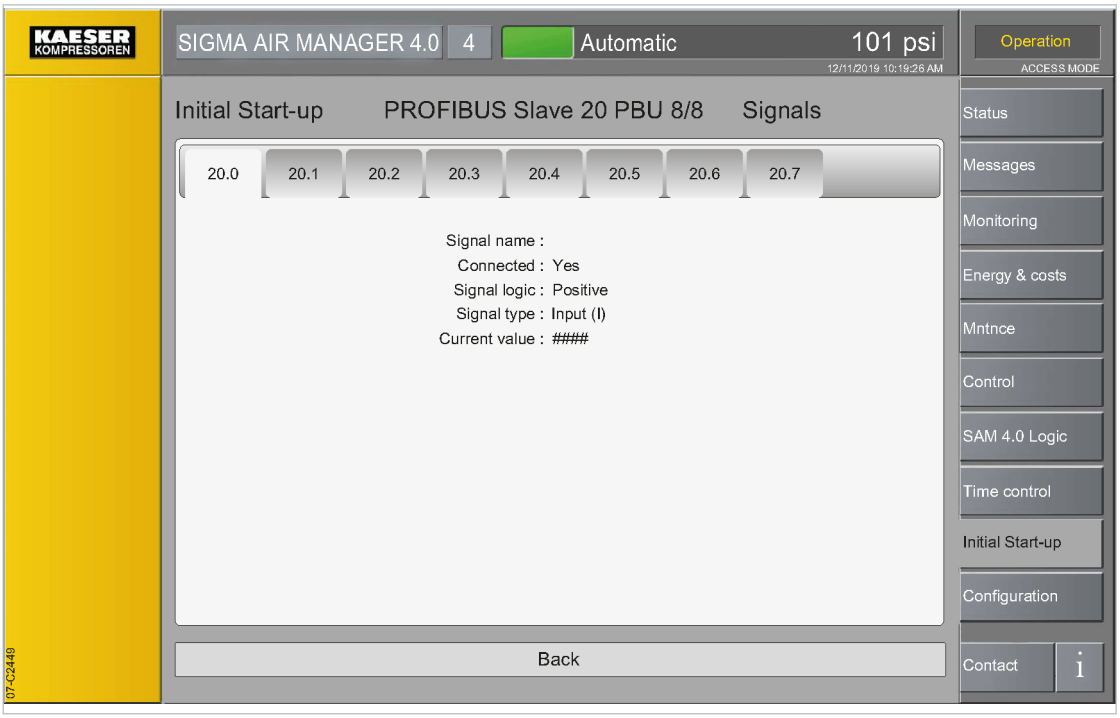


Fig. 65 Example PROFIBUS Slave 20

4. Touch the required I/O signal.
   The menu for the selected I/O signal is displayed.

Element	Meaning
I/O signals	Using the signal number to select an I/O signal sub-menu.
Signal name	This field displays the name of the signal.
Connected	■ *Yes*: SIGMA AIR MANAGER 4.0 uses this I/O signal. ■ *No*: This I/O signal is deactivated and is not used.

Element	Meaning
Signal logic	■ *Positive*: The signals are processed 1:1. ■ *Negative*: The signals are processed inverted.
Signal type	■ *Input (I)* ■ *Output (O)*
Current value	Current measured value or state at this measured value.

Tab. 69 Meaning of the *I/O signals* menu elements

5. Check the displayed settings.

7.15 SIGMA NETWORK

SIGMA AIR MANAGER 4.0 communicates via the SIGMA NETWORK with compressed air generators and other devices with compatible controllers.
Communication within the SIGMA NETWORK is configured using “Engineering Base” – with the exception of the IP address of the I/O block. The *SIGMA NETWORK* menu is used to check the settings.

The *SIGMA NETWORK* menu has the following sub-menus:

- Compressors
- Dryer
- Control valves

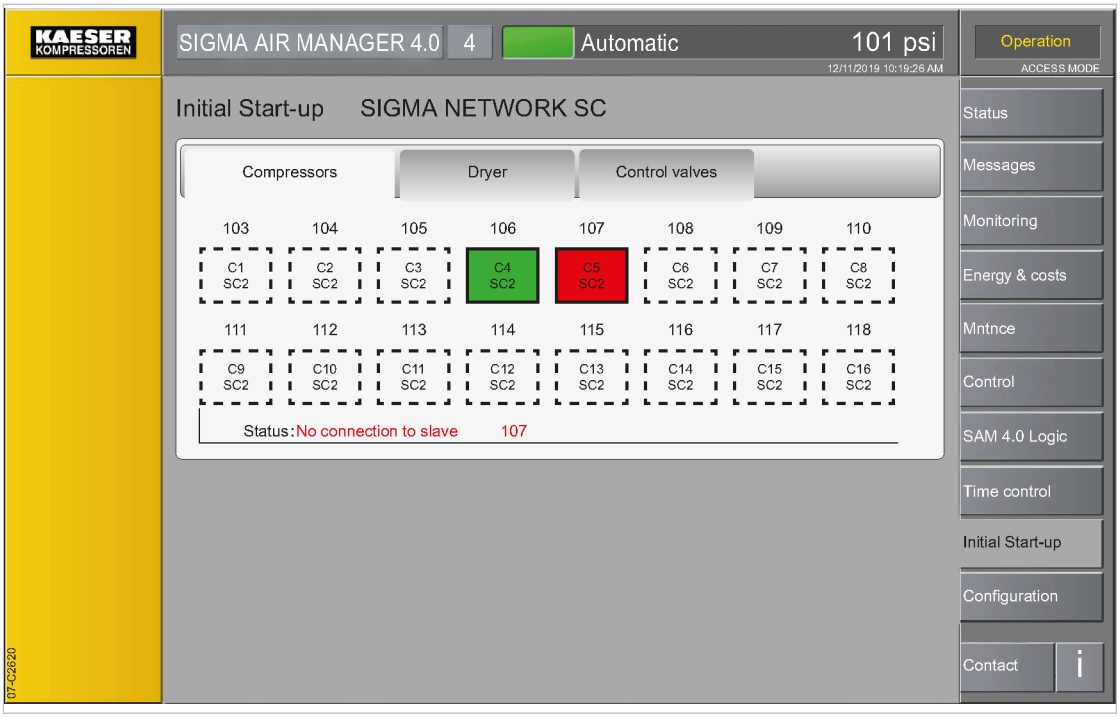


Fig. 66 *SIGMA NETWORK* menu

1. Press the Initial Start-up – SIGMA NETWORK key.

2. Touch the requested tab, e.g. *Compressors*.
   The *Compressors* menu is displayed.

Element	Meaning
Elements C1–C16	Compressed air generator, e.g. with KAESER controller SIGMA CONTROL 2
Elements D1–D16	Dryer, e.g. with KAESER controller SIGMA CONTROL SMART
Elements DHS1–DHS16	Air-main charging system with KAESER controller
Individual element	■ Green symbol: Bus communication okay ■ Red symbol: There is a communications fault ■ Dotted frame: No device expected at this position
Status	*OK*: Bus communication okay *No connection*: Communication fault

Tab. 70 Meaning of the SIGMA NETWORK menu elements - overview

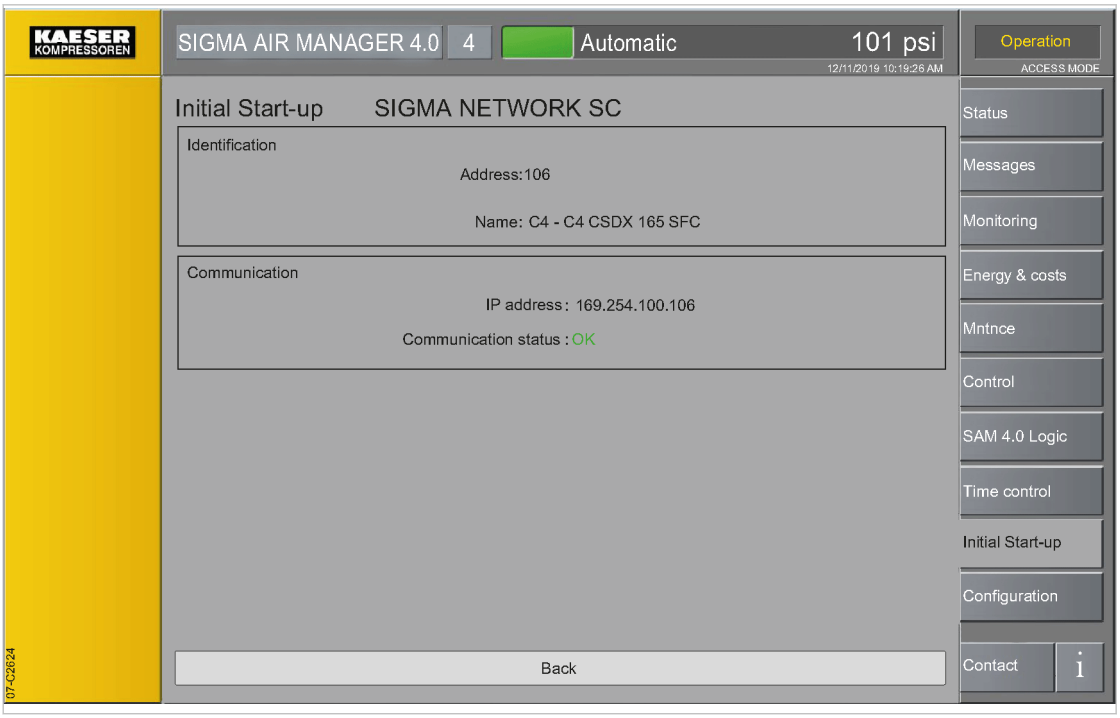


Fig. 67 *SIGMA NETWORK* menu

3. Touch the required machine with the KAESER SIGMA CONTROL 2 controller.
   The *SIGMA NETWORK* menu for the corresponding machine is displayed.

Element	Meaning
Address	Controller address
Name	Machine designation
IP address	The IP address currently assigned to the controller is displayed here

Element	Meaning
Communication status	*OK*: Bus communication okay
	No connection: Communication fault

Tab. 71 Meaning of the SIGMA NETWORK menu elements - controller

4. Check the displayed settings.

7.15.1 Start the dryer or air-main charging system (DHS)

During the login process, only one dryer or air-main charging system can be logged onto SIGMA AIR MANAGER 4.0 at the same time. If multiple dryers or air-main charging systems need to be logged in, this must be done sequentially. Dryers or air-main charging systems that have not yet been logged in must remain switched off until they are logged in.

To ensure smooth commissioning of dryers or air-main charging systems, a certain sequence must be followed.

Below you will find an example that describes commissioning based on a dryer. An air-main charging system (DHS) is commissioned in the same way via submenu *Control valves*.

Precondition All installation activities and wiring tasks have been properly and completely performed according to chapter 6 "Installation"

The SIGMA AIR MANAGER 4.0 is switched on.

The new dryers or air-main charging systems to be logged on are switched off at the power supply disconnecting device.

1. Switch on the power supply disconnecting device for **one** new dryer.
   The communications status for the dryer is displayed in the menu: *OK* is illuminated in orange

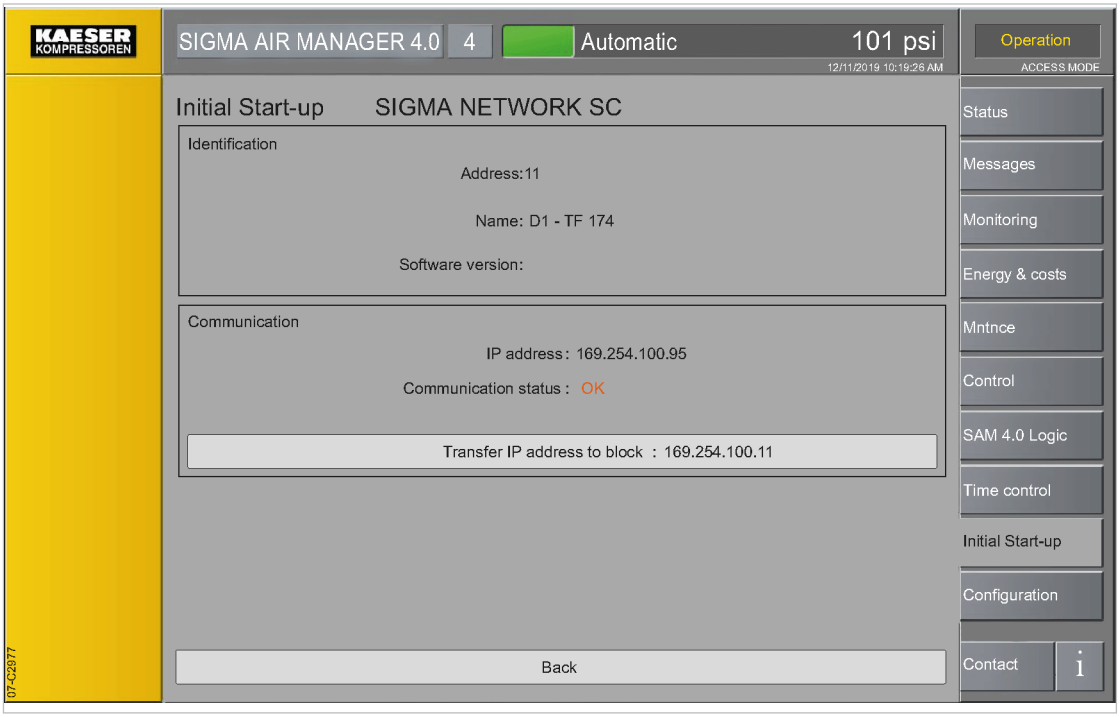


Fig. 68 Start dryer operation

2. Press the Transfer IP address to dryer key.
   The IP address is transferred to the dryer controller.
   This process takes a few seconds.
   The communications status for the dryer is displayed in the menu: *OK* is illuminated in green
3. If additional dryers are to be logged on to SIGMA AIR MANAGER 4.0, perform the same procedure as described above, starting with step 1.

7.16 Control

The *Control* menu has the following sub-menus:

- Parameter
  - "Constant pressure control"
  - "Pressure monitoring"
  - "Volume flow rate control" *)
  - "Adapt. pressure reg.-low pressure" *)
  - "Advanced" *)
- "Actual pressure value"

*) Availability dependent on Engineering Base configuration

7.16.1 Constant pressure control

Use the *Constant pressure control* menu to set the "Required pressure" [pREQ] and display other basic pressure parameters of the station.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)
The required pressure for the air network to be controlled is known.

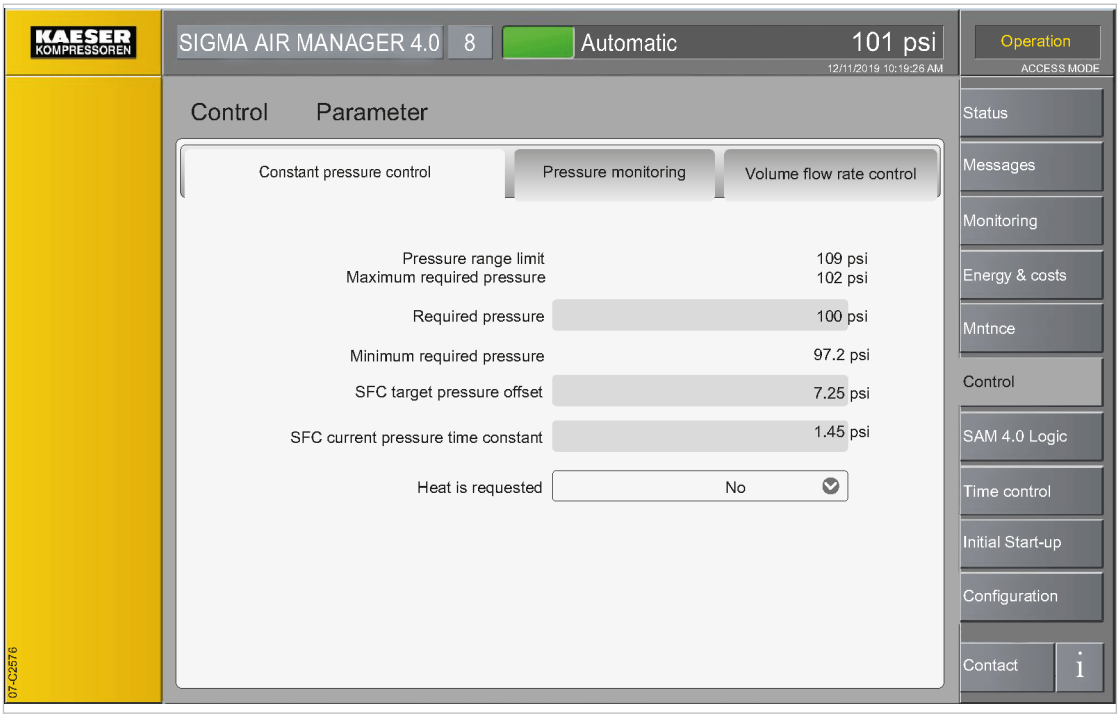


Fig. 69 Menu *Control – Parameter*

1. Press the Control – Parameter key
   The menu *Control – Parameter* is displayed.

Parameters	Meaning
Pressure range limit [pR]	You define the pressure margin by setting a pressure value above the *required pressure.*. For example, if you want a required pressure of 101.5 psi and a pressure margin of 7.5 psi, you must specify 109 psi as value for the *pressure margin*.
Maximum required pressure	*Maximum required pressure* is the maximal values that you can set for the required pressure.
Required pressure [pREQ]	The *required pressure* is the pressure required by the consumers in the compressed air network. SIGMA AIR MANAGER 4.0 usually maintains the *required pressure* with a maximum deviation of 1.5 psi. For energetic reasons, the *required pressure* is to be set as low as possible, i.e., not higher as required for the consumers within the compressed air network. A pressure of 14.5 psi higher than required causes approximately 6 % more energy consumption.
Minimum required pressure	*Minimum required pressure* is the minimal values that you can set for the required pressure.
SFC target pressure offset	Set here and offset value for the target pressure for frequency-controlled machines. The SFC target pressure offset indicates by how much the target value of the pressure for the pressure controller in the compressor is above the required pressure.

Parameters	Meaning
SFC current pressure time constant	Here you can set a time constant for frequency-controlled machines (SFC) for smoothing the SFC actual pressure value in seconds.
Heat is requested	Here you can activate/deactivate this function for machines with heat recovery.

Tab. 72 Parameters in the *Constant pressure control* menu

2. Tap the input field in line *Required pressure*.
   An input mask opens.
3. Set *Required pressure*.
4. Set *SFC target pressure offset*.
5. Check other displayed data.

7.16.2 Pressure monitoring

The monitoring parameters of the station can be displayed in the *Pressure monitoring* menu.

Parameters	Meaning
Activation of "Pressure too high" alarm	Displays the status of the signal function.
Threshold value "Pressure too high"	Defined threshold value for the monitoring function.
Trigger delay "Pressure too high"	Time by which the threshold value must be continually exceeded before a signal is triggered.
Activation of "Pressure too low" alarm	Displays the status of the signal function.
Threshold value "Pressure too low"	Defined threshold value for the monitoring function.
Trigger delay "Pressure too low"	Time by which the threshold value must be continually exceeded before a signal is triggered.
Activation of "Pressure too low" alarm (dp)	Displays the status of the signal function.
Threshold value "Pressure too low" (dp)	Defined threshold value for the monitoring function.
Trigger delay "Pressure too low" (dp)	Time by which the threshold value must be continually exceeded before a signal is triggered.

Tab. 73 Parameters in the *Pressure monitoring* menu

7.16.3 Volume flow rate control

Set the parameters for this operating mode in the *Volume flow rate control* menu.

Precondition The *Volume flow rate control* operating mode is only visible in the *Control* menu if it has previously been configured in Engineering Base for its application

Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login")

The required parameters for the compressed air network to be controlled are known.

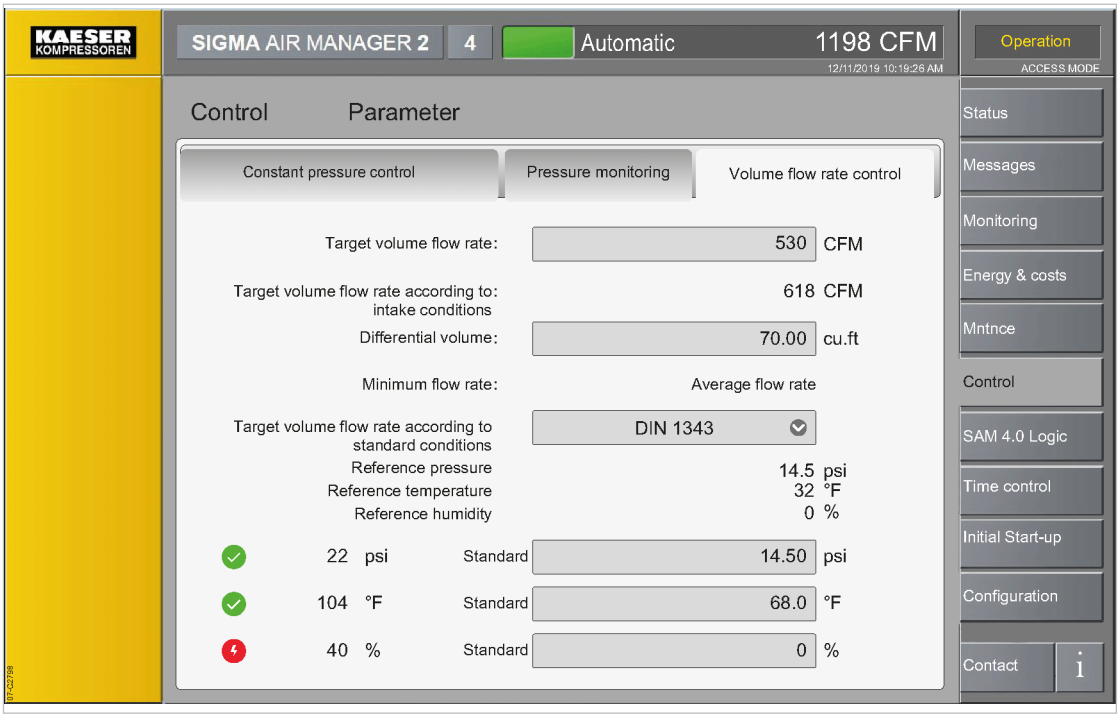


Fig. 70 Menu: *Control – Parameter – Volume flow rate control*

1. Press the Control – Parameter key.
2. Touch the Volume flow rate control tab.
   The *Control – Parameter – Volume flow rate control* menu is displayed.

Parameters	Meaning
Target volume flow rate	Set-point value to which the flow rate is controlled.
Target volume flow rate according to inlet condition	Flow rate that must be reached under the given intake conditions (pressure, temperature, humidity) in order to ensure the *Target volume flow rate.*
Differential volume	The value for the difference volume determines how far the delivered volume may deviate from the target volume before compressed air generators are switched on or off.
Minimum flow rate	With the setting *Average flow rate*, the set-point value is only then corrected in the event of a deviation if the integral of the deviated delivery volume exceeds the set difference volume. With the setting *Minimum flow rate*, the value is only corrected if the target flow rate is fallen short of.
Target volume flow rate according to standard condition	Selection of the requested standard (ISO 1217, DIN 1343, ASME & CAGI) or option “1:1”. If option “1:1: is selected, the set target flow rate is supplied under any intake conditions.
Reference pressure Reference temperature Reference humidity	These values correspond to the reference points of the corresponding standard and change depending on which of the different standards is selected.

Parameters	Meaning
	The sensor provides valid values.
	The sensor does not provide valid values.
Current value	Current measured value of the corresponding sensor.
Standard	Release value for corresponding sensor in the event that the sensor signal does not provide valid values.

Tab. 74 Meaning of the menu elements in the *Volume flow rate control* menu

3. Enter the required settings.

7.16.4 Adapt. pressure reg.-low pressure

Set the parameters for the operating mode “Pressure control without receiver volume” in the *Adapt. pressure reg.-low pressure* menu.

Precondition The *Adapt. pressure reg.-low pressure* operating mode is only visible in the *Control* menu if it has previously been configured in Engineering Base for its application

Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

The required parameters for the compressed air network to be controlled are known

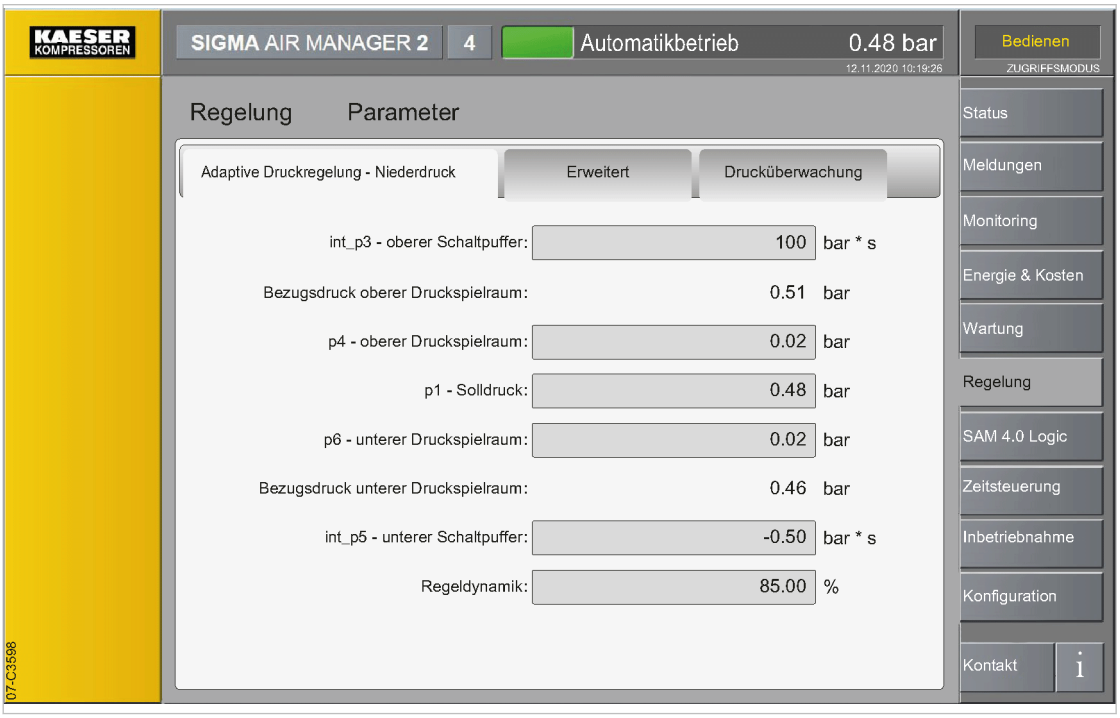


Fig. 71 Menu *Control – Adapt. pressure reg.-low pressure*

1. Press the Control – Parameter key.

2. Tap the Adapt. pressure reg.-low pressure tab.
   The *Control – Parameter – Adapt. pressure reg.-low pressure* menu is displayed.

Parameters	Meaning
p1 - set-point pressure	Set-point value to which the pressure value is controlled.
p4 - upper pressure range	Pressure differential between target pressure p1 and the upper reference pressure p3 for the integral calculation.
Reference pressure upper pressure range	The upper reference value p3 represents the value for activating the integral calculation of int_p3 and is the result from the sum of p1 + P4.
int_p3 - upper switching buffer	Time integral over pressure differential.
p6 - lower pressure range	Pressure differential between target pressure p1 and the lower reference pressure p5 for the integral calculation.
Reference pressure lower pressure range	The lower reference value p5 represents the value for activating the integral calculation of int_p5 and is the result from the difference between p1 - P4.
int_p5 - lower switching buffer	Time integral over pressure differential.
Control dynamics	Setting the reaction speed of the control.

Tab. 75 Parameters in the *Adapt. pressure reg.-low pressure* menu

3. Enter the required settings.

7.16.5 Advanced

Further parameters for the *Adapt. pressure reg.-low pressure* operating mode can be set in the *Advanced* menu.

Precondition The *Advanced* operating mode is only visible in the *Control* menu if it has previously been configured in Engineering Base for its application

Login with password access Level 2 *Configuration* (see chapter 7.4 "User Login")

The required parameters for the compressed air network to be controlled are known

Fig. 72 Menu: *Control – Parameter – Advanced*

1. Press the Control – Parameter key.
2. Tap the Advanced tab.
   The menu *Control – Parameter – Advanced* is displayed.

Parameter	Meaning
p9 - Reference pressure for immediate shutdown action	p9 is the upper reference value which, when reached, causes a compressed air generator to shut down immediately
τ_9 - Time constant for p9	The time constant for p9 defines the minimum interval (in seconds) between two possible compressed air generator shutdown actions, provided that the following applies: p2 <= p9
p7 - Upper threshold for shutdown action	p7 is the upper, process-dependent threshold value for immediate shutdown of a compressed air generator. If p2 >= p7, SIGMA AIR MANAGER 4.0 shuts the compressed air generator down. After the first immediate shutdown, a time difference of τ_7 must follow between each subsequent shutdown
τ_7 - Time constant for p7	The time constant for p7 defines the minimum interval (in seconds) between two possible compressed air generator shutdown actions, provided that the following applies: p2 >= p7
p8 - Lower threshold for activation of addi. air generators	p8 is the lower, process-dependent threshold value for immediate activation of a compressed air generator: If p2 <= p8, SIGMA AIR MANAGER 4.0 shuts the compressed air generator down. After the first immediate activation, a time difference of τ_8 must follow between each subsequent activation
τ_8 - Time constant for p8	The time constant for p8 defines the minimum interval (in seconds) between two possible compressed air generator activations, provided that the following applies: p2 <= p8

Parameter	Meaning
Δp - Min. differ. between threshold values + target pressure	Δp is the minimum distance between the setpoint p1 and the cut-in/cut-out threshold values (process and station-dependent): If the distance between p1 and one of the switching threshold values is specified so that one of the differences |p1 – p7|, |p1 – p8| or |p1 – p9| < Δp, the set value is corrected. This serves to ensure that the minimum distance to p1 is maintained

Tab. 76 Meaning of the menu elements in the *Advanced* menu

3. Enter the required settings.

7.16.6 Actual press. value

Set the parameters for the air main charging systems in the *Actual press. value* menu.

Precondition Login with password access Level 2 *Configuration* (see chapter 7.4 "User Login")
The air main charging systems used in the compressed air network are known

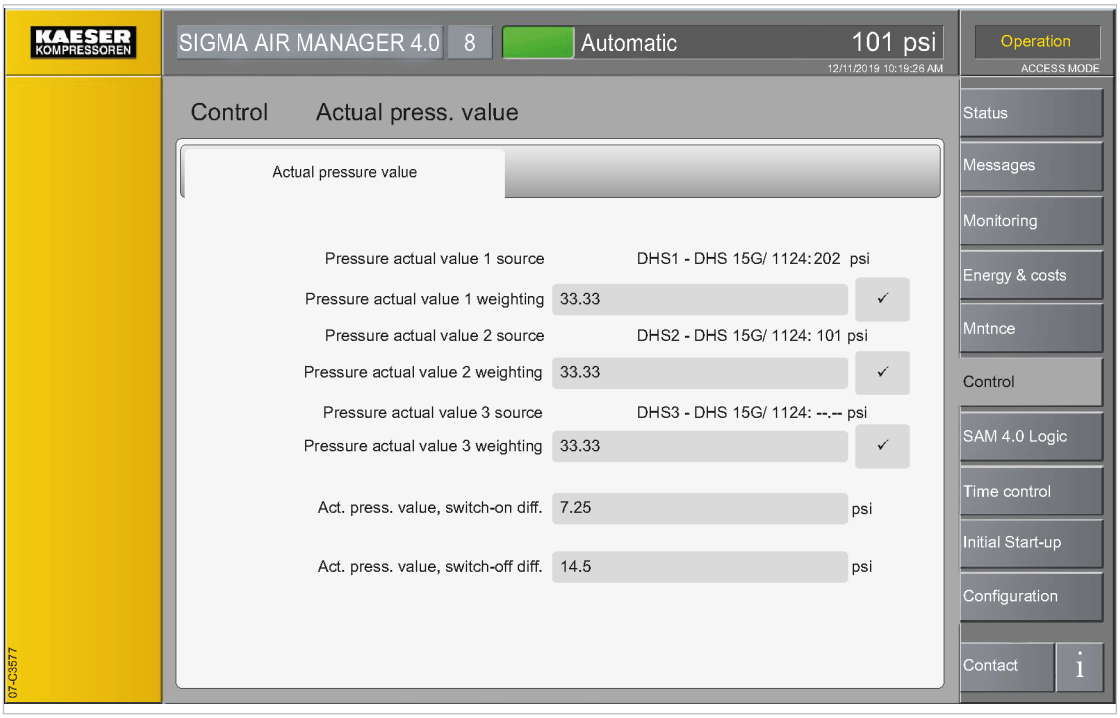


Fig. 73 Menu *Control – Actual press. value*

1. Press the Control – Actual press. value key
   The menu *Control – Actual press. value* is displayed.

Parameter	Meaning
Pressure actual value 1 source Pressure actual value 2 source Pressure actual value 3 source	Designation of the measuring point

Parameter	Meaning
Pressure actual value 1 weighting Pressure actual value 2 weighting Pressure actual value 3 weighting	Weighting by which the corresponding measured value of the actual pressure value source is taken for the network pressure calculation
Actual pressure value switch-on diff.	If the deactivated actual pressure value then exceeds this value, the pressure transducer is reactivated
Actual pressure value switch-off diff.	If the pressure differential between the two lowest actual pressure values is greater than/equal to this value, the lower of the two pressure transducers is deactivated

Tab. 77 Parameters in the *Actual press. value* menu

7.17 Timer control

Individual tasks are defined in the *Timer control* menu. Using the timer control, you can set timers for various compressed air station parameters (such as required pressure and air delivery ON/OFF).

Timers can be set for up to 99 tasks.

The time control is configured locally at SIGMA AIR MANAGER 4.0.

For a sample task, see the 7.17.7"Example" section.

Precondition Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login")

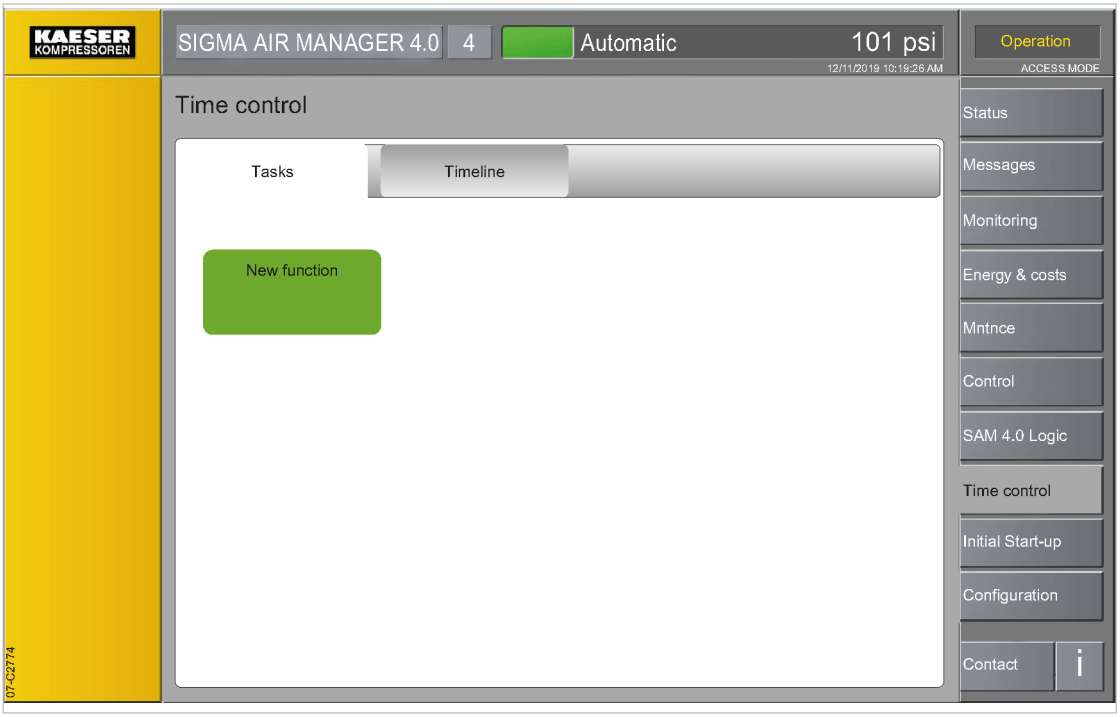


Fig. 74 *Timer control* menu

➢ Press the Timer control key.
The *Timer control* menu is displayed.

7.17.1 New function

A new task can be configured in the *Task* menu.

Precondition The *Timer control* menu is displayed

1. Touch the Tasks tab.
2. Press the New function key.

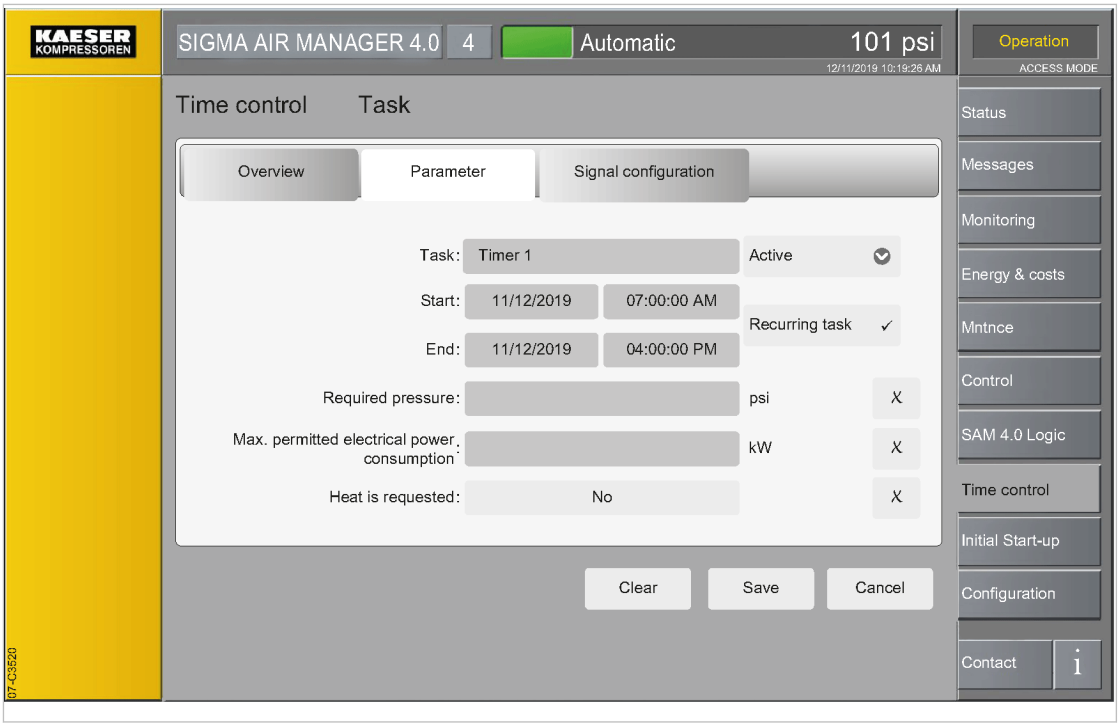


Fig. 75 Menu: *Timer control – Task – Parameter*

3. Touch the Parameter tab.
The *Timer control – Task – Parameter* menu is displayed.

Element	Meaning
Task	User-defined task name. The *Active* option is used to execute this task. The option *Inactive* is used to **not** execute the task.
Start	Input fields for start date and time of the task.
End	Input fields for end date and time of the task.
Recurring task	Opens the *Recurring task* menu, in which the recurring tasks can be configured (see chapter 7.17.2).
Required pressure	Set and activate (optional) the set-point value for the required pressure of the task.

Element	Meaning
Max. permitted electrical power consumption	Set and activate (optional) set-point value for maximum allowable power consumption for the task.
Heat is requested	Set and activate (optional) if heat is required for the task.
Control field "✓“	Parameter is defined as a set-point value by the timer control.
Control field “✗”	Parameter is **not** defined as a set-point value by the timer control.
Save	Save all settings for the task and close the menu

Tab. 78 Meaning of the *Timer control – Task – Parameter* menu elements

4. Enter the desired name for this task in the *Task* field.
5. Enter the date and time for start and end of this task in the *Startand End* fields.
6. Touch the control field on the right to activate the desired parameter.
   A check mark “✓” is displayed in the activated control field.
7. Enter the set-point value(s) for the activated parameter(s) or touch the desired function.

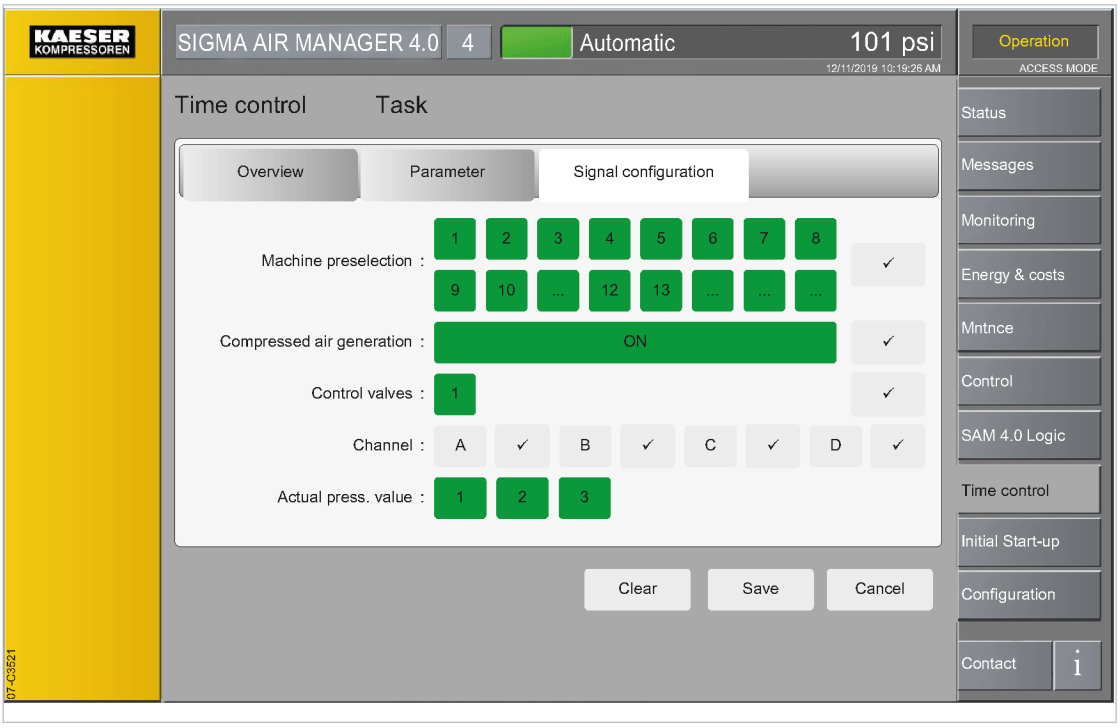


Fig. 76 Menu: *Timer control – Task – Signal configuration*

8. Touch the Signal configuration tab.
   The *Timer control – Task – Signal configuration* menu is displayed.

Element	Meaning
Machine preselection	Set the machines that are to be used for the task and activate the function (optional).
Compressed air generation	Set the status of compressed air generation during the task and activate the function (optional).

Element	Meaning
Control valves	Set the regulating valves (DHS) to be used for the task and activate the function (optional).
Channel	Set the status of channels during the task and activate the function (optional).
Control	Set the pressure transducer to be considered for pressure control.
Control field "✓“	Parameter is defined as a set-point value by the timer control.
Control field “✗”	Parameter is **not** defined as a set-point value by the timer control.
Key colour: Green	The corresponding function has been activated.
Save	Save all settings for the task and close the menu.

Tab. 79 Meaning of the *Timer control – Task – Signal configuration* menu elements

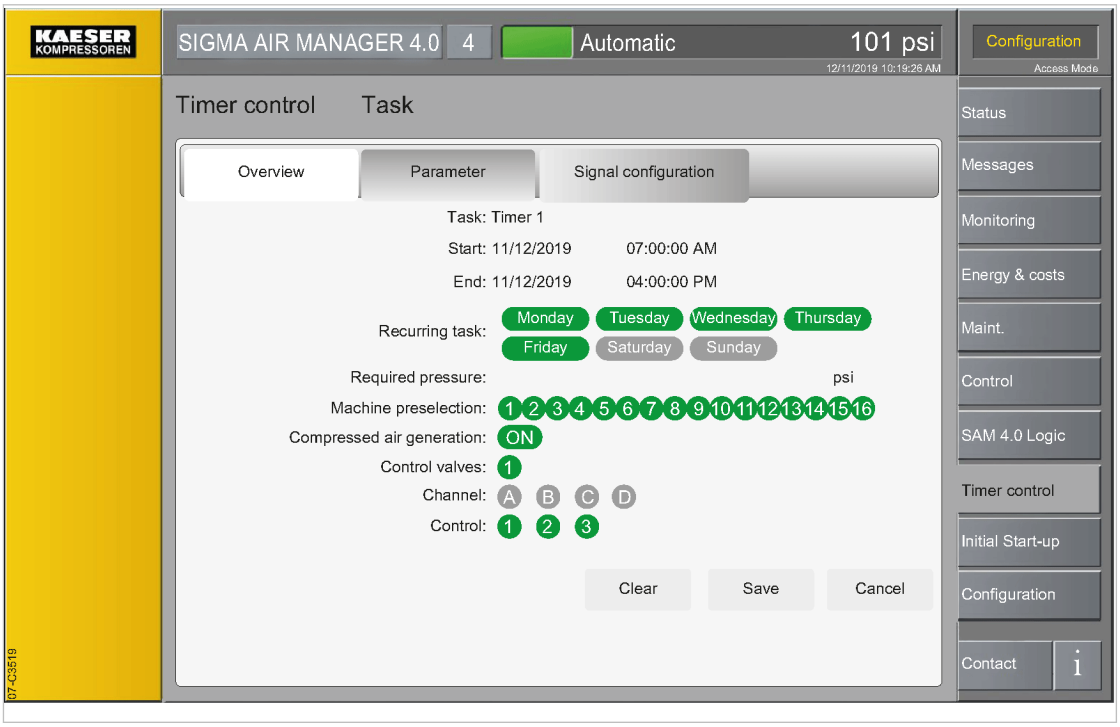


Fig. 77 Menu: *Timer control – Task – Overview*

9. Touch the Overview tab.
   The *Timer control – Task – Overview* menu is displayed.
10. All settings for the selected task are shown clearly arranged on a page in the *Overview* menu. You cannot make any changes in here.
11. Press the Save key.
    The task is saved and the *Task* menu closes.

An error message will appear in case of a conflict with a previously saved task. The new task cannot be saved until the conflict is eliminated.

The following conflicts may occur:

- A conflict arises if two different tasks are set up to change the same parameter at the same time.
- New recurring tasks must not conflict with existing recurring tasks.
- New non-recurring tasks must not conflict with existing non-recurring tasks.

7.17.2 Recurring task

If a task is set up as a recurring task, it is repeated at regular intervals.

A recurring task has lower priority than a non-recurring task that is active at the same time.

Precondition The *Timer control* menu is displayed.

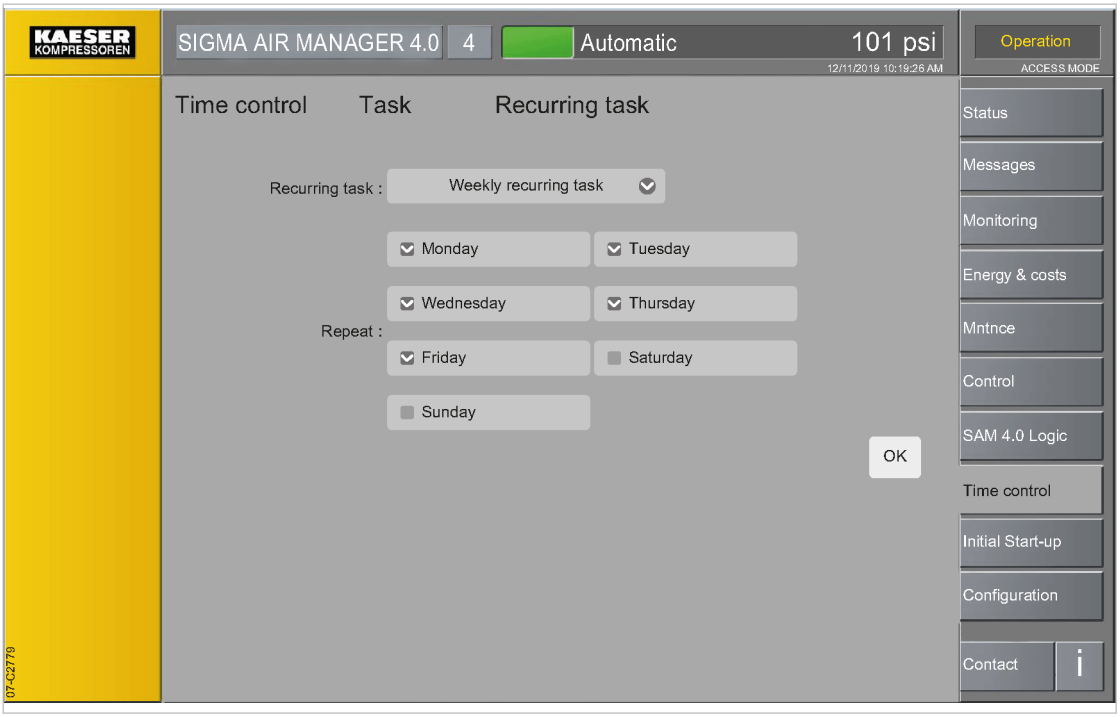


Fig. 78 Menu: *Timer control – Task – Recurring task*

1. Touch the Tasks tab.
2. Touch the desired task.
   The *Task* menu is displayed.
3. Touch the Parameter tab.
   The *Timer control – Task – Parameter* menu is displayed.
4. Press the Recurring task key.
   The *Recurring task* menu is displayed.
5. Touch the symbol in the *Recurring task* row.
6. Select the *Weekly recurring task* option, for example.

7. Touch the desired weekday.
   The selected weekday is indicated by a check mark "✓" in the check box.
8. Activate recurring function by placing a check mark "✓" in the *Recurring task* control box.
9. Press the OK key.
   The *Recurring task* menu closes.
10. Press the Save key.
    The task is saved and the *Task* menu closes.
    In the *Timer control* menu, recurring tasks are marked with a circle symbol.

7.17.3 Edit task

An existing task can be edited in the *Task* menu.

Precondition The *Timer control* menu is displayed

Fig. 79 *Timer control* menu

1. Touch the Tasks tab.
2. Touch the desired task.
   The *Task* menu is displayed.
3. Enter the required settings.
4. Press the Save key.
   The settings are saved and the menu closes.

Active tasks are marked with a yellow frame in the list.

7.17.4 Delete tasks

An existing task can be deleted in the *Task* menu.

Precondition The *Timer control* menu is displayed

1. Touch the Tasks tab.
2. Touch the task to be deleted.
   The *Task* menu is displayed.
3. Press the Clear key.
   The task is deleted and the menu closes.

7.17.5 Timeline

All tasks and the parameters they influence are shown clearly arranged on a timeline in the *Timeline* menu. Any 16-hour period, past, present or future, can be viewed. The transparent visualization of the factors permits a clear understanding of the effects of the timer control.

Precondition The *Timer control* menu is displayed

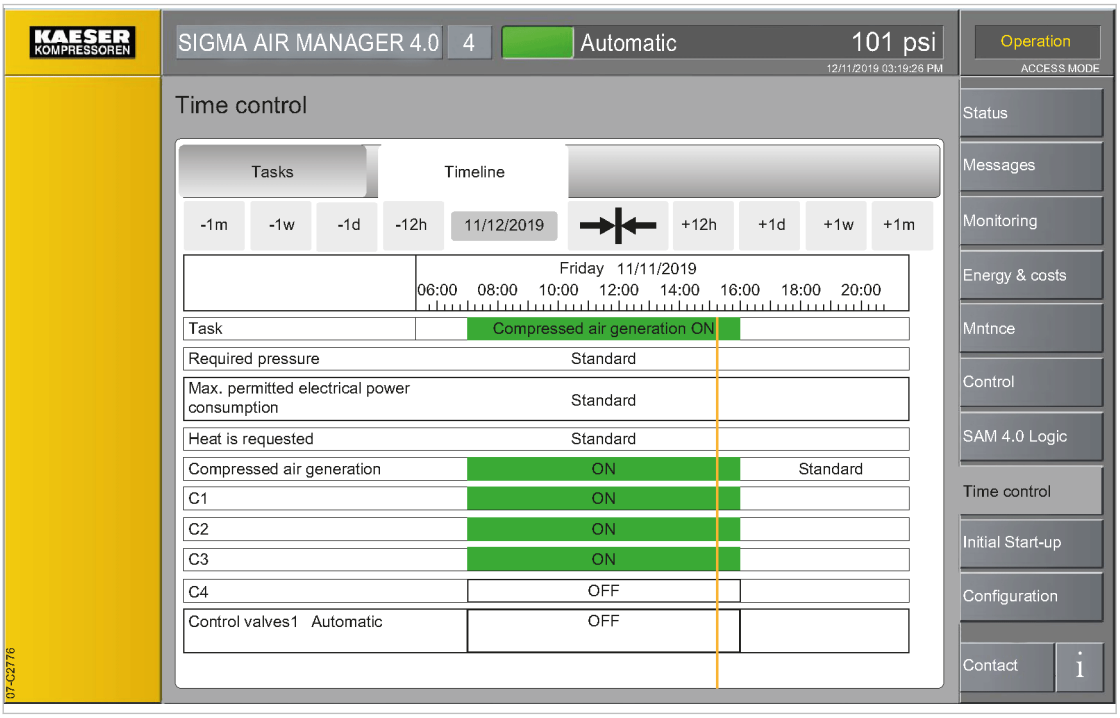
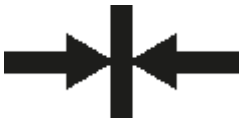


Fig. 80 Menu *Timer control – Timeline*

1. Touch the Timeline tab.
   The *Timeline* menu is displayed.

Element	Meaning
-12h/+12h	Move half a day forward or back
-1d/+1d	Move a day forward or back
-1w/+1w	Move a week forward or back
-1m/+1m	Move a month forward or back

Element	Meaning
Date	Select the *Set the date* menu and enter the desired date
	Reset the time line to the current time
Timeline	The timeline can be shifted continuously to the left or right
Yellow line	Current time

Tab. 80 Meaning of the menu elements *Timeline*

2. Tap the time line and move it to the left or right.

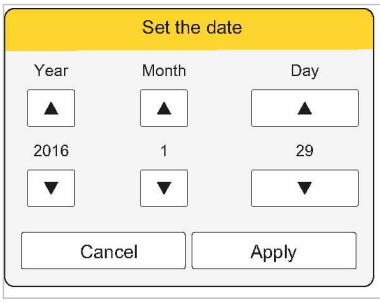


Fig. 81 *Set the date* menu

3. Alternatively, tap the *Date* field.
   The *Set the date* menu is displayed.

Element	Meaning
Year	Set year
Month	Set month
Day	Set day
Arrow keys	Move up/down in the list
Cancel	Settings are **not** saved
Apply	Settings are saved

Tab. 81 Meaning of the menu elements *Set the date*

4. Use the arrow keys to set the current date:
   - Year
   - Month
   - Day
5. Save the selected date using the Apply key.

7.17.6 Activating time control

To activate the time control, press the «Timer control» key on the operating panel of SIGMA AIR MANAGER 4.0. In addition, you can also activate by means of I/O signals and by the control system.

Precondition At least one valid task must be created and saved in the time control settings
In the *Configuration – Key lock* menu the «Timer control» key is released

1. Press «Timer control» .
   The system returns a confirmation prompt.
2. Confirm prompt with the Yes key.
   The «Timer control» key lights up **green**.

Result SIGMA AIR MANAGER 4.0 follows the scheduled tasks of the time control.

7.17.7 Example

The following example clearly illustrates, step-by-step, a frequent use case for the time control function.

Definition of task:

- Compressed air flow should be active on weekdays from 6 am to 8 pm.
- Compressed air flow should be deactivated on weekends from Friday at 8 pm to Monday at 6 am.
- This cycle is to be repeated every week.

Proposed solution:

Two tasks are required for the time control:

- Compressed air OFF weekdays
- Compressed air OFF weekends

Precondition Without timer control, compressed air flow is continuously active
The timer control function does not have any other tasks that conflict with the following settings
The *Timer control* menu is displayed

1. Touch the Tasks tab.
2. Press the New function key.
   The menu *Timer control – Task* is displayed.

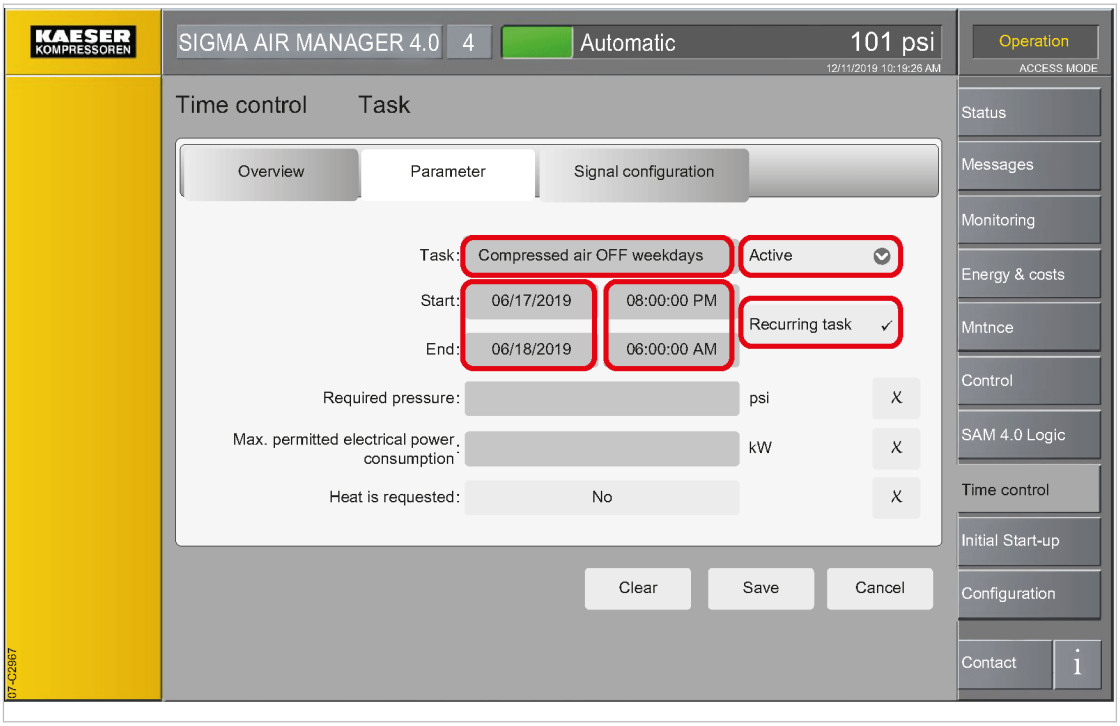


Fig. 82 Task: "Compressed air OFF weekdays"

3. Touch the Parameter tab.
   The *Timer control – Task – Parameter* menu is displayed.
4. Enter "Compressed air OFF weekdays" in the *Task* field.
5. Touch the symbol in the *Task* row.
6. Select the *Active* option.
7. Configure date and time settings for the task "Compressed air OFF weekdays".
8. Press the Recurring task key.
   The *Recurring task* menu is displayed.

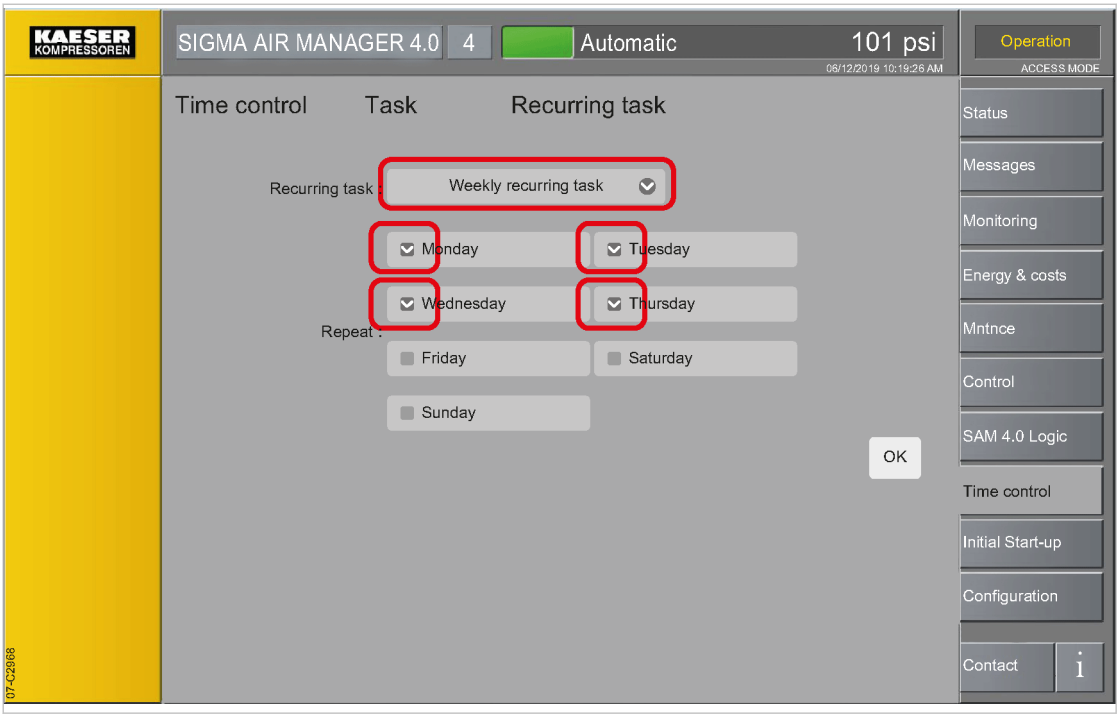


Fig. 83 Serial task menu for the task "Compressed air OFF weekdays"

9. Touch the symbol in the *Recurring task* row.
10. Select the *Weekly recurring task* option.
11. Touch to select the control box for the weekdays *Monday*, *Tuesday*, *Wednesday* and *Thursday*.

    The selected weekday is indicated by a check mark "✓" in the check box.
12. Press the OK key.

    The *Recurring task* menu closes.
13. Touch the Signal configuration tab.

Compressed air flow is deactivated starting on Monday at 8 pm and ends on Tuesday at 6 am.

The period between start and end is **one day**.
The serial task function is used to set repetitions on additional weekdays.

An error message appears if the period between start and end is set at more than one day while simultaneously multiple weekdays are set using the serial task function.

The start time is the time at which compressed air flow is to be deactivated. The compressed air flow is reactivated at the end time.

The menu *Timer control – Task – Signal configuration* is displayed.

14. Activate the control field for the *Compressed air generation* parameter by tapping it.

    A check mark "✓" is displayed in the activated control field.
15. For the *Compressed air generation* parameter, set the *OFF* option.
16. Press the Save key.

    The task is saved and the *Timer control – Tasks* menu is displayed.
17. Press the New function key.

    The menu *Timer control – Task* is displayed.

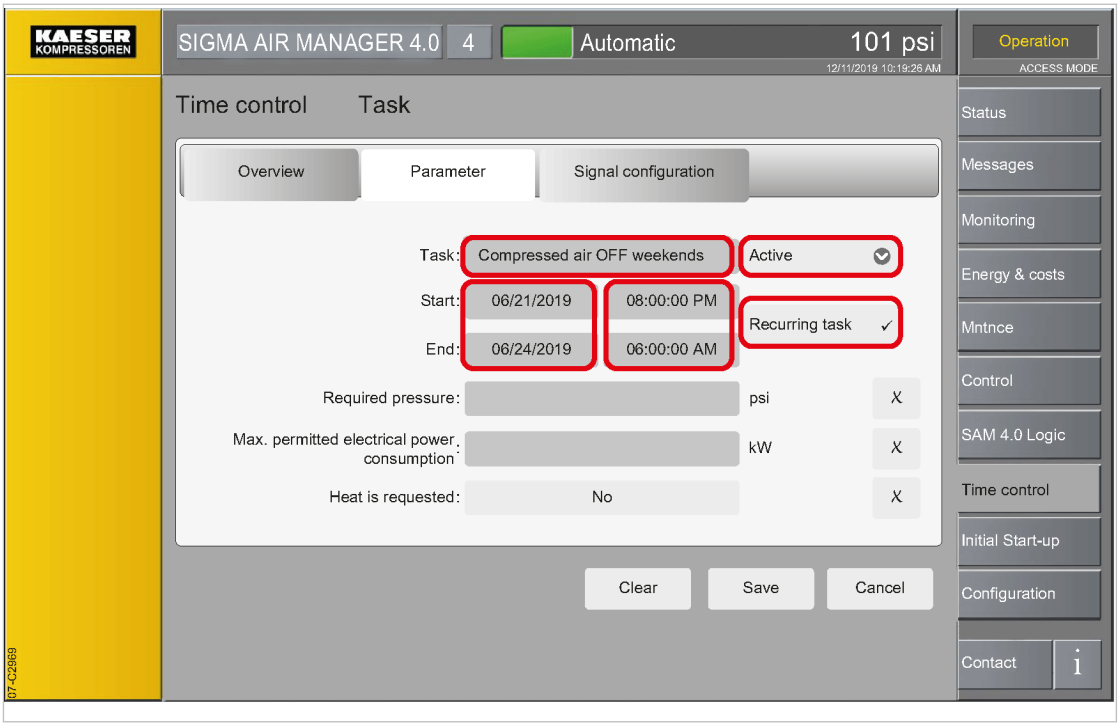


Fig. 84 Task: "Compressed air OFF weekends"

18. Touch the Parameter tab.
    The menu *Timer control – Task – Parameter* is displayed.
19. Enter "Compressed air OFF weekend" in the *Task* field.
20. Touch the symbol in the *Task* row.
21. Select the *Active* option.
22. Configure date and time settings for the "Compressed air OFF weekends" task.

Deactivation of the compressed air flow starts on Friday at 8 pm and ends on Monday at 6 am.
The period between start and end is **three days**.
Using the series task function, one weekly repetition is set for **Friday**.

23. Press the Recurring task key.
    The *Recurring task* menu is displayed.

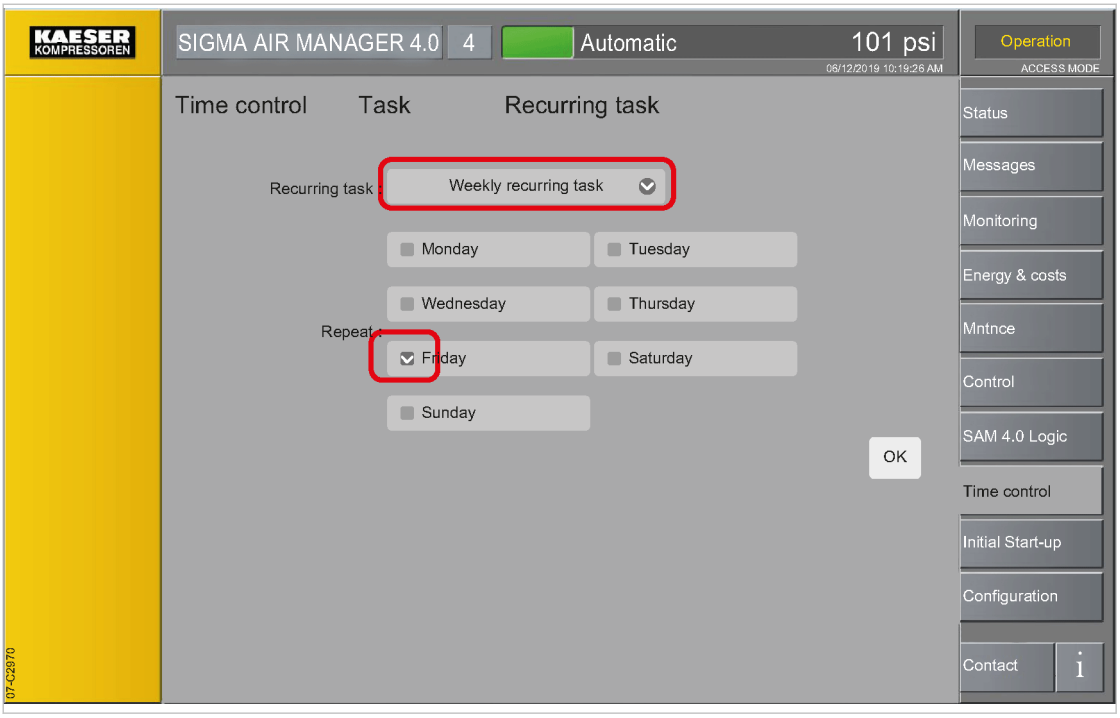


Fig. 85 Series task menu for the "Compressed air OFF weekends" task

24. Touch the symbol in the *Recurring task* row.
25. Select the *Weekly recurring task* option.
26. Select the control box for the ***Friday*** weekday by touching it.
    The selected weekday is marked in the control box with a check mark "✓".
27. Press the OK key.
    The *Recurring task* menu closes.
28. Touch the Signal configuration tab.
29. For the *Compressed air generation* parameter, set the *OFF* option.
30. Activate the control field for the *Compressed air generation* parameter by touching it.
    A check mark "✓" is displayed in the activated control field.
31. Press the Save key.
    The task is saved and the *Timer control – Tasks* menu is displayed.

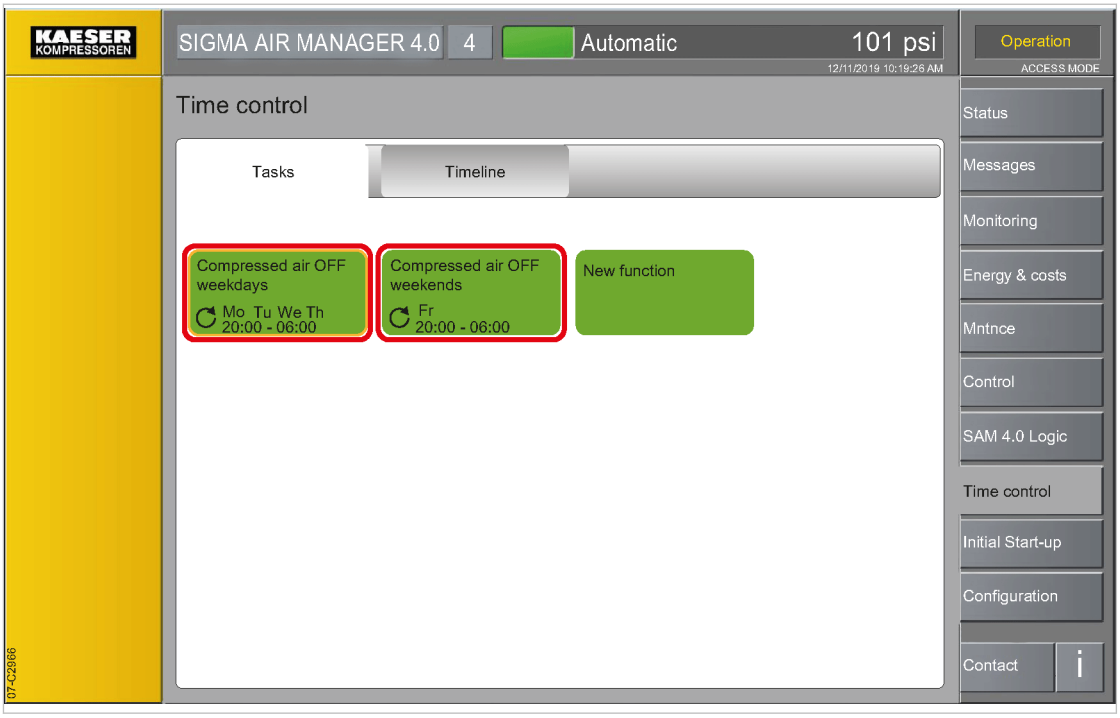


Fig. 86 *Timer control* menu with the two tasks

32. Touch the Timeline tab.
    The menu *Timer control – Timeline* is displayed.

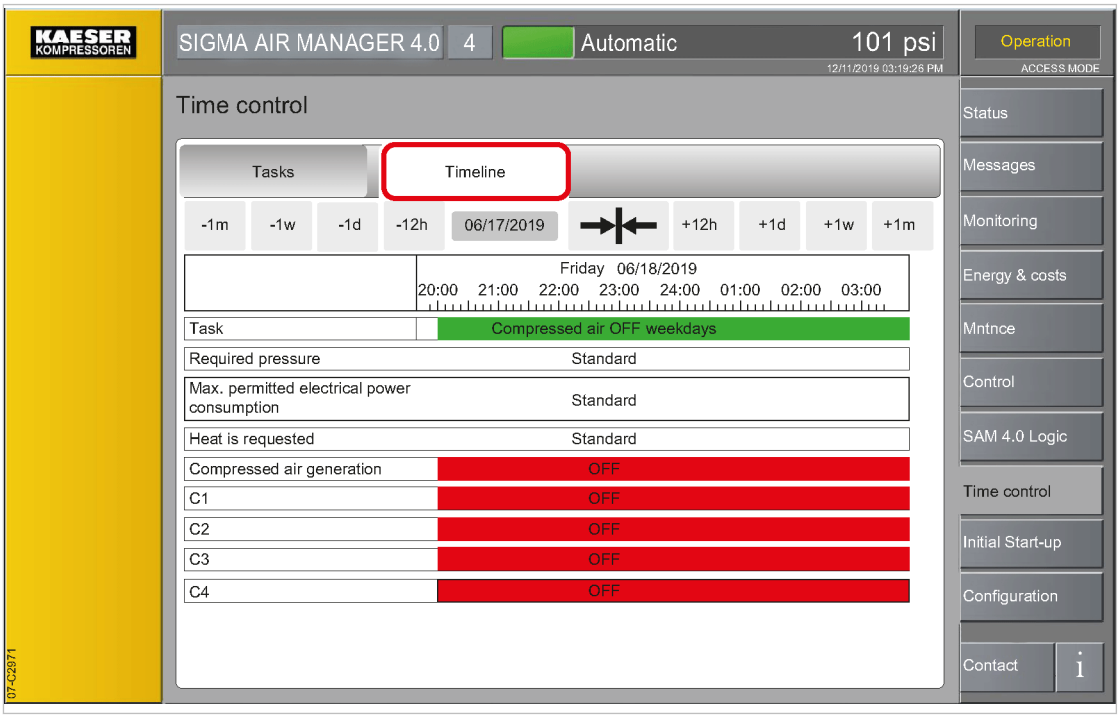


Fig. 87 *Timeline* menu with the task "Compressed air OFF weekdays"

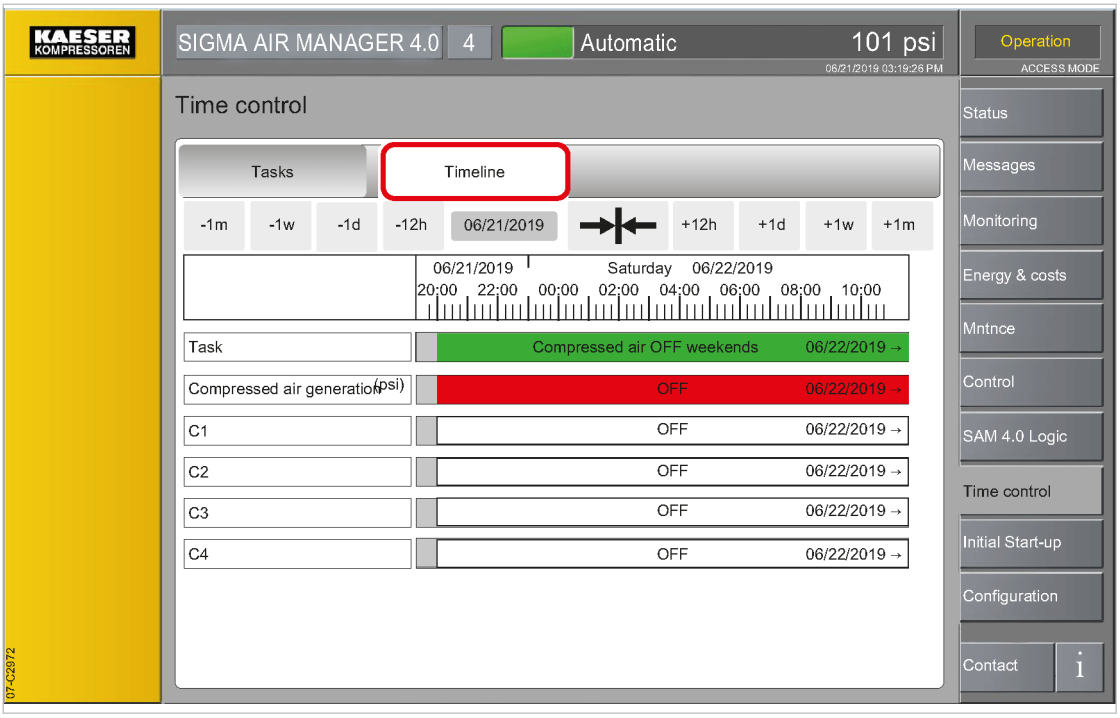


Fig. 88 *Timeline* menu with the task "Compressed air OFF weekends"

33. Check the settings and correct them if necessary in the *Tasks* menu.
34. Press the «Timer control» key.
    The system returns a confirmation prompt.
35. Confirm prompt with the Yes key.
    The «Timer control» key **lights up green**.

Result SIGMA AIR MANAGER 4.0 follows the scheduled tasks of the time control.

7.18 Data backup

SIGMA AIR MANAGER 4.0 energy data is periodically backed up once per hour on the SD card. Data backup for energy data and station data can also be executed manually if necessary. The manual data backup overwrites the previously automatically backed up data. An authorized KAESER service representative can load the manually backed up data on the new device if the SIGMA AIR MANAGER 4.0 is replaced.

Precondition An SD card with compatible file system (FAT32) and minimum 8 GB free memory is plugged into SIGMA AIR MANAGER 4.0 (see Chapter 10.3"Software update").

Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login").

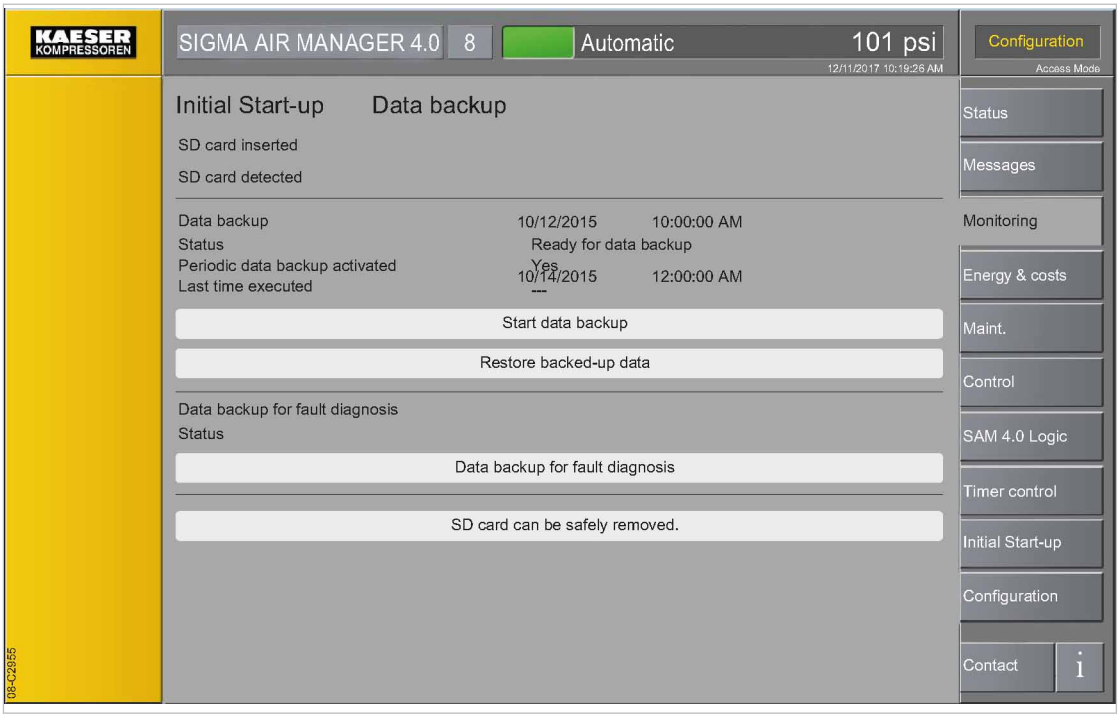


Fig. 89 *Data backup* menu

1. Press the Initial Start-up – Data backup key.
   The menu *Initial Start-up – Data backup* is displayed.

Element	Meaning
SD card inserted	An SD card has been physically inserted.
SD card detected	An SD card has been electronically detected.
Status	Displays whether data backup can be started.
Last time executed	Time of last successful data backup.
Start data backup	Key used to manually start data backup.
Restore backed-up data	Key used by a KAESER service technician to reload the data from the most recent backup on SIGMA AIR MANAGER 4.0.
Perform data backup for diagnostics	Key used to start the backup of settings and measurement data for troubleshooting on the SD card.
SD card can be safely removed.	Key with which the SD card is securely logged off from the electronic control (file system info at operating system level) so that is can subsequently be removed without data loss.

Tab. 82 Meaning of the *Data backup* menu elements

2. If needed, back up settings and station data using the Start data backup key or back up settings and measurement data using the Perform data backup for diagnostics key.
   The corresponding data are stored on the SD card.
3. If the backup is accessed via KAESER CONNECT (see 8.8 "KAESER CONNECT" section), the data are downloaded to the internet device and saved.

4. Press SD card can be safely removed. key prior to removing the SD card.
   The SD card is securely logged off from the electronic control and can be removed without the risk of data loss.

7.19 Control technology

SIGMA AIR MANAGER 4.0 uses a communication module for communicating with the user's control system. The communications parameters can be set and the communications status can be verified in the *Control technology* menu.

⚠ Depending on the communication module used, different parameters can be set in this menu.

Precondition The required communications module is installed (see chapter 6.9 "Installation").
Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login").
The communication parameters are known. Request the required information from your IT department.

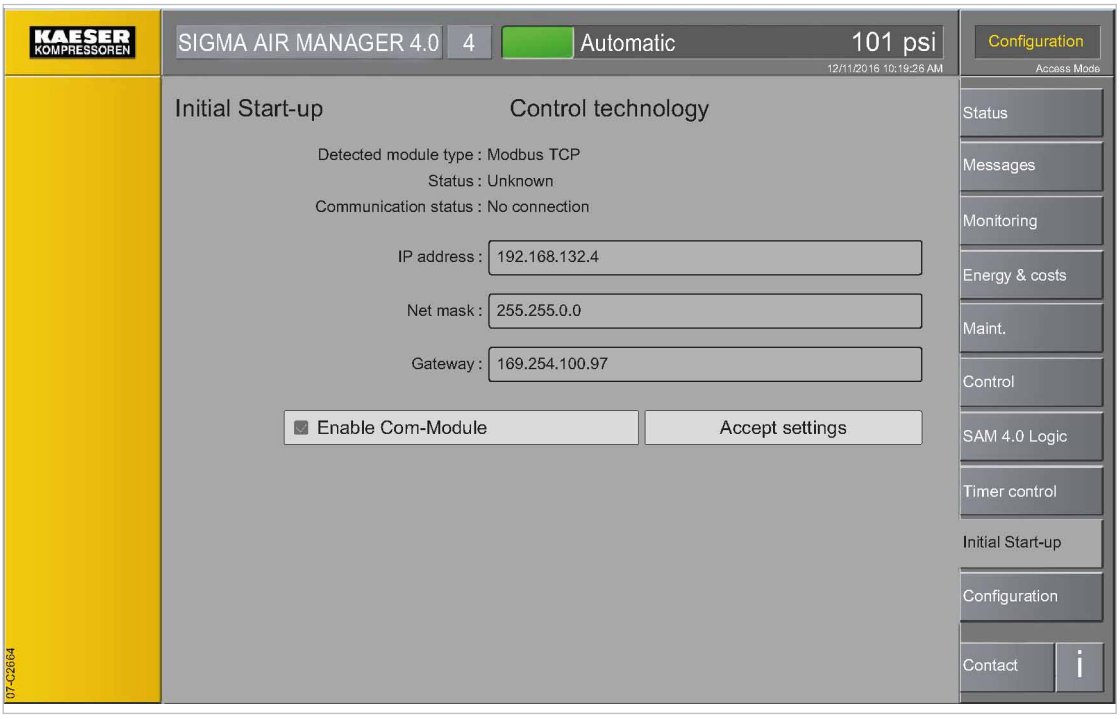


Fig. 90 *Control technology* menu – Modbus TCP as a sample communications module

1. Press the Initial Start-up – Control technology key.
   The *Control technology* menu is displayed.
2. Activate the *Enable Com-Module* option by placing a check mark "✓" in the control box.
   The communication module is activated. The system detects the communication module type and displays it in the *Detected module type* line.
3. Configure the communications parameters required for the respective communications module.

4. Apply settings using the Accept settings key.
   The communication module is started with the set parameters.
   Communication with the control electronics is working.
5. Verify the communication parameters.

"Technical description SAM 4.0 process image", document number 7_9696_PA.

7.19.1 Activating remote control

Precondition In the *Configuration – Key lock* menu the «Remote control» key is released.

1. Press the «Remote control» key.
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The «Remote control» key lights up **green**.
   You can control SIGMA AIR MANAGER 4.0 from a central control center.

7.20 Activating SIGMA AIR MANAGER 4.0

⚠ 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 SIGMA AIR MANAGER 4.0 with those listed in the operating manual.*

➢ Use the "Commissioning" check list.

To be checked	Description	Confirmed?
Machines are set up	Chapter 6.13 "Setting machines"	
Date and time is set	Chapter 7.6 "Date and time"	
The configuration is imported	Chapter 7.5 "Importing the configuration"	
The configuration has been checked	The "Engineering Base" settings shown (chapter 7 "Initial Start-up") have been verified and are correct	
Machines are connected	Chapters 7.13 "SIGMA NETWORK I/O" and 7.14 "PROFIBUS"	
Required pressure is set	Chapter 7.16 "Control"	

Tab. 83 "Commissioning" check list

Precondition

No personnel are working on the machine.

All access doors on the machines are closed and locked.

The ambient conditions for SIGMA AIR MANAGER 4.0 as described in Chapter 5 "Installation and Operating Conditions" are met.

The temperature of the machines is not below +37 °F.

All installation activities and wiring tasks have been properly and completely performed according to chapter 6 "Installation".

There is no bus error.

All items in the "Commissioning" check list are complied with.

Login with Access Level 2 *Configuration* (see 7.4 "User Login").

1. Press the Status – Manual preselect key.
   The *Manual preselect* menu is displayed.
2. Use the buttons in the column to the left of the P&I symbol to select the required machine.
   The pre-selection button changes to green.

Compressed air station with compressed air generation in the Manual operating mode	Compressed air station without compressed air generation in the Manual operating mode
1. Set the machines to remote mode.	1. Switch on the machines.

1. Press «Automatic» .
   The system returns a confirmation prompt.
2. Press OK to confirm the prompt.
   The «Automatic» key lights up **green**.
   SIGMA AIR MANAGER 4.0 assumes control of the compressed air station.

8 Operation

8.1 Calculated values

Except for pressure and temperatures, the values displayed at SIGMA AIR MANAGER 4.0 are usually not measured values. These values are calculated from specified nominal values, input values and run times. Deviations from measured values are unavoidable. In conventional connections, only machines with the "motor running" feedback signal are taken into consideration for the calculation.

8.2 Switching on and off

Precondition

The ambient conditions as described in Chapter 5 "Installation and Operating Conditions" are met.

In the *Configuration – Key lock* menu, the keys on the operating panel are available.

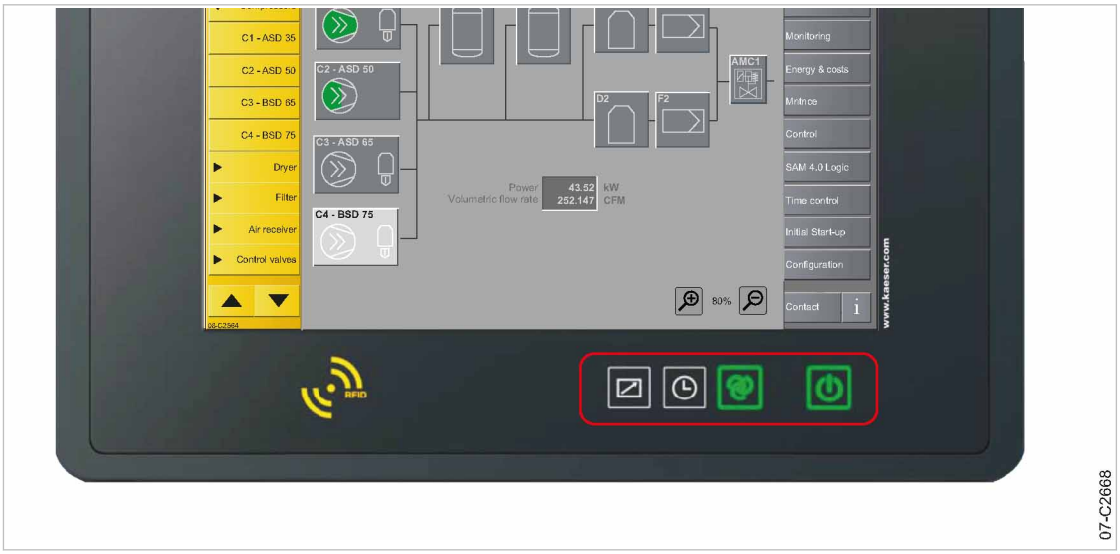


Fig. 91 Keys on the operating panel

8.2.1 Switching the compressed air station on

1. Press «Compressed air generation» .
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The «Compressed air generation» key lights up **green**.

8.2.2 Activating automatic mode

1. Press «Automatic» .
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The «Automatic» key lights up **green**.
   SIGMA AIR MANAGER 4.0 assumes control of the compressed air station.

8.2.3 Activating remote control

1. Press «Remote control» .
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The «Remote control» key lights up **green**.
   You can control SIGMA AIR MANAGER 4.0 from a central control center.

8.2.4 Activating timer control

1. Press «Timer control» .
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The «Timer control» key lights up **green**.
   SIGMA AIR MANAGER 4.0 follows the scheduled tasks.

8.2.5 Switching off the compressed air station

You can switch off the compressed air supply **for the entire station** at SIGMA AIR MANAGER 4.0.

1. Press «Compressed air generation» .
   The system returns a confirmation prompt.
2. Confirm with Yes.
   The compressed air station shuts down and **compressed air is no longer delivered**.
   The «Compressed air generation» key lights up **red**.

8.3 Help function

SIGMA AIR MANAGER 4.0 features an integrated Help function. A matching description can be displayed for the menu currently open.

1. Press the key.
   The Help page for the current menu appears.
2. If the Help page takes more than one screen page, scroll up or down with **two fingers** .
3. Tap underlined terms to open additional Help pages.
4. Use the Back/forward keys to scroll up and down through the Help pages.
5. Tap theContents key to open the table of contents for the Help function.
   A list of Help topics will be displayed.
   A glossary can also be opened from the table of contents.
6. Press the Close key.
   The Help page closes and the current SIGMA AIR MANAGER 4.0 menu is displayed again.

The images shown in the help pages are intended only as examples. The menus or functions may be different or currently unavailable for the installed software.

The installed version of the software may also include functions not yet described, or described differently, in the Help function.

8.4 Status

The *Status* menu has the following sub-menus:

- "Overview"
  - "Pressure curve"
  - "Pressure display"
  - "Current values"
  - "History"
- "Manual preselect"
  - Compressed air generators
  - Dryer
- "Sources"
  - "Pressure and power"
  - "Preselect"
  - "Priorities"
  - "Control valves"
- "Station"

1. Press the Status key.
2. Select the required sub-menu.
3. If the sub-menu page displayed has several pages, touch one of the tabs to open the corresponding page.

8.4.1 Overview – Pressure curve

The *Status – Overview – Pressure curve* menu displays the "network pressure" of the entire station as a graphic representation of the pressure progression curve. The machine's operating points are graphically displayed.

One or more "pressure transducers" in the network provide the measured values. If multiple pressure transducers are used, the software calculates a weighted mean value (see chapter 7.16 "Control" – "Parameter").

The values are displayed in the previously set "unit" above the time axis shown.

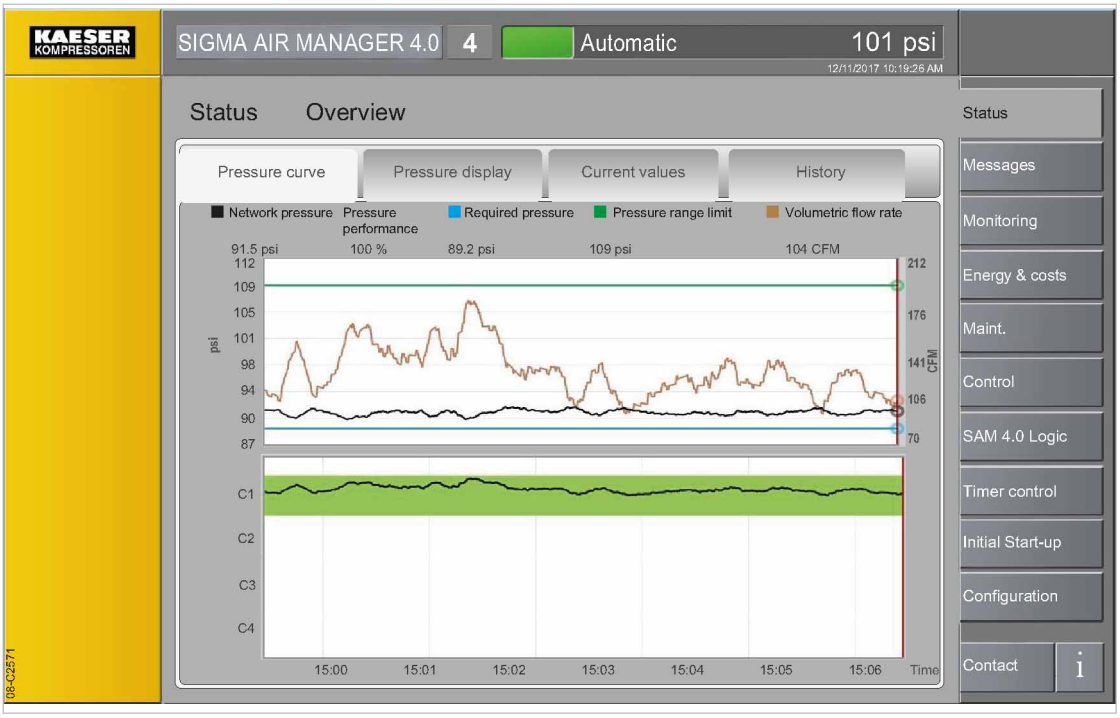


Fig. 92 *Pressure curve* menu

8.4.1.1 Network pressure

The system displays the progression curve of the "system pressure" of the air station over the time axis.

The values are displayed in the set "unit".

8.4.1.2 Pressure performance

Ratio of the time period the network pressure is within the range between the pressure range limit and the demand pressure and the time outside this range. The calculated value of the pressure quality in the displayed time period.

8.4.1.3 Required pressure

The required pressure is the minimum pressure required by the consumers in the compressed air network (measured with the "pressure transducer").

SIGMA AIR MANAGER 4.0 usually maintains the demand pressure with a maximum deviation of 1.5 psi. 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. A pressure of 14.5 psi higher than required causes approximately 6 % more energy consumption.

8.4.1.4 Pressure range limit

The pressure range limit is the maximum permissible pressure in the compressed air station. This value may be specified by the compressed air consumer or the compressed air station.

8.4.1.5 Volumetric flow rate

Current compressed air volume delivered by the entire compressed air station per time unit.

8.4.2 Overview – Pressure display

The *Overview – Pressure display* menu displays the current "system pressure" as numerical value in a large font.

This display type enables good legibility from a larger distance.

The values are displayed in the set "unit".

Fig. 93 *Pressure display* menu

8.4.3 Overview – Current values

Current data of the entire station are displayed in the *Status – Overview – Current values* menu.

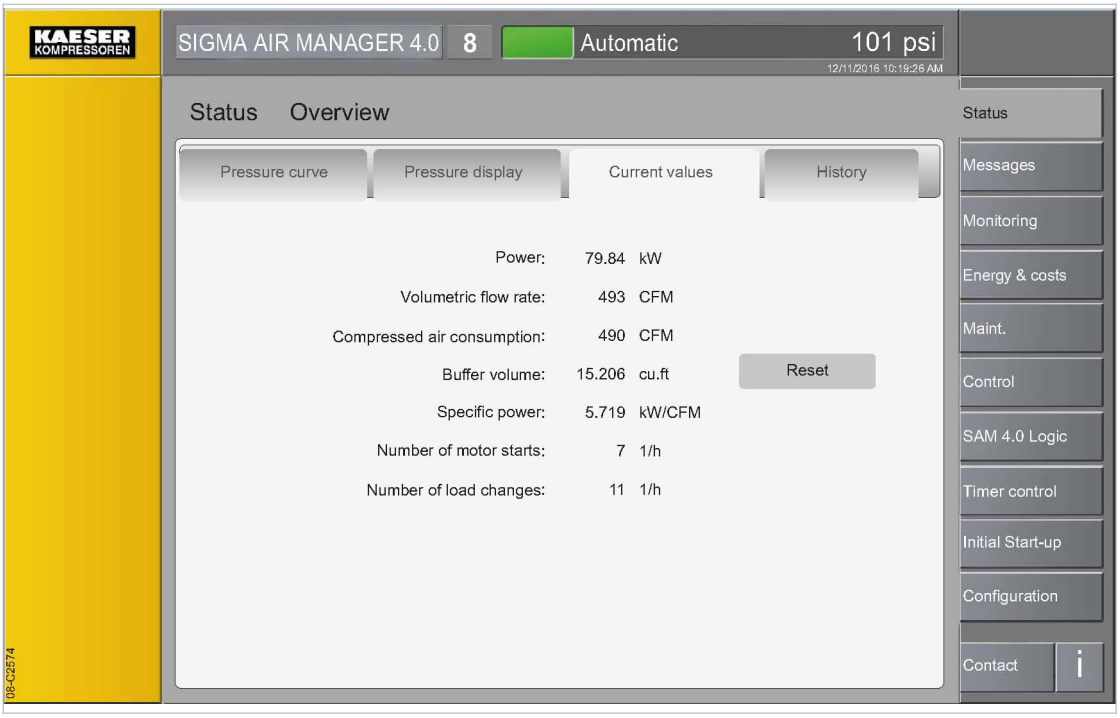


Fig. 94 *Current values* menu

8.4.3.1 Power

Displays the electrical power currently drawn by the entire station.
The values are displayed in the set "unit".

8.4.3.2 Volumetric flow rate

Current compressed air volume delivered by the entire station.
The values are displayed in the set "unit".

8.4.3.3 Compressed air consumption

Current compressed air usage in the compressed air system.
The values are displayed in the set "unit".

8.4.3.4 Buffer volume

Calculated buffer volume in the entire compressed air system.
The values are displayed in the set "unit".

8.4.3.5 Specific power

This standard value is used as a reference value in the assessment of the station's efficiency. The value is calculated from the power consumption per volumetric flow. Lower values indicate a high degree of efficiency.

8.4.3.6 Number of motor starts

The number of motor starts of all machines within the last 60 minutes.

8.4.3.7 Number of load changes

Number of load changes (from one "operating point" to another) of all machines within the last 60 minutes.

8.4.4 Overview – History

This sub-menu page records the maximum, mean or minimum pressure values and other sum values.

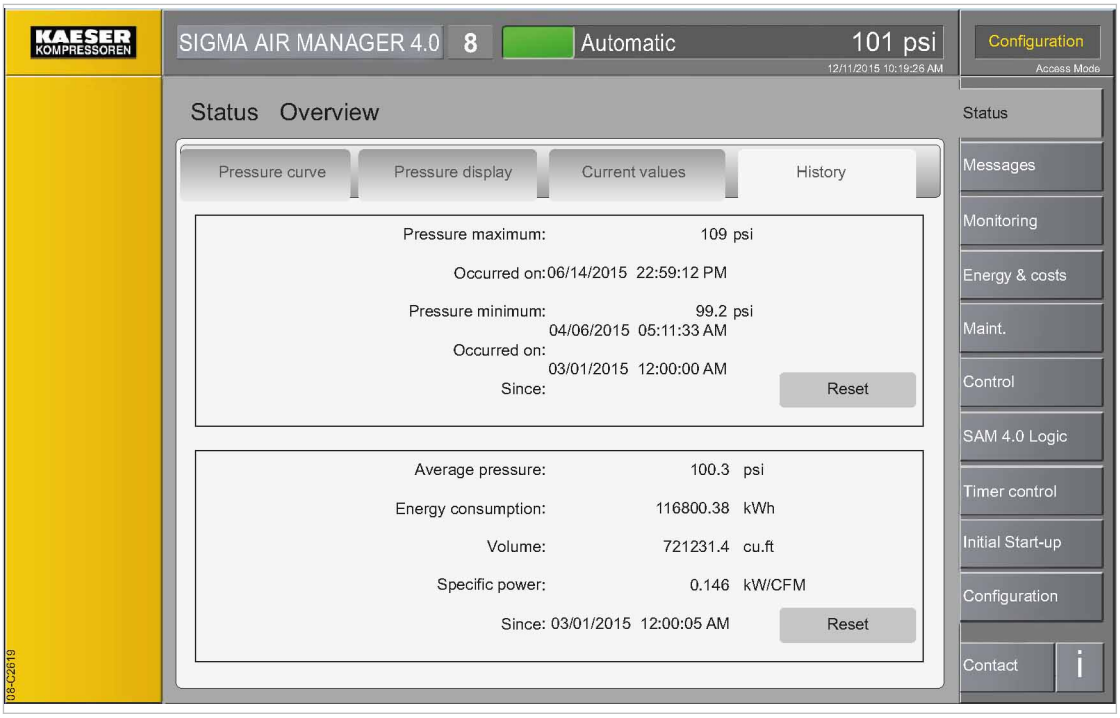


Fig. 95 *History* menu

8.4.4.1 Pressure maximum

The maximum pressure in the network, measured from the reference time set. Date and time of the event are also stored. This value corresponds to the highest measured pressure in the network and can be used to evaluate the compressed air quality.

The values are displayed in the set "unit".

8.4.4.2 Pressure minimum

The minimum pressure in the network, measured from the reference time set. Date and time of the event are also stored. This value corresponds to the lowest measured pressure in the network and can be used to evaluate the compressed air quality.

The values are displayed in the set "unit".

8.4.4.3 Reset

The set reference time is reset to the current date and the current time.

8.4.4.4 Average pressure

The mean pressure in the network, calculated since the reference time set.

The values are displayed in the set "unit".

8.4.4.5 Energy consumption

Energy consumption of machines monitored by SIGMA AIR MANAGER 4.0, calculated since the reference time set.

The values are displayed in the set "unit".

8.4.4.6 Volume

Compressed air volume delivered by the station, calculated since the reference time set.

The values are displayed in the set "unit".

8.4.4.7 Specific power

This standard value is used as a reference value in the assessment of the station's efficiency. The value is calculated from the power consumption per volumetric flow. Lower values indicate a high degree of efficiency.

The values are displayed in the set "unit".

8.4.5 Manual preselect

In the *Manual preselect* menu individual machines can be pre-selected or deselected for compressed air production or compressed air treatment. For maintenance work, for example, you may be forced to temporarily deactivate individual machines.

Fault messages, warning messages and maintenance messages are suppressed for deselected machines.

If you deselect more than one machine simultaneously, the compressed air supply may no longer be sufficient.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

Air network to be controlled is known.

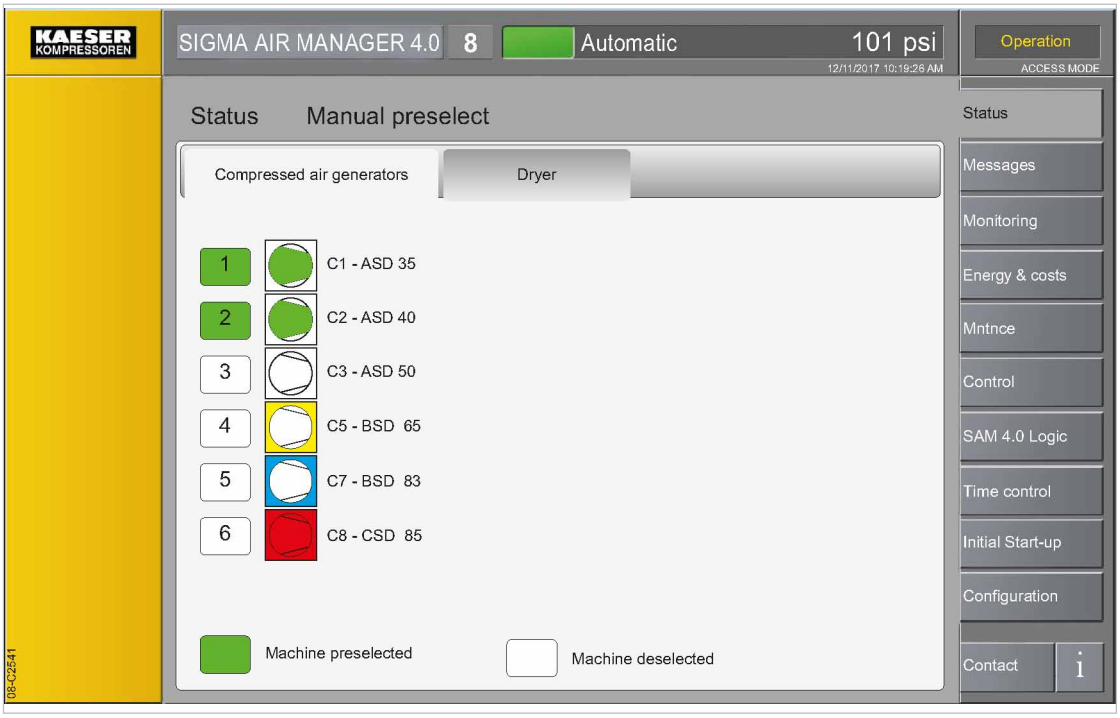
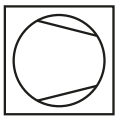
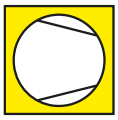


Fig. 96 *Manual preselect* menu

1. Press the Status – Manual preselect key.
2. Tap the requested tab, e.g. *Compressed air generators*
   The *Manual preselect* menu is displayed

Symbol	Meaning
	Machine in READY mode
	Machine in IDLE mode
	Machine in LOAD mode
	Machine has warning messages
	Machine has fault messages

Symbol	Meaning
	Machine cannot be controlled remotely (local mode)

Tab. 84 Meaning of the symbols in the *Manual preselect* menu

3. Use the buttons in the column to the left of the P&I symbol to select or deselect the machine as appropriate.
   - The button is white: The machine is deselected. It is **not** used.
   - Deselecting a machine running in Load mode causes it to be switched from SIGMA AIR MANAGER 4.0 mode to idle or standstill. The deselected machine does not switch to local mode.
   - The button is green: The machine is selected. It is being used to generate compressed air or for compressed air treatment.

8.4.6 Sources

The *Sources* menu has the following sub-menus:

- "Pressure and power"
- "Preselect"
- "Priorities"
- "Control valves"

These sub-menus provide an organized representation of setting values and specifications from the currently valid configuration.

8.4.6.1 Pressure and power

The *Pressure and power* menu provides an overview of the current setting values and priorities for the various operating modes.

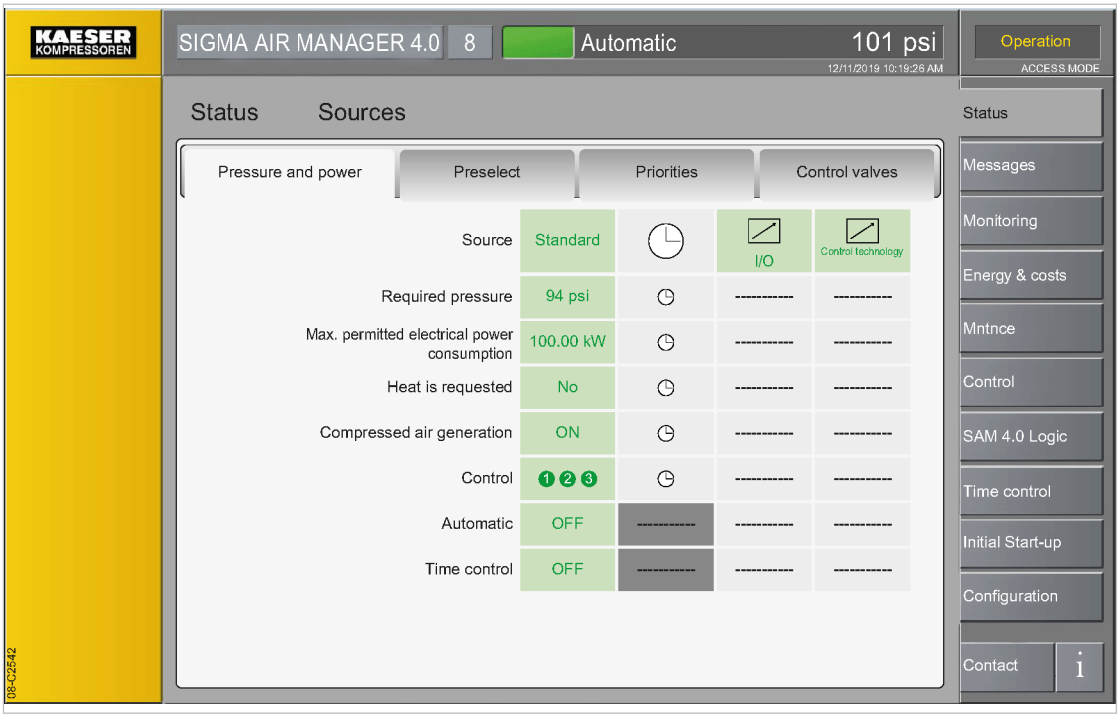


Fig. 97 *Pressure and power* menu

1. Press the Status – Sources key.
2. Touch the *Pressure and power* tab.
   The *Pressure and power* menu is displayed.

Element	Priority	Meaning
Source	-	Parameter and operating state name
Green-colored field	-	A green field indicates that the corresponding function is currently active. In the case of a parameter, it indicates the active set-point value.
Grey-colored field	-	A grey field indicates that the corresponding parameter cannot be affected.
Control technology 	1	Parameters and operating states in the Remote control operating mode through a master control panel
I/O 	2	Parameters and operating states in the Remote control operating mode through digital or analogue inputs.
	3	Parameters and operating states in the Timer control operating mode
Standard	4	SIGMA AIR MANAGER 4.0 Default setting without additional influences from additional or external control functions

Tab. 85 Meaning of the *Pressure and power* menu

8.4.6.2 Preselect

The *Preselect* menu displays an overview showing which machines switch to LOAD in the corresponding operating mode.

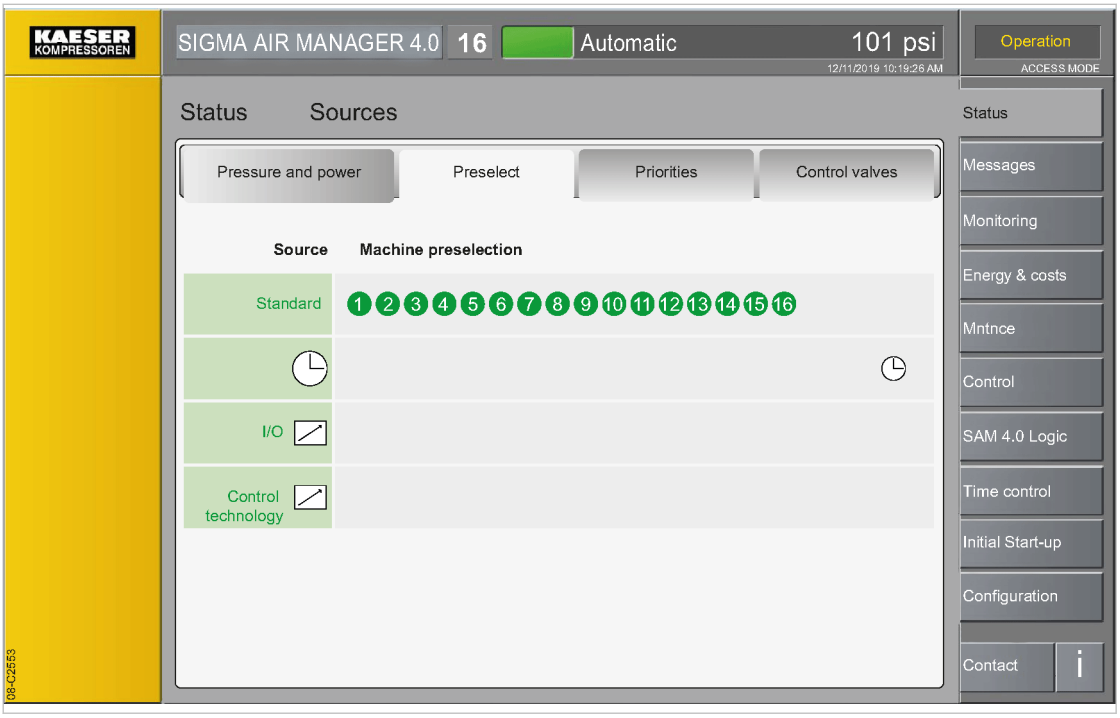


Fig. 98 *Preselect* menu

1. Press the Status – Sources key.
2. Touch the *Preselect* tab.
   The *Preselect* menu is displayed.

Element	Priority	Meaning
Source	-	Operating mode
Machine preselection	-	List of available machines. The number in the symbol indicates the machine number. The color of the symbol indicates whether the corresponding machine works in normal operation (green) or has fault message (red).
Field in the *Source* column is green	-	A green field indicates that the corresponding function is currently active. In the case of machines, it means that these machines are preselected for use in compressed air generation.
Standard	1	SIGMA AIR MANAGER 4.0 Default setting without additional influences from additional or external control functions
	2	Operating states in the Timer control operating mode
I/O 	3	Operating states in the Remote control operating mode through digital or analog inputs.

Element	Priority	Meaning
Control technology 	4	Operating states in the Remote control operating mode through a master control panel

Tab. 86 Meaning of the *Preselect* menu

8.4.6.3 Priorities

The *Priorities* menu displays an overview showing the priority of each machine for switching to LOAD and IDLE.

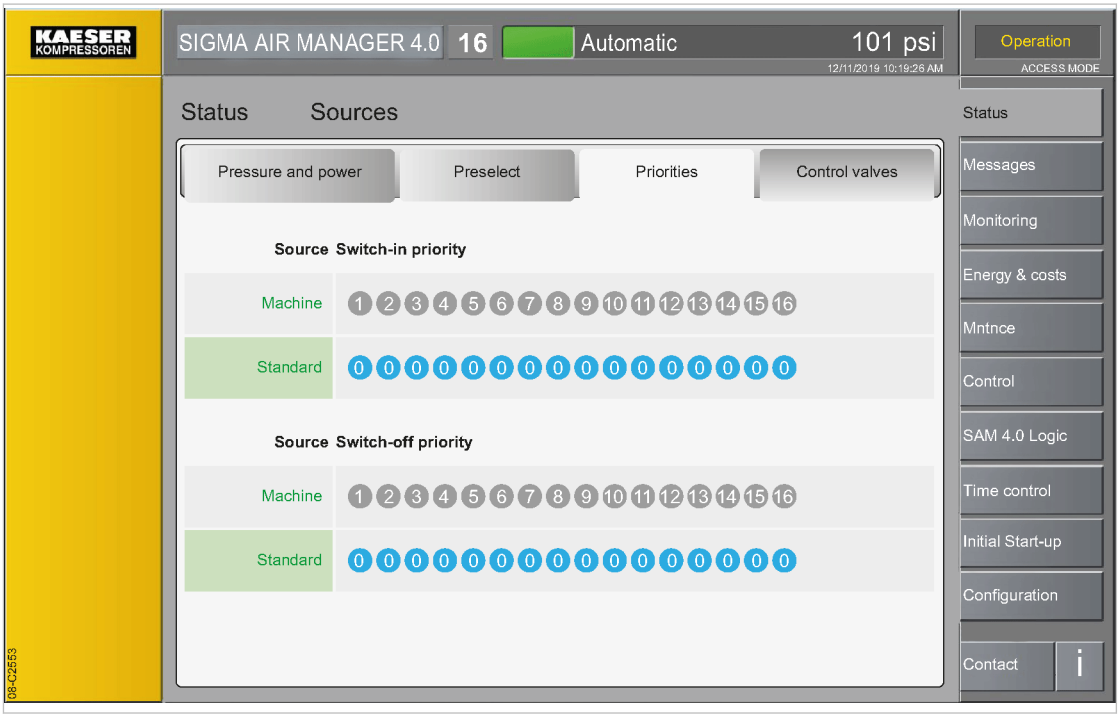


Fig. 99 *Priorities* menu

1. Press the Status – Sources key.
2. Touch the *Priorities* tab.
   The *Priorities* menu is displayed.

Element	Meaning
Source	Operating mode
Switch-in priority	Machine cut-in priority
Switch-off priority	Machine cut-out priority
“+”	Machine has a higher priority than normal
“-”	Machine has a lower priority than normal
“0”	Machine has a normal priority
Machine	Number of machine (1–16)

Element	Meaning
Standard	SIGMA AIR MANAGER 4.0 Default setting without additional influences from additional or external control functions

Tab. 87 Meaning of the *Priorities* menu

8.4.6.4 Control valves

The *Control valves* menu displays an overview showing the sources that control the regulating valves.

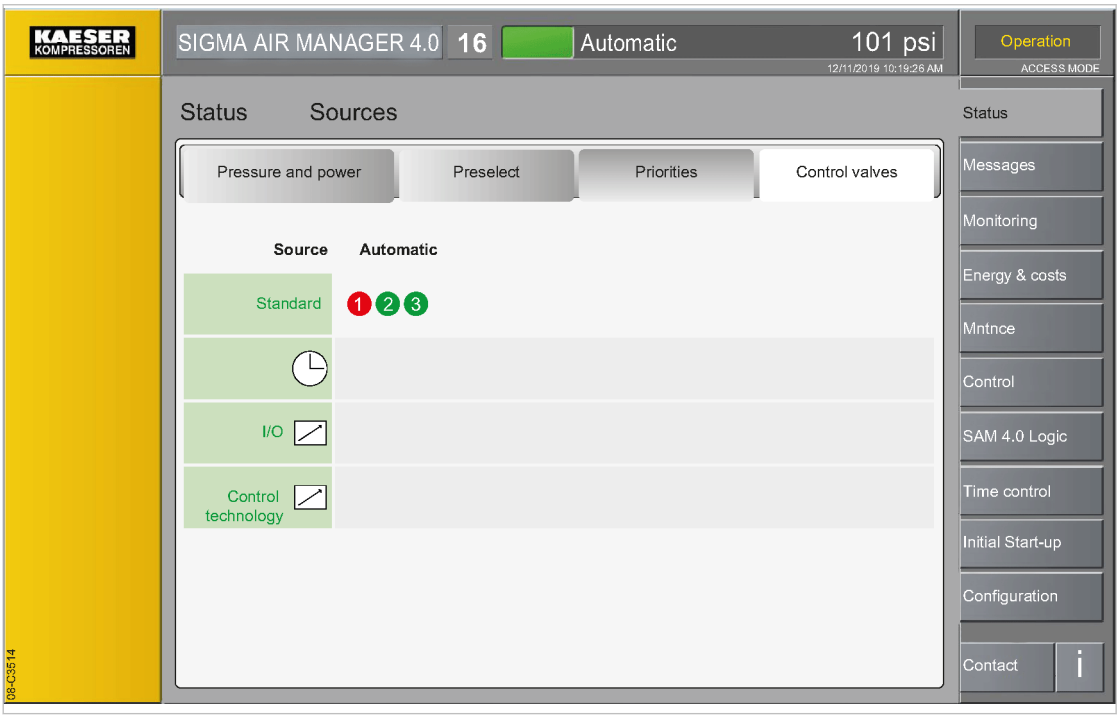


Fig. 100 *Control valves* menu

1. Press the Status – Sources key.
2. Touch the *Control valves* tab.
   The *Control valves* menu is displayed.

Element	Priority	Meaning
Source	-	Operating mode
Automatic	-	List of available regulating valves, each with color display of the operating mode
Field in the *Source* column is green	-	A green field indicates that the corresponding function is currently active. In the case of machines, it means that these machines are preselected for use in compressed air generation
Standard	1	SIGMA AIR MANAGER 4.0 Default setting without additional influences from additional or external control functions
	2	Operating states in the Timer control operating mode

Element	Priority	Meaning
I/O	3	Operating states in the Remote control operating mode through digital or analog inputs.
Control technology	4	Operating states in the Remote control operating mode through a master control panel

Tab. 88 Meaning of the *Control valves* menu

8.4.7 Station

The *Status – Station* menu displays the P&I diagram of the compressed air station. The P&I diagram illustrates the structure, operating modes and important data of the station. These data are continuously updated.

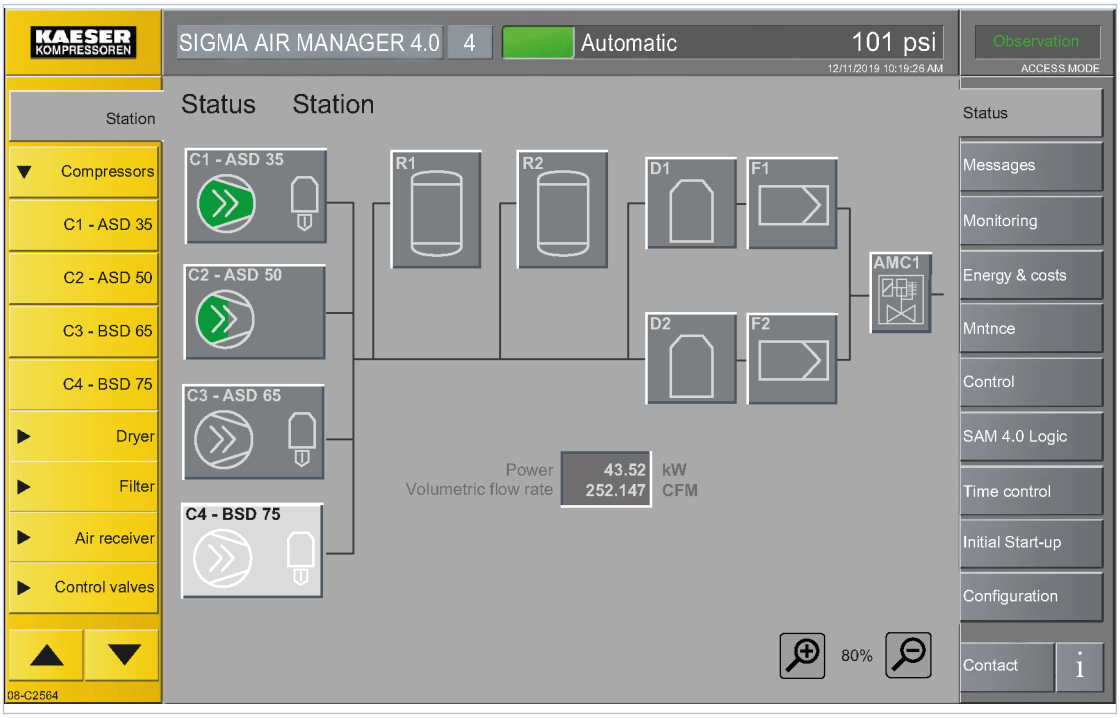


Fig. 101 *Station* menu

1. Press the Status – Station key.
   The *Station* menu is displayed.

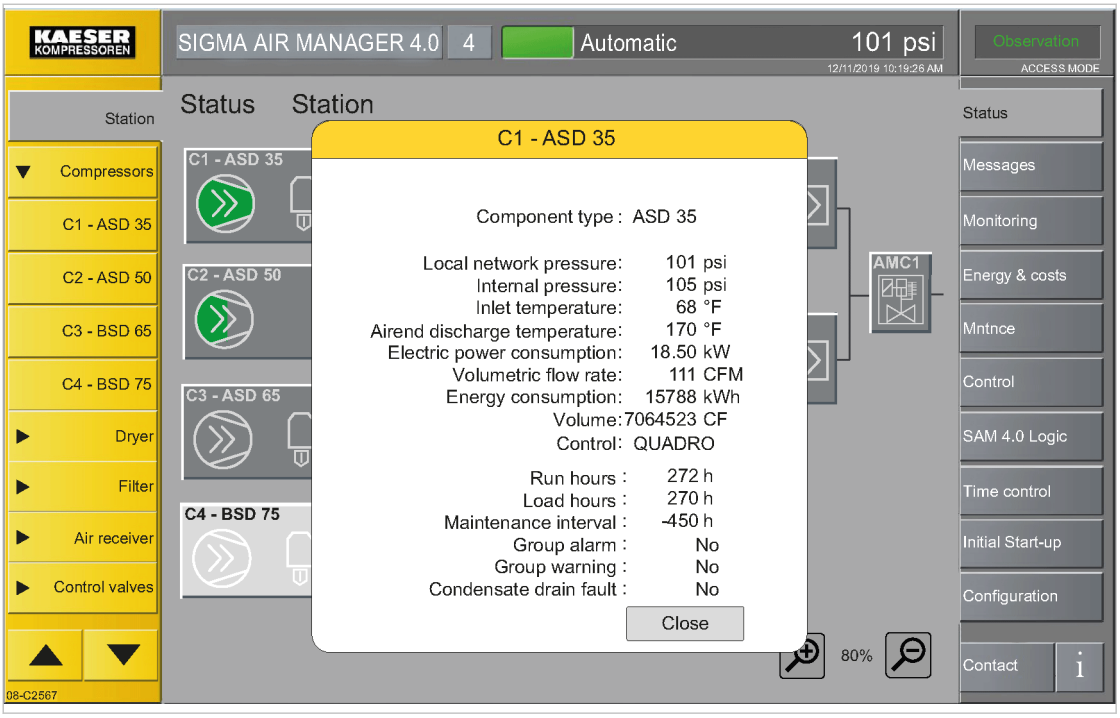


Fig. 102 Machine details

2. Touch the P&I symbol to display the selected machine details.
   The system opens a window with the current data of the selected machine.
3. The display of the symbols in the P&I diagram changes with the operating state of the corresponding machine.

Example: P&I symbol for a compressor in different operating states:

Sign	Meaning
	Machine in READY mode
	Machine in IDLE mode
	Machine in LOAD mode
	Machine has warning messages or service messages
	Machine has fault messages

Sign	Meaning
	Machine in local mode
	Machine is deselected.
Further color codes	See chapter 8.4.8 "colour codes"

Tab. 89 P&I symbol for a compressor in different operating states

8.4.8 Color coding

In the menus *Status – Overview*, *Status – Station*, *Monitoring – Compressed air consumption* and *Monitoring – Specific power* the operating states of the machines / the station are identified by means of color codes at the icons in the P&I diagram and compressor status graphs.

8.4.8.1 Meaning of the color codes

Color	Meaning	Explanation
Red:	Machine has a fault	Group alarm for machine
	Station OFF	The compressed air generation for the entire station has been switched off
Blue:	Machine be controlled remotely	SIGMA AIR MANAGER 4.0 cannot control the compressor
	Manual operation	SIGMA AIR MANAGER 4.0 in manual operation The compressed air generators are switched so that they run in local mode
Orange:	Group warning	Group warning for machine
Pink:	Emergency mode active	Machine is in emergency mode and is used only when absolutely necessary to ensure the supply of the required compressed air
Green:	Forced LOAD RUN	The machine is manually forced to operating point LOAD RUN. For 60 minutes, the machine is primarily used for the compressed air supply (and accordingly run in LOAD RUN) if permitted by the compressed air consumption (complying with the upper pressure band limit)
Brown:	Standby machine	Machine is used as a standby machine and is used only when absolutely necessary to ensure the supply of the required compressed air. However, unlike a machine in emergency mode, 2 hours of load run operation per week are also ensured
Gray:	Machine is de-selected.	The machine is de-selected on SIGMA AIR MANAGER 4.0. The machine is no longer used for the compressed air supply. Notifications are ignored

Color	Meaning	Explanation
Black: ■	Machine in operating mode LOAD	Speed trend for variable-speed compressed air generators

Tab. 90 Meaning of the color codes

8.4.8.2 Illustration of the operating states of compressed air generators

Menu	Illustration	Color codes
Status – Overview	Bar diagram underneath each compressor status graph Line graph of the compressor status graph	red, orange or blue, green, pink, brown, depending on priority Black
Monitoring – Compressed air consumption		
Monitoring – Specific power		
Status – Station	Color of compressed air generator symbol	red, orange
	Dot representation next to compressed air generator icon - if available	blue, green, pink, brown, depending on priority

Tab. 91 Illustration of the operating states of compressed air generators

8.4.8.3 Illustration of the operating states of the station

Menu	Illustration	Color codes
Status – Overview	Operating state of the station in the form of a colored bar at the top end of the operating state diagram	red, blue, depending on priority
Monitoring – Compressed air consumption		
Monitoring – Specific power		

Tab. 92 Illustration of the operating states of the station

8.4.8.4 Priorities

For the operating states of the compressed air generators, the following descending priority applies to the bottom colored lines:

- Red
- Orange
- no color

For the operating states of the compressed air generators, the following descending priority applies to the top colored lines:

- Blue
- Green
- Pink
- Brown
- no color

For the operating states of the station, the following descending priority applies:

- Red
- Blue
- no color

8.4.8.5 Example: Icon in the P&I diagram

In the menu *Status – Station*, the following colored dots are shown at the P&I icons, depending on the operating mode. Meaning of color coding, see table 90

Icon	Meaning
	Colored dot on P&I icon (in the example: blue)

Tab. 93 Icon in the P&I diagram

8.4.8.6 Example: Compressor status graphs

In the menus *Status – Overview*, *Monitoring – Compressed air consumption* and *Monitoring – Specific power* the operating states of the individual machines (compressor status graphs - lower diagram) are identified by means of colored lines and bars. Meaning of color coding, see table 90

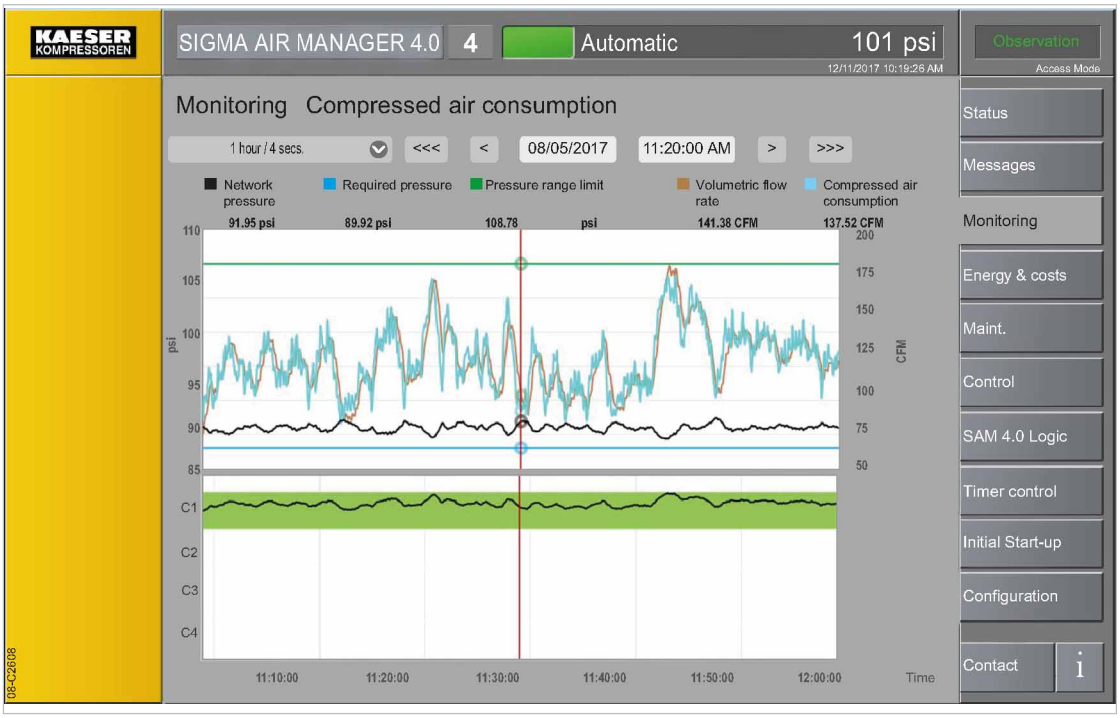


Fig. 103 Colored lines and bars in the compressor status graphs diagram

8.5 Selecting a machine

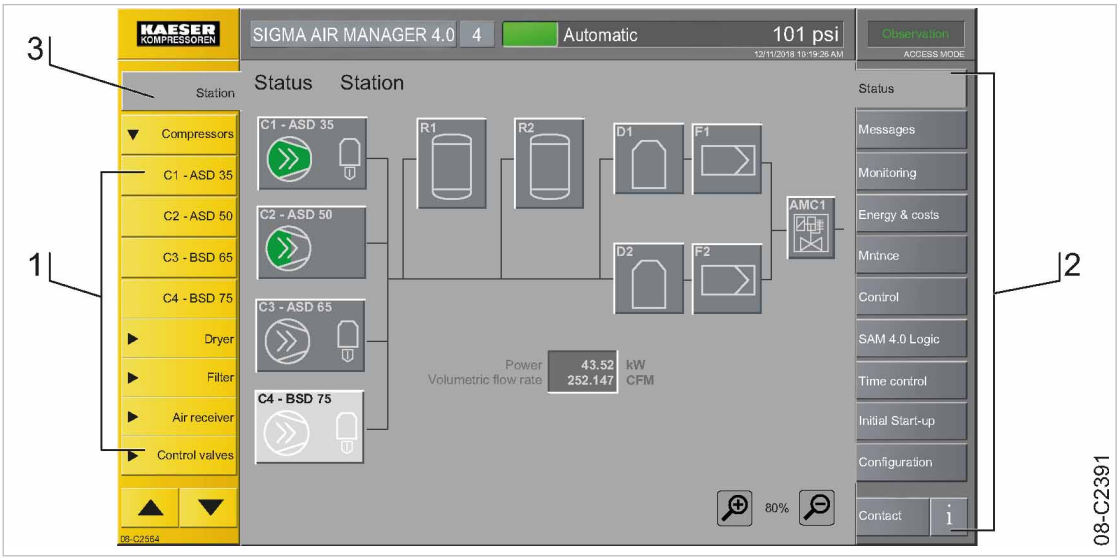


Fig. 104 Device selection list

1 Device selection list
2 Function selection bar
3 Station key

The device selection list 1 is shown on the left side of the "touch screen" and the function selection bar 2 is shown on the right side. Press Station 3 to select information menus for the entire compressed air station.
The menu content depends of the function selected in the function selection bar.

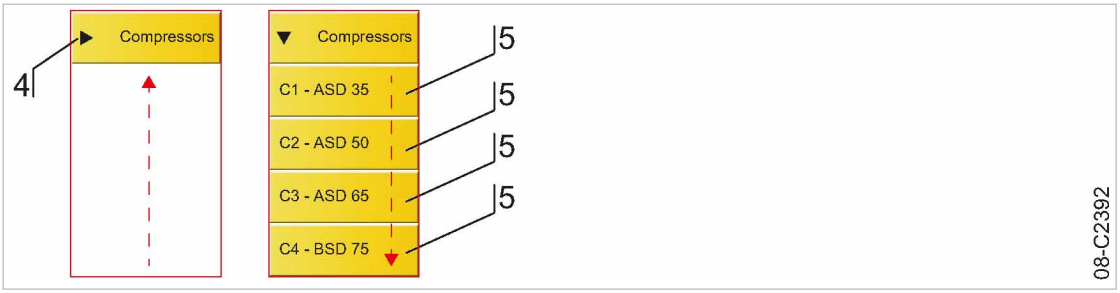


Fig. 105 Device class

4 Device class collapsed
5 Device class expanded: Machines can be selected individually

Under the Station key 3, machines with the same function are arranged as a device class 4, for example,

- Compressors
- Dryer
- Air receiver
- Filter
- Condensate treatment
- Control valves
- Data points

When you press the key for a device class [4], for example, Compressors, this class will expand and every machine/component in this class is displayed with its own key [5].

Press the device class key [4] a second time and the class is collapsed.

If a machine/component [5] is selected in the device class [4] using a key, a status menu opens which displays general and current information about the selected machine/component.

The content and scope of the status menu is dependent on the selected machine/component and their connection to SIGMA AIR MANAGER 4.0. It may be divided into several sub-pages (tabs).

Possible sub-pages:

- "Serial and power data"
- "Characteristic curves"
- "Control"
- "Hours counter"
- "Control" ("Control valves")
- "Parameter" ("Control valves")

8.5.1 Serial and power data

In the *Serial and power data* menu the following parameters can be displayed for the selected machine/component:

The displayed data is drawn from the "Engineering Base" configuration.

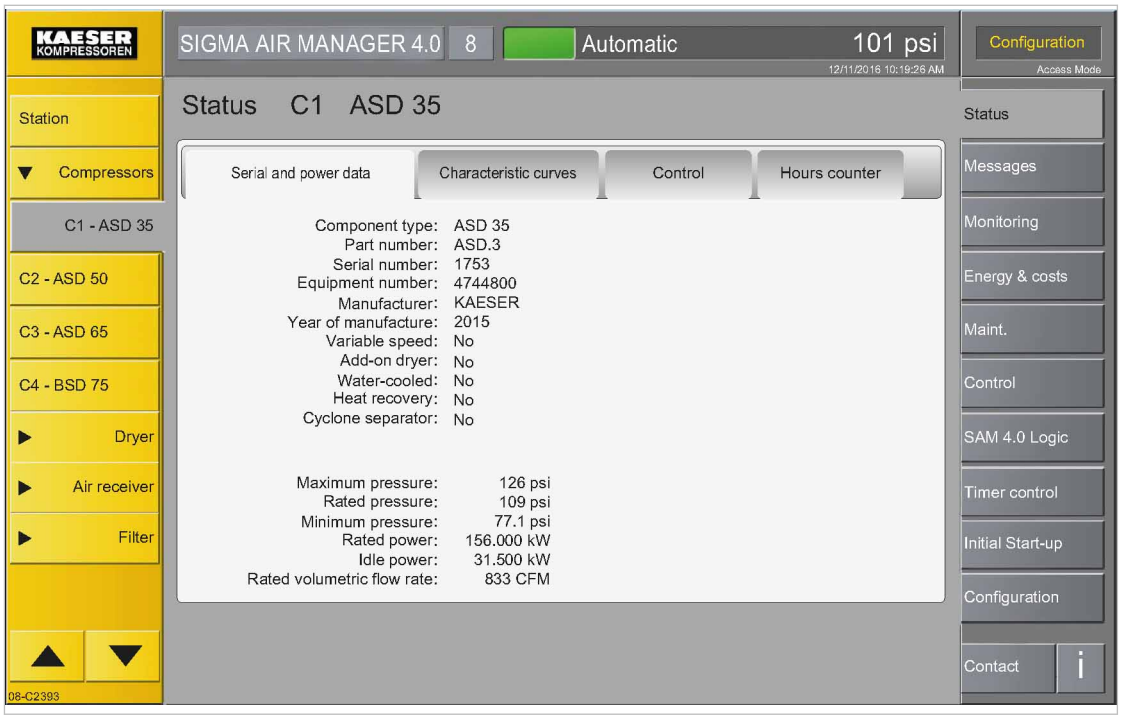


Fig. 106 *Serial and power data* menu

Element	Meaning
Component type	Type designation of the machine/component

Element	Meaning
Part number	Material number of the machine/component
Serial number	Serial number of the machine/component
Equipment number	KAESER-specific equipment no.
Manufacturer	Name of the manufacturer of the machine/component
Year of manufacture	Year of manufacture for the machine/component
Variable speed	Availability of the "variable speed" option
Add-on dryer	Availability of the "add-on dryer" option
Water-cooled	Availability of the "water-cooled" option
Heat recovery	Availability of the "heat recovery" option
Cyclone separator	Availability of the "centrifugal separator" option
Maximum pressure	Maximum gauge working pressure for which the machine/component is designed
Rated pressure	Pressure for a certain design condition relative to a certain rated power and rated flow rate
Minimum pressure	Minimum working pressure for which the machine/component is designed
Rated power	Power consumption of the machine at rated pressure
Idle power	Power consumption of the machine at the IDLE operating point
Rated volumetric flow rate	Machine flow rate at rated pressure

Tab. 94 Meaning of the menu elements in the *Serial and power data* menu

8.5.2 Characteristic curves

The *Characteristic curves* menu graphically displays the characteristic curves of machines (e.g. for variable-speed machines: flow rate vs. speed).

Fig. 107 *Characteristic curves* menu

8.5.3 Control

In the *Control* menu the "Engineering Base" settings for the selected machine can be displayed:

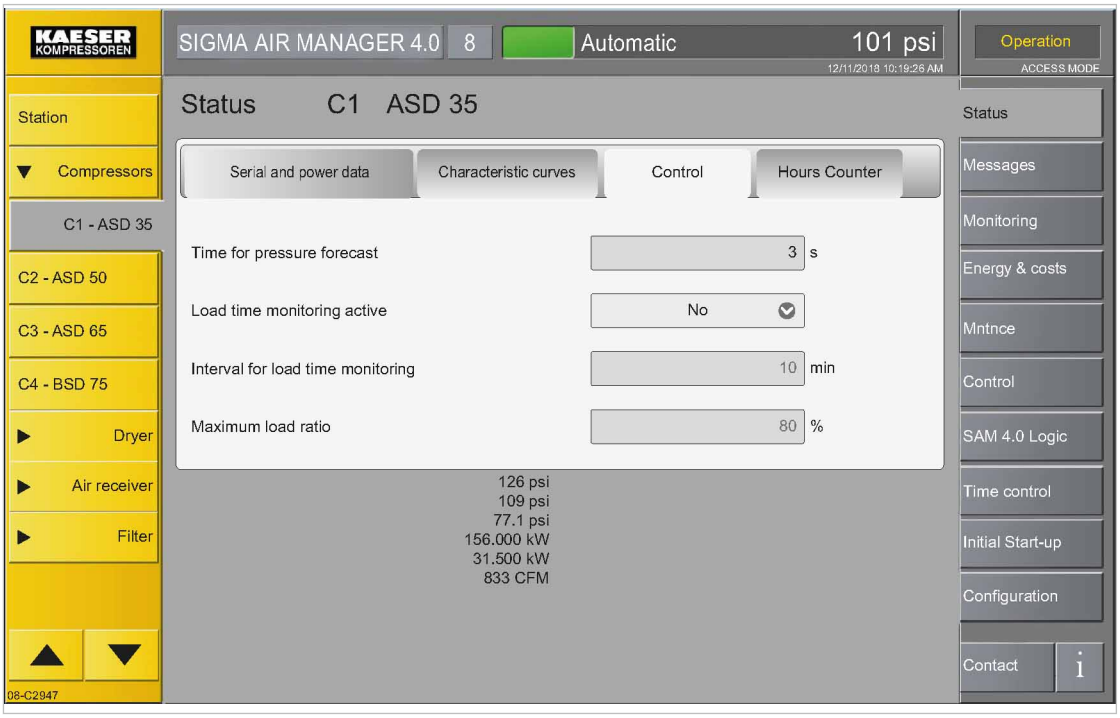


Fig. 108 *Control* menu

Element	Meaning
Time for pressure forecast	Adjustments of the flow rate of a compressed air generator with variable-speed drive are applied to the current pressure of the station with a delay. To compensate for this delay, the *Time for pressure forecast* parameter can be used to configure a time period for which the SIGMA AIR MANAGER 4.0 generates a prediction of the future pressure value.
Load time monitoring active	Load run time monitoring is required for compressed air generators not designed for continuous operation. The *Yes* option is used to activate load run time monitoring.
Interval for load time monitoring	The *Interval for load time monitoring* parameter is used to configure the time period for which the SIGMA AIR MANAGER 4.0 monitors the load run proportion.
Maximum load ratio	The *Maximum load ratio* parameter is used to configure the maximum permissible proportion of load run (as a percentage) during the period of load run time monitoring. By means of cycling operation of the compressed air generators, SIGMA AIR MANAGER 4.0 ensures that the maximum load run proportion is not exceeded.

Tab. 95 Meaning of the menu elements in the *Control* menu

8.5.4 Hours counter

In the *Hours counter* menu the following parameters can be displayed or configured for the selected machine:

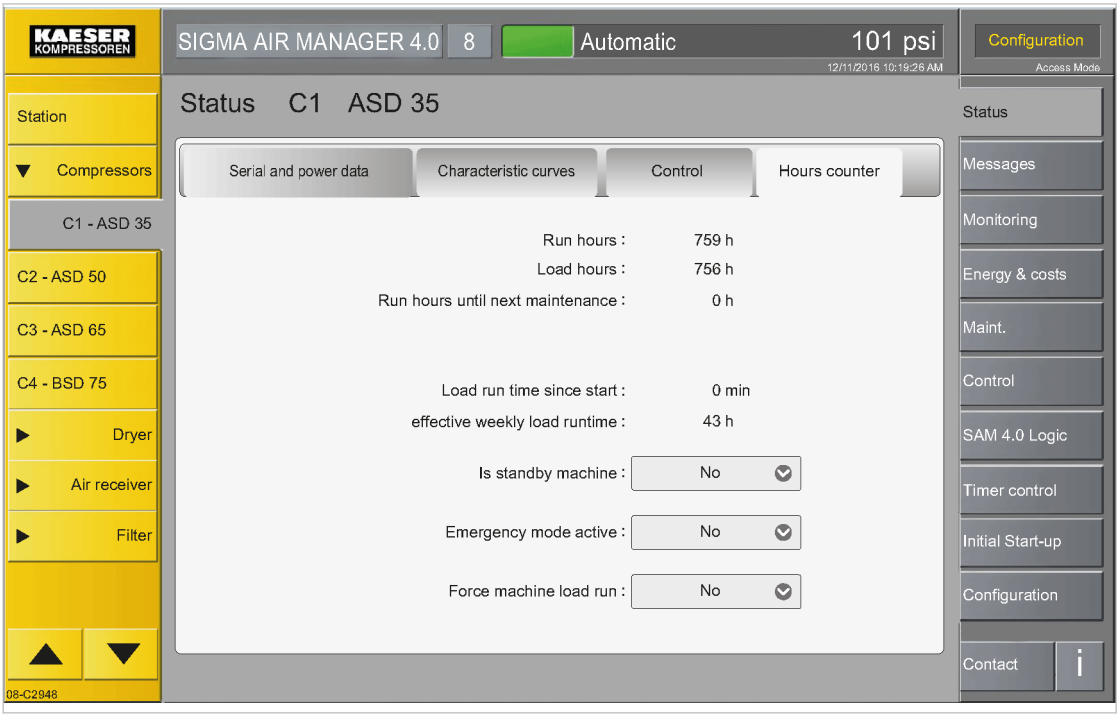


Fig. 109 *Hours counter* menu

Element	Meaning
Run hours	Display of the total machine run time.

Element	Meaning
Load hours	Display of the machine run time in operating point ON LOAD.
Run hours until next maintenance	Display of the remaining machine run time until the next maintenance.
Load run time since start	Display of the machine run time in operating point ON LOAD since the most recent machine start.
Effective weekly runtime in load	Display of the machine run time in operating point ON LOAD in the current week.
Is standby machine	By configuring the *Yes* option the selected machine is used on a secondary basis as needed. On weekdays from Tuesday to Thursday between 8:00 AM and 4:00 PM, an attempt is made to achieve a minimum total load run time of two hours. This avoids damage due to insufficient use. This feature ensures that the machine is available for compressed air production.
Emergency mode active	As for the *Is standby machine*, element, however without minimum load run time.
Force machine load run	The *Yes* option is used to switch the machine to the ON LOAD operating point for up to 30 minutes - provided there is demand in the compressed air network. This makes it possible to check if the concerned machine is ready for operation, although as a result of the machine's characteristics, SIGMA AIR MANAGER 4.0 would currently not or only rarely switch the machine to the ON LOAD operating point. No more than one machine should be used in this manner at the same time.

Tab. 96 Meaning of the menu elements in the *Hours counter* menu

8.5.5 Control (Control valves)

In the *Control* menu you can display or set the following parameters for the selected regulating valve:

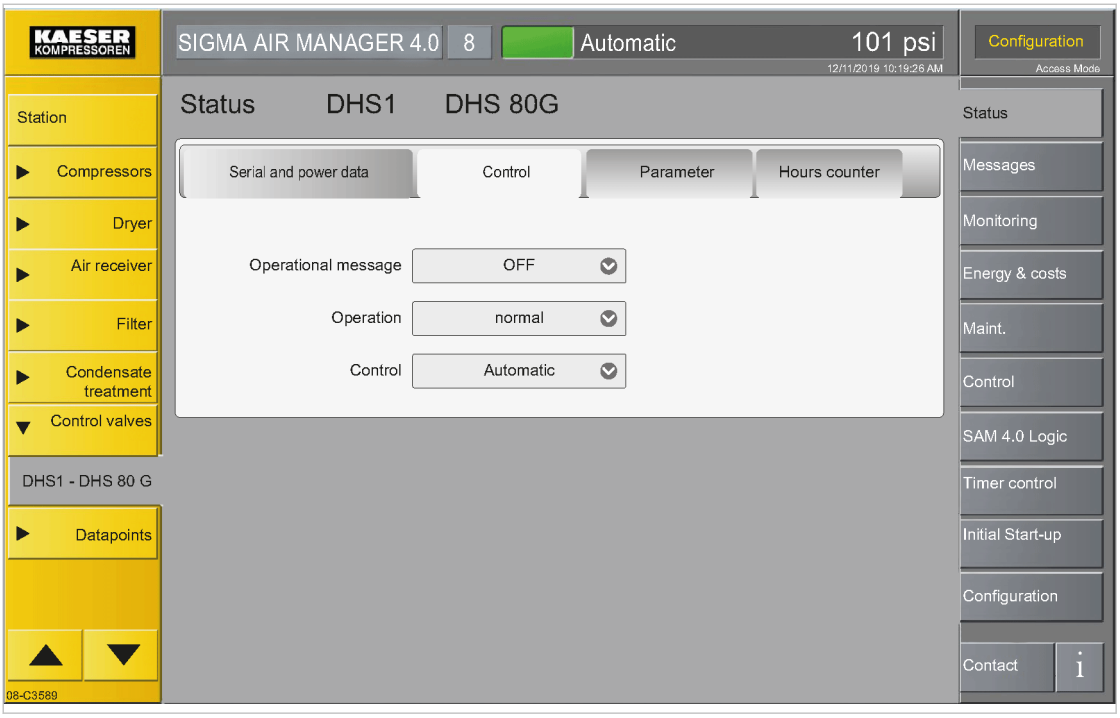


Fig. 110 *Control* menu

Element	Meaning
Operational message	Use the option *Yes* for enabling the sending of messages for pressure monitoring.
Operation	Operating functions are set to operate the air-main charging system in four different control characteristics.
Control	Set *Valve closed* to close the air-main charging system.

Tab. 97 Meaning of the menu elements in the *Control* menu

8.5.6 Parameter (Control valves)

In the *Parameter* menu you can display or set the following parameters for the selected regulating valve:

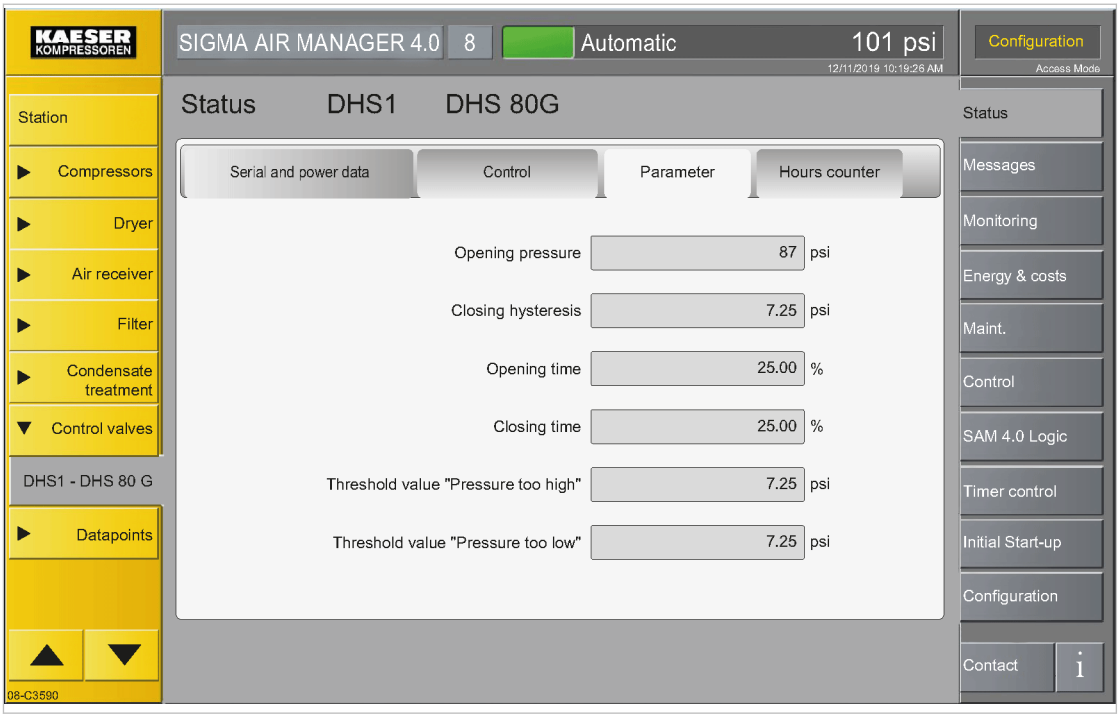


Fig. 111 *Parameter* menu

Element	Meaning
Opening pressure	Pressure at which the regulating valve opens in automatic mode.
Closing hysteresis	Differential to opening pressure at which regulating valve closes.
Opening time	Time as a percentage in which the regulating valve opens relative to the maximum speed.
Closing time	Time as a percentage in which the regulating valve closes relative to the maximum speed.
Threshold value "Pressure too high"	Switching threshold for the pressure excess warning.
Threshold value "Pressure too low"	Switching threshold for the pressure shortfall warning.

Tab. 98 Meaning of the menu elements in the *Parameter* menu

8.6 Monitoring

The *Monitoring* menu has the following sub-menus:

- "Compressed air consumption"
- "Specific power"
- "Measurement data"
- "Export"

8.6.1 Compressed air consumption

The *Compressed air consumption* menu displays an overview of the station providing important data (such as system pressure consumption) and the load times of the individual machines. This enables the user to analyze the operating state of the station during a specific period of time in the past.

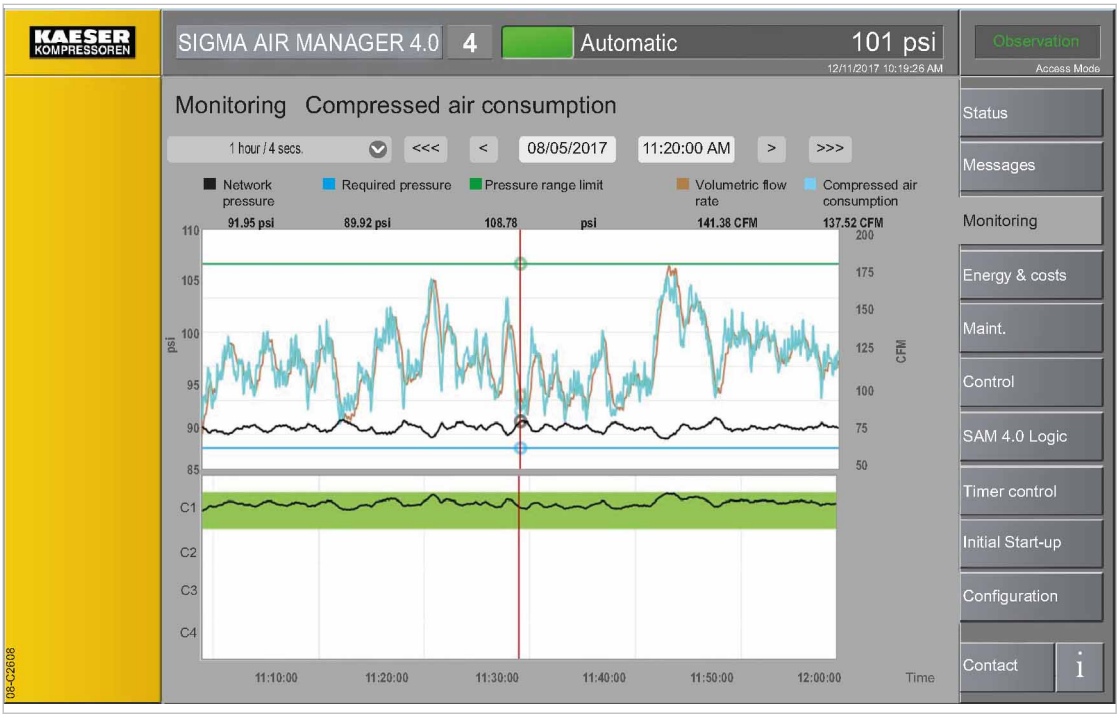


Fig. 112 Menu *Monitoring – Compressed air consumption*

1. Press the Monitoring – Compressed air consumption key.
   The *Monitoring – Compressed air consumption* menu is displayed.

Element	Meaning
1 hour / 4 secs.	Use ⌄ to select one of the four provided time intervals. The station data for the selected time period are displayed
<<< / >>>	Moving the time slot forward/backward by larger intervals
< / >	Moving the time slot forward/backward by smaller intervals
05.03.2015	Input field for the desired date for which you want to display the station data
11:20:00	Input field for the desired time for which you want to display the station data
⌃ ⌄	With SAM 4.0-16, selection of machines back/next
Network pressure	Current value display. The top window displays the system pressure progression. The axis label is shown to the left side of the display window
Volumetric flow rate	Current compressed air volume delivered by the entire station per time unit
Required pressure	Display of the specified "required pressure"

Element	Meaning
Pressure range limit	Display of the "system pressure" limit
Compressed air consumption	Current value display The top window displays the system pressure progression. The axis label is shown to the right side of the display window
C1 ... Cx	The bottom window displays the load times of the individual machines
Vertical red line	Cursor for selecting a specific point in time in the time window
Further color codes	See chapter 8.4.8 "colour codes"

Tab. 99 Meaning of the menu *Monitoring – Compressed air consumption*

2. Enter the date and time for the required time window (see Chapter 7.6 "Date and time").
   The top and bottom windows display the station data for the selected period of time.
3. Display individual measured values by moving the red cursor with the arrow keys.

8.6.2 Specific power

The *Specific power* menu displays an overview of the station providing important data (such as network pressure progression) and the load times of the individual machines. This enables the user to analyze the operating state of the station during a specific period of time in the past.

Fig. 113 Menu *Monitoring – Specific power*

1. Press the Monitoring – Specific power key.
   The *Monitoring – Specific power* menu is displayed.

Element	Meaning
1 hour / 4 secs.	Use ⌄ to select one of the four provided time intervals. The station data for the selected time period are displayed.

Element	Meaning
<<< / >>>	Moving the time slot forward/backward by larger interval
< / >	Moving the time slot forward/backward by smaller interval
05.03.2015	Input field for the desired date for which you want to display the station data
11:20:00	Input field for the desired time for which you want to display the station data
	In SAM 4.0-16, selection of machines 1–8 or 9–16
Network pressure	Current value display. The top window displays the system pressure progression. The axis label is shown to the left side of the display window
Pressure performance	Display of the calculated pressure quality
Required pressure	Display of the specified "required pressure"
Pressure range limit	Display of the "system pressure" limit
Specific power	Current value display The top window displays the specific output progression. The axis label is shown to the right side of the display window
C1 ... Cx	The bottom window displays the load times of the individual machines
Vertical red line	Cursor for selecting a specific point in time in the time window

Tab. 100 Meaning of the menu *Monitoring – Specific power*

2. Enter the date and time for the required time window (see Chapter 7.6 "Date and time").
   The top and bottom windows display the station data for the selected period of time.
3. Display individual measured values by moving the red cursor with the arrow keys.

8.6.3 Measurement data

Set a user-defined station overview in the *Measurement data* menu. On up to four pages, you can set and read out analogue and/or digital measured values from the machines.

Fig. 114 Menu: *Monitoring – Measurement data – Diagram*

1. Press the Monitoring – Measurement data key.
2. Touch the *Diagram* tab.
   The *Measurement data* menu is displayed.

Element	Meaning
Diagram	Tab for *Diagram* sub-menu
Setting analogue	Tab for *Setting analogue* sub-menu
Setting digital	Tab for *Setting digital* sub-menu
1 hour / 4 secs.	Use ⌄ to select one of the several available time intervals. The station data for the selected time period are displayed
<<< / >>>	Moving the time slot forward/backward by larger intervals
< / >	Moving the time slot forward/backward by smaller intervals
05.03.2015	Input field for the desired date for which you want to display the station data
11:20:00	Input field for the desired time for which you want to display the station data
Page 1	Use ⌄ to select one the four pages
C1 ...	Analog values are displayed in the top window
D1 ... D4	Digital values are displayed in the bottom window
Vertical red line	Cursor for selecting a specific point in time in the time window

Tab. 101 Meaning of the menu *Monitoring – Measurement data – Diagram*

3. Use Page 1 ⌄ to set the required page.

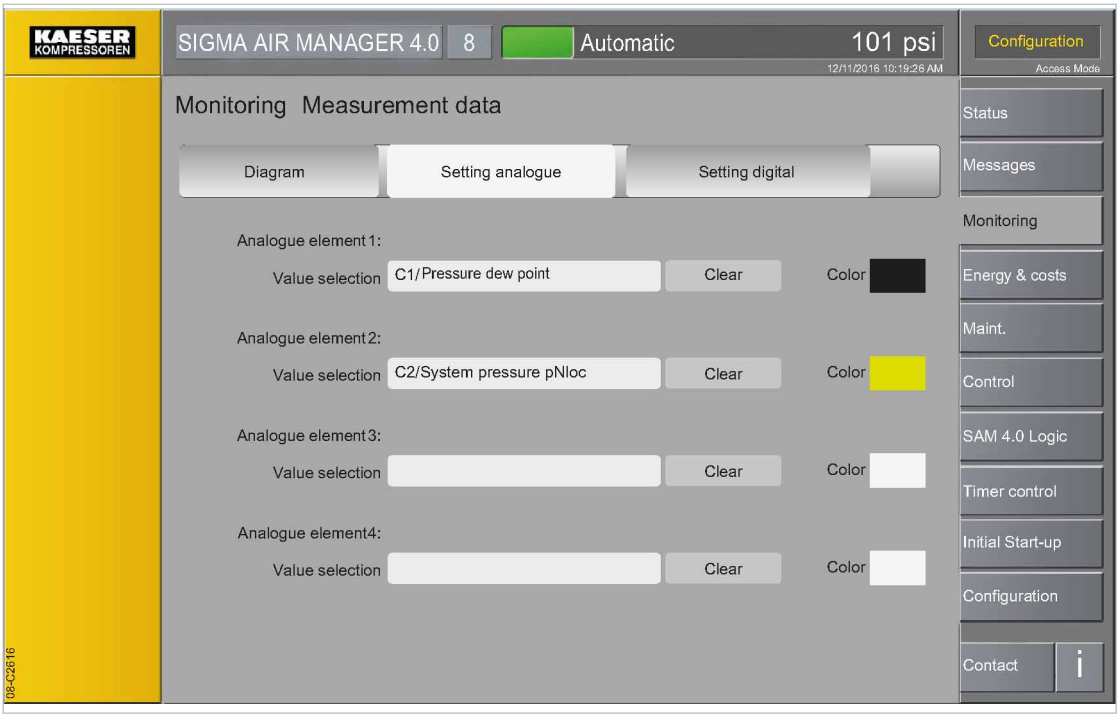


Fig. 115 Menu: *Monitoring – Measurement data – Setting analogue*

4. Touch the *Setting analogue* or *Setting digital* tab.
   The *Setting analogue* or *Setting digital* menu is displayed.

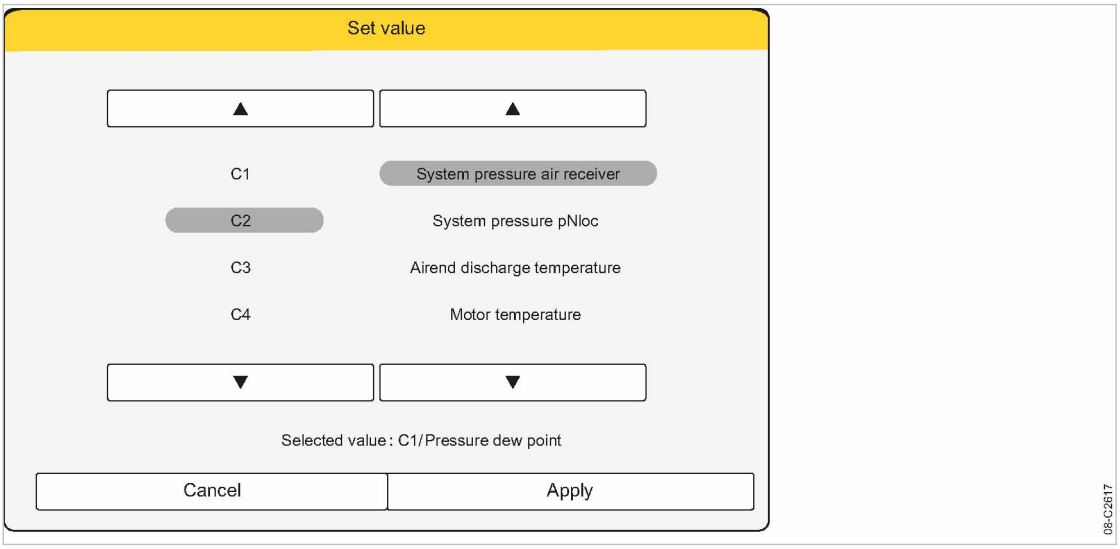


Fig. 116 *Set value* menu

5. At *Analogue element 1–4* or *Digital element 1–4* touch the *Value selection* input field.
   The *Set value* menu is displayed.

Element	Meaning
Arrow keys	Move up/down in the list
Left column	List of the machine

Element	Meaning
Right column	List of the values
Selected value	Actual selected machine / selected value
Cancel	Settings **not** saved
Apply	Settings saved

Tab. 102 Meaning of the *Setting analogue* or *Setting digital* menu elements

6. In the left column, select the desired machine by touching it. Use the arrow keys to scroll through the list.
7. In the right column, select the desired value by touching it. Use the arrow keys to scroll through the list.

You can maximally set two different physical units (pressure and temperature, for example) for analogue value display on a single page.

Row *Selected value* displays the currently set machine and the currently set value.

8. Press Apply to apply the settings.

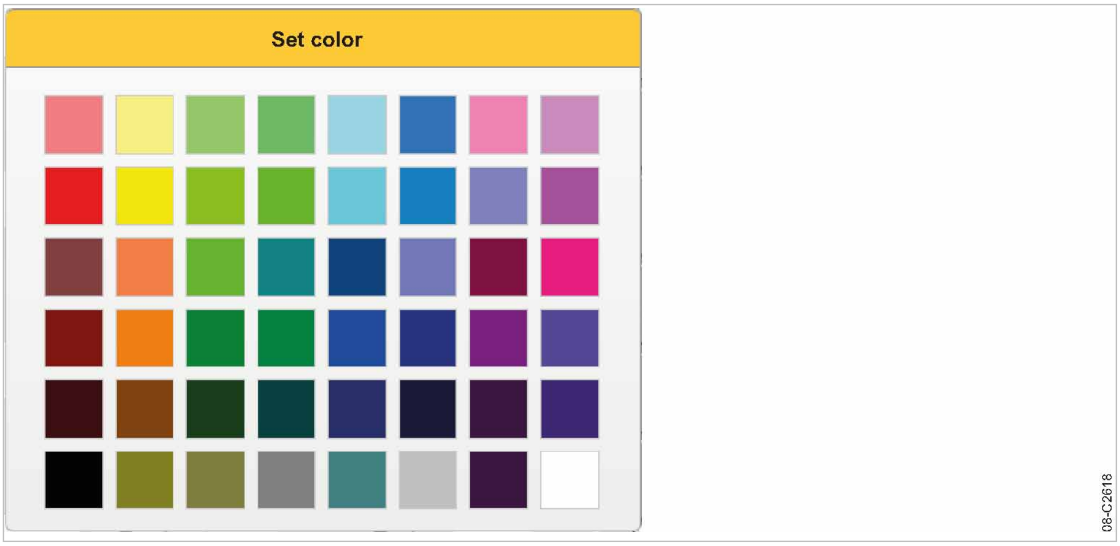


Fig. 117 *Set color* menu

9. In row *Color*, touch the colored field.
   The *Set color* menu is displayed.
10. Touch the desired colored field.
11. Touch the *Diagram* tab.
    The *Diagram* menu is displayed.
12. Enter the *date* and *time* for the required time window (see Chapter 7.6 "Date and time").
    The top (analogue values) and bottom (digital values) windows display the station data for the selected period of time.
13. Display individual measured values by moving the red cursor with the arrow keys or touching.

8.6.4 Export

Set the measured data report in the *Monitoring – Export* menu. You may save a file with the measured data to an SD card.

Precondition
Login with Access Level 2 *Configuration* (see Chapter 7.4 "User Login").
SD card with sufficient memory capacity is present (format: FAT32).

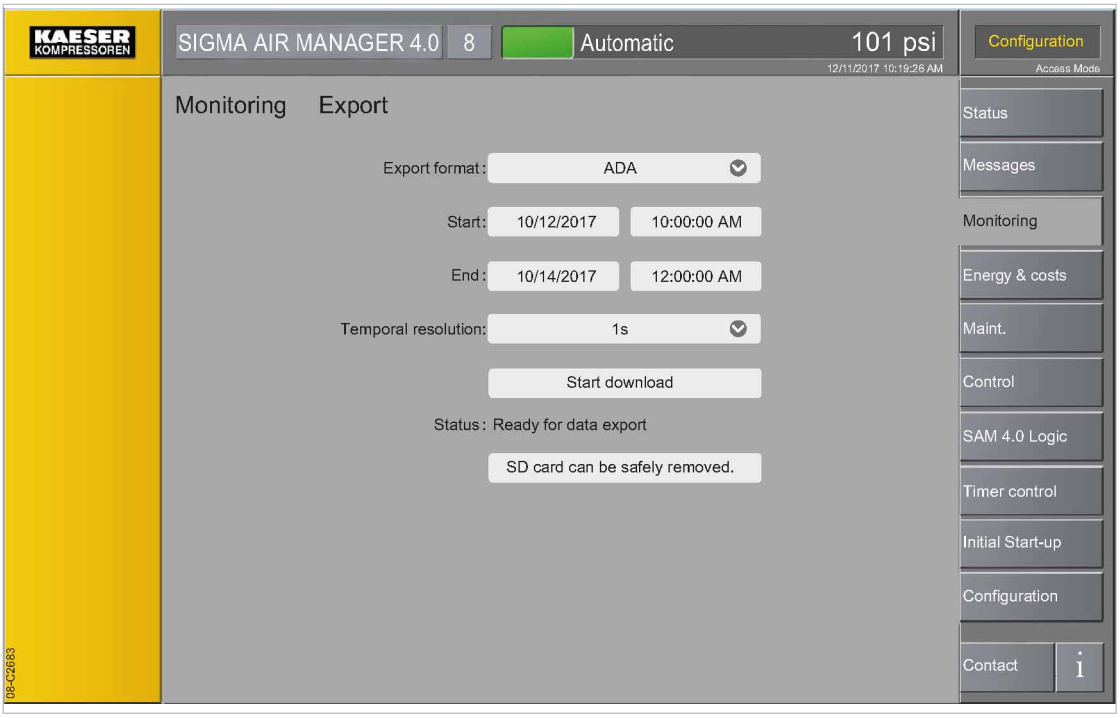


Fig. 118 Menu *Monitoring – Export*

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.6 "Installing the control cabinet").
2. Push the SD card into the X3 slot until it latches. The bevelled edge of the card must point to the right side towards the terminal (see chapter 7.5"Inserting the SD card").
3. Close and latch the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.12.6).
4. Press the Monitoring – Export key.
   The *Monitoring – Export* menu is displayed.

Element	Meaning
Export format	Selection of the required data format for the file
Start	Start date of the period to be analyzed. Enter the date and time in the corresponding fields
End	End date of the period to be analyzed. Enter the date and time in the corresponding fields
Temporal resolution	Selection of the desired period of time for data recording
Start download	Starts the file saving process to the SD card
Status	Displays whether data backup can be started

Element	Meaning
SD card can be safely removed.	Key with which the SD card is securely logged off from the electronic control (file system info at operating system level) so that is can subsequently be removed without data loss

Tab. 103 Meaning of the *Export* menu elements

5. Enter the required settings.
6. Press the Start download key.
   You may save a file with the SIGMA AIR MANAGER 4.0 measured data to an SD card.
7. When you use KAESER CONNECT (see Chapter 8.8 "KAESER CONNECT") to access the export function, the file is downloaded to the Internet-capable device.
8. Press SD card can be safely removed. key prior to removing the SD card.
   The SD card is securely logged off from the electronic control and can be removed without the risk of data loss.

Depending on the selected interval and the defined temporal resolution, this export may take up to 15 minutes. The approximate export time is displayed on the status line.

8.7 Energy & costs

In the *Energy & costs* menu the energy data from the station collected by SIGMA AIR MANAGER 4.0 are clearly displayed. You can set the energy tariff, enabling you to display the energy data relative to costs.

The *Energy & costs* menu has the following sub-menus:

- "Table"
- "Diagram"
- "Period comparison"
- "Tariff configuration"
- "Report"

8.7.1 Table

In the *Table* menu the energy consumption and energy costs can be displayed for each individual machine as well as the entire station over a selectable period.

Precondition Tariff costs are configured in the *Tariff configuration* menu

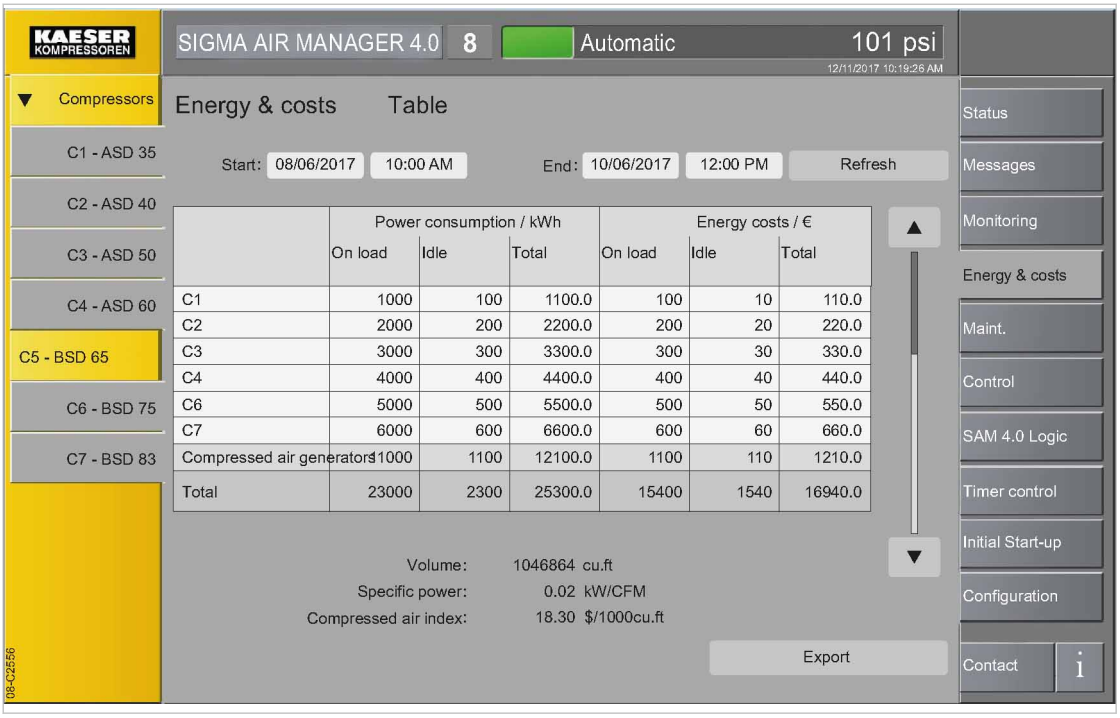


Fig. 119 Menu *Energy & costs – Table*

1. Press the Energy & costs – Table key.
   The *Energy & costs – Table* menu is displayed.

Element	Meaning
Start	Start date of the period to be analyzed. Enter the date and time in the corresponding fields.
End	End date of the period to be analyzed. Enter the date and time in the corresponding fields.
Refresh	The system updates the calculation and displays the results.
Power consumption / kWh	The energy consumption of the selected machines is displayed individually and as a total.
Energy costs / [currency]	The energy costs of the selected machines are displayed individually and as a total. The values are displayed in the set "unit".
Volume	Volume of the compressed air delivered by all machines. The values are displayed in the set "unit".
Specific power	The required electric power that is required for compressing a volume unit per time unit
Compressed air index	Value calculated from the costs per delivery volume. Used to assess the cost efficiency of the selected machines.
Export	Opens the menu *Export* in which you can configure and download the report for energy and costs.

Tab. 104 Meaning of the menu elements *Energy & costs – Table*

2. Touch to select or deselect the desired machine(s) in the device selection list.
   In the *Table* menu the data is recalculated and the display is updated based on the machine selected.

8.7.2 Energy & Costs Report

In the *Energy & costs – Table – Export* menu the report for energy and costs can be configured. For external analysis, you may save a file in CSV format to an SD card.

When you change the display language (see chapter 7.3 "Language"), the system automatically changes the unit settings and display formats to match the language. Check the settings and correct, if necessary.

Precondition Login with Access Level 2 Configuration (see 7.4 "User Login" section)
SD card with sufficient memory capacity is available (format: FAT32)

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.6 "Installing the control cabinet").
2. Push the SD card into the X3 slot until it clicks into place. The bevelled edge of the card must point to the right side towards the terminal (see chapter 7.5 "Inserting the SD card").
3. Close and latch the cover of the SIGMA AIR MANAGER 4.0 terminal (see chapter 6.12.6 "Install Control cabinet").
4. Press Energy & costs – Table – Export.
   The *Energy & costs – Table – Export* menu is displayed.

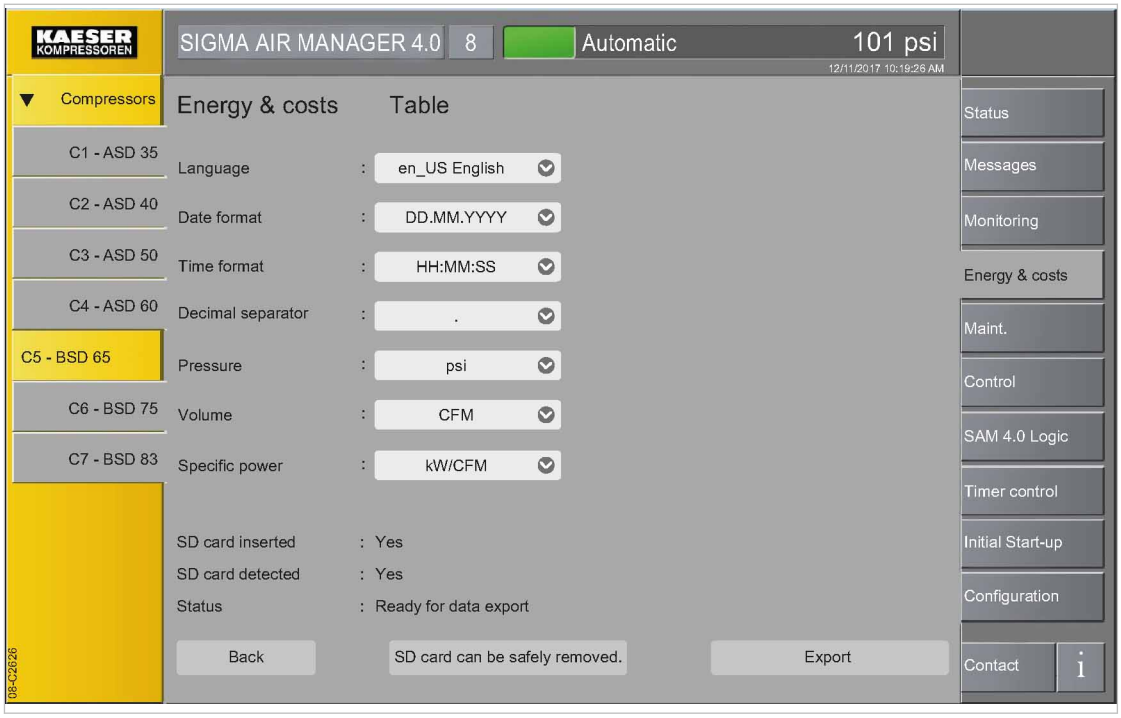


Fig. 120 Menu: *Energy & costs – Table – Export*

5. Touch to select or deselect the desired machine(s) in the device selection list.
   In the *Table* menu the data is recalculated and the display is updated based on the machine selected.

6. Set the required parameters.

Element	Meaning
Language	Language settings for the Energy & Costs Report
Date format	Country-specific date format
Time format	Country-specific date format
Decimal separator	Decimal separator format
Pressure	Pressure unit
Volume	Volume unit
Specific power	Specific capacity unit
SD card inserted	An SD card has been physically inserted.
SD card detected	An SD card has been electronically detected.
Status	Status readiness for data export
SD card can be safely removed.	Key with which the SD card is securely logged off from the electronic control (file system info at operating system level) so that it can subsequently be removed without data loss
Export	The Energy & Costs Report for all compressors is saved to the SD card. The file format used is ".csv".

Tab. 105 Meaning of the menu elements *Export*

7. Press the Export key.
   The Energy & Costs Report is saved to the SD card.
8. Accessing the export function via KAESER CONNECT (see 8.8 "KAESER CONNECT" section) the file is downloaded from the internet and saved.
9. Press SD card can be safely removed. key prior to removing the SD card.
   The SD card is securely logged off from the electronic control and can be removed without the risk of data loss.

8.7.3 Diagram

In the *Energy & costs – Diagram* menu the energy consumption and energy costs for the entire stations can be displayed as a pie chart for a selectable period. You may also use external factors in the calculation of overall costs, such as service expenses. You can freely define these expenses in a table and add them as fixed costs.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)
Tariff costs are configured in the *Tariff configuration* menu

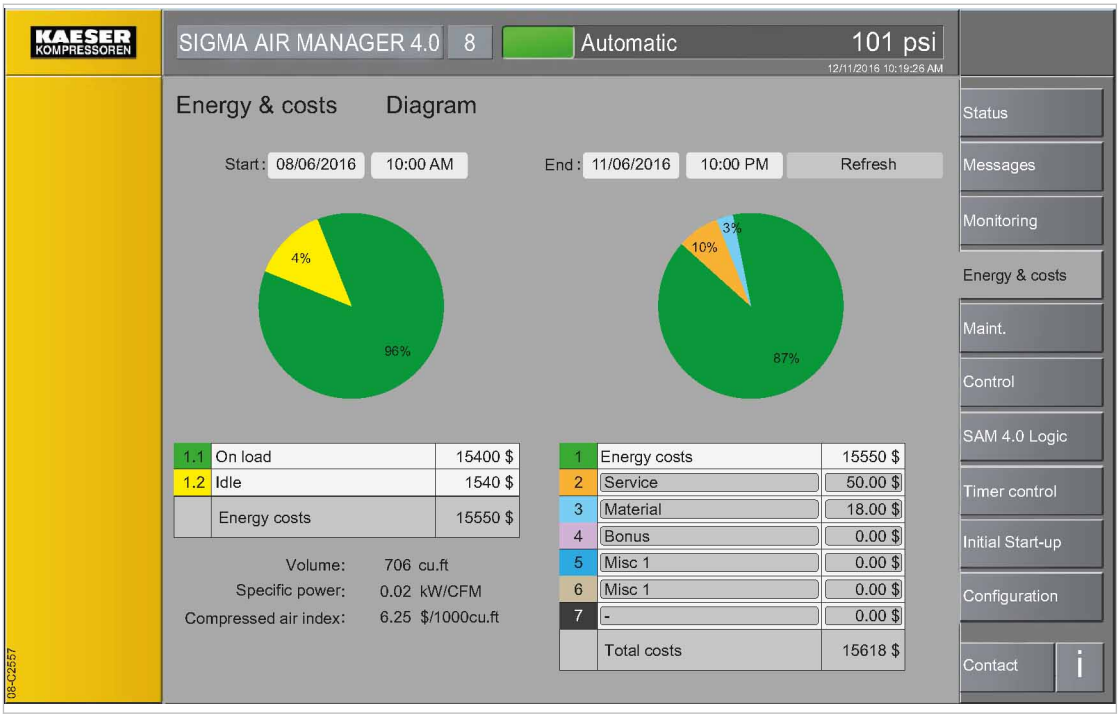


Fig. 121 Menu *Energy & costs – Diagram*

1. Press the Energy & costs – Diagram key.
   The *Energy & costs – Diagram* menu is displayed.

Element	Meaning
Start	Start date of the period to be analyzed. Enter the date and time in the corresponding fields.
End	End date of the period to be analyzed. Enter the date and time in the corresponding fields.
Refresh	The system updates the calculation and displays the results.
On load/Idle diagram	Pie chart indicating the percentage portions of LOAD and IDLE
Total costs diagram	Pie chart indicating the total costs for the percentage portions of energy costs and freely defined fixed costs
ON LOAD	Energy consumption of all machines in LOAD mode
IDLE	Energy consumption of all machines in IDLE mode
Energy costs	Energy costs of the station. The values are displayed in the currency.
Volume	Volume of the compressed air delivered by all machines. The values are displayed in the set "unit".
Specific power	The required electric power that is required for compressing a volume unit per time unit
Compressed air index	Value calculated from the costs per delivery volume. Used to assess the cost efficiency of the selected machines.
Cost types, item 2–7.	Freely definable cost types to be taken into account during the calculation of the station total costs.

Element	Meaning
Total costs	Total from energy costs and freely definable costs for the entire station.

Tab. 106 Meaning of the menu elements *Energy & costs – Diagram*

2. Enter the required data for the freely definable cost types (item 2–7).

Result In the *Energy & costs – Diagram* menu the diagrams and total costs are recalculated and the displayed updated.

8.7.4 Period comparison

In the *Period comparison* menu the energy consumption of the operating points LOAD RUN and IDLE can be displayed for the entire station as a bar graph for the past six time intervals.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)
Tariff costs are configured in the *Tariff configuration* menu

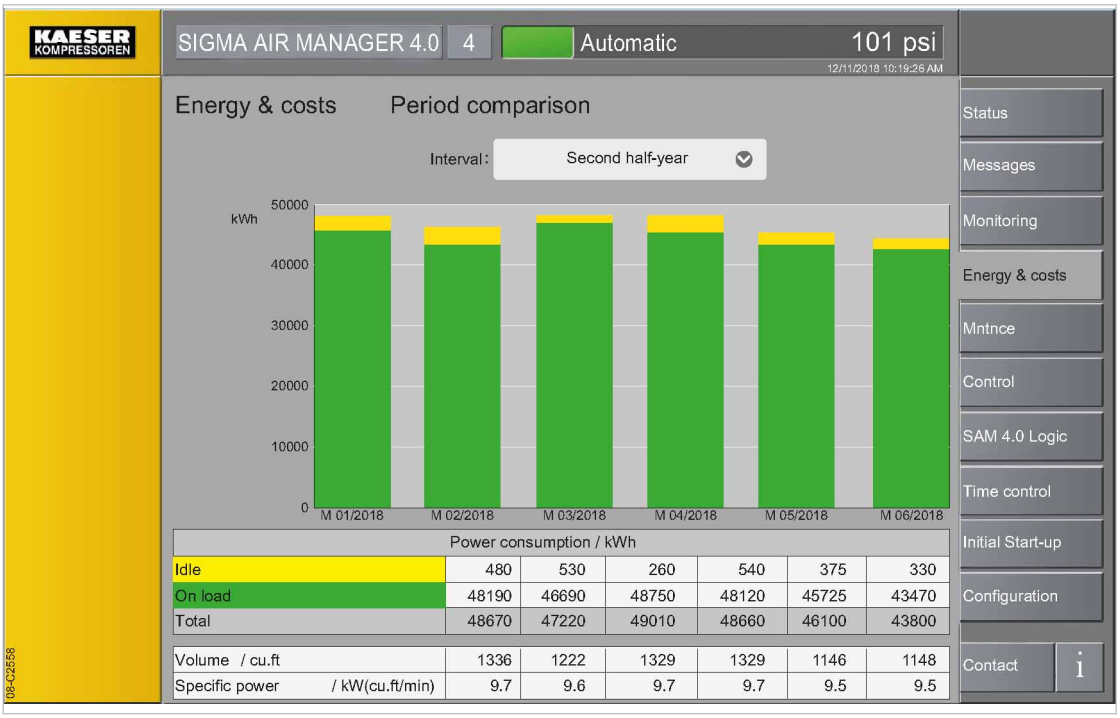


Fig. 122 Menu *Energy & costs – Period comparison*

1. Press the Energy & costs – Period comparison key.

Depending on the stored data volume, the recalculation and drawing of the bar graph may take up to one minute.

The *Energy & costs – Period comparison* menu is displayed.

Element	Meaning
Interval	Selecting the desired period of time for the bar graph: ■ Days (D) ■ Weeks (W) ■ First half-year ■ Second half-year ■ Quarters (Q) ■ Years (Y)
On load/Idle diagram	Bar graph for the last six intervals for absolute portions of LOAD and IDLE
ON LOAD	Energy consumption of the entire station in LOAD mode
IDLE	Energy consumption of the entire station in IDLE mode
Total	Energy consumption of the entire station

Tab. 107 Meaning of the menu elements *Energy & costs – Period comparison*

2. In the line *Interval*, touch the ⌄ symbol.
3. Enter the desired interval.

Result In the *Energy & costs – Period comparison* menu the energy consumption data and diagrams are displayed for the configured time period.

8.7.5 Tariff configuration

In the *Tariff configuration* menu settings can be configured for the energy tariff.

The menu has the following sub-menus:

- Tariff costs
- Tariff validity

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

1. Press the Energy & costs – Tariff configuration key.

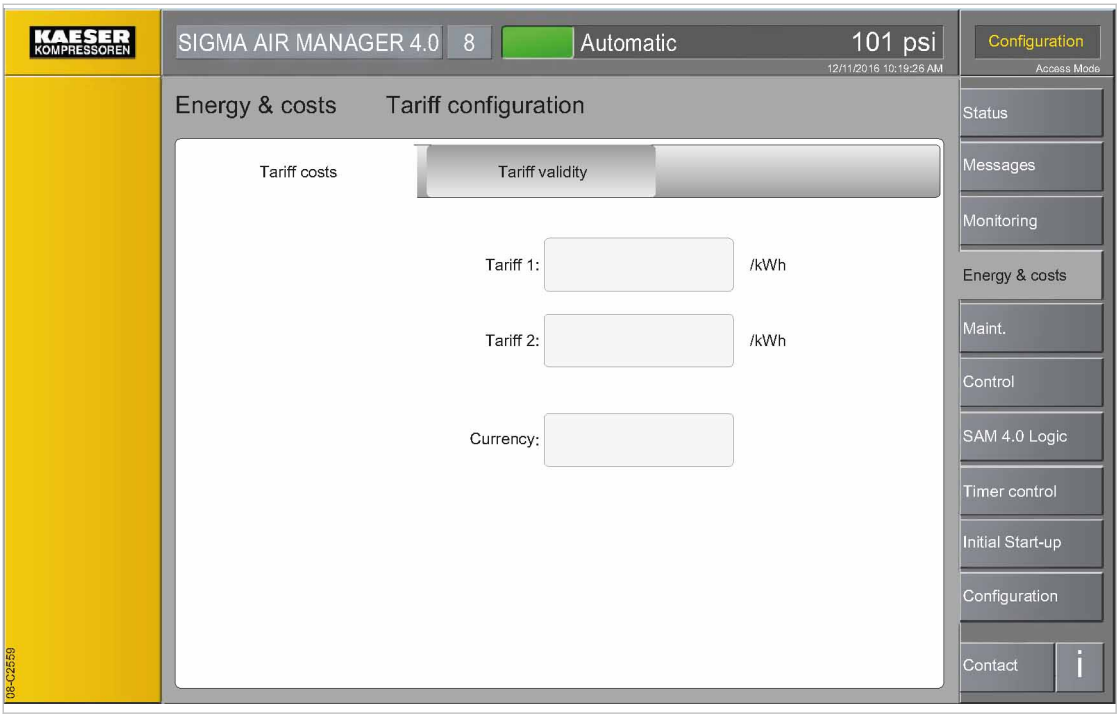


Fig. 123 Menu *Energy & costs – Tariff configuration*

2. Tap the *Tariff costs* tab,
   The *Energy & costs – Tariff configuration – Tariff costs* menu is displayed.

Element	Meaning
Tariff 1	Cost per energy unit of quantity, normal tariff
Tariff 2	Cost per energy unit of quantity, reduced tariff
Currency	National "currency unit"

Tab. 108 Meaning of the menu elements *Energy & costs – Tariff configuration – Tariff costs*

3. In the *Tariff 1* line, configure the costs per energy management unit at the normal tariff.
4. In the *Tariff 2* line, configure the costs per management unit at the reduced tariff.
5. In the *Currency* line, enter the desired currency unit.

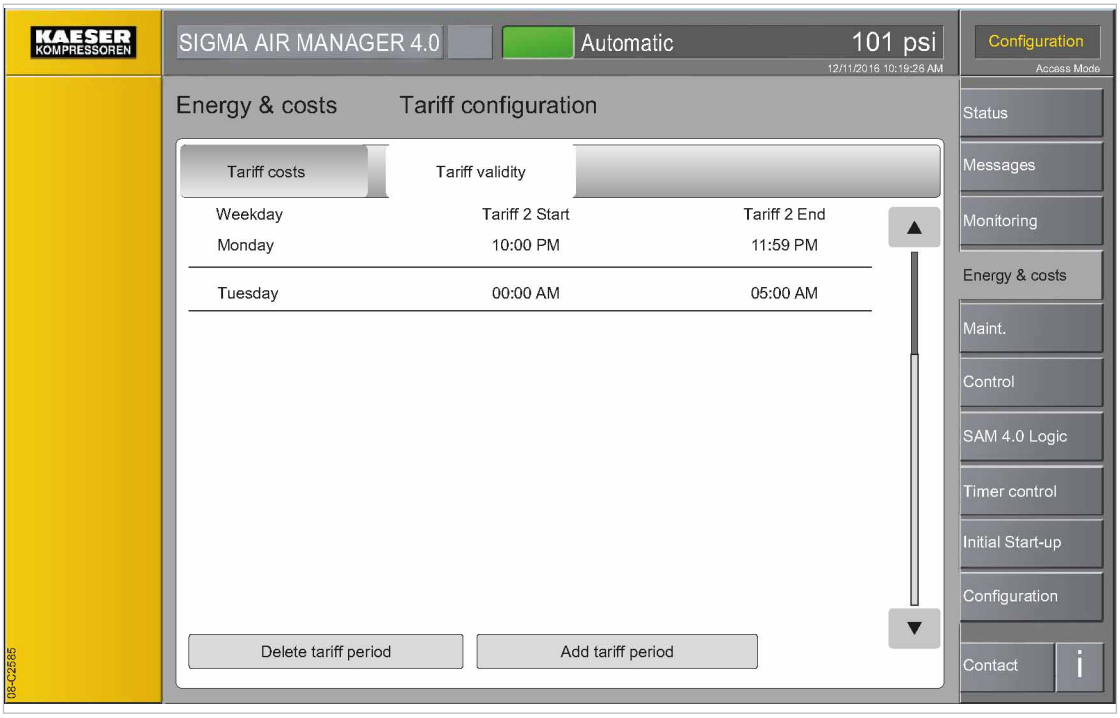


Fig. 124 Menu: *Energy & costs – Tariff configuration – Tariff validity*

6. Tap the *Tariff validity* tab,
   The *Energy & costs – Tariff configuration – Tariff validity* menu is displayed.

Element	Meaning
Add tariff period	Add the new tariff period.
Weekday	Set the weekday for Tariff 2.
Tariff 2 Start	Set the time for the tariff start.
Tariff 2 End	Set the time for the tariff end.
Delete tariff period	Delete the selected tariff period.

Tab. 109 Meaning of the menu elements *Energy & costs – Tariff configuration – Tariff validity*

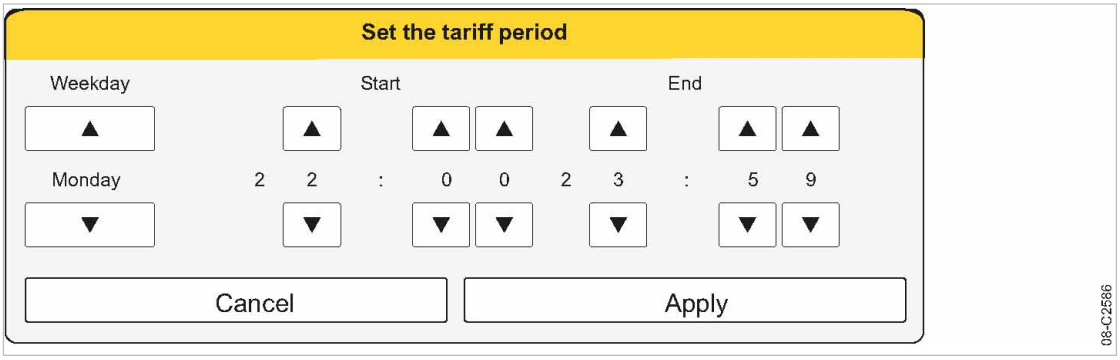


Fig. 125 *Set the tariff period* menu

7. Touch the Add tariff period button.
   The *Set the tariff period* menu is displayed

Element	Meaning
Arrow keys	Set value
Weekday	Set weekday
Start	Set the time (hours/minutes) for the tariff start
End	Set the time (hours/minutes) for the tariff end
Cancel	Settings **not** saved
Apply	Settings saved

Tab. 110 Meaning of the menu elements *Set the tariff period*

8. Use the Up and Down arrow keys to set the weekday.
9. Use the Up and Down arrow keys to set the starting and end time.
10. Add the set time period with Apply.

Result A time period for Tariff 2 has been added. When calculating the energy costs for this period of time, SIGMA AIR MANAGER 4.0 takes the reduced tariff into account.

8.7.6 Report

In the *Report* menu the email for sending the report Energy & costs can be configured. The report is sent as a ZIP archive and contains the key figures for the compressed air station as well as visual evaluations.

The menu has the following sub-menus:

- Send options
- General settings

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)
The parameters of the *X7 Ethernet 1 Gb* interface are correctly configured (see 7.11.4 "X7 Ethernet 1 Gb" section)
The email parameters are correctly configured (see 7.12 "E-mail" section)

1. Press the Energy & costs – Report key.

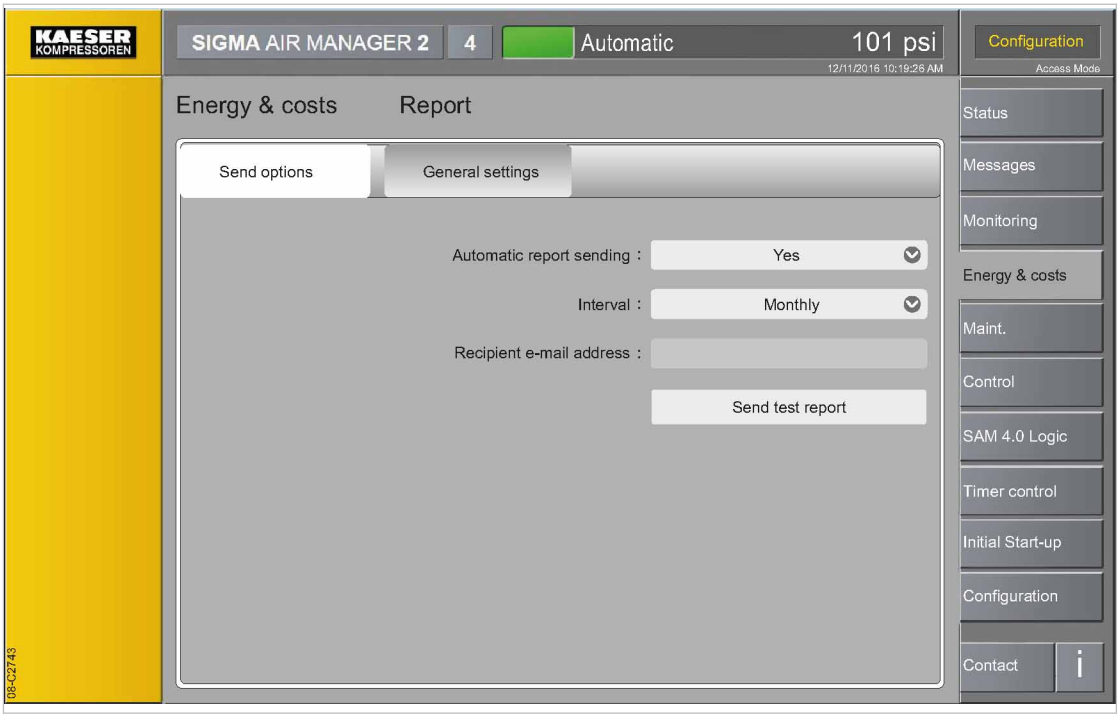


Fig. 126 Menu *Report – Send options*

2. Tap the *Send options* tab,
   The *Send options* menu is displayed

Element	Meaning
Automatic report sending	The *Yes* option is used to activate automatic sending of the report
Interval	Setting to adjust the frequency with which the report is sent: ■ Daily ■ Weekly ■ Monthly ■ Quarterly ■ Annually
Recipient e-mail address	email address to which the report is sent
Send test report	To check the settings, a test report can be sent locally by email to SIGMA AIR MANAGER 4.0

Tab. 111 Meaning of the menu elements *Send options*

3. Enter the required settings.

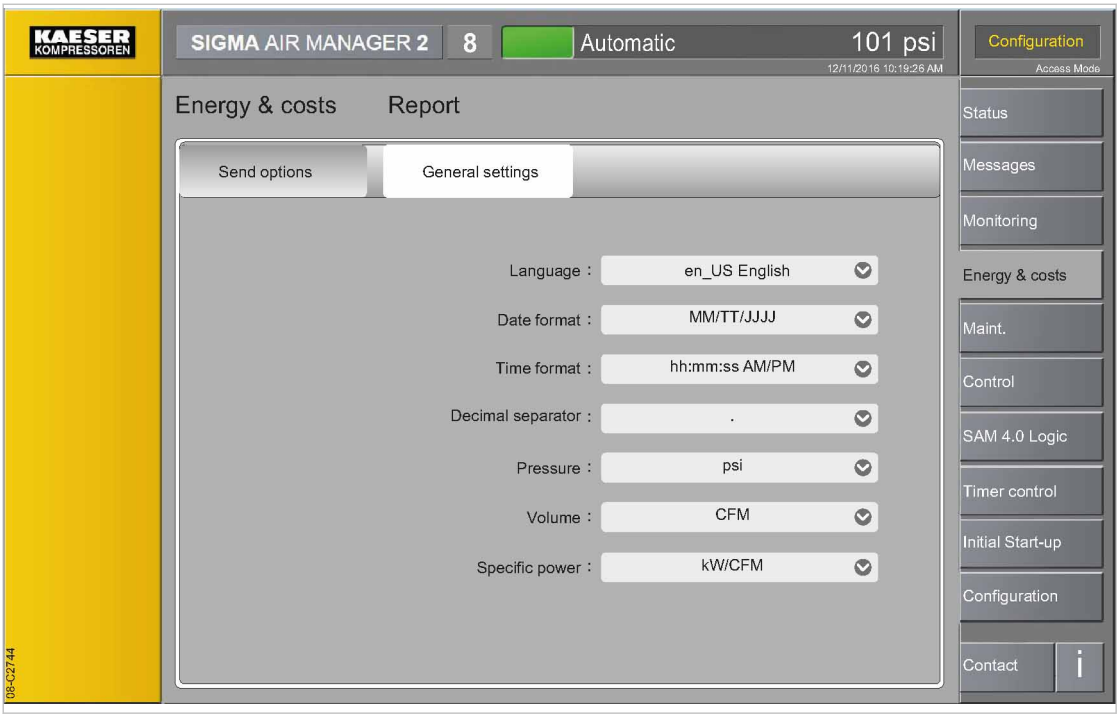


Fig. 127 Menu *Report – General settings*

4. Tap the *General settings* tab,
   The *General settings* menu is displayed

Element	Meaning
Language	Language settings for the Energy & Costs Report
Date format	Country-specific date format
Time format	Country-specific date format
Decimal separator	Decimal separator format
Pressure	Pressure unit
Volume	Volume unit
Specific power	Specific capacity unit

Tab. 112 Meaning of the menu elements *General settings*

5. Enter the required settings.
6. Tap the *Send options* tab,
   The *Send options* menu is displayed
7. Press the Send test report key.

Result The settings are correct if the recipient has received the test report.

8.8 KAESER CONNECT

The user interface of SIGMA AIR MANAGER 4.0 can be displayed on an Internet-enabled device (PC, laptop, tablet). For this purpose, SIGMA AIR MANAGER 4.0 must be connected to the external computer via the X7 Ethernet 1 Gb interface, directly (network cable) or indirectly (network). A web browser is used for the visualization.

You cannot remotely adjust any settings via KAESER CONNECT.

For KAESER CONNECT to be able to use the Internet-capable device, it must be registered in the same network as SIGMA AIR MANAGER 4.0.

To be able to use KAESER CONNECT, the browser installed on the Internet-capable device must be able to display HTML5 content. For security reasons, we strongly recommend to use only up-to-date browser versions.

For security reasons access to KAESER CONNECT remotely via the IoT client has been deactivated. This does not affect local access from the customer network.

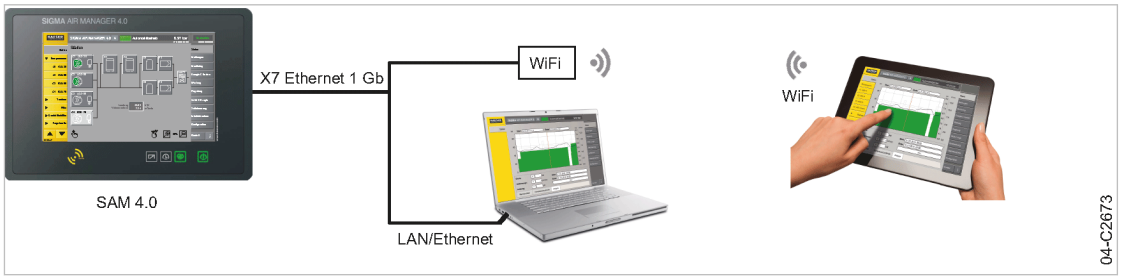


Fig. 128 KAESER CONNECT

8.8.1 Opening KAESER CONNECT

Precondition The user with password has been created (see chapter 7.4.3 User administration)
User name and password are known (see Chapter 7.4 "User log-in")
The IP address of SIGMA AIR MANAGER 4.0 (see Chapter 7.11 "X7 Ethernet 1 Gb") is known.

1. Connect SIGMA AIR MANAGER 4.0 to the internet device or network using an Ethernet cable.

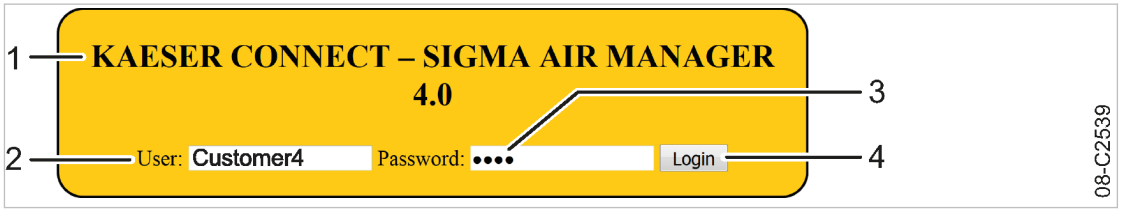


Fig. 129 SIGMA AIR MANAGER 4.0 Log-in

[1] The SIGMA AIR MANAGER 4.0 HMI log-in window
[2] User
[3] Password
[4] Login key

2. In the web browser, enter the IP address of SIGMA AIR MANAGER 4.0. See chapter 7.11.3.
   The log-in window [1] opens.
3. Enter the user name [2]. See chapter 7.4.3.
4. Enter the password [3].
5. Click Login [4].
   KAESER CONNECT for SIGMA AIR MANAGER 4.0 is displayed.

6. If necessary, set the language; see Chapter 7.3 "Language" (local settings in SIGMA AIR MANAGER 4.0 are not affected).
7. If necessary, set the units; see Chapter 7.7 "Units" (local settings in SIGMA AIR MANAGER 4.0 are not affected).

8.8.2 Closing KAESER CONNECT

➢ To close KAESER CONNECT, click Logout.

8.9 Contact

Press Contact key for displaying contact information about KAESER.

Fig. 130 *Contact* menu

When you open the *Contact* menu via KAESER CONNECT, a link to our website http://www.kaeser.com/sam4manual/response.asp is displayed. There you will find the latest version of the SIGMA AIR MANAGER 4.0 operating manual for download as PDF file.

9 Fault Recognition and Rectification

9.1 KAESER SERVICE

The messages valid for SIGMA AIR MANAGER 4.0 are dependent on how the compressor station is equipped.

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 Messages

Alarm, service and warning messages are displayed at SIGMA AIR MANAGER 4.0 and stored in the event memory. A pop-up window appearing on top of the current display notifies the user of new messages.

Messages **must** be acknowledged.

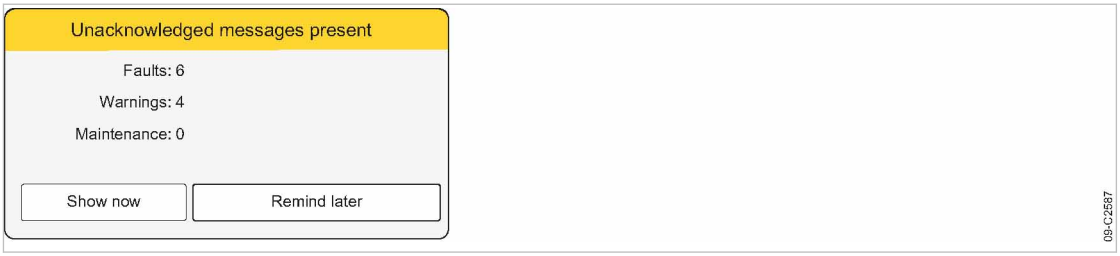


Fig. 131 Message *Unacknowledged message(s) present*

➢ Use Show now to call up the *Messages – Unacknowledged* menu.

Element	Meaning
Faults	Number of ignored fault messages
Warnings	Number of ignored warning messages
Maintenance	Number of ignored maintenance messages
Show now	Open the *Messages – Unacknowledged* menu
Remind later	Postpone display of ignored messages

Tab. 113 Meaning of the menu elements Unacknowledged message(s) present

The event memory differentiates between:

- Unacknowledged
- Active
- History (storing the last 1000 messages).

Precondition Login with Access Level 2 *Configuration* (see chapter 7.4 "User Login")

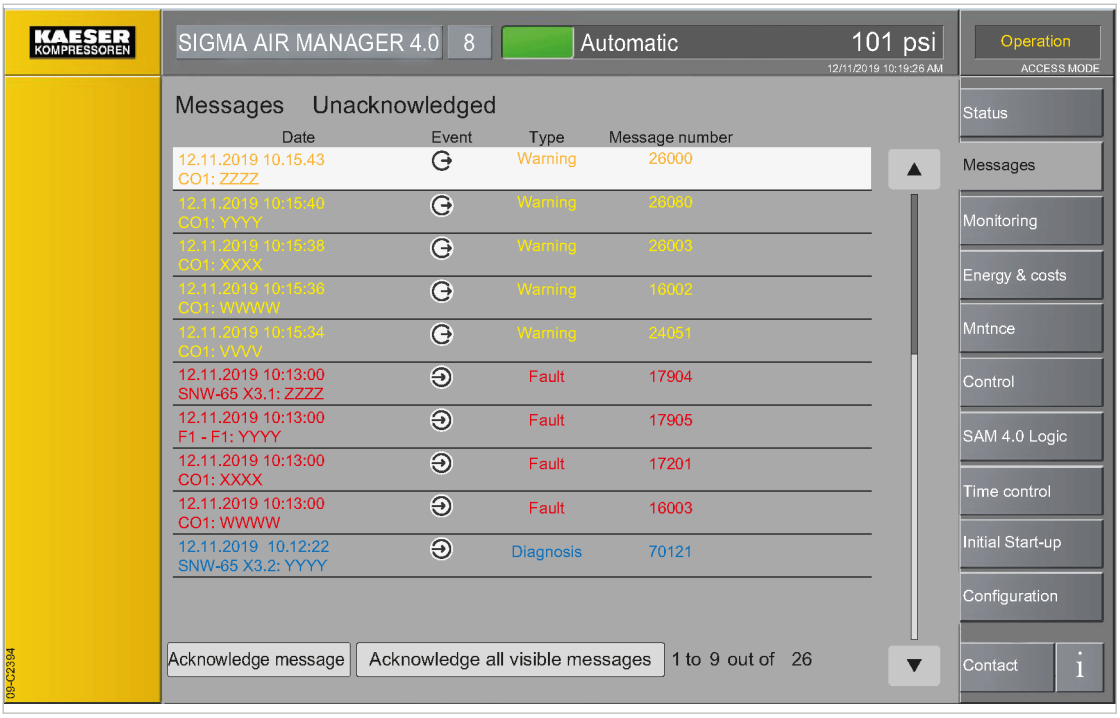


Fig. 132 Menu *Messages – Unacknowledged*

1. Press Messages.
2. Select a menu item:
   - Unacknowledged
   - Active
   - History
     Symbols for three different event types are shown for the messages:
     - – - Message coming
     - – - Message acknowledged
     - – - Message gone
   - The following data is also shown:
     - – *Date* - date and time
     - – *Message number* - number of the message output by the specific machine
     - – Second row: Message text
   - The messages types are identified by color:
     - – Red: Fault
     - – Yellow: Warning, Maint.
     - – Blue: Diagnosis, System
     - – Black: Operation
3. If the message list is longer than one screen page, swipe with your finger up or down or use the arrow keys.
4. In the *Messages – Unacknowledged* menu, tap an individual message for selection.
5. Use Acknowledge message to acknowledge the selected message.
6. Use Acknowledge all visible messages to acknowledge all displayed messages that have not yet been acknowledged.

9.3 Other faults

Alarm	Possible cause	Remedy
Operation of the touch screen is difficult and/or returns errors.	The touch screen is dirty.	Wipe the touch screen surfaces with a soft cloth (micro-fibre, for example) without any harsh cleaning agent.
	SIGMA AIR MANAGER 4.0 is not correctly grounded. The capacitive touch screen must be earthed to work properly.	Ground the SIGMA AIR MANAGER 4.0 properly (see chapter 6.12.2).
#### is displayed instead of a value.	SIGMA AIR MANAGER 4.0 was unable to determine the value.	Check the electrical connection and the sensor.
The compressed air station cannot be switched to Automatic mode.	Error in the "Engineering Base" configuration.	Make correction in "Engineering Base".
	The *Network pressure* measured value is not available.	Check the electrical connection and the pressure transducer.
The keys on the operating panel are flashing.	An internal software error has occurred	Switch off the power supply for SIGMA AIR MANAGER 4.0 at the user's power supply disconnecting device, wait 10 seconds and switch on again. If the error occurs again, call KAESER SERVICE.

Tab. 114 Other faults

10 Maintenance

10.1 Maintenance tasks on electrical equipment

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

- Qualified personnel, see chapter 3 “Assigning personnel”.
- Technicians qualified to maintain SIGMA AIR MANAGER 4.0 and service personnel instructed by and under the supervision of such a qualified technician
- KAESER SERVICE

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

Enter completed maintenance tasks in the corresponding lists in the operating manual.

10.2 Menu “Maintenance”

Maintenance-relevant information about the connected machines/components can be viewed in the *Maintenance* menu, where settings can also be made.

The *Maintenance* menu has the following sub-menus:

- "Overview"
- "History"
- "Report"
- "Maintenance management"

➢ Check the displayed data and adjust the settings as required.

10.2.1 Menu “Maintenance – Overview”

View maintenance information for the entire station or for individual machines/components in the *Overview* menu.

1. Press the Maintenance – Overview key.
   The *Maintenance – Overview* menu for the entire station is displayed.

Element	Meaning
	This symbol means that there is still sufficient runtime remaining until the next scheduled maintenance measure
	This symbol means that there is only a little runtime remaining until the next scheduled maintenance measure
	This symbol means that the time until the scheduled maintenance measure has already been exceeded
C1 – ASD 35	Compressor number and type (example)

Element	Meaning
Oil filter	Components to be maintained
in XXXXh YYYYh	XXXX (black, positive numerical values): Time until next maintenance task XXXX (red, negative numerical values): Amount by which the time until the scheduled maintenance task has already been exceeded YYYY (grey numerical values): Interval between two maintenance tasks
Bar chart	Graphical display of maintenance times: Green bar: sufficient runtime remains until the next scheduled maintenance task Yellow bar: only a little time remains until the next scheduled maintenance task or the time has just been exceeded Red bar: the time until the scheduled maintenance measure has been excee-ded
Estimated due date for next service measure:	Calculated date when the next maintenance measure is estimated to be carried out
Type	Status display for the selected machine

Tab. 115 Meaning of the menu elements in menu *Maintenance – Overview*

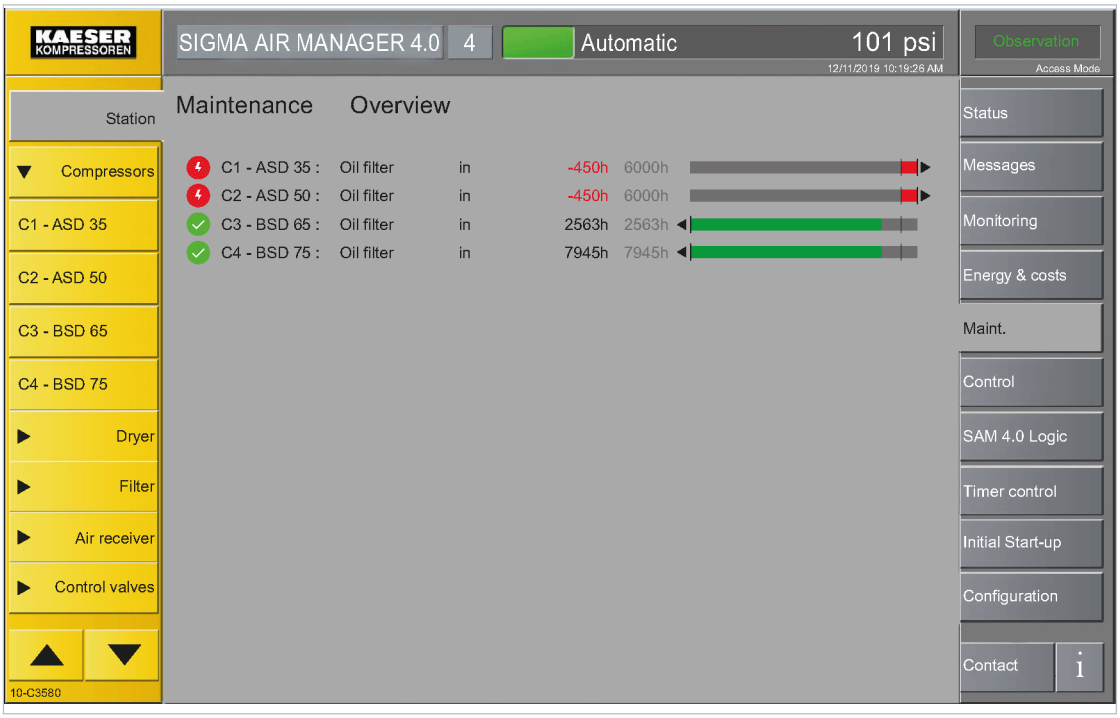


Fig. 133 Menu *Maintenance – Overview for the entire station*

2. Select the desired machine in the device selection bar.
   The menu *Maintenance – Overview* for the selected machine is displayed.

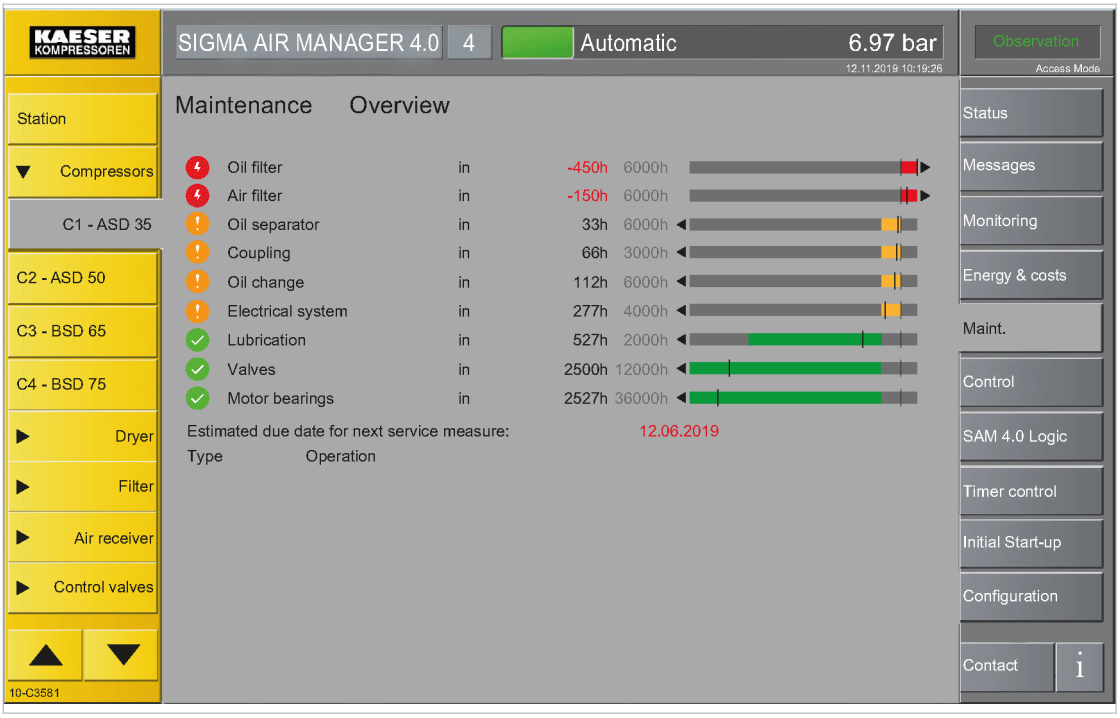


Fig. 134 Menu *Maintenance – Overview – for the selected machine*

3. Check the displayed remaining runtime and schedule the next maintenance measure.

10.2.2 Menu “Maintenance – History”

View maintenance-relevant messages for the entire station or for individual machines/components in the *History* menu.

The *History* menu has the following sub-menus:

- “Current”
- “Compressor”
- “System”
- “Diagnosis”

1. Press the Maintenance – History key.
   The *Maintenance – History* menu for the entire station is displayed.
2. Select the desired machine in the device selection bar.
   The menu *Maintenance – History – Current* for the selected machine is displayed.

Element	Meaning
Current	This menu displays all messages in chronological order. The last message is shown at the top.
Compressor	This menu displays all fault messages and warnings in chronological order. The last message is shown at the top.
System	This menu displays all system messages in chronological order. The last message is shown at the top.
Diagnosis	This menu displays all diagnostic messages in chronological order. The last message is shown at the top.

Element	Meaning
#	This column shows the message number.
Type	Type of message.
Event	Display of the event type of the message.
	Event type: Message coming
	Event type: Message going
	Event type: Message acknowledged
Date	Date and time of the message.
Message	Message text

Tab. 116 Meaning of the menu elements in menu *Maintenance – History*

Fig. 135 Menu *Maintenance – History – Current for the selected machine*

3. Select the Compressor tab.
   The menu *Maintenance – History – Current* for the selected machine is displayed.

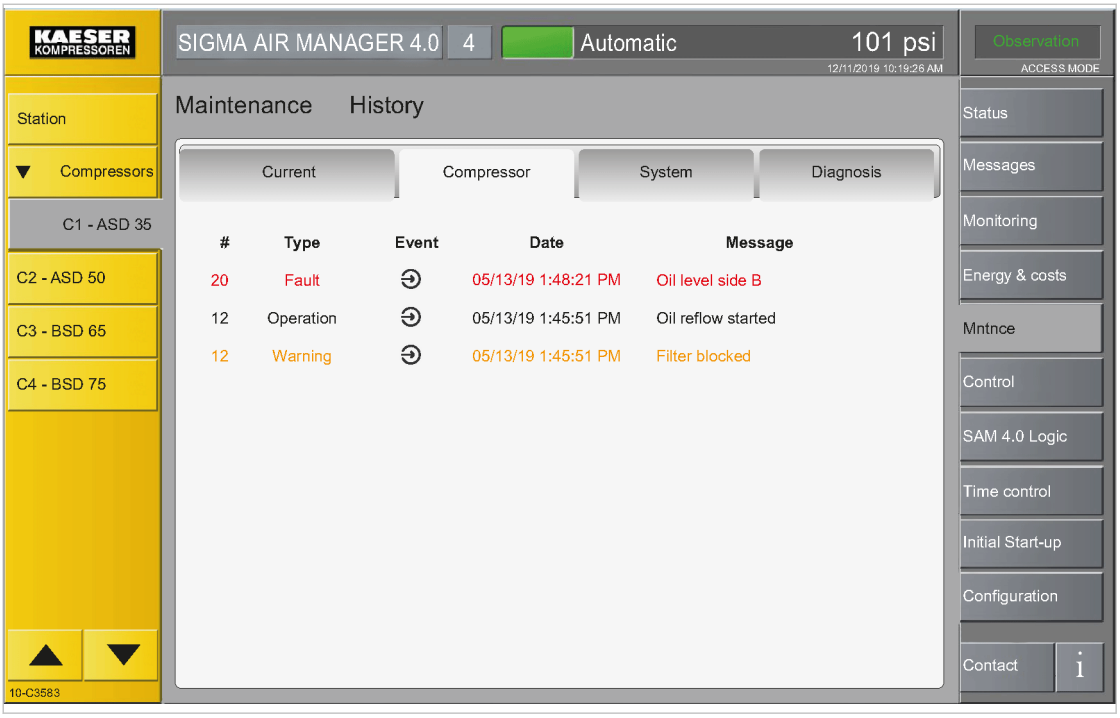


Fig. 136 Menu *Maintenance – History – Compressor for the selected machine*

4. Select the System tab.
   The menu *Maintenance – History – System* for the selected machine is displayed.

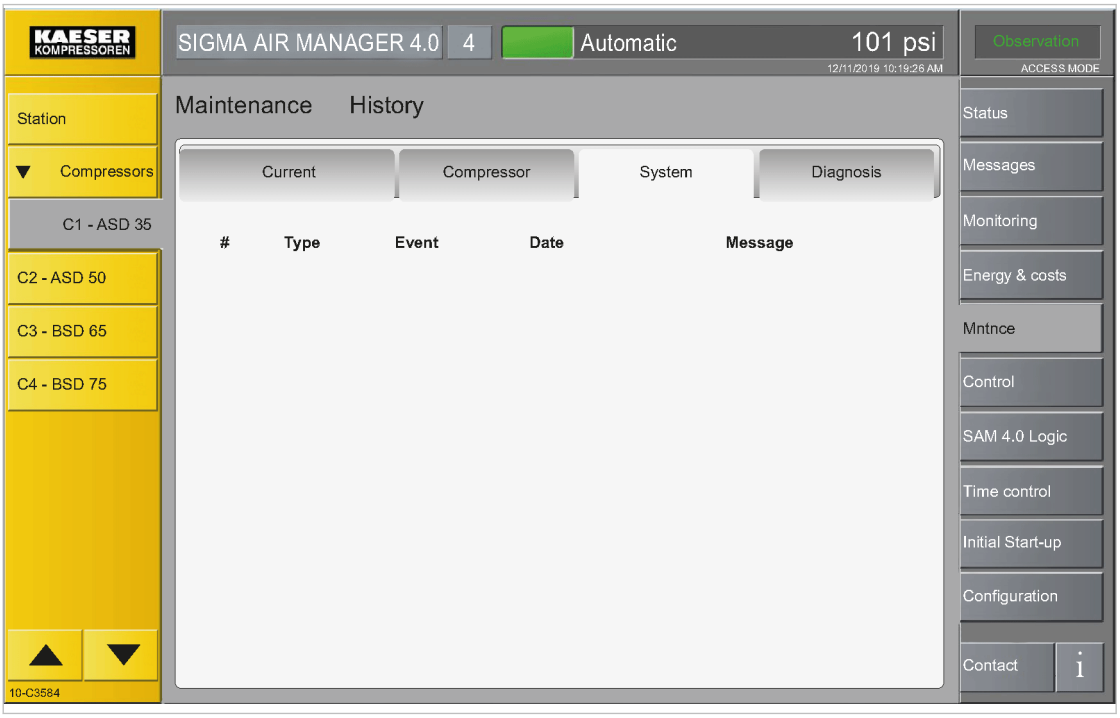


Fig. 137 Menu *Maintenance – History – System for the selected machine*

5. Select the Diagnosis tab.
   The menu *Maintenance – History – Diagnosis* for the selected machine is displayed.

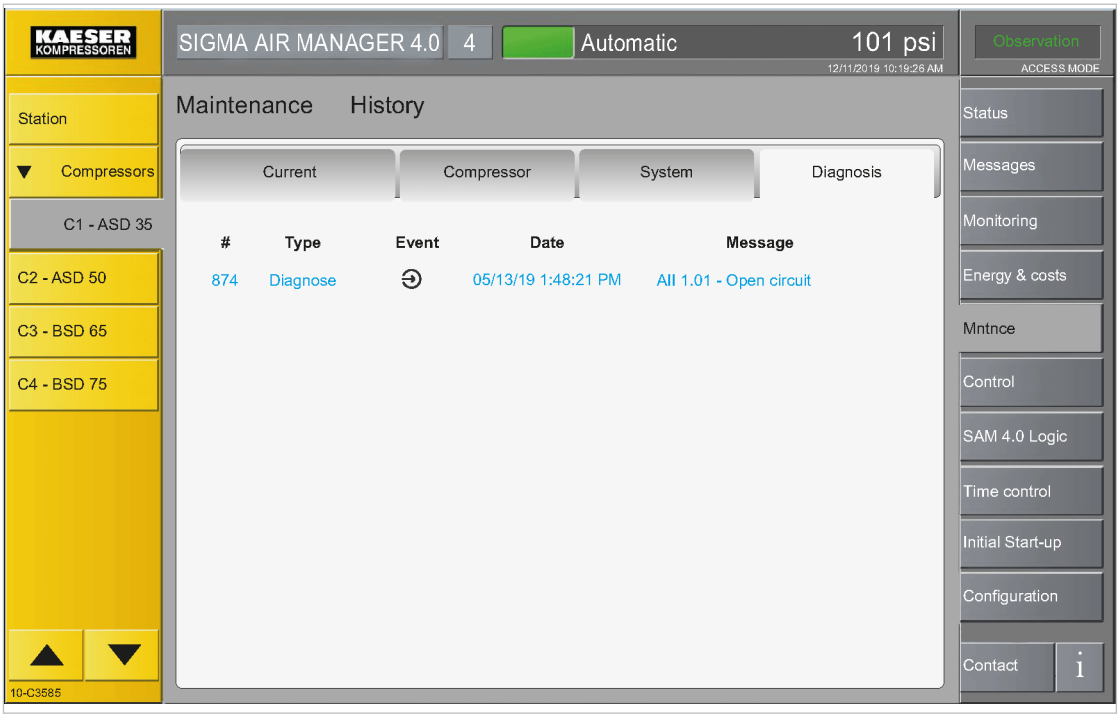


Fig. 138 Menu *Maintenance – History – Diagnosis for the selected machine*

6. Check the displayed messages.

10.2.3 Menu “Report”

Set e-mail sending for messages in the *Report* menu.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

The parameters of the *X7 Ethernet 1 Gb* interface are correctly configured (see chapter 7.11.4 "X7 Ethernet 1 Gb")

The e-mail parameters are correctly configured (see chapter 7.12 "E-mail")

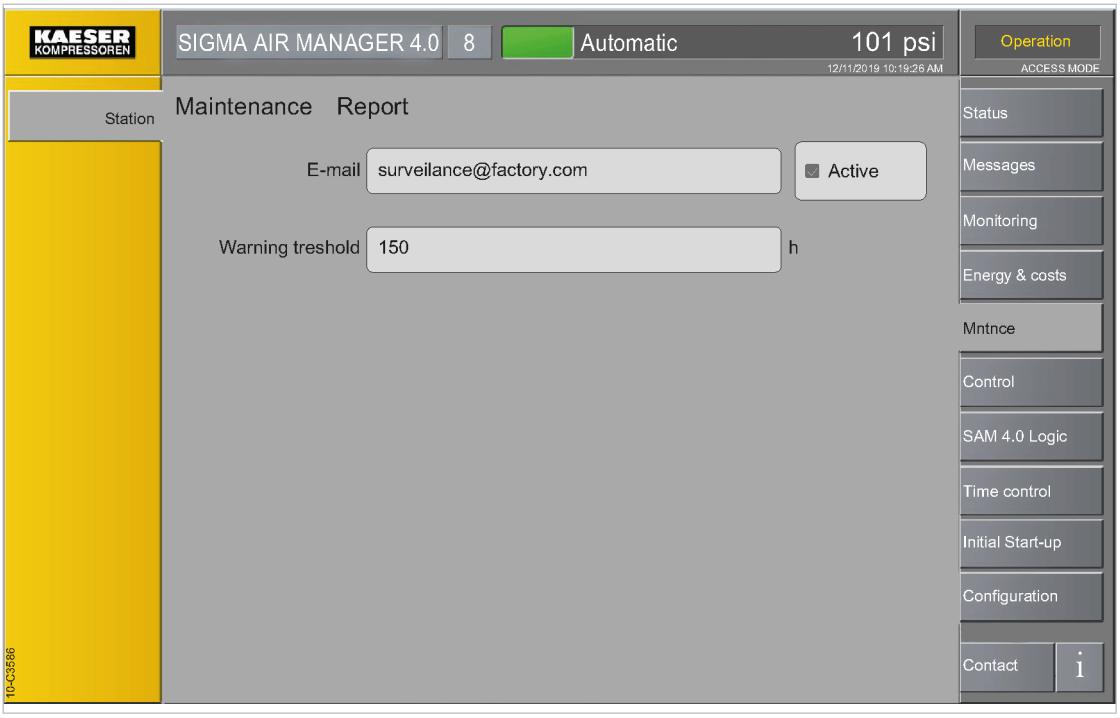


Fig. 139

1. Press the Maintenance – Report key.
   The *Maintenance – Report* menu is displayed.

Element	Meaning
E-mail	The e-mail address to which the messages are sent.
Warning threshold	In here, set the number of hours as of which messages are sent prior to the maintenance deadline expiring.
Active	E-mail sending is activated if the *Active* checkbox is ticked off

Tab. 117 Meaning of the menu elements in menu *Report – Overview*

2. Enter the required settings.

10.2.4 Menu “Maintenance management”

Compressors can be assigned to maintenance groups in the *Maintenance management* menu. This allows you to carry out maintenance measures that are due on several machines at the same time.

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" section)

The parameters of the *X7 Ethernet 1 Gb* interface are correctly configured (see chapter 7.11.4 "X7 Ethernet 1 Gb")

The email parameters are correctly configured (see chapter 7.12 "E-mail")

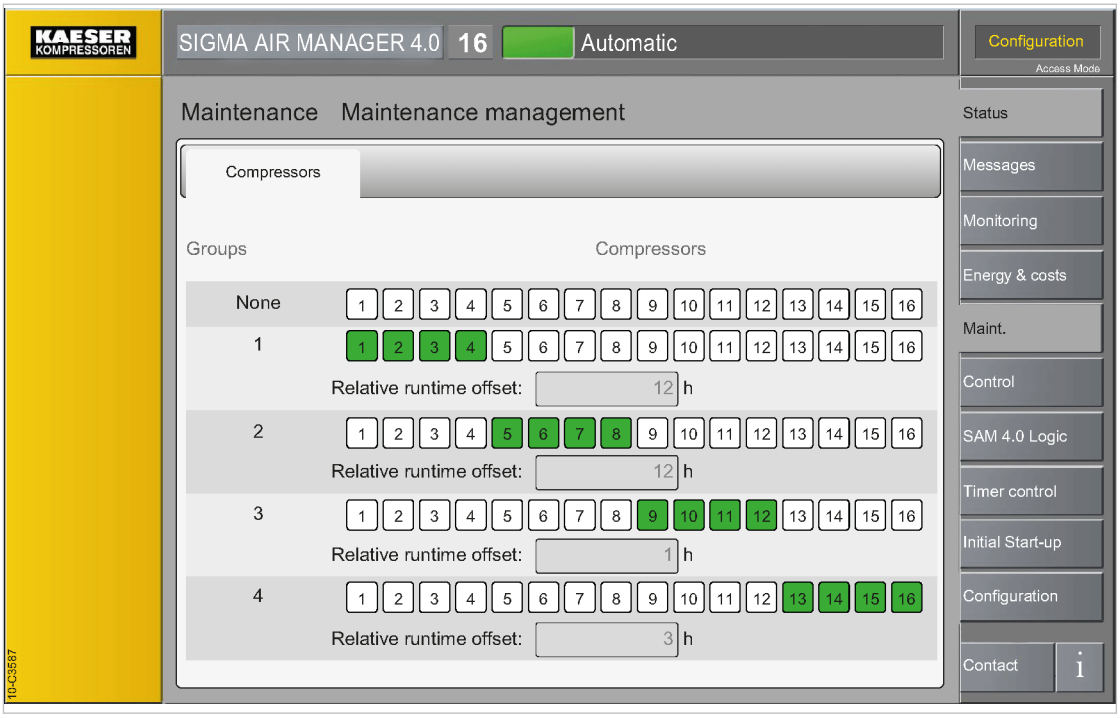


Fig. 140

1. Press the Maintenance – Maintenance management key.
   The *Maintenance – Maintenance management* menu is displayed.

Element	Meaning
Groups	Maintenance group selection
Compressors	Assigning compressors to a maintenance group
None	The machines are not assigned to a maintenance group
1 – 4	Maintenance group 1 to 4
Relative runtime offset:	Runtime offset for the compressors within a maintenance group. The number of hours determines the permitted difference of compressor runtimes between the machines that are used the most and those used the least.

Tab. 118 Meaning of the menu elements in menu *Maintenance – Maintenance management*

2. Assign the corresponding compressors to a maintenance group by tapping the machine number.
   The machine numbers of the compressors that have been assigned to the maintenance groups are shown in green boxes. The numbers of compressors that have not been assigned remain in row *None*.
3. Enter the number of permitted hours for the runtime offset in fields *Relative runtime offset:*.

10.3 Software update

You require an SD to card to update SIGMA AIR MANAGER 4.0.

For the software update, you must temporarily switch off the SIGMA AIR MANAGER 4.0 power supply. If compressed air is generated (the «Compressed air generation» key at SIGMA AIR MANAGER 4.0 illuminates in green), the machines will switch to internal controller regulation when the SIGMA AIR MANAGER 4.0 power supply is switched off. The compressed air station runs in "Manual" mode. The machines are under the control of their own internal controllers. Because of the internal cascaded pressure regulation settings on the compressors, the system pressure will swing much further in manual mode than in automatic mode with SIGMA AIR MANAGER 4.0.

Precondition An SD card with the update file required to update SIGMA AIR MANAGER 4.0 is available.
The compressed air station is known.

➢ Perform the update only when the compressed air supply is not at risk due to manual operation.
➢ Perform the following actions in the sequence described below:

10.3.1 Switching on manual operation

1. Ensure that SIGMA AIR MANAGER 4.0 is set to *Manual* mode. The «Automatic» key does not illuminate.
2. If the «Automatic» key illuminates **green**, press this key.

The *Manual* mode can cause large pressure swings in the compressed air system.
Stations with machines without system pressure switch will deliver no compressed air in the *Manual* mode or if the SIGMA AIR MANAGER 4.0 fails.

The system returns a confirmation prompt.

3. Confirm prompt with the Yes key.
   The «Automatic» key no longer illuminates in **green**.
   The machines are under the control of their own internal controllers.

10.3.2 Insert the SD card.

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see Chapter 6.6).

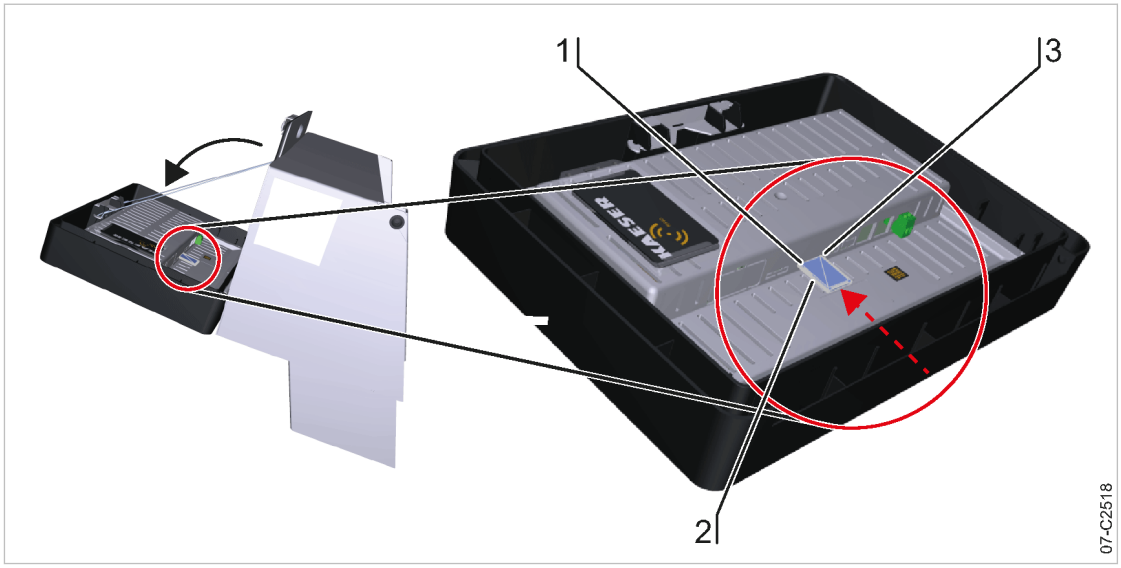


Fig. 141 Insert the SD card.

1 X3: Slot for SD card reader
2 SD card
3 Bevelled SD card edge

2. Push the SD card 2 into the X3 slot 1 until it latches. The bevelled edge 3 of the card must point to the right side towards the terminal.
3. Close and latch the cover of the SIGMA AIR MANAGER 4.0 terminal (see Chapter 6.12).

10.3.3 Importing the update file

Precondition Login with Access Level 2 *Configuration* (see 7.4 "User Login" chapter)

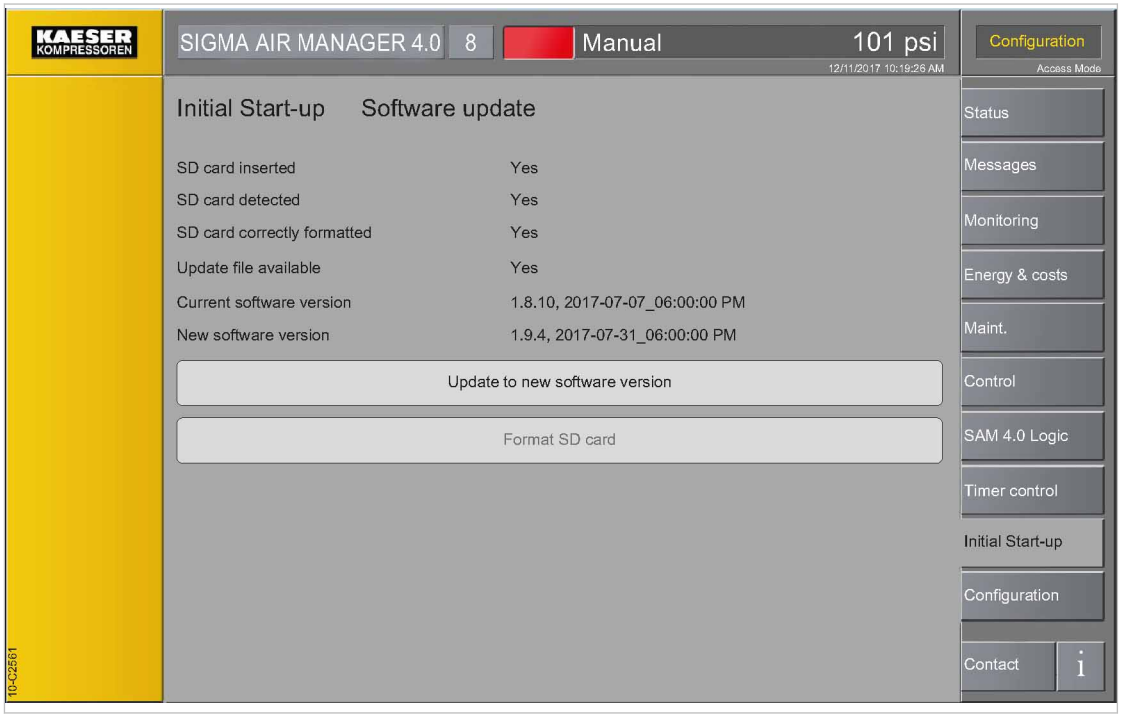


Fig. 142 *Software update* menu

1. Press the Initial Start-up – Software update key

   The *Software update* menu displays the status as follows:

   - *SD card inserted*: An SD card has been physically inserted
   - *SD card detected*: An SD card has been electronically detected
   - *SD card correctly formatted*: The file system of the SD card is compatible (FAT32)
   - *Update file available*: A valid update file is detected
   - *Current software version*: Version data of the software currently installed on SIGMA AIR MANAGER 4.0
   - *New software version*: Version data of the update file on the SD card
2. When all conditions for an update are met, press Software update.

   SIGMA AIR MANAGER 4.0 restarts, imports the update file and automatically executes the update. During the update messages in English are displayed reporting the update progress.

The SD cards formatting is incorrect (FAT32).

➢ Use the function: Format SD card to correctly reformat the SD card.

➢ The read-only protection of the SD card must not in "lock" position.

➢ Copy the valid update file to the SD card and repeat the update process as described under "Inserting the SD card".

3. **NOTICE** *Controller damage due to power failure*

   ➢ *Do not interrupt the SIGMA AIR MANAGER 4.0 power supply during the update process!*
4. The update takes a few minutes. When the update has completed, the *Update successful* message is displayed.
5. Switch off the SIGMA AIR MANAGER 4.0 power supply (miniature circuit breaker in the SIGMA AIR MANAGER 4.0 control cabinet or the user's power supply disconnecting device).
6. Remove the SD card [2].
7. Switch on the SIGMA AIR MANAGER 4.0 power supply (miniature circuit breaker in the SIGMA AIR MANAGER 4.0 control cabinet or the user's power supply disconnecting device).

Result SIGMA AIR MANAGER 4.0 starts with the new software.

➢ Document the software version in the “Software versions” table in the annex (see chapter 13.3.2).

➢ Download the desired operating manual from our server (see chapter 1.6).

10.3.4 Activating automatic mode

1. Press the «Automatic» [⎈] key.

   The system returns a confirmation prompt.
2. Confirm prompt with the Yes key.

   The «Automatic» [⎈] key lights up **green**.

   SIGMA AIR MANAGER 4.0 assumes control of the compressed air station.

10.4 Changing the additional buffer battery

SIGMA AIR MANAGER 4.0 features a permanently installed buffer battery. In the event of a failure, you can install a second buffer battery. This additional buffer battery is switched in parallel to the factory-installed battery and assumes its function. The functionality of this second battery is not impaired by the discharged factory-installed battery.

➢ Comply with the following instructions.

10.4.1 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.*

➢ Properly dispose of discharged buffer batteries.

10.4.2 Buffer battery life

Under normal operating conditions, the buffer battery in SIGMA AIR MANAGER 4.0 has a life of at least 10 years.

NOTICE

Data loss from discharged buffer battery

➢ *Heed warning messages from SIGMA AIR MANAGER 4.0 concerning the buffer battery charge level.*

➢ *Install the additional buffer battery only when SIGMA AIR MANAGER 4.0 is switched on.*

In the event of a voltage loss and discharged buffer battery, the internal clock is reset to the date 01.01.1970 after power has returned.

➢ Notice the maximum storage times for unused buffer batteries.

10.4.3 Installing the additional buffer battery

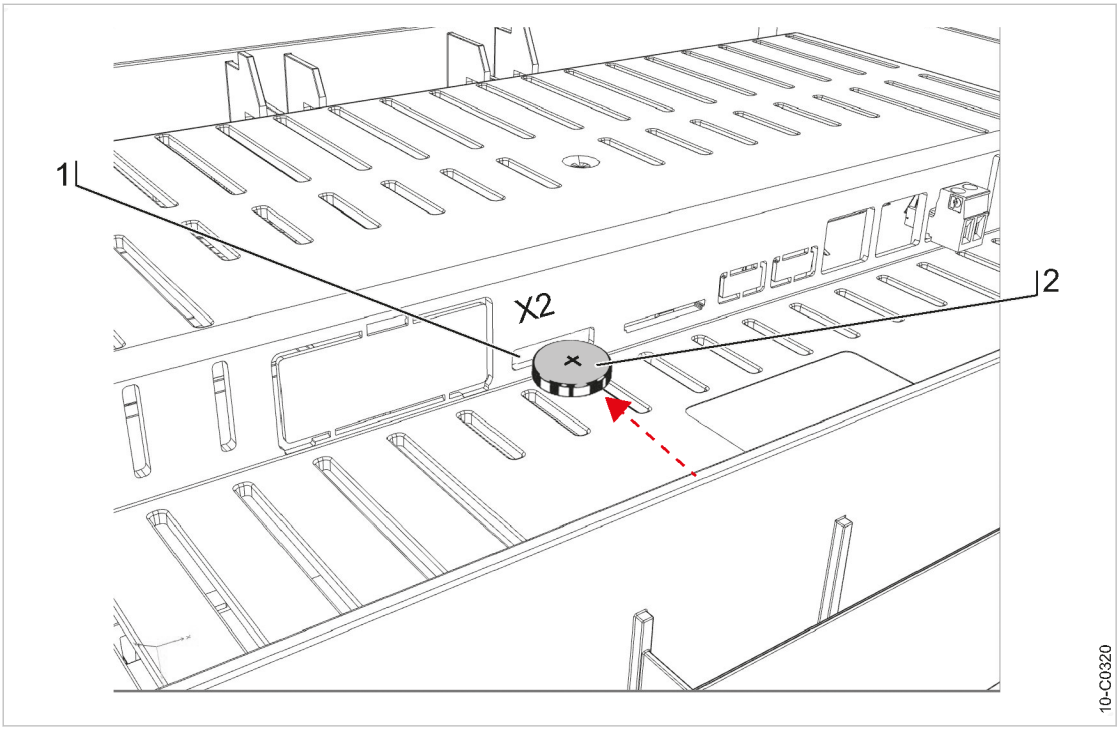


Fig. 143 Buffer battery location

[1] “X2 Battery”: Slot for additional buffer battery
[2] Buffer battery

Precondition You have a new buffer battery at hand (for part number and type, please see chapter 11).
The SIGMA AIR MANAGER 4.0 is switched on.

1. Open the cover of the SIGMA AIR MANAGER 4.0 terminal (see Chapter 6.6).
2. Use a slot-head screwdriver to break off the plastic cover ("Battery X2") at the rear of the SIGMA AIR MANAGER 4.0 terminal.
3. Insert the buffer battery [2] into the slot [1]. The positive pole of the buffer battery points away from the terminal rear (see illustration).
4. Insert the buffer battery [2] into the slot [1] until you feel resistance.
5. Check and correct, if required, the time zone, date and time (see chapter 7.6).
6. Record the installation date of the buffer battery in the maintenance table in the annex of this operating manual (chapter 13.6).

Discharged batteries are hazardous waste.

➢ Dispose of discharged batteries according to national regulations and directives. See chapter 12.2.

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 inquiry and when ordering spare parts. See Chapter 2.1 System information for the required data.

11.2 Replacement parts for service and repair

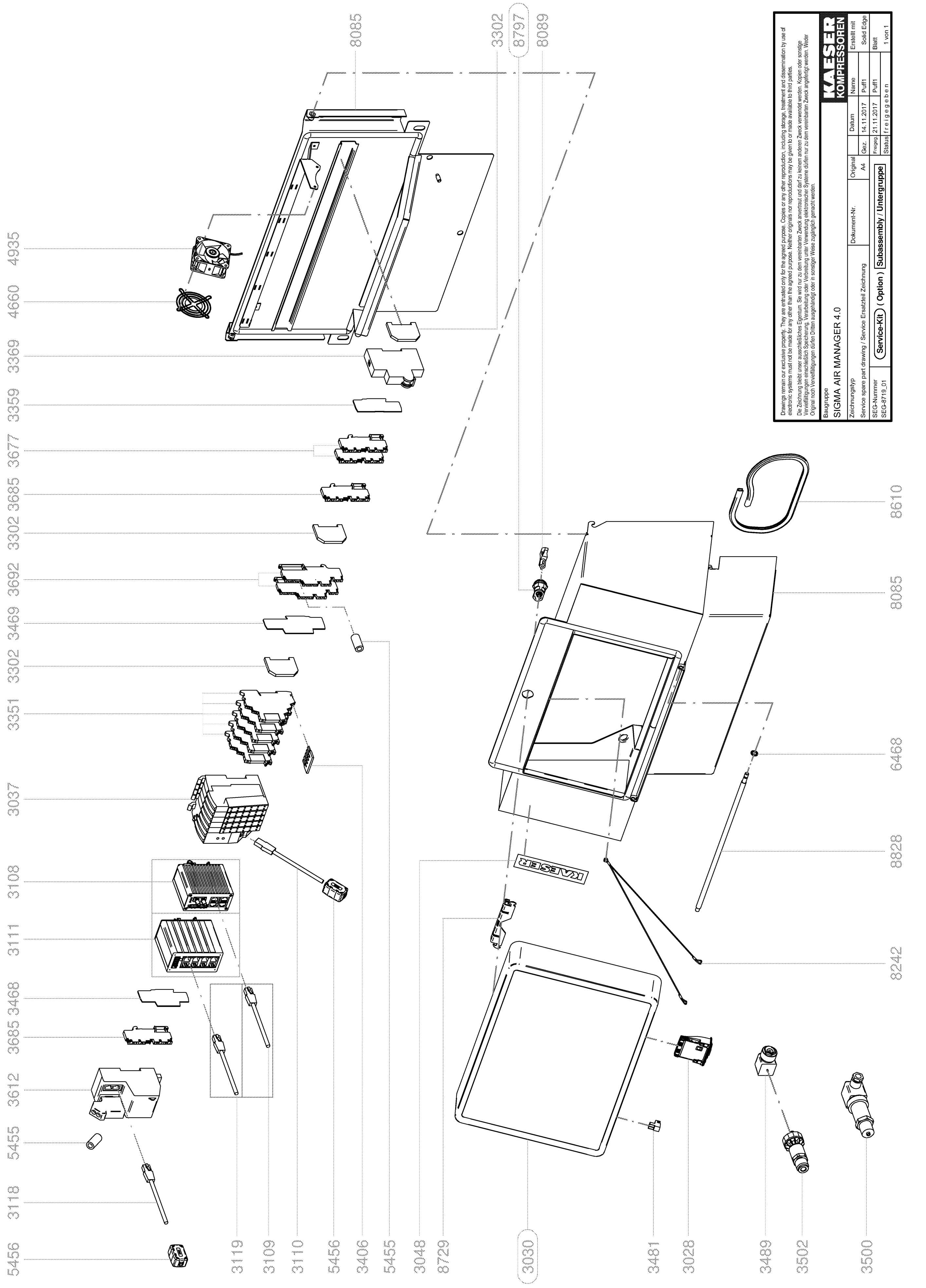
If required, you can purchase an additional buffer battery (see Chapter 10.4) from a retail store:

Designation	Voltage [V]	Capacity [Ah]	Type
Lithium buffer battery	3.0	0.19	CR2032/BR2032

Tab. 119 Replacement buffer battery

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

➢ Make sure that any inspection, service (preventive maintenance), and repair not described in this manual are carried out by an authorized KAESER service representative.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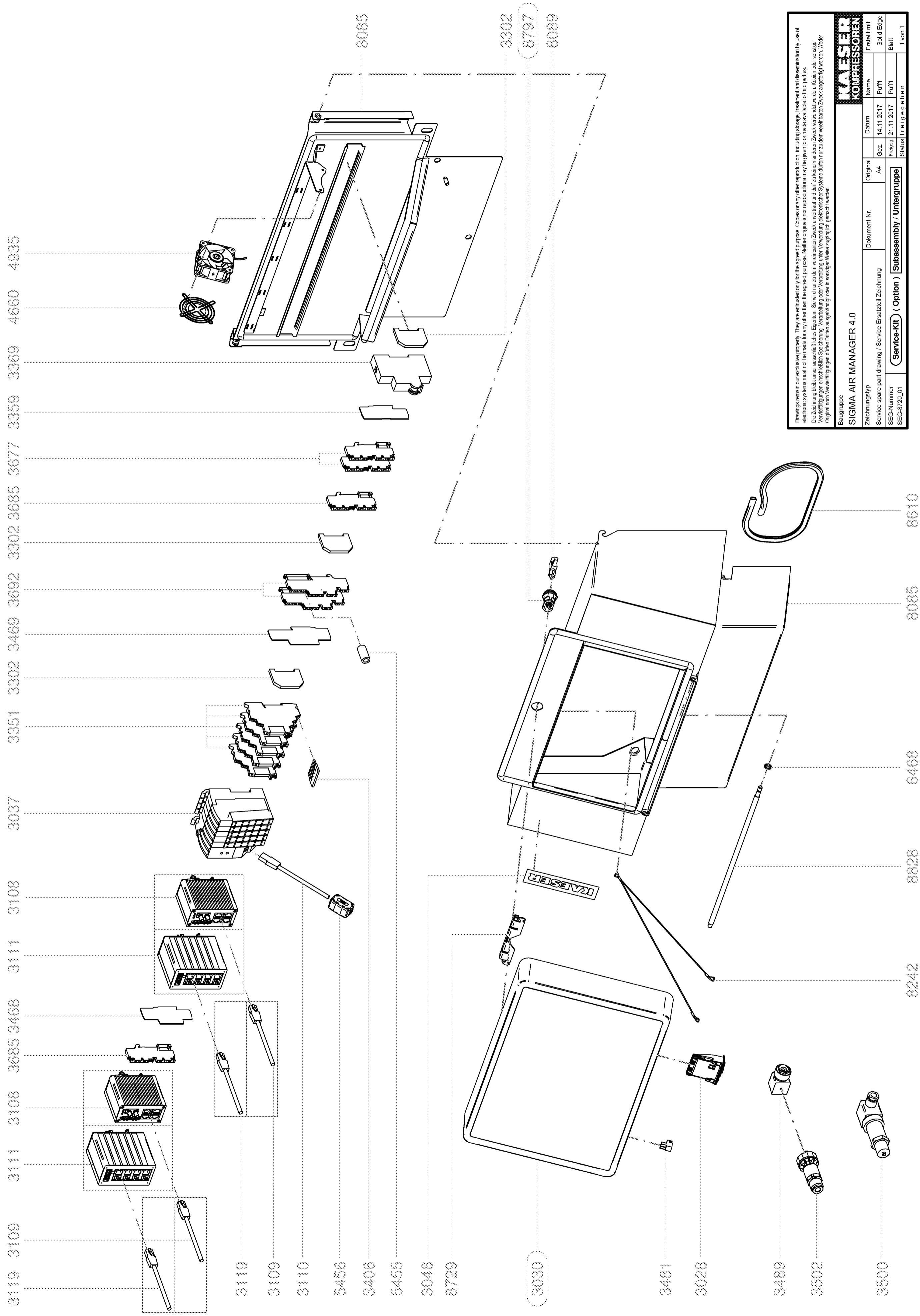
KAESER KOMPRESSOREN
SIGMA AIR MANAGER 4.0
Service-Kit (Option) Subassembly / Untergruppe

Legend		KAESER KOMPRESSOREN
	SIGMA AIR MANAGER 4.0	SEL-4277_01 E

Item	Description	Option
3028	Communication Modul	
3030	Control SAM	
3037	Input Output Module	
3048	Control label	
3108	Ethernet Switch	
3109	Ethernet Patchkabel	
3110	Ethernet Patchkabel	
3111	Ethernet Switch	
3118	Ethernet Patchkabel	
3119	Ethernet Patchkabel	
3302	End clamp	
3351	Coupling relays	
3359	End plate	
3369	Protect switch	
3406	Plug-in jumpers	
3468	End plate	
3469	End plate	
3481	Connecting plug	
3489	Right-angle plug	
3500	Pressure transducer	
3502	Pressure transducer	
3612	Converter	
3677	Duo-Bushing clamp	
3685	Ground terminal	
3692	Duo-Bushing clamp	
4660	Fan guard	
4935	Control cabinet fan	
5455	Protection sleeve	
5456	Protection sleeve	
6468	Sealing ring	
8085	Body control cabinet	
8089	Control cabinet key	
8242	Support	
8610	Edge protecting strip	
8729	Locking plate	
8797	Twist fastener	
8828	Hinge	

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

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!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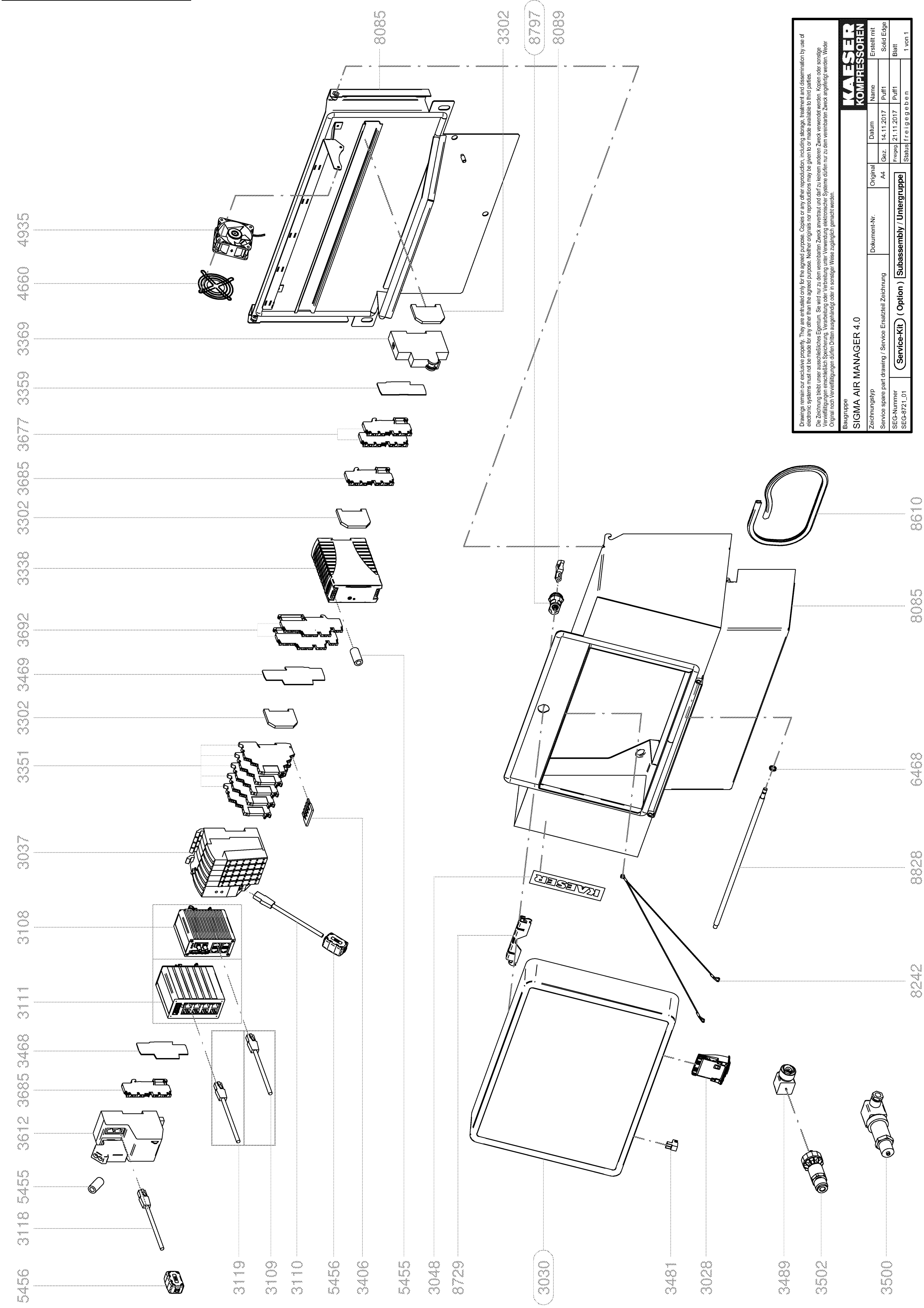
Baugruppe
SIGMA AIR MANAGER 4.0
Service spare part drawing / Service Ersatzteil Zeichnung
SEG-8720_01
Service-Kit
(Option)
Subassembly / Untergruppe
14.11.2017
21.11.2017
Solid Edge
1 von 1

Legend		KAESER KOMPRESSOREN
	SIGMA AIR MANAGER 4.0	SEL-4278_01 E

Item	Description	Option
3028	Communication Modul	
3030	Control SAM	
3037	Input Output Module	
3048	Control label	
3108	Ethernet Switch	
3109	Ethernet Patchkabel	
3110	Ethernet Patchkabel	
3111	Ethernet Switch	
3119	Ethernet Patchkabel	
3302	End clamp	
3351	Coupling relays	
3359	End plate	
3369	Protect switch	
3406	Plug-in jumpers	
3468	End plate	
3469	End plate	
3481	Connecting plug	
3489	Right-angle plug	
3500	Pressure transducer	
3502	Pressure transducer	
3677	Duo-Bushing clamp	
3685	Ground terminal	
3692	Duo-Bushing clamp	
4660	Fan guard	
4935	Control cabinet fan	
5455	Protection sleeve	
5456	Protection sleeve	
6468	Sealing ring	
8085	Body control cabinet	
8089	Control cabinet key	
8242	Support	
8610	Edge protecting strip	
8729	Locking plate	
8797	Twist fastener	
8828	Hinge	

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

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!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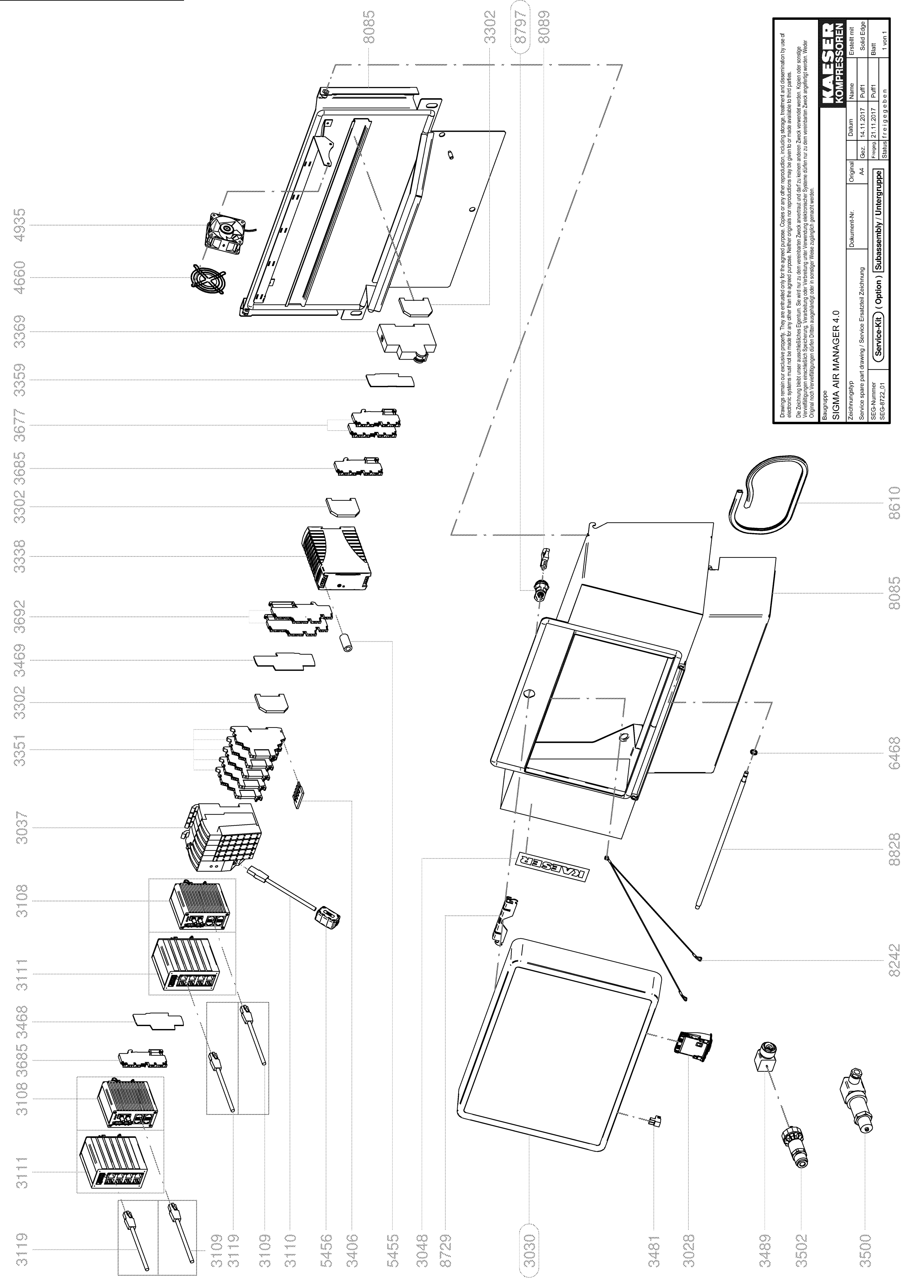
KAESER KOMPRESSOREN
SIGMA AIR MANAGER 4.0
Service spare part drawing / Service Ersatzteil Zeichnung
Service-Kit (Option) Subassembly / Untergruppe
SEG-8721_01
14.11.2017 Puff1
21.11.2017 Puff1
Solid Edge
1 von 1

Legend		KAESER KOMPRESSOREN
	SIGMA AIR MANAGER 4.0	SEL-4279_01 E

Item	Description	Option
3028	Communication Modul	
3030	Control SAM	
3037	Input Output Module	
3048	Control label	
3108	Ethernet Switch	
3109	Ethernet Patchkabel	
3110	Ethernet Patchkabel	
3111	Ethernet Switch	
3118	Ethernet Patchkabel	
3119	Ethernet Patchkabel	
3302	End clamp	
3338	Current supply	
3351	Coupling relays	
3359	End plate	
3369	Protect switch	
3406	Plug-in jumpers	
3468	End plate	
3469	End plate	
3481	Connecting plug	
3489	Right-angle plug	
3500	Pressure transducer	
3502	Pressure transducer	
3612	Converter	
3677	Duo-Bushing clamp	
3685	Ground terminal	
3692	Duo-Bushing clamp	
4660	Fan guard	
4935	Control cabinet fan	
5455	Protection sleeve	
5456	Protection sleeve	
6468	Sealing ring	
8085	Body control cabinet	
8089	Control cabinet key	
8242	Support	
8610	Edge protecting strip	
8729	Locking plate	
8797	Twist fastener	
8828	Hinge	

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

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!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3111
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8085
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3109
3110
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3406
5455
3048
8729
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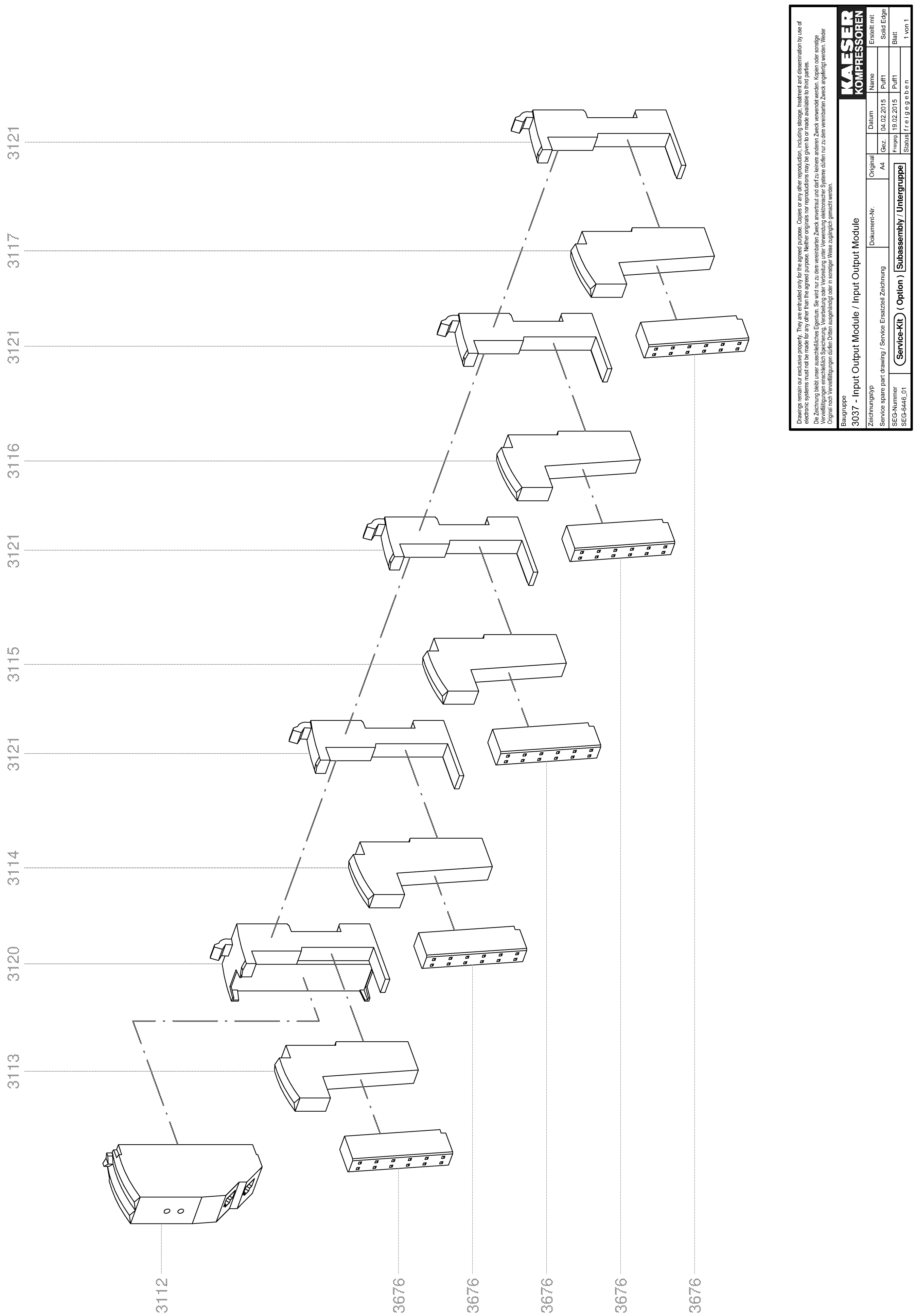
3481
3028
3489
3502
3500
KAESER KOMPRESSOREN
Baugruppe
SIGMA AIR MANAGER 4.0
Zeichnungstyp
Service spare part drawing / Service Ersatzteil Zeichnung
Dokument-Nr.
Original
A4
Datum
Name
Erstellt mit
Gez.
14.11.2017
Puff1
Solid Edge
Freigeg.
21.11.2017
Puff1
Blatt
1 von 1
SEG-Nummer
SEG-8722_01
Service-Kit
(Option)
Subassembly / Untergruppe
Status
f r e i g e g e b e n
KAESER

Legend		KAESER KOMPRESSOREN
	SIGMA AIR MANAGER 4.0	SEL-4280_01 E

Item	Description	Option
3028	Communication Modul	
3030	Control SAM	
3037	Input Output Module	
3048	Control label	
3108	Ethernet Switch	
3109	Ethernet Patchkabel	
3110	Ethernet Patchkabel	
3111	Ethernet Switch	
3119	Ethernet Patchkabel	
3302	End clamp	
3338	Current supply	
3351	Coupling relays	
3359	End plate	
3369	Protect switch	
3406	Plug-in jumpers	
3468	End plate	
3469	End plate	
3481	Connecting plug	
3489	Right-angle plug	
3500	Pressure transducer	
3502	Pressure transducer	
3677	Duo-Bushing clamp	
3685	Ground terminal	
3692	Duo-Bushing clamp	
4660	Fan guard	
4935	Control cabinet fan	
5455	Protection sleeve	
5456	Protection sleeve	
6468	Sealing ring	
8085	Body control cabinet	
8089	Control cabinet key	
8242	Support	
8610	Edge protecting strip	
8729	Locking plate	
8797	Twist fastener	
8828	Hinge	

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

Before and during all work, be sure to read and follow the safety and service instructions in the machine's service manual!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Die Zeichnung bleibt unser ausschließliches Eigentum. Sie wird nur zu dem vereinbarten Zweck anvertraut und darf zu keinem anderen Zweck verwendet werden. Kopien oder sonstige Vervielfältigungen einschließlich Speicherung, Verarbeitung oder Verbreitung unter Verwendung elektronischer Systeme dürfen nur zu dem vereinbarten Zweck angefertigt werden. Weder Original noch Vervielfältigungen dürfen Dritten ausgehändigt oder in sonstiger Weise zugänglich gemacht werden.
Baugruppe
3037 - Input Output Module / Input Output Module
Zeichnungstyp
Service spare part drawing / Service Ersatzteil Zeichnung
Dokument-Nr.
Original
A4
Datum
Name
Erstellt mit
Gez. 04.02.2015 Puff1
Solid Edge
Freigeg. 19.02.2015 Puff1
Blatt
1 von 1
Status f r e i g e g e b e n
SEG-Nummer
SEG-6446_01
Service-Kit (Option) Subassembly / Untergruppe
3121
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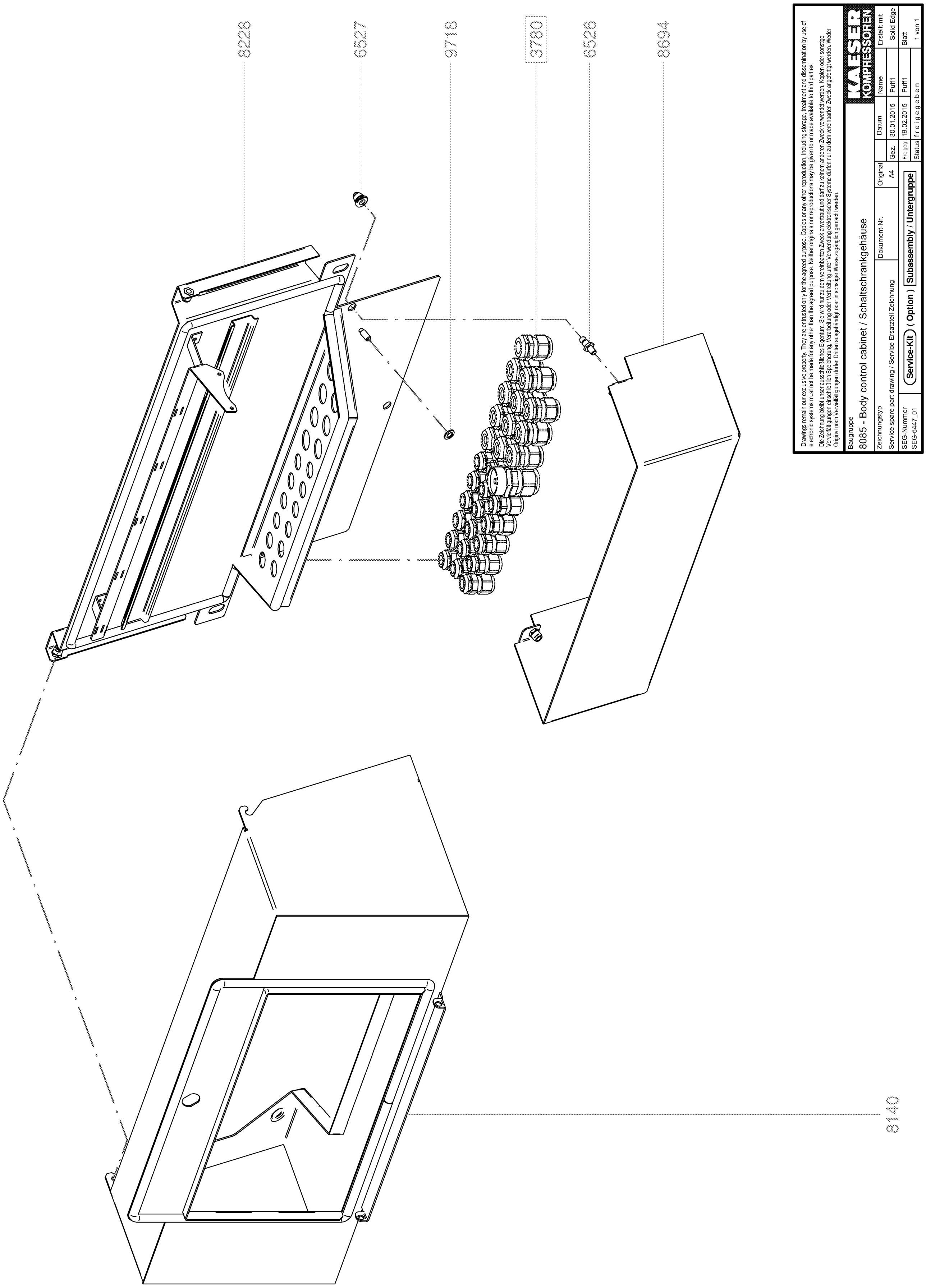
3115
3121
3114
3120
3113
3112
3676
3676
3676
3676
3676

Legend		KAESER KOMPRESSOREN
3037	Input Output Module	SEL-4085_01 E

Item	Description	Option
3112	Bus controller	
3113	Supply module	
3114	Input module DI	
3115	Input module DO	
3116	Input module AI	
3117	Potential distribution	
3120	Lower part bus controller	
3121	Lower part IO-module	
3676	Terminal box	

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

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


8228
6527
9718
3780
6526
8694
8140
8085 - Body control cabinet / Schaltschrankgehäuse
Service spare part drawing / Service Ersatzteil Zeichnung
Service-Kit (Option) Subassembly / Untergruppe
SEG-6447_01
30.01.2015
19.02.2015
Solid Edge
1 von 1

Legend		KAESER KOMPRESSOREN
8085	**Body control cabinet**	SEL-4086_01 E

Item	Description	Option
3780	Electro-consumables	
6526	Plug-in connection plug	
6527	Plug-in connection ball	
8140	Enclosure	
8228	Rear cover	
8694	Cover, lower	
9718	Contact washer	

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

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

11.3 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

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

11.4 Displaying the software version

You can display the software version used in SIGMA AIR MANAGER 4.0 (see Chapter 7.11).

➢ Press the Configuration – SAM 4.0 terminal key.
Select the *Serial data* menu.
Section *Software* displays the software version and date.

12 Decommissioning, Storage and Transport

12.1 De-commissioning

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

- SIGMA AIR MANAGER 4.0 is temporarily not needed.
- SIGMA AIR MANAGER 4.0 is to be moved to another location.

1. Isolate SIGMA AIR MANAGER 4.0 (power supply disconnecting device) from all power phases .
2. Switch off external power sources.
3. Disconnect SIGMA AIR MANAGER 4.0 from all connections when the device is to be moved to another location.

12.2 Disposal

Material T9 Torx screwdriver

Precondition SIGMA AIR MANAGER 4.0 is de-commissioned.

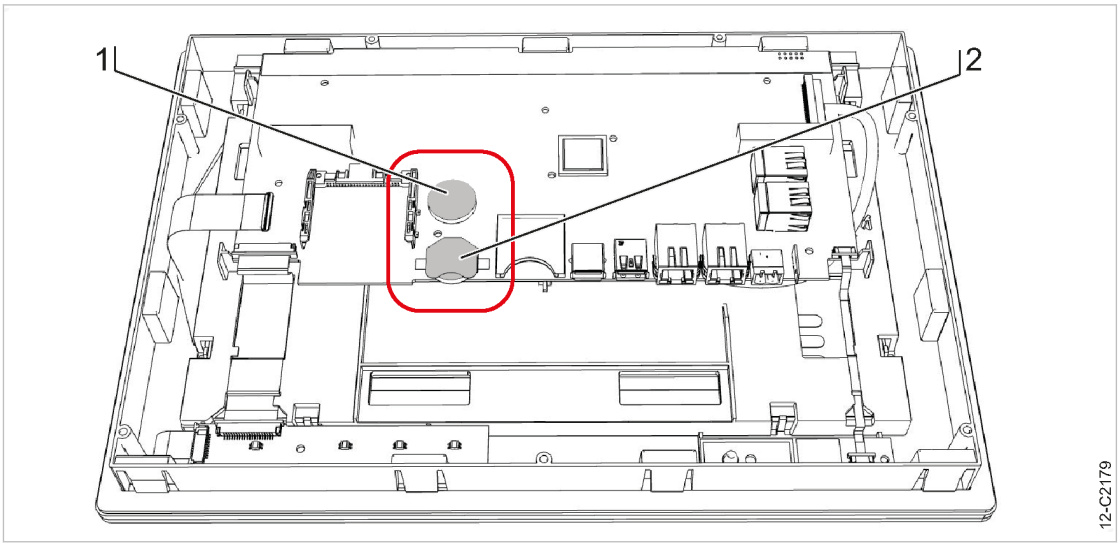


Fig. 144 Buffer battery positions

[1] Permanently installed buffer battery
[2] Additional buffer battery

1. Disconnect SIGMA AIR MANAGER 4.0 from all connections.
2. Open the control cabinet of the SIGMA AIR MANAGER 4.0 cover (see chapter 6.6).
3. Detach all connections from the SIGMA AIR MANAGER 4.0 terminal.
4. Use a suitable tool to force the removal of incommoding cover parts.
5. Use a Torx screwdriver to remove the T9 screws at the rear housing panel of the SIGMA AIR MANAGER 4.0 terminal.
6. Remove the housing panel.
7. Use a suitable tool to remove the permanently installed and any additional buffer battery.

8. Dispose of buffer batteries in a responsible manner (see chapter "Environmentally-friendly battery disposal").
9. Deliver the SIGMA AIR MANAGER 4.0 to an authorized disposal expert.

12.2.1 Battery disposal

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

Fig. 145 Battery disposal

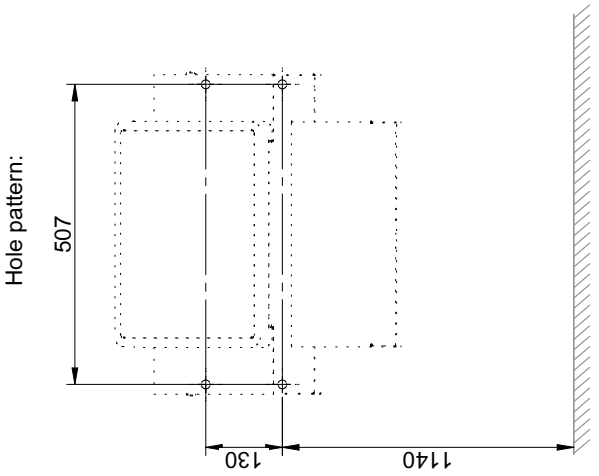
[1] Do not dispose of batteries with residential waste
[2] Battery contains lead (if applicable)

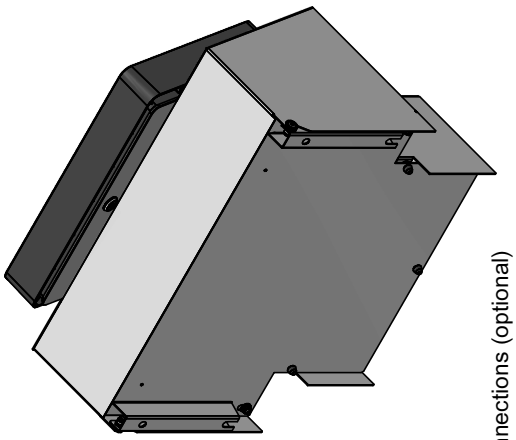
➢ Dispose of batteries in accordance with local environmental regulations.

13 Annex

13.1 Dimensional drawing

See Chapter 6.6 for instructions about the attachment of the control cabinet.



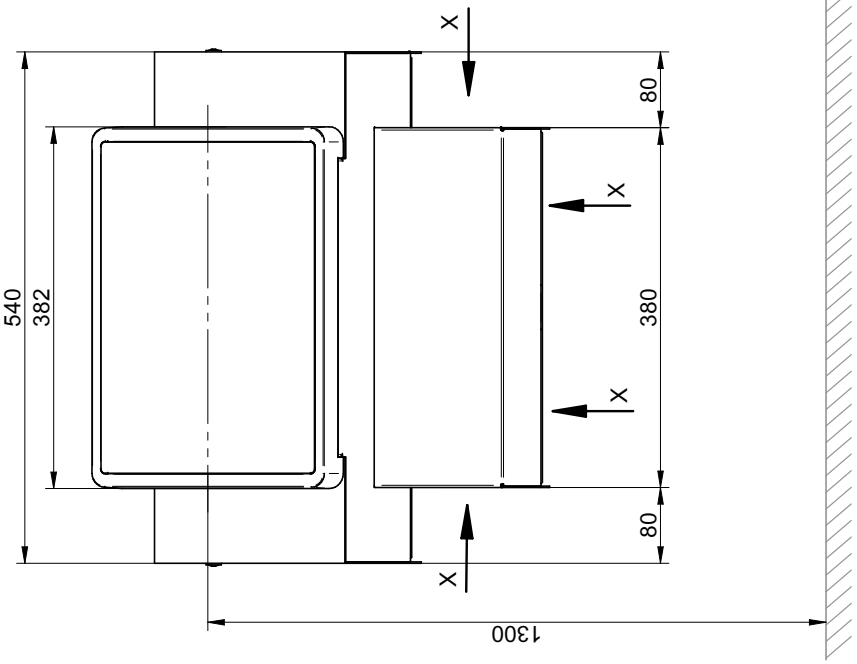


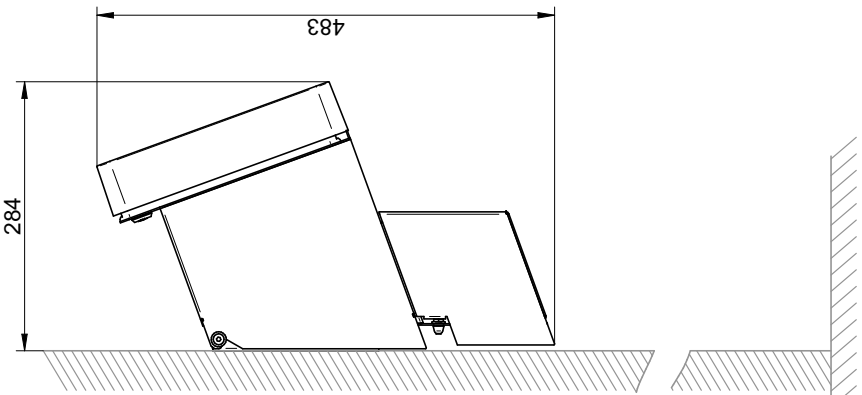
X = Electrical connections (optional)

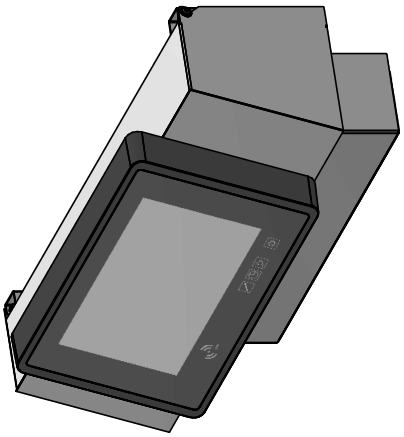
Change number	Projection	Scale 1 : 5		Date	Name
			Drawn	16.01.2015	MARKOVIC
Document TZM 10291143 USE 00		Original A3	Edited	19.01.2015	MARKOVIC
			Released	19.01.2015	SCHUBT4
Document TZD 10291143 D 00		Designation SAM2.1			
Status Released		Dimension and connection dim.			

KAESER KOMPRESSOREN — Language USE — Sheet 1 / 1

Stand 05.12.2014







13.2 Equipment and options

Enter the current technical equipment, built-in options, retrofits and other technical modifications for this device in the below table.

Designation	This device	Remark
Type	□ SAM 4.0-4 □ SAM 4.0-8 □ SAM 4.0-16	
Options		
E1:PROFIBUS master	□	
E9: Network Section Control	□	
E10: Ports RJ45: SIGMA NETWORK	□	
E12: Ports RJ45/FOC: SIGMA NETWORK	□	
E19: Single-mode FOC	□	
C41:PROFIBUS DP	□	
C42: Modbus RTU	□	
C44: Modbus TCP	□	
C45: PROFINET IO	□	
C50: EtherNet/IP	□	
Retrofits		

Tab. 120 Equipment and options

13.3 SIGMA AIR MANAGER 4.0 setting values

After commissioning and changes to the configuration or settings, please document the following information:

- Name of the "Engineering Base" configuration file
- Any setting modifications at the SIGMA AIR MANAGER 4.0 terminal

➢ Enter the information in the prepared lists.

Result The documentation of configuration and settings simplify the task of external Service Technicians in particular, when providing service on your equipment.

13.3.1 Notes

Notes			

Notes			

Tab. 121 Notes for changes/settings

13.3.2 Software versions

See Chapter 10.3 for instructions about software updating.
See Chapter 11.4 for displaying the software version.

Software version	Date and time	Name [1]	Notes

[1] Person having carried out the software update.

Tab. 122 Software versions

13.3.3 "Engineering Base" configuration

See Chapter 7.5 for instructions about the "Engineering Base" configuration.

"Engineering Base" configuration file	Date and time	Name [1]	Remark

[1] Person performing the "Engineering Base" configuration.

Tab. 123 "Engineering Base" configuration

13.3.4 Time and date

See Chapter 7.6 for instructions about setting the date and time.

Date	Time	Time zone [1]	Automatic updating of times?	Time server address	Name

[1] Default setting: *United States*

Tab. 124 Time and date

13.3.5 Settings for the X7 Ethernet interface

X7 Ethernet 1 Gb	Setting	Name
Active		
DHCP		
IP address		
Net mask		
Gateway		
Name server		

Tab. 125 Settings for the X7 Ethernet interface

13.3.6 Pressure regulation settings

13.3.6.1 Pressure parameters

See instructions in chapter 7.16

Date/time						
Name	Unit	Factory setting				
Required pressure	[psig]	100				
Pressure low pt	[psig]	0.00				
Pressure low dpt	[psig]	4				
Pressure low tpt	[s]	10				
Pressure low dpt active		–				

Tab. 126 Pressure parameters

13.3.6.2 System parameters

See instructions in chapter 7.16

Date/time					
Name	Unit	Factory setting			
Restart					
Automatic restart		+			
Delay period for restart	[s]	60			
Minimum pressure with air system OFF		Active –			
Further settings					
Monitoring period for motor running	[s]	60			
Power limiting	[hp]	670			
Power limiting active		–			
+ ≙ Yes, – ≙ No					

Date/time					
Name	Unit	Factory setting			
Back pressure	[psig]	0.00			
+ ≙ Yes, – ≙ No					

Tab. 127 System parameters

13.3.7 Operating hours and maintenance intervals

Date/time							
Name		Factory setting					
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					
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					

Date/time							
Name		Factory setting					
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					
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					

Date/time							
Name		Factory setting					
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)	–					
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)	–					

Date/time							
Name		Factory setting					
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					
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. 128 Operating hours and maintenance intervals

13.4 Machine settings

13.4.1 Setting the pressure regulation (pressure controller in series with the SIGMA AIR MANAGER 4.0 load output)

See instructions in chapter 6.13.3

Recommended settings for machines with an "external load control" actuating input [psig]

The reference point is the maximum working pressure

➢ Adjust the setting values for the pressure regulation (pressure switch (-B1) or system pressure) as follows:

Machine number	ON pressure		OFF pressure	
Maximum working pressure 14.5 psig to 36 psig:				
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 36 psig to 87 psig:				
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 87 psig to 232 psig:				
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 232 psig to 464 psig:				
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. 129 Recommended settings: Pressure controller in series with SIGMA AIR MANAGER 4.0 "external load control" load output

Recommended settings for machines with the "Man/Auto"/ "Load/Idle" operating mode" control input [psig]

The reference point is the maximum working pressure

➢ Adjust the setting values for the pressure regulation (pressure switch (-B1) or system pressure) as follows:

Machine number	ON pressure		OFF pressure	
Maximum working pressure 14.5 psig to 36 psig:				
all	ON	– 0.10	OFF	+ 0.05
Maximum working pressure 36 psig to 87 psig:				
all	ON	– 0.2	OFF	+ 0.2
Maximum working pressure 87 psig to 232 psig:				
all	ON	– 0.4	OFF	+ 0.3
Maximum working pressure 232 psig to 464 psig:				
all	ON	– 4.0	OFF	+ 1.0

Tab. 130 Recommended settings: Pressure controller in series with the SIGMA AIR MANAGER 4.0 "Man/Auto and Load/Idle" load output

Personal settings

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

Tab. 131 Personal settings: Pressure controller in series with SIGMA AIR MANAGER 4.0 load output

13.4.2 Pressure range for manual operation

To avoid simultaneous cut-in of machines in manual mode, you must set the system pressure p2 and/or system pressure switch –B1.1.

Suggested setting [psig]:

Machine number	ON pressure		OFF pressure	
Maximum working pressure 14.5 psig:				
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 108.8 psig:				
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 145 psig:				
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 188.5 psig:				
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 362.6 psig:				
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 464.1 psig:				
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. 132 Recommended settings: Pressure range for manual operation

Personal settings

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

Tab. 133 Personal settings: Pressure range for manual operation

13.4.3 System offset for manual mode

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

Date and 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						

Date and time						
Name						
Time delay	tv [s]	tv [s]	tv [s]	tv [s]	tv [s]	tv [s]
Machine 9						
Machine 10						
Machine 11						
Machine 12						
Machine 13						
Machine 14						
Machine 15						
Machine 16						

Tab. 134 Personal settings: System offset (manual operation)

13.5 Installation accessories

Communication modules

Description	Material number	Remarks
PROFINET IO retrofit kit	7.5250.01920	Communication module with accessories for installation by user. Can be retrofitted.
PROFIBUS DP-V0 Retrofit Kit	7.5250.01880	
Modbus TCP retrofit kit	7.5250.01950	
EtherNet/IP retrofit	7.5250.02090	

Tab. 135 Communication modules

SIGMA NETWORK

Description	Material number	Remarks
Line SIGMA NETWORK	7.9679.0	CAT5 2x2x0.64 gr, for indoor installation, PVC coating, grey, ∅ 0.3 in., by the yard
Stripping tool	8.8294.0	Ethernet cable stripping tool
RJ45 bus connector	7.7628.1	RJ45 plug, 4 insulation displacement/clamping contacts, tool-free installation (fast connect)
LAN RJ45 retrofit kit	7.5250.01870	RJ45 bus connector, screw fittings, accessories

Description	Material number	Remarks
Fiber optic cable with plugs and insertion tool		Fiber optic cable Duplex ST/ST, multi-mode G50/125OM2, insertion tool on both sides; assembled cable, yard ware up to 3280 yd
	7.9677.0	Indoor installation
	7.9677.00010	Outdoor installation

Tab. 136 SIGMA NETWORK installation accessories

Pressure transducer

Description	Material number		Pressure range
	With plug	Without plug	
For Type I	7.4599.0	—	0–14.5 psig
For Type II	7.3397.1	—	0–87 psig
	7.2816.3	—	0–145 psig
	7.6689.0	—	0–464 psig
	7.4773.0	—	0–652 psig
For Type III	7.7040E3	7.7040.3	0–232 psig
	7.7044E1	7.7044.1	0–362 psig
	—	7.7042.1	0–464 psig
For vacuum	7.7046.0	7.7041.2	0–750 “Hg (absolute)

Tab. 137 Pressure transducer

Pressure transducer accessories

Description	Material number	Remarks
Angle plug Form A	7.1344.0	For pressure transducer
Fitting set straight, elbow, G 1/4, G1/2 with shut-off valve and accessories up to 232 psig	8.0484.10050	For air receiver connection
Fitting set straight, elbow, G 1/4, G1/2 with shut-off valve and accessories up to 653 psig	8.0484.00090	For air receiver connection
Fitting set G 1/4, G1/2 with shut-off valve and accessories up to 218 psig	204465.0	1–liter air receiver for connection to pipework
Connecting cable for pressure transducer	7.2679.0	Screened, 2 x 18 AWG, for indoor installation, PVC sheath, grey, 0.24 in. diameter

Tab. 138 Pressure transducer accessories

PROFIBUS installation parts and cable

Description	Material number	Remarks
Connecting cable for PROFIBUS	7.4666.0	Screened, 1x2x0.64/2.55, for indoor installation, PVC sheath. violet, 0.3 in. diameter
PROFIBUS connector plug for SIGMA AIR MANAGER	7.4664.20010	35° cable outlet
PROFIBUS plug set for SIGMA CONTROL	7.5250.00300	For PG and M cable glands including EMC glands
PROFIBUS DP communication module set for SIGMA CONTROL 2	7.5250.01880	Module, bus connector, fittings

Tab. 139 PROFIBUS installation accessories

Modules for load-idle control

Description	Pressure	Part number	Remarks
Module for external load/idle control (7.7005.1 or 7.7005.2)	115 psig 160 psig 217 psig	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	115 psig	7.7706.00033	Like 7.7006.00003 but for machines with variable frequency drive (SFC)
Module for external load/idle control (7.7005.3)	115 psig 160 psig 217 psig	7.7056.00002 7.7056.00012 7.7056.00022	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	115 psig	7.7056.00035	Like 7.7056.00002 but for machines with frequency converter (SFC)

Tab. 140 Load/idle modules

RC suppressor

Description	Material number	Remarks
RC 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 retention capacity: 15 VA

Tab. 141 RC suppressor

13.6 Exchanging the battery

Exchanging the battery				
Date/time				

Exchanging the battery				
Name				

Tab. 142 Changing the battery

13.7 Electrical Diagram

Wiring Diagram

SIGMA AIR MANAGEMENT SYSTEM

SIGMA AIR MANAGER 4.0

manufacturer: KAESER COMPRESSORS
96450 COBURG
GERMANY

c				Date	08.03.2021 USE	KAESER KOMPRESSOREN	cover page	=	
b				Drawn	Sitter		SIGMA AIR MANAGER 4.0	+	
a				Released	Oberender				
A	Change	Date	Name				DWASAM2-U3000.05	page 1	1 Sht.

Lfd. Nr. No.	Benennung Name		Zeichnungsnummer (Kunde) Drawing No. (customer)	Zeichnungsnummer (Hersteller) Drawing No. (manufacturer)	Blatt Page	Anlagenkennzeichen Unit designation
1	cover page			DWASAM2-U3000.05	1	
2	list of contents			ZWASAM2-U3000.05	1	
3	general instructions / electrical equipment identification			UWASAM2-U3000.05	1	
4	electrical component parts list			UWASAM2-U3000.05	2	
5	block diagram	SIGMA NETWORK		UWASAM2-U3000.05	3	
6	block diagram	PROFIBUS DP		UWASAM2-U3000.05	4	
7	block diagram	Conventionally controlled maschines		UWASAM2-U3000.05	5	
8	interconnection diagram			UWASAM2-U3000.05	6	
9	wiring diagram	power supply		SWASAM2-U3000.05	1	
10	wiring diagram	power supply / Bus Controller		SWASAM2-U3000.05	2	
11	wiring diagram	digital inputs		SWASAM2-U3000.05	3	
12	wiring diagram	digital outputs		SWASAM2-U3000.05	4	
13	wiring diagram	analog inputs		SWASAM2-U3000.05	5	
14	wiring diagram	Potential distributor		SWASAM2-U3000.05	6	
15	wiring diagram	control		SWASAM2-U3000.05	7	
16	wiring diagram	1.Switch / option E10		SWASAM2-U3000.05	8	
17	wiring diagram	1.Switch / option E12 without E10		SWASAM2-U3000.05	9	
18	wiring diagram	2.switch / option E10 without E12		SWASAM2-U3000.05	10	
19	wiring diagram	2.switch / option E12		SWASAM2-U3000.05	11	
20	wiring diagram	converter / option E1		SWASAM2-U3000.05	12	
21	wiring diagram	volt-free contacts		SWASAM2-U3000.05	13	
22	wiring diagram	connection variants		SWASAM2-U3000.05	14	
23	wiring diagram	connection variants		SWASAM2-U3000.05	15	
24	wiring diagram	connection variants		SWASAM2-U3000.05	16	
25	wiring diagram	Handling terminals		SWASAM2-U3000.05	17	
26	lay-out	mains voltage 100-240V 60Hz		AWASAM2-U3000.05	1	
27	lay-out	mains voltage 24V DC		AWASAM2-U3000.05	2	

c				Date	08.03.2021	KAESER KOMPRESSOREN	list of contents	=	
b				Drawn	Sitter		SIGMA AIR MANAGER 4.0	+	
a				Released	Oberender			ZWASAM2-U3000.05	page 1
B	Change	Date	Name						1 Sht.

1	2	3	4	5	6	7	8

general instructions

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

control cabinet wiring for non-designated conductors
with multi-standard stranded conductors

primary circuits ungrounded:	black
control voltage DC ungrounded:	blue 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
primary circuits grounded:	grey
control voltage DC grounded:	white/blue 1mm² H05V-K, 18AWG UL-Style 1015, CSA-TEW
ground conductor:	green/yellow H07V-K, UL-Style 1015, CSA-TEW

option E1 = PROFIBUS Master
option E10 = Ports RJ45: SIGMA NETWORK
option E12 = Ports RJ45/ FOC: SIGMA NETWORK
option E19 = Single mode FOC

option C41 = communication module PROFIBUS DP
option C42 = communication module Modbus RTU
option C44 = communication module Modbus TCP
option C45 = communication module PROFINET IO
option C50 = communication module EtherNet/IP

-A1	SIGMA AIR MANAGER 4.0
-A1-X1	communication module
-F1	disconnect switch power supply
-K1	I/O-Module Bus Controller
-K1-X0	I/O-Module power supply
-K1-X1	I/O-Module digital inputs
-K1-X2	I/O-Module digital outputs
-K1-X3	I/O-Module analog inputs 20mA
-K1-X4	I/O-Module Potential distributor
-K10,-K11	Ethernet Switch
-K21...-K25	coupling relay
-M1	controller ventilator
-T1	power unit
-T10	protocol converter SIGMA NETWORK - PROFIBUS DP
-W80...-W83	cables SIGMA NETWORK
-X1	terminal strip power supply
-X10	terminal strip control 24VDC

c				Date	08.03.2021	KAESER KOMPRESSOREN	general instructions / electrical equipment identification	=	
b				Drawn	Sitter		SIGMA AIR MANAGER 4.0	+	
a				Released	Oberender			UWASAM2-U3000.05	page 1
C	Change	Date	Name						6 Sht.

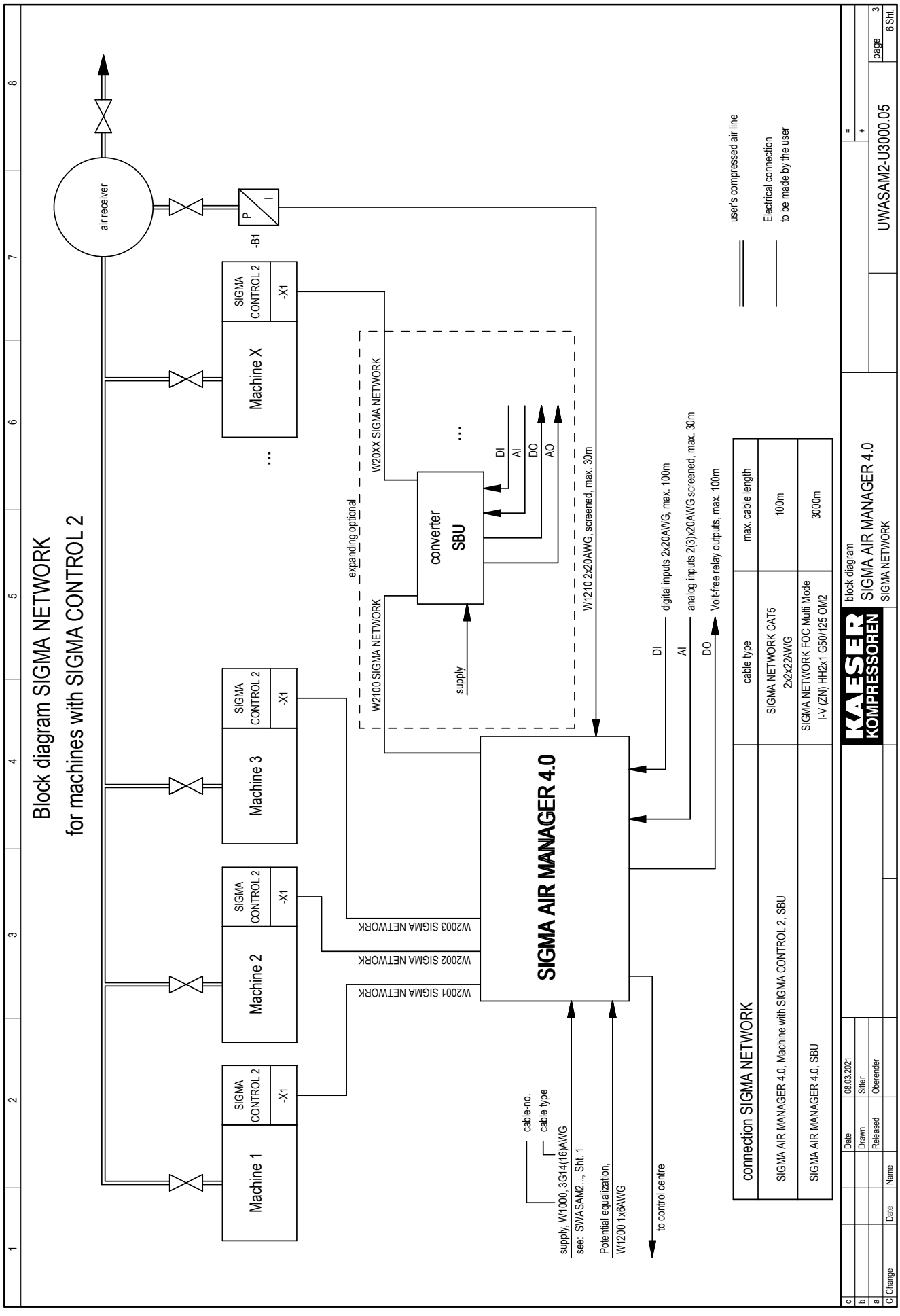
model

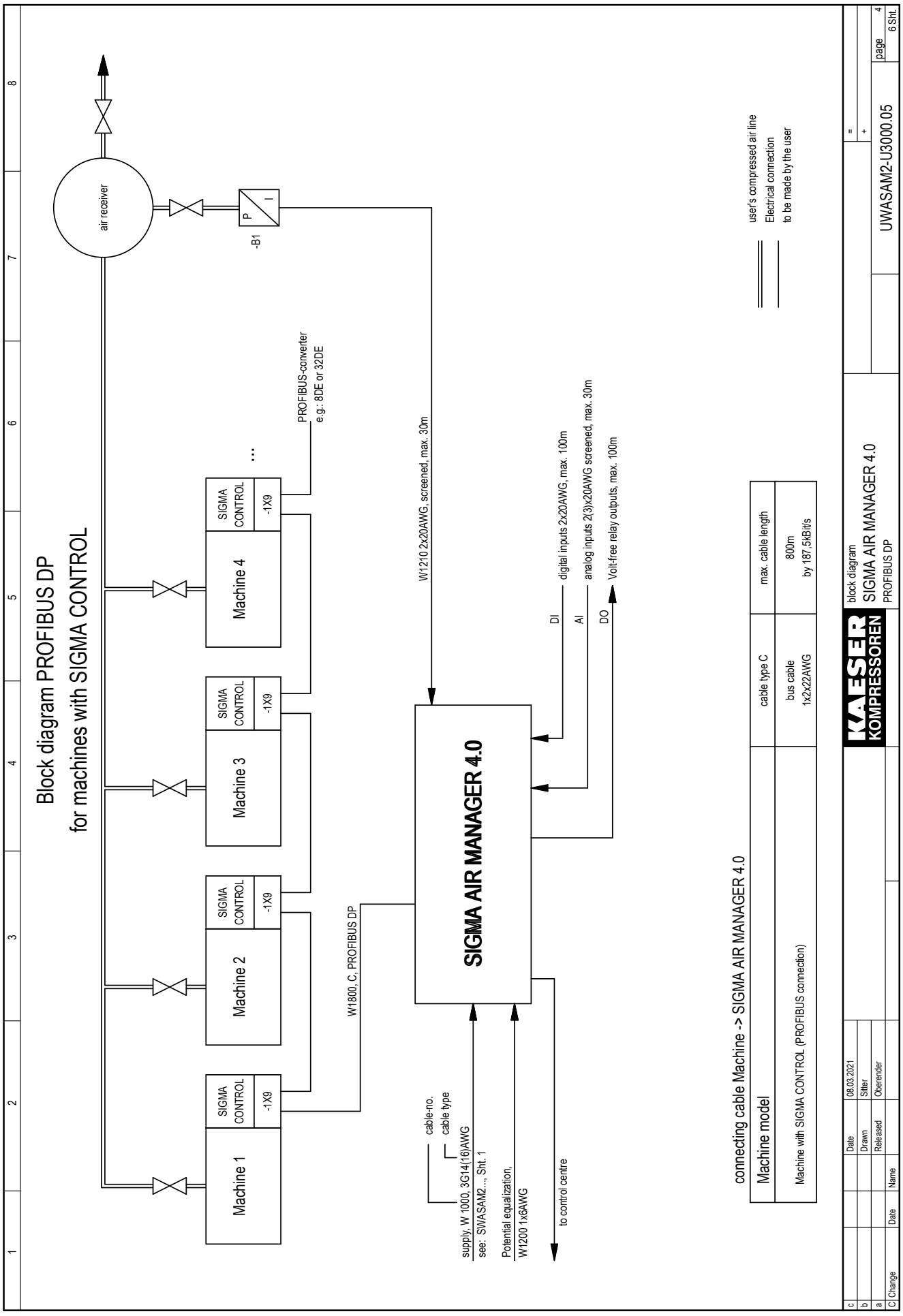
electrical component parts list
SIGMA AIR MANAGER 4.0

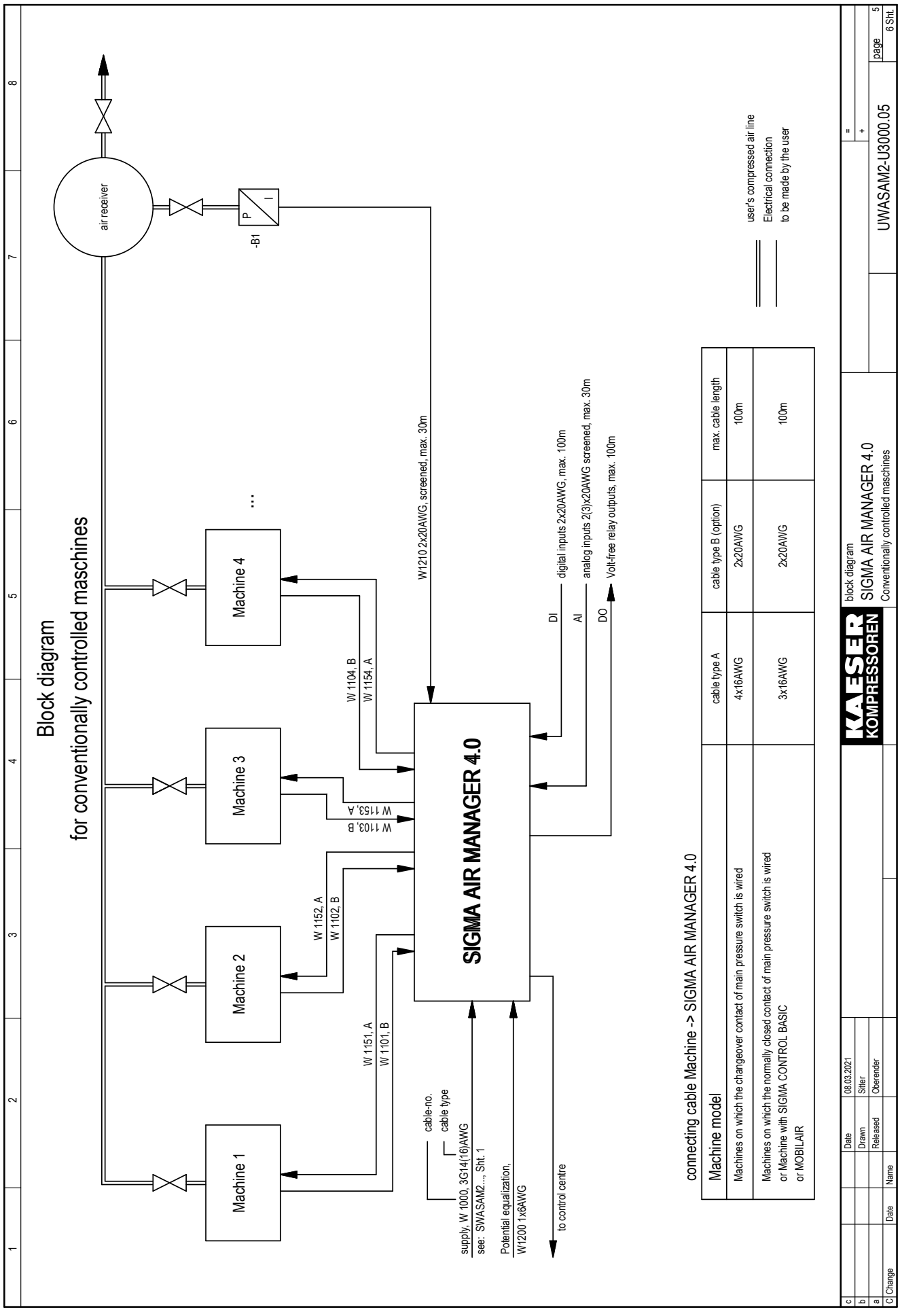
machine power supply		**100-240 V ±10 %, 60 Hz**	**24 V ±10 %, DC**		
supply terminals	**-X1:U1/N/L+ /L-**	---	2x 7.3149.02600		
	Wieland		WKFN 4 D2/2/35		
	-X1:GRD	2x 7.3149.01850	2x 7.3149.01850		
	Wieland	WKFN 4 D2/2/SL/35	WKFN 4 D2/2/SL/35		
	Stripped length	11 mm	11 mm		
	Handling	fig. 2, Sht. 17	fig. 2, Sht. 17		
terminals	**-X10**	2x 7.3149.02620	2x 7.3149.02620		
	Wieland	WKFN 2.5 E1/2/VB/35	WKFN 2.5 E1/2/VB/35		
	Handling	fig. 1, Sht. 17	fig. 1, Sht. 17		
sequencer	**-A1**	7.9696P2	7.9696P2		
	Prodrive	SIGMA AIR MANAGER 4.0	SIGMA AIR MANAGER 4.0		
communication module	**-A1-X1**	7.7606.00060	7.7606.00060		
PROFINET IO (option C45)	**HMS**	AB6506-B	AB6506-B		
communication module	**-A1-X1**	7.7606.00050	7.7606.00050		
Modbus TCP (option C44)	**HMS**	AB6455-B	AB6455-B		
communication module	**-A1-X1**	7.7606.00040	7.7606.00040		
PROFIBUS DP (option C41)	**HMS**	AB6426-B	AB6426-B		
communication module	**-A1-X1**	7.7606.00010	7.7606.00010		
Modbus RTU (option C42)	**HMS**	AB6429-B	AB6429-B		
communication module	**-A1-X1**	7.7606.00070	7.7606.00070		
Ethernet/IP (option C50)	**HMS**	AB6946-C	AB6946-C		
I/O-Module	**-K1**	7.9631.0	7.9631.0		
Bus Controller	**B&R**	X20BC0087-C01	X20BC0087-C01		
I/O-Module	**-K1-X0**	7.9631.00010	7.9631.00010		
power supply	**B&R**	X20PS9400	X20PS9400		
I/O-Module	**-K1-X1**	7.9631.00020	7.9631.00020		
6DI	**B&R**	X20DI6371	X20DI6371		
I/O-Module	**-K1-X2**	7.9631.00030	7.9631.00030		
6DOT	**B&R**	X20DO6322	X20DO6322		
I/O-Module	**-K1-X3**	7.9631.00041	7.9631.00041		
4 AII	**B&R**	X20AI4632-1	X20AI4632-1		
I/O-Module	**-K1-X4**	7.9631.00090	7.9631.00090		
Potential distributor	**B&R**	X20PD2113	X20PD2113		
I/O-Module	**-K1**	7.9630.0	7.9630.0		
lower part	**B&R**	X20BB80	X20BB80		
I/O-Module	**-K1-X1.-X4**	7.9630.00010	7.9630.00010		
lower part	**B&R**	X20BM11	X20BM11		
I/O-Module	**-K1-X0.-X4**	7.9632.0	7.9632.0		
terminal block	**B&R**	X20TB12	X20TB12		
Switch RJ45	**-K10, -K11**	7.9662.0	7.9662.0		
option E10	**Wieland**	WIENET UMS 8	WIENET UMS 8		
Switch RJ45 / FOC	**-K10, -K11**	7.9663.0	7.9663.0		
option E12 without E19	**Wieland**	WIENET UMS 4-1FM	WIENET UMS 4-1FM		
Switch RJ45 / FOC	**-K10, -K11**	7.9663.00010	7.9663.00010		
option E19	**Wieland**	WIENET UMS 4-1FS	WIENET UMS 4-1FS		
protocol converter	**-T10**	7.9661.1	7.9661.1		
option E1	**Hilscher**	NT100-RE-DP/KAES	NT100-RE-DP/KAES		
cables	**-W80.-W83**	7.7818.1	7.7818.1		
	Weidmüller	LSZH grey 0.5m	LSZH grey 0.5m		
disconnect switch	**-F1**	7.3140.05110	7.3140.05110		
	Siemens	5SJ4203-8HG41	5SJ4203-8HG41		
power supply	**-T1**	7.9665.1	---		
	Wieland	WIPOS P1 24-2.5			
coupling relay	**-K21.-K25**	7.3172.00310	7.3172.00310		
	Phoenix	RIF-0-RPT-24DC/21	RIF-0-RPT-24DC/21		
	Handling	fig. 3, Sht. 17	fig. 3, Sht. 17		
controller ventilator	**-M1**	7.9660.0	7.9660.0		
	Rübsamen&Herr	614NGML-283	614NGML-283		
Fan safety guard	**-M1**	7.9660.00010	7.9660.00010		
	Rübsamen&Herr	BG80	BG80		
ferrit bead		7.4890.00070	7.4890.00070		
hinged	**Würth**	74271112	74271112		
ferrit bead		7.4890.00020	7.4890.00020		
closed	**Würth**	74270081	74270081		

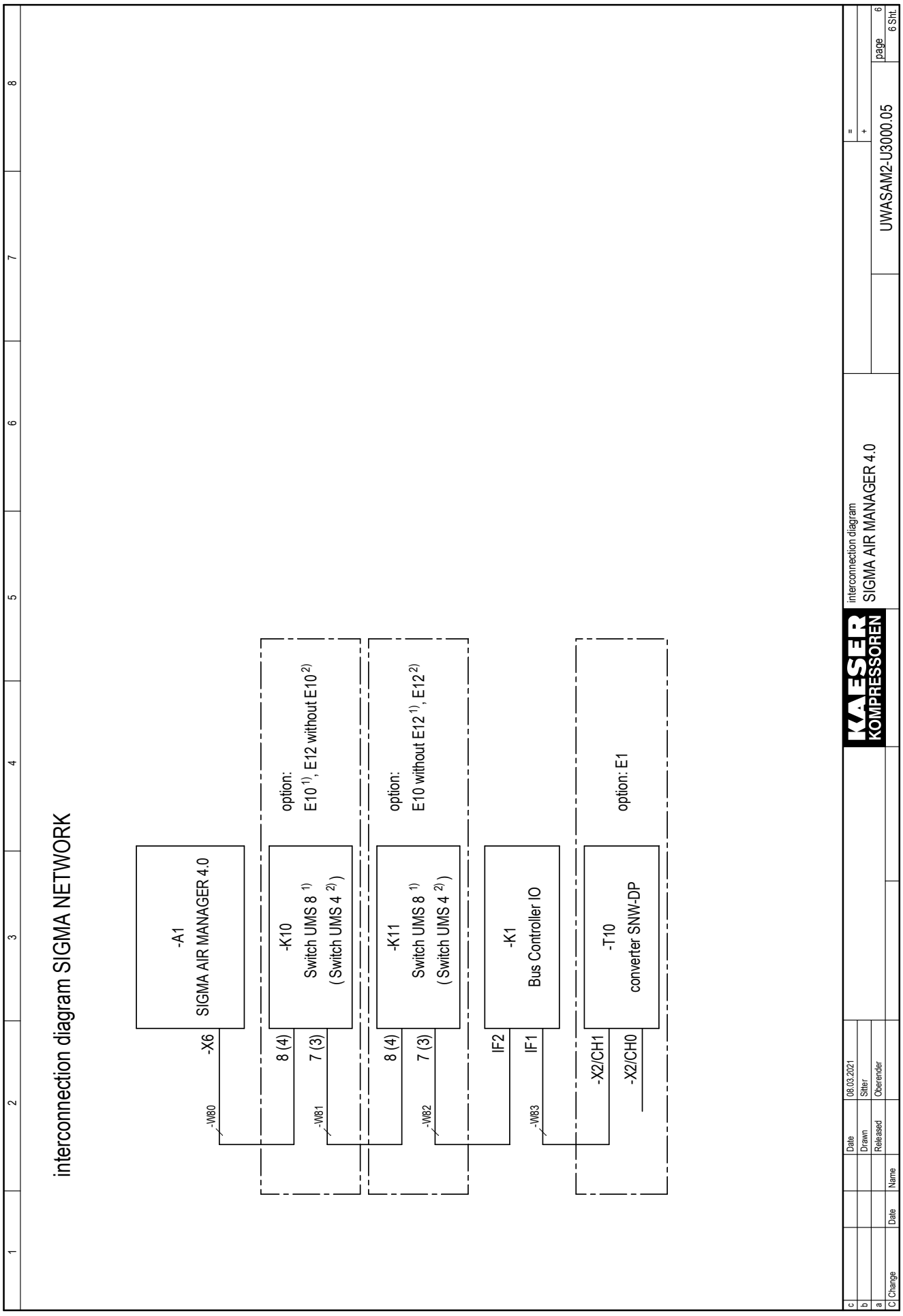
= +
page 2 6 Sht.
UWASAM2-U3000.05
electrical component parts list
SIGMA AIR MANAGER 4.0
KAESER KOMPRESSOREN

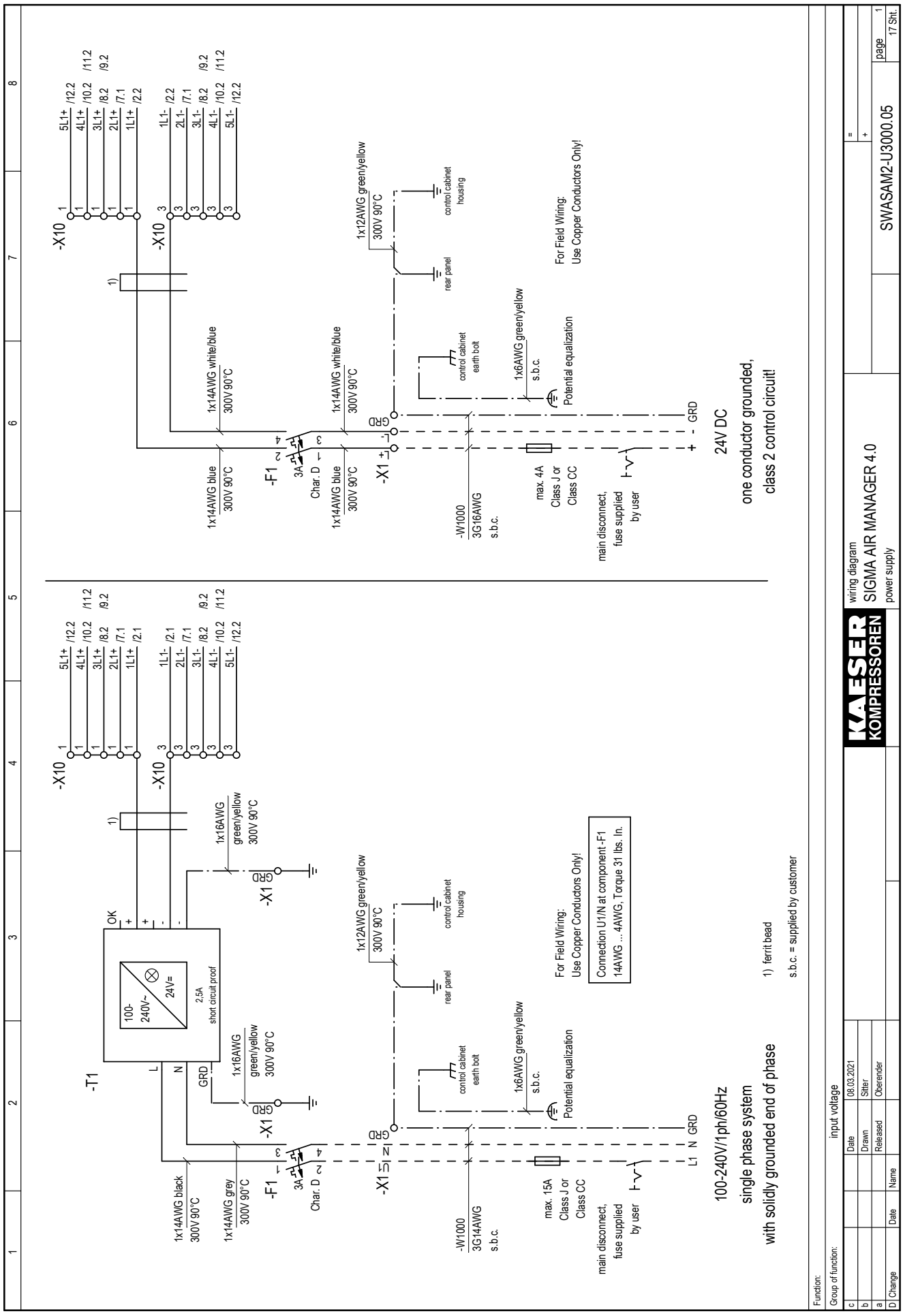
	Date	Name
Drawn	08.03.2021	Sliter
Released		Oberender
Date		
C Change		
a		
b		
c		

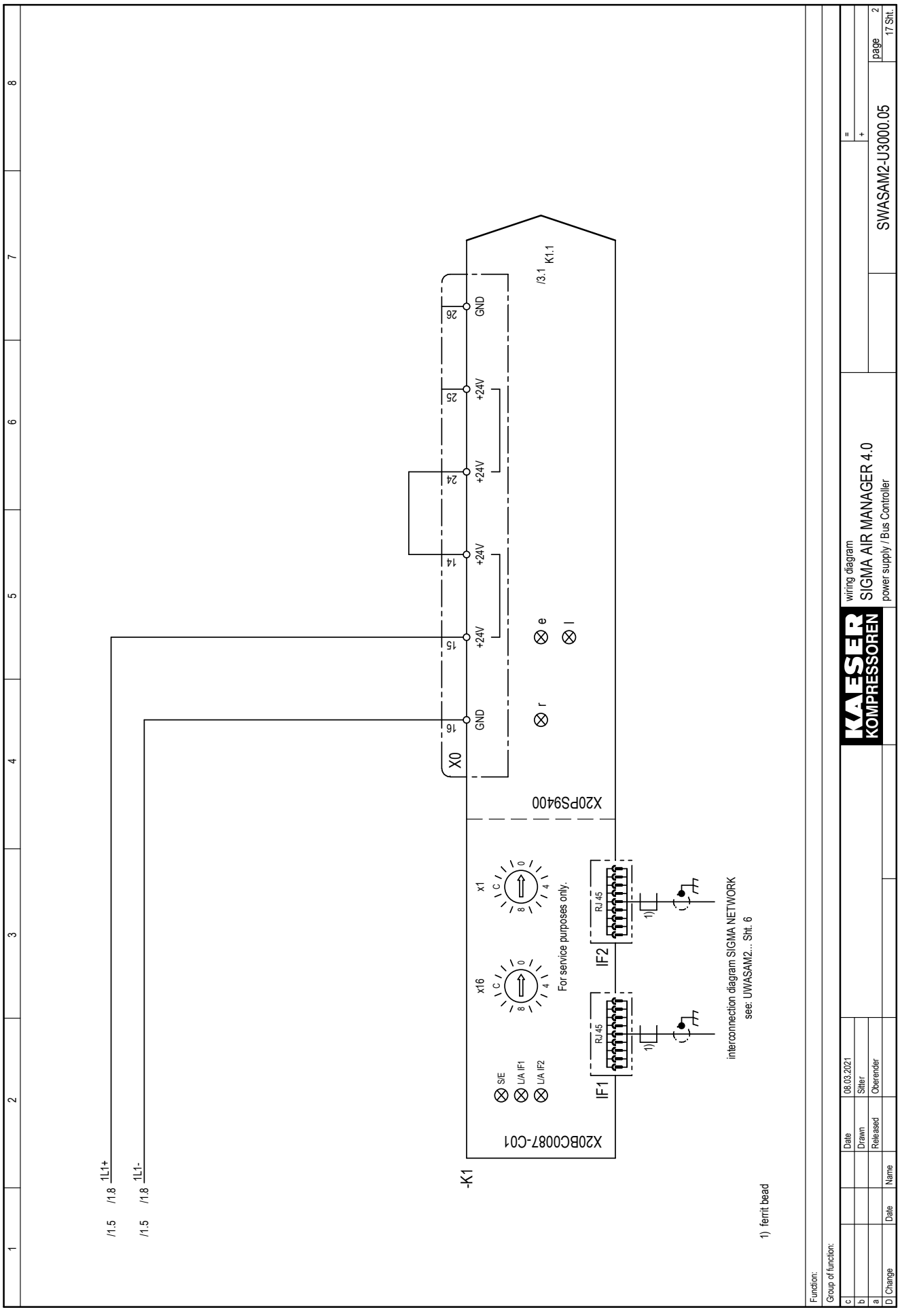

Block diagram SIGMA NETWORK
for machines with SIGMA CONTROL 2
air receiver
-B1
P
I
Machine 1
Machine 2
Machine 3
Machine X
SIGMA CONTROL 2
-X1
SIGMA AIR MANAGER 4.0
converter SBU
supply
DI
AI
DO
AO
expanding optional
W2100 SIGMA NETWORK
W20XX SIGMA NETWORK
W2001 SIGMA NETWORK
W2002 SIGMA NETWORK
W2003 SIGMA NETWORK
W1210 2x20AWG, screened, max. 30m
digital inputs 2x20AWG, max. 100m
analog inputs 2(3)x20AWG screened, max. 30m
Volt-free relay outputs, max. 100m
user's compressed air line
Electrical connection
to be made by the user
cable-no.
cable type
supply, W1000, 3G14(16)AWG
see: SWASAM2..., Sht. 1
Potential equalization,
W1200 1x6AWG
to control centre
connection SIGMA NETWORK
SIGMA AIR MANAGER 4.0, Machine with SIGMA CONTROL 2, SBU
SIGMA AIR MANAGER 4.0, SBU
cable type
max. cable length
SIGMA NETWORK CAT5
2x2x22AWG
100m
SIGMA NETWORK FOC Multi Mode
I-V (ZN) HH2x1 G50/125 OM2
3000m
KAESER KOMPRESSOREN
block diagram
SIGMA AIR MANAGER 4.0
SIGMA NETWORK
UWASAM2-U3000.05
page 3
6 Sht.
Change
Date
Name
08.03.2021
Sitter
Oberender

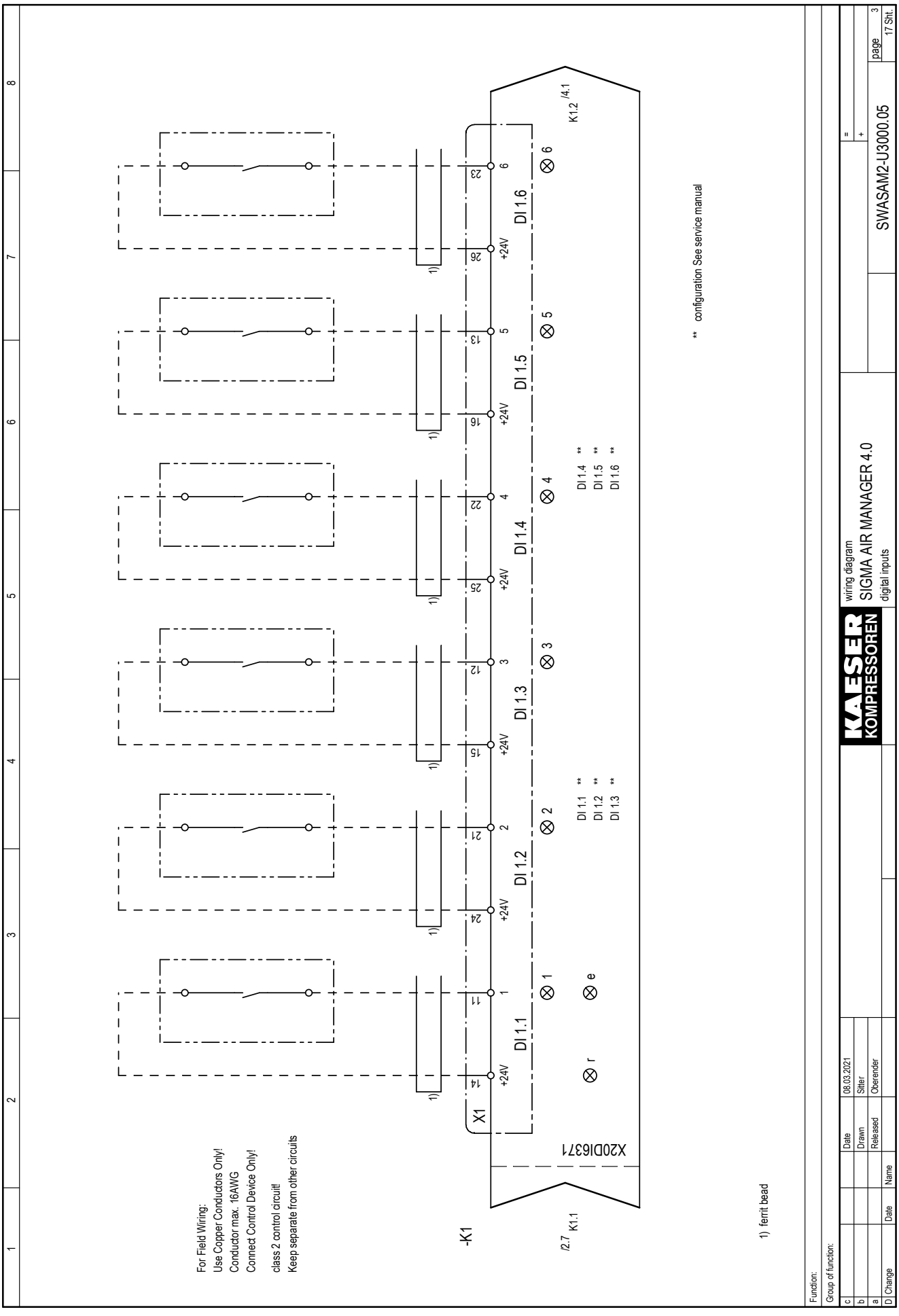

Block diagram PROFIBUS DP
for machines with SIGMA CONTROL
air receiver
-B1
P
I
Machine 1
Machine 2
Machine 3
Machine 4
SIGMA CONTROL
-1X9
PROFIBUS-converter
e.g.: 8DE or 32DE
W1800, C, PROFIBUS DP
W1210 2x20AWG, screened, max. 30m
SIGMA AIR MANAGER 4.0
DI
digital inputs 2x20AWG, max. 100m
AI
analog inputs 2(3)x20AWG screened, max. 30m
DO
Volt-free relay outputs, max. 100m
cable-no.
cable type
supply, W 1000, 3G14(16)AWG
see: SWASAM2..., Sht. 1
Potential equalization,
W1200 1x6AWG
to control centre
user's compressed air line
Electrical connection
to be made by the user
connecting cable Machine -> SIGMA AIR MANAGER 4.0
Machine model
cable type C
max. cable length
Machine with SIGMA CONTROL (PROFIBUS connection)
bus cable
1x2x22AWG
800m
by 187,5kBit/s
KAESER KOMPRESSOREN
block diagram
SIGMA AIR MANAGER 4.0
PROFIBUS DP
UWASAM2-U3000.05
page 4
6 Sht.
Date 08.03.2021
Drawn Sitter
Released Oberender
Change Date Name

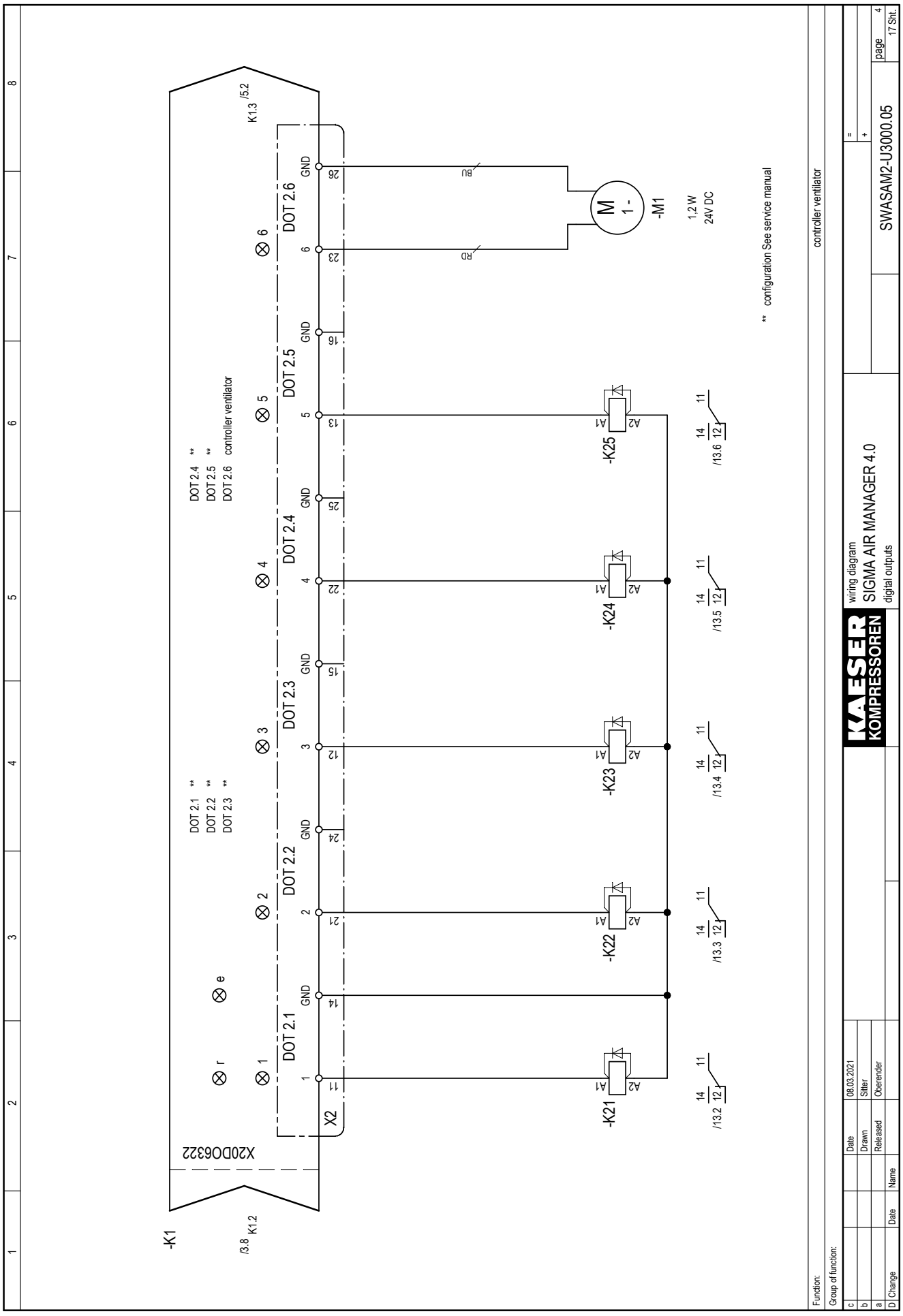

Block diagram
for conventionally controlled maschines
air receiver
-B1
P
I
Machine 1
Machine 2
Machine 3
Machine 4
...
SIGMA AIR MANAGER 4.0
W1210 2x20AWG, screened, max. 30m
W 1151, A
W 1101, B
W 1152, A
W 1102, B
W 1103, B
W 1153, A
W 1104, B
W 1154, A
DI
AI
DO
digital inputs 2x20AWG, max. 100m
analog inputs 2(3)x20AWG screened, max. 30m
Volt-free relay outputs, max. 100m
cable-no.
cable type
supply, W 1000, 3G14(16)AWG
see: SWASAM2..., Sht. 1
Potential equalization,
W1200 1x6AWG
to control centre
user's compressed air line
Electrical connection
to be made by the user
connecting cable Machine -> SIGMA AIR MANAGER 4.0
Machine model
cable type A
cable type B (option)
max. cable length
Machines on which the changeover contact of main pressure switch is wired
4x16AWG
2x20AWG
100m
Machines on which the normally closed contact of main pressure switch is wired or Machine with SIGMA CONTROL BASIC or MOBILAIR
3x16AWG
2x20AWG
100m
KAESER KOMPRESSOREN
block diagram
SIGMA AIR MANAGER 4.0
Conventionally controlled maschines
UWASAM2-U3000.05
page 5
6 Sht.
Change
Date
Name
08.03.2021
Sitter
Oberender

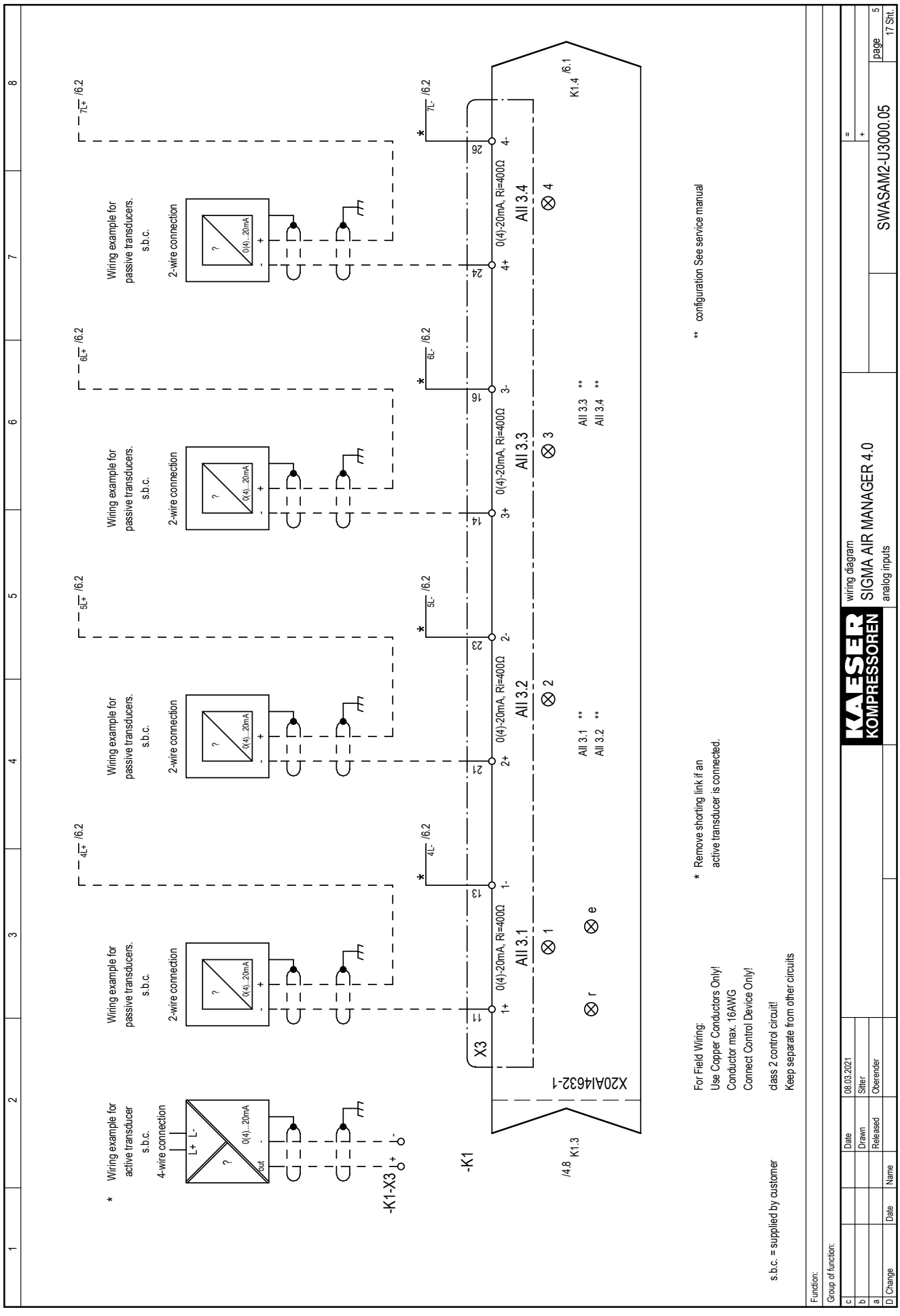

interconnection diagram SIGMA NETWORK
-A1
SIGMA AIR MANAGER 4.0
-X6
-W80
-K10
Switch UMS 8 1)
(Switch UMS 4 2))
option:
E10 1), E12 without E10 2)
8 (4)
7 (3)
-W81
-K11
Switch UMS 8 1)
(Switch UMS 4 2))
option:
E10 without E12 1), E12 2)
8 (4)
7 (3)
-W82
-K1
Bus Controller IO
IF2
IF1
-W83
-T10
converter SNW-DP
option: E1
-X2/CH1
-X2/CH0
KAESER KOMPRESSOREN
interconnection diagram
SIGMA AIR MANAGER 4.0
UWASAM2-U3000.05
page 6
6 Sht.
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Date
C Change

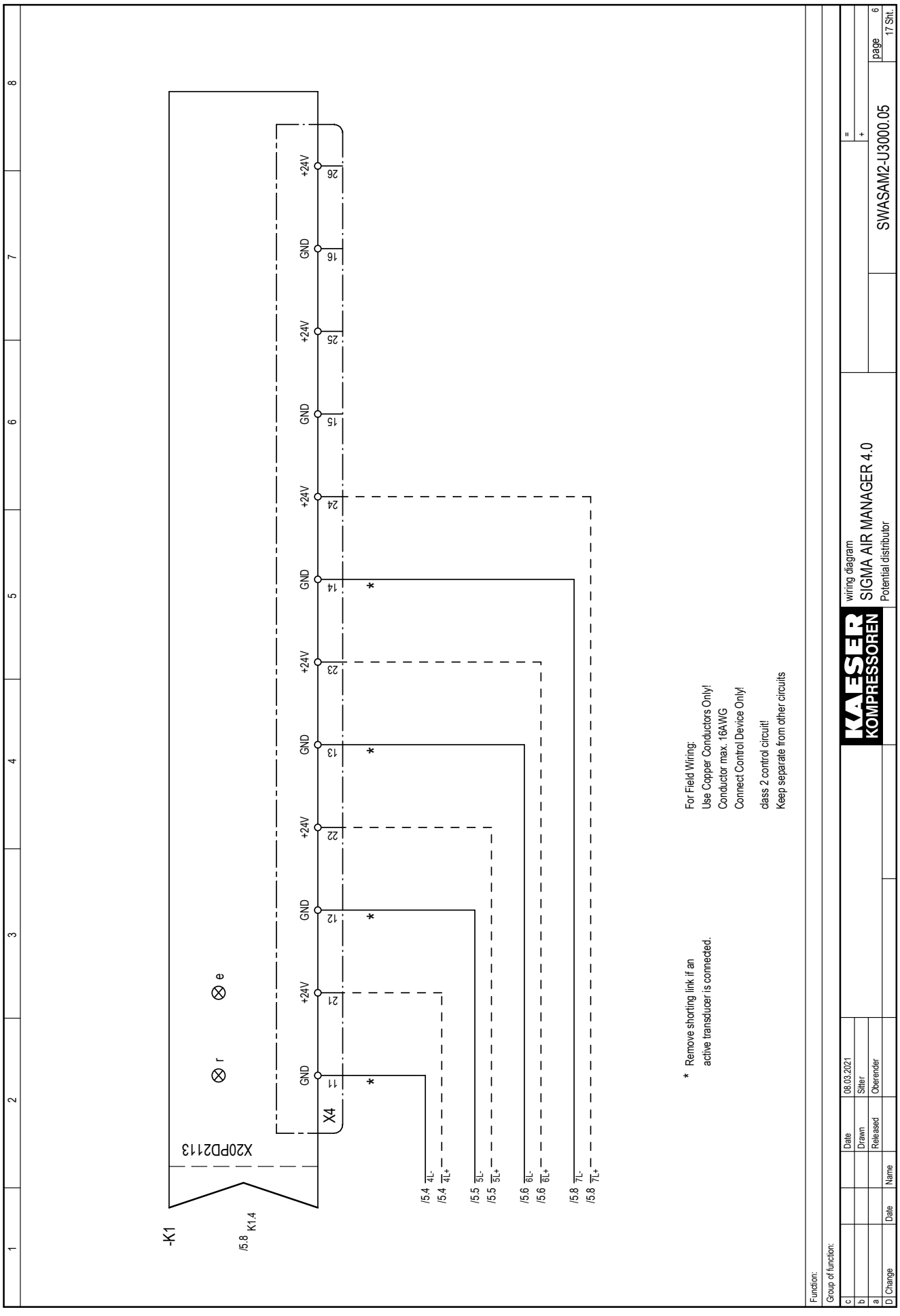

-T1
100-240V~
24V=
2,5A short circuit proof
OK
L
N
GRD
-X10
-X1
-F1
3A
Char. D
-W1000
3G14AWG
s.b.c.
1x14AWG black 300V 90°C
1x14AWG grey 300V 90°C
1x16AWG green/yellow 300V 90°C
1x12AWG green/yellow 300V 90°C
1x6AWG green/yellow
s.b.c.
rear panel
control cabinet housing
control cabinet earth bolt
Potential equalization
For Field Wiring:
Use Copper Conductors Only!
Connection U1/N at component -F1
14AWG ... 4AWG; Torque 31 lbs. In.
max. 15A Class J or Class CC
main disconnect, fuse supplied by user
100-240V/1ph/60Hz
single phase system
with solidly grounded end of phase
L1 N GRD
1) ferrit bead
s.b.c. = supplied by customer
1x14AWG blue 300V 90°C
1x14AWG white/blue 300V 90°C
max. 4A Class J or Class CC
24V DC
one conductor grounded,
class 2 control circuit!
+ - GRD
5L1+ /12.2
4L1+ /10.2
3L1+ /8.2
2L1+ /7.1
1L1+ /2.2
1L1- /2.1
2L1- /7.1
3L1- /8.2
4L1- /10.2
5L1- /12.2
/11.2
/9.2
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
power supply
SWASAM2-U3000.05
page 1
17 Sht.

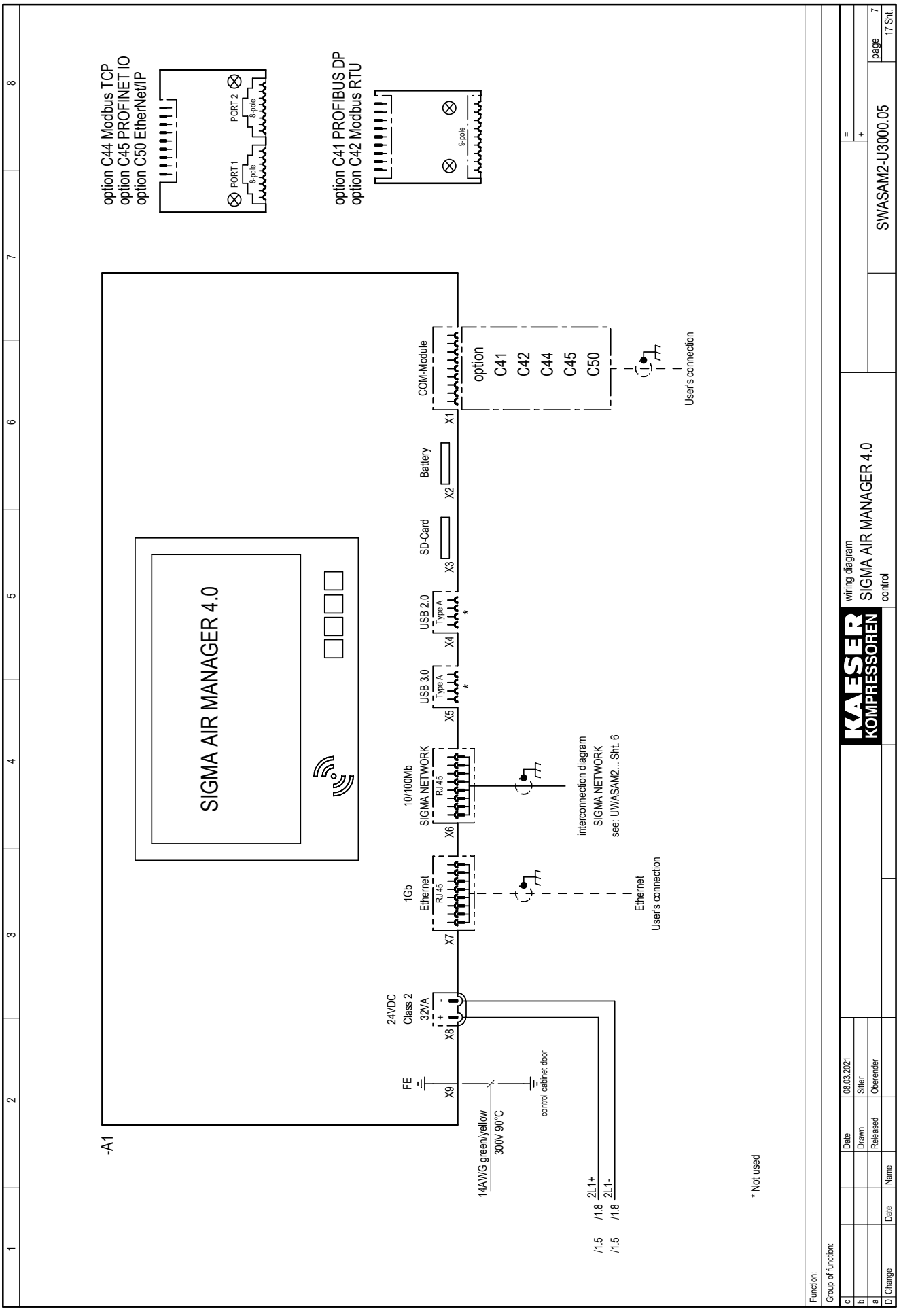

1L1+
1L1-
/1.5 /1.8
/1.5 /1.8
-K1
X20BC0087-C01
X20PS9400
X0
16 GND
15 +24V
14 +24V
24 +24V
25 +24V
26 GND
/3.1 K1.1
r
e
l
S/E
L/A IF1
L/A IF2
x16
x1
For service purposes only.
IF1
IF2
RJ 45
1)
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht. 6
1) ferrit bead
Function:
Group of function:
Date 08.03.2021
Drawn Sliter
Released Oberender
Name
Change
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
power supply / Bus Controller
SWASAM2-U3000.05
page 2
17 Sht.

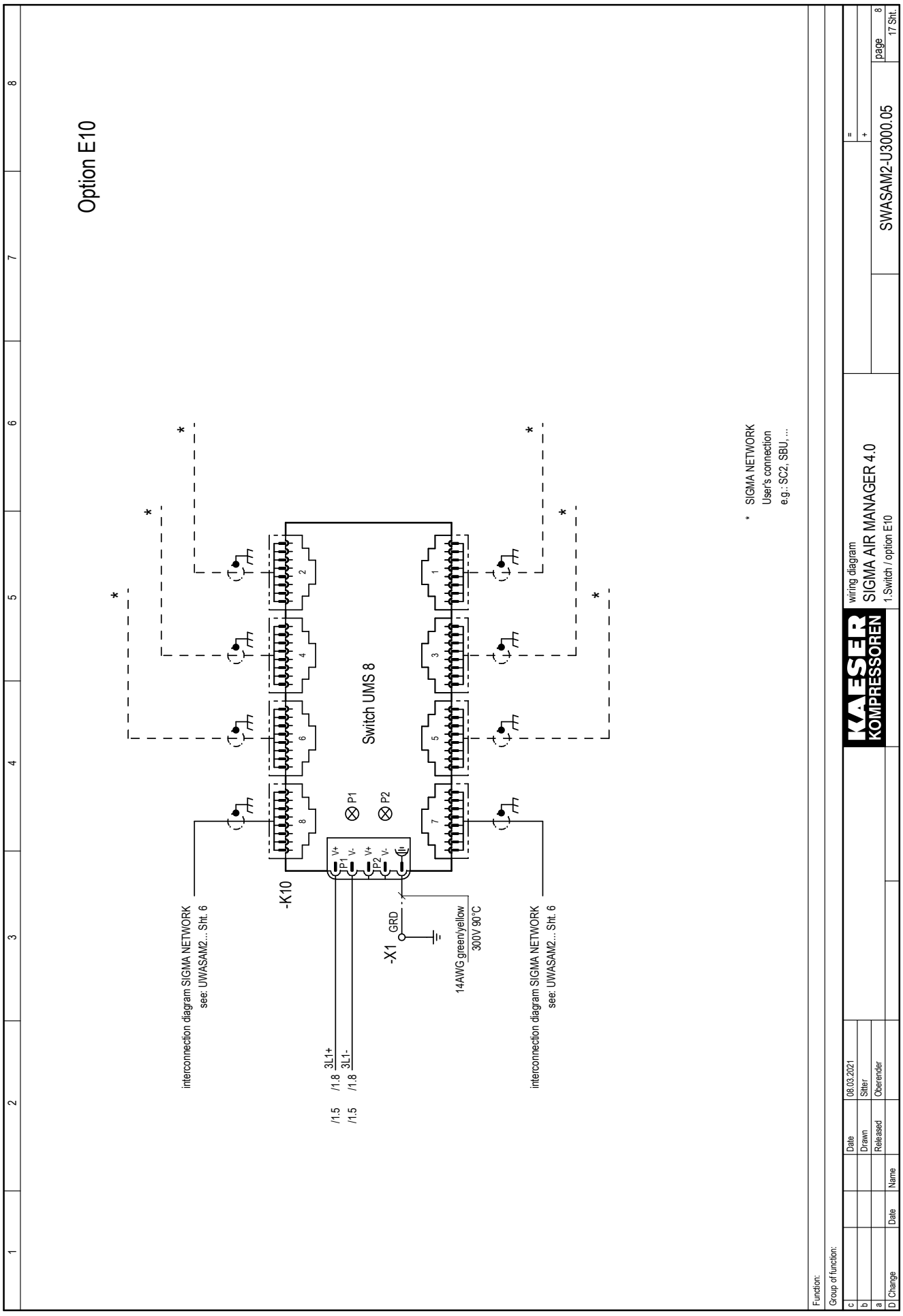

For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
-K1
X1
X20DI6371
DI 1.1
DI 1.2
DI 1.3
DI 1.4
DI 1.5
DI 1.6
+24V
DI 1.1 **
DI 1.2 **
DI 1.3 **
DI 1.4 **
DI 1.5 **
DI 1.6 **
** configuration See service manual
1) ferrit bead
1)
/2.7 K1.1
/4.1 K1.2
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
digital inputs
SWASAM2-U3000.05
page 3
17 Sht.
Function:
Group of function:
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change

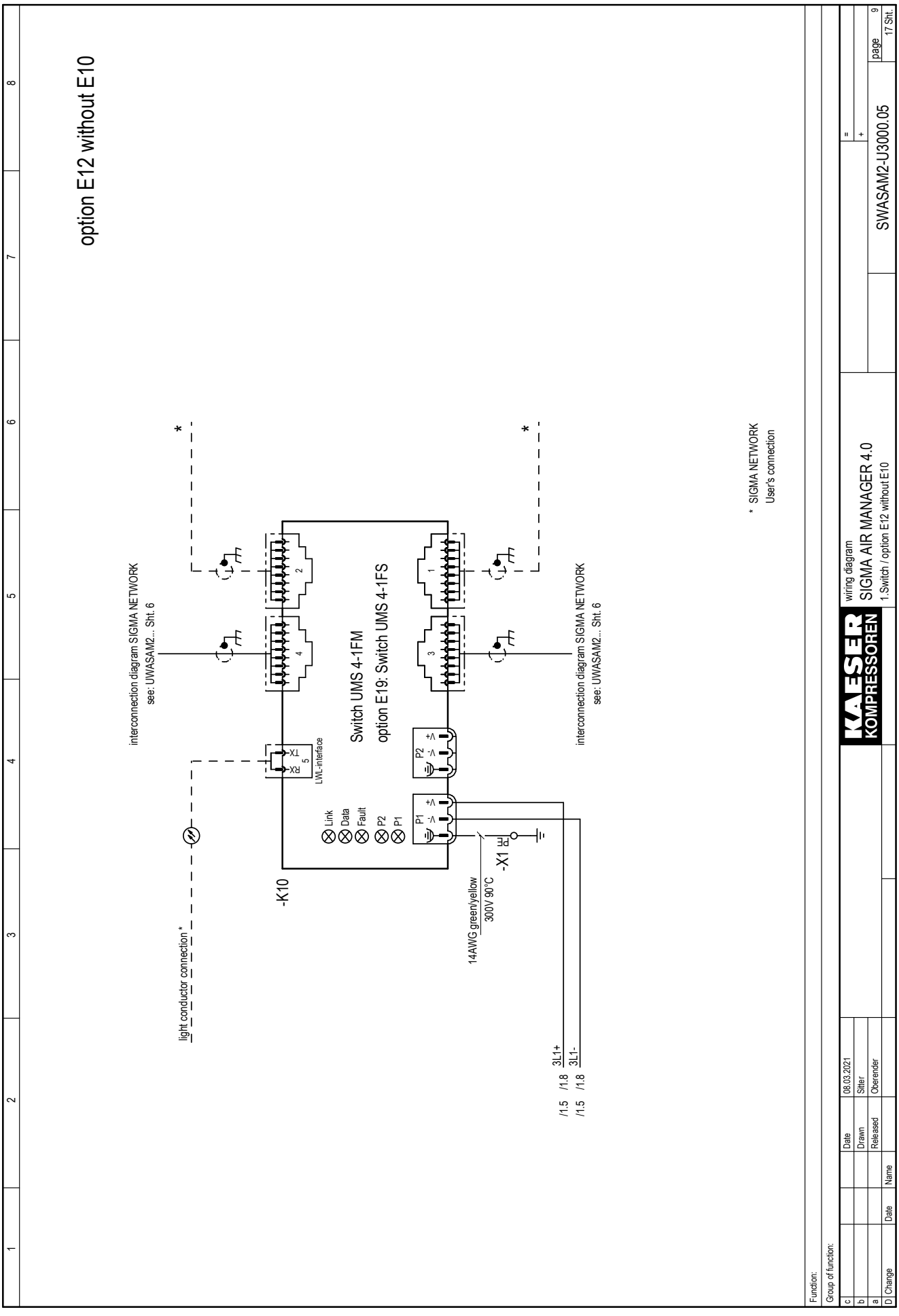

-K1
/3.8 K1.2
X20DO6322
X2
DOT 2.1
DOT 2.2
DOT 2.3
DOT 2.4
DOT 2.5
DOT 2.6
GND
-K21
-K22
-K23
-K24
-K25
-M1
1,2 W
24V DC
BU
RD
DOT 2.1 **
DOT 2.2 **
DOT 2.3 **
DOT 2.4 **
DOT 2.5 **
DOT 2.6 controller ventilator
** configuration See service manual
controller ventilator
wiring diagram
SIGMA AIR MANAGER 4.0
digital outputs
SWASAM2-U3000.05
page 4
17 Sht.
Date 08.03.2021
Drawn Sliter
Released Oberender

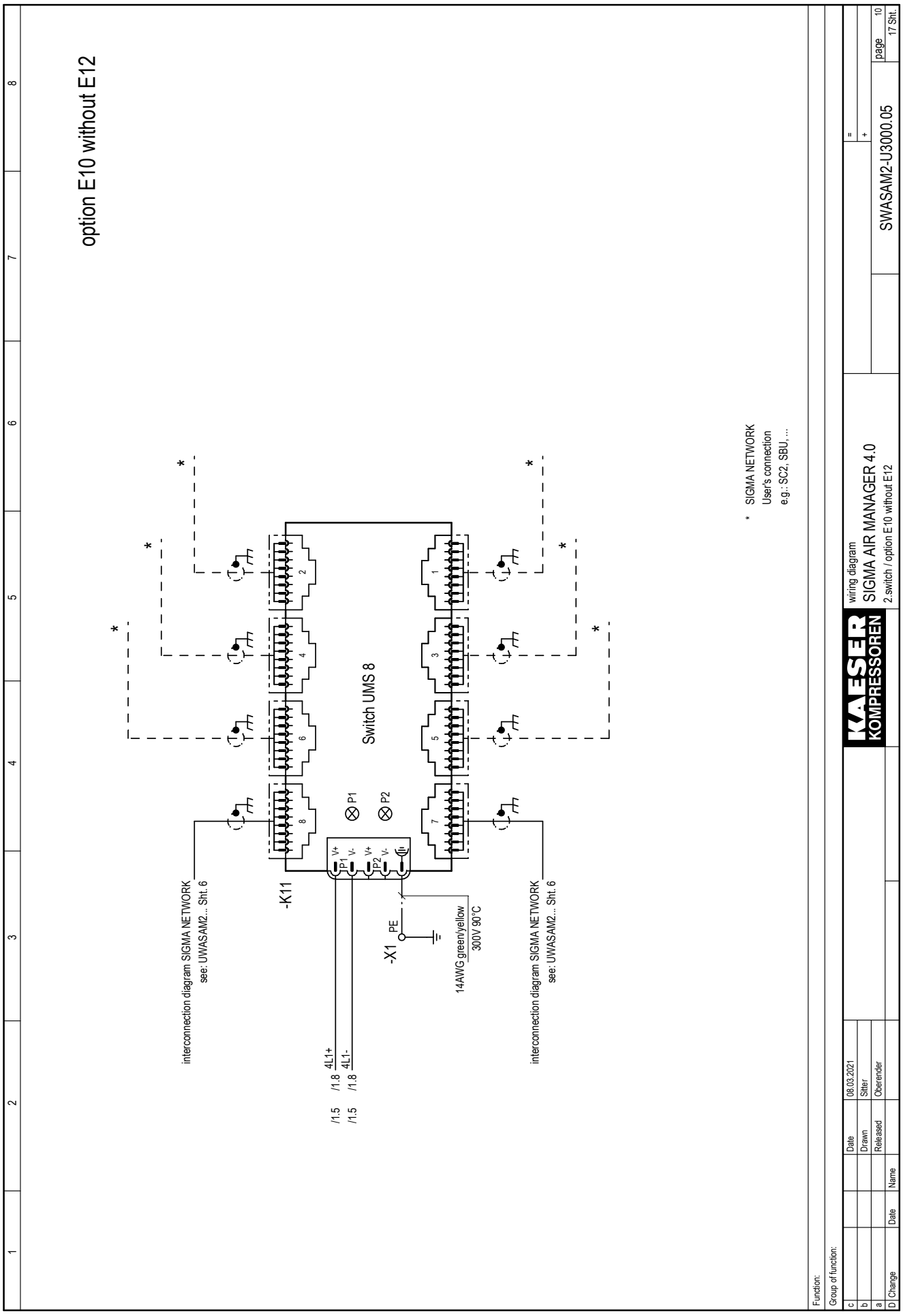

Wiring example for active transducer s.b.c. 4-wire connection
Wiring example for passive transducers. s.b.c. 2-wire connection
-K1-X3
-K1
X3
X20AI4632-1
/4.8 K1.3
K1.4 /6.1
All 3.1
All 3.2
All 3.3
All 3.4
0(4)-20mA, Ri=400Ω
* Remove shorting link if an active transducer is connected.
** configuration See service manual
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
s.b.c. = supplied by customer
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
analog inputs
SWASAM2-U3000.05
page 5
17 Sht.
Function:
Group of function:
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change

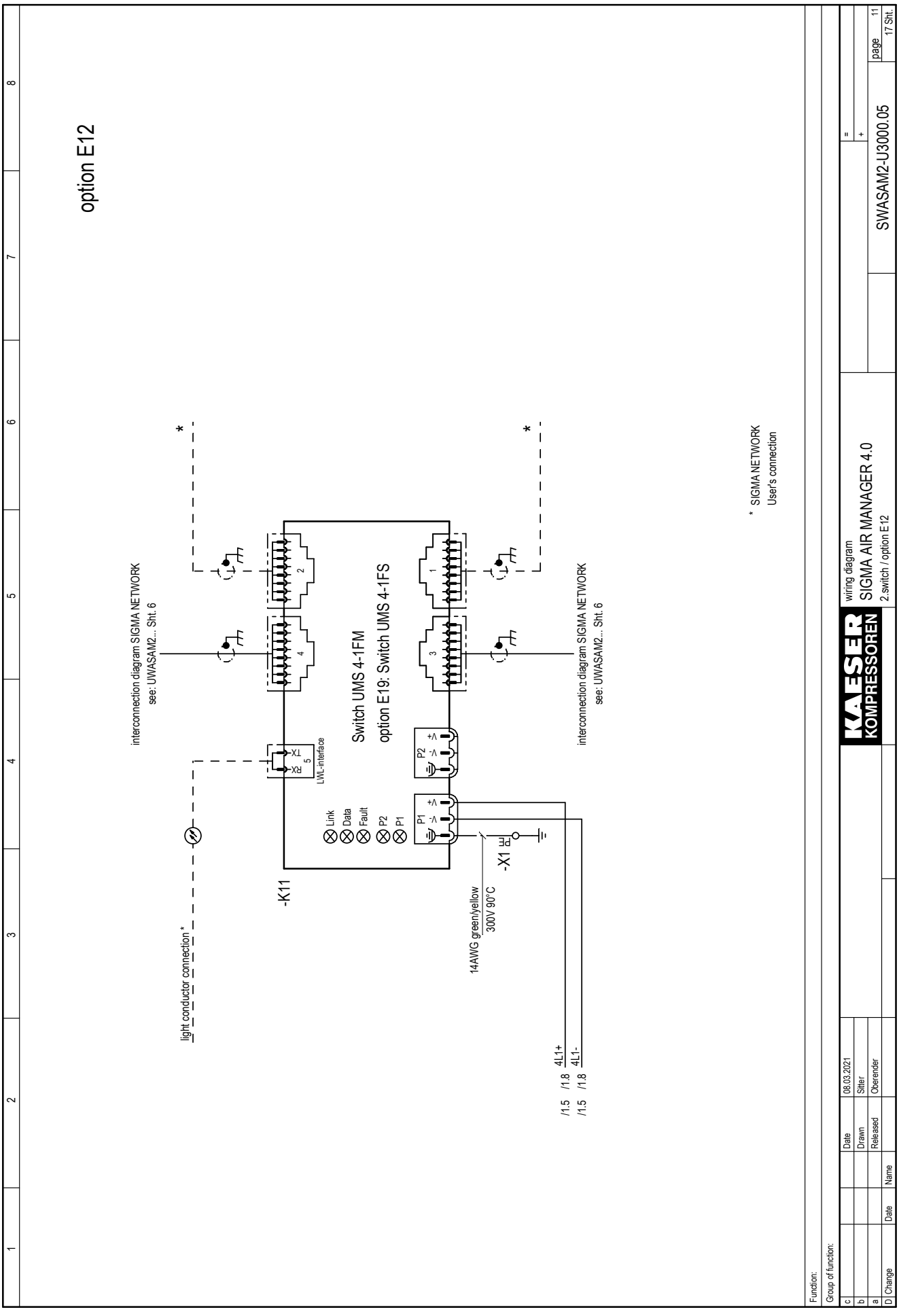

-K1
/5.8 K1.4
X20PD2113
X4
GND
+24V
11
21
12
22
13
23
14
24
15
25
16
26
/5.4 4L-
/5.4 4L+
/5.5 5L-
/5.5 5L+
/5.6 6L-
/5.6 6L+
/5.8 7L-
/5.8 7L+
* Remove shorting link if an active transducer is connected.
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
Potential distributor
SWASAM2-U3000.05
page 6
17 Sht.
Function:
Group of function:
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Date
D Change

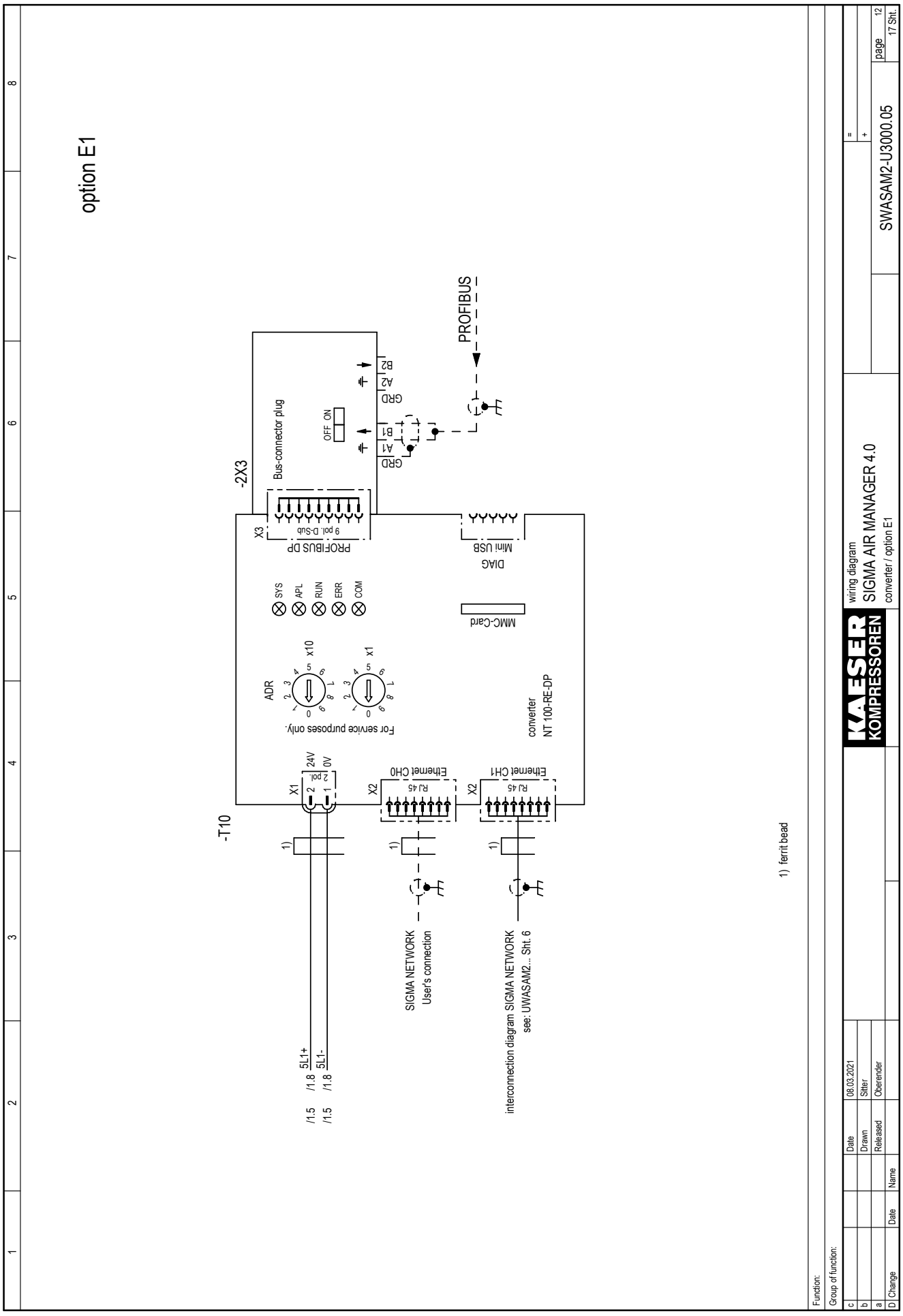

option C44 Modbus TCP
option C45 PROFINET IO
option C50 EtherNet/IP
PORT 1
PORT 2
8-pole
option C41 PROFIBUS DP
option C42 Modbus RTU
9-pole
SIGMA AIR MANAGER 4.0
-A1
COM-Module
X1
option
C41
C42
C44
C45
C50
Battery
X2
SD-Card
X3
USB 2.0
Type A
X4
USB 3.0
Type A
X5
10/100Mb
SIGMA NETWORK
RJ45
X6
1Gb
Ethernet
RJ45
X7
24VDC
Class 2
32VA
X8
FE
X9
User's connection
interconnection diagram
SIGMA NETWORK
see: UWASAM2... Sht. 6
Ethernet
User's connection
14AWG green/yellow
300V 90°C
control cabinet door
/1.8 2L1+
/1.8 2L1-
/1.5
/1.5
* Not used
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
control
SWASAM2-U3000.05
page 7
17 Sht.
Function:
Group of function:
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Name
Change

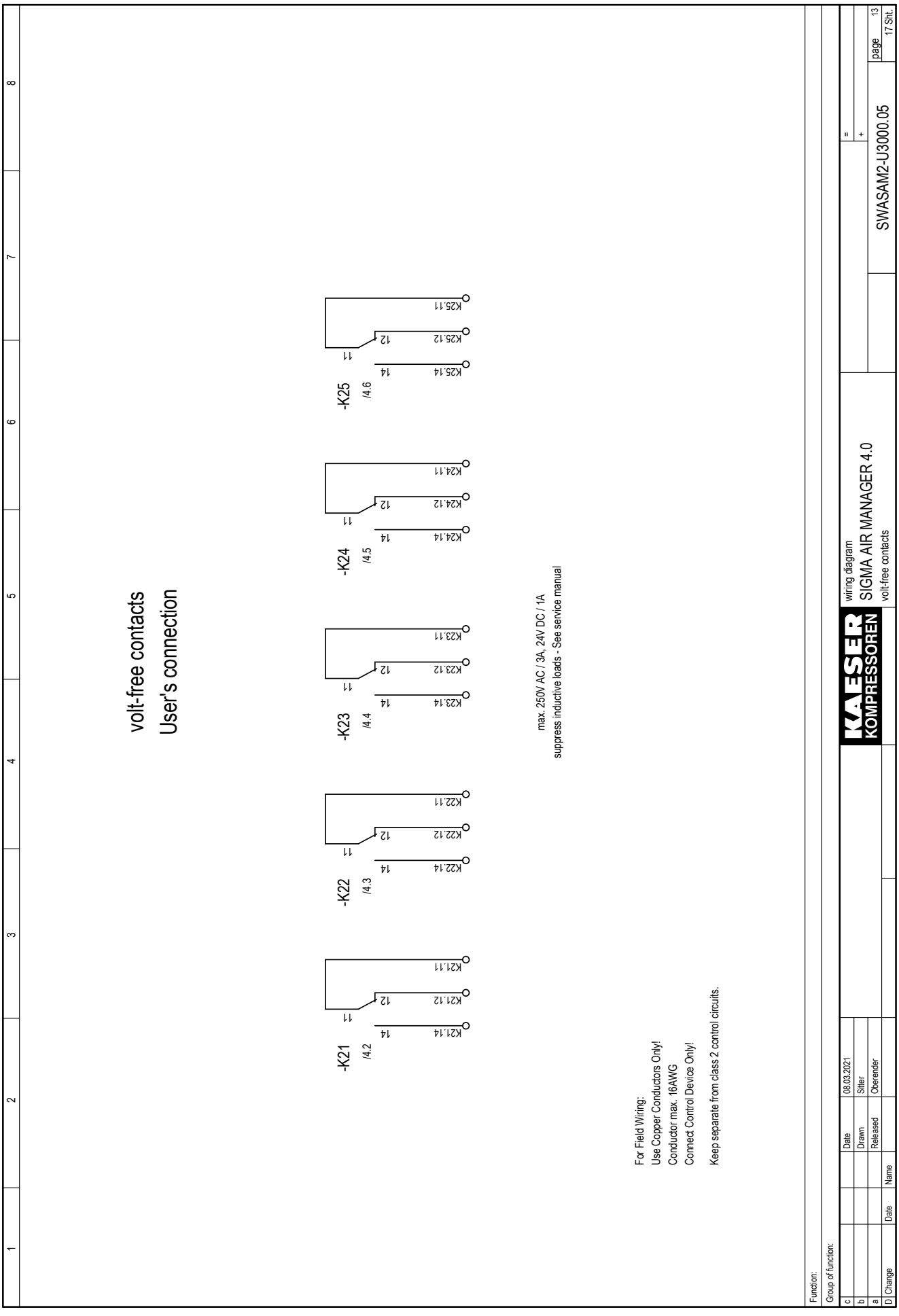

Option E10
Switch UMS 8
-K10
-X1
P1
P2
GRD
3L1+
3L1-
/1.8
/1.5
14AWG green/yellow
300V 90°C
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht. 6
* SIGMA NETWORK
User's connection
e.g.: SC2, SBU, ...
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
1.Switch / option E10
SWASAM2-U3000.05
page 8
17 Sht.
Function:
Group of function:
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change

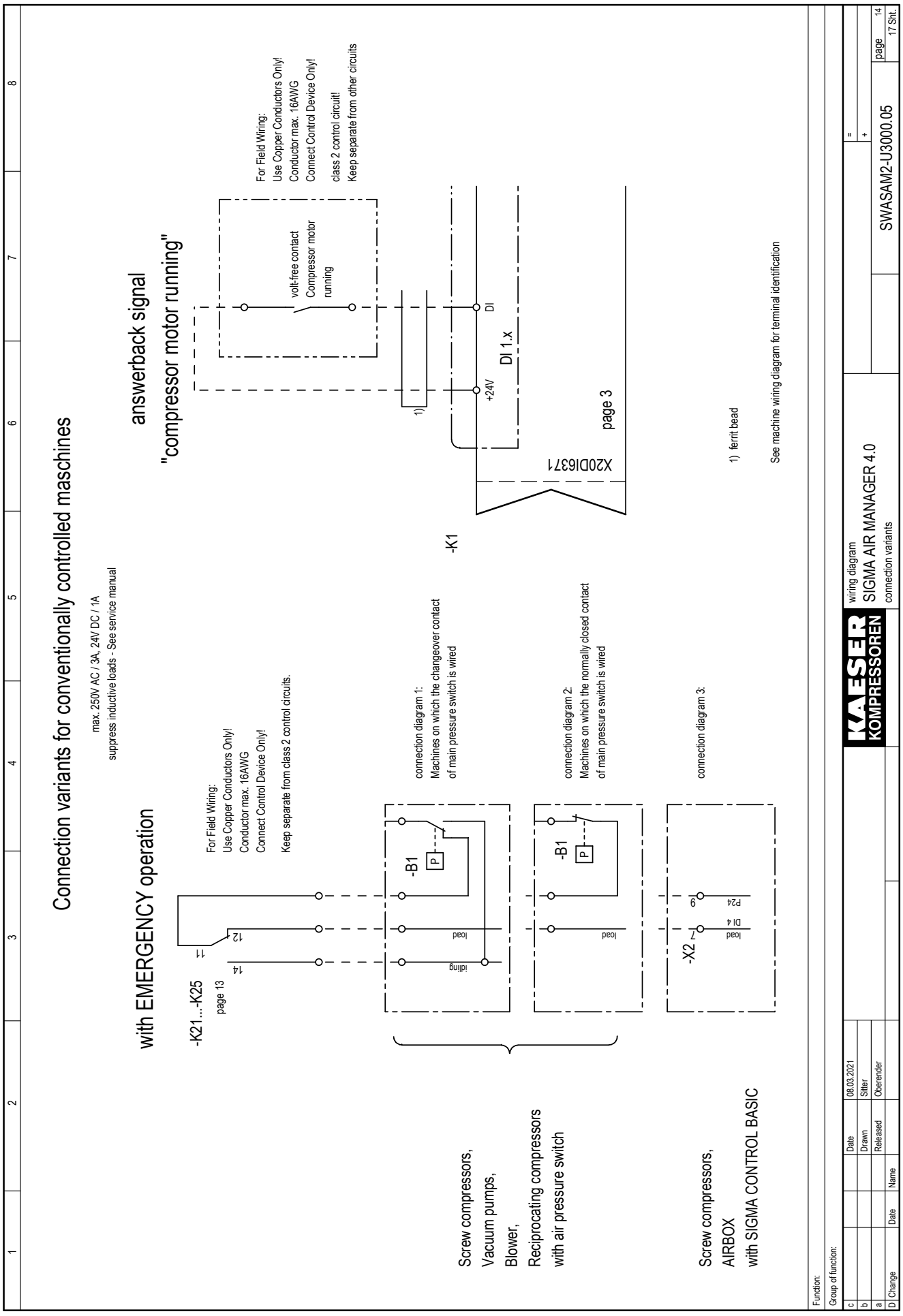

option E12 without E10
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht 6
light conductor connection *
-K10
LWL-interface
TX
RX
Switch UMS 4-1FM
option E19: Switch UMS 4-1FS
Link
Data
Fault
P2
P1
14AWG green/yellow
300V 90°C
-X1
3L1+
3L1-
/1.8
/1.5
* SIGMA NETWORK
User's connection
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
1.Switch / option E12 without E10
SWASAM2-U3000.05
page 9
17 Sht.
Function:
Group of function:
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Change
Name

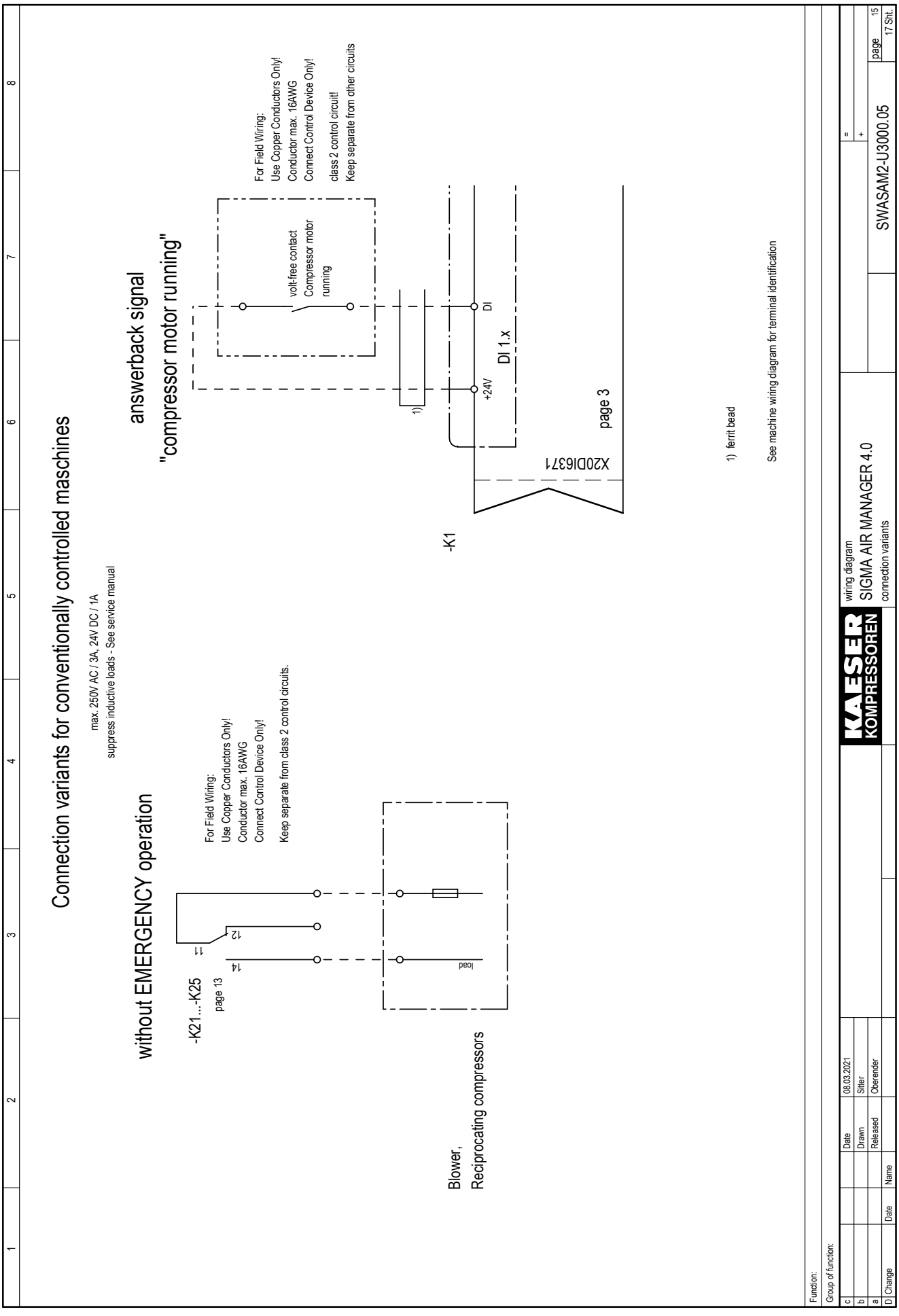

option E10 without E12
Switch UMS 8
-K11
-X1
P1
P2
PE
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht. 6
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht. 6
4L1+
4L1-
/1.8
/1.8
/1.5
/1.5
14AWG green/yellow
300V 90°C
* SIGMA NETWORK
User's connection
e.g.: SC2, SBU, ...
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
2.switch / option E10 without E12
SWASAM2-U3000.05
page 10
17 Sht.
Function:
Group of function:
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change

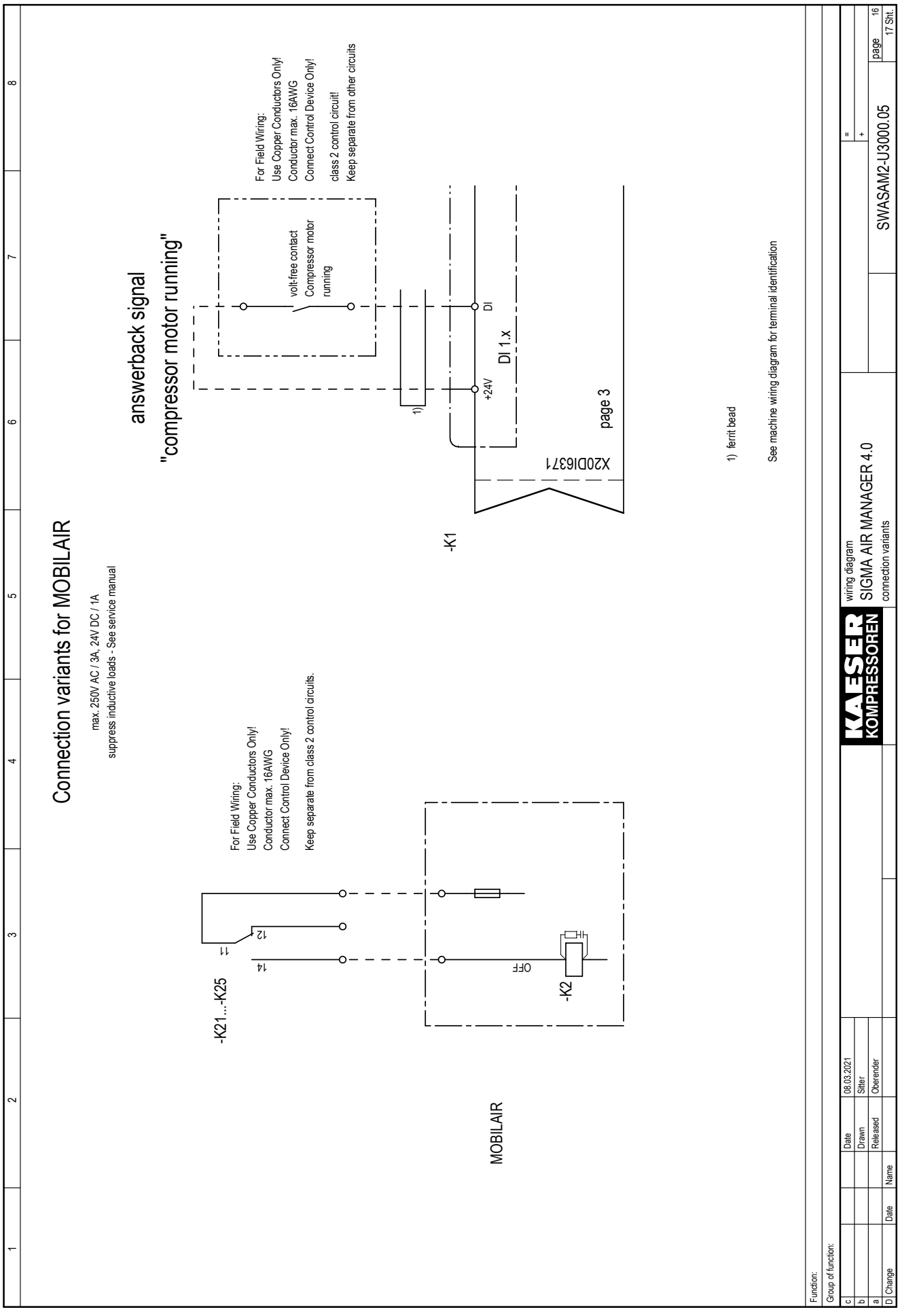

option E12
interconnection diagram SIGMA NETWORK
see: UWASAM2... Sht. 6
light conductor connection *
-K11
LWL-interface
TX
RX
Switch UMS 4-1FM
option E19: Switch UMS 4-1FS
Link
Data
Fault
P2
P1
P1 +
P1 -
P2 +
P2 -
-X1
14AWG green/yellow
300V 90°C
4L1+
4L1-
/1.8
/1.5
* SIGMA NETWORK
User's connection
wiring diagram
SIGMA AIR MANAGER 4.0
2.switch / option E12
SWASAM2-U3000.05
page 11
17 Sht.
Function:
Group of function:
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Name
Change


option E1
PROFIBUS
-2X3
Bus-connector plug
OFF ON
B2
A2
GRD
B1
A1
GRD
X3
9 pol. D-Sub
PROFIBUS DP
Mini USB
DIAG
SYS
APL
RUN
ERR
COM
MMC-Card
ADR
x10
x1
For service purposes only.
converter
NT 100-RE-DP
-T10
X1
24V
0V
2 pol.
X2
RJ 45
Ethernet CH0
X2
RJ 45
Ethernet CH1
1)
SIGMA NETWORK
User's connection
interconnection diagram SIGMA NETWORK
see: UWASAM2.. Sht. 6
5L1+
5L1-
/1.8
/1.8
/1.5
/1.5
1) ferrit bead
Function:
Group of function:
Date
Drawn
Released
Name
Change
08.03.2021
Sliter
Oberender
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
converter / option E1
SWASAM2-U3000.05
page 12
17 Sht.


volt-free contacts
User's connection
-K21
/4.2
K21.11
K21.12
K21.14
-K22
/4.3
K22.11
K22.12
K22.14
-K23
/4.4
K23.11
K23.12
K23.14
-K24
/4.5
K24.11
K24.12
K24.14
-K25
/4.6
K25.11
K25.12
K25.14
max. 250V AC / 3A, 24V DC / 1A
suppress inductive loads - See service manual
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
Keep separate from class 2 control circuits.
Function:
Group of function:
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
volt-free contacts
SWASAM2-U3000.05
page 13
17 Sht.
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change


Connection variants for conventionally controlled maschines
with EMERGENCY operation
max. 250V AC / 3A, 24V DC / 1A
suppress inductive loads - See service manual
answerback signal
"compressor motor running"
-K21...-K25
page 13
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
Keep separate from class 2 control circuits.
volt-free contact
Compressor motor running
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
11
12
14
-B1
P
load
idling
connection diagram 1:
Machines on which the changeover contact
of main pressure switch is wired
-K1
1)
+24V
DI
DI 1.x
X20DI6371
page 3
connection diagram 2:
Machines on which the normally closed contact
of main pressure switch is wired
-X2
DI 4
P24
connection diagram 3:
1) ferrit bead
See machine wiring diagram for terminal identification
Screw compressors,
Vacuum pumps,
Blower,
Reciprocating compressors
with air pressure switch
Screw compressors,
AIRBOX
with SIGMA CONTROL BASIC
Function:
Group of function:
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Change
Name
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
connection variants
SWASAM2-U3000.05
page 14
17 Sht.


Connection variants for conventionally controlled maschines
max. 250V AC / 3A, 24V DC / 1A
suppress inductive loads - See service manual
without EMERGENCY operation
-K21...-K25
page 13
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
Keep separate from class 2 control circuits.
11
12
14
load
Blower,
Reciprocating compressors
answerback signal
"compressor motor running"
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
volt-free contact
Compressor motor
running
1)
+24V
DI 1.x
DI
-K1
X20DI6371
page 3
1) ferrit bead
See machine wiring diagram for terminal identification
Function:
Group of function:
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
connection variants
SWASAM2-U3000.05
page 15
17 Sht.
Change
Date
Name
08.03.2021
Sitter
Oberender
Drawn
Released


Connection variants for MOBILAIR
max. 250V AC / 3A, 24V DC / 1A
suppress inductive loads - See service manual
answerback signal
"compressor motor running"
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
class 2 control circuit!
Keep separate from other circuits
volt-free contact
Compressor motor running
1)
DI
DI 1.x
+24V
-K1
X20DI6371
page 3
1) ferrit bead
See machine wiring diagram for terminal identification
For Field Wiring:
Use Copper Conductors Only!
Conductor max. 16AWG
Connect Control Device Only!
Keep separate from class 2 control circuits.
11
12
14
OFF
-K2
-K21...-K25
MOBILAIR
Function:
Group of function:
Date
Drawn
Released
Name
Change
08.03.2021
Sliter
Oberender
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
connection variants
SWASAM2-U3000.05
page 16
17 Sht.

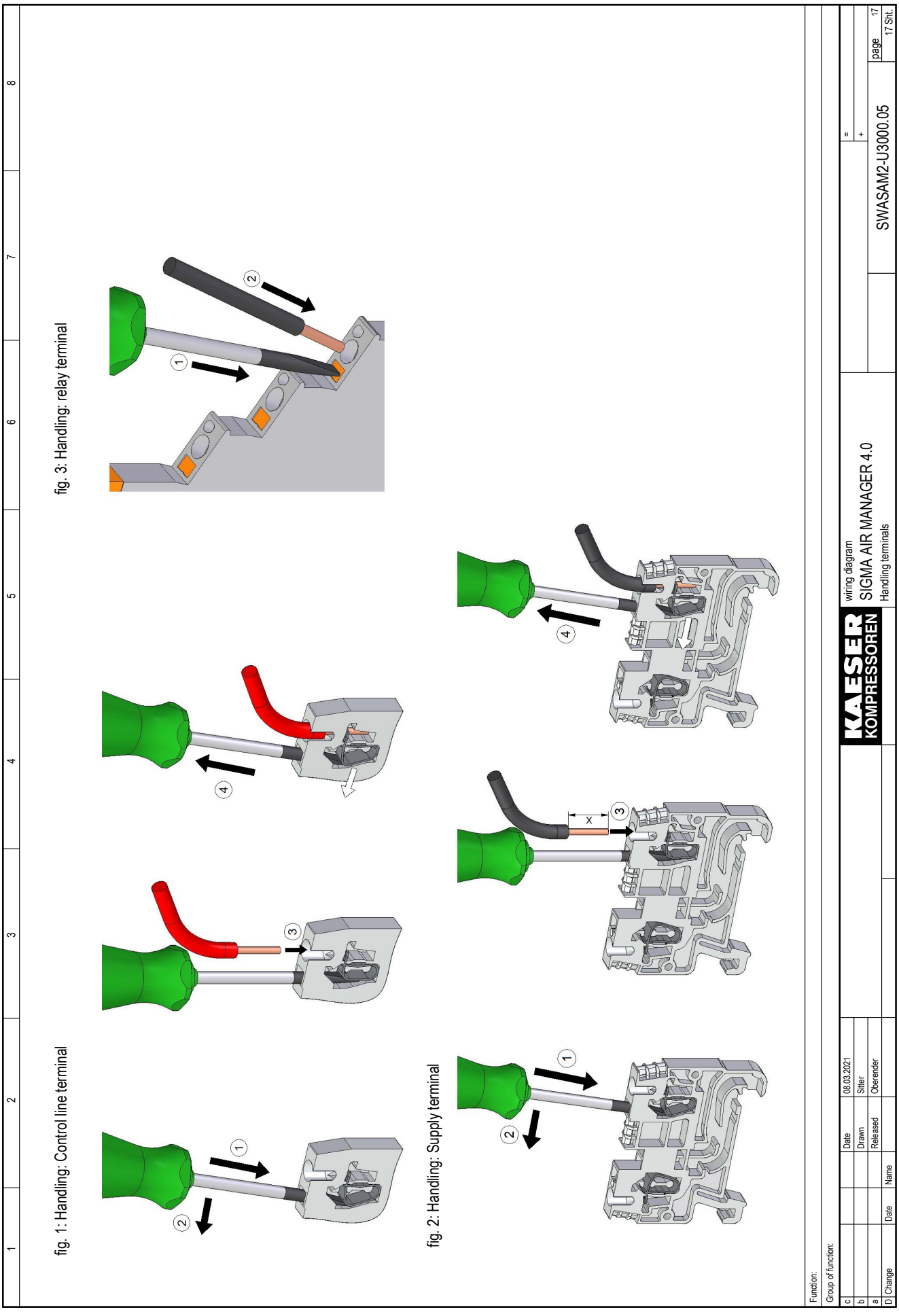
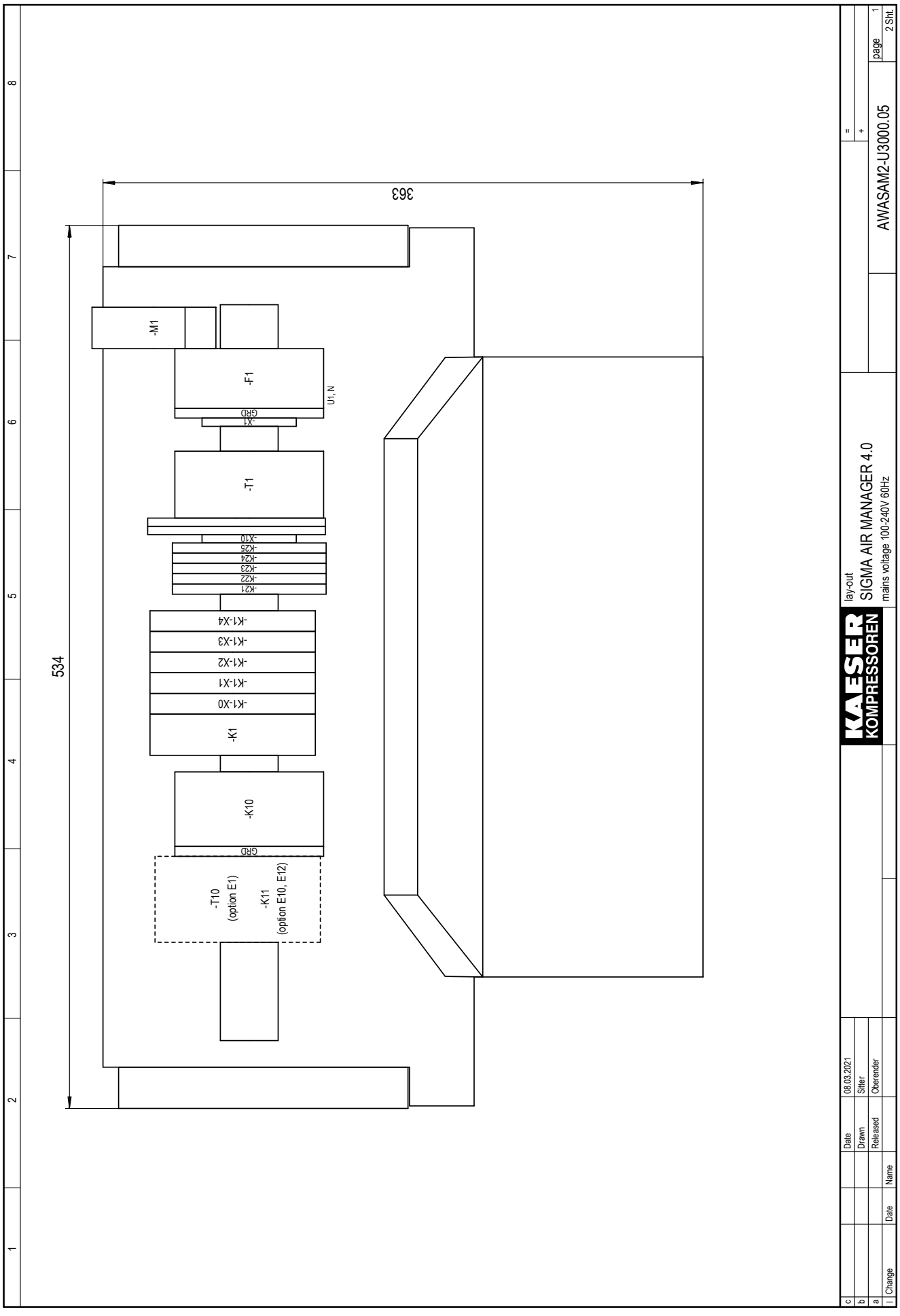
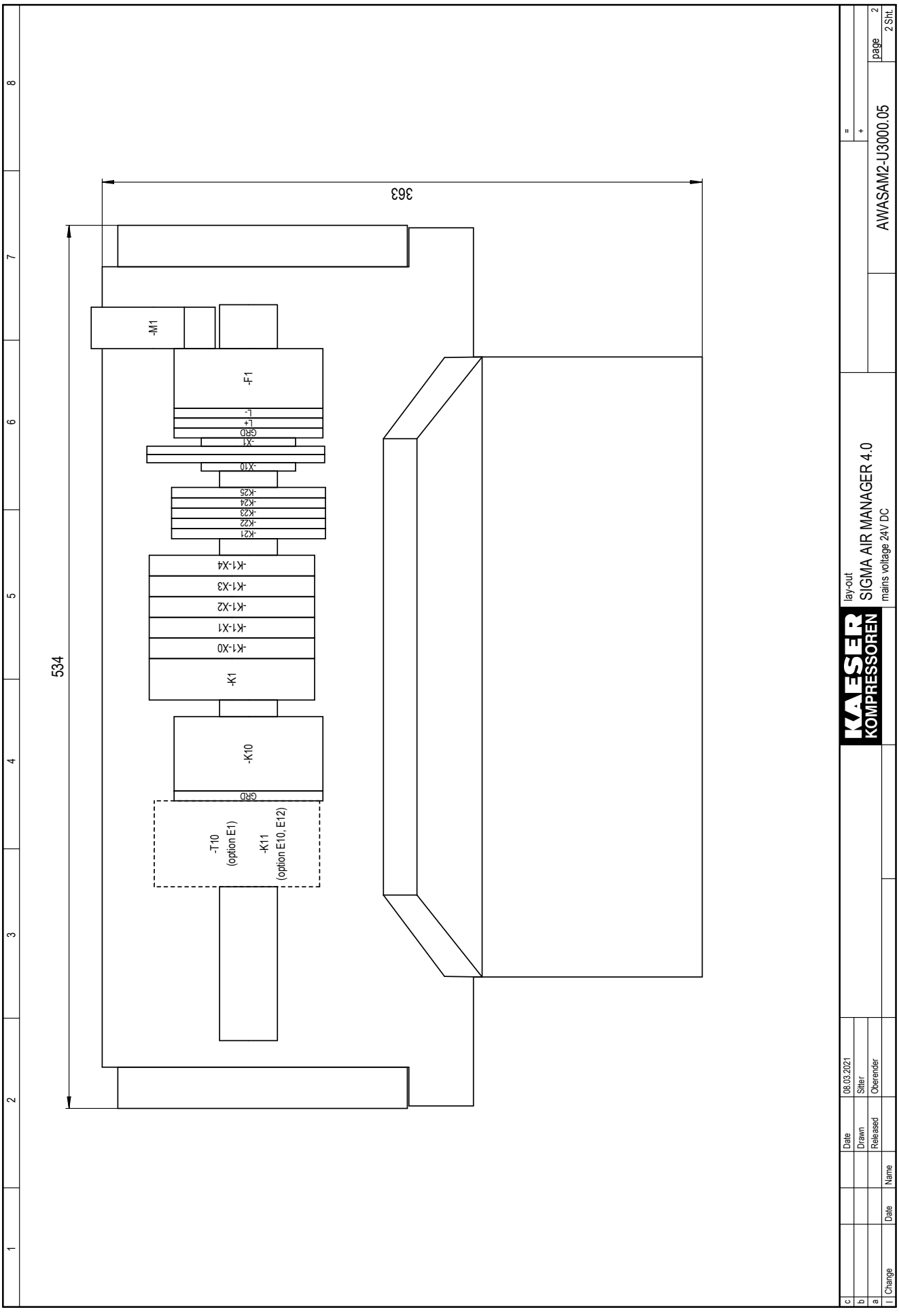


fig. 3: Handling: relay terminal
fig. 1: Handling: Control line terminal
fig. 2: Handling: Supply terminal
Function:
Group of function:
KAESER KOMPRESSOREN
wiring diagram
SIGMA AIR MANAGER 4.0
Handling terminals
SWASAM2-U3000.05
page 17
17 Sht.
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Name
Change


363
534
-M1
-F1
U1, N
GRD
-X1
-T1
-X10
-K25
-K24
-K23
-K22
-K21
-K1-X4
-K1-X3
-K1-X2
-K1-X1
-K1-X0
-K1
-K10
GRD
-T10
(option E1)
-K11
(option E10, E12)
KAESER KOMPRESSOREN
lay-out
SIGMA AIR MANAGER 4.0
mains voltage 100-240V 60Hz
AWASAM2-U3000.05
page 1
2 Sht.
Date 08.03.2021
Drawn Sitter
Released Oberender
Name
Change


363
534
-M1
-F1
L-
L+
GRD
-X1
-X10
-K25
-K24
-K23
-K22
-K21
-K1-X4
-K1-X3
-K1-X2
-K1-X1
-K1-X0
-K1
-K10
GRD
-T10
(option E1)
-K11
(option E10, E12)
KAESER KOMPRESSOREN
lay-out
SIGMA AIR MANAGER 4.0
mains voltage 24V DC
AWASAM2-U3000.05
page 2
2 Sht.
Date
Drawn
Released
08.03.2021
Sitter
Oberender
Change
Name
Date

13.8 I/O block 6DI & 6DOT & 4 AII with relays

Enter the wiring information of the actual application into the following tables.

Sample entry in assignment table

Input	Terminal			Line		Destination	Application
DI 1.1	1	X1	11	W7625 2x 16 AWG: 1		Compressor 3 -X1:25	Motor running K3
	+24V	X1	14	W7625 2x 16 AWG: 2		Compressor 3 -X1:26	Motor running K3
DOT 2.1	1	X2	11	1x1 mm²: SM		-K21: A1	Internal wiring
	GND	X2	14	1x1 mm²: SM		-K21: A2	Internal wiring
AII 3.1	1+	X3	11	W4713 2x 16 AWG: BN		DHS -X1:19	Pressure from air main charging system
	1–	X3	13	W4713 2x 16 AWG: SW		DHS -X1:20	
	+24V	X4	21				
	GND	X4	11				
Relay -K21			A1	1x1 mm²: SM		-K1-X2: 11	Internal wiring
			A2	1x1 mm²: SM		-K1-X2: 14	Internal wiring
	CC		11	W4633 3G 16 AWG: BN		Compressor 3 -X3: 18	C3 load
	NC		12				
	NO		14	W4633 3G 16 AWG: SM		Compressor 3 -X3: 19	C3 load

Tab. 143 Sample entry in assignment table I/O block with relays

Module 1: X1 DI1.x

Input	Terminal		Line	Destination	Application
DI 1.1	1	X1	11		
	+24V	X1	14		
DI 1.2	2	X1	21		
	+24V	X1	24		
DI 1.3	3	X1	12		
	+24V	X1	15		
DI 1.4	4	X1	22		
	+24V	X1	25		
DI 1.5	5	X1	13		
	+24V	X1	16		
DI 1.6	6	X1	23		
	+24V	X1	26		

Tab. 144 Assignment I/O block – Module 1: X1 DI1.x – 20DI6371 – 6x DI 24VDC

Module 2: X2 DOT2.x (wiring when shipped)

Input	Terminal			Line	Destination	Application
DOT 2.1	1	X2	11	1x1 mm²: SM	-K21: A1	Internal wiring
	GND	X2	14	1x1 mm²: SM	-K21: A2	Internal wiring
Relay -K21			A1	1x1 mm²: SM	-K1-X2: 11	Internal wiring
			A2	1x1 mm²: SM	-K1-X2: 14	Internal wiring
	CC		11			
	NC		12			
	NO		14			
DOT 2.2	2	X2	21	1x1 mm²: SM	-K22: A1	Internal wiring
	GND	X2	24			
Relay -K22			A1	1x1 mm²: SM	-K1-X2: 21	Internal wiring
			A2	Wire jumper	-K21: A2	Internal wiring
	CC		11			
	NC		12			
	NO		14			
DOT 2.3	3	X2	12	1x1 mm²: SM	-K23: A1	Internal wiring
	GND	X2	15			

Input	Terminal		Line		Destination	Application
Relay -K23		A1	1x1 mm²: SM		-K1-X2: 12	Internal wiring
		A2	Wire jumper		-K21: A2	Internal wiring
	CC	11				
	NC	12				
	NO	14				
DOT 2.4	4	X4	22	1x1 mm²: SM	-K24: A1	Internal wiring
	GND	X4	25			
Relay -K24		A1	1x1 mm²: SM		-K1-X2: 22	Internal wiring
		A2	Wire jumper		-K21: A2	Internal wiring
	CC	11				
	NC	12				
	NO	14				
DOT 2.5	5	X5	13	1x1 mm²: SM	-K25: A1	Internal wiring
	GND	X5	16			

Input	Terminal		Line	Destination	Application
Relay -K25		A1	1x1 mm²: SM	-K1-X2: 13	Internal wiring
		A2	Wire jumper	-K21: A2	Internal wiring
	CC	11			
	NC	12			
	NO	14			
DOT 2.6	6	X6	23	1x1 mm²: SM	SBU: -K26: A1 SIGMA AIR MANAGER 4.0: Control cabinet fan	Internal wiring
	GND	X6	26	SIGMA AIR MANAGER 4.0: 1x1 mm²: SM	SIGMA AIR MANAGER 4.0: Control cabinet fan	
SBU: Relay -K26		A1	1x1 mm²: SM	-K1-X2: 23	Internal wiring
		A2	Wire jumper	-K21: A2	Internal wiring
	CC	11			
	NC	12			
	NO	14			

Tab. 145 Assignment I/O block – Module 2: X2 DOT2.x – X20DO6322 – 6x relays

Modules 3 & 4: X3 & X4 AII3.x

Input	Terminal		Line	Destination	Application
AII 3.1	1+	X3	11		
	1–	X3	13		
	+24V	X4	21		
	GND	X4	11		
AII 3.2	2+	X3	21		
	2–	X3	23		
	+24V	X4	22		
	GND	X4	12		
AII 3.3	3+	X3	14		
	3–	X3	16		
	+24V	X4	23		
	GND	X4	13		
AII 3.4	4+	X3	24		
	4–	X3	26		
	+24V	X4	24		
	GND	X4	14		

Tab. 146 Assignment I/O block Modules 3 & 4 – X3 & X4 AII3.x – X20AI4632-1 – 4x AII 0-22mA 16Bit & X20PD2113

13.9 Hub

Enter the wiring information of the actual application into the following table. If you require more than table, please use this table to create photocopies.

Switch __: K __

Input	Conductor	Destination
Port 1		
Port 2		
Port 3		
Port 4		
Port 5		
Port 6		
Port 7		
Port 8		

Tab. 147 Switch allocation

Switch __: K __

Input	Conductor	Destination
Port 1		
Port 2		
Port 3		
Port 4		
Port 5		
Port 6		
Port 7		
Port 8		

Tab. 148 Switch allocation

13.10 Glossary

Term	Meaning
"ADA"	Abbreviation for: “**A**ir **D**emand **A**nalysis”. KAESER-specific format for the export of data that SIGMA AIR MANAGER 4.0 has collected when controlling the compressed air station.
"Current values"	The display of current measurement data for the entire station or selected machine(s).
"Automatic"	Operating mode in which SIGMA AIR MANAGER 4.0 assumes control of the compressed air station.
"Required pressure"	The demand pressure is the minimum pressure needed by consumers in the compressed air system.

Term	Meaning
"Observation"	If a user logs in with "Logged out" access mode, the system switches to the "Monitor" log-in status. The user is then logged on in read-only mode and can display all menus and check the settings.
"Configuration"	If a user logs in with "Monitor" access mode, the system switches to the "Operate" log-in status. The user is then logged on in read and write mode and can change settings.
"Operating state"	Operating states of compressors and blowers: ■ READY ■ IDLE ■ ON LOAD
AMCS (referred to as 'DHS' for Kaeser equipment)	Abbreviation for: "Air-main charging system."
"Pressure display"	Large numerical pressure display of "Network pressure". This display type is easy to read even from far away.
Pressure performance	The system calculates the pressure performance over a defined interval as the percentage of time with network pressure >= required pressure.
"Air-main charging system (DHS)"	The air-main charging system is a device designed for the relief of the compressed air treatment facility when an empty compressed air network is being filled. This prevents problems in the compressed air treatment equipment caused by excessive compressed air flow rate through the equipment.
"Pressure curve"	The pressure curve is the visual display of the network pressure progression and the selected limits for the entire station or the selected machines.
"Compressed air consumption"	Calculated current compressed air usage in the compressed air network.
Pressure range	The pressure range is the difference between the pressure range limit and the required pressure.
"Pressure range limit"	The pressure range limit is the maximum permissible pressure in the compressed air station. This value may be specified by the compressed air consumer or the compressed air station.
"Pressure transducer"	Sensor for measuring the pressure (relative, absolute or differential pressure). The sensor is available for different pressure measuring ranges and converts pressure into an electric signal.
"Variable speed"	When a "frequency converter" is used, the fixed system AC voltage is converted to an AC voltage with variable frequency. This changes the speed of AC motors and as a result, the flow rate of the machine.
"Engineering Base"	"Engineering Base" is a central KAESER planning tool. It generates configuration files to be imported into SIGMA AIR MANAGER 4.0.

Term	Meaning
Ethernet	The X7 "interface" connects the SIGMA AIR MANAGER 4.0 to the customer's data network. This connection can be used to remotely access the user interface of SIGMA AIR MANAGER 4.0 via "KAESER CONNECT". In addition, SIGMA AIR MANAGER 4.0 is linked to the KAESER IoT client, control technology and the Intranet/Internet.
Remote control	Remote control of SIGMA AIR MANAGER 4.0 from a central control center.
"FOC"	Abbreviation for: fiber optic components . Component for signal transmission via light waves. Used in SIGMA NETWORK for the accurate transmission of data over longer distances with immunity from electromagnetic interference.
"Frequency converter" (FC)	Converts incoming current to produce alternating current of variable frequency and amplitude to operate electrical equipment.
Manual	Operating mode in which the machines use their internal pressure control. This mode may be required during a SIGMA AIR MANAGER 4.0 "software update" for example.
"History"	Display of maximum, average and minimum pressure values and other derived values.
IOM	Abbreviation for: "Input/output modules". Machine control modules with digital and analog input/output ports for SIGMA CONTROL 2 machine control.
"KAESER CONNECT"	The user interface of SIGMA AIR MANAGER 4.0 can be displayed on an Internet-enabled device (PC, laptop, tablet, etc.).
"KAESER IoT Client"	The KAESER IoT client is a data transmission component for SIGMA AIR MANAGER 4.0. It is positioned between SIGMA AIR MANAGER 4.0 and the KAESER DATA CENTER and transfers the data from the compressed air station via a secure VPN connection.
Configuration	■ Settings that can be made directly on the SIGMA AIR MANAGER 4.0 terminal. ■ Data from the Engineering Base output that is imported into SIGMA AIR MANAGER 4.0 and used to control the customer-specific compressed air station.
"Alive message"	SIGMA AIR MANAGER 4.0 features an option for sending a daily e-mail message stating "Alive message" at a pre-selected time. This message confirms that SIGMA AIR MANAGER 4.0 is in operation and that the e-mail function is working.
"Control technology"	Central control and monitoring station. SIGMA AIR MANAGER 4.0 can be controlled remotely via a communications module (X1 interface).
Messages – Active	Displays a list of system messages sorted chronologically, with the most recent messages at the top.
Messages – History	List of the last 1000 messages sorted chronologically.

Term	Meaning
Messages – Unacknowledged	New messages not yet acknowledged by the operator. You can highlight individual messages and acknowledge them by selecting «Acknowledge message». This removes the message from the list of unacknowledged messages.
"Network pressure"	Network pressure is the current pressure in the compressed air network as measured by the "pressure transducer".
System pressure too high	“Pressure too high" is a monitoring function. If the monitoring function is activated, the system issues a warning message as soon as the network pressure exceeds the set threshold value.
System pressure too low	"Pressure too low" is a monitoring function. If the monitoring function is activated, the system issues a warning message as soon as the network pressure falls below the set threshold value.
OLM	Abbreviation for: Optical Link Module. See "FOC".
Predictive maintenance	Predictive maintenance as optional service: KAESER SIGMA SMART AIR.
"PROFIBUS"	The Process Field Bus (Profibus) is a field bus communication standard in plant engineering. PROFIBUS devices are connected in series, i.e. one after another. A terminating resistor is required at both ends of the wiring.
Pt100	Platinum sensor for temperature measurement. A change in temperature causes a precisely measurable change in the platinum sensor's resistance. A Pt100 sensor has a 100 Ohm resistance at 32 °F.
"P&I diagram"	Piping and instrument flow chart in plant and process engineering. The P&I diagram symbolically displays all devices required for the station operation, such as: ■ Compressors ■ Blowers ■ Containers ■ Separators ■ Filters ■ Valves ■ Fans/ventilators ■ Coolers ■ Piping ■ Actuators ■ Sensors
"RFID"	Abbreviation for: Radio Frequency identification. Non-contacting and reliable identification technology. Consists of a reader and a chip card or chip.
SAM	SIGMA AIR MANAGER. KAESER first-generation master controller for the energy-efficient control of compressed air stations with up to 16 compressors.
"SIGMA AIR MANAGER 4.0"	KAESER master controller for Industry 4.0 for energy-efficient control, monitoring and evaluation of compressed air stations with up to 16 compressors.

Term	Meaning
"SAM 4.0 Logic"	Using SAM 4.0 Logic, you can create programs for the control of machines or devices, similar to a PLC (programmable logic controller).
"SBU"	The SIGMA NETWORK bus converter is an interface expansion for SIGMA AIR MANAGER 4.0. A SBU is connected via SIGMA NETWORK to SIGMA AIR MANAGER 4.0.
SCS	Abbreviation for: “SIGMA CONTROL SMART”.
SIGMA CONTROL SMART	Machine controller for, e.g. KAESER dryers.
SD card	Digital storage medium. An SD card can be inserted in the SIGMA AIR MANAGER 4.0 using the X3 card slot. This can be used for control data storage, software updates and for importing configuration data from the Engineering Base.
SFC	Abbreviation for: SIGMA Frequency Converter: see "Frequency converter".
SIGMA CONTROL 2	Machine controller for KAESER compressors and blowers.
"SIGMA NETWORK"	KAESER-specific network based on Modbus TCP for controlling compatible KAESER machines. The devices are connected to SIGMA NETWORK in a star set-up.
SNW	Abbreviation for: "SIGMA NETWORK".
"Specific power"	The required electric power that is required for compressing a volume unit per time unit.
PLC	Abbreviation for: programmable logical controller. See "SAM 4.0 Logic".
"Station"	Compressed air station consisting of compressed air machines and components.
ADT	Compressed air is heated during the compression process. The airend discharge temperature (ADT) is the compression temperature at the compressed air outlet, measured directly at the airend.
VPN	Abbreviation for: virtual private network: private computer network that uses a public network infrastructure.
Volumetric flow rate	The rate of compressed air delivery for the entire station or the selected machine.
"Timer control"	Using the time control, you can set timers for various compressed air station parameters (e.g. "Required pressure" or air delivery ON/OFF). The time control is configured locally at SIGMA AIR MANAGER 4.0.

Tab. 149 Glossary