User Manual

Controller

SIGMA CONTROL 2 SCREW FLUID ≥4.0.X

No.: 9_9450 07 USE

Manufacturer:

KAESER KOMPRESSOREN SE

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/KKW/SSC 2.08 en Z1 IBA-SIGMA CONTROL FLUID
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KAESER KOMPRESSOREN

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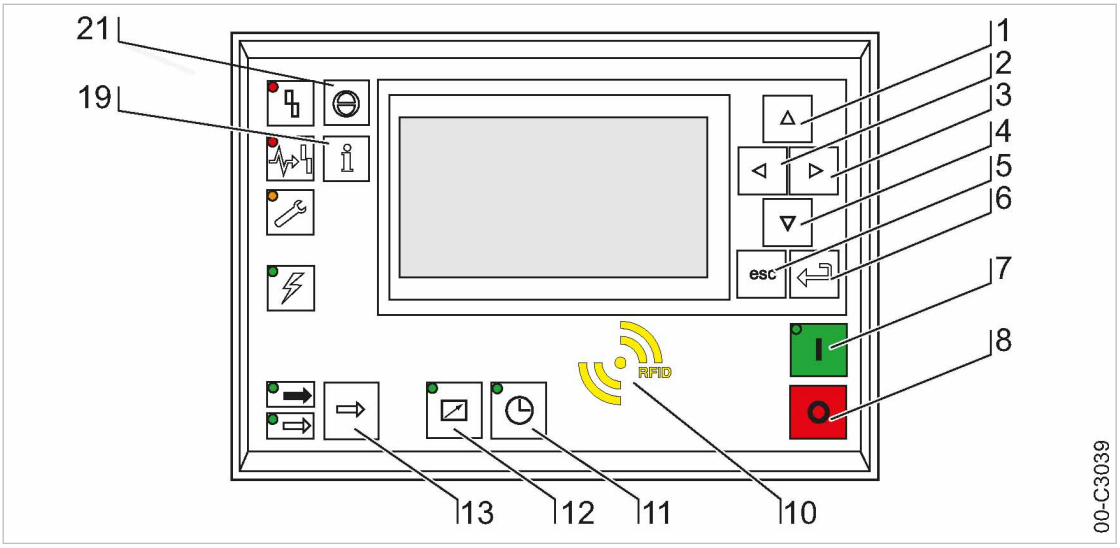


Fig. 1 Operating elements

Item	Description	Function
1	«Up»	Scrolls up the menu options. Increases a parameter value.
2	«Left»	Jumps to the left. Moves the cursor position to the next left field.
3	«Right»	Jumps to the right. Moves the cursor position to the next right field.
4	«Down»	Scrolls down the menu options. Reduces a parameter value.
5	«Escape»	Returns to the next higher menu option level. Exits the edit mode without saving.
6	«Enter»	Jumps to the selected submenu option. Exits the edit mode and saves.
7	«ON»	Switches the machine on.
8	«OFF»	Switches the machine off.
10	RFID	RFID reader for user log-in with RFID Equipment Card.
11	«Timer control»	Switches the timer control on and off.
12	«Remote control»	Switches the remote control on and off.
13	«LOAD/IDLE»	Toggles between the LOAD and IDLE modes.
19	«Information»	Displays the event memory.
21	«Acknowledgement»	Confirms/acknowledges alarms and warning messages. If permissible: Resets the fault counter (RESET).

Tab. 1 Operating elements

1.2 Display elements

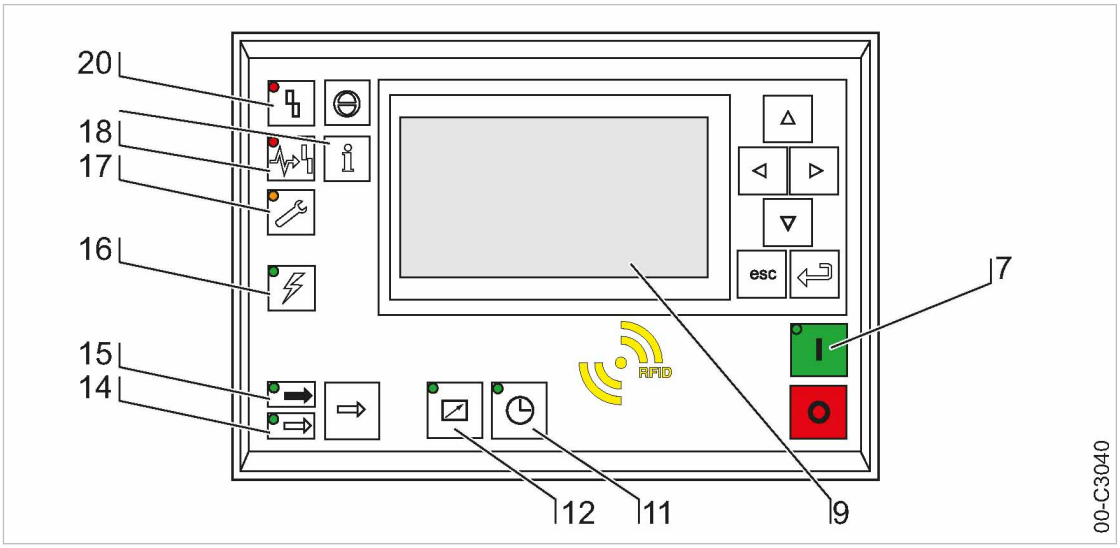


Fig. 2 Display elements

Item	Description	Function
7	*ON*	Display illuminates green when the machine switched on.
9	*Display*	Graphic display with 8 lines and 30 characters per line.
11	*Timer control*	Continuous green light when the machine is controlled by the timer.
12	*Remote control*	Continuous green light when the machine is in remote control.
14	*IDLE*	Continuous green light when the machine is running in IDLE. Flashes when the «LOAD/IDLE» toggle key is pressed.
15	*LOAD*	Continuous green light when the machine is running in LOAD.
16	*Controller voltage*	Continuous green light when voltage is applied to the controller.
17	*Warning*	Flashes in yellow in the following events: ■ Maintenance work due ■ Warning message Continuous yellow light after acknowledgement.
18	*Communications error*	Continuous red light to indicate a defective communication connection, or an external alarm message without machine shutdown.
20	*Alarm*	Flashes red to indicate a machine alarm. Continuous red light after acknowledgement.

Tab. 2 Display elements

1.3 Main menu

Press «Up» / «Down» / «Enter» to open the main menu.

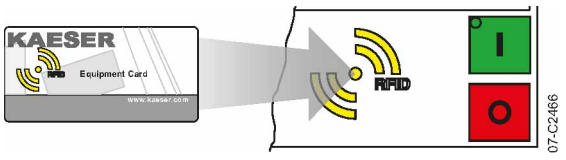
Menu No.	Menu designation	Function
1	Status	Displays messages, statistics and status information.

Menu No.	Menu designation	Function
2	Performance data	Displays measured data of the machine and its components (e.g., motors).
3	Operating data	Displays operating hours, switching cycles and energy data.
4	Maintenance	Displays maintenance data of the machine and its components.
5	Configuration	Setting of machine parameters, compressed air system and accessories.
6	Compressor clock	Setting the timer control.
7	User	Manual user log-in and password administration.
8	Communication	Setting the Ethernet interface, COM modules and control center connection.
9	Machine test	Safety relief valve and temperature sensor test and shutdown at excessive temperature.
10	Components	Display of settings on machine components, e.g. the power switching unit.

Tab. 3 Main menu

See Chapter 5.6.2 for the complete menu structure.

1.4 Functions – Overview

Function	Menu No.	Action steps	Chapter
Setting the contrast	Main menu	Press and hold «Information» – «Up» / «Down».	8.2.11
Setting the brightness	Main menu	Press and hold «Information» – «Left» / «Right».	8.2.11
Setting the language	Main menu	«Enter» – «Up» – «Enter» – «Up» / «Down».	8.2.2
Setting date, time and time zone	5.1	*<Configuration – General>*.	8.2.7
Identification with RFID Equipment Card	–		8.2.4
Setting pressure parameters	5.2.2	*<Configuration – Pressure control – Pressure settings – pA/pB>*.	8.4
Setting the «Timer control»	6	*<Compressor clock – Setting timing program>*.	8.5.1
Activating the «Timer control» key	6	*<Compressor clock – Key clock – ☑>*.	8.5.1.3
Activating «Timer control»	–	Activate the «Timer control» key – Press «Timer control».	8.5.1.4

Function	Menu No.	Action steps	Chapter
Activate the «Remote control» key	5.2.3 5.4.1 5.5	*<Configuration – Compressor start – Compressor on – Key remote – ☑>*.	8.2.12
Activating the «Remote control»	–	Activate the «Remote control» key – Press «Remote control».	8.2.12
Setting the control mode	5.3	Select *<Configuration – Control mode – Local mode – Control mode>*.	8.6.1
Setting up the holiday period	5.4.2	*<Configuration – Compressor start – Compressor off – Holidays – Start/End/☑>*.	8.5.2
Displaying operating data	3	*<Operating data – Operating hours / Switching cycles>*.	9.8
Setting the maintenance interval	4	*<Maintenance – Select/set component>*.	9.10
Checking the safety relief valve	9.1	For the test process, see Chapter.	9.11
High temperature shutdown test	9.1	For the test process, see Chapter.	9.12
Alarm messages	1.1.1	An alarm message causes the machine to shut down. The *Alarm* LED flashes red. Alarm messages are identified with the letter **A**. Example: <0002 S k 31/12/2017 13:14:15 Motor temperature ⇞> .	10.2
Warning messages	1.1.1	If maintenance work is to be carried out or if the warning is displayed before an alarm, the yellow *Warning* LED flashes. Warning messages are identified with the letter **W**.	10.3
Operational messages	1.1.1	Operational messages provide information about the current operational state of the machine. Operational messages are identified with the letter **O**.	10.4
Diagnostic messages	1.1.1	A diagnostic message causes the machine to shut down. They provide information on the status of the controller, the connected input and output modules and support an authorized KAESER service representative in troubleshooting. Diagnostic messages are identified with the letter **D**.	10.5
System messages	1.1.1	A system message causes the machine to shut down. System messages are identified with the letter **Y**.	10.6

Tab. 4 Functions – Overview

Settings can be made after log-in with the RFID Equipment Card and password access level 2.

2 Regarding this Document

2.1 Using this document

The user manual contains important information to the entire life cycle of SIGMA CONTROL 2.

The user manual is a component of the product.

- ➢ Keep the user manual in a safe place throughout the life of SIGMA CONTROL 2.
- ➢ Pass the user manual on to the next owner/user of the machine.
- ➢ Ensure that all amendments received are inserted into the user manual.

2.2 Copyright

This user manual is protected by copyright. Any queries regarding the use or duplication of this documentation should be referred to KAESER. Correct use of information will be fully supported.

2.2.1 Software

The software used in SIGMA CONTROL 2 contains copyright-protected software packages which are licensed as Open Source.
A copy of these licenses is contained in SIGMA CONTROL 2.
Display the licenses by pointing your browser to the "COPYING" file in the root directory of SIGMA CONTROL 2.
URL:
http:// <Hostname>/COPYING

The licenses can also be found under these addresses:
http://www.gnu.org/licenses
http://code.google.com/p/curve25519-donna/

Within three years from receipt of SIGMA CONTROL 2, you may obtain the complete source code by sending a corresponding order to the following address:

Technical Office Electrical Design
KAESER KOMPRESSOREN SE
96450 Coburg, Postfach 2143
Germany

This offer is valid for anybody having this information.

2.3 Approvals

The product has the following approvals:

- 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 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
- To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).
- This device complies with Part 15 of the FCC Rules. 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 complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
  - This device may not cause interference and
  - This device must accept any interference, including interference that may cause undesired operation of the device
- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
  - l'appareil ne doit pas produire de brouillage, et
  - l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

2.4 Updating the user manual

The page http://www.kaeser.com/int-en/manuals/response.aspx of our website provides frequently updated versions of this user manual.

➢ Download the user manual in your language.

2.5 Symbols and labels

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

2.5.1 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 non-compliance
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. 5 Danger levels and their definition (personal injury)

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

⚠ DANGER
The type and source of the imminent danger is shown here!
The possible consequences of ignoring a warning are shown here.
If you ignore the warning notice, the "DANGER" signal word indicates a lethal or severe injury will occur.
➢ *The measures required to protect yourself from danger are shown here.*

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

Example:

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

2.5.2 Potential damage warnings

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

Warning notices for damages are identified by their signal term.

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

Tab. 6 Danger levels and their definition (damage to property)

Example:

NOTICE

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

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

➢ Carefully read and fully comply with warnings against damages.

2.5.3 Other alerts and their symbols

The meaning of names is emphasized by different formatting. Depending on the font, not all formatting options can be realized.

Name	Formatting	Example
Operating state	UPPER CASE	LOAD
Item number	(...)	Open valve (4)
Indication	*italic*	*ON* LED
Key	« ... »	«ON» key
Menu option	*< ... >*	*<Configuration>*
Menu path	*<Menu 1 – Menu 2 – ...>*	*<Configuration – Pressure control>*
activated	...	The minutes display flashes. 00:00:00

Tab. 7 Formatting options

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.
Operating instructions with several steps are numbered in the sequence of the operating steps.

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

➢ ... as is a solution.

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

Further information Further subjects are introduced here.

3 Technical Data

3.1 SIGMA CONTROL 2 Controller

Industrial computer

- Internal temperature monitoring
- Internal low voltage monitoring
- Battery-buffered real-time clock
  - Battery service span more than 10 years
  - Battery replaceable

3.1.1 Versions and options

SIGMA CONTROL 2 is offered in different designs.

Type	Prepared for connection to control center	Connection to control technology not provided
Option	C3	C48
Compo-nents	Main Control System (MCS): Slot for an optional communication module (to connect to a control center)	Main Control System Input Output (MCSIO): Digital and analog inputs and outputs integrated
	Input-Output-Module (IOM): Modules with digital and analog inputs and outputs.	

Tab. 8 Versions and options

3.1.2 User interface with display, CPU and interfaces

User interface

Feature	MCS	MCSIO
Material	Plastics	
Width [in.]	7.5	
Height [in.]	5.1	
Depth [in.]	1.8	2.4
Number of membrane keys	13	
Number of LEDs	9	
Degree of protection, control cabinet exterior	IP 54	
Degree of protection, control cabinet interior	IP 20	
Voltage [V]	24	
Current [A]	0.3	2.5
Voltage source	Input/output module	External

Tab. 9 User interface

Display

Feature	Value
Graphical display [px]	255 x 128
Width [in.]	3.2
Height [in.]	1.6
Maximum number of lines/characters	8/30
Colors	Black/white with grey scale
Lighting	LED backlit
px = pixel	

Tab. 10 Display data

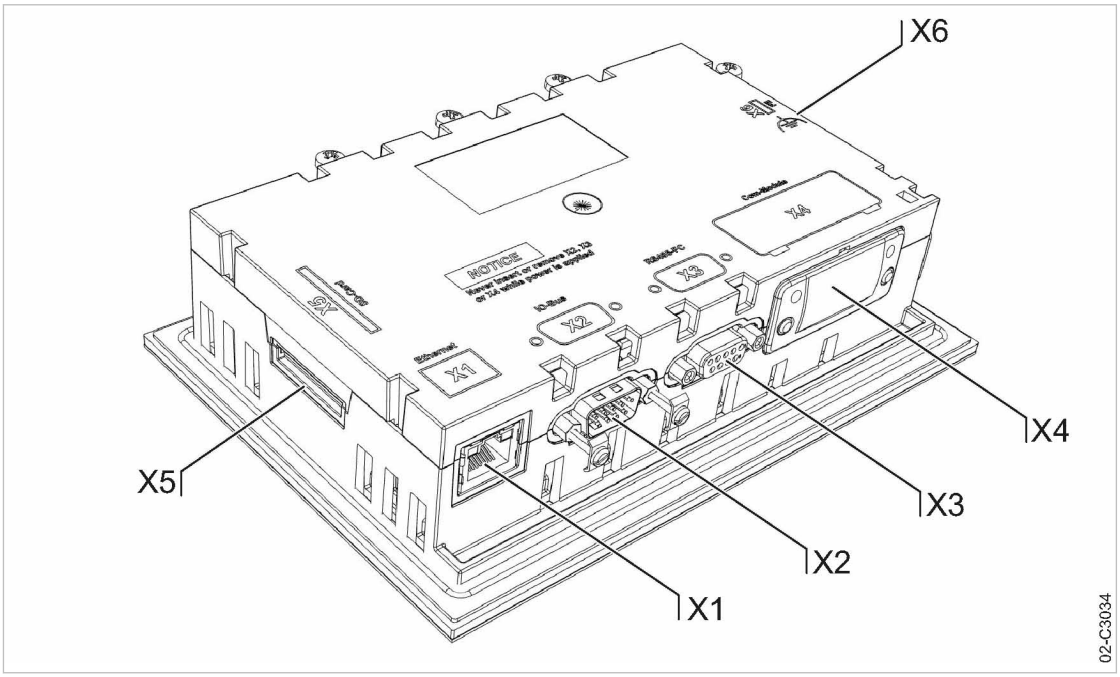


Fig. 3 MCS interfaces

Identification	Interface	Connection
X1	Ethernet 10/100 Base T	RJ 45 socket
X2	I/O bus	9-pole SUB-D pins
X3	RS485–FC (USS interface)	9-pole SUB-D socket
X4	Com modules, slot for communications module	Module optional for: PROFIBUS, PROFINET, Modbus RTU, Modbus TCP, DeviceNet
X5	SD card, SD card slot	SD/SDHC card
X6	FG	Functional ground (FG)
The positions of the interfaces X1–X6 are marked on the rear of the controller.		

Tab. 11 MCS interfaces

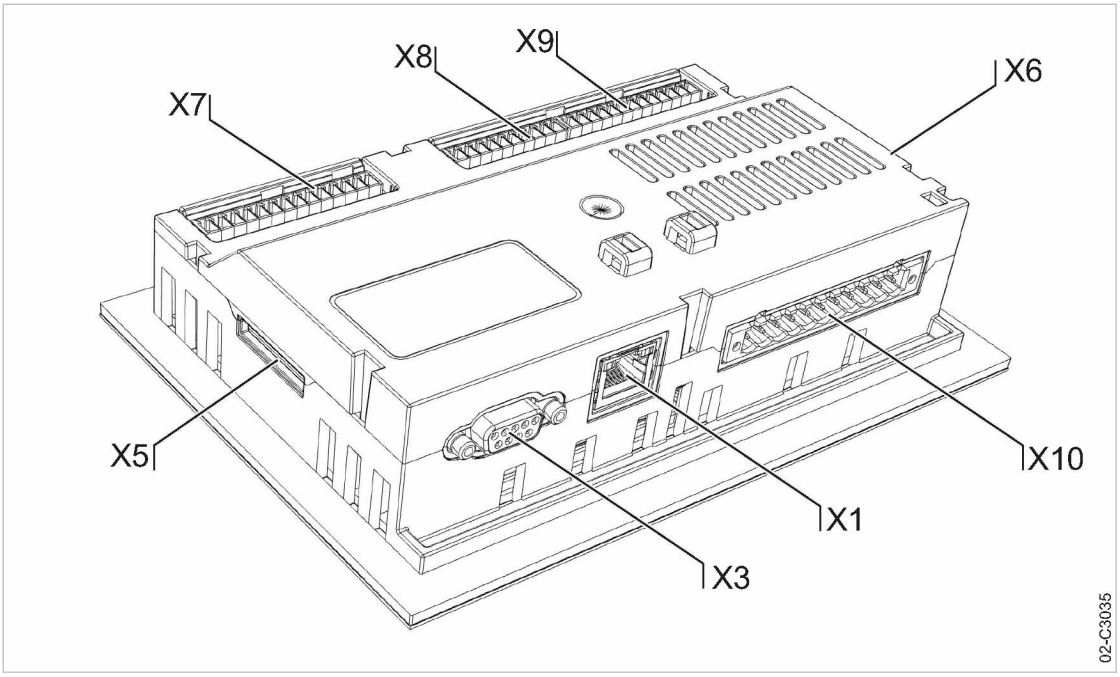


Fig. 4 MCSIO interfaces

Marking	Interface	Connection
X1	Ethernet 10/100 Base T	RJ 45 socket
X3	RS485–FC (USS interface)	9-pole SUB-D socket
X5	SD card, SD card slot	SD/SDHC card
X6	FG	Functional ground (FG)
X7	24 VDC, DII	Power supply 24 VDC Digital inputs DII1.00–DII1.05
X8	DII/DOT	Digital inputs DII1.06–DII1.07 Digital outputs DOT1.00–DOT1.01
X9	AII/AIR	Analog input current 0–20 mA, AII1.00–AII1.01 Analog input resistor AIR1.00–AIR1.01
X10	DOR	Digital output relay 250 VAC, 4 A DOR1.00–DOR1.04
The positions of the interfaces X1–X10 are marked on the rear of the controller.		

Tab. 12 MCSIO interfaces

Identification with RFID Equipment Card

Feature	Value
Hardware on the SIGMA CONTROL 2 controller	RFID write/read device
Hardware (external)	RFID Equipment Card
Recognition distance [in.]	Max. 2

Feature	Value
Frequency [MHz]	13.56

Tab. 13 RFID

3.1.3 Inputs and outputs with MCSIO

Integrated inputs and outputs with MCSIO type controller

Input/Output	Number
Digital input (DI), 24 VDC	8
Digital output transistor (DOT), 24 VDC, 0.5 A	2
Analog input current (AII), 0–20 mA	2
Analog input resistor (AIR), PT100	2
Digital output relay (DOR), 250 VAC, 4 A	5

Tab. 14 MCSIO inputs and outputs

3.1.3.1 Maximum cable lengths

Input/Output	Cable length [ft.]
Analog input current (AII), Analog input resistor (AIR) Analog output current (AOI)	< 100
Digital input (DI), Digital output relay (DOR)	< 330
Digital output transistor (DOT)	< 100

Tab. 15 Cable lengths

3.1.4 Input/output modules

IOM modules only in combination with the MCS controller type

There are three different types of input/output modules with different numbers of inputs and outputs.
The number of input/output modules actually available depends on the machine type and the available options.
Refer to the machine's wiring diagram for the input/output modules installed in your equipment.

The input/output module features:

- Internal temperature monitoring
- Internal low voltage monitoring
- LED indication of operational status

IOM 1

Input/Output	Input/output module 1		
	Internal, into the control cabinet	Available in parallel on both sides	External, into the compressor interior
Digital input (DI), 24 VDC	4	10	2
Analog input current (AII), 0–20 mA	–	1	2
Analog input resistor (AIR), PT100	–	1	3
Digital output relay (DOR), 250 VAC, 8 A	8	–	–
Digital output transistor (DOT), 24 VDC, 0.5 A	–	2	1
Analog output current (AOI), 0–20 mA	–	–	–

Tab. 16 IOM 1

IOM 2

Input/Output	Input/output module 2		
	Internal, into the control cabinet	Available in parallel on both sides	External, into the compressor interior
Digital input (DI), 24 VDC	6	–	2
Analog input current (AII), 0–20 mA	–	1	2
Analog input resistor (AIR), PT100	–	3	–
Digital output relay (DOR), 250 VAC, 8 A	4	–	–
Digital output transistor (DOT), 24 VDC, 0.5 A	–	2	2
Analog output current (AOI), 0–20 mA	–	1	–

Tab. 17 IOM 2

IOM 3

Input/Output	Input/output module 3		
	Internal, into the control cabinet	Available in parallel on both sides	External, into the compressor interior
Digital input (DI), 24 VDC	6	–	2
Analog input current (AII), 0–20 mA	–	1	3
Analog input resistor (AIR), PT100	–	3	8
Digital output relay (DOR), 250 VAC, 8 A	8	–	–
Digital output transistor (DOT), 24 VDC, 0.5 A	–	1	1
Analog output current (AOI), 0–20 mA	–	1	–

Tab. 18 IOM 3

3.1.4.1 Electrical connection specifications IOM

Power is provided by the power supply unit within the machine.

Feature	Value
Rated power supply (stabilized) [V DC]	24
Current consumption SIGMA CONTROL 2 with IOM 1 [A]	2.4
Current consumption IOM 2 [A]	2.5
Current consumption IOM 3 [A]	1.6
IOM = Input/Output module	

Tab. 19 Power supply specifications

3.1.4.2 Maximum cable lengths

Input/Output	Conductor length [ft.]
Analog input current (AII), Analog input resistor (AIR) Analog output current (AOI)	< 100
Digital input (DI), Digital output relay (DOR)	< 330
Digital output transistor (DOT)	< 100

Tab. 20 Cable lengths

3.1.4.3 Input/output module – degree of protection

Feature	Value
Degree of protection within the machine	IP 54
Degree of protection within the control cabinet	IP 20

Tab. 21 IOM degree of protection

3.1.4.4 Input/output modules – dimensions

Feature	Value
Width [in.]	4.9
Height [in.]	9.8
Depth [in.]	1.7

Tab. 22 IOM dimensions

3.1.5 Sensors

Pressure transducer

Feature	Value
Output signal [mA]	0/4–20

Feature	Value
Connection	Twin cable

Tab. 23 Pressure transducer

Resistance thermometer

Feature	Value
Sensing resistance	PT100
Connection	Twin cable

Tab. 24 Resistance thermometer

4 Safety and Responsibility

4.1 Basic instructions

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:

- ➢ Close and lock the door of the equipment properly.
- ➢ Place the equipment as far as possible from the interfered radio or television receiver.

Changes or modifications not expressly approved by KAESER could void the user's authority to operate the equipment.

This device complies with Industry Canada licence-exempt RSS standard(s).
Operation is subject to the following two conditions:

- this device may not cause interference and
- this device must accept any interference, including interference that may cause undesired operation of the device

SIGMA CONTROL 2 is manufactured to the latest engineering standards and acknowledged safety regulations.

The safety regulations of the machine in which SIGMA CONTROL 2 is installed apply.

4.2 Specified use

SIGMA CONTROL 2 is solely intended for the control of machines in which SIGMA CONTROL 2 is factory-installed. 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 specifications given in this user manual and the machine's operator manual.
- ➢ Operate the machine only within its performance limits and under the permitted ambient conditions.

4.3 Improper use

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

- ➢ Use SIGMA CONTROL 2 only as intended.
- ➢ Do not use SIGMA CONTROL 2 to control other machines or products for which SIGMA CONTROL 2 is not intended.

5 Design and Function

5.1 The controller

SIGMA CONTROL 2 controls, regulates, monitors, and protects the machine.

All parameters needed to operate KAESER rotary screw compressors can be set and displayed using the controller. Various user-dependent password mechanisms protect the parameters.

Components

SIGMA CONTROL 2 has the following components:

- **M**ain **C**ontrol **S**ystem (MCS):
  - Industrial PC.
  - Software for the control, regulation, and monitoring of the machine, for the display and modification of settings and for communication.
  - User interface with backlit display, touch keys, LEDs, and interfaces.
  - **R**adio **F**requency **I**denfication (RFID):
    Identification with RFID Equipment Card.
  - Slot for customer interface; optional communications module.
  - SD card slot for SD/SDHC cards:
    Manual loading of updates with an SC card, reading or recording process data.
- **M**ain **C**ontrol **S**ystem **I**nput **O**utput (MCSIO):
  - As with MCS, but with:
  - Integrated digital and analog inputs and outputs.
  - Without slot for customer interface.
- **I**nput-**O**utput-**M**odule (IOM):
  For SIGMA CONTROL 2 (Prepared for connection to control center): modules with digital and analog inputs and outputs with autonomous power supply.

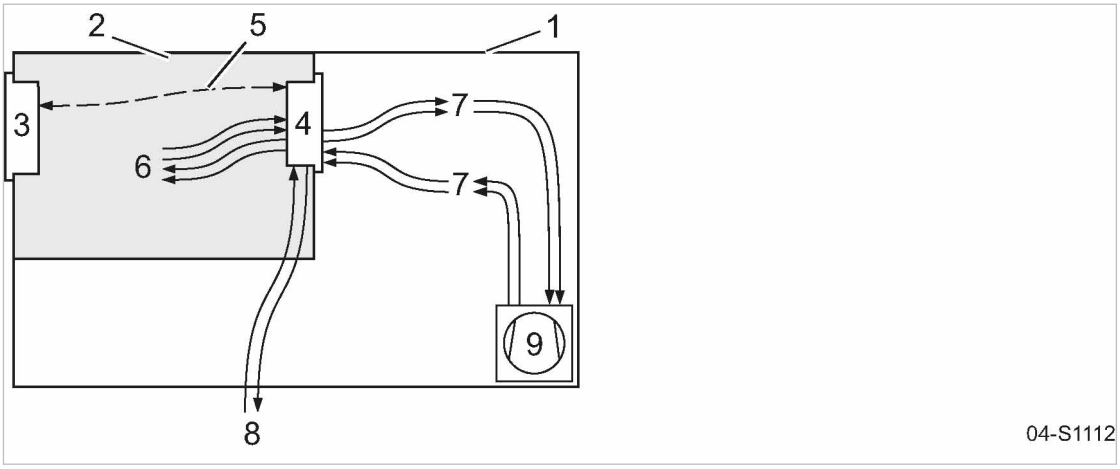


Fig. 5 MCS system design with IOM

1. Machine enclosure
2. Control cabinet
3. SIGMA CONTROL 2 (Prepared for connection to control center)
4. Input-Output-Module (IOM):
5. I/O bus
6. Inputs/outputs in the interior of the control cabinet
7. Inputs/outputs in the interior of the compressor
8. Inputs/outputs for external sensors
9. Compressor

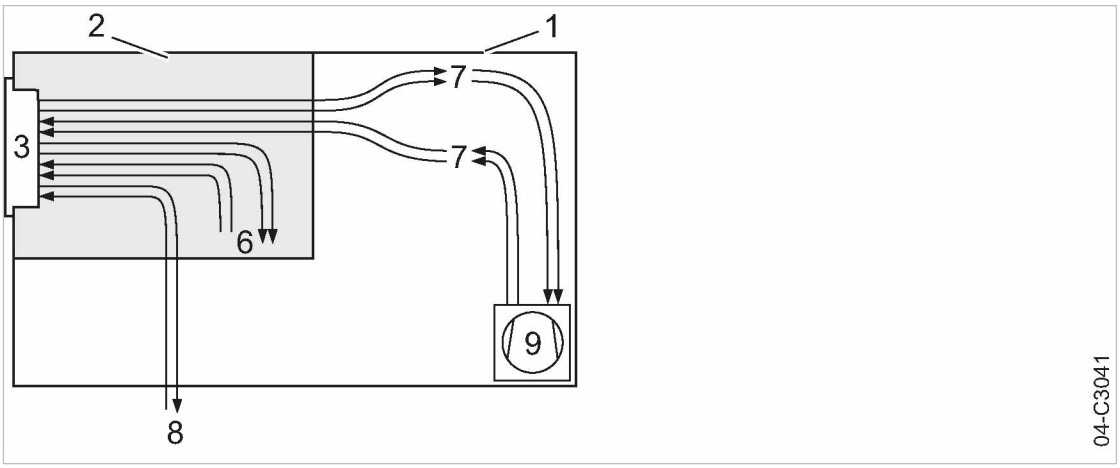


Fig. 6 MCSIO system design

1. Machine enclosure
2. Control cabinet
3. SIGMA CONTROL 2 (Connection to control technology not provided)
6. Inputs/outputs in the interior of the control cabinet
7. Inputs/outputs in the interior of the compressor
8. Inputs/outputs for external sensors
9. Compressor

Function

The **control and regulating function** allows:

- Automatic changeover of the machine from LOAD to IDLE or READY.
- Optimum utilization of the drive motor in relation to the user's actual air demand.
- Automatic restart of the machine after a power failure (can be deactivated).

The **monitoring function** allows:

- Supervision of all maintenance-relevant components via the maintenance interval counters.
- Display of warning and maintenance messages for due maintenance on the display of SIGMA CONTROL 2.

The **protective function** allows:

- Automatic machine shutdown on alarms that may lead to damage to the machine, e.g. high current, high pressure or high temperature.

5.2 Operating panel

5.2.1 Indicating and operating elements

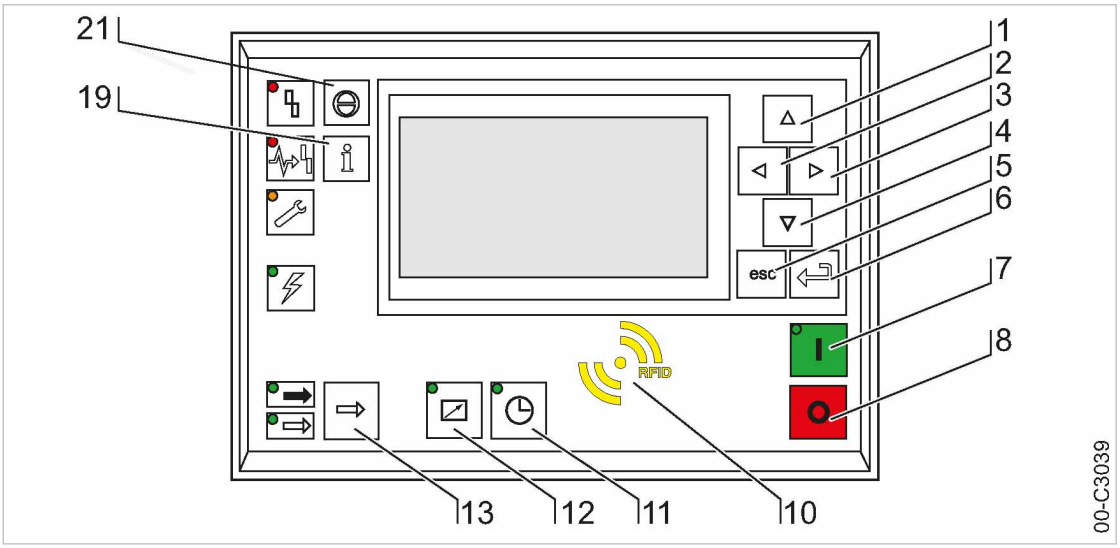


Fig. 7 Indicating and operating elements

Item	Description	Function
1	«Up»	Scrolls up the menu options. Increases a parameter value.
2	«Left»	Jumps to the left. Moves the cursor position to the next left field.
3	«Right»	Jumps to the right. Moves the cursor position to the next right field.
4	«Down»	Scrolls down the menu options. Reduces a parameter value.
5	«Escape»	Returns to the next higher menu option level. Exits the edit mode without saving.
6	«Enter»	Jumps to the selected menu option. Exits the edit mode and saves.
7	«ON»	Switches the machine on.
8	«OFF»	Switches the machine off.
10	RFID	RFID reader for user log-in with RFID Equipment Card.
11	«Timer control»	Switches the timer control on and off.

Item	Description	Function
12	«Remote control»	Switches the remote control on and off.
13	«LOAD/IDLE»	Toggles between the LOAD and IDLE modes.
19	«Information & Events»	Displays the event memory.
21	«Acknowledgement»	Confirms/acknowledges alarms and warning messages. If permissible: Resets the fault counter (RESET).

Tab. 25 Operating elements

5.2.2 Display elements

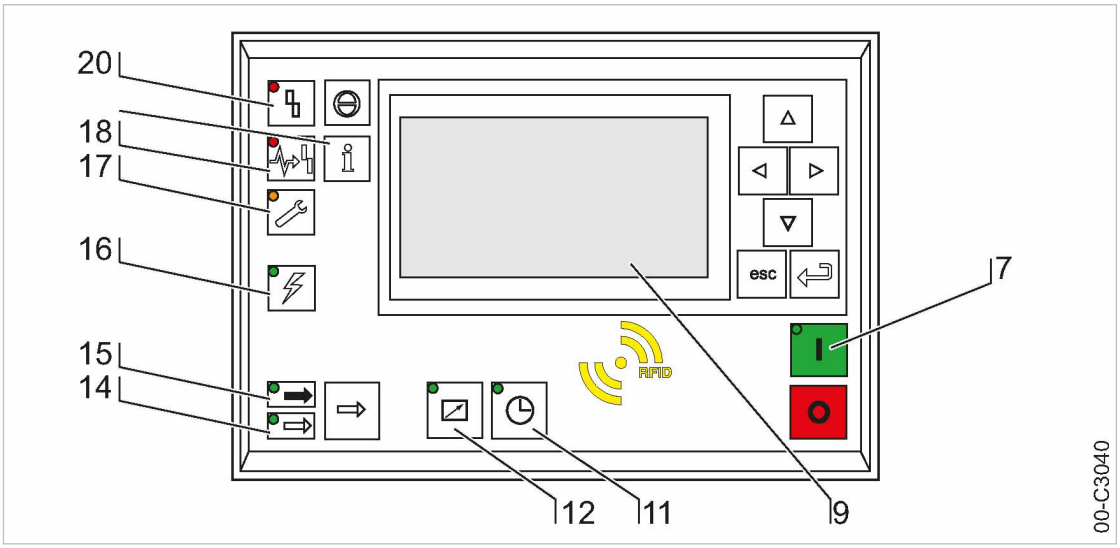


Fig. 8 Display elements

Item	Description	Function
7	*ON*	Continuous green light when the machine switched on.
9	*Display*	Graphic display with 8 lines and 30 characters per line.
11	*Timer control*	Continuous green light when the machine is controlled by the timer.
12	*Remote control*	Continuous green light when the machine is in remote control.
14	*IDLE*	Continuous green light when the machine is running in IDLE. Flashes when the «LOAD/IDLE» toggle key is pressed.
15	*LOAD*	Continuous green light when the machine is running in LOAD.
16	*Controller voltage*	Continuous green light when voltage is applied to the controller.
17	*Warning*	Flashes in yellow in the following events: ■ Maintenance necessary ■ Warning message Continuous yellow light after acknowledgement.
18	*Communications error*	Continuous red light to indicate a defective communication connection, or an external alarm message without machine shutdown.

Item	Description	Function
20	*Alarm*	Flashes red to indicate a machine alarm. Continuous red light after acknowledgement.

Tab. 26 Display elements

5.2.3 RFID reader

RFID is the abbreviation for “**R**adio **F**requency **I**dentification” and makes possible to identify persons and objects.
Placing a suitable transponder in front of the RFID reader of the controller will automatically activate the communication between transponder and SIGMA CONTROL 2.

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

Typical application:

- Operators log on at the machine.
  (Manual input of the password not required)

The RFID Equipment Cards are carefully packed in a plastic sleeve.
This plastic sleeve is attached to the rear of the controller in the control cabinet.

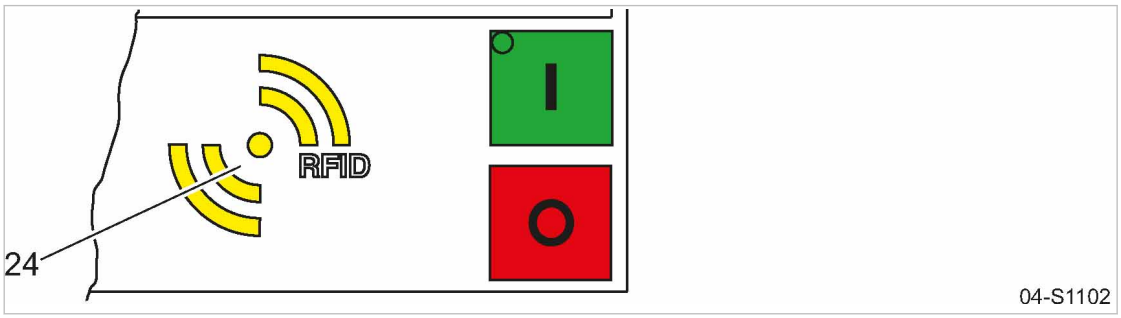


Fig. 9 RFID reader

Item	Description	Function
24	RFID	RFID reader for the communication with a RFID Equipment Card or RFID Key.

Tab. 27 RFID reader

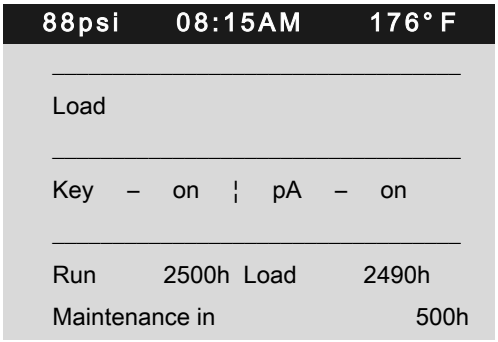
5.3 Display

Use the display to read information and to enter data. The display comprises 8 lines, each of 30 characters.

During operation, the display will indicate the operating mode.

Pressing «Enter» or one of the arrow keys opens the main menu. Here, you can set the language to be used for the display of texts or open the various submenus.

5.3.1 Operating mode



Header

Current operating mode

Operating parameters

Operating parameters

Maintenance indicator

Header

The header is the topmost line on the display. It is always shown as white text on a black background.

Important information and values are displayed in the header.

The displayed data varies depending on the machine type:

Type	Header, left	Header, center	Header, right
SIGMA CONTROL 2 FLUID	Working pressure	Time	Airend discharge temperature
SIGMA CONTROL 2 DRY	Working pressure	Time	Airend discharge temperature
SIGMA CONTROL 2 VAC	Working pressure	Time	Airend discharge temperature
SIGMA CONTROL 2 BOOSTER	Pressure at the compressed air inlet p1	Temperature at the compressed air outlet T2	Pressure at the compressed air outlet p4

Tab. 28 Header

Lines 3 and 5: Operational state

Depending on the settings, either the current state of the machine or a menu text is shown in line 3. The following parameters with their current values are displayed in line 5:

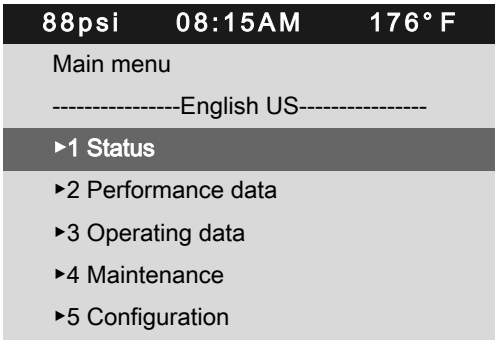
- Remote control yes/no
- Timer control yes/no
- Pressure control

Lines 7 and 8: Machine state

The following parameters with their current values are displayed in lines 7 and 8:

- The hours during which the machine was activated.
- The hours during which the machine ran in operating mode LOAD.
- Remaining working hours of the machine before the next maintenance.

5.3.2 Main menu



Description

The main menu is the top menu level. You open the individual submenus in the main menu.

A scrollbar appears at the right side of the display if you open a menu with more than 6 lines. It represents the currently visible portion of the menu. A short scrollbar thus indicates that the opened menu is very long as only a small portion can be displayed.

The image above provides an example for the appearance of the main menu (without scrollbar).

Numbering

Each menu is numbered.

Not all menus may be displayed because the access to certain menus is restricted by the access level, and some menus are displayed or hidden due to specific settings or options.

For example, you can recognize subordinate menus in the menu structure by the number preceding their designation. The menu structure is explained in chapter 5.6.2.

Active line

The active line is always shown as white text on a dark background. Do not confuse this with the header which is also shown with white lettering on a black background.

Press «Enter» to open a menu in the active line. This opens the selected menu.
Here, you can change parameters.

5.3.3 Setting parameters

In order to set a parameter in the active line of the selected menu, you must always switch to setting mode.

Changing parameters

Press «Enter». The value of the parameter will flash indicating that it can be changed.

The «Enter» key affects only the active line.

In some lines, you can change more than a single parameter.
In this case, you must first select the specific parameter with the «Left» or «Right» keys.

Resetting current parameters

In order to reset current parameters to zero, activate the check box for *Reset* in the active line of the display.

First, press «Enter» to switch into setting mode. The check box *Reset* will flash.
You then press «Up». The check box is activated and flashes.
Press «Enter» to save the settings.
The parameters no longer flash and are reset. The check box for *Reset* is again deactivated.

Check box *Reset*	Status
☒	activated
☐	deactivated

Tab. 29 Reset check box status

5.3.4 Activating keys with check boxes

Certain keys of the SIGMA CONTROL 2 are locked by default. Activate the corresponding check boxes in the active line of the display to unlock these keys.

First, press «Enter» to switch into setting mode. The check box will flash.
You then press «Up». The check box is activated and flashes.
Press «Enter» again to save the settings.
The display line no longer flashes and the key is activated.
Proceed correspondingly to deactivate a key.

Check box	Status
☑	activated
☐	deactivated

Tab. 30 Check box status

5.4 Access rights

Access to the controller is governed by the user name combined with a password.

Users log on using an RFID Equipment Card by default. Alternatively, you can manually enter the user name and the password.

When the controller is switched on, the lowest level of access (level 0) is activated.

You have access to a further level: Access level 2
Access level 2 allows you to display and adjust further parameters.

The access level will automatically return to level 0 after 10 minutes without any key being pressed.

Secure storage of the RFID Equipment Cards

You will receive 2 RFID Equipment Cards with each machine.
They are stored in a plastic sleeve.
This plastic sleeve is attached at the rear of the controller in the control cabinet.
If you lose both RFID Equipment Cards, you can register a new RFID Equipment Card only after having entered the user name and the password. A new RFID Equipment Card may be registered by KAESER service subject to a fee, if the user name and the password are lost.

5.5 KAESER CONNECT

Using an Internet-capable device with web browser, you can open a visualization of the controller. This enables remote checking of, for example, the operating and energy efficiency of your machine. For this purpose, you must once generate a password (see Chapter 8.2.5). KAESER CONNECT does not require additional software to do so. The display language of KAESER CONNECT can be set independently to the language used with SIGMA CONTROL 2.

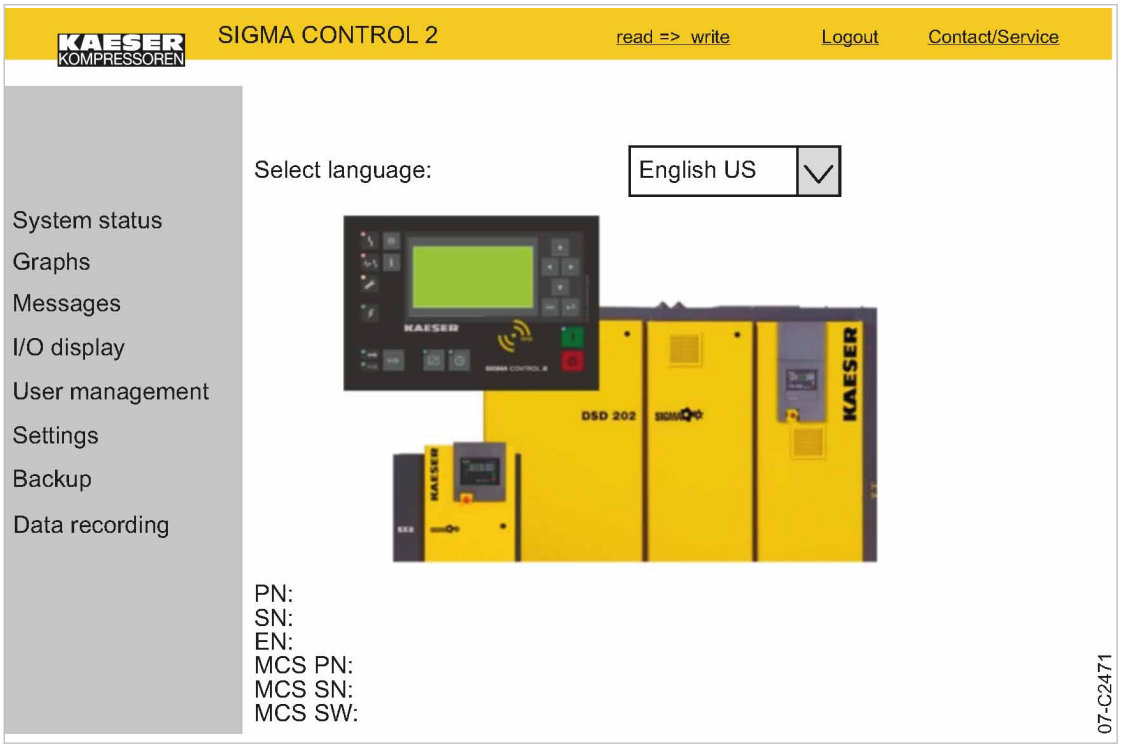


Fig. 10 KAESER CONNECT for SIGMA CONTROL 2

KAESER CONNECT functions:

Operating element	Meaning
read => write	Switching from read-only to read/write mode To create users and acknowledge messages
write => read	Switching from read/write to read-only mode
Logout	User log-out
Contact/Service	Displaying the contact information for an authorized KAESER service representative
Select language:	Setting the display language for KAESER CONNECT
System status	Mapping of the local menu
Graphs	■ Pressures and temperatures are displayed in different graphs ■ Graphic representation of the machine status (STOP, IDLE, LOAD) and RPM along the time axis
Messages	■ Current messages ■ Message history (event memory)
I/O display	Assignment of the input/output modules

Operating element	Meaning
User management	■ Creating and activating new user accounts ■ Modifying or deactivating existing user accounts ■ Changing passwords
Settings	■ Unit display format ■ Date display format ■ Time display format
Backup	Saving the SIGMA CONTROL 2 data to a PC

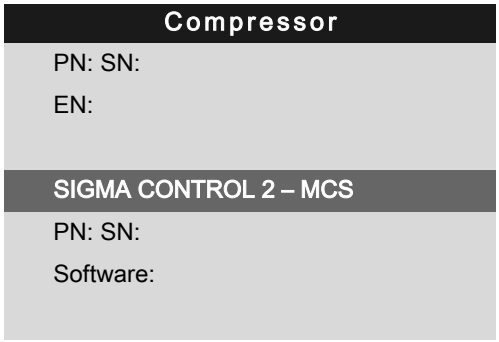
Tab. 31 KAESER CONNECT functions

Further information For opening KAESER CONNECT, login and other procedures, please see chapter 8.3.

5.6 Menus – overview

5.6.1 Operating mode

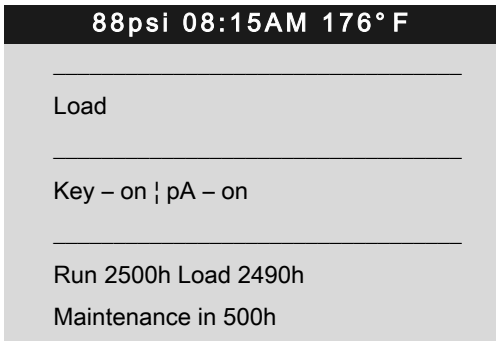
When the machine is switched on, details of the software are displayed, for example:



Machine model
Part number and serial number of the machine
Equipment number of the machine

MCS: Main Control System
Part number and serial number of the controller
Software version

Subsequently, the software is loaded and the current operating mode is displayed, for example:



Header
Current operating mode
Operating parameters
Operating parameters
Maintenance indicator

The following parameters are displayed:

- Current operating mode of the machine
- On the left-hand side of "¦" you can see from where the compressor is switched on (in the illustrated example via the green «ON» key) and what the current status is (in the example "on").
- On the right-hand side of "¦", you can see the mode of the load control (in the illustrated example, the network nominal pressure pA is active) and the mode of the compressor (in the example it is switched on).
- Number of operating hours and hours of the machine being in LOAD mode.

5.6.2 Menu structure

Press «Enter» or one of the arrow keys to open the main menu.

In the main menu, you can:

- Retrieve displayed information
- Enter customer-specific settings

The menus shown require password access level 2.

Main menu

Navigation	Function/Submenu
1 Status	■ Messages ■ Statistics ■ Current pressure control ■ Current operating mode ■ DI/DO status ■ pN/ADT curve ■ pN/n curve [1)] For details of the *Status* menu, please see table 33.
[1)] Power switching with frequency converter	
[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
2 Performance data	■ Compressor – System pressure pNloc – Internal pressure pi – ADT – Oil separator – Starting temperature – Inlet temperature – PD temperature – Air filter ■ Compressor motor – Motor temperature (if available) – Speed [1)] – Current [1)] – UzK [1)] – Torque [1)] ■ Fan – Speed [1)] – Current [1)] – UzK [1)] – Torque [1)] ■ Analogue values ■ SIGMA CONTROL 2
3 Operating data	■ Operating hours – Compressor – On load – Motor – Compressor block – SIGMA CONTROL 2 – Partial load valves ■ Switching cycles – Load valve on – Mains contactor on ■ kWh counter
[1)] Power switching with frequency converter	
[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
4 Maintenance	Oil filter Oil separator Oil change Air filter Valve inspection Belt/coupling inspection Compressor motor Bearing lube Bearing change Fan motor(s) Bearing lube Bearing change Electrical equipment Annual maintenance due
5 Configuration	For details of the *Configuration* menu, please see table 34.
6 Compressor clock	Key clock Reset Switching point 01: Switching point 02: Switching point 03: Switching point 04: Switching point 05: Switching point 06: Switching point 07: Switching point 08: Switching point 09: Switching point 10:
7 User	Name Password Current access level:
8 Communication	■ Ethernet/SIGMA NETWORK ■ Com-Module [3)] Key remote For details of the *Communication* menu, please see table 37.
9 Machine test	■ TÜV inspection

[1)] Power switching with frequency converter

[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)

Navigation	Function/Submenu
10 Components	■ Compressor motor – Power switching For details of the *Components* menu, please see table 39.
[1] Power switching with frequency converter	
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Tab. 32 Menu structure

5.6.2.1 *Status* menu

Navigation	Function/Submenu
1.1 Messages	■ Current messages ■ Message history – Compressor messages – Diagnostic messages – System messages ■ Address error – Incorrect parameterisation in [2] Status report current Alarms current Warnings
1.2 Statistics	Load (hours) since/Reset: Load (speed) [1] since/Reset: Network actual pressure pNloc Motor starts since/Reset: Motor starts /d Motor starts /h Motor starts T↓ Last load run Last idle run Last motor off
[1] Power switching with frequency converter	
[2] Only visible in the event of parameterization error	
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
1.3 Current pressure control	SIGMA CONTROL 2 Cut-out pressure SP/SD Network actual pressure Frequency converter [1)] Setpoint pressure [1)] Actual pressure [1)] Speed nominal value [1)] Speed actual value [1)] Speed limits [1)]
1.4 Current operating mode	Compressor on Load control Control mode Idle period Acknowledgement Waste heat recovery (if available)
1.5 DI/DO status	1st I/O module DI/DO display 2nd I/O module DI/DO display 3rd I/O module DI/DO display
1.6 pN/ADT curve	Diagram: Nominal pressure/Discharge temperature
1.7 pN/n curve [1)]	Diagram: Nominal pressure/Speed
[1)] Power switching with frequency converter	
[2)] Only visible in the event of parameterization error	
[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Tab. 33 *Status* menu

5.6.2.2 *Configuration* menu

Navigation	Function/Submenu
5.1 General	■ System information – SIGMA CONTROL 2 MCS [3)] – Software – KAESER:PN/SN – Controller manufacturer:PN/SN – MFGDT (Manufacturing date) – Compressor – EN (Equipment number) – PN (Part number) – SN (Serial number) – I/O modules – First IOM – Second IOM (if available) [3)] – FC information [1)] – Compressor motor – Oil-/air cooler fan – Oil cooler fan Model: Date/time Time zone ■ Time server – active: – IP address Date format Time format Pressure unit Temperature unit Display lighting
5.2 Pressure control	■ Pressure sensors ■ Pressure settings ■ Load control ■ Network actual pressure For details of the *Pressure control* menu, please see table 35.
[1)] Power switching with frequency converter	
[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
5.3 Control mode	Local mode: ■ Venting period ■ DUAL ■ QUADRO ■ Partial load valves
5.4 Compressor start	■ Compressor on ■ Compressor off Autostart: Start inhibit: Starting temperature
5.5 Acknowledgement	Remote mode: RC ack Key remote
5.6 ETM	Waste heat recovery Local mode: Remote mode: current RC DI Key remote ■ Oil cooler ■ Waste heat recovery
5.7 I/O periphery	■ DO functions ■ Analogue values ■ External messages ■ Switch For details of the *I/O periphery* menu, please see table 36.
5.8 Timer	on off DOR
[1] Power switching with frequency converter	
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
5.9 Refrigeration dryer (if available)	Control mode Compressor ready: Compressor Clk/RC/RB off: Temperature ↑ DOR DOT Temperature ↡ DOR DOT Safe compressed air supply/Safe compressed air quality Error operation without RD active: Run time max.: Reset Alarm:
[1] Power switching with frequency converter	
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Tab. 34 *Configuration* menu

***Pressure control* menu**

Navigation	Function/Submenu
5.2.1 Pressure sensors	System pressure pNloc Internal pressure pi
5.2.2 Pressure settings	pRV (Safety relief valve opening pressure) Pressure rise pE SP/SD ΔpFC [1] Nominal pressure Setpoint pressure pA SP/SD pB SP/SD System pressure low Cut-in pressure min
[1] Power switching with frequency converter	

Navigation	Function/Submenu
5.2.3 Load control	■ pA/pB Clock (Menu see Remote mode) Local mode Remote mode pA/pB Cycle pA/pB RC pA/pB DO Load RC loc.-load RC Key remote Key idle
5.2.4 Network actual pressure	pNloc (locale network pressure)/FC USS [1]/AII AII For sensor error: Type of message: Warning Alarm
[1] Power switching with frequency converter	

Tab. 35 *Pressure control* menu

I/O periphery menu

Navigation	Function/Submenu
5.7.1 DO functions	Controller on DOR DOT Compressor on DOR DOT Motor running DOR DOT Idle DOR DOT On load DOR DOT Group alarm DOR DOT Group warning DOR DOT Remote mode DOR DOT Clock active DOR DOT ■ Clock contact DOR DOT EMERGENCY STOP DOR DOT

[1] Power switching with frequency converter

Navigation	Function/Submenu
5.7.2 Analogue values	■ AnMod (Analog modules) – AnMod_p_1 – AnMod_p_2 – AnMod_p_3 – AnMod_p_4 – AnMod_T_1 – AnMod_T_2 – AnMod_T_3 – AnMod_T_4 – AnMod_I_1 – AnMod_I_2 ■ AI (Analog inputs) – AI_p_1 – AI_p_2 – AI_T_1 – AI_T_2 – AI_I_1 – AI_I_1 ■ AO (Analog outputs) – AO_p_1 – AO_p_2 – AO_T_1 – AO_T_2 – AO_I_1 – AO_I_2 – AO_n_1 [1)] ■ PD (Process data) – PD_p_1 – PD_p_2 – PD_T_1 – PD_T_2 – PD_I_1 – PD_I_2
5.7.3 External messages	■ External message 1 ■ External message 2 ■ External message 3 ■ External message 4 ■ External message 5 ■ External message 6

[1)] Power switching with frequency converter

Navigation	Function/Submenu
5.7.4 Switch	■ System pressure pNloc ■ Internal pressure pi ■ ADT ■ Inlet temperature ■ PD temperature
[1] Power switching with frequency converter	

Tab. 36 *I/O periphery* menu

5.6.2.3 *Communication* menu

Navigation	Function/Submenu
8.1 Ethernet/SIGMA NETWORK	■ IP configuration – IP address – Subnet mask – Gateway – DNS Server 1 – DNS Server 2 – Restart network
	■ Connections – SIGMA CONTROL 2 – SAM 4.0 Restart Timeout Cycle time For details of the *Connections* menu, please see table 38.
	■ E-mail – active: Compressor number: Language: Repeat cut-off time: – Sender address: Sender name: Contact telephone: Receiver address: – SMTP Server: User name: Password: – Port/Timeout Resend after:
	MAC: MAC address
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Navigation	Function/Submenu
8.2 Com-Module [3]	The content of the menu depends on the type of the communication module identified. The following KAESER communications modules may be used: ■ PROFIBUS ■ Modbus ■ Modbus TCP ■ DeviceNet ■ PROFINET
[3] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Tab. 37 *Communication* menu

5.6.2.4 *Connections* menu

Navigation	Function/Submenu
8.1.2 Connections	■ SIGMA CONTROL 2 – Status – Mode – Port – Communication partner – IP address – Communication error Start td Timeout ■ SAM 4.0 – Status – SAM 4.0 active: Send/receive Send – IP address – Port – Communication error Start td Timeout
	Restart Timeout Cycle time

Tab. 38 *Connections* menu

5.6.2.5 *Components* menu

Navigation	Function/Submenu
10.1 Compressor motor	USS status: Run/Error ■ Power switching – Star-delta start – DOL start – High-voltage cell [3)] – SFC USS [1)] – Softstart [3)] – Customer-provided [3)] For details of the *Power switching* menu, please see table 40.
[1)] Power switching with frequency converter	
[3)] SIGMA CONTROL 2 (Prepared for connection to control technology)	

Tab. 39 *Components* menu

5.6.2.6 *Power switching* menu

Navigation	Function/Submenu
10.1.1 Power switching	■ Star-delta start – Temp. warm start – Star time T↑ – Star time T↓ – Y/Δ switching time – Overload relay – Mains contactor – Star contactor – Delta contactor ■ DOL start – Run-up period: – Overload relay – Mains contactor – Delta contactor ■ High-voltage cell [3] – Run-up period: – Overload relay – Mains contactor ■ SFC USS [1] USS status: Run/Error – Run-up period: – Service operation – Heavy load monitoring – Mains contactor – STO channel A – STO channel B ■ Softstart [3] – ready – Motor running – Start-up ended – Start – Reset – Mains contactor ■ Customer-provided [3] – Temp. warm start – Run-up period T↑ – Run-up period T↓ – ready – Mains contactor/Alarm td – Redundancy contactor/Alarm td

[1] Power switching with frequency converter

[3] SIGMA CONTROL 2 (Prepared for connection to control technology)

10.1.1 Power switching	If there is a power switching unit with a frequency converter, the further content of the menu is determined by the type of frequency converter and the settings available for it.

Tab. 40 *Power switching* menu

5.7 Operating modes and control modes

5.7.1 Operating modes

STOP

The machine is connected to the power supply.
The *Controller voltage* LED lights green.
The machine is switched off. The *On* LED is extinguished.

READY

The machine has been activated with the «ON» key:

- The *On* LED lights green.
- The drive motor is stopped.
- The inlet valve is closed.
- The minimum pressure check valve isolates the oil separator tank from the air system.
- The venting valve is open.

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

In addition, timing and/or remote control may affect the start of the motor.

LOAD

The compressor motor runs under load.

- The inlet valve is open.
- The airend delivers compressed air to the air system.

IDLE

The compressor motor runs unloaded with low power consumption.

- The inlet valve is closed.
- The minimum pressure check valve isolates the oil separator tank from the air system.
- The venting valve is open.

A small volume of air circulates through the bleed hole in the inlet valve, through the airend and back to the inlet valve via the venting line.

5.7.2 Control modes

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

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

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

- DUAL
- QUADRO
- VARIO
- CONTINUOUS
- DYNAMIC

Option C1
- MODULATING control

DUAL

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

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

QUADRO

Unlike the DUAL regulating mode, the machine will switch from LOAD to READY in QUADRO mode after periods with low compressed air consumption.

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

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

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

VARIO

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

CONTINUOUS

Unlike the DUAL control mode, the machine is switched back and forth between LOAD and IDLE, to maintain the machine working pressure between the preset minimum and maximum values. When maximum pressure is reached, the machine switches to IDLE. However, the machine does **not** switch to READY.

DYNAMIC

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

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

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

Option C1 MODULATING control

The MODULATING control is an additional mechanical regulation. It continuously changes the delivery volume within the machine's control range.

A control valve, the proportional controller, changes the degree of opening of the inlet valve when the machine transports compressed air into the air network (LOAD).

The load and power consumption of the drive motor rises and falls with the air demand.

5.7.3 Frequency-controlled drive (SFC)

If the machine runs in LOAD , the frequency converter compares the ACTUAL value with the TARGET value of the system pressure and regulates, depending on the difference, the speed of the compressor motor and the airend.
The speed of the airend determines the rate of compressed air delivery and the working pressure.

If air consumption rises, the frequency converter increases motor speed and therefore increases the volume of air delivered.

If air consumption drops, the converter reduces motor speed and therefore reduces the volume of air delivered.

The network pressure remains constant – within the control range of the converter – regardless of fluctuating air demand.

If the network pressure exceeds the TARGET value:

Outside the frequency converter's range of control the machine reverts to the selected control mode.

DUAL:

The minimum controllable speed is reached and the machine switches to IDLE . The drive motor runs unloaded with low power consumption.
When the preset idling time has elapsed, the machine switches to READY.

VARIO/QUADRO/CONTINUOUS:

The minimum controllable speed is reached and, depending on the air demand at the time, the machine switches either to READY or to IDLE. The machine remains in IDLE at least for the duration of the *venting time*, before it switches to READY.

DYNAMIC:

The minimum controllable speed is reached and, depending on the air temperature of the drive motor the machine switches either to READY or to IDLE. The machine remains in IDLE at least for the duration of the *venting time*, before it switches to READY.

If the network pressure falls below the TARGET value:

The frequency converter runs the motor up to a speed at which air delivery matches the air demand.

The inlet valve opens and the machine delivers compressed air.

The frequency converter varies the speed of the drive motor according to the air demand. The power consumption of the drive motor rises and falls according to air demand.

5.7.4 MODULATING control

With the help of a mechanical control valve (the proportional controller), the opening and closing of the inlet valve is continuously varied in relation to the actual air demand. The airend delivers compressed air to the distribution network.
The load and power consumption of the drive motor rises and falls with the air demand.
To ensure optimal control on large compressors, the control air for the proportional controller is taken from an external air receiver.

6 Installation and Operating Conditions

6.1 Maintaining ambient conditions

➢ Follow the instructions in the machine's operator manual.

6.2 Installation conditions

The installation and operating conditions depend the machine into which the controller is installed.

NOTICE

UV radiation!
Direct sunlight (UV radiation) can destroy the display screen.

➢ *Do not allow the display screen to be subjected to direct sunlight.*

➢ See the machine's operator manual for required conditions.

7 Installation

7.1 Reporting Transport Damage

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

7.2 Machine identification

If the machine is run in sequenced operation its identification as detailed in the installation diagram is to be taken into account.

Identifying the machine for operation in remote mode.

➢ Attach the following notice to warn of remote machine operation (suggestion):

⚠ WARNING
Remote control: danger of unexpected starting!
➢ Make sure the power supply disconnecting device is switched off before commencing any work on the machine.

Tab. 41 Machine identification

➢ Label the starting device in the remote control center as follows (suggestions):

⚠ WARNING
Remote control: danger of unexpected starting!
➢ Before starting, make sure that no one is working on the machine and that it can be safely started.

Tab. 42 Remote control identification

Identifying the machine for clock control mode operation

➢ Attach the following notice to warn of remote machine operation (suggestion):

⚠ WARNING
Clock control: Risk of injury caused by unexpected starting!
➢ Make sure the power supply disconnecting device is switched off before commencing any work on the machine.

Tab. 43 Machine identification

8 Initial Start-up

8.1 Outline

SIGMA CONTROL 2 was designed and developed for a number of applications. Potential settings are correspondingly varied.

It is possible that only a few of these settings are needed for the initial start-up. This depends on the application .

The following sections explain the large number of practical applications, but only one configuration is relevant for a specific use.

8.2: Configuring the controller (display format, units, languages, etc.)

8.3: Using KAESER CONNECT

8.4: Pressure parameters of the machine

8.5: Machine start and stop

8.6: Control modes

8.7: Electronic Thermal Management

8.8: Refrigerated dryer

8.9: Configuring the machine for local mode

8.10: Configuring the machine for master control operation

8.11: Configuring input and output signals

8.12: Activating remote acknowledgement

8.13: Linking to an external pressure transducer

8.14: Commissioning the machine

8.2 Configuring the controller

The following chapters describe in detail the basic settings for the SIGMA CONTROL 2. The quick installation guide at the beginning of this operating manual provides an overview of the essential displays and operating elements, the main menu and important functions.

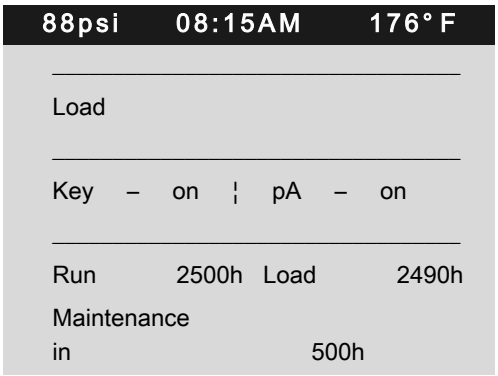
➢ Carry out settings as required:
- 8.2.1: Selecting menu options (introduction)
- 8.2.2: Setting the language
- 8.2.3: Noting number of the KAESER Equipment Card
- 8.2.4: User log-in with RFID Equipment Card
- 8.2.5: Generating a password
- 8.2.6: Manual user log-in
- 8.2.7: Checking and setting time and date
- 8.2.8: Setting the time zone (summer and winter time)
- 8.2.9: Setting display formats (date, time, units of pressure and temperature)
- 8.2.10: Setting the display illumination
- 8.2.11: Setting the contrast and the brightness
- 8.2.12: Activating the remote control
- 8.2.13: IP configuration
- 8.2.14: Configuring the e-mail function
- 8.2.15: Setting the time server
- 8.3.6: Creating a user account

8.2.1 Selecting menu options

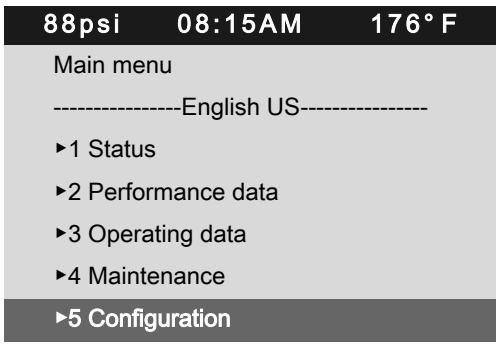
All menu options can be selected with the «Down», «Up» and «Enter» keys.

Example: Selecting the < Configuration – General > menu

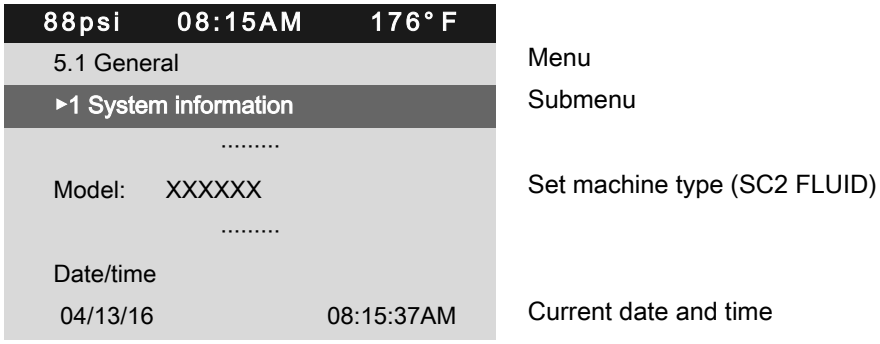
1. Switch on the machine and wait for SIGMA CONTROL 2 to start.
   The operating mode is displayed.



2. Press «Enter».
   The main menu is displayed.



3. Use «Up» or «Down» to select the *Configuration* line.
4. Press «Enter».
   The *Configuration* menu is displayed.
5. Use «Up» or «Down» to select the *General* line.
6. Press «Enter».
   The *General* menu is displayed.



7. Use «Up» or «Down» to select a menu item in the *General* submenu such as *System information*.
8. Press «Escape» repeatedly to leave this menu.

8.2.2 Setting the language

The controller can display text messages in the following languages:

Arabic	Estonian	Italian	Norwegian	Spanish
Bulgarian	Finnish	Japanese	Polish	Spanish (South America)
Chinese	French	Korean	Portuguese	Czech
Danish	French (Canada)	Croatian	Romanian	Turkish
German	Greek	Latvian	Russian	Hungarian
English	Hebrew	Lithuanian	Swedish	...
English (USA)	Indonesian	Dutch	Slovenian	...

Tab. 44 Display languages

Some of the units, as well as clock and date format, will be adjusted according to the language selected. You can manually change these settings (see chapter 8.2.9).

Precondition The operating mode is displayed.

1. Press «Enter».
   The main menu is displayed.

88psi 08:15AM 176° F	
Main menu	
----------English US----------	Current language
▸1 Status	Active line
▸2 Performance data	Submenu
▸3 Operating data	Submenu
▸4 Maintenance	Submenu
▸5 Configuration	Submenu

2. Press the «Up» key.
   The currently set language is displayed as the active line.

88psi 08:15AM 176° F	
Main menu	
----------English US----------	Active line with currently set language
▸1 Status	Submenu
▸2 Performance data	Submenu
▸3 Operating data	Submenu
▸4 Maintenance	Submenu
▸5 Configuration	Submenu

3. Press «Enter».
   The currently set language flashes.
4. Use «Up» or «Down» to select the desired language.
5. Press «Enter».

Result The user interface is displayed in the set language.

8.2.3 Noting the number of the KAESER Equipment Card

The number of your KAESER Equipment Card is identical with the *user name* displayed on SIGMA CONTROL 2 after you have successfully logged on using your KAESER Equipment Card.

Fig. 11 Back of the KAESER Equipment Card

[1] Back of the KAESER Equipment Card
[2] Number of the KAESER Equipment Card

1. Note the user name (= number of the KAESER Equipment Card).
2. Keep the note at a secure location.

If your KAESER Equipment Card gets damaged or can no longer be found?

➢ If you know your user name and password, you can manually log on to SIGMA CONTROL 2 (see chapter 8.2.5).

8.2.4 User log-in with KAESER Equipment Card

Use the KAESER Equipment Card to quickly and easily check the advanced access rights to the SIGMA CONTROL 2 controller.

Advanced access rights let you:

- Read additional data
- Change other settings

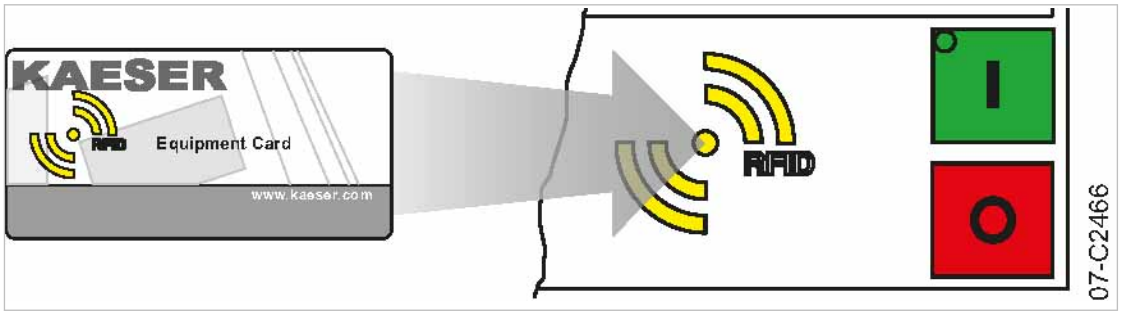
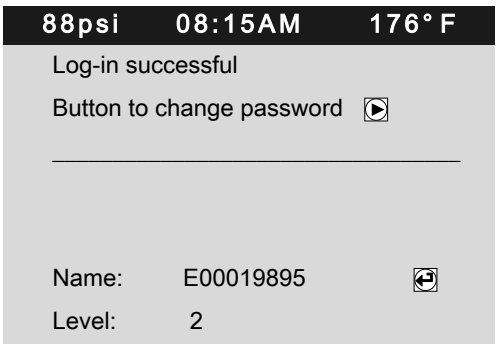


Fig. 12 User log-in with KAESER Equipment Card

1. Hold the KAESER Equipment Card in front of the RFID reader.
   Your user name and access level will be displayed.



Menu

Prompt, whether the password is to be changed

2. Press «Enter» to confirm the access right.
   The access right is confirmed.

The KAESER Equipment Card is damaged or lost?

➢ Manually enter the user name and password, see chapter 8.2.6.

8.2.5 Generating a password

In the event that your KAESER Equipment Card is damaged or lost, you must manually log on to SIGMA CONTROL 2. A password is also required to use KAESER CONNECT to log on at SIGMA CONTROL 2 (see chapter 8.3).

Prerequisite for this is that you know your

- Name
- Password

You have noted your user name and stored it at a suitable location (see chapter 8.2.3). You now generate a password at the SIGMA CONTROL 2. Note this generated password as well, and store it in a suitable location. If your KAESER Equipment Card is damaged or lost, the card won't be necessary to manually log on to SIGMA CONTROL 2 when you have these two pieces of information.

Precondition Any menu is displayed

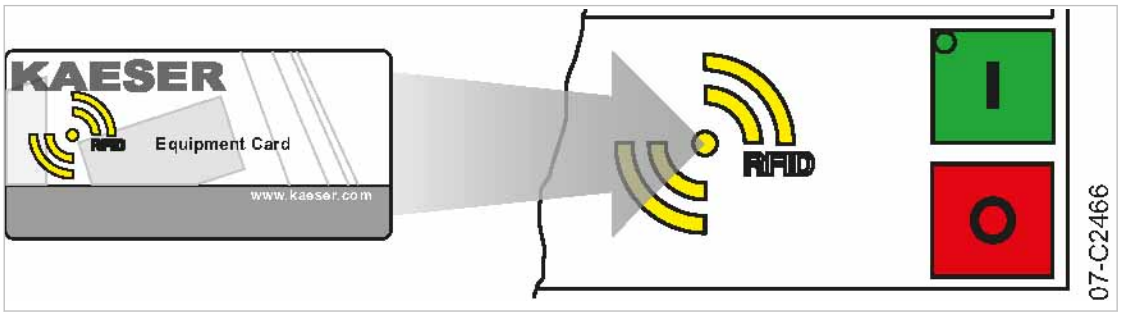
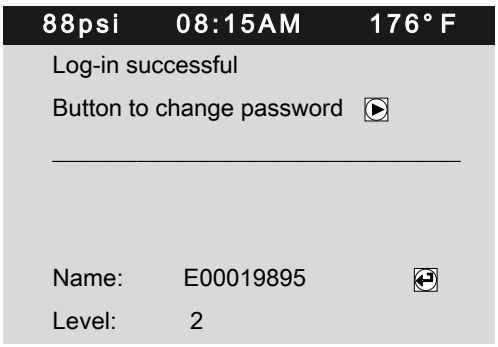


Fig. 13 User log-in with KAESER Equipment Card

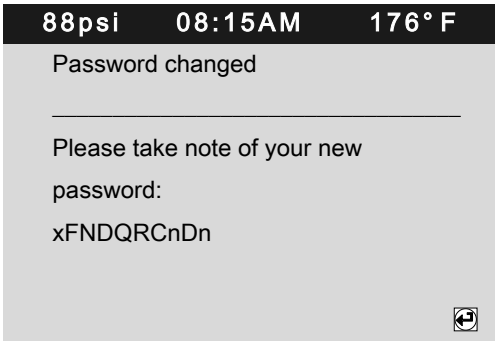
1. Hold the KAESER Equipment Card in front of the controller's RFID reader.
   Users are always logged on with password access level 2.



Menu

Prompt, whether the password is to be changed

2. Press the «Right» key within five seconds.
   The new *Password* is displayed.



Menu

New password

3. Note the new password.
4. Store the password at a suitable location, if it should become necessary to manually log-on without KAESER Equipment Card.
5. Press «Enter».
   The setting is applied.

8.2.6 Manual user log-in

In the event that your KAESER Equipment Card is damaged or lost, you can manually log on to SIGMA CONTROL 2.

Precondition The user name (see chapter 8.2.3) and password (see chapter 8.2.5) are known.
The operating mode is displayed.

1. Open the 7 *User* menu.
2. Use «Up» or «Down» to select the *Name* line.
3. Press «Enter».
   The setting mode is active.
   A column with alphanumeric characters is displayed.
   The selected character flashes.

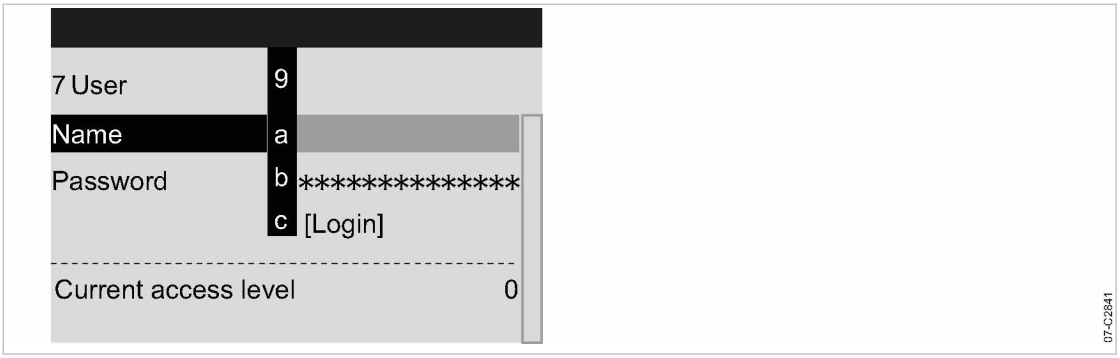


Fig. 14 Manual user log-in

4. Select the required character with the «Up» or «Down» keys.
5. Press the «Right» key.
   The cursor jumps to the next position of the user name.
6. Enter the remaining characters of the user name in the same manner.
7. Press «Enter».
   The user name is entered.
8. Use «Up» or «Down» to select the *Password* line.
9. Press «Enter».
   Enter the remaining letters and digits of the password in the same manner.
   The password is case sensitive!
10. Press «Enter».
    The password is entered.
11. Use «Up» or «Down» to select the *[Login]* line.
12. Press «Enter».
    Current access level: 2 is displayed.

Result You are now logged on to SIGMA CONTROL 2 with password access level 2, having manually input your user name and the password.

8.2.7 Checking and setting time and date

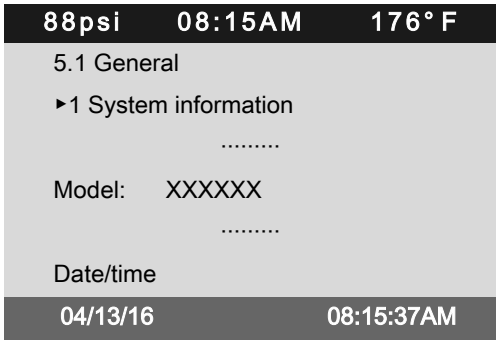
Precondition Password access level 2 is activated.

Checking and setting time

- ➢ When operating the machine with a timer program, check the time settings at least once a year.
- ➢ You can automatically synchronize date and time using a time server. Manual setting of the time is no longer required in this case. See chapter 8.2.15.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Date/time* line.

3. Press the «DOWN» key.



Menu

Set machine type (SC2 FLUID)

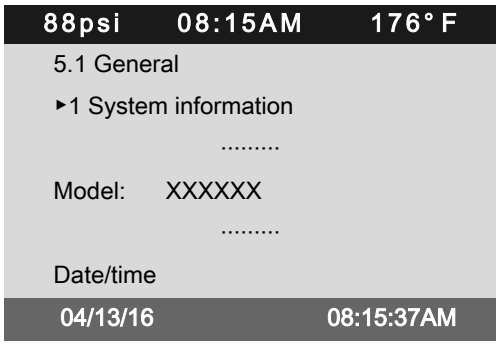
Date and time

4. Press the «Right» key.
5. Press «Enter».
   The display for hours *00:00:00* flashes.
6. Use «Up» or «Down» to set the hours.
7. Press the «Right» key.
   The display for minutes *00.00:00* flashes.
8. Use «Up» or «Down» to set the minutes.
9. Press the «Right» key.
   The display for seconds *00:00.00* flashes.
10. Use «Up» or «Down» to set the seconds.
11. Press «Enter» to accept all settings.
    The setting is applied.
12. Press «Escape» repeatedly to return to the main menu.

Checking and setting the date

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Date/time* line.
3. Press the «DOWN» key.



Menu

Set machine type (SC2 FLUID)

Date and time

4. Press «Enter».
   The display for days *00.00.00* flashes.
5. Use «Up» or «Down» to set the day.
6. Press the «Right» key.
   The display for months *00.00.00* flashes.

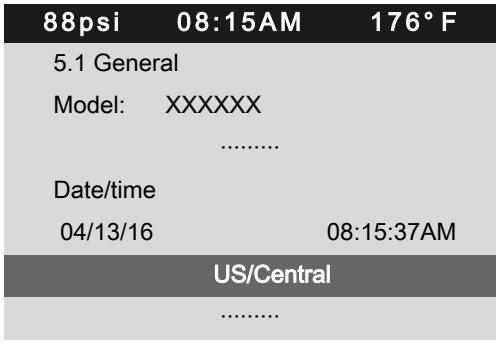
7. Use «Up» or «Down» to set the month.
8. Press the «Right» key.
   The display for years *00.00.00* flashes.
9. Use the «Up» or «Down» keys to set the years.
10. Press «Enter».
    The setting is applied.
11. Press «Escape» repeatedly to return to the main menu.

8.2.8 Set the time zone

Set the time zone for the SIGMA CONTROL 2 to ensure the timely automatic conversion from winter time (standard time) to daylight savings time, for example.

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Date/time* line.
3. Press «Down» twice.



4. Press «Enter».
   The time zone display flashes.
5. Use «Up» or «Down» to set the time zone.
6. Press «Enter».
   The setting is applied.
7. Press «Escape» repeatedly to leave this menu.

8.2.9 Setting display formats

When setting the language, the system automatically sets the units and the time and date formats. You can manually change these settings.

Setting the date format

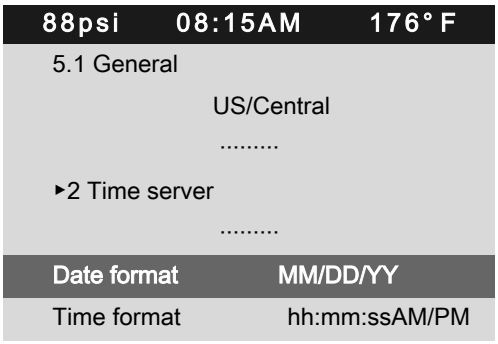
Select your preferred format:

Format	Example
DD.MM.YY	30.07.16
YY-MM-DD	16–07–30
MM/DD/YY	07/30/16

Tab. 45 Date formats

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Date format* line.



3. Press «Enter».
   The *MM/DD/YY* display flashes.
4. Use the «Up» or «Down» keys to set the date format.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

Setting the time format

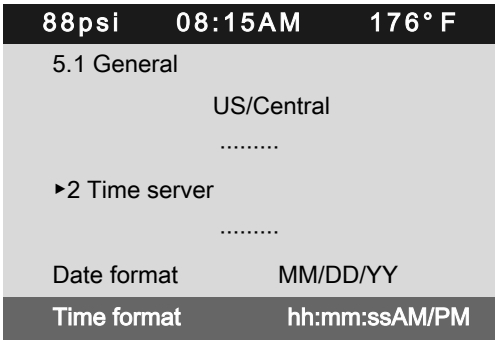
Select your preferred format for the time display:

Format	Example
hh:mm:ss	13:33:45
hh:mm	13:33
hh:mm:ssAM/PM	01:33:45PM
hh:mmAM/PM	01:33PM

Tab. 46 Time formats

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Time format* line.



3. Press «Enter».
   The *hh:mm:ssAM/PM* indication flashes.

4. Use the «Up» or «Down» keys to set the time format.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

Setting the pressure display units

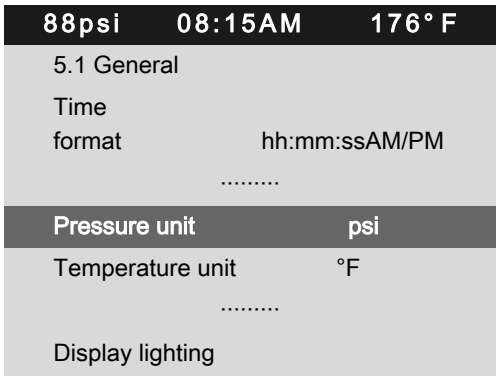
Select your preferred display of the pressure unit:

Format	Example
bar	5.5bar
hPa	5523hPa
MPa	0.55MPa
psi	80psi
at	5.6at

Tab. 47 Units of pressure

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use the «Up» or «Down» keys to select the *Pressure unit* line.



3. Press «Enter».
   The display for the set unit flashes.
4. Use the «Up» or «Down» keys to set the unit.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

Setting the temperature display units

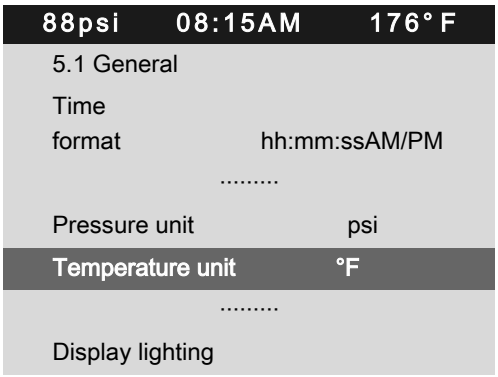
Select your preferred display of the temperature unit:

Format	Example
°C	46°C
K	319K
°F	114°F

Tab. 48 Units of temperature

Precondition Password access level 2 is activated.

1. Open the 5.1 *<Configuration – General >* menu.
2. Use the «Up» or «Down» keys to select the *Temperature unit* line.



3. Press «Enter».
   The display for the set unit flashes.
4. Use the «Up» or «Down» keys to set the unit.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

8.2.10 Setting the display illumination

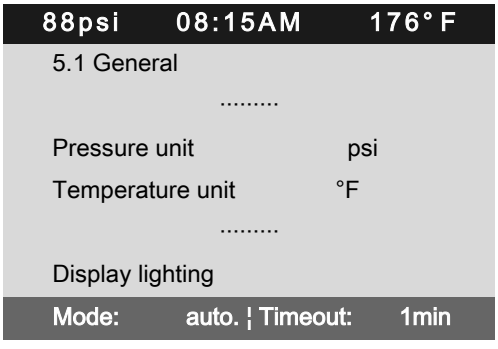
Select your personal mode for the display illumination:

Mode	1	2	3
Indication	*automatic*	*on*	*off*
Function	The illumination extinguishes after the *time-out* has elapsed.	Permanent setting Illumination "on"	Permanent setting Illumination "off"

Tab. 49 Display illumination

Precondition Access level 2 is activated.

1. Open the 5.1 *<Configuration – General >* menu.
2. Use the «Up» or «Down» keys to select the *Display lighting* line.
3. Press the «DOWN» key.
   The *Mode* line is displayed.



4. Press «Enter».
   The display for the set mode flashes.
5. Use the «Up» or «Down» keys to set the *auto.* mode.
6. Press «Enter».
   The setting is applied.
7. Press the «Right» key.
8. Set the value for the *Timeout* in the same manner, e.g. 1 min.
9. Press «Enter».
10. Press «Escape» repeatedly to leave this menu.

Result The display illumination is set for automatic operation with deactivation following one minute without user intervention.

8.2.11 Setting the contrast and the brightness

The display settings for contrast and brightness are set to the highest possible values by default. Change the settings if adverse lighting conditions make it difficult to read the displayed information.

Precondition The operating mode is displayed.

1. Press and hold the «Information» key.
2. Use «Up» or «Down» to adjust the contrast.
3. Use «Left» or «Right» to adjust the brightness.

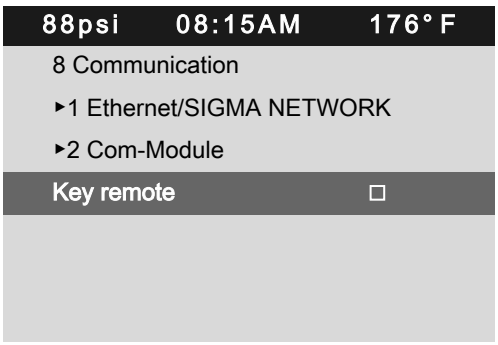
Result The settings for contrast and brightness have been adjusted.

8.2.12 Activating the remote control

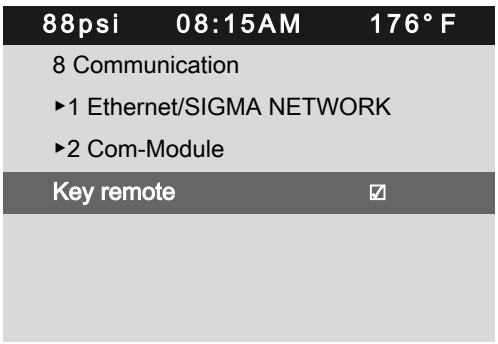
The «Remote control» key on the operating panel of the SIGMA CONTROL 2 can be activated or deactivated. Various menus offer check boxes for this setting.

Precondition Password access level 2 is activated.
The operating mode is displayed.

1. Open the 8 *Communication* menu.
2. Use «Up» or «Down» to select the *Key remote* line.
3. Press «Enter».
   The check box *Key remote* flashes.



4. Press the «Up» key.
   The check box *Key remote* is activated.



Menu

Active line with activated check box

5. Press «Enter».
   The «Remote control» key is activated.
6. Press «Escape» repeatedly to leave this menu.

Proceed in the same manner to deactivate the «Remote control» key.

7. Press the «Remote control» key on the operating panel of SIGMA CONTROL 2.

Result SIGMA CONTROL 2 Remote control is activated.

8.2.13 IP configuration

For the SIGMA CONTROL 2 to be connected to the network, you must set the IP configuration (for KAESER CONNECT for example).

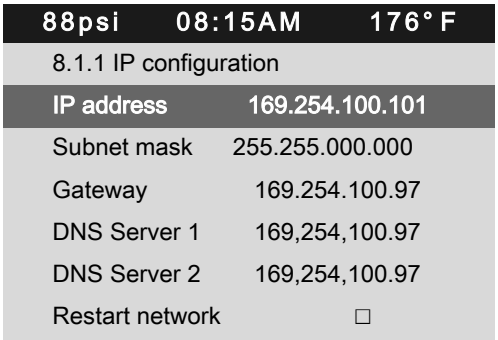
If you use SIGMA CONTROL 2 as the master control of two machines, you set other network parameters in the *IP configuration* menu (see chapter 8.10.4).

The network parameters for the IP configuration must be specified manually. You **cannot** use DHCP for an automatic IP configuration.

Precondition Password access level 2 is activated.

The network parameters are known. Request the required information from your IT department.

1. SIGMA CONTROL 2 Connect to the network using an Ethernet cable.
2. Select the 8.1.1 *<Communication – Ethernet/SIGMA NETWORK – IP configuration>* menu.
3. Use «Up» or «Down» to select the *IP address* line.



Menu

Active line, factory setting

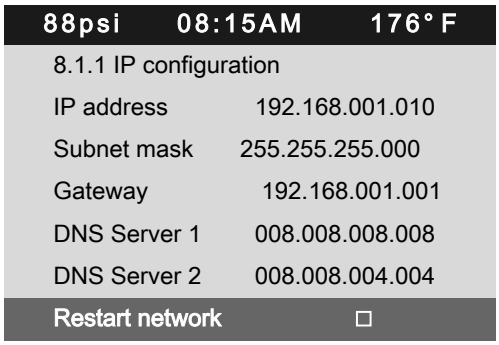
4. Press «Enter» to switch into setting mode.
   The first group of numbers of the *IP address* flashes *169*.*254.100.101*.

5. Use «Up» or «Down» to set the first group of numbers of the *IP address*.
6. Press the «Right» key.
   The SECOND group of numbers of the *IP address* flashes *192.168.100.101*.
7. Use «Up» or «Down» to set the second, third and fourth group of numbers of the *IP address*.
   The *IP address* is correctly set.
8. Press «Enter» to accept the setting.
   The setting is applied.
9. Press «Down».
   The *Subnet mask* line is displayed.
10. Set the remaining network parameters as described above:

Parameters	Setting value	Meaning
IP address		IP address of the interface X1 Ethernet
Subnet mask		Subnet mask of the network
Gateway		Gateway address of the network
DNS Server 1		DNS server 1 address
DNS Server 2		DNS server 2 address
Restart network	–	Activate the changed network parameters

Tab. 50 Network parameters

11. Use the «Up» or «Down» keys to select the *Restart network* line.



12. Press «Enter».
    The check box *Restart network* will flash.
13. Press «Up» key.
    The check box is activated.
14. Press «Enter».

Result The network is restarted.
The set network parameters are active.

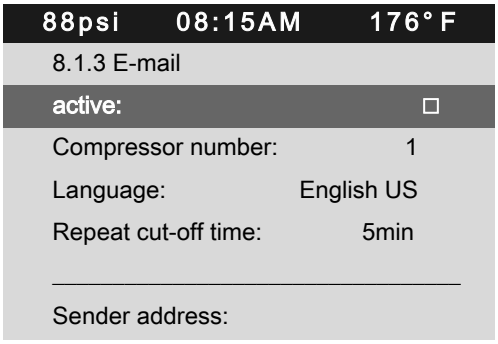
8.2.14 Setting the e-mail function

SIGMA CONTROL 2 uses e-mail to send information (messages) to an e-mail address.
For this purpose, an Ethernet connection with an SMTP server is required.

Setting e-mail parameters

Precondition
Password access level 2 is activated.
IP configuration is set; see chapter 8.2.13
An SMTP server is active in the network.
The e-mail parameters are known. Request the required information from your IT department.

1. Open the 8.1.3 *<Communication – Ethernet/SIGMA NETWORK – E-mail>* menu.
2. Use the «Up» or «Down» keys to select the *active:* line.



Menu

Activating/deactivating the e-mail function

Setting the language

3. Press «Enter».
   The check box *active:* will flash.
4. Press «Up» key.
   The check box is deactivated.
5. Press «Enter».
   The e-mail function is deactivated.
6. Set the e-mail parameters as described above:

Parameters	Setting value	Meaning
Compressor number:		This field displays the machine number that appears as the sender of e-mails. The recipient is thus able to recognize the different machines sending mails.
Language:		Use this field to define the language for the message texts. This setting in independent from the language setting in SIGMA CONTROL 2 (see chapter 8.2.2).
Repeat cut-off time:		In this field, enter the time in minutes (repeat block time) that the system must wait in order not send multiple recurring messages in short time intervals.
Sender address:		Enter the e-mail address of the sender in this field.
Sender name:		Enter the name of the sender in this field.
Contact telephone:		In this field, enter a telephone number under which the system operator can be reached. This telephone number is sent with each e-mail.
Receiver address:		The e-mail address of the recipient.
SMTP Server:		IP address of the SMTP server receiving and forwarding the e-mails.
User name:		Log-in user name for logging on to the SMTP server.
Password		Log-in password for logging on to the SMTP server.

Parameters	Setting value	Meaning
Port		Port address of the SMTP server.
Timeout		In this field, enter the seconds for SIGMA CONTROL 2 to wait for a reply by the SMTP server before e-mail sending is cancelled.
Resend after:		In this field enter, the time in seconds for the system to wait after a failed e-mail sending operation before it again attempts to send the mail.

Tab. 51 E-mail parameters

7. Activating the e-mail function: Activate the *active:* check box as described above.
8. Press «Esc» repeatedly to leave this menu.

Result The e-mail parameters are set and the e-mail function is activated.

8.2.15 Configuring the time server

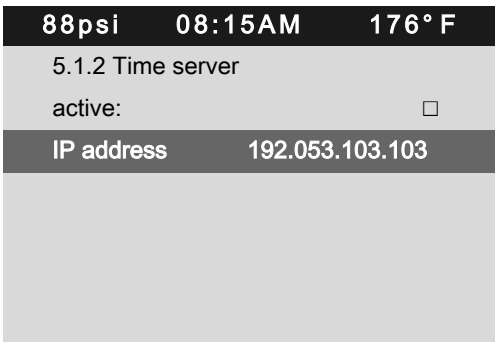
If SIGMA CONTROL 2 is connected to the network, you can set the access to an SNTP server available in the Internet or a local Intranet. SIGMA CONTROL 2 then automatically imports the date and time settings and ensures continuous synchronization of the internal clock with the external time server.

Precondition Password access level 2 is activated.

IP configuration is set; see chapter 8.2.13.

The time server's IP address is known. Request the required information from your IT department.

1. Open the 5.1.2 *<Configuration – General – Time server>* menu.
2. Use the «Up» or «Down» keys to select the *IP address* line.



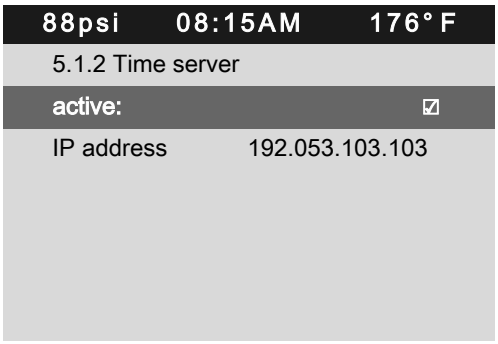
Menu

Activating/deactivating the time server function

Example address, time server

3. Press «Enter».
   The first group of numbers of the *IP address* flashes *192.053.103.103*.
4. Use «Up» or «Down» to set the first group of numbers of the *IP address*.
5. Press the «Right» key.
   The second group of numbers of the *IP address* flashes *192.053.103.103*.
6. Use «Up» or «Down» to set the second, third and fourth group of numbers of the *IP address*.
   The *IP address* is correctly set.
7. Press «Enter» to accept the setting.
   The setting is applied.
8. Use «Up» or «Down» to select the *active:* line.

9. Press «Enter».
   The check box *active:* will flash.
10. Press «Up» key.
    The check box is activated.



Menu
The time server function is activated
Example address, time server

11. Press «Enter».
12. Press «Escape» repeatedly to return to the main menu.

Result Access to the selected time server is active.
The internal clock of SIGMA CONTROL 2 is permanently synchronized.

8.3 Using KAESER CONNECT

Using an Internet-capable device with web browser, you can use KAESER CONNECT to remotely display these SIGMA CONTROL 2 menus:

- System status
- Graphs
- Messages
- I/O display
- User management
- Settings
- Backup
- Data recording

Thus, KAESER CONNECT provides an excellent option for an easy and quick check of the economy and energy efficiency of your machines.

The following functions are **not** available with KAESER CONNECT:

- Remotely starting the machine
- Remotely setting parameters

For KAESER CONNECT to be able to use the Internet-capable device, it must be registered in the **same network** as SIGMA CONTROL 2.

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.

8.3.1 Open KAESER CONNECT

Precondition The user name (see chapter 8.2.3) and password (see chapter 8.2.5) are known.
The IP address of your controller is known, see chapters 8.2.13 and 8.10.4.

1. Use an Ethernet cable to connect SIGMA CONTROL 2 to the Internet-capable device or network.
2. In the web browser, enter the controller's IP address.
   The Login window is displayed.

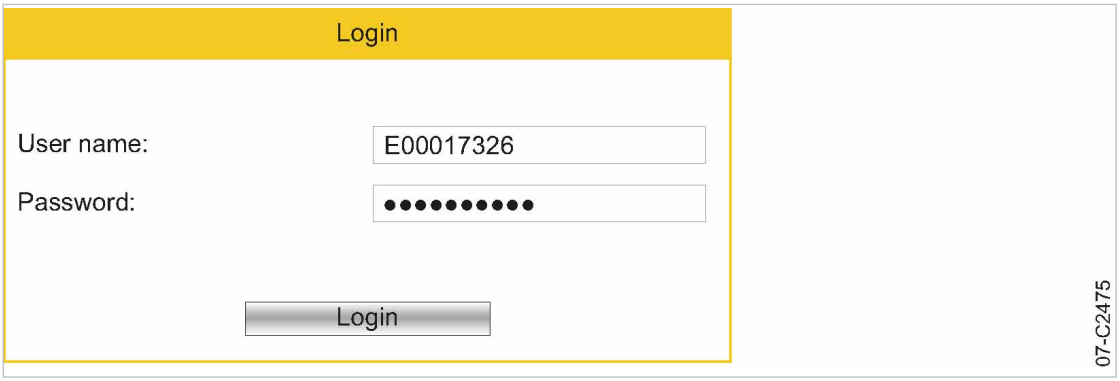


Fig. 15 Login window

3. Enter your user name in the *User name:* field.
4. Enter your password in the *Password:* field.
5. Click Login.
   KAESER CONNECT for SIGMA CONTROL 2 is displayed.

Fig. 16 KAESER CONNECT for SIGMA CONTROL 2

6. Click the arrow key [1] to open Select language:.
   The *Select language:* window is displayed.

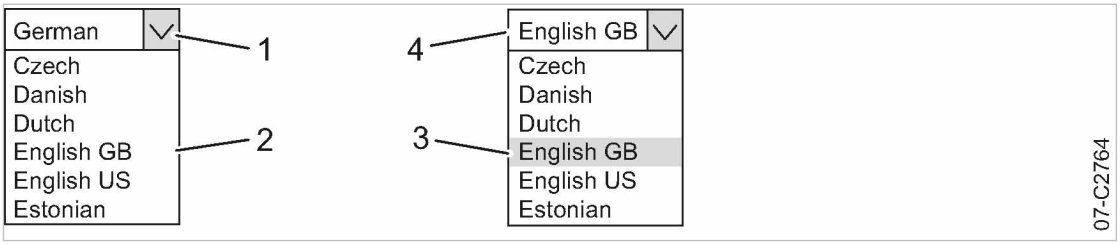


Fig. 17 Select language: window

[1] «Arrow key» Select language:
[2] Select language: window
[3] Select a language
[4] Selected language

7. Select the required language [3].

Result KAESER CONNECT is displayed in the selected language.

8.3.2 System status menu

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

Fig. 18 *System status* menu

1. Click the *System status* menu element.
   The *System status* menu is displayed

Fig. 19 Main menu

2. Click in the SIGMA CONTROL 2 display.
   The Main menu is displayed.
3. Click the numbered lines.
   The system displays the corresponding sub-menus.
4. Press ESC repeatedly to leave this menu.

8.3.3 Graphs menu

When starting the *Graphs* menu, the recorded data from the last 60 minutes are loaded. The last 20 minutes are displayed in a graph. The system updates the graph every ten seconds whilst the current time is displayed.

If an SD card is provided in the X5 SD card slot, you can retrieve and display the automatically-recorded machine data for any time in the past.

Moving the mouse pointer across the graph calls up a ruler. The time selected with the ruler and the associated values are displayed in the legend above the graph. When the ruler is hidden, the time and associated values are displayed at the right edge of the graph.

The graph content depends on the machine type.

The *Speed* display is implemented only for machines with frequency converter.

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Click the *Graphs* menu element.

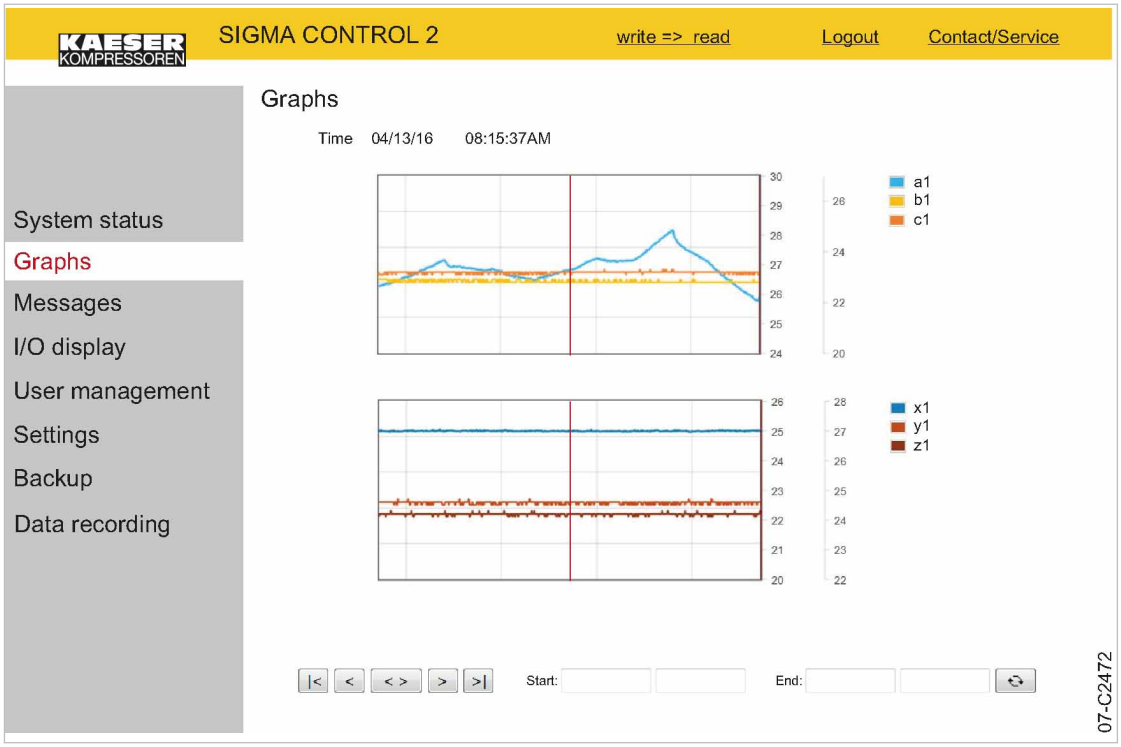


Fig. 20 *Graphs* (illustration similar)

2. Check the displayed data.

8.3.3.1 Zoom function

Use the Zoom function to enlarge significant curve developments:
Highlight a specific area within the graph by drawing a rectangle with the mouse pointer pressed.
The selected area will be enlarged as soon as the mouse pointer is released.

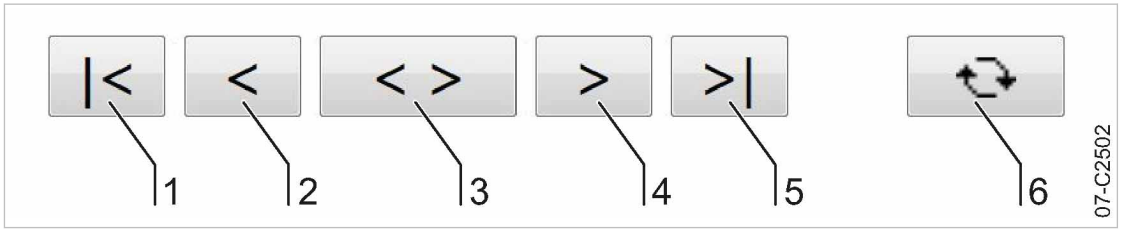


Fig. 21 Arrow keys

Item	Description	Function
1	«Start»	Display the oldest data in the cache memory or load the data from the previous 20 minutes from the SD card
2	«Scroll left»	Shift the display area by $^1/_3$ to the left
3	«Zoom-out»	Time range is enlarged
4	«Scroll right»	Shift the display area by $^1/_3$ to the right
5	«End»	Display of newest data
6	«Refresh»	Load and display the entered machine data from start time to end time

Tab. 52 Arrow key functions

1. Click the «Start» [1] arrow key.
   The oldest data in the cache memory or the data of the last 20 minutes are loaded form the SD card and displayed
2. Click the «Scroll right» [4] arrow key.
   The display area is shifted to the right by $^1/_3$.
3. With the mouse button pressed, draw a rectangle around the selected area.
4. Release the mouse button.
   The selected area is enlarged (zoom-in function).
5. Click the «Zoom-out» [3] arrow key.
   The time range is enlarged (zoom-out function).

8.3.3.2 Displaying past machine data

You can display the automatically-recorded machine data for any time in the past.

Precondition An SD card with sufficient free memory is inserted in the X5 SD card slot
The SD card was inserted for the entire operating time of the machine.
The SIGMA CONTROL 2 data recorder function is activated.

1. Enter the date and time for the start time in the required time period in *Start:*.
2. Enter the date and time for the end time in the required time period in *End:*.
3. Click [6].
   The machine data for the specified time interval are loaded and displayed.

8.3.4 Messages menu

The following messages are shown:

- Current messages
- Compressor messages
- System messages
- Diagnostic messages

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

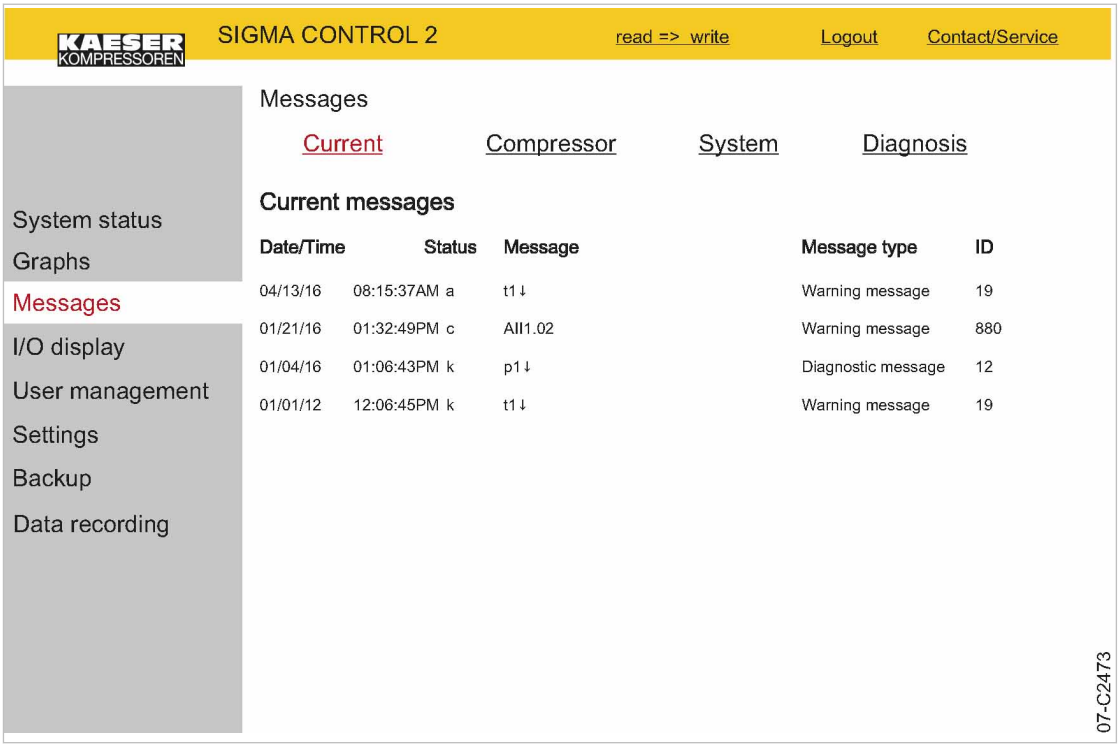


Fig. 22 *Messages*

1. Open the *Messages* menu.
   The *Messages* menu is displayed.
2. Click the required message type.
3. Check messages.

8.3.5 I/O display menu

The measured values of the analog inputs and the states of the digital inputs and outputs are displayed in the *I/O display* menu. Depending on the machine options, you may select from further IOM module tabs.

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

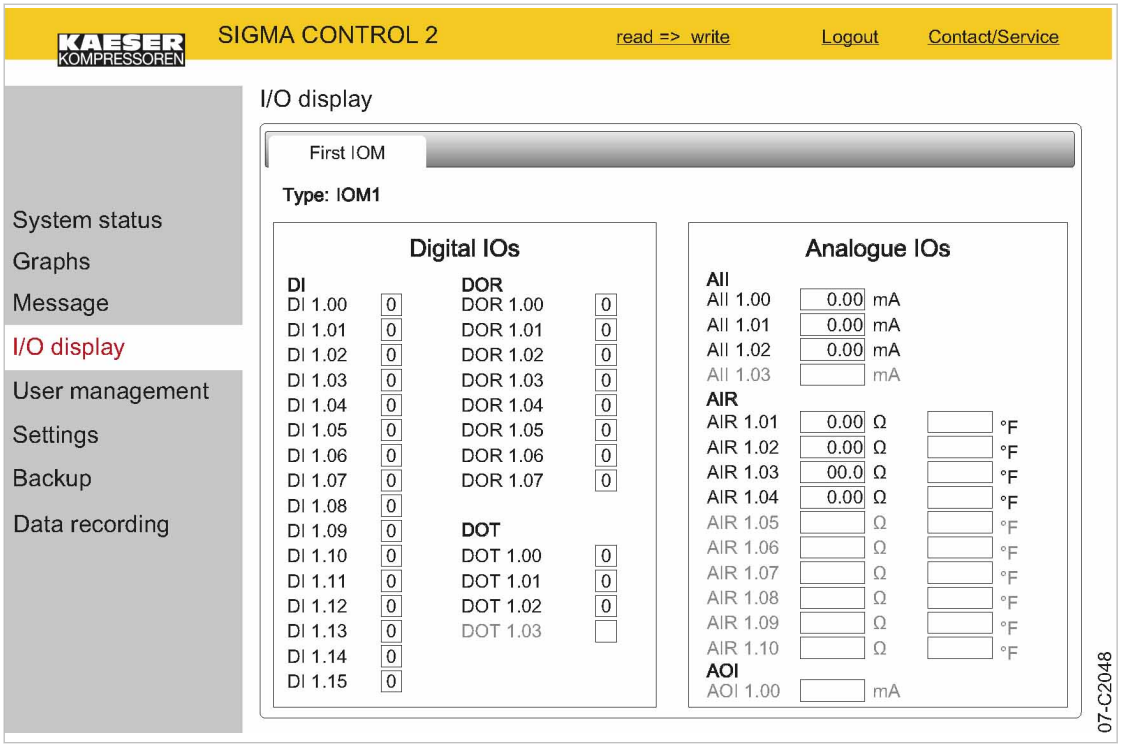


Fig. 23 *I/O display* (illustration similar)

➢ Click the *I/O display* menu element.
The current measured data and states of the input/output modules are displayed.

8.3.6 User management menu

Use the *User management* menu to create additional user accounts for other employees.

In order to be able to create user accounts, you must activate the write mode. The system will prompt you to enter and confirm your user name and your password. Subsequently, the write mode is activated (see Chapter 8.2.5).
The write mode is granted only to one person at a time.
If a second user attempts to log on in write mode, he will be refused by the system.
The system will return an error message.

String length for personally created user names and passwords:

- User name: 6 to 16 characters, the second character must not be a number
- Password: 6 to 16 characters

Precondition The generated password is available.
KAESER CONNECT for SIGMA CONTROL 2 is displayed.

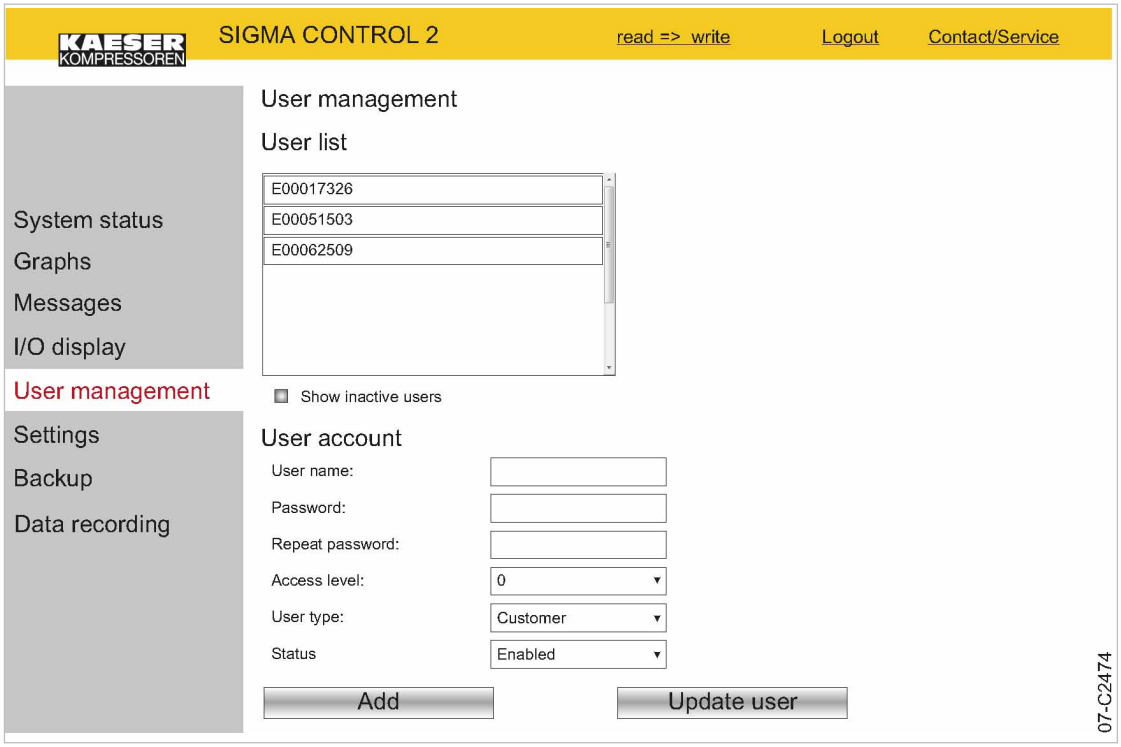


Fig. 24 *User management* menu

1. Select the *User management* menu element.
2. Click *read => write* to activate the read/write mode.
   The *Log on for write access:* window is displayed.

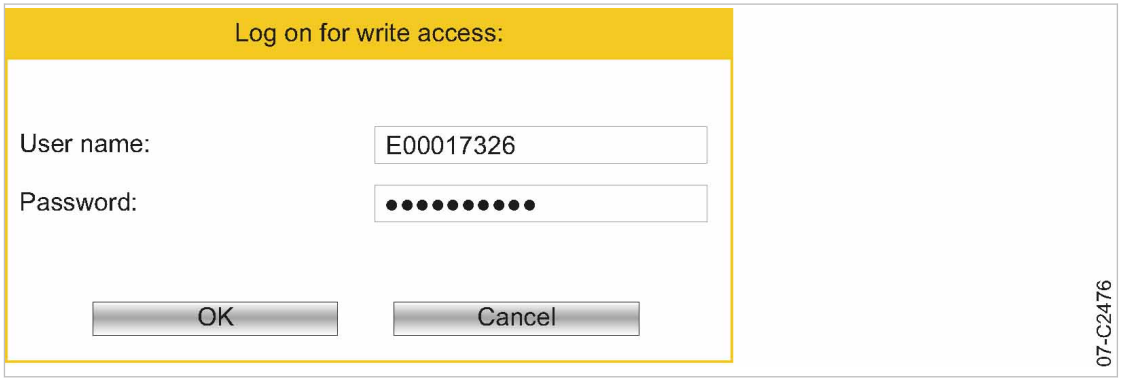


Fig. 25 *Log on for write access:* window

3. Enter your user name in the *User name:* field.
4. Enter your password in the *Password:* field.
5. Click OK.
   The *User management* menu is displayed.

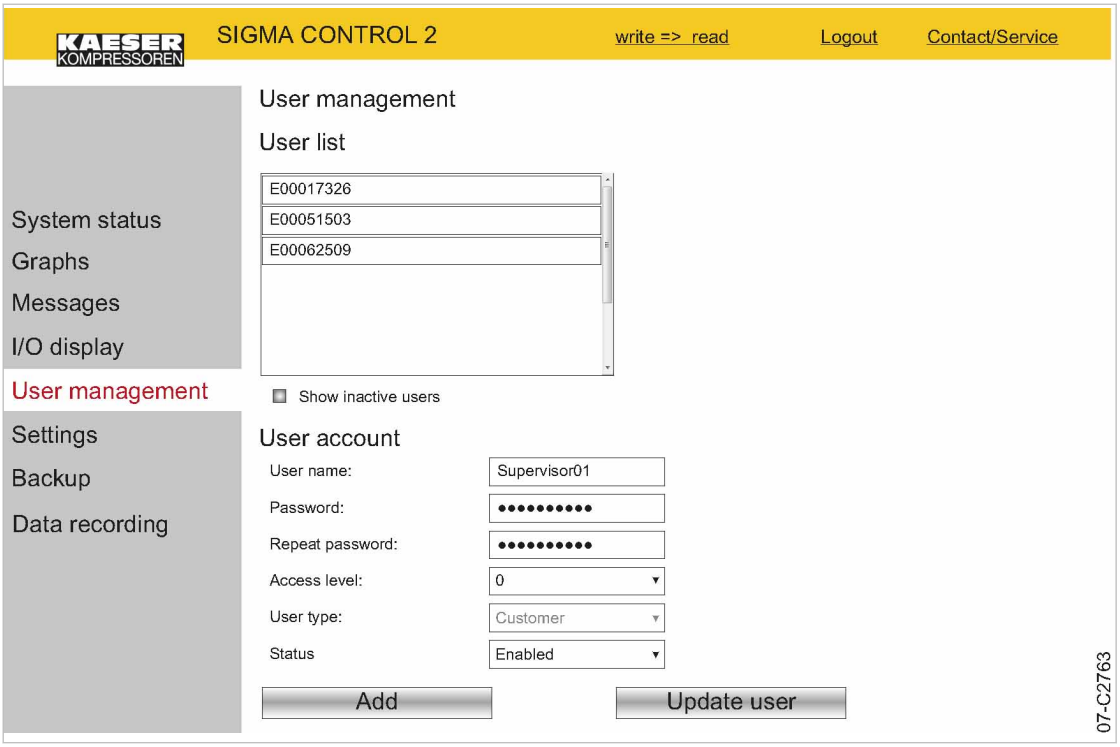


Fig. 26 *User management* menu

6. Enter a new user name in the *User name:* field.
7. Enter a new password in the *Password:* field.
8. Re-enter the same new password in the *Repeat password:* field.
9. Set Level 2 in the *Access level:* field.
10. Set the *State:* option in the Enabled field.
11. Click Add.
    The new user name has been added to the user list.

Result A new user account has been created and activated.

Editing a user account

You can edit existing user accounts:

- Changing the password
- Changing the access level
- Changing the status

Example: Change the password for an existing user account.

Precondition The *User management* menu is displayed.
Write mode is activated.

1. Click the required user account in the list.
2. Enter a new password in the *Password:* field.
3. Re-enter the same new password in the *Repeat password:* field.
4. Click Update user.

Result The password for the existing user account is changed.

8.3.7 Settings

Settings via KAESER CONNECT apply only to your PC and your Browser.

The following settings are available.

- Units
- Date format
- Time format

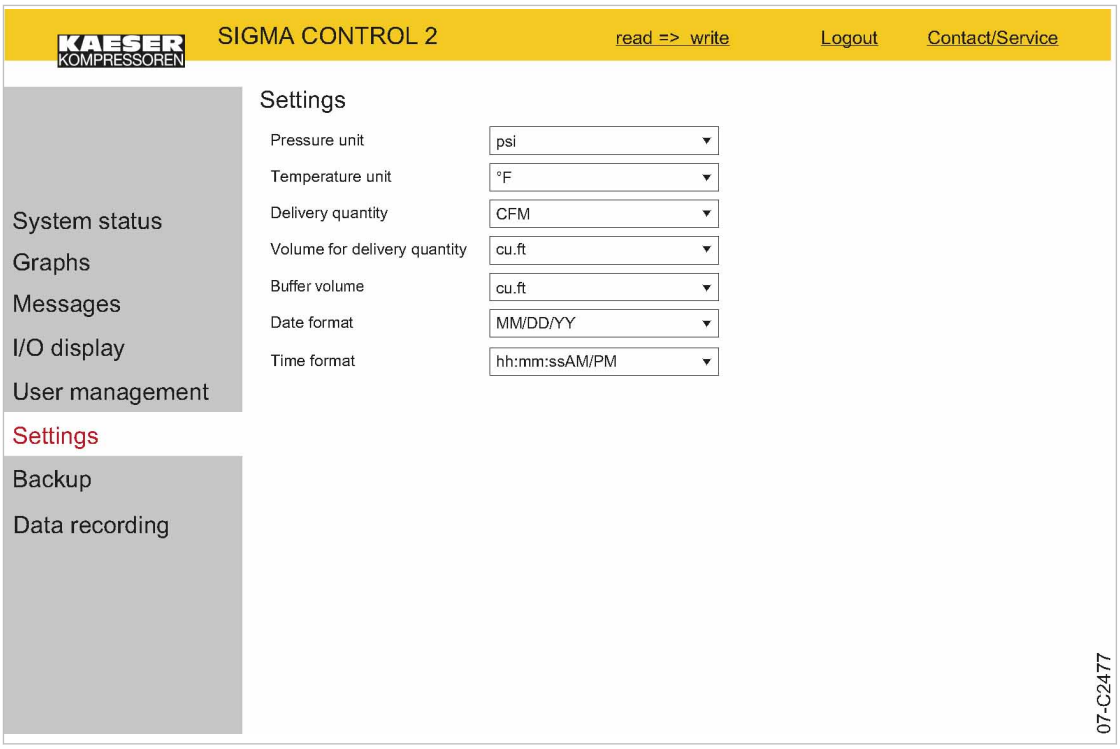


Fig. 27 *Settings*

Converting units to US values:

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Select the *Settings* menu.
2. Click the arrow key for the unit of pressure.
   A selection list of units of pressure is displayed.
3. Select the desired unit.
4. Click the arrow key for the unit of temperature.
   A selection list of units of temperature is displayed.
5. Select the desired unit.
6. Set additional units and date and time formats.

8.3.8 Backup menu

The *Backup* menu allows you to download data from SIGMA CONTROL 2 to the Internet-capable device.

The following backup types are available:

- Backup all
- Log files
- Settings
- User information

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Click the *Backup* menu element.

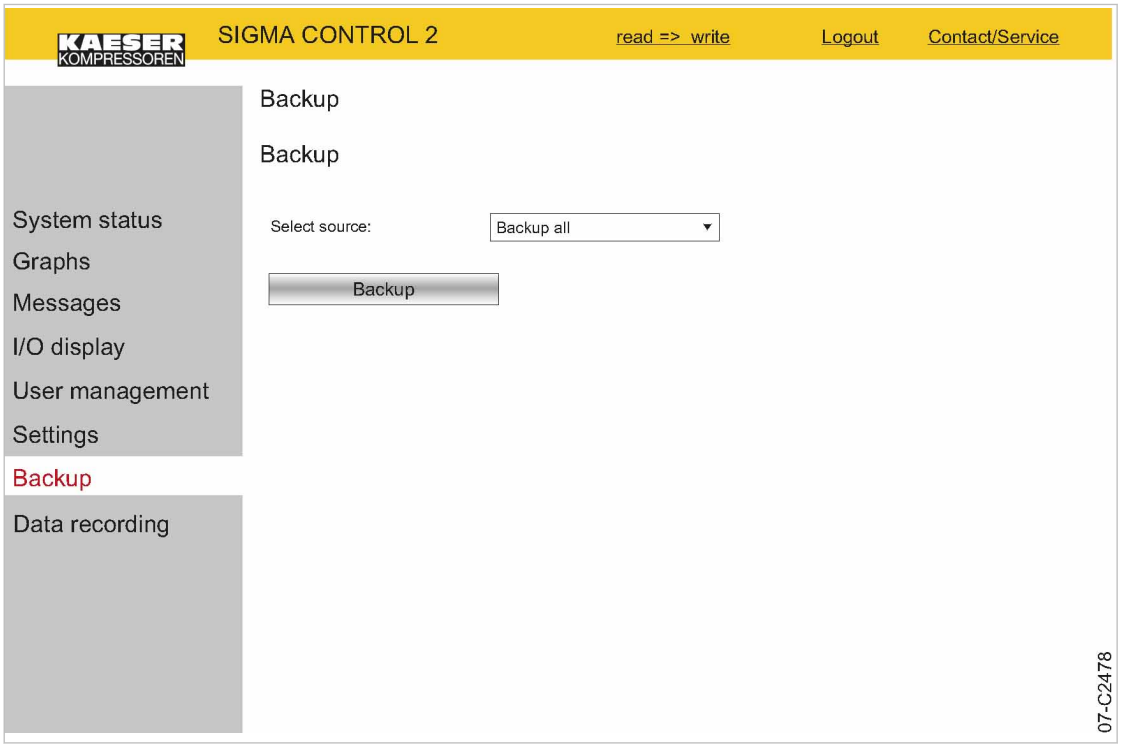


Fig. 28 *Backup* menu

2. Set the required backup type in the *Select source:* option.
3. Click Backup.

Result The data are downloaded to the Internet-capable device.

8.3.9 Closing KAESER CONNECT

In order to close KAESER CONNECTfor SIGMA CONTROL 2, click Logout in the header.

➢ Click Logout.
The system displays a message confirming the successful logout.

8.4 Adjusting the pressure parameters of the machine

This section contains instructions for how to display and adjust the pressure parameters of the machine.

The section is divided into the following sections:

- 8.4.1: Displaying pressure parameters
- 8.4.2: Configuring the pressure parameters

"Display" means that the parameter will only be shown.

"Setting" means that the parameter can also be changed.

Parameters	Explanation
pRV	Display: Activating pressure of the safety relief valve on the oil separator tank.
pE	Pressure increase. Setting: ■ pE SP: Switching point for pressure increase; upper safety limit for machine maximum pressure; in an external LOAD control, this value is used to switch the machine from LOAD to IDLE in the event of a fault. ■ pE SD: Switching differential of pressure increase.
ΔpFC	Limiting value for machines with frequency-controlled drive (SFC). Setting: ■ dp FC: Limit of the lowest delivery quantity. When the value [switching point system setpoint pressure +dp FC] is exceeded, the compressor switches from LOAD to IDLE.
Nominal pressure	Display: The compressor is designed for this pressure (maximum system pressure setpoint).
Setpoint pressure	Setpoint pressure can be regulated to two values: pA and pB. Setting: ■ Switching point pA or control pressure pA in machines with frequency converter (SFC). ■ Switching point pB or control pressure pB in machines with frequency converter (SFC).
System pressure low	A warning message is displayed when the limit value for the system pressure is reached. Setting: ■ SD: Switching differential for system pressure low. ↓: Switching point for system pressure low. ■ Option: Configure the output signal. Warning message displayed or an additional output signal is sent, e.g., to a control center.

Parameters	Explanation
Cut-in pressure min	Display: For design reasons, pressure can only be built up above this value.

Tab. 53 Compressor pressure parameters

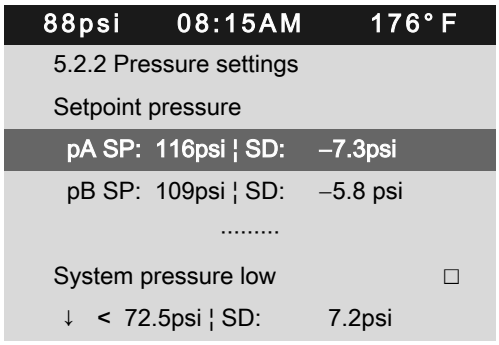
➢ Parameters correspond to the following specifications.

8.4.1 Displaying pressure parameters

Precondition Password access level 2 is activated.

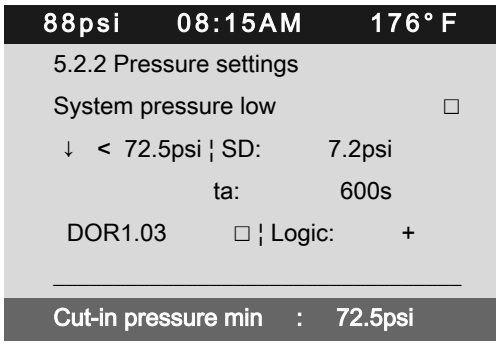
Opening the menu for pressure parameters

1. Open the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.
2. Press «Enter».
   The *Pressure settings* menu is displayed.



Displaying further parameters

1. Use the «Up» or «Down» keys to select the *Cut-in pressure min* line.



2. Display further parameters with the «Up» and «Down» keys.

8.4.2 Configuring the pressure parameters

8.4.2.1 Adjusting the system setpoint pressure: pA and pB

The pressure parameters can only be set within certain limits:

Rated machine pressure ≥ SP: pA pB / ≥ Min. cut-in pressure* + switching differential

Tab. 54 Setting limits for the system setpoint pressure (* Cut-in pressure min)

The machine switches to LOAD under the following condition:

System pressure ≤ SP: pA /pB - switching differential

Tab. 55 Pressure condition for LOAD

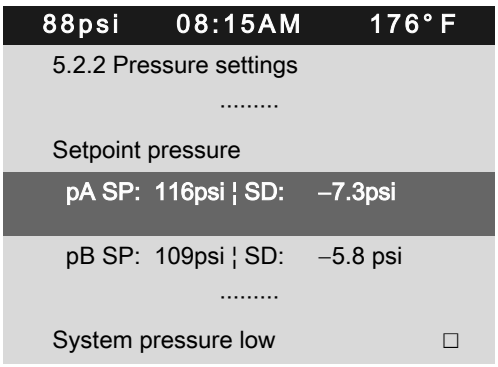
The machine switches to IDLE under the following conditions:

System pressure = System setpoint pressure

Tab. 56 Pressure conditions for IDLE

Precondition Password access level 2 is activated.

1. Select the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.
2. Use «Up» or «Down» to select the *pASP* line.



3. Press «Enter».
   The setting mode is active.
4. Use «Up» or «Down» to adjust the *pA SP* value.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Adjust the *SD* switching differential in the same way.
7. Adjust the *pB SP* and the *SD* switching differential in the same manner, if necessary.
8. Press «Escape» repeatedly to return to the main menu.

Result The settings for the system setpoint pressure *pA* and *pB* are adjusted.

8.4.2.2 Adjusting the value for "System pressure low"

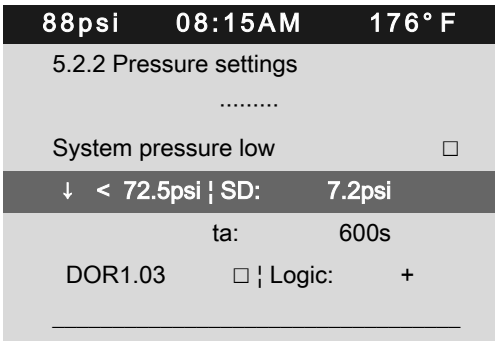
If the system pressure falls to the *System pressure low* value, SIGMA CONTROL 2 will display a warning message for the system pressure being too low.
Be generous when setting the time value for the display of the warning message.
If the time interval is set too short, the system will display a warning message despite the machine delivering compressed air and approaching the preset value for the system setpoint pressure.
The switching differential influences the pressure level at which the message can be acknowledged or the optionally activated output can switch again:

Message	Output
72.5 psi message appears	Active
80.0 psi message disappears	Inactive

Tab. 57 Example: activated output

Precondition Password access level 2 is activated.

1. Select the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.
2. Use «Up» or «Down» to select the ↓ < line.



Menu

Current system pressure low point

3. Press «Enter» to switch into setting mode.
   The setting mode is active.
4. Use «Up» or «Down» to adjust the value for *System pressure low*.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Adjust the *SD* switching differential in the same way, if necessary.
7. Press «Escape» repeatedly to leave this menu.

8.4.2.3 Adjusting the SD switching differential of the pressure increase

The value for pressure rise *pE SP* serves as a safety limit value when the machine is externally controlled. When the system setpoint pressure reaches the value *pE SP* (for example, when the external control functions incorrectly) the machine switches to IDLE. The warning message *External load signal?* is displayed.

The parameter for *pE SP* pressure increase is preset and cannot be changed. You can, however, adjust the *SD* switching differential.

Displaying and adjusting the pressure increase parameters:

Pressure increase	Display parameters	Setting parameters
Switching point *pE SP*	x	–
Switching differential *SD*	x	x

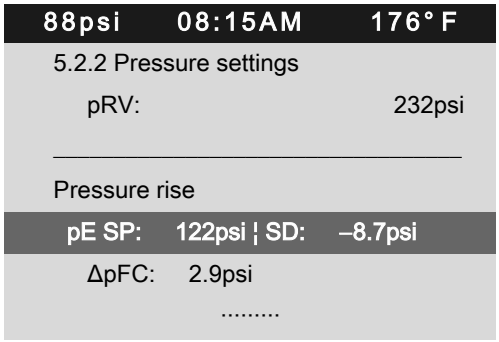
x = fitted, – = not fitted

Tab. 58 Displaying and adjusting parameters

Precondition Password access level 2 is activated.

1. Select the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.

2. Use «Up» or «Down» to select the *pESP* line.



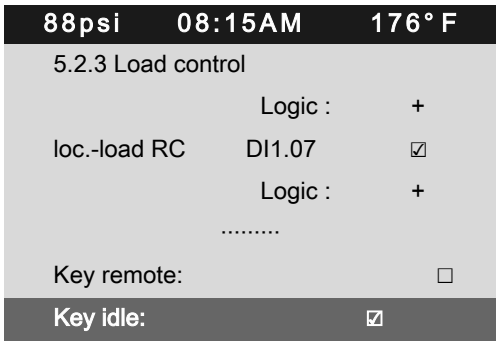
3. Press «Enter» to switch into setting mode.
   The setting mode is active.
4. Use «UP» or «DOWN» to adjust the required value for *SD*.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press «Escape» repeatedly to return to the main menu.

8.4.3 Activating/deactivating the «LOAD/IDLE» key

In order to prevent unauthorized users from switching the machine to IDLE, you can deactivate the «LOAD/IDLE» key on the SIGMA CONTROL 2 operating panel.

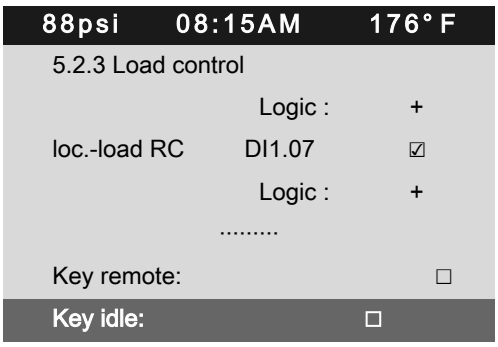
Precondition Password access level 2 is activated.

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Key idle* line.
3. Press «Enter» to switch into setting mode.
   The check box *Key idle* will flash.



4. Press the «Up» key.
   The deactivated check box is displayed.

5. Press «Enter» to save the setting.
   The «IDLE» key is deactivated.



Menu

Active line with deactivated check box

6. Press «Escape» repeatedly to return to the main menu.

Result Thus, it is ensured that unauthorized users can press the «IDLE» key without the machine switching to IDLE.

8.5 Configuring machine start and stop

➢ In addition to manually starting the machine locally, you have the following alternatives:

Function	State on delivery, setting	See
Automatic start/stop in timer mode	No clock (time) program set	8.5.1
Holidays	Not set	8.5.2
Remote start, e.g. from a control center	Deactivated	8.5.3
"Venting" function	Activated	8.5.5
"Autostart" function	Activated	8.5.6

Tab. 59 Settings for machine start and stop

8.5.1 Automatic start/stop in timer mode

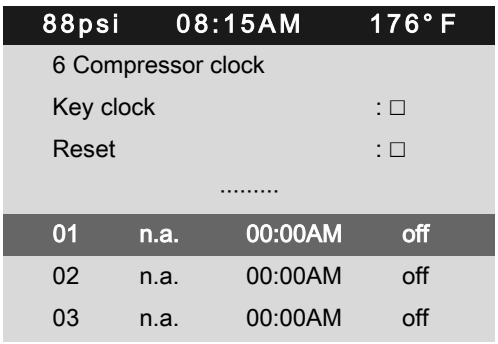
Overview

- Selecting the *Compressor clock* menu
- Setting/adjusting the time program
- Activating the «Clock» key
- Activating timer control

8.5.1.1 Compressor clock

Precondition Password access level 2 is activated.

1. Open the 6 *Compressor clock* menu.
   The *Compressor clock* menu is displayed.



User-defined clock program:

No.:	Day	Time	Function
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			

Tab. 60 User-defined clock program machine ON/OFF

8.5.1.2 Setting/adjusting the clock program (example)

When setting a clock program for the first time, note the switching times on the "User-defined clock program" table.

In addition to individual weekdays, the controller has the following cycles:

- Mon-Thu
- Mon-Fri
- Mon-Sat
- Mon-Sun
- Sat-Thu

You can also program an OFF time (plant vacation shutdown, for example) (see Section 8.5.2).

Example

- Machine ON: On weekdays 06:30AM – 05:00PM, Fridays 06:30AM – 03:00PM
- Machine OFF: Sat – Sun and during midday break 12:00PM – 01:00PM

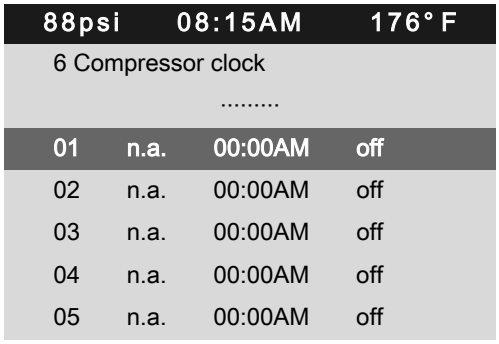
The following switching points result:

No.:	Day	Time	Function
01	Mon-Fri	06:30AM	on
02	Mon-Fri	12:00PM	off
03	Mon-Fri	01:00PM	on
04	Mon-Thu	05:00PM	off
05	Fri	03:00PM	off

Tab. 61 Example of a machine ON/OFF clock program

Precondition Password access level 2 is activated.

1. Select the 6 *Compressor clock* menu.
2. Use «Up» or «Down» to select the *01* line.



Menu

Active line with switching point 01

Switching point 02

Switching point 03

Switching point 04

Switching point 05

3. Press «Enter» to switch into setting mode.
   The *n.a.* column flashes in the active line.
4. Use the «Up» or «Down» keys to specify the settings for the weekdays.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press the «Right» key.
7. Press «Enter» to switch into setting mode.
   The column time, display for hours, *00:00* flashes in the active line.
8. Use «Up» or «Down» to specify the settings for the hours.
9. Press the «Right» key.
10. The column time, display for minutes, 00:*00* flashes in the active line.
11. Use «Up» or «Down» to specify the settings for the minutes.

12. Press «Enter» to accept the setting.
    The setting is applied.

88psi	08:15AM	176° F	
6 Compressor clock			Menu
.....			
01	Mon-Fri	06:30AM on	Switching point 01 is set
02	Mon-Fri	12:00PM off	Switching point 02 is set
03	Mon-Fri	01:00PM on	Switching point 03 is set
04	Mon-Thu	05:00PM off	Switching point 04 is set
05	Fri	03:00PM off	Switching point 05 is set

13. Press the «Right» key.
14. Press «Enter» to switch into setting mode.
    The *on/off* indicator flashes.
15. Use «Up» or «Down» to specify the settings for the action Compressor On.
16. Press «Enter» to accept the setting.
    The setting is applied.
    The action Compressor ON is set for the first switching point.
17. Specify further switching points in the same manner.

Result Weekdays, time and the Compressor ON/Compressor OFF actions are set for all switching points of the user-defined clock program.

8.5.1.3 Activating the «Timer control» key

1. Use «Up» or «Down» to select the *Key clock* line.
2. Press «Enter» to switch into setting mode.
   The check box *Key clock* flashes in the active line.

88psi	08:15AM	176° F	
6 Compressor clock			Menu
Key clock		: ☑	Active line with deactivated check box
Reset		: ☐	
.....			
01	Mon-Fri	06:30AM on	Switching point 01
02	Mon-Fri	12:00PM off	Switching point 02
03	Mon-Fri	01:00PM on	Switching point 03

3. Press the «Up» key to activate the check box.
   The check box is activated.
4. Press «Enter» to accept the setting.
   The setting is applied.
5. Press «Escape» repeatedly to return to the main menu.

Result The «Timer control» key is activated.
The activated key «Timer control» can be used for activating the timer control.

8.5.1.4 Activating timer control

Precondition The «Timer control» key is activated; see chapter 8.5.1.3.

➢ Press the «Timer control» key on the SIGMA CONTROL 2 operating panel to activate the time control.

Result The *Timer control* LED on the operating panel of the SIGMA CONTROL 2 signalizes with *green continuous light* that the machine is operated with activated timer control.

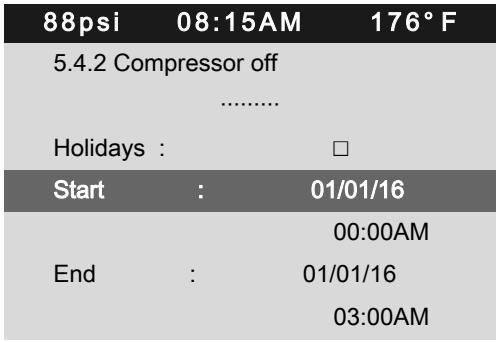
The timer control of SIGMA CONTROL 2 switches the machine according to the defined switching points of the timer program.

8.5.2 Setting up the holiday period

In addition to the fixed cycles of a timing program or timer, you can also specify a longer lasting standstill time. For example, you may specify a standstill period for vacation shutdown by defining the following:

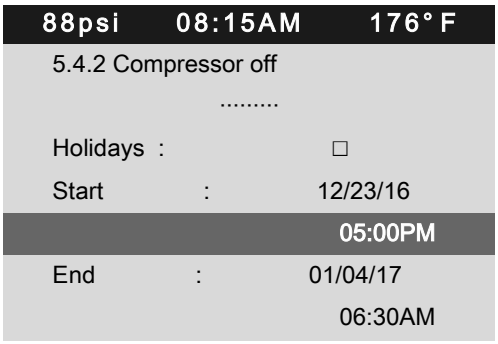
Precondition Password access level 2 is activated.

1. Select the 5.4.2 *<Configuration – Compressor start – Compressor off>* menu.
2. Use «Up» or «Down» to select the *Start* line.

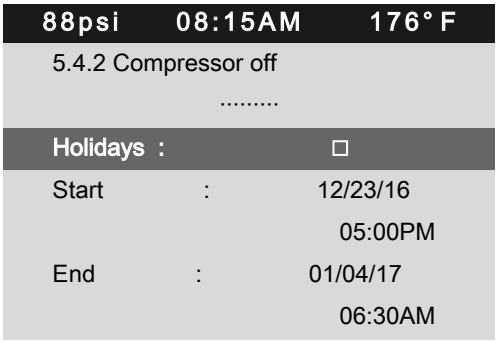


3. Press «Enter» to switch into setting mode.
   The display for days *00.00.00* flashes.
4. Use «Up» or «Down» to set the day.
5. Press the «Right» key.
   The display for months *00.00.00* flashes.
6. Use «Up» or «Down» to set the month.
7. Press the «Right» key.
   The display for years *00.00.00* flashes.
8. Use the «Up» or «Down» keys to set the year.
9. Press «Enter» to accept the setting.
   The setting is applied.
10. Press «Down».
11. Press «Enter» to switch into setting mode.
    The display for hours *00:00:00* flashes.
12. Use «Up» or «Down» to set the hours.
13. Press the «Right» key.
    The display for minutes *00:00:00* flashes.

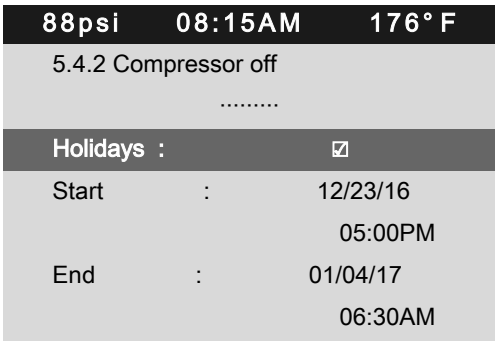
14. Use «Up» or «Down» to set the minutes.
15. Press «Enter» to accept the setting.
    The date and time for the start of the company shutdown are set.
16. Adjust the date and time for the end of the company shutdown in the same manner.



17. Use «Up» or «Down» to select the *Holidays* line.



18. Press «Enter» to switch into setting mode.
    The check box *Holidays* will flash.
19. Press the «UP» key to activate the check box.
    The check box is activated.



20. Press «Enter» to accept the setting.

Result In this example, a company shutdown (standstill time) for the time between 12/23/16 / 05:00PM until 01/04/17 / 06:30AM has been set for the machine.

8.5.3 Starting the machine remotely (Remote ON/OFF)

If the machine is to be started and stopped remotely, the following settings have to be set:

Overview

- Making the electrical connection (a spare input for the remote contact can be found in the electrical wiring diagram for the machine, DI 1.07 being preferred).
- Switching machine start to remote mode.
- Activating the «Remote control» key.
- Activating the «Timer control» key and configuring the clock program (see chapter 8.5.1.2), if necessary.
- Assigning a different input for the remote contact *RC*, if required.
- Pressing the «Remote control» key.

8.5.3.1 Switching machine start to Remote mode

Two methods are available to start the machine remotely from a control center:

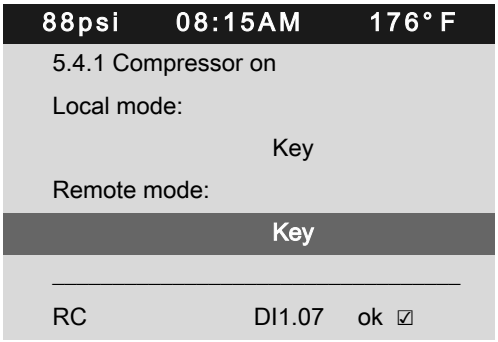
- Variant **A**: Starting the machine with the input signal from the remote control center.
- Variant **B**: Starting the machine from the remote control center in addition to a configured ON/OFF clock program.
  The machine can be started from the remote control center even though the timer control is activated and the ON/OFF program has selected OFF at this point in time.

Precondition The electrical connection has been made.

Password access level 2 is activated.

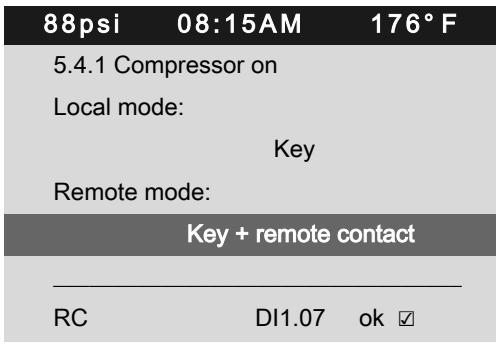
The operating mode is displayed.

1. Open the 5.4.1 *<Configuration – Compressor start – Compressor on>* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.
3. Press the «DOWN» key.
4. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.



5. Use «Up» or «Down» to set the *Key + remote contact* input.

6. Press «Enter» to accept the setting.
   The setting is applied.

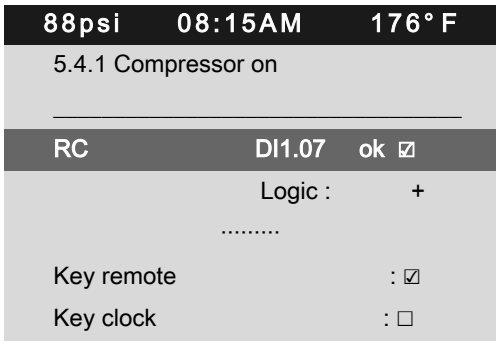


Result The machine start is set to *Remote mode Key + remote contact*.

8.5.3.2 Assigning another input

Inputs already assigned cannot be further assigned.

1. Use «Up» or «Down» to select the *RC* line.



2. Press «Enter» to switch into setting mode.
   The display for the currently set input flashes.
3. Select another input with the «Up» or «Down» keys.
4. Press «Enter» to accept the setting.
   The input has now been assigned.
5. Press the «Remote control» key to enable the machine to be started from the remote control center.

If an input is rejected it means it is already assigned.

➢ Select a different input.

8.5.4 Activating the remote control

➢ Activating remote control, see chapter 8.2.12.

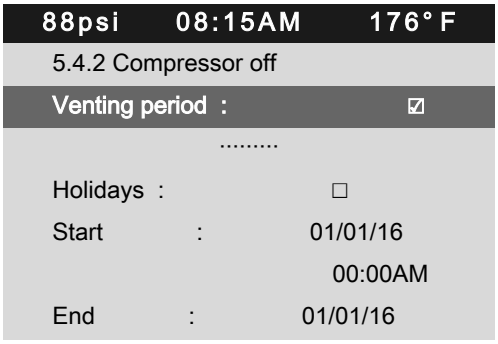
Result SIGMA CONTROL 2 remote control is activated.

8.5.5 Activating/deactivating the idle period "Venting period" function

Prior to the machine's transition from the operating modes LOAD to READY you can also activate an IDLE period ("Venting period" function). The duration of the IDLING period can be timed and/or regulated by internal pressure. The machine-dependent venting period between the LOAD and READY operating modes ensures load changes at minimum material stresses and is therefore activated at the factory (default setting). If this function is not required, you can deactivate it.

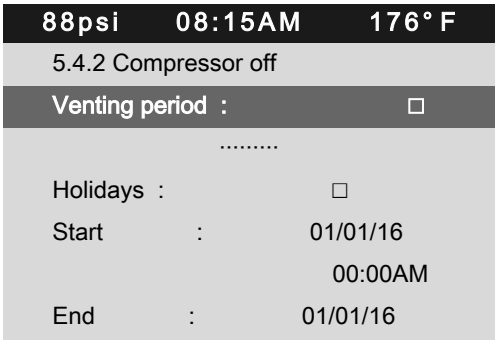
Precondition Password access level 2 is activated.

1. Open the 5.4.2 *<Configuration – Compressor start – Compressor off>* menu.
2. Use «Up» or «Down» to select the *Start* line.



Menu
Factory setting: "Venting period" activated

3. Press «Enter» to switch into setting mode.
   The check box *Venting period* will flash.
4. Press the «UP» key.
   The check box is deactivated.



Menu
Active line with deactivated check box
Date for start
Time for start
Date for end
Time for end

5. Press «Enter» to accept the setting.
   The setting is applied.

Apart from the discontinuation of the pressure or load requirement, venting of the machine is also executed when the «OFF» key is pressed.

Press the «OFF» key twice to immediately shut the machine off.

➢ Press the «OFF» key twice.

Result The machine is switched off without venting (IDLE time).

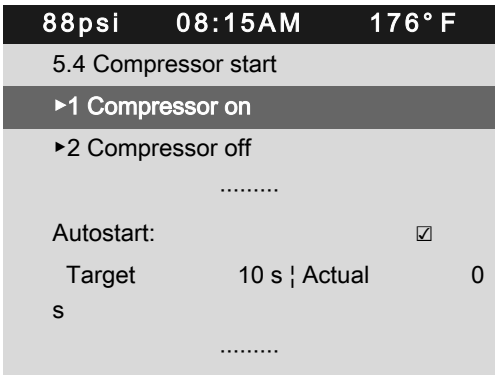
8.5.6 Activating/deactivating and adjusting the "Autostart" function

The *Autostart:* function is activated (default setting).

To avoid overloading the power supply through several machines starting simultaneously, a delay period determining the restart of each machine can be entered.

Precondition Password access level 2 is activated.

1. Select the 5.4 *<Configuration – Compressor start>* menu.
2. Press «Enter».
   The *Compressor start* menu is displayed.



Menu

Active line

Autostart activated

Setting up the Autostart delay period

If you operate several machines, it is better to start them in sequence.

Use the "Delay time for Autostart" table to plan the time-delayed machine start. In the "Start period" column, enter for each individual machine the real time required for the first possible LOAD. Cumulatively add these values in the "Delay time" column. Enter the value of the delay time of each machine in the corresponding controller.

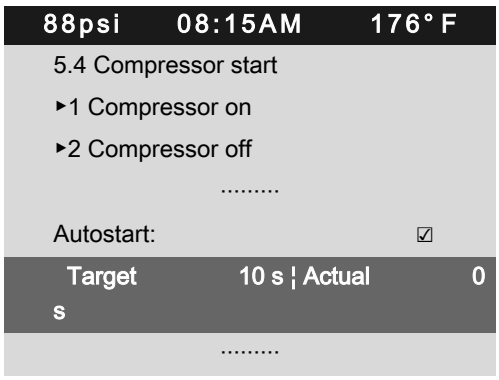
The first machine may start immediately and does not require a delay time.

Machine number	Start time [sec]	Delay time [sec]
1	—	—
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Tab. 62 Autostart delay period

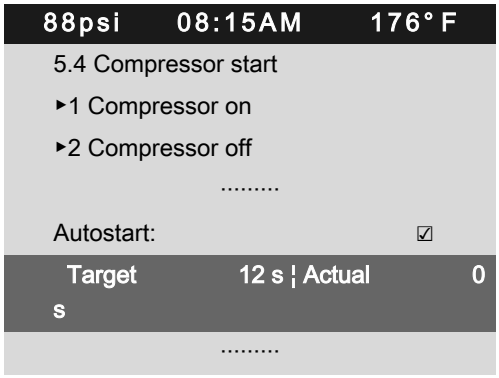
Precondition Password access level 2 is activated.

1. Select the 5.4 *Compressor start* menu.
2. Use «Up» or «Down» to select the *Target* line.



Menu
Autostart is activated
Set/expiring delay time

3. Press «Enter» to switch into setting mode.
   The *Target* display flashes.
4. Use «Up» or «Down» to set the time delay in seconds.



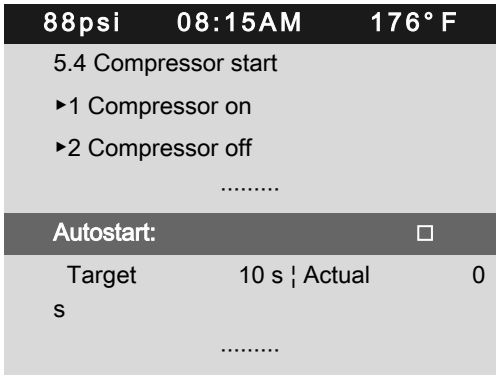
Menu
Active line

5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press «Escape» repeatedly to return to the main menu.

Result The delay time for an Autostart after a power failure has been adjusted from 10 s to 12 s.

Deactivate/activate the Autostart function

1. Use «Up» or «Down» to select the *Autostart:* line.



Menu
Autostart deactivated
Set/expiring delay time

2. Press «Enter» to switch into setting mode.
   The check box *Autostart:* will flash.

3. Press the «Up» key.
   The check box *Autostart:* is deactivated.
4. Press «Enter» to accept the setting.

The *Autostart:* function can be activated in the same manner.

The setting is applied.

5. Press «Escape» repeatedly to return to the main menu.

Result Autostart after a power failure is deactivated.

8.6 Activating and adjusting the control modes

The controller is provided with various control modes that can bring about different capacity utilization depending on machine application. Chapter 5.7 provides a comprehensive description of all control modes.

8.6.1 Selecting a control mode

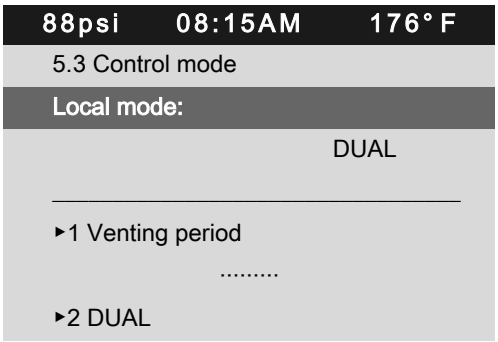
The following control modes are possible:

- DUAL
- QUADRO
- VARIO
- DYNAMIC
- Continuous

- The standard setting of the control mode depends on the machine type.
- The machine-dependant venting period between the LOAD and READY operating modes ensures load changes at minimum material stresses.

Precondition Password access level 2 is activated.

1. Select the 5.3 *<Configuration – Control mode >* menu.
2. Use «Up» or «Down» to select the *Local mode* line.



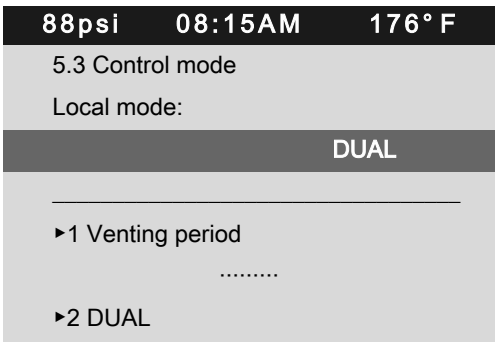
Menu

Active line

Venting period menu

3. Press «Down».
   The currently set control mode is displayed.

4. Press «Enter» to switch into setting mode.
   The currently active control mode flashes.



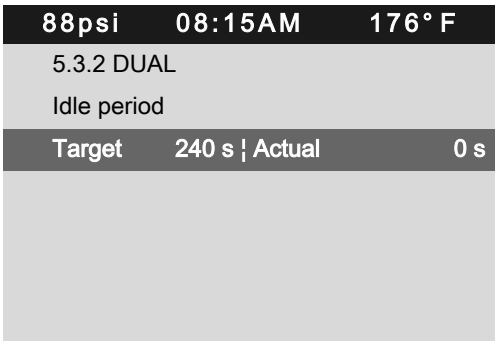
5. Use «Up» or «Down» to set the control mode.
6. Press «Enter» to accept the setting.
   The setting is applied.
7. Press «Escape» repeatedly to return to the main menu.

8.6.2 Adjusting the idle time of DUAL control mode

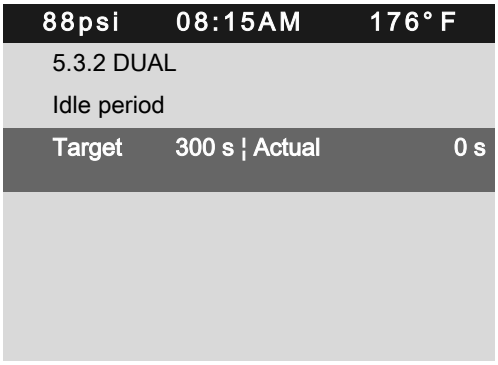
The machine is READY when the specified idle time has elapsed.
The shorter the period, the more often the machine will switch from IDLE to READY.
SIGMA CONTROL 2 will take into account the maximum motor switching capacity.
Depending on the machine type, the machine's motor may not fall below a minimum idling or standstill time.

Precondition
Password access level 2 is activated.
The DUAL control mode is set.
The operating mode is displayed.

1. Select the 5.3.2 *<Configuration – Control mode – DUAL>* menu.



2. Use «Up» or «Down» to select the *Target* line.



Menu

Active line with increased idle time, (example: 300 seconds)

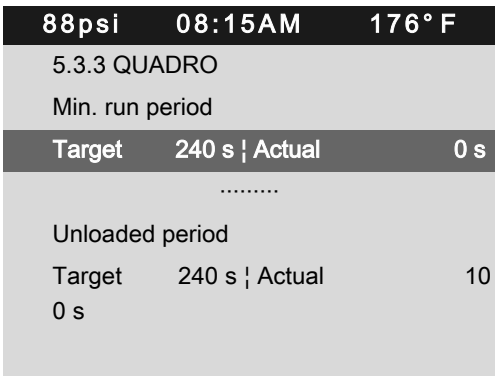
3. Press «Enter» to switch into setting mode.
   The seconds display flashes.
4. Use «Up» or «Down» to set the seconds.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press «Escape» repeatedly to return to the main menu.

8.6.3 Adjusting the minimum running and unloaded period in QUADRO control mode

When the minimum running period has elapsed, the machine switches from IDLE to READY. Depending on the setting for the unloaded period, the machine switches from LOAD to IDLE or directly to READY.

Precondition Password access level 2 is activated.
The QUADRO control mode is set.

1. Select the 5.3.3 *<Configuration – Control mode – QUADRO>* menu.

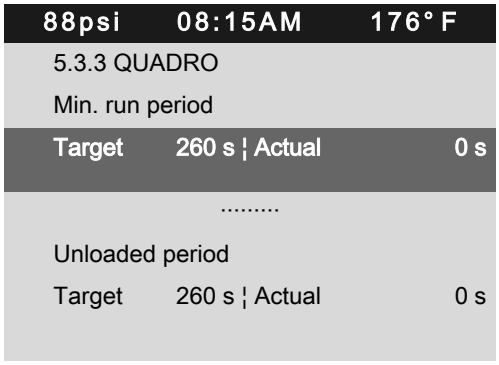


Menu

Active line setpoint value for minimum run time

2. Use the «Up» or «Down» keys to select the *Min. run period* line.
3. Press the «DOWN» key.
4. Press «Enter».
   The seconds display flashes.

5. Use «Up» or «Down» to set the seconds.



Menu

Active line with changed setpoint value for minimum run time

Changed setpoint value for unloaded period

6. Press «Enter» to accept the setting.
   The setting is applied.
7. Adjust the target value for the *Unloaded period* switching differential in the same way, if necessary.
8. Press «Escape» repeatedly to return to the main menu.

Further information See chapter 5.7 for an overview of the control modes.

8.7 Electronic Thermal Management

The design of the electronic thermal management (ETM) is determined by your machine's design.

Model	Electronic thermal management (ETM)
Machine type 1	Without heat recovery
Machine type 2	Heat recovery without electrically controlled valve
Machine type 3	Heat recovery with adjustable airend discharge temperature for the regulator of the electrically controlled heat recovery valve

Tab. 63 Machine type and ETM design

Note:

- The machine runs with increased airend discharge temperature when heat recover is set to active.
- An increased airend discharge temperature causes poor efficiency of the compressed air generation.

1. Check whether your machine is fitted with an electronic thermal management.
2. Check whether the setpoint value of the airend discharge temperature for the regulator of the electrically controlled heat recovery valve can be adjusted.
3. Set the heat recovery to "active" if you can use the machine's exhaust heat.
4. Set the heat recovery to "inactive" if you cannot use the machine's exhaust heat.

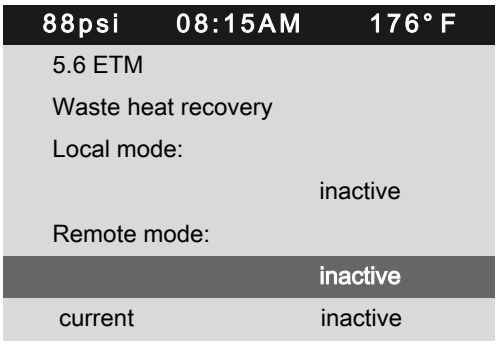
8.7.1 Activating the heat recovery for machine type 2

The heat recovery can be set for local operation, as well as for remote operation. In remote operation, the heat recovery can be controlled by means of a load remote contact.

Example: Heat recovery for machines in "remote operation".

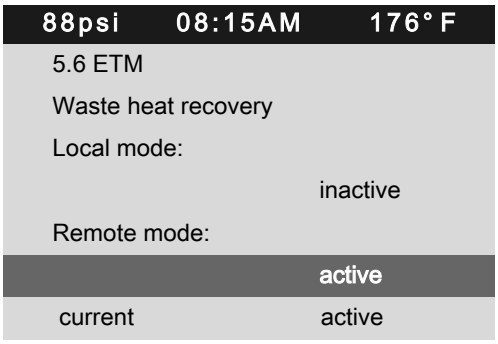
Precondition Password access level 2 is activated.

1. Select the 5.6 *<Configuration – ETM>* menu.
2. Use the «Up» or «Down» keys to select the *Remote mode:* line.



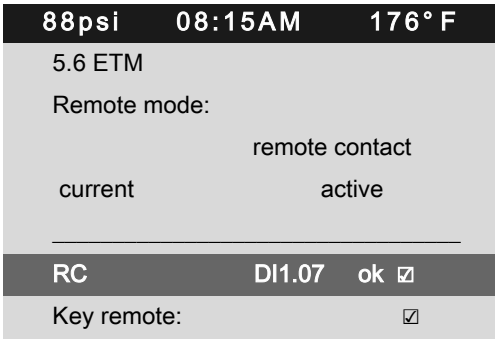
Menu
Active line
Status of heat recovery

3. Press the «DOWN» key.
4. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.
5. Use «Up» or «Down» key to set the *active* option.
6. Press «Enter» to accept the setting.
   The setting is applied.



Menu
Active line
Status of heat recovery

7. If a load remote contact controls the remote control, set the *remote contact* option.



Menu
Active line

8. Subsequently, set the requested digital input *DI* in line *RC* and activate the corresponding check box.
9. Activate the «Remote control» key (see chapter 8.2.12).

Result The heat recovery system in "remote operation" has been activated.

The «Remote control» key is activated.

No other settings are required.

The current status for the heat recovery is displayed in the *current* line.

8.7.2 Activating the heat recovery for machine type 3

Example: Heat recovery with adjustable setpoint value for the airend discharge temperature for the regulator of the electrically controlled heat recovery valve for machines in "local operation".

Precondition Password access level 2 is activated.

1. Select the 5.6 *<Configuration – ETM>* menu.
2. Use the «Up» or «Down» keys to select the *Local mode:* line.

88psi 08:15AM 176° F	
5.6 ETM	Menu
Waste heat recovery	
Local mode:	
inactive	Active line
Remote mode:	
inactive	
current inactive	Status of heat recovery

3. Press the «DOWN» key.
4. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.
5. Use «Up» or «Down» key to set the *active* option.
6. Press «Enter» to accept the setting.
   The setting is applied.

88psi 08:15AM 176° F	
5.6 ETM	Menu
Waste heat recovery	
Local mode:	
active	Active line
Remote mode:	
inactive	
current active	Status of heat recovery

Result The heat recovery system has been activated.

Further information The setpoint value for the airend discharge temperature for the regulator of the electrically controlled heat recovery valve can be set manually; see chapter 8.7.2.1.

8.7.2.1 Setting the setpoint value for the airend discharge temperature

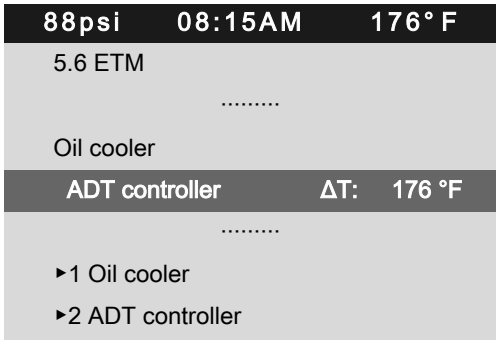
The airend discharge temperature and the water outlet temperature are related. To increase the value for the water outlet temperature, you must increase the setpoint value for the airend discharge temperature.

Maximum setting = 198 °F.

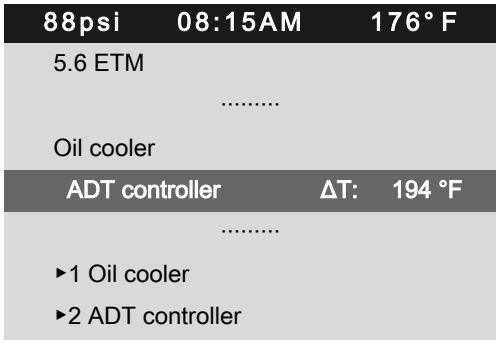
The specific value of the discharge temperature depends on the respective application for the heat recovery at the customer's.

Precondition Password access level 2 is activated.

1. Select the 5.6 *<Configuration – ETM>* menu.
2. Use the «Up» or «Down» keys to select the *ADT controller* line.



3. Press «Enter» to switch into setting mode.
   The setting mode is active.
4. Use «Up» or «Down» to set the setpoint for the *ADT controller*.



5. Press «Enter» to accept the setting.
   The setting is applied.

Result The setpoint value of the airend discharge temperature for the regulator of the electrically controlled heat recovery valve is set.

8.7.3 Deactivating heat recovery

If the heat recovery is set to inactive, you have improved efficiency in compressed air generation.

➢ Set the heat recovery to "inactive" if you cannot use the machine's exhaust heat.

8.8 Refrigerated dryer

Overview:

- Setting the operating mode
- Output messages
- Procedures following a fault of the refrigerated dryer:
  - The quality of the compressed air has priority:
    Immediately contact an authorized KAESER service representative.
- Procedures following a fault of the refrigerated dryer:
  - Compressed air quality has priority:
    Activate fault mode without refrigerated dryer.

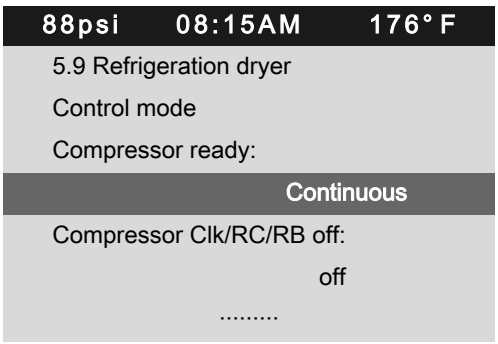
➢ It is mandatory to follow the procedures indicated according to the priorities established for the compressed air quality or compressed air quantity!

8.8.1 Setting the operating mode

The CONTINUOUS or TIMER modes can be activated for the refrigerated dryer.
If the TIMER setting is used, the refrigerated dryer is shut down under timing control whenever compressed air is not required.
The operating temperature in the refrigerated dryer is kept constant within narrow limits under this method of control by cycling the refrigerant circulation.

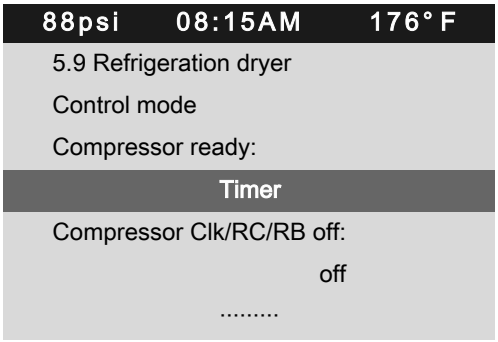
Precondition Password access level 2 is activated.

1. Select the 5.9 *<Configuration – Refrigeration dryer>* menu.
2. Use the «Up» or «Down» keys to select the *Compressor ready:* line.
3. Press the «DOWN» key.



4. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.

5. Use «Up» or «Down» to set the *Timer* operating mode.



6. Press «Enter» to accept the setting.
   The setting is applied.
7. Press «Escape» repeatedly to leave this menu.

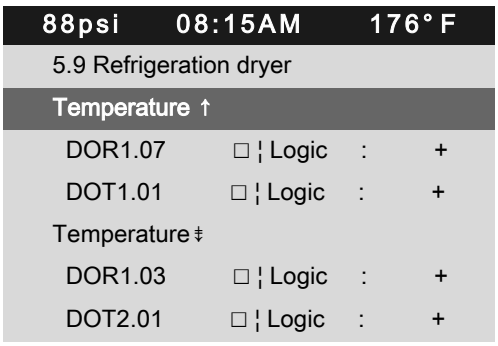
Result The CONTINUOUS operating mode has been switched to the TIMER operating mode.

8.8.2 Output messages

If required, you can activate messages regarding the operating temperature of the refrigerated dryer as a binary signal.
You can assign to *DOR* or *DOT*.
If you have correctly parameterized, *ok* will be displayed.

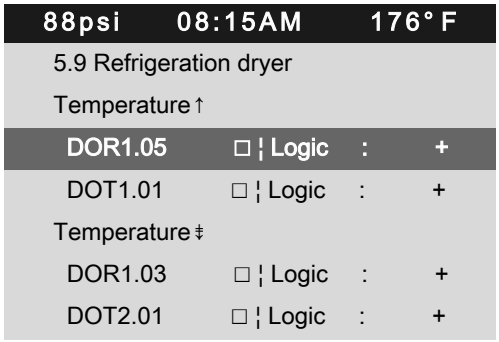
Precondition Password access level 2 is activated.

1. Select the 5.9 *<Configuration – Refrigeration dryer>* menu.
2. Use «Up» or «Down» to select the *Temperature* line.



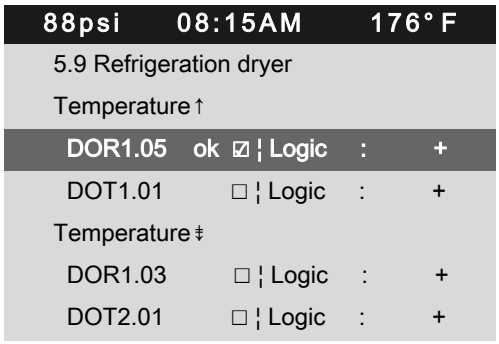
3. Press the «DOWN» key.
4. Press «Enter» to switch into setting mode.
   The setting mode is active.

5. Select a free input DOR with the «Up» or «Down» key.



Menu
Temperature high
Active line, example: DOR selected

6. Press «Enter» .
   The setting is applied.
7. Press the «Right» key.
8. Press «Enter».
   The setting mode is active.
9. Press «UP».



Menu
Temperature high
Active line

Temperature low

10. Press «Enter».
    ok is displayed as the active line.
11. Set the *Temperature ⇟* message if necessary in the same way.

Upon activation of the check box, *err* is displayed.
- ➢ The parameterization is incorrect.
- ➢ Deactivate the check box.
- ➢ Assign another and/or free output.

8.8.3 Fault in the refrigerated dryer – compressed air quality has priority

After a fault occurs in the refrigerated dryer, the SIGMA CONTROL 2 shuts the machine down. No compressed air is delivered.
Because compressed air quality (dried compressed air) is crucial, you must contact an authorized KAESER service representative immediately.

Precondition The operator decides: Compressed air quality has a higher priority than the compressed air quantity.

1. Keep machine shut down because the required compressed air quality is no longer delivered.

2. Immediately contact an authorized KAESER service representative.
   An authorized KAESER service representative eliminates the fault and executes a reset.
   The machine is ready for the delivery of high-quality, dried compressed air.

8.8.4 Fault in the refrigerated dryer – compressed air quantity has priority

NOTICE

Higher residual humidity in the compressed air!
Higher residual humidity in the compressed air encourages corrosion.

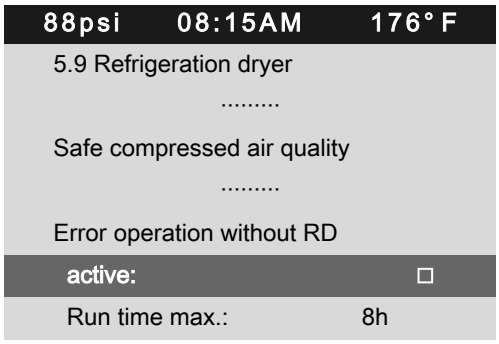
➢ *Carefully assess a "Fault mode without refrigerated dryer" in respect to the further use of the compressed air.*

After a fault occurs in the refrigerated dryer, the SIGMA CONTROL 2 shuts the machine down. In order to ensure compressed air delivery for a defined period of time, the operator can activate the *Error operation without RD* function. The quality of the compressed air (dried compressed air) is compromised in this case. The *0069 Error operation without RD → Call service!* warning message is displayed. The *0069* warning message remains active for the entire time of operation in fault mode.

Precondition The operator decides: Compressed air quantity has a higher priority than the compressed air quality.

Password access level 2 is activated.

1. Open the 5.9 *<Configuration – Refrigeration dryer>* menu.
2. Use the «Up» or «Down» keys to select the *Error operation without RD* line.
3. Press the «DOWN» key.



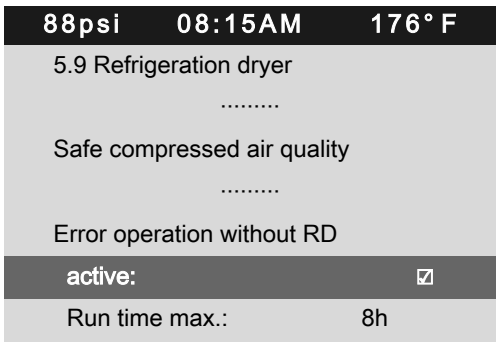
Menu

Active line

Running time (fixed)

4. Press «Enter» to switch into setting mode.
   The setting mode is active.

5. Press «Up» key.
   The check box is activated.



6. Press «Enter» to accept the setting.
   The setting is applied.

Result "Fault mode without refrigerated dryer" function is activated.
The compressor provides compressed air for connected consumers.
The compressed air delivered in this mode contains a higher residual humidity because the function of the refrigerated dryer is defective.

8.9 Configuring the machine for local mode

In local mode, the machine is regulated with the system setpoint pressure *pA* or *pB*. The controller is equipped with the following modes of operation:

Operating mode	Description	See chapter
pA	The machine is controlled by the system setpoint pressure *pA*.	8.9.3.3
pB	The machine is controlled by the system setpoint pressure *pB*.	
pA/pB Clock	The changeover between the *pA* and *pB* system setpoint pressures is regulated by a clock program.	8.9.2
pA/pB Cycle	The changeover between the *pA* and *pB* system setpoint pressure is regulated by a programmed time pulse.	8.9.3

Tab. 64 Local operating mode (local mode)

➢ Adjusting the system setpoint pressure as described in chapter 8.4.

Overview

- Open the *Configuration* menu
- Setting the clock program (see chapter 8.9.2)
  or Setting the timer (see chapter 8.9.3)
- Setting local operating mode

8.9.1 Load control menu

Precondition Password access level 2 is activated.

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
   The *Load control* menu is displayed.

8.9.2 Configuring the system setpoint pressure changeover using the clock

Note the configuration sequence:
- ➢ First, determine the clock program.
- ➢ Then select the operating mode.

Overview
- Deleting an existing clock program
- Entering the weekday for the first switching point
- Entering the time of the first switching point
- Configuring the system setpoint pressure for the first switching point *pA* or *pB*
- Setting up any further switching points
- Setting the operating mode *pA/pB Clock*: see chapter 8.9.3.3

User-defined clock program

No.:	Day	Time	System setpoint pressure
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			

Tab. 65 User-defined clock program

When setting a clock program for the first time, note first the switching times on the "User-defined clock program" table for example.

In addition to individual weekdays, the controller has the following cycles:
- Mon-Thu
- Mon-Fri
- Mon-Sat
- Mon-Sun
- Sat-Thu

Example
- Peak load period: On weekdays from 06:30AM–05:00PM, Fridays 06:30AM–03:00PM
- Low load period: Midday from 12:00PM–01:00PM and the remaining period.

The clock program is established with the following switching points (maximum 10 switching points available):

No.:	Weekday	Time	System setpoint pressure
01	Mon-Fri	06:30AM	*pA on*
02	Mon-Fri	12:00PM	*pB on*
03	Mon-Fri	01:00PM	*pA on*
04	Mon-Thu	05:00PM	*pB on*
05	Fri	03:00PM	*pB on*

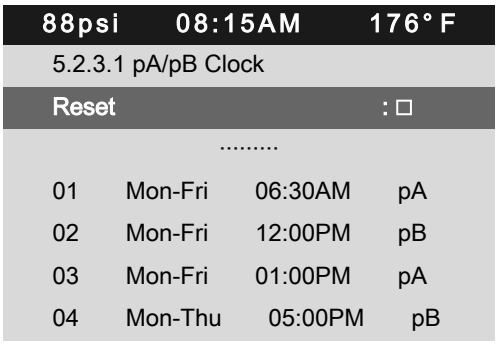
Tab. 66 Example of system pressure changeover switching points

Deleting an existing clock program

Take the following steps to delete an existing clock program:

Precondition Password access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *pA/pB Clock* line.
3. Press «Enter».
   The *Clock program* menu is displayed.
4. Use «Up» or «Down» to select the *Reset* line.



Menu

Active line

5. Press «Enter» to switch into setting mode.
   The check box *Reset:* will flash.
6. Press «UP».
   The check box is activated.
7. Press «Enter» to accept the settings.
   The clock program is now deleted.

Setting the switching point

Precondition Password access level 2 is activated.

1. Open the 5.2.3.1 *<Configuration – Pressure control – Load control – pA/pB Clock>* menu.
   The *Clock program* menu is displayed.

88psi	08:15AM	176° F	
5.2.3.1 pA/pB Clock			
Reset		: □	
	.....		
01	n.a.	00:00AM	pA
02	n.a.	00:00AM	pA
03	n.a.	00:00AM	pA
04	n.a.	00:00AM	pA

Menu

2. Press «Enter» to switch into setting mode.
   The display for the set operating mode flashes.

88psi	08:15AM	176° F	
5.2.3.1 pA/pB Clock			
Reset		: □	
	.....		
01	Mon-Fri	06:30AM	pA
02	Mon-Fri	12:00PM	pB
03	Mon-Fri	01:00PM	pA
04	Mon-Thu	05:00PM	pB

Menu

Settings for weekdays, time, pA

Settings for weekdays, time, pB

3. Use «Up» or «Down» to set the weekdays.
4. Press «Enter» to accept the setting.
   The setting is applied.
5. Press the «Right» arrow.
6. Press «Enter».
   The display for hours, *00:00* flashes.
7. Use «Up» or «Down» to set the hours.
8. Press the «Right» key.
9. The display for minutes, 00:*00* flashes.
10. Use «Up» or «Down» to set the minutes.
11. Press «Enter».
    The setting is applied.
12. Press the «Right» arrow.
13. Press «Enter».
    The *pA/pB* indication flashes.
14. Use «Up» or «Down» to set *pA or pB*.
15. Press «Enter».
    The setting is applied.
16. Set the other switching points in the same manner.
    The clock program is now finished.
17. Setting the operating mode *pA/pB Clock*: see chapter 8.9.3.3

8.9.3 Configuring the system setpoint pressure changeover using the timer

Overview

- Deleting the old timer configuration, if necessary
- Setting timer periods *pA* and *pB*
- Setting starting time for *pA* or *pB*
- Setting the operating mode *pA/pB Cycle*: See chapter 8.9.3.3

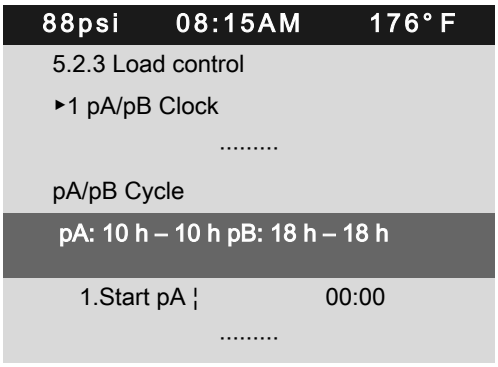
8.9.3.1 Setting timer periods pA and pB

Keep to the order of the configuration. The *pA/pB Cycle* operating mode must not be activated when configuring the timer period.

➢ Configure the timer first and then select the operating mode or select another operating mode first.

Precondition Password access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *pA/pB Cycle* line.
3. Press the «DOWN» key.
   The *pA* line is displayed.
4. Press «Enter» to switch into setting mode.
   The display for the cycle duration in hours, *00* flashes.
5. Use «Up» or «Down» to set the hours.
6. Press «Enter» to accept the setting.
   The setting is applied.



Menu

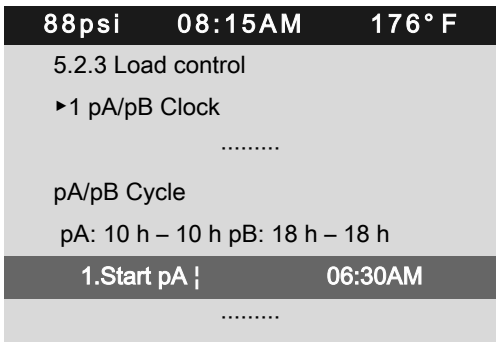
Active line, manually set setpoint value – automatically elapsing value (example)

7. Press the «Right» arrow.
8. Set the cycle duration for *pB* in the same manner.
9. Press «Enter».
   The timer period for the system setpoint pressure *pA* and *pB* is set.

8.9.3.2 Setting the starting time for pA or pB

1. Use «Up» or «Down» to select the *1.Start pA* line.
2. Press the «Right» arrow.

3. Press «Enter» to switch into setting mode.
   The display for hours, *00:00* flashes.



Menu

Active line, starting time

4. Use «Up» or «Down» to set the hours.
5. Press the «Right» key.
   The display for minutes, *00 .00* flashes.
6. Use «Up» or «Down» to set the minutes.
7. Press «Enter» to accept the settings.

Result The starting time for *pA* is set.

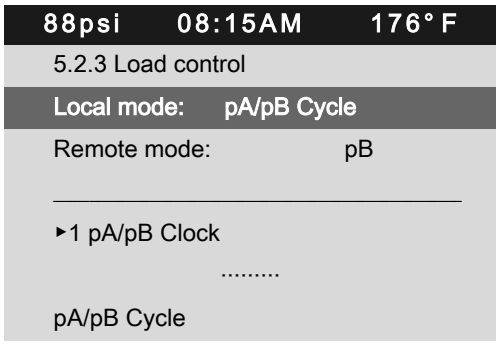
The cycle is set to start with *pB*.

➢ Press «Enter» and specify *1.Start pB* with «UP».

8.9.3.3 Setting local mode

Precondition Password access level 2 is activated.
The timing program or timer is set up.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Local mode* line.
3. Press «Enter» to switch into setting mode.
   The display for the set operating mode flashes.



Menu

Active line

4. Use «Up» or «Down» to set the required operating mode (*pA*, *pB*, *pA/pB Clock*, *pA/pB Cycle*).
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press «Esc» repeatedly to leave this menu.

Result The timer is fully configured.

8.10 Configuring the machine for master control

8.10.1 List of the different master controllers

The machine controller is equipped with several methods of working under other controllers.

Method	Description	Section
Master control with SAM 4.0.	You must modify the settings in SIGMA CONTROL 2 for the operation via SIGMA NETWORK using the KAESER SIGMA AIR MANAGER 4.0.	8.10.2
Master control via PROFIBUS (only available with SIGMA CONTROL 2 - requires an additional module).	The controller (and therefore the compressor) receives the instruction LOAD, IDLE or local operation via the PROFIBUS Master (e. g. SIGMA AIR MANAGER). The system setpoint pressures pA and pB are irrelevant for the LOAD/IDLE signals.	8.10.3
Master control of two compressors with SIGMA CONTROL 2 via Ethernet interface.	The two SIGMA CONTROL 2 controllers operate as master and slave. The slave receives the command to switch between the two system setpoint pressures pA and pB from the master.	8.10.4
Master control via LOAD remote contact. Master control via a LOAD remote contact is another method of controlling the machine externally. There are two possibilities:	LOAD remote contact: An input signal from a superordinate controller switches the machine to LOAD or IDLE. The setpoint pressure settings pA and pB have no relevance.	8.10.5
	Local/LOAD remote contact: Using two inputs, a master controller (e.g. MVS 8000) switches the machine between LOAD/IDLE and local operation.	8.10.6
Setpoint pressure preselection.	pA/pB remote contact: An input contact provides the signal to switch from the system setpoint pressure pA to pB.	8.10.7
Master control of machines regulated by pressure switch.	On machines with the same FAD, SIGMA CONTROL 2 controls the pressure switch via a floating relay output.	8.10.8.1
	On machines supplying an unequal FAD, the pressure ranges are matched to each other.	8.10.8.2

Tab. 67 Master control – overview

Further information Examples of timing programs for equal machine loading are given in section 8.10.9.

8.10.2 SAM 4.0 mode

You must modify the settings in SIGMA CONTROL 2 for the operation via SIGMA NETWORK using, for example, the KAESER SIGMA AIR MANAGER 4.0 (SAM 4.0).

Precondition

SIGMA CONTROL 2 is connected to SAM 4.0 via SIGMA NETWORK and ready for operation (see the SAM 4.0 operating manual in the chapter “Installation”)

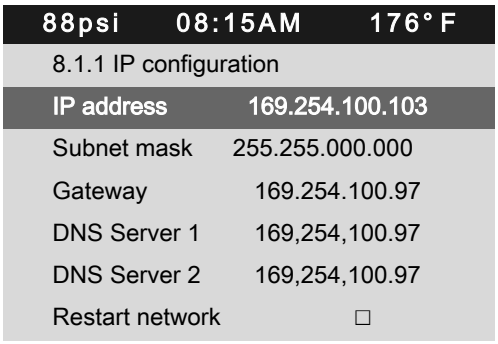
System pressure pB is set as the pressure for the “SAM 4.0 manual mode".

Password access level 2 is activated.

The remote control is activated (see chapter 8.2.12)

Setting the IP configuration

1. Open the 8.1.1 *<Communication – Ethernet/SIGMA NETWORK – IP configuration>* menu.
2. Use «Up» or «Down» to select the *IP address* line.

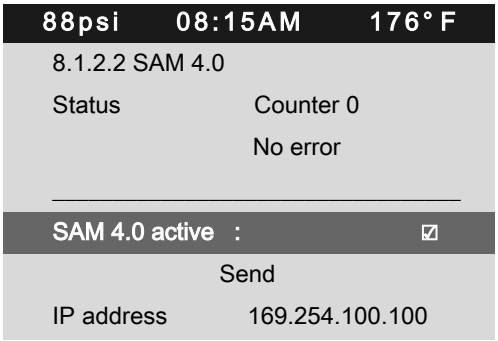


3. Set the IP address for SIGMA CONTROL 2 using the following pattern:
   169.254.100.(SAM 4.0 machine number +102)
   (for the setting see chapter 8.2.13).

Setting the SAM 4.0 mode

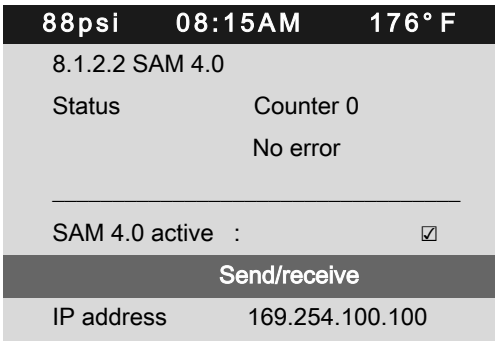
The IP address for SAM 4.0 has been set on SIGMA CONTROL 2 at the factory: 169.254.100.100 and **must not** be changed. The same applies to Port 2000.

1. Open the 8.1.2.2 *<Communication – Ethernet/SIGMA NETWORK – Connections – SAM 4.0>* menu.
2. Use «Up» or «Down» to select the *SAM 4.0active* line.



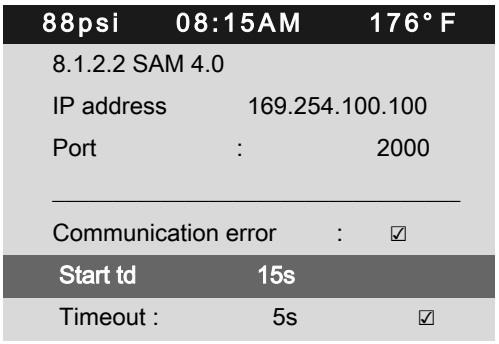
3. Press «Enter» to switch into setting mode.
   The *SAM 4.0 active* check box flashes.
4. Press the «UP» key.
   The check box is activated.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Press the «DOWN» key.

7. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.
8. Use «Up» or «Down» to set the *Send/receive* value.



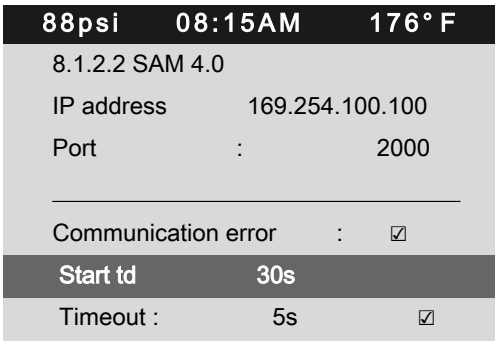
Header
Menu
Active line

9. Press «Enter» to accept the setting.
   The setting is applied.
10. Use «Up» or «Down» to select the *Starttd* line.



Header
Menu
Active line

11. Press «Enter» to switch into setting mode.
    The setting mode is active.
12. Use «Up» or «Down» to set the *Start td* value to 30 s.



Header
Menu
Active line

13. Press «Enter» to accept the setting.
    The setting is applied.

Result SIGMA CONTROL 2 communicates with SAM 4.0 via SIGMA NETWORK.
The communication is working smoothly when neither SIGMA CONTROL 2 nor SAM 4.0 report any communication fault.

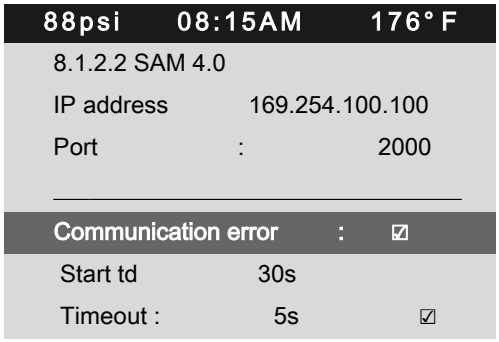
8.10.2.1 Reaction in the event of a communication malfunction

After switching on the power supply, monitoring for communication malfunctions is suppressed for a period of time which can be defined by means of the *Start td* parameter. The setting depends on the time passing at the bus master between return of power and start of communication via the bus.

For the communication with SAM 4.0, the value of Start td must be set to 30 s.

SIGMA CONTROL 2 can monitor the bus communication at user level. For this purpose, the bus master reads a value ("toggle bit") that changes with every bus cycle and returns it without change. SIGMA CONTROL 2 returns a communication malfunction if the value does not change for a time longer than set (*Timeout*).

Monitoring for communication malfunction can be **activated** if needed. For this purpose, the *Send/receive* option must be set for the data exchange. Activate the *Communication error* check box to enable monitoring for communication malfunctions.



Settings for connection to SAM 4.0.

Parameters	Factory setting	Set value
Check box Communication error	Check box ☑ activated [1]	
Start td	30 s	
Timeout	5 s	
Check box Timeout	Check box ☑ activated	

[1] Prerequisite: The *Send/receive* option has been set.

Tab. 68 Parameters for monitoring for communication malfunction

8.10.3 Configuring PROFIBUS mode (SIGMA AIR MANAGER)

Only possible with SIGMA CONTROL 2 (prepared for connection to control center)

Overview:

- Establishing the electrical connection
- Setting the remote operating mode *pB*
- Configuring the PROFIBUS interface
- Activating the «Remote control» key

Precondition Retrofit kit PROFIBUS required

Establishing the electrical connection

Pin	Assignment
1	Spare
2	Spare
3	PROFIBUS connection B
4	TTL signal RTS
5	Ground
6	+5 V for bus terminal
7	Spare
8	PROFIBUS connection A
9	Spare

Tab. 69 PROFIBUS DP pin connection

Interface plug wiring

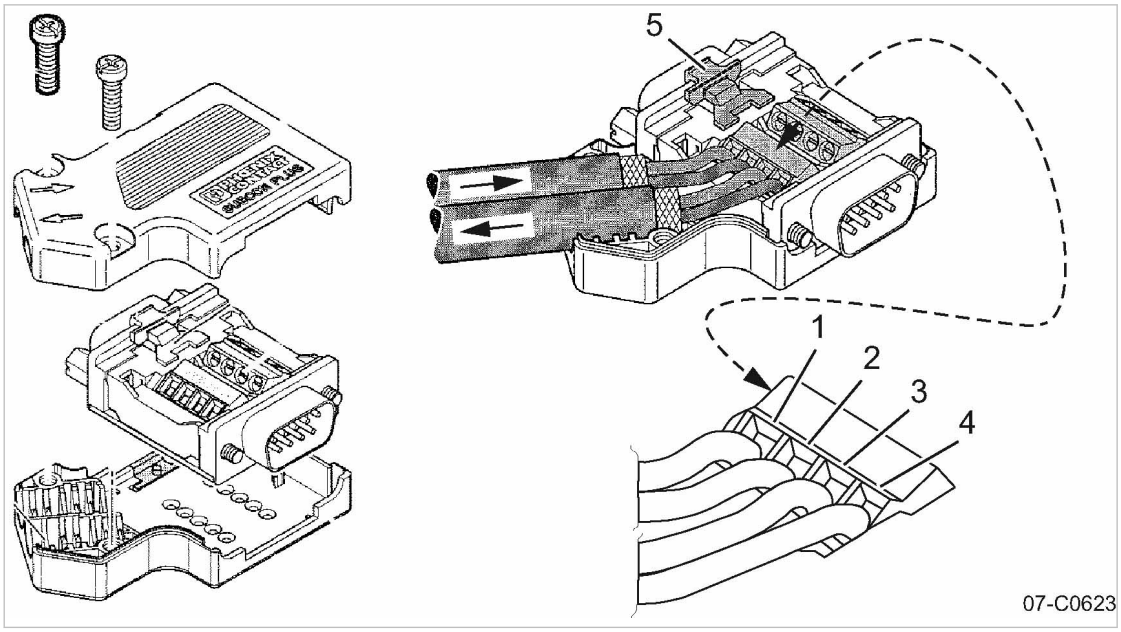


Fig. 29 PROFIBUS plug wiring

[1] Terminal 1A
[2] Terminal 1B
[3] Terminal 2A
[4] Terminal 2B
[5] Slide switch, terminating resistor

Electrical diagram example with SIGMA AIR MANAGER

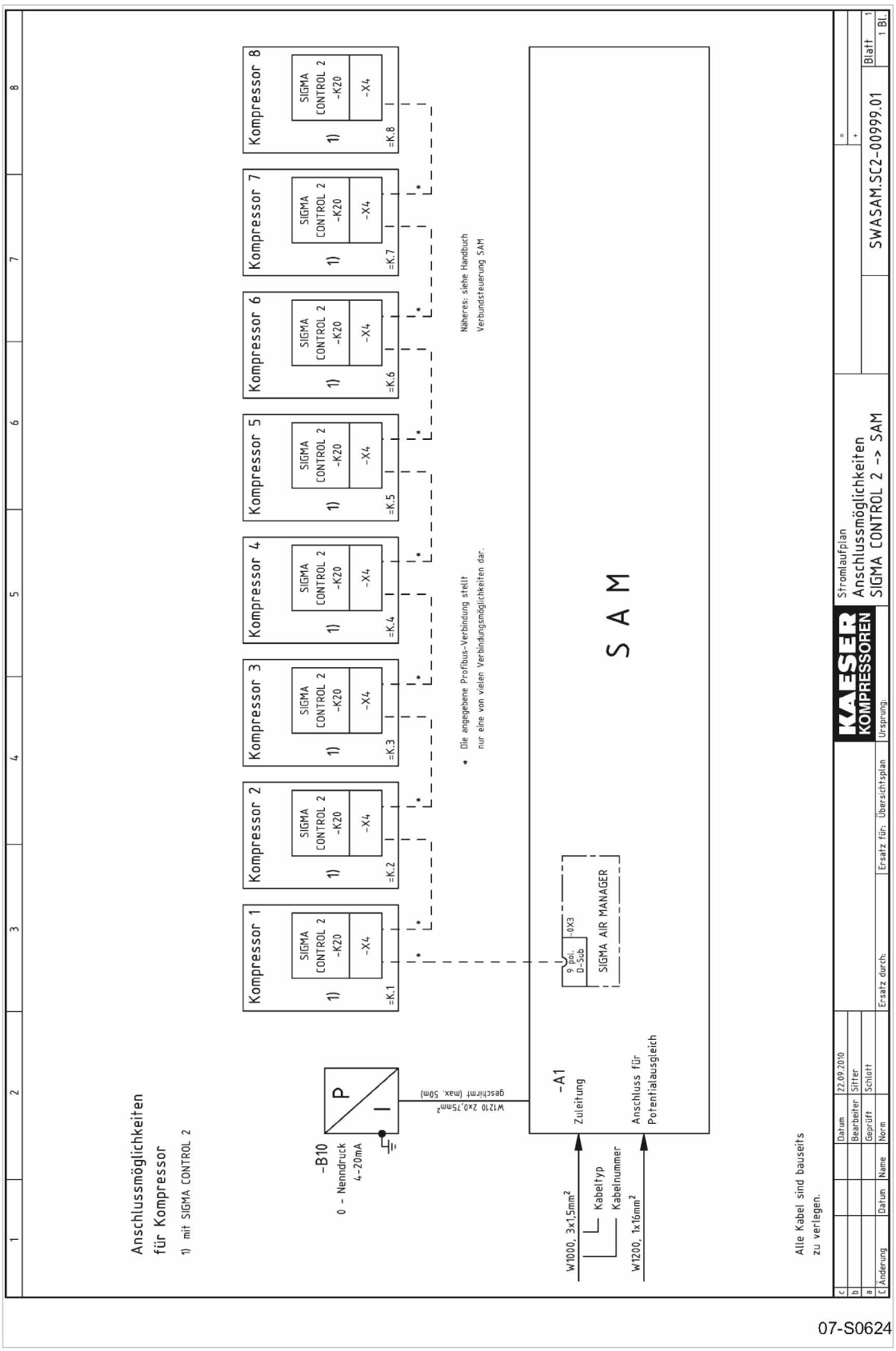


Fig. 30 Electrical diagram example with SIGMA AIR MANAGER

1. Connect the bus subscribers one after the other according to the pin assignment below.
2. Connect the screening to the plug housings at both ends.
3. Set the terminating resistor in the plug to ON for the first and last subscribers to the PROFIBUS .

Result The terminals for the remaining bus conduit (2A/2B) are switched off.

8.10.3.1 Inserting the communication module

The SIGMA CONTROL 2 communication interface is sealed with a plastic cover when shipped from the factory. Before you can insert the communication module in the X4 interface, you must remove the plastic cover from the SIGMA CONTROL 2 . The designation of the interfaces is provided on the rear of the SIGMA CONTROL 2.

Material Small screwdriver

Torx screwdriver, size 9

Precondition The machine is disconnected from the power supply.

The absence of voltage has been verified.

➢ Work with caution.

Removing the plastic cover

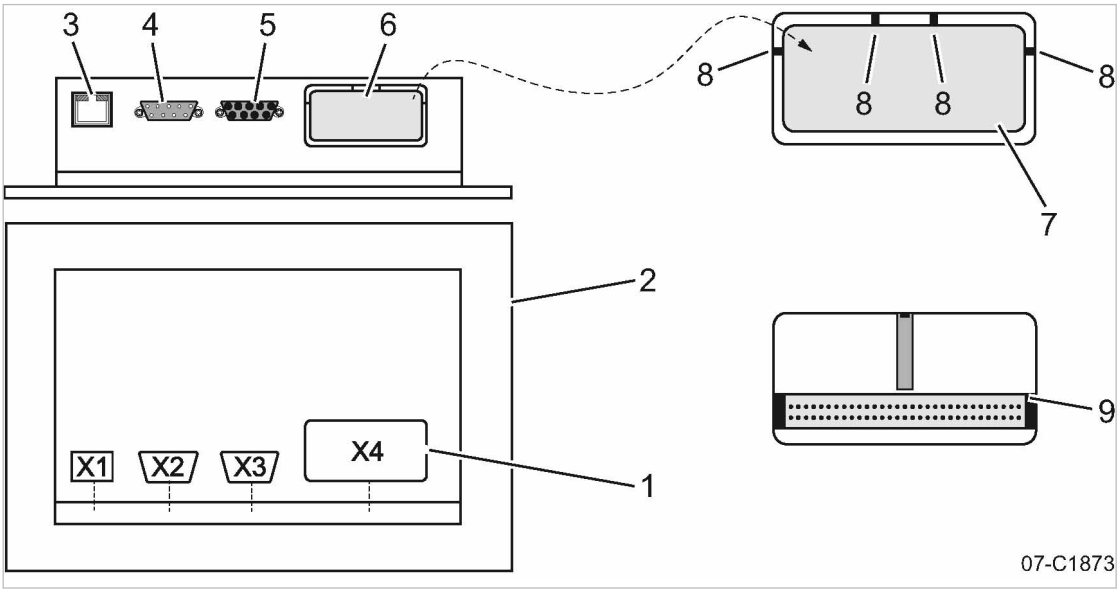


Fig. 31 Communication interface

1. Designation of the interfaces
2. Rear side of the SIGMA CONTROL 2 controller
3. Ethernet interface X1
4. IO BUS X2
5. RS485–FC (USS interface) X3
6. Communication interface X4 (customer interface)
7. Plastic cover
8. Fin
9. Communication interface X4 without plastic cover

1. Place the screwdriver next to the fin.
2. Insert the tip into the slot between the plastic cover and the enclosure of the SIGMA CONTROL 2.
3. Press the screwdriver down until the fin breaks.

4. Break the other fins in the same manner.
5. Remove the plastic cover [7].

Inserting and fixing the communication module

Align the communication module until both cable connectors are at the same height.

Precondition The plastic cover is removed.

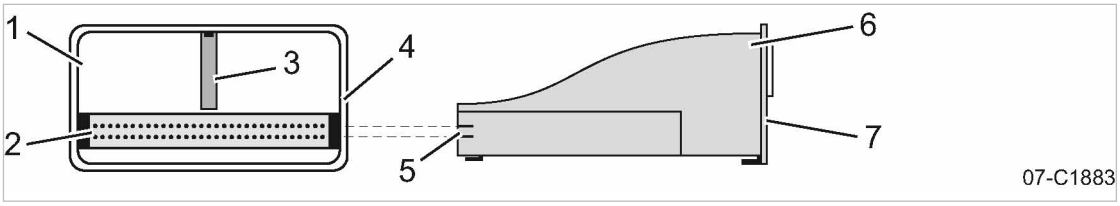


Fig. 32 Inserting the communication module

[1] Bay, interface X4
[2] Cable connector, interface X4
[3] Guiding plate
[4] Recess, module bay
[5] Cable connector, communication module
[6] Communication module
[7] Front plate

1. Align the communication module [6].
2. Insert the communication module into the bay of interface X4 [1] until it latches (see Fig. 32).
   The module is correctly installed when its front plate [7] is seated solidly in the recess of the module bay [4].
3. Use the Torx T9 screwdriver to screw in the fixing screws.

8.10.3.2 Activating operation via PROFIBUS

Overview:

- Activating the communications module
- Setting the slave address
- Setting reaction for a communication malfunction
- Activating the remote control

Precondition The communication module is plugged and screwed into the X4 interface.
The electrical connection to the bus master is made.
The machine's power supply is activated.
The machine is parametrized as a slave in the bus master.
The bus master is operational.

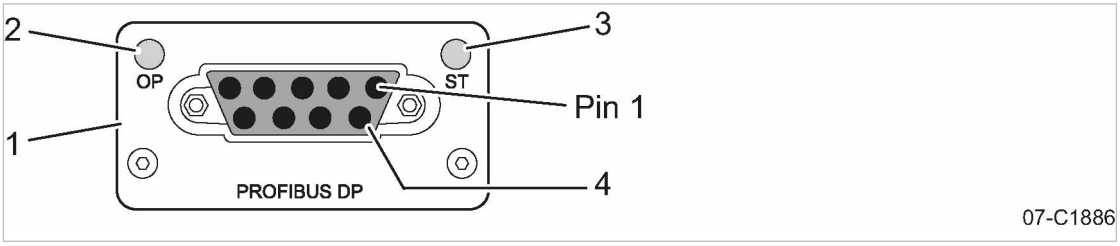


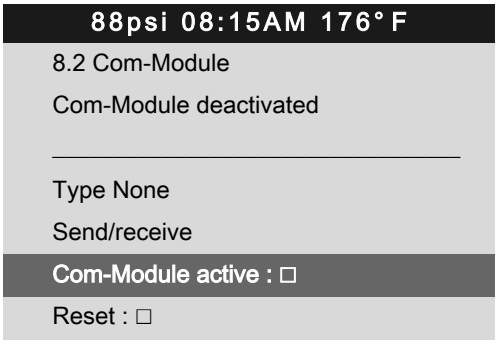
Fig. 33 Front plate of the PROFIBUScommunication module

[1] PROFIBUS communication module
[2] Operation *LED*
[3] Status *LED*
[4] PROFIBUSinterface

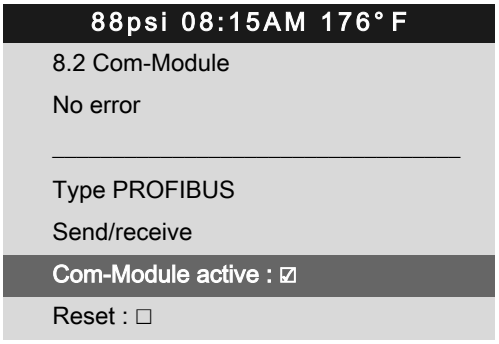
➢ Proceed as shown.

Activating the communications module

1. Select the 8.2 *<Communication – Com-Module>* menu.
   The *Com-Module* menu is displayed
2. Use «Up» or «Down» to select the *Com-Moduleactive* line.
3. Press «Enter» to switch into setting mode.
   The *Com-Module active* check box flashes.



4. Press the «Up» key.
   The check box is activated.
5. Press «Enter» to accept the setting.
   The communication module is activated.



6. Press «Escape» repeatedly to return to the main menu.

Setting the slave address

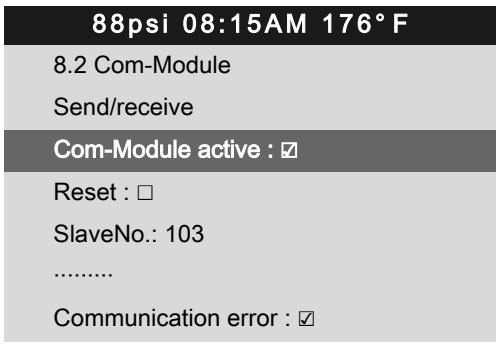
You only need to set the slave address for the communication with the SIGMA AIR MANAGER.

The other parameters do not require adjustment. When connected to a SIGMA AIR MANAGER, the slave address is determined as follows:

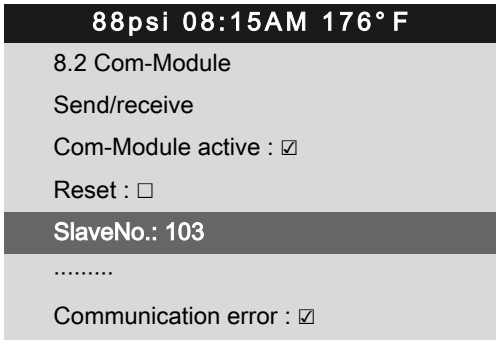
Compressor number used at SIGMA AIR MANAGER +102.

Precondition Password access level 2 is activated.

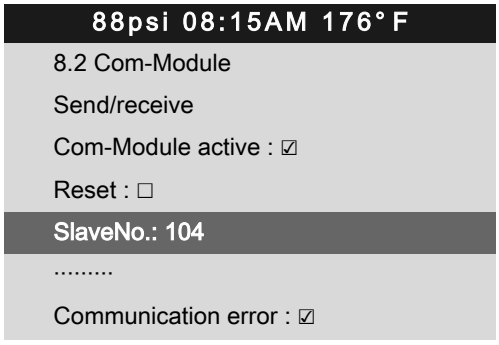
1. Select the 8.2 *<Communication – Com-Module>* menu.
   The *Com-Module* menu is displayed



2. Use «Up» or «Down» to select the *SlaveNo.* line.



3. Press «Enter» to switch into setting mode.
   The display for the slave address flashes.
4. Use «Up» or «Down» to set the slave address 104.
5. Press «Enter» to accept the setting.
   The setting is applied.



Result Slave address *104* is set.

Setting reaction for a PROFIBUS communication malfunction

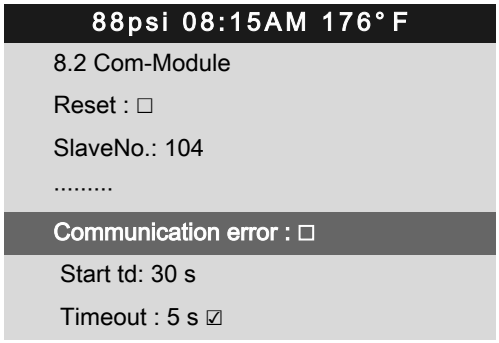
Exchange of data with a PROFIBUS connection takes place in fixed cycles. The PROFIBUSconnection can be monitored with the help of the cycle time:
The bus connection is considered to be interrupted if no data is exchanged between the bus master and the controller (as bus subscriber) after expiry of a set time period (time-out).
Time-out monitoring is activated. You may neither adjust nor deactivate time-out for SIGMA AIR MANAGER.

After switching on the power supply, the communication malfunction can be suppressed temporarily.

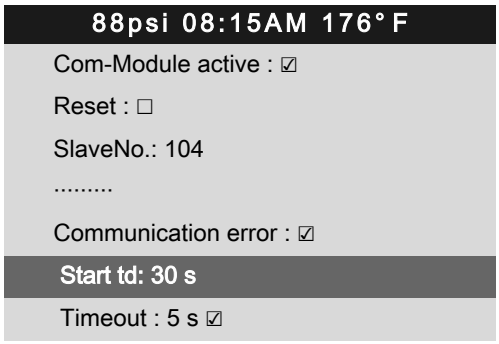
Monitoring for communication malfunction can be deactivated if needed. For this purpose, the *Send* option must be selected for the data exchange.

- Settings for SIGMA AIR MANAGER **without** SIGMA AIR CONTROL PLUS
  - Start: 30 seconds
- Settings for SIGMA AIR MANAGER **with** SIGMA AIR CONTROL PLUS
  - Start: 40 seconds

1. Use «Up» or «Down» to select the *Communication error* line.
2. Press «Enter» to switch into setting mode.
   The check box *Communication error* will flash.



3. Press the «Up» key.
   The check box is activated.
   The monitoring for communication malfunctions is active.
4. Use «Up» or «Down» to select the *Starttd* line.



5. Press «Enter» to switch into setting mode.
   The *00* seconds display flashes.
6. Use «Up» or «Down» to set the seconds.
7. Press «Enter» to accept the setting.
   The setting is applied.

Activating the remote control

➢ Activate remote control see chapter 8.2.12.

Result SIGMA CONTROL 2 remote control is activated.
The bus master now remotely controls the SIGMA CONTROL 2.

8.10.4 Configuring the master control of two machines in master/slave operation

Two machines with SIGMA CONTROL 2 work as master/slave in the same air network. The master controls the machine configured as a slave and provides the signal for the *pA* and *pB* setpoint pressures.

Example: Two machines with different delivery quantities

Local operating mode of the master: Local mode *pA/pB Clock*.

- Toggles between system pressure setpoints *pA* and *pB* by a clock program.
- At peak load times, pressure is regulated to system setpoint pressure *pA* .
  During periods of low air demand, pressure is regulated to system setpoint pressure *pB* (e. g. at weekends).
- The machine with the lesser air delivery is the slave.
  In times with lower air demand, the machine with the smaller delivery is used more frequently.

Example: Two machines with equal delivery quantities

- Local operating mode of the master: Local mode *pA/pB Cycle*.
  (Toggles between system pressure setpoints *pA* and *pB* target pressure by a clock).
  The timer ensures even loading of both machines. The system pressure setpoints are set the same for both machines.
- During timer period 1, the master regulates to *pA* and signals the slave for *pB*.
  During timer period 2, the master regulates to *pB* and signals the slave to *pA*.

If two machines with SIGMA CONTROL 2 are to work in master-slave mode, their controllers must have the same software version.

➢ Follow the configuration steps as described in table 70:

Controller	Procedure	Chapter
Both	Making the electrical connection	8.10.4.1
Both	Set the system pressure setpoints for both, *pA* and *pB*. The pressure for switching points *pA* and *pB* is measured directly at the compressor. Pressure losses in the network do not need to be taken into account.	8.10.4.2 and 8.10.4.3
Master	Either set up switching times for the clock program	8.10.4.2
	Or, set switching times for the clock	8.10.4.2
Master	Set the type of LOAD control (clock program or clock) in local mode	8.10.4.2
Slave	Set remote mode *pA/pB SC2*	8.10.4.3
Slave	Activate the «Remote control» key	8.10.4.3
Both	Set IP addresses for Ethernet	8.10.4.2 and 8.10.4.3
Both	Activate controller as master or slave	8.10.4.2 and 8.10.4.3

Tab. 70 Master-slave configuration procedure

8.10.4.1 Making the electrical connection

You need the following accessories to create the network connection with SIGMA NETWORK or Ethernet:

- SIGMA NETWORK cable (7.9679.0) or Ethernet cable with a maximum connection length of 328 ft. each.
- For each machine with SIGMA CONTROL 2:
  - Retrofit kit LAN RJ45 (7.5250.01870)
- For connecting the machines to a network (LAN) or switch:
  - 2x RJ45 plug (7.7628.1)

➢ Make the electrical connection according to the local condition. For more information, see the installation manual for the Retrofit kit LAN RJ45 (7.5250.01870)

Installing the Ethernet cable

Use a cross-link Ethernet cable for the direct connection of two machines.

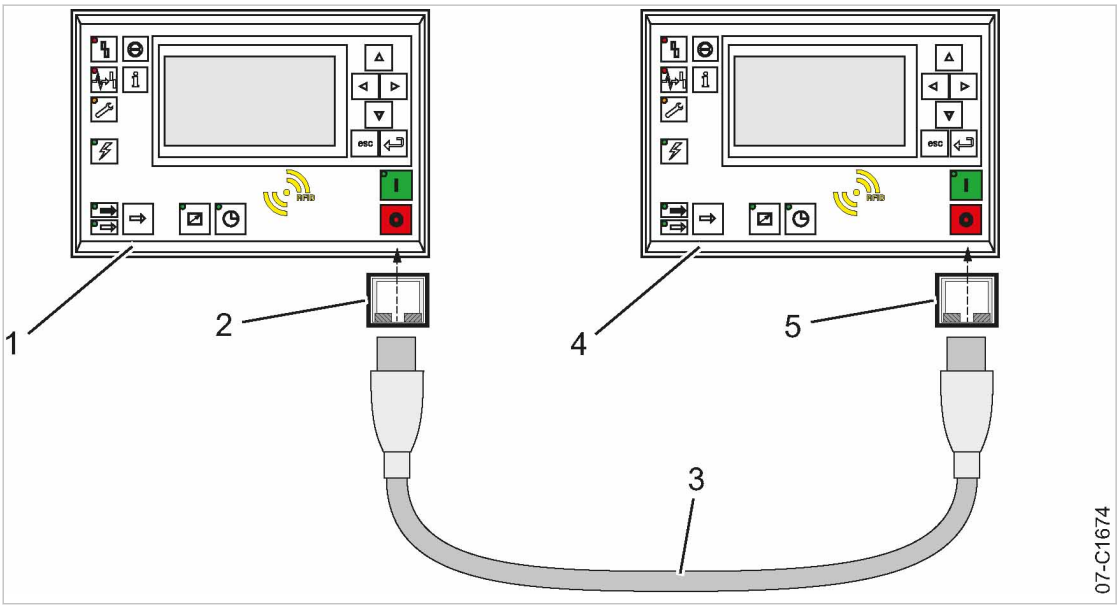


Fig. 34 Direct connection of two SIGMA CONTROL 2

[1] Controller machine 1 (Master mode)
[2] Ethernet interface X1
[3] Ethernet cable, cross-link
[4] Controller machine 2 (Slave mode)
[5] Ethernet interface X1

➢ Install the Ethernet cable between the two machines.

For connecting the machines to a network (LAN) or switch (when using KAESER CONNECT for example).

➢ Install the Ethernet cable from each machine to the LAN connection or switch.

Connecting the Ethernet cable with the machine

For each machine:

1. Insert the Ethernet cable into the machine and the machine's control cabinet, using an EMC connection.
2. Feed the Ethernet cable through the cable ducts to SIGMA CONTROL 2. Use the wiring path in the 24V range (blue wiring) of the ducts.

3. Install the Ethernet bus plug at the cable end.
4. Push the bus plug into the Ethernet interface X1 of the SIGMA CONTROL 2 until it latches.

For connecting the machines to a network (LAN) or switch

Connect the Ethernet cable for each machine to the LAN connection or switch.

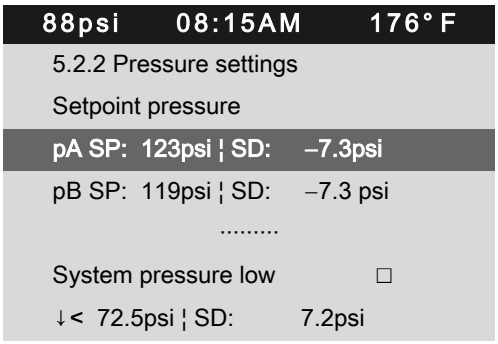
1. Install the Ethernet bus plug to the cable end.
2. Push the bus plug into the LAN socket until it latches.

8.10.4.2 Configure the controller of machine 1 as master

Precondition The electrical connection is made.
Password access level 2 is activated.

Setting the switching points pA and pB

1. Select the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.
   The *pA* line is displayed.
2. Press «Enter» to switch into setting mode.
   The value for *pA* flashes.



3. Use «Up» or «Down» to set the *pA* value.
4. Press «Enter» to accept the setting.
   The setting is applied.
5. Press «Down».
   The *pB* line is displayed.
6. Adjust the value for *pB* in the same manner, If necessary,

Setting the times

SIGMA CONTROL 2 provides the following options for selecting times:

- 1: Clock program
- 2: Timer

1. Decide your desired method.
2. Follow the instructions below for the settings required.

Alternative 1: Setting the clock program

Precondition The electrical connection is made.
Password access level 2 is activated.

➢ Setting the target pressure change with a clock program; see chapter 8.9.2.

Alternative 2: Setting the timer

Precondition The electrical connection is made.
Password access level 2 is activated.

1. Setting clock periods *pA* and *pB* see chapter 8.9.3.1
2. Setting the starting time for *pA* or *pB*; see chapter 8.9.3.2.

Master IP configuration

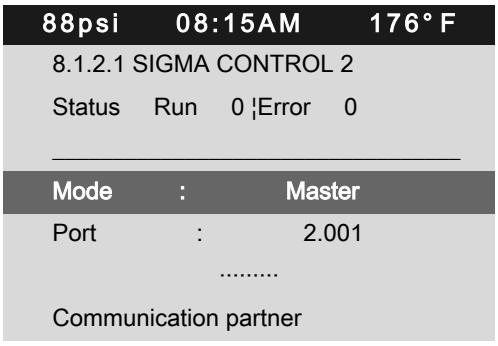
If the controllers of both machines are linked directly, they must be given different IP addresses.

Example:

- IP address of the machine 1 controller (Master mode): 169.254.100.101
- IP address of the machine 2 controller (Slave): 169.254.100.102

Precondition The electrical connection is made.
Password access level 2 is activated.

1. IP address set for the master: For instructions, see chapter 8.2.13, IP address for the above example.
   The IP address of machine 1 (master) is set correctly.
2. Open the 8.1.2.1 *<Communication – Ethernet/SIGMA NETWORK – Connections – SIGMA CONTROL 2>* menu.
3. Use «Up» or «Down» to select the *Mode* line.
4. Press «Enter» to switch into setting mode.
   The setting mode is active.



5. Use «Up» or «Down» to set Machine 1 *Master* operating mode.
6. Press «Enter» to accept the setting.
   The setting is applied.
7. Use «Up» or «Down» to select the *IP address* line.
8. Press «Enter» to switch into setting mode.
   The setting mode is active.

9. Set the IP address of the communication partner (slave, see above example).
10. Press «Enter» to accept the setting.
    The IP address of machine 2 (slave) is set correctly.
    The setting is applied.

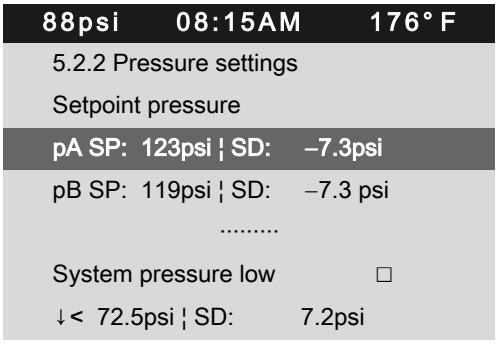
Result The controller of machine 1 is set as master.

8.10.4.3 Configuring the machine 2 controller as slave

Precondition The electrical connection is made.
Password access level 2 is activated.

Setting the switching points pA and pB

1. Open the 5.2.2 *<Configuration – Pressure control – Pressure settings>* menu.
   The *pA* line is displayed.
2. Press «Enter» to switch into setting mode.
   The value for *pA* flashes.



3. Use «Up» or «Down» to set the *pA* value.
4. Press «Enter» to accept the setting.
   The setting is applied.
5. Press «Down».
   The *pB* line is displayed.
6. If necessary, adjust the value for the *pB* switching differential in the same manner.

Activating the remote control

➢ Activating Remote control see chapter 8.2.12.

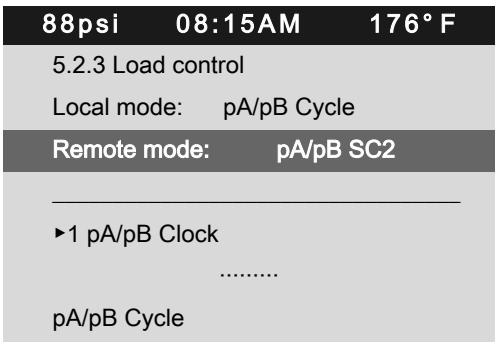
Result SIGMA CONTROL 2 Remote control is activated.

Setting the remote operating mode

Precondition The electrical connection is made.
Password access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.

3. Press «Enter» to switch into setting mode.
   The setting mode is active.



Menu

Active line, current operating mode

4. Use «Up» or «Down» to set the *pA/pB SC2* input.
5. Press «Enter» to accept the setting.
   The setting is applied.

Specifying machine 2 with Slave IP address

If the controllers of both machines are linked directly, they must be given different IP addresses.

Example:

- IP address of the machine 1 controller (Master mode): 169.254.100.101
- IP address of the machine 1 controller (Slave mode): 169.254.100.102

Precondition The electrical connection is made.
Password access level 2 is activated.

1. IP address set for the master: For instructions, see chapter 8.2.13, IP address for the above example.
   The IP address of machine 2 (slave) is set correctly.
2. Open the 8.1.2.1 *<Communication – Ethernet/SIGMA NETWORK – Connections – SIGMA CONTROL 2>* menu.
3. Use «Up» or «Down» to select the *Mode* line.
4. Press «Enter» to switch into setting mode.
   The setting mode is active.
5. Use «Up» or «Down» to set Machine 2 *Slave* operating mode.
6. Press «Enter» to accept the setting.
   The setting is applied.
7. Use «Up» or «Down» to select the *IP address* line.
8. Press «Enter» to switch into setting mode.
   The setting mode is active.
9. Set the IP address of the communication partner (master, see above example).
10. Press «Enter» to accept the setting.
    The setting is applied.

Result The controller of machine 2 is set as slave.

8.10.5 Configuring master control using the LOAD remote contact (e.g., SIGMA AIR MANAGER BASIC)

Overview

- Making the electrical connection for LOAD remote contact
- Setting the LOAD remote contact operating mode and assigning the input
- Adjusting the pressure increase *pE*, if necessary
- Activating the «Remote control» key

➢ Configure master control as described below.

8.10.5.1 Making the electrical connection for LOAD remote contact (excerpt)

Machine (example)

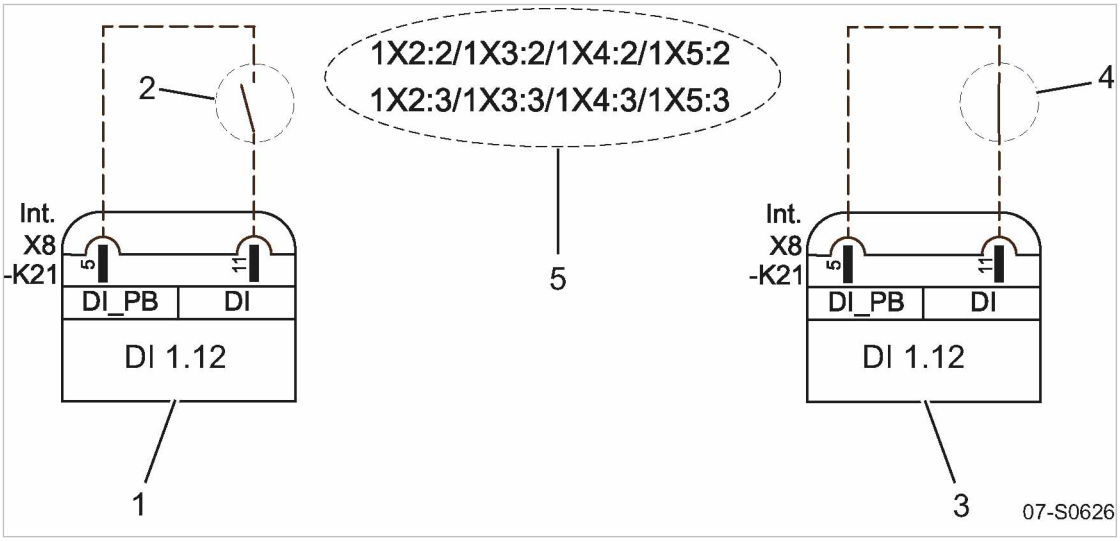


Fig. 35 LOAD remote contact

1 Electrical connection DI 1.12
2 LOAD remote contact open (IDLE)
3 Electrical connection DI 1.12
4 LOAD remote contact closed (LOAD)
5 SIGMA AIR MANAGER BASIC contacts

➢ Establish the electrical connection for DI 1.12 according to the diagram.

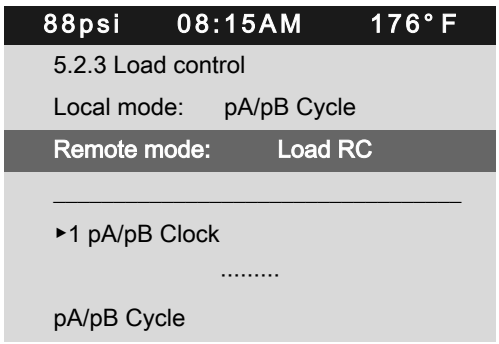
8.10.5.2 Setting the LOAD remote contact operating mode and assigning the input for LOAD remote contact

Precondition Password access level 2 is activated.

Setting the LOAD remote contact operating mode

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.

3. Press «Enter» to switch into setting mode.
   The currently active operating mode *Remote mode* flashes.



Menu

Active line

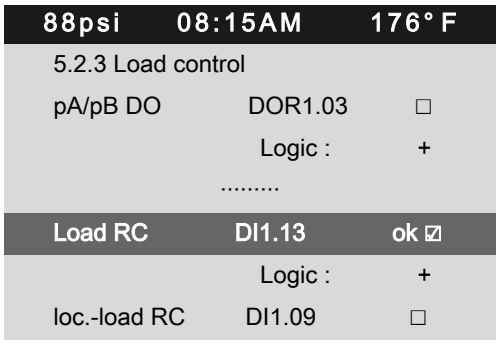
4. Use «Up» or «Down» to set the *Load RC* input.
5. Press «Enter» to accept the setting.
   The LOAD remote contact operating mode is set.

Assigning the input for LOAD remote contact

The input for the LOAD remote contact is pre-assigned.

Setting is only necessary if you deliberately want to use a different input.

1. Use «Up» or «Down» to select the *Load RC* line.
2. Press «Enter» to switch into setting mode.
   The *DI* display flashes.



Menu

Active line; standard DI 1.13

3. Use «Up» or «Down» to select the input for the LOAD remote contact.
4. Press «Enter» to accept the setting.
   The setting is applied.
5. Press the «Right» arrow.
6. Press «Enter».
   The check box *Load RC* will flash.
7. Press «Up» key.
   The check box is activated.
8. Press «Enter».
   ok is displayed to the left of the check box.
   The operating mode is set.

8.10.5.3 Setting the SD switching differential of the pressure increase

➢ Set the SD switching differential of the pressure increase as described in chapter 8.4.2.3.

Further information Detailed information on the pressure parameters is provided in chapter 8.4.2.

8.10.5.4 Activating the remote control

➢ Activate remote control see chapter 8.2.12.

Result SIGMA CONTROL 2 remote control is activated.

8.10.6 Configuring the master control with local/LOAD remote contact

Overview

- Making the electrical connection
- Setting the local/LOAD remote contact operating mode and assigning the input
- Setting local operating mode, if necessary
- Activating the «Remote control» key

➢ Configure master control as described below.

8.10.6.1 Making the electrical connection

Use the input “Controller On for the "alarm machine X" message (DOR1.03) to prevent line breaks!

➢ Wire the "motor running” and "Controller on” (DOR1.03) messages from the compressor to the MVS 8000.

- Contact A open: SIGMA CONTROL 2controls with *pB* system setpoint pressure.
- Contact A closed: SIGMA CONTROL 2 controls via external LOAD mode contact.
- DI 1.13: LOAD/IDLE external.
- DI 1.09: LOAD control – switchover local/LOAD remote contact.

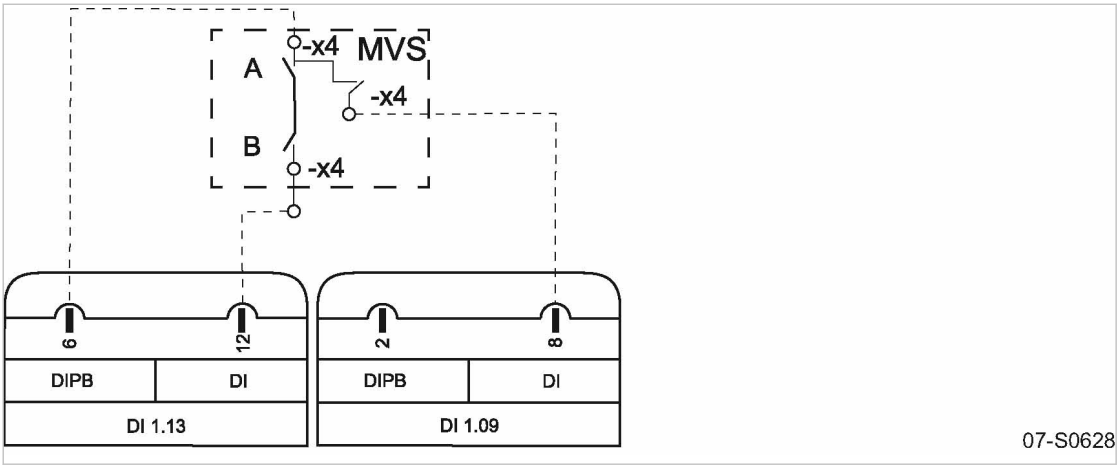


Fig. 36 Wiring diagram for local/LOAD remote contact:
Ⓐ Changeover between automatic and manual modes
Ⓑ LOAD/IDLE contact

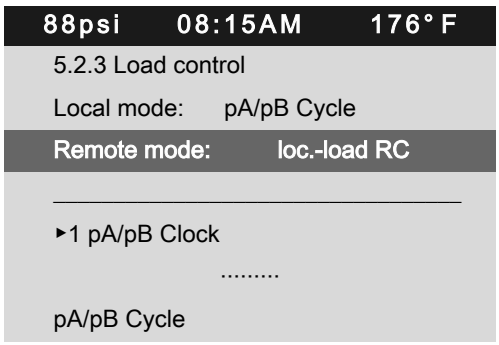
➢ Make the electrical connection according to the diagram.

8.10.6.2 Setting the local/LOAD remote contact operating mode and assigning the input

Precondition Password access level 2 is activated.

Setting local/LOAD remote contact operating mode

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.
3. Press «Enter».
   The currently active operating mode *Remote mode* flashes.

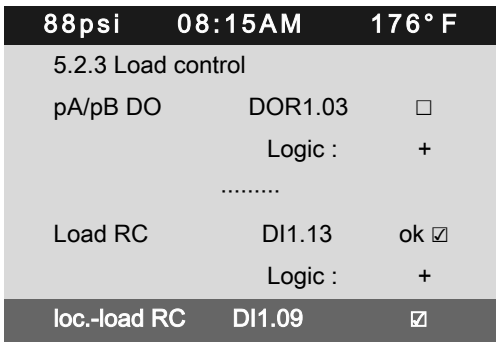


4. Use «Up» or «Down» to set the *loc.-load RC* input.
5. Press «Enter».
   The local/LOAD remote contact operating mode is set.

Assigning an input for the local/LOAD remote contact for switching the pressure control

1. Use «Up» or «Down» to select the *loc.-load RC* line.

2. Press «Enter».
   The *DI* display flashes.



Menu
No input assigned
Active line

3. Use «Up» or «Down» to select a new input for local/LOAD remote contact.
4. Press «Enter».
   The input for local/LOAD remote contact is assigned.

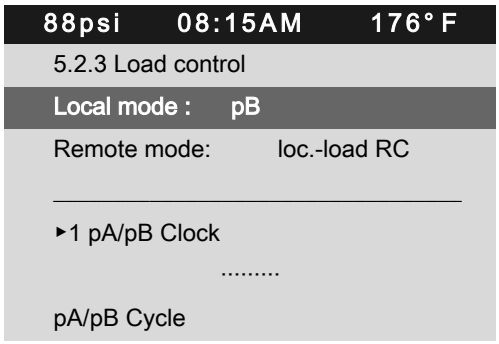
8.10.6.3 Setting local operating mode pB

The *pB* system setpoint pressure is normally set for local operation.

➢ When setting the *pB* system setpoint pressure, bear in mind that, under certain circumstances, more than one compressor may be operating in local mode (see section 8.4 for adjusting the system setpoint pressure).

Precondition Password access level 2 is activated.

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Local mode* line.
3. Press «Enter» to switch into setting mode.
   The operating mode display flashes.



Menu
Active line, current operating mode

4. Use «Up» or «Down» to set the *pB* input.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Adjust the *pB* system setpoint pressure, if necessary (see section 8.4).
   The local operating mode *pB* is set.

8.10.6.4 Activating the remote control

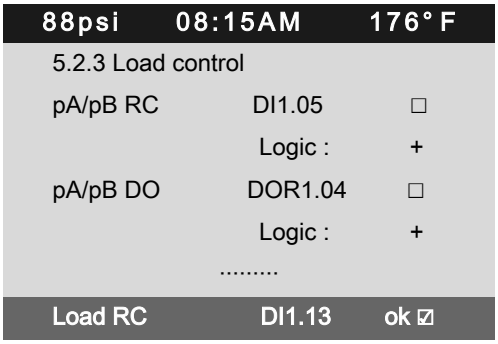
➢ Activate remote control see chapter 8.2.12.

Result SIGMA CONTROL 2 remote control is activated.

8.10.6.5 Assigning an input for the LOAD remote contact for switching the pressure control

Precondition Password access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Load RC* line.
3. Press «Enter» to switch into setting mode.
   The *DI* display flashes.



Menu

Active line

4. Use «Up» or «Down» to select the input for the LOAD remote contact.
5. Press «Enter» to accept the setting.
   The input for LOAD remote contact is assigned.

8.10.7 Setting the setpoint pressure pre-selection via remote contact

The signal to changeover from setpoint pressure *pA* to setpoint pressure *pB* comes from an input contact. If there is a signal at the input then system pressure is regulated on setpoint pressure *pB*.

Overview

- Setting up remote contact mode pA/pB
- Assigning the remote contact input
- Activating the remote control

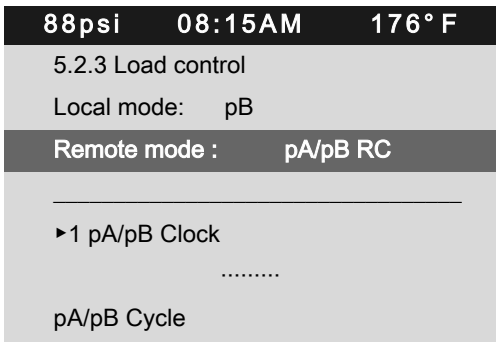
➢ Configure the setpoint pressure pre-selection as described.

8.10.7.1 Setting up remote contact mode pA/pB

Precondition The electrical connection is made.
Password access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.

3. Press «Enter».
   The currently active operating mode flashes.



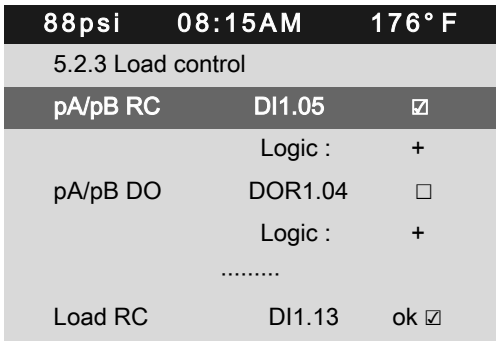
4. Use «Up» or «Down» to set the *pA/pB RC* input.
5. Press «Enter».

Result The *pA/pB RC* operating mode is set.

8.10.7.2 Assigning the remote contact input

A spare input can be found in the machine circuit diagram.

1. Use «Up» or «Down» to select the *pA/pB RC* line.
2. Press «Enter».
   The *DI* display flashes.



3. Use «Up »or «Down» to set the *DI* input.
4. Press «Enter».

Result The input for remote contact has now been assigned.

8.10.7.3 Activating the remote control

➢ Activating the remote control see chapter 8.2.12.

Result SIGMA CONTROL 2 remote control is activated.

8.10.8 Configuring master control of compressors regulated by pressure switch

➢ Configure the master control as described below.

8.10.8.1 Configuring master control via floating relay contact

Requirement:
A machine with SIGMA CONTROL 2 (e.g. series BSD) and a conventional machine **without** SIGMA CONTROL 2 of the same capacity are to run in sequence as base load or peak load machines.

Proposal:

- Set/adjust the clock program or clock on SIGMA CONTROL 2.
- Select local mode with time control pA/pB Clock or clock pA/pB Cycle.
- Set the system setpoint pressures pA and pB analogous to the required values. They must be identical to the pressure switch settings on the machine without SIGMA CONTROL 2.
- To make the system setpoint pressure changeover between the two machines possible, a floating relay contact must be assigned to the selected local operating mode. An auxiliary contactor can be energized via this contact to activate the pressure switches for pA and pB on the compressor without SIGMA CONTROL 2. See the example wiring diagram below.

Overview

- Making the electrical connection
- Setting the system setpoint pressure pA and pB.
- Setting operating mode in local operating mode
- Assigning the floating relay contact
- Setting local operating mode

Making the electrical connection

- Contact A **open**: SIGMA CONTROL 2 controls with system setpoint pressure pB
- Contact A **closed**: SIGMA CONTROL 2 controls with system setpoint pressure pA
- B 1.1: Pressure switch for system setpoint pressure pB
- B 1.2: Pressure switch for system setpoint pressure pA

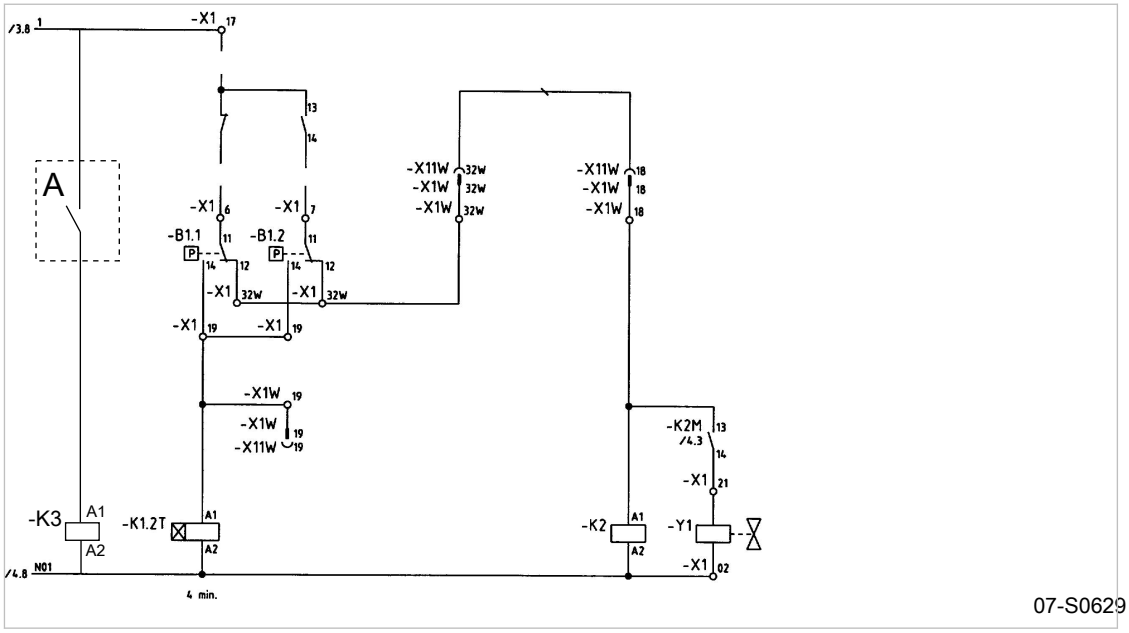


Fig. 37 Machine with pressure switch regulation

Ⓐ floating relay contact SIGMA CONTROL 2

➢ Make the electrical connection according to the diagram.

Setting the system setpoint pressure pA and pB.

Precondition Password access level 2 is activated.
The electrical connection is made.

1. Select the *<5.2.2 – Pressure control – Pressure settings>* menu (see chapter 8.4.1).
2. Use «Up» or «Down» to select the *pASP* line.
3. Press «Enter» to switch into setting mode.
   The setting mode is active.
   The *Setpoint pressure pA*display flashes.

88psi 08:15AM 176° F	
5.2.2 Pressure settings	Menu
Setpoint pressure	
pA SP: 123psi ¦ SD: –7.3psi	Active line
pB SP: 119psi ¦ SD: –7.3 psi	
.....	
System pressure low □	
↓< 72.5psi ¦ SD: 7.2psi	

4. Use «Up» or «Down» to set the value for *pA*.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Adjust the value for the *SD* switching differential in the same way, if necessary.
7. Adjust the value for *pB/SD* in the same manner, if necessary.
8. Press «Esc» repeatedly to leave this menu.

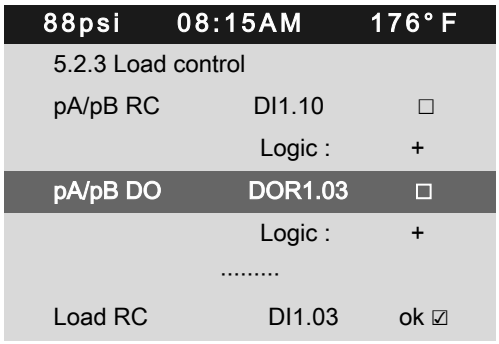
Configuring local mode

➢ Set the clock program or clock as described in section 8.9.

Assigning the floating relay contact (activate)

Precondition Password access level 2 is activated.
The electrical connection made (select spare contact from the machine's electrical diagram).

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *pA/pB DO* line.



Menu

Active line, no output assigned

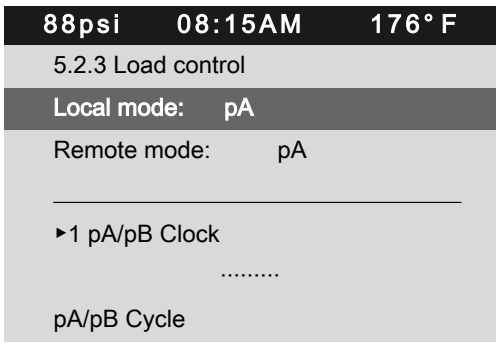
3. Press «Enter» .
   The setting mode is active.
4. Use «Up» or «Down» to set the required output.
5. Press «Enter».
   The setting is applied.

Result This output can now be used for the changeover between the two pressure switches.

Setting local mode

Precondition Password access level 2 is activated.

1. Select the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Local mode* line.



Menu

Active line, current operating mode

3. Press «Enter» to switch into setting mode.
   The setting mode is active.
4. Use «Up» or «Down» to set the *pA/pB Clock or pA/pB Cycle* operating mode.
5. Press «Enter» to accept the setting.
   The setting is applied.

8.10.8.2 Configuring the master control without an electrical connection

Requirement:
A high-capacity machine with SIGMA CONTROL 2 (e. g. BSD) is to work as base load machine. A second machine (e.g., SK) **without** SIGMA CONTROL 2 is to supply air in times of low demand.

Proposal:

- Select the system setpoint pressures pA and pB of the BSD machine for the switching point of the SK machine's pressure switch to be in between. When pB is activated for the periods of low demand, the SK machine automatically functions as the base load machine.
- Set the required values for a clock program on SIGMA CONTROL 2.
- Select local mode pA/pB SC2Clk.
- Activate the compressor timer.

Function diagram

Period t1–t7: high compressed air demand	Period t8–t14: low compressed air demand
t1 Air demand rises. System pressure pNloc drops.	t8: Air demand rises. System pressure pNloc drops.
t2 BSD switches to LOAD.	t9: SK switches to LOAD.
t3: System setpoint pressure pA reached. BSD switches to IDLE.	t10: System setpoint pressure pB reached. SK switches to IDLE.
t4: BSD switches to LOAD. Air demand not covered.	t11: BSD switches to LOAD. Air demand not covered.
t5: SK also switches to LOAD. System pressure pNloc begins to rise.	t12: SK switches to LOAD. System pressure pNloc begins to rise.
t6: SK switches to IDLE.	t13: SK switches to IDLE.
t7: BSD switches to IDLE.	t14: BSD switches to IDLE.

Tab. 71 Function diagram

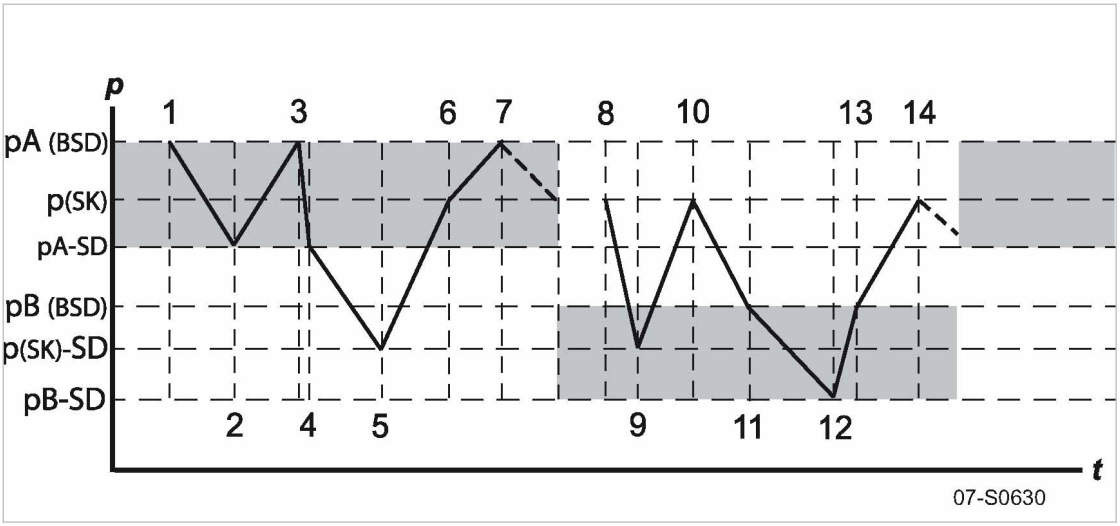


Fig. 38 Function diagram

SD Switching differential
p Pressure
t Time

Setting the system setpoint pressure pA and pB

Precondition Password access level 2 is activated.

1. Select the *<5.2.2 – Pressure control – Pressure settings>* menu (see chapter 8.4.1).
2. Use «Up» or «Down» to select the *pASP* line.

88psi 08:15AM 176° F	
5.2.2 Pressure settings	Menu
Setpoint pressure	
pA SP: 123psi ¦ SD: –7.3psi	Active line
pB SP: 119psi ¦ SD: –7.3 psi	
.....	
System pressure low □	
↓< 72.5psi ¦ SD: 7.2psi	

3. Press «Enter» to switch into setting mode.
   The *pA* display flashes.
4. Use «Up» or «Down» to set the *pA* value.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. If necessary, adjust the value for SD/ in the same manner.
7. If necessary, adjust the value for *pB/SD* in the same manner.
8. Press «Esc» repeatedly to leave this menu.

Configuring the clock program

➢ Configure the clock program as described in chapter 8.9.2.

8.10.9 Examples of time settings for equal overall load

Requirement:
Two machines of the same capacity are to be equally loaded. Versions A, B and C describe the different possibilities of achieving this requirement.

A detailed description for configuring a clock or timing program can be found in Chapter 8.9.

Variant A: Daily switch between system setpoint pressure pA and system setpoint pressure pB after 24 hours

The compressors start with a system setpoint pressure *pB* at 0:00 hours. A timer triggers the switch between system setpoint pressure *pA* and system setpoint pressure *pB* (local operating mode: *pA/pB Cycle* local mode).

Precondition The setpoint pressure *pA*/*pB* is configured the same for both machines.

➢ Establish a cycle with the following switching points:
- Cycle time *pA*: 24 h
- Cycle time *pB*: 24 h
- Start *pB*: 00:00AM

Variant B: Equal duty cycle during the day

A timer triggers the switch between system setpoint pressure *pA* and system setpoint pressure *pB* (local operating mode *pA/pB Clock*.

Precondition The system setpoint pressure *pA*/*pB* is configured the same for both machines.

➢ The clock program is set up using the following switching points:

No.:	Weekday	Time	Network nominal pressure
01	Mon-Sun	00:00AM	*pA* On
02	Mon-Sun	06:30AM	*pB* On
03	Mon-Sun	12:00PM	*pA* On
04	Mon-Sun	05:00PM	*pB* On

Tab. 72 Example for a clock program for equal duty cycling during the day

Variant C: Equal duty cycle during the week

A timer triggers the switch between system setpoint pressure *pA* and system setpoint pressure *pB* (local operating mode: *pA/pB SC2Clk*).

Precondition The system setpoint pressure *pA*/*pB* is configured the same for both machines.

➢ The clock program is set up using the following switching points:

No.:	Weekday	Time	Network nominal pressure
01	Mon	00:00AM	*pA* On
02	Mon	09:00PM	*pB* On
03	Tue	05:00PM	*pA* On

No.:	Weekday	Time	Network nominal pressure
04	Wed	03:00PM	*pB* On
05	Thu	12:00PM	*pA* On
06	Fri	09:00AM	*pB* On
07	Sat	06:30AM	*pA* On
08	Sun	03:00AM	*pB* On

Tab. 73 Example for a clock program for equal duty cycling during the week

8.11 Configuring input and output signals

The controller's analog and digital inputs and outputs can be used for customized messages and/or other functions.

This chapter deals with the various options in the following sections:

- 8.11.1: Outputting operational states of machine on digital outputs
- 8.11.2: Outputting input signals on the display
- 8.11.3: Outputting measured values on the display

The controller only allows assignment of spare inputs and outputs.
If an occupied input or output is assigned this will be rejected by the controller.
When delivered from the factory, the outputs DO0.3 to DO0.5 are available for assignment.
Further spare outputs can be found in the machine circuit diagram.

➢ Configure the inputs and outputs as described in the following.

8.11.1 Outputting important operational states of the machine

Important operational machine states can be made available as digital signals via floating contacts. Each output can be assigned only once.

The following messages can be output:

Message	Explanation	Output
Controller on	Controller is powered up	
Compressor on	The machine is switched on	
Motor running	Compressor motor running	
IDLE	The machine is running in IDLE mode	
ON LOAD	The machine is running in LOAD mode	
Group alarm	Fault has occurred	
Group warning	Warning message has appeared	
Remote mode	Remote mode is activated	
Clock active	Clock is activated	
Clock contact	The clock contact is closed	
EMERGENCY STOP	The EMERGENCY STOP push button has been pressed	

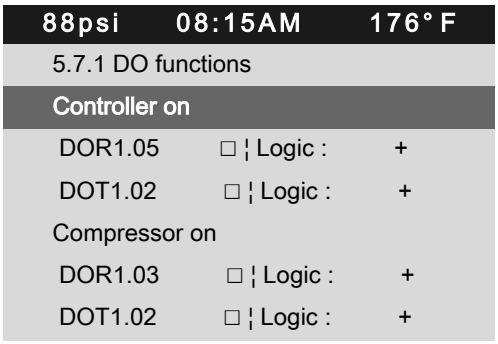
Tab. 74 Assigned output signals

8.11.1.1 DO functions menu

The requested message can be assigned to a free digital output (DOR orDOT).

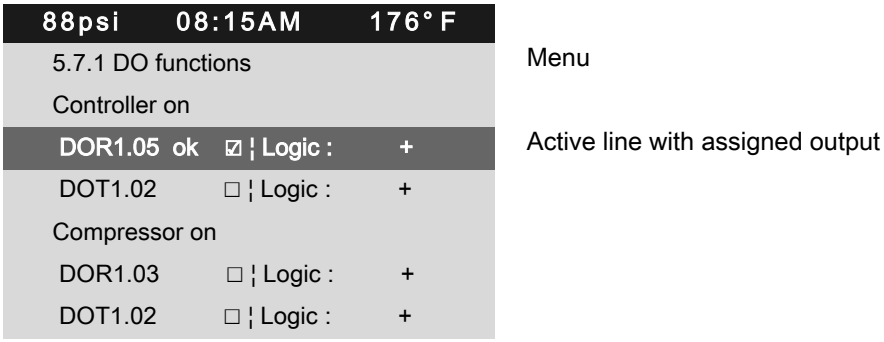
Precondition Password access level 2 is activated.

1. Select the 5.7.1 *<Configuration – I/O periphery – DO functions>* menu.
   A list of available messages and their assigned outputs is displayed.



8.11.1.2 Assigning a message to an output

1. Select the required message with the «Up» or «Down» keys.
2. Press the «Down» key once.
   Output DOR has been selected.
3. Press «Down» twice.
   Output DOT has been selected.
4. Press «Enter».
   The output of the selected message flashes.



5. Select a free output with the «Up» or «Down» key.
6. Press «Enter».
   The setting is applied.
7. Press the «Right» key.
8. Press «Enter».
   The check box will flash.
9. Press «Up» key.
   The check box associated to the output is activated.
10. Press «Enter».
    If the message is correctly assigned to the output and activated, *ok* is displayed.
11. If necessary, set the *Logic* option.

Result A message about the operational state is now sent via the assigned output.

You are missing an organized display of assigned output signals?

➢ Enter the selected output in table 74.

8.11.2 Output input signals on the display

As well as the defined fault and warning messages there are 6 additional freely selectable input signals that can be used to display messages. A list of the alarm and warning messages is provided in chapters 10.2 and 10.3. Information on spare inputs is given in the machine circuit diagram.

An input signal can be classified as either an alarm, a warning or an operational message. To suppress any possible contact bounce or similar problems, the input signal can be delayed by an adjustable period. This ensures that the signal must be apparent for a minimum period before it can be processed as a message.

If an input signal is classified as an alarm, the controller goes into the alarm state and shuts down the machine.

Overview

Use the *External messages* menu for specifying the settings.

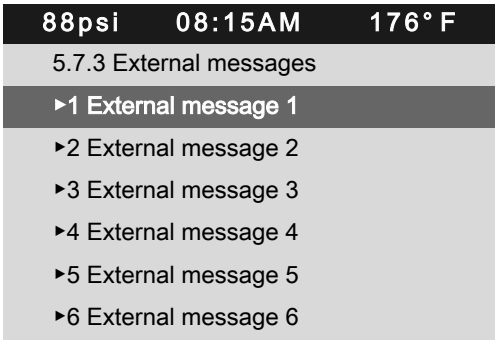
- Entering the message text
- Assigning and activate the input
- Setting the time delay
- Setting the logic
- Assigning and activate the output
- Selecting the message type
- Activating the message.

8.11.2.1 External messages menu

Precondition The electrical connection has been made.

Access level 2 is activated.

1. Open the 5.7.3 *<Configuration – I/O periphery – External messages>* menu.
   The *External messages* menu is displayed



Menu

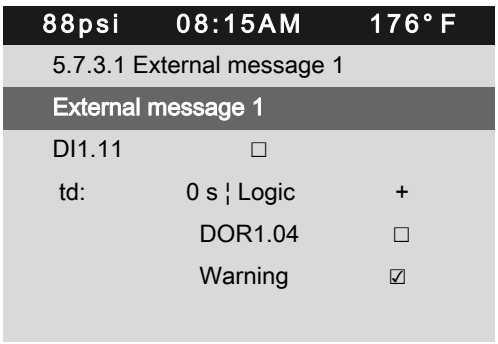
Active line with external message No. 1

8.11.2.2 Entering the message text

In the below example we select *External message 1*.

1. Use «Up» or «Down» to select the *External message 1* line.

2. Press «Enter».
   The *External message 1* menu is displayed.

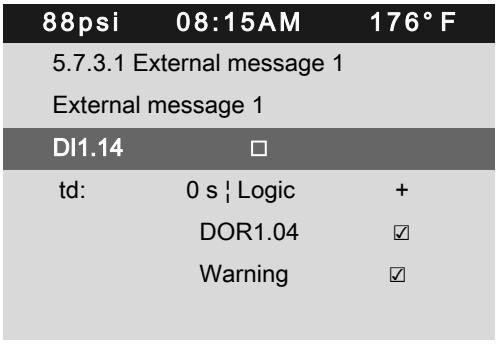


Menu
Active line, message text
No input assigned
Logic
Message type (operational, alarm, warning)

3. Press «Enter».
   The cursor is located at the first character of the message text.
   A column with alphanumeric characters is displayed.
   The selected character flashes.
4. Select the required character with the «Up» or «Down» keys.
5. Press the «Right» key.
   The cursor jumps to the next position of the message text.
6. Enter the remaining characters of the message text in the same manner.
7. Press «Enter».
   The message text has been entered.
8. Press «Enter».
   The setting is applied.

8.11.2.3 Assigning and activating the input

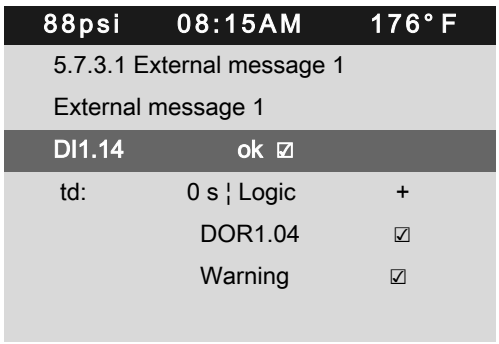
1. Use «Up» or «Down» to select the *DI* line.
2. Press «Enter».
   The display for the currently set input flashes.
3. Use «Up» or «Down» to select the input.
4. Press «Enter».
   The setting is applied.



Menu
Message name
The output has been selected
Logic
Example: Warning message type

5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the input flashes.

7. Press «Up» key.
   The check box is activated.



Menu
Message name
Active line, Input is selected and activated
Logic

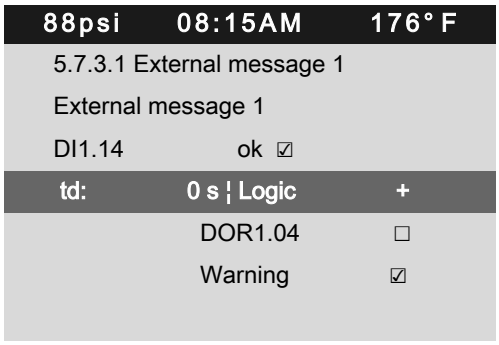
Example: Warning message type

8. Press «Enter».
   ok is displayed.
   The input is assigned and activated.

8.11.2.4 Setting the time delay

The delay time can be set in the range between 0 and 600 seconds. The delay is counted down from 600 in 1 second increments with the «DOWN» key and counted upwards from zero in 1 second increments with the «UP» key.

1. Use «Up» or «Down» to select the *td* line.
2. Press «Enter».
   The *td* delay time flashes.



Menu
Message name

Active line, set time delay td

3. Use «Up» or «Down» to set the time delay in seconds.
4. Press «Enter».

Result The *td* delay time has been set.

8.11.2.5 Setting the logic

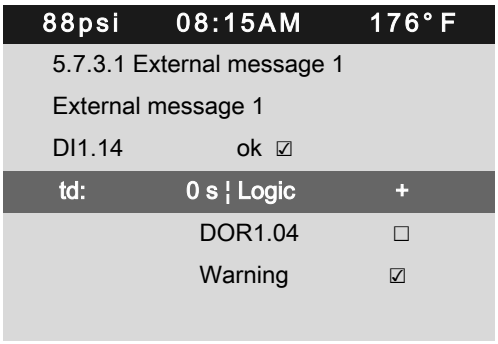
Possible logic settings

Message at	Sign
24 V	+
0 V	-

Tab. 75 Logic settings

1. Use «Up» or «Down» to select the *td* line.

2. Press the «Right» arrow.
3. Press «Enter».
   The control field *Logic* flashes.
4. Use «UP» or «Down» to set the desired behavior, see table 75.



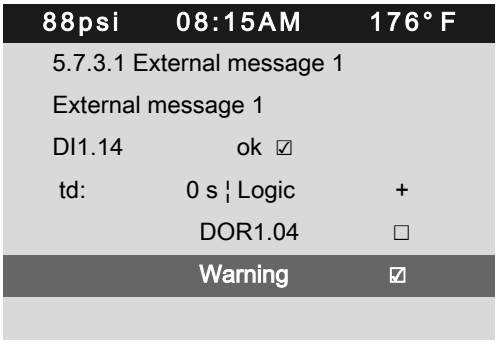
Menu
Message name
Active line, set logic control field
Example: Warning message type

5. Press «Enter».

Result For messages at 24 V, the logic is set with the **+** symbol.

8.11.2.6 Setting the message type

1. Select the message type line with the «Up» and «Down» keys.
2. Press «Enter».
   The display for the message type flashes.
3. Use «Up» or «Down» to set the message type.



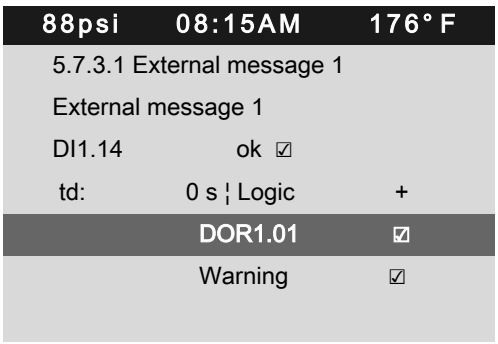
Menu
Message name
Logic
Example: Warning message type

4. Press «Enter».
   The message type is set.

8.11.2.7 Assigning and activating the output

1. Use «Up» or «Down» to select the *DOR* line.
2. Press «Enter».
   The *DOR* display flashes.
3. Select the output with the «Up» and «Down» keys.

4. Press «Enter» .
   The setting is applied.



Menu
Message name
Logic
Active line, output is selected and activated
Example: Warning message type

5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the output flashes.
7. Press «Up» key.
   The check box is activated.
8. Press «Enter».
   The output is assigned and activated.

Result The signal at the DI digital input is available as *External message 1* and as output signal at the selected DOR output.

8.11.3 Output measured values on the display

For analog measured values you can define customized messages.
The message can be classified as either a fault, a warning or an operational message.

If exceeding the switching point is classified as a fault, the controller goes into the fault state when the signal continues and shuts down the machine.

The following messages can be output:

Message	Explanation	Measured value	Output
AnMod_p_1	Customized monitoring of the pressure value p1		
AnMod_p_2	Customized monitoring of the pressure value p2		
AnMod_p_3	Customized monitoring of the pressure value p3		
AnMod_p_4	Customized monitoring of the pressure value p4		
AnMod_T_1	Customized monitoring of the temperature value T1		
AnMod_T_2	Customized monitoring of the temperature value T2		
AnMod_T_3	Customized monitoring of the temperature value T3		
AnMod_T_4	Customized monitoring of the temperature value T4		
AnMod_I_1	Customized monitoring of the current value I1		
AnMod_I_2	Customized monitoring of the current value I2		
T-Switch inlet temperature	Customized monitoring of the intake temperature		

Message	Explanation	Measured value	Output
p-Switch pi	Customized monitoring of internal pressure pi in the oil separator tank		
T-Switch ADT	Customized monitoring of the airend discharge temperature ADT		
p-Switch pN	Customized monitoring of local network pressure pNloc at compressor output		
T-Switch PDT	Customized monitoring of the compressed air discharge temperature		

Tab. 76 Assigned analog measured values

Overview

Use the *Analogue values* or *Switch* menus for specifying the settings.

- Entering the message text
- Selecting and activating measured value
- Setting the time delay
- Setting the logic
- Selecting the message type
- Assigning and activating the output

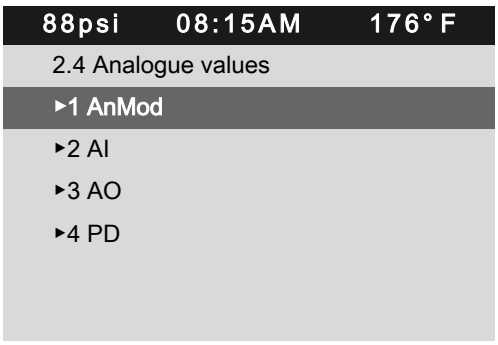
Below, the settings are displayed based on an example in the *Analogue values* menu. Use the *Switch* menu analogously for specifying the settings.

8.11.3.1 Analogue values menu

Precondition The electrical connection has been made.

Password access level 2 is activated.

1. Open the 2.4 *<Configuration – I/O periphery – Analogue values>* menu.
   The *Analogue values* menu is displayed.

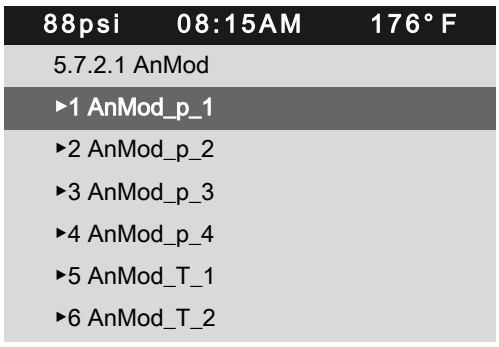


8.11.3.2 Entering the message text

In the following example, a message from the analog module is defined by pressure value p1.

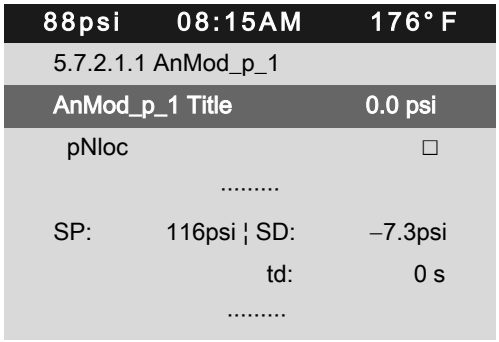
1. Use «Up» or «Down» to select the *AnMod* line.

2. Press «Enter».
   The 5.7.2.1 *AnMod* menu is displayed.



Menu
AnMod_p_1 measured value

3. Use «Up» or «Down» to select the *AnMod_p_1* line.
4. Press «Enter».
   The 5.7.2.1.1 AnMod_p_1 menu is displayed.



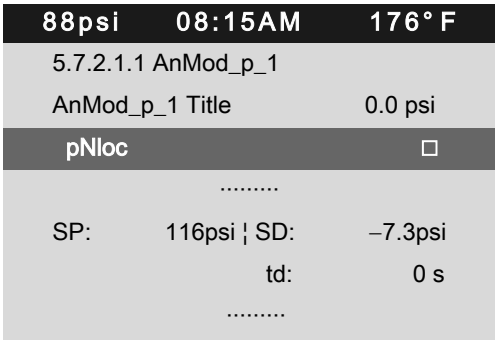
Menu
Message text
Analog measured value
Switching point (SP) and switching differential (SD)
Time delay (td)

5. Press «Enter».
   The cursor is located at the first character of the message text.
   A column with alphanumeric characters is displayed.
   The selected character flashes.
6. Select the required character with the «Up» or «Down» keys.
7. Press the «Right» key.
   The cursor jumps to the next position of the message text.
8. Enter the remaining characters of the message text in the same manner.
9. Press «Enter».
   The message text has been entered.
10. Press «Enter».
    The setting is applied.

8.11.3.3 Selecting and activating measured value

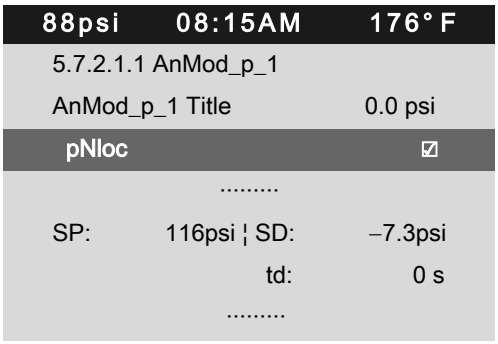
1. Press the «DOWN» key.
2. Press «Enter».
   The display for the currently set measured value flashes.
3. Use «Up» or «Down» to select the measured value.

4. Press «Enter».



Menu
Message text
Selected analog measured value
Switching point (SP) and switching differential (SD)
Time delay (td)

5. Press the «Right» key.
6. Press «Enter».
   The check box assigned to the input flashes.
7. Press «Up» key.
   The check box is activated.

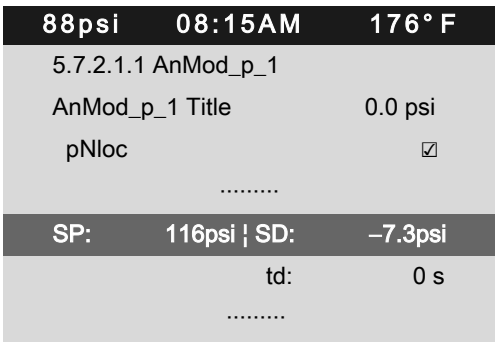


Menu
Message text
Selected analog measured value, activated
Switching point (SP) and switching differential (SD)
Time delay (td)

8. Press «Enter».
   The measured value is assigned and activated.

8.11.3.4 Setting the switching point and switching differential

1. Use «Up» or «Down» to select the *SP* line.



Menu
Message text
Selected analog measured value
Switching point (SP) and switching differential (SD)
Time delay (td)

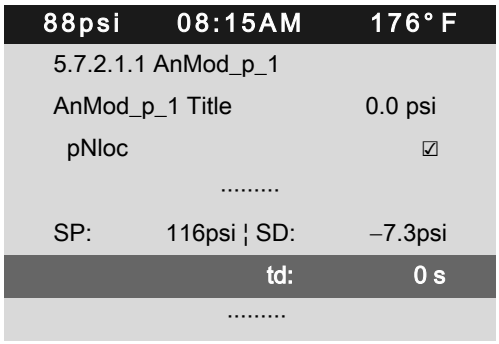
2. Press «Enter».
   The display for the current value of the switching point flashes.
3. Use «Up» or «Down» to set the *SP* value.
4. Press «Enter».
   The setting is applied.
5. If necessary, adjust the value for SD in the same manner.

Result The threshold value for the SP switching point and the SD switching differential are set.

8.11.3.5 Setting the time delay

The period can be set between 0 and 600 seconds. The delay is counted down from 600 with the «DOWN» key and counted upwards from zero in 0.01 second increments with the «UP» key.

1. Use «Up» or «Down» to select the *td* line.
2. Press «Enter».
   The *td* delay time flashes.



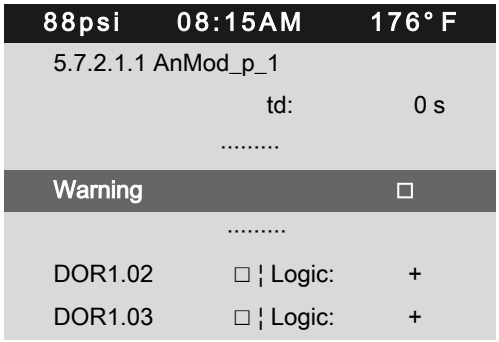
Menu
Message text
selected analog measured value
Switching point (SP) and switching differential (SD)
Time delay (td)

3. Use «Up» or «Down» to set the time delay in seconds.
4. Press «Enter».

Result The *td* delay time has been set.

8.11.3.6 Setting the message type

1. Select the message type line with the «Up» and «Down» keys.
2. Press «Enter».
   The display for the message type flashes.
3. Use «Up» or «Down» to set the message type.



Menu
Time delay (td)
Set message type, in the example: Warning

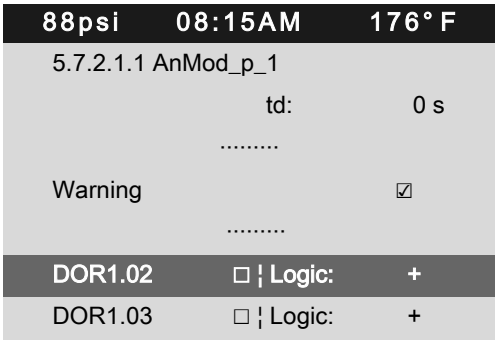
4. Press «Enter».
5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the message type flashes.
7. Press «Up» key.
   The check box is activated.
8. Press «Enter».

Result The message type is set and activated.

8.11.3.7 Assigning and activating the output

By triggering the message one or two digital DOR outputs can be switched.

1. Use «Up» or «Down» to select the *DOR* line.
2. Press «Enter».
   The *DOR* display flashes.
3. Use «Up» or «Down» to select the output.
4. Press «Enter».
   The setting is applied.



5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the output flashes.
7. Press «Up» key.
   The check box is activated.
8. Press «Enter».
   The output is assigned and activated.
9. Press the «Right» arrow.
10. Press «Enter».
    The control field *Logic* flashes.
11. Use «UP» or «Down» to set the desired behavior, see table 75.
12. Press «Enter».

Result For messages at 24 V, the logic is set with the **+** symbol.

Result The pNloc measured value at the analog AnMod_p_1 input is available as a message and as output signal at the selected DOR output.

8.12 Activating remote acknowledgement

When warning or alarm messages are routed to a remote control center via an output it makes sense to have these messages acknowledged by the control center.

Acknowledging the message without correcting the cause, however, can lead to machine damage.

Safety-relevant "EMERGENCY STOP push button" and "Maintenance door limit switch" messages **cannot** be acknowledged remotely.

The following conditions must be fulfilled:

- The remote control of the compressor is set (see chapter 8.5.3 Controlling machine from a remote location)
- Remote control is activated (see chapter 8.2.12 Activating remote control)
- A controller input has been assigned for the acknowledgement signal.

Overview

- Selecting the *<Configuration – Acknowledgement>* menu
- Setting the "Remote acknowledgement" function
- Activating the remote control
- Assigning an input
- Press the «Remote control» key

⚠ CAUTION

Machine damage can result from acknowledging a fault message without remedying its cause!

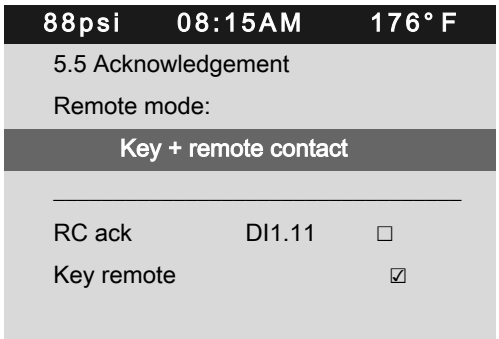
➢ *Find the failure cause.*

➢ Decide to acknowledge or not.

8.12.1 Setting the remote acknowledgement function

Precondition Password access level 2 is activated.

1. Open the 5.5 *<Configuration – Acknowledgement>* menu.
2. Use the «Up» or «Down» keys to select the *Remote mode* line.
3. Press the «DOWN» key.
4. Press «Enter» to switch into setting mode.
   The currently active operating mode flashes.
5. Use «Up» or «Down» to set the *Key + remote contact* input.



Menu

Active line with "Key + remote contact" setting

6. Press «Enter» to accept the setting.
   The setting is applied.

Result The Remote acknowledgement function is set.

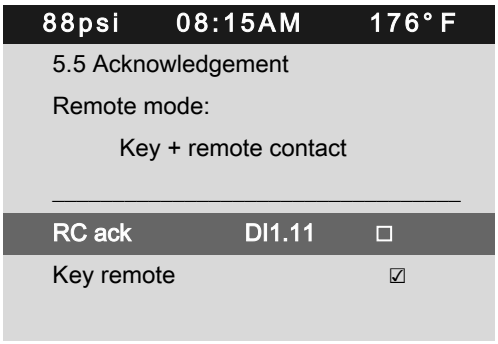
8.12.2 Activating the remote control

➢ Activating remote control see chapter 8.2.12.

Result SIGMA CONTROL 2 remote control is activated.

8.12.3 Assigning an input

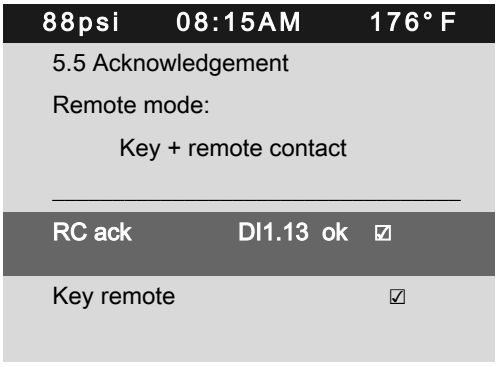
1. Use «Up» or «Down» to select the *RCack* line.



Menu

Active line

2. Press «Enter».
   The *DI* display flashes.
3. Use «Up» or «Down» to set the input.
4. Press «Enter» to accept the setting.
   The input has now been assigned.
5. Press the «Right» arrow.
6. Press «Enter» to switch into setting mode.
   The check box assigned to the input flashes.
7. Press the «Up» key.
   The check box is activated.
8. Press «Enter» to accept the setting.
   The input is assigned and activated.



Menu

Active line, input for remote contact assigned and activated

9. Press the «Remote control» key to enable remote acknowledgement.

Result Should a message occur, it can now be acknowledged from a control center.

8.13 Linking to an external pressure transducer

If the air system is operated with an air receiver, the pressure in the receiver can be regulated by an external pressure transducer.

Transmitting a pressure transducer value	Assignment to an input
The external pressure transducer is connected to SIGMA CONTROL 2.	Assign *AII*
Pressure transducer characteristics: ■ 4–20 mA ■ 0–232 psi	

Tab. 77 Transmitting a pressure transducer value

The controller processes the options in the following sequence:

- Pressure according to the assigned external transducer
- The local system pressure transducer (pNloc) remains active

Overview

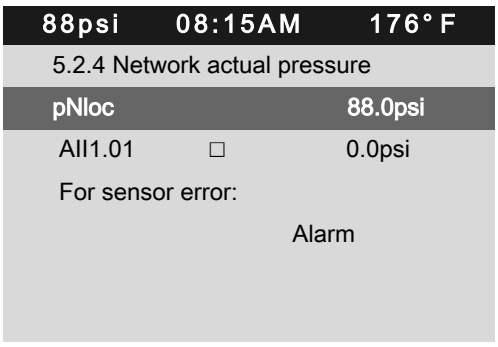
Example: The external pressure transducer is connected to SIGMA CONTROL 2.

- Select the *<Configuration – Pressure control>* menu.
- Assigning an input

8.13.1 Pressure control menu

Precondition Password access level 2 is activated.

1. Select the 5.2.4 *< Configuration – Pressure control – Network actual pressure>* menu.
   The *Network actual pressure* menu is displayed.



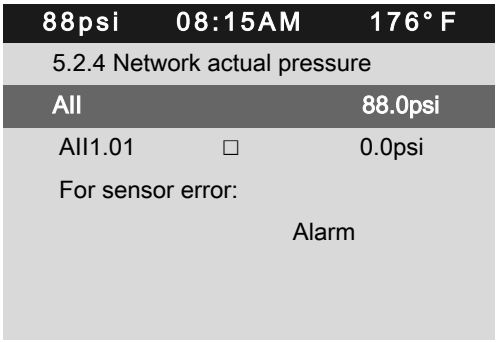
Menu

Active line (local pressure transducer)

8.13.2 Assigning an input to an external pressure transducer

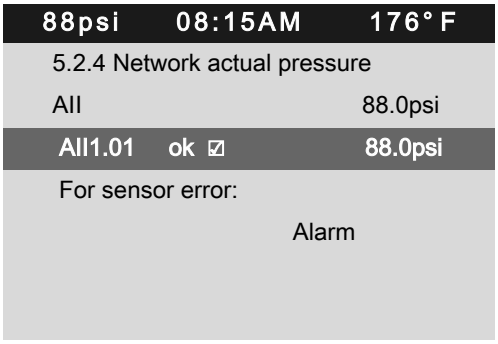
1. Press «Enter» to switch into setting mode.
   The *pNloc* indication flashes.

2. Use «Up »or «Down» to set the *AII* input.



Active line (external pressure transducer)

3. Press «Enter» to accept the setting.
   The *AII* input is set.
4. Press «Down».
   The line for activating the input is displayed.
5. Press the «Right» key.
6. Press «Enter» to switch into setting mode.
   The check box assigned to the input flashes.



Active line

7. Press «UP».
   The check box is activated.
   ok is displayed.
8. Press «Enter» to accept the setting.
   The setting is applied.

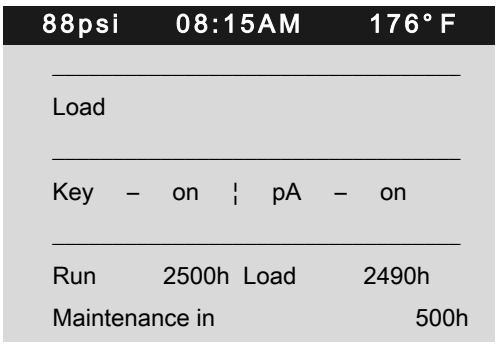
Result The input for the external transducer is now activated.

8.14 Commissioning the machine

Checking the controller settings	Section	Complied?
➢ Language correctly set?	8.2.2	
➢ Date and time correct?	8.2.7	
➢ Display format correctly set?	8.2.9	
➢ System pressure setpoint correctly set?	8.4	

Tab. 78 Check list for commissioning the machine

1. Check and confirm all the items in the checklist before commissioning the machine.
   When power is applied to the machine the controller boots and carries out a self test. The display and the *Controller on* LED illuminate.



2. Continue the commissioning process as described in chapter "Commissioning" of the machine's operating manual.

9 Operation

9.1 Switching on and off

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

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

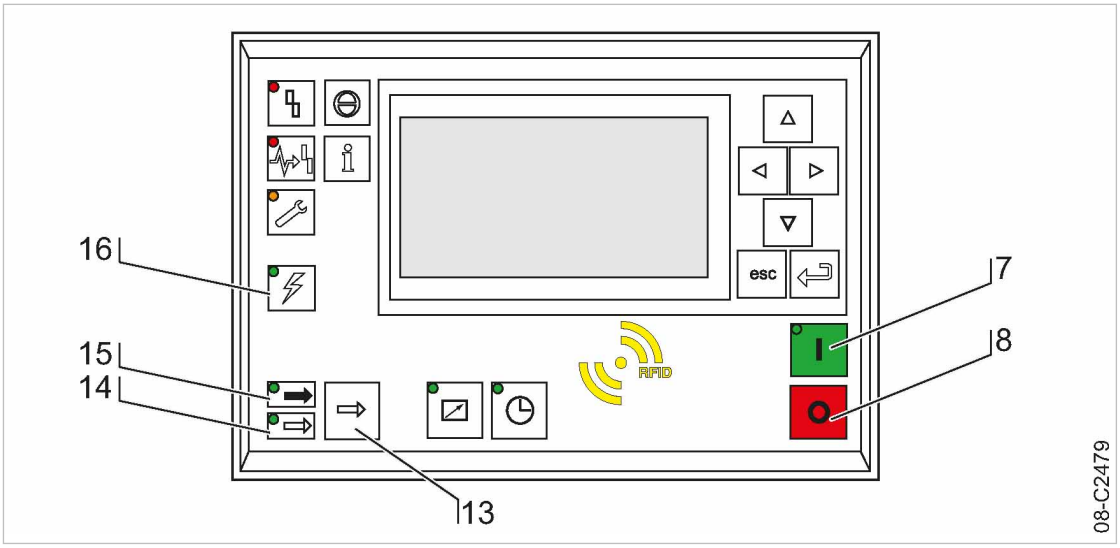


Fig. 39 Switching on and off

7 «ON» key
8 «OFF» key
13 «Load/Idle» toggle key
14 *IDLE* LED
15 *LOAD* LED
16 *Controller voltage* LED

9.1.1 Switching on

Precondition No personnel are working on the machine.
All access doors and panels are closed and secure.

1. Switch on the power supply disconnecting device.
2. Switch on the machine and wait for SIGMA CONTROL 2 to start.
   The *Controller voltage* LED 16 lights green.
3. Press the «On» 7 key.
   The *On* LED lights green.

If a power failure occurs, the machine is **not** prevented from restarting automatically when power is resumed.
It can restart automatically as soon as power is restored (see chapter 8.5).

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

9.1.2 Switching off

1. Press the «OFF» key.

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

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

In rare cases, if you need to shut the machine down immediately and cannot wait until the automatic shutdown process is finished:

➢ Press «OFF» once again.

9.2 Switching off in an emergency and switching on again

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

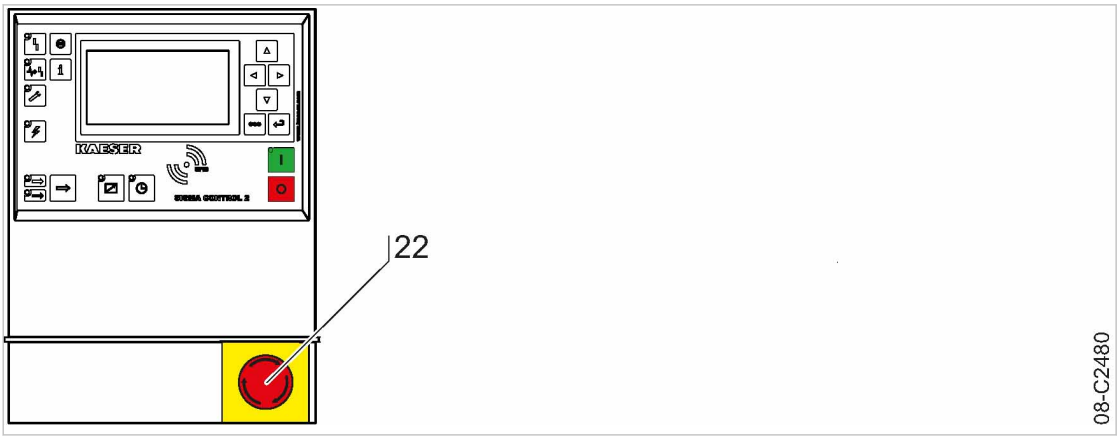


Fig. 40 Switching off in an emergency

22 EMERGENCY STOP push button

Switching off

➢ Press the EMERGENCY STOP push button.

Result The EMERGENCY STOP push button remains latched after actuation.

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

Switching on

Precondition The fault has been rectified

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

Result The machine can now be started again.

9.3 Acknowledging alarm and warning messages

Messages are displayed on the "new value" principle: You can acknowledge warning or fault messages immediately after *Message coming* or *Message going*. However, warning and fault messages can be acknowledged only following a successful elimination of the corresponding fault.

Message sequence 1	Indication
Message coming	LED flashes
Message acknowledged	LED illuminates
Message going	LED off

Tab. 79 Message sequence 1

Message sequence 2	Indication
Message coming	LED flashes
Message going	LED flashes
Message acknowledged	LED off

Tab. 80 Message sequence 2

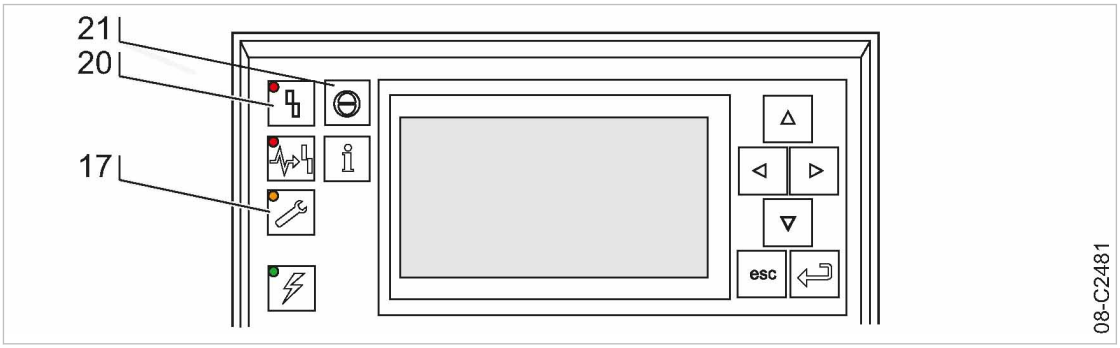


Fig. 41 Acknowledging messages

[17] *Warning* LED (yellow)
[20] *Alarm* LED (red)
[21] Key «Acknowledge»

Alarm message

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

Precondition The fault has been rectified

➢ Press «Ack» to acknowledge the fault message.
Alarm LED extinguishes. The machine is again ready for operation.

If the machine has been stopped with the EMERGENCY STOP push button.

➢ First turn the EMERGENCY STOP push button in the direction of the arrow to unlatch it.

➢ Then acknowledge the alarm message.

Further information A list of possible alarm messages occurring during operation are shown in chapter 10.2.

Warning message

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

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

➢ Press «Ack» to acknowledge the warning message.
The *Maintenance* LED extinguishes. The machine is again ready for operation.

Further information
A list of possible warning messages occurring during operation are shown in chapter 10.3.

9.4 Displaying messages

The following information can be accessed in the 1.1 *<Status – Messages>* menu:

- Current messages
  - Last alarm
  - Last warning
  - Number of currently registered alarms and/or warnings
- Message history: The last 1000 events, these include alarm and warning messages
  - Compressor messages
  - Diagnostic messages
  - System messages
- Address error: Display of incorrect parameterization in menu X

The information (message) is shown in three lines of the display.

Line	Submenu/Segment/Text
1	Selected submenu: ■ Compressor messages ■ Diagnostic messages ■ System messages
2	Segment: ■ Message number ■ Message type ■ Message status ■ Message date ■ Message time
3	Text: ■ Message text ■ –

Tab. 81 Information of a message

Message type and status are shown abbreviated.

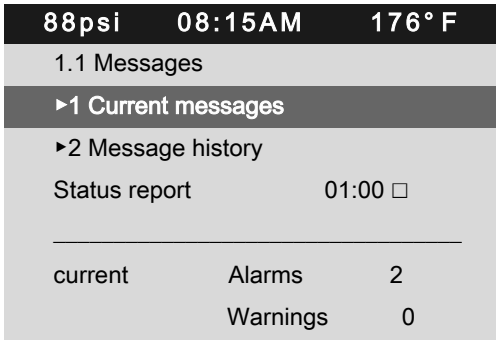
Segment	Indication	Meaning
Message number	*0059* (example)	Message 0059

Segment	Indication	Meaning
Message type	*W*	Warning/service message
	A	Alarm message
Message status	*c*	Message has come
	g	Message gone
	a	Message acknowledged (reset)
Date	*04/13/16* (example)	Date
Time	*08:15:37AM* (example)	Time

Tab. 82 Message abbreviations

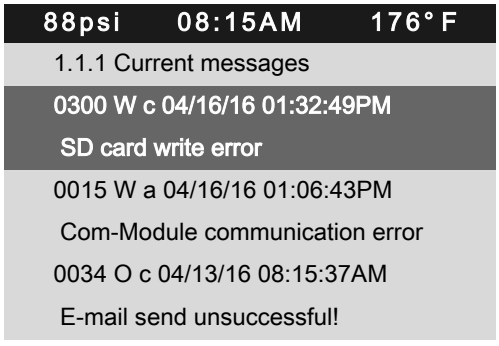
9.4.1 Selecting the status menu

1. Open the 1.1 *<Status – Messages>* menu.
   The *Messages* menu is displayed
   The number of current alarms and warnings is displayed in the two bottom lines.



Displaying the last alarm or warning

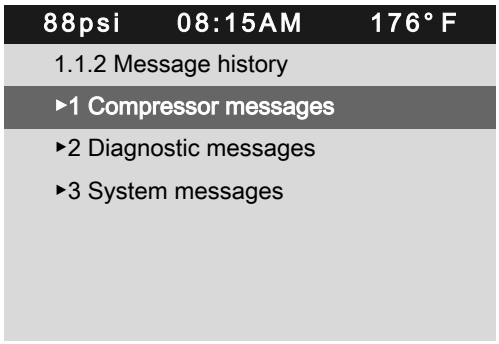
1. Open the 1.1.1 *<Status – Messages – Current messages>* menu.
   The third line displays the last alarm or warning message.



2. Press «Esc» repeatedly to leave this menu.

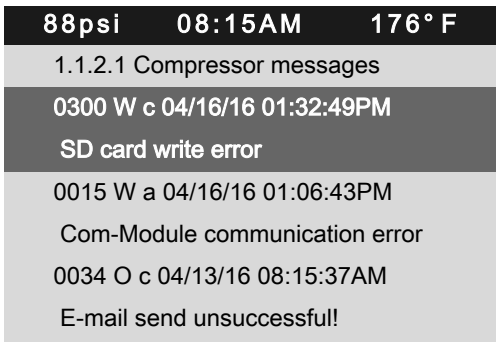
Displaying the message history

1. Select the 1.1.2 *<Status – Messages – Message history>* menu.
   The *Message history* menu is displayed.



Menu
Active line with submenu: Compressor messages
Diagnostic messages
System messages

2. Press «Enter».
   The 1.1.2.1 *Compressor messages* menu is displayed.
   The third line displays the last alarm or warning message.



Menu
Last message
Message text for message 0300
Message text for message 0015
Message text for message 0034

3. Press «Esc» repeatedly to leave this menu.

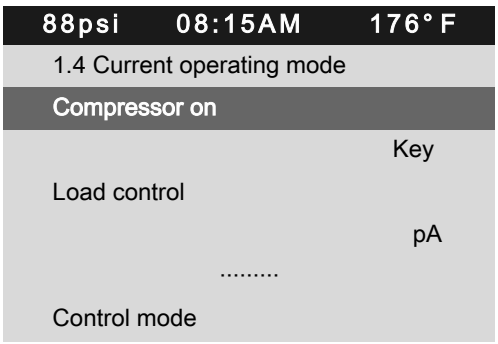
9.5 Displaying the current operating mode

The operating mode is displayed in 2 segments (example):

On/off switching via	Load control via
Key	*pA*

Tab. 83 Operating mode display

1. Select the 1.4 *<Status – Current operating mode>* menu.
   The *Current operating mode* menu is displayed.



Abbreviation of operating modes

Segment	Indication	Meaning
On/off switching via	Key	«ON» key on the control panel of SIGMA CONTROL 2
	Key + clock	Cycle Control
	Key + remote contact	Remote contact (external LOAD signal)
	Key + remote bus	Remote bus (external bus signal)
LOAD control via	pA	System setpoint pressure*pA*
	pB	System setpoint pressure*pB*
	pA/pB Clock	System setpoint pressure via time control
	pA/pB Cycle	System setpoint pressure via timer
	pA/pB SC2	System setpoint pressure via 2 machines working in master-slave mode
	pA/pB RC	System setpoint pressure via remote contact
	pA/pB RB	System setpoint pressure via remote bus
	Load RC	LOAD remote contact (external LOAD signal)
	Load RB	Remote bus (external bus signal)
	loc.-load RC	Local/LOAD remote contact

Tab. 84 Abbreviation of operating modes

9.6 Adjusting the working pressure

➢ Adjust the pressure parameter to suit the compressor and application.

Further information A detailed explanation of all pressure parameter settings is given in chapter 8.4.

9.7 Displaying analog data

The *Performance data* menu provides the following information:

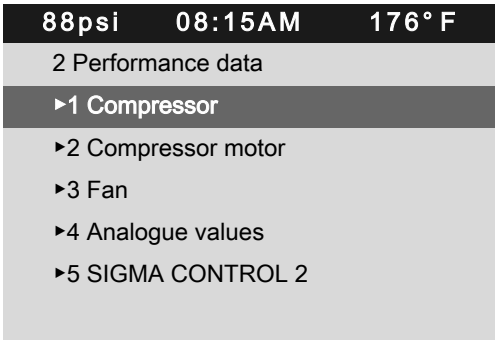
- Compressor

- Compressor motor
- Fan
- Analogue values
- SIGMA CONTROL 2

Displaying analog data

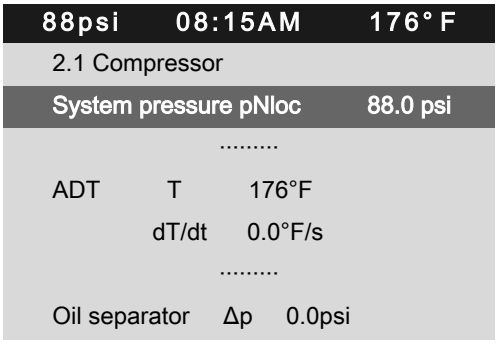
Precondition Password access level 2 is activated.
The operating mode is displayed.

1. Open the 2 *Performance data* menu.
   A list of the components is displayed.



Menu
Active line

2. If necessary, repeatedly press «Up» or «Down» to select the required component.
3. Press «Enter» access compressor measurement data.
   The system displays the measurement data for the compressor.



Menu
Local System pressure pNloc
Airend discharge temperature
Rise of airend discharge temperature
Differential pressure, oil separator cartridge

9.8 Displaying operating data

The following information can be called up in the *Operating data* menu:

- Operating hours
  - Compressor: Total machine running time
  - On load: Machine running time in LOAD mode
  - Motor: Motor running time (can be changed)
  - Compressor block: Airend running time (can be changed)
  - SIGMA CONTROL 2: Controller running time

- Switching cycles
  - Load valve on
  - Mains contactor on (adjustable)
- kWh counter

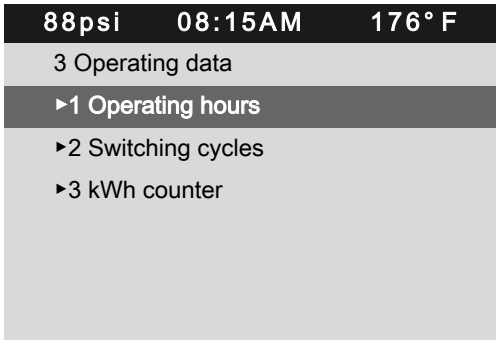
➢ Reset the run times after replacing the airend or the compressor motor.
➢ Reset the main contactor switching cycle counter after replacing the main contactor.

9.8.1 Checking the operating hours

Displaying the operating hours

Precondition Password access level 2 is activated.

1. Open the 3 *Operating data* menu.



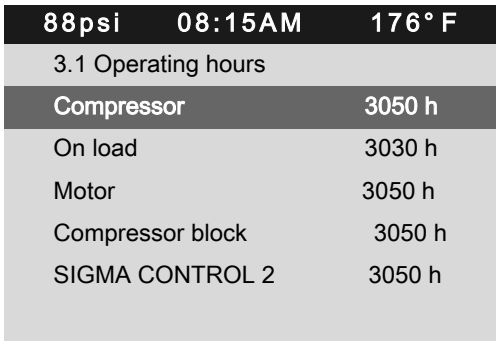
Menu
Active line

Changing the operating hours

The running times of the compressor motor and airend can be adjusted. This may be required after a replacement, for example.

Precondition Password access level 2 is activated.

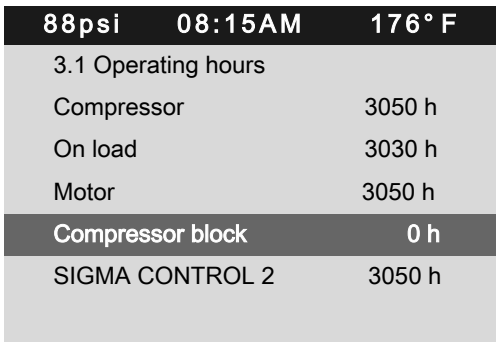
1. Open the 3.1 *<Operating data – Operating hours>* menu.



Menu
Active line

2. Use «Up» or «Down» to select the *Compressor block* line.

3. Press «Enter».
   The display of the running time flashes.



4. Use «Down» or «Up» key to set the value for operating hours to zero.
5. Press «Enter».
   The setting is applied.
6. Press «Esc» repeatedly to leave this menu.

Result The operating hours for the new airend are set to *0 h*.

9.8.2 Checking the switching cycles

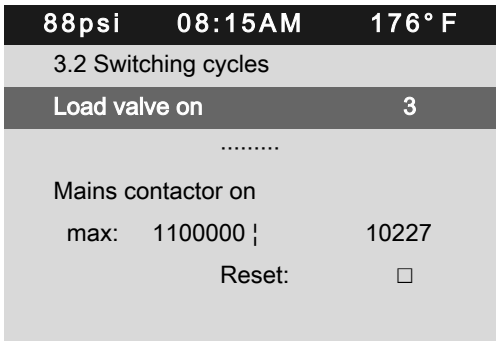
The system monitors the usage times of safety-relevant components to ensure the proper condition of all safety-relevant functions. Depending on the component, the usage time may be defined by run time or switching cycles. For the main contactor, the usage time is defined by the maximum permissible number of switching cycles.
The main contactor switching cycle counter in SIGMA CONTROL 2 records the number of switching cycles and generates a warning message when the maximum permissible number of switching cycles is exceeded.
When this warning message is generated, the safety-relevant function is no longer ensured. The main contactor must be replaced!

➢ Comply with all instructions.

Displaying the switching cycles

Precondition Password access level 2 is activated.

1. Select the 3.2 *<Operating data – Switching cycles>* menu.
2. Compare the maximum permissible number of switching cycles with the value displayed by the switching cycle counter.



Result The safety-relevant function is ensured.

The maximum permissible number of switching cycles have not exceeded.
The main contactor can still be used.

The safety-relevant function is not ensured.
The maximum permissible number of switching cycles have exceeded.
➢ Have the main contactor replaced.

Replacing the main contactor

If the displayed value of the main contactor exceeds the maximum permissible number of switching cycles, SIGMA CONTROL 2 generates the warning message *0024 Mains contactor operations ≠*.
The main contactor must be replaced.

➢ Have the main contactor replaced by an authorized KAESER service representative.

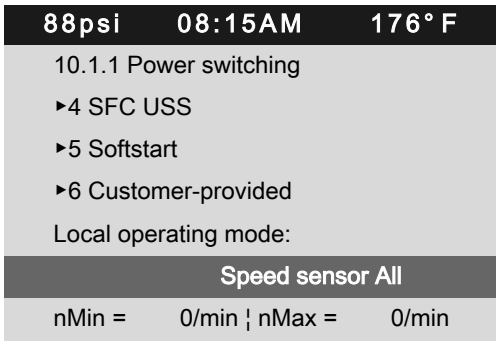
Resetting the main contactor switching cycle counter

➢ Have the main contactor replaced by an authorized KAESER service representative.

9.9 Displaying the frequency converter settings

Precondition The machine is fitted with the frequency converter option (example).
The operating mode is displayed.

1. Select the 10.1.1 *<Components – Compressor motor – Power switching>* menu.
2. Use «Up» or «Down» to select the *Local operating mode:* line.
   In the two lines underneath *Local operating mode*:, the source for the speed setting and the setting values for the minimal and maximum speed are shown.



Speed setting

3. Press «Escape» repeatedly to return to the main menu.

9.10 Setting the maintenance interval

Maintenance tasks are tasks to be completed to ensure the functionality of a technical installation.
Time interval established by the manufacturer at which end a maintenance task must be completed.

Example: Changing the oil change service interval.

Precondition Password access level 2 is activated.
The operating mode is displayed.

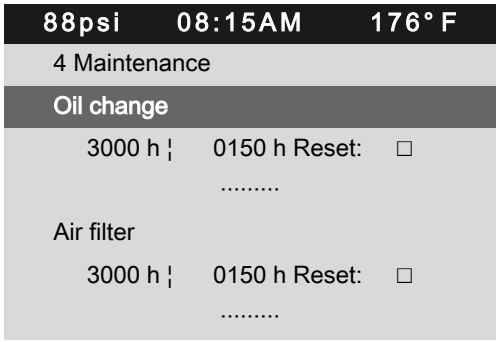
NOTICE

Unauthorized extended maintenance intervals
Progressing damage to the machine up to functional incapacity.

➢ *Observe the maintenance intervals of the manufacturer.*

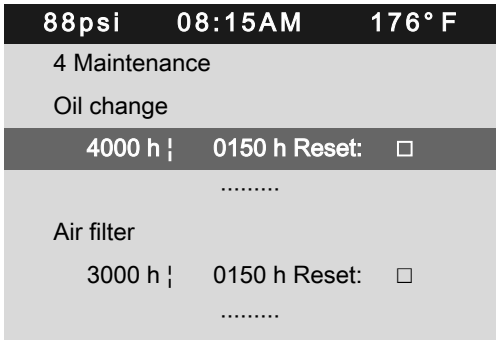
Selecting menu maintenance

1. Open the 4 *Maintenance* menu.
2. Use «Up» or «Down» to select the *Oil change* line.



Active line, Description maintenance interval
Preset interval 3000 h

3. Press the «DOWN» key.
   The maintenance interval for oil change is displayed as active line.



Maintenance interval description
Active line, factory-defined interval

4. Press «Enter».
   The setting mode is active.
5. Use «Up» or «Down» to set the value for new value for the maintenance interval.

Keep the «Up» key pressed to change the maintenance interval in increments of 10, 100 or 1000.

6. Press «Enter».
   The setting is applied.
7. Press «Escape» repeatedly to return to the main menu.

9.11 Checking the safety relief valve

Overview

- Preparing the inspection
- Performing the inspection
- Correct conclusion of the test
- Resetting

When the check mode is activated, monitoring of internal pressure (blow-off protection - if provided) and regulation of network pressure are deactivated.

The measured value of the *pi* pressure value is used to describe the following check:

Check box	Status
☑	activated
☐	deactivated

Tab. 85 Check box status

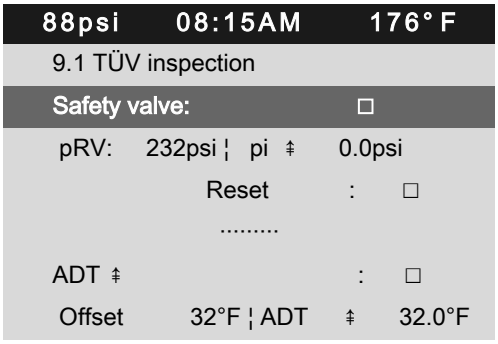
⚠ WARNING

Danger of injury from pressurized components!

➢ *Perform the following actions in the sequence provided.*

Preparing the test

1. Note the activating pressure of the safety relief valve from the machine's nameplate.
2. Press the «OFF» key to shut down the machine.
3. Close the user's shut-off valve between the machine and the pressure system.
4. Log on with password access level 2.
5. Open the 9.1 *<Machine test – TÜV inspection>* menu.



Menu

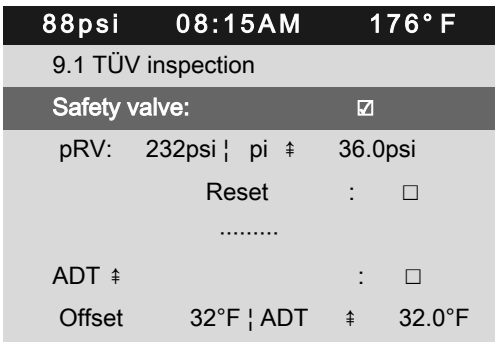
Active line with check box

Safety relief valve activating pressure (example)

Performing the test successfully

1. Use «Up» or «Down» to select the *Safety valve:* line.
2. Press «Enter».
   The check box *Safety valve:* will flash.
3. Press «Up» key.
   The check box is activated.

4. Press «Enter».
   The test mode is now activated.



Menu

Active line with check box

Safety relief valve activating pressure

5. **⚠ WARNING** *Risk of hearing damage when safety relief valve blows off!*
   - ➢ *Close all access doors, replace and secure all removable panels.*
   - ➢ *Always wear ear protection.*
6. **⚠ WARNING** *Risk of burns due to released cooling oil and compressed air when blowing off the safety relief valve!*
   - ➢ *Close all access doors, replace and secure all removable panels.*
   - ➢ *Wear eye protection.*
7. Press the «ON» key. After the motor start is completed, keep the «LOAD/IDLE» key pressed. Otherwise, the machine remains in IDLE and is stopped after two minutes.
   The machine switches to LOAD and the machine's *pi* pressure rises.
8. Monitor on the display the *pi* pressure rise during the TÜV check.
9. If the *pi* pressure increases to 10 % above the set pressure of the safety relief valve, immediately release the «LOAD/IDLE» key.
10. Shut down the machine with the «OFF» key and immediately replace the safety relief valve.

If the alarm message *pRV ⇞* appears, the safety relief valve is defective. *pi* pressure has exceeded the set pressure of the safety relief valve by 29.0 psi.

➢ Have the safety relief valve replaced.

Avoid oil mist:

➢ Release the «LOAD/IDLE» key immediately when the safety relief valve responds, in order to prevent unnecessary oil mist.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The check box *Safety valve:* in the active line flashes.
2. Press the «DOWN» key to deactivate the box.
   The check box is deactivated.
3. Press «Enter».
   The test mode is deactivated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.
5. Open the user's shut-off valve between the machine and the air distribution network.

Result The machine is ready for operation.

Resetting

If the test is cancelled when opening the safety relief valve, SIGMA CONTROL 2 will indicate the highest measured value as internal pressure.
To reset the saved value, activate the *Reset* check box.

➢ Activate the *Reset* check box.

9.12 Checking the temperature sensor and overheating shutdown function

The machine should shut down if the airend discharge temperature (ADT) reaches a maximum of 230°F.
SIGMA CONTROL 2 will simulate a higher temperature for checking this function.

For this purpose, SIGMA CONTROL 2 automatically determines an offset value to be displayed. During the test mode, this offset is added to the actual compressor discharge temperature to cause the machine to shut down prematurely.

No warning message is generated. However, the corresponding fault message "0015Airend discharge temperature ADT ↨" switches off the machine once the maximum discharge temperature has been reached.

Overview

- Allow the machine to warm up, then shut it down and allow it to cool down slightly
- Performing the test
- Correct conclusion of the test
- Resetting

Performing the test

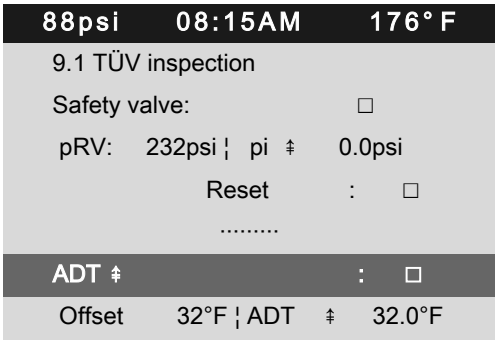
The offset value of *95°F* displayed in activated test mode refers to the example discharge temperature of *163°F* as shown in the header of the display.

Precondition Allow the machine to warm up. Shut down the machine as soon as the discharge temperature has stabilized.

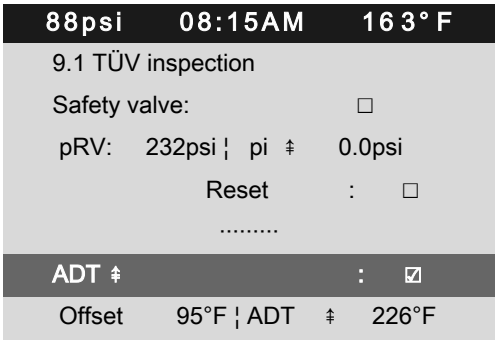
Machine has cooled down by approximately 41°F (from discharge temperature of warmed up machine).

Password access level 2 is activated.

1. Open the 9.1 *<Machine test – TÜV inspection>* menu.
2. Use the «Up» or «Down» keys to select the *ADT* line.



3. Press «Enter».
   The *ADT ⇞* check box flashes.
4. Press «Up» key.
   The check box is activated.
5. Press «Enter».
   The *Offset* display changes to *95°F*.
   The *ADT ⇞* display changes to *226°F*.
   The test mode is now activated.



6. Press the «ON» key.
   The machine is running in LOAD.
   The discharge temperature increases again.
   The machine will switch off as soon as the discharge temperature attains a value of *230°F*.

The machine does not shut down?

➢ Abort the test and contact an authorized KAESER service representative soon as possible.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The setting mode is active.
   The check box flashes in line *ADT ⇞*.
2. Press the «DOWN» key.
   The check box is deactivated.
3. Press «Enter» to accept the setting.
   The offset is reset to *32°F*.

Result The test mode is deactivated and the test is completed.

Resetting

SIGMA CONTROL 2 will display the highest measured value if the test for switching off at high temperature is aborted.

Activate the *Reset* check box in order to reset the stored value.

➢ Activate the *Reset* check box.

9.13 Save data

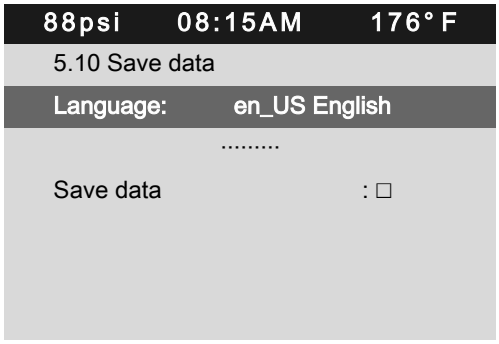
SIGMA CONTROL 2 settings can be backed up to an SD card.

Precondition An SD card with compatible file system (FAT32) and minimum 50 MB free memory is plugged into the SD card slot X5 of SIGMA CONTROL 2

The write protection of the SD card has been deactivated.

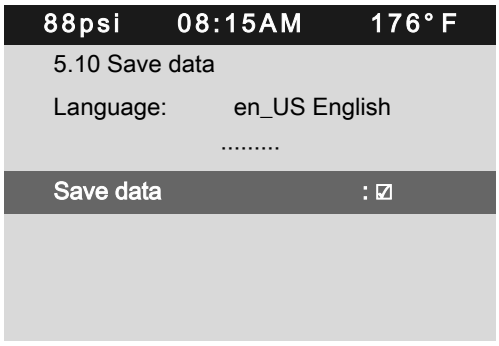
Password access level 2 is activated.

1. Open the 5.10 *<Configuration – Save data>* menu.
2. Use «Up» or «Down» to select the *Language:* line.



Header
Menu
Active line

3. Press «Enter» to switch into setting mode.
   The display for the set language flashes.
4. Use «Up» or «Down» to select the desired language.
5. Press «Enter» to accept the setting.
   The setting is applied.
6. Use «Up» or «Down» to select the *Save data* line.



Header
Menu
Active line

7. Press «Enter».
   The check box *Save data* will flash.
8. Press «Up» key.
   The check box is activated.
9. Press «Enter».
   A security query is displayed.
10. Press «Enter».

Result The settings are saved on the SD card.

10 Fault Recognition and Rectification

10.1 Basic instructions

The following tables are intended to assist in locating faults.

SIGMA CONTROL 2 will indicate three types of faults:

- Fault on the machine:
  The *red LED* flashes, the machine is shut down, see chapters 10.2 and 10.5.
- Fault on the controller:
  The machine is shut down, see chapter 10.6.
- Warning:
  The *yellow LED* illuminates, the machine is **not** shut down, see chapter 10.3.

The messages valid for your machine are dependent on the controller and individual equipment.

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

10.2 Interpreting alarm messages

If an input signal is classified as an alarm, the controller will display the fault upon the signal's arrival.

Consequences:

- The *red LED* flashes:
- The controller switches the machine off.

Alarm messages are identified with the letter A.

The message numbers are not numbered consecutively.

Meanings of designation of fault messaged within this table with "**%d**".

[1] Messages 0073–0078 and 0081–0096 are customer-specific and may differ from the suggested values.
Complete them with your defined message text, possible causes and remedies. (see chapter 8.11).

Message	Possible cause	Remedy
0001 A Direction of rotation	The compressor drive motor is turning in the wrong direction.	Changeover phase lines L1 and L2.
0002 A Motor temperature ↟	Compressor drive motor overheated.	Keep ambient conditions within specified limits. Check the cooling air supply. Clean the motor.
0003 A pRV ↟	The activating pressure of the safety relief valve on the oil separator tank has been exceeded.	Change the safety relief valve.
0004 A EMERGENCY STOP	EMERGENCY STOP push button actuated.	Unlatch the push button.

Message	Possible cause	Remedy
0005 A Oil separator Temperature ↟	Maximum air temperature at the oil separator tank outlet is exceeded.	Check the line to the trip relay. Check the oil separator cartridge for damage.
0007 A Power supply monitor	Fault in main power supply.	Have the main power supply checked.
0008 A Diagnostics group alarm	A diagnostic message has occurred.	For more details, see the text of the diagnostic message.
0010 A Blow-off protection ↟	The activating pressure of the safety relief valve on the oil separator tank has been exceeded.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0011 A Oil-/air cooler fan Overcurrent	Overload shutdown of the fan motor.	Investigate cause of shutdown. Reset the overload protection relay.
0012 A Access doors	Door open / interlocked panel removed while the machine is running.	Fit and secure all panels and close access doors.
0013 A Compressor motor overcurrent	Overload shutdown of the compressor drive motor.	Investigate cause of shutdown. Change the oil separator cartridge.
0014 A Oil cooler fan overcurrent	Overload shutdown of the oil cooler fan motor.	Investigate cause of shutdown. Reset the overload protection relay.
0015 A Airend discharge temperature ADT ↟	Maximum permissible airend discharge temperature (ADT) exceeded.	Keep ambient conditions within specified limits. Clean the cooler. Check the cooling oil level.
0016 A Air cooler - Fan Overcurrent	Overload shutdown of the air cooler fan motor.	Investigate cause of shutdown. Reset the overload protection relay.
0017 A Safety shutdown ADT	Maximum permissible airend discharge temperature (ADT) exceeded.	Keep ambient conditions within specified limits. Clean the cooler. Check the cooling oil level.
0018 A Interior fan Overcurrent	Overload shutdown of the air cooler fan motor.	Investigate cause of shutdown. Reset the overload protection relay.
0019 A Internal pressure pi ↟	Inlet valve defective.	Contact an authorized KAESER service representative.
0021 A Refrigeration dryer T ↟	Refrigerated dryer: Compressed air temperature too low.	Contact an authorized KAESER service representative.
0022 A Oil separator Δp ↟	Oil separator cartridge clogged.	Change the oil separator cartridge.
0033 A Oil pressure ↟	Oil level too low. Defective oil pump (provided only in vacuum machines).	Check the cooling oil level. If necessary, request that an authorized KAESER service representative replaces the oil pump.

Message	Possible cause	Remedy
0034 A Mains contactor on?	Main contactor of the compressor motor does not open.	Check main contactor and wiring.
0035 A Cabinet fan I ↟	Overload shutdown of the control cabinet fan motor.	Contact an authorized KAESER service representative.
0038 A PD temperature ↟	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0039 A PD temperature ↟	Package discharge (PD) temperature too high.	Check the cooling oil level. Clean the cooler. Check the fan motor.
0040 A Mains contactor off?	Main contactor of the compressor motor does not deactivate.	Check main contactor and wiring.
0041 A Mains voltage ↟	Second power failure.	Check power supply voltage. Checking the door interlock switch.
0042 A Back pressure stop	Back pressure in the oil separator tank caused by defective venting.	Check venting line.
0043 A Airend discharge temperature ADT rise dT/dt ↟	The rate of rise of the airend discharge temperature (ADT) is too fast.	Check the cooling oil level.
0044 A No pressure buildup	The machine does not produce compressed air. The working pressure does not rise above 50 psi within the specified time period. The machine does not enter LOAD mode. Minimum pressure check valve defective.	Check the machine for leaks. Check coupling and V-belt. Contact an authorized KAESER service representative.
0048 A High-voltage cell	Fault in the high voltage cell.	Contact an authorized KAESER service representative.
0050 A Customer-provided power element	Power switching module not ready or defective.	Check power switching module.
0051 A Aggregate A	Aggregate A failed.	Contact an authorized KAESER service representative.
0052 A Aggregate B	Aggregate B failed.	Contact an authorized KAESER service representative.
0056 A RD condensate drain	Refrigerated dryer: Condensate drain defective.	Refrigerated dryer: Check the condensate drain and conduits.
0057 A Model?	Compressor model uncertain.	Contact an authorized KAESER service representative.
0058 A Condensate drain	Condensate drain defective.	Check the condensate drain and conduits.

Message	Possible cause	Remedy
0059 A Back pressure run	Drive belt or coupling broken.	Drive belts: Replace drive belt. Coupling: Contact an authorized KAESER service representative.
0060 A Softstart	Fault in the soft start equipment.	Contact an authorized KAESER service representative.
0062 A Refrigeration dryer p ↡	Refrigerated dryer: Pressure too high in refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ↡	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Contact an authorized KAESER service representative.
0064 A Refrigeration dryer compressor motor temperature ↡	Permissible ambient temperatures exceeded. Condenser cooling insufficient. Compressed air inlet temperature is too high. Low refrigerant level.	Check and lower ambient temperatures. Clean the condenser. Check the fan. Check compressed air cooling at the compressor. Clean the compressor cooler. Contact an authorized KAESER service representative.
0067 A SC2 <=> SC2 communication error	The electrical connection is interrupted. IP configuration incorrect.	Check the electrical connection. Check the IP configuration.
0073 A External message 1	[1]	
0074 A External message 2	[1]	
0075 A External message 3	[1]	
0076 A External message 4	[1]	
0077 A External message 5	[1]	
0078 A External message 6	[1]	
0081 A AnMod_p_1	[1]	
0082 A AnMod_p_2	[1]	
0083 A AnMod_p_3	[1]	

Message	Possible cause	Remedy
0084 A AnMod_p_4	1)	
0085 A AnMod_T_1	1)	
0086 A AnMod_T_2	1)	
0087 A AnMod_T_3	1)	
0088A AnMod_T_4	1)	
0089A AnMod_I_1	1)	
0090 A AnMod_I_2	1)	
0092 A T-Switch inlet temperature	1)	
0093 A p-Switch pi	1)	
0094 A T-Switch ADT	1)	
0095 A p-Switch pN	1)	
0096 A T-Switch PDT	1)	
0100 A Star contactor on?	Star contactor of the compressor motor does not activate.	Check star contactor and wiring.
0101 A Star contactor off?	Star contactor of the compressor motor does not deactivate.	Check star contactor and wiring.
0102 A Delta contactor on?	Delta contactor of the compressor motor does not activate.	Check delta contactor and wiring.
0103 A Delta contactor off?	Delta contactor of the compressor motor does not deactivate.	Check delta contactor and wiring.
0104 A High-voltage cell on?	High-voltage cell does not activate.	Contact an authorized KAESER service representative.
0105 A High-voltage cell off?	High-voltage cell does not deactivate.	Contact an authorized KAESER service representative.
0106 A Softstarter DI%.2d closed?	Soft start device does not activate.	Contact an authorized KAESER service representative.
0107 A Softstarter DI%.2d open?	Soft start device does not deactivate.	Contact an authorized KAESER service representative.
0108 A Softstarter DI%.2d closed?	Run-up of the soft start device is not completed.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0109 A Softstarter DI%.2d open?	Run-down of the soft start device is not completed.	Contact an authorized KAESER service representative.
0111 A Oil-/air cooler fan Mains contactor on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0112 A Oil-/air cooler fan Mains contactor off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0113 A Oil-/air cooler fan Speed ↓ on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0114 A Oil-/air cooler fan Speed ↓ off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0115 A Oil-/air cooler fan Speed ↑ on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0116 A Oil-/air cooler fan Speed ↑ off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0121 A Oil cooler fan Mains contactor on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0122 A Oil cooler fan Mains contactor off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0131 A Air cooler - Fan Mains contactor on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0132 A Air cooler - Fan Mains contactor off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0141 A Interior fan Mains contactor on?	Main contactor of the fan motor does not activate.	Check main contactor and wiring.
0142 A Interior fan Mains contactor off?	Main contactor of the fan motor does not deactivate.	Check main contactor and wiring.
0150 A Redundancy contactor on?	Redundancy contactor does not activate.	Check redundancy contactor and wiring.
0151 A Redundancy contactor off?	Redundancy contactor does not deactivate.	Check redundancy contactor and wiring.
0200 A Compressor motor USS alarm	Frequency converter fault.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0201 A Compressor motor USS alarm	Frequency converter fault.	Contact an authorized KAESER service representative.
0202 A Compressor motor USS alarm	Frequency converter fault.	Contact an authorized KAESER service representative.
0203 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0204 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0205 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0206 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized Kaeser service representative.
0207 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0208 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0210 A Compressor motor FC Over temperature alarm	Compressor motor temperature too high.	Keep ambient conditions within specified limits. Cooler maintenance.
0211 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0212 A Compressor motor FC AI2 error	Speed sensor of the frequency converter (here: AI2).	Contact an authorized KAESER service representative.
0220 A Compressor motor FC Motor overload alarm	Compressor motor overload.	Contact an authorized KAESER service representative.
0221 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0230 A Compressor motor FC Motor overload alarm	Compressor motor overload.	Contact an authorized KAESER service representative.
0231 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0232 A Compressor motor FC AI1 error	Speed sensor of the frequency converter (here: AI1).	Contact an authorized KAESER service representative.
0240 A Compressor motor USS alarm	Fault caused by software driver.	Contact an authorized KAESER service representative.
0241 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0242 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0243 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0244 A Compressor motor FC activation failed	Frequency converter incorrectly activated.	Contact an authorized KAESER service representative.
0245 A Compressor motor FC run-up time exceeded	Minimum speed not reached with a defined time (can be set).	Check the set value. Contact an authorized KAESER service representative.
0246 A Compressor motor FC nMin undershot	Below minimum speed by a specific speed (can be set) for a specific time (can be set).	Check the set value. Contact an authorized KAESER service representative.
0247 A Compressor motor FC: STO function inactive	Parametrization error.	Contact an authorized KAESER service representative.
0248 A Compressor motor FC off - STO?	Parametrization error.	Contact an authorized KAESER service representative.
0251 A Oil-/air cooler fan USS alarm	Fault caused by software driver.	Contact an authorized KAESER service representative.
0252 A Oil-/air cooler fan FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0253 A Oil-/air cooler fan FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0254 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0255 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0260 A Oil-/air cooler fan FC Motor overload alarm	Fan motor overload.	Contact an authorized KAESER service representative.
0261 A Oil-/air cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Contact an authorized KAESER service representative.
0270 A Oil-/air cooler fan FC Motor overload alarm	Fan motor overload.	Contact an authorized KAESER service representative.
0271 A Oil-/air cooler fan FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0280 A Oil-/air cooler fan USS alarm	Fault caused by software driver.	Contact an authorized KAESER service representative.
0281 A Oil-/air cooler fan FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0282 A Oil-/air cooler fan USS error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0283 A Oil-/air cooler fan FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0284 A Oil-/air cooler fan FC activation failed	Fan frequency converter incorrectly activated.	Contact an authorized KAESER service representative.
0287 A Oil-/air cooler fan FC: STO function inactive	Frequency converter parametrizing incorrect.	Check frequency converter parametrizing. Contact an authorized KAESER service representative.
0288 A Oil-/air cooler fan FC off - STO?	Frequency converter parametrizing incorrect.	Check frequency converter parametrizing. Contact an authorized KAESER service representative.
0301 A Oil cooler fan USS alarm	Frequency converter fault.	Contact an authorized KAESER service representative.
0303 A Oil cooler fan FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0305 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0320 A Oil cooler fan FC Motor overload alarm	Fan motor overload.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0321 A Oil cooler fan FC Alarm %d	Fault message of the frequency converter with message number (here: 50).	Contact an authorized KAESER service representative.
0330 A Oil cooler fan USS alarm	Frequency converter fault.	Contact an authorized KAESER service representative.
0331 A Oil cooler fan FC PKW failure P%d.E%d	Frequency converter fault.	Contact an authorized KAESER service representative.
0332 A USS bus communication error %d	Fault caused by software driver.	Contact an authorized KAESER service representative.
0333 A Oil cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Contact an authorized KAESER service representative.
0334 A Oil cooler fan FC activation failed	Fan frequency converter incorrectly activated.	Contact an authorized KAESER service representative.
0337 A Oil cooler fan FC: STO function inactive	Frequency converter parametrizing incorrect.	Check frequency converter parametrizing. Contact an authorized KAESER service representative.
0338 A Oil cooler fan FC off - STO?	Frequency converter parametrizing incorrect.	Check frequency converter parametrizing. Contact an authorized KAESER service representative.
0500 A I/O parameterisation incorrect in module %d!	An I/O address has been assigned more than once.	Display and correct the incorrect parameters in the *1.1.3Address error* menu.

Tab. 86 Fault messages, possible causes and remedies

10.3 Interpreting warning messages

If an input signal is classified as a warning, the controller will display the warning upon the signal's arrival.

Consequences:

- The *yellow LED* flashes.
- The controller does **not** switch off the machine.

Warning messages are identified with the letter W.

The message numbers are not numbered consecutively.

In this table, you will see "**%d**" for a variable value, e.g. a number, duration or I/O address.

[1] Messages 0073–0078 and 0081–0096 are customer-specific and may differ from the suggested values.
Complete them in the table below with your defined message text, possible causes and remedies (see chapter 8.11).

Message	Possible cause	Remedy
0001 W Equipment number incomplete	Equipment number entered incompletely or not at all.	Contact an authorized KAESER service representative.
0002 W Motor temperature ↑	Drive motor overheating.	Keep ambient conditions within specified limits. Check the cooling air supply. Clean the motor.
0004 W Oil separator Δp ↑	Increased differential pressure of the oil separator cartridge. Oil separator cartridge clogged.	Change the oil separator cartridge.
0008 W Airend discharge temperature ADT ↑	Maximum airend discharge temperature will soon be reached.	Clean the cooler. Check the cooling oil level. Replace the oil filter element. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0011 W Oil filter Δp ↑	Increased pressure differential of the oil filter. Oil filter clogged.	Change the oil filter.
0013 W Air filter Δp ↑	Air filter clogged.	Change the air filter.
0015 W Com-Module communication error	The bus link via PROFIBUS interface is interrupted.	Check bus lines and plug.
0021 W Refrigeration dryer T ↡	Refrigerated dryer: Compressed air temperature too low.	Keep ambient conditions within specified limits. Contact an authorized KAESER service representative.
0024 W Mains contactor operations ↡	The maximum permissible number of switching cycles has been exceeded.	Have the main contactor replaced by an authorized KAESER service representative.
0025 W Oil separator h ↡	Oil separator cartridge: Maintenance interval has elapsed.	Change the oil separator cartridge.
0026 W Oil change h ↡	Cooling oil: Maintenance interval has elapsed.	Change the cooling oil.
0027 W Oil filter h ↡	Oil filter: Maintenance interval has elapsed.	Change the oil filter.

Message	Possible cause	Remedy
0028 W Air filter h ⇞	Air filter: Maintenance interval has elapsed.	Change the air filter.
0029 W Valve inspection h ⇞	Valves: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0030 W Belt/coupling inspection h ⇞	Belt tension/coupling: Maintenance interval has elapsed.	Carry out a visual inspection. Tension the drive belt.
0031 W Motor bearing h ⇞	Motor bearing of compressor motor: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0032 W Electrical equipment h ⇞	Electric components and electrical installation: Maintenance interval has elapsed.	Inspect and reset the maintenance interval counter.
0033 W Fan bearing h ⇞	Motor bearing of fan motors: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0034 W PD temperature ↓	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0035 W PD temperature ↑	Compressed air discharge temperature too high.	Clean the cooler. Check the cooling oil level.
0036 W Motor starts/h ⇞	The permissible number of motor starts was exceeded in the last 60 minutes.	Extend the idle period. Increase the capacity of the air receiver. Increase the cross-section of piping between compressor and air receiver.
0037 W Motor starts/d ⇞	The permissible number of motor starts was exceeded in the last 24 hours.	Extend the idle period. Increase the capacity of the air receiver. Increase the cross-section of piping between compressor and air receiver.
0038 W Blow-off protection ↑	The safety relief valve's activating pressure will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0041 W Mains voltage ↓	1. Power failure: The machine is automatically restarted.	Check power supply.
0043 W External load signal?	Ambiguous external load signal: Increased cut-out pressure exceeded. The external load control has not switched to IDLE.	Check settings of the external controller. Take into account pressure drops across filters and dryer.

Message	Possible cause	Remedy
0044 W Oil temperature ↓	Cooling oil temperature too low.	Check temperature switch, line and connection. Check the oil circuit. Increase room temperature.
0045 W DO test active	Test operation for the manual actuation of individual outputs is active.	Switch the power supply off and on again.
0046 W System pressure ↓	System pressure has fallen below the set system pressure low' value. Air consumption too high.	Check air demand. Check cable runs and sensor connections. Check the system pressure low' warning value.
0047 W No pressure buildup	The machine does not produce compressed air. The working pressure does not rise above 50 psi bar within the pre-set time period. The machine does not enter LOAD mode Minimum pressure check valve defective.	Check the machine for leaks. Check coupling and V-belt. Contact an authorized KAESER service representative.
0048 W Bearing lube h ⇞	Re-grease the motor bearings. Maintenance interval has elapsed.	Re-grease the motor bearings.
0049 W Annual maintenance	Last maintenance was 1 year ago.	Carry out the necessary maintenance and reset the corresponding maintenance interval counter.
0050 W Fan bearing lube h ⇞	Maintenance interval has elapsed.	Re-grease the fan bearing.
0051 W Double aggregate emergency operation!	Last maintenance was 1 year ago.	Carry out the necessary maintenance and reset the corresponding maintenance interval counter.
0053 W Condensate drain 2	Condensate drain defective. Too much condensate. Line interrupted. Condensate cannot be drained.	Check the condensate drain and condensate lines. Check the lines. Check EcoDrain. Check inlet conditions.
0058 W SC2 <=> SC2 communication error	The electrical connection is interrupted. IP configuration incorrect	Check the electrical connections. Check the IP configuration.
0059 W Start temperature ↓ ↓	The airend temperature is too low (< −50°F) for the machine to be operated.	Keep ambient conditions within specified limits.
0060 W Start temperature ↓	The airend temperature is too low (<+35°F).	Keep ambient conditions within specified limits.
0061 W Compressor T ↓	The airend discharge temperature (ADT) did not reach the minimum value within the specified time.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0062 W Refrigeration dryer p ⇟	Refrigerated dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 W Refrigeration dryer p ⇟	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switch tripped.	Contact an authorized KAESER service representative.
0064 W Refrigeration dryer compressor motor temperature ⇟	Permissible ambient temperatures exceeded. Condenser cooling insufficient Compressed air inlet temperature is too high. Low refrigerant level.	Check and lower ambient temperatures. Clean the condenser. Check the fan. Check compressed air cooling at the compressor. Clean the compressor cooler. Contact an authorized KAESER service representative.
0065 W Refrigeration dryer external shut-off	Low room temperature. Risk that refrigerated dryer freezes. Refrigerated dryer has automatically been deactivated.	Keep ambient conditions within specified limits. Check temperature sensor.
0067 W System pressure ↑	System pressure is above the "system pressure high" value.	Check cable runs and sensor connections. Check the "system pressure high" warning setting.
0068 W Condensate drain	Condensate drain defective. Too much condensate. Line interrupted. Condensate cannot be drained.	Check the condensate drain and condensate lines. Check the lines. Check EcoDrain. Check inlet conditions.
0069 W Error operation without RD → Call service!	Refrigerated dryer defective. Compressed air supply with non-dried air is activated.	Immediately contact an authorized KAESER service representative.
0070 W Refrigeration dryer T ↑	Refrigerated dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.
0071 W Oil level ↓	Cooling oil level too low.	Top off the cooling oil.
0072 W RD condensate drain	Refrigerated dryer: Condensate drain defective.	Check the condensate drain.
0073 W External message 1	[1]	

Message	Possible cause	Remedy
0074 W External message 2	1)	
0075 W External message 3	1)	
0076 W External message 4	1)	
0077 W External message 5	1)	
0078 W External message 6	1)	
0081 W AnMod_p_1	1)	
0082 W AnMod_p_2	1)	
0083 W AnMod_p_3	1)	
0084 W AnMod_p_4	1)	
0085 W AnMod_T_1	1)	
0086 W AnMod_T_2	1)	
0087 W AnMod_T_3	1)	
0088 W AnMod_T_4	1)	
0089 W AnMod_I_1	1)	
0090 W AnMod_I_2	1)	
0092 W T-Switch inlet temperature	1)	
0093 W p-Switch pi	1)	
0094 W T-Switch ADT	1)	
0095 W p-Switch pN	1)	
0096 W T-Switch PDT	1)	
0097 W SAM 4.0 communication error	Bus link via SIGMA NETWORK interrupted.	Check bus lines and plug.

Message	Possible cause	Remedy
0200 W Compressor motor FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0201 W Compressor motor FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0202 W Compressor motor FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0203 W Compressor motor FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0210 W Compressor motor FC AI1 error	Pressure transducer of the frequency converter defective.	Contact an authorized KAESER service representative.
0230 W Compressor motor FC AI0 error	Pressure transducer of the frequency converter defective.	Contact an authorized KAESER service representative.
0231 W Compressor motor FC Alarm %d	Malfunction at compressor motor or its frequency converter.	Contact an authorized KAESER service representative.
0240 W Compressor motor FC test shut-off required	Run time of the frequency converter since last shutdown too large.	Temporarily fully disconnect the machine from the power supply. (Required for the safety functions.)
0243 W Compressor motor FC Alarm %d	Malfunction at compressor motor or its frequency converter.	Contact an authorized KAESER service representative.
0251 W Oil-/air cooler fan FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0253 W Oil cooler fan FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0254 W Oil cooler fan FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0255 W Oil-/air cooler fan FC Service mode active	Frequency converter in service mode.	Terminate service mode.
0260 W Oil-/air cooler fan FC Alarm %d	Fault in fan frequency converter.	Acknowledge message. Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0261 W Oil-/air cooler fan FC Alarm %d	Fault in fan frequency converter.	Acknowledge message. Contact an authorized KAESER service representative.
0262 W Oil cooler fan FC Alarm %d	Fault in fan frequency converter.	Acknowledge message. Contact an authorized KAESER service representative.
0263 W Oil cooler fan FC Alarm %d	Fault in fan frequency converter.	Acknowledge message. Contact an authorized KAESER service representative.
0300 W SD card write error	Write protection activated? Memory card defective.	Deactivate the write protection. Use a new memory card.
0866 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
0867 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
0868 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0869 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0872 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
0873 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
0874 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0875 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0878 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
0879 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0880 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0881 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0884 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
0885 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
0886 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
0887 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1034 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1035 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1036 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1037 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1040 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1041 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1042 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1043 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1046 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.

Message	Possible cause	Remedy
1047 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1048 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1049 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1052 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1053 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1054 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1055 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1202 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1203 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1204 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1205 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1208 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1209 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1210 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1211 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1214 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1215W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1216 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1217 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1220 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1221 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1222 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1223 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1370 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1371 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1372 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1373 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1376 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1377 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1378 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1379 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1382 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1383 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1384 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1385 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1388 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1389 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1390 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1391 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1538 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1539 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1540 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1541 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1544 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1545 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
1546 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1547 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1550 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input faulty.	Check the power supply.
1551 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1552 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1553 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1556 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1557 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1558 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1559 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1706 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1707 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1708 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1709 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1712 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.

Message	Possible cause	Remedy
1713 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1714 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1715 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1718 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1719 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1720 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1721 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1724 W AII%d.0%d - error power supply	Power supply for ext. sensor at analog input defective.	Check the power supply.
1725 W AII%d.0%d - overload fault	Overload in signal for ext. sensor at analog input defective.	Contact an authorized KAESER service representative.
1726 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analog input.	Check cable runs and sensor connections.
1727 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analog input.	Check cable runs and sensor connections.

Tab. 87 Warning messages and remedies

10.4 Interpreting operation messages

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

Operating messages are identified with the letter O.

The message numbers are not numbered consecutively.

In this table, you will see "**%d**" for a variable value, e.g. a number, duration or I/O address.

[1] Messages 0073–0078 and 0081–0096 are customer-specific and undefined.
Complete them in the table below with your defined message text and interpretation (see also chapter 8.11).

Message	Meaning
0001 O Delayed start (%ds) active	Total duration until the machine is ready to start after power has been restored or after a communication error to the master controller (e.g. SAM 4.0) or after switching on the SAM manual mode.
0009 O Compressor on	The machine is switched on.
0010 O Controller on	The controller is switched on with the «ON» key.
0011 O Cold start release	The machine can be switched on although the machine temperature is below the permissible starting temperature. The machine can be switched on only as long as the message is displayed.
0027 O Power OFF → ON	Request: Switch the power supply off and on.
0028 O DYNAMIC motor temperature ↑	Control mode DYNAMIC: The temperature of the compressor motor is too high.
0030 O Voltage restored	Main power supply returned after main failure.
0033 O Machine report	Machine report sent by e-mail.
0034 O E-mail send unsuccessful!	No e-mail sending of machine information.
0073 O External message 1	[1]
0074 O External message 2	[1]
0075 O External message 3	[1]
0076 O External message 4	[1]
0077 O External message 5	[1]
0078 O External message 6	[1]
0081 O AnMod_p_1	[1]
0082 O AnMod_p_2	[1]

Message	Meaning
0083 O AnMod_p_3	1)
0084 O AnMod_p_4	1)
0085 O AnMod_T_1	1)
0086 O AnMod_T_2	1)
0087 O AnMod_T_3	1)
0088 O AnMod_T_4	1)
0089 O AnMod_I_1	1)
0090 O AnMod_I_2	1)
0092 O T-Switch inlet temperature	1)
0093 O p-Switch pi	1)
0094 O T-Switch ADT	1)
0095 O p-Switch pN	1)
0096 O T-Switch PDT	1)
0200 O IOSlot1 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot1 (in the example 50 times).
0201 O IOSlot2 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot2 (in the example 50 times).
0202 O IOSlot3 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot3 (in the example 50 times).
0203 O IOSlot4 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot4 (in the example 50 times).
0204 O IOSlot5 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot5 (in the example 50 times).
0205 O IOSlot6 Undervoltage error %d	The internal voltage monitoring reports low voltage fault IO-Slot6 (in the example 50 times).
0300 O Cycle-exact data recording active	Service information.

Message	Meaning
0301 O FEZ-Prozessabbild aktiv	Service information.
0500 O Safety shutdown "IOMDiagnosis()"	Service information.
0501 O Safety shutdown "Safeguard()"	Service information.
0550 O ADT channel error "currleak" detected	Short-term overload fault without shutdown occurred at ADT.
0551 O ADT channel error "channel open" detected	Short-term overload fault without shutdown occurred at ADT.
0850 O IOSlot%d - bus error	IOM bus fault.
0867 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
0873 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
0879 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
0885 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1000 O 2 RFID Equipment Cards successfully registered	You successfully registered 2 KAESER RFID Equipment Cards at the controller.
1018 O IOSlot%d - bus error	IOM bus fault.
1035 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1041 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1047 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1053 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1186 O IOSlot%d - bus error	IOM bus fault.
1203 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.
1209 O All%d.0%d - overload fault	Short-term overload fault without shutdown occurred at All.

Message	Meaning
1215 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1221 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1354 O IOSlot%d - bus error	IOM bus fault.
1371 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1377 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1383 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1389 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1522 O IOSlot%d - bus error	IOM bus fault.
1539 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1545 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1551 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1557 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1690 O IOSlot%d - bus error	IOM bus fault.
1707 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1713 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1719 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.
1725 O AII%d.0%d - overload fault	Short-term overload fault without shutdown occurred at AII.

Tab. 88 Operational messages

10.5 Interpreting diagnostic messages

A diagnostic message causes the machine to shut down.

Diagnostic messages are identified with the letter D.

They provide information on the status of the controller, the connected input and output modules, and support KAESER service with troubleshooting.

10.6 Interpreting system messages

A system message causes the machine to shut down. Contact an authorized KAESER service representative.

System messages are identified with the letter **Y**.

The message numbers are not numbered consecutively.

Message	Possible cause	Remedy
0001 Y Hardware watchdog reset	System error	Contact an authorized KAESER service representative.
0002 Y Internal software error	System error	Contact an authorized KAESER service representative.
0003 Y Filesystem Read/Write failure	System error	Contact an authorized KAESER service representative.
0004 Y CPU load too high	System error	Contact an authorized KAESER service representative.
0005 Y RAM out of memory	System error	Contact an authorized KAESER service representative.
1000 Y RFID error: switch SIGMA CONTROL power supply OFF → ON!	System error	Contact an authorized KAESER service representative.

Tab. 89 System messages and remedies

11 Maintenance

11.1 Changing the buffer battery

When SIGMA CONTROL 2 displays a warning message indicating that the integrated buffer battery has discharged and requires replacement, please contact an authorized KAESER service representative.

12 Spares, Operating Materials, Service

12.1 Note the nameplate

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

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

12.2 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!

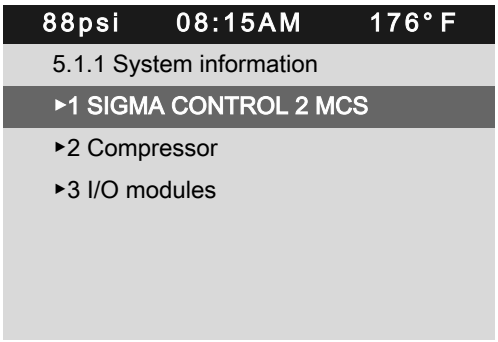
Result Your advantage:
lower costs and higher compressed air availability.

12.3 Service Addresses

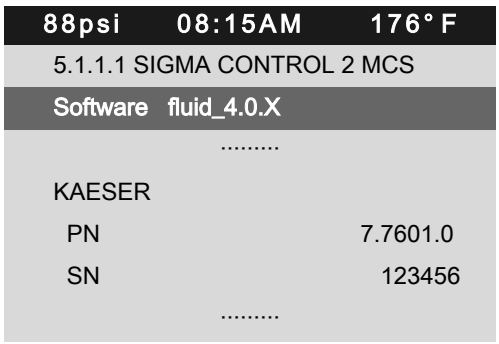
Addresses of KAESER representatives are given at the end of this manual.

12.4 Displaying the version number, machine model, part number and serial number

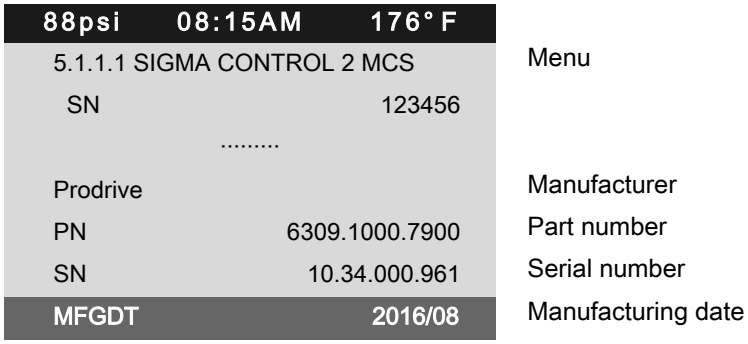
1. Open the 5.1.1 *<Configuration – General – System information>* menu.



2. Press «Enter».
   The system information is displayed.



3. Press «Up» or «Down» repeatedly to display further information.



13 Decommissioning, Storage and Transport

13.1 De-commissioning

➢ Follow the instructions in the machine's operator manual.

13.2 Packing

➢ Follow the instructions in the machine's operator manual.

13.3 Storage

➢ Follow the instructions in the machine's operator manual.

13.4 Transporting

➢ Follow the instructions in the machine's operator manual.

13.5 Disposal

Precondition SIGMA CONTROL 2 is decommissioned.

1. Disconnect SIGMA CONTROL 2 from all connections.
2. If necessary, use a tool to forcefully remove the rear enclosure panel.
3. Use a suitable tool to remove the internally installed buffer battery.
4. Properly dispose of the buffer batteries.
5. Hand the SIGMA CONTROL 2 over to an authorized disposal expert.

13.5.1 Battery disposal

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

Fig. 42 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.