User Manual

Controller

SIGMA CONTROL 2 SCREW FLUID ≥4.1.X

No.: 9_9450 08 E



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Contents

1 SIGMA CONTROL 2 Quick installation guide
- 1.1 Operating elements 1
- 1.2 Display elements 2
- 1.3 Main menu – Overview 2
- 1.4 Functions – Overview 3

2 Regarding this document
- 2.1 Using this document 5
- 2.2 Copyright 5
  - 2.2.1 Software 5
- 2.3 Certification 6
- 2.4 Updating the operating manual 6
- 2.5 Symbols and labels 6
  - 2.5.1 Warnings 6
  - 2.5.2 Potential damage warnings 7
  - 2.5.3 Other alerts and their symbols 8

3 Technical Specifications
- 3.1 Controller SIGMA CONTROL 2 9
  - 3.1.1 Versions and Options 9
  - 3.1.2 User interface with display, CPU and interfaces 9
  - 3.1.3 In- and outputs with MCSIO 12
  - 3.1.4 Input/output modules 12
  - 3.1.5 Sensors 14

4 Safety and Responsibility
- 4.1 Basic instructions 16
- 4.2 Specified use 16
- 4.3 Improper use 16

5 Design and Function
- 5.1 Controller overview 17
- 5.2 Operating panel 19
  - 5.2.1 Operating elements 19
  - 5.2.2 Display elements 20
  - 5.2.3 RFID reader 21
- 5.3 Display 21
  - 5.3.1 Operating mode 22
  - 5.3.2 Main menu 23
  - 5.3.3 Setting parameters 23
  - 5.3.4 Activating keys with check boxes 24
- 5.4 Access rights 24
- 5.5 KAESER CONNECT 25
- 5.6 Menus – overview 26
  - 5.6.1 Operating mode 26
  - 5.6.2 Menu structure 27
- 5.7 Operating modes and control modes 43
  - 5.7.1 Machine operating modes 43
  - 5.7.2 Control modes 44
  - 5.7.3 Variable speed drive with frequency converter (SFC) 45
  - 5.7.4 MODULATING control 46

6 Installation and Operating Conditions
- 6.1 Maintaining ambient conditions 47
- 6.2 Installation conditions 47

7 Installation
7.1 Reporting Transport Damage 48
7.2 Machine identification 48

8 Initial Start-up
8.1 Outline 49
8.2 Setting the controller 49
8.2.1 Selecting menu options 50
8.2.2 Setting the language 51
8.2.3 Noting the user name 52
8.2.4 User log-in with RFID Equipment Card 53
8.2.5 Generating a password 54
8.2.6 Manual user log-in 55
8.2.7 Create the master RFID Equipment Card 56
8.2.8 Checking/setting time and date 57
8.2.9 Set the time zone 59
8.2.10 Set display formats 59
8.2.11 Setting the display illumination 62
8.2.12 Setting the contrast and the brightness 63
8.2.13 Activating the remote control 63
8.2.14 IP configuration 64
8.2.15 Setting the e-mail function 65
8.2.16 Setting the time server 67
8.3 KAESER CONNECT benefits 68
8.3.1 Open KAESER CONNECT 69
8.3.2 System status menu 70
8.3.3 Graphs menu 72
8.3.4 Messages menu 74
8.3.5 I/O display menu 74
8.3.6 User management menu 75
8.3.7 Settings menu 78
8.3.8 Save data menu 79
8.3.9 KAESER CONNECT exit 79
8.4 Pressure parameters of the machine 80
8.4.1 Displaying pressure parameters 81
8.4.2 Setting pressure parameters 81
8.4.3 Activating/deactivating the «LOAD/IDLE» key 84
8.5 Machine start and machine stop 85
8.5.1 Automatic start/stop in timer mode 85
8.5.2 Setting the company shut-down 89
8.5.3 Controlling machine from a remote location 90
8.5.4 Activating the remote control 92
8.5.5 "Venting" function 93
8.5.6 "Autostart" function 93
8.6 Control modes 96
8.6.1 Setting the control mode 96
8.6.2 Setting the DUAL control mode 97
8.6.3 Setting the QUADRO control mode 98
8.7 Electronic Thermal Management 99
8.7.1 Activating the heat recovery for machine type 2 99
8.7.2 Activating the heat recovery for machine type 3 101
8.7.3 Deactivating heat recovery 102
8.8 Refrigeration dryer 103
8.8.1 Setting the operating mode 103
8.8.2 Output messages 104

8.8.3 Fault in the refrigeration dryer – compressed air quality has priority 105
8.8.4 Fault in the refrigeration dryer – compressed air supply has priority 106
8.9 Setting the machine for local mode 107
8.9.1 Menu Load control 107
8.9.2 Setting the nominal pressure change via timing program 107
8.9.3 Setting the nominal pressure change via timer 110
8.10 Setting the machine for master control operation 112
8.10.1 Overview of the different master operating modes 112
8.10.2 SAM 4.0 mode 113
8.10.3 Setting PROFIBUS operation (SIGMA AIR MANAGER) 116
8.10.4 Master control of two machines in master/slave operation 124
8.10.5 Configuring master control using the LOAD remote contact (e.g., SIGMA AIR MANAGER BASIC) 130
8.10.6 Setting the master control with local/LOAD remote contact 132
8.10.7 Setting the nominal pressure pre-selection via remote contact 136
8.10.8 Master control for machines regulated by pressure switch 137
8.10.9 Examples of time settings for equal overall load 142
8.11 Setting input and output signals 143
8.11.1 Output operational states of machine on digital outputs 143
8.11.2 Output input signals on the display 145
8.11.3 Output measured values on the display 149
8.11.4 Switching and/or triggering messages with thresholds 155
8.12 Timer 159
8.13 Activating remote acknowledgement 160
8.13.1 Setting the remote acknowledgement function 161
8.13.2 Activating the remote control 161
8.13.3 Assigning an input 162
8.14 Linking to an external pressure transducer 163
8.14.1 Pressure control menu 163
8.14.2 Assigning an input to an external pressure transducer 163
8.15 Commissioning the machine 164

9 Operation

9.1 Switching the compressed air station on and off 166
9.1.1 Switching on 166
9.1.2 Switching off 167
9.2 Switching off in an emergency 167
9.3 Acknowledging alarm and warning messages 168
9.4 Displaying messages 169
9.4.1 Status – Messages menu 170
9.5 Displaying the current operating mode 172
9.6 Setting the working pressure 173
9.7 Displaying analogue data 173
9.8 Displaying operating data 174
9.8.1 Checking the operating hours 174
9.8.2 Checking the switching cycles 175
9.9 Displaying the frequency converter settings 176
9.10 Setting the maintenance interval 177
9.11 Check the safety valve 178
9.12 Excessive temperature shut-down test 180
9.13 Save data 182

10 Fault Recognition and Rectification

10.1 Basic instructions 184
10.2 Interpreting fault messages 184

Contents

10.3 Interpreting warning messages 192
10.4 Interpreting operation messages 212
10.5 Interpreting diagnostic messages 216
10.6 Interpreting system messages 216

11 Maintenance
11.1 Changing the buffer battery 218

12 Spares, Operating Materials, Service
12.1 Note the nameplate 219
12.2 KAESER AIR SERVICE 219
12.3 Service Addresses 219
12.4 Displaying the version number, machine model, material number and serial number 219

13 Decommissioning, Storage and Transport
13.1 De-commissioning 221
13.2 Packing 221
13.3 Storage 221
13.4 Transporting 221
13.5 Disposal 221
13.5.1 Dispose of the battery in accordance with local environmental regulations. 221

List of Illustrations

Fig. 1	Operating elements	1
Fig. 2	Display elements	2
Fig. 3	MCS interfaces	10
Fig. 4	MCSIO interfaces	11
Fig. 5	MCS system design with IOM	18
Fig. 6	MCSIO system design	18
Fig. 7	Operating elements	19
Fig. 8	Display elements	20
Fig. 9	RFID reader	21
Fig. 10	KAESER CONNECT for SIGMA CONTROL 2	25
Fig. 11	Back of the RFID Equipment Card	53
Fig. 12	User log-in with RFID Equipment Card	53
Fig. 13	User log-in with RFID Equipment Card	54
Fig. 14	Manual user log-on	56
Fig. 15	Log-in mask	69
Fig. 16	KAESER CONNECT for SIGMA CONTROL 2	70
Fig. 17	Select language: window	70
Fig. 18	*System status* menu	71
Fig. 19	Main menu	71
Fig. 20	*Graphs* (illustration similar)	72
Fig. 21	Control keys	73
Fig. 22	*Messages* (illustration similar)	74
Fig. 23	*I/O display* (illustration similar)	75
Fig. 24	*User management* menu	76
Fig. 25	*Log on for write access:* window	76
Fig. 26	*User management* menu	77
Fig. 27	*Settings* menu	78
Fig. 28	*Backup* menu	79
Fig. 29	Wiring of the PROFIBUS connection	117
Fig. 30	Electrical diagram example with SIGMA AIR MANAGER	118
Fig. 31	Communication interface	119
Fig. 32	Insert the communication module.	120
Fig. 33	Front plate communication module PROFIBUS	120
Fig. 34	Direct connection of two SIGMA CONTROL 2	125
Fig. 35	LOAD remote contact	131
Fig. 36	Wiring diagram for local/LOAD remote contact:	133
Fig. 37	Machine with pressure switch regulation	138
Fig. 38	Function diagram	141
Fig. 39	Switching the compressed air station on and off	166
Fig. 40	Switching off in an emergency	167
Fig. 41	Acknowledging messages	168
Fig. 42	Battery labelling	222

List of Illustrations

List of Tables

Tab. 1 Operating elements 1
Tab. 2 Display elements 2
Tab. 3 Main menu – Overview 2
Tab. 4 Functions – Overview 3
Tab. 5 Danger levels and their definition (personal injury) 7
Tab. 6 Danger levels and their definition (damage to property) 7
Tab. 7 Formatting options 8
Tab. 8 Versions and Options 9
Tab. 9 User interface 9
Tab. 10 Display data 10
Tab. 11 MCS interfaces 10
Tab. 12 MCSIO interfaces 11
Tab. 13 RFID 11
Tab. 14 Number of internal inputs and outputs 12
Tab. 15 Cable lengths 12
Tab. 16 SC2IOM-1 13
Tab. 17 SC2IOM-2 13
Tab. 18 SC2IOM-3 13
Tab. 19 Power supply specifications 14
Tab. 20 Cable lengths 14
Tab. 21 Degree of protection, IOM 14
Tab. 22 IOM dimensions 14
Tab. 23 Pressure transducer 14
Tab. 24 Resistance thermometer 15
Tab. 25 Operating elements 19
Tab. 26 Display elements 20
Tab. 27 RFID reader 21
Tab. 28 Data in the header depending on the machine type 22
Tab. 29 Reset check box status 24
Tab. 30 Check box status 24
Tab. 31 KAESER CONNECT functions 25
Tab. 32 Menu structure of main menu 27
Tab. 33 *Status* menu 30
Tab. 34 *Configuration* menu 32
Tab. 35 *Pressure control* menu 34
Tab. 36 *I/O periphery* menu 36
Tab. 37 *Communication* menu 39
Tab. 38 *Connections* menu 40
Tab. 39 *Components* menu 41
Tab. 40 *Power switching* menu 42
Tab. 41 Machine identification 48
Tab. 42 Remote control identification 48
Tab. 43 Machine identification 48
Tab. 44 Supported languages 51
Tab. 45 Date formats 59
Tab. 46 Possible settings for the time format 60
Tab. 47 Possible settings for the pressure unit 61
Tab. 48 Possible settings for the temperature unit 61
Tab. 49 Display illumination 62
Tab. 50 Network parameters 65
Tab. 51 E-mail parameters 66
Tab. 52 Control key functions 73
Tab. 53 Compressor pressure parameters 80
Tab. 54 Setting limits for the network nominal pressure (* Cut-in pressure min) 81

List of Tables

Tab. 55 Pressure condition for LOAD 82
Tab. 56 Pressure conditions for IDLE 82
Tab. 57 Example: activated output 82
Tab. 58 Displaying and setting parameters 83
Tab. 59 Settings for machine start and machine stop 85
Tab. 60 User-defined clock programme machine ON/OFF 86
Tab. 61 Example of a machine ON/OFF clock program 87
Tab. 62 Autostart delay period 94
Tab. 63 Machine type and ETM design 99
Tab. 64 Operating modes in local operating mode (local mode) 107
Tab. 65 User-defined timing program for nominal pressure change 108
Tab. 66 Example: Switching points, nominal pressure change 108
Tab. 67 Master control (interconnected operation) – overview 112
Tab. 68 Parameters for monitoring for communication malfunction 116
Tab. 69 Pin assignment of SUB-D 9-pole interface on the PROFIBUS module 117
Tab. 70 Master-slave settings 124
Tab. 71 Function diagram 140
Tab. 72 Example for a clock program for equal duty cycling during the day 142
Tab. 73 Example for a timing program for equal duty cycling during the week 143
Tab. 74 Assigned output signals 143
Tab. 75 Logic settings 148
Tab. 76 Assigned analogue measured values 150
Tab. 77 Available measured values 155
Tab. 78 Transmitting a pressure transducer value 163
Tab. 79 Check list for starting the machine 164
Tab. 80 Message sequence 1 168
Tab. 81 Message sequence 2 168
Tab. 82 Information of a message 169
Tab. 83 Message abbreviations 170
Tab. 84 Operating mode display 172
Tab. 85 Abbreviation of operating modes 172
Tab. 86 Check box status 178
Tab. 87 Fault messages, possible causes and remedies 184
Tab. 88 Warning messages and remedies 193
Tab. 89 Operational messages 212
Tab. 90 System messages and remedies 217

1 SIGMA CONTROL 2 Quick installation guide

1.1 Operating elements

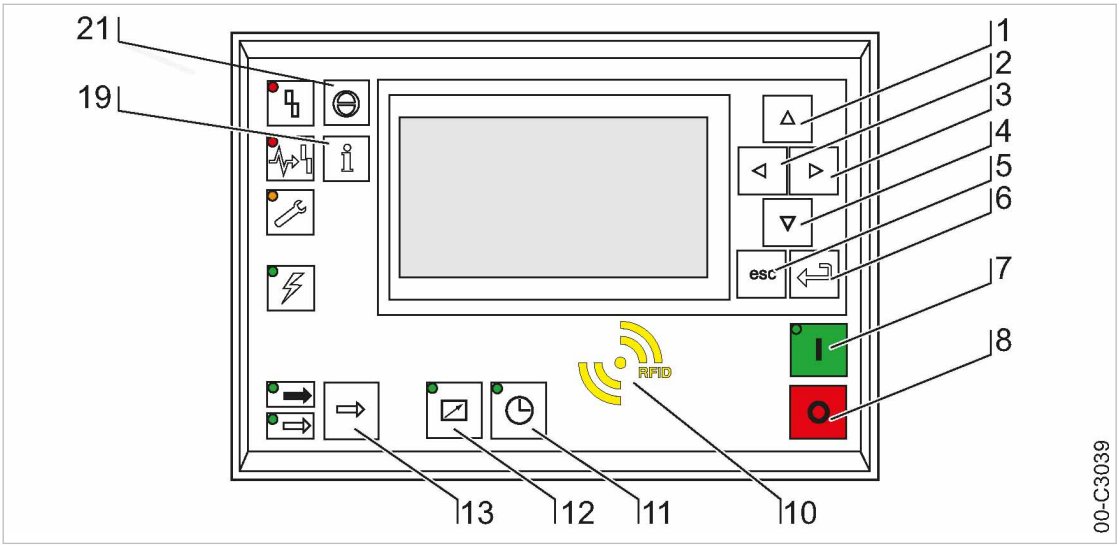


Fig. 1 Operating elements

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 left.
3	«Right»	Jumps to the right. Moves the cursor position to the right.
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»	Switch on the machine.
8	«OFF»	Switch off the machine.
10	RFID	RFID reader for user log-in with RFID Equipment Card.
11	«Time control»	Switches the time 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

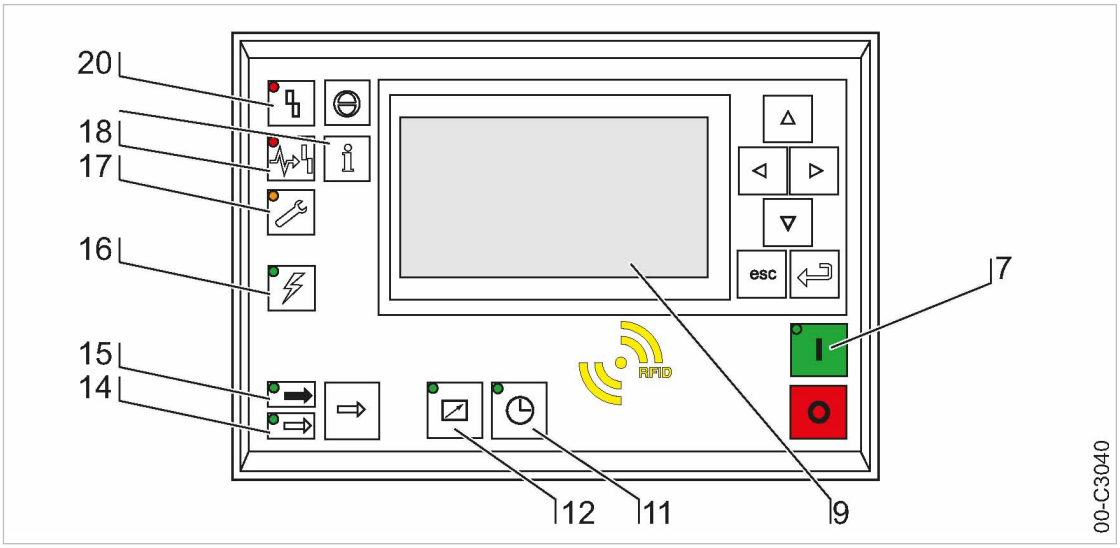


Fig. 2 Display elements

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	*Time 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	*Voltage applied to controller*	Continuous green light when voltage is applied to the controller.
17	*Warning*	Flashes in yellow in the following events: ■ Maintenance necessary. ■ Warning message
18	*Communications error*	Continuous red light to indicate a faulty communication connection without machine shut-down.
20	*Fault*	Flashes red to indicate a machine fault. Continuous red light after acknowledgement.

Tab. 2 Display elements

1.3 Main menu – Overview

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

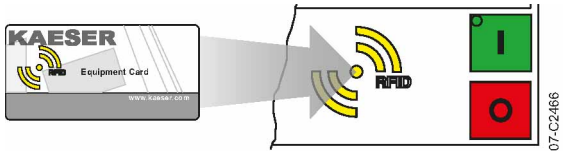
Menu No.	Menu designation	Function
1	Status	Displays messages, statistics and status information

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 time control
7	User	Manual user log-in and password administration
8	Communication	Setting the Ethernet interface, COM modules and control centre connection
9	Machine test	Pressure relief valve and temperature sensor test and shut-down at excessive temperature
10	Components	Display of settings on machine components, e.g. the power switching unit

Tab. 3 Main menu – Overview

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»	8.2.12
Setting the brightness	Main menu	Press and hold «Information» – «Left» / «Right»	8.2.12
Setting the language	Main menu	«Enter» – «Up» – «Enter» – «Up» / «Down»	8.2.2
Setting date, time and time zone	5.1	*<Configuration – General>*	8.2.8
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 «time control»	6	*<Compressor clock – Setting timing program>*	8.5.1
Activating the «time control» key	6	*<Compressor clock – Key clock – ☑>*	8.5.1.3

Function	Menu No.	Action steps	Chapter
Activating «time control»	–	Activate the «Time control» key – Press «Time control»	8.5.1.4
Activate the «remote control» key	5.2.3 5.4.1 5.5	*<Configuration – Compressor start – Compressor on – Key remote – ☑>*	8.2.13
Activating the «remote control»	–	Activate the «Remote control» key – Press «Remote control»	8.2.13
Setting the Control Mode	5.3	Select *<Configuration – Control mode – Local mode – Control mode>*	8.6.1
Setting the company shut-down	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
Check the pressure relief valve	9.1	For the test process, see Chapter	9.11
Overtemperature shut-down test	9.1	For the test process, see Chapter	9.12
Fault messages	1.1.1	A fault message causes the machine to shut down. The *Fault* LED flashes red. Fault 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 the KAESER SERVICE in trouble-shooting. 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 access level 2.

2 Regarding this document

2.1 Using this document

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

The operating manual is a component of the product.

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

2.2 Copyright

This operating 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 be also 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 of the copyright-protected software packages 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 Certification

This 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 or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.
- This device complies with part 15 of the FCC rules. The operation is subject to the following two conditions:
  - this device may not cause harmful interference, and
  - this device must accept any interference received, including interference that may cause undesired operation.
- This device fulfils the provisions of the Industry Canada Licence, with the exception of the RSS rules. The operation is subject to the following two conditions:
  - this device may not cause harmful interference, and
  - this device must accept any interference received, including interference that may cause undesired operation.



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

2.4 Updating the operating manual

Go to our website http://www.kaeser.com/sc2manual to find the latest version of the operating manual.

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

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

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

➢ The protective measures against the damages are shown here.

➢ Carefully read and fully comply with warnings against damages.

2.5.3 Other alerts and their symbols

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

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.

Here conditions relevant to safety are named that 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 Specifications

3.1 Controller SIGMA CONTROL 2

Industrial PC

- Internal temperature monitoring
- Internal undervoltage monitoring
- Battery-buffered real-time clock
  - Battery service life: 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 centre	Connection to control technology not provided [1]
Option	C3	C48
Compo-nents	Main Control System (MCS): Slot for an optional communication module (to connect to a control centre)	Main Control System Input Output (MCSIO): Digital and analogue inputs and outputs integrated
	Input-Output-Module (IOM): Modules with digital and analogue inputs and outputs.	

[1] only SIGMA CONTROL 2 FLUID

Tab. 8 Versions and Options

3.1.2 User interface with display, CPU and interfaces

User interface

Feature	MCS	MCSIO
Material	Plastics	
Width [mm]	190	
Height [mm]	130	
Depth [mm]	45	60
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

Characteristic	Value
Graphical display [px]	255 x 128
Width [mm]	82
Height [mm]	41
Maximum number of lines/characters	8/30
Colours	Black/white with grey scale
Lighting	LED backlit
px ≙ pixel	

Tab. 10 Display data

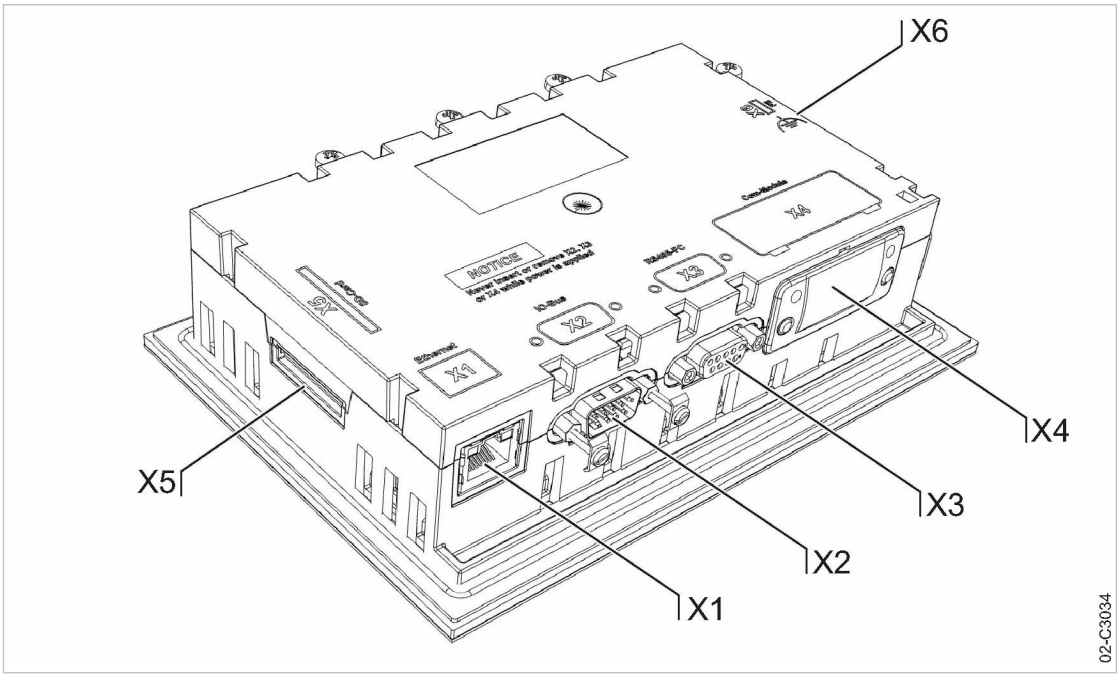


Fig. 3 MCS interfaces

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, EtherNet/IP
X5	SD card, SD card slot	SD/SDHC card
X6	FE	Functional earth (FE)
The positions of the interfaces X1–X6 are marked on the rear of the controller.		

Tab. 11 MCS interfaces

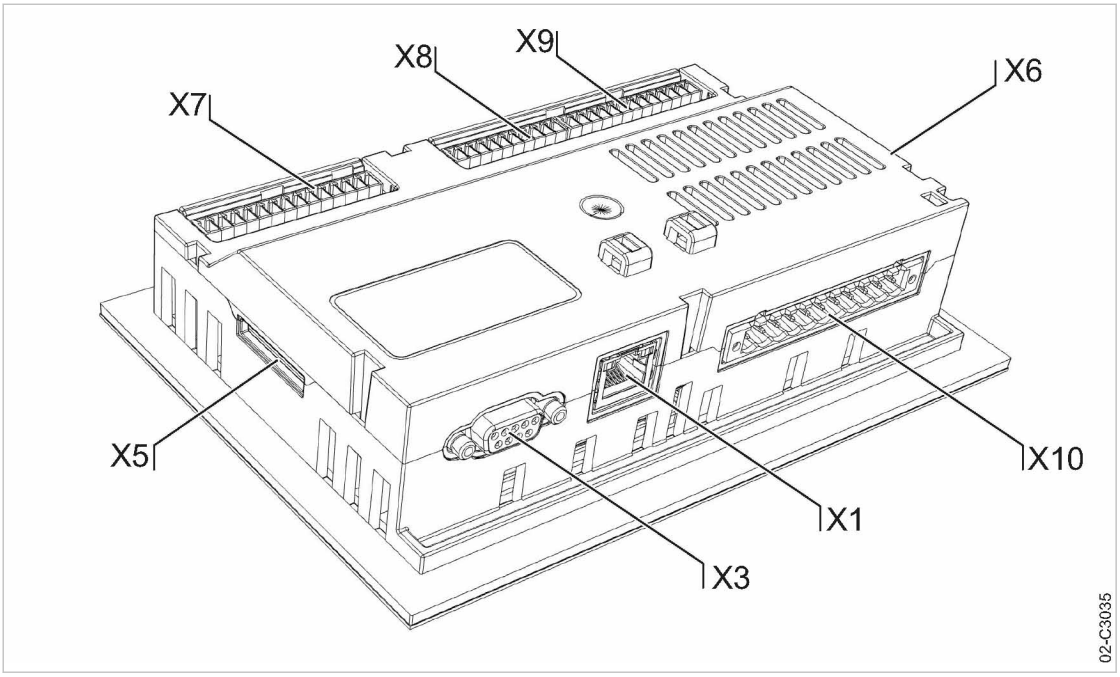


Fig. 4 MCSIO interfaces

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	FE	Functional earth (FE)
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	Analogue input current 0–20 mA, AII1.00–AII1.01 Analogue 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

Characteristic	Value
Hardware on the SIGMA CONTROL 2 controller	RFID write/read device
Hardware (external)	RFID Equipment Card
Recognition distance [m]	max. 0.05

Characteristic	Value
Frequency [MHz]	13.56
Emitted maximum transmitting power at 10 m distance [dB(µA/m)]	11

Tab. 13 RFID

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

3.1.3 In- and outputs with MCSIO

Integrated in- 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
Analogue input current (AII), 0–20 mA	2
Analogue input resistor (AIR), PT100	2
Digital output relay (DOR), 250 VAC, 4 A	5

Tab. 14 Number of internal inputs and outputs

3.1.3.1 Maximum cable lengths

Input/Output	Cable length [m]
Analogue input current (AII), Analogue input resistor (AIR) Analogue output current (AOI)	< 30
Digital input (DI), Digital output relay (DOR)	< 100
Digital output transistor (DOT)	< 30

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.

Every input/output module is equipped with:

- Internal temperature monitoring

- Internal undervoltage monitoring
- LED indication of operational status

IOM 1

Input/Output	Input/output module 1		
	Internal, in the control cabinet	available in parallel on both sides	External, in the compressor interior
Digital input (DI), 24 VDC	4	10	2
Analogue input current (AII), 0–20 mA	–	1	2
Analogue 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
Analogue output current (AOI), 0–20 mA	–	–	–

Tab. 16 SC2IOM-1

IOM 2

Input/Output	Input/output module 2		
	Internal, in the control cabinet	available in parallel on both sides	External, in the compressor interior
Digital input (DI), 24 VDC	6	–	2
Analogue input current (AII), 0–20 mA	–	1	2
Analogue 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
Analogue output current (AOI), 0–20 mA	–	1	–

Tab. 17 SC2IOM-2

IOM 3

Input/Output	Input/output module 3		
	Internal, in the control cabinet	available in parallel on both sides	External, in the compressor interior
Digital input (DI), 24 VDC	6	–	2
Analogue input current (AII), 0–20 mA	–	1	3
Analogue 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
Analogue output current (AOI), 0–20 mA	–	1	–

Tab. 18 SC2IOM-3

3.1.4.1 Electrical connection specifications IOM

Power is provided by the machine's power supply unit.

Characteristic	Value
Rated voltage (stabilised) [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	Cable length [m]
Analogue input current (AII), Analogue input resistor (AIR) Analogue output current (AOI)	< 30
Digital input (DI), Digital output relay (DOR)	< 100
Digital output transistor (DOT)	< 30

Tab. 20 Cable lengths

3.1.4.3 Input/output modules – degree of protection

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

Tab. 21 Degree of protection, IOM

3.1.4.4 Input/output modules – dimensions

Characteristic	Value
Width [mm]	125
Height [mm]	250
Depth [mm]	44

Tab. 22 IOM dimensions

3.1.5 Sensors

Pressure transducer

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

Characteristic	Value
Connection	Two-core

Tab. 23 Pressure transducer

Resistance thermometer

Characteristic	Value
Sensing resistance (to DIN IEC 751)	PT100
Connection	Two-core

Tab. 24 Resistance thermometer

4 Safety and Responsibility

4.1 Basic instructions

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 these operating instructions and the machine's service 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 Controller overview

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) [only SIGMA CONTROL 2 FLUID]:
  - As with MCS, but with:
  - integrated digital and analogue inputs and outputs
  - Without slot for customer interface
- **I**nput-**O**utput-**M**odule (IOM):
  For SIGMA CONTROL 2 (Prepared for connection to control centre): modules with digital and analogue inputs and outputs with autonomous power supply.

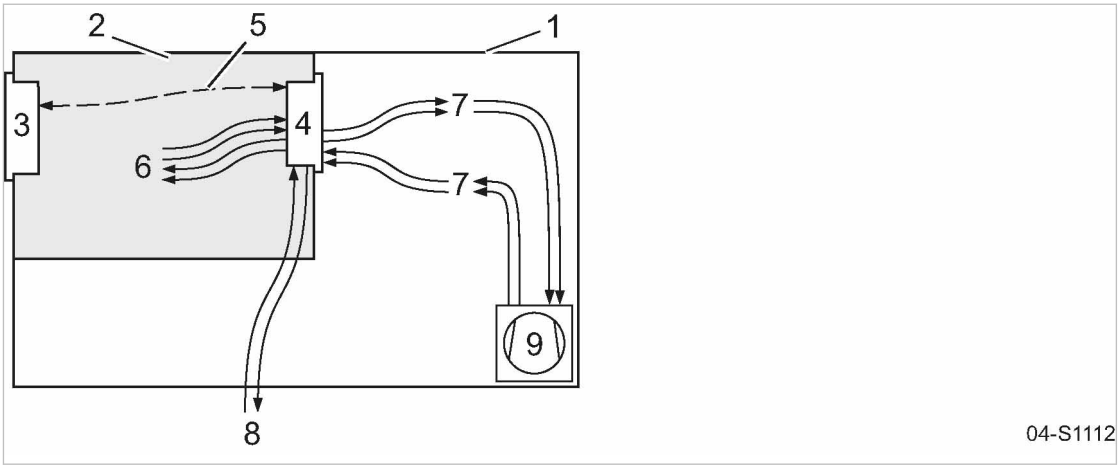


Fig. 5 MCS system design with IOM

1 Machine enclosure
2 Control cabinet
3 SIGMA CONTROL 2 (Prepared for connection to control centre)
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

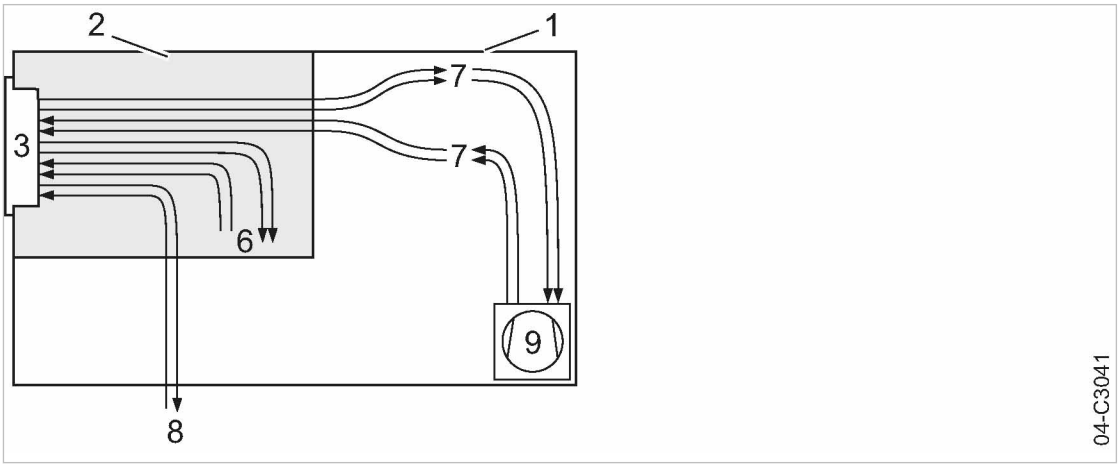


Fig. 6 MCSIO system design

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 utilisation of the drive motor / engine 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:

- Monitoring 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 shut-down on alarms that may lead to damage to the machine, e.g. over-current, overpressure or overtemperature.

5.2 Operating panel

5.2.1 Operating elements

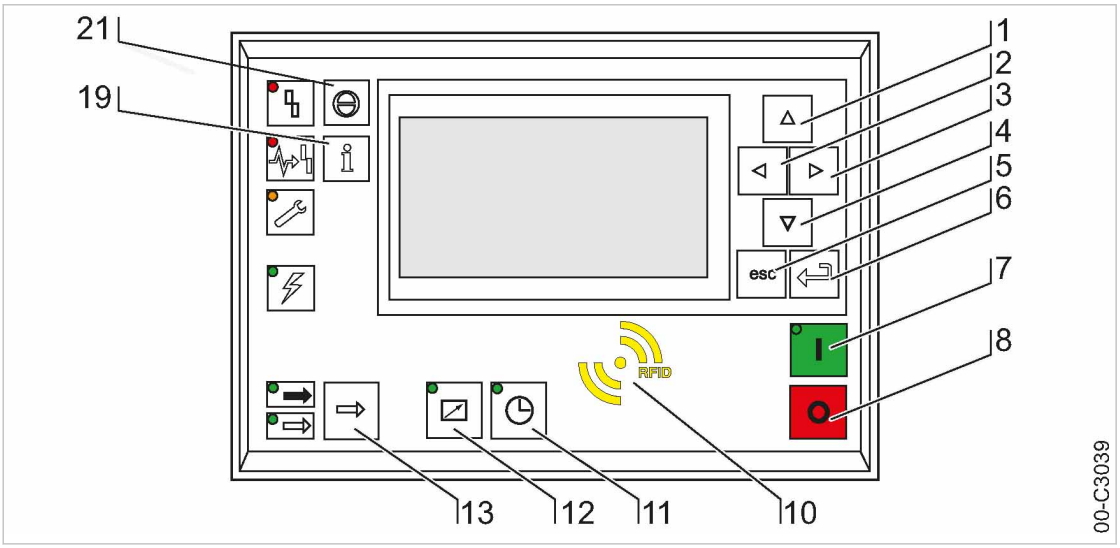


Fig. 7 Operating elements

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 left.
3	«Right»	Jumps to the right. Moves the cursor position to the right.
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»	Switch on the machine.
8	«OFF»	Switch off the machine.
10	RFID	RFID reader for user log-in with RFID Equipment Card.
11	«Time control»	Switches the time 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»	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

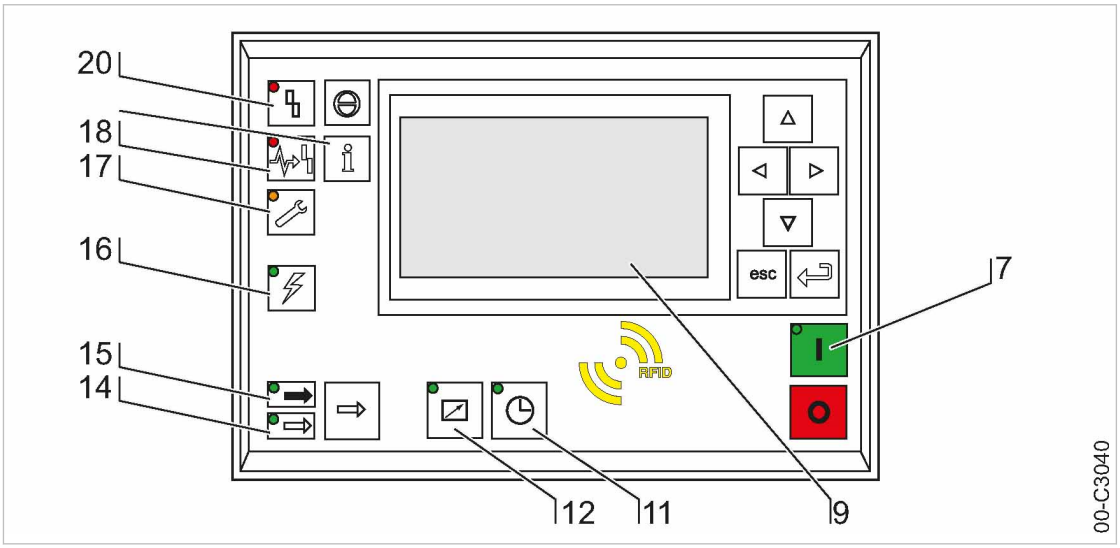


Fig. 8 Display elements

Item	Description	Function
7	*ON*	Display illuminates green when the machine switched on.
9	*Display*	Graphic display with 8 lines and 30 characters per line.
11	*Time 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	*Voltage applied to controller*	Continuous green light when voltage is applied to the controller.
17	*Warning*	Flashes in yellow in the following events: ■ Maintenance necessary. ■ Warning message
18	*Communications error*	Continuous red light to indicate a faulty communication connection without machine shut-down.

Item	Description	Function
20	*Fault*	Flashes red to indicate a machine fault. 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.

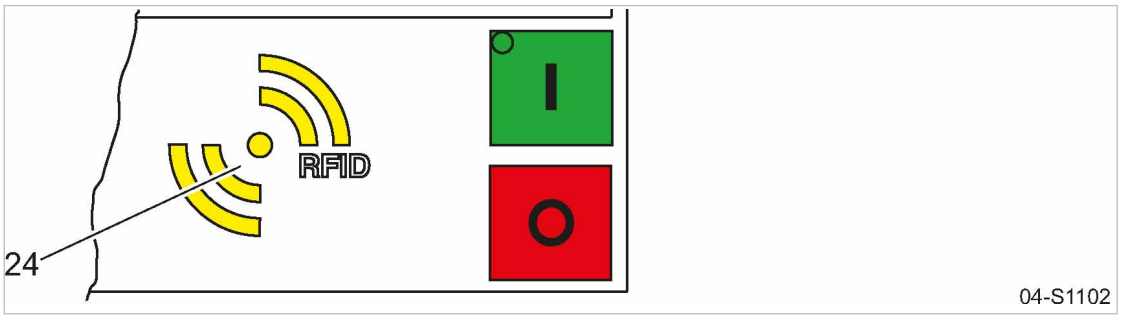


Fig. 9 RFID reader

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

Tab. 27 RFID reader

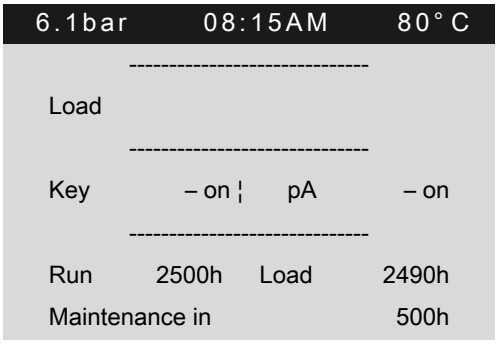
5.3 Display

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

During operation, the display will indicate the operating mode.

Press «Enter» or one of the arrow keys to open 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, centre	Header, right
SIGMA CONTROL 2 FLUID	Working gauge pressure	Time	Airend discharge temperature
SIGMA CONTROL 2 DRY	Working gauge pressure	Time	Airend discharge temperature
SIGMA CONTROL 2 VAC	Working gauge 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
SIGMA CONTROL 2 PISTON	Working gauge pressure	–	Time

Tab. 28 Data in the header depending on the machine type

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:

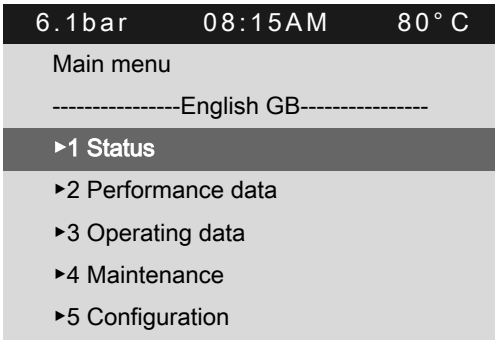
- Remote control yes/no
- Time control yes/no
- Pressure control

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 time of the machine until the next maintenance

5.3.2 Main menu



Header
Current language
Active line
Sub-menu
Sub-menu
Sub-menu
Sub-menu

Representation

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 recognise 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. In deviation of this, the header is also shown as white text on a dark background, but cannot be selected.

Press «Enter» to open a menu in the active line. This opens the selected menu.
You change parameters in Setting mode.

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.

Setting 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 one 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 display no longer flashes and the parameters 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 again «Enter» 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 the 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 visualisation of the controller. This enables remote checking of, for example, the operating and energy efficiency of your machine. For this purpose, you must generate a password once (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.

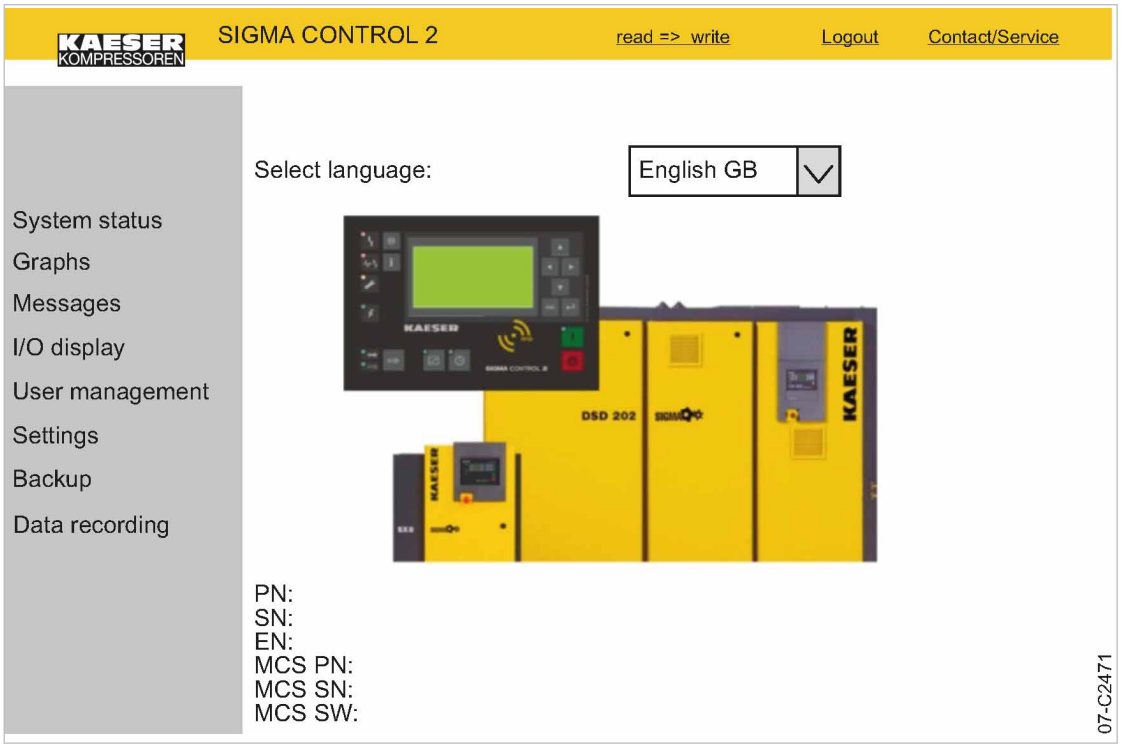


Fig. 10 KAESER CONNECT for SIGMA CONTROL 2

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	Log out user
Contact/Service	Displaying the contact information for KAESER SERVICE
Select language:	Setting the display language for KAESER CONNECT
System status	Menu representation on local display
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 ■ Event history
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 data via KAESER CONNECT from SIGMA CONTROL 2 to a PC

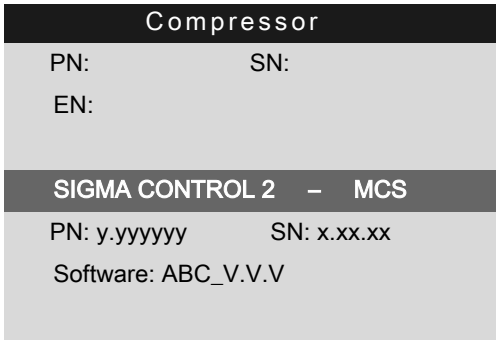
Tab. 31 KAESER CONNECT functions

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

5.6 Menus – overview

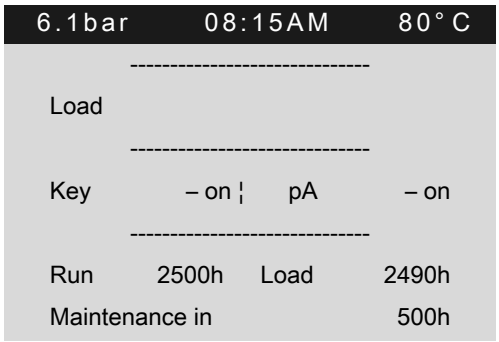
5.6.1 Operating mode

When the power supply is switched on, details of the software are displayed (for example):



Machine model
Material number and serial number of the machine
Equipment number of the machine
MCS: Main Control System
Material number and serial number of the controller
Software version

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



Header
Current operating mode
Operating parameters
Operating parameters
Maintenance indicator

The following parameters are displayed:

- Current operational state of 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 access level 2.

Depending on the SIGMA CONTROL 2 software version, machine type and available options, only the menus that are available for this particular machine will be displayed.

Main menu

Navigation	Function/Sub-menu
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 centre)

Navigation	Function/Sub-menu
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)] – Reference value [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 centre)	

Navigation	Function/Sub-menu
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 centre)	

Navigation	Function/Sub-menu
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 centre)	

Tab. 32 Menu structure of main menu

5.6.2.1 *Status* menu

Navigation	Function/Sub-menu
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 Internal pressure 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 centre)	

Navigation	Function/Sub-menu
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 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/airend 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 centre)	

Tab. 33 *Status* menu

5.6.2.2 *Configuration* menu

Navigation	Function/Sub-menu
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 (Material 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 centre)	
[4)] SIGMA CONTROL 2 FLUID	

Navigation	Function/Sub-menu
5.3 Control mode	Local mode: ■ Venting period [4)] ■ DUAL ■ QUADRO [4)] ■ Partial load valves [4)]
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	Heat recovery Local mode: Remote mode: current RC DI Key remote Heat recovery ADT controller Thermostat valve Oil cooler Thermostat valve ADT controller ■ Oil cooler ■ 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.

[1)] Power switching with frequency converter

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

[4)] SIGMA CONTROL 2 FLUID

Navigation	Function/Sub-menu
5.8 Timer	on off DOR current
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:
5.10 Save data	Language: Save data
[1] Power switching with frequency converter	
[3] SIGMA CONTROL 2 (Prepared for connection to control centre)	
[4] SIGMA CONTROL 2 FLUID	

Tab. 34 *Configuration* menu

***Pressure control* menu**

Navigation	Function/Sub-menu
5.2.1 Pressure sensors	System pressure pNloc Internal pressure pi
[1] Power switching with frequency converter	
[4] SIGMA CONTROL 2 FLUID	
[5] SIGMA CONTROL 2 VAC	

Navigation	Function/Sub-menu
5.2.2 Pressure settings	System pressure high [5)] pRV (Safety valve actuating pressure) Pressure rise [4)] pE SP/SD ΔpFC [1)] Nominal pressure Setpoint pressure pA SP/SD pB SP/SD System pressure low Cut-in pressure min Pressure fall [5)]
5.2.3 Load control	Local mode Remote mode ■ pA/pB Clock (Menu see 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 (localer network pressure)/FC USS [1)]/AII AII For sensor error: Type of message: Warning Alarm
[1)] Power switching with frequency converter	
[4)] SIGMA CONTROL 2 FLUID	
[5)] SIGMA CONTROL 2 VAC	

Tab. 35 *Pressure control* menu

I/O periphery menu

Navigation	Function/Sub-menu
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/Sub-menu
5.7.2 Analogue values	■ AnMod (Analogue 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 (Analogue inputs) – AI_p_1 – AI_p_2 – AI_T_1 – AI_T_2 – AI_I_1 – AI_I_1 ■ AO (Analogue 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/Sub-menu
5.7.4 Switch	■ System pressure pNloc ■ Internal pressure pi ■ ADT ■ Inlet temperature ■ PD temperature ■ n Compressor motor
[1] Power switching with frequency converter	

Tab. 36 *I/O periphery* menu

5.6.2.3 *Communication* menu

Navigation	Function/Sub-menu
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: Use SSL: – 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 centre)

Navigation	Function/Sub-menu
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 ■ EtherNet/IP
[3] SIGMA CONTROL 2 (Prepared for connection to control centre)	

Tab. 37 *Communication* menu

5.6.2.4 *Connections* menu

Navigation	Function/Sub-menu
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/Sub-menu
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 centre)	

Tab. 39 *Components* menu

5.6.2.6 *Power switching* menu

Navigation	Function/Sub-menu
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 [1)] – Run-up period: – ready – 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 [1)] – ready – Motor running – Start-up ended – Start – Reset – Mains contactor ■ Customer-provided [1)] – 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 centre)

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 Machine operating modes

STOP

The machine is connected to the power supply.
The *voltage applied to controller* LED lights green.
The machine is switched off. The *ON* LED is extinguished.

READY

The machine has been activated with «ON»:

- The *On* LED lights green.
- The compressor drive engine 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 / engine starts as soon as network 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 / engine runs under load.

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

IDLE

The compressor motor / engine 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 bypass bore 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 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 / engine. The shorter the *idling time* setting, the sooner (and more frequently) the drive motor / engine is stopped.

QUADRO

In contrast to the 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 *minimum run-time* and the *unloaded period*.

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

VARIO

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

CONTINUOUS

In the CONTINUOUS control mode, the machine is switched back and forth between LOAD and IDLE, in order to maintain the machine's 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

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

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

The lower the drive motor / engine 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 flow rate 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 / engine rises and falls with the air demand.

5.7.3 Variable speed drive with frequency converter (SFC)

If the machine runs in the LOAD mode, the ACTUAL value is compared with the TARGET value of the network pressure. Depending on the pressure differential, the system controls the speed of the drive motor and, thus, the airend.
The speed of the airend determines the rate of compressed air delivery and the working pressure.

If the compressed air demand rises, the motor / engine speed increases and consequently the volume of air delivered.

If air consumption drops, SIGMA CONTROL 2 reduces the motor speed and, therefore, 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 mode. The drive engine 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 / engine, 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 / engine up to a speed at which air delivery matches the air demand.

The inlet valve opens and the machine delivers compressed air.

The speed of the drive motor / engine is regulated according to the 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 service 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 operating 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: 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. 41 Machine identification

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

⚠ WARNING
Remote control: Risk of injury caused by 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 time control (clock mode operation)

➢ Attach the following notice to indicate the ON/OFF timer program machine operation (suggestion):

⚠ WARNING
Time 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. The settings that can be made 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 involved.

8.2: Setting 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: Refrigeration dryer

8.9: Setting the machine for local mode

8.10: Setting the machine for master control operation

8.11: Input and output signals

8.13: Activating remote acknowledgement

8.14: Linking to an external pressure transducer

8.15: Commissioning the machine

8.2 Setting 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.

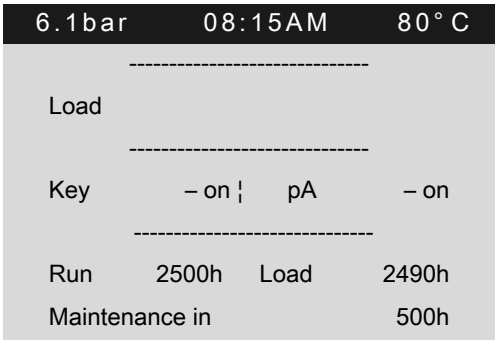
➢ Carry out settings as required:
- 8.2.1: Selecting menu options (introduction)
- 8.2.2: Setting the language
- 8.2.3: Noting the user name
- 8.2.4: User log-in with RFID Equipment Card
- 8.2.5: Generating a password
- 8.2.6: Manual user log-in
- 8.2.7: Create the master RFID Equipment Card
- 8.2.8: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

8.2.1 Selecting menu options

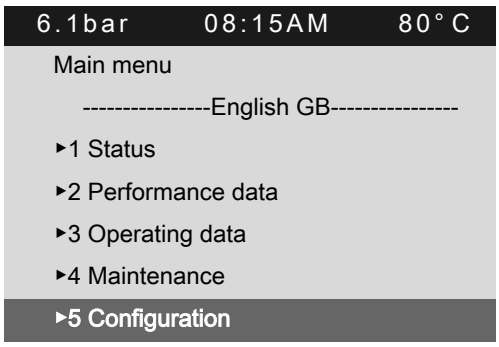
All menu options can be selected with the «Down», «Up» and «Enter» keys.

Example: Open the < Configuration – General > menu.

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

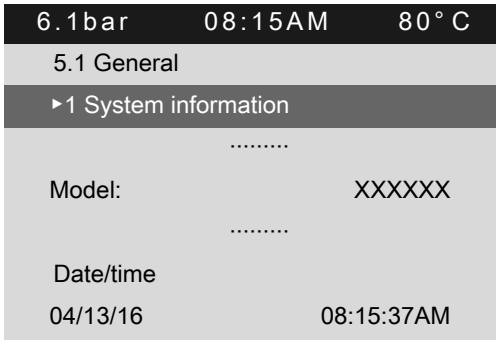


2. Press «Enter».
   The Main menu is displayed.



Header
Current language
Sub-menu
Sub-menu
Sub-menu
Sub-menu
Active line

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



Header
Menu
Sub-menu
set machine type
current date and time

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

8.2.2 Setting the language

You can set the user interface to one of these 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 Supported languages

Depending on the selected language, the system automatically sets the units and the time and date formats. You can manually change these settings (see chapter 8.2.10).

Precondition The operating mode is displayed.

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

6.1bar 08:15AM 80°C	Header
Main menu	
----------English GB----------	Current language
▸1 Status	Active line
▸2 Performance data	Sub-menu
▸3 Operating data	Sub-menu
▸4 Maintenance	Sub-menu
▸5 Configuration	Sub-menu

2. Press «Up» key.
   The currently set language is displayed.

6.1bar 08:15AM 80°C	Header
Main menu	
----------English GB----------	Active line with current set language
▸1 Status	Sub-menu
▸2 Performance data	Sub-menu
▸3 Operating data	Sub-menu
▸4 Maintenance	Sub-menu
▸5 Configuration	Sub-menu

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 user name

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



Fig. 11 Back of the RFID Equipment Card

[1] Back of the RFID Equipment Card
[2] Number of your RFID Equipment Card

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

If your RFID 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 RFID Equipment Card

The RFID Equipment Card enables an easy and quick log-in at SIGMA CONTROL 2. It authorises you to access advanced functions of the controller.

Advanced access rights allow you to:

- Read additional data
- Change other settings

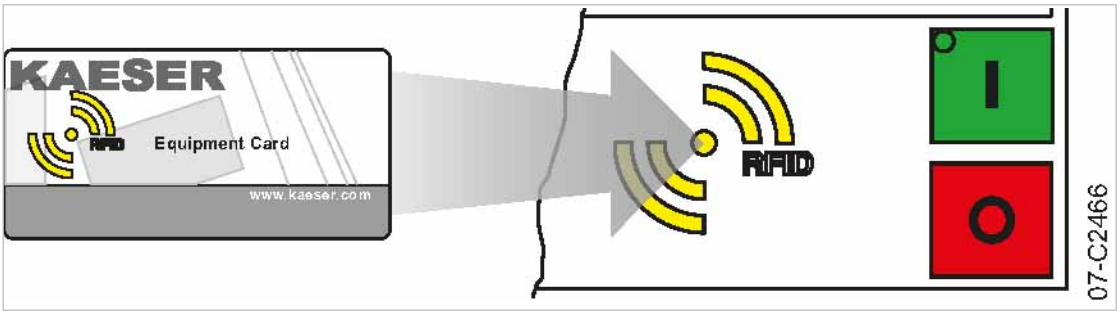
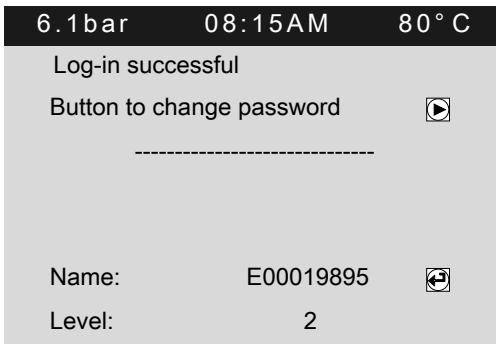


Fig. 12 User log-in with RFID Equipment Card

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



Header
Menu
Prompt, whether the password is to be changed

2. Press «Enter».
   The access right is confirmed.

The RFID 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 RFID 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). In the next step, generate a password on SIGMA CONTROL 2. Note this generated password as well, and store it a suitable location. If your RFID 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

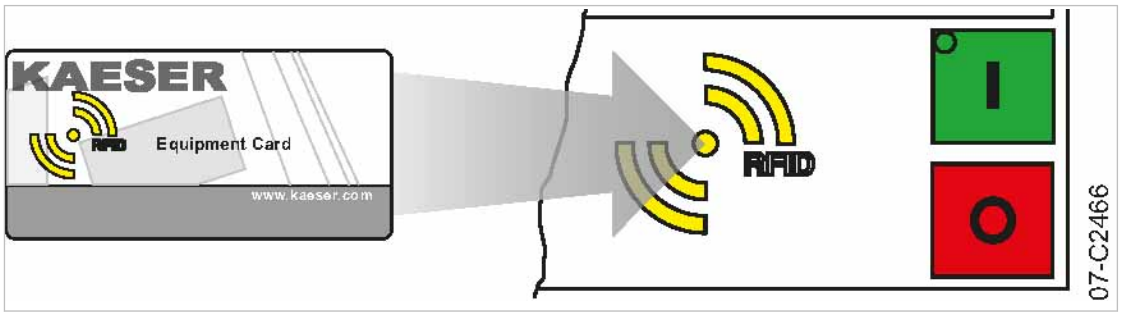
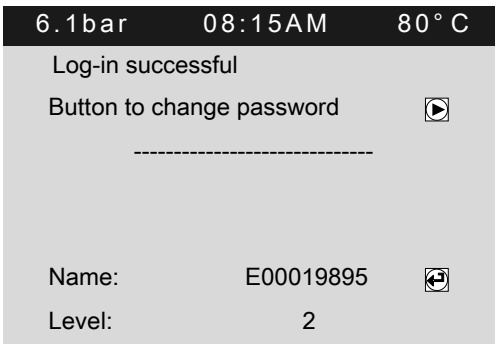


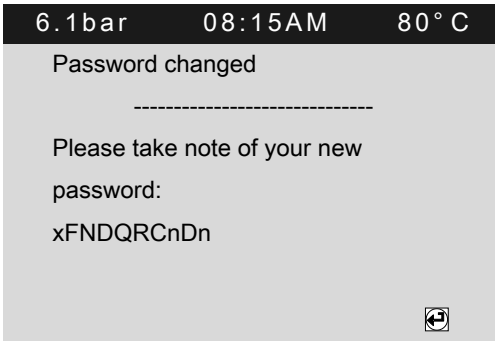
Fig. 13 User log-in with RFID Equipment Card

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



Header
Menu
Prompt, whether the password is to be changed

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



Header
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 RFID Equipment Card.
5. Press «Enter».
   The setting is applied.

8.2.6 Manual user log-in

In the event that your RFID 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.

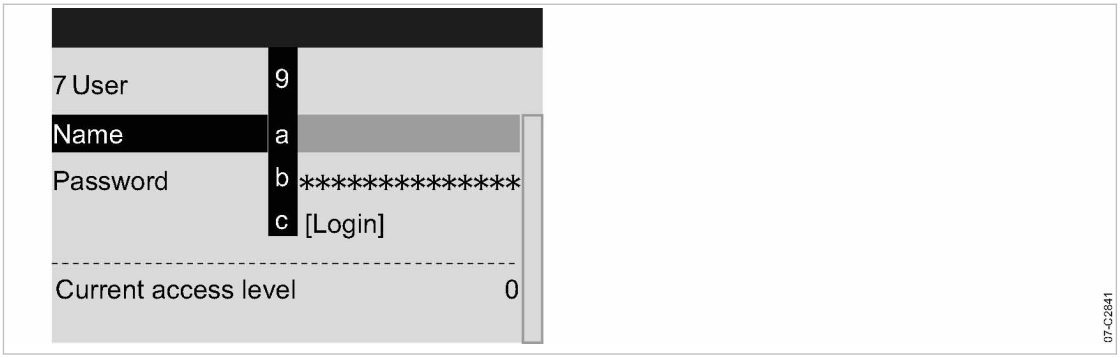


Fig. 14 Manual user log-on

4. Select the required character with the «Up» or «Down» keys.
5. Press the «Right» arrow.
   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.

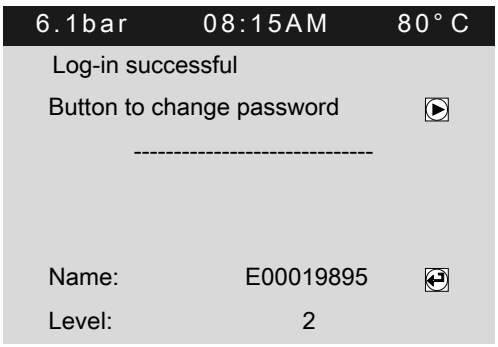
Result You are now logged on to SIGMA CONTROL 2 with access level 2, having manually input your user name and the password.

8.2.7 Create the master RFID Equipment Card

If you are running several KAESER machines with the SIGMA CONTROL 2 control it may make sense to create a master RFID Equipment Card with which you can log onto all machines.

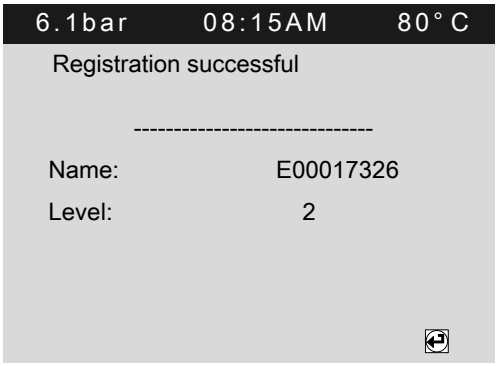
Precondition The RFID Equipment Card delivered with the machine and at least one additional teachable RFID Equipment Card are available.
The operating mode is displayed.

1. Hold the RFID Equipment Card delivered with the machine in front of the RFID reader.
   Users are always logged on with access level 2.



Header
Menu
Prompt, whether the password is to be changed

2. Within 10 minutes, hold the master RFID Equipment Card to be taught in front of the RFID reader.
   The master RFID Equipment Card is not registered at the machine.



Header
The master RFID Equipment Card has been registered

3. Repeat the above steps at the next machine if the master RFID Equipment Card is to be registered at other machines.

Result You have registered a master RFID Equipment Cards at the machine.

8.2.8 Checking/setting time and date

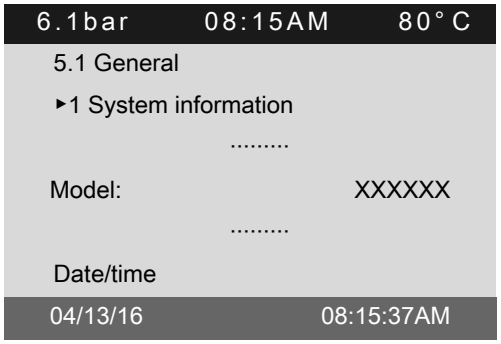
Precondition Access level 2 is activated.

Check and set time

- ➢ When operating the machine with a timer program, check the time settings at least once a year.
- ➢ You can automatically synchronise date and time using a time server. Manual setting of the time is no longer required in this case. See chapter 8.2.16.

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

3. Press the «DOWN» key.



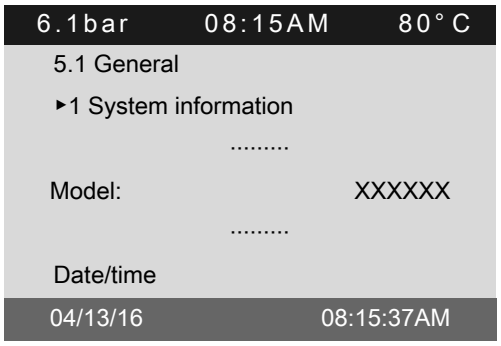
Header
Menu
Sub-menu
set machine type
current date and time

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» arrow.
   The display for minutes *00.00:00* flashes.
8. Use «Up» or «Down» to set the minutes.
9. Press the «Right» arrow.
   The display for seconds *00:00.00* flashes.
10. Use «Up» or «Down» to set the seconds.
11. Press «Enter».
    The setting is applied.
12. Press «Escape» repeatedly to leave this menu.

Check/set the date

Precondition Access level 2 is activated.

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



Header
Menu
Sub-menu
set machine type
current 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» arrow.
   The display for months *00.00.00* flashes.

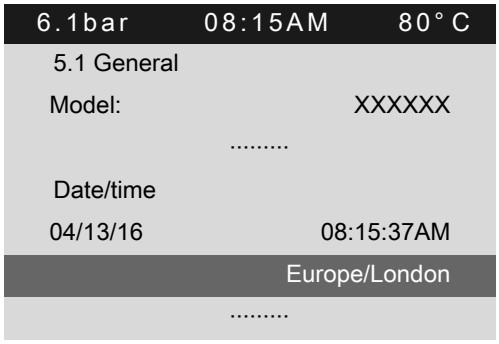
7. Use «Up» or «Down» to set the month.
8. Press the «Right» arrow.
   The display for years *00.00.00* flashes.
9. Use «Up» or «Down» to set the years.
10. Press «Enter».
    The setting is applied.
11. Press «Escape» repeatedly to leave this menu.

8.2.9 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 Access level 2 is activated.

1. Open the 5.1 *<Configuration – General>* menu.
2. Use «Up» or «Down» 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.

8.2.10 Set display formats

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

Setting the date format

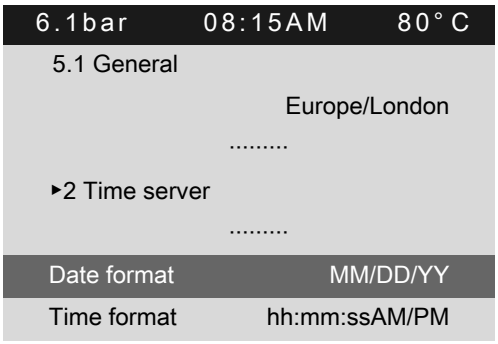
Set the display for the date format:

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 Access level 2 is activated.

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



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

Setting the time format

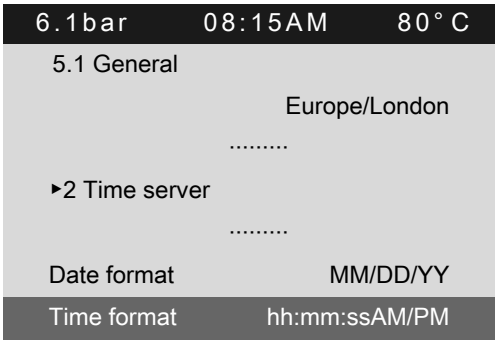
Set the display for the time format:

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 Possible settings for the time format

Precondition Access level 2 is activated.

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



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

4. Use «Up» or «Down» 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

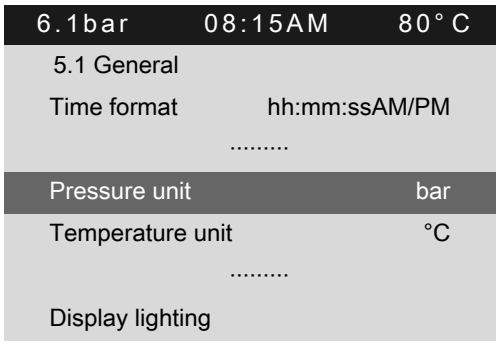
Set the pressure unit for display:

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

Tab. 47 Possible settings for the pressure unit

Precondition Access level 2 is activated.

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



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

Setting the temperature display units

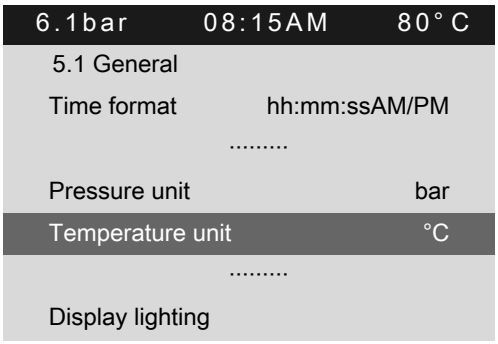
Set the temperature unit for display:

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

Tab. 48 Possible settings for the temperature unit

Precondition Access level 2 is activated.

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



Header
Menu
Unit of pressure
Unit of temperature

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

8.2.11 Setting the display illumination

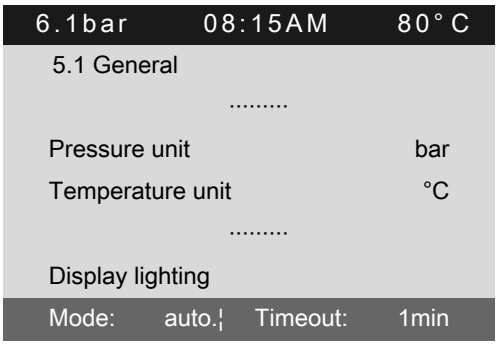
Set the display lighting mode:

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 «Up» or «Down» to select the *Display lighting* line.
3. Press the «DOWN» key.
   The *Mode* line is displayed.



Header
Menu
Unit of pressure
Unit of temperature
Active line

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» arrow.
8. Set the value for the *Timeout* in the same manner: 1 min, for example.
9. Press «Enter».
10. Press «Escape» repeatedly to leave this menu.

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

8.2.12 Setting the contrast and the brightness

Contrast and brightness are factory set to normal light conditions. You can manually set contrast and brightness for different lighting conditions.

Precondition The operating mode is displayed.

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

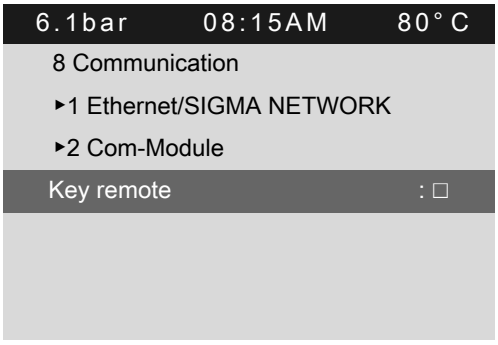
Result Contrast and brightness are set.

8.2.13 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.

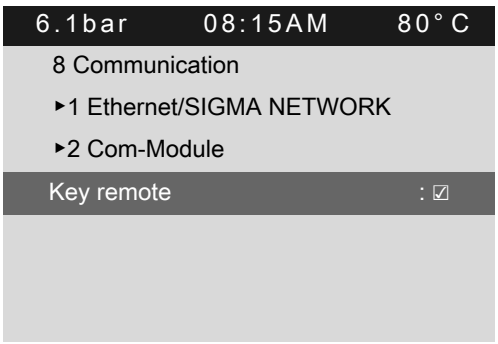
Precondition Access level 2 is activated.
The operating mode is displayed.

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



Header
Menu
Active line with deactivated check box

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



Header
Menu
Active line with deactivated 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 «Remote control» key on the operating panel of SIGMA CONTROL 2.

Result SIGMA CONTROL 2 remote control is activated.

8.2.14 IP configuration

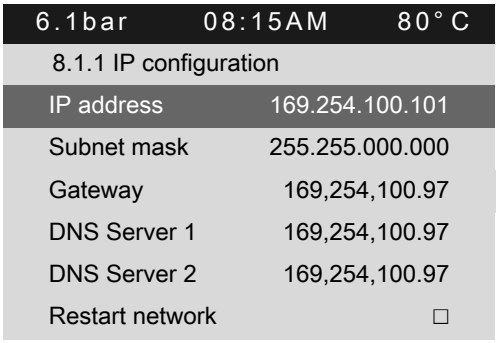
For the SIGMA CONTROL 2 to be connected to the network, you must set the IP configuration (for KAESER CONNECT for example).

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 Access level 2 is activated.
The network parameters are known. Request the required information from your IT department.

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



Header
Menu
active line, factory setting

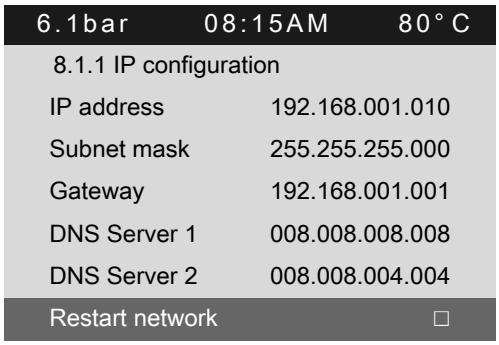
4. Press «Enter».
   The first group of numbers of the *IP address* flashes *169*.254.100.101.

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



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

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

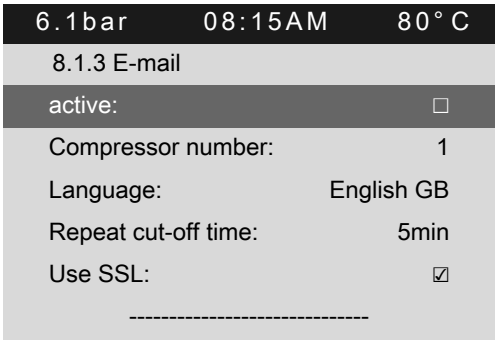
8.2.15 Setting the e-mail function

SIGMA CONTROL 2 is able to send messages per e-mail.
For this purpose, a network connection with an SMTP server is required.

Setting e-mail parameters

Precondition
Access level 2 is activated.
IP configuration is set; see chapter 8.2.14.
An SMTP server is active in the network.
The e-mail parameters are known. Request the required information from the IT department.

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



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

Parameter	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 identify the different machines sending mails.
Language:		Use this field to define the language for the message texts. This setting is 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 to send multiple recurring messages in short time intervals.
Use SSL:		E-mail sending is encrypted if the check box is ticked.
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 air station 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

Parameter	Setting value	Meaning
Password		Log-in password for logging on to the SMTP server
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.
Retry attempts:		Setting option for the number of attempts to resend after failed e-mail sending.

Tab. 51 E-mail parameters

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

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

8.2.16 Setting the time server

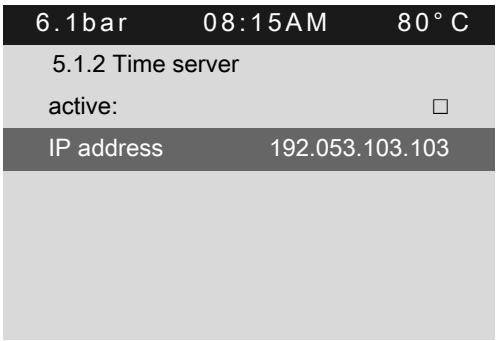
If SIGMA CONTROL 2 is connected to the network, you can set the access to an SNTP server available in the Internet or a local Intranet. SIGMA CONTROL 2 then automatically imports the date and time settings and ensures continuous synchronisation of the internal clock with the external time server.

Precondition Access level 2 is activated.

IP configuration is set; see chapter 8.2.14.

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

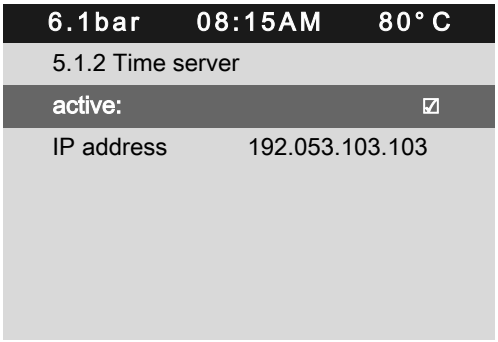
1. Open the 5.1.2 *<Configuration – General – Time server>* menu.
2. Use «Up» or «Down» to select the *IP address* line.



Header
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».
   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 the «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 leave this menu.

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

8.3 KAESER CONNECT benefits

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** implemented 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 controller's IP address is known, see chapters 8.2.14 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 IP address of the controller.
   The log-in mask is displayed.

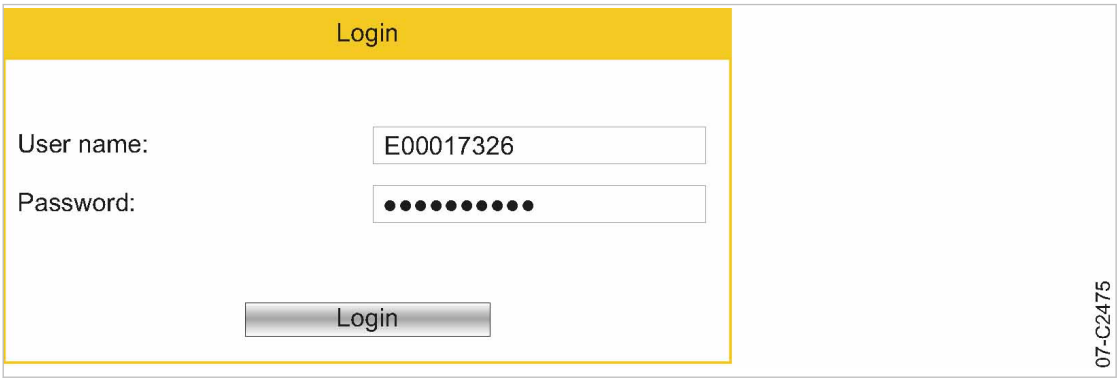


Fig. 15 Log-in mask

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.

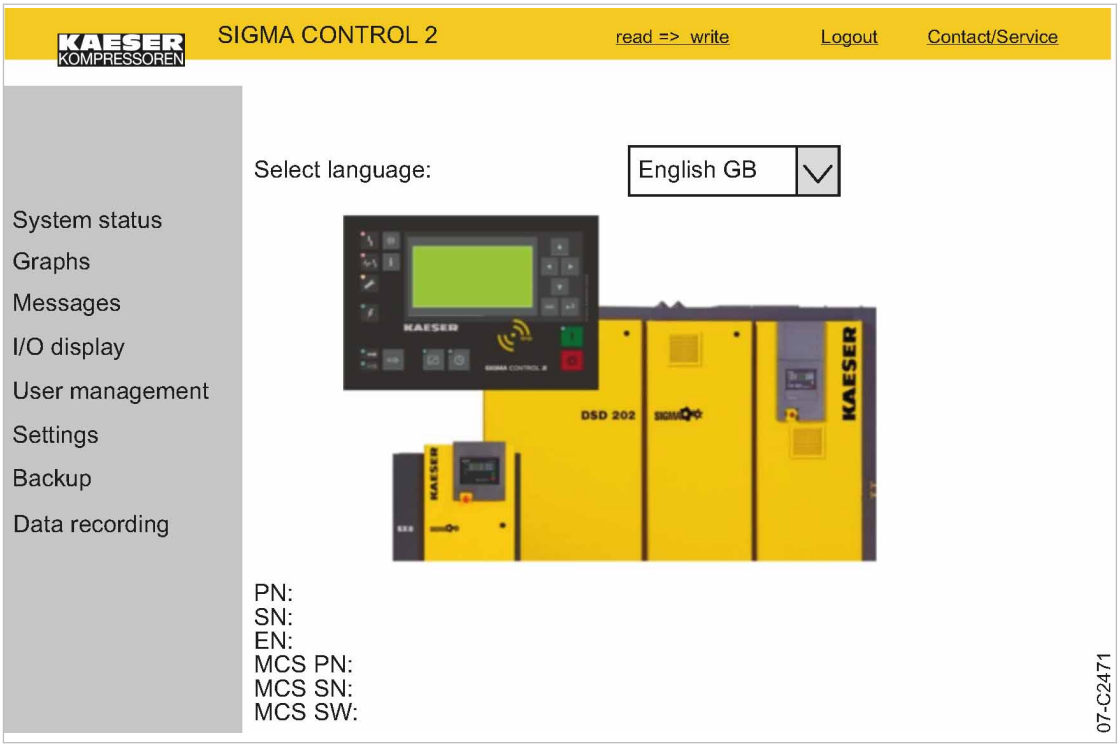


Fig. 16 KAESER CONNECT for SIGMA CONTROL 2

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

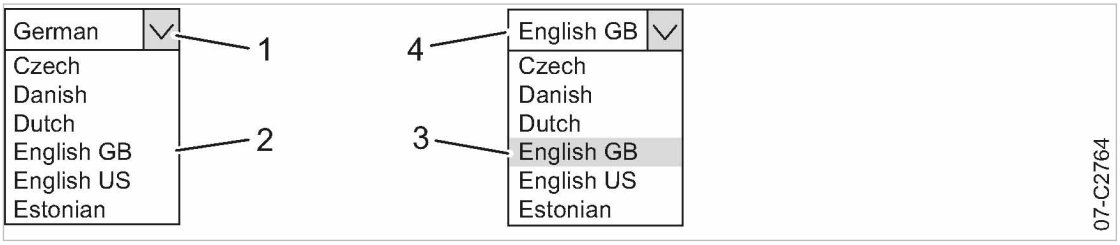


Fig. 17 Select language: window

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

7. Click to set the selected language [3].

Result KAESER CONNECT is displayed in the set 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 machine data from the last 20 minutes are displayed as diagram. 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.

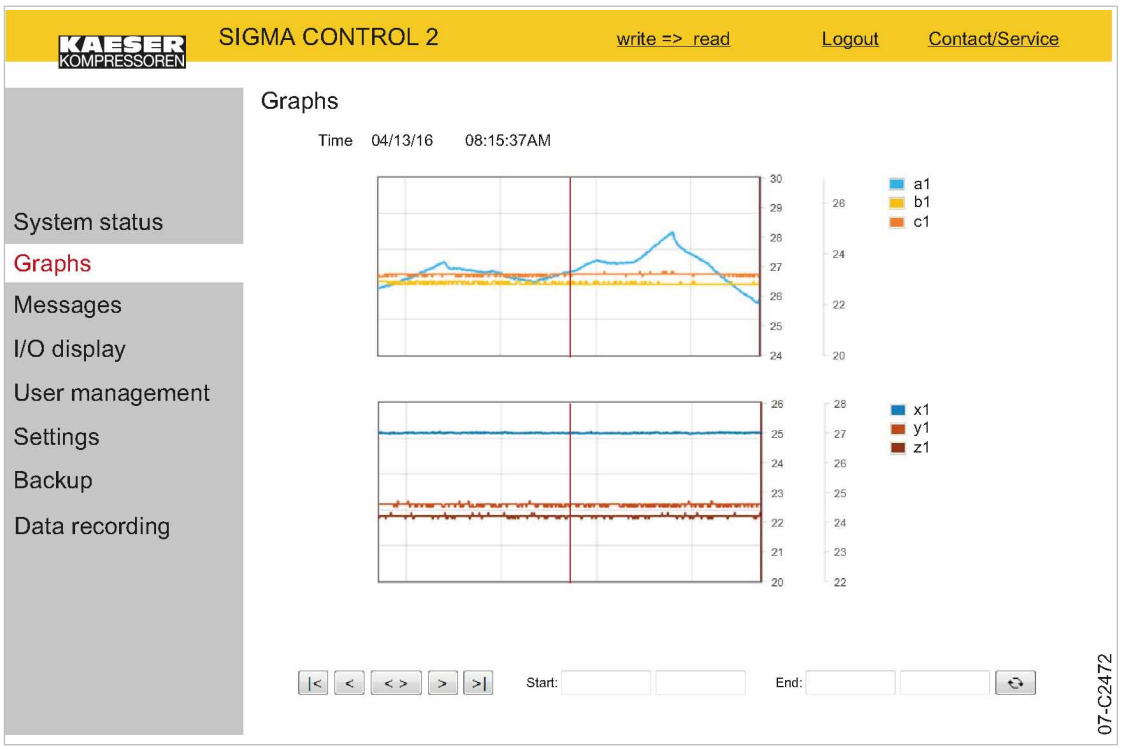


Fig. 20 *Graphs* (illustration similar)

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.

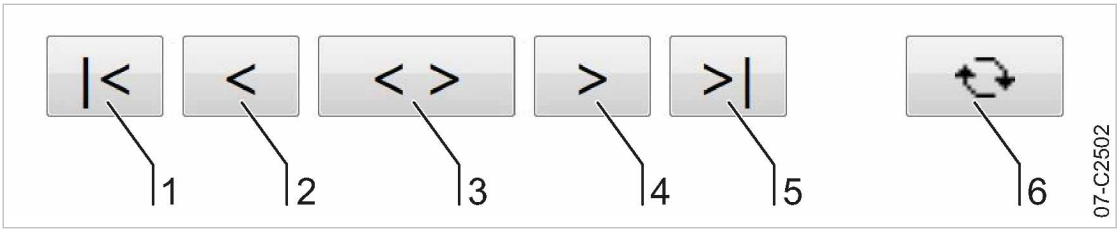


Fig. 21 Control keys

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 the current data
6	«Refresh»	Load and display the entered machine data from start time to end time

Tab. 52 Control 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 Display 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 types can be displayed:

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

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

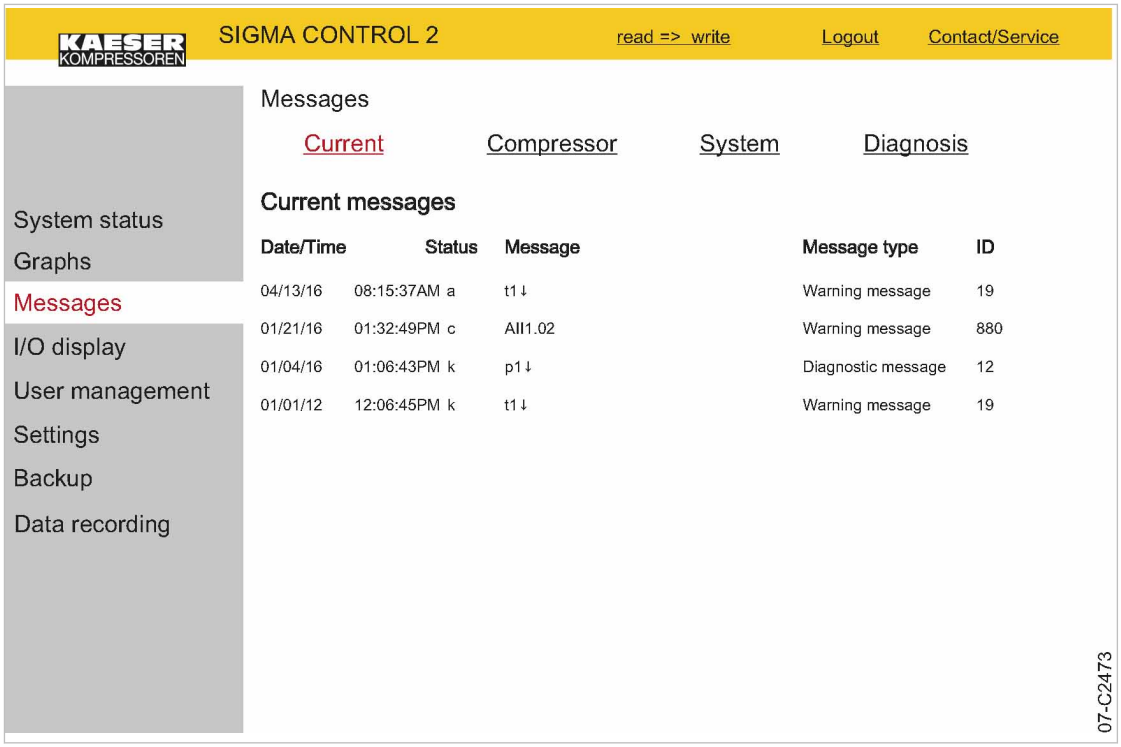


Fig. 22 *Messages* (illustration similar)

1. Click the *Messages* menu element.
   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 analogue 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.

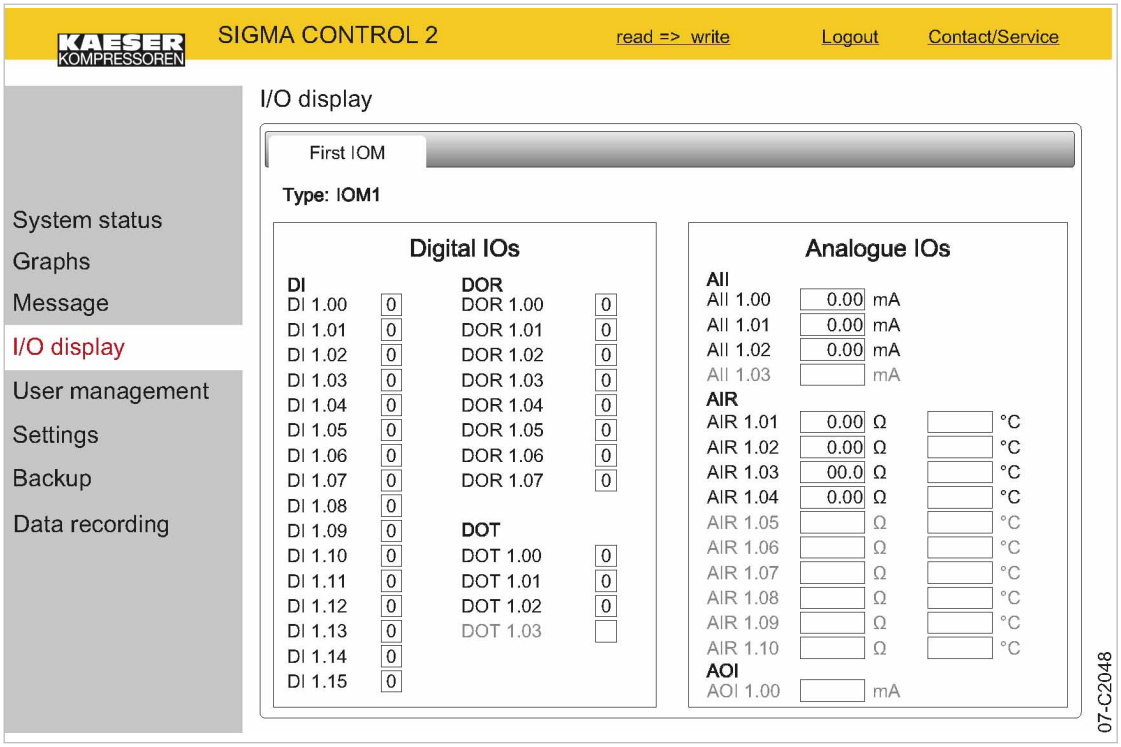


Fig. 23 *I/O display* (illustration similar)

➢ 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.

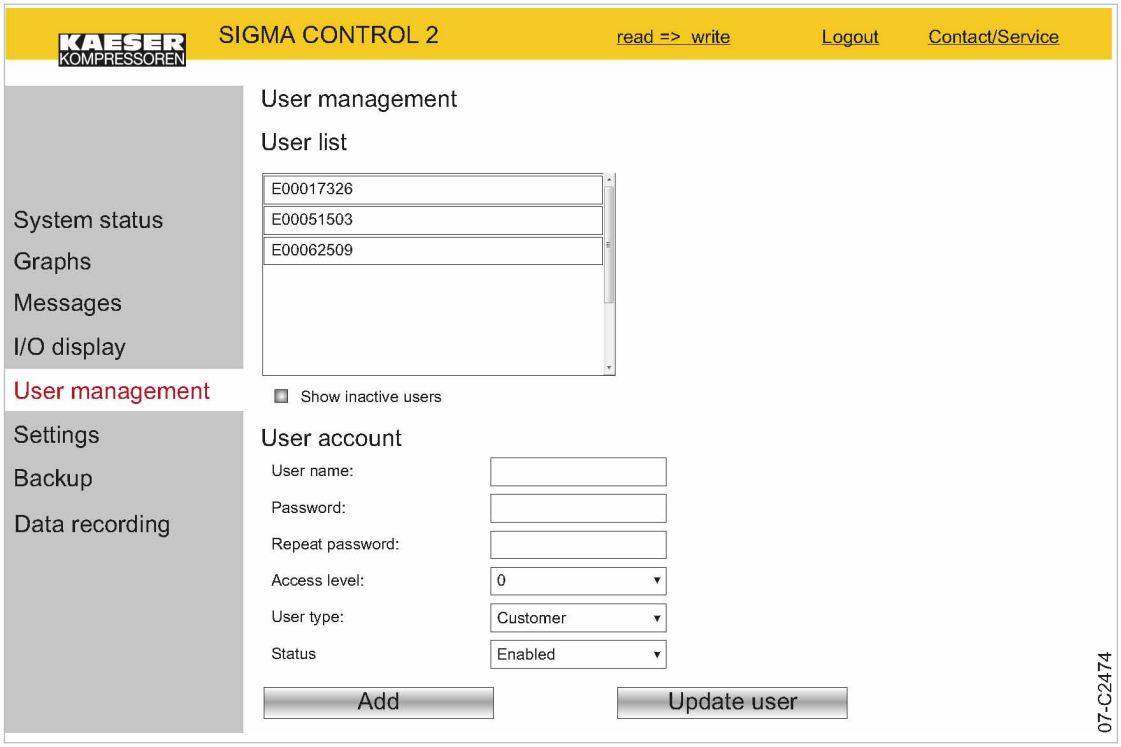


Fig. 24 *User management* menu

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

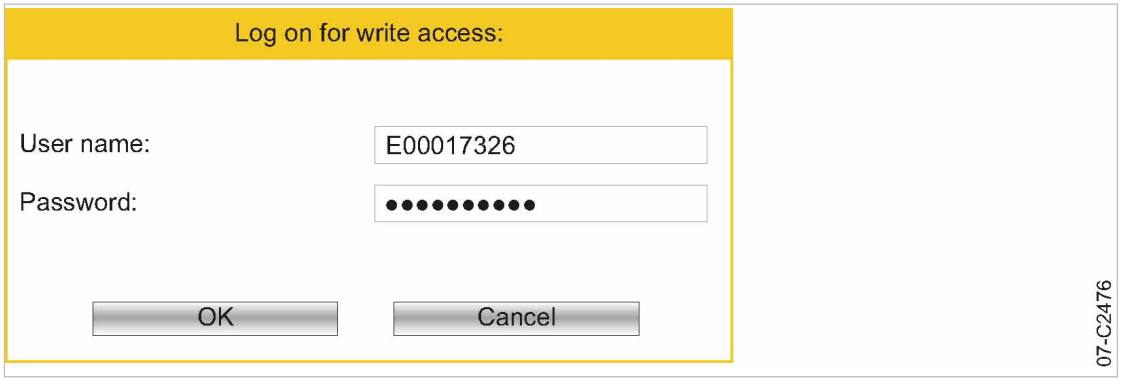


Fig. 25 *Log on for write access:* window

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

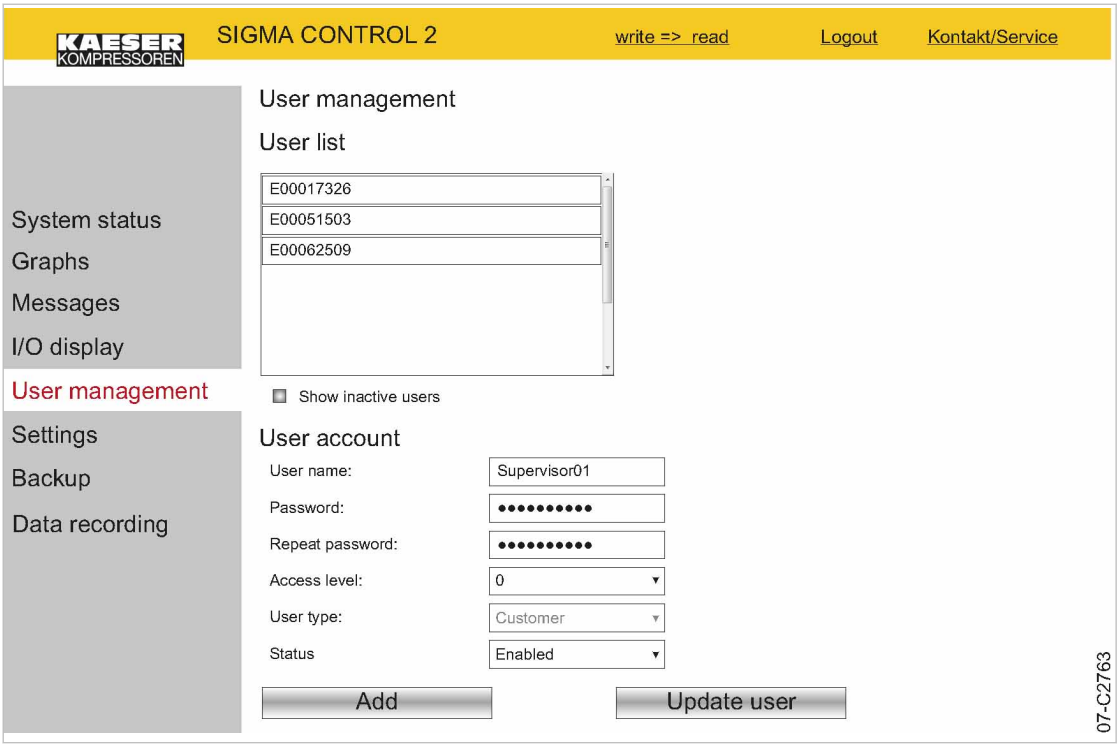


Fig. 26 *User management* menu

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 menu

These settings are only required for access to KAESER CONNECT via web browser.

The following settings are possible.

- Units
- Date format
- Time format

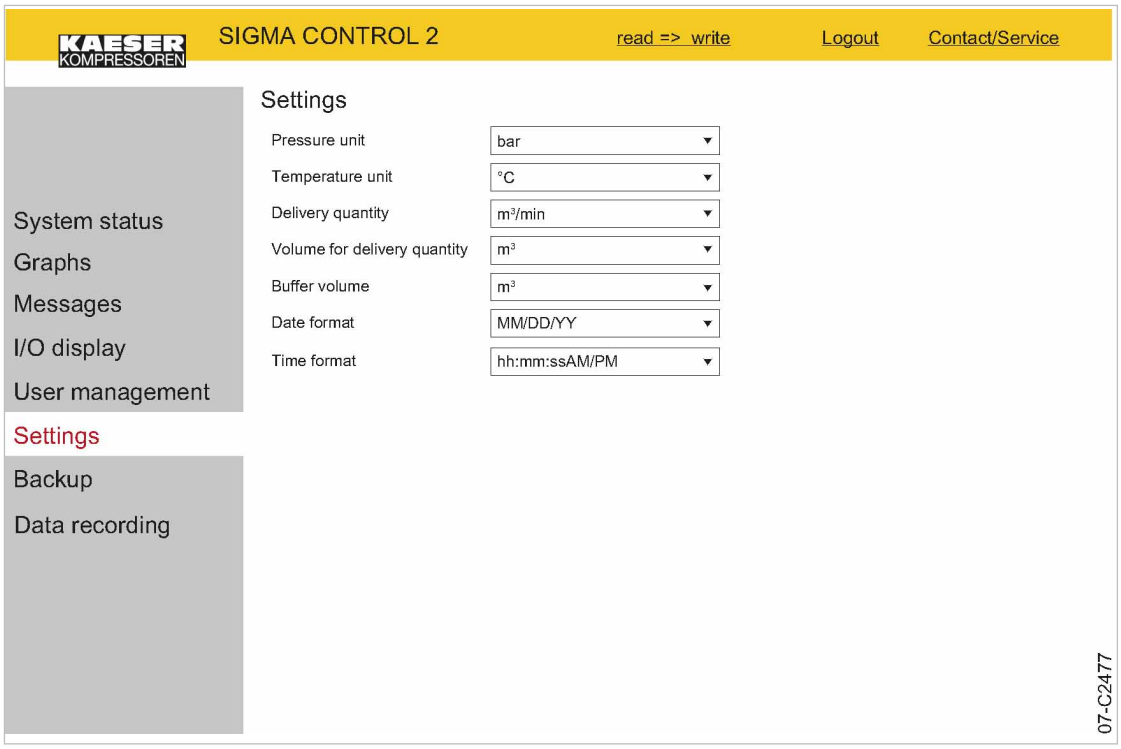


Fig. 27 *Settings* menu

For example, you want to convert your units to US values:

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Click the *Settings* menu element.
2. Click the arrow key for the unit of pressure.
   A selection list of units of pressure is displayed.
3. Set the appropriate pressure unit (psi).
4. Click the arrow key for the unit of temperature.
   A selection list of units of temperature is displayed.
5. Set the appropriate temperature unit (°F).
6. Set additional units and date and time formats.

8.3.8 Save data 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.

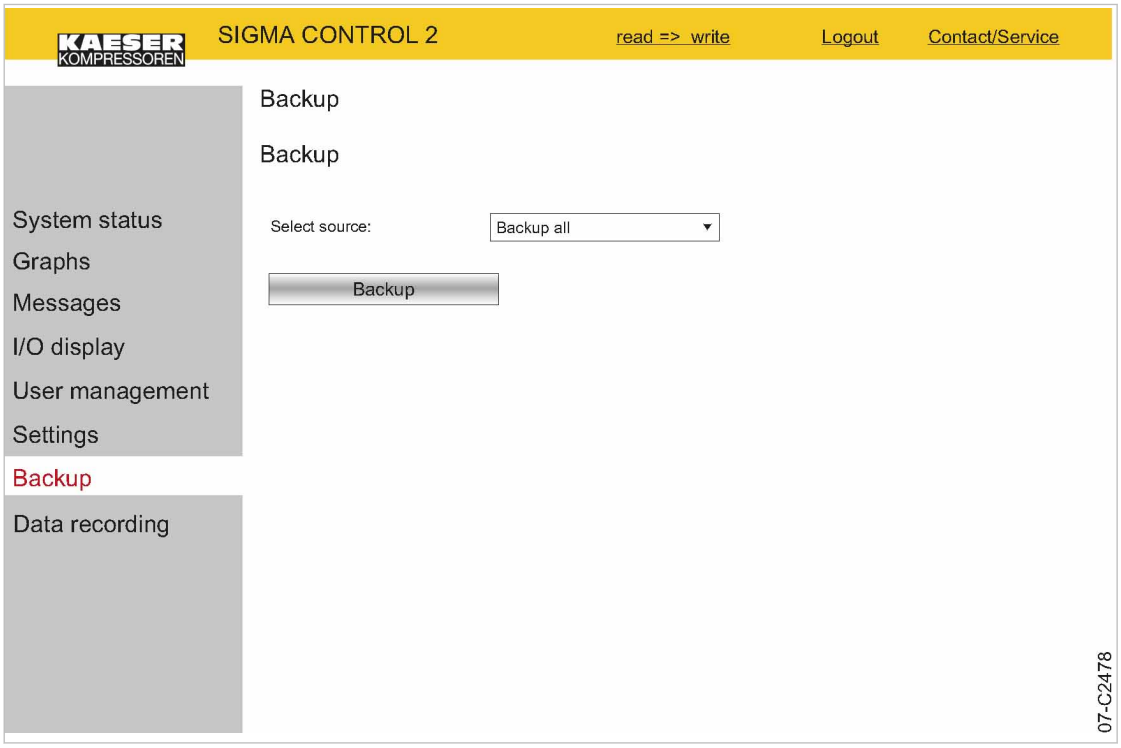


Fig. 28 *Backup* menu

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 KAESER CONNECT exit

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

➢ Click Logout.

Result The system displays a message confirming the successful logout.

8.4 Pressure parameters of the machine

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

The chapter is divided into the following sections:

- 8.4.1: Displaying pressure parameters
- 8.4.2: Setting pressure parameters

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

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

Parameters	Explanation
pRV	Display: Actuating pressure of the safety 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 lowest flow rate. When the value [switching point system set-point pressure +dp FC] is exceeded, the compressor switches from LOAD to IDLE.
Nominal pressure	Display: Nominal press.:The compressor is designed for this pressure (maximum network nominal pressure)
Setpoint pressure	Network nominal pressure can be regulated to 2 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 network pressure is reached. Setting: ■ SD: Switching differential for network pressure low ↓: Switching point for network pressure low ■ Option: Configure the output signal Warning message displayed or an additional output signal is sent, e.g., to a control centre

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

Tab. 53 Compressor pressure parameters

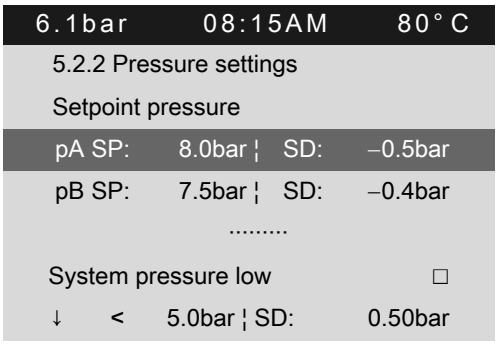
➢ Set the parameters according to the following specifications

8.4.1 Displaying pressure parameters

Precondition Access level 2 is activated.

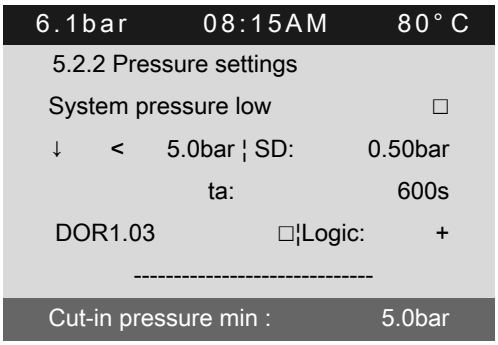
Open the menu for pressure parameters.

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



Display further parameters

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



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

8.4.2 Setting pressure parameters

8.4.2.1 Setting the network nominal pressure: pA and pB

The pressure parameters can only be set within certain limits:

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

Tab. 54 Setting limits for the network nominal pressure (* Cut-in pressure min)

The machine switches to LOAD under the following condition:

Network pressure ≤ SP: pA /pB - switching differential

Tab. 55 Pressure condition for LOAD

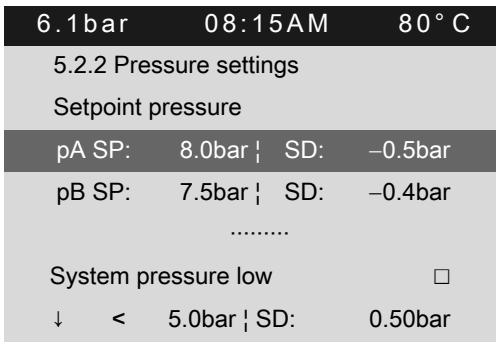
The machine switches to IDLE under the following conditions:

Network pressure = Network nominal pressure

Tab. 56 Pressure conditions for IDLE

Precondition Access level 2 is activated.

1. Open 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 set the *pA SP* value.
5. Press «Enter».
   The setting is applied.
6. Set the *SD* switching differential in the same manner.
7. If necessary, adjust the value for the *pB SP* and the *SD* switching differential in the same way.
8. Press «Escape» repeatedly to leave this menu.

Result The parameters for the network nominal pressure *pA* and *pB* are set.

8.4.2.2 Setting "System pressure low" parameters

When the network pressure drops to the value *System pressure low*, SIGMA CONTROL 2 displays a warning message for insufficient network pressure.
The switching differential influences the pressure at which the message can be acknowledged or the optionally activated output will again switch:

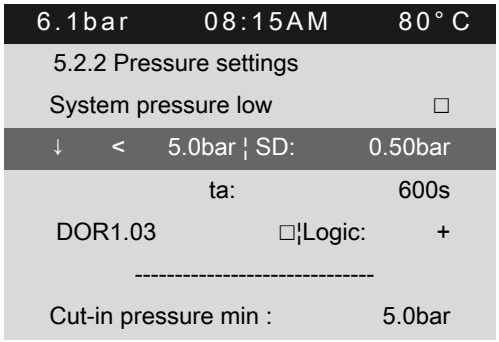
Message	Output
5.0 bar Message coming	Active
5.5 bar Message going	Inactive

Tab. 57 Example: activated output

Precondition Access level 2 is activated.

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

2. Use «Up» or «Down» to select the ↓ < line.



Header
Menu
current network pressure low point

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

8.4.2.3 Setting the SD switching differential of the pressure increase

The pressure increase *pE SP* serves as a safety limit when the machine is externally controlled. When the network nominal 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 triggered.

The parameter for *pE SP* pressure increase is pre-set 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

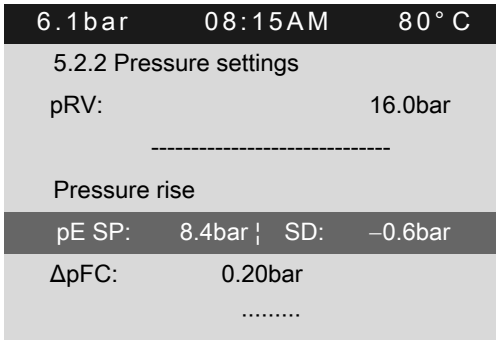
x ≙ fitted, – ≙ not fitted

Tab. 58 Displaying and setting parameters

Precondition Access level 2 is activated.

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

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



Header
Menu
Active line

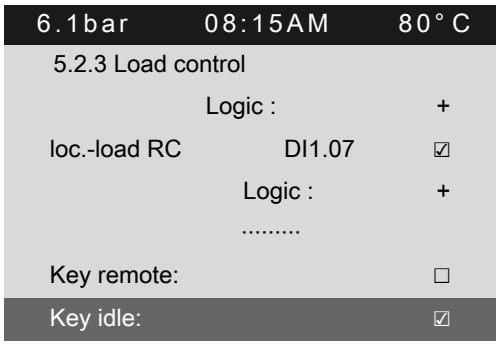
3. Press «Enter».
   The setting mode is active.
4. Use «UP» or «DOWN» to set the required value for *SD*.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

8.4.3 Activating/deactivating the «LOAD/IDLE» key

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

Precondition Access level 2 is activated.

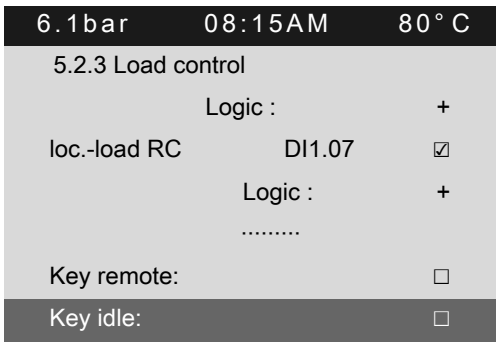
1. Open the 5.2.3 *<Configuration – Pressure control – Load control>* menu.
2. Use «Up» or «Down» to select the *Key idle* line.
3. Press «Enter».
   The check box *Key idle* will flash.



Header
Menu
Active line with deactivated check box

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

5. Press «Enter».
   The «IDLE» key is de-activated.



Header
Menu
Active line with deactivated check box

6. Press «Escape» repeatedly to leave this menu.

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

8.5 Machine start and machine 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
Controlling machine from a remote location	Deactivated	8.5.3
"Venting" function	Activated	8.5.5
"Autostart" function	Activated	8.5.6

Tab. 59 Settings for machine start and machine stop

8.5.1 Automatic start/stop in timer mode

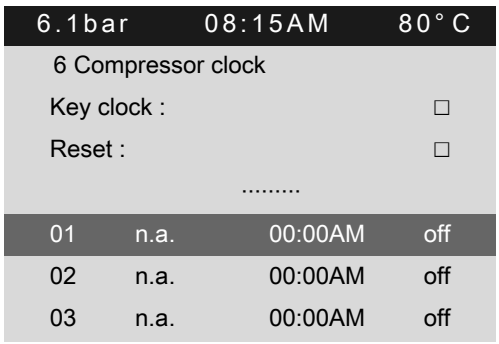
Overview

- Open the *Compressor clock* menu
- Set clock program
- Activate the «Timer» key
- Activating time control

8.5.1.1 Compressor clock

Precondition Access level 2 is activated.

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



Header
Menu
The time control key is activated
All current switching points are reset
Active line

User-defined clock program

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

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

8.5.1.2 Setting the clock program (example)

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

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 shut-down) (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

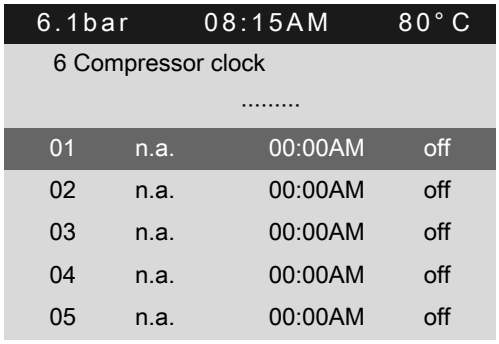
The following switching points result:

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 Access level 2 is activated.

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



Header
Menu
Active line with switching point 01
Switching point 02
Switching point 03
Switching point 04
Switching point 05

3. Press «Enter».
   The *n.a.* indication flashes.
4. Use «Up» or «Down» to set the weekdays.
5. Press the «Enter» key.
   The setting is applied.
6. Press the «Right» key.
7. Press «Enter».
   The display for hours, *00*:*00* flashes.
8. Use «Up» or «Down» to set the hours.
9. Press the «Right» arrow.
10. The display for minutes, 00:*00* flashes.
11. Use «Up» or «Down» to set the minutes.

12. Press the «Enter» key.
    The setting is applied.

6.1bar	08:15AM	80° C		Header
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» arrow.
14. Press «Enter».
    The *on/off* indicator flashes.
15. Use «Up» or «Down» to set the Compressor On action.
16. Press «Enter».
    The setting is applied.
    The Compressor ON action is set for the first switching point.
17. Set the other 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 Activate the «Timer» key

1. Use «Up» or «Down» to select the *Key clock* line.
2. Press «Enter».
   The check box *Key clock* will flash.

6.1bar	08:15AM	80° C		Header
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.
   The check box is activated.
4. Press «Enter».
   The setting is applied.
5. Press «Escape» repeatedly to leave this menu.

Result The «Time control» key is activated.

8.5.1.4 Activating time control

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

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

Result The *Time control* LED on the operating panel of the SIGMA CONTROL 2 signalises with *green continuous light* that the machine is operated with activated time control.

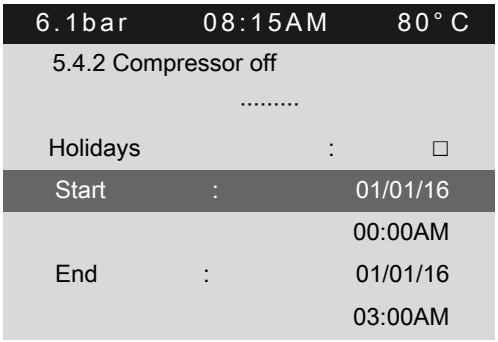
The time control of SIGMA CONTROL 2 switches the machine according to the defined switching points of the time program.

8.5.2 Setting the company shut-down

In addition to the weekly repeating settings of the time control, you can also set a longer lasting shut-down time. For company shut-down, see the time as follows:

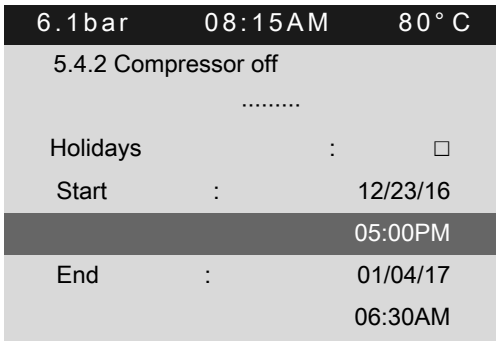
Precondition Access level 2 is activated.

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



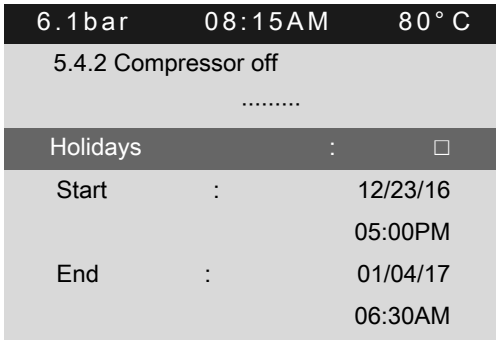
3. Press «Enter».
   The display for days *00.00.00* flashes.
4. Use «Up» or «Down» to set the day.
5. Press the «Right» arrow.
   The display for months *00.00.00* flashes.
6. Use «Up» or «Down» to set the month.
7. Press the «Right» arrow.
   The display for years *00.00.00* flashes.
8. Use «Up» or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

15. Press «Enter».
    The date and time for the start of the company shut-down are set.
16. Se the date and time for the end of the company shut-down in the same manner.



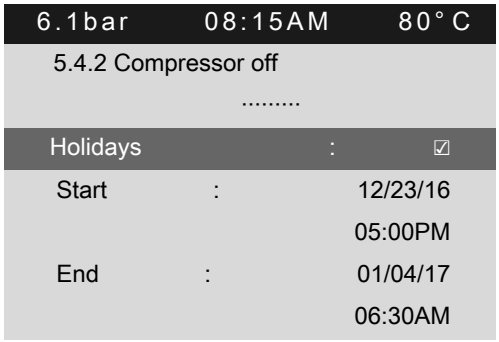
Header
Menu
Date for start
Time for start
Date for end
Time for end

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



Header
Menu
Active line
Date for start
Time for start
Date for end
Time for end

18. Press «Enter».
    The check box *Holidays* will flash.
19. Press «UP».
    The check box is activated.



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

20. Press «Enter».

Result In this example, a company shut-down (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 Controlling machine from a remote location

If the machine is to be started and stopped from a remote control centre, provide the following settings:

Overview

- Make the electrical connection (a spare input for the remote contact is to be found in the electrical wiring diagram for the machine, DI 1.07 being preferred).
- Switch machine start to remote mode
- Activating the «remote control» key
- If necessary, activate the «Time control» key and configure the clock program (see chapter 8.5.1.2).
- If required, assign a different input for the remote contact *RC*.
- Press the «Remote control» key.

8.5.3.1 Switch machine start to remote mode

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

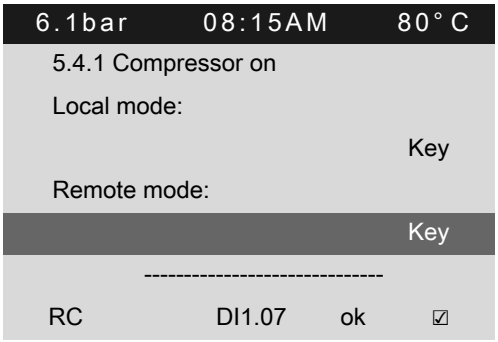
- Variant **A**: Start the machine with the input signal from the remote control centre.
- Variant **B**: Starting the machine from the remote control centre in addition to a configured ON/OFF clock program.
  The machine can be started from the remote control centre even though the time control is activated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

Precondition The electrical connection has been made.

Access level 2 is activated.

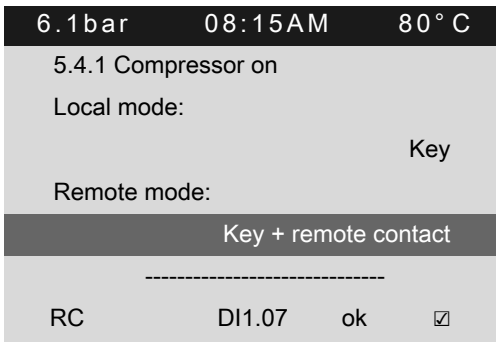
The operating mode is displayed.

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».
   The currently active operating mode flashes.



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

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

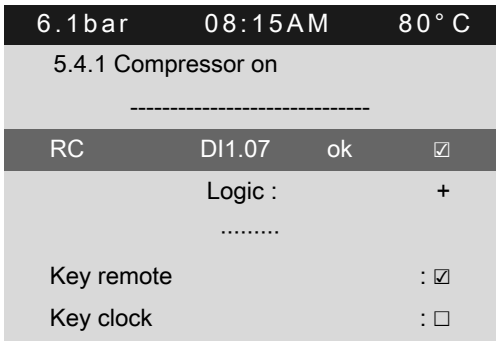


Result The machine start is set to *Remote mode Key + remote contact*.

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

If your entry is rejected it means that the input is already assigned.
➢ Select a different input.

8.5.4 Activating the remote control

➢ Activate remote control see chapter 8.2.13.

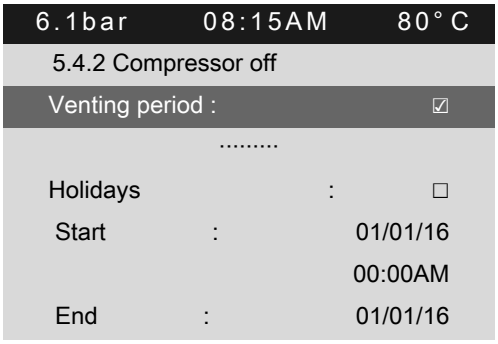
Result SIGMA CONTROL 2 remote control is activated.

8.5.5 "Venting" function

Prior to the machine's transition from the operating modes LOAD to READY you can also activate an IDLE phase ("venting" function). The duration of the IDLING phase can be timed and/or regulated by internal pressure. The machine-dependent venting phase 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.

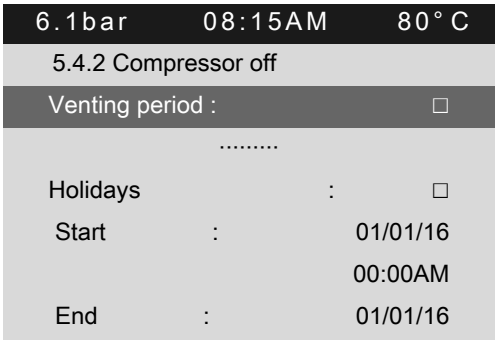
Precondition Access level 2 is activated.

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



Header
Menu
Factory setting: "Venting" function activated

3. Press «Enter».
   The check box *Venting period* will flash.
4. Press «UP».
   The check box is deactivated.



Header
Menu
Active line with deactivated check box

5. Press «Enter».
   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 phase).

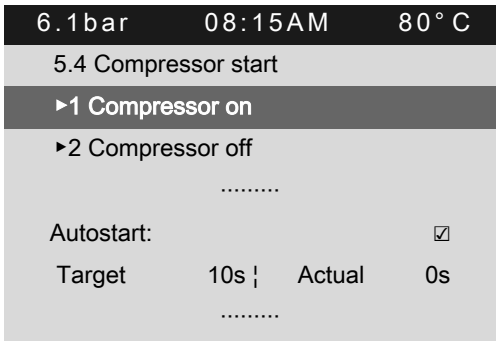
8.5.6 "Autostart" function

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

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

Precondition Access level 2 is activated.

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



Header
Menu
Active line
Autostart activated
Set/expiring delay time

Setting 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.

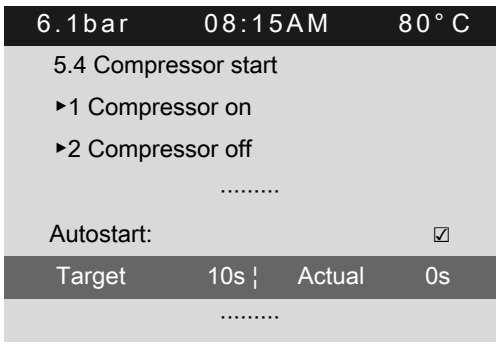
The first machine may start immediately and does not require a delay time.

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

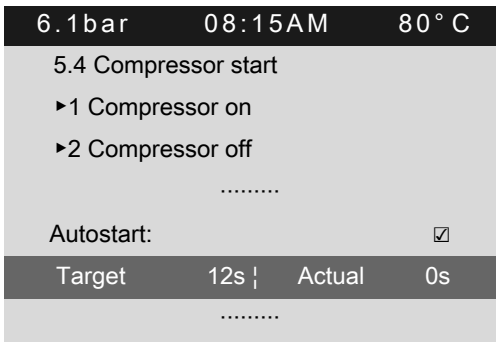
Precondition Access level 2 is activated.

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



Header
Menu
Active line
Autostart activated
Set/expiring delay time

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



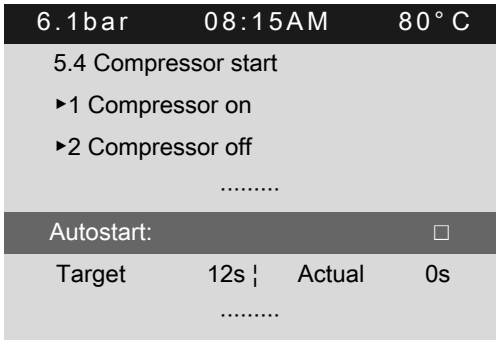
Header
Menu
Active line
Autostart activated

5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this 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.



Header
Menu
Active line
Autostart deactivated
Set/expiring delay time

2. Press «Enter».
   The check box *Autostart:* will flash.
3. Press «Up» key.
   The check box *Autostart:* is deactivated.

4. Press «Enter».

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

The setting is applied.

5. Press «Escape» repeatedly to leave this menu.

Result Autostart after a power failure is deactivated.

8.6 Control modes

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

8.6.1 Setting the control mode

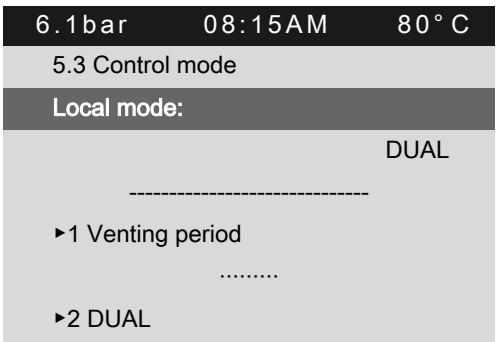
These control modes are possible:

- DUAL
- QUADRO
- VARIO
- DYNAMIC
- Continuous

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

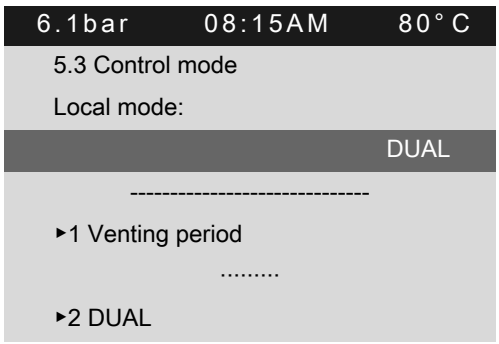
Precondition Access level 2 is activated.

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



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

4. Press «Enter».
   The currently active control mode flashes.



Header
Menu
Active line
Venting period menu

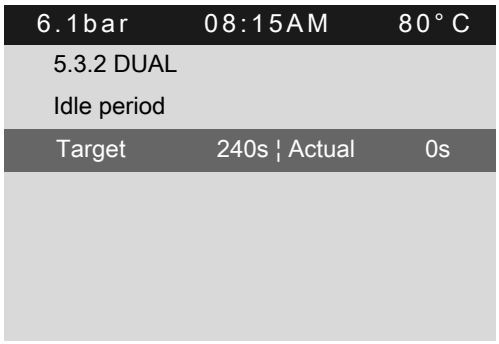
5. Use «Up» or «Down» to set the control mode.
6. Press «Enter».
   The setting is applied.
7. Press «Escape» repeatedly to leave this menu.

8.6.2 Setting the 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 / engine switching capacity.
Depending on the machine type, the machine's motor / engine may not fall below a minimum idling or standstill time.

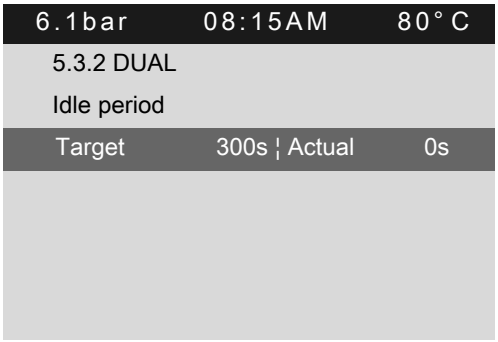
Precondition
Access level 2 is activated.
The DUAL control mode is set.
The operating mode is displayed.

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



Header
Menu
active line

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



Header
Menu
increased idle time (e.g. 300 s)

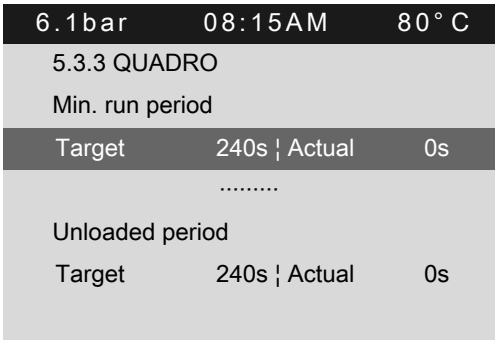
3. Press «Enter».
   The seconds display flashes.
4. Use «Up» or «Down» to set the seconds.
5. Press «Enter».
   The setting is applied.
6. Press «Escape» repeatedly to leave this menu.

8.6.3 Setting the QUADRO control mode

When the minimum running period has elapsed, the machine switches from IDLE to READY. The expired duration of the unloaded period controls whether the machine switches from IDLE to READY only after expiry of the set unloaded period or after expiry of the venting period.

Precondition Access level 2 is activated.
The QUADRO control mode is set.

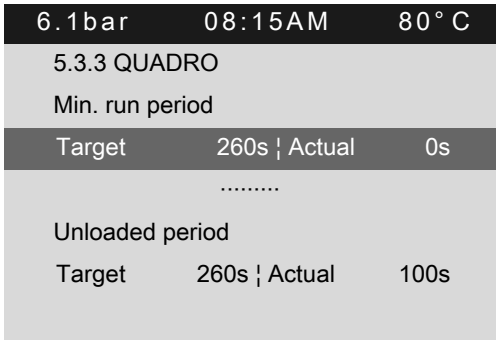
1. Open the 5.3.3 *<Configuration – Control mode – QUADRO>* menu.



Header
Menu
Set value for minimum run-time
Set value for unloaded period

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.



Header
Menu
changed set-point for minimum run-time
changed set-point for unloaded period

6. Press «Enter».
   The setting is applied.
7. If necessary, adjust the target value for the *Unloaded period* switching differential in the same way.
8. Press «Escape» repeatedly to leave this 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 options.

Type	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 poorer efficiency of the compressed air generation.

1. Check whether your machine is fitted with an electronic thermal management.
2. Check whether the nominal value of the discharge temperature for the regulator of the electrically controlled heat recovery valve can be adjusted.
3. Activate the heat recovery only if you can use the machine's exhaust heat.
4. Deactivate the heat recovery if you cannot use the machine's exhaust heat.

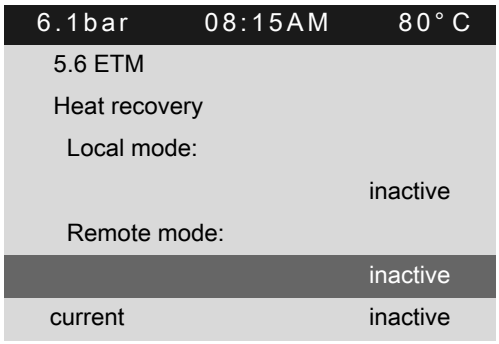
8.7.1 Activating the heat recovery for machine type 2

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.

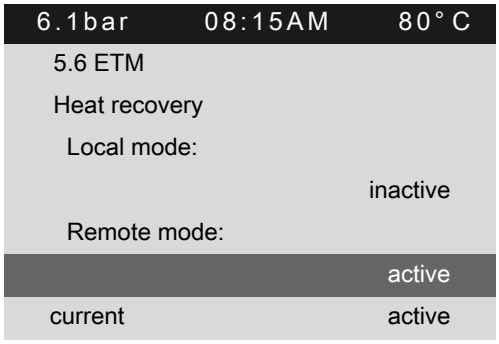
Example: Heat recovery for machines in "remote operation".

Precondition Access level 2 is activated.

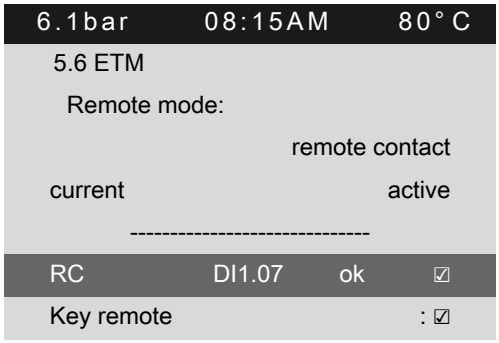
1. Open the 5.6 *<Configuration – ETM>* menu.
2. Use «Up» or «Down» to select the *Remote mode:* line.



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



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



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 8.2.13).

Result The heat recovery system in "remote operation" has been activated.
The «Remote control» key is activated.
No other settings are required.

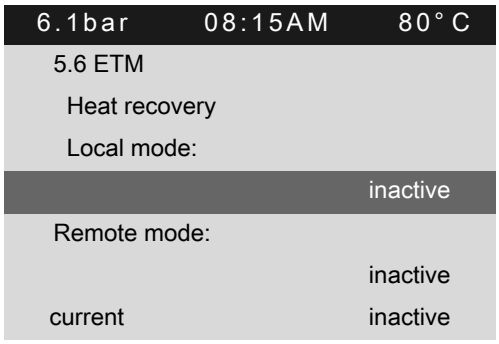
The current status for the heat recovery is displayed in the *current* line.

8.7.2 Activating the heat recovery for machine type 3

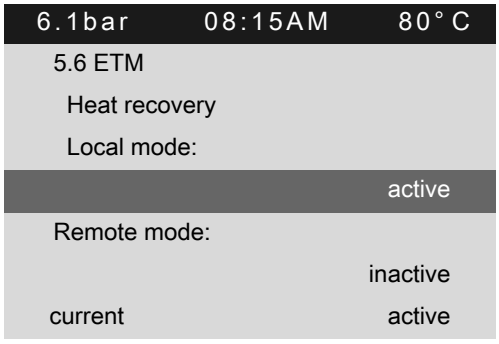
Example: Heat recovery with adjustable setpoint for the airend discharge temperature for the regulator of the electrically controlled heat recovery valve for machines in "local operation".

Precondition: Access level 2 is activated.

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



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



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

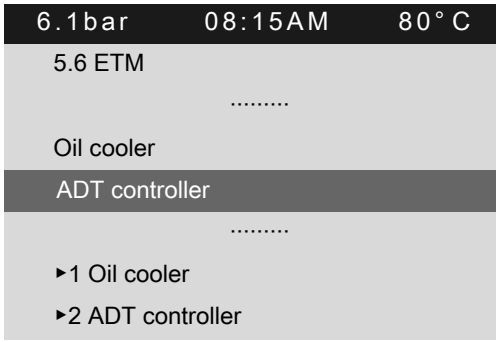
The airend discharge temperature and the water outlet temperature are related. To increase the value for the water outlet temperature, you must increase the setpoint value for the airend discharge temperature.

Maximum setting = 92 °C.

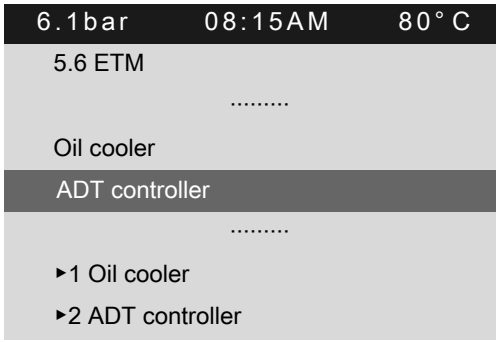
The specific value of the discharge temperature depends on the respective application for the heat recovery at the customer's.

Precondition Access level 2 is activated.

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



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



5. Press «Enter».
   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 Refrigeration dryer

Overview:

- Setting the operating mode
- Output messages
- Procedures following a fault of the refrigeration dryer:
  - The quality of the compressed air has priority:
    Immediately contact KAESER SERVICE
- Procedures following a fault of the refrigeration dryer:
  - Compressed air supply has priority:
    Activate fault mode without refrigeration dryer

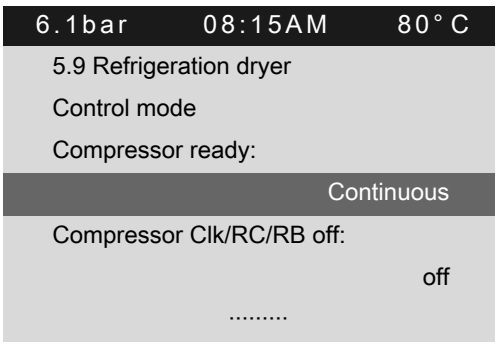
➢ It is mandatory to follow the procedures indicated according to the priorities established for the compressed air quality or compressed air supply!

8.8.1 Setting the operating mode

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

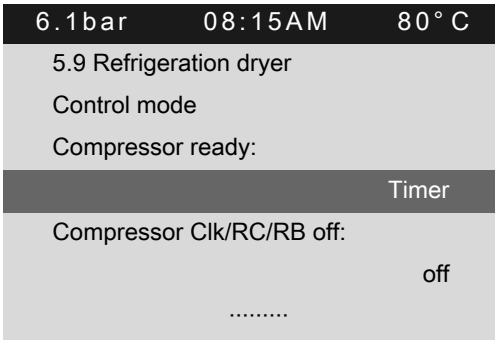
Precondition Access level 2 is activated.

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



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

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



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

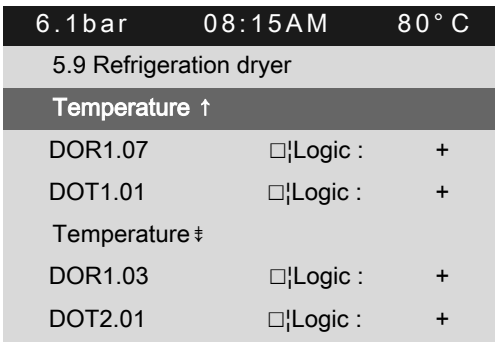
Result The CONTINUOUS operating mode has been switched to the TIMER operating mode.

8.8.2 Output messages

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

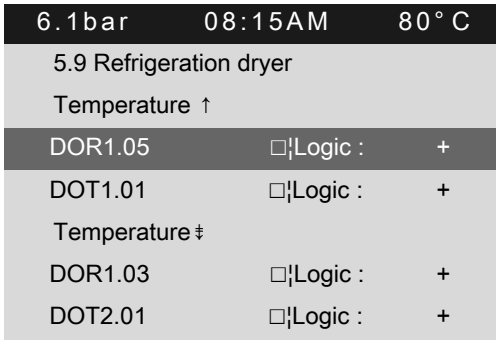
Precondition Access level 2 is activated.

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

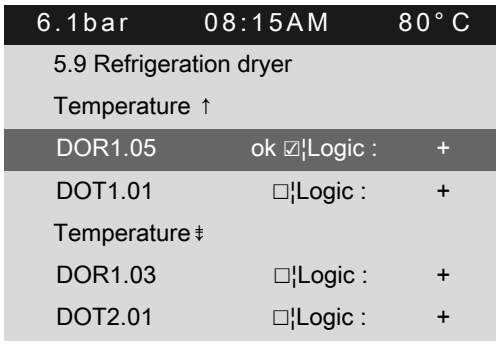


3. Press the «DOWN» key.
4. Press «Enter».
   The setting mode is active.

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



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



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

Upon activation of the check box, *err* is displayed.

- ➢ The parameterisation is incorrect.
- ➢ Deactivate the check box.
- ➢ Assign another and/or free output.

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

After a fault occurs in the refrigeration dryer, the SIGMA CONTROL 2 shut the machine down.
No compressed air is delivered.
Because compressed air quality (dried compressed air) is crucial, you must call KAESER SERVICE immediately.

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

1. Keep machine shut down because the required compressed air quality is no longer delivered.
2. Immediately contact KAESER SERVICE.
   The KAESER Service Technician eliminates the fault and executes a reset.
   The machine is ready for the delivery of high-quality, dried compressed air.

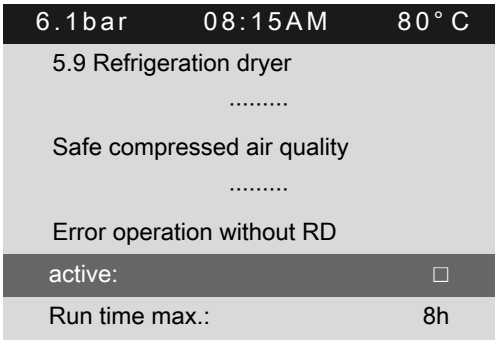
8.8.4 Fault in the refrigeration dryer – compressed air supply has priority

NOTICE
Higher residual humidity in the compressed air
Corrosion due to higher residual humidity in the compressed air.
➢ Assess a "Fault mode without refrigeration dryer" in respect to the further use of the compressed air.

After a fault occurs in the refrigeration dryer, the SIGMA CONTROL 2 shut the machine down. In order to ensure compressed air supply 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.

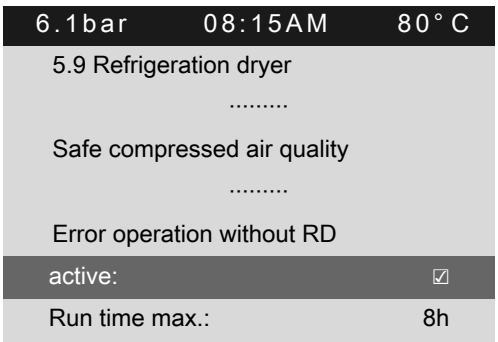
Precondition The operator decides: Compressed air supply has a higher priority than the compressed air quality
Access level 2 is activated.

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



Header
Menu
Active line
Running time (fixed)

4. Press «Enter».
   The setting mode is active.
5. Press the «Up» key.
   The check box is activated.



Header
Menu
Active line
Running time (fixed)

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

Result "Fault mode without refrigeration 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 refrigeration dryer is defective.

8.9 Setting the machine for local mode

In local mode the machine is regulated with the nominal pressure *pA* or *pB*. The controller offers the following modes of operation:

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

Tab. 64 Operating modes in local operating mode (local mode)

➢ Set the nominal pressure as described in chapter 8.4.

Overview

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

8.9.1 Menu Load control

Precondition Access level 2 is activated.

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

8.9.2 Setting the nominal pressure change via timing program



Note the setting sequence:

➢ First, set the timing program.

➢ Then select the operating mode.

Overview

- Deleting an existing timing program
- Entering the weekday for the first switching point
- Enter the time of the first switching point.
- Set the nominal pressure for the first switching point *pA* or *pB*
- Set up any further switching points.
- Select the operating mode *pA/pB Clock* : see chapter 8.9.3.3.

User-defined timer program

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

Tab. 65 User-defined timing program for nominal pressure change

When setting a clock programme 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

- Base load period: Weekdays from 06:30AM–05:00PM, Fridays 06:30AM–03:00PM
- Low load period: Midday from 12:00PM–01:00PM and remaining time

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

No.:	Weekday	Time	Nominal 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: Switching points, nominal pressure change

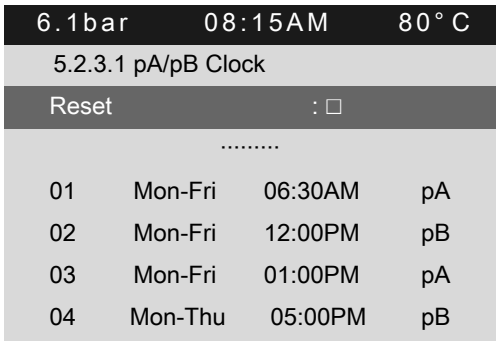
Deleting an existing timing program

Delete an existing timing program as follows:

Precondition Access level 2 is activated.

1. Open the 5.2.3 *<Configuration – Pressure control – Load control >* menu.

2. Use the «Up» or «Down» keys to select the *pA/pB Clock* line.
3. Press the «Enter» key.
   The *Timing program* menu is displayed.
4. Use the «Up» or «Down» keys to select the *Reset* line.

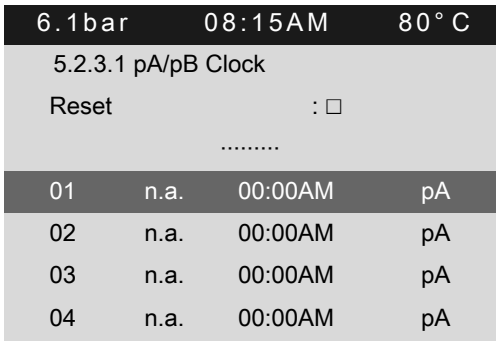


5. Press the «Enter» key.
   The check box *Reset:* will flash.
6. Press the «UP» key.
   The check box is activated.
7. Press the «Enter» key.
   The timing program is now deleted.

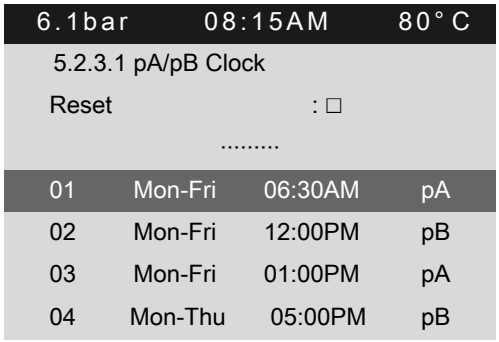
Setting the switching point

Precondition Access level 2 is activated.

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



2. Press the «Enter» key.
   The display for the set operating mode flashes.



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

8.9.3 Setting the nominal pressure change via timer

Overview

- Delete the old timer configuration, if necessary
- Set timer period *pA* and *pB*
- Set starting point for *pA* or *pB*
- Select the operating mode *pA/pB Cycle* : see chapter 8.9.3.3

8.9.3.1 Set timer period pA and pB

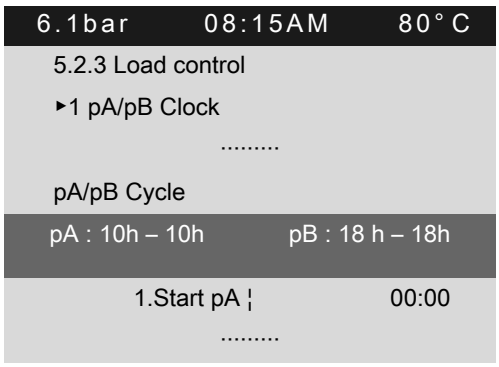
Observe and keep to the configuration sequence. The *pA/pB Cycle* operating mode must not be activated when configuring the timer period.

➢ First set the timer and then the operating mode, or set another operating mode beforehand.

Precondition Access level 2 is activated.

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

6. Press the «Enter» key.
   The setting is applied.

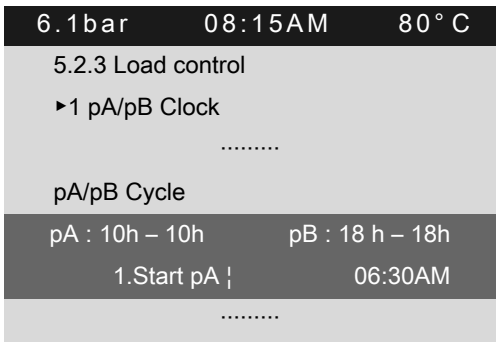


Header
Menu
Active line, manually set setpoint value – automatically elapsing value (example)

7. Press the «Right» key.
8. Set the cycle duration for *pB* in the same way.
9. Press the «Enter» key.
   The cycle duration for the nominal pressure *pA* and *pB* is set.

8.9.3.2 Set starting time for pA or pB

1. Use the «Up» or «Down» keys to select the *1.Start pA* line.
2. Press the «Right» key.
3. Press the «Enter» key.
   The display for hours, *00: 00* flashes.



Header
Menu
Active line, starting time

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

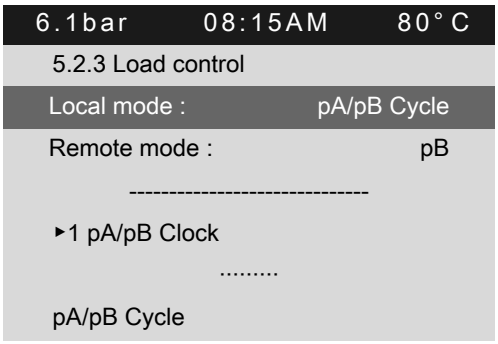
Result The starting time for *pA* is set.

The cycle is set to start with *pB* .
➢ Press the «Enter» key and adjust with «Up» *1.Start pB* key.

8.9.3.3 Setting local mode

Precondition 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 the «Up» or «Down» keys to select the *Local mode* line.
3. Press the «Enter» key.
   The display for the set operating mode flashes.



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

Result The timer setting is completed.

8.10 Setting the machine for master control operation

8.10.1 Overview of the different master operating modes

The controller offers several possibilities to work together with other controllers:

Method	Description	Section
Master control with SAM 4.0	The operating mode settings on the SIGMA CONTROL 2 must be changed via a SIGMA NETWORK to enable control by a SIGMA AIR MANAGER 4.0.	8.10.2
Interconnected operation via PROFIBUS (only available with SIGMA CONTROL 2 - prepared for connection to a control centre with optional communications module)	Using the PROFIBUS Master (e. g. SIGMA AIR MANAGER), the controller (and therefore the machine) receives, for example, the LOAD, IDLE or local mode command. 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 receive the command to switch between the two system setpoint pressures pA and pB from the master.	8.10.4

Method	Description	Section
Master control via LOAD remote contact. Master control via a LOAD remote contact is another method of controlling the machine externally.	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 pre-selection	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 flow rate, SIGMA CONTROL 2 controls the pressure switch via a floating relay output.	8.10.8.1
	On machines supplying an unequal flow rate, the pressure ranges are matched to each other.	8.10.8.2

Tab. 67 Master control (interconnected operation) – 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”)

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

Access level 2 is activated.

The remote control is activated (see chapter 8.2.13)

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.

6.1bar 08:15AM 80°C	Header
8.1.1 IP configuration	Menu
IP address 169.254.100.103	active line, factory setting
Subnet mask 255.255.000.000	
Gateway 169,254,100.97	
DNS Server 1 169,254,100.97	
DNS Server 2 169,254,100.97	
Restart network ☐	

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 8.2.14).

Setting 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.

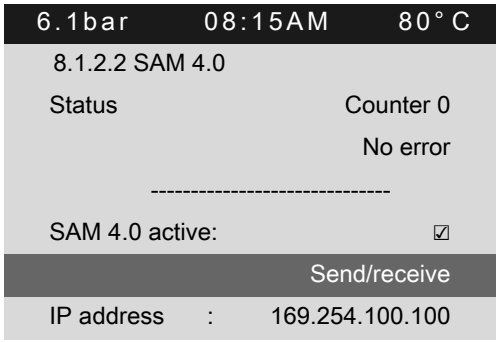
1. Open the 8.1.2.2 *<Communication – Ethernet/SIGMA NETWORK – Connections – SAM 4.0>* menu.
2. Use «Up» or «Down» to select the *SAM 4.0 active:* line.

6.1bar 08:15AM 80°C	Header
8.1.2.2 SAM 4.0	Menu
Status Counter 0	
No error	

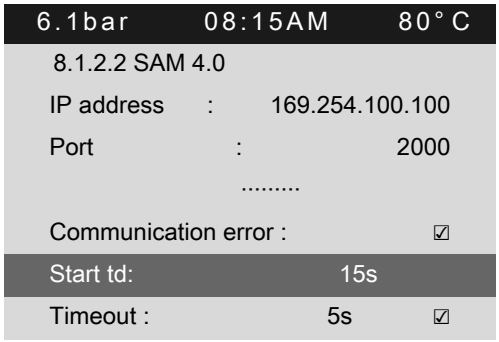
SAM 4.0 active: ☑	Active line
Send	
IP address : 169.254.100.100	

3. Press «Enter».
   The *SAM 4.0 active:* check box flashes.
4. Press «UP».
   The check box is activated.
5. Press «Enter».
   The setting is applied.
6. Press the «DOWN» key.
7. Press «Enter».
   The currently active operating mode flashes.

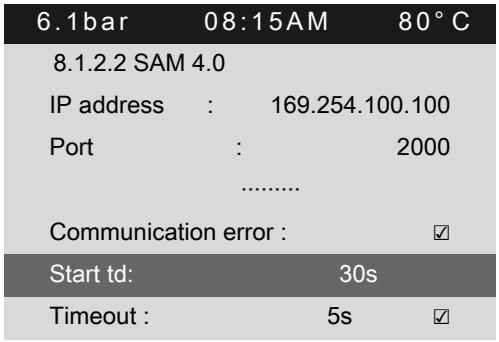
8. Use «Up» or «Down» to set the *Send/receive* value.



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



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



13. Press the «Enter» key.
    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.

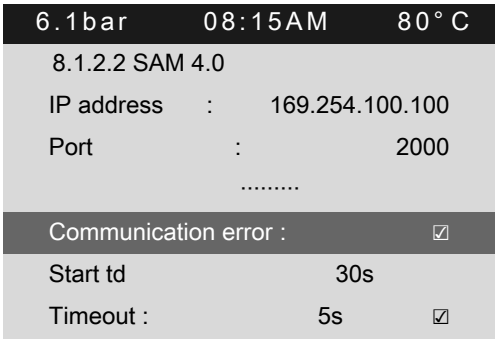
8.10.2.1 Reaction in the event of a communication malfunction

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 voltage 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.



Header
Menu
active line

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 Setting PROFIBUS operation (SIGMA AIR MANAGER)

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

Overview:

- PROFIBUS DP-V0 Retrofit Kit required
- Establishing the electrical connection
- Set the remote operating mode *pB*.
- Set 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	Earth
6	+5 V for bus terminal
7	Spare
8	PROFIBUS connection A
9	Spare

Tab. 69 Pin assignment of SUB-D 9-pole interface on the PROFIBUS module

Interface plug wiring

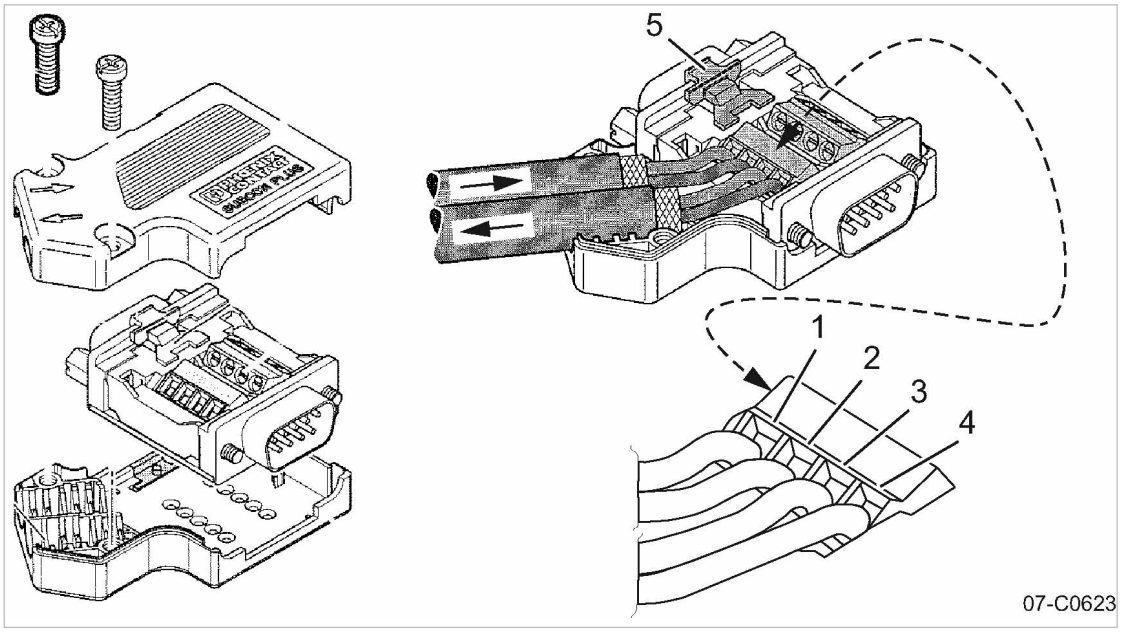


Fig. 29 Wiring of the PROFIBUS connection

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

Electrical diagram example with SIGMA AIR MANAGER (extract)

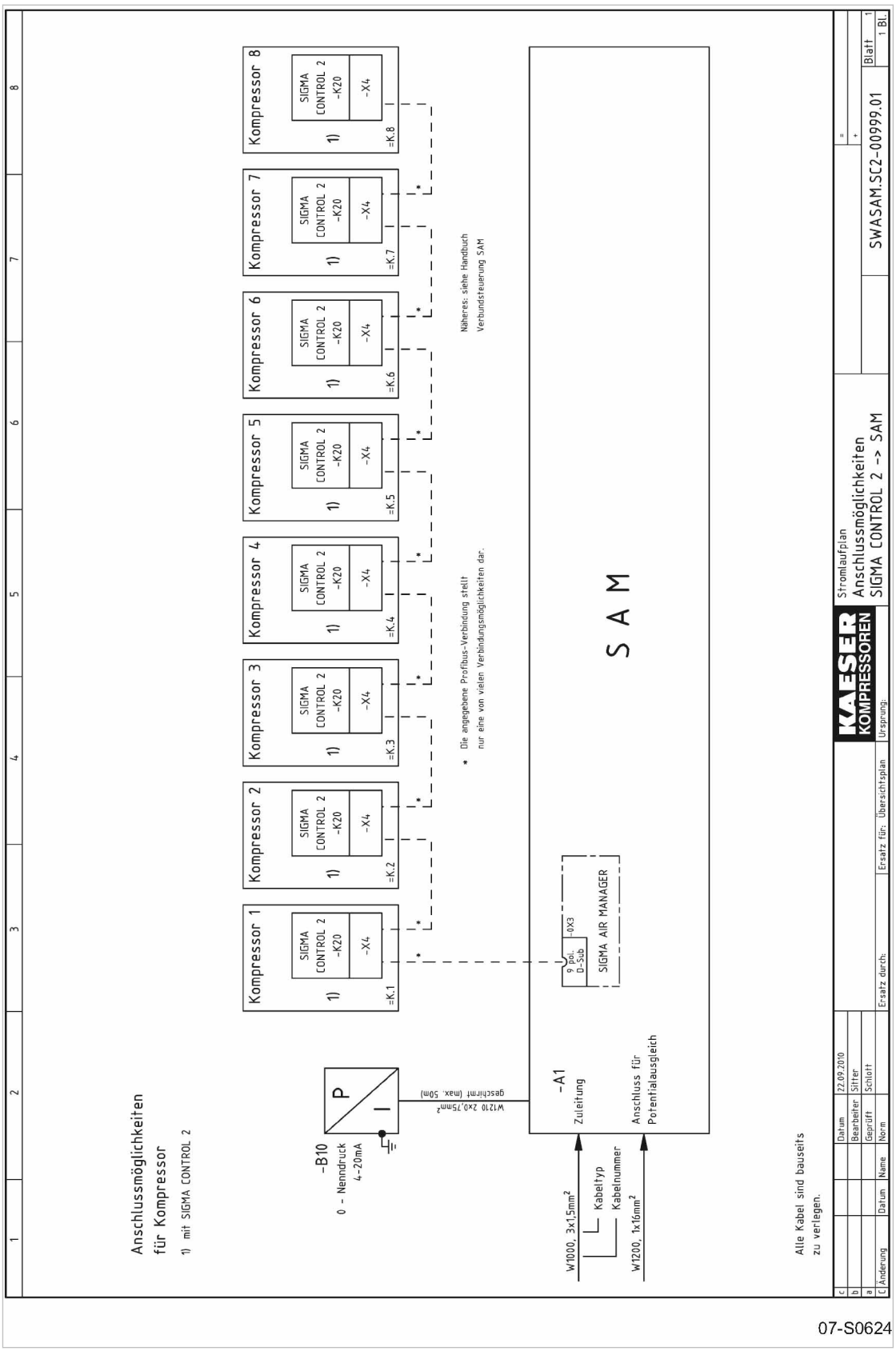


Fig. 30 Electrical diagram example with SIGMA AIR MANAGER

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 connection.

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

8.10.3.1 Installing the communication module

The SIGMA CONTROL 2 communication interface is closed 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.

Remove the plastic cover.

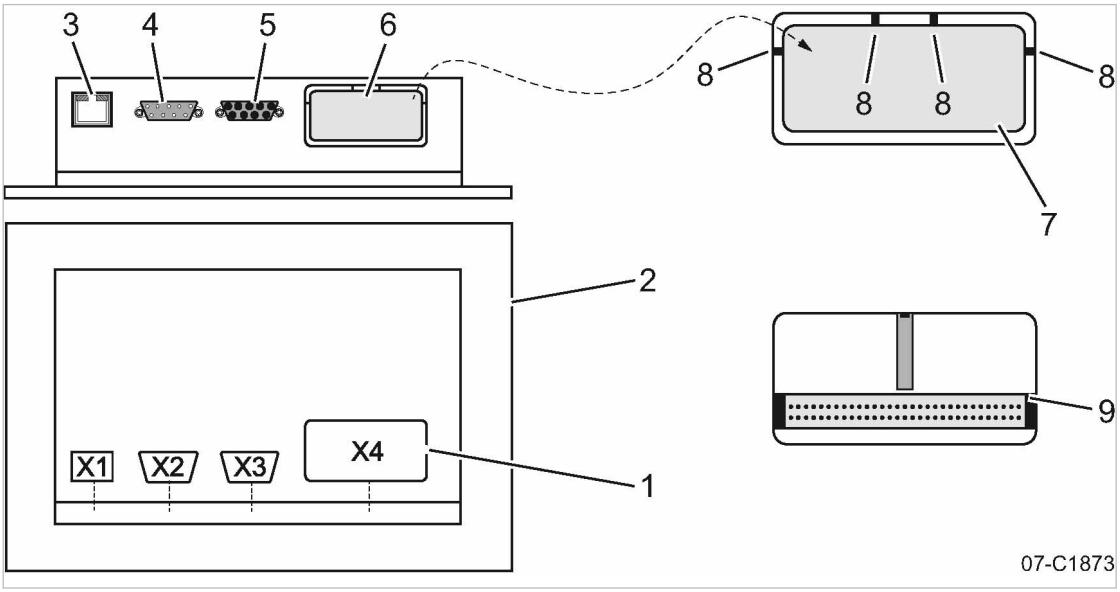


Fig. 31 Communication interface

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.

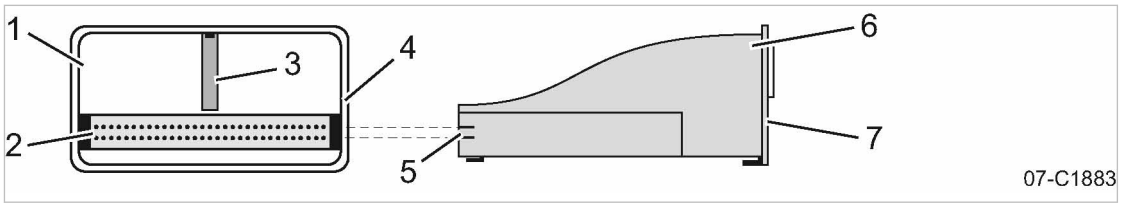


Fig. 32 Insert the communication module.

[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:

- Set the slave number
- Set reaction for a communication malfunction.
- Activate the communications module
- Activate the remote mode

Precondition The communication module is plugged and screwed into the X4 interface.
The bus is wired to the bus master.
The machine's voltage supply is activated.
The machine is parametrised as a slave in the bus master.
The bus master is operational.

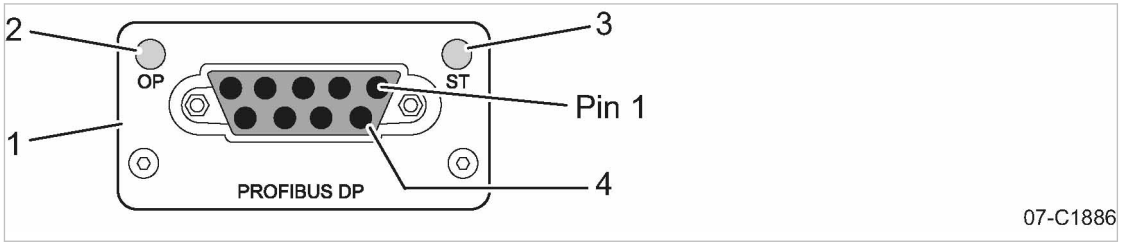


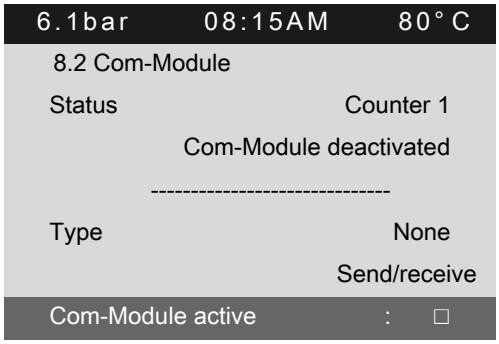
Fig. 33 Front plate communication module PROFIBUS

[1] Communication module PROFIBUS
[2] Operation *LED*
[3] Status *LED*
[4] PROFIBUS-Interface

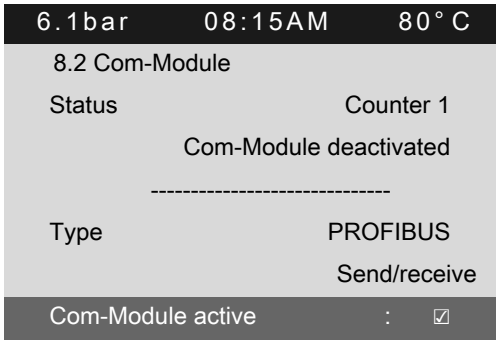
➢ Proceed as shown.

Activate the communications module

1. Open 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».
   The *Com-Module active* check box flashes.



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



6. Press «Escape» repeatedly to leave this menu.

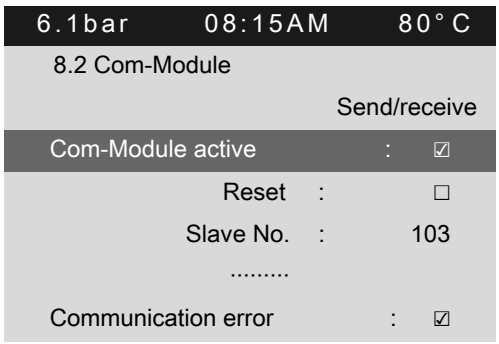
Set the slave number



You must set the slave address for the communication with the SIGMA AIR MANAGER.
When connected to a SIGMA AIR MANAGER, the slave address is determined as follows:
Compressor number used at SIGMA AIR MANAGER +102.

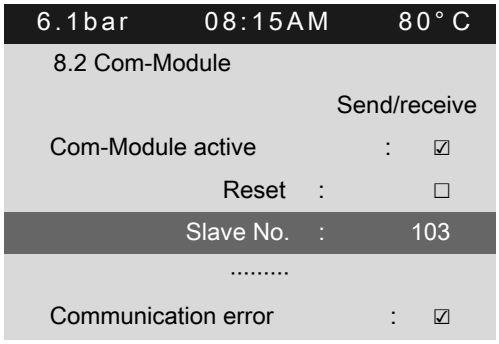
Precondition Access level 2 is activated.

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



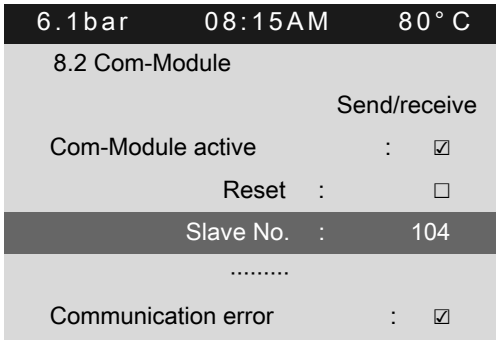
Header
Menu
Active line

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



Header
Menu
Active line

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



Header
Menu
Active line
Monitoring for communication malfunction is active.

Result Slave address *104* is set.

Reaction in a PROFIBUS communication malfunction

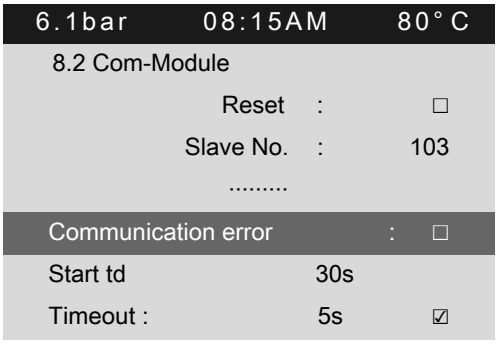
Exchange of data with a PROFIBUS connection takes place in fixed cycles. The PROFIBUSconnection can be monitored with the help of the cycle time:
The bus connection is considered to be interrupted if no data is exchanged between the bus master and the controller (as bus subscriber) after expiry of a 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.

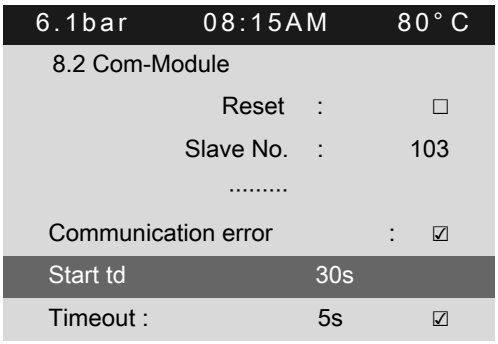
- Settings for SIGMA AIR MANAGER **without** SIGMA AIR CONTROL PLUS
  - Start: 30 seconds
- Settings for SIGMA AIR MANAGER **with** SIGMA AIR CONTROL PLUS
  - Start: 40 seconds

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



Header
Menu
active line

2. Press «Enter».
   The check box *Communication error* will flash.
3. Press «Up».
   The check box is activated.
   The monitoring for communication malfunctions is active.
4. Use «Up» or «Down» to select the *Starttd* line.



Header
Menu
Communication monitoring is activated
active line

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

Activating the remote control

➢ Activate remote control see chapter 8.2.13.

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

8.10.4 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 with the controller configured as a slave and provides the instruction for the *pA* and *pB* target pressures.

Example: Two machines with different flow rates

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

- A clock program switches between the *pA* and *pB* target pressures.
- At peak load times, pressure is regulated to the *pA* target pressure.
  During periods of low air demand, pressure is regulated to *pB* target pressure (e.g., at weekends).
- The machine with the lower flow rate is the slave.
  In times with lower compressed air demand, the machine with the lower flow rate is used more frequently.

Example: Two machines with equal flow rates

- Local operating mode of the master: Local mode *pA/pB Cycle*.
  (A timer switches between *pA* and *pB* target pressure).
  The timer ensures even loading of both machines. The target pressures are set the same for both machines.
- For cycle time 1, the master regulates to *pA* and gives the slave the signal for *pB*.
  For cycle time 2, the master regulates to *pB* and gives the slave the signal to regulate 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	Establishing the electrical connection	8.10.4.1
Both	Set the target pressures for both, *pA* and *pB*. The pressure for the *pA* and *pB* switching points 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	Activating the remote control	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 settings

8.10.4.1 Establishing 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 100 m 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)

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

Install the Ethernet cable

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

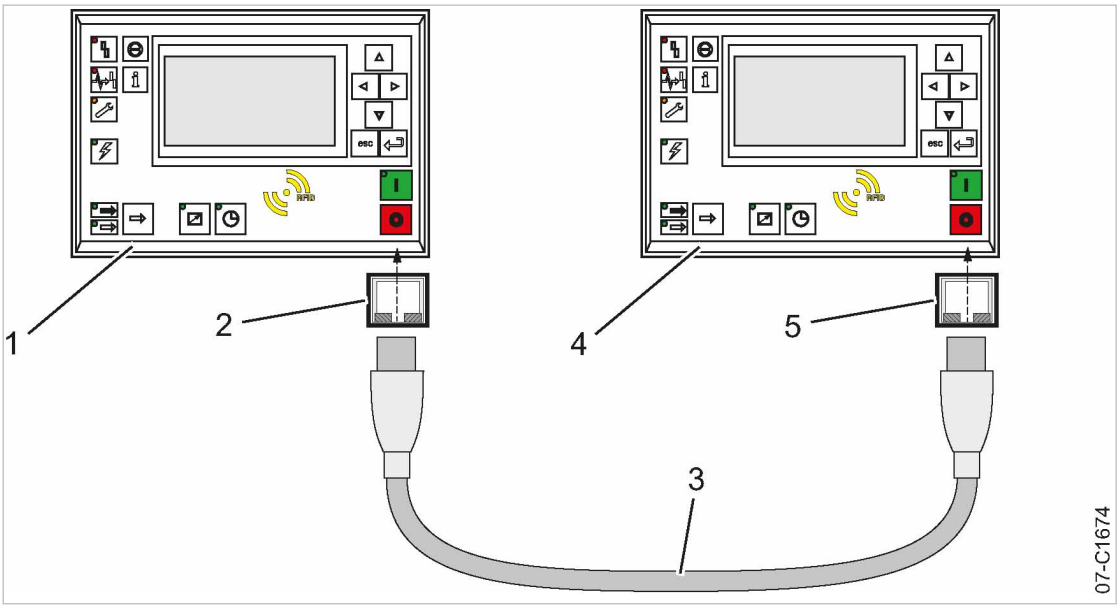


Fig. 34 Direct connection of two SIGMA CONTROL 2

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

➢ Install the Ethernet cable between the two machines.

When you connect 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.

Connect 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. Lead 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. Attach the RJ45-plug to the cable end.
4. Plug the RJ45 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.

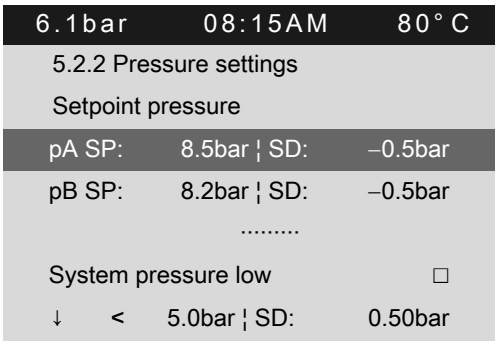
1. Attach the RJ45-plug to the cable end.
2. Plug the RJ45plug into the network socket until it latches.

8.10.4.2 Setting the controller of machine 1 as master

Precondition The electrical connection is made.
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».
   The value for *pA* flashes.



3. Use «Up» or «Down» to set the *pA* value.
4. Press «Enter».
   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.

Setting the times

SIGMA CONTROL 2 provides the following options for selecting times:

- 1: Clock program
- 2: Timer

1. Decide for clock program **or** timer.
2. Follow the instructions below for the settings required.

Alternative 1: Set clock program

Precondition The electrical connection is made.
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.
Access level 2 is activated.

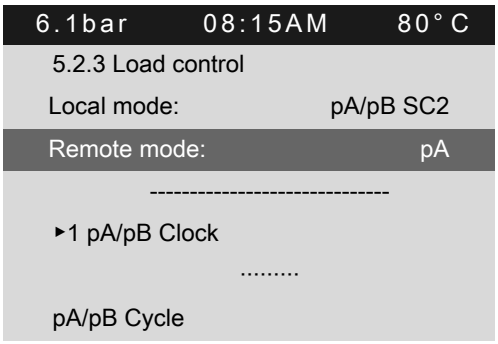
1. Setting the timer for *pA* and *pB*; see chapter 8.9.3.1.
2. Setting the starting time for *pA* or *pB*; see chapter 8.9.3.2.

Alternative 3: Setting the base load change switching

In this mode the automatic base load change between the two machines is carried out in a manner that idle times of the two compressors are prevented and the energy-efficiency of the compressed air generation is increased.

Precondition The electrical connection is made.
Access level 2 is activated.

➢ Setting local operating mode to *pA/pB SC2*.



Header
Menu
Active line, current operating mode

Master IP configuration

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

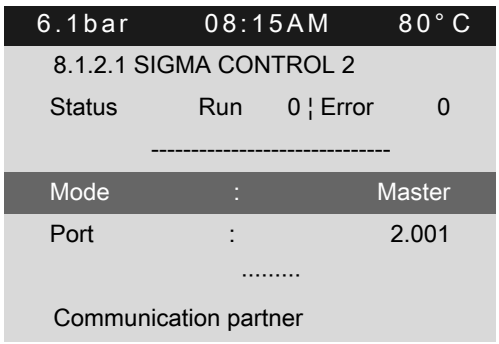
Example:

- IP addressController machine 1 (Master mode): 169.254.100.101
- IP address Controller machine 2 (Slave): 169.254.100.102

Precondition The electrical connection is made.
Access level 2 is activated.

1. Set IP address for the master: For instructions, see chapter 8.2.14, 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».
   The setting mode is active.



5. Use «Up» or «Down» to set Machine 1 *Master* operating mode.
6. Press «Enter».
   The setting is applied.
7. Use «Up» or «Down» to select the *IP address* line.
8. Press «Enter».
   The setting mode is active.
9. Set the IP address of the communication partner (slave, see above example).
10. Press «Enter».
    The IP address of machine 2 (slave) is set correctly.
    The setting is applied.

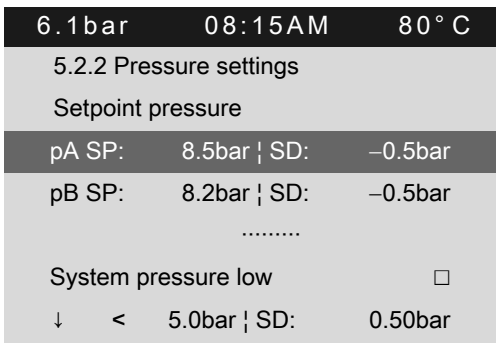
Result The controller of machine 1 is set as master.

8.10.4.3 Setting the machine 2 controller as slave

Precondition The electrical connection is made.
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».
   The value for *pA* flashes.



3. Use «Up» or «Down» to set the *pA* value.

4. Press «Enter».
   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

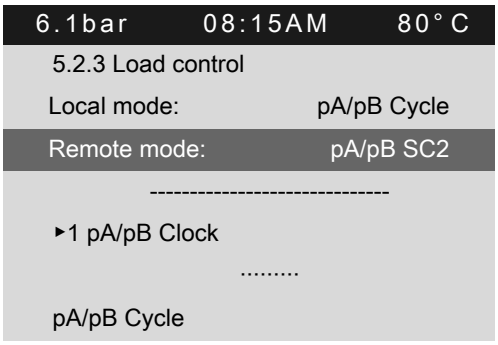
➢ Activate remote control see chapter 8.2.13.

Result SIGMA CONTROL 2 remote control is activated.

Set the remote operating mode

Precondition The electrical connection is made.
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 setting mode is active.



Header
Menu
Active line, current operating mode

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

Slave IP configuration

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

Example:

- IP addressController machine 1 (Master mode): 169.254.100.101
- IP address Controller machine 2 (Slave): 169.254.100.102

Precondition The electrical connection is made.
Access level 2 is activated.

1. Set IP address for the master: For instructions, see chapter 8.2.14, 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».
   The setting mode is active.
5. Use «Up» or «Down» to set Machine 2 *Slave* operating mode.
6. Press «Enter».
   The setting is applied.
7. Use «Up» or «Down» to select the *IP address* line.
8. Press «Enter».
   The setting mode is active.
9. Set the IP address of the communication partner (master, see above example).
10. Press «Enter».
    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

- Establish the electrical connection for LOAD remote contact
- Set the LOAD remote contact operating mode and assign the input
- If required, set temporary pressure increase *pE*.
- Activating the «remote control» key

➢ Set master control as described below.

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

Machine (example)

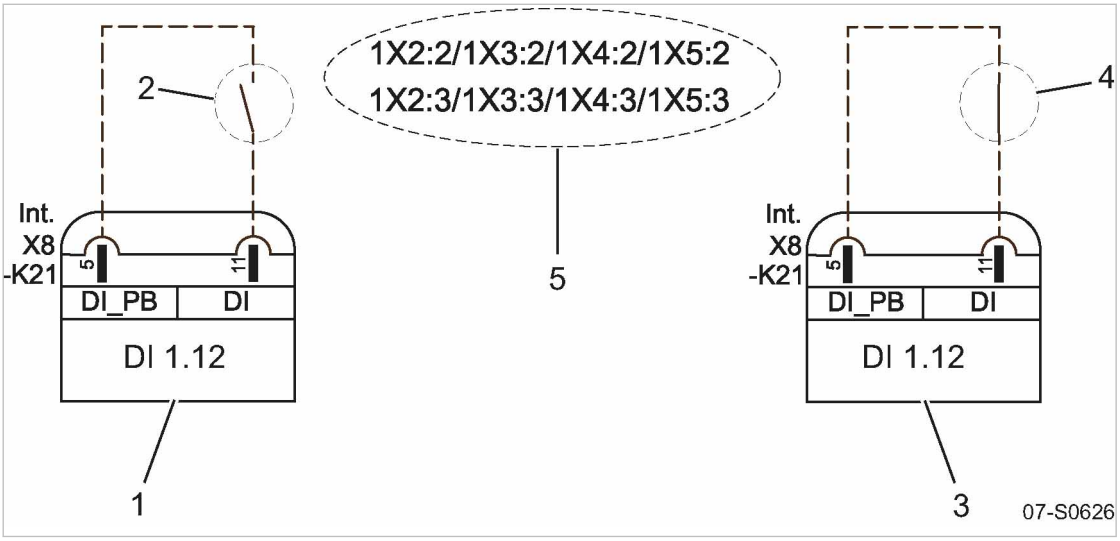


Fig. 35 LOAD remote contact

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

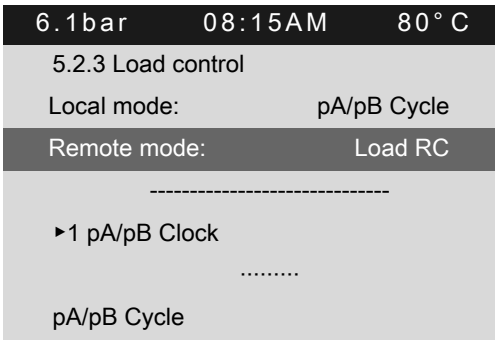
➢ Establish the electrical connection for DI 1.12 according to the diagram.

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

Precondition Access level 2 is activated.

Set the LOAD remote contact operating mode

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 *Remote mode* flashes.



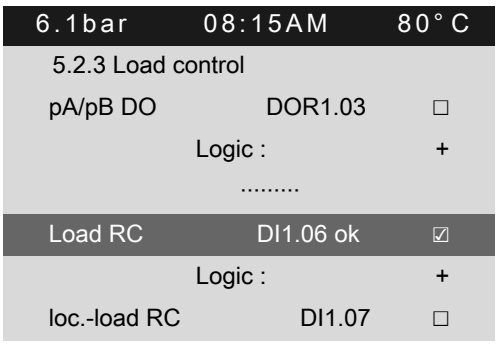
4. Use «Up» or «Down» to set the *Load RC* input.
5. Press «Enter».
   The LOAD remote contact operating mode is set.

Assign 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».
   The *DI* display flashes.



Header
Menu
Active line; standard DI 1.13

3. Use «Up» or «Down» to select the input for the LOAD remote contact.
4. Press «Enter».
   The setting is applied.
5. Press the «Right» key.
6. Press «Enter».
   The check box *Load RC* will flash.
7. Press «Up».
   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 8.2.13.

Result SIGMA CONTROL 2 remote control is activated.

8.10.6 Setting the master control with local/LOAD remote contact

Overview

- Establishing the electrical connection
- Set the local/LOAD remote contact operating mode and assign the input.

- Set local operating mode, if necessary.
- Activating the «remote control» key

➢ Set master control as described below.

8.10.6.1 Establishing the electrical connection

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

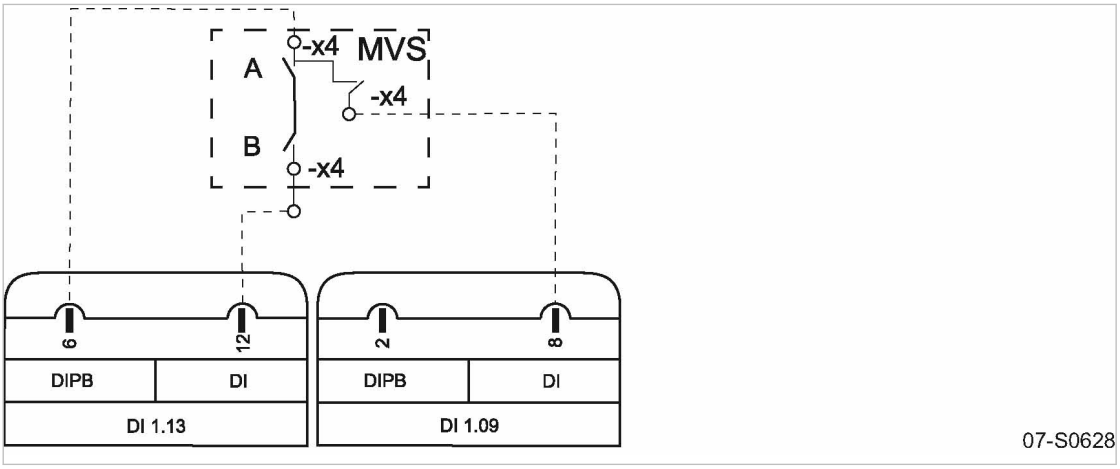


Fig. 36 Wiring diagram for local/LOAD remote contact:
Ⓐ Changeover between automatic and manual modes
Ⓑ LOAD/IDLE contact

➢ Make the electrical connection according to the diagram.

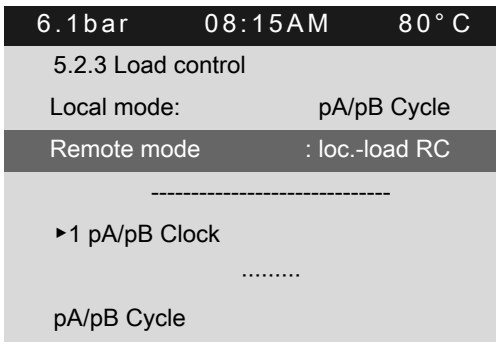
8.10.6.2 Set the local/LOAD remote contact operating mode and assign the input.

Precondition Access level 2 is activated.

Set local/LOAD remote contact operating mode:

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

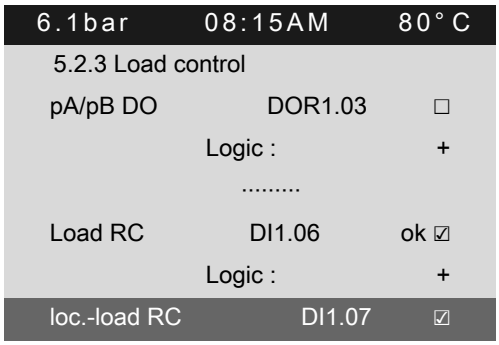
3. Press «Enter».
   The currently active operating mode *Remote mode* flashes.



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

Assign 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.



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

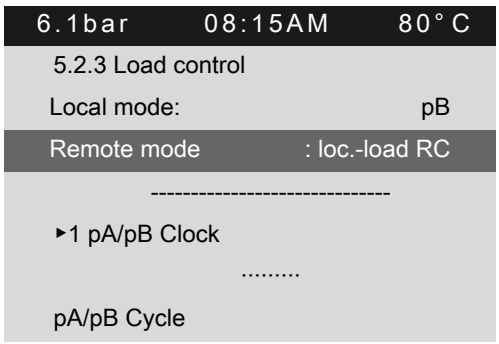
The *pB* nominal pressure is normally set for local operation.

➢ When setting the *pB* nominal 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 nominal pressure).

Precondition 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 *Local mode* line.

3. Press «Enter».
   The operating mode display flashes.



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

8.10.6.4 Activating the remote control

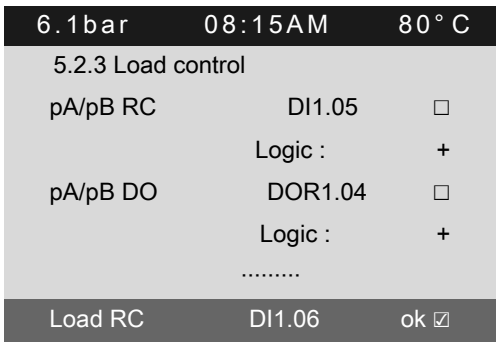
➢ Activate remote control see chapter 8.2.13.

Result SIGMA CONTROL 2 remote control is activated.

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

Precondition 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».
   The *DI* display flashes.



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

8.10.7 Setting the nominal pressure pre-selection via remote contact

The signal to changeover from nominal pressure *pA* to nominal pressure *pB* comes from an input contact. If a signal is activated at the input, the nominal pressure is regulated to *pB*.

Overview

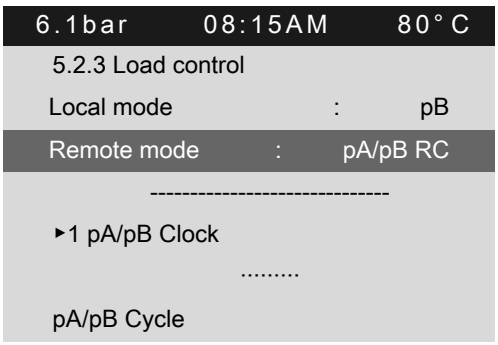
- Setting up remote contact mode pA/pB
- Assigning the remote contact input
- Activating the remote control

➢ Set the nominal pressure pre-selection as described.

8.10.7.1 Setting up remote contact mode pA/pB

Precondition The electrical connection is made.
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.



Header
Menu
Active line

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

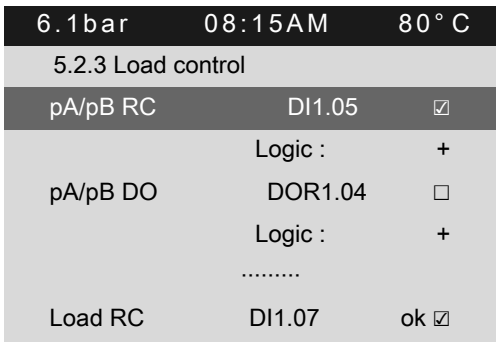
Result The *pA/pB RC* operating mode is set.

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.



Header
Menu
Active line

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

➢ Activate remote control see chapter 8.2.13.

Result SIGMA CONTROL 2 remote control is activated.

8.10.8 Master control for machines regulated by pressure switch

➢ Set the master control as described below.

8.10.8.1 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 with the same flow rate are to run in sequence as base load or peak load machines.

Suggestion:

- Set the clock program or clock on SIGMA CONTROL 2.
- Select local mode with time control pA/pB Clock or clock pA/pB Cycle.
- Select the network nominal 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 nominal 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 energised 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

- Establishing the electrical connection
- Set the network nominal pressure pA and pB.
- Set operating mode in local operating mode
- Assigning the floating relay contact
- Set local operating mode

Establishing the electrical connection

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

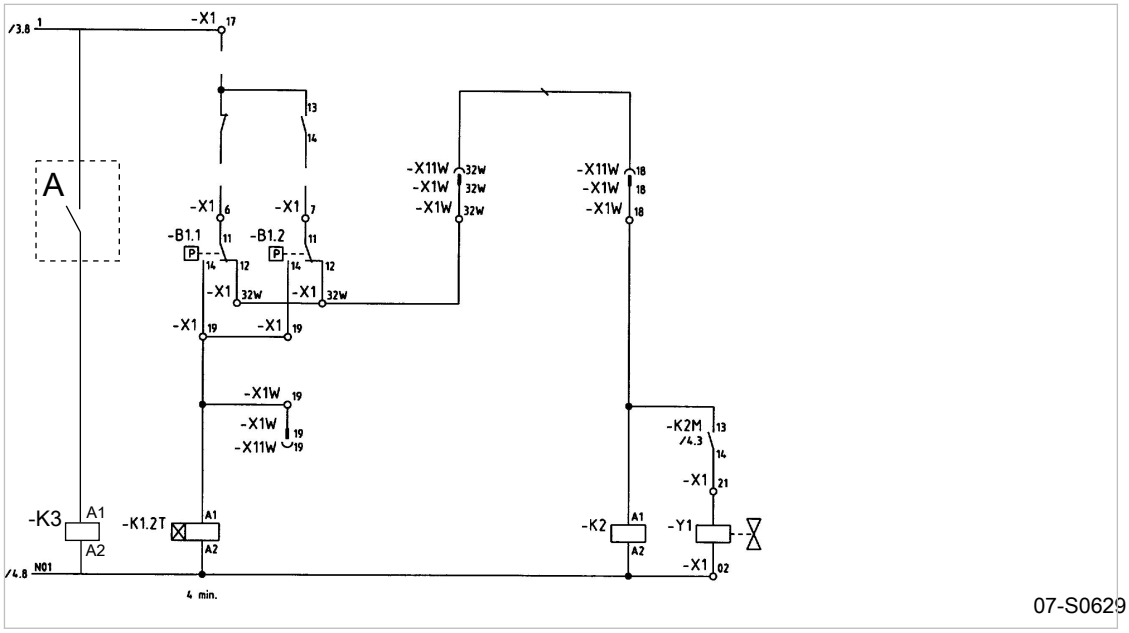


Fig. 37 Machine with pressure switch regulation
Ⓐ potential-free contact SIGMA CONTROL 2

➢ Make the electrical connection according to the diagram.

Set the network nominal pressure pA and pB.

Precondition Access level 2 is activated.
The electrical connection is made.

1. Open 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».
   The setting mode is active.
   The *Setpoint pressure pA*display flashes.

6.1bar 08:15AM 80°C	Header
5.2.2 Pressure settings	Menu
Setpoint pressure	
pA SP: 8.5bar ¦ SD: –0.5bar	Active line
pB SP: 8.2bar ¦ SD: –0.5bar	
.....	
System pressure low □	
↓ < 5.0bar ¦ SD: 0.50bar	

4. Use «Up» or «Down» to set the value for *pA*.
5. Press «Enter».
   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 «Escape» repeatedly to leave this menu.

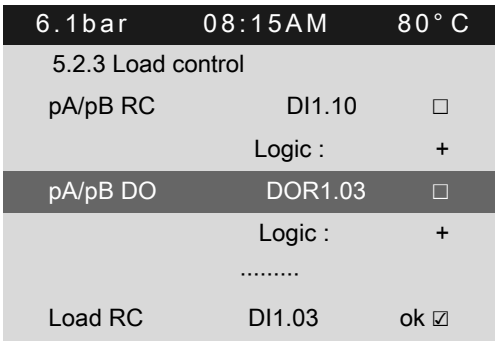
Setting local mode

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

Assigning the potential-free contact (activate)

Precondition 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.



Header
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.

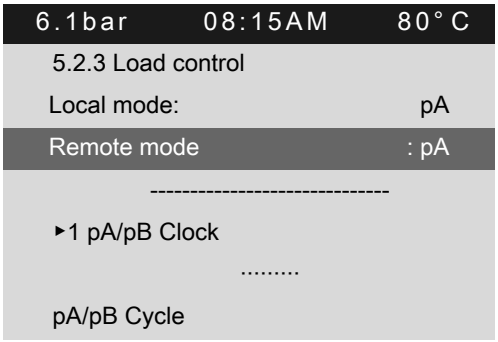
Result This output can now be used for the changeover between the two pressure switches.

Setting local mode

Precondition 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 *Local mode* line.



Header
Menu
Active line, current operating mode

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

8.10.8.2 Master control without an electrical connection

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

Suggestion:

- Select the system set-point 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 Clock.
- Activate the compressor timer

Function diagram:

Period t1–t7: high air demand	Period t8–t14: low 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: Network nominal pressure pA reached. BSD switches to IDLE.	t10: Network nominal 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.

Period t1–t7: high air demand	Period t8–t14: low air demand
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

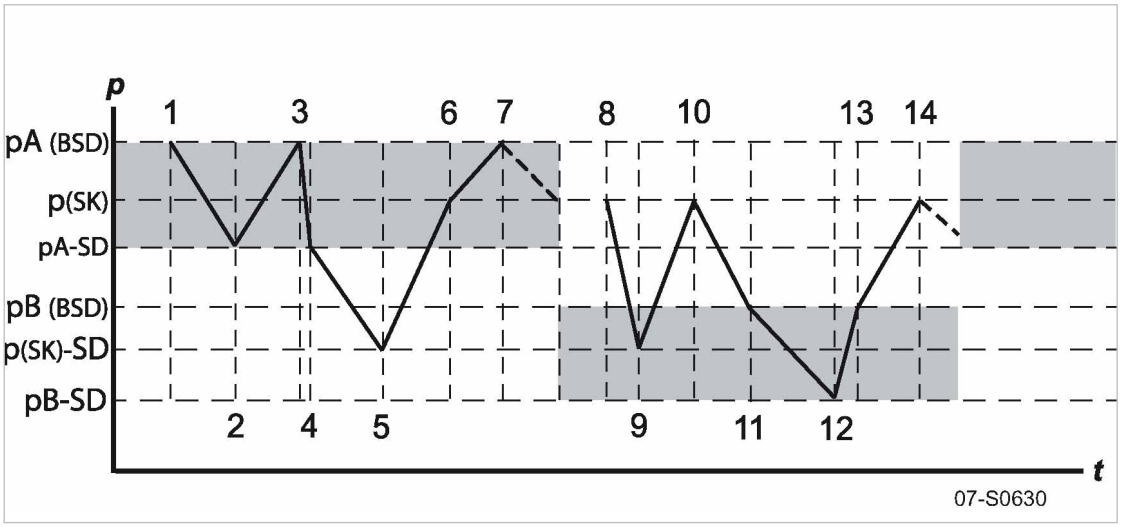


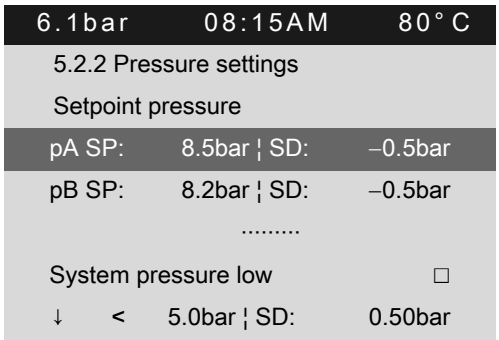
Fig. 38 Function diagram

SD Switching differential
p Pressure
t Time

Set the network nominal pressure pA and pB.

Precondition Access level 2 is activated.

1. Open 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».
   The *pA* display flashes.

4. Use «Up» or «Down» to set the *pA* value.
5. Press «Enter».
   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 «Escape» repeatedly to leave this menu.

Set clock program

➢ Set the clock program as described in chapter 8.9.2.

8.10.9 Examples of time settings for equal overall load

Requirement:
Two machines with comparable flow rate are to be equally utilized. Versions A, B and C describe the different possibilities of achieving this requirement.



A detailed description for creating a timing program or setting the timer can be found in Chapter 8.9.

Variant A: Daily switch between network nominal pressure pA and network nominal pressure pB after 24 hours

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

Precondition The network nominal 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 network nominal pressure *pA* and network nominal pressure *pB* (local operating mode *pA/pB Clock*.

Precondition The network nominal 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 timing program triggers the switch between network nominal pressure *pA* and network nominal pressure *pB* (local operating mode: *pA/pB SC2Clk*).

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

➢ The timing 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
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 timing program for equal duty cycling during the week

8.11 Setting input and output signals

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

The various options are explained in the following chapters:

- 8.11.1: Output operational states of machine on digital outputs
- 8.11.2: Output input signals on the display
- 8.11.3: Output measured values on the display
- 8.11.4: Switching and/or triggering messages with thresholds



The controller only allows assignment of spare inputs and outputs.
Any assignment of a pre-assigned input or output is discarded 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.

➢ Set the inputs and outputs as described below.

8.11.1 Output operational states of machine on digital outputs

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 engine running	

Message	Explanation	Output
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	Informs you whether the «Remote control» key is active	
Clock active	Informs you whether the time control for the compressor («Time control» key lights up in green) is active	
Clock contact	Timer with which a relay/transistor output can be switched	
EMERGENCY STOP	Signals whether the EMERGENCY STOP command device has been actuated	

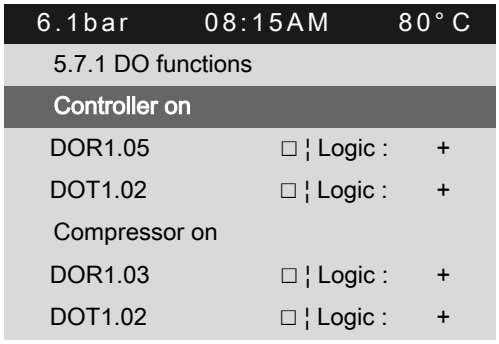
Tab. 74 Assigned output signals

8.11.1.1 DO functions menu

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

Precondition Access level 2 is activated.

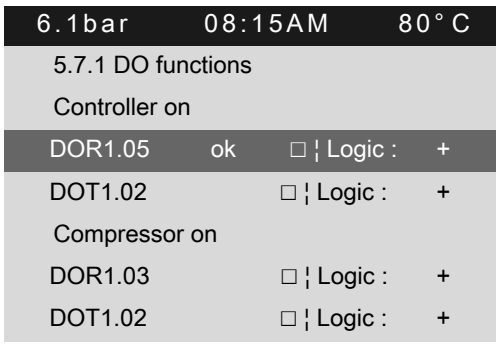
1. Open the 5.7.1 *<Configuration – I/O periphery – DO functions>* menu.
   A menu containing a list of available messages and their assigned outputs is displayed.



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 digital output.

You are missing an organised display of assigned output signals?
➢ Enter the selected output in table 74.

8.11.2 Output input signals on the display

In addition to the defined alarm and warning messages there are six further 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. Please see the machine's wiring diagram for information on free inputs.

An input signal can be classified as either a fault, 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 fault, the controller goes into the alarm state and shuts down the machine.

Overview

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

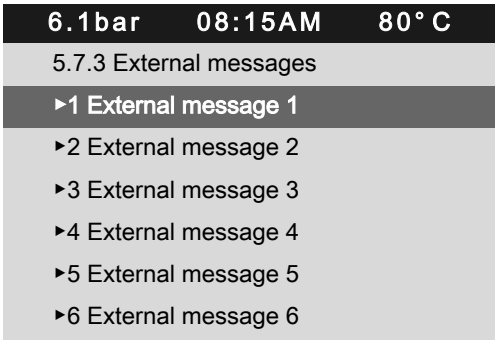
- Enter the message text
- Assign and activate the input
- Set the time delay
- Setting the logic

- Assign and activate the output
- Selecting the message type
- Activate 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

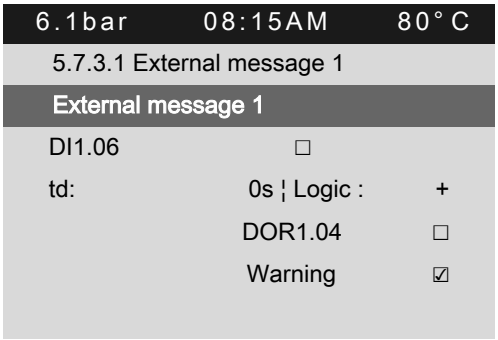


Menu
Active line with external message No. 1

8.11.2.2 Enter 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



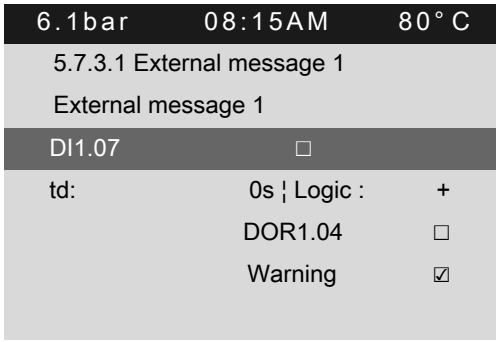
Header
Menu
Message text
No input assigned
Logic
Message type (operational, alarm, warning)

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» arrow.
   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 Assign and activate the input

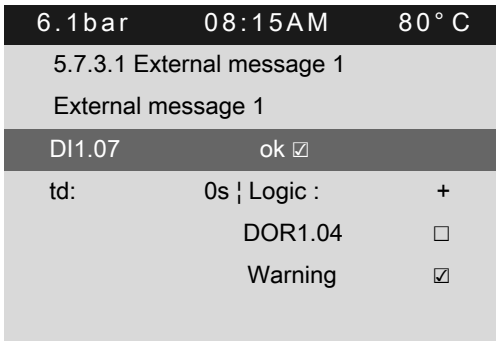
1. Use «Up» or «Down» to select the *DI* line.
2. Press «Enter».
   The display for the currently set input flashes.
3. Use «Up» or «Down» to select the input.
4. Press «Enter».
   The setting is applied.



Header
Menu
Message text
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 the «Up» key.
   The check box is activated.



Header
Menu
Message text
Input selected
Logic

Example: Warning message type

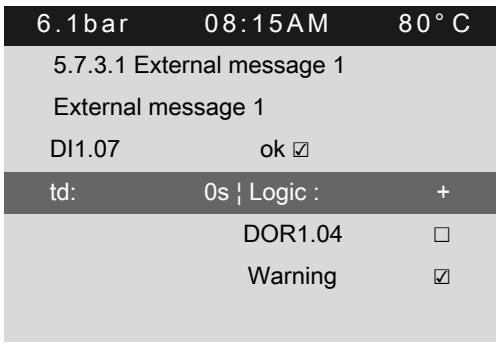
8. Press «Enter».
   ok is displayed.
   The input is assigned and activated.

8.11.2.4 Set the time delay

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



Header
Menu
Message text
Input selected
set time delay td
Example: Warning message type

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

Result The *td* delay time has been set.

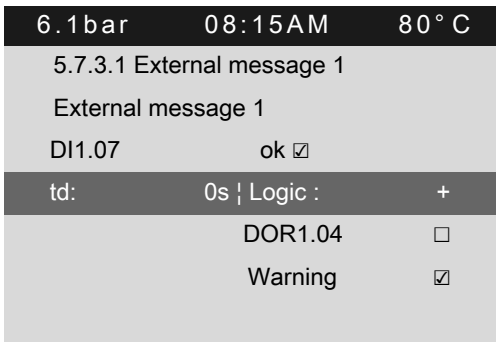
8.11.2.5 Setting the logic

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 behaviour, see table 75.



Header
Menu
Message text
Input selected
active line, set logic control field
Example: Warning message type

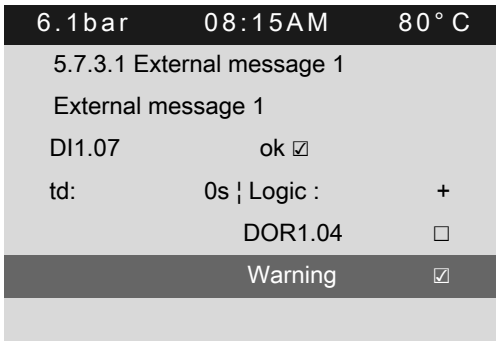
5. Press «Enter».

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.

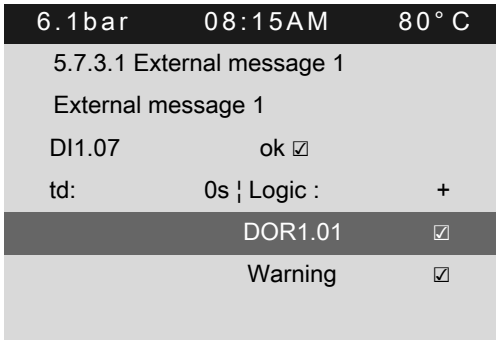


Header
Menu
Message text
Input selected
active line, set logic control field
Example: Warning message type

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

8.11.2.7 Assign and activate 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.



Header
Menu
Message text
Input selected
active line, set logic control field
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 the «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 analogue measured values you can define customised 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	Customised monitoring of the pressure value p1		
AnMod_p_2	Customised monitoring of the pressure value p2		
AnMod_p_3	Customised monitoring of the pressure value p3		
AnMod_p_4	Customised monitoring of the pressure value p4		
AnMod_T_1	Customised monitoring of the temperature value T1		
AnMod_T_2	Customised monitoring of the temperature value T2		
AnMod_T_3	Customised monitoring of the temperature value T3		
AnMod_T_4	Customised monitoring of the temperature value T4		
AnMod_I_1	Customised monitoring of the current value I1		
AnMod_I_2	Customised monitoring of the current value I2		
T-Switch inlet temperature	Customised monitoring of the intake temperature		
p-Switch pi	Customised monitoring of internal pressure pi in the oil separator tank		
T-Switch ADT	Customised monitoring of the airend discharge temperature ADT		
p-Switch pN	Customised monitoring of local network pressure pNloc at compressor output		
T-Switch PDT	Customised monitoring of the compressed air discharge temperature		

Tab. 76 Assigned analogue measured values

Overview

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

- Enter the message text
- Select and activate measured value
- Set the time delay
- Setting the logic
- Selecting the message type
- Assign and activate the output

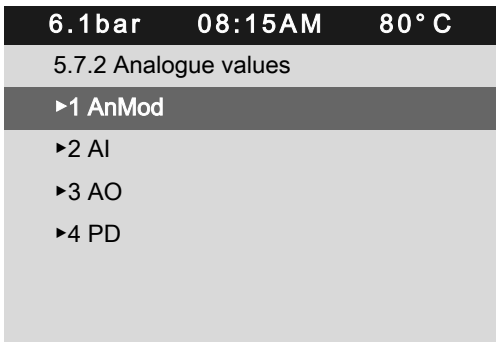
Below, the settings are displayed based on an example in the *Analogue values* menu. Use the *Switch* menu analogously for specifying the settings.

8.11.3.1 Analogue values menu

Precondition The electrical connection has been made.

Access level 2 is activated.

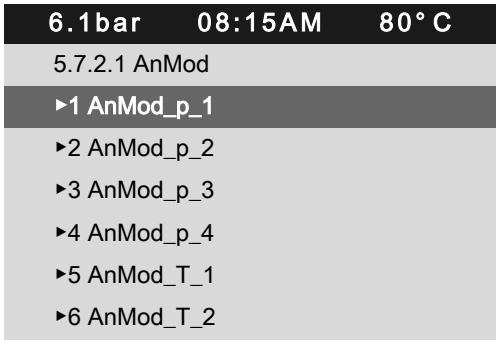
1. Open the 5.7.2 *<Configuration – I/O periphery – Analogue values>* menu.
   The *Analogue values* menu is displayed



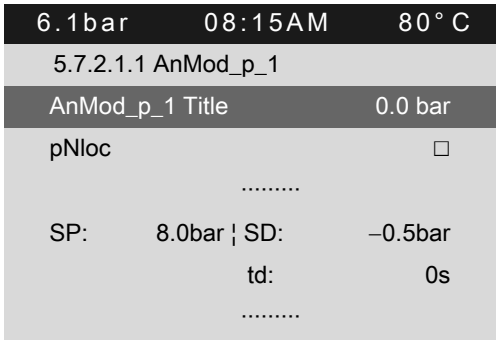
8.11.3.2 Enter the message text

In the following example, a message from the analogue 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.



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.

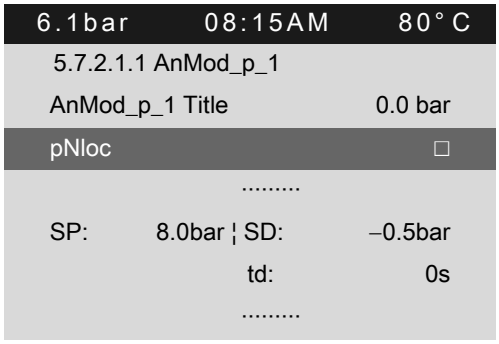


5. Press «Enter».
   The cursor is located at the first character of the message text.
   A column with alphanumeric characters is displayed.
   The selected character flashes.
6. Select the required character with the «Up» or «Down» keys.

7. Press the «Right» arrow.
   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.

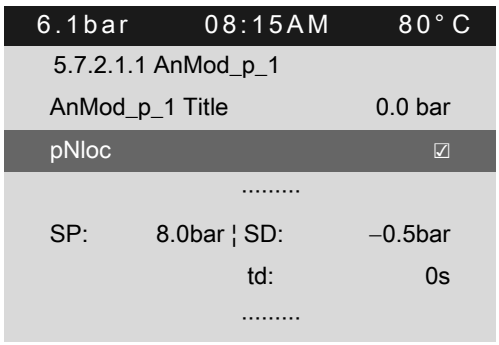
8.11.3.3 Select and activate measured value

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».



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

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

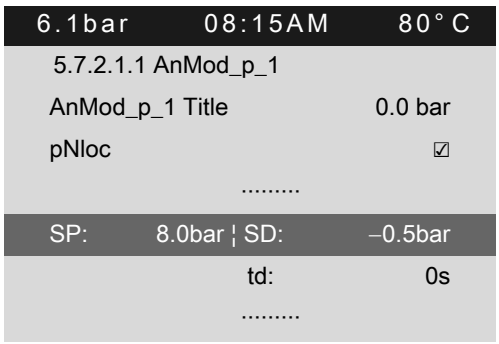


Header
Menu
Message text
selected analogue measured value, activated
Switching point (SP) and switching differential (SD)
Time delay (td)

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.



Header
Menu
Message text
selected analogue measured value, activated
Switching point (SP) and switching differential (SD)
Time delay (td)

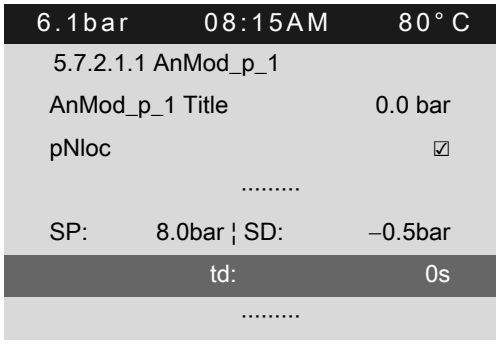
2. Press «Enter».
   The display for the current value of the switching point flashes.
3. Use «Up» or «Down» to set the *SP* value.
4. Press «Enter».
   The setting is applied.
5. If necessary, adjust the value for SD in the same manner

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

8.11.3.5 Set the time delay

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



Header
Menu
Message text
selected analogue measured value, activated
Switching point (SP) and switching differential (SD)
Time delay (td)

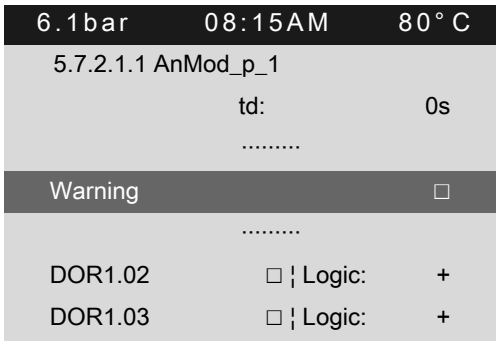
3. Use «Up» or «Down» to set the time delay in seconds.
4. Press «Enter».

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.



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

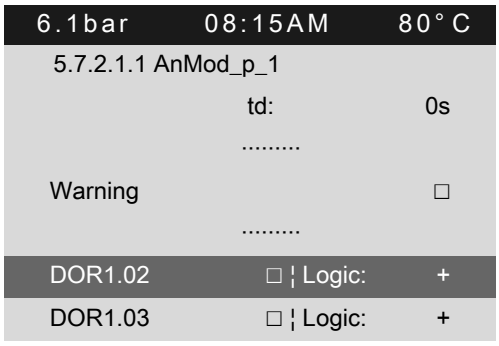
4. Press «Enter».
5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the message type flashes.
7. Press the «Up» key.
   The check box is activated.
8. Press «Enter».

Result The message type is set and activated.

8.11.3.7 Assign and activate 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. Select the output with the «Up» and «Down» keys.
4. Press «Enter».
   The setting is applied.



Header
Menu
Time delay (td)
set message type, in the example: Warning
active line (DOR output)

5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the output flashes.
7. Press the «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 behaviour, 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 analogue AnMod_p_1 input is available as a message and as output signal at the selected DOR output.

8.11.4 Switching and/or triggering messages with thresholds

Some measured values of the controller can be used for customised messages and/or other switching functions.

The following measured values are available:

Measured value	Explanation	Message #	Output
System pressure pNloc	Threshold for pressure *System pressure pNloc* (local network pressure at compressor output)	0095 O/W/A	
Internal pressure pi	Threshold for pressure *Internal pressure pi* (internal pressure pi in the oil separator tank)	0093 O/W/A	
ADT	Threshold for temperature *ADT* (discharge temperature)	0094 O/W/A	
Inlet temperature	Threshold for temperature *Inlet temperature* (inlet temperature)	0092 O/W/A	
PD temperature	Threshold for temperature *PD temperature* (compressed air discharge temperature)	0096 O/W/A	
n Compressor motor [1)]	Threshold for the compressor motor speed	0098 O/W/A	

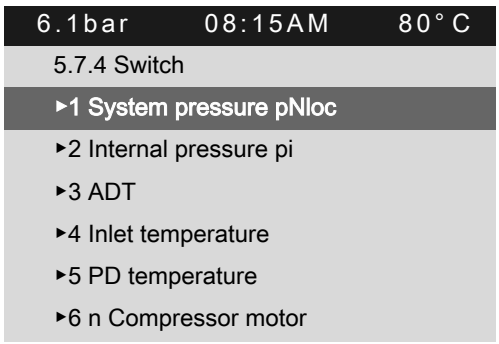
[1)] Power switching with frequency converter

Tab. 77 Available measured values

Example: Setting for the local network pressure at compressor output *System pressure pNloc*.

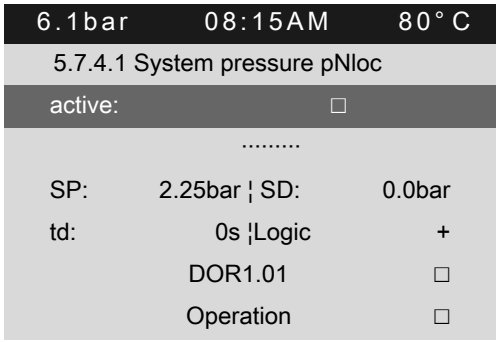
Precondition Access level 2 is activated.

1. Open the 5.7.4 *<Configuration – I/O periphery – Switch>* menu.
   A menu containing a list of available measured values is displayed.



Header
Menu
Active line

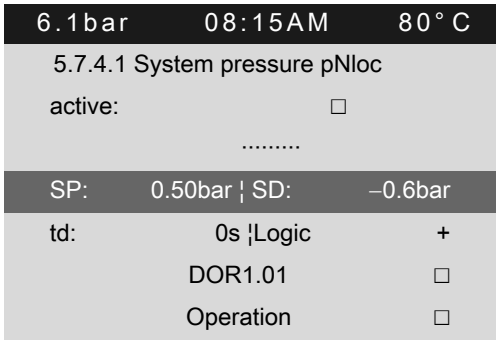
2. Use «Up» or «Down» to select the measured value.
3. Press «Enter».
   The menu for the selected measured value (in the example *System pressure pNloc*) is displayed.



Header
Menu
active line with check box
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

8.11.4.1 Setting the switching point and switching differential

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



Header
Menu
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

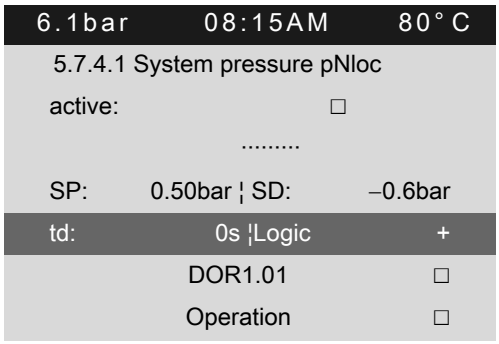
2. Press «Enter».
   The display for the current threshold of the switching point flashes.
3. Use the «Up» or «Down» keys to set the *SP* threshold.
4. Press «Enter».
   The setting is applied.
5. If necessary, adjust the value for the *SD* switching differential in the same way.

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

8.11.4.2 Set the time delay

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



Header
Menu
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

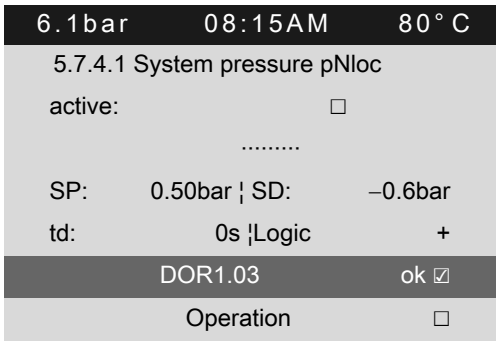
3. Use «Up» or «Down» to set the time delay in seconds.
4. Press «Enter».

Result The *td* delay time has been set.

8.11.4.3 Assign and activate the output

Once the threshold has been reached you can switch a digital output *DOR*.

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.



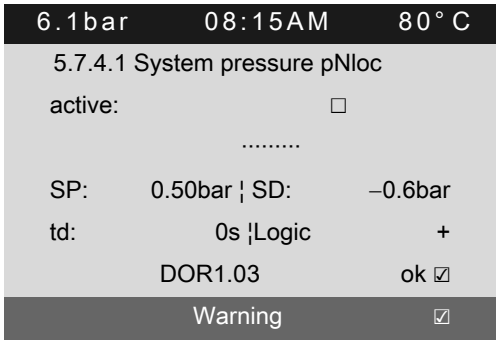
Header
Menu
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

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

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

8.11.4.4 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.



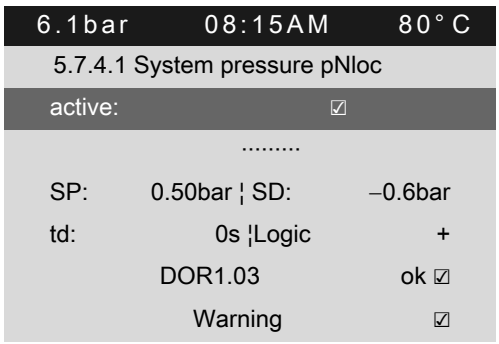
Header
Menu
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

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 message is activated.
8. Press «Enter».

Result The message type is set and activated.

8.11.4.5 Activating the threshold

1. Use «Up» or «Down» to select the *active:* line.
2. Press «Enter».
   The check box will flash.



Header
Menu
active line with check box
Switching point (SP) and switching differential (SD)
Delay (td) and logic
Output DOR
Type of message

3. Press the «Up» key.
   The check box is activated.

4. Press the «Enter» key.
   The threshold is selected and activated.

Result In the above example the switching point for *System pressure pNloc* has been set and is active. If the pressure is reached or exceeded and remains longer than the set time delay *td*, the message is triggered with the set message type and the set output *DOR* is switched. If the pressure falls below the threshold *SP* + switching differential *SD*, the message and output are reset. The switching behaviour is inverted by setting "-" of *Logic* parameter.

The settings for the other measured values are carried out in the same manner.

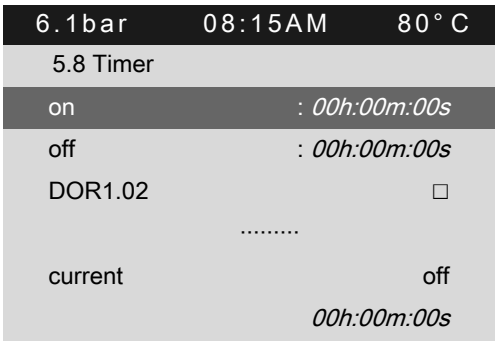
8.12 Timer

SIGMA CONTROL 2 is equipped with an integrated timer that can control an adjustable DOR output for customer-specific applications. Valid setting values for the cutting in and out duration are between 24 h ≥ t ≥ 15 m.

Precondition Access level 2 is activated.

The electrical connection has been established (for information about a spare *DOR* output please see the machine's wiring diagram)

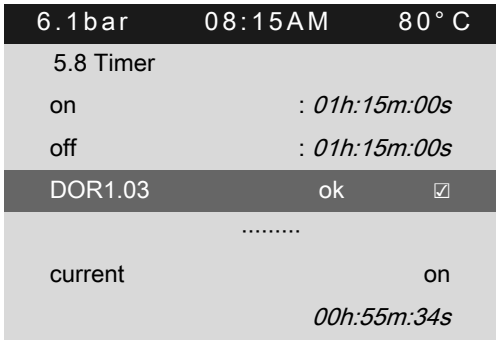
1. Open the 5.8 *<Configuration – Timer>* menu.



Header
Menu
Cut-in period
Cut-out period
set output
Current status DOR
Remaining time until status change

2. Use «Up» or «Down» to select the *on* line.
3. Press «Enter».
   The setting mode is active.
   The display for hours *00h*:00m:00s flashes.
4. Use «Up» or «Down» to set the hours.
5. Press the «Right» key.
   The display for minutes *01h*:*00m*:00s flashes.
6. Use «Up» or «Down» to set the minutes.
7. Press the «Right» key.
   The display for seconds *01h:15m:00s* flashes.
8. Use «Up» or «Down» to set the seconds.
9. Press «Enter».
   The setting is applied.
10. Use the «Up» or «Down» keys to select the *off* line.
11. Proceed in the same manner to set the cut-out period.
12. Use the «Up» or «Down» keys to select the *DOR* line.

13. Press «Enter».
    The setting mode is active.
14. Use «Up» or «Down» to set the required output *DOR*.
15. Press «Enter».
    The setting is applied.
16. Press the «Right» key.
17. Press «Enter».
    The check box will flash.
18. Press the «Up» key.
    The check box associated to output *DOR* is activated.
19. Press «Enter».
    If output *DOR* is correctly assigned and activated, *ok* is displayed.



Header
Menu
Cut-in period
Cut-out period
Set output DOR
Current status DOR
Remaining time until status change

Result The set output *DOR* is controlled by the timer.
The current status of output *DOR* is displayed in the *current* line. The remaining time until the next status change is displayed in the line underneath.

8.13 Activating remote acknowledgement

When fault or warning messages are routed to a remote control centre via an output it makes sense to have these messages acknowledged by the control centre.

Acknowledging the message without correcting the cause, however, can lead to machine damage.
Safety-relevant "EMERGENCY STOP device" 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 8.2.13 Activating remote control)
- A controller input has been assigned for the acknowledgement signal.

Overview

- Select the *<Configuration – Acknowledgement>* menu.
- Set the "Remote acknowledgement" function.
- Activating the remote control

- Assigning an input
- Press the «Remote control» key.

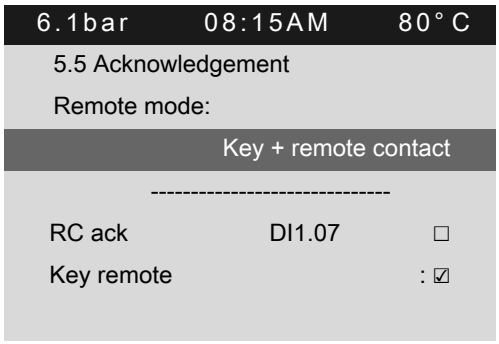
CAUTION
Machine damage can result from acknowledging a fault message without remedying its cause!
➢ Find the failure cause.

➢ Decide to acknowledge or not.

8.13.1 Setting the remote acknowledgement function

Precondition Access level 2 is activated.

1. Open the 5.5 *< Configuration – Acknowledgement >* menu.
2. Use «Up» or «Down» to select the *Remote mode* line.
3. Press the «DOWN» key.
4. Press «Enter».
   The currently active operating mode flashes.
5. Use «Up» or «Down» to set the *Key + remote contact* input.



Header
Menu
Active line with "Key + remote contact" setting

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

Result The Remote acknowledgement function is set.

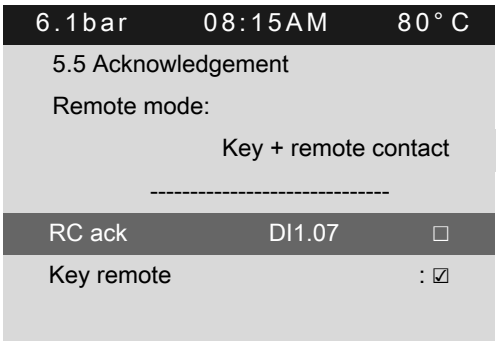
8.13.2 Activating the remote control

➢ Activate remote control see chapter 8.2.13.

Result SIGMA CONTROL 2 remote control is activated.

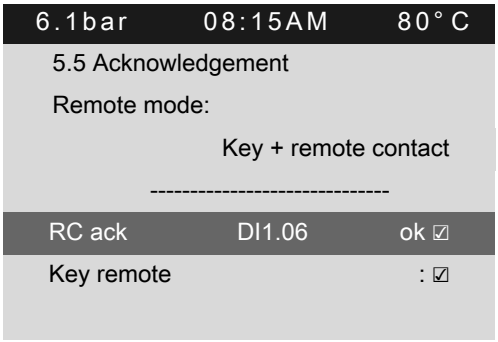
8.13.3 Assigning an input

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



Header
Menu
Active line

2. Press «Enter».
   The *DI* display flashes.
3. Use «Up» or «Down» to set the input.
4. Press «Enter».
   The input has now been assigned.
5. Press the «Right» arrow.
6. Press «Enter».
   The check box assigned to the input flashes.
7. Press the «Up» key.
   The check box is activated.
8. Press «Enter».
   The input is assigned and activated.



Header
Menu
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 centre.

8.14 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.	*All* assign
Pressure transducer characteristics: ■ 4–20 mA ■ 0–16.0 bar	

Tab. 78 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

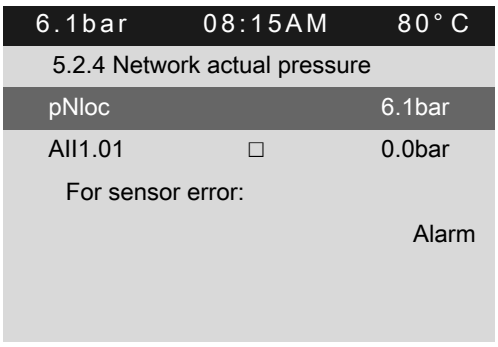
Example: The external pressure transducer is connected to SIGMA CONTROL 2.

- Open the *<Configuration – Pressure control>* menu.
- Assigning an input

8.14.1 Pressure control menu

Precondition Access level 2 is activated.

1. Open the 5.2.4 *< Configuration – Pressure control – Network actual pressure>* menu.
   The *Network actual pressure* menu is displayed

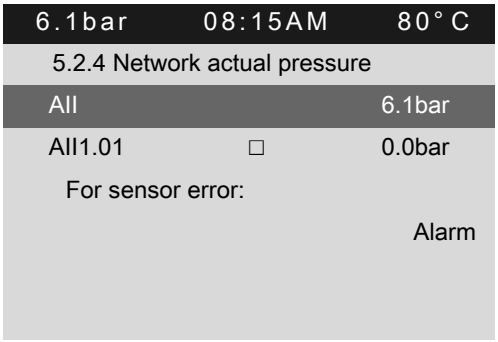


Header
Menu
Active line (local pressure transducer)

8.14.2 Assigning an input to an external pressure transducer

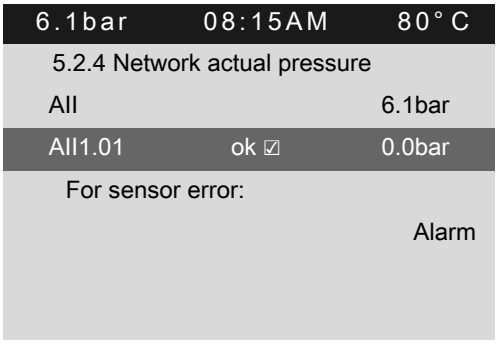
1. Press «Enter».
   The *pNloc* indication flashes.

2. Use «Up »or «Down» to set the *AI/* input.



Header
Menu
Active line (external pressure transducer)

3. Press «Enter».
   The *AI/* input is set.
4. Press «Down».
   The line for activating the input is displayed.
5. Press the «Right» key.
6. Press «Enter».
   The check box assigned to the input flashes.



Header
Menu
Active line

7. Press «UP».
   The check box is activated.
   ok is displayed.
8. Press «Enter».
   The setting is applied.

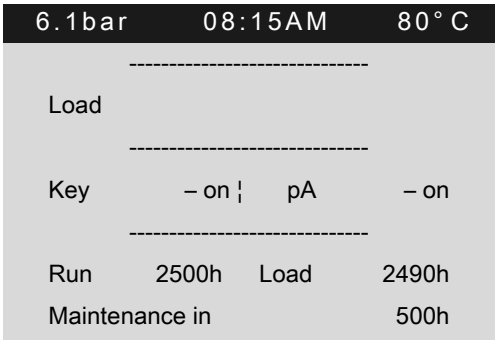
Result The input for the external transducer is now activated.

8.15 Commissioning the machine

Checking the controller settings	Chapter	Confirmed?
➢ Language correctly set?	8.2.2	
➢ Date and time correct?	8.2.8	
➢ Display format correctly set?	8.2.10	
➢ System pressure setpoint correctly set?	8.4	

Tab. 79 Check list for starting the machine

1. Check and confirm all the items in the check list before first start-up of 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.



Header
Current operating mode
Operating parameters
Operating parameters
Maintenance indicator

2. Continue the commissioning process as described in chapter "Commissioning" of the machine's operating manual.

9 Operation

9.1 Switching the compressed air station on and off

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

Precondition A power supply isolating device has been installed by the user.

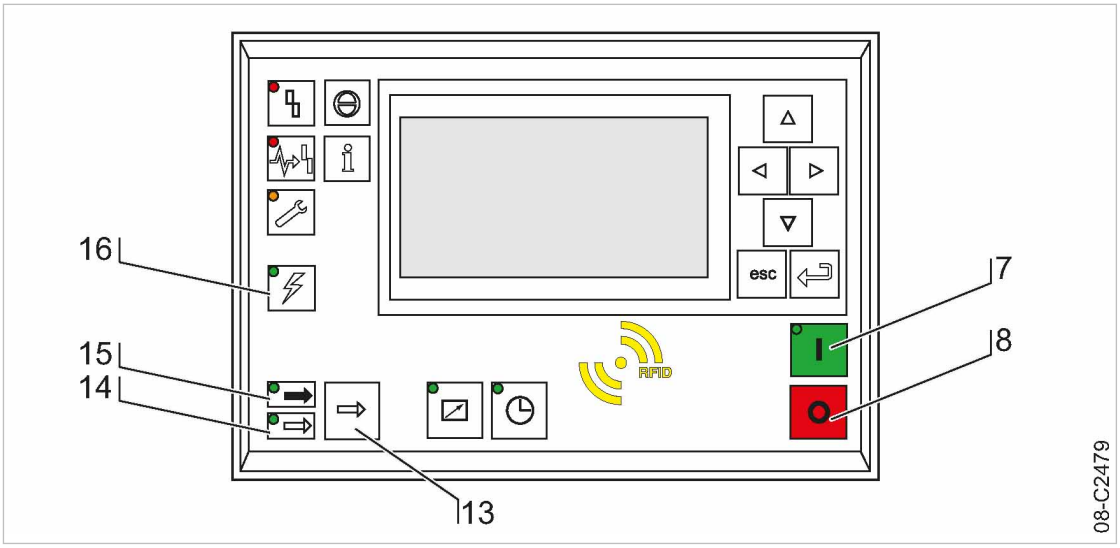


Fig. 39 Switching the compressed air station on and off

7	«ON» key	14	*IDLE* LED
8	«OFF» key	15	*LOAD* LED
13	«Load/Idle» toggle key	16	*Voltage applied to controller* LED

9.1.1 Switching on

Precondition No personnel are working on the machine.
All maintenance doors and removable panels are in place and secured.
The ambient conditions as described in Chapter "Installation and Operating Conditions" are met

1. Switch on the user's power supply isolating device.
2. Switch on the machine and wait for SIGMA CONTROL 2 to start.
   The *voltage applied to controller* 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 re-starting automatically when power is resumed.
The compressor motor / engine may automatically re-start as soon as power is restored (see chapter 8.5).

Result At the first switching-on after the power has been restored, the compressor starts as soon as network pressure is lower than the network nominal 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 display *Stopping* is displayed. The *ON* LED extinguishes as soon as the automatic shut-off action is completed.
2. Switch off and lock out the power supply isolating device.

Result The *Voltage applied to controller* LED extinguishes. The machine is switched off and disconnected from the mains supply.

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

➢ Press «OFF» once again.

9.2 Switching off in an emergency

The EMERGENCY STOP command device is located below the controller.

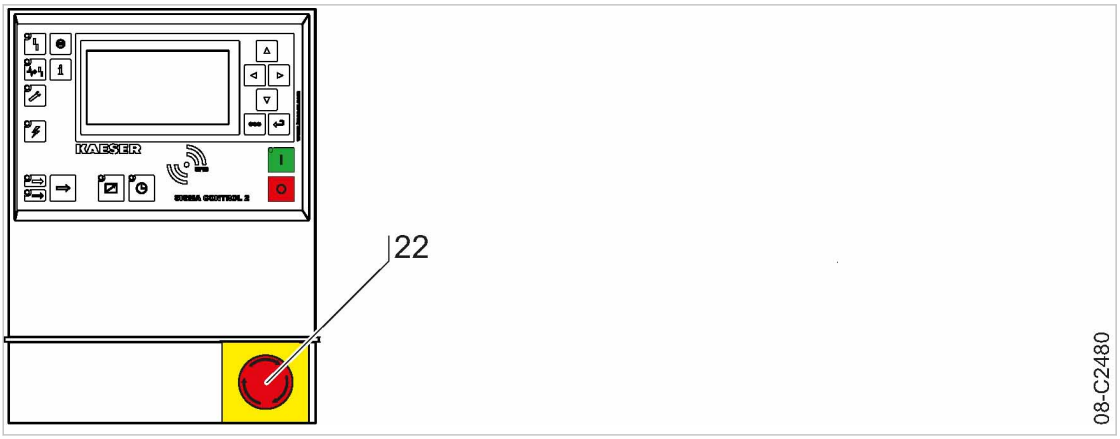


Fig. 40 Switching off in an emergency

22 EMERGENCY STOP command device

Switching off

➢ Press the EMERGENCY STOP command device.

After actuating the EMERGENCY STOP command device, the machine is shut down. However, the machine is still connected to the electrical mains supply.

Result The EMERGENCY STOP command device remains latched after actuation.

The compressor's pressure system is vented and the machine is prevented from automatically re-starting.

Switching on

Precondition The fault has been rectified

1. Turn the EMERGENCY STOP command device 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. 80 Message sequence 1

Message sequence 2	Indication
Message coming	LED flashes
Message going	LED flashes
Message acknowledged	LED off

Tab. 81 Message sequence 2

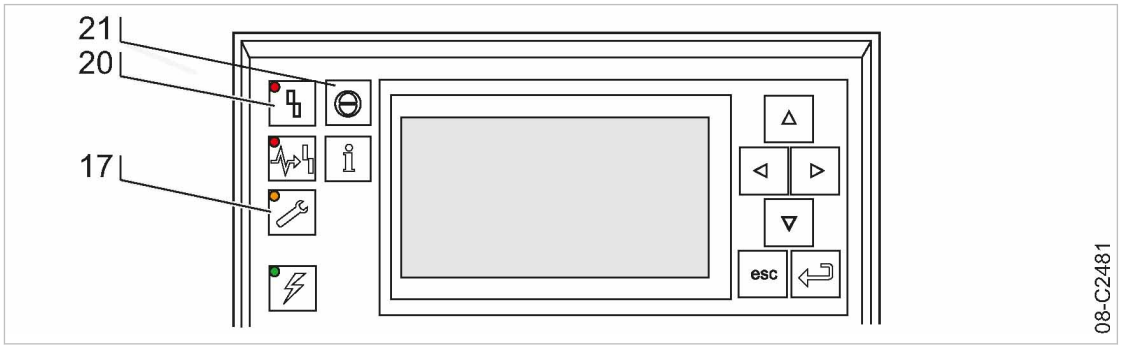


Fig. 41 Acknowledging messages
[17] *Warning* LED (yellow)
[20] *Alarm* LED (red)
[21] Key «Acknowledge»

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 control device

➢ First turn the EMERGENCY STOP control device 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 fault and/or warnings
- Message history: The last 1000 events, these include fault and warning messages
  - Compressor messages
  - Diagnostic messages
  - System messages
- Address error: Display of incorrect parameterisation 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

Line	Submenu/Segment/Text
3	Text: ■ Message text ■ –

Tab. 82 Information of a message

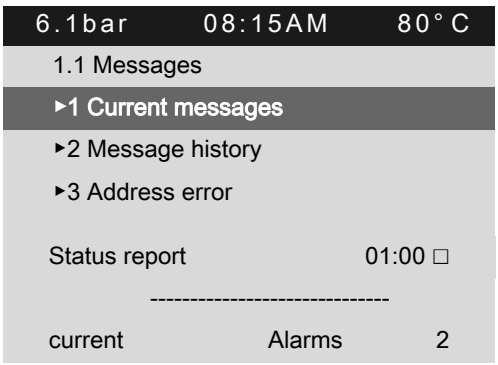
Message type and status are shown abbreviated.

Segment	Display	Meaning
Message number	*0059* (example)	Message 0059
Type of message	*W*	Warning and maintenance message
	A	Alarm
Message status	*c*	Message has come
	g	Message gone
	a	Message acknowledged
Date	*04/13/16* (Example)	Date
Time	*08:15:37AM* (Example)	Time

Tab. 83 Message abbreviations

9.4.1 Status – Messages menu

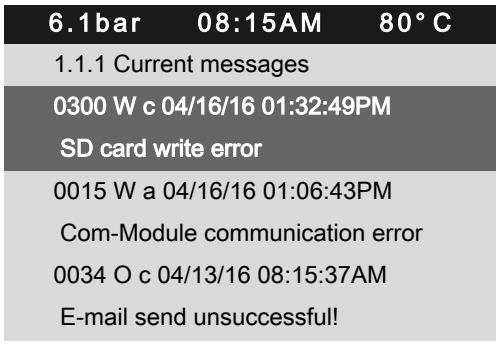
1. Open the 1.1 *<Status – Messages >* menu.
   The *Messages* menu is displayed
   The number of current faults and warnings is displayed in the two bottom lines.



Header
Menu
Active line
Only displayed in the event of I/O parametrisation error
Number of currently registered faults

Displaying the last fault/warning

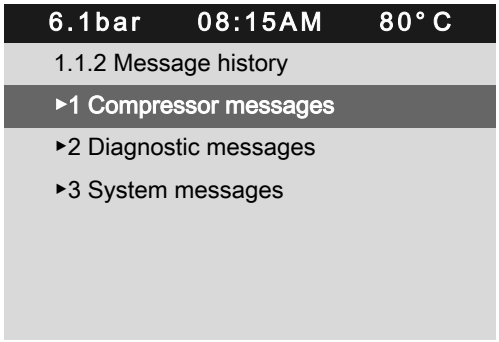
1. Open the 1.1.1 *<Status – Messages – Current messages>* menu.
   The third line displays the last fault or warning message.



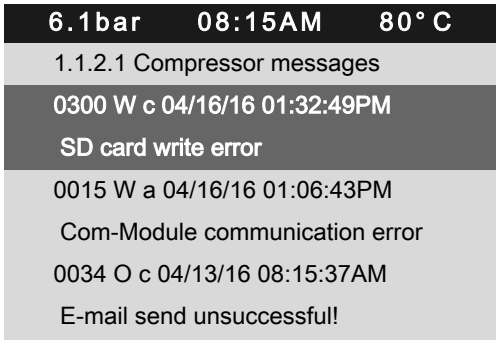
2. Press «Escape» repeatedly to leave this menu.

Displaying the message history

1. Open the 1.1.2 *<Status – Messages – Message history>* menu.
   The *Message history* menu is displayed



2. Press «Enter».
   The 1.1.2.1 *Compressor messages* menu is displayed.
   The third line displays the last fault or warning message.



3. Press «Escape» repeatedly to leave this menu.

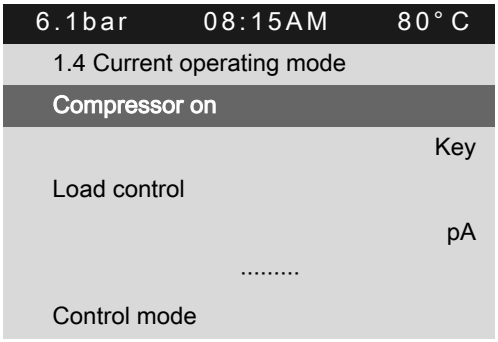
9.5 Displaying the current operating mode

The operating mode is displayed in 2 segments (example):

On/off switching via	Load control via
Key	*pA*

Tab. 84 Operating mode display

1. Open the 1.4 *<Status – Current operating mode >* menu.
   The *Current operating mode* menu is displayed



Header
Menu
Active line

Abbreviation of operating modes

Segment	Display	Meaning
On/off switching via	Key	«ON» key on the operating panel of SIGMA CONTROL 2
	Key + clock	Cycle Control
	Key + remote contact	Remote contact (FK): external LOAD signal
	Key + remote bus	Remote bus (FB): external bus signal
LOAD control via	pA	*pA* nominal pressure
	pB	*pB* nominal pressure
	pA/pB Clock	Nominal pressure via time control
	pA/pB Cycle	Nominal pressure via timer
	pA/pB SC2	Nominal pressure via 2 machines working in master-slave mode
	pA/pB RC	Nominal pressure via remote contact
	pA/pB RB	Nominal 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. 85 Abbreviation of operating modes

9.6 Setting 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 analogue data

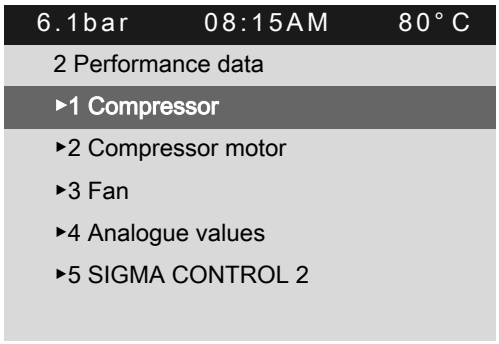
The following information regarding the components shown below can be called up in the *Performance data* menu option:

- Compressor
- Compressor motor
- Fan
- Analogue values
- SIGMA CONTROL 2

Displaying analogue data

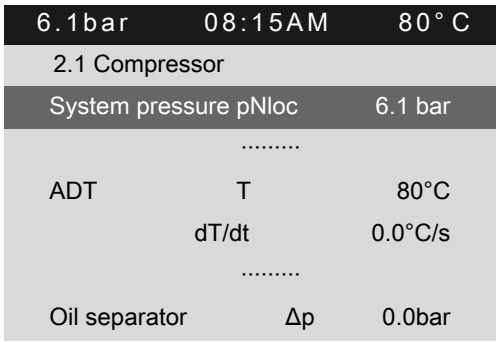
Precondition Access level 2 is activated.
The operating mode is displayed.

1. Open the 2 *Performance data* menu.
   A list of the components is displayed.



Header
Menu
Active line

2. If necessary, repeatedly press «Up» or «Down» to select the required component.
3. Press «Enter».
   The measured data of the selected component are displayed.



Header
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: Running time of compressor motor (adjustable)
  - Compressor block: Running time of airend (adjustable)
  - SIGMA CONTROL 2: Controller running time
- Switching cycles
  - Load valve on
  - Mains contactor on (adjustable)
- kWh counter

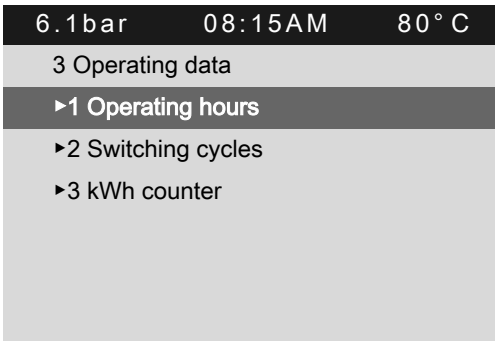
➢ Reset the run times after replacing the compressor block or the compressor motor.
➢ Reset the mains contactor switching cycle counter after replacing the mains contactor.

9.8.1 Checking the operating hours

Display the operating hours

Precondition Access level 2 is activated.

1. Open the 3 *Operating data* menu.

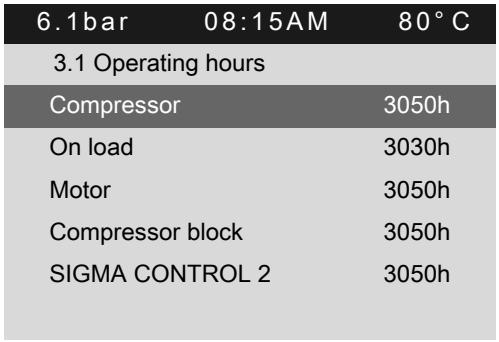


Changing the operating hours

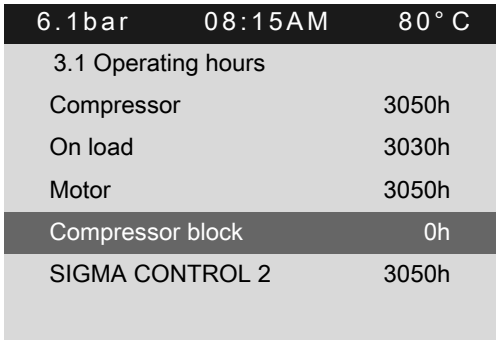
The running times of the compressor motor and compressor block components can be adjusted. This may be required after a replacement, for example.

Precondition Access level 2 is activated.

1. Open the 3.1 *<Operating data – Operating hours>* menu.



2. Use «Up» or «Down» to select the *Compressor block* line.
3. Press «Enter».
   The runtime display 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 «Escape» 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 mains contactor, the usage time is defined by the maximum permissible number of switching cycles.
The mains 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 mains contactor must be replaced!

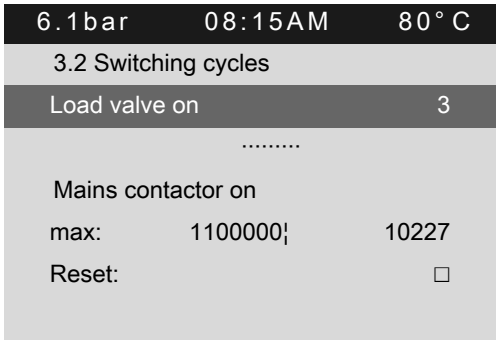
➢ Comply with all instructions.

Displaying switching cycles

Precondition Access level 2 is activated.

1. Open 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.



Header
Menu
Active line
Maximum value/switching cycle timer

Result The safety-relevant function is ensured.
The maximum permissible number of switching cycles have not exceeded.
The mains contactor can still be used.

The safety-relevant function is not ensured.
The maximum permissible number of switching cycles have exceeded.
➢ Have the mains contactor replaced.

Replacing the mains contactor

If the displayed value of the mains contactor exceeds the maximum permissible number of switching cycles, SIGMA CONTROL 2 generates the warning message *0024 Mains contactor operations* ≠.
The mains contactor must be replaced.

➢ Have the mains contactor replaced by authorised KAESER SERVICE.

Resetting the mains contactor switching cycle counter

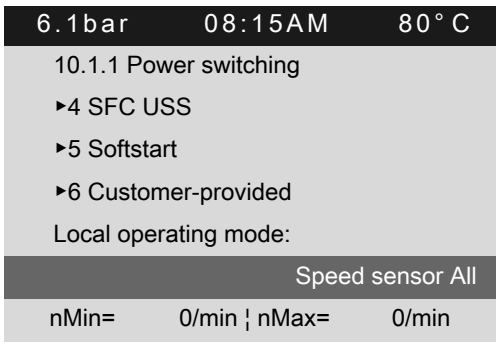
➢ Have the mains contactor replaced by authorised KAESER SERVICE.

9.9 Displaying the frequency converter settings

Precondition Machine with frequency converter option
The operating mode is displayed.

1. Open 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.



Header

Speed setting

3. Press «Escape» repeatedly to leave this 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.

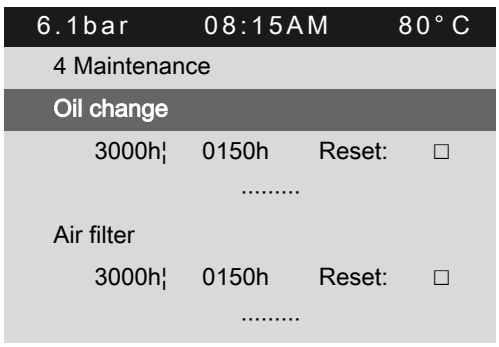
Precondition Access level 2 is activated.

The operating mode is displayed.

NOTICE
Unauthorised extended maintenance intervals
Progressing damage to the machine up to functional incapacity.
➢ Observe the maintenance intervals of the manufacturer.

Maintenance menu

1. Open the 4 *Maintenance* menu.
2. Use «Up» or «Down» to select the *Oil change* line.

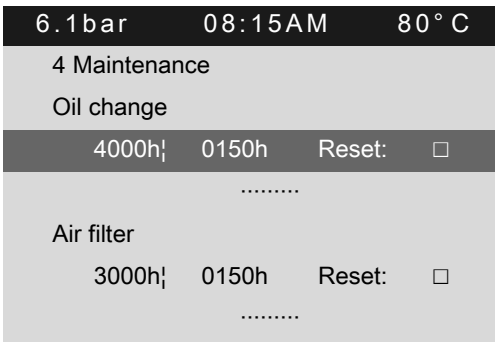


Header

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.



Header

Maintenance interval description

Active line, factory-defined interval

4. Press «Enter».
   The setting mode is active.
5. Use «Up» or «Down» to set the 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 Check the safety valve

Overview

- Preparing the inspection
- Performing the inspection
- Correct conclusion of the test
- Resetting

When the check mode is activated, the threshold value for the blow-off protection is raised and regulation of the network pressure is deactivated.

The measured value of the *pi* pressure value is used to describe the test below.

Check box	Status
☑	activated
□	deactivated

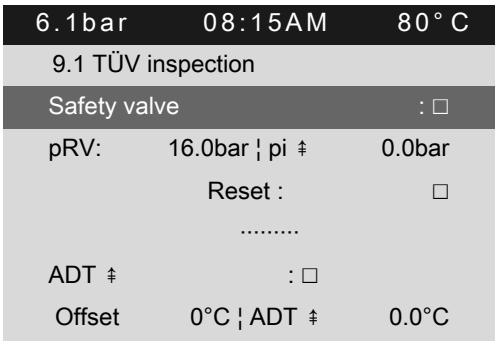
Tab. 86 Check box status

WARNING
Danger of injury from pressurised components!
➢ Perform the following actions in the sequence provided.

Preparing the inspection

1. Note the safety valve's actuating pressure from the machine's nameplate.
2. Press the «Off» key to shut down the machine.

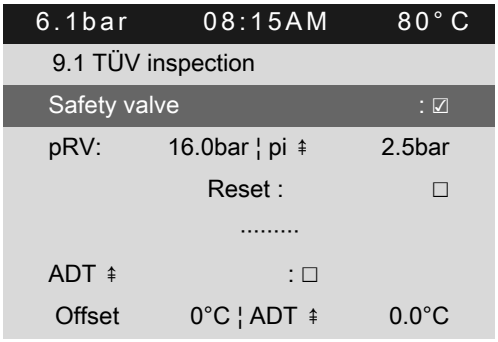
3. Close the user's shut-off valve between the machine and the air distribution network.
4. Log on with access level 2.
5. Open the 9.1 *<Machine test – TÜV inspection>* menu.



Header
Menu
Active line with check box
Safety valve actuating pressure (example)

Performing the inspection

1. Use «Up» or «Down» to select the *Safety valve* line.
2. Press «Enter».
   The check box *Safety valve* will flash.
3. Press «Up».
   The check box is activated.
4. Press «Enter».
   The test mode is now activated.



Header
Menu
Active line with check box
Safety valve actuating pressure, internal pressure



5. **WARNING!**
   Risk of hearing damage when safety 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 valve!
   - ➢ Close all access doors, replace and secure all removable panels.
   - ➢ Wear eye protection.
7. Press the «ON» key. After the motor / engine 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. Use the display to monitor the *pi* pressure rise during the TÜV check.

9. If the *pi* pressure increases to 11 % above the actuating pressure of the safety valve, immediately release the «LOAD/IDLE» key.
10. Shut down the machine with the «OFF» key and immediately replace the safety valve.

If the alarm message *pRV ≠* appears, the safety valve is defective. *pi* pressure has exceeded the actuating pressure of the safety valve by 2.0 bar.

➢ Have the safety valve replaced immediately.

Avoid oil mist:

➢ Release the «LOAD/IDLE» key immediately as soon as the safety valve actuates, in order to prevent unnecessary oil mist.

Correct conclusion of the test

1. Press «Enter».
   The check box *Safety valve* will flash.
2. Press the «DOWN» key.
   The check box is deactivated.
3. Press «Enter».
   The test mode is de-activated and the test is completed.
4. Press «Escape» repeatedly to leave this 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 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 Excessive temperature shut-down test

The machine should shut down if the airend discharge temperature (ADT) reaches a maximum of 110°C.
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 airend 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 inspection
- Correct conclusion of the test
- Resetting

Performing the inspection

The offset value of *35.0°C* displayed in activated test mode refers to the discharge temperature of *73°C* as shown in the example.

Precondition

Allow the machine to warm up. Shut down the machine as soon as the discharge temperature (VET) has stabilised.

Machine has cooled down by approx. 5°C (from discharge temperature of warmed up machine)

Access level 2 is activated.

1. Open the 9.1 *<Machine test – TÜV inspection>* menu.
2. Use «Up» or «Down» to select the *ADT* line.

6.1bar	08:15AM	80°C	Header
9.1 TÜV inspection			Menu
Safety valve		: □	
pRV:	16.0bar ¦ pi ⇞	0.0bar	Safety valve actuating pressure (example)
	Reset :	□	
	.....		
ADT ⇞		: □	Active line with check box
Offset	0°C ¦ ADT ⇞	0.0°C	

3. Press «Enter».
   The *ADT* ⇞ check box flashes.
4. Press the «Up» key.
   The check box is activated.
5. Press the «Enter» key.
   The display *Offset* switches to *35.0°C*.
   The display *ADT* ⇞ switches to *108°C*.
   The test mode is now activated.

6.1bar	08:15AM	73°C	Header
9.1 TÜV inspection			Menu
Safety valve		: □	
pRV:	16.0bar ¦ pi ⇞	0.0bar	Safety valve actuating pressure (example)
	Reset :	□	
	.....		
ADT ⇞		: ☑	Active line with check box
Offset	35.0°C ¦ ADT ⇞	108°C	

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 *110°C*.

The machine does not shut down?

➢ Abort the test and contact authorised KAESER SERVICE as soon as possible.

Correct conclusion of the test

1. Press «Enter».
   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».
   The offset is reset to *0°C*.

Result The test mode is de-activated and the test is completed.

Resetting

SIGMA CONTROL 2 will display the highest measured value if the test for switching off at excessive 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.

Access level 2 is activated.

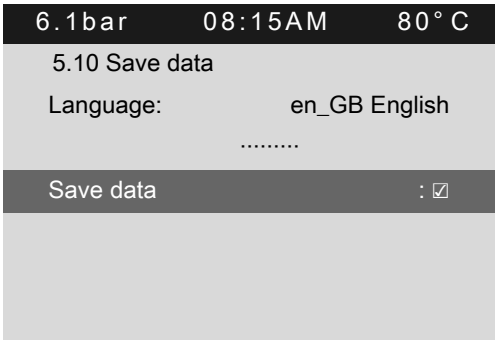
1. Open the 5.10 *<Configuration – Save data>* menu.
2. Use «Up» or «Down» to select the *Language:* line.



Header
Menu
Active line

3. Press «Enter».
   The display for the set language flashes.
4. Use «Up» or «Down» to select the desired language.
5. Press «Enter».
   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 the «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 authorised KAESER SERVICE technician.

10.2 Interpreting fault messages

If an input signal is classified as a fault, the controller will display the fault upon the signal's arrival.

Consequences:

- The *red LED* flashes:
- The controller switches the machine off.

Fault messages are identified with the letter A.

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 0081-0098 are customer-specific.
Complete possible causes and remedies for your defined message text (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 actuating pressure of the safety valve on the oil separator tank has been exceeded.	Change the safety valve.
0004 A EMERGENCY STOP	EMERGENCY STOP command device 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.
0006 A Surge arrester	Over voltage in the power supply (only in version for Canada)	Check power supply. Call KAESER SERVICE.
0007 A Power supply monitor	Overvoltage and undervoltage in the power supply	Check setting of the voltage alarm and power supply. Call KAESER SERVICE.
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 actuating pressure of the safety valve on the oil separator tank has been exceeded.	Check the safety valve.
0011 A Oil-/air cooler fan overcurrent	Overload shut-down of the fan motor.	Investigate cause of shut-down. Reset the overload 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 shut-down of the compressor drive motor.	Investigate cause of shut-down.
0014 A Oil cooler fan overcurrent	Overload shut-down of the oil cooler fan motor.	Investigate cause of shut-down. Reset the overload 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 shut-down of the air cooler fan motor.	Investigate cause of shut-down. Reset the overload 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 shut-down of the air cooler fan motor.	Investigate cause of shut-down. Reset the overload relay.
0019 A Internal pressure pi ↟	Inlet valve defective.	Call KAESER SERVICE.
0021 A Refrigeration dryer T ↟	Refrigeration dryer: Compressed air temperature too low.	Call KAESER SERVICE.
0022 A Oil separator Δp ↟	Oil separator cartridge clogged.	Change the oil separator cartridge.

Message	Possible cause	Remedy
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 KAESER SERVICE replaces the oil pump.
0034 A Mains contactor on?	Mains contactor of the compressor motor does not activate.	Check mains contactor and wiring.
0035 A Cabinet fan I ↡	Overload shut-down of the control cabinet fan motor.	Call KAESER SERVICE.
0038 A PD temperature ↡	Package discharge (PD) temperature too low.	Call KAESER SERVICE.
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?	Mains contactor of the compressor motor does not deactivate.	Check mains 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 3.5 bar 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. Call KAESER SERVICE.
0048 A High-voltage cell	Fault in the high voltage cell.	Call KAESER SERVICE.
0050 A Customer-provided power element	Power switching module not ready or faulty.	Check power switching module.
0051 A Aggregate A	Aggregate A failed.	Call KAESER SERVICE.
0052 A Aggregate B	Aggregate B failed.	Call KAESER SERVICE.
0053 A Condensate drain 2	Refrigeration dryer: Condensate drain faulty	Refrigeration dryer: Check the condensate drain and conduits.

Message	Possible cause	Remedy
0056 A RD condensate drain	Refrigeration dryer: Condensate drain faulty	Refrigeration dryer: Check the condensate drain and conduits.
0057 A Model?	Compressor model uncertain.	Call KAESER SERVICE.
0058 A Condensate drain	Condensate drain faulty.	Check the condensate drain and conduits.
0059 A Back pressure run	Drive belt or coupling broken.	Drive belts: Replace drive belts. Coupling: Call KAESER SERVICE.
0060 A Softstart	Fault in the soft start equipment.	Call KAESER SERVICE.
0062 A Refrigeration dryer p ↟	Refrigeration dryer: Pressure in refrigerant circuit high. Pressure monitor has tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ↟	Refrigeration dryer: refrigerant lost; pressure in the refrigerant circuit too low. The pressure monitor has tripped.	Call KAESER SERVICE.
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. Call KAESER SERVICE.
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]	

Message	Possible cause	Remedy
0082 A AnMod_p_2	1)	
0083 A AnMod_p_3	1)	
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)	
0098 A n-Switch Compressor motor	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.	Call KAESER SERVICE.
0105 A High-voltage cell off?	High-voltage cell does not deactivate.	Call KAESER SERVICE.

Message	Possible cause	Remedy
0106 A Softstarter DI%.2d closed?	Soft start device does not activate.	Call KAESER SERVICE.
0107 A Softstarter DI%.2d open?	Soft start device does not deactivate.	Call KAESER SERVICE.
0108 A Softstarter DI%.2d closed?	Run-up of the soft start device is not completed.	Call KAESER SERVICE.
0109 A Softstarter DI%.2d open?	Run-down of the soft start device is not completed.	Call KAESER SERVICE.
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	Call KAESER SERVICE.
0201 A Compressor motor USS alarm	Frequency converter fault	Call KAESER SERVICE.
0202 A Compressor motor USS alarm	Frequency converter fault	Call KAESER SERVICE.
0203 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0204 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0205 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0206 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0207 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0208 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0210 A Compressor motor FC Over temperature alarm	Compressor motor temperature too high.	Keep ambient conditions within specified limits. Cooler maintenance.

Message	Possible cause	Remedy
0211 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0212 A Compressor motor FC AI2 error	Speed sensor of the frequency converter.	Call KAESER SERVICE.
0220 A Compressor motor FC Motor overload alarm	Compressor motor overload.	Call KAESER SERVICE.
0221 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0230 A Compressor motor FC Motor overload alarm	Compressor motor overload.	Call KAESER SERVICE.
0231 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0232 A Compressor motor FC AI1 error	Speed sensor of the frequency converter.	Call KAESER SERVICE.
0240 A Compressor motor USS alarm	Fault caused by software driver.	Call KAESER SERVICE.
0241 A Compressor motor FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0242 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0243 A Compressor motor FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0244 A Compressor motor FC activation failed	Frequency converter incorrectly activated.	Call KAESER SERVICE.
0245 A Compressor motor FC run-up time exceeded	Minimum speed not reached with a defined time (can be set).	Check the set value. Call KAESER SERVICE.
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. Call KAESER SERVICE.
0247 A Compressor motor FC: STO function inactive	Parametrisation error	Call KAESER SERVICE.

Message	Possible cause	Remedy
0248 A Compressor motor FC off - STO?	Parametrisation error	Call KAESER SERVICE.
0251 A Oil-/air cooler fan USS alarm	Fault caused by software driver.	Call KAESER SERVICE.
0253 A Oil-/air cooler fan FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0255 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0270 A Oil-/air cooler fan FC Motor overload alarm	Fan motor overload.	Call KAESER SERVICE.
0271 A Oil-/air cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0280 A Oil-/air cooler fan USS alarm	Fault caused by software driver.	Call KAESER SERVICE.
0281 A Oil-/air cooler fan FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0282 A Oil-/air cooler fan USS error %d	Fault caused by software driver.	Call KAESER SERVICE.
0283 A Oil-/air cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0284 A Oil-/air cooler fan FC activation failed	Fan frequency converter incorrectly activated.	Call KAESER SERVICE.
0287 A Oil-/air cooler fan FC: STO function inactive	Frequency converter parametrising incorrect.	Check frequency converter parametrising. Call KAESER SERVICE.
0288 A Oil-/air cooler fan FC off - STO?	Frequency converter parametrising incorrect.	Check frequency converter parametrising. Call KAESER SERVICE.
0301 A Oil cooler fan USS alarm	Frequency converter fault	Call KAESER SERVICE.
0303 A Oil cooler fan FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.

Message	Possible cause	Remedy
0305 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0320 A Oil cooler fan FC Motor overload alarm	Fan motor overload.	Call KAESER SERVICE.
0321 A Oil cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0330 A Oil cooler fan USS alarm	Frequency converter fault	Call KAESER SERVICE.
0331 A Oil cooler fan FC PKW failure P%d.E%d	Frequency converter fault	Call KAESER SERVICE.
0332 A USS bus communication error %d	Fault caused by software driver.	Call KAESER SERVICE.
0333 A Oil cooler fan FC Alarm %d	Fault message of the frequency converter with message number.	Call KAESER SERVICE.
0334 A Oil cooler fan FC activation failed	Fan frequency converter incorrectly activated.	Call KAESER SERVICE.
0337 A Oil cooler fan FC: STO function inactive	Frequency converter parametrising incorrect.	Check frequency converter parametrising. Call KAESER SERVICE.
0338 A Oil cooler fan FC off - STO?	Frequency converter parametrising incorrect.	Check frequency converter parametrising. Call KAESER SERVICE.
0500 A I/O parameterisation incorrect in module %d!	An I/O address has been assigned more than once.	Have the menu with the incorrect parametrisation displayed in the 1.1.3*Address error* menu and correct the parameter in there

Tab. 87 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, and 0098 are customer-specific.
Complete possible causes and remedies for your defined message text (see chapter 8.11).

Message	Possible cause	Remedy
0001 W Equipment number incomplete	Equipment number entered incompletely or not at all.	Call KAESER SERVICE.
0002 W Motor temperature ↑	Drive motor overheating.	Keep ambient conditions within specified limits. Check the cooling air supply. Clean the motor.
0003 W Air filter Δp ↟	Initial warning: Air filter clogged.	Change the air filter element soon.
0004 W Oil separator Δp ↑	Increased differential pressure of the oil separator cartridge. Oil separator cartridge clogged.	Change the oil separator cartridge.
0005 W Idle warm-up	Idle warming up is activated	—
0006 W Surge arrester	Over voltage in the power supply (only in version for Canada)	Check power supply. Call KAESER SERVICE.
0007 W Power supply monitor	Overvoltage and undervoltage in the power supply	Check setting of the voltage alarm and power supply. Call KAESER SERVICE.
0008 W Airend discharge temperature ADT ↑	Maximum airend discharge temperature will soon be reached.	Clean the cooler. Check the cooling oil level. Change the oil filter. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0010 W Oil filter 2 Δp ↑	Increased pressure differential of the oil filter. Oil filter clogged.	Change the oil filter.
0011 W Oil filter 1 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 ↡	Refrigeration dryer: Compressed air temperature too low.	Keep ambient conditions within specified limits. Call KAESER SERVICE.

Message	Possible cause	Remedy
0024 W Mains contactor operations ⇞	The maximum permissible number of switching cycles has been exceeded.	Have the mains contactor replaced by an authorised 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.
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.	Call KAESER SERVICE.
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.	Call KAESER SERVICE.
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.	Call KAESER SERVICE.
0034 W PD temperature ↓	Package discharge (PD) temperature too low.	Call KAESER SERVICE.
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 valve's actuating pressure will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.

Message	Possible cause	Remedy
0041 W Mains voltage ↓	1. Power supply failure: The machine is automatically re-started.	Check power supply.
0043 W External load signal?	External load signal indistinct: 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.
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 ↓	Network pressure has fallen below the set 'network pressure low' value. Air consumption too high.	Check air demand. Check cable runs and sensor connections. Check the 'network pressure low' warning value.
0047 W No pressure buildup	The machine does not produce compressed air. The working pressure does not rise above 3.5 bar 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. Call KAESER SERVICE.
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 2 faulty / not ready. Too much condensate. Line interrupted. Condensate cannot be drained.	Check the condensate drain and conduits. Check the lines. Check ECO-DRAIN. 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.

Message	Possible cause	Remedy
0059 W Start temperature ↓↓	The airend temperature is too low (< −10 °C) for the machine to be operated.	Keep ambient conditions within specified limits.
0060 W Start temperature ↓	The airend temperature is too low (<+2 °C).	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.	Call KAESER SERVICE.
0062 W Refrigeration dryer p ↟	Refrigeration 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 ↟	Refrigeration dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Call KAESER SERVICE.
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. Call KAESER SERVICE.
0065 W Refrigeration dryer external shut-off	Low room temperature. Risk that refrigeration dryer freezes. Refrigeration dryer has automatically been deactivated.	Keep ambient conditions within specified limits. Check temperature sensor.
0067 W System pressure ↑	Network pressure is above the "network pressure high" value.	Check cable runs and sensor connections. Check the "network pressure high" warning setting.
0068 W Condensate drain	Condensate drain faulty / not ready. Too much condensate. Line interrupted. Condensate cannot be drained.	Check the condensate drain and conduits. Check the lines. Check ECO-DRAIN. Check inlet conditions.
0069 W Error operation without RD → Call service!	Refrigeration dryer defective. Compressed air supply with non-dried air is activated.	Immediately contact KAESER SERVICE.
0070 W Refrigeration dryer T ↑	Refrigeration dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.

Message	Possible cause	Remedy
0071 W Oil level ↓	Cooling oil level too low.	Top up the cooling oil.
0072 W RD condensate drain	Refrigeration dryer: Condensate drain faulty.	Check the condensate drain.
0073 W External message 1	1)	
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)	

Message	Possible cause	Remedy
0096 W T-Switch PDT	[1]	
0097 W SAM 4.0 communication error	Bus link via SIGMA NETWORK interrupted	Check bus lines and plug.
0098 W n-Switch Compressor motor	[1]	
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 faulty	Call KAESER SERVICE.
0230 W Compressor motor FC AI0 error	Pressure transducer of the frequency converter faulty	Call KAESER SERVICE.
0231 W Compressor motor FC Alarm %d	Malfunction at compressor motor or its frequency converter.	Call KAESER SERVICE.
0240 W Compressor motor FC test shut-off required	Run time of the frequency converter since last shut-down 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.	Call KAESER SERVICE.
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.

Message	Possible cause	Remedy
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 frequency converter for fan.	Acknowledge message. Call KAESER SERVICE.
0261 W Oil-/air cooler fan FC Alarm %d	Fault in frequency converter for fan.	Acknowledge message. Call KAESER SERVICE.
0262 W Oil cooler fan FC Alarm %d	Fault in frequency converter for fan.	Acknowledge message. Call KAESER SERVICE.
0263 W Oil cooler fan FC Alarm %d	Fault in frequency converter for fan.	Acknowledge message. Call KAESER SERVICE.
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 analogue input faulty.	Check the voltage supply.
0867 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
0868 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0869 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0872 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
0873 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
0874 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0875 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0878 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
0879 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.

Message	Possible cause	Remedy
0880 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0881 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0884 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
0885 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
0886 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0887 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
0897 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0898 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0899 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0900 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0903 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0904 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0905 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0906 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0909 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
0910 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0911 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0912 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0915 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0916 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0917 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0918 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0921 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0922 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0923 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0924 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0927 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0928 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0929 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0930 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
0933 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0934 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0935 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0936 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0939 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0940 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0941 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0942 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0945 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0946 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0947 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
0948 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0951 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0952 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
0953 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
0954 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1034 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1035 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1036 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1037 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1040 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1041 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1042 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1043 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1046 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1047 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1048 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1049 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1052 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1053 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.

Message	Possible cause	Remedy
1054 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1055 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1058 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1059 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1060 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1061 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1062 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1064 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1065 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1066 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1067 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1068 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1070 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1071 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1072 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1073 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1074 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1076 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1077 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1078 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1079 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1080 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1082 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1083 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1084 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1085 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1086 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1088 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1089 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1090 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1091 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1092 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1094 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1095 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1096 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1097 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1098 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1100 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1101 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1102 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1103 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1104 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1106 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1107 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1108 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1109 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1110 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1112 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1113 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1114 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1115 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1116 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1118 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1119 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1120 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1121 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1122 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1202 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1203 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1204 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1205 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1208 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1209 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1210 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1211 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1214 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1215W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1216 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1217 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1220 W AII%d.0%d - error power supply	Power supply for ext. sensor at analogue input faulty.	Check the voltage supply.
1221 W AII%d.0%d - overload fault	Overload on the analogue input for ext. sensor.	Call KAESER SERVICE.
1222 W AII%d.0%d - open circuit	No continuity in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1223 W AII%d.0%d - short-circuit	Short circuit in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1226 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1227 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1228 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1229 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1230 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1232 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1233 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1234 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1235 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1236 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1238 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1239 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1240 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1241 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1242 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1244 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1245 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1246 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1247 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1248 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1250 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1251 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1252 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1253 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1254 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1256 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1257 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1258 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1259 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1260 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1262 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1263 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1264 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1265 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1266 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1268 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1269 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1270 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1271 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1272 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1274 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1275 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1276 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1277 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1278 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1280 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1281 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Message	Possible cause	Remedy
1282 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1283 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1284 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1286 W AIR%d.0%d - accidental ground	No ground fault in line for ext. sensor at analogue input.	Check cable runs and sensor connections.
1287 W AIR%d.0%d - short-circuit	Short circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1288 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.
1289 W AIR%d.0%d - sensor fault	Sensor fault at indicated analogue input.	Check cable runs and sensor connections.
1290 W AIR%d.0%d - open circuit	Open circuit in line for indicated analogue input.	Check cable runs and sensor connections.

Tab. 88 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 0081-0098 are customer-specific.
Complete the meaning of the message for your defined message text (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.

Message	Meaning
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 / engine is too high.
0030 O Voltage restored	Mains power supply returned after mains 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)
0083 O AnMod_p_3	1)
0084 O AnMod_p_4	1)
0085 O AnMod_T_1	1)
0086 O AnMod_T_2	1)

Message	Meaning
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)
0098 O n-Switch Compressor motor	1)
0200 O IOSlot1 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot1
0201 O IOSlot2 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot2
0202 O IOSlot3 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot3
0203 O IOSlot4 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot4
0204 O IOSlot5 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot5
0205 O IOSlot6 Undervoltage error %d	The internal voltage monitoring reports undervoltage fault IOSlot6
0300 O Cycle-exact data recording active	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 shut-down occurred at ADT.

Message	Meaning
0551 O ADT channel error "channel open" detected	Short-term overload fault without shut-down occurred at ADT.
0850 O IOSlot%d - bus error	IOM bus fault
0867 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
0873 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
0879 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
0885 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1000 O 2 RFID Equipment Cards successfully registered	You successfully registered 2 RFID Equipment Cards at the controller.
1018 O IOSlot%d - bus error	IOM bus fault
1035 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1041 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1047 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1053 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1186 O IOSlot%d - bus error	IOM bus fault
1203 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1209 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1215 O AII%d.0%d - overload fault	Short-term overload fault without shut-down occurred at AII.
1221 O AII%d.0%d - overload fault	Short-term overload fault without shut-down 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 shut-down occurred at AII.

Message	Meaning
1377 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1383 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1389 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1522 O IOSlot%d - bus error	IOM bus fault
1539 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1545 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1551 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1557 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1690 O IOSlot%d - bus error	IOM bus fault
1707 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1713 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1719 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.
1725 O All%d.0%d - overload fault	Short-term overload fault without shut-down occurred at All.

Tab. 89 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 the KAESER SERVICE in trouble-shooting.

10.6 Interpreting system messages



A system message causes the machine to shut down. Contact KAESER SERVICE.

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	Call KAESER SERVICE.
0002 Y Internal software error	System error	Call KAESER SERVICE.
0003 Y Filesystem Read/Write failure	System error	Call KAESER SERVICE.
0004 Y CPU load too high	System error	Call KAESER SERVICE.
0005 Y RAM out of memory	System error	Call KAESER SERVICE.
1000 Y RFID error: switch SIGMA CONTROL power supply OFF → ON!	System error	Call KAESER SERVICE.

Tab. 90 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 KAESER SERVICE.

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 enquiry and order for spares.

12.2 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

- Authorised service technicians with KAESER factory training
- Increased operational reliability ensured by preventive maintenance
- Energy savings achieved by avoidance of pressure losses
- optimum conditions for operation of the compressed air system,
- The security of genuine KAESER spares.
- Increased legal certainty as all regulations are kept to.

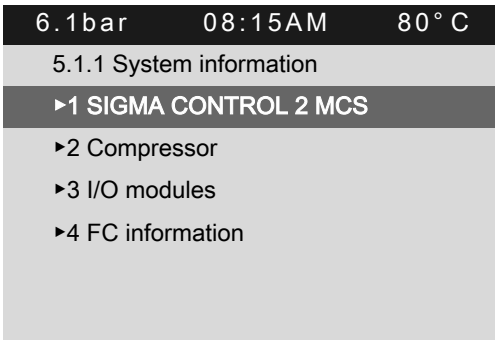
➢ It make sense to sign a KAESER AIR SERVICE maintenance agreement.
Your advantage:
lower costs and higher compressed air availability.

12.3 Service Addresses

Addresses of KAESER agents are given at the end of this user manual.

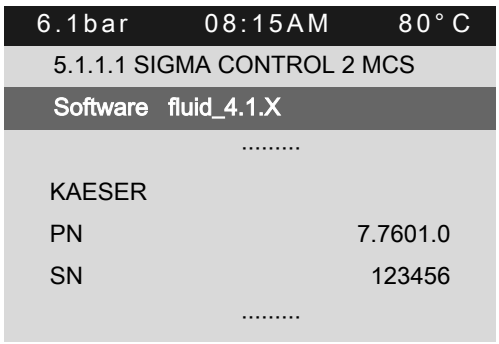
12.4 Displaying the version number, machine model, material number and serial number

1. Open the 5.1.1 *<Configuration – General – System information>* menu.



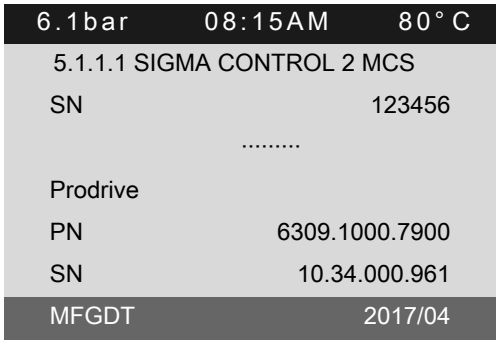
Header
Menu
Active line

2. Press «Enter».
   The system information is displayed.



Header
Menu
Software version
Material number
Serial number

3. Repeatedly press «Up» or «Down» to display further information.



Header
Menu
Manufacturer
Material number
Serial number
Manufacturing date

13 Decommissioning, Storage and Transport

13.1 De-commissioning

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

13.2 Packing

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

13.3 Storage

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

13.4 Transporting

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

13.5 Disposal

Precondition SIGMA CONTROL 2 is de-commissioned.

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 authorised disposal expert.

13.5.1 Dispose of the battery in accordance with local environmental regulations.

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 delivered to the national battery collection system. This procedure facilitates the handling and recycling of batteries.

The 2006/66/EC directive stipulates for the EU member states that old batteries are returned to the point of sale or delivered to a designated disposal system (free of charge). These disposal facilities may be local recycling yards for used electric and electronic devices and their points of sale.



Fig. 42 Battery labelling

1 Do not dispose of batteries with residential waste.
2 Battery contains lead (if applicable)

➢ Comply with national disposal regulations and dispose of batteries in an environmentally-friendly manner.

You actively contribute to the protection of our environment when you bring used bateries to the appropriate recycling system.