Service manual

Controller

SIGMA CONTROL 2 SCREW FLUID 1.0.2.x

9_9450 02USE

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Quick user guide

Controller

SIGMA CONTROL 2 SCREW FLUID 1.0.2.x

9_9450 02 USE

Contents

Contents

1 Important settings

In this chapter, important or often used settings are explained in brief. Detailed information on function, configuration, fault removal and important instructions concerning safe operation are found in subsequent chapters.

Setting and other work on the machine may only be carried out by the following persons:

- persons trained on the machine/controller and persons instructed by and under the supervision of a specialist,
- trained technicians,
- authorized service personnel.

2 Setting the contrast and the brightness

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

Optimizing the contrast settings:

- Press and hold the «Information» key.
- At the same time, press the «Left» or «Right» key.

Optimizing the brightness settings:

- Press and hold the «Information» key.
- At the same time, press the «UP» or «DOWN» key.

Precondition The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Press and hold the «Information» key.

3. Press «UP» or «DOWN» to adjust the contrast.
4. Press «Left» or «Right» to adjust the brightness.

Result The settings for contrast and brightness have been adjusted.

3 Setting the display language

Precondition The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Press the «UP» or «DOWN» keys until the current language is shown as active line.

Active line with current language
Submenu
Submenu
Submenu
Submenu
Submenu

3. Use the «Enter» key to switch to setting mode.
   The currently set language flashes.
4. Move to the required language with «UP »or «DOWN».
5. Confirm the setting with «Enter».
6. Press «Escape» repeatedly to return to the main menu.

Result The display texts are now in the selected language.

4 Entering a password

Use a supplied Equipment Card to log on at the controller.

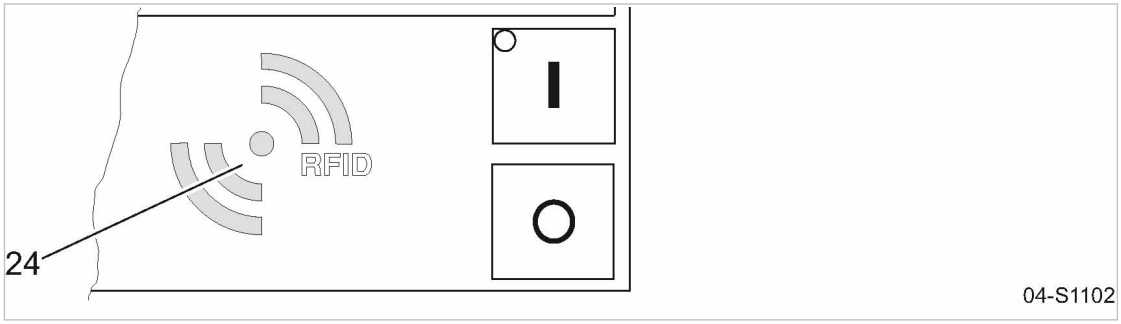


Fig. 1 RFID reader

24 RFID reader

1. Hold the Equipment Card in front of the RFID reader for a short time (several seconds).
   The system reads the data and displays your access level.
2. Press «Enter» to confirm the logon.

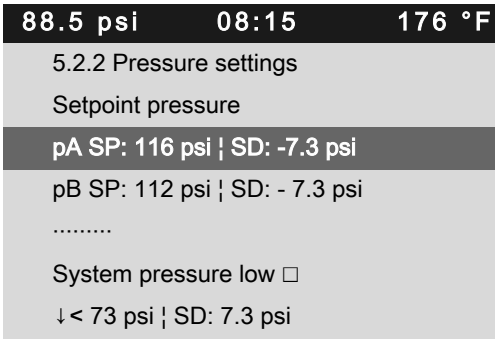
Result The operating mode is displayed. You are logged on.

Further information See chapter 7.2.4 for instructions on logging on to the controller manually.

5 Adjusting the system setpoint pressure

Precondition
Access level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➞ Pressure control ➞ Pressure settings >* menu.
   Switching point *pA* is displayed in the active line.



Current menu
Parameter to be adjusted
Active line, settings for switching point pA
Settings for switching point pB

3. Press «Enter» to switch into setting mode.
   The current value flashes.
4. Use «UP» or «DOWN» to adjust the setting for the switching point *pA* .
5. Press «Enter» to accept the setting.
6. Press the «Right» key once.
7. Press «Enter» to switch into the setting mode for the switching differential.
   The current value flashes.
8. Use «UP» or «DOWN» to adjust the setting for the switching differential.
9. Press «Enter» to accept the setting.
10. If necessary, adjust the value for switching point pB in the same way.
11. Press «Escape» repeatedly to return to the main menu.

Further information
See chapter 7.4 for the adjustment of the machine's pressure parameters.

6 Activating the «clock» key.

Activating/deactivating the check box

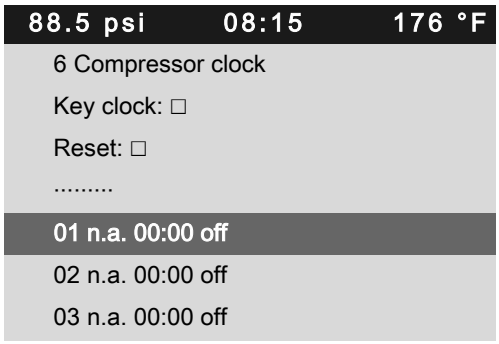
Check box	Check box for reset	Status
☑	☒	activated
☐	☐	deactivated

Tab. 1 Check box status

Precondition Password level 2 is activated.
The display shows the operating mode.

Select the clock compressor menu

1. Press «Enter».
   The main menu is displayed.
2. Select *< Compressor clock >*.
   The display for setting the Compressor clock timing program appears.



Entering switching points

1. Press «Enter» to switch into setting mode.
   The *n.a.* column flashes in the active line.
2. Use «UP» to specify the settings for the weekdays.
3. Press «Enter» to accept the setting.
4. Press the «Right» key once.
5. Press «Enter» to switch into setting mode.
   Column time, hours display, *00 : 00* flashes in the active line.
6. Use «UP» to specify the settings for the hours.
7. Press the «Right» key once.
   Column time, hours display, *00 : 00* flashes in the active line.
8. Use «UP» to specify the settings for the minutes.

9. Press «Enter» to accept the settings.
   The display stops flashing and the time (hours/minutes) is set.

88.5 psi 08:15 176 °F	
6 Compressor clock	Current menu
Key clock: ☐	
Reset: ☐	
.....	
01 Mon-Fri 06:30 on	example for weekdays
02 Mon-Fri 12:00 off	example for time
03 Mon-Fri 13:00 on	For example, compressor ON action

10. Press the «Right» key once.
11. Press «Enter» to switch into setting mode.
    Column *action on/off* flashes.
12. Use «UP» to specify the settings for the compressor ON action.
13. Press «Enter» to accept the setting.
    The compressor ON action is set for the first switching point.
14. Specify further switching points in the same manner.

Result Weekdays, time and the compressor ON / compressor OFF actions are set for all switching points.

Activating the «clock» key.

1. Use «UP» key to change to line *Key clock* .
2. Press «Enter» to switch into setting mode.
   The check box flashes in the active line.

88.5 psi 08:15 176 °F	
6 Compressor clock	Menu
Key clock: ☑	Active line with check box
Reset: ☐	Resetting all current switching points
.....	
01 Mon-Fri 06:30 on	
02 Mon-Fri 12:00 off	
03 Mon-Fri 13:00 on	

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

- Proceed in the same manner to deactivate the «clock» key.
- All defined switching points will be reset simultaneously if you activate the reset check box.

6 Activating the «clock» key.

Result The machine runs according to the defined switching points of the clock program.

Further information See chapter 7.5 for configuration of starting and stopping the machine.
See chapter 7.7.2 for configuration of load changeover based on a clock program.

7 Activating the «<Remote control»> key

Further settings have to be made to allow the machine to be remotely controlled.

➢ Refer to the section "Additional information" in this chapter.

Activating/deactivating the check box

Check box	Status
☑	activated
☐	deactivated

Tab. 2 Check box status

The following menus are used to activate the «Remote control» key:

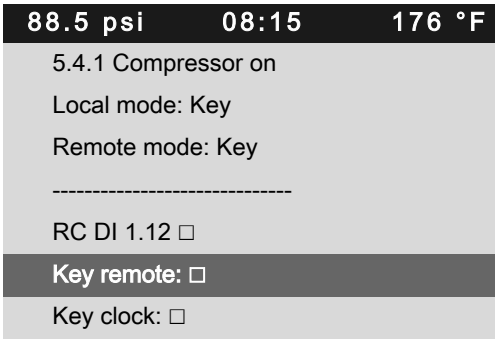
- Menu *<Compressor ON>*
- Menu *<Load control>*

The function will be available as soon as the «Remote control» key in one of the menus has been activated.

Precondition Password level 2 is activated.
The display shows the operating mode.

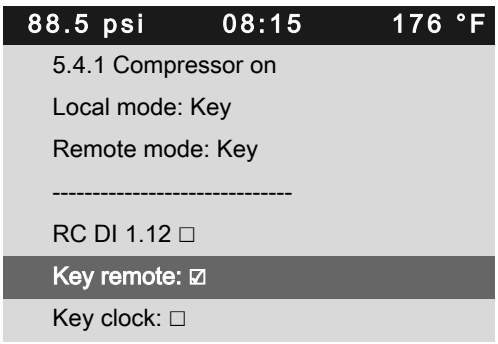
Activating the «Remote control» key in the Compressor ON menu

1. Press «Enter».
   The main menu is displayed.
2. Select *< Configuration → Compressor start → Compressor on >*.
3. Press «DOWN» repeatedly until *Key remote* is displayed as active line.
4. Press «Enter» to switch into setting mode.
   The *check box* for «Remote control» key will flash.



5. Press the «UP» key.
   The activated check box is displayed.

6. Press «Enter» to save the setting.
   The «Remote control» key is activated and can be used.



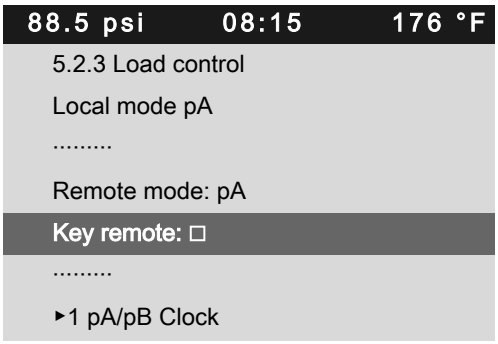
7. Press «Escape» repeatedly to return to the main menu.
8. Press the «Remote control» key to enable remote mode.

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

Activating the «Remote control» key in the load control menu

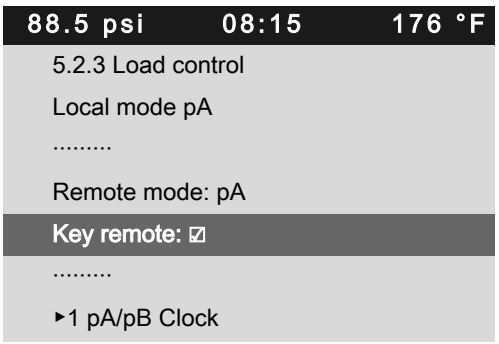
Precondition Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select *< Configuration → Pressure control → Load control >*.
3. Press «UP» repeatedly until *Key remote* is displayed as active line.
4. Press «Enter» to switch into setting mode.
   The check box for «Remote control» key will flash.



5. Press the «UP» key.
   The activated check box is displayed.

6. Press «Enter» to accept the setting.
   The «Remote control» key is activated and can be used.



7. Press «Escape» repeatedly to return to the main menu.
8. Press the «Remote control» key to enable remote mode.

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

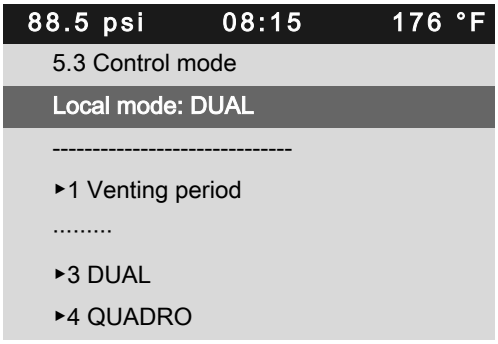
Further information
See chapter 7.5 for configuration of starting and stopping the machine.
See chapter 7.8 for configuration of load changeover under master control.

8 Changing the control mode

The standard setting of the control mode depends on the machine type.

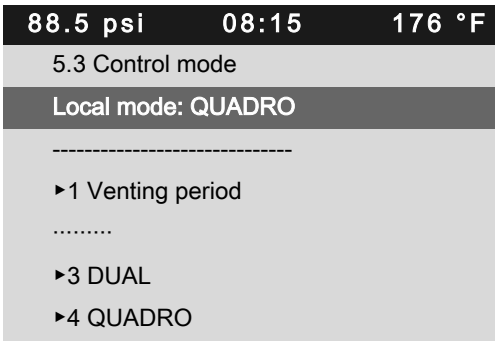
Precondition
Access level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➞ Control mode >* menu.
   Local mode is displayed as an active line.



Current menu
Active line with control mode to be adjusted

3. Press «Enter» to switch into setting mode.
   The control mode display *DUAL* flashes.



Current menu
Active line with adjusted control mode

4. Use «UP» key to select the control mode QUADRO.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

Result
The regulating mode DUAL has been switched to QUADRO.

Further information
See chapter 4.7 for the functions of the control modes.
See chapter 7.6 for changing the parameters of the control modes.

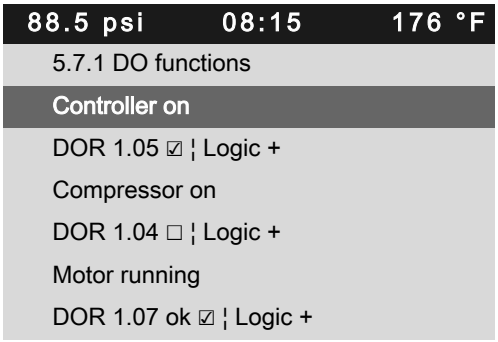
9 Outputting important operational states of the machine

Important operational machine states can be assigned via floating relay contacts as a binary signal on the outputs DOR 1.05 – DOR 1.07. Further outputs are also available as options. You can assign every output only once.

Precondition
Password level 2 is activated.
The display shows the operating mode.

Menu configuration ➜ I/O Periphery ➜ DO Functions

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➜ I/O periphery ➜ DO functions >* menu.
   Controller on is displayed in the active line.
3. Select the required message with the «UP» or «DOWN» key.



Assigning a message to an output

1. Press «Enter» to switch into setting mode.
   The display flashes.
2. Select a free output with the «UP» or «DOWN» key.
3. Press «Enter» to accept the setting.
   A message is now sent via the output assigned.
4. Press «Escape» repeatedly to return to the main menu.

Further information
See chapter 7.10 for configuration and use of the controller's inputs and outputs.

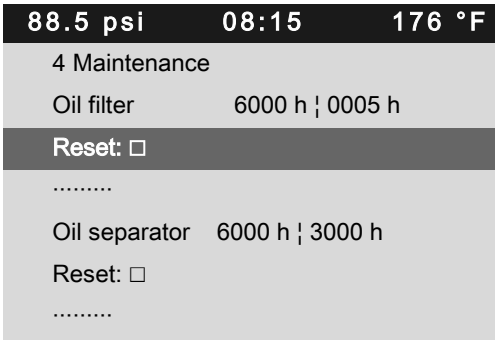
10 Resetting maintenance interval counters

For example, Resetting the maintenance interval counter for oil filter.

Precondition
Maintenance has been performed.
Warning message has been acknowledged.
Access level 2 is activated.
The display shows the operating mode.

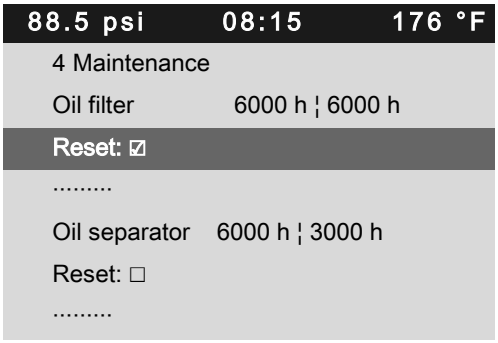
Maintenance menu

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Maintenance >* menu.
   The maintenance counter for *Oil filter* is displayed in the active line.
3. Press «DOWN» once.
   Reset is displayed as an active line.
4. Press «Enter» to switch into setting mode.
   The *check box* for reset flashes.



Menu
Maintenance interval, remaining time
Active line

5. Use the «UP» key to activate the check box for reset.



Menu
Maintenance interval, remaining new time
Active line

6. Press «Enter» to accept the setting.
   The check box for reset is deactivated automatically.

Result
The remaining time of the new oil filter complies with the defined maintenance interval of 3000 h or 6000 h (dependant on machine model).

Further information
See chapter 8.7 for setting the maintenance intervals.
See chapter 10 for the maintenance of the controller.

11 Safety relief valve checking

Overview

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

When the check mode is activated, monitoring of internal pressure (blow-off protection – if provided) and regulation of network pressure are deactivated.

The measured value of internal pressure pi is used to describe the following check.

Check box	Status
☑	activated
☐	deactivated

Tab. 3 Check box status

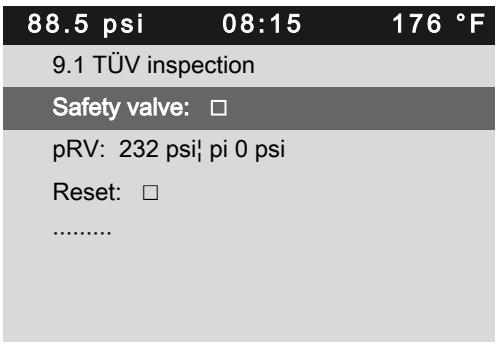
⚠ WARNING

Danger of injury from pressurized components!

➢ *Perform the following actions in the sequence provided.*

Preparing the test

1. Note the activating pressure of the safety relief valve from the machine's nameplate.
2. Press the «OFF» key to shut down the machine.
3. Close the user's shut-off valve between the machine and the air distribution network.
4. Log on to SIGMA CONTROL 2 with access level 2 (see chapter 7.2.4).
5. In operating mode, switch to the main menu with the «Enter» key.
6. Select the *< Machine test ➞ TÜV inspection >* menu.
   Safety relief valve is displayed as an active line.

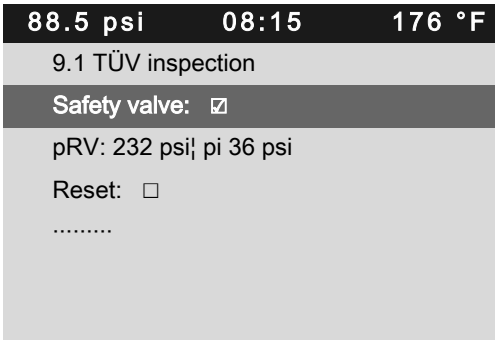


Menu
Active line with check box
Relief valve activating pressure (example)

Performing the test

1. Press «Enter».
   The *check box* flashes in the active line.
2. Use the «UP» key to activate the check box.

3. Press «Enter» to accept the setting.
   The test mode is now activated.
   The monitoring of internal and network set point pressures is deactivated!



Menu

Active line with check box

Safety relief valve activating pressure

4. **⚠ WARNING** *Excessive noise is caused when the safety relief valve blows off!*
   - ➢ *Close all access doors; replace and secure all removable panels.*
   - ➢ *Wear hearing protection.*
5. **⚠ WARNING** *Risk of burns due to released cooling oil and compressed air when blowing off the safety relief valve!*
   - ➢ *Close all access doors; replace and secure all removable panels.*
   - ➢ *Wear eye protection.*
6. Press and hold the «ON» key.
   The machine switches to load, the machine's internal pressure pi rises.
7. Monitor on the display the pressure rise pi during the check.
8. If the internal pressure pi increases to more than 10% above the correct opening pressure of the safety relief valve, shut down the machine with the «OFF» key and replace the safety relief valve.

If the alarm message *pRV ≠* appears, the safety relief valve is defective. The permissible internal pressure was exceeded by 30 psi.

- ➢ Have the safety relief valve replaced.

Avoid oil mist:

- ➢ Release the «ON» key immediately when the safety relief valve responds, in order to prevent unnecessary oil mist.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.
2. Use the «DOWN» key to deactivate the check box.
3. Press «Enter» to accept the setting.
   The test mode is deactivated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.
5. Open the shut-off valve from the machine.

Result The machine is ready for operation.

Resetting

If the test is canceled when opening the safety relief valve, SIGMA CONTROL 2 will indicate the highest measured value as internal pressure.
Activate the check box for reset in order to reset the stored value.

➢ Activate the check box.

Further information See chapter 8.8 to test the safety relief valve.

12 Checking the temperature sensor and overheating shutdown function

The machine should shut down if the airend discharge temperature (ADT) reaches a maximum of 230 °F.
SIGMA CONTROL 2 will simulate a higher temperature for checking this function.

For this purpose, SIGMA CONTROL 2 automatically determines an offset value to be displayed. During the test mode, this is added to the actual airend discharge temperature to cause the machine to shut down prematurely.

In standard operation, SIGMA CONTROL 2 generates the "overtemperature" fault message when the maximum airend discharge temperature is reached. Since the modified test temperature is 4 °F below the fault message switching point for overtemperature, the system will not generate a fault message in test mode.

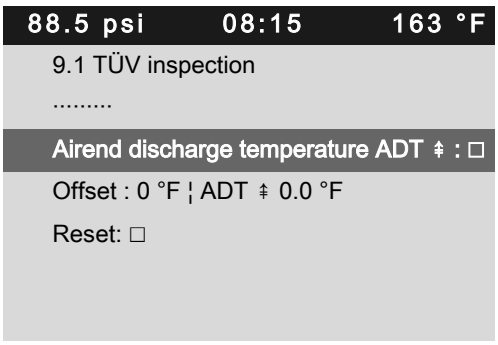
Overview

- Shut down the machine and allow to cool down slightly
- Performing the test
- Correct conclusion of the test
- Resetting

Performing the test

Precondition Machine cooled down by approximately 40 °F

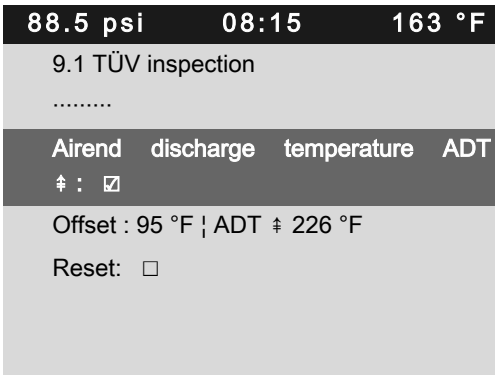
1. Log on to SIGMA CONTROL 2 with password level 2. (see section 7.2.4).
2. In operating mode, switch to the main menu with the «Enter» key.
3. Select the *< Machine test → TÜV inspection >* menu.
   The *safety relief valve* is displayed as the active line.
4. Press «DOWN» repeatedly until *Airend discharge temperature ADT* ⇞ is displayed as active line.
5. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.



Fallen airend discharge temperature (ADT)
Menu
Active line

6. Use the «UP» key to activate the check box.

7. Press «Enter» to accept the setting.
   The *Offset* display changes to *95 °F*.
   The *Airend discharge temperature ADT ⇞* display changes to *226 °F*.
   The test mode is now activated.



8. Press the «ON» key to switch the machine to LOAD.
   The machine switches to LOAD and the airend discharge temperature rises again.
   The machine will switch off as soon as the airend discharge temperature attains a value of *226 °F*.

The machine does not shut down?

➢ Abort the test and contact KAESER Service as soon as possible.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.
2. Use the «DOWN» key to deactivate the check box.
3. Press «Enter» to accept the setting.
   The offset is reset to *32 °F*.
   The test mode is deactivated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.

Resetting

SIGMA CONTROL 2 will display the highest measured value if the test for switching off at overtemperature is aborted.
Activate the check box for Reset in order to reset the stored value.

➢ Activate the check box for Reset.

Further information — See chapter 8.9 for testing the temperature sensor.

13 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.

Messages 0081 to 0095 are customer-specific and undefined. Complete them with your defined message text and interpretation.

Message	Meaning
0001 O Load control pA	The machine is regulated by system set point pressure pA.
0002 O Load control pB	The machine is regulated by system set point pressure pB.
0003 O Load control RC	The machine is regulated via the remote contactor.
0004 O Load control RB	The machine is remotely regulated via the bus connection.
0005 O ready	The machine is switched on and in STANDSTILL operating mode.
0006 O Idle	The machine is switched on and in IDLE operating mode.
0007 O On load	The machine is switched on and in LOAD operating mode.
0008 O off	The machine is switched off. The power supply is connected.
0009 O Compressor on	The machine is switched on.
0010 O Controller on	The power supply is connected. The controller is powered.
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.
0025 O Setpoint pressure pA	The value for pA is output.
0026 O Setpoint pressure pB	The value for pB is output.
0027 O Power OFF → ON	Request: Switch the power supply off and on.
0028 O DYNAMIC motor temperature ↑	Control mode DYNAMIC: The temperature of the compressor motor is too high.

Message	Meaning
0081 O	
0082 O	
0083 O	
0084 O	
0085 O	
0086 O	
0087 O	
0088 O	
0089 O	
0090 O	
0091 O	
0092 O	
0093 O p-Switch pi	
0094 O T-Switch ADT	
0095 O p-Switch pN	

Tab. 4 Operational Messages

14 Interpreting diagnostic messages

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 troubleshooting.

15 Interpreting fault messages

Alarm messages are identified with the letter A.

The message numbers are not numbered consecutively.

Messages 0081 to 0095 are customer-specific and may differ from the suggested values. Complete them with your defined message text, possible causes, and remedies.

Message	Possible cause	Remedy
0001 A Direction of rotation	The compressor drive motor is turning in the wrong direction.	Change over phase lines L1 and L2.
0002 A Motor temperature ‡	Compressor drive motor overheated.	Clean the motor. Keep ambient conditions within specified limits.
0003 A pRV ‡	The activating pressure of the pressure relief valve on the oil separator tank has been exceeded.	Change the safety relief valve.
0004 A EMERGENCY STOP	EMERGENCY STOP push button actuated.	Unlatch the push button.
0005 A Oil separator Temperature ‡	Maximum air temperature at the oil separator tank outlet is exceeded.	Check the line to the trip relay.
0007 A Mains monitor	Fault in main power supply.	Have the main power supply checked.
0009 A SIGMA CONTROL 2 T‡	Permissible enclosure temperature for SIGMA CONTROL 2 exceeded.	Keep ambient conditions within specified limits. Control cabinet: Check filter mats and fan.
0010 A Blow-off protection ‡	The activating pressure of the safety relief valve on the oil separator tank has been exceeded.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0011 A Oil-/air cooler fan Overcurrent	Overload shut-down of the first 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. Change the oil separator cartridge.
0014 A Oil-/air cooler fan Overcurrent	Overload shut-down of the second fan motor.	Investigate cause of shut-down. Reset the overload relay.

Message	Possible cause	Remedy
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 Oil-/air cooler fan Overcurrent	Overload shut-down of the third fan motor.	Investigate cause of shut-down. Reset the overload relay.
0019 A Internal pressure pi ↟	–	–
0021 A Refrigeration dryer T ↟	Refrigeration dryer: Compressed air temperature too low.	Contact an authorized KAESER service representative.
0022 A Oil separator Δp ↟	Oil separator cartridge clogged.	Change the oil separator cartridge.
0023 A Motor bearings	Drive motor bearings overheated.	Re-grease the motor bearings.
0024 A Water-cooling water shortage	Cooling water pressure is too low.	Check cooling water supply.
0034 A Mains contactor on?	Main contactor does not close.	Check main contactor and wiring.
0035 A Cabinet fan I ↟	Overload shut-down of the control cabinet fan motor.	Contact an authorized KAESER service representative.
0038 A PD temperature ↟	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0039 A PD temperature ↟	Package discharge (PD) temperature too high.	Check the cooling oil level. Clean the cooler. Check the fan motor.
0040 A Mains contactor off?	Main contactor does not open.	Check main contactor and wiring.
0041 A Mains voltage ↟	Second power failure.	Check power supply voltage. Check 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.

Message	Possible cause	Remedy
0044 A No pressure buildup	The machine produces no compressed air. The working pressure does not rise above 50 psi within a default period.	Check the machine for leaks. Check coupling / V-belts
0045 A Compressor T ↓ ↓	Thermostatic valve defective	Contact an authorized KAESER service representative.
0048 A High-voltage cell	Fault in the high voltage cell.	Contact an authorized KAESER service representative.
0051 A Aggregate A	Aggregate A failed.	Contact an authorized KAESER service representative.
0052 A Aggregate B	Aggregate B failed.	Contact an authorized KAESER service representative.
0056 A RD condensate drain	Refrigerated dryer: The condensate drain is defective.	Refrigerated dryer: Check condensate drain and condensate conduits.
0057 A Model?	Compressor model uncertain.	Contact an authorized KAESER service representative.
0058 A Condensate drain	The condensate drain is defective.	Check condensate drain and condensate conduits.
0059 A Back pressure run	Drive belts or coupling broken.	Drive belt: Replace drive belts. Coupling: Contact an authorized KAESER service representative.
0061 A Oil separator rise dT/dt ↟	The rate of rise of the airend discharge temperature is too fast.	Check the cooling oil level.
0062 A Refrigeration dryer p ↟	Refrigerated dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ↟	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Contact an authorized KAESER service representative.
0081 A		

Message	Possible cause	Remedy
0082 A		
0083 A		
0084 A		
0085 A		
0086 A		
0087 A		
0088 A		
0089 A		
0090 A		
0091 A		
0092 A		
0093 A p-Switch pi		
0094 A T-Switch ADT		
0095 A p-Switch pN		
0097 A High-voltage cell on?	High-voltage cell does not activate.	Check high-voltage cell and wiring.
0098 A High-voltage cell off?	High-voltage cell does not deactivate.	Check high-voltage cell and wiring.
0099 A Mains contactor on?	Main contactor does not close.	Check main contactor and wiring.
0100 A Mains contactor off?	Main contactor does not open.	Check main contactor and wiring.
0101 A Compressor motor - Overcurrent	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0102 A Oil-/air cooler fan Overcurrent	Overload shut-down of the first fan motor.	Investigate cause of shut-down. Reset the overload relay.

Message	Possible cause	Remedy
0200 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0201 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0202 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0205 A Compressor motor USS alarm	Communications error	Check connection and line path.
0210 A Compressor motor FC Motor overload alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0211 A Compressor motor FC Motor overload alarm	Frequency converter fault	Contact an authorized KAESER service representative.

Tab. 5 Fault messages and remedies

16 Interpreting warning messages

Warning messages are identified with the letter W.

The message numbers are not numbered consecutively.

Messages 0081 to 0092 are customer-specific and may differ from the suggested values. Complete them with your defined message text, possible causes, and remedies.

Message	Possible cause	Remedy
0002 W Motor temperature ↑	Drive motor overheating.	Clean the motor. Keep ambient conditions within specified limits.
0004 W Oil separator Δp ↑	The pressure drop across the oil separator cartridge has risen. Oil separator cartridge clogged.	Change the oil separator cartridge.
0007 W Motor bearings	Drive motor bearing defective.	Contact an authorized KAESER service representative.
0008 W Airend discharge temperature ADT ↑	Maximum airend discharge temperature will soon be reached.	Clean the cooler. Check the cooling oil level. Replace the oil filter. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0011 W Oil filter Δp ↑	The pressure differential of the oil filter has risen. Oil filter clogged.	Change the oil filter.
0013 W Air filter Δp ↑	Air filter clogged.	Change the air filter element.
0015 W Bus alarm	The bus link from the Profibus DP interface is interrupted.	Check bus highway and plug.
0017 W Refrigeration dryer T ↓	Refrigerated dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install a ventilation fan.
0018 W Refrigeration dryer p ↓	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Contact an authorized KAESER service representative.
0025 W Oil separator h ⇟	Oil separator cartridge: Maintenance interval has elapsed.	Change the oil separator cartridge.
0026 W Oil change h ⇟	Cooling oil Maintenance interval has elapsed.	Change the cooling oil.
0027 W Oil filter h ⇟	Oil filter: Maintenance interval has elapsed.	Change the oil filter.

Message	Possible cause	Remedy
0028 W Air filter h ⇟	Air filter: Maintenance interval has elapsed.	Change the air filter element.
0029 W Valve inspection h ⇟	Valves: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0030 W Belt/coupling inspection h ⇟	Belt tension/coupling: Maintenance interval has elapsed.	Carry out a visual inspection. Re-tension drive belts.
0031 W Motor bearings h ⇟	Motor bearing of compressor motor: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0032 W Electrical equipment h ⇟	Electric components and installation: Maintenance interval has elapsed.	Inspect and reset the maintenance interval counter.
0033 W Fan bearings h ⇟	Motor bearing of fan motors: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0034 W PD temperature ↓	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0035 W PD temperature ↑	Compressed air discharge temperature too high.	Clean the cooler. Check the cooling oil level.
0036 W Motor starts/h ⇟	The permissible number of motor starts was exceeded in the last 60 minutes.	Extend the idle period. Increase the capacity of 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 air receiver. Increase the cross-section of piping between compressor and air receiver.
0038 W Blow-off protection ↑	The activating pressure of the safety relief valve will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0041 W Mains voltage ↓	1. Power failure: The machine is automatically restarted.	Check power supply. Check the door interlock switch.

Message	Possible cause	Remedy
0043 W External load signal?	Ambiguous external load signal: Increased cut-out pressure exceeded. The external load control has not switched to idle (off load).	Check settings of the external controller. Take 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 circulation. Increase room temperature.
0046 W System pressure ↓	Network pressure has fallen below the set “low” value. Air consumption too high.	Check air demand. Check cable runs and sensor connections. Check the “sys. press. low” warning setting.
0047 W No pressure buildup	The compressor cannot build-up to working pressure.	Check for air leaks. Check the value for internal pressure given in the *<analog data>* menu against the reading on the oil separator tank pressure gauge.
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.
0059 W Start temperature ↓ ↓	The airend temperature is too low (<14°F) for the machine to be operated.	Keep ambient conditions within specified limits.
0060 W Start temperature ↓	The airend temperature is too low (<36°F).	Keep ambient conditions within specified limits.
0061 W Compressor T ↓	The airend discharge temperature (ADT) did not reach the minimum value within the specified time.	Contact an authorized KAESER service representative.
0066 W Air filter Δp ↟	Initial warning: Air filter clogged.	Change the air filter element soon.
0068 W Condensate drain	The condensate drain is defective.	Check the condensate drain and drain line.
0069 W Refrigeration dryer p ↑	Refrigerated dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0070 W Refrigeration dryer T ↑	Refrigerated dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install a ventilation fan.

Message	Possible cause	Remedy
0071 W Oil level ↓	Cooling oil level too low.	Replenish the cooling oil.
0072 W RD condensate drain	Refrigerated dryer: The condensate drain is defective.	Check the condensate drain.
0081 W		
0082 W		
0083 W		
0084 W		
0085 W		
0086 W		
0087 W		
0088 W		
0089 W		
0090 W		
0091 W		
0092 W		
0093 W p-Switch pi		
0094 W T-Switch ADT		
0095 W p-Switch pN		

Tab. 6 Warning messages and remedies

17 Interpreting system messages

System messages are identified with the letter Y.

The message numbers are not numbered consecutively.

Message	Possible cause	Remedy
0001 Y Hardware watchdog reset	System error	Contact an authorized KAESER service representative.
0002 Y Internal software error	System error	Contact an authorized KAESER service representative.
0003 Y Filesystem Read/Write failure	System error	Contact an authorized KAESER service representative.
0004 Y CPU load too high	System error	Contact an authorized KAESER service representative.
0005 Y RAM out of memory	System error	Contact an authorized KAESER service representative.
1000 Y RFID error: switch SIGMA CONTROL power supply OFF→ON!	System error	Contact an authorized KAESER service representative.

Tab. 7 System messages and remedies

KAESER COMPRESSORS

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1 Regarding this Document

1.1 Using this document

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

1.2 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.

1.2.1 Software

The software used in SIGMA CONTROL 2 contains copyright-protected software which is licensed by GNU General Public License in versions 2 and 3.
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>/ SIGMA CONTROL 2 COPYING

The licenses can be also found under this address:
http://www.gnu.org/licenses/gpl-2.0.txt
http://www.gnu.org/licenses/gpl.txt

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

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

This offer is valid for anybody having this information.

1.3 Updating the operating manual

The page *<http://www.kaeser.com/sc2manual>* of our website provides frequently updated versions of this operating manual.

Be prepared to provide the part number and the serial number of the machine in which the SIGMA CONTROL 2 is installed.
Both numbers can be found on the nameplate of the machine.

- ➢ Download the operating manual in your language.

1.4 Symbols and labels

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

1.4.1 Warnings

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

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

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

Tab. 8 Danger levels and their definitions (personal injury)

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

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

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

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

1.4.2 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
NOTICE	Warns of a potentially dangerous situation	Damage to property is possible

Tab. 9 Danger levels and their definition (damage to property)

Example:

NOTICE

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

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

➢ Carefully read and fully comply with warnings against damages.

1.4.3 Other alerts and their symbols

This symbol identifies particularly important information.

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

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

➢ This symbol denotes lists of actions comprising one stage of a task.
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.

2 Technical Data

2.1 SIGMA CONTROL 2 Controller

Industrial computer

- Internal temperature monitoring
- Internal undervoltage monitoring
- Battery-buffered real-time clock
  - Battery life span more than 10 years
  - Battery replaceable

2.1.1 User interface with display, CPU and interfaces

User interface

Feature	Value
Material	Plastics
Width [in]	7.5
Height [in]	5.1
Depth [in]	1.8
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
Voltage source	Input/output module

Tab. 10 User interface

Display

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

Tab. 11 Display data

Interfaces

Interface	Connection	Marking
Ethernet 10/100 Base T	RJ 45 socket	X1
IO bus	9-pole SUB-D pins	X2
RS485–FC (USS interface)	9-pole SUB-D socket	X3
COM modules, slot for communications module	Module optional for: Profibus, Modbus, Profinet, Devicenet	X4
SD card, SD card slot	SD/SDHC card	X5
The positions of the interfaces X1–X5 are marked on the rear of the controller.		

Tab. 12 Interfaces

Identification with RFID Equipment Card

Feature	Value
Hardware on the SIGMA CONTROL 2 controller	RFID write/read device
Hardware (external)	KAESER Equipment Card
Recognition distance [in]	Max. 2
Frequency [MHz]	13.56

Tab. 13 RFID

2.1.2 Input/output modules

There are three different types of input/output modules with different amounts of inputs and outputs.
The actually available number of input/output modules 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, into the control cabinet	available in parallel on both sides	External, into the compressor interior
Digital input (DI), 24 VDC	4	10	2
Analog input current (AII), 0–20 mA	–	1	2
Analog input resistor (AIR), PT100	–	1	3
Digital output relay (DOR), 250 VAC, 8 A	8	–	–
Digital output transistor (DOT), 24 VDC, 0.5 A	–	2	1

Input/Output	Input/output module 1		
	Internal, into the control cabinet	available in parallel on both sides	External, into the compressor interior
Analog output current (AOI), 0–20 mA	–	–	–

Tab. 14 SC2IOM-1

IOM 2

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

Tab. 15 SC2IOM-2

IOM 3

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

Tab. 16 SC2IOM-3

2.1.2.1 Power supply specifications

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

Feature	Value
Rated power supply (stabilized) [V DC]	24
Current consumption SIGMA CONTROL 2 with IOM 1 [A]	2,4
Current consumption IOM 2 [A]	2,5
IOM ≙ input/output module	

Feature	Value
Current consumption IOM 3 [A]	1,6
IOM ≙ input/output module	

Tab. 17 Power supply specifications

2.1.2.2 Maximum cable lengths

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

Tab. 18 Cable lengths

2.1.2.3 Input/output modules – degree of protection

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

Tab. 19 Degree of protection, IOM

2.1.2.4 Input/output modules – dimensions

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

Tab. 20 IOM dimensions

2.1.3 Sensors

Pressure transducer

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

Tab. 21 Pressure transducer

Resistance thermometer

Feature	Value
Sensing resistance (to DIN IEC 751)	PT100

Feature	Value
Connection	Twin cable

Tab. 22 Resistance thermometer

3 Safety and Responsibility

3.1 Basic instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

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

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

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

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

3.2 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.

3.3 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.

4 Design and Function

4.1 The controller

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

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

Components

SIGMA CONTROL 2 comprises 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, and interfaces.
  - **R**adio **F**requency **I**denfication (RFID):
    Identification with the KAESER 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
- **I**nput-**O**utput-**M**odule (IOM):
  Modules with digital and analog inputs and outputs with their own power supply.

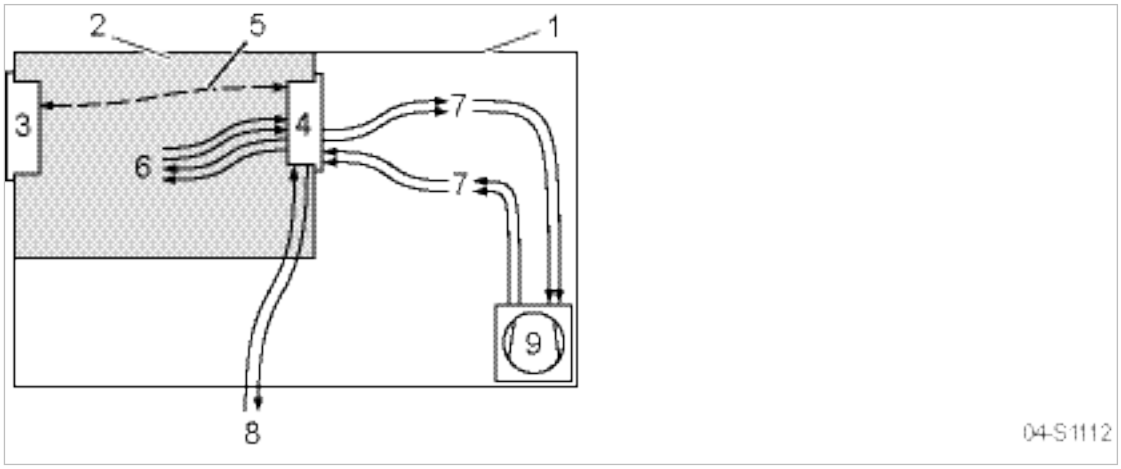


Fig. 2 System structure

1. Machine enclosure
2. Control cabinet
3. SIGMA CONTROL 2
4. Input/output module
5. IO 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

Function

The **control and regulating function** allows:

- Automatic changeover of the machine from LOAD to IDLE or STANDSTILL.

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

The **monitoring function** allows:

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

The **protective function** allows:

- Automatic machine shutdown on alarms that may lead to damage to the machine, e.g. overcurrent, overpressure, overtemperature.

4.2 Operating panel SIGMA CONTROL 2

Keys

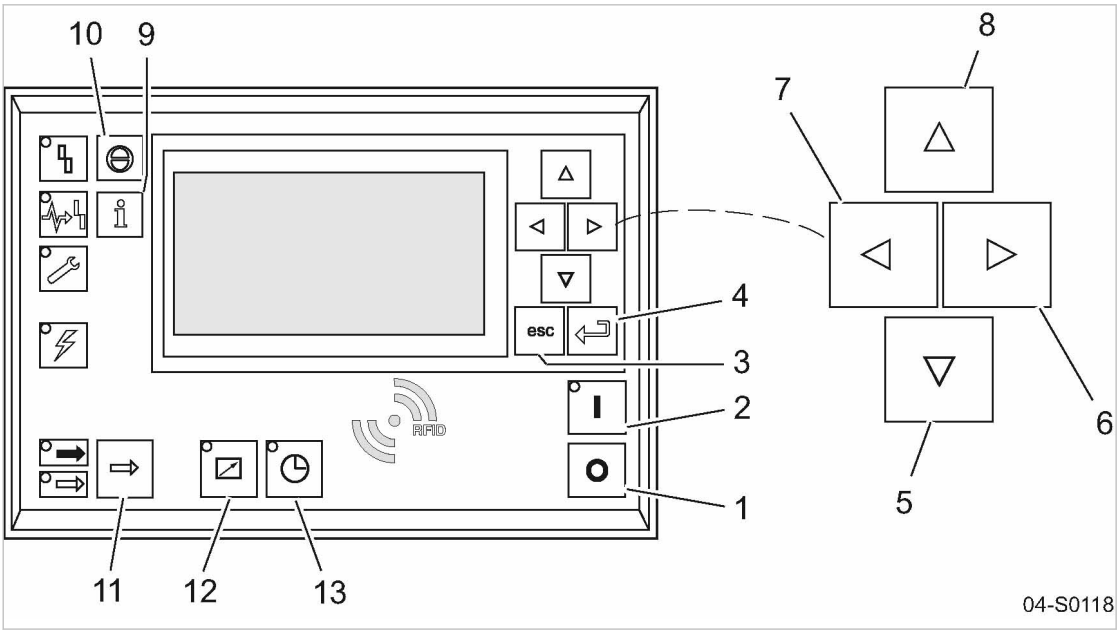


Fig. 3 Keys – overview

Item	Name	Function
1	«OFF»	Switch off the machine.
2	«ON»	Switch on the machine.
3	«Escape»	Returns to the next higher menu option level. Exits the edit mode without saving.
4	«Enter»	Jumps to the selected menu option. Exits the edit mode and saves.
5	«DOWN»	Scrolls down the menu options. Reduces a parameter value.
6	«Right»	Jumps to the right.
7	«Left»	Jumps to the left.

Item	Name	Function
8	«UP»	Scrolls up the menu options. Increases a parameter value.
9	«Events and information»	Operating mode: Displays the event memory.
10	«Acknowledgement»	Acknowledges alarms and warning messages. If permissible: Resets the fault counter (RESET).
11	«LOAD/IDLE»	Toggles the compressor between LOAD and IDLE operating modes.
12	«Remote control»	Switches remote control on and off.
13	«Shift clock»	Switches clock control on and off.

Tab. 23 Keys

Indicators

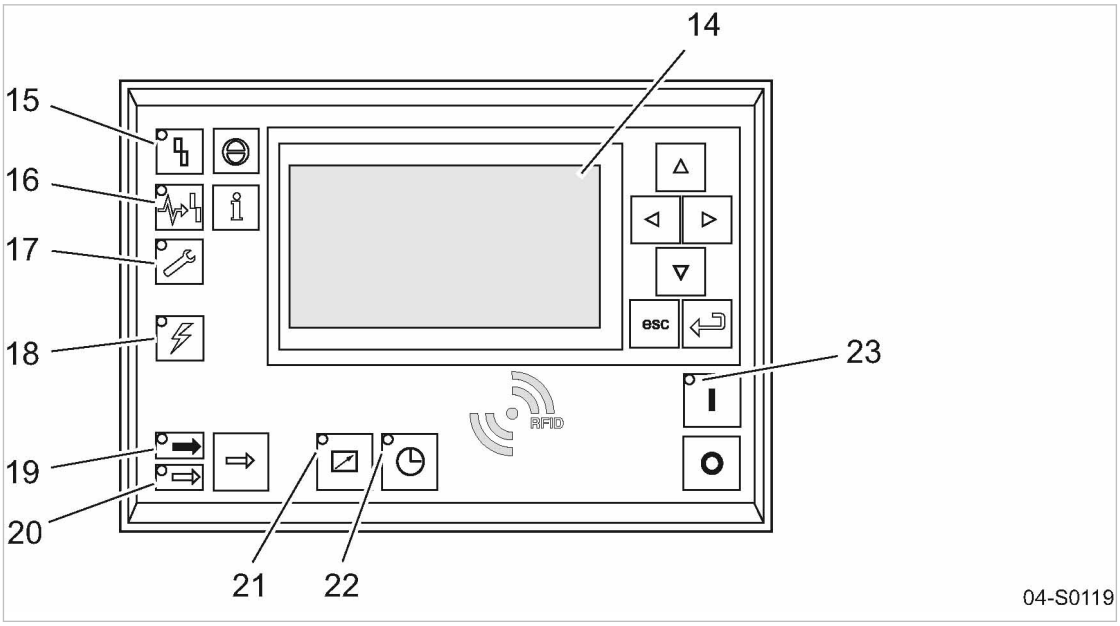


Fig. 4 Indicators

Item	Name	Function
14	Indicator field or display	Graphic display with 8 lines and 30 characters.
15	*Fault*	Flashes red when an alarm occurs. Lights continuously when acknowledged.
16	*Communication*	Continuous red illumination if a communication connection (Ethernet, USS, COM modules) has a fault.
17	*Warning*	Flashes in yellow in the following events: ■ maintenance work due, ■ Warning message Lights continuously when acknowledged.

Item	Name	Function
18	*Control voltage*	Lights green when the power supply is switched on.
19	*LOAD*	Lights green when the compressor is running under LOAD.
20	*IDLE*	Lights green when the compressor is running in IDLE. Flashes when the «LOAD/IDLE» toggle key is pressed.
21	*Remote control*	The LED lights when the machine is in remote control.
22	*Shift clock*	The LED lights when the machine is in clock control.
23	*Machine ON*	Lights green when the machine switched on.

Tab. 24 Indicators

RFID sensor field

RFID is the abbreviation for “**R**adio **F**requency **I**ndentification” and enables the identification of persons or objects.
Placing a suitable transponder in front of the RFID sensor field of the controller will automatically activate the communication between transponder and SIGMA CONTROL 2 .

A suitable transponder is the EQUIPMENT CARD. Two of them have been provided with the machine.

Typical application:

- Users log on to the machine.
  (no manual input of the password required.)

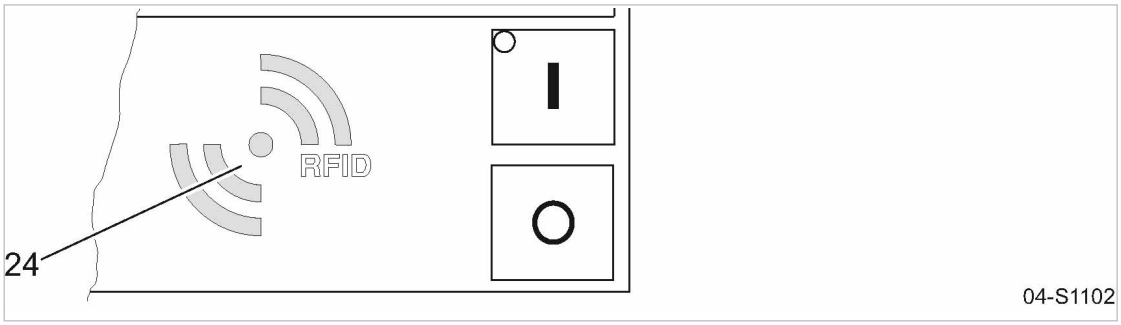


Fig. 5 RFID sensor field

Item	Name	Function
24	RFID	RFID sensor field for the communication with a suitable RFID transponder.

Tab. 25 RFID sensor field

Further information More information about the use of RFID technology is provided in the SIGMA CONTROL 2 operating manual.

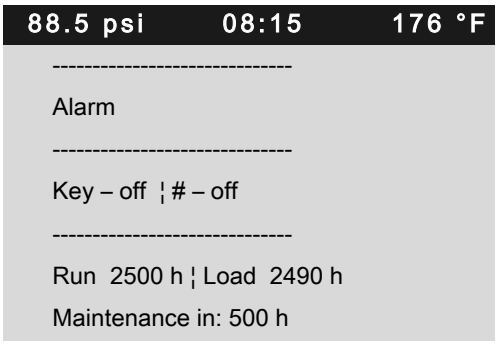
4.3 Display

In the display level, information can be read and data entered, The display comprises 8 lines, each of 30 characters.

During operation, the display will indicate the operating mode.

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

4.3.1 Operating mode



Header

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

The following parameters are displayed permanently on the title bar:

- Working pressure
- Time
- Airend discharge temperature (ADT)

Line 3: Operational state

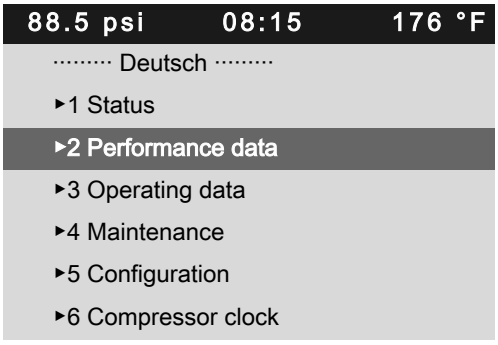
Depending on settings, either the current state of the machine or menu text is shown in line 3.

Lines 5 and 6: Machine state

The following parameters with their current values are displayed in lines 5 and 6:

- Remote control yes/no
- Time control yes/no
- Pressure control
- The hours during which the machine was activated
- The hours during which the machine ran in operating mode LOAD.

4.3.2 Main menu



Description

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

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

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

Numbering

Each menu is numbered.

Because the access to certain menus is restricted to specific access rights, not all menus may be shown.

For example, you can recognize subordinate menus in the menu structure by the number preceding their designation. The menu structure is explained in chapter 4.6.2.

Active line

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

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

Further information For the setting of parameters see chapter 4.3.3.

4.3.3 Setting parameters

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

You move to setting mode by:
Pressing «Enter». The value of the parameter will flash indicating that it can be changed.

Changing parameters

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

The «Enter» key affects only the active line.

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

Resetting current parameters

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

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

Check box *Reset*	Status
☒	activated

Check box *Reset*	Status
☐	deactivated

Tab. 26 Reset check box status

4.3.4 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. 27 Check box status

4.4 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.

Throughout this operating manual, the RFID Equipment Card will be simply called the "Equipment Card".

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

You have access to a further level: Level 2.
In level 2, you can display and specify further parameters and, for instance, reset the system pressure or the maintenance counters.

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

4.4.1 Secure storage of the RFID Equipment Cards

You will receive 2 RFID Equipment Cards with each machine.
If both Equipment Cards are misplaced, you can register a new Equipment Card only after entering the user name and the password. A new Equipment Card may registered by an authorized KAESER service representative, subject to a fee, if the user name and the password are lost.

4.5 Checking the machine status with KAESER CONNECT

Using a PC with web browser, you can call up a visualization of your machine's controller and thus check the energy efficiency of the machine. KAESER CONNECT does not require additional and expensive special software applications. KAESER CONNECT selectively visualizes the current status of your controller in your country's language.

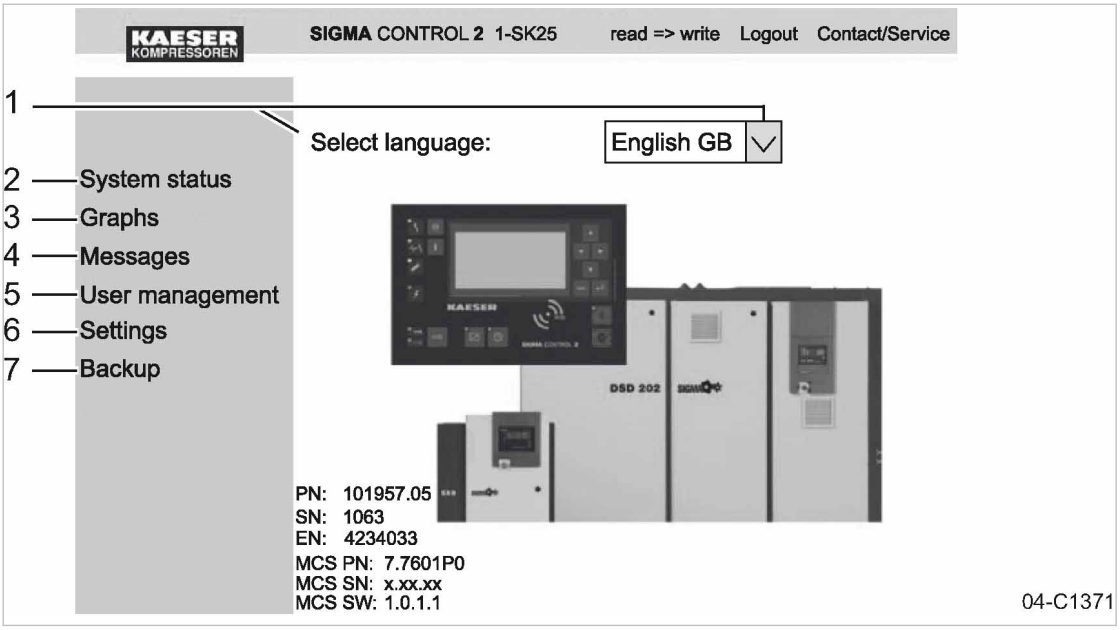


Fig. 6 KAESER CONNECT for SIGMA CONTROL 2

[1] Choice of language
[2] System status
[3] Graphs
[4] Messages
[5] User administration
[6] Settings
[7] Data backup

KAESER CONNECT functions:

- System status
  - Mapping of the local menu
- Graphs
  - Graphic representation of the main pressure and airend discharge temperature along the time axis.
  - Graphic representation of the compressor status (OFF, IDLE, LOAD) and RPM along the time axis.
- Messages
  - Current messages
  - Message history (event memory)
- User administration
  - Creating and activating new user accounts.
  - Deactivating existing user accounts.
  - Changing passwords.
- Settings
  - Unit display format
  - Date display format
  - Time display format
- Data backup
  - Writing data to your own PC.

Further information For the Login and other procedures, please see chapter 7.3.

Header

- Please note the designations in the menu's header. The designations cover user-friendly functions such as:
- Activate write mode
  - You switch from read mode to write mode to create a new user account, for example.
- Closing KAESER CONNECT:
  - Logout function in the header.
- Contact KAESER Service:
  - Display of KAESER Service addresses.

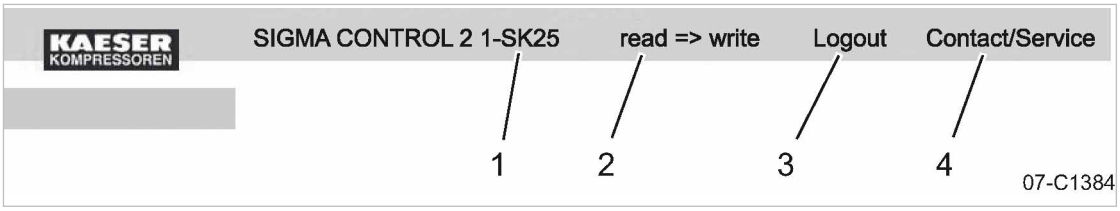


Fig. 7 Header

1 Machine designation
2 Write mode
3 Logout
4 Contact KAESER Service

4.6 Menus – overview

4.6.1 Operating mode

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

Compressor	
Compressor PN:	Compressor SN:
Compressor EN:	
SIGMA CONTROL 2 MCS	
PN:	SN:
Software:	

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

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

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

88.5 psi	08:15	176 °F

Alarm		

Key – off ¦ # – off		

Run 2500 h ¦ Load 2490 h		
Maintenance in: 500 h		

Current operating mode

Operating parameters

Operating parameters

The following parameters are displayed:

- Operating mode of the machine
- Information to the «LOAD/IDLE» keys, «Remote control» or «Clock»
- Value for system setpoint pressure pA
- Number of operating hours and hours of the machine being in LOAD mode

The operations menu provides the most important parameters during the machine's operation.

4.6.2 Menu structure

Pressing «Enter» or one the arrow keys opens the main menu.

In the main menu, you can:

- Retrieve displayed information
- Enter customer-specific settings

The menus shown require access level 2.

Main menu

Navigation	Function/submenu
1 Status	■ Messages – Status report – Current warnings Current faults ■ Statistics ■ Current pressure control ■ Actual operating mode ■ DI/DO-indicator ■ Diagram: Rated pressure/airend discharge temperature For details of the *<status>* menu, see table 29 “Menu Status".
2 Performance data	Display of the following measured data: ■ System pressure pNloc ■ ADT (airend discharge temperature) Increased speed ADT ■ Δp / oil separator ■ Starting temp. ■ Temperature MCS (Main Control System) ■ Temperature, first I/O module

Navigation	Function/submenu
3 Operating data	Operating hours ■ Compressor ■ On load ■ Engine ■ Airend ■ SIGMA CONTROL 2 kWh counter ■ Active ■ Countpulse ■ kWh ■ Reset
	Load valve ON
4 Maintenance	■ Oil filter ■ Oil separator ■ Oil change ■ Air filter ■ Valve inspection ■ Belts / coupling inspection ■ Bearing lubrication ■ Motor bearings ■ Electrical equipment ■ Annual maintenance
5 Configuration	For details of the *<configuration>* menu, see table 30 “Menu Configuration".
6 Compressor clock	Activate/deactivate compressor timer Delete/reset the existing clock program
	Enter weekdays and times: ■ 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

Navigation	Function/submenu
8 Communication	■ Ethernet ■ COM module
	Activating/deactivating the «Remote control» key
	For details of the *<Communication>* menu, see table 33 “Menu Communication".
9 Machine test	■ TÜV check
10 Components	■ Compressor drive motor – Power switching For details of the *<Components>* menu, see table 35 “Menu Components".

Tab. 28 Menu structure

4.6.2.1 Status menu

Navigation	Function/submenu
1.1 Messages	■ Current messages ■ Message history (event memory) – Compressor messages – Diagnostic messages – System messages ■ Address error
	Status report
	Current warnings Current faults
1.2 Statistics	■ Overall load ■ Actual system pressure pNloc Internal pressure ■ Total number of motor starts ■ Motor starts per day Motor starts per hour ■ Total number of motor starts below minimum temperature ■ Last load run ■ Last idle run ■ Last motor OFF
1.3 Current pressure control	■ SIGMA CONTROL 2 ■ Cut-out pressure ■ Actual system pressure

Navigation	Function/submenu
1.4 Current operating mode	■ Compressor ON Load control ■ Regulating mode Idle time ■ Acknowledgement
1.5 DI/DO display	■ First I/O module – DI/DO-indicator ■ Second I/O module – DI/DO-indicator ■ Third I/O module – DI/DO-indicator ■ Fourth I/O module – DI/DO-indicator ■ Fifth I/O module – DI/DO-indicator ■ Sixth I/O module – DI/DO-indicator
1.6 pN/ADT curve	Diagram: Rated pressure/airend discharge temperature

Tab. 29 Status menu

4.6.2.2 Configuration menu

Navigation	Function/submenu
5.1 General	Machine model Date and time Date format Time format Pressure unit Temperature unit Display illumination
	System data ■ SIGMA CONTROL 2 MCS – Software – KAESER: Part number Serial number – Controller manufacturer: Part number Serial number Date of manufacture ■ Compressor – Equipment number – Part number – Serial number ■ IO modules – First IOM
5.2 Pressure control	■ Pressure sensors ■ Pressure settings ■ Load control ■ Actual system pressure For details of the *<Pressure control>* menu, see table 31 “Menu Pressure Control".
5.3 Control mode	Local mode
	■ Venting period ■ DUAL ■ QUADRO ■ Mod. valve
	Refrigerated dryer
5.4 Compressor start	■ Compressor ON ■ Compressor OFF
	Auto start Start temperature

Navigation	Function/submenu
5.5 Acknowledgement	Remote operation «Remote control» key Remote contact Ack
5.6 ADT	■ AIR 1.00 Conduit correction ■ Rate of rise of the airend discharge temperature
5.7 I/O periphery	■ DO functions ■ Quantities ■ External messages ■ Switch For details of the *<I/O periphery>* menu, see table 32 “I/O periphery menu”.
5.8 Timer	■ On ■ Off ■ DOR 1.03

Tab. 30 Configuration menu

Pressure control menu

Navigation	Function/submenu
5.2.1 Pressure sensors	■ System pressure pNloc ■ Internal pressure pi
5.2.2 Pressure settings	■ pRV Pressure relief valve opening pressure ■ Pressure increases ■ Nominal pressure ■ System setpoint pressure ■ System pressure low ■ Minimum cut-in pressure
5.2.3 Load control	■ Setting local mode ■ Set remote operation Activate/deactivate «Remote control» key ■ Timer operating mode pA/pB ■ Remote contact operating mode pA/pB ■ Assign load remote contact ■ Assign local load remote contact: ■ Activate/deactivate the IDLE key
5.2.4 Network actual pressure	pNloc actual system pressure All

Tab. 31 Pressure control menu

I/O periphery menu

Navigation	Function/submenu
5.7.1 DO functions	Controller ON Compressor ON Motor running IDLE LOAD Group fault Group warning Remote operation Timer active EMERGENCY-OFF ■ Timer contact (enter timing program)
5.7.2 Quantities	Configure display of measured values ■ Display 1 (p) ■ Display 2 (p) ■ Display 3 (T) ■ Display 4 (T) ■ Display 5 (I) ■ Display 6 (I)
5.7.3 External messages	Configure display of external messages ■ External message 1 ■ External message 2 ■ External message 3 ■ External message 4 ■ External message 5 ■ External message 6
5.7.4 Switch	Configuring the switching points for pressure and temperature ■ System pressure pNloc ■ Internal pressure pi ■ Airend discharge temperature (ADT) ■ Inlet temperature ■ Package discharge temperature (PDT)

Tab. 32 I/O periphery menu

4.6.2.3 Communication menu

Navigation	Function/submenu
8.1 Ethernet	■ IP configuration – IP address – Subnet mask – Gateway – DNS Server 1 – DNS Server 2 – Restart network
	■ Connections – SIGMA CONTROL 2 Restart Timeout Cycle time For details of the *<connections>* menu, see table 34 “Menu Connections".
	■ Email – Activate/deactivate email Compressor number Language – Sender address Sender name Telephone number contact person Recipient address – SMTP server User name – Port Interval

Navigation	Function/submenu
8.2 Com-Module	■ PROFIBUS – Status – Start Com module Slave number – Bus fault Start time Timeout ■ MODBUS – Status – Start Com module Slave number – Bus fault Start time Timeout – Baud rate Stop bits Parity Timeout Modus ■ MODBUS TCP – Status – Start Com module – Bus fault Start time Timeout – IP address Subnet mask Gateway DNS Server 1 DNS Server 2 ■ DEVICENET – Status – Start Com module Slave number Reset – Bus fault Start time Timeout

Tab. 33 Communication menu

4.6.2.4 Connections menu

Navigation	Function/submenu
8.1.2 Connections	■ SIGMA CONTROL 2 – Status – Mode Master/Slave Port – IP address of communication partner

Tab. 34 Connections menu

4.6.2.5 Components menu

Navigation	Function/submenu
10.1 Compressor motor	■ Power switching – Star-delta start – Direct start – High-voltage cell – SFC USS Micromaster – SFC USS Sinamics For details of the *<Connections>* menu, see table 36 “Menu Connections".

Tab. 35 Components menu

4.6.2.6 Power switching menu

Navigation	Function/submenu
10.1.1 Power switching	■ Star-delta start – Temperature, warm start – Star time at warm start Star time at cold start Star/Delta changeover time – Overload relays – Mains contactor – Star contactor – Delta contactor ■ Direct start – Acceleration time – Overload relays – Mains contactor ■ High-voltage cell – Acceleration time – ready – Mains contactor ■ SFC USS Micromaster – Service mode – Mains contactor ■ SFC USS Sinamics – Service mode – Mains contactor

Tab. 36 Power switching menu

4.7 Operating modes and control modes

4.7.1 Operating modes

The machine operates in the following modes:

- LOAD:
  The inlet valve is open. The airend delivers compressed air to the distribution network.
  The drive motor runs under full load.
- IDLE:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The venting valve is open.
  A small volume of air circulates through the bleed hole in the inlet valve, through the airend and back to the inlet valve via the venting valve.
  The drive motor runs without load and draws little current.

- STANDSTILL:
  The inlet valve is closed. The minimum pressure/check valve shuts off the oil separator from the distribution network. The venting valve is open.
  The drive motor is stopped.

Option C1

- MODULATING CONTROL:
  With the help of a control valve (the proportional controller) the degree of opening of the inlet valve is steplessly varied in response to the 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.
  The regulating valve is factory set. The setting should not be changed without consultation with an authorized KAESER service representative.

4.7.2 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 of by consumers and maintain 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 STANDSTILL 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

Energy-efficient control modes for various applications:

Application	Recommended control mode
Compressed air station with one machine or several machines with comparable delivery	VARIO
Machine for peak load in a compressed air station	DUAL
Machine for intermediate load in a compressed air station	VARIO
Machine for basic load in a compressed air station	QUADRO

Tab. 37 Energy-efficient control modes

The SIGMA CONTROL 2 is factory set to DUAL control mode unless specifically ordered otherwise.

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 STANDSTILL.

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

QUADRO

In contrast to the DUAL regulating mode, the machine will switch from LOAD to STANDSTILL 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 STANDSTILL after passing through IDLE.

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

The shorter these times are set, the sooner (and more frequently) the drive motor 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 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. The motor is **not** stopped, i.e. the machine does not switch to STANDSTILL.

DYNAMIC

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

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

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

4.7.3 Frequency-controlled drive (SFC)

The frequency converter compares the actual network pressure with a target value and adjusts the speed of the drive motor, and thereby the delivery of the compressor, accordingly.
The speed of the airend determines the rate of compressed air delivery and the working pressure.

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

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

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

If network pressure exceeds the target value:

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

DUAL:

The minimum controllable speed is reached and the machine switches to IDLE. The drive motor runs unloaded with low power consumption.
When the idle period has elapsed, the machine switches to STANDSTILL.

VARIO/QUADRO/CONTINUOUS:

The minimum controllable speed is reached and, depending on the air demand at the time, the machine switches either to IDLE or to STANDSTILL.

DYNAMIC:

The minimum controllable speed is reached and, depending on the air temperature of the drive motor, the machine switches either to STANDSTILL or to IDLE.

If network pressure falls below the set-point:

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

The inlet valve opens and the machine delivers compressed air.

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

4.8 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.

5 Installation and Operating Conditions

5.1 Maintaining ambient conditions

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

5.2 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.

6 Installation

6.1 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.

6.2 Machine identification

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

Identifying the machine for operation in remote mode.

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

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

Tab. 38 Machine identification

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

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

Tab. 39 Remote control identification

Identifying the machine for clock control mode operation

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

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

Tab. 40 Machine identification

7 Initial Start-up

7.1 Outline

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

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

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

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

7.3: Using the KAESER CONNECT

7.4: Matching the pressure parameters of the machine and possible modules

7.5: Configuring machine start and stop

7.6: Activating and setting up the control modes

7.7: Configuring the machine for local mode

7.8: Configuring the machine for master control

7.9: Configuring email

7.10: Configuring input and output signals

7.11: Activating remote acknowledgement

7.12: Linking to an external pressure transducer

7.13: Machine commissioning

7.2 Configuring the controller

All controller settings are explained in detail in the following sections. The most common settings are summarized for experienced users in the front of this manual.

➢ Carry out settings as required:

- 7.2.1: Selecting menu options (introduction)
- 7.2.2: Changing the display language
- 7.2.4: Entering and displaying passwords
- 7.2.5: Setting up time and date
- 7.2.6: Setting up display formats (date, time, units of pressure and temperature)
- 7.2.7: Activating summer/winter time
- 7.3.4: Creating additional user accounts

7.2.1 Selecting menu options

All menu options can be selected with the «DOWN», «UP» and «Enter» keys.

Example: Selecting the < Configuration → General > menu option

Precondition The display shows the operating mode.

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

2. Press the «UP» or «DOWN» key until *Configuration* is displayed as the active line.
3. In order to open the *< Configuration >* menu, press «Enter» once.
4. Use the «DOWN» or «UP» keys to select a submenu in the *< Configuration >* menu, *< General >* or *< Pressure control >* for example.
5. Press «UP» repeatedly until *General* is displayed as the active line.
6. Press «Enter».
   The current menu is the submenu *< General >* in the menu *< Configuration >*.
7. With the «DOWN» or «UP» keys you can select the menu option *< General >*, for example *< System information >*.

7.2.2 Changing the display language

The controller can display text messages in the following languages:

Arabian	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	...
English (GB)	Hebrew	Lithuanian	Swedish	...
English (USA)	Indonesian	Dutch	Slovenian	...

Tab. 41 Display language

Some of the units, as well as clock and date format, will be adjusted according to the language selected.

Precondition The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Press the «UP» key once.
   The specified language is displayed as the active line.
3. Use the «Enter» key to switch to setting mode.
   The currently set language flashes.
4. Use the «DOWN» or «UP» keys to select the desired language.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.
   The display texts are now in the selected language.

7.2.3 Access rights with equipment card

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

Advanced access rights:
- read additional data
- change other settings

1. Hold the Equipment Card in front of the controller's reader.
(see also chapter 4.2)
Your user name and access level will be displayed.
2. Press «Enter» to confirm the access right.

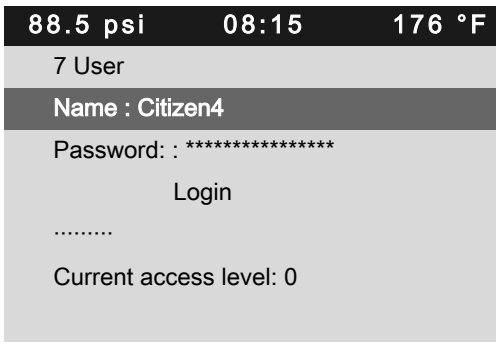
The Equipment Card is damaged or lost?
➢ Manually enter the user name and password (see also the following chapter).

7.2.4 Access right via manual input

Entering the user name

Precondition The display shows the operating mode.

1. Press «Enter».
The main menu is displayed.
2. Use the «DOWN» key to select the *<User>* menu option.
The *Name* line is displayed as being active.



3. Press «Enter» to switch into setting mode.
A column with alphanumeric characters is displayed.
4. Repeatedly press «DOWN» or «UP» until the requested character is displayed.
5. Press the «Right» key.
The cursor jumps to the next position.
6. Complete the remaining characters of the name.
7. Press the «Right» key.
8. Press «Enter» to accept the settings.

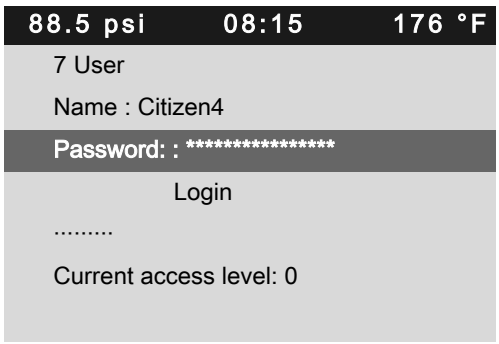
Result The user name is entered in full.

Enter current password

Precondition The user name has been entered.

1. Press «DOWN» once.
The *Password* line is displayed as being active.

2. Press «Enter» to switch into setting mode.
   A column with alphanumeric characters is displayed.



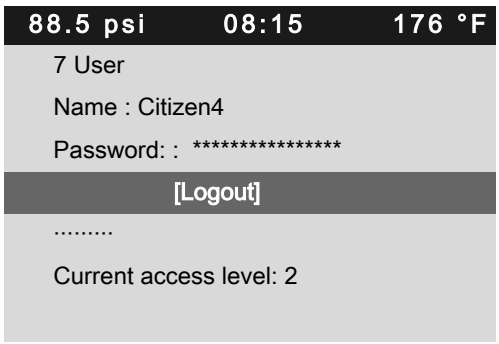
3. Repeatedly press «DOWN» or «UP» until the requested character is displayed.
4. Press the «Right» key.
   The cursor jumps to the next position.
5. Complete the remaining characters of the password.
6. Press the «Right» key.
7. Press «Enter» to accept the settings.

Result The password is entered in full.

Logging on

Precondition User name and password are entered.

1. Press «DOWN» once.
   The *Login* line is displayed as being active.
2. Press «Enter» to complete the login process.
   The *Login* text in the active line switches to *Logout*.
   Your current access level is shown as *2* .



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

Result You are logged in with a higher access level.

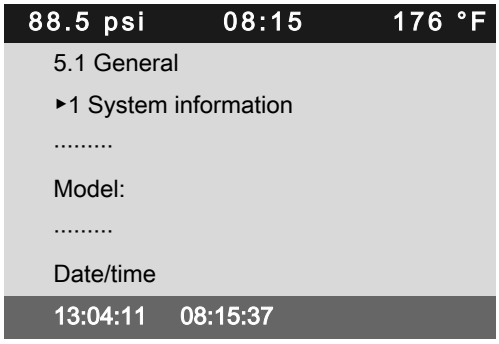
7.2.5 Checking/setting time and date

Precondition Password level 2 is activated.
The display shows the operating mode.

Checking/setting the time

➢ When operating the machine with a timer program, check the time settings at least once a year.

1. Press «Enter».
   The main menu is displayed.
2. Select the menu *< Configuration ➞ General >*.
3. Press the «DOWN» key repeatedly until the current time is displayed as the active line.

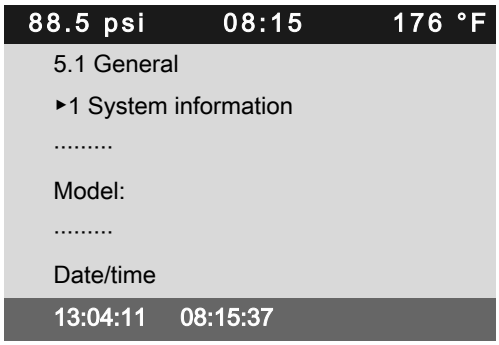


4. Press the «Right» key.
5. Press «Enter» to switch into setting mode.
   The hours display flashes. *00: 00: 00*.
6. Use «UP» or «DOWN» to change the hour setting.
7. Press the «Right» key.
   The minutes display flashes. *00: 00: 00*.
8. Use «UP» or «DOWN» to change the minute setting.
9. Press the «Right» key.
   The seconds display flashes. *00: 00: 00* .
10. Use «UP» or «DOWN» to change the second setting.
11. Press «Enter» to save the settings.
12. Press «Escape» repeatedly to return to the main menu.

Checking/setting the date

Precondition Password level 2 is activated,
the *< Configuration ➞ General >* menu is selected (see chapter 7.2.1).

1. Press the «DOWN» key repeatedly until the current date is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   The day display flashes. *00: 00: 00*.
3. Use «UP» or «DOWN» to change the day setting.
4. Press the «Right» key.
   The month display flashes. *00: 00: 00*.
5. Use «UP» or «DOWN» to change the month setting.
6. Press the «Right» key.
   The year display flashes. *00: 00: 00* .
7. Use «UP» or «DOWN» to change the year setting.
8. Press «Enter» to save the settings.
9. Press «Escape» repeatedly to return to the main menu.

7.2.6 Setting display formats

When setting the language, several display formats will automatically adjust to local usage.

Setting the date format

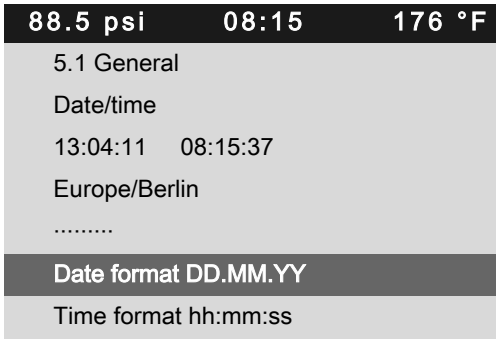
Select your preferred format.

Format	Example:
DD.MM.YY	30.07.10
YY-MM-DD	10–07–30
MM/DD/YY	07/30/10

Tab. 42 Date formats

Precondition Password level 2 is activated,
Menu *< Configuration> General >* is selected (see 7.2.1).

1. Press the «DOWN» key repeatedly until *Date format* is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   DD.MM.YY flashes.
3. Change the format with the «DOWN» or «UP» key.
4. Press «Enter» to save the setting.
5. Press «Escape» repeatedly to return to the main menu.

Setting the time format

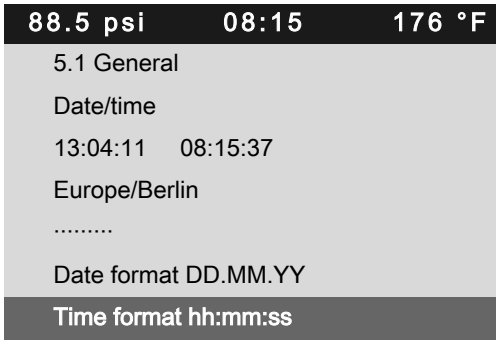
Select your preferred format for the time display:

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

Tab. 43 Time formats

Precondition Password level 2 is activated,
Menu *< Configuration> General >* is selected (see 7.2.1).

1. Press the «DOWN» key repeatedly until *Time format* is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   hh:mm:ss flashes.
3. Change the format with the «DOWN» or «UP» key.
4. Press «Enter» to save the setting.
5. Press «Escape» repeatedly to return to the main menu.

Setting the pressure display units

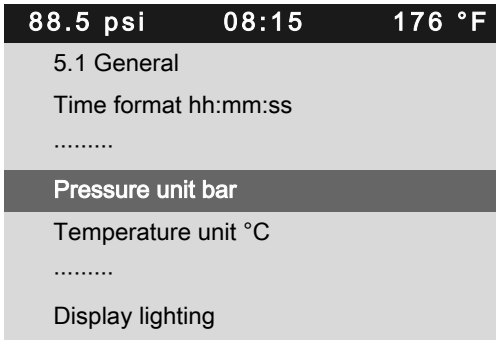
Select your preferred display of the pressure units:

Format	Example:
bar	5.5 bar
hPa	5523 hPa
MPa	0.55 MPa
psi	80 psi
at	5.6 at
"Hg	162.9 "Hg

Tab. 44 Units of pressure

Precondition Password level 2 is activated,
Menu *< Configuration> General >* is selected (see 7.2.1).

1. Press the «DOWN» key repeatedly until *Pressure unit* is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   The *bar* parameter flashes.
3. Change the unit with the «DOWN» or «UP» key.
4. Press «Enter» to save the setting.
5. Press «Escape» repeatedly to return to the main menu.

Setting the temperature display units

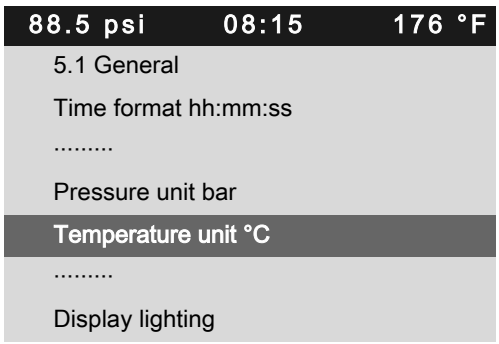
Select your preferred display of the temperature units:

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

Tab. 45 Units of temperature

Precondition Password level 2 is activated,
Menu *< Configuration> General >* is selected (see 7.2.1).

1. Press the «DOWN» key repeatedly until *Temperature unit* is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   The *°C* parameter flashes.
3. Change the unit with the «DOWN» or «UP» key.
4. Press «Enter» to save the setting.
5. Press «Escape» repeatedly to return to the main menu.

Setting the display illumination

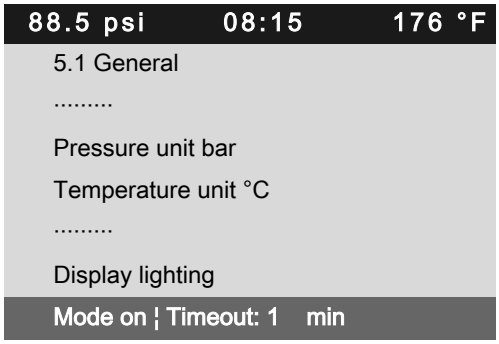
Select your personal mode for the display illumination:

Mode	1	2	3
Display	*automatic*	*ON*	*OFF*
Function	The illumination extinguishes after the *timeout* has elapsed.	Permanent setting Illumination "on"	Permanent setting Illumination "off"

Tab. 46 Display illumination

Precondition Password level 2 is activated,
Menu *< Configuration> General >* is selected (see 7.2.1).

1. Press «DOWN» repeatedly until *Display lighting* is displayed.
2. Press «DOWN» once until *Mode* is displayed as the active line.



3. Press «Enter» to switch into setting mode.
   The *on* display flashes.
4. Use «UP» to select the *auto.* mode.
5. Press «Enter» to save the setting.
6. Enter the setting for *Timeout* in the same manner.
7. Press «Enter» to save the setting.
8. Press «Escape» repeatedly to return to the main menu.

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

7.2.7 Setting and activating summer/winter time

The system automatically switches between summer and winter time.

7.3 Using KAESER CONNECT:

Using a PC with web browser, KAESER CONNECT enables you to view the following of the SIGMA CONTROL 2:

- System status
- Graphs
- Messages

- User administration
- Settings
- Data backup

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

The following functions are not available with KAESER CONNECT:

- Remotely starting the machine
- Remotely changing parameters

7.3.1 Displaying the system status

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Select the *<System status>* menu.
   The system displays the status information.

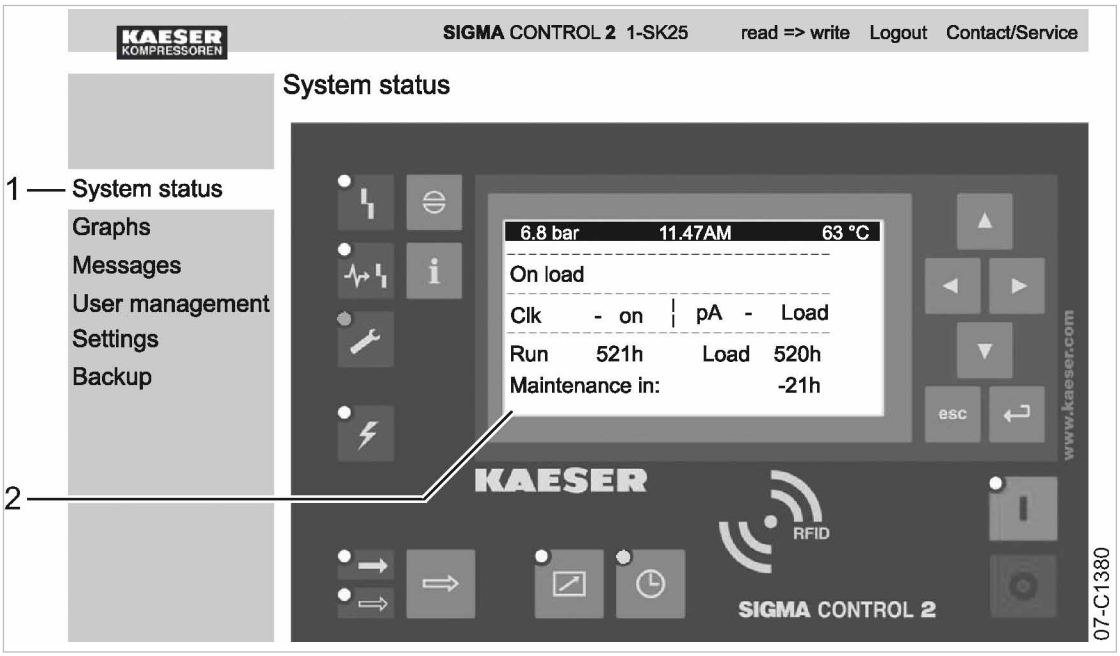


Fig. 8 Status display

1 *<System status>* menu
2 Display SIGMA CONTROL 2 with status information

2. Check the status information.

The entire local menu can be displayed at your PC.

1. Simply click in the display of the operating mode.
   The *<main menu>* is displayed.

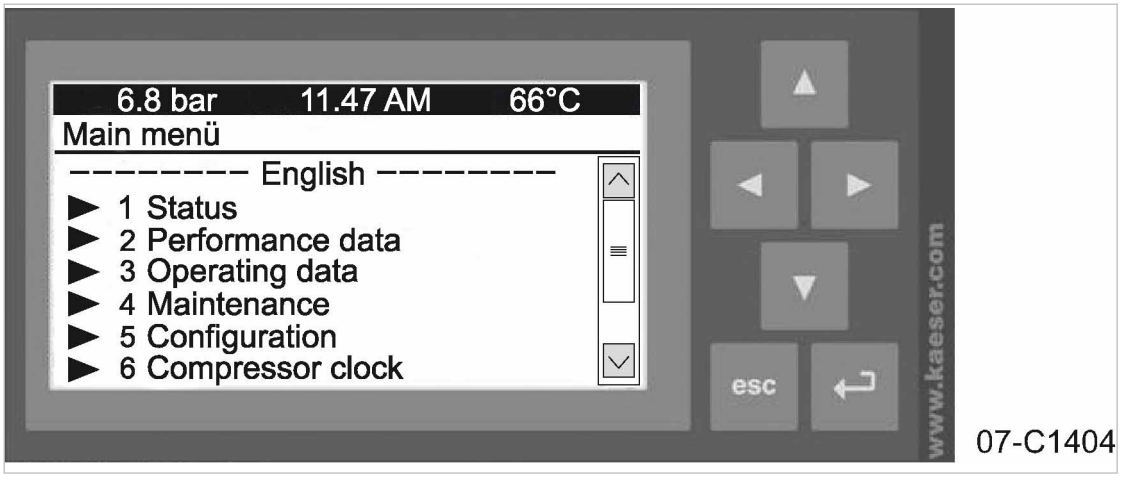


Fig. 9 Main menu

2. You now may click the *<Status>* menu.
   The system displays the corresponding *<submenus>*.

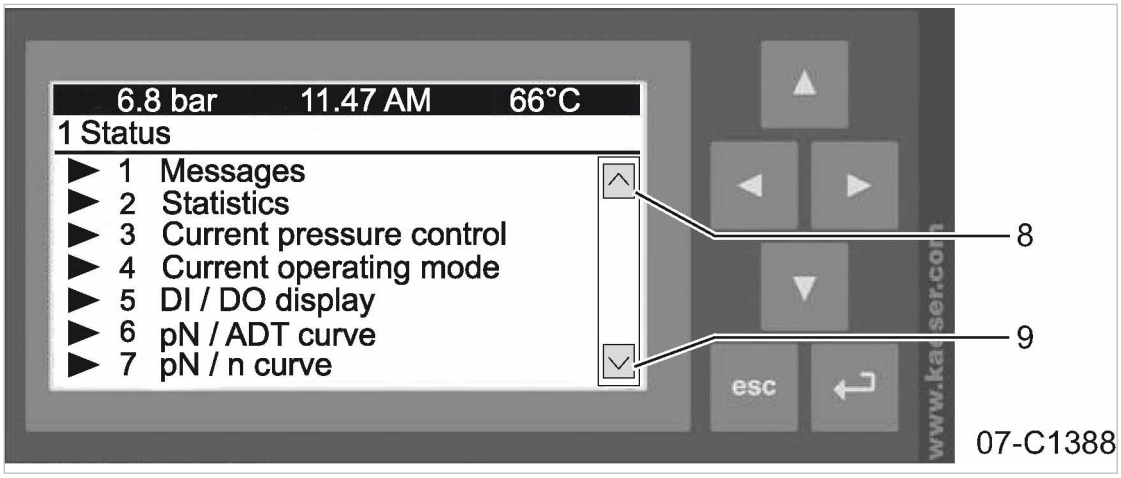


Fig. 10 Status menu with submenus

[1] Messages
[2] Statistics
[3] Current pressure regulation
[4] Current operating mode
[5] DI/DO display
[6] pN / ADT curve
[7] pN / n curve
[8] «Scroll down» key
[9] «Scroll up» key

3. Navigate through the submenus by additional clicks in the display.
4. Click «Scroll up» [9] to start the upward scroll.
   Data not visible prior to the scroll action are now displayed.
5. Click «Scroll down» [8] to start the downward scroll.
6. To move back between the menus, click «esc» as often as required.

7.3.2 Display graphs

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

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 display at the right edge of the graph.

The following graphs can be displayed:

- Network pressure
- Airend discharge temperature
- Machine status
  - OFF
  - IDLE
  - LOAD
- Speed

The display of the *speed* is implemented only for machines with frequency converter (SFC models).

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Select the *<Graphs>* menu.
   The system displays graphs.

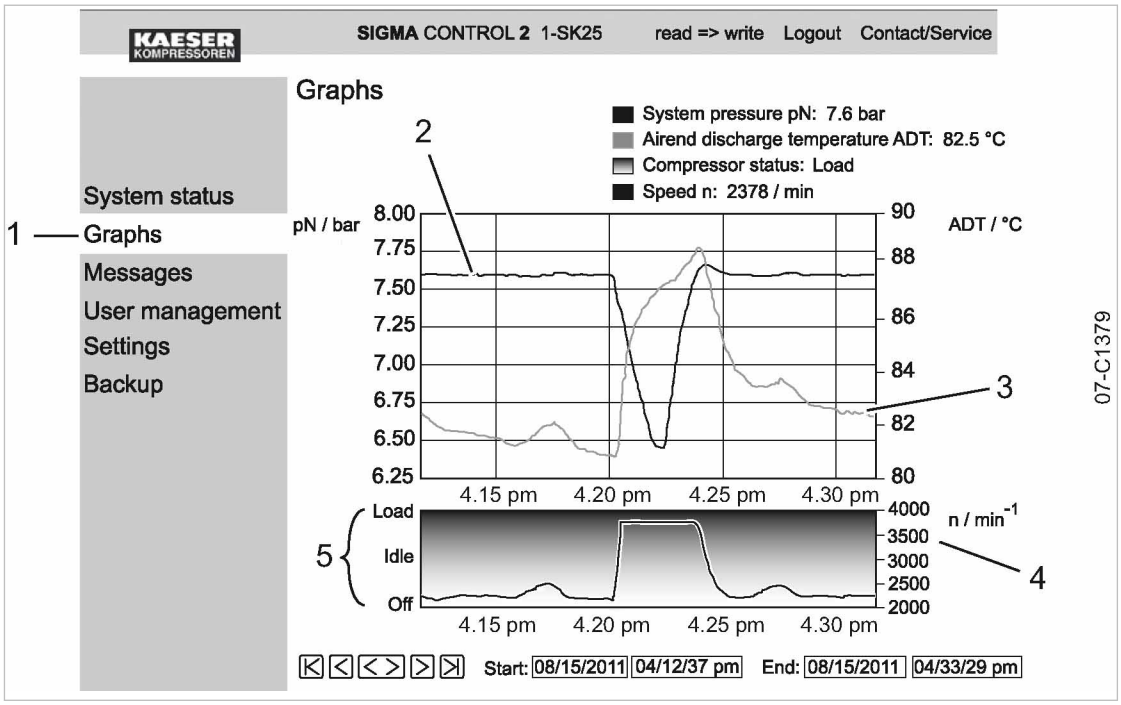


Fig. 11 Pressure/temperature graphs

[1] *<Graphs>* menu
[2] Network pressure
[3] Airend discharge temperature (ADT)
[4] Speed
[5] Machine status

2. Check pressure activity.
3. Check airend discharge temperature.

7.3.2.1 Zoom and arrow key functions

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.

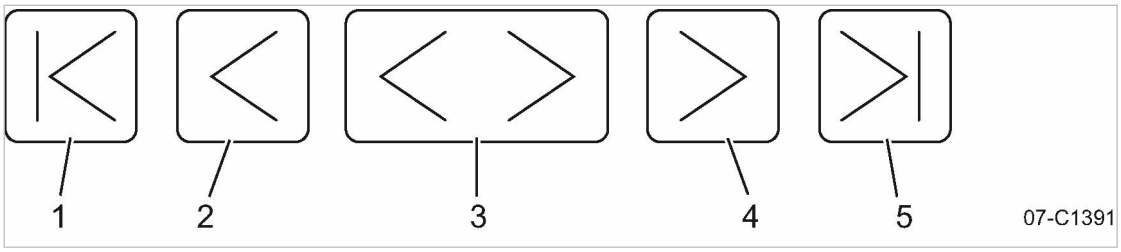


Fig. 12 Arrow keys

Position	Name	Function
1	«Start»	Display of oldest data
2	«Scroll left»	Shift the display area $^1/_3$ to the left
3	«Zoom-out»	Time range is enlarged
4	«Scroll right»	Shift the display area $^1/_3$ to the right
5	«End»	Display of newest data

Tab. 47 Arrow keys and functions

1. Click the «Start» [1] arrow key.
   The oldest data are displayed.
2. Click the «Scroll right» [4] arrow key.
   The display area is shifted to the right by $^1/_3$.
3. Draw a rectangle with the mouse pointer pressed.
4. Release the mouse pointer.
   The selected are is enlarged (zoom-in function).
5. Click the «Zoom-out» [3] arrow key.
   Time range is enlarged (zoom-out function).

7.3.3 Displaying messages

The following messages are shown:

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

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Open menu *<Messages>*.
   Menu *<Messages>* is displayed.

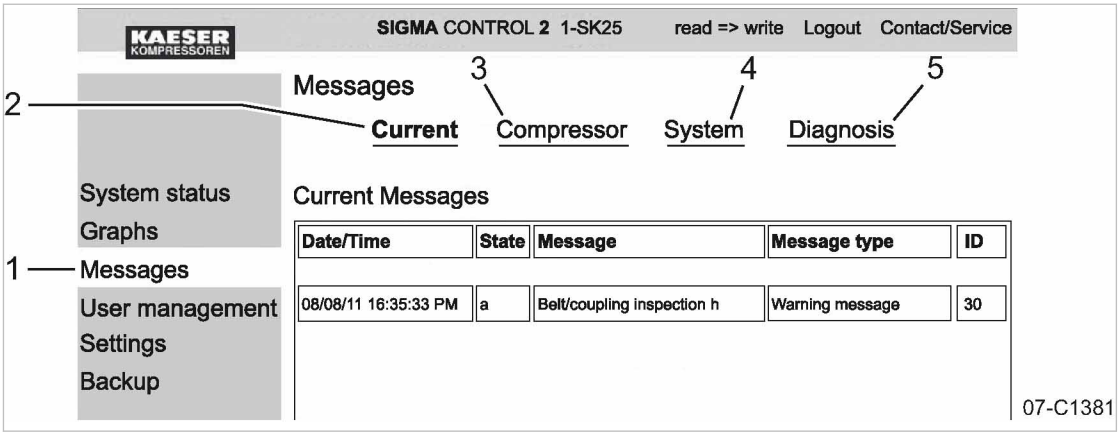


Fig. 13 Messages

1 Menu *< Messages >*
2 Current messages
3 Compressor messages
4 System messages
5 Diagnostic messages

2. Check messages.

7.3.4 Creating additional user accounts

Use the *<User administration>* menu to create additional user accounts for other employees.

In order to be able to create user accounts, you must activate the write mode 2. The system will prompt you enter and confirm your user name and your password. Subsequently, the write mode is activated.
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.

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 KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Select the *<User administration>* menu.
   The system displays the *<User administration>* menu.

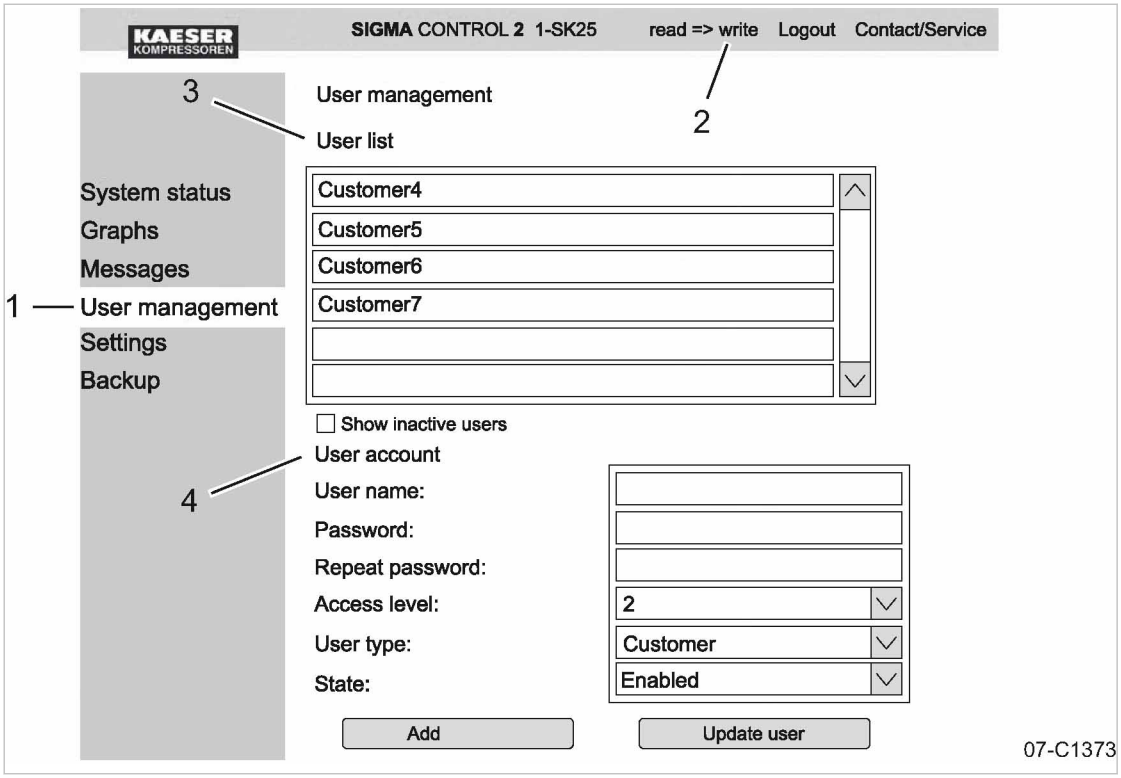


Fig. 14 User administration menu

1 *<User administration>* menu
2 Activate write mode
3 User list
4 User account

2. Activate the write mode 2.
   The *Log on to write* window opens.

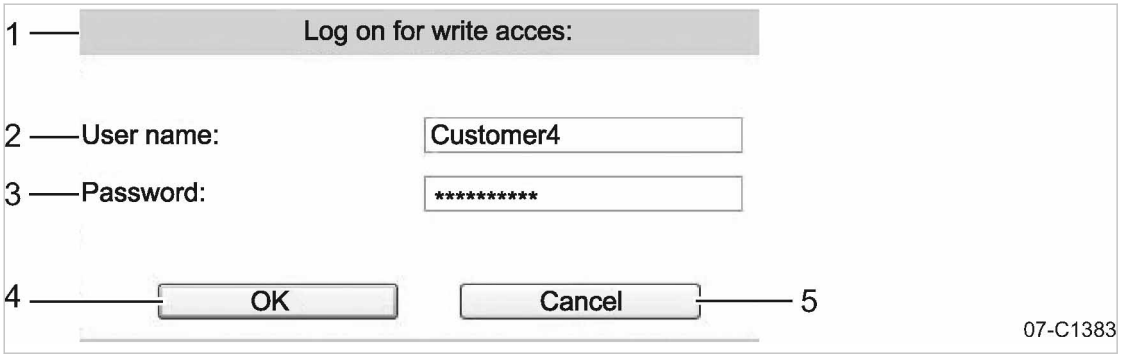


Fig. 15 "Log on to write" window

1 *Log on to write* window
2 User name
3 Password
4 «OK»
5 «esc» key

3. Enter your own user name.
4. Enter your own password.
5. Click «OK».

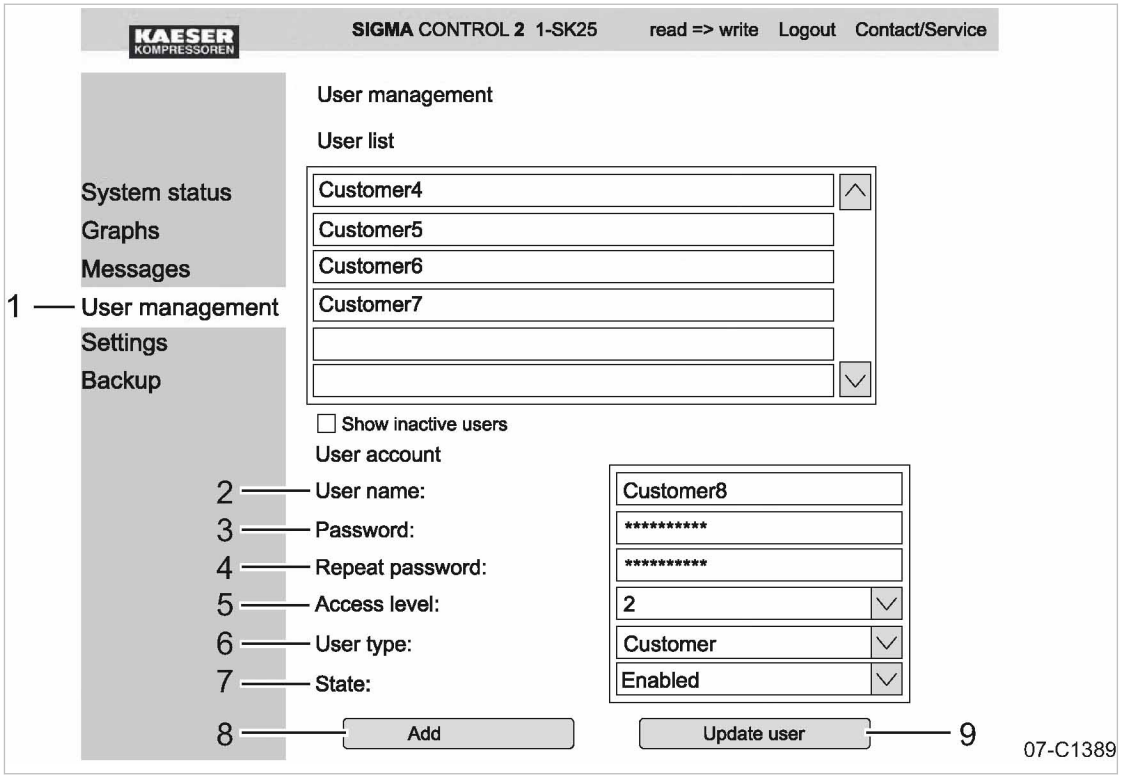


Fig. 16 Creating a new user

1 *<User administration>* menu
2 New user name
3 Password
4 Confirm the password
5 Access level
6 User type
7 Status
8 «Add» key
9 «Update» key

6. Enter the new user name 2.
7. Enter the new password 3.
8. Confirm the new password 4.
9. Select access level 2 5.
10. Select user type Customer 6.
11. Select status Activated 7.
12. Click «Add» 8.
    The new user name has been added to the user list.

Result A new user account has been created and activated.

Updating user accounts

Similar to the creation of new user accounts, you can also update existing user accounts.

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

For example, shown here how to change a password.

Precondition The system displays the *<User administration>* menu.
Write mode is activated.

1. Click on the existing user account.
2. Enter the new password.
3. Confirm the new password.
4. Click «Update» [9].

Result The existing user account has been updated.

7.3.5 Settings

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

The following settings are available:

- Units
- Date format
- Time format

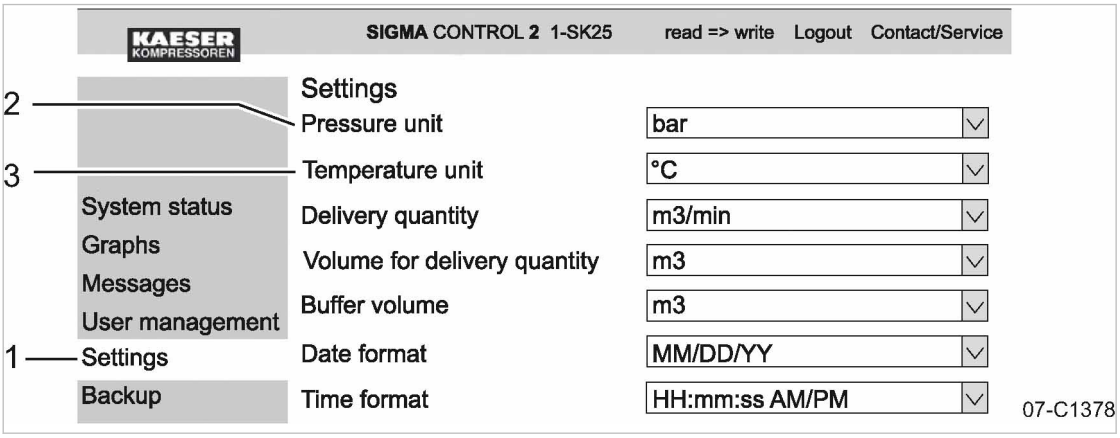


Fig. 17 Settings

[1] *<Settings>* menu
[2] Unit of pressure
[3] Unit of temperature

Converting units to US values:

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

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

7.3.6 Performing a data backup

In order to use KAESER CONNECT to easily back up data from the SIGMA CONTROL 2 to your own PC, use the *<Data backup>* menu.

You can choose to either perform a full backup or partial backups:

- Full
- Log files
- Settings
- User data

Precondition KAESER CONNECT for SIGMA CONTROL 2 is displayed.

1. Open the *<Data backup>* menu.
   The system displays the *<Data backup>* menu.

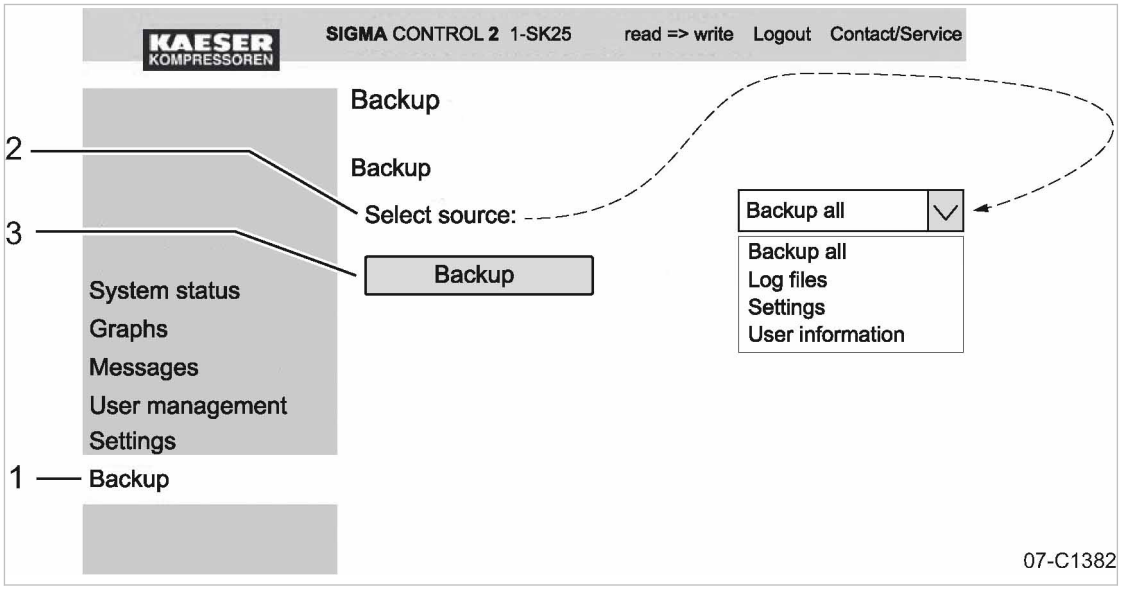


Fig. 18 Data backup

[1] *<Data backup>* menu
[2] Selection
[3] «Data backup» key

2. Select [2].
3. Click the «Data backup» [3] key.

Result Data is saved to your PC.

7.3.7 Closing KAESER CONNECT:

To close KAESER CONNECT for SIGMA CONTROL 2, click Logout [3] in the header.

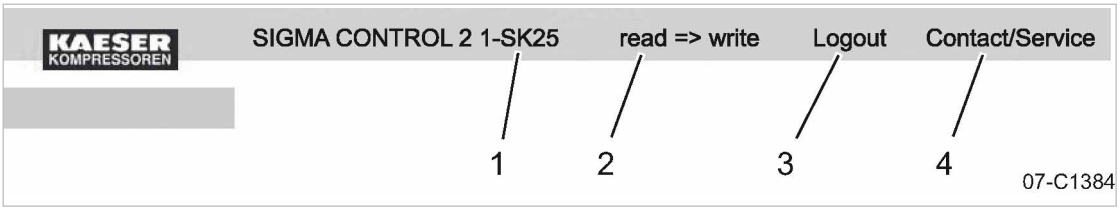


Fig. 19 Header

1 Machine designation
2 Activation Write mode
3 Logout
4 Contact KAESER Service

➢ Click Logout.
The logout message is displayed.

Result You have closed KAESER CONNECT for SIGMA CONTROL 2.

7.4 Adjusting the pressure parameters of the machine

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

The section is divided into the following sections:

- 7.4.1: Displaying pressure parameters
- 7.4.2: Configuring the pressure parameters

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

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

Parameter	Explanation
pRV	Display: Activating pressure of the pressure relief valve on the oil separator tank.
pE	Pressure increases Setting: ■ pE SP: Switching point for pressure increase; upper safety limit for machine maximum pressure; in an external LOAD control, this value is used to switch the machine from LOAD to IDLE in the event of a fault. ■ pE SD: Switching differential of pressure increase
ΔpFC	Limiting value for machines with frequency-controlled drive (SFC). Setting: ■ dp FC: Limit of the lowest delivery quantity. When the value [switching point system setpoint pressre +dp FC] is exceeded, the compressor switches from LOAD to IDLE.
Nominal pressure	Display: The compressor is designed for this pressure (maximum setpoint pressure)

Parameter	Explanation
Setpoint pressure	Setpoint pressure can be regulated to two values: pA and pB Setting: ■ Switching point pA or control pressure pA in machines with frequency converter (SFC) ■ Switching point pB or control pressure pB in machines with frequency converter (SFC)
System pressure low	A warning message is displayed when the limit value for the system pressure is reached. Setting: ■ SD: Switching differential for system pressure low, SP: Switching point for system pressure low ■ Option Configuring output signal Warning message displayed or an additional output signal is sent, e.g., to a remote control center
Cut-in pressure min	Display: For design reasons, pressure can only be built up above this value.

Tab. 48 Compressor pressure parameters

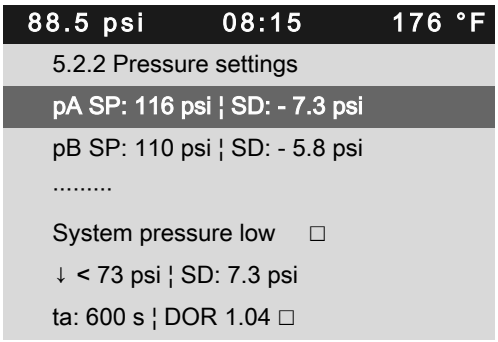
➢ Parameters correspond to the following specifications

7.4.1 Displaying pressure parameters

Precondition Access level 2 is activated.
The *< Configuration ➞ Pressure control >* menu is selected.

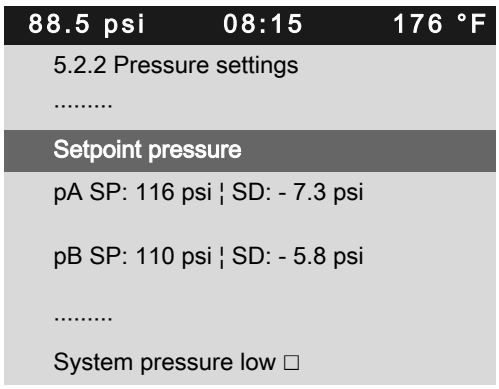
Call up the menu for pressure parameters

1. Press «DOWN» or «UP» repeatedly until *Pressure settings* is displayed as the active line.
2. Press «Enter».
   The system displays the pressure parameters.



Displaying compressor parameters

1. Press «DOWN» repeatedly until *Setpoint pressure* is displayed.



Menu

Active line

Current system setpoint pressure pA and switching differential

Current system setpoint pressure pB and switching differential

2. Displaying further parameters with the «UP» and «DOWN» keys.

7.4.2 Configuring the pressure parameters for compressors

7.4.2.1 Adjust the system setpoint pressure: pA and pB

The pressure parameters can only be set within certain limits:

Rated machine pressure ≥ SP pA / pB ≥ minimum cut-in pressure* + switching differential

Tab. 49 Setting limits for system setpoint pressure (* Cut-in pressure min)

The machine switches to LOAD under the following condition:

System pressure ≤ SP: pA /pB - switching differential

Tab. 50 Pressure condition for LOAD

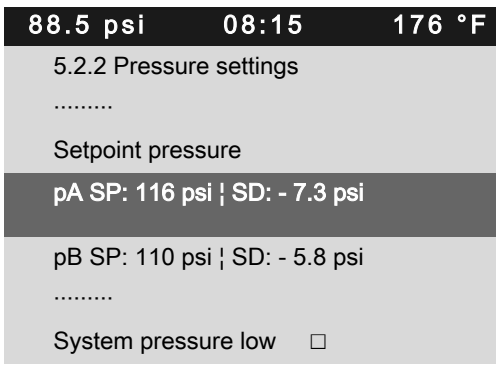
The machine switches to IDLE under the following condition:

System pressure = setpoint pressure

Tab. 51 Pressure condition for IDLE

Precondition Access level 2 is activated.

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.4.1)
2. Press «UP» or «DOWN» repeatedly until the following is displayed as the active line:



Menu

Active line with current value for system setpoint pressure pA

3. Press «Enter» to switch into setting mode.
   The *116 psi* parameter flashes.
4. Use «UP» or «DOWN» to adjust the system setpoint pressure pA.
5. Press «Enter» to accept the setting.
6. Adjust the switching differential in the same way.
7. Adjust the pB and the switching differential in the same manner, if necessary.
8. Press «Escape» repeatedly to return to the main menu.

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

7.4.2.2 Adjusting the value for “System pressure low”

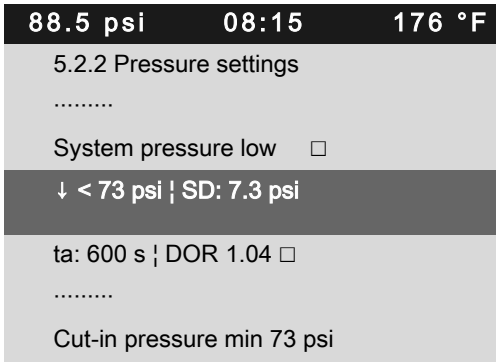
If the system pressure falls to the *sys.press.low* value, SIGMA CONTROL 2 will display a warning message for the system pressure being too low.
The switching differential influences the pressure at which the message can be acknowledged or the optionally activated output will again switch:

Message	Output
73 psi message appears	Active
80 psi messages disappears	Inactive

Tab. 52 Example: Activated output

Precondition Access level 2 is activated.

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.4.1)
2. Press the «DOWN» key repeatedly until the following is displayed as the active line:



Menu

Current value system pressure low, current switching differential

3. Press «Enter» to switch into setting mode.
   The *73 psi* parameter flashes.
4. Use «UP» or «DOWN» to adjust the setting.
5. Press «Enter» to accept the setting.
6. Adjust the switching differential if necessary in the same way.
7. Press «Escape» repeatedly to return to the main menu.

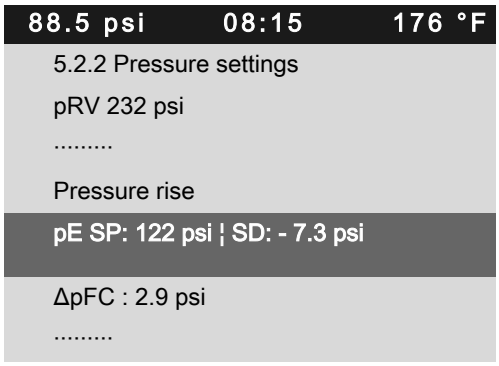
7.4.2.3 Adjusting pressure rise pE

The value for pressure rise pE serves as a safety limit value when the machine is externally controlled. When the system set pressure reaches the value pE (for example, when the external control functions incorrectly) the machine switches to IDLE.

The warning message *ext.load signal?* is displayed.

Precondition Access level 2 is activated.

1. Select *< Configuration → Pressure control → Pressure settings >* (see Section 7.4.1)
2. Press the «DOWN» key repeatedly until the following is displayed as the active line:



Menu

Active line with current switching point pressure rise, current switching differential

3. Press «Enter» to switch into setting mode.
   The *122 psi* parameter flashes.
4. Use «UP» or «DOWN» to adjust the setting.
5. Press «Enter» to accept the setting.
6. Adjust the switching differential if necessary in the same way.
7. Press «Escape» repeatedly to return to the main menu.

7.4.2.4 Adjusting pressure rise: Machine with variable frequency drive (SFC)

The pressure rise value *dpfC* is the limit from which the machine switches to IDLE.

This value can be between 2.9 psi and 5.8 psi. The factory setting is 2.9 psi.

The pressure rise is added to the setpoint pressure. In this way, the setpoint pressure can be changed without having to adjust the parameter again.

Precondition Access level 2 is activated.

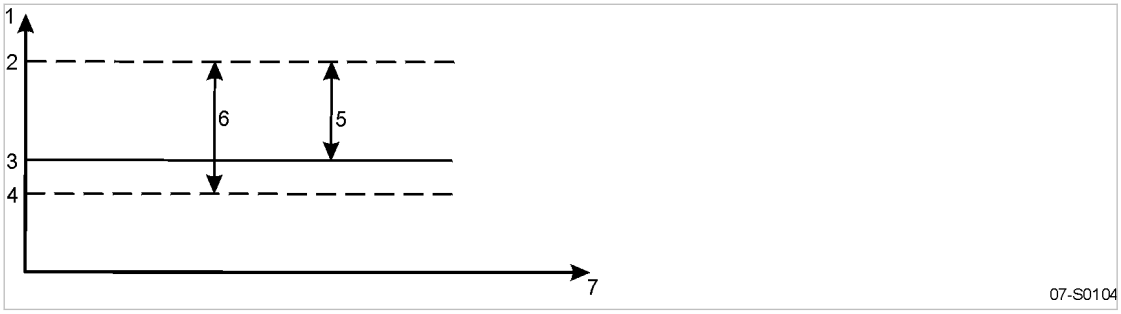
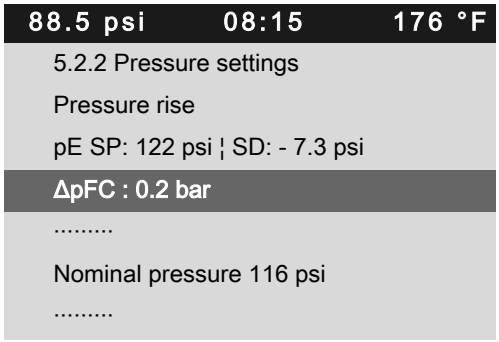


Fig. 20 Pressure rise in frequency-controlled machines

[1] System pressure
[2] IDLE switching point: System setpoint pressure + dpFC
[3] System setpoint pressure pA or pB
[4] LOAD switching point: (System setpoint pressure + dpFC) - switching differential
[5] Pressure rise dpFC
[6] System pressure band width

1. Select *< Configuration → Pressure control → Pressure settings >* (see Section 7.4.1)

2. Keep pressing the «DOWN» key until the following is displayed:



Menu

Pressure increases

Active line with pressure rise dpFC

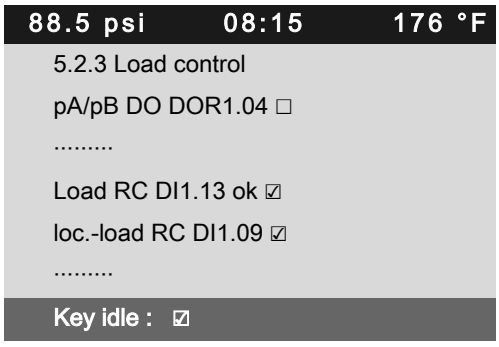
3. Press «Enter» to switch into setting mode.
4. Use «UP» or «DOWN» to adjust the setting.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

7.4.3 Activating/deactivating the «IDLE» key

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

Precondition Password level 2 is activated,
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected (see Section 7.2.1).

1. Press «UP» or «DOWN» repeatedly until *«IDLE»* key is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The check box for «IDLE» key will flash.

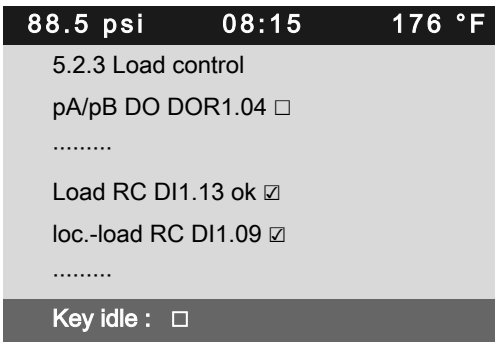


Menu

Active line with check box

3. Press the «UP» key.
   The deactivated check box is displayed.

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



Menu

Active line with deactivated check box

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

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

7.5 Configuring machine start and stop

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

Function	State on delivery, setting	See
Automatic start/stop in programmed clock mode	No clock (time) program entered	7.5.1
Holidays	Not set	7.5.2
Remote start, e.g. from a control centre.	Deactivated	7.5.3
IDLE (venting)	Activated	7.5.4
Automatic restart after power failure (after delay period).	Activated	7.5.5

Tab. 53 Settings for machine start and stop.

7.5.1 Automatic start/stop in programmed clock mode

Overview

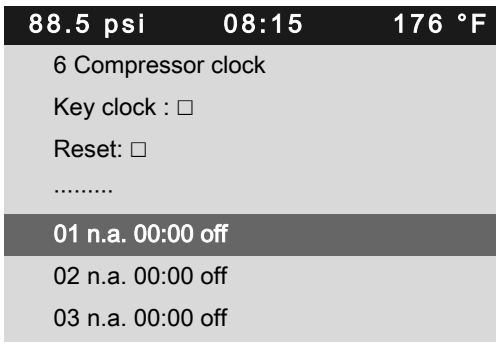
- If not activated, enter password for level 2
- Select the <Compressor clock> menu
- Set/adjust the time program
- Activate the «Clock» key

7.5.1.1 Selecting the compressor clock menu

Precondition Password level 2 is activated.
The display shows the operating mode.

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

2. Select *< Compressor clock >*.
   The display for setting the *Compressor clock* timing program appears.



7.5.1.2 Setting the clock program (example)

When setting a timer program for the first time, note the switching times on a sheet of paper first.

In addition to individual week days, the controller has the following cycles:

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

You can also program an OFF time (shutdown periods) (see section 7.5.2).

Example:

- Machine ON: Weekdays 6:30 – 17:00, Fridays 6:30 – 15:00.
- Machine OFF: Sat – Sun and during midday break from 12:00 – 13:00.

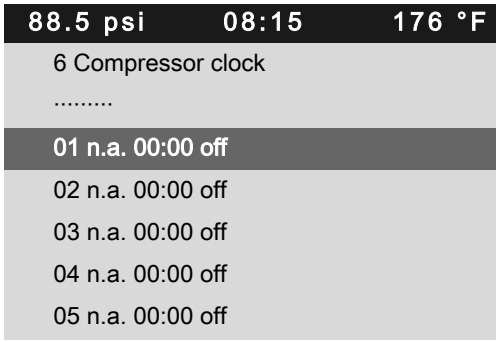
The following switching points result:

No.	Day	Time	Function
1	Mon-Fri	06:30	ON
2	Mon-Fri	12:00	OFF
3	Mon-Fri	13:00	ON
4	Mon-Thu	17:00	OFF
5	Fri	15:00	OFF

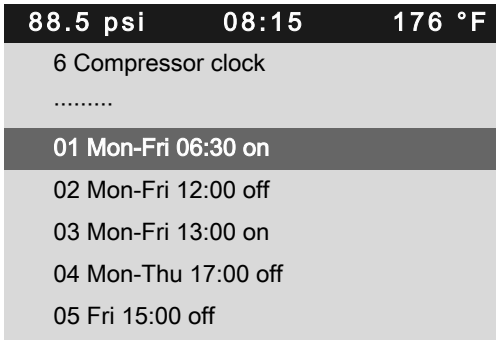
Tab. 54 Example of a machine ON/OFF timer program

Precondition Password level 2 is activated,
the «Clock» key is activated,
the "clock" menu is selected.

1. Press «DOWN» repeatedly until the *01 switching point* is displayed as the active line.



2. Press «Enter» to switch into setting mode.
   The *n.a.* column flashes in the active line.
3. Use «UP» to specify the settings for the weekdays.
4. Press «Enter» to accept the setting.
5. Press the «Right» key once.
6. Press «Enter» to switch into setting mode.
   The column time, display for hours, *00: 00* in the active line flashes.
7. Use «UP» to specify the settings for the hours.
8. Press the «Right» key once.
9. The column time, display for minutes, *00: 00* in the active line flashes.
10. Use «UP» to specify the settings for the minutes.
11. Press «Enter» to accept the settings.
    The display stops flashing and the time (hours/minutes) is set.

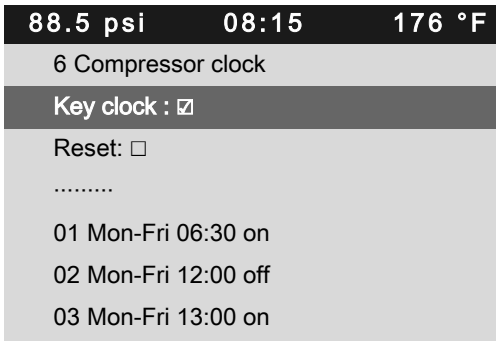


12. Press the «Right» key once.
    The *Action on/off* column flashes.
13. Press «Enter» to switch into setting mode.
14. Use «UP» to specify the settings for the action Compressor ON.
15. Press «Enter» to accept the setting.
    The Compressor ON function is set for the first switching point.
16. Specify further switching points in the same manner.

Result Weekdays, time, and the Compressor ON/Compressor OFF functions are set for all switching points.

7.5.1.3 Activating the «Compressor timer» key

1. Press «UP» repeatedly until *Key clock* is displayed as active line.
2. Press «Enter» to switch into setting mode.
   The check box flashes in the active line.



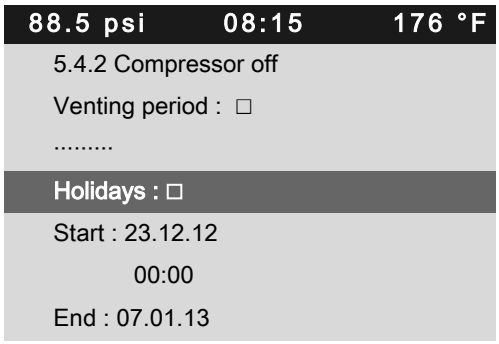
3. Use the «UP» key to activate the check box.
4. Press «Enter» to accept the setting.
5. Press «Escape» repeatedly to return to the main menu.
   The «Clock» key is activated and can be used.
6. Press «Clock» to enable the operation with a timing program.

7.5.2 Setting up the holiday period

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

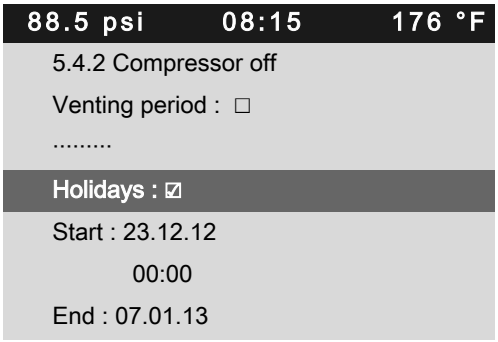
Precondition The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select *< Configuration → Compressor start → Compressor off >*.
3. Press «DOWN» repeatedly until *Holidays* is displayed as active line.



4. Press «Enter» to switch into setting mode.
   The *check box* flashes.

5. Press the «UP» key.



6. Press Enter to accept the setting.

You may manually adjust the start and end of vacation shut-down (date) in the setting mode. Adjust the times for start and end (hours and minutes) of the vacation shut-down in the same manner described in chapter 7.5.1.2 (timing program) for the times of the switching points.

Result You have set a standstill time 23.12.12–07.01.13 for your machine.

7.5.3 Starting the machine remotely (Remote ON/OFF)

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

Overview

- Make the electrical connection (a spare input for the remote contact is to be found in the electrical wiring diagram for the machine, DI 1.0 being preferred).
- Switch machine start to remote mode.
- Press the «Remote» key.
- If necessary, activate the «Clock » key and configure the clock program (see section7.5.1.2).
- If required, assign the remote contact to another input.
- Press the «Remote» key.

7.5.3.1 Switch machine start to Remote mode

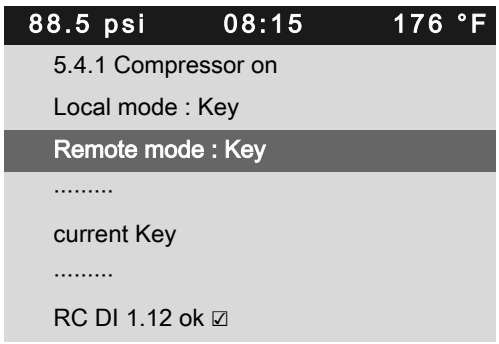
Two methods are available to start the machine remotely:

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

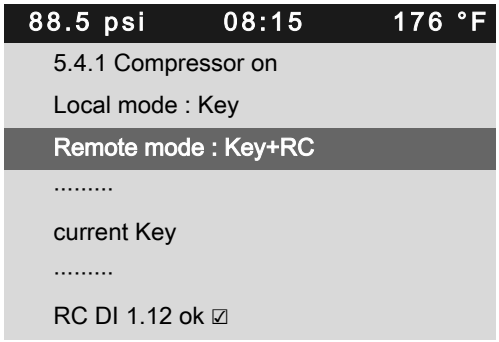
Precondition The electrical connection has been made.
Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Compressor start → Compressor on >* menu.
3. Press «UP» repeatedly until *Remote mode* is displayed as active line.

4. Press «Enter» to switch into setting mode.
   Key flashes.



5. Press «DOWN» repeatedly until *Key+RC* is displayed.
6. Press «Enter» to accept the setting.

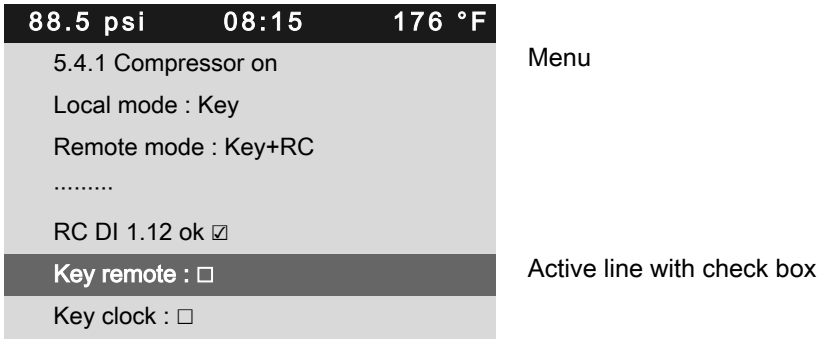


Result The machine start is set to remote operation with *Key+RC*.

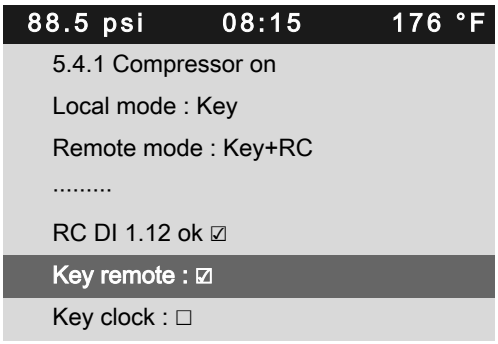
7.5.3.2 Activating/deactivating the «Remote control» key

Precondition The electrical connection has been made.
Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Compressor start → Compressor on >* menu.
3. Press «DOWN» repeatedly until *Key remote* is displayed as active line.
4. Press «Enter» to switch into setting mode.
   The *check box* for the remote control key will flash.



5. Press the «UP» key.
   The activated check box is displayed.
6. Press «Enter» to save the setting.



Menu

Active line with deactivated check box

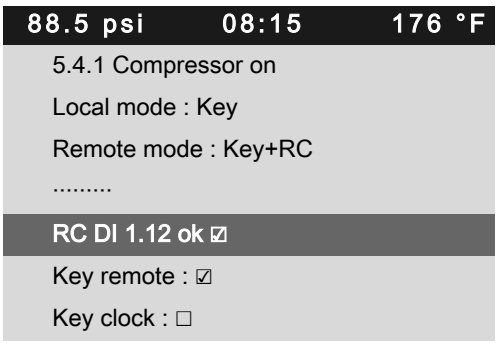
The Clock key is not activated.

7. Press «Escape» repeatedly to return to the main menu.
   The «Remote control» key is activated and can be used.
8. If method **B** with the timer program is selected, the «Clock» key must be activated in the same manner.

7.5.3.3 Assigning another input

Inputs already assigned cannot be further assigned.

1. Press the «DOWN» key repeatedly until the following is displayed as active line:



Menu

Remote contact DI 1.12 (preset)

2. Press «Enter» to switch into setting mode.
   Display for input flashes.
3. Select another input with the «UP» or «DOWN» keys.
4. Press «Enter» to accept the setting.
   The input has now been assigned.
5. Press the «Remote control» key to enable the machine to be started from the remote control centre.

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

➢ Select a different input.

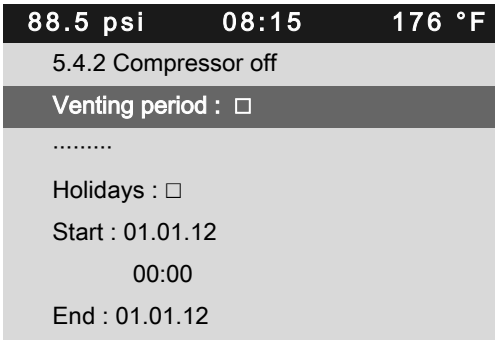
7.5.4 Activating/deactivating the idle phase (Venting period function)

After receiving the OFF signal from the remote control center, an additional idling phase (Venting period) can be activated before the machine is stopped completely. The duration of the idling phase can be timed and/or regulated by internal pressure.

Precondition Password level 2 is activated.

The display shows the operating mode.

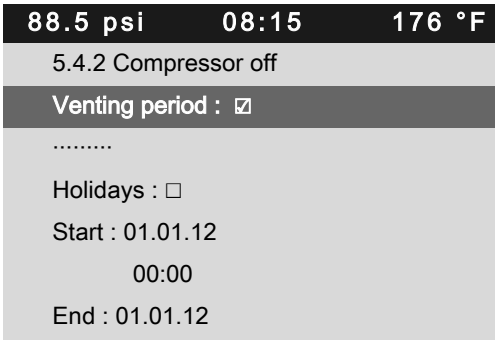
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➞ Compressor start ➞ Compressor off >* menu.
   The check box for *"Venting period"* is displayed in the active line.



Menu

Actual setting: Venting period deactivated

3. Press «Enter» to switch into setting mode.
   The check box for the "Venting period" function will flash.
4. Press the «UP» key.



Menu

Actual setting: Venting period activated

5. Press «Enter» to save the setting.
   The check box for the "Venting period" function is activated.

The function can be deactivated in the same manner.

You may also activate the Venting period function by pressing the «OFF» key on the controller.

➢ Press the «OFF» key.

Result The "Venting period" function is activated.

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

➢ Press the «OFF» key twice.

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

7.5.5 Activating/deactivating and adjusting the "Automatic restart after a power failure" function

'Autostart' is activated as standard.

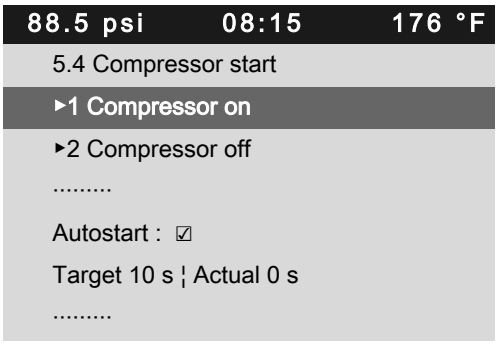
To avoid overloading the main power supply through several machines starting simultaneously, a delay period determining the restart of each machine can be entered.

Overview

- If not activated, enter password for level 2
- Select the *< Configuration ➞ Compressor start >* menu.
- Activate/deactivate the restart function
  or
  set the restart delay.

Precondition Password level 2 is activated.
The *< Configuration ➞ Compressor start >* menu option is selected.

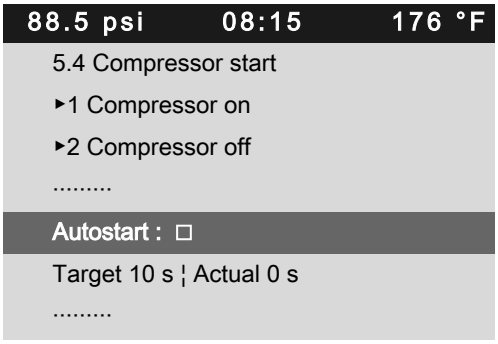
1. Press «Enter».
   The *Compressor start* menu is displayed.



Menu
Active line
Automatic restart activated

Deactivating/activating automatic restart

1. Press «DOWN» repeatedly until *Autostart* is displayed as the active line.



Menu
Automatic restart is deactivated
Set/expiring delay period.

2. Press «Enter» to switch into setting mode.
   The check box for the "Autostart" function will flash.
3. Press the «UP» key.
   The check box for the "Autostart" function is deactivated.

4. Press «Enter» to accept the setting.

Activate the “Autostart” function in the same manner.

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

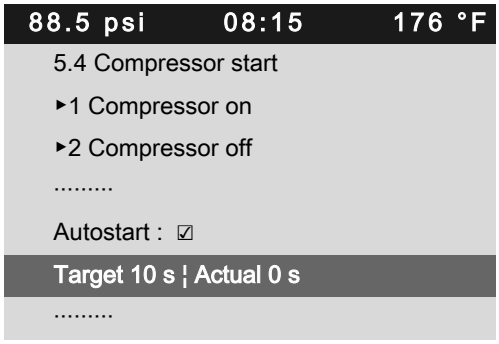
Result Automatic restart after a power failure is now deactivated.

Setting up the automatic restart delay period

If you operate several machines, it is better to start them in sequence.
Time for restart: Use the set times (IDLE to LOAD) of the other machines as base.

Precondition Password level 2 is activated.
The *< Compressor start >* menu is selected.

1. Press «DOWN» repeatedly until the delay time for the restart is displayed as the active line.

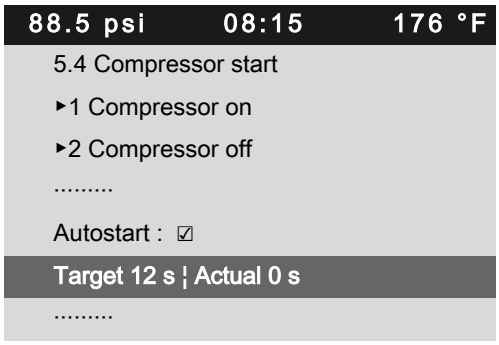


Menu

Automatic restart is activated

Set/expiring delay period.

2. Press «Enter» to switch into setting mode.
   The display for the delay time *Setpoint* flashes.
3. Change the time using the «DOWN» or «UP» keys.



Menu

Active line

4. Press «Enter» to accept the setting.
5. Press «Escape» repeatedly to return to the main menu.

Result Delay time for restart after a main power failure has been adjusted from 10 s to 12 s.

7.6 Activating and setting up the control modes

The controller is provided with various control modes that can bring about different capacity utilization depending on machine application. Chapter 4.7 provides a comprehensive description of all control modes.

7.6.1 Selecting a control mode

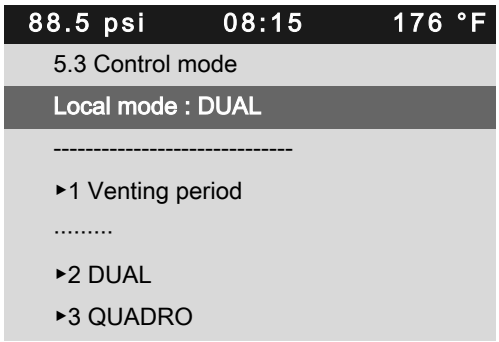
The following control modes are possible:

- DUAL
- QUADRO
- VARIO
- DYNAMIC
- CONTINUOUS

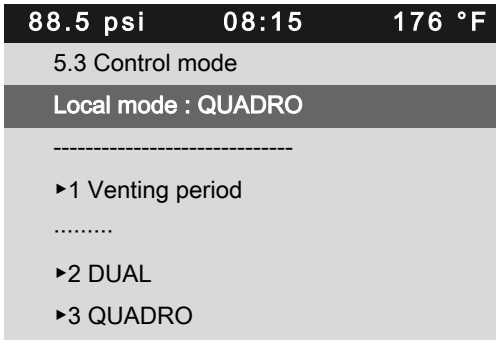
The standard setting of the control mode depends on the machine type.

Precondition Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Control mode >* menu.
   Local mode is displayed as the active line.



3. Press «Enter» to switch into setting mode.
   The control mode display *DUAL* flashes.



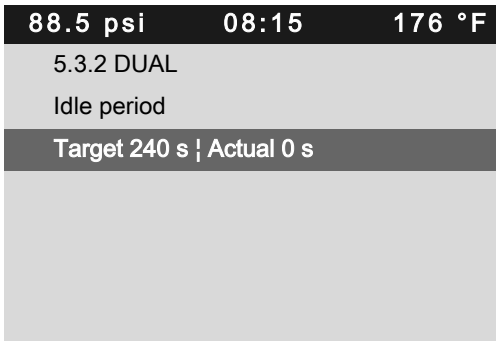
4. Use «UP» to change the regulating mode to *QUADRO* .
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

7.6.2 Adjusting the idle time of DUAL mode

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

Precondition
Password level 2 is activated.
Control mode is selected.
The display shows the operating mode.

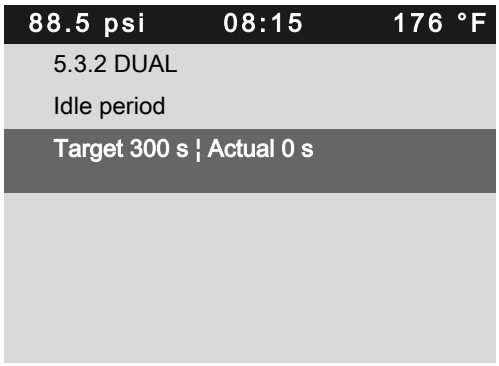
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➞ Control mode ➞ DUAL >* menu. (see section 7.6.1)
   The idling time setting is shown in the active line.



Menu

Active line

3. Press «Enter» to switch into setting mode.
   The current idling time setting *240 s* flashes.



Menu

Active line with changed Idle period , (example: 300 seconds)

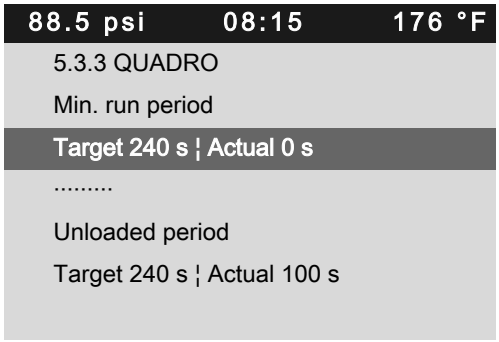
4. Set the required IDLE period with the «UP» key.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

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

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

Precondition
Password level 2 is activated.
The QUADRO control mode is selected.
The display shows the operating mode.

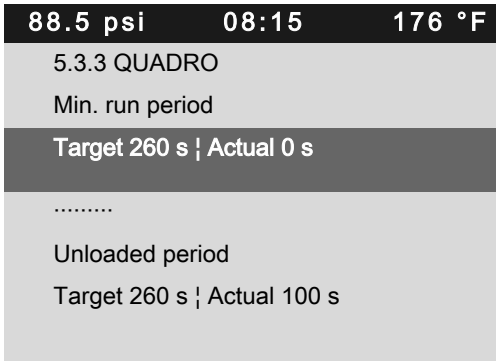
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Control mode → QUADRO >* menu.
3. Press «DOWN» repeatedly until *Target* is displayed as the active line.



Menu

Active line setpoint value for minimum run time

4. Press «Enter» to switch into setting mode.
   The set point value *240 s* flashes.



Menu

Active line with changed setpoint value for minimum run time

Changed setpoint value for the standstill period

5. Press the «UP» key to adjust the minimum run time.
6. Press «Enter» to accept the setting.
7. Change the standstill period accordingly.
8. Press «Escape» repeatedly to return to the main menu.

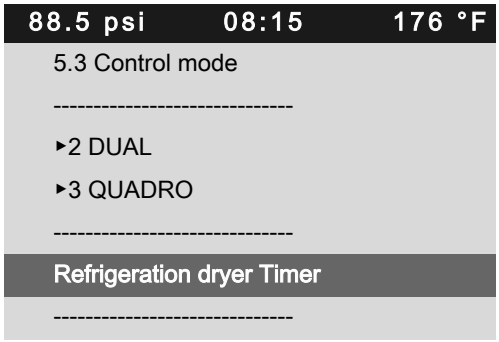
7.6.4 Setting the refrigerated dryer control modes

Precondition
Password level 2 is activated.
Menu option *< Control mode >* is selected.

1. Press «UP» repeatedly until *Refrigeration dryer* is displayed as the active line.

Control mode timer is set up as standard.

2. Check if the control mode timer is set up.



Further information See chapter 4.7 for an overview of the control modes.

7.7 Configuring the machine for local mode

In local mode the machine is regulated with the pA or pB. The controller is provided with the following modes of operation:

Operating mode	Description	See section
pA	The machine is controlled by system pressure setpoint pA	7.7.3.3
pB	The machine is controlled by system pressure setpoint pB	
pA/pB Clock	The changeover between pA and pB is regulated by a clock program.	7.7.2
pA/pB Cycle	The changeover between pA and pB is regulated by a programmed time pulse.	7.7.3

Tab. 55 Local operating mode (local mode)

➢ Adjusting system pressure setpoint as described in section 7.4.

Overview

- Enter password level 2
- Select *< Configuration >*.
- Set/adjust the clock program (see Section 7.7.2)
  or
  Set/adjust the timer (see Section 7.7.3).
- Local mode

7.7.1 Select menu < configuration ➜ Pressure control ➜ Load control

Precondition Password level 2 is activated.

1. In operating mode, switch to the main menu with the «Enter» key.
2. Select *< Configuration ➜ Pressure control ➜ Load control >*.
   The *< Load control >* menu is displayed.

7.7.2 Configuring the system pressure set-point changeover using the clock

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

Overview
- If not activated, enter password for level 2
- Set the day of the week for the first switching point (delete any existing clock program).
- Entering the time of the first switching point
- Select the system setpoint pressure for the first switching point pA or pB
- Specify any further switching points.
- Select the pA/pB Clock operating mode, see Section 7.7.3.3.

When setting a clock program for the first time, note the switching times on a sheet of paper first.

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

Example
- Peak load period: weekdays 06:30 – 17:00, Fridays 06:30 – 16:00;
- Low load period: midday from 12:00 – 13:00 and the remaining period.

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

No.	Weekday	Time	System set-point pressure
01	Mon-Fri	06:30	pA on
02	Mon-Fri	12:00	pB on
03	Mon-Fri	13:00	pA on
04	Mon-Thu	17:00	pB on
05	Fri	16:00	pB on

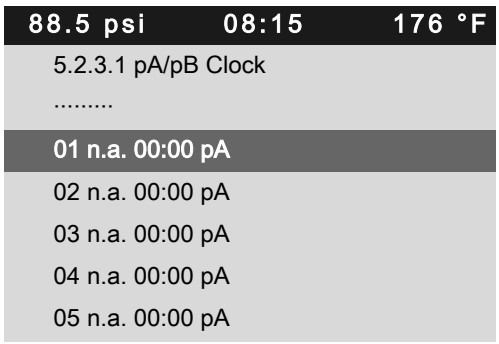
Tab. 56 Example of system pressure changeover switching points

Setting the day of the week for the first switching point

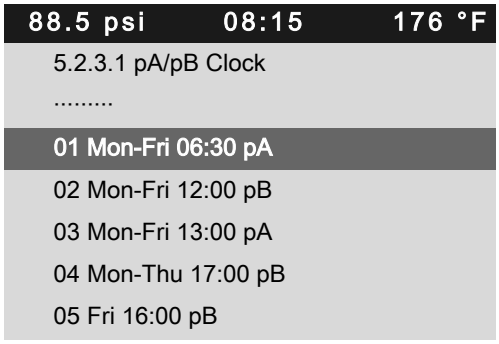
Precondition Password level 2 is activated,
The *< Configuration ➞ Pressure settings ➞ Load control >* menu is selected (see Section 7.7.1).

1. Press «DOWN» repeatedly until *pA/pB Clock* is displayed as the active line.

2. Press «Enter».
   The system displays the setting options for the switching points.



3. Press «Enter» to switch into setting mode.
   n.a. flashes in the active line.



4. Use «DOWN» or «UP» to set the time and confirm by pressing «Enter».
5. Press the «Right» key once.
6. Press «Enter» once.
   Column time, hours display, *00: 00* flashes in the active line.
7. Use «UP» or «DOWN» to change the hour setting.
8. Press the «Right» key once.
9. Column, minutes display, *00 00* flashes in the active line.
10. Use «DOWN» or «UP» to set the minutes and confirm by pressing «Enter».
    The display stops flashing and the time (hours/minutes) is set.
11. Press the «Right» key once.
12. Press «Enter».
    Setpoint pressure display pA/pB flashes.
13. Use «UP» or «DOWN» to change the setting for pA or pB.
14. Specify further switching points in the same manner.

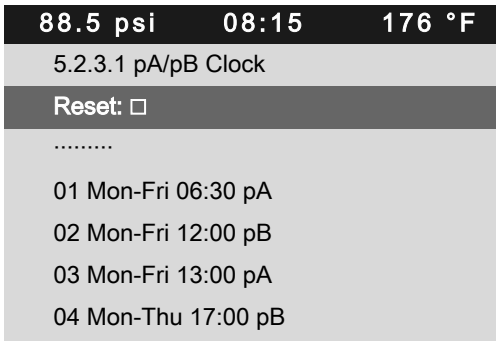
Deleting the existing clock program

Take the following steps to delete an existing clock program:

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure settings ➞ Load control >* menu is selected.

1. Press «DOWN» repeatedly until *pA/pB Clock* is displayed as active line.

2. Press «Enter».
   The current clock program is displayed.
3. Press the «UP» repeatedly until *Reset* is displayed as active line.



4. Press «Enter» to switch into setting mode.
   Check box reset flashes.
5. Press «UP».
   The check box is activated.
6. Press «Enter» to accept the settings.

Result The clock program is now deleted.

Select the operating mode

1. Press the «DOWN» key.
2. Press «Enter» and use the «DOWN» or «UP» key to select pA or pB (not required in this example).
3. Set up the remaining switching points in the same way.
   The clock program is now finished.
4. Select the pA/pB Clock operating mode, see Section 7.7.3.3.
5. Press «Escape» repeatedly to return to the main menu.

7.7.3 Configuring the system pressure setpoint changeover using the timer

Overview

- Enter password level 2
- Delete the old clock configuration, if necessary
- Setting the clock periods pA and pB
- Select the starting time for pA or pB.
- Select the pA/pB Cycle operating mode, see Section 7.7.3.3.

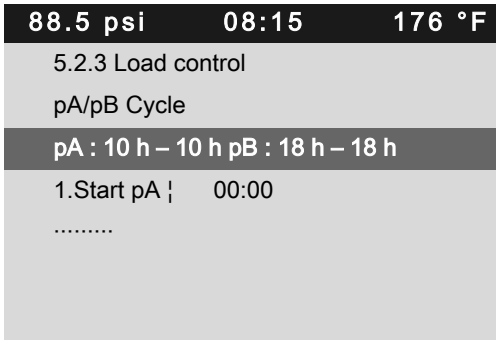
7.7.3.1 Setting the clock periods pA and pB

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

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

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Keep pressing the «DOWN» key until *settings pA / pB* appears in the active line.
2. Press «Enter» to switch into setting mode.
   pA flashes.
3. Press the «UP» repeatedly until the desired timer period is displayed as active line.
4. Press «Enter» to accept the setting.



Menu

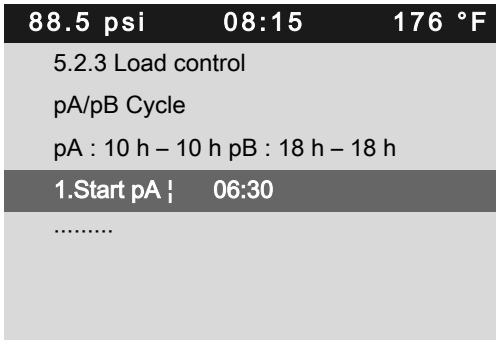
active line, timer period – expiring period (example)

5. Set the timer period for pB in the same manner.
6. Press «Enter» to accept the setting.

Result Timer period for the setpoint pressure pA and pB is set.

7.7.3.2 Setting the starting time for pA or pB

1. Press the «DOWN» key.
2. Press the «Right» key.
3. Press «Enter» to switch into setting mode.
   The starting time *h* flashes.



Menu

active line, starting time

4. Press «UP» to set the hours.
5. Press the «Right» key.
   The starting time *min* flashes.
6. Press «UP» to set the minutes.
7. Press «Enter» to accept the settings.

Result The starting time for pA is set.

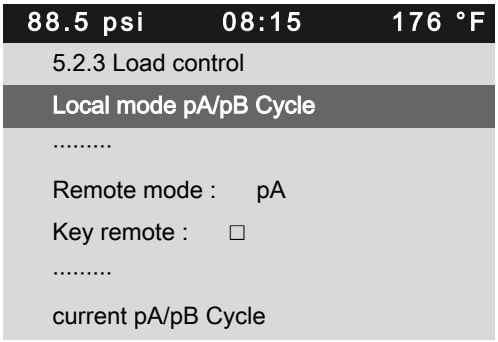
The period is to start with pB.

➢ Press the «Enter» key and set first start pB with the «UP» key.

7.7.3.3 Selecting local mode

Precondition
Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.
The clock program or timer is set up.

1. Press «UP» repeatedly until *Local mode* is displayed as active line.
2. Press «Enter» to switch into setting mode.
   Operating mode flashes.



3. Press the «UP» or «DOWN» key to select the required operating mode (pA, pB, pA/pB Clock or pA/pB Cycle).
4. Press «Enter» to accept the setting.
   The actual operating mode is displayed.
5. Press «Escape» repeatedly to return to the main menu.

Result
The clock is fully configured.

7.8 Configuring the machine for master control

7.8.1 List of the various master controllers

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

Master controller type	Description	Section
Master control via Profibus (only possible with an additional module)	The controller (and therefore the compressor) receives the instruction LOAD, IDLE or local operation via the Profibus master (e.g. SIGMA AIR MANAGER or VESIS). The system set-point pressures pA and pB are irrelevant for the LOAD/IDLE signals.	7.8.2.1
Master control of two compressors with SIGMA CONTROL 2 via Ethernet interface	2 The SIGMA CONTROL 2 controllers operate as master and slave. The slave receive the command to switch between the two system set-point pressures pA and pB from the master.	7.8.4
Examples of a master control of two compressors with SIGMA CONTROL 2 via Ethernet interface	2 The SIGMA CONTROL 2 controllers operate as master and slave. The slave receives the command to switch between the two system set-point pressures pA and pB from the master.	7.8.5

Master controller type	Description	Section
Master control via LOAD remote contact. Master control via a remote LOAD contact is another method of controlling the machine externally. There are two possibilities:	LOAD remote contact: An input signal from a superordinate controller switches the machine to LOAD or IDLE. The setpoint pressure settings pA and pB have no relevance.	7.8.6
	Local/LOAD remote contact: Using two inputs, a master controller (e.g. MVS 8000) switches the machine between LOAD/IDLE and local operation.	7.8.7
Set-point pressure pre-selection	pA/pB remote contact: An input contact provides the signal to switch from the set-point pressure pA to pB.	7.8.8
Master control of compressors regulated by pressure switch There are two possibilities of linking to a machine regulated by pressure switch:	On machines with the same FAD, SIGMA CONTROL 2 controls the pressure switch via a floating relay output.	7.8.9.1
	On machines supplying an unequal FAD, the pressure ranges are matched to each other.	7.8.9.2

Tab. 57 Master control – overview

Further information Examples of clock programs for equal machine loading are given in section 7.8.10.

7.8.2 Configuring Profibus mode (SIGMA AIR MANAGER or VESIS)

Overview

- Profibus DP-V0 interface retrofit kit is necessary
- Make the electrical connections
- Set the remote operating mode pB.
- Configure the Profibus interface
- Activate the «remote control» key

Precondition Profibus DP-V0 interface retrofit kit is required.

Making the electrical connections

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

Tab. 58 Profibus DP pin connection

Wiring the interface plug

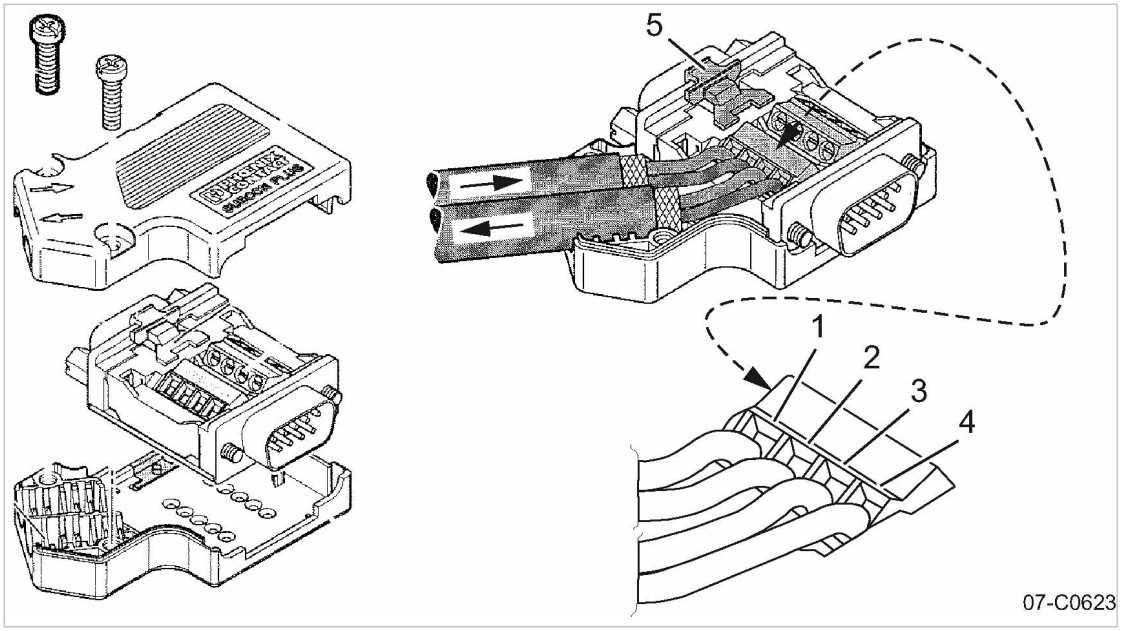


Fig. 21 Profibus plug wiring

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

Wiring possibilities for master control (excerpt)

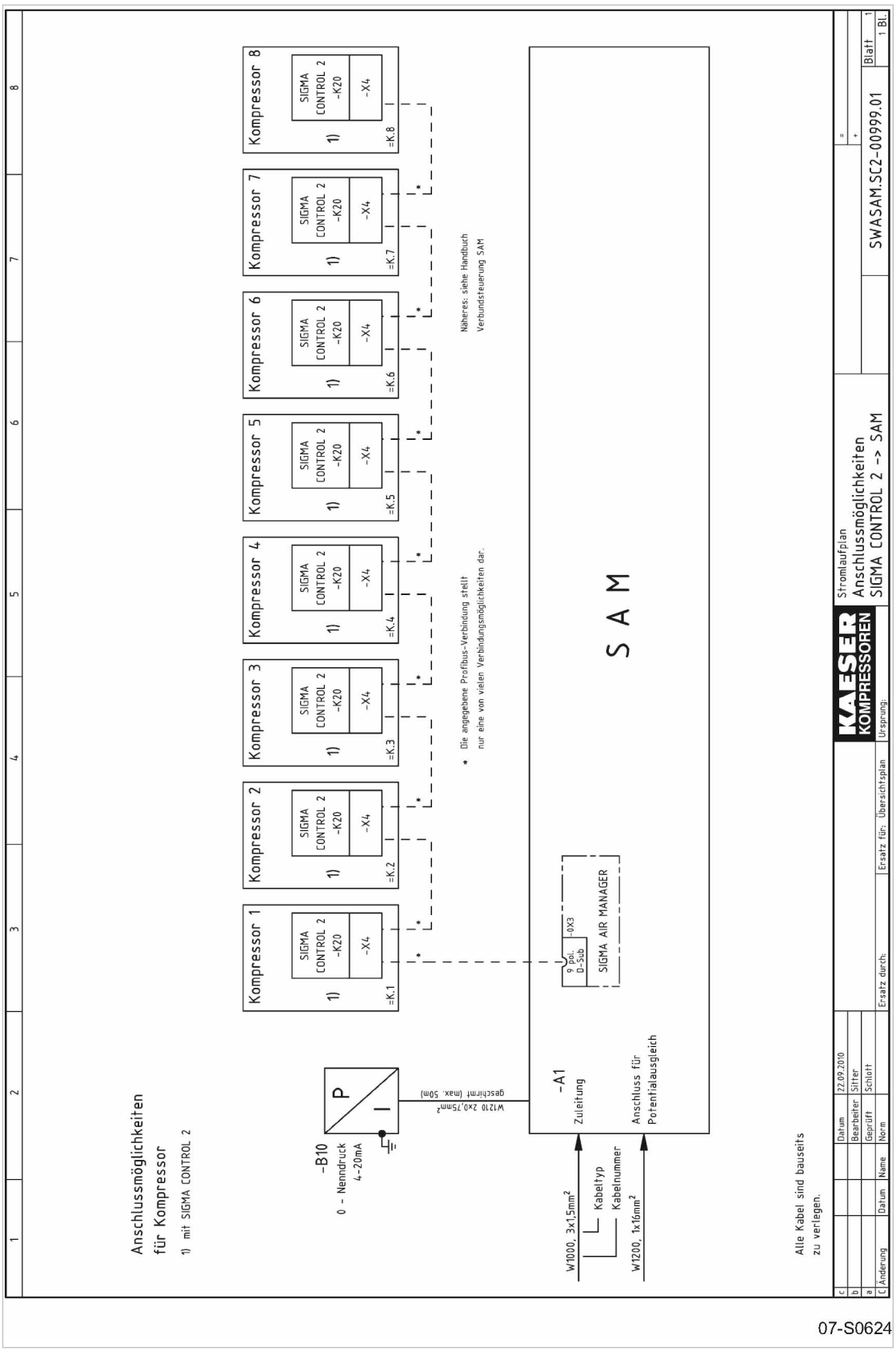


Fig. 22 Electrical diagram example with SIGMA AIR MANAGER

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. Switch in the terminating resistor in the plugs of the first and last subscribers to the Profibus.

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

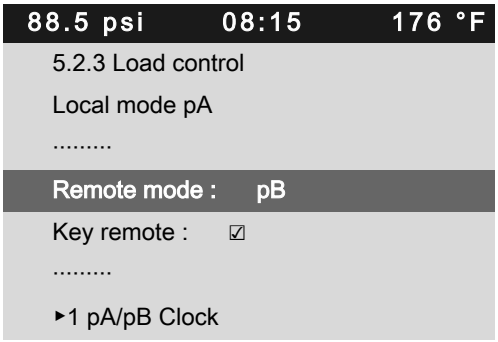
Setting the remote operating mode pB

When automatic mode is changed to manual mode at the sequencer, SIGMA CONTROL 2 changes to the set remote mode. In such cases, it is preferable to set the operating mode to "Remote mode pB".

➢ Where more than one machine is involved, make sure that the system set-point pressure pB is set for local operation.

Precondition Password level 2 is activated.
Menu *< Configuration ➞ Pressure control ➞ Load control >* is selected.

1. Press «DOWN» repeatedly until *Remote mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   Operating mode flashes.



3. Set operating mode pB with the «UP» or «DOWN» key.
4. Press «Enter» to accept the setting.
   The remote mode pB is set.
5. Adjust the set-point pressure pB if necessary.

Further information See chapter 7.4 for set-point pressure adjustment.

7.8.2.1 Configuring Profibus mode (SIGMA AIR MANAGER or VESIS)

Overview

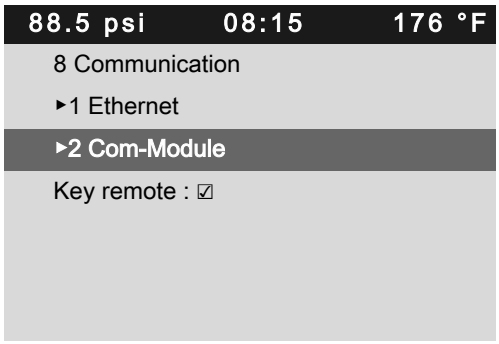
Configuration takes place with the following steps:

- Selecting a Profibus interface
- Assigning the slave address
- If necessary, setting suppression time for bus fault
- Activating the communications module
- Assigning an output contact for the bus alarm message (take a spare contact from the electrical diagram)

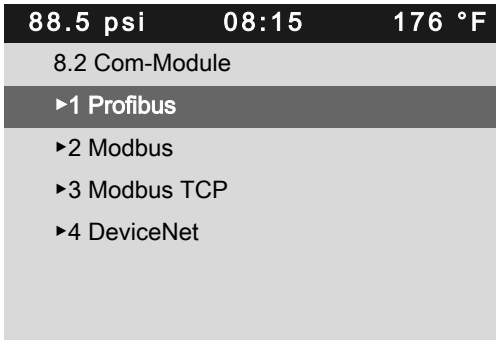
Precondition
Communications module from Profibus DP-V0 retrofit kit is installed.
The electrical connection to the bus master has been made.
Password level 2 is activated.
The display shows the operating mode.

Selecting a Profibus interface

1. Press «Enter».
2. Press «DOWN» repeatedly until *< Communication >* is displayed as the active line.
3. Press «Enter».
4. Press the «DOWN» key.
   Menu *< Com-Module >* is displayed as the active line.



5. Press «Enter».
   Profibus line is displayed as being active.



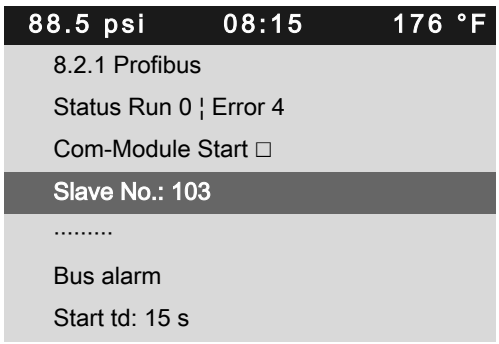
6. Press «Enter».

Assigning the slave address

You only need to set the slave address for the communication with the SIGMA AIR MANAGER.
The other parameters do not require adjustment.
When connected to a SIGMA AIR MANAGER, the slave address is determined as follows:
Compressor number used at SIGMA AIR MANAGER +102.

1. Press the «DOWN» key repeatedly until *Slave* is displayed as the active line.

2. Press «Enter» to switch into setting mode.
   Slave flashes.



Menu

Active line; current slave address assigned

3. Set the slave address with «UP» or «DOWN».
4. Press «Enter» to accept the setting.

Result The slave address is assigned.

Setting the suppression time for bus alarm

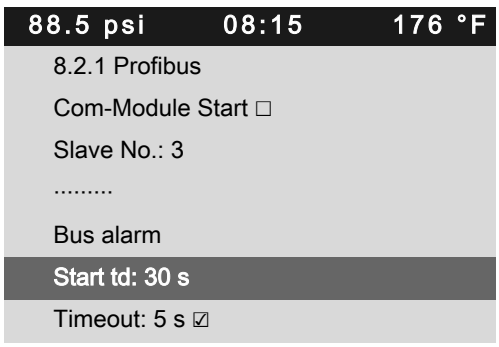
Exchange of data with a Profibus connection takes place in three fixed cycles. The Profibus connection can be monitored with the help of the cycle time:
The bus connection is considered to be interrupted if no data is exchanged between the bus master and the controller (as bus subscriber) after expiry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

1. Press the «DOWN» key repeatedly until *Start td:* is displayed as the active line.

After switching on the power supply, the bus alarm can be suppressed temporarily.

- 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

2. Press «Enter» to switch into setting mode.
   Start flashes.



Menu

Active line, suppression time for bus alarm

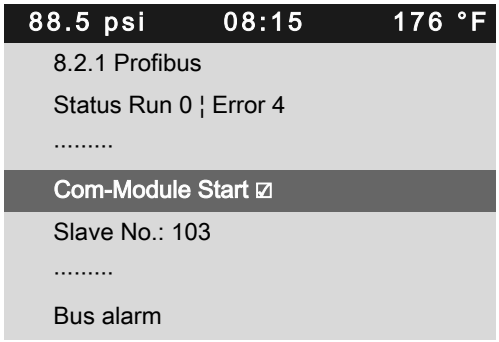
Delay time, active bus timeout setting

3. Change the time using the «DOWN» or «UP» keys.
4. Press «Enter» to accept the setting.

Result The suppression time for a bus alarm is set.

Activating the communications module

1. Press «UP» repeatedly until *Com-Module Start* is displayed as the active line.

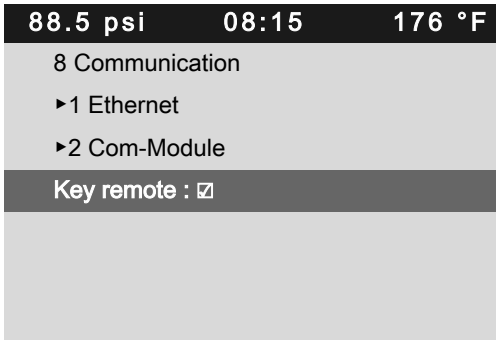


2. Press «Enter» to switch into setting mode.
   The check box will flash.
3. Press «UP» or «DOWN» key
   The communications module for Profibus is activated.
4. Press «Enter» to accept the setting.
   If no electrical connection to the bus has been made up to this point, the message *bus alarm* appears.
5. Acknowledge the message and check the electrical connections.

Activating the «Remote control» key

Precondition Password level 2 is activated.
The *< Communication >* menu is selected.

1. Press «DOWN» repeatedly until *Key remote :* is displayed as the active line.
2. Press «Enter».
   The check box for the «Remote control» key will flash.



3. Use the «UP» key to activate the check box.
4. Press «Enter» to accept the setting.
   The remote control function is activated and can be used.
5. Press the «Remote control» key to enable remote mode.

7.8.3 Configuring the Profibus interface without SIGMA AIR MANAGER / VESIS

Contact KAESER Service for information on configuring the interface if Profibus is to be used.

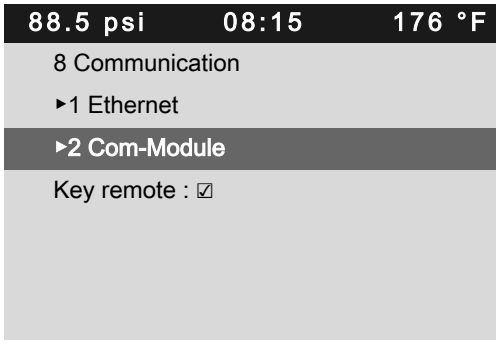
Overview

- Selecting a Profibus interface
- Assigning the slave address
- If necessary, setting suppression time for bus fault
- Activating the communications module
- Assigning an output contact for the bus alarm message (take a spare contact from the electrical diagram)

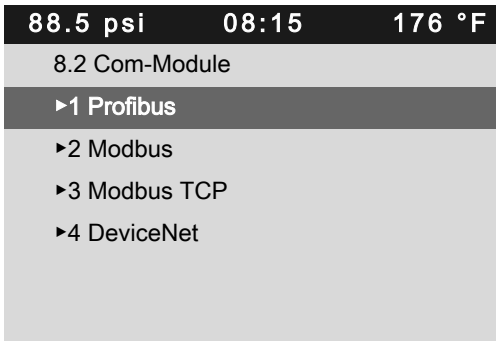
Precondition Communications module from Profibus DP-V0 retrofit kit is installed.
The electrical connection to the bus master has been made.
Password level 2 is activated.
The required data has been provided by KAESER.
The display shows the operating mode.

Selecting a Profibus interface

1. Press «Enter».
2. Press «DOWN» repeatedly until *< Communication >* is displayed as the active line.
3. Press «Enter».
4. Press the «DOWN» key.
   Menu *< Com-Module >* is displayed as the active line.



5. Press «Enter».
   Profibus line is displayed as being active.



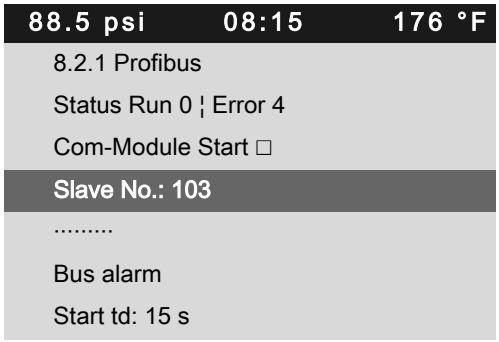
6. Press «Enter».

Assigning the slave address

The permissible address length is between 3 and 126 characters.

For configuring the Profibus interface **without** SIGMA AIR MANAGER or VESIS, the rule "compressor number +102" **does NOT** apply.

1. Press the «DOWN» key repeatedly until *Slave* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The slave display flashes.



3. Set the slave address with «UP» or «DOWN».
4. Press «Enter» to accept the setting.

Result The slave address is assigned.

Further steps

Proceed with the further configuration as outlined in section 7.8.2.1:

➢ If required, also set the suppression time for the bus alarm.

7.8.4 Examples for master control of two machines using the Ethernet interface (master/slave operation)

Configuration procedure

Controller	Procedure	Chapter
Both	Establish the electrical connections	7.8.5.1
Both	Set system pressure set-points pA and pB. The pressure for switching points p! and pB is measured directly at the compressor. Pressure losses in the network do not need to be taken into account.	7.8.5.2
master	Either set up switching times for the clock program	7.8.5.3
	or set switching times for the timer	7.8.5.4
master	Set the type of LOAD control (clock program or timer) in local mode.	7.8.5.5
slave	Set remote mode: pA/pB SC2	7.8.5.6
slave	Activating the «remote control» key	7.8.5.7
Both	Set IP addresses for Ethernet	7.8.5.8

Controller	Procedure	Chapter
Both	Activate master or slave	7.8.5.8

Tab. 59 Master-slave configuration procedure

➢ Proceed with the configuration as described below.

7.8.5 Examples for master control using the Ethernet interface (master/slave operation)

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

Example: 2 machines with different delivery quantities

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

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

Example: 2 machines with equal delivery quantities

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

If two machines 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 59 .

7.8.5.1 Making the electrical connections

Prepare the following for the Ethernet connection:

- Ethernet cable, 328 ft. maximum, depending on connection.
- For each machine with SIGMA CONTROL 2 :
  - Ethernet connector set
- For connecting the machines to a network (LAN):
  - 2 Ethernet connection plugs

➢ Make the electrical connections as shown in the table below.

Installing the Ethernet cable

For direct connection of the two machines:

➢ Install the Ethernet cable between the two machines.

For connecting the machines to a network (LAN):

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

Connecting the Ethernet cable with the machine

For each machine:

1. Insert the Ethernet cable into the machine and the machine's control cabinet, using an EMC connection.
2. 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. Install the Ethernet bus plug at the cable end.
4. Push the bus plug into the Ethernet interfacee X1 of the SIGMA CONTROL 2 until it latches.

For connecting the machines to a network (LAN):

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

1. Install the Ethernet bus plug at the cable end.
2. Push the bus plug into the LAN socket X1 until it latches.

7.8.5.2 Both: Adjusting system setpoint pressure pA and pB

Precondition: Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Pressure settings >* menu is selected.

1. Press «Enter» to switch into setting mode.
   The display of *switching point pA* flashes.
2. Adjust the value with the «UP» or «DOWN» key.
3. Press «Enter» to accept the setting.
4. Adjust the switching differential for the system setpoint pressure pA in the same manner.
5. Adjust the values for pB in the same manner.
6. Press «Escape» repeatedly to return to the main menu.

Further information: Further information on setting up the pressure parameters is found in chapter 7.4.

7.8.5.3 Master: Configuring the system pressure setpoint changeover using the clock

Keep to the order of the configuration!

1. Set clock program
2. Select operating mode.

When a clock program is first set up, note the start times for the system pressure setpoints on a sheet of paper first.

In addition to individual week days, the controller has the following cycles available.

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

- Mon-Sun
- Sat-Thu

➢ Record the start times for the system setpoint pressure.

Further information The example given in chapter 7.7.2 describes the settings for a clock program in more detail.

Overview

- Deleting the existing clock program
- Entering the weekday for the first switching point
- Enter the time of the first switching point.
- Set the first pressure switching point
- Set up any further switching points.
- Select operating mode: pA/pB Clock(see chapter 7.8.5.5)

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control ➞ pA/pB Clock >* menu is selected.

➢ Edit the list items in their sequence

Deleting the existing clock program

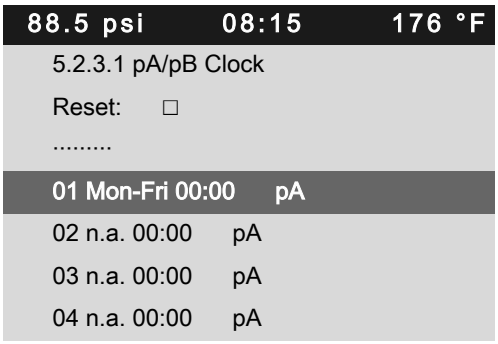
To delete an existing clock program, proceed as follows:

1. Press «UP» repeatedly until *Reset:* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *Reset* check box flashes.
3. Press the «UP» key once.
4. Press «Enter» to accept the setting.

Result The clock program is now reset.

Entering the weekday for the first switching point

1. Press «DOWN» repeatedly until the *01 switching point* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The display for *weekday* flashes.

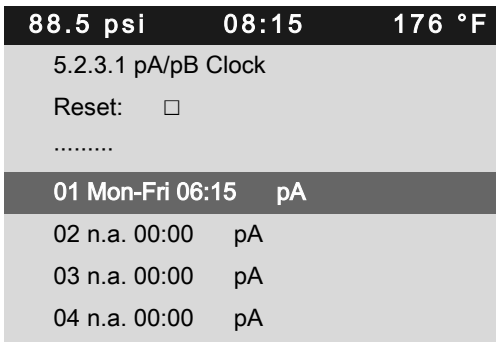


3. Press «UP» repeatedly until the desired weekday is displayed.
4. Press «Enter» to accept the setting.

Result The weekday is set for the first switching point.

Setting the time for the first switching point

1. Press the «Right» key.
2. Press «Enter» to switch into setting mode.
   The display for *hours 00:00* flashes.
3. Press «UP» repeatedly until the hours are set.
4. Press the «Right» key.
   The display for *minutes 00.00* flashes.
5. Press «UP» repeatedly until the minutes are set.



6. Press «Enter» to accept the settings.

Result The start time is set for the first switching point.

Setting the system pressure for the first switching point

1. Press the «Right» key.
2. Press «Enter» to switch into setting mode.
   The display for the system setpoint pressure flashes. System setpoint pressure pA or system setpoint pressure pB.
3. Press the «UP» or «DOWN» key to select the required system setpoint pressure System setpoint pressure pA or system setpoint pressure pB.
4. Set up the remaining switching points in the same way.
   The clock program is now finished.
5. Select operating mode pA/pB Clock (see chapter 7.8.5.5)
6. Press «Escape» repeatedly to return to the main menu.

7.8.5.4 Master: Configuring the system pressure setpoint changeover using the timer

Keep to the order of the configuration!

1. Configure the timer.
2. Select operating mode.

Overview

- Set timer periods pA and pB

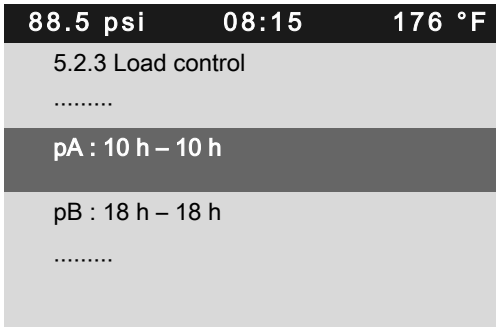
- Select starting time for pA or pB.
- Select the timer operating mode: pA/pB Cycle(see section7.8.5.5)

➢ Proceed in the sequence shown.

Setting timer periods pA and pB

Precondition Access level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press the «UP» repeatedly until the timer period is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *timer period* pA flashes.



Menu

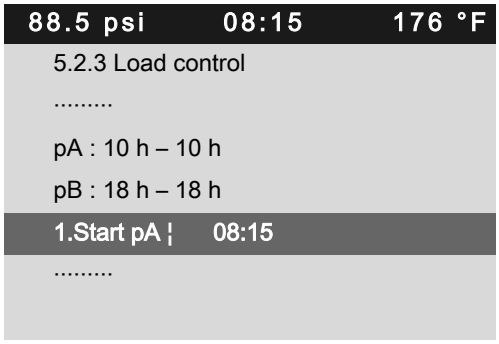
Active line, timer period pA | expired timer period (example)

3. Press «UP» to set the timer duration pA.
4. Press «Enter» to accept the setting.
5. Press the «Right» key.
6. Press «Enter» to switch into setting mode.
   The timer period *pB* flashes.
7. Press «UP» to set the timer duration pB.
8. Press «Enter» to accept the setting.

Result The timer period for pA and pB is set.

Setting the starting time for pA or pB.

1. Press «DOWN» repeatedly until *1.Start pA* is displayed as active line.
2. Press Enter to switch into setting mode.
   The display for *hours 00:00* flashes.
3. Press «UP» repeatedly until the desired number of hours is displayed.



Menu

Active line, starting time with pA (example)

4. Press the «Right» key.
   The display for *minutes* *00:00* flashes.
5. Press «UP» repeatedly until the desired number of minutes is displayed.
6. Press «Enter» to accept the settings.
7. If the cycle is to start with pB, press «Enter» and use the «DOWN» or «UP» key to set the value for 1.Start pB.
8. Set the required starting time pB in the same manner.
   The timer is now configured.
9. Select operating mode pA/pB Cycle (see section 7.8.5.5).
10. Press «Escape» repeatedly to return to the main menu.

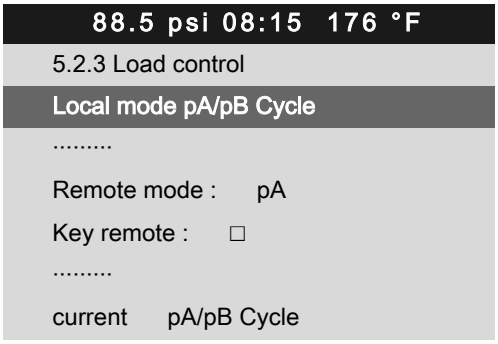
The system automatically resets the times for the duration to zero (0).

➢ Do not use the main switch to turn the machine on or off.

7.8.5.5 Master: Selecting local mode

Precondition
Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.
Time program or timer are set.

1. Press «UP» repeatedly until *Local mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   Operating mode flashes.



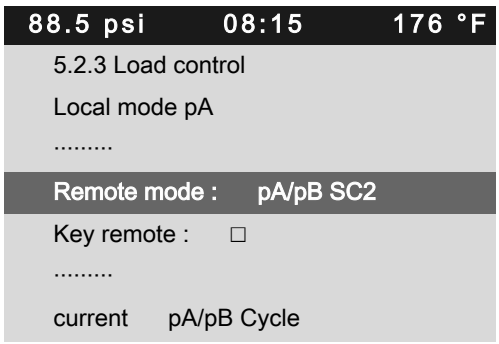
3. Press «UP» or «AB» to select the desired local operating mode (pA/pB Clock or pA/pB Cycle).
4. Press «Enter» to accept the operating mode.
   The display of the current operating mode switches to the new operating mode.

7.8.5.6 Slave: Setting remote mode

Precondition
Access level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «UP» or «DOWN» repeatedly until *Remote mode* is displayed as the active line.

2. Press «Enter» to switch into setting mode.
   The *Remote operation* display flashes.



3. Use «UP» to select the following operating mode: pA/pB SC2.
4. Press «Enter» to accept the setting.

Result Remote operation is set to pA/pB SC2 operating mode.

7.8.5.7 Slave: Activating/deactivating the «Remote control» key

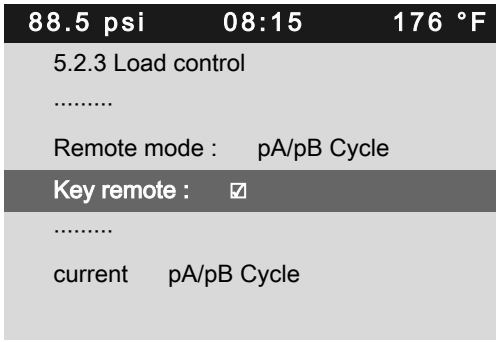
Activating/deactivating the check box

Check box	Check boxes for Reset	Status
☑	☒	activated
☐	☐	deactivated

Tab. 60 Check box status

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «DOWN» once.
   Key remote line is displayed as being active.
2. Press «Enter» to switch into setting mode.
   The check box will flash.



3. Use the «UP» key to activate the check box.
4. Press Enter to accept the setting.
   The «remote control» key is activated and can be used.
5. Press the «remote control» key to enable remote mode.

You want to deactivate the «remote control» key?

➢ Deactivate the check box for the «remote control» key.

7.8.5.8 Master and slave: Configuring Ethernet interface

Overview

- Select menu *< Communication >*.
- Specify machine 1 as master
- Specify machine 2 as slave
- Saving the settings

Precondition Access level 2 is activated.
The menu *< Communication ➞ Ethernet >* is selected.

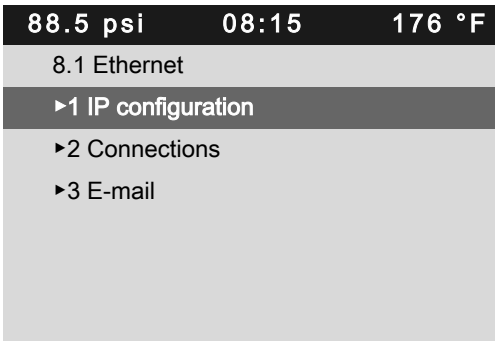
Select the IP configuration menu

Different IP addresses must be entered in the *< Ethernet ➞ IP configuration >* menu for each machine.

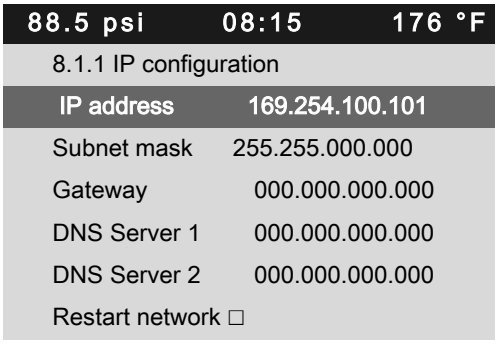
For a direct connection of the two machines (example):

- Master: 169.254.100.101
- Slave: 169.254.100.102

1. Press «Enter».
   The *< IP configuration >* menu is displayed as being active.



2. Press «Enter».
   IP address line is displayed as being active.

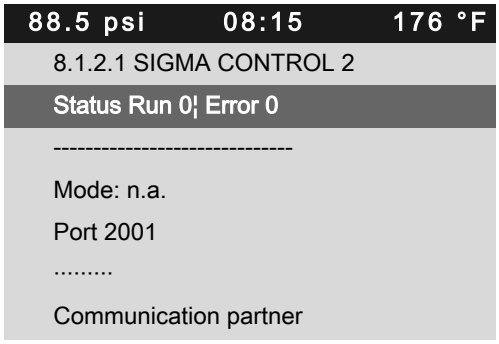


3. Press «Enter» to switch into setting mode.
4. Use «UP» or «DOWN» to set the IP address of at least one machine.

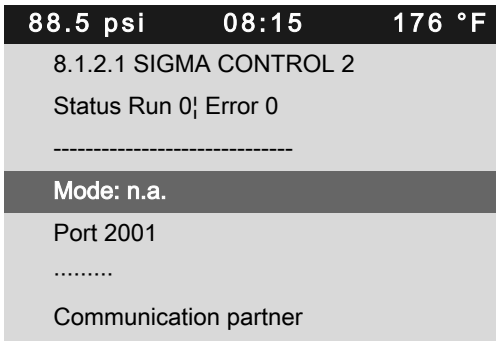
Specify the controller of machine 1 as master

Precondition The menu *< Communication ➞ Ethernet ➞ Connections >* is selected.

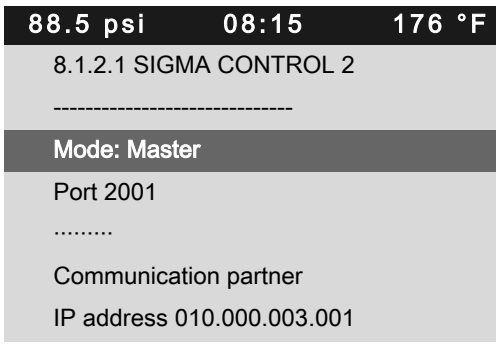
1. Press «Enter».
   The *< SIGMA CONTROL 2 >* menu is displayed as being active.
2. Press «Enter».
   The *Status* line is displayed as being active.



3. Press «DOWN» repeatedly until *Mode* is displayed as active line.

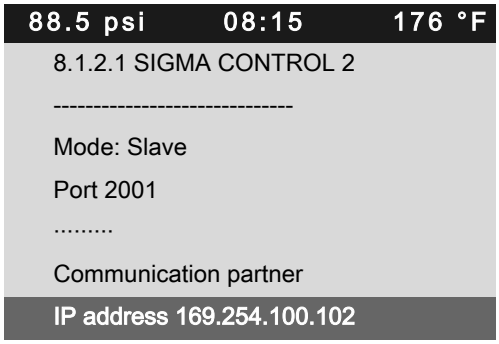


4. Press «Enter» to switch into setting mode.
   n.a. flashes.
5. Press «UP» to set the *< Master >* mode.



6. Press «Enter» to accept the setting.
7. Press «DOWN» repeatedly until *IP address* is displayed as active line.

8. Press «Enter» to switch into setting mode.



IP address of communication partner (slave)

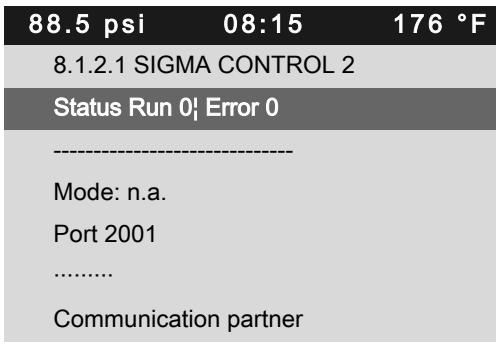
9. Use «UP» or «DOWN» to set the IP address of machine 2.
10. Press «Enter» to accept the setting.
11. Switch off the control voltage and then switch back on.

Result The system automatically saves the settings independently of the voltage.

Specifying the controller of Machine 2 as slave

Precondition The menu *< Communication → Ethernet → Connections >* is selected.

1. Press «Enter».
   The *< SIGMA CONTROL 2 >* menu is displayed.
   The Status line is displayed as being active.
2. Press «DOWN» repeatedly until *Mode* is displayed as the active line.
3. Press «Enter» to switch into setting mode.
   n.a. flashes.



Menu

Active line

4. Press «UP» to set the *< Slave >* mode.

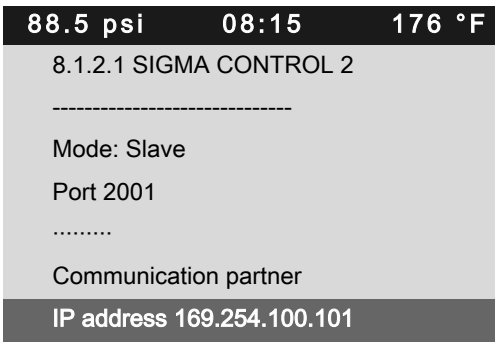
Menu

Active line; slave is set.

IP address

5. Press «Enter» to accept the setting.

6. Press «DOWN» repeatedly until *IP address* is displayed as the active line.
7. Press «Enter» to switch into setting mode.



IP address of communication partner (master)

8. Use «UP» or «DOWN» to set the IP address of Machine 1.
9. Press «Enter» to accept the setting.
10. Switch off the control voltage and then switch back on.

Result The system automatically saves the settings independently of the voltage.

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

Overview

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

➢ Configure master control as described below.

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

Machine (example)

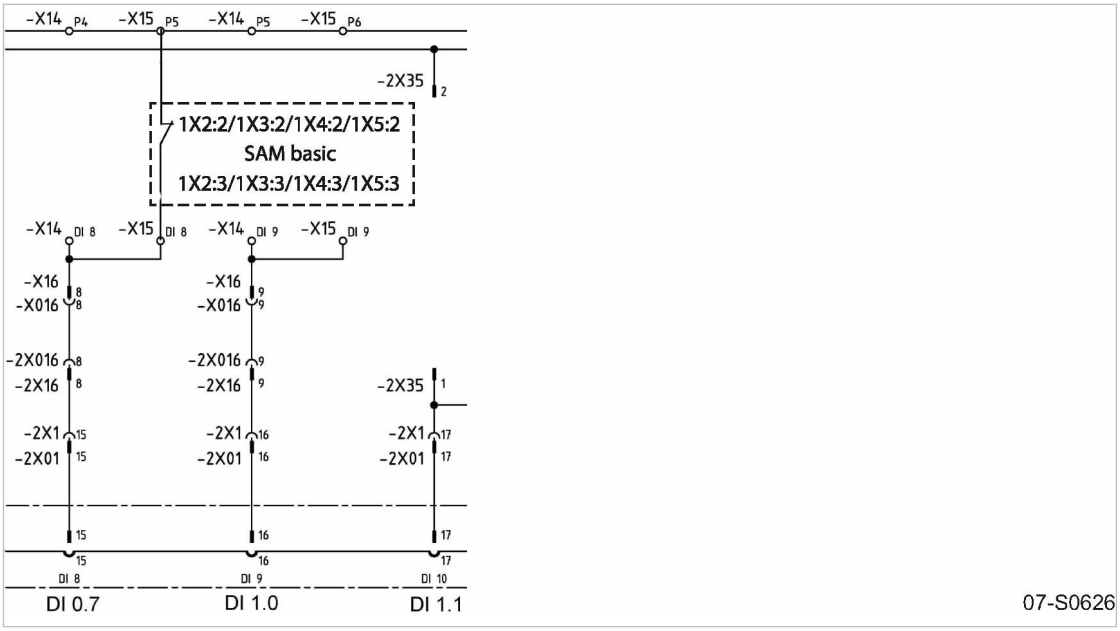


Fig. 23 LOAD remote contact

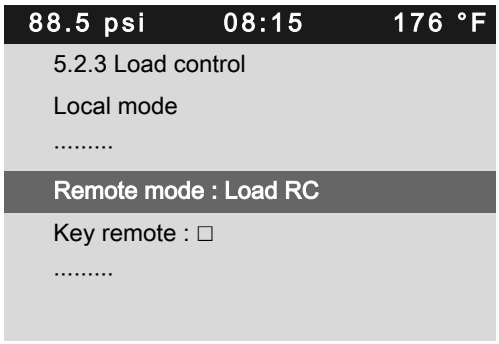
➢ Establish the electrical connection with Tue 1.13 according to the diagram.

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

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

Setting the remote LOAD contact operating mode

1. Press «UP» or «DOWN» repeatedly until *Remote mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   Display for remote mode flashes.



Menu

Active line, current operating mode

3. Use «UP» to select the LOAD remote contact operating mode.
4. Press «Enter» to accept the setting.

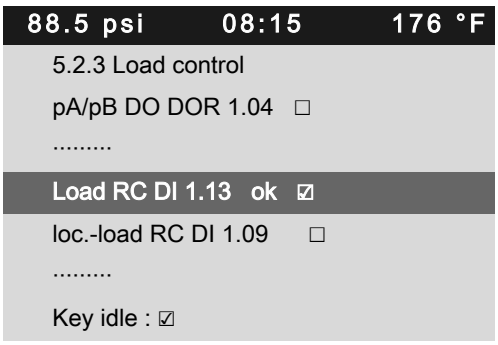
Result The remote LOAD contact operating mode is set.

Assigning the input for LOAD remote contact

The input for the LOAD remote contact is preassigned.

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

1. Press «DOWN» repeatedly until *Load RC* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *digital input* display flashes.



3. Use the «UP» or «DOWN» keys to select the input for the LOAD remote contact.
4. Press «Enter» to accept the setting.
5. Activate the check box for *DI 1.13* .
   ok is displayed.

Result The input is now configured.

7.8.6.3 Adjusting the pressure increase pE

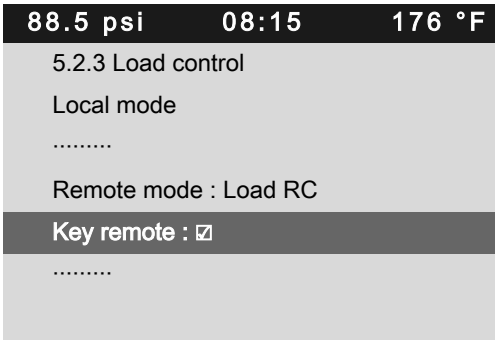
➢ Adjust the pressure increase pE as described in section 7.4.2.3.

Further information Detailed information on this pressure parameter is found in section 7.4.2.

7.8.6.4 Activating the «Remote control» key

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «UP» repeatedly until *Key remote* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *check box* for the «Remote control» key will flash.



3. Use the «UP» key to activate the check box.

4. Press «Enter» to accept the setting.
   The «Remote control» key is activated and can be used.
5. Press the «Remote control» key to enable remote mode.

7.8.7 Configuring the master control with local/LOAD remote contact

Overview

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

➢ Configuring master control as described below.

7.8.7.1 Making the electrical connections

Use the input “Controller On” for the "alarm machine X" message (DOR 1.03) to prevent line breaks!

➢ Wire the "motor running” and "control on” (DOR 1.03) messages from the compressor to the MVS 8000.

- Contact A open: SIGMA CONTROL 2 controls with system set-point pressurepB
- Contact A closed: SIGMA CONTROL 2 controls using a remote contact input.
- DI 1.13: LOAD/IDLE external
- DI 1.09: LOAD control – switchover local/remote LOAD contact

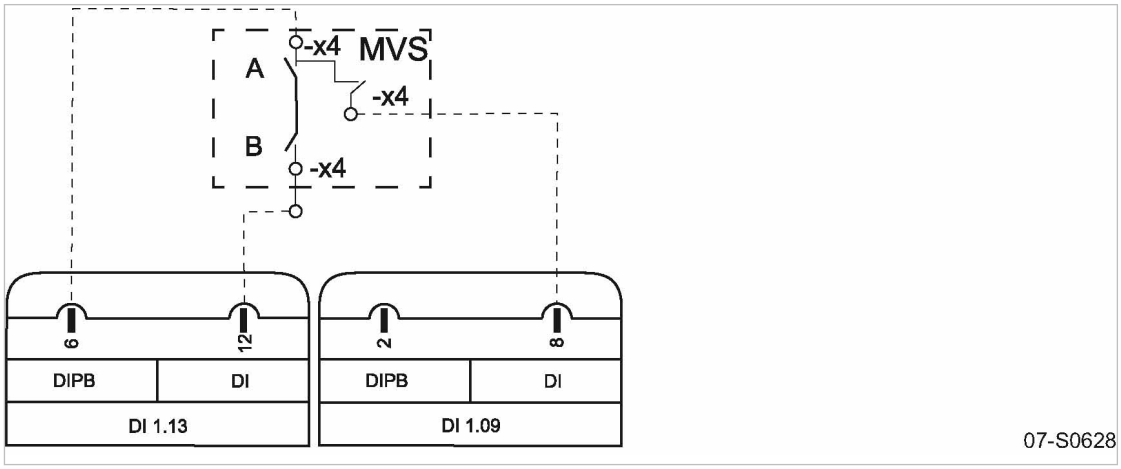


Fig. 24 Wiring diagram for local/LOAD remote contact

Ⓐ Changeover between automatic and manual modes
Ⓑ LOAD/IDLE contact

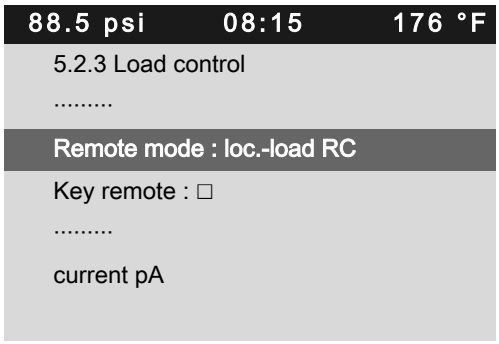
➢ Make the electrical connection according to the diagram.

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

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

Setting local/LOAD remote contact operating mode

1. Press «UP» repeatedly until *Remote mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *Remote operation* display flashes.

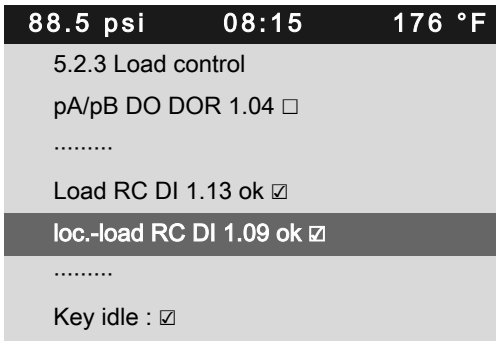


3. Use «UP» to select the *loc.-load RC* operating mode.
4. Press «Enter» to accept the setting.

Result The local/load remote contact operating mode is set.

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

1. Press «DOWN» repeatedly until *loc.-load RC* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   DI flashes.



3. Use «UP» to select a new input for local/load remote contact.
4. Press «Enter» to accept the setting.

Result The input for local/load remote contact operating mode is assigned.

7.8.7.3 Setting local operating mode pB

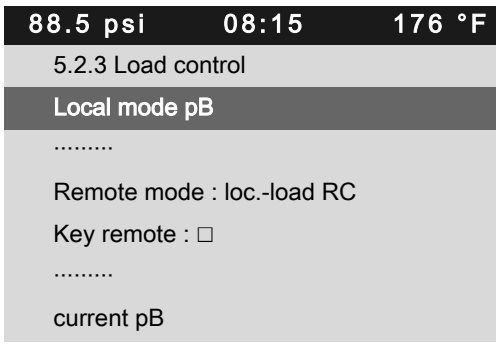
Set-point pressure pB is normally set for local operation.

➢ When setting the system set-point pressure pB, keep in mind that under certain circumstances, more than one compressor may be operating in local mode (see section 7.4 for adjusting set-point pressure).

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «UP» repeatedly until *Local mode* is displayed as the active line.

2. Press «Enter» to switch into setting mode.
   Setpoint pressure flashes.



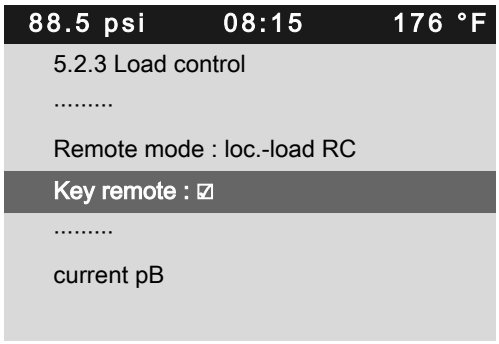
3. Use «UP» to select the pB operating mode.
4. Press «Enter» to accept the setting.
5. Adjust the set-point pressure pB, if necessary (see section 7.4).

Result The local operating mode pB is set.

7.8.7.4 Activating the «Remote control» key

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «UP» or «DOWN» repeatedly until *Key remote* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The check box for the «Remote control» key will flash.



3. Use the «UP» key to activate the check box.
4. Press «Enter» to accept the setting.
   The «Remote control» key is activated and can be used.
5. Press the «Remote control» key to enable remote mode.

Result The master control is fully configured.

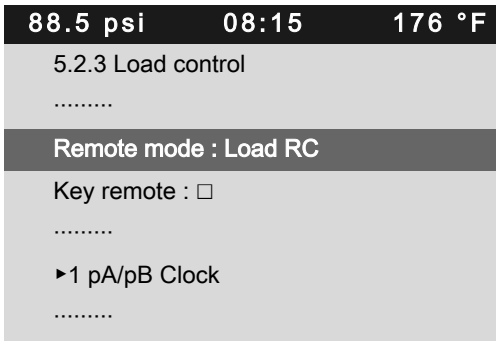
7.8.7.5 Setting the LOAD remote contact operating mode and assigning the input

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

Setting the LOAD remote contact operating mode

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure control ➞ Load control >* menu is selected.

1. Press «DOWN» repeatedly until *Remote mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *Remote control mode* display flashes.

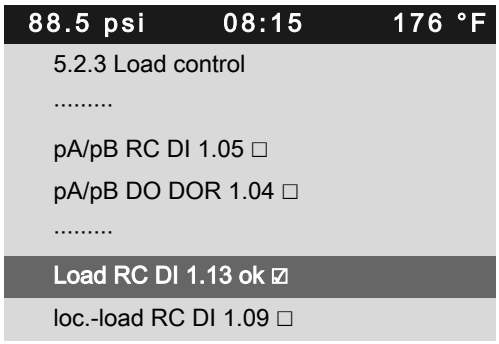


3. Use «UP» to select the *Load RC* operating mode.
4. Press «Enter» to accept the setting.

Result The remote load contact operating mode is set.

Assigning an input for the LOAD remote contact for switching overpressure control

1. Press «DOWN» repeatedly until *Load RC* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   DI flashes.



3. Use «UP» to select a new input for load remote contact.
4. Press «Enter» to accept the setting.

Result The input for load remote contact is assigned.

7.8.8 Configuring setpoint pressure pre-selection via remote contact

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

Overview

- Setting up remote contact mode pA/pB

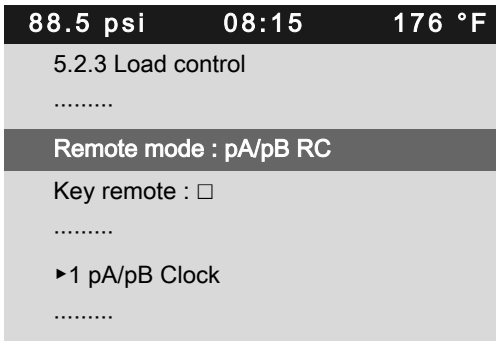
- Assigning the remote contact input
- Activating the «remote control» key

➢ Configure the setpoint pressure pre-selection as described.

7.8.8.1 Setting up remote contact mode pA/pB

Precondition Password level 2 is activated,
The electrical connections are made,
Menu *< Configuration → Pressure control → Load control >* is selected.

1. Press «UP» repeatedly until *Remote mode* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   Display for remote mode flashes.



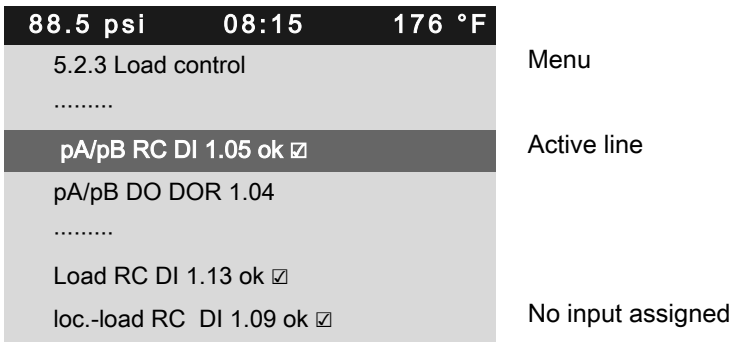
3. Use the «UP» key to select operating mode pA/pB RC.
4. Press «Enter» to accept the setting.

Result Operating mode pA/pB remote contact is selected.

7.8.8.2 Assigning the remote contact input

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

1. Press «UP» repeatedly until *pA/pB RC* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   DI flashes.



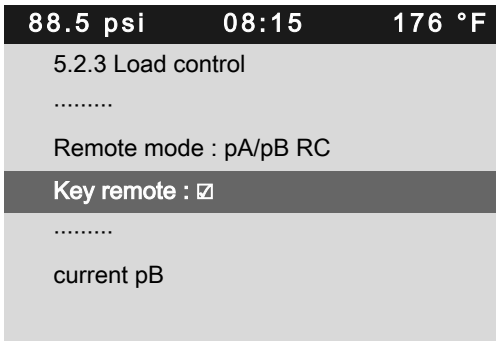
3. Use the «UP» key to select input pA/pB RC.
4. Press «Enter» to accept the setting.

Result The input for remote contact has now been assigned.

7.8.8.3 Activating the «remote control» key

Precondition Password level 2 is activated,
Menu *< Configuration ➞ Pressure control ➞ Load control >* is selected.

1. Press «UP» repeatedly until *Key remote* is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   Check box flashes.



3. Use the «UP» key to activate the check box.
4. Press «Enter» to accept the setting.
   The «remote control» key can be used.
5. Press the «remote control» key to enable remote mode.

Result The operating mode is now configured.

7.8.9 Configuring master control of compressors regulated by pressure switch

➢ Configure master control as previously described.

7.8.9.1 Configuring master control via floating relay contact

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

Proposal:

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

Overview

- Establish the electrical connections
- Set setpoint pressures pA and pB.
- Configure/adjust local operating mode

- Assign the floating relay contact
- Set local operating mode

Establish the electrical connections

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

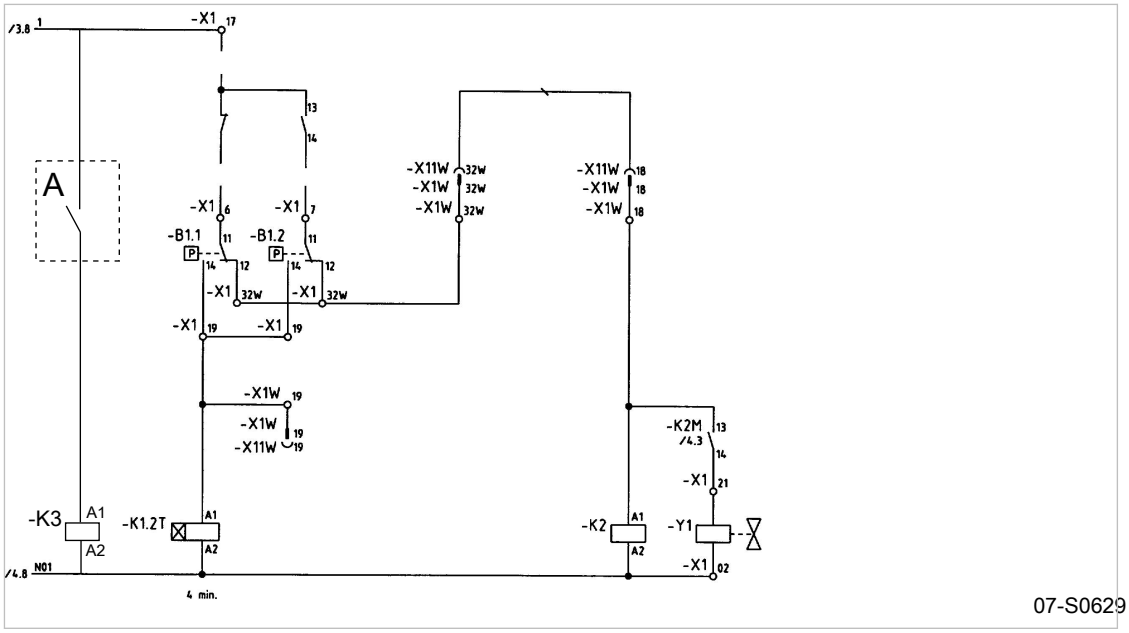


Fig. 25 Machine with pressure switch regulation
Ⓐ potential-free contact SIGMA CONTROL 2

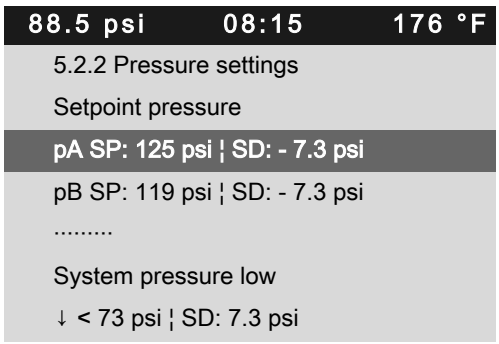
➢ Make the electrical connection according to the diagram.

Set setpoint pressures pA and pB.

Precondition Access level 2 is activated,
The electrical connections are made.

1. Select menu *< Configuration ➞ Pressure control ➞ Pressure settings >* (see section 7.4.1).

2. Press «Enter» to switch into setting mode.
   Setpoint pressure pA flashes.



3. Use «UP» or «DOWN» to adjust the value.
4. Press «Enter» to accept the setting.
5. Adjust the switching differential pA in the same manner.
6. If necessary, adjust the value for pB in the same way.
7. Press «Escape» repeatedly to return to the main menu.

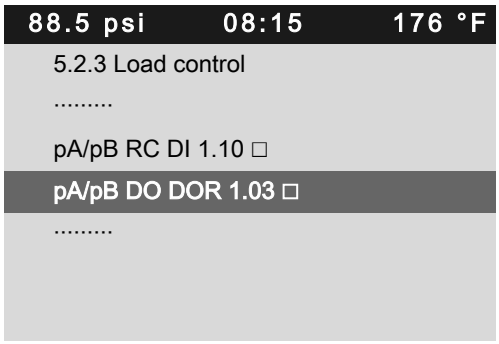
Configuring local mode

➢ Set the clock program or timer as described in section 7.7.

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 *< Configuration ➞ Pressure control ➞ Load control >*.
2. Press the «DOWN» key repeatedly until the following is displayed as active line:



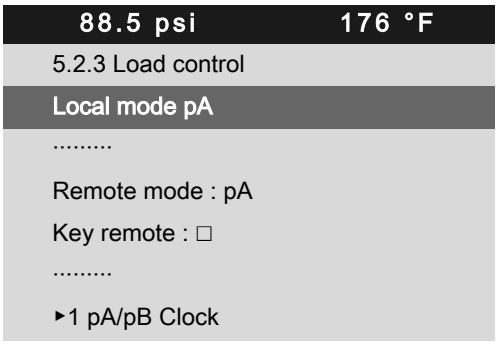
3. Press «Enter» to switch into setting mode.
   Output display flashes.
4. Use «DOWN» or «UP» to select the required output (DOR).
5. Press «Enter» to accept the setting.
   This output can now be used for the changeover between the two pressure switches.

Set local mode

Precondition Password level 2 is activated.

1. Select the *< Configuration ➞ Pressure control ➞ Load control >* menu.

2. Press «UP» repeatedly until *Local mode* is displayed as the active line.
3. Press «Enter» to switch into setting mode.
   The *Local operation* display flashes.



Menu

Active line, current local operating mode

4. Use «UP» or «DOWN» to set pA/pB Clock or pA/pB Cycle operating mode.
5. Press «Enter» to accept the operating mode.
   The actual operating mode is displayed.

7.8.9.2 Configuring sequencing mode without an electrical connection

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

Proposal:

- Select the system 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 SC2 Clk.
- Activate the compressor timer

Function diagram:

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

Time period t1–t7: high compressed air demand	Time period t8–t14: low compressed air demand
t6: SK switches to IDLE.	t13: SK switches to IDLE.
t7: BSD switches to IDLE.	t14: BSD switches to IDLE.

Tab. 61 Function diagram

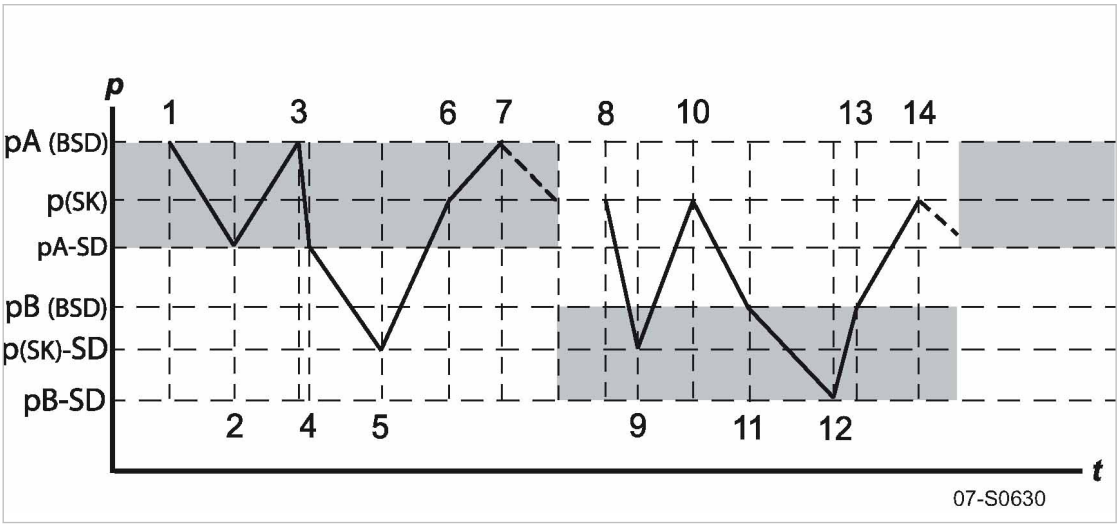


Fig. 26 Function diagram
SD Switching differential
p Pressure
t Time

Set setpoint pressures pA and pB.

Precondition Access level 2 is activated.

1. Select *< Configuration → Pressure control → Pressure settings >* (see Section 7.4.1)
   The *< Pressure settings >* menu is displayed.
2. Press «DOWN» repeatedly until *Setpoint pressure pA SP:* is displayed as active line.

88.5 psi 08:15 176 °F	
5.2.2 Pressure settings	Menu
Setpoint pressure	
pA SP: 125 psi ¦ SD: -7.3 psi	Active line with system set-point pressure pA and switching differential
pB SP: 119 psi ¦ SD: -7.3 psi	System pressure set-point pB and switching differential.
.....	
System pressure low	
< 73 psi ¦ SD: 7.3 psi	

3. Press «Enter» to switch into setting mode.
   The display for *system set-point pressure pA* flashes.
4. Use «UP» or «DOWN» to adjust the value.

5. Press «Enter» to accept the setting.
6. Adjust the switching differential in the same way.
7. If necessary, adjust the values for system set-point pressure pB in the same manner.
8. Press «Escape» repeatedly to return to the main menu.

Configuring the clock program

The clock program for the example is set up using the following switching points: A maximum of 10 switching points are available:

No.	Weekday	Time	System set-point pressure
01	Mon-Fri	06:30	pA On
02	Mon-Fri	17:00	pB On

Tab. 62 Example switching points

Overview

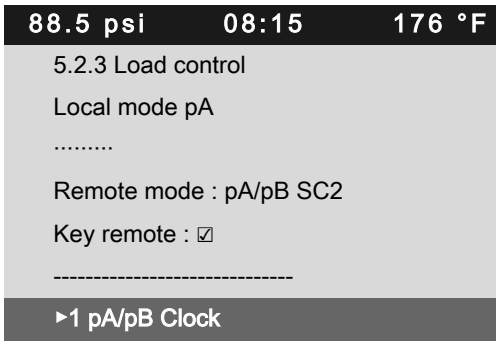
- Set the day of the week for the first switching point.
- Set the time for the first switching point
- Set the system pressure for the first switching point
- Specify any further switching points.

Precondition Password level 2 is activated.
The *< Configuration ➞ Pressure settings ➞ Load control >* menu is selected.

➢ Configure the switching program as described below.

Enter the weekday for the first two switching points

1. Press the «DOWN» key repeatedly until *< pA/pB Clock >* is displayed as active line.



2. Press «Enter».
   The *< pA/pB Clock >* menu is displayed.
3. If you want to delete an existing clock program, press «UP» until *Reset:* is displayed as the active line.
4. Press «Enter» to switch into setting mode.
   The check box will flash.

5. Press «UP».
   The check box is activated.

88.5 psi 08:15 176 °F	
5.2.3.1 pA/pB Clock	Menu
Reset: ☒	Active line, delete existing clock program
.....	
01 n.a. 00:00 pA	First switching point deleted
02 n.a. 00:00 pA	Second switching point deleted
03 n.a. 00:00 pA	Third switching point deleted
04 n.a. 00:00 pA	Fourth switching point deleted

6. Press «Enter» to accept the setting.
   You have deleted the existing clock program.
   All switching points are reset to *pA* .
   The *Reset* check box is deactivated automatically.
7. Press the «DOWN» key repeatedly until the switching point 01 is displayed as the active line.
8. Press «Enter» to switch into setting mode.
   The *Weekdays* column flashes.
9. Press «UP» repeatedly until Mon-Fri appears.
10. Press «Enter» to accept the setting.

88.5 psi 08:15 176 °F	
5.2.3.1 pA/pB Clock	Menu
Reset: ☐	
.....	
01 Mon-Fri 00:00 pB	Active line, First switching point, set weekdays
02 Mon-Fri 00:00 pB	Weekday Second switching point
03 n.a. 00:00 pB	
04 n.a. 00:00 pB	

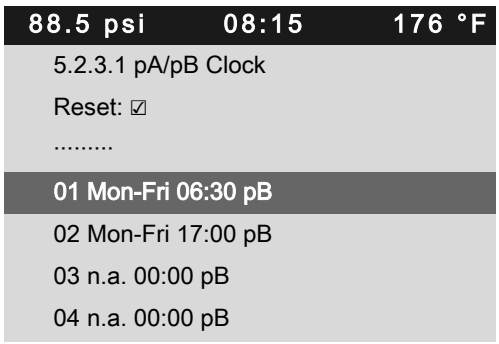
11. Enter the weekdays for the second switching point in the same manner.

Result The weekdays for the first two switching points are set.

Set the time for the first two switching points

1. Press the «UP» key repeatedly until the switching point 01 is displayed as the active line.
2. Press the «Right» key once.
3. Press «Enter» to switch into setting mode.
   The column time, display for hours, *00 : 00* in the active line flashes.
4. Use «UP» to specify the settings for the hours.
5. Press the «Right» key once.
   The column time, display for minutes, *00 : 00* in the active line flashes.
6. Use «UP» to specify the settings for the minutes.

7. Press «Enter» to accept the settings.
   The display stops flashing and the time (hours/minutes) is set.

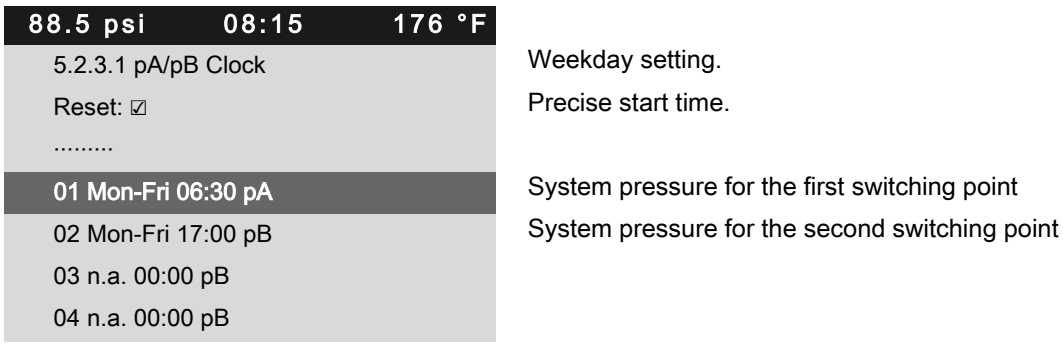


8. Enter the time for the second switching point in the same manner.

Result The times for the first two switching points are set.

Select the system set-point pressure pA or pB for the first two switching points.

1. Press the «UP» key repeatedly until the switching point 01 is displayed as the active line.
2. Press the «Right» key once.
   The column for system set-point pressure *pA* or *pB* is displayed.
3. Press «Enter» to switch into setting mode.
   The column for the system set-point pressure flashes.
4. Use «UP» to specify the settings for the system set-point pressure pA or pB.
5. Press «Enter» to accept the settings.



6. Enter the system set-point pressure for the second switching point in the same manner.
7. Press «Escape» repeatedly to return to the main menu.

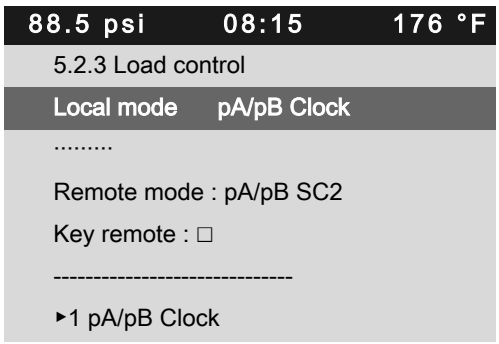
Result Select the system set-point pressure pA or system set-point pressure pB for the first two switching points.

Set local mode

Precondition Access level 2 is activated.

1. Select the *< Configuration ➞ Pressure settings ➞ Load control >* menu.
   The *Local mode* mode is displayed as being active.

2. Press «Enter» to switch into setting mode.
   The *Local operation* display flashes.



3. Press «UP» repeatedly until *Local mode pA/pB Clock* appears.
4. Press «Enter» to accept the setting.

Result The current local mode *pA/pB Clock* is set.

7.8.10 Examples of time settings for equal overall load

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

A detailed description for configuring a clock or timer program can be found in chapter 7.7.

Variant A: Daily switch between system set-point pressure pA and system set-point pressure pB after 24 hours

The compressors start with a system set-point pressure pB at 00:00 hours. A timer triggers the switch between system set-point pressurepA and system set-point pressure pB (local operating mode: Local mode pA/pB Cycle).

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

➢ Establish a cycle with the following switching points:
- Cycle time pA: 24 h
- Cycle time pB: 24 h
- Start pB: 01:00:00

Variant B: Equal duty cycle during the day

A timer triggers the switch between system set-point pressure pA and system set-point pressure pB (local operating mode pA/pB Clock).

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

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

No.	Weekday	Time	System set-point pressure
01	Mon-Sun	00:00	pA On
02	Mon-Sun	06:00	pB On

No.	Weekday	Time	System set-point pressure
03	Mon-Sun	12:00	pA On
04	Mon-Sun	18:00	pB On

Tab. 63 Example for a clock program for equal duty cycling during the day

Variant C: Equal duty cycle during the week

A timer triggers the switch between system set-point pressure pA and system set-point pressure pB (local operating mode: pA/pB SC2 Clk).

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

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

No.	Weekday	Time	System set-point pressure
01	Mon	00:00	pA On
02	Mon	21:00	pB On
03	Tue	18:00	pA On
04	Wed	15:00	pB On
05	Thu	12:00	pA On
06	Fri	09:00	pB On
07	Sat	06:00	pA On
08	Sun	03:00	pB On

Tab. 64 Example for a clock program for equal duty cycling during the week

7.9 Configuring email

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

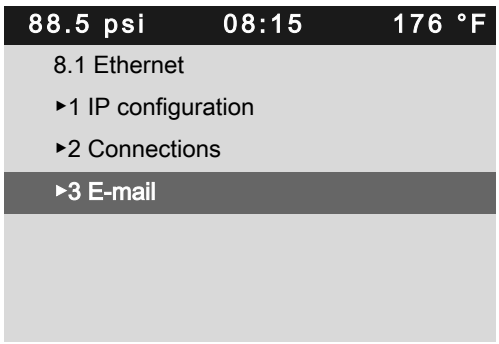
Overview

- Select the menu *< Communication → Ethernet >*.
- Configure and activate the email function.
- Set interval and suppress repeats.

Select menu

1. Select the menu *< Communication → Ethernet >*.

2. Press «DOWN» twice.
   E-mail submenu line is displayed as being active.



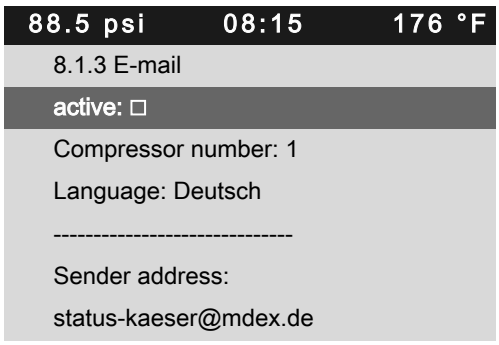
Menu

Active line, submenu email

Configure and activate the email function

Precondition Password level 2 is activated.
E-mail submenu is displayed as being active.

1. Press «Enter».
   The display shows *Email function* as the active line.
2. Press «Enter» to switch into setting mode.
   The *check box* for the email function flashes.
3. Press «UP» to deactivate the email function.
4. Press «Enter» to accept the setting.
   The email function is deactivated.



Menu

Active line; deactivate/activate email function

Setting the language

5. Set:
   - Compressor number
   - Language
   - Sender address
   - Sender's name
   - Telephone number of contact person
   - Recipient address
   - SMTP server:
     - Username
     - Password
6. Reactivate the email function.
7. Press «Escape» repeatedly to return to the main menu.

Further setting options:

- SMTP port
- Timeout
- Interval (repeats)

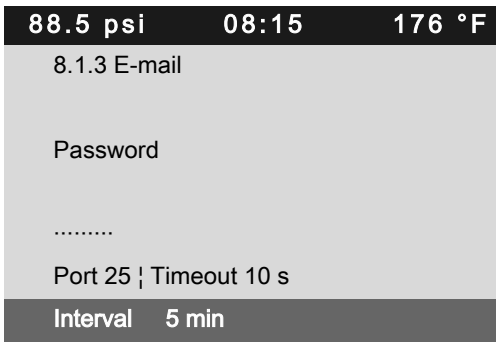
Result The email functions are configured and activated.

Suppress repeat messages (setting an interval)

To suppress messages repeating at short intervals, a period of 0 – 900 minutes can be set during which a repeat of the same message is suppressed, i.e. is not sent.

Precondition Password level 2 is activated.
E-mail submenu is displayed as being active.

1. Press «Enter».
2. Press «DOWN» repeatedly until *Interval* is displayed as the active line.
3. Press «Enter» to switch into setting mode.
   The *value* for the time of suppression flashes.



4. Use the «UP» or «DOWN» keys to set the desired duration of suppression.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

Result Suppression interval is set.

7.10 Configuring input and output signals

The controller's binary and analog inputs and outputs can be used for other requirements.

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

- 7.10.1: Outputting important operational states of the compressors.
- 7.10.2: Display of analog input values
- 7.10.3: Displaying additional binary input signals

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

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

7.10.1 Outputting important operational states of the machine

Important operational machine states can be made available as a binary signal via volt-free contacts.
Each output can be assigned only once.

The following messages can be returned:

Message	Explanation	Outlet
Controller on	Controller is powered up	
Compressor on	The machine is switched on.	
Motor running	Compressor motor running	
IDLE	The machine runs in the IDLE operating mode.	
ON LOAD	The machine runs in the LOAD operating mode.	
Group alarm	Fault has occurred	
Group warning	Warning message has appeared	
Remote mode	Remote mode is activated	
Clock active	The clock is activated	
Clock contact	The clock contact is closed.	
EMERGENCY STOP	The «EMERGENCY STOP» switch is operated.	

Tab. 65 Assigned output signals

Overview

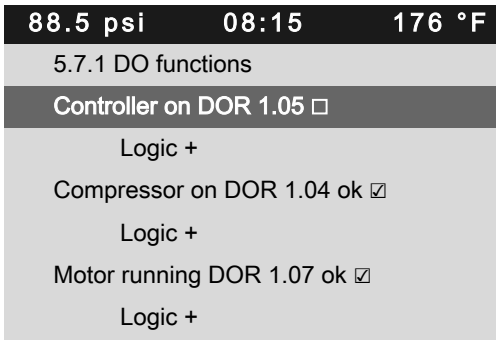
The configuration is entered in menu *< Configuration ➞ I/O Peripherie ➞ DO Functions >*:

- Password level 2 is activated.
- Assign a message to an output

7.10.1.1 Slect menu < Configuration ➞ I/O Peripherie

Precondition Access level 2 is activated.

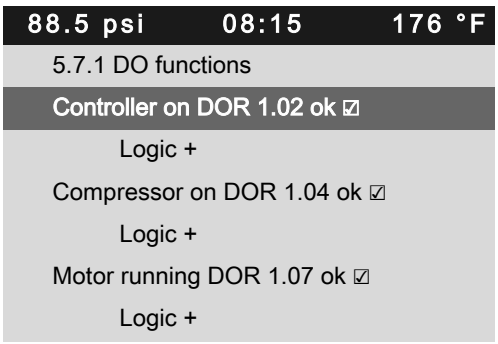
1. In operating mode, switch to the main menu with the «Return» key.
2. Select *< Configuration ➞ I/O periphery ➞ DO functions >*.
   A list of available messages and their assigned outputs is displayed.



7.10.1.2 Assign a message to an output

1. Select the required message with the «DOWN» key.

2. Press «Enter» to switch into setting mode.
   The *Display* of the chosen indication flashes.



Menu

active line with assigned output

3. Select a free output with the «UP» or «DOWN» key.
4. Press «Enter» to accept the setting.
5. Press the Right key.
6. Press «Enter» to switch into setting mode.
7. Activate the *check box*.
8. Press «Enter» to accept the setting.
9. If necessary set *Logic*.
   The system now uses the assigned output to send a message.

You are missing an organized display of assigned output signals?

➢ Enter the selected output in table 65.

7.10.2 Display analog input values

Up to 6 values, for example pressure or temperature from various sensors/transducers can be displayed in the *<analog data>* menu.
Of these, 2 each are assigned to pressure and temperature transducers; 2 further inputs can be assigned to freely selectable sensor types. A list of standard analog data that can be displayed is found in chapter 8.5.

Overview

The configuration is entered in menu *< Configuration ➞ I/O periphery ➞ show quantities >*:

- Select menu *< Configuration ➞ I/O periphery ➞ show quantities >*
- Select display (display 1–6)
- Edit the sensor designation and unit of measure
- Allocate analog input
- Selecting the type of signal (4–20 mA / 0–20 mA)
- Assign a value range to the measurement signal (calibration)

Example

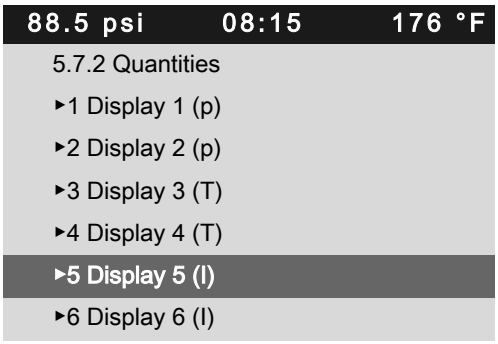
The following example explains the configuration:
The signal value from a flow measuring device is to be displayed in the measured *<data menu>*.

- Sensor designation: Flow rate 01
- The sensor is connected to analog input AII 1.03.
- The sensor has a measuring range of 0–29 cfm.
- The sensor is operated with 4–20 mA.

7.10.2.1 Select the menu show quantities

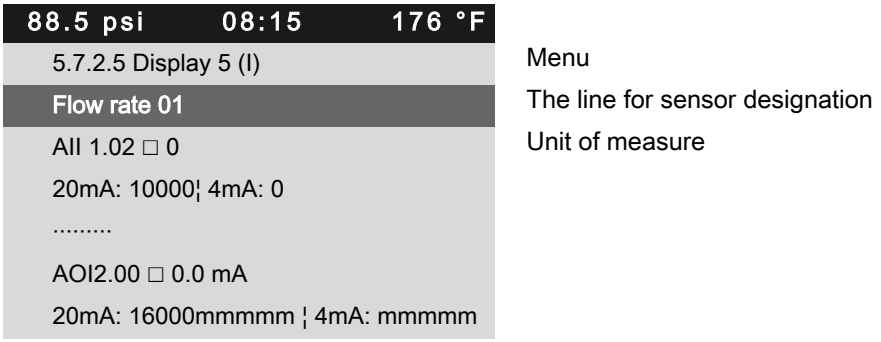
Precondition Password level 2 is activated,
The electrical connection is made.

1. Select menu *< Configuration → I/O periphery → Quantities >* (see chapter 7.10).
   Pressure/Temperature are displayed.
2. Press «DOWN» repeatedly until *Display 5 (l)* is displayed as the active line.



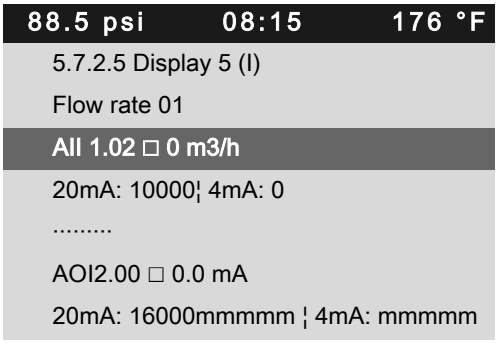
7.10.2.2 Edit the sensor designation and unit of measure

1. Press «Enter» to switch into setting mode.
   The display shows the line for the sensor designation as active line.
   The display of the *character set* flashes.
2. Use the «UP» and «DOWN» keys to select characters from the character set in order to assign a name to the sensor signal. There are 20 characters to choose from.



3. Press «Enter» to accept the setting.
4. Press «DOWN» once.
5. Press the «Right» key once.
6. Press «Enter» to switch into setting mode.
   The *Unit* display of the sensor flashes.

7. Use the «UP» and «DOWN» keys to select characters from the character set in order to assign the unit to the sensor signal.



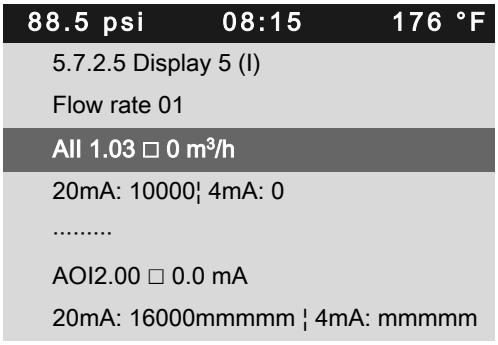
Menu
The line for sensor designation
Unit of measure

8. Press «Enter» to accept the setting.

Result Editing sensor designation and unit of measure.

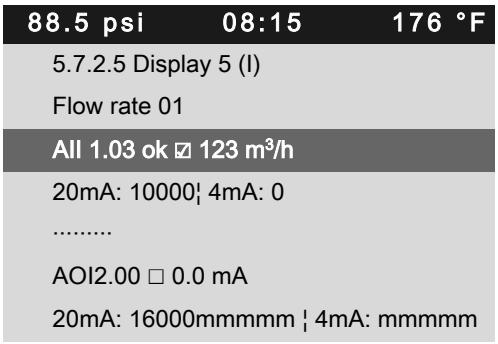
7.10.2.3 Allocate analog input

1. Press «left» twice, until *AII 1.02* is displayed.
2. Press «Enter» to switch into setting mode.
   Display for analog input flashes.
3. Select *AII 1.03* with the «UP» key.
4. Press «Enter» to accept the setting.



Menu
The line for sensor designation
Active line

5. Press the «Right» key once.
6. Press «Enter» to switch into setting mode.
   Check box for analog input flashes.
7. Activate the *check box* for AII 1.03.



Menu
The line for sensor designation
Active line, the signal value is displayed

8. Press «Enter» to accept the setting.
   OK is displayed.
   The signal value is displayed in the active line.

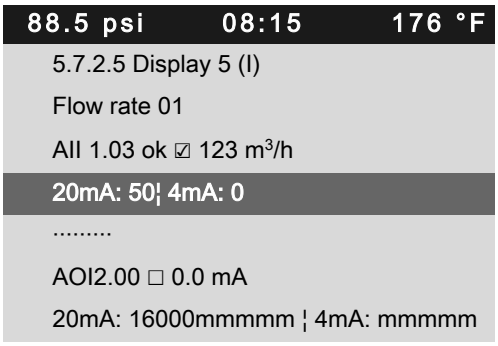
7.10.2.4 Determining the type of analog signal (0/4–20 mA)

1. Press «DOWN» once.
2. Press «Right» once to set the type of current signal.
   As 4 -20 mA is preset, no further setting is needed.

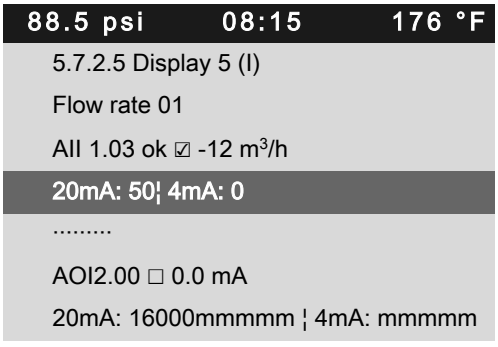
7.10.2.5 Assign a value range to the measurement signal (calibration)

The factory setting is a range from 0-16,000 that represents a signal current between 4–20 mA. This quantity range has to be adapted to represent the measurement range of the sensor of 0–29 cfm.

1. Press «DOWN» once, until *20 mA* is displayed in the active line.
2. Press «Enter» to switch into setting mode.
   Quantity range flashes.



3. Press and hold the «DOWN» key and to set the top of the range to 29.
   The quantity reduces initially in steps of units, then tens, hundreds and finally in thousands.
4. Using this method, reduce the value to 100 and then set to 29 with the «DOWN» key.
5. Press the «Enter» key to accept the value.



6. Set the value for the bottom range (4 mA) to zero accordingly.
   The measured value adjusts to the calibration.

Result The signal value from the sensor can now be displayed in the *<performance data>* menu (see chapter 8.5).

7.10.3 Display additional binary input signals

As well as the defined alarm and warning messages there are 6 further freely selectable input signals that can be used to display messages. A list of the defined alarm and warning messages is provided in chapters 9.2 and 9.5. Information on spare inputs is given in the machine circuit diagram.

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

If an input signal is classified as an alarm the controller enters the alarm state and shuts down the machine when the signal is received.

Overview

Use the *<Configuration ➞ I/O Periphery ➞ External messages>* menu for the configuration:

- Enter the message text
- Assign and activate the input
- Set the time delay
- Set logic
- Assign and activate the output
- Select the message type (operational, alarm, warning)
- Activate the message.

7.10.3.1 Select the < External messages> menu

Precondition: Access level 2 is activated,
The electrical connections are made.

1. In operating mode, switch to the main menu with the «Return» key.
2. Select *< Configuration ➞ I/O periphery ➞ External messages >* (see Section 7.10.1.1)
   The *External messages* menu is displayed.

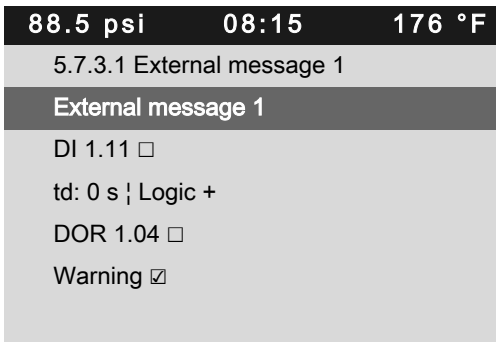
88.5 psi 08:15 176 °F	
5.7.3 External messages	Menu
▸1 External message 1	Active line with external message No. 1
▸2 External message 2	
▸3 External message 3	
▸4 External message 4	
▸5 External message 5	
▸6 External message 6	

7.10.3.2 Enter the message text

External message 1 is shown as example.

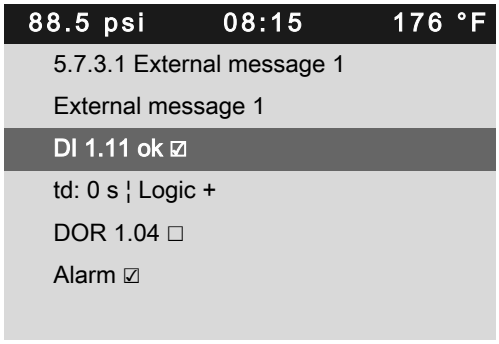
1. Press «Enter».
   External message 1 is displayed as active line.
2. Press «Enter» to switch into setting mode.
   The display of the *character set* flashes.

3. Enter the individual message text.
4. Press «Enter» to accept the setting.



7.10.3.3 Assign and activate the input

1. Press «DOWN» repeatedly until "Input" is displayed as active line.
2. Press «Enter» to switch into setting mode.
   The display of the *input* flashes.
3. Select the input with the «UP» or «DOWN» keys.
4. Press «Enter» to accept the setting.



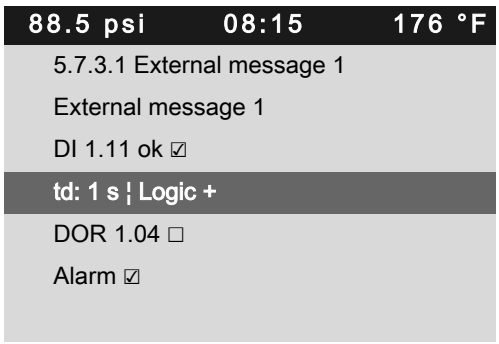
5. Press the «Right» key.
6. Press «Enter» to switch into setting mode.
   Check box flashes.
7. Press «UP» key to activate the check box.
8. Press «Enter» to accept the setting.
   ok is displayed.
   The input is assigned and activated.

7.10.3.4 Set the time delay

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

1. Press «DOWN» once.

2. Press «Enter» to switch into the setting mode for the time delay.
   The *delay time* display flashes.



3. Select the required delay time with the «UP» key.
4. Press «Enter» to accept the setting.

Result The delay time is set.

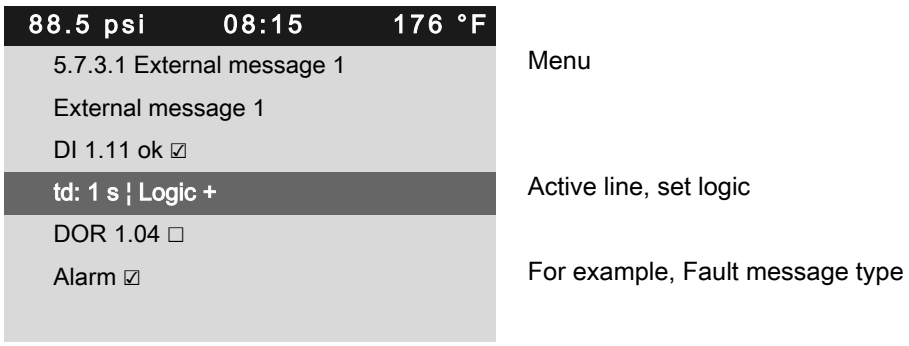
7.10.3.5 Set logic

Possible logic settings

Message at	Symbol
24 V	+
0 V	-

Tab. 66 Logic

1. Press the «Right» key once.
2. Press «Enter» to switch into the logic setting mode.
   The *logic* display flashes.
3. Use «UP» to set the desired behavior, see table 66.

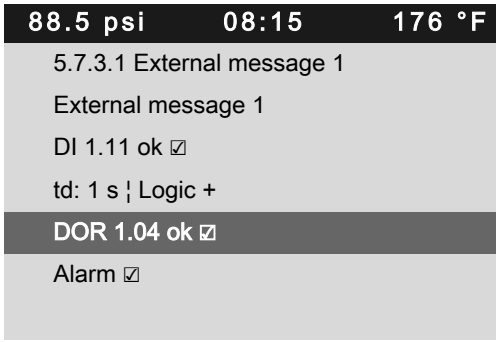


4. Press «Enter» to accept the setting.
   For messages at 24 V, the logic is with the **+** symbol.

7.10.3.6 Assign and activate the output

1. Press «DOWN» repeatedly until "Output" is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The *Output* display flashes.
3. Select the output with the «UP» or «DOWN» keys.

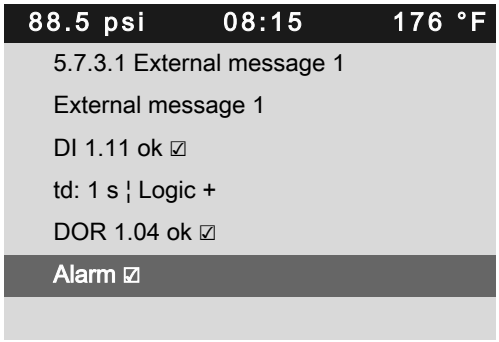
4. Press «Enter» to accept the setting.



5. Press the «Right» key.
6. Press «Enter» to switch into setting mode.
   Check box flashes.
7. Press «UP» key to activate the check box.
8. Press «Enter» to accept the setting.
   ok is displayed.
   The output is assigned and activated.

7.10.3.7 Select the message type (operational, alarm, warning)

1. Press «DOWN» once until message type is displayed as the active line.
2. Press «Enter» to switch into setting mode.
   The display of *message type* flashes.
3. Use «UP» to select the corresponding message type.



4. Press «Enter» to accept the setting.

Result The input signal is available as external message 1 and/or as output.

7.11 Activating remote acknowledgement

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

Acknowledging the message without correcting the cause, however, can lead to machine damage.

The following conditions must be fulfilled:

- The remote acknowledgement and «remote» key are activated.
- A controller input has been assigned for the acknowledgement signal.

Overview

- Enter password level 2
- Select the *< Configuration ➞ Acknowledgement >* menu.
- Setting the remote acknowledgement function.
- Activating the «remote» key.
- Assigning an input.
- Press the «remote» key.

⚠ CAUTION

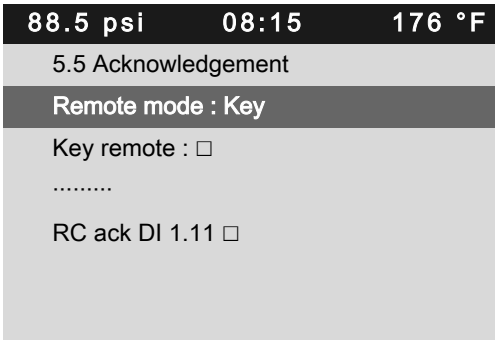
Machine damage can result from acknowledging a fault message without remedying its cause!

➢ *Find the fault and then decide to acknowledge or not.*

7.11.1 Selecting menu <Configuration ➞ Acknowledgement >

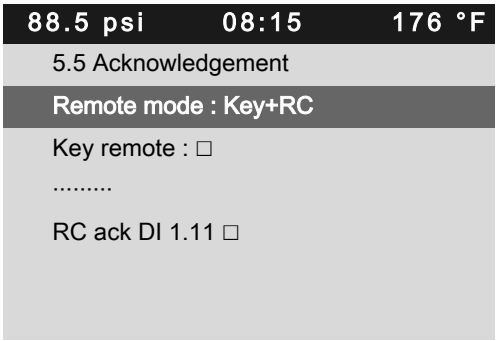
Precondition Access level 2 is activated.

1. In operating mode, switch to the main menu with the «Enter» key.
2. Select the *< Configuration ➞ Acknowledgement >* menu.
   Remote mode line is displayed as being active.



7.11.2 Setting the remote acknowledgement function.

1. Press «Enter» to switch into setting mode.
   Key flashes.
2. Press the «UP» key.
   Key+RC is displayed.

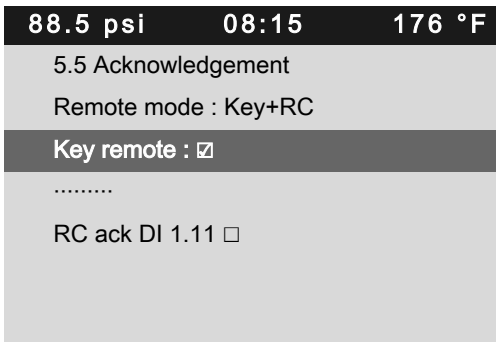


3. Press «Enter» to accept the setting.

Result The remote acknowledgement is now set.

7.11.3 Activating the «remote control» key

1. Press «DOWN» once.
   Key remote is displayed in the active line.
2. Press «Enter» to switch into setting mode.
   The check box for *Key remote* will flash.
3. Press the «UP» key.



Menu

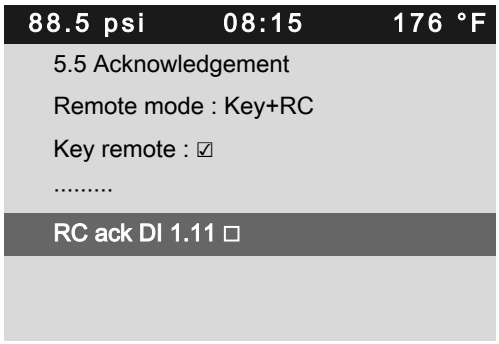
Active line with activated check box for remote key

4. Press «Enter» to accept the setting.

Result The «remote key» is now activated.

7.11.4 Assigning an input.

1. Press «DOWN» repeatedly until the active line is displayed.

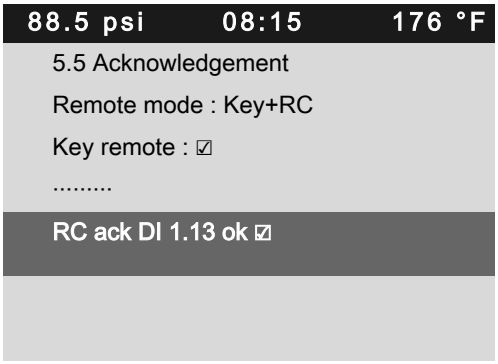


Menu

Active line

2. Press «Enter».
   DI flashes.
3. Use the «UP» key to select the required input.
4. Press «Enter» to accept the setting.
   The input has now been assigned.
5. Press the «Right» key.
6. Press «Enter» to switch into setting mode.
   Check box for analog input flashes.
7. Press the «UP» key.

8. Press «Enter» to accept the setting.
   Display *ok* appears,
   the input is assigned and activated.



Menu

Active line, input for Load RC is assigned and activated.

9. Press the «remote» key to enable remote acknowledgement.

Result Should a warning message occur, it can now be acknowledged from a remote control center.

7.12 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.

The sensor output can be linked in the following ways:

- Via a Profibus link (from a master controller). An input does not have to be assigned.
- Via the USS protocol (from a pressure transducer linked to the frequency converter), assigned to input FC USS.
- Via a pressure transducer connected to SIGMA CONTROL (assignment of an analog input required).
  Characteristics:
  - 4–20 mA
  - 0–232 psi
  - 0–14.5 psi(a) (for Vacuum)

The controller processes the options in the following sequence:

- Profibus value
- Pressure according to the assigned external transducer
- System pressure pNloc, the local system pressure transducer remains activated

Overview

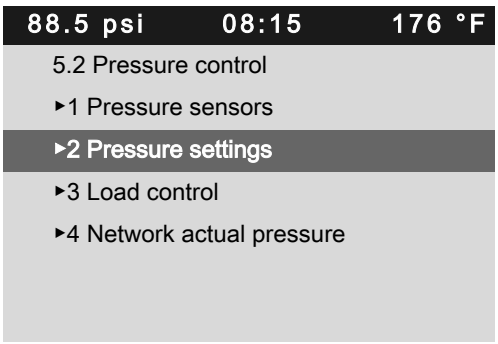
- Enter password level 2
- Select the *< Configuration ➞ Pressure control >* menu.
- Assigning an input.

7.12.1 Selecting menu <Configuration ➞ Pressure control >

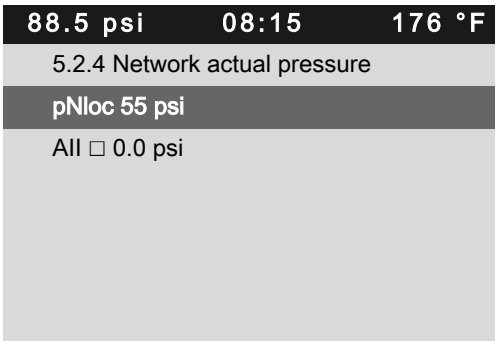
Precondition Access level 2 is activated.

1. In operating mode, switch to the main menu with the «Enter» key.

2. Select the *< Configuration → Pressure control >* menu.
   < Pressure settings > sub-menu line is displayed as being active.

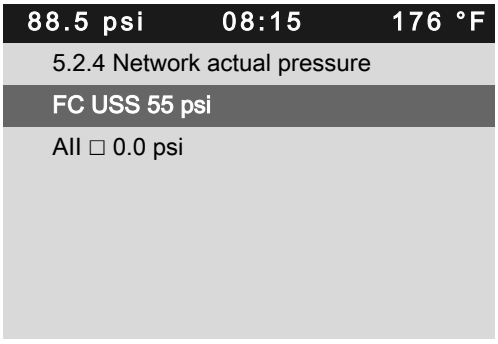


3. Press «DOWN» twice.
   < Network actual pressure > submenu is displayed as being active.
4. Press «Enter».
   The menu *< Network actual pressure >* is displayed.



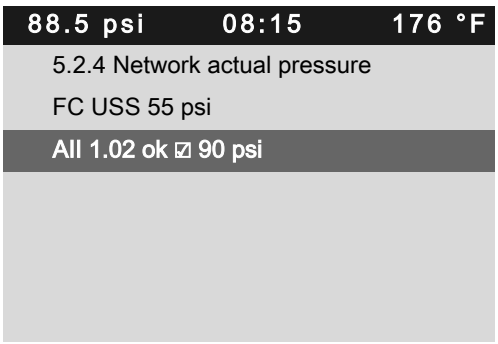
7.12.2 Allocating the input to an external transducer

1. Press «Enter» to switch into setting mode.
   pNloc flashes.
2. Press the «UP» key once.
   Message *FC USS* is displayed.



3. Press «Enter» to accept the setting.
   Input *FC USS* (Measured values via the frequency controller) is shown in the display.
4. Press «DOWN» once.
   Line for input activation is shown in the display.
5. Press the «Right» key.

6. Press «Enter» to switch into setting mode.
   Check box flashes.



Active line (external transducer)

7. Press the «UP» key.
8. Press «Enter» to accept the setting.

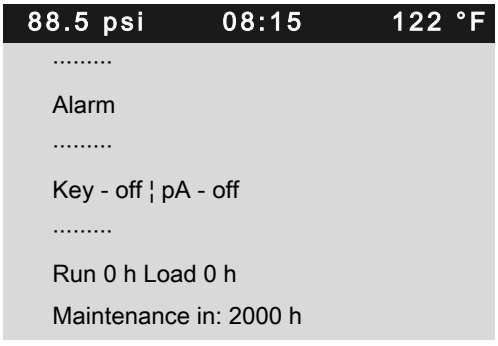
Result The input for the external transducer is now activated.

7.13 Commissioning the machine

Checking the controller settings	Section	Confirmed?
➢ Language correctly set?	7.2.2	
➢ Date and time correct?	7.2.5	
➢ Display format correctly set?	7.2.6	
➢ System pressure set-point correctly set?	7.4	

Tab. 67 Checklist of installation conditions

1. Cover all points in the checklist before starting the machine.
   When power is applied to the machine, the controller boots and carries out a self test.
   The display and LED *controller power* light up.
   The time, the current system pressure, and the airend discharge temperature are then displayed in the first line.



2. Press the «LOAD/IDLE »key.
3. **NOTICE** *Run-up time too short.*
   A run-up time that is too short can damage the machine.
   ➢ *Press the <ON> key and let the machine run for at least 1 minute in IDLE to allow sufficient oil to enter the pressure system.*

4. Press the «ON »key.
5. Press the «LOAD/IDLE »key.

Result The machine switches to LOAD.

8 Operation

8.1 Switching on and off

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

A power supply disconnecting device has been installed by the user.

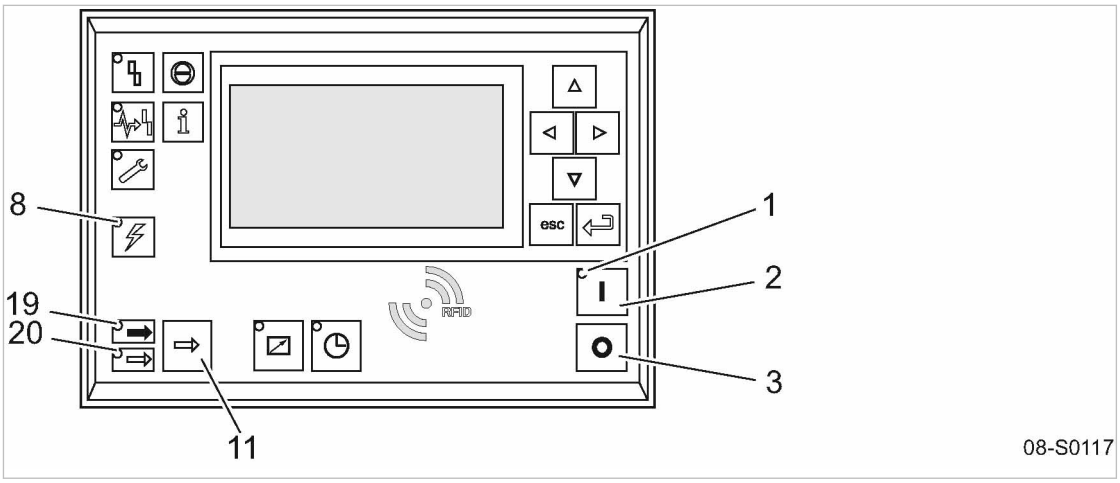


Fig. 27 Switching on and off

1 *Machine ON* LED (green)
2 «ON» key
3 «OFF» key
8 *Control voltage* LED (green)
11 «LOAD/IDLE» toggle key
19 *LOAD* LED
20 *IDLE* LED

8.1.1 Switching on

Precondition No personnel are working on the machine.

All access doors and panels are closed and secure.

1. Switch on the power supply isolating device.
   After the controller has carried out a self-test, the green *Control voltage* LED is lit continuously.
2. Press the «ON »key.
   The green *Machine ON* LED is lit continuously.

If a power failure occurs, the machine is **not** prevented from re-starting automatically when power is resumed.
It can re-start automatically as soon as power is restored.

Result The compressor motor starts as soon as system pressure is lower than the set point pressure (cut-off pressure).

8.1.2 Switching off

1. Press the «LOAD/IDLE »key.
   The machine switches to IDLE and the *IDLE* LED flashes.
2. After allowing the machine to IDLE for 20 seconds, Press the «OFF» key.
   The *Machine ON* LED extinguishes.

3. Press the «LOAD/IDLE »key.
   The *warning* LED extinguishes.
   The machine is ready for further operation. The machine can be re-started.
4. Switch off and lock out the power supply disconnecting device.

Result The *Control voltage* LED extinguishes. The machine is switched off and disconnected from the power supply.

8.1.3 Switching off in an emergency and switching on again

The EMERGENCY STOP push-button is located below the control panel.

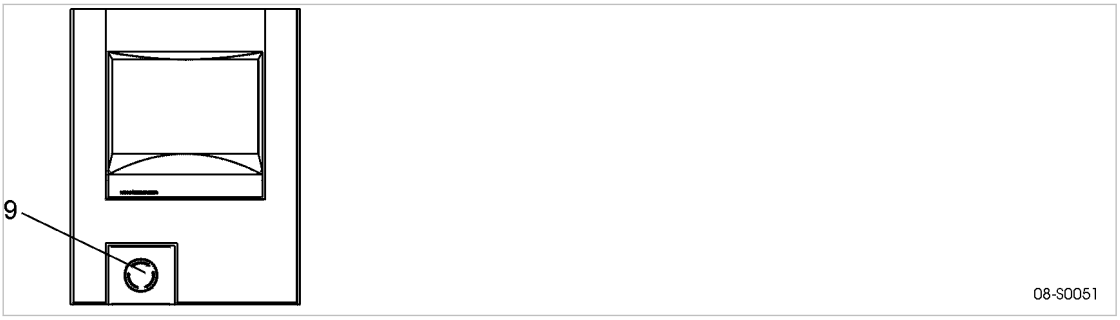


Fig. 28 Switching off in an emergency
[9] EMERGENCY STOP control device:

Switching off

➢ Press the EMERGENCY STOP control device.

Result The EMERGENCY STOP button 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 device in the direction of the arrow to unlatch it.
2. Acknowledge any existing alarm messages.

Result The machine can now be started again.

8.2 Acknowledging alarm and warning messages

The functions for acknowledging alarm and warning messages are not yet implemented.
➢ Ignore any corresponding references to chapter 8.2 in this manual.

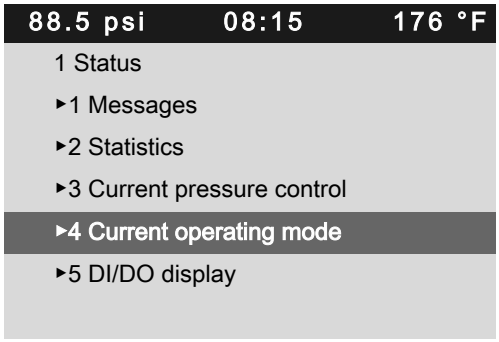
8.3 Displaying the current operating mode

The operating mode is displayed in 4 segments (example):

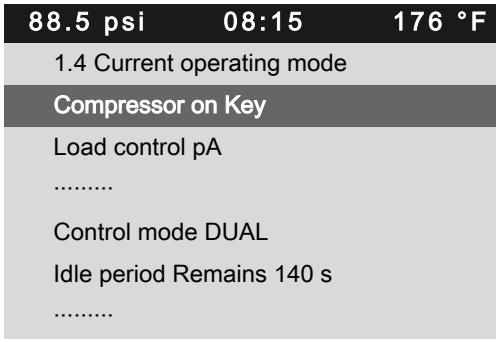
On/off switching via	Machine state	LOAD control via	State of the LOAD control
Key	on	pA	Idle

Tab. 68 Operating mode display

1. In operating mode, switch to the main menu with the «Enter» key.
2. Select *< Status >*.
   The *< Status >* menu is displayed.
3. Press the «DOWN» key repeatedly until *< Current operating mode >* is displayed as the active line.



4. Press «Enter».
   Submenu *< Current operating mode >* is displayed.



Abbreviation of operating modes

Segment	Display	Meaning
On/off switching via	Key	«ON» key on the control panel
	Clock	Internal timer
	RC	Remote contact (external LOAD signal)
	RB	Remote bus (external bus signal)
	cRC	Clock or remote contact (external LOAD signal)
	Holidays	Holidays (see chapter 7.5.2)

Segment	Display	Meaning
Machine state	ON	Switched on
	OFF	Switched off
	Alm	Alarm There is a fault registered
LOAD control via	pA	System setpoint pressure pA
	pB	System setpoint pressure pB
	pE	Raised system pressure pE (at a dubious LOAD signal)
	RC	Remote contact (external LOAD signal)
	RB	Remote bus (external bus signal)
State of the LOAD control	Idle	IDLE
	Load	LOAD
	Ready	Drive motor off and machine ready to operate Drive motor started with air demand
	Off	Drive motor is off

Tab. 69 Possible operating modes

8.4 Adjusting 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 7.4.

8.5 Displaying analog data

The following information can be called up in the *< Performance data >* menu option:

- Local system pressure
- Discharge temperature
  Rate of rise of the airend discharge temperature
- Oil separator differential pressure
- Motor starting temperature
- Temperature SIGMA CONTROL 2 MCS
- Temperature, first I/O module

The data for actual pressure can be displayed in *< Configuration ➞ Pressure control ➞ Network actual pressure >*.

Displaying analog data

Precondition Password level 2 is activated.
The display shows the operating mode.

1. In operating mode, switch to the main menu with the «Enter» key.

2. Select the *< Performance data >* menu.
   A list of *Performance data* is displayed.

88.5 psi 08:15 176 °F	
2 Performance data	Menu
System pressure pNloc 88 psi	Local System pressure pNloc
.....	
ADT T 176 °F	Airend discharge temperature
dT/dt 32 °F /s	Increase airend discharge temperature
Oil separator Δp 32 psi	Oil separator differential pressure
.....	

3. Keep pressing the «DOWN» key to display further *Performance data* settings.

88.5 psi 08:15 176 °F	
2 Performance data	Menu
.....	
Starting temperature 32 °F	Motor temperature
.....	
.....	
MCS T 97 °F	Controller temperature (Main Control System)
First IOM T 32 °F	Temperature, first I/O module

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

8.6 Displaying operating data

The following information can be called up in the *<operating data>* menu option:

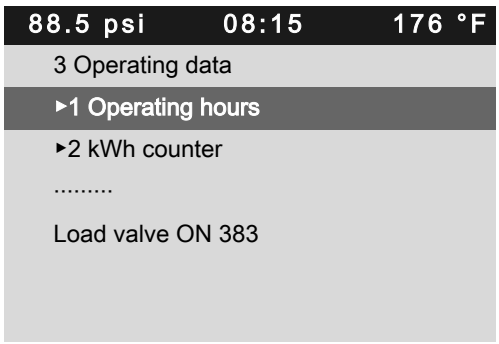
- *<Operating hours>*
  - Compressor: Total machine running time
  - Load run: Machine on-load running time
  - Motor: Motor running time (can be changed)
  - Airend: Airend running time (can be changed)
  - SIGMA CONTROL 2: Controller running time
- Load valve: Total number of activations

Displaying operating data

Precondition Password level 2 is activated.

1. In operating mode, switch to the main menu with the «Enter» key.

2. Select *< Operating data >*.
   The menu *Operating data* is displayed.



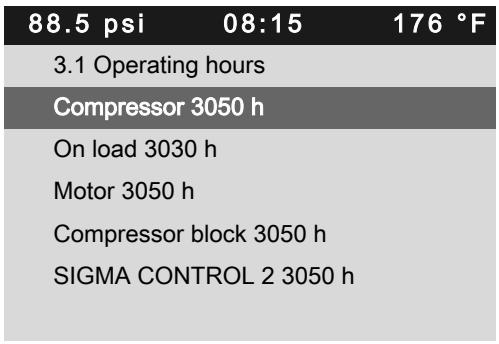
Changing the operating hours

The run times of the motor and airend components can be changed if, for example, a component exchange is required.

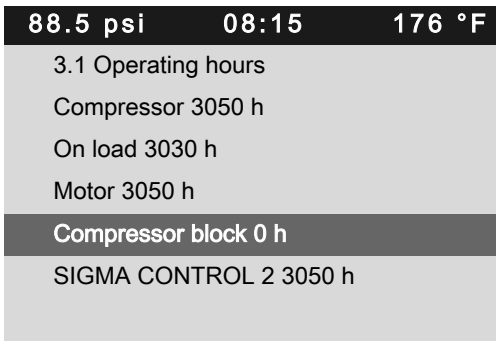
Example: Airend exchange

Precondition Password level 2 is activated.

1. Select the *< Operating data → Operating hours >* menu.
   The menu *Operating hours* is displayed.



2. Press «DOWN» repeatedly until *Compressor block* is displayed as the active line.
3. Press «Enter» to switch into setting mode.
   The runtime value *3050 h* flashes.



4. Use «DOWN» or «Up» to set the value for operating hours to zero.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

Result The operating hours for the new airend have been set to *0 h*.

8.6.1 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.

Messages 0081 to 0095 are customer-specific and undefined. Complete them with your defined message text and interpretation.

Message	Meaning
0001 O Load control pA	The machine is regulated by system set point pressure pA.
0002 O Load control pB	The machine is regulated by system set point pressure pB.
0003 O Load control RC	The machine is regulated via the remote contactor.
0004 O Load control RB	The machine is remotely regulated via the bus connection.
0005 O ready	The machine is switched on and in STANDSTILL operating mode.
0006 O Idle	The machine is switched on and in IDLE operating mode.
0007 O On load	The machine is switched on and in LOAD operating mode.
0008 O off	The machine is switched off. The power supply is connected.
0009 O Compressor on	The machine is switched on.
0010 O Controller on	The power supply is connected. The controller is powered.
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.
0025 O Setpoint pressure pA	The value for pA is output.
0026 O Setpoint pressure pB	The value for pB is output.
0027 O Power OFF → ON	Request: Switch the power supply off and on.
0028 O DYNAMIC motor temperature ↑	Control mode DYNAMIC: The temperature of the compressor motor is too high.

Message	Meaning
0081 O	
0082 O	
0083 O	
0084 O	
0085 O	
0086 O	
0087 O	
0088 O	
0089 O	
0090 O	
0091 O	
0092 O	
0093 O p-Switch pi	
0094 O T-Switch ADT	
0095 O p-Switch pN	

Tab. 70 Operational Messages

8.7 Setting the maintenance interval

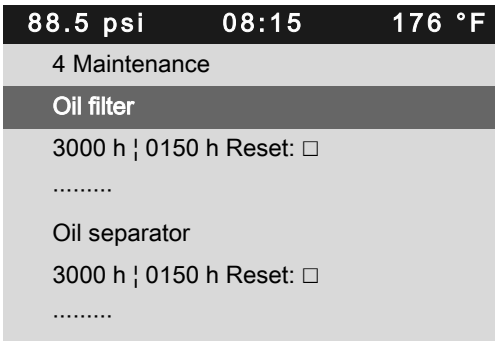
Example: Changing the oil change service interval.

Precondition Password level 2 is activated.

The display shows the operating mode.

Select menu “ Maintenance ”

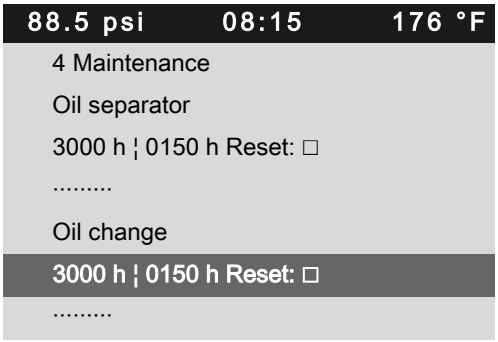
1. Press «Enter».
   The main menu is displayed.
2. Select *< Maintenance >*.
   The maintenance interval “Oil filter” is displayed as the active line.



Active line, description of maintenance interval

Preset interval 3000 h

3. Press «DOWN» repeatedly until the maintenance interval for Oil change is displayed as the active line.



Maintenance interval description

Active line, preset interval

4. Press «Enter» to switch into setting mode.
   Maintenance interval display flashes.
5. Use the «UP» key to set the new value for the maintenance interval.

Simply keep the «UP» key pressed to quickly change the maintenance interval in increments of 10, 100 or 1000.

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

8.8 Safety relief valve checking

Overview

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

When the check mode is activated, monitoring of internal pressure (blow-off protection – if provided) and regulation of network pressure are deactivated.

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

Check box	Status
☑	Activated
☐	Deactivated

Tab. 71 Check box status

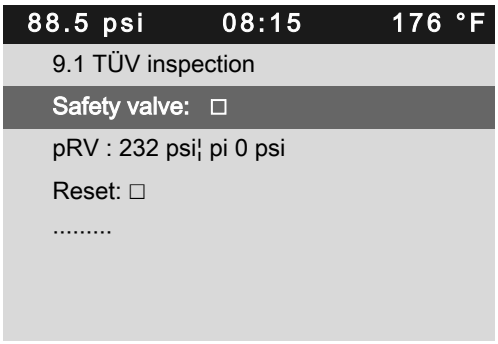
⚠ WARNING

Danger of injury from pressurized components!

➢ *Perform the following actions in the sequence provided.*

Preparing the test

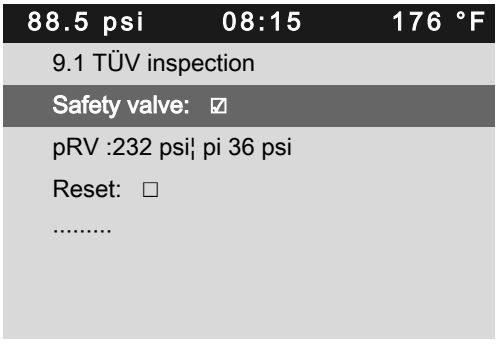
1. Note the activating pressure of the safety relief valve from the machine's nameplate.
2. Press the «OFF» key to shut down the machine.
3. Close the user's shut-off valve between the machine and the air distribution network.
4. Log on to SIGMA CONTROL 2 with access level 2 (see chapter 7.2.4).
5. In operating mode, switch to the main menu with the «Enter» key.
6. Select the *< Machine test ➞ TÜV inspection >* menu.
   Pressure relief valve is displayed as the active line.



Menu
Active line with check box
Relief valve activating pressure (example)

Performing the test

1. Press «Enter» to switch into setting mode.
   The check box flashes in the active line.
2. Use the «UP» key to activate the check box.
3. Press «Enter» to accept the setting.
   The test mode is now activated.
   The monitoring of internal and network setpoint pressures is deactivated!



Menu
Active line with check box
Relief valve activating pressure

4. **⚠ WARNING** *Excessive noise is caused when the safety relief valve blows off!*
   - ➢ *Close all access doors; replace and secure all removable panels.*
   - ➢ *Wear hearing protection.*
5. **⚠ WARNING** *Risk of burns due to released cooling oil and compressed air when blowing off the safety relief valve!*
   - ➢ *Close all access doors; replace and secure all removable panels.*
   - ➢ *Wear eye protection.*
6. Press and hold the «ON» key.
   The machine switches to load, the machine's internal pressure pi rises.
7. Monitor on the display the pressure rise pi during the check.
8. If the internal pressure pi increases to more than 10% above the correct opening pressure of the safety relief valve, shut down the machine with the «OFF» key and replace the safety relief valve.

If the alarm message *pRV ≠* appears, the safety relief valve is defective. The permissible internal pressure was exceeded by 30 psi.

➢ Have the safety relief valve replaced.

Avoid oil mist:

➢ Release the «ON» key immediately when the safety relief valve responds, in order to prevent unnecessary oil mist.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The check box flashes in the active line.
2. Use the «DOWN» key to deactivate the check box.
3. Press «Enter» to accept the setting.
   The test mode is deactivated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.
5. Open the shut-off valve from the machine.

Result The machine is ready for operation.

Resetting

If the test is canceled when opening the safety relief valve, SIGMA CONTROL 2 will indicate the highest measured value as internal pressure.
Activate the check box for reset in order to reset the stored value.

➢ Activate the check box.

8.9 Checking the temperature sensor and overheating shutdown function

The machine should shut down if the airend discharge temperature (ADT) reaches a maximum of 230 °F.
SIGMA CONTROL 2 will simulate a higher temperature for checking this function.

For this purpose, SIGMA CONTROL 2 automatically determines an offset value to be displayed. During the test mode, this is added to the actual airend discharge temperature to cause the machine to shut down prematurely.

In standard operation, SIGMA CONTROL 2 generates the "overtemperature" fault message when the maximum airend discharge temperature is reached. Since the modified test temperature is 4 °F below the fault message switching point for overtemperature, the system will not generate a fault message in test mode.

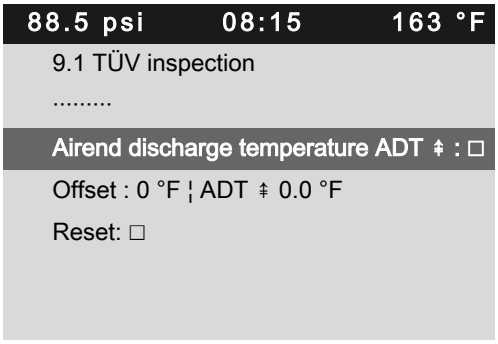
Overview

- Shut down the machine and allow to cool down slightly
- Perform the test
- Correct conclusion of the test
- Resetting

Performing the test

Precondition Machine cooled down by approximately 40 °F

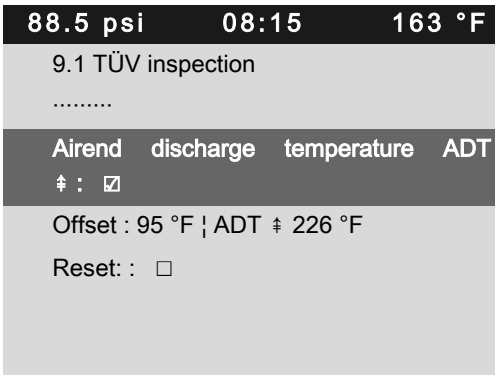
1. Log on to SIGMA CONTROL 2 with password level 2. (see section 7.2.4).
2. In operating mode, switch to the main menu with the «Enter» key.
3. Select the *< Machine test → TÜV inspection >* menu.
   Safety valve is displayed in the active line.
4. Press «DOWN» repeatedly until *Airend discharge temperature ADT ⇞* is displayed as the active line.
5. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.



Fallen airend discharge temperature (163 °F)
Menu
Active line

6. Use the «UP» key to activate the check box.

7. Press «Enter» to accept the setting.
   The *Offset* display changes to *95 °F*.
   The *Airend discharge temperature ADT* ⇞ display changes to *226 °F*.
   The test mode is now activated.



8. Press the «ON» key to switch the machine to LOAD.
   The machine switches to LOAD and the airend discharge temperature rises again.
   The machine will switch off as soon as the airend discharge temperature attains a value of *226 °F*.

The machine does not shut down?

➢ Abort the test and contact KAESER Service as soon as possible.

Correct conclusion of the test

1. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.
2. Use the «DOWN» key to deactivate the check box.
3. Press «Enter» to accept the setting.
   The offset is reset to *32 °F*.
   The test mode is deactivated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.

Resetting

SIGMA CONTROL 2 will display the highest measured value if the test for switching off at overtemperature is aborted.
Activate the check box for reset in order to reset the stored value.

➢ Activate the check box.

9 Fault Recognition and Rectification

9.1 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: red LED flashes - see chapter 9.2.
- Fault on the controller: red LED flashes - see chapter 9.3.
- Warning: yellow LED lights - see chapter 9.5.

The messages valid for your machine are dependent on the controller and individual equipment.

1. Do not attempt fault rectification measures other than those given in this manual!
2. In all other cases:
   Have the fault rectified by an authorized KAESER service representative.

9.2 Interpreting fault messages

Alarm messages are identified with the letter A.

The message numbers are not numbered consecutively.

Messages 0081 to 0095 are customer-specific and may differ from the suggested values. Complete them with your defined message text, possible causes, and remedies.

Message	Possible cause	Remedy
0001 A Direction of rotation	The compressor drive motor is turning in the wrong direction.	Change over phase lines L1 and L2.
0002 A Motor temperature ‡	Compressor drive motor overheated.	Clean the motor. Keep ambient conditions within specified limits.
0003 A pRV ‡	The activating pressure of the safety relief valve on the oil separator tank has been exceeded.	Change the safety relief valve.
0004 A EMERGENCY STOP	EMERGENCY STOP push button actuated.	Unlatch the push button.
0005 A Oil separator Temperature ‡	Maximum air temperature at the oil separator tank outlet is exceeded.	Check the line to the trip relay.
0007 A Mains monitor	Fault in main power supply.	Have the main power supply checked.
0009 A SIGMA CONTROL 2 T‡	Permissible enclosure temperature for SIGMA CONTROL 2 exceeded.	Keep ambient conditions within specified limits. Control cabinet: Check filter mats and fan.
0010 A Blow-off protection ‡	The activating pressure of the safety relief valve on the oil separator tank has been exceeded.	Change the oil separator cartridge. Open the shut-off valve in the venting line.

Message	Possible cause	Remedy
0011 A Oil-/air cooler fan Overcurrent	Overload shut-down of the first 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. Change the oil separator cartridge.
0014 A Oil-/air cooler fan Overcurrent	Overload shut-down of the second 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 Oil-/air cooler fan Overcurrent	Overload shut-down of the third fan motor.	Investigate cause of shut-down. Reset the overload relay.
0019 A Internal pressure pi ‡	–	–
0021 A Refrigeration dryer T ‡	Refrigerated dryer: Compressed air temperature too low.	Contact an authorized KAESER service representative.
0022 A Oil separator Δp ‡	Oil separator cartridge clogged.	Change the oil separator cartridge.
0023 A Motor bearings	Drive motor bearings overheated.	Re-grease the motor bearings.
0024 A Water-cooling water shortage	Cooling water pressure is too low.	Check cooling water supply.
0034 A Mains contactor on?	Main contactor does not close.	Check main contactor and wiring.
0035 A Cabinet fan I ‡	Overload shut-down of the control cabinet fan motor.	Contact an authorized KAESER service representative.
0038 A PD temperature ‡	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0039 A PD temperature ‡	Package discharge (PD) temperature too high.	Check the cooling oil level. Clean the cooler. Check the fan motor.

Message	Possible cause	Remedy
0040 A Mains contactor off?	Main contactor does not open.	Check main contactor and wiring.
0041 A Mains voltage ↕	Second power failure.	Check power supply voltage. Check 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 produces no compressed air. The working pressure does not rise above 50 psi within a default period.	Check the machine for leaks. Check coupling / V-belts
0045 A Compressor T ↓ ↓	Thermostatic valve defective	Contact an authorized KAESER service representative.
0048 A High-voltage cell	Fault in the high voltage cell.	Contact an authorized KAESER service representative.
0051 A Aggregate A	Aggregate A failed.	Contact an authorized KAESER service representative.
0052 A Aggregate B	Aggregate B failed.	Contact an authorized KAESER service representative.
0056 A RD condensate drain	Refrigerated dryer: The condensate drain is defective.	Refrigerated dryer: Check condensate drain and condensate conduits.
0057 A Model?	Compressor model uncertain.	Contact an authorized KAESER service representative.
0058 A Condensate drain	The condensate drain is defective.	Check condensate drain and condensate conduits.
0059 A Back pressure run	Drive belts or coupling broken.	Drive belt: Replace drive belts. Coupling: Contact an authorized KAESER service representative.
0060 A Softstart	Fault in the soft start equipment.	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0061 A Oil separator rise dT/dt ↟	The rate of rise of the airend discharge temperature is too fast.	Check the cooling oil level.
0062 A Refrigeration dryer p ↟	Refrigerated dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ↟	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Contact an authorized KAESER service representative.
0081 A		
0082 A		
0083 A		
0084 A		
0085 A		
0086 A		
0087 A		
0088 A		
0089 A		
0090 A		
0091 A		
0092 A		
0093 A p-Switch pi		
0094 A T-Switch ADT		
0095 A p-Switch pN		
0097 A High-voltage cell on?	High-voltage cell does not activate.	Check high-voltage cell and wiring.
0098 A High-voltage cell off?	High-voltage cell does not deactivate.	Check high-voltage cell and wiring.

Message	Possible cause	Remedy
0099 A Mains contactor on?	Main contactor does not close.	Check main contactor and wiring.
0100 A Mains contactor off?	Main contactor does not open.	Check main contactor and wiring.
0101 A Compressor motor - Overcurrent	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0102 A Oil-/air cooler fan Overcurrent	Overload shut-down of the first fan motor.	Investigate cause of shut-down. Reset the overload relay.
0200 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0201 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0202 A Compressor motor USS alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0205 A Compressor motor USS alarm	Communications error	Check connection and line path.
0210 A Compressor motor FC Motor overload alarm	Frequency converter fault	Contact an authorized KAESER service representative.
0211 A Compressor motor FC Motor overload alarm	Frequency converter fault	Contact an authorized KAESER service representative.

Tab. 72 Fault messages and remedies

9.3 Interpreting system messages

System messages are identified with the letter Y.

The message numbers are not numbered consecutively.

Message	Possible cause	Remedy
0001 Y Hardware watchdog reset	System error	Contact an authorized KAESER service representative.
0002 Y Internal software error	System error	Contact an authorized KAESER service representative.
0003 Y Filesystem Read/Write failure	System error	Contact an authorized KAESER service representative.
0004 Y CPU load too high	System error	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
0005 Y RAM out of memory	System error	Contact an authorized KAESER service representative.
1000 Y RFID error: switch SIGMA CONTROL power supply OFF→ON!	System error	Contact an authorized KAESER service representative.

Tab. 73 System messages and remedies

9.4 Interpreting diagnostic messages

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 representative in troubleshooting.

9.5 Interpreting warning messages

Warning messages are identified with the letter W.

The message numbers are not numbered consecutively.

Messages 0081 to 0092 are customer-specific and may differ from the suggested values. Complete them with your defined message text, possible causes, and remedies.

Message	Possible cause	Remedy
0002 W Motor temperature ↑	Drive motor overheating.	Clean the motor. Keep ambient conditions within specified limits.
0004 W Oil separator Δp ↑	The pressure drop across the oil separator cartridge has risen. Oil separator cartridge clogged.	Change the oil separator cartridge.
0005 W Start inhibit	Too frequent manual on and off switching.	Do not exceed the maximum number of motor switchings per hour when manual on/off switching.
0007 W Motor bearings	Drive motor bearing defective.	Contact an authorized KAESER service representative.
0008 W Airend discharge temperature ADT ↑	Maximum airend discharge temperature will soon be reached.	Clean the cooler. Check the cooling oil level. Replace the oil filter. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0011 W Oil filter Δp ↑	The pressure differential of the oil filter has risen. Oil filter clogged.	Change the oil filter.
0013 W Air filter Δp ↑	Air filter clogged.	Change the air filter element.

Message	Possible cause	Remedy
0015 W Bus alarm	The bus link from the Profibus DP interface is interrupted.	Check bus highway and plug.
0017 W Refrigeration dryer T ↓	Refrigerated dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install a ventilation fan.
0018 W Refrigeration dryer p ↓	Refrigerated dryer: Refrigerant lost; pressure in the refrigerant circuit too low. Inlet pressure switched tripped.	Contact an authorized KAESER service representative.
0025 W Oil separator h ⇞	Oil separator cartridge: Maintenance interval has elapsed.	Change the oil separator cartridge.
0026 W Oil change h ⇞	Cooling oil Maintenance interval has elapsed.	Change the cooling oil.
0027 W Oil filter h ⇞	Oil filter: Maintenance interval has elapsed.	Change the oil filter.
0028 W Air filter h ⇞	Air filter: Maintenance interval has elapsed.	Change the air filter element.
0029 W Valve inspection h ⇞	Valves: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0030 W Belt/coupling inspection h ⇞	Belt tension/coupling: Maintenance interval has elapsed.	Carry out a visual inspection. Re-tension drive belts.
0031 W Motor bearings h ⇞	Motor bearing of compressor motor: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0032 W Electrical equipment h ⇞	Electric components and installation: Maintenance interval has elapsed.	Inspect and reset the maintenance interval counter.
0033 W Fan bearings h ⇞	Motor bearing of fan motors: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0034 W PD temperature ↓	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0035 W PD temperature ↑	Compressed air discharge temperature too high.	Clean the cooler. Check the cooling oil level.

Message	Possible cause	Remedy
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 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 air receiver. Increase the cross-section of piping between compressor and air receiver.
0038 W Blow-off protection ↑	The activating pressure of the safety relief valve will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0041 W Mains voltage ↓	1. Power failure: The machine is automatically restarted.	Check power supply. Check the door interlock switch.
0043 W External load signal?	Ambiguous external load signal: Increased cut-out pressure exceeded. The external load control has not switched to idle (off load).	Check settings of the external controller. Take 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 circulation. Increase room temperature.
0046 W System pressure ↓	Network pressure has fallen below the set “low” value. Air consumption too high.	Check air demand. Check cable runs and sensor connections. Check the “sys.press. low” warning setting.
0047 W No pressure buildup	The compressor cannot build-up to working pressure.	Check for air leaks. Check the value for internal pressure given in the *<analog data>* menu against the reading on the oil separator tank pressure gauge.
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.
0059 W Start temperature ↓ ↓	The airend temperature is too low (<14°F) for the machine to be operated.	Keep ambient conditions within specified limits.

Message	Possible cause	Remedy
0060 W Start temperature ↓	The airend temperature is too low (<+35°F).	Keep ambient conditions within specified limits.
0061 W Compressor T ↓	The airend discharge temperature (ADT) did not reach the minimum value within the specified time.	Contact an authorized KAESER service representative.
0066 W Air filter Δp ⇡	Initial warning: Air filter clogged.	Change the air filter element soon.
0068 W Condensate drain	The condensate drain is defective.	Check the condensate drain and drain line.
0069 W Refrigeration dryer p ↑	Refrigerated dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0070 W Refrigeration dryer T ↑	Refrigerated dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install a ventilation fan.
0071 W Oil level ↓	Cooling oil level too low.	Replenish the cooling oil.
0072 W RD condensate drain	Refrigerated dryer: The condensate drain is defective.	Check the condensate drain.
0081 W		
0082 W		
0083 W		
0084 W		
0085 W		
0086 W		
0087 W		
0088 W		
0089 W		
0090 W		
0091 W		

Message	Possible cause	Remedy
0092 W		
0093 W p-Switch pi		
0094 W T-Switch ADT		
0095 W p-Switch pN		

Tab. 74 Warning messages and remedies

10 Maintenance

10.1 Maintenance Work

The SIGMA CONTROL 2 and the I/O modules are maintenance-free. Use basic safety instructions and safety instructions for working on live components.

11 Spares, Operating Materials, Service

11.1 Note the nameplate

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

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

11.2 KAESER AIR SERVICE

KAESER AIR SERVICE offers:

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

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

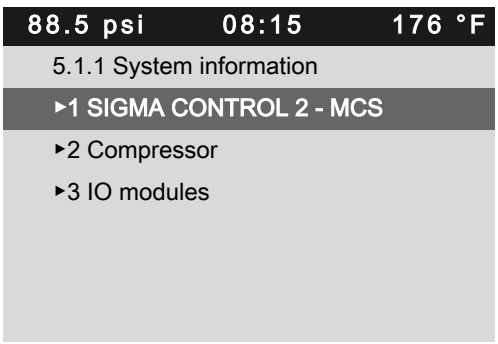
Result Your advantage:
lower costs and higher compressed air availability.

11.3 Service Addresses

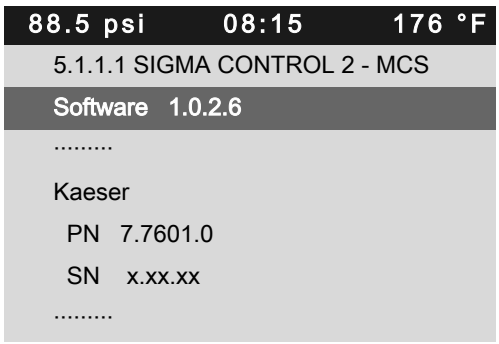
Addresses of KAESER representatives are given at the end of this manual.

11.4 Displaying the version number, machine model, part number, and serial number

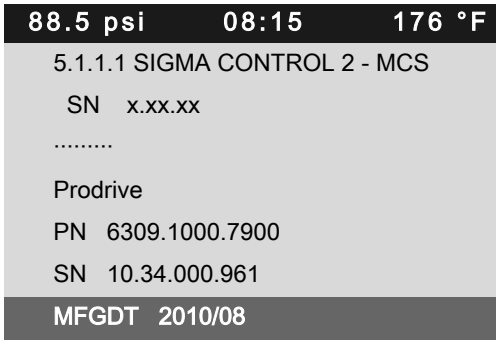
1. In operating mode, switch to the main menu with the «Enter» key.
2. Select the *< Configuration ➞ General ➞ System information >* menu.



3. Press «Enter» to open the submenu.
   The system information is displayed.



4. Keep pressing the «DOWN» key to display further settings.



12 Decommissioning, Storage and Transport

12.1 De-commissioning

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

12.2 Packing

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

12.3 Storage

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

12.4 Transporting

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

12.5 Disposal

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