Service Manual

Controller

SIGMA CONTROL 2 SCREW FLUID 1.0.x.x

No.: 9_9450 00 USE

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Quick user guide

Controller

SIGMA CONTROL 2 SCREW FLUID 1.0.x.x

9_9450 00 USE

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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 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
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.

3 Entering a password

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

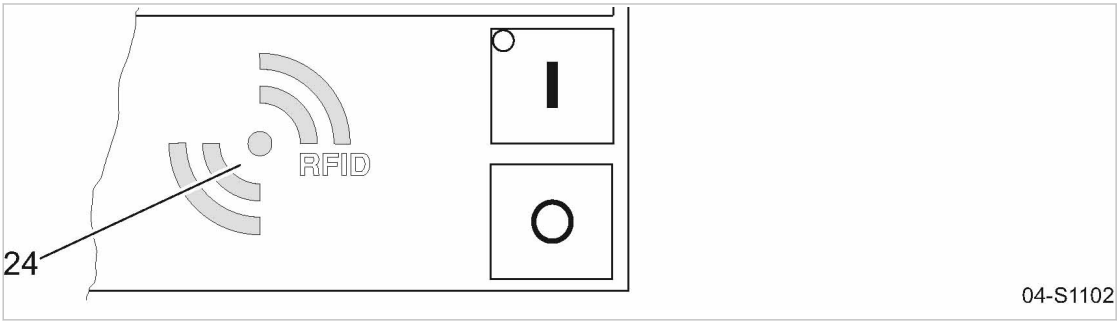


Fig. 1 RFID reader

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.

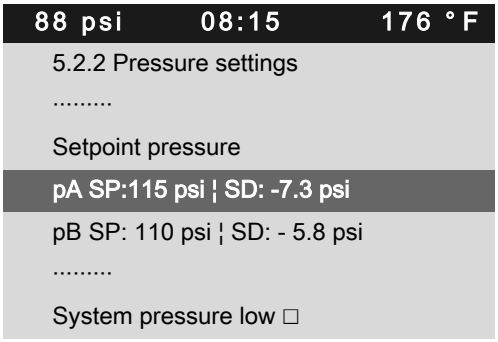
Result The operating mode is displayed. You are logged on.

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

4 Adjusting the system set-point 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 ➞ Pressure control ➞ Pressure settings >* menu.
3. Press «UP» or «DOWN» repeatedly until the switching point *pA* is displayed as active line:



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

Further information
See chapter 7.3 for the adjustment of the machine's pressure parameters.

5 Activating the «Timer» key

Activating/deactivating the check box

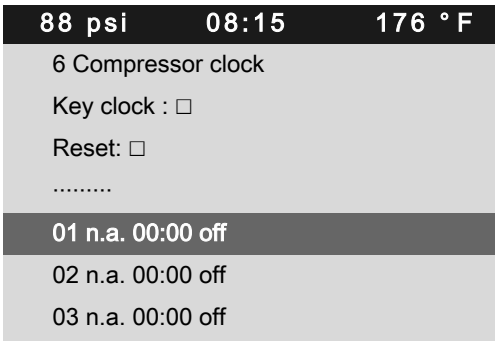
Check box	Check box for Reset	Status
☑	☒	activated
☐	☐	deactivated

Tab. 1 Check box status

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

Selecting the Compressor clock menu

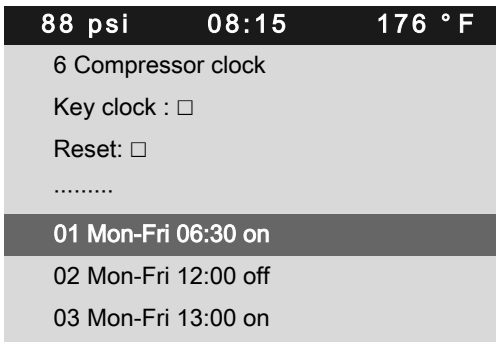
1. Press «Enter».
   The main menu is displayed.
2. Select *< Compressor clock >*.
   The display for setting the Compressor clock timing program appears.



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.
   Time column, 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.
   Time column, minutes 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.

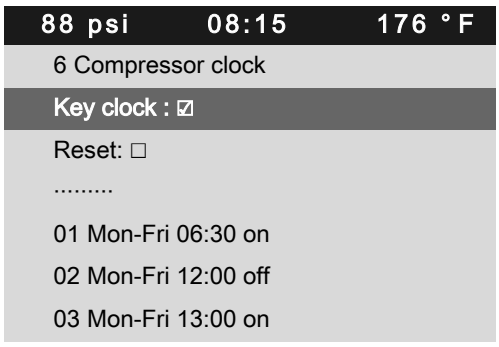


10. Press the «Right» key once.
11. Press «Enter» to switch into setting mode.
    The action *off / on* column flashes.
12. Use «UP» to specify the settings for the Compressor ON action.
13. Press «Enter» to accept the setting.
    The Compressor ON action is set for the first switching point.
14. Specify 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 «Timer» key

1. Use «UP» to move to line *Key clock* .
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.
   The «Timer» key is activated.
5. Press «Escape» repeatedly to return to the main menu.
6. Press the «Timer» key.

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

5 Activating the «Timer» key

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

Further information See chapter 7.4 for the Configuration of starting and stopping the machine.
See chapter 7.6.2 for the Configuration of load changeover based on a timing program.

6 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:

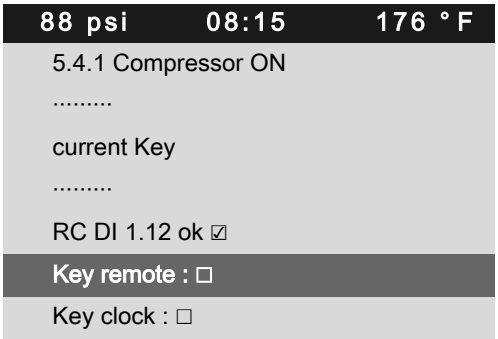
- Menu *< Compressor ON >*
- Menu *< Load control >*

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.

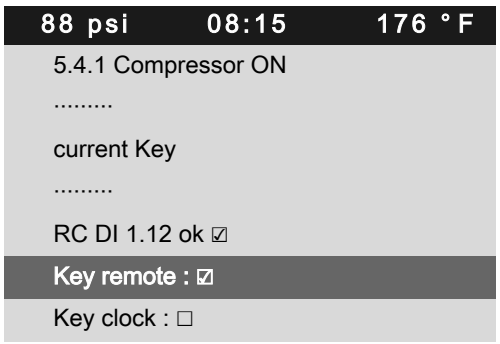
Activating the «Remote control» key in the Compressor ON menu

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 Key remote will flash.



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

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



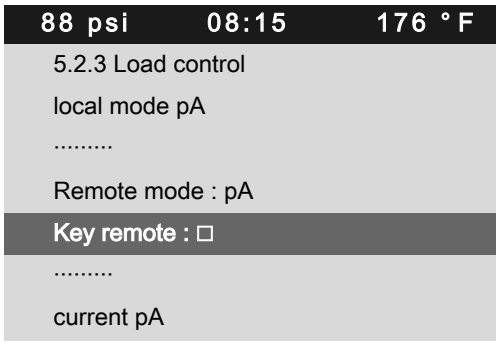
7. Press «Escape» repeatedly to return to the main menu.
8. Press the «Remote control» key to enable Remote mode.

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

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

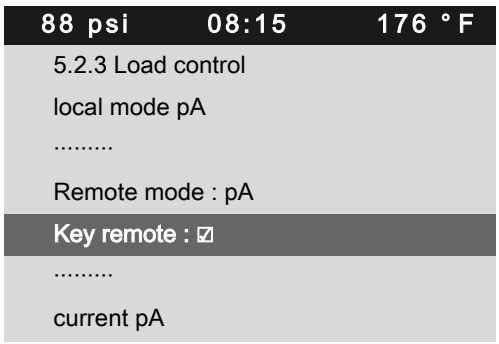
Precondition Password level 2 is activated.
The display shows the operating mode.

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 Key remote will flash.



5. Press «UP».
   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

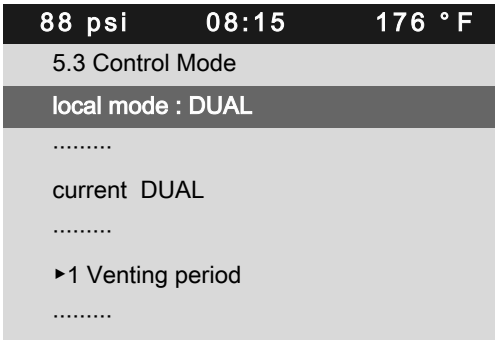
See chapter 7.4 for the Configuration of starting and stopping the machine.
See chapter 7.7 for the Configuration of the load changeover in sequenced mode.

7 Changing the control mode

The standard setting of Control Mode depends on the machine type.

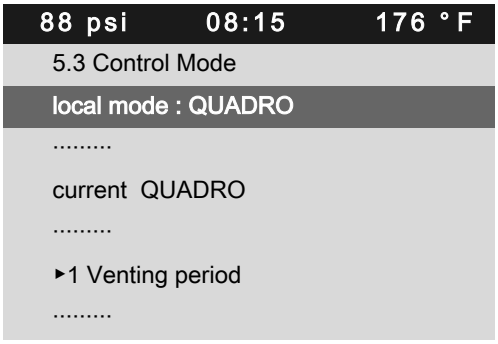
Precondition
Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Control Mode >* menu.
3. Press «UP» repeatedly until *local mode* is displayed as active line.
   The Control Mode setting is shown in the active line.



Current menu
Active line with Control Mode to be adjusted
Current control mode

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



Current menu
Active line with adjusted Control Mode
Current control mode

5. Use «UP» to change the Control Mode QUADRO.
6. Press «Enter» to accept the setting.
   The new Control Mode *QUADRO* is shown in the *current* line.
7. Press «Escape» repeatedly to return to the main menu.

Result
The Control Mode DUAL has been changed to Control Mode QUADRO.

Further information
See chapter 4.6 for the functions of the control modes.
See chapter 7.5 for the Configuration of the control mode parameters.

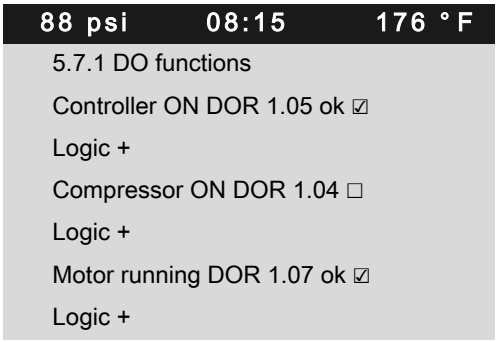
8 Outputting important operational states of the machine

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 optionally available. You can assign every output only once.

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

Configuration ➞ I/O periphery ➞ DO functions menu

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» keys.



Menu

Active line with Controller ON message

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 7.9 for Configuration and use of the controller's inputs and outputs.

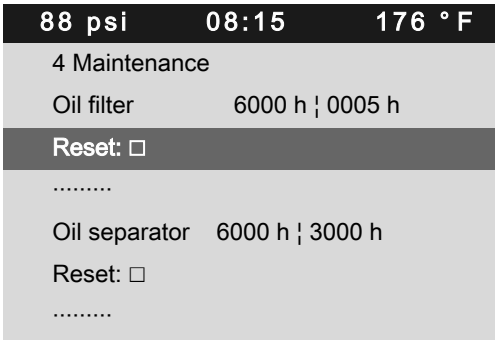
9 Resetting maintenance interval counters

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.

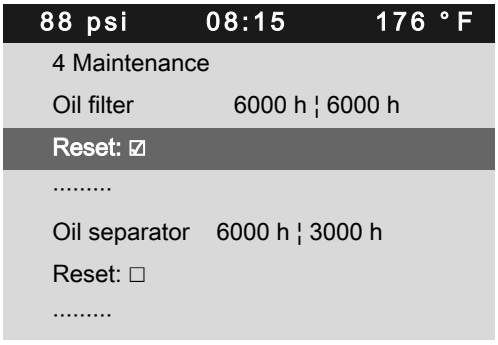
Maintenance menu

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 line is displayed as being active.
4. Press «Enter» to switch into setting mode.
   The check box for *Reset* will flash.



Menu
Maintenance interval ¦ remaining time
Active line

5. Use the «DOWN» key to deactivate 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 6000 h.

Further information
See chapter 8.4 for setting the maintenance intervals.
See chapter 10 for the maintenance of the controller.

10 Testing the safety relief valve

Overview

- Preparing the test
- Performing the test
- Correct conclusion of the test
- Performing a Reset

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

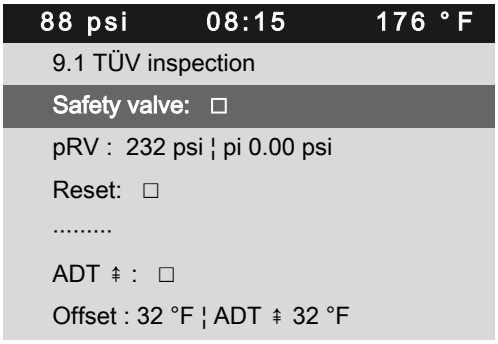
⚠ WARNING

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 password 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 valve line is displayed as being active.



Menu

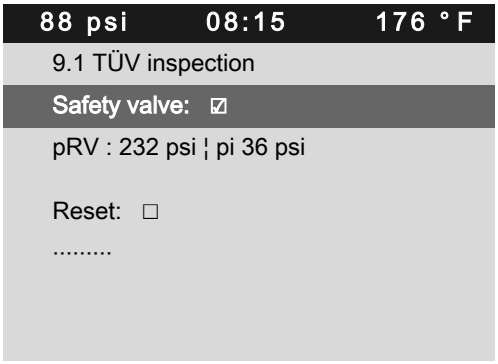
Active line with check box

Safety relief valve activating pressure (example)

Performing the test

1. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.
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

Activating pressure safety relief valve (pRV) ¦ Internal pressure pi (current)

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. Manually monitor on the display the pressure rise pi during the TÜV inspection.
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.
9. Have the Safety valve replaced immediately.

If the alarm message *pRV ≠* appears, the safety relief valve is defective. The permissible internal pressure was exceeded by 29 psi.

- ➢ Have the safety relief valve replaced immediately.

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 "Safety relief valve" test mode is de-activated 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, the internal pressure *pi* will indicate the highest measured value.
Activate the check box for Reset in order to reset the stored value.

➢ Activate the check box for Reset.

Further information — See chapter 8.5 to test the safety relief valve.

11 Checking the temperature sensor and overheating shutdown function

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

For this purpose, SIGMA CONTROL 2 automatically determines an offset value to be displayed. During the test mode, this Offset is added to the actual 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.

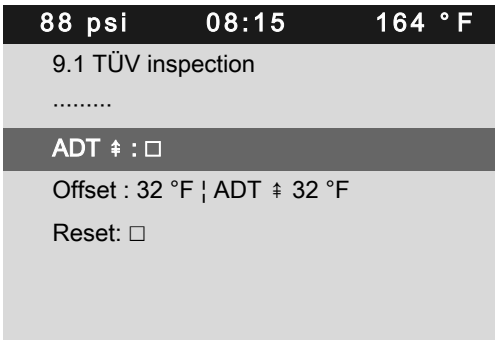
Overview

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

Performing the test

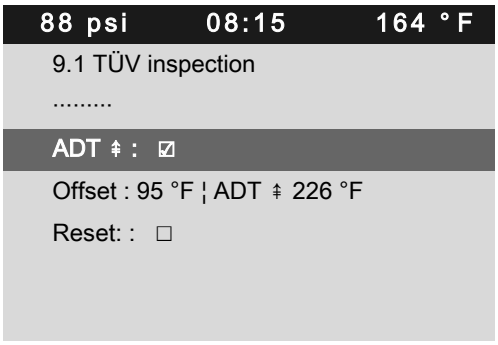
Precondition Machine cooled down by approx. 9 °F

1. Log on to SIGMA CONTROL 2 with access 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 *ADT* ⇞ is displayed as active line.
5. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.



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 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 *ADT* 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 de-activated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.

Resetting

ADT ↕ 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 8.6 for testing the temperature sensor.

12 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 T↑	Control mode DYNAMIC: The temperature of the compressor motor is too high.
0081 O	

Message	Meaning
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

13 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.

14 Interpreting fault messages

Fault 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 T ↟	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 control device actuated.	Unlatch the push-button.
0005 A Oil separator T ↟	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 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 Fan M4 I ↟	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 Motor I ↟	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0014 A Fan M5 I ↟	Overload shut-down of the second fan motor.	Investigate cause of shut-down. Reset the overload relay.

Message	Possible cause	Remedy
0015 A ADT ⇞	Maximum permissible airend discharge temperature (ADT) exceeded.	Keep ambient conditions within specified limits. Clean the cooler. Check the cooling oil level.
0016 A Fan M6 I⇞	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 dp⇞	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 Fan M7 I⇞	Overload shut-down of the control cabinet fan motor.	Contact an authorized KAESER service representative.
0038 A PD T⇞	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0039 A PD T⇞	Package discharge (PD) temperature too high.	Check the cooling oil level. Clean the radiator. 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 ADT dT/dt ⇞	The rate of rise of the airend discharge temperature (ADT) is too fast.	Check the cooling oil level.
0044 A No pressure buildup	The machine does not produce compressed air. The working pressure does not rise above 50 psi within the preset period.	Check the machine for leaks. Check coupling / V-belt.

Message	Possible cause	Remedy
0045 A Compressor T ǂ	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	Refrigeration dryer: The condensate drain is defective.	Refrigeration 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 belt or coupling broken.	Drive belt: Replace drive belt. Coupling: Contact an authorized KAESER service representative.
0060 A Softstart	Fault in the soft start equipment.	Contact an authorized KAESER service representative.
0061 A Oil separator dT/dt ǂ	The rate of rise of the airend discharge temperature is too fast.	Check the cooling oil level.
0062 A Refrigeration dryer p ǂ	Refrigeration dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ǂ	Refrigeration 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		

Message	Possible cause	Remedy
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 Motor I ǂ	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0102 A Fan M4 I ǂ	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.

Message	Possible cause	Remedy
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 Group alarm	Frequency converter fault	Contact an authorized KAESER service representative.

Tab. 5 Fault messages and measures

15 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 T↑	Drive motor overheating.	Clean the motor. Keep ambient conditions within specified limits.
0003 W V-belt tension	Belt tension is too low.	Re-tension drive belt.
0004 W Oil separator dp↑	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 ADT↑	Maximum airend discharge temperature will soon be reached.	Clean the radiator. Check the cooling oil level. Replace the oil filter. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0010 W Buffer battery	Data retention battery is almost discharged.	Change the battery.
0011 W Oil filter Δp↑	The pressure differential of the oil filter has risen. Oil filter clogged.	Change the oil filter.
0012 W Modem problem	SIGMA CONTROL 2 does not recognize modem.	Check the link between the SIGMA CONTROL 2 and the modem.
0013 W Air filter dp↑	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.
0016 W Error: RAM	Internal RAM defective.	Contact an authorized KAESER service representative.
0017 W Refrigeration dryer T↓	Refrigeration dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.

Message	Possible cause	Remedy
0018 W Refrigeration dryer p↓	Refrigeration 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 belt.
0031 W Motor bearing h⇟	Motor bearing of compressor motor: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0032 W Electrical equipment h⇟	Electric components and installation: Maintenance interval has elapsed.	Inspect and reset the maintenance interval counter.
0033 W Fan bearing h⇟	Motor bearing of fan motors: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0034 W PD T↓	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0035 W PD T↑	Compressed air discharge temperature too high.	Clean the radiator. 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 safety relief valve's activating pressure will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0041 W Mains voltage ↓	1. Power failure: The machine is automatically restarted.	Check power supply. 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 T↓	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 T↓ ↓	The airend temperature is too low (<14 °F) for the machine to be operated.	Keep ambient conditions within specified limits.
0060 W Start T↓	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 dp⇡	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↑	Refrigeration 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↑	Refrigeration dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.

Message	Possible cause	Remedy
0071 W Oil level ↓	Cooling oil level too low.	Replenish the cooling oil.
0072 W RD condensate drain	Refrigeration dryer: The condensate drain is defective.	Check condensate drainage
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

16 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 SIGMA CONTROL 2 operating manual

The page http://www.kaeser.com/sc2manual will soon present an updated version of the operating manual in certain languages.

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.

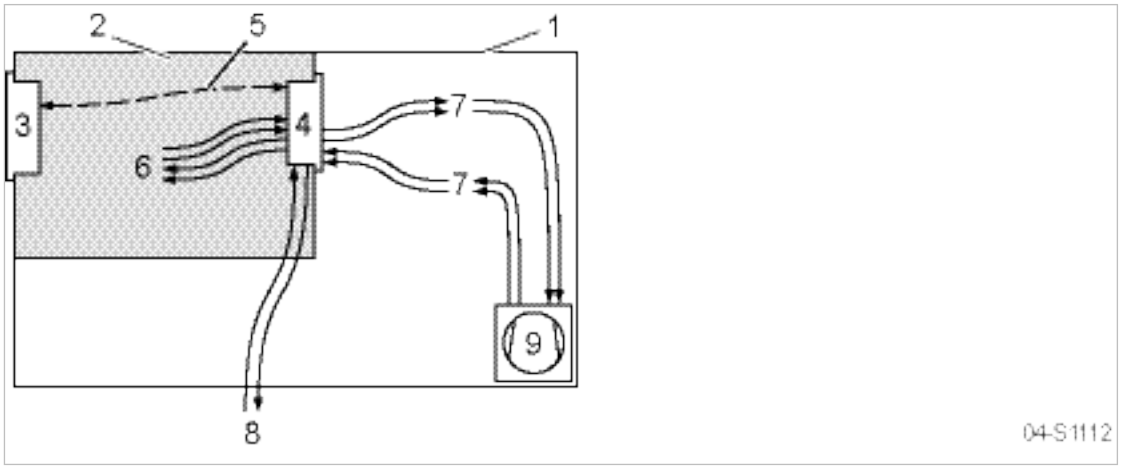


Fig. 2 System structure

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

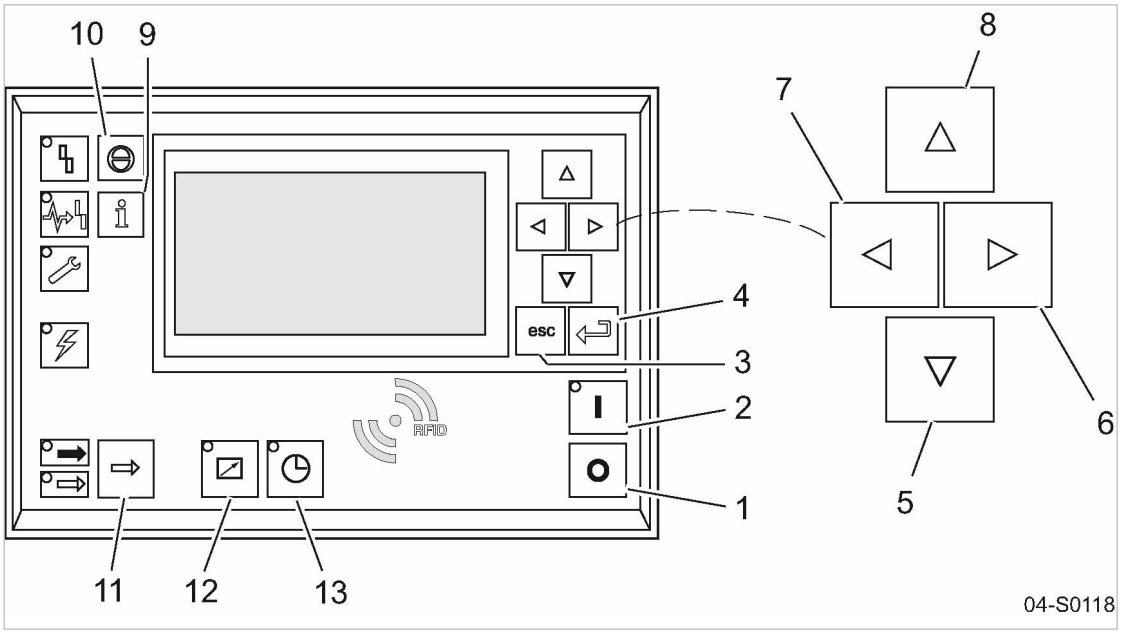


Fig. 3 Keys – overview

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

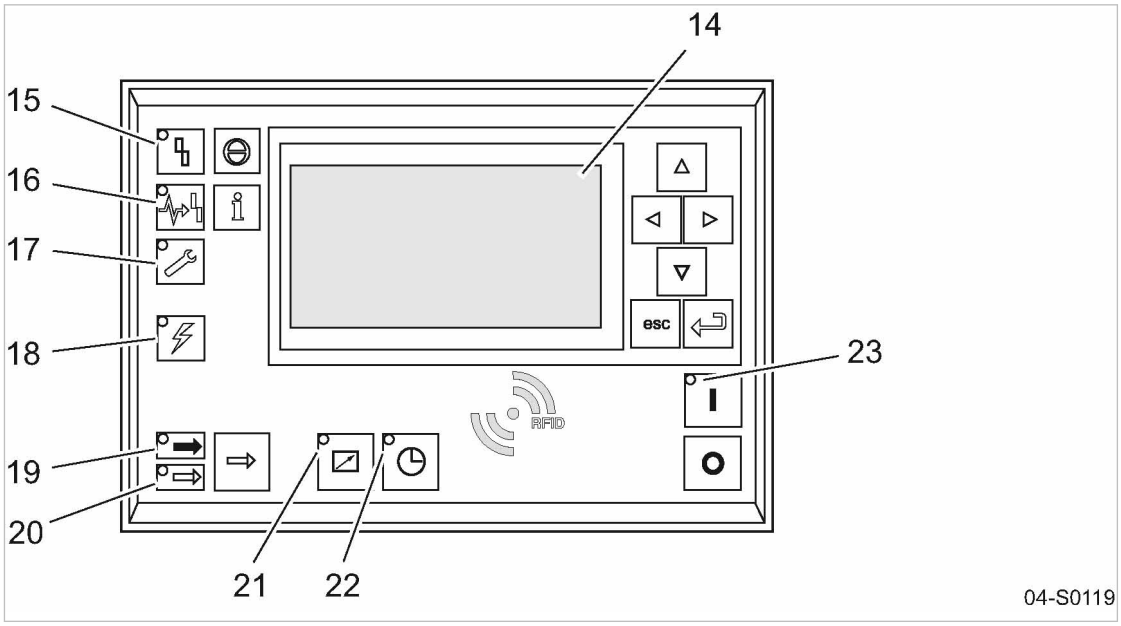


Fig. 4 Indicators

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.)

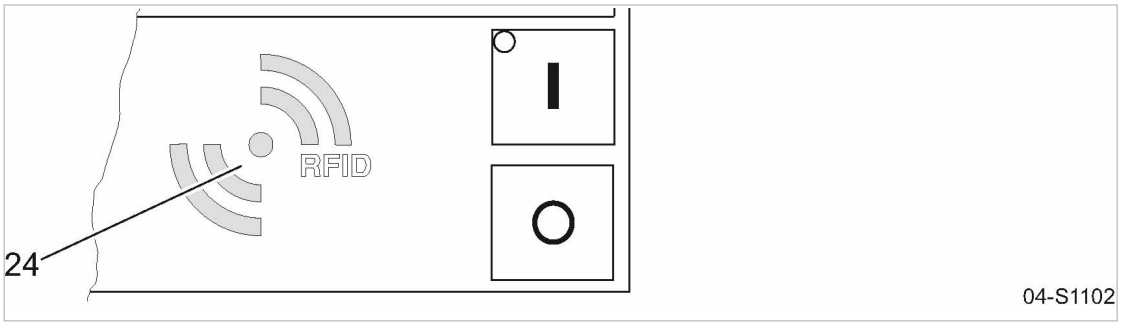


Fig. 5 RFID sensor field

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.

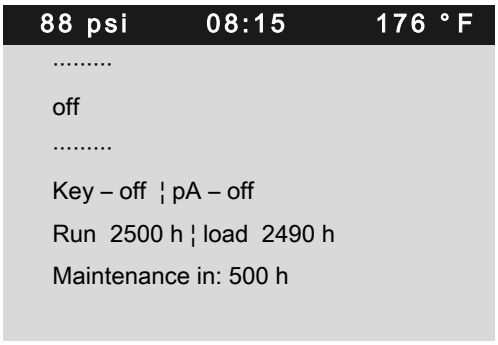
4.3 Display

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

During operation, the display will indicate the operating mode.

Pressing «Enter» or one 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

Line 3: Operational state

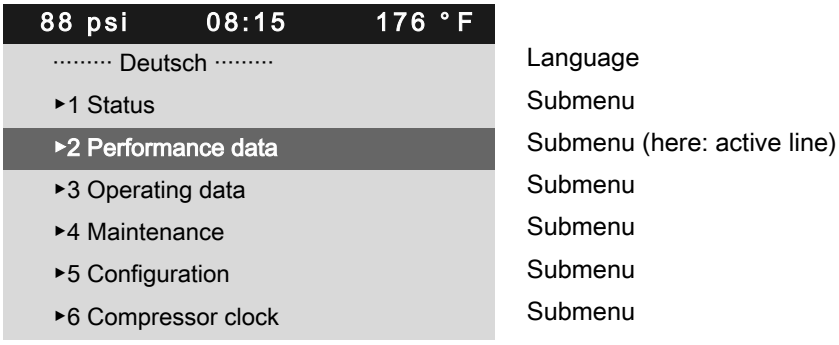
Depending on settings, either the current state of the machine or menu text is shown in line 3.

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 4.5.2.

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 for Reset will flash.
You then press «UP». The check box is activated and flashes.
Press «Enter» to save the settings.
The parameters no longer flash and are reset. The check box for Reset is again deactivated.

Check boxes for Reset	Status
☒	activated

Check boxes for 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 Menus – overview

4.5.1 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:	

Material number and serial number of the machine
Equipment number of the machine

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

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

88 psi	08:15	176 °F
.....		
off		
.....		
Key – off ¦ pA – 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 «Timer»
- Value for 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.

4.5.2 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	■ 1.1 Messages – Status report – current Warnings current Alarms ■ 1.2 Statistics ■ 1.3 Current pressure control ■ 1.4 Current operating mode For details of the *< Status >* menu, see table 29 “Status menu”.
2 Performance data	Display of the following Performance data : ■ System pressure pNloc ■ Internal pressure pi ■ ADT ■ Oil separator ■ Starting temperature ■ Motor temperature ■ MCS Temperature ■ First IOM ..... Sixth IOM
3 Operating data	■ Load valve ON
	■ 3.1 Operating hours – Compressor – ON LOAD – Motor – Compressor block – SIGMA CONTROL 2
4 Maintenance	■ Oil filter ■ Oil separator ■ Oil change ■ Air filter ■ Valve inspection ■ Belt/coupling inspection ■ Bearing lube ■ Motor bearings ■ Fan bearing ■ Electrical equipment
5 Configuration	For details of the *< Configuration >* menu, see table 30 “Configuration menu”.
6 Compressor clock	Entering weekdays and times: ■ Switching points 01 10

Navigation	Function/submenu
7 User	■ Name Password: ■ Current access level:
8 Communication	■ 8.1 Ethernet ■ 8.2 Com-Module
	■ Key remote For details of the *< Communication >* menu, see table 33 “Communication menu”.
9 Machine test	■ 9.1 TÜV inspection
10 Components	■ 10.1 Compressor motor – 10.1.1 Power switching For details of the *< Components >* menu, see table 35 “Components menu”.

Tab. 28 Menu structure

4.5.2.1 Menu: 1 Status

Navigation	Function/submenu
1.1 Messages	■ 1.1.1 Current messages ■ 1.1.2 Message history – 1.1.2.1 Compressor messages – 1.1.2.2 Diagnostic messages – 1.1.2.3 System messages
1.2 Statistics	■ Load overall ■ Pressure actual value pNloc ■ Internal pressure ■ Motor starts ■ Motor starts /d ■ Motor starts /h ■ Motor starts T↓ ■ Last load run ■ Last idle run ■ Last motor OFF
1.3 Current pressure control	■ Cut-out press. ■ Pressure actual value ■ Setpoint pressure

Navigation	Function/submenu
1.4 Current operating mode	■ Compressor ON Load control ■ Control Mode Idle period ■ Acknowledgement

Tab. 29 Menu Status

4.5.2.2 Menu: 5 Configuration

Navigation	Function/submenu
5.1 General	■ Model ■ Time ■ Date format ■ Time format ■ Unit of pressure ■ Temperature unit
	5.1.1 System information ■ Compressor – Part number – Serial number – Equipment number ■ SIGMA CONTROL 2 MCS – Part number – Serial number – Software
5.2 Pressure control	■ 5.2.1 Pressure sensors ■ 5.2.2 Pressure settings ■ 5.2.3 Load control ■ 5.2.4 Pressure actual value For details of the *< Pressure control >* menu, see table 31 “Pressure control menu”.
5.3 Control Mode	■ Dryer
	■ 5.3.1 Venting period ■ 5.3.3 DUAL ■ 5.3.4 QUADRO
5.4 Compressor start	■ Autostart
	■ 5.4.1 Compressor ON ■ 5.4.2 Compressor OFF ■ Back pressure

Navigation	Function/submenu
5.5 Acknowledgement	■ Remote mode ■ Key remote ■ current ■ RC ack
5.6 ADT	■ AIR 1.00 ■ Conductor correction: ■ ADT rise dT/dt
	■ 5.6.1 T-Switch ADT
5.7 I/O periphery	■ 5.7.1 DO functions ■ 5.7.2 Quantities ■ 5.7.3 External messages For details of the *< I/O periphery >* menu, see table 32 “I/O periphery menu”.

Tab. 30 Menu Configuration

Menu: 5.2 Pressure control

Navigation	Function/submenu
5.2.1 Pressure sensors	■ System pressure pNloc ■ AII 1.00 ■ AOI2.00 ■ Internal pressure pi ■ AII 1.01 ■ AOI2.00
	■ 5.2.1.1 p-Switch pN ■ 5.2.1.2 p-Switch pi
5.2.2 Pressure settings	■ pRV ■ Pressure rise ■ Nominal pressure ■ Setpoint pressure pA ■ Setpoint pressure pB ■ System pressure low ■ Cut-in pressure min
5.2.3 Load control	■ local mode ■ Remote mode ■ Key remote ■ pA/pB cycle ■ pA/pB RC ■ loc.-loadRC ■ Key idle

Navigation	Function/submenu
5.2.4 Pressure actual value	■ Pressure actual value pNloc ■ AII 1.02 ■ current pNloc

Tab. 31 Menu Pressure control

Menu: 5.7 I/O periphery

Navigation	Function/submenu
5.7.1 DO functions	■ Controller ON ■ Compressor ON ■ Motor running ■ IDLE ■ ON LOAD ■ Group alarm ■ Group warning ■ Remote mode ■ Clock active ■ EMERGENCY STOP
	■ 5.7.1.1 Clock contact – Switching points 01 10
5.7.2 Quantities	■ Display 1 (p), Display 2 (p) ■ Display 3 (T), Display 4 (T) ■ Display 5 (I), Display 6 (I)
5.7.3 External messages	■ External message 1 ..... External message 6

Tab. 32 Menu I/O periphery

4.5.2.3 Menu: 8 Communication

Navigation	Function/submenu
8.1 Ethernet	■ 8.1.1 IP configuration – IP address – Subnet mask – Gateway – DNS Server 1 – DNS Server 2
	■ 8.1.2 Connections – 8.1.2.1 SIGMA CONTROL 2 For details of the *< SIGMA CONTROL 2 >* menu, see table 34 “SIGMA CONTROL 2 menu”.
	■ 8.1.2 Connections – Restart – Timeout – Cycle time
	■ 8.1.3 E-mail – active: – Compressor number: – Sender address: – Sender name: – Contact telephone: – Receiver address: – SMTP Server: – User name: – Port – Interval time
8.2 Com-Module	■ 8.2.1 PROFIBUS – Status Run – Start Com-Module: Slave no.: – Bus alarm Start td: Timeout: ■ 8.2.2 MODBUS – Status Run – Start Com-Module: Slave no.: – Bus alarm Start td: Timeout:

Tab. 33 Menu Communication

4.5.2.4 Menu: 8.1.2.1 SIGMA CONTROL 2

Navigation	Function/submenu
8.1.2.1 SIGMA CONTROL 2	■ Mode: ■ Port ■ Communication partner IP address

Tab. 34 Menu SIGMA CONTROL 2

4.5.2.5 Menu: 10 Components

Navigation	Function/submenu
10.1 Compressor motor	■ 10.1.1 Power switching – 10.1.1.1 Star-delta start – 10.1.1.2 DOL start – 10.1.1.3 High-voltage cell – 10.1.1.4 SFC USS Micromaster – 10.1.1.5 SFC USS Sinamics

Tab. 35 Menu Components

4.6 Operating modes and control modes

4.6.1 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.

4.6.2 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. 36 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.

4.6.3 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.

4.7 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. 37 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. 38 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. 39 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: Matching the pressure parameters of the machine and possible modules

7.4: Configuring machine start and stop

7.5: Activating and setting up the control modes

7.6: Configuring the machine for local mode

7.7: Configuring the machine for master control

7.8: Configuring e-mail

7.9: Configuring input and output signals

7.10: Configuring the compressed air outlet temperature

7.11: Activating remote acknowledgement

7.12: Linking to an external pressure transducer

7.13: Activating the energy-saving mode for the refrigeration dryer

7.14: 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: Creating additional user names
- 7.2.6: Setting up time and date
- 7.2.7: Setting display formats (date, time, units of pressure and temperature)
- 7.2.8: Activating summer/winter time
- 7.3.3: Activating/deactivating the «IDLE» key

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 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 instance.
5. Press «UP» repeatedly until *General* is displayed as active line.
6. Press «Enter».
   The current menu is the *< General >* submenu in the *< Configuration >* menu.
7. Use the «DOWN» or «UP» keys to select a menu option in the *< General >* submenu, *< System information >* for instance.

7.2.2 Changing the display language

The controller can display text messages in the following languages:

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

Tab. 40 Language diversity

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 «UP» repeatedly until the specified language is displayed as 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.

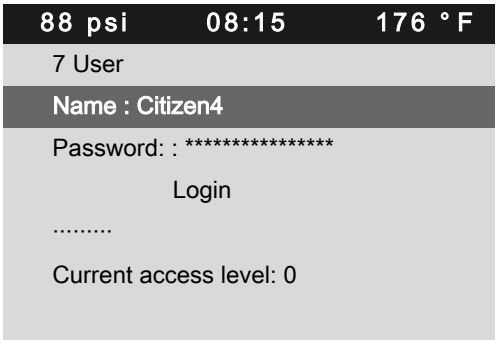
The Equipment Card is damaged or lost.
➢ Manually enter the user name and password (see also the following chapter).

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 «DOWN» 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.

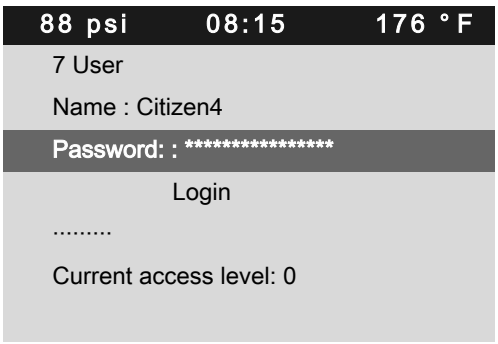
Result The user name is entered in full.

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.



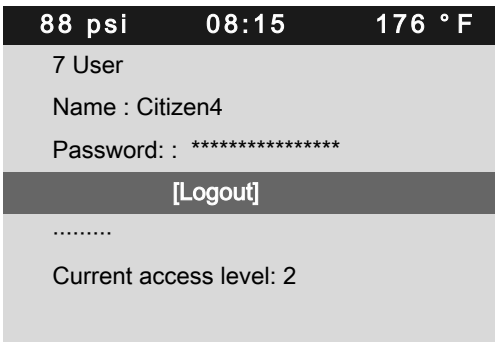
3. Repeatedly press «DOWN» or «UP» until the requested character is displayed.
4. Press the «Right» key.
   The cursor jumps to the next position.
5. Complete the remaining characters of the password.
6. Press the «Right» key.
7. Press «Enter» to accept the settings.

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 Creating additional user names

In order to change passwords or to create new users, you require a PC application (remote HMI). Use the Equipment Card to quickly and easily check the advanced access rights to the SIGMA CONTROL 2.

➢ Preferably use the Equipment Card.

7.2.6 Checking/setting time and date

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

Checking and setting 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 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 7.2.1).

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

7.2.7 Setting display formats

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

Setting the date format

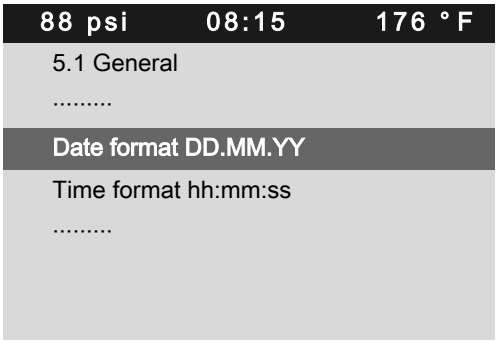
Select your preferred format.

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

Tab. 41 Date format

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 active line.



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

Setting the time format

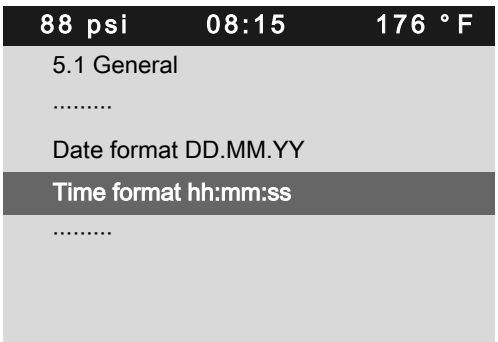
Select your preferred format for the time display:

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. 42 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 active line.



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

Setting the pressure display units

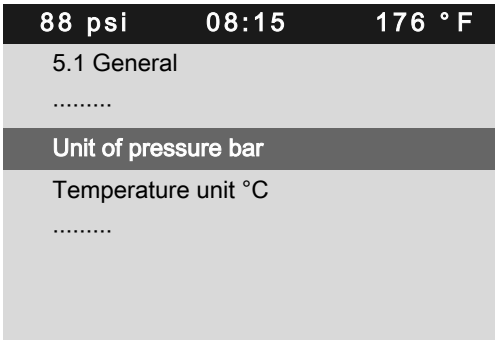
Select your preferred display of the pressure unit:

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. 43 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 *Unit of pressure* is displayed as active line.



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

Setting the temperature display units

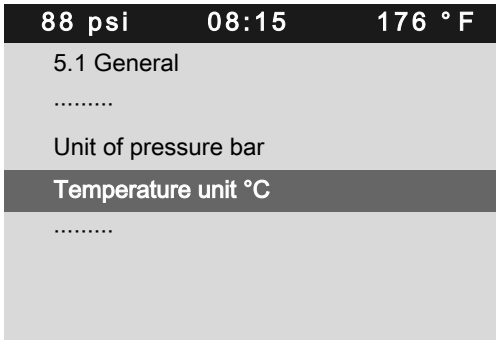
Select your preferred display of the temperature unit:

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

Tab. 44 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 active line.



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

7.2.8 Setting and activating summer/winter time

The functions for summer/winter time are not yet implemented.

➢ Ignore any corresponding references to chapter 7.2.8 in this manual.

7.3 Pressure parameters of the machine

This chapter contains information on the display and configuration of all the machine pressure parameters and is divided into the following sections:

- 7.3.1: Displaying pressure parameters
- 7.3.2: 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 safety relief valve on the oil separator tank
pE	Pressure increase Setting: ■ pE SP: Switching point pE; upper safety limit for machine maximum pressure; in an external LOAD control, this value is used to switch the machine from LOAD to IDLE. ■ pE SD: Switching differential pE

Parameter	Explanation
dpFC	Limiting value for machines with frequency-controlled drive (SFC). Setting: ■ dpFC Limit for minimum delivery. If this value is exceeded [Setpoint pressure switching point + dpFC], the compressor switches from LOAD to IDLE.
Nominal pressure	Display: The compressor is designed for this pressure (maximum system pressure set-point)
Setpoint pressure	The Setpoint pressure can be regulated to two different 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 can be displayed when the limiting value System pressure low is reached. Setting: ■ BeSD: Switching differential System pressure low, SP: Switching point System pressure low ■ Optional warning message: no message, Warning message displayed or an additional output signal is sent, e.g., to a control centre
Cut-in pressure min	Display: For design reasons, pressure can only be built up above this value.

Tab. 45 Compressor pressure parameters

➢ Parameters correspond to the following specifications

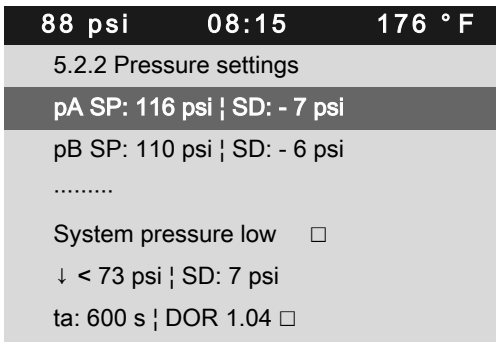
7.3.1 Displaying pressure parameters

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

Opening the menu for pressure parameters

1. Press «DOWN» or «UP» repeatedly until *Pressure settings* is displayed as active line.

2. Press «Enter».
   The system displays the pressure parameters.

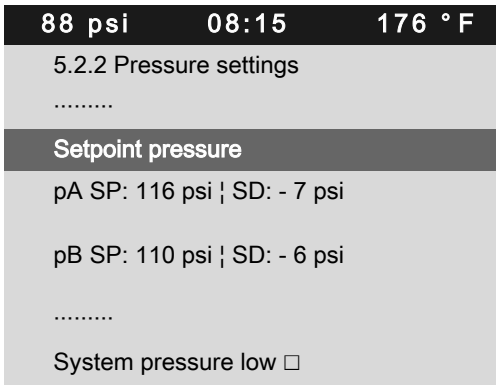


Menu

Active line

Displaying compressor parameters

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



Menu

Active line

current Setpoint pressure pA and switching differential

current Setpoint pressure pB and switching differential

2. Display further parameters with «UP» and «DOWN».

7.3.2 Configuring the pressure parameters for compressors

7.3.2.1 Adjusting system set-point 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. 46 Setting limits for system set-point pressure (* Cut-in pressure min)

The machine switches to LOAD under the following condition:

System pressure ≤ SP: pA /pB - switching differential

Tab. 47 Pressure condition for LOAD

The machine switches to IDLE under the following condition:

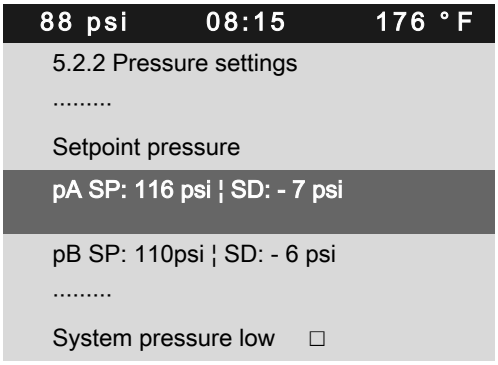
System pressure = Setpoint pressure

Tab. 48 Pressure condition for IDLE

Precondition Password level 2 is activated.

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.3.1)

2. Press «UP» or «DOWN» repeatedly until the following is displayed as active line:



Menu

Active line with current value for Setpoint pressure pA

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

Result The settings for Setpoint pressure pA and pB are adjusted.

7.3.2.2 Adjusting the value for "System pressure low"

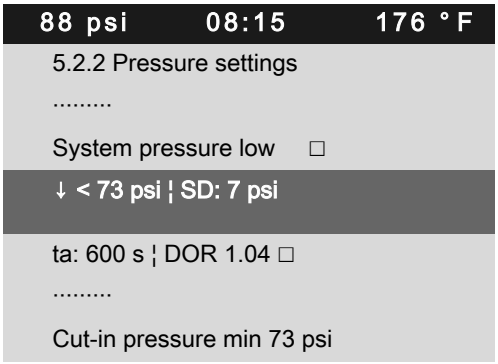
If the system pressure falls to the "System pressure low" value, SIGMA CONTROL 2 will display a warning message for the system pressure being too low.
The switching differential influences the pressure at which the message can be acknowledged or the optionally activated output will again switch:

Message	Output
73 psi Message coming	active
80 psi Message going	inactive

Tab. 49 Example: Activated output

Precondition Password level 2 is activated.

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.3.1)
2. Press the «DOWN» key repeatedly until the following is displayed as 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.

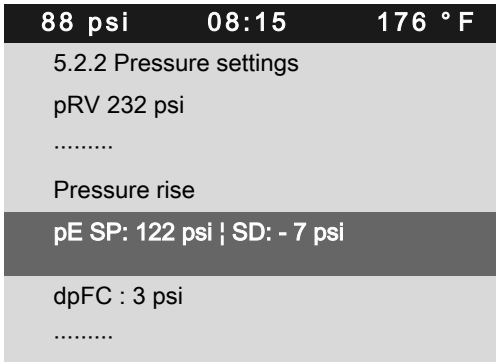
7.3.2.3 Adjusting pressure rise pE

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 *External load signal?* is triggered.

Precondition Password level 2 is activated.

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.3.1)
2. Press the «DOWN» key repeatedly until the following is displayed as 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.

7.3.2.4 Adjusting pressure rise in frequency-controlled machines (SFC)

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

This value can be between 3 psi and 6 psi. The factory setting is 3 psi.

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

Precondition Password level 2 is activated.

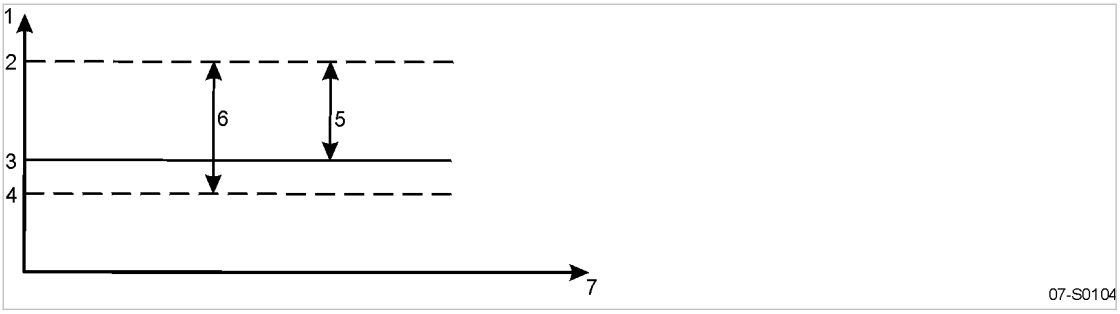


Fig. 6 Pressure rise in frequency-controlled machines

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

1. Select *< Configuration ➞ Pressure control ➞ Pressure settings >* (see Section 7.3.1)
2. Press «DOWN» repeatedly until the following is displayed:

88 psi 08:15 176 °F	
5.2.2 Pressure settings	Menu
Pressure rise	
pE SP: 122 psi ¦ SD: - 7 psi	Pressure increase
dpFC : 3 psi	Active line with pressure increase value dpFC
.....	
Nominal pressure 116 psi	
.....	

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.

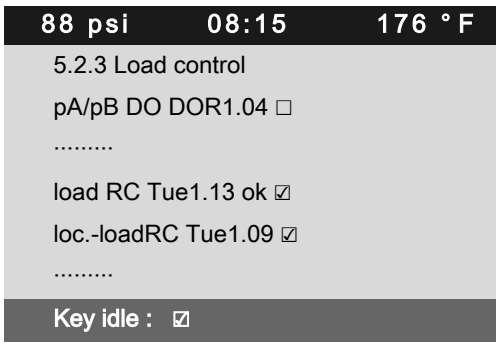
7.3.3 Activating/deactivating the «IDLE» key

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 active line.

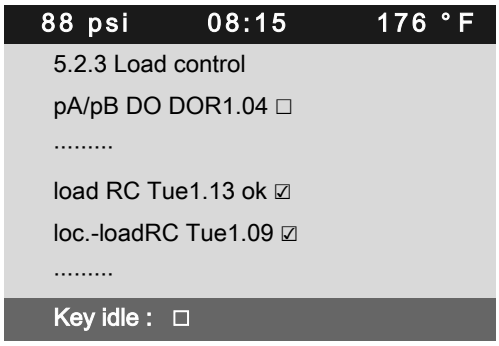
2. Press «Enter» to switch into setting mode.
   The check box for «IDLE» key will flash.



Menu

Active line with check box

3. Press «UP».
   The deactivated check box is displayed.
4. Press «Enter» to save the setting.
   The «IDLE» key is de-activated.



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.

7.4 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	7.4.1
Holidays	Not set	7.4.2
Remote start, e.g. from a control center	Deactivated	7.4.3
IDLE (venting)	Activated	7.4.4
Automatic restart after power failure (after delay period).	Activated	7.4.5

Tab. 50 Settings for machine start and stop.

7.4.1 Automatic start/stop in programmed clock mode

Overview

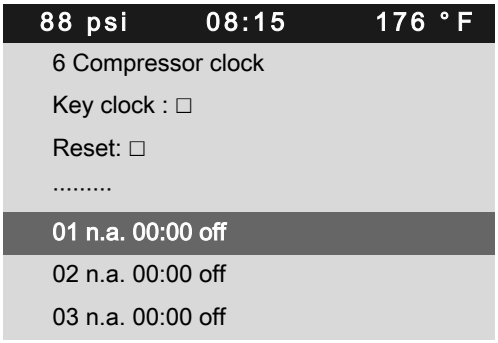
- If not activated, enter password for level 2.

- Select *< Compressor clock >*.
- set/adjust the time program.
- Activate the «clock» key.

7.4.1.1 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.



7.4.1.2 Setting the clock program (example)

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

You can also program an OFF time (Shutdown periods) (see Section 7.4.2).

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:

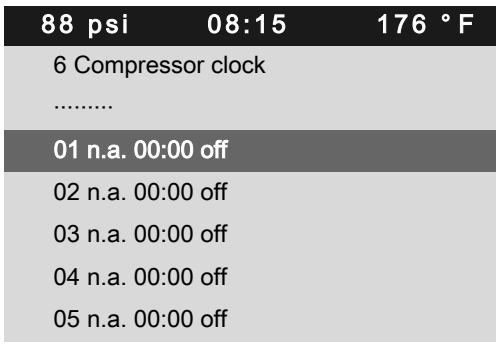
No.	Day	Time	Function
1	Mon-Fri	06:30	ON
2	Mon-Fri	12:00	OFF
3	Mon-Fri	13:00	ON
4	Mon-Thu	17:00	OFF

No.	Day	Time	Function
5	Fri	15:00	OFF

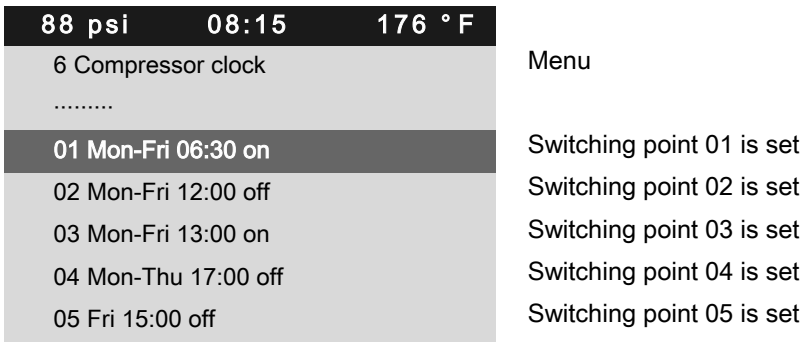
Tab. 51 Example of a machine ON/OFF clock program

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 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.
   Time column, hours display, *00 : 00* flashes in the active line.
7. Use «UP» to specify the settings for the hours.
8. Press the «Right» key once.
9. Time column, minutes display, *00 : 00* flashes in the active line.
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.



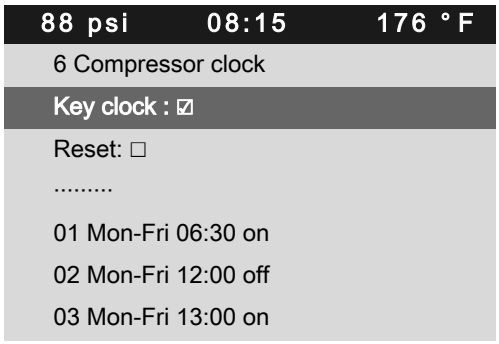
12. Press the «Right» key once.
    The *Action off / on* column flashes.
13. Press «Enter» to switch into setting mode.
14. Use «UP» to specify the settings for the Compressor ON action.

15. Press «Enter» to accept the setting.
    The Compressor ON action 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 actions are set for all switching points.

7.4.1.3 Activating the«compressor clock» key

1. Press the «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. Activate the check box with «UP» and press «Enter».
4. Press «Escape» repeatedly to return to the main menu.
   The «clock» key is activated and can be used.
5. Press «clock» to enable the operation with a timing program.

7.4.2 Setting up the holiday period

The functions for company shutdown are not yet implemented.

➢ Ignore any corresponding references to chapter 7.4.2 in this manual.

7.4.3 Starting the machine remotely from a control center (remote ON/OFF or remote control function)

If the machine is to be started and stopped from a remote control center then the following settings have to be made:

Overview

- Make the electrical connection (a spare input for the remote contact is shown in the electrical wiring diagram for the machine, preferably DI 1.12).
- Switch machine start to remote mode.
- Activate the «remote control» key.
- If required, activate the «clock» key and configure the clock program (see Section 7.4.1.2)
- If required, assign the remote contact to another input.
- Press the «remote control» key.

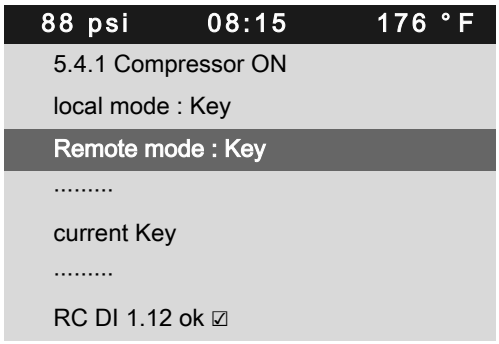
7.4.3.1 Switching the machine start to Remote mode

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

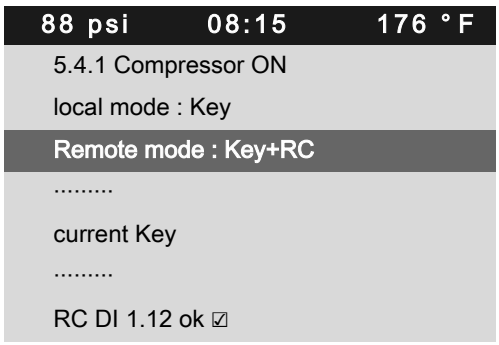
- Method **A**: Starting the machine with the input signal from the remote control center.
- Method **B**: Starting the machine from the remote control center in addition to a configured ON/OFF clock program.
  The machine can be started from the remote control center even though the clock is activated and the actual program sequence is 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 the «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.

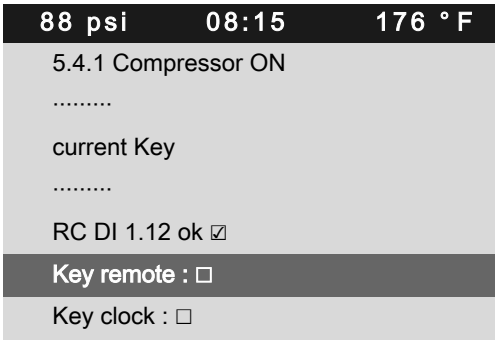


Result The machine start is set to Remote mode with Key+RC.

7.4.3.2 Activating/deactivating the «remote control» key

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

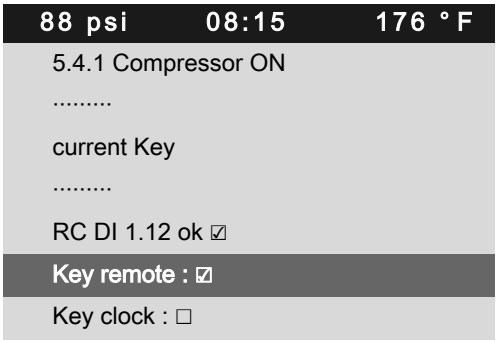
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Compressor start → Compressor ON >* menu.
3. Press «DOWN» repeatedly until *Key remote* is displayed as active line.
4. Press «Enter» to switch into setting mode.
   The check box for Key remote will flash.



Menu

Active line with check box

5. Press «UP».
   The activated check box is displayed.
6. Confirm the setting with «Enter».



Menu

Active line with deactivated check box

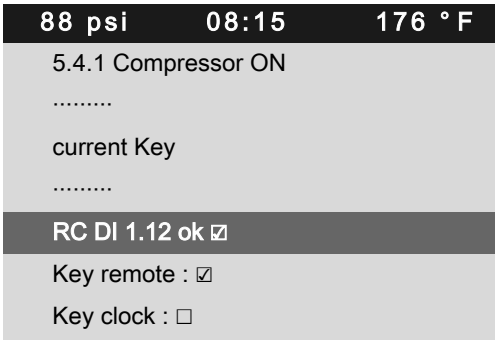
The clock key is not activated.

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 clock program is selected, the «clock» key must be activated in the same manner.

7.4.3.3 Assigning another input

Inputs already assigned cannot be further assigned.

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



2. Press «Enter».
   An inverse cursor appears.
3. Use the «UP» or «DOWN» keys to select another input and confirm with «Enter».
   The input has now been assigned.
4. Press the «Remote» key to enable the machine to be started from the remote control center.

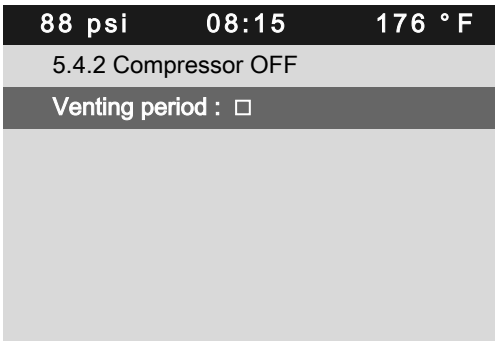
If an input is rejected it means it is already assigned.
➢ Select a different input.

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

After receiving the OFF signal from the remote control center, an additional idling (Venting period function) phase 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 *"Venting period"* function is displayed in the active line.
3. Press «Enter» to switch into setting mode.
   The check box for the "Venting period" function will flash.



4. Press «UP».
   The check box for the "Venting period" function is activated.

5. Press «Enter» to save the setting.

The function can be deactivated in the same manner.

Result The "Venting period" function is activated.

7.4.5 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.

Deactivating/activating automatic restart

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

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

2. Press «Enter» to switch into setting mode.
   Target flashes.
3. Change the time using the «DOWN» or «UP» keys.

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

Result You have adjusted the delay tome for the restart after a mains failure from 10 s to 12 s.

7.5 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 4.6 provides a comprehensive description of all control modes.

7.5.1 Selecting a control mode

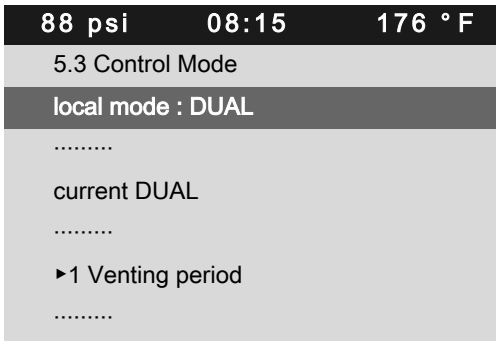
The following control modes are possible:

- DUAL
- QUADRO
- VARIO
- DYNAMIC
- CONTINUOUS

The standard setting of Control Mode depends on the machine type.

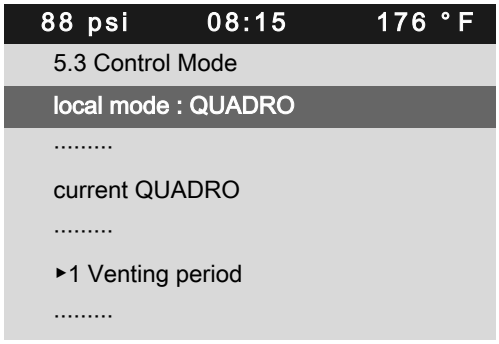
Precondition Password level 2 is activated.
The display shows the operating mode.

1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Control Mode >* menu.
3. Press «UP» repeatedly until *local mode* is displayed as active line.
   The Control Mode setting is shown in the active line.



Menu
Active line
Current Control Mode
Menu Venting period

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



Menu
Active line
Changed current Control Mode
Menu Venting period

5. Use «UP» to adjust Control Mode to the QUADRO setting.

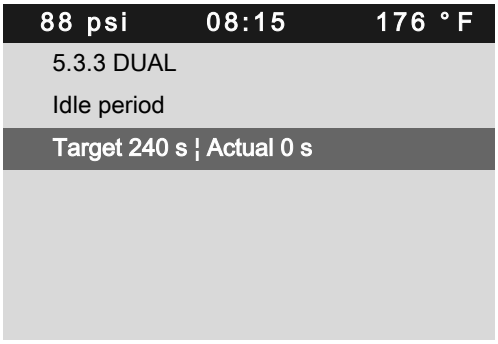
6. Press «Enter» to accept the setting.
   The new Control Mode *QUADRO* is shown in the *current* line.
7. Press «Escape» repeatedly to return to the main menu.

7.5.2 Adjusting Idle period of Control Mode DUAL

When the Idle period period has elapsed, the machine comes to a STANDSTILL.
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 Idle period or standstill time.

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

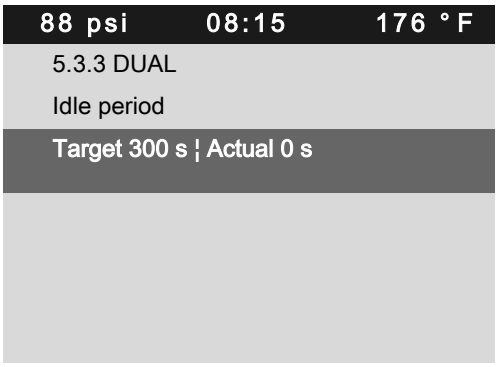
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration ➞ Control Mode ➞ DUAL >* menu. (see section 7.5.1)
   The Idle period setting is shown in the active line.



Menu

Active line

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



Menu

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

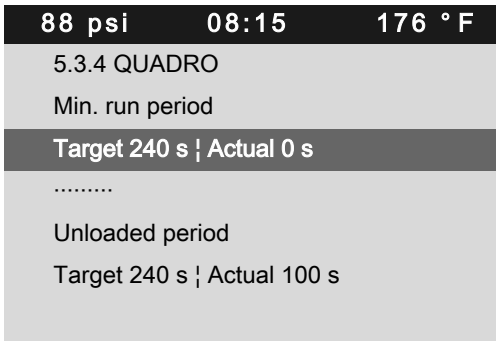
4. Use «UP» to change to the desired Idle period.
5. Press «Enter» to accept the setting.
6. Press «Escape» repeatedly to return to the main menu.

7.5.3 Adjusting the unloaded and minimum running period in Control Mode QUADRO

When the Min. run period has elapsed, the machine switches from IDLE to STANDSTILL. Depending on the setting for Unloaded period, the machine switches from LOAD to IDLE or directly to STANDSTILL.

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

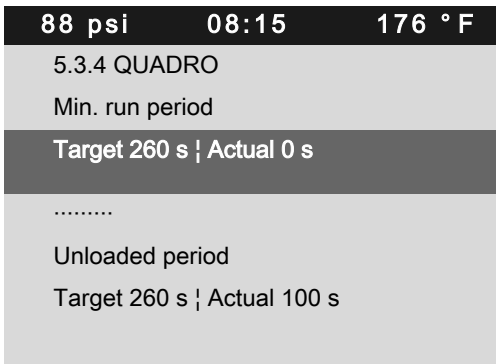
1. Press «Enter».
   The main menu is displayed.
2. Select the *< Configuration → Control Mode → QUADRO >* menu.
3. Press «DOWN» repeatedly until *Target* is displayed as active line.



Menu

Active line set-point value for Min. run period

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



Menu

Active line with changed set-point value for Min. run period

Changed set-point value for Unloaded period

5. Use «UP» to change the Min. run period.
6. Press «Enter» to accept the setting.
7. Change the Unloaded period accordingly.
8. Press «Escape» repeatedly to return to the main menu.

Further information
See chapter 4.6 for an overview of the control modes.

7.6 Configuring the machine for local mode

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

Operating mode	Description	See section
pA	The machine is controlled by Setpoint pressure pA	7.6.3.3
pB	The machine is controlled by Setpoint pressure pB	
pA/pB clock	The changeover between pA and pB is regulated by a timer program.	7.6.2
pA/pB cycle	The changeover between pA and pB is regulated by a programmed time pulse.	7.6.3

Tab. 52 Local operating mode (local mode)

➢ Adapting the Setpoint pressure as described in Section 7.3.

Overview

- If not activated, enter password for level 2
- Select *< Configuration >*.
- Set/adjust the clock program (see Section 7.6.2)
  or
  Timer (see Section 7.6.3).
- Local mode

7.6.1 Selecting <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.

7.6.2 Configuring the system pressure set-point changeover using the timer program

Note the configuration sequence:
➢ First, determine the timer 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 timer program).
- Enter Time for the first switching point.
- Select Setpoint pressure for the first switching point pA or pB
- Specify any further switching points.
- Select Operating mode pA/pB clock, see Section 7.6.3.3.

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

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):

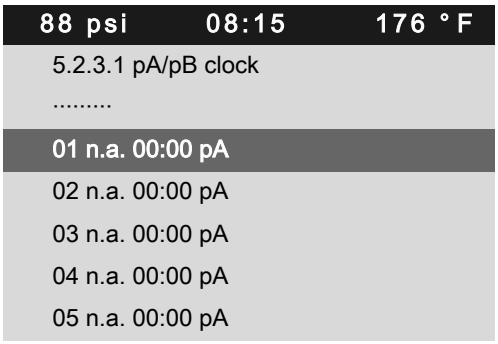
No.	Weekday	Time	System set-point pressure
01	Mon-Fri	06:30	pA on
02	Mon-Fri	12:00	pB on
03	Mon-Fri	13:00	pA on
04	Mon-Thu	17:00	pB on
05	Fri	16:00	pB on

Tab. 53 Example of system pressure changeover switching points

Setting the day of the week for the first switching point

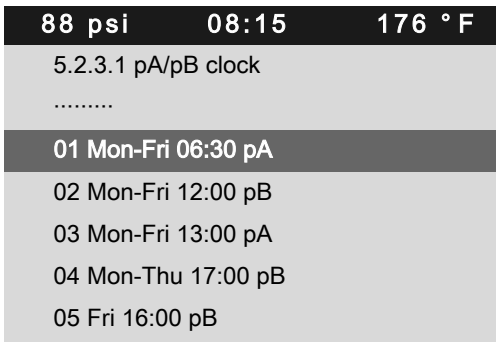
Precondition Password level 2 is activated,
The *< Configuration ➞ Pressure settings ➞ Load control >* menu is selected (see Section 7.6.1).

1. Press «DOWN» repeatedly until *pA/pB clock* is displayed as active line.
2. Press «Enter».
   The system displays the setting options for the switching points.



Menu

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



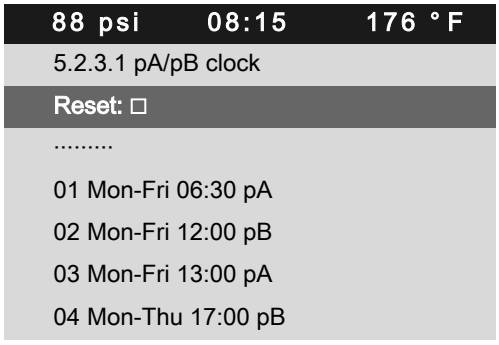
4. Use «DOWN» or «UP» to set the time and confirm by pressing «Enter».
5. Press the «Right» key once.
6. Press «Enter» once.
   Time column, hours display, *00 : 00* flashes in the active line.
7. Use «UP» or «DOWN» to change the hour setting.
8. Press the «Right» key once.
9. Time column, minutes display, *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 pA/Setpoint pressure 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 timer program

Take the following steps to delete an existing timer 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 timer program is displayed.
3. Press the «UP» repeatedly until *Reset* is displayed as active line.



4. Press «Enter» to switch into setting mode.
   The check box for Reset will flash.
5. Press «UP».
   The check box is activated.
6. Press «Enter» to accept the settings.

Result The timer program is now deleted.

Selecting 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. Specify any other Switching points in the same manner.
   The timer program is now created.
4. Select the pA/pB clock operating mode, see Section 7.6.3.3.
5. Press «Escape» repeatedly to return to the main menu.

7.6.3 Configuring the system pressure set-point changeover using the Timer

Overview

- If not activated, enter password for level 2
- Delete the old timer configuration, if necessary
- Set timer periods pA and pB.
- Select the starting time for pA or pB.
- Select Operating mode pA/pB cycle, see Section 7.6.3.3.

7.6.3.1 Setting the timer periods pA and pB

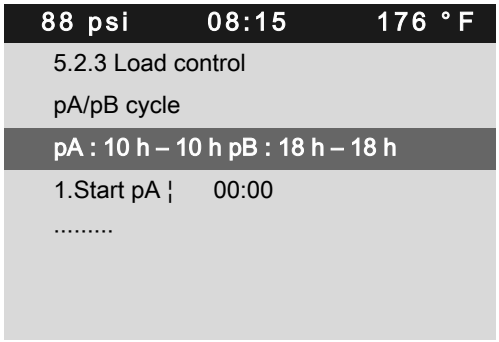
Note the Configuration sequence. For the Configuration of the timer period, Operating mode pA/pB cycle must be deactivated.

➢ First, configure the Timer, then select the Operating mode, if necessary, select first a different Operating mode.

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

1. Press the «DOWN» repeatedly until the *Settings* for pA and pB menu section is displayed as 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.

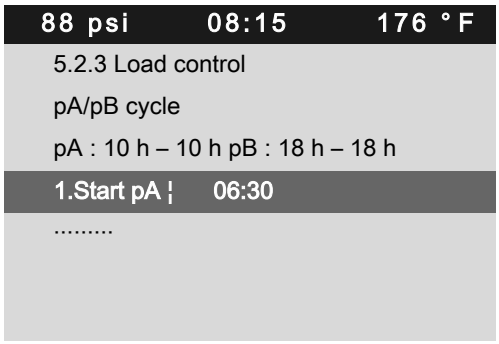


5. Set the timer period for pB in the same manner.
6. Press «Enter» to accept the setting.

Result The timer period for Setpoint pressure pA and pB is set.

7.6.3.2 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.



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.

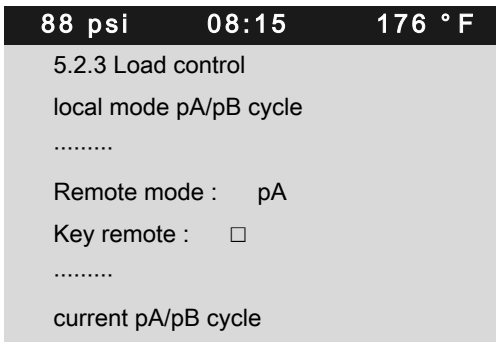
The period is to start with pB.
➢ Press «Enter» and specify 1.Start pB with «UP».

7.6.3.3 Selecting local mode

Precondition Password level 2 is activated.
The *< Configuration ➝ Pressure control ➝ Load control >* menu is selected.
The timer program or the Timer is set.

1. Press the «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 timer is fully configured.

7.7 Configuring the machine for master control

The functions for a master control are not yet implemented.

➢ Ignore any corresponding references to chapter 7.7 in this manual.

7.8 Configuring e-mail

The functions for the e-mail configuration are not yet implemented.

➢ Ignore any corresponding references to chapter 7.8 in this manual.

7.9 Configuring input and output signals

The configuration of input and output signals is not yet implemented.

➢ Ignore any corresponding references to chapter 7.9 in this manual.

7.10 Configuring the compressed air outlet temperature (PD temperature)

The functions for the compressed air outlet temperature are not yet implemented.

➢ Ignore any corresponding references to chapter 7.10 in this manual.

7.11 Activating remote acknowledgement

The functions for remote acknowledgement are not yet implemented.

➢ Ignore any corresponding references to chapter 7.11 in this manual.

7.12 Linking to an external pressure transducer

The functions for the external pressure transducer are not yet implemented.

➢ Ignore any corresponding references to chapter 7.12 in this manual.

7.13 Activating the energy-saving mode for Dryer

The functions for the energy-saving mode are not yet implemented.

➢ Ignore any corresponding references to chapter 7.13 in this manual.

7.14 Commissioning the machine

The functions for machine commissioning are not yet implemented.

➢ Ignore any corresponding references to chapter 7.14 in this manual.

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.

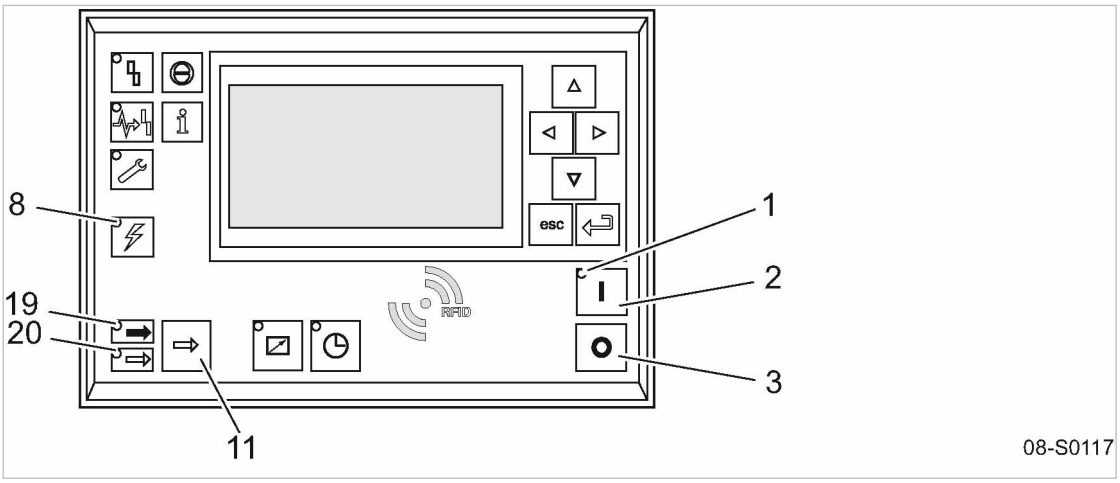


Fig. 7 Switching on and off

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.

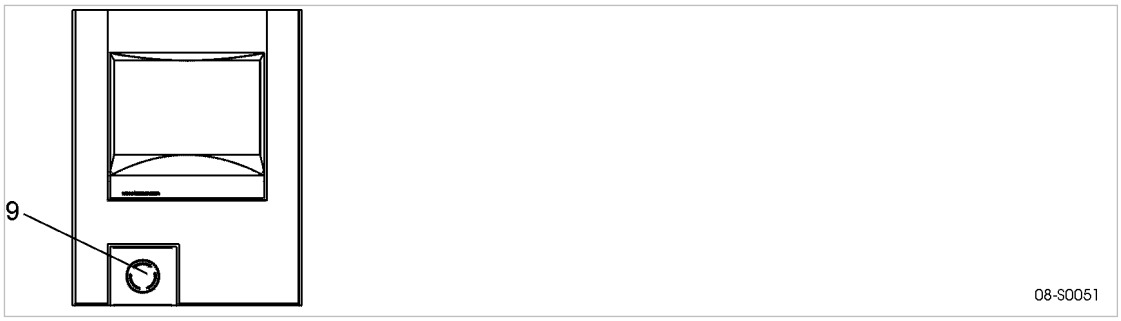


Fig. 8 Switching off in an emergency
[9] EMERGENCY STOP control device:

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 operating data

The following information can be called up in the operating data menu option:

- Operating hours
  - Compressor run: Total machine running time
  - ON LOAD: 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
  - Modulating control valve: Modulating valve operating hours
- Load valve: Total number of activations
- Machine power consumption (according to version)

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 *Operating data* menu is displayed.

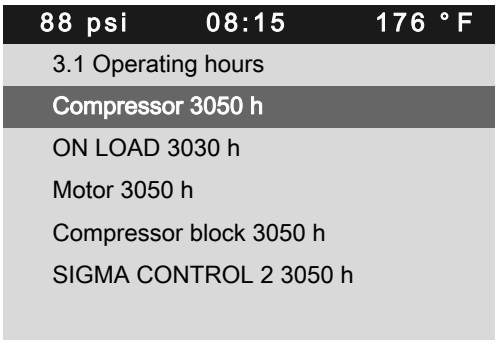
Changing the operating hours

The run times of the motor and airend components can be changed if, for example, a component exchange is required.

Example: Airend exchange

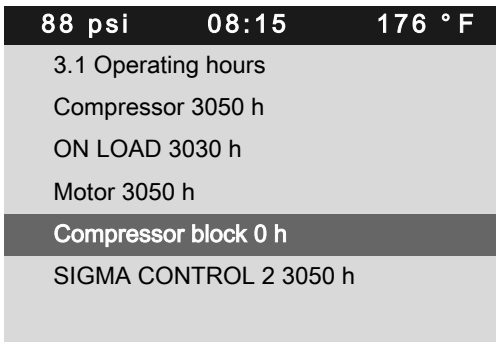
Precondition Password level 2 is activated.

1. Select the *< Operating data → Operating hours >* menu.
   The *Operating hours* menu is displayed.



2. Press «DOWN» repeatedly until *Compressor block* is displayed as 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 are set to *0 h* .

8.3.1 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.

Message	Meaning
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 T↑	Control mode DYNAMIC: The temperature of the compressor motor is too high.
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	

Message	Meaning
0094 O T-Switch ADT	
0095 O p-Switch pN	

Tab. 54 Operational Messages

8.4 Setting the maintenance interval

The functions for setting maintenance intervals are not yet implemented.

➢ Ignore any corresponding references to chapter 8.4 in this manual.

8.5 Testing the safety relief valve

Overview

- Preparing the test
- Performing the test
- Correct conclusion of the test
- Performing a Reset

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. 55 Check box status

⚠ WARNING

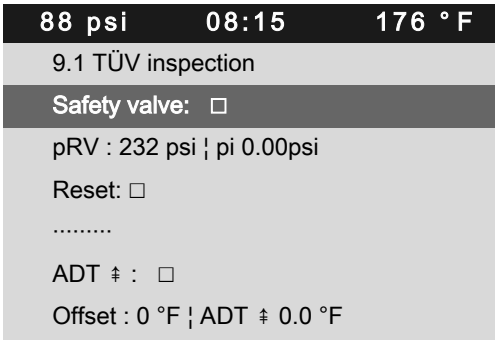
Danger of injury from pressurized components!

➢ *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.

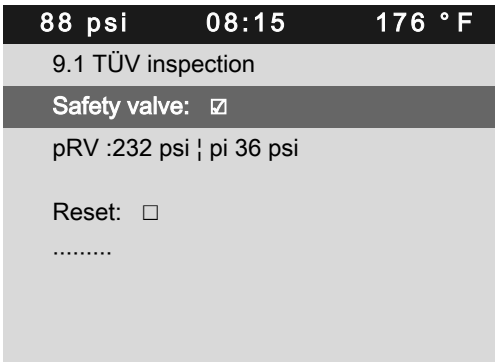
6. Select the *< Machine test ➔ TÜV inspection >* menu.
   Safety valve line is displayed as being active.



Menu
Active line with check box
Safety 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 set point pressures is deactivated!



Menu
Active line with check box
Activating pressure safety relief valve (pRV) ¦ Internal pressure pi (current)

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. Manually monitor on the display the pressure rise pi during the TÜV inspection.
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 valve.
9. Have the safety relief valve replaced immediately.

If the alarm message *pRV ≠* appears, the safety relief valve is defective. The permissible internal pressure was exceeded by 29 psi.

➢ Have the safety relief valve replaced immediately.

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 "Safety relief valve" test mode is de-activated 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, the internal pressure *pi* will indicate the highest measured value.
Activate the check box for Reset in order to reset the stored value.

➢ Activate the check box for *Reset* .

8.6 Checking the temperature sensor and overheating shutdown function

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

For this purpose, SIGMA CONTROL 2 automatically determines an offset value to be displayed. During the test mode, this Offset is added to the actual 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.

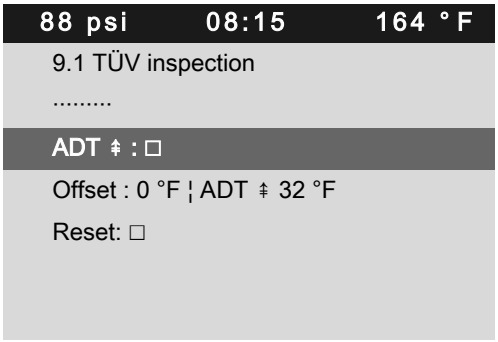
Overview

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

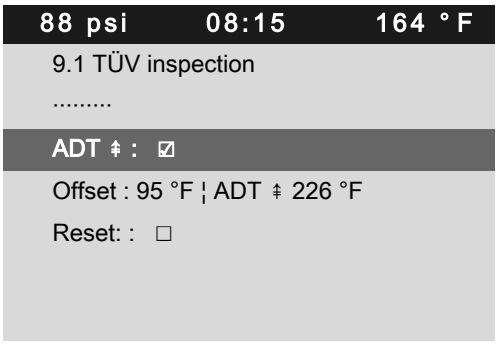
Performing the test

Precondition Machine cooled down by approx. 9 °F

1. Log on to SIGMA CONTROL 2 with access 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 *ADT ⇞* is displayed as active line.
5. Press «Enter» to switch into setting mode.
   The check box in the active line flashes.



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 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 *ADT* attains a value of *226°F*.

The machine does not shut down?

➢ Cancel the test and gave the temperature sensor replaced immediately.

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 de-activated and the test is completed.
4. Press «Escape» repeatedly to return to the main menu.

Resetting

ADT ≠ 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.

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

Fault 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 T⇞	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 control device actuated.	Unlatch the push-button.
0005 A Oil separator T⇞	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 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 Fan M4 I ‡	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 Motor I ‡	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0014 A Fan M5 I ‡	Overload shut-down of the second fan motor.	Investigate cause of shut-down. Reset the overload relay.
0015 A ADT ‡	Maximum permissible airend discharge temperature (ADT) exceeded.	Keep ambient conditions within specified limits. Clean the cooler. Check the cooling oil level.
0016 A Fan M6 I ‡	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 dp ‡	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 mains contactor and wiring.
0035 A Fan M7 I ‡	Overload shut-down of the control cabinet fan motor.	Contact an authorized KAESER service representative.
0038 A PD T ‡	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0039 A PD T ‡	Package discharge (PD) temperature too high.	Check the cooling oil level. Clean the radiator. Check the fan motor.
0040 A Mains contactor off?	Main contactor does not open.	Check main contactor and wiring.

Message	Possible cause	Remedy
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 ADT dT/dt ↡	The rate of rise of the airend discharge temperature (ADT) is too fast.	Check the cooling oil level.
0044 A No pressure buildup	The machine does not produce compressed air. The working pressure does not rise above 50 psi within the preset period.	Check the machine for leaks. Check coupling / V-belt.
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	Refrigeration dryer: The condensate drain is defective.	Refrigeration 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 belt or coupling broken.	Drive belt: Replace drive belt. Coupling: Contact an authorized KAESER service representative.
0060 A Softstart	Fault in the soft start equipment.	Contact an authorized KAESER service representative.
0061 A Oil separator dT/dt ↡	The rate of rise of the airend discharge temperature is too fast.	Check the cooling oil level.

Message	Possible cause	Remedy
0062 A Refrigeration dryer p ⇟	Refrigeration dryer: Pressure too high in the refrigerant circuit. Safety pressure switch tripped.	Clean the refrigerant condenser. Check the fan motor. Maintain operating conditions.
0063 A Refrigeration dryer p ⇟	Refrigeration 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.
0099 A Mains contactor on?	Main contactor does not close.	Check main contactor and wiring.

Message	Possible cause	Remedy
0100 A Mains contactor off?	Main contactor does not open.	Check maincontactor and wiring.
0101 A Motor I⇞	Overload shut-down of the compressor drive motor.	Investigate cause of shut-down. Change the oil separator cartridge.
0102 A Fan M4 I⇞	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 Group alarm	Frequency converter fault	Contact an authorized KAESER service representative.

Tab. 56 Fault messages and measures

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.
0005 Y RAM out of memory	System error	Contact an authorized KAESER service representative.

Message	Possible cause	Remedy
1000 Y RFID error: switch SIGMA CONTROL power supply OFF→ON!	System error	Contact an authorized KAESER service representative.

Tab. 57 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 T↑	Drive motor overheating.	Clean the motor. Keep ambient conditions within specified limits.
0003 W V-belt tension	Belt tension is too low.	Re-tension drive belt.
0004 W Oil separator dp↑	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 ADT↑	Maximum airend discharge temperature will soon be reached.	Clean the radiator. Check the cooling oil level. Replace the oil filter. Ensure adequate ventilation. Keep surrounding temperature within recommended limits.
0010 W Buffer battery	Data retention battery is almost discharged.	Change the battery.
0011 W Oil filter Δp↑	The pressure differential of the oil filter has risen. Oil filter clogged.	Change the oil filter.

Message	Possible cause	Remedy
0012 W Modem problem	SIGMA CONTROL 2 does not recognize modem.	Check the link between the SIGMA CONTROL 2 and the modem.
0013 W Air filter dp↑	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.
0016 W Error: RAM	Internal RAM defective.	Contact an authorized KAESER service representative.
0017 W Refrigeration dryer T↓	Refrigeration dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.
0018 W Refrigeration dryer p↓	Refrigeration 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 belt.
0031 W Motor bearing h⇟	Motor bearing of compressor motor: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0032 W Electrical equipment h⇟	Electric components and installation: Maintenance interval has elapsed.	Inspect and reset the maintenance interval counter.
0033 W Fan bearing h⇟	Motor bearing of fan motors: Maintenance interval has elapsed.	Contact an authorized KAESER service representative.
0034 W PD T↓	Package discharge (PD) temperature too low.	Contact an authorized KAESER service representative.
0035 W PD T↑	Compressed air discharge temperature too high.	Clean the radiator. 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 safety relief valve's activating pressure will soon be reached.	Change the oil separator cartridge. Open the shut-off valve in the venting line.
0041 W Mains voltage ↓	1. Power failure: The machine is automatically restarted.	Check power supply. 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 T↓	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 T↓ ↓	The airend temperature is too low (<14 °F) for the machine to be operated.	Keep ambient conditions within specified limits.
0060 W Start T↓	The airend temperature is too low (<35 °F).	Keep ambient conditions within specified limits.

Message	Possible cause	Remedy
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 dp↑	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↑	Refrigeration 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↑	Refrigeration dryer: Compressed air temperature too high.	Maintain operating conditions. Clean the refrigerant condenser. Clean the cooler. Install an extractor fan.
0071 W Oil level ↓	Cooling oil level too low.	Replenish the cooling oil.
0072 W RD condensate drain	Refrigeration dryer: The condensate drain is defective.	Check condensate drainage
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		

Message	Possible cause	Remedy
0094 W T-Switch ADT		
0095 W p-Switch pN		

Tab. 58 Warning messages and remedies

10 Maintenance

10.1 Safety

Follow the instructions below for safe installation.
Warning instructions are located before a potentially dangerous task.

Disregard of these instructions can result in serious injury.

Basic safety instructions

Disregarding safety instructions can result in unforeseeable hazards.

- ➢ Follow the instructions in chapter 3 'Safety and Responsibility'.
- ➢ Allow maintenance work to be performed by authorized personnel only.
- ➢ Make sure that no one is working on the machine.
- ➢ Ensure that all service doors and panels are locked.

Working on live components

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

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

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

➢ Why not sign a KAESER AIR SERVICE maintenance agreement!

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

11.3 Service Addresses

Addresses of KAESER representatives are given at the end of this manual.

11.4 Displaying the version number, machine model, material, serial, and equipment numbers

1. In operating mode, switch to the main menu with the «Enter» key.
2. Select the *< Configuration ➞ General ➞ System information >* menu.
   The system information is displayed.

88 psi 08:15 176 °F	
5.1.1 System information	Menu
Compressor	Compressor overview
Compressor PN *** Compressor SN ***	Material number, serial number
Compressor EN ***	Equipment number
SIGMA CONTROL 2 MCS	Controller overview SIGMA CONTROL 2
PN: 7.7601P0 SN: 10-34-000-	Material number, serial number
Software: 0.7.4.1	Software version

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

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.