

Technical description  
SIGMA AIR MANAGER

*Adaptive 3D-control*

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<http://www.kaeser.com>



# Release code request



for SIGMA AIR MANAGER adaptive 3D-control option

**Your Fax number:** \_\_\_\_\_

or

**Your email address:** \_\_\_\_\_

In order to activate the option **adaptive 3D-control** a **release code** must be entered in the SIGMA AIR MANAGER to ensure against misuse of the system.

We will provide you with your personal release code without charge immediately. We require the material and serial numbers of your SIGMA AIR MANAGER and the customer and invoice number of the **adaptive 3D-control option** so that we can issue the release code.

Please complete and sign the form below and return it to us so that we can issue your release code.

**Fax: +49 9561 640 889**

**Email: [service@kaeser.com](mailto:service@kaeser.com)**

**To be filled out by the user!**

**Please enter here:**

SIGMA AIR MANGER (SAM)

**Material no.:** (e.g. 7.7726.1) \_\_\_\_\_

**Serial no.:** (e.g. 1312) \_\_\_\_\_

Take data from the nameplate on the outside of SAM control cabinet

Option adaptive 3D-control

**Customer no.:** \_\_\_\_\_

**Invoice no.** \_\_\_\_\_

Take data from the invoice for the option

I accept the terms of the end-user licence set out overleaf.

\_\_\_\_\_  
Place, data

\_\_\_\_\_  
User's signature

To be filled out by KAESER:

**Release code:** \_\_\_\_\_

**Date:** \_\_\_\_\_

The software product described overleaf is protected by copyright laws and by international copyright agreements and by other laws and agreements on intellectual property. This software product is to be treated by the end-user just as any other copyright material. This software product is licensed by KAESER and is not for sale. By exercising your right to use this software, you automatically agree with the terms and conditions of this agreement.

## I. Software product licence

1. KAESER grants the end user the non-exclusive right to use the software for an unlimited period under the condition that it used solely in connection with the KAESER SIGMA AIR MANAGER (SAM) master controller.
2. The software may not be modified, reverse-engineered, translated or any part deleted. Any alphanumeric identification, brand names and copyright references may not be changed or removed from the storage mediums. The above terms also apply to the accompanying documentation.
3. The end user may not assign his or her rights, either in part or in full, to any third party or grant any corresponding rights of use to any third party.
4. If the terms of this agreement are substantially contravened, both parties have the right to terminate in writing without notice. In the event of a termination the end-user must return the software complete to KAESER or destroy it and confirm its destruction in writing to KAESER.

## II. Warranty

KAESER and the end user agree that it is not possible to develop computer programs to the point that they function faultlessly under all conditions of operation. KAESER warrants the conformity of the software to the specification of performance given to the end user that describes the correct use

and conditions of application of the software. In the case of a software error the end user will be provided with an update to the latest product status. Any existing data storage mediums containing corrupt software or any back-up copies thereof must be returned to KAESER or destroyed completely by the end user. The warranty does not extend to deficiencies caused by deviations from the conditions of application for which the software is intended.

## III. Liability

KAESER is not liable for damages of any kind (including, but not limited to loss of profit, loss of production, loss of business information or any other damage to property) resulting from the use or the impossibility of use of the software.

## IV. Miscellaneous

1. Collateral agreements must be made in writing
2. The place of fulfilment and court of jurisdiction for all claims arising out of this business agreement, especially with regard to delivery, is Coburg, even if the sale or delivery was initiated by a KAESER subsidiary. The court of jurisdiction also covers disputes concerning the formation and effectiveness of the contractual relationship. The supplier is also entitled to sue at the customer's court of jurisdiction. The law of the Federal Republic of Germany applies in all cases with the exception of the United Nations Convention on Contracts for the International Sale of Goods (CISG) in its present form.
3. Should there be any queries arising out of this agreement or should you have any other reason to contact KAESER, please refer to KAESER KOMPRESSOREN GmbH, Coburg, or to your responsible KAESER subsidiary.

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## 1. Using this document

This document explains the adaptive 3D-control and the steps required for updating the SIGMA AIR MANAGER. It is a supplement to the "SIGMA AIR MANAGER" service manual.

Always use this document together with the "SIGMA AIR MANAGER" service manual. Special attention should be paid to Section 1 "Regarding this document" and Section 3 "Safety and responsibility" in the "SIGMA AIR MANAGER" service manual.

## 2. Complying with safety notes



Please note the information provided in Section 3 "Safety and responsibility" in the "SIGMA AIR MANAGER" service manual.



Only qualified personnel may carry out the update of the Sigma Air Manager.

KAESER KOMPRESSOREN cannot accept any liability for damage caused by the update.

## 3. Getting familiar with the adaptive 3D-control

With the KAESER software version v1.10, the pressure range control is converted to the adaptive 3D-control. This section provides you with the most pertinent information about the new control.

### 3.1 Understanding the functionality

The adaptive 3D-control minimises the energy requirements of the compressed air station by automatically adapting to the operating conditions. It automatically adapts the selection of the compressors to be activated and deactivated as well as the cut-out and cut-in pressures for the selected compressors to the current operating conditions of the compressed air station. Thus, setting the switching sequence and the pressure range as well as some additional functions such as PI controller or standby compressors are no longer required.

### 3.2 Getting familiar with the control parameters

**i** The pressure values indicated in this section apply to station with 10 bar or 16 bar pressure-measuring transducers.

The adaptive 3D-control has only three variable control parameters:

- **Required pressure:**

This is the pressure required by the consumers in the compressed air network (pressure-measuring transducers). The controller will usually maintain the required pressure with a maximum deviation of 0.1 bar.

**i** For energetic reasons, the operating pressure is to be set as low as possible, i.e., not higher as required for the consumers within the compressed air network.

Use the set-point pressure  $p_w$  minus 0.4 bar or  $p_{u2}$  minus 0.1 bar as reference value when setting the required pressure.

- **Pressure range:**

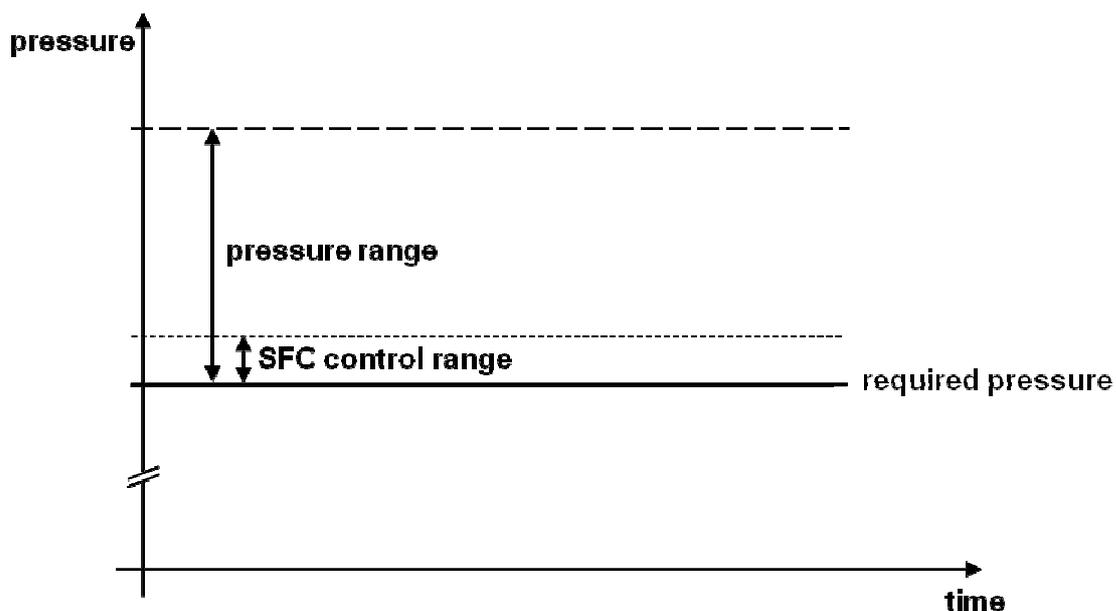
The pressure range is added to the required pressure and limits the pressure upwards. It is factory-set to 1.2 bar. For energetic reasons, select the largest possible pressure range.

Settings between 0.8 bar and 1.2 bar are most useful.

- **SFC control range:**

The SFC control range is added to the required pressure and represents the lower portion of the pressure range. It is used as a control range for SFC compressors. Within the SFC control range, no compressor will be deactivated. It is factory-set to 0.2 bar. For energetic reasons, do not reduce the SFC control range.

Settings between 0.2 bar and 0.3 bar are most useful.



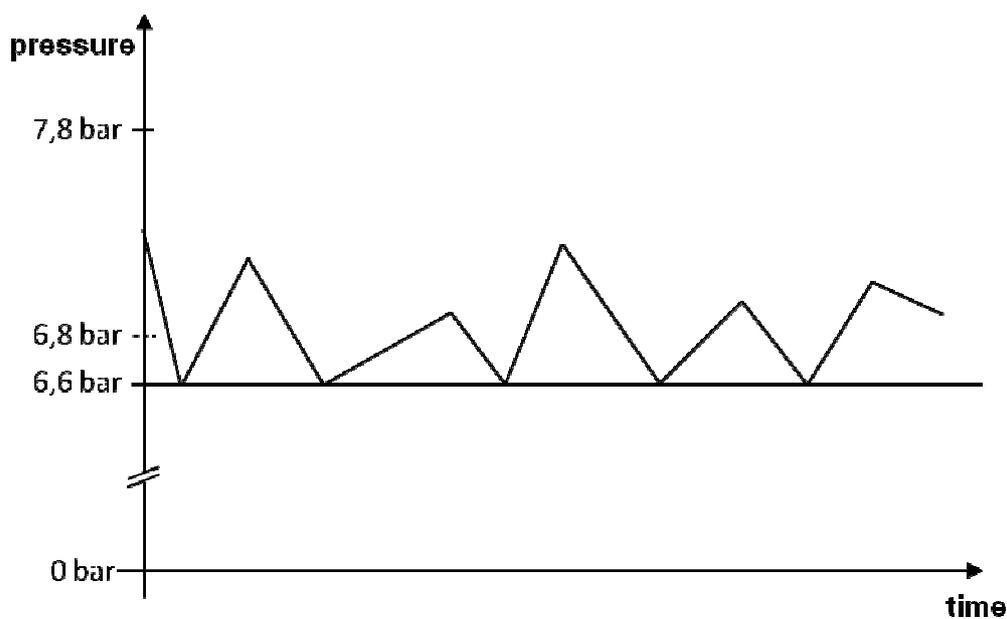
### 3.3 Understanding the pressure progress

The adaptive 3D-control minimises the energy requirements of the compressed air system as it usually maintains the required pressure and the pressure range. Other demands on the pressure progress, such as the general compliance with a narrow pressure band for example, will counteract the objective of energy savings.

Compared with the pressure band control working with rigid pressure switching points, the adaptive 3D-control with its energetically optimised and flexible pressure switching points results in a less regular pressure progress. In low consumption or purely leak covering in particular, this results also in a "wider" pressure progress, i.e., a larger distance between the pressure reversal points.



The pressure progress results from the energetic optimisation in the adaptive 3D-control and is not enforced by control parameters.



### 4. Getting familiar with the update process

Requirements for the SIGMA AIR MANAGER update:

- Prepared SIGMA CONTROLS (see chapter 5)
- Valid release code for the adaptive 3D-control option(see release code request)
- Update files (software) for SIGMA AIR MANAGER (see chapter 6)

The SIGMA AIR MANAGER software comprises three parts:

- **Operating system:** The current version is **SYSTEM v1.08 (134)**. Use a laptop or PC with serial cable connection to update to this version.
- **KAESER software:** The current version number is **STEP5 v1.10**. To update to this version, you require a flashcard containing the appropriate update files.
- **SIGMA AIR CONTROL *plus*:** When updating the KAESER software, you also update to the current version **v1.10**.

### 5. Preparing the SIGMA CONTROL

With KAESER software version v1.10, the pressure range control is converted to the adaptive 3D-control. The controllers of the connected SC compressors must be adjusted for the adaptive 3D-control.

#### 5.1 Updating the SIGMA CONTROL

Beginning with the SIGMA CONTROL software version 81.00, the current idling times of the compressors are analyzed by the adaptive 3D-control and transmitted to the SIGMA AIR MANAGER.

Hence, SIGMA CONTROLS with software versions older than 81.00 must be updated to the current version. Perform the corresponding update.

#### 5.2 Setting the control mode on the SIGMA CONTROL

When determining the cut-in pressure, the adaptive 3D-control takes into account the longer response times of standing compressors and thus ensures that the maintenance of the required pressure is not endangered. In addition, the adaptive 3D-control prevents idling compressors to be deactivated immediately prior to their switching to load.

You should, therefore, activate the QUADRO control mode on all SIGMA CONTROLS including those for peak load compressors. Alternatively, you may set the VARIO or DYNAMIC control mode.

## 6. Preparing the SIGMA AIR MANAGER update

Prior to updating the SIGMA AIR MANAGER you must prepare the update by executing the following four steps:

### 6.1 Determining the existing SIGMA AIR MANAGER software

Determine the version of the software currently used in the SIGMA AIR MANAGER. Note the version of the operating system (SYSTEM) and the KAESER software (STEP5).

The menu option "1.6 System information" [Main menu > F1 > F1 > F6] displays the software versions. The following lines must be read for the update:

```
SYSTEM      : v 1.08
STEP5       : v 0.23
```

Software versions older than v0.14 do not have this menu option. The software versions of the SIGMA AIR MANAGER can be determined during a startup.

### 6.2 Checking the update capability of the SIGMA AIR MANAGER

Verify whether and how you can perform an update to the current KAESER software on the basis of your existing software version. This table indicates which versions you can update only without data import or only with an intermediate update to another software version.

Existing KAESER software version	Update without data import	Update with data import
v0.07 and older	not possible	not possible
v0.08 to v0.12	possible	not possible
v0.13	possible	Intermediate update to v0.16
v0.14 to v0.19 and v9.13	possible	Intermediate update to v0.23
v0.20 to v0.23	possible	possible
v9.xx (special software)	not possible	not possible

### 6.3 Selecting the correct update files

The update files are provided in the D:\Docs\SAM\_Update directory of your laptop or PC.

#### 6.3.1 Selecting the files for the operating system update

You have the option to perform the update of the operating system with or without import of the customer-specific settings. Select one of the following files:

- **SAM\_OS\_Backup.exe:** Update with import of customer-specific settings.
- **SAM\_OS\_Reset.exe:** Update without import of customer-specific settings, i.e., the factory settings will be applied.

### 6.3.2 Selecting the files for the update of the KAESER software

The update of the KAESER software can also be performed with or without the import of the customer-specific settings. Update files for data import contain the keyword "to" in their name, whereas update files without data import have the keyword "new" in their names.

In addition, you must differentiate between the two language packages *Standard* and *Asia*. Update-files with the *Standard* language package have the suffix "\_S", whereas the update files for the *Asia* language package feature the "\_A" suffix.

The following languages are supported:

*Standard*: Czech, Danish, German, English-UK, English-US, Spanish, French, Croatian, Indonesian, Italian, Hungarian, Malay, Dutch, Norwegian, Polish, Russian, Romanian, Slovenian, Finnish, Swedish, Turkish.

*Asia*: English-UK, Chinese(simplified), Chinese(traditional), Japanese, Korean, German, Spanish, French.

Verify which language package is currently installed by opening the menu option for language settings in the SIGMA AIR MANAGER (Main menu > F3).

Select one of the following update files for the *Standard* language package. Please see the table in Section 6.2 for the selection of the correct file.

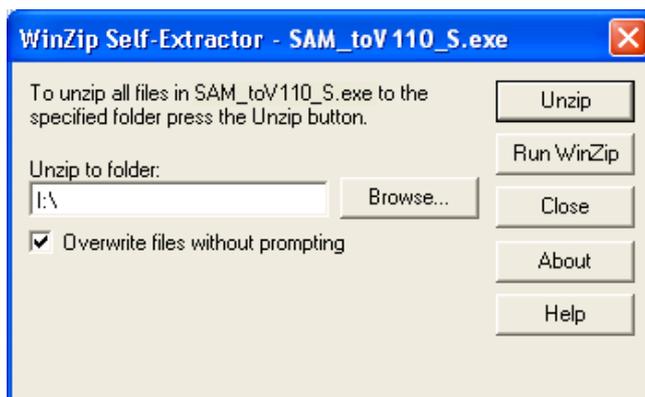
- **SAM\_V110new\_S.exe**: Update **without import of customer-specific settings**. With this update, all factory settings are restored. You may use this update file if the currently installed KAESER software is v0.08 or newer.
- **SAM\_toV110\_S.exe**: Update **with import of customer-specific settings**. You may use this update file if the currently installed KAESER software is v0.20 or newer.
- **SAM\_fromV014toV019\_towardsV023\_S.exe**: Intermediate update in the event that your currently installed software version is between v0.14 and v0.19 and you want to import the customer-specific settings. Subsequently to this installation, you must perform a second update to the current software version using the **SAM\_toV110\_S.exe** file.
- **SAM\_V013toV016.exe**: Intermediate update to version v0.16 in the event that your currently installed software version is v0.13 and you want to import the customer-specific settings. As a subsequent step, you must execute the **SAM\_fromV014toV019\_towardsV023\_S.exe** update file. As a last step, you update to the current version using the **SAM\_toV110\_S.exe** file.

The v1.10 software is not yet available for the *Asia* language package.

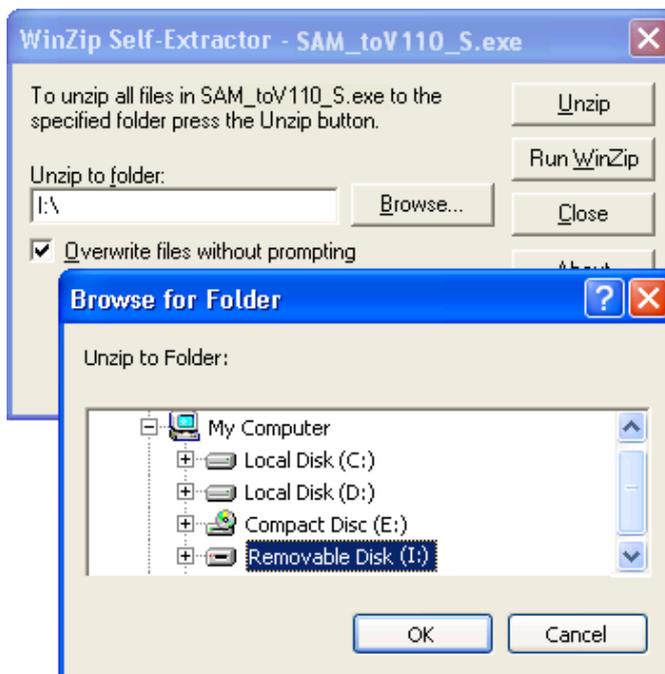
## 6.4 Copying the update files to a flashcard

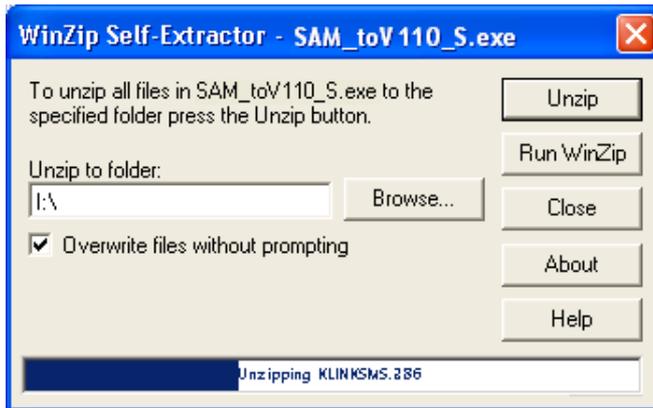
You must copy the files required for the update of the KAESER software to a flashcard (Kaeser 7.7721.x) suitable for the update process.

- Insert the flashcard into the PCMCIA slot of your laptop.
- Delete all files on the flashcard.
- Select the correct update file (see Section 6.3).
- Execute the update file by double-clicking (of e.g., **SAM\_toV110\_S.exe**). The following window will open:

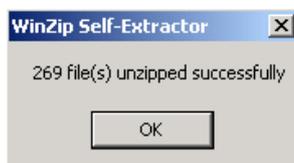


- Click "Browse..." and select the flashcard drive (removable device) as target directory. Clicking "Unzip" will start the extraction process. All the update files required are now saved automatically on the flashcard.

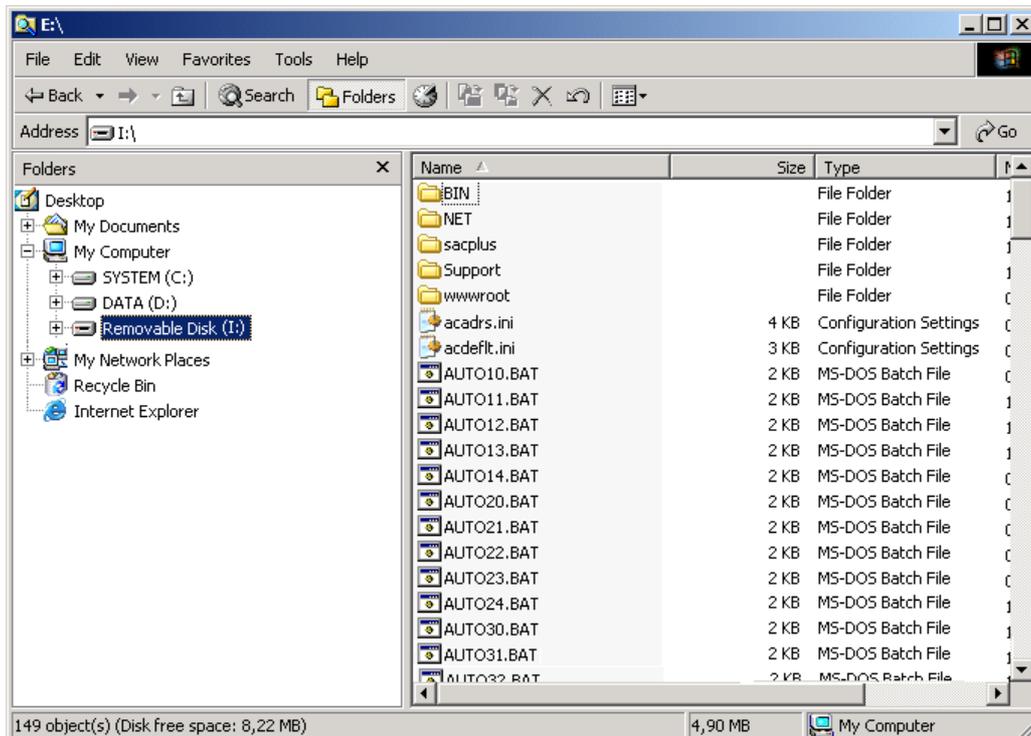




- The system will open a message window when the extraction process is completed. Confirm with "OK" and exit WinZip with "Close".



All the update files needed are stored on the flashcard as shown below:



- Before removing the flashcard from the laptop, you must deactivate the flashcard drive. Left-click the "Safely remove hardware" symbol on the taskbar in the bottom right corner of your desktop. Select "Remove PCMCIA IDE/ATAPI Controller - drive(I:)".
- Remove the flashcard. You will need it again for the update of the KAESER software after the operating system has been updated.

### 6.5 Recording the set parameters

Prior to the update, please record all parameters set in the SIGMA AIR MANAGER. Copy the lists in the annex of the SIGMA AIR MANAGER service manual and use these copies to record the settings.

If SIGMA AIR CONTROL *plus* is used, open the *Settings > Tariff* page and record the entries in all entry fields. Open *Contact/Service* and again record all entries.

Page Settings > Tariff:

Rate Tuesday , 2003-08-19 , 10:06

Currency:

High tarif (HT):  € / kWh

Low tarif (LT):  € / kWh

Caution: after changing the currency and corresponding adjustment of the electricity tarif, it is no longer possible to calculate costs before the date of change. The instructions in the service manual must be observed.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
HT start: (hh:mm)	<input type="text" value="06"/> : <input type="text" value="00"/>	<input type="text" value="00"/> : <input type="text" value="00"/>					
HT end: (hh:mm)	<input type="text" value="22"/> : <input type="text" value="00"/>	<input type="text" value="13"/> : <input type="text" value="00"/>	<input type="text" value="00"/> : <input type="text" value="00"/>				

Page Contact/Service:

**KAESER subsidiary**

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**Phone:**   
**Fax:**   
**email:**

**Support:**

**Contact person**

**Address:**   
  
  
  
**Phone:**   
**Fax:**   
**email:**

**Support:**

**Plain text:**

## 7. Stepwise performing the SIGMA AIR MANAGER update

Follow the steps shown below for a correct update of the software.

### 7.1 Switching to manual operation

- Set the "Automatic restart" parameter to "yes" to ensure that SIGMA AIR MANAGER goes into manual mode after power off/on [main menu > F1 > F4 > F3].
- The compressed air system must be ON (LED in the green ON key lit) if the air supply is to be available during the update.
- Switch the system to manual operation by pressing the AUTOMATIC key. The LED of the AUTOMATIC key will extinguish.

SIGMA AIR MANAGER no longer controls the air system in manual operation. The compressors are under the control of their own internal controllers. Because of the internal cascaded pressure regulation settings on the compressors, system pressure will swing much further in manual mode than in automatic mode with SIGMA AIR MANAGER.

### 7.2 Updating the operating system

You do not need to perform an operating system update if the existing operating system of your SIGMA AIR MANAGER is version SYSTEM v1.08(134). In this event, please continue with the next step (updating the KAESER software).



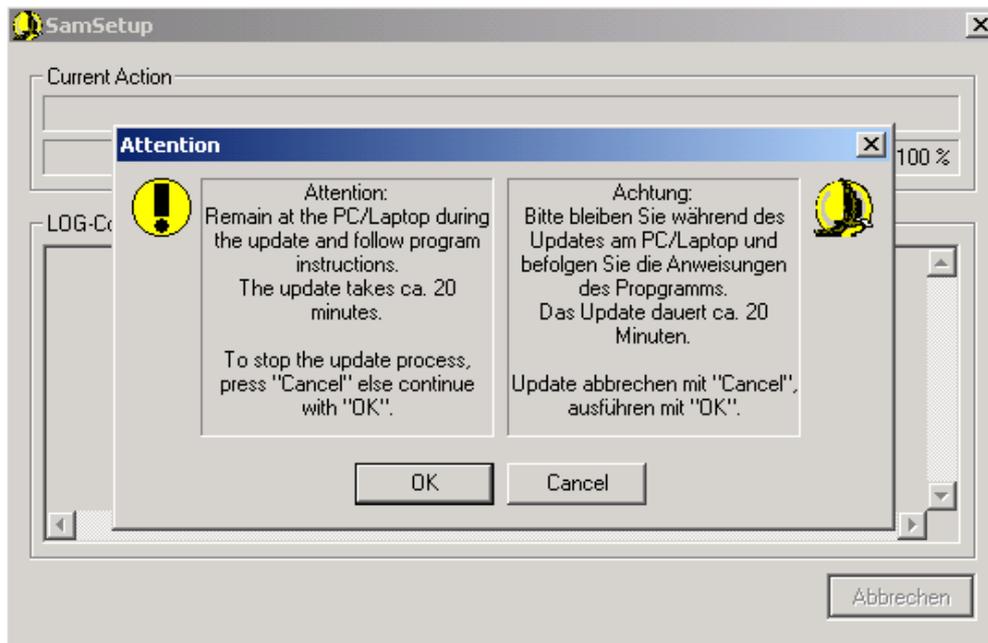
The operating system update takes approximately 10 minutes. The update will be aborted in the event of a power failure in the SIGMA AIR MANAGER or the laptop/PC and must then again be performed from the beginning. This is also necessary if the laptop or PC will switch to hibernation or automatic turn-off.

- You must ensure the continued power supply of the SIGMA AIR MANAGER and the laptop/PC for the entire duration of the update.

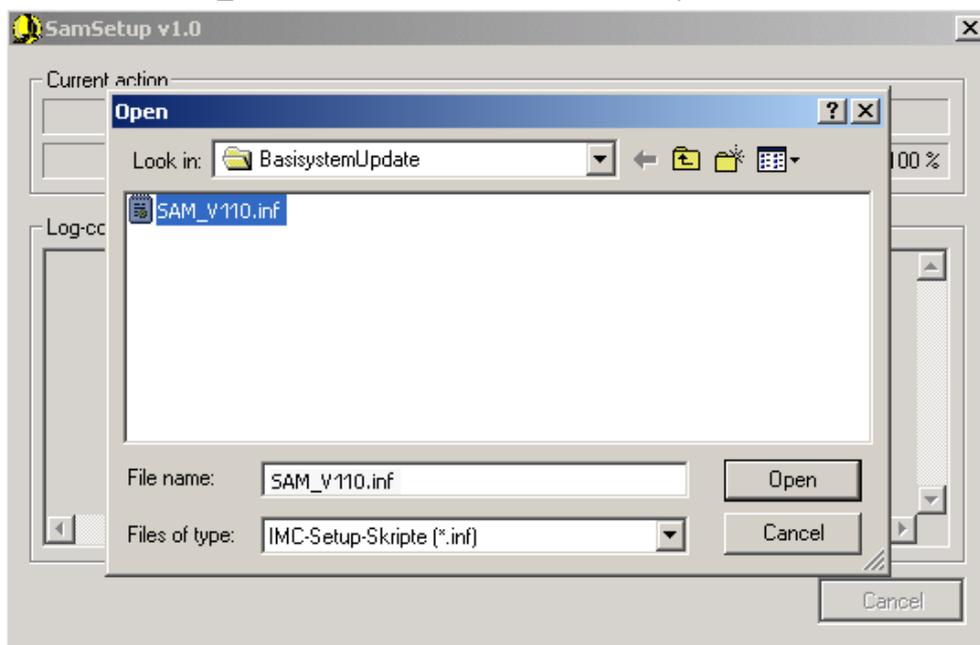
Perform the update in the following sequence:

- Use a null modem cable to connect the SIGMA AIR MANAGER with the laptop/PC: First, connect the null modem cable with the RS232 interface (e.g. "COM1") of the laptop/PC. Use and USB adapter if the laptop/PC does not have an RS232 interface. Connect the null modem cable to the RS232 interface on SIGMA AIR MANAGER (0X2, centre SUB-D connector).
- Deactivate SIGMA AIR CONTROL *plus* in the "1.5.2 SIGMA AIR CONTROL plus" menu option [Main menu > F1 > F1 > F5 > F2] if it is activated. Wait until the message "SACplus is deactivated, you can switch off (H)" is displayed on SIGMA AIR MANAGER.
- Choose either **SAM\_OS\_Backup.exe** (Update with import of customer-specific settings) or **SAM\_OS\_Reset.exe** (Update without import of customer-specific settings). More information is provided in Section 6.3.

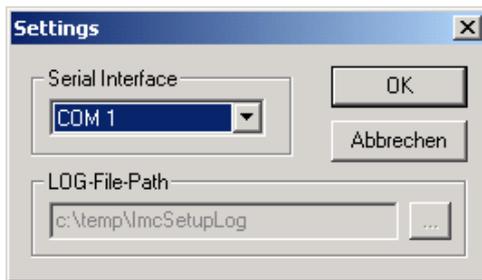
- Double-click the file to be executed.
- Confirm the prompt with "OK".



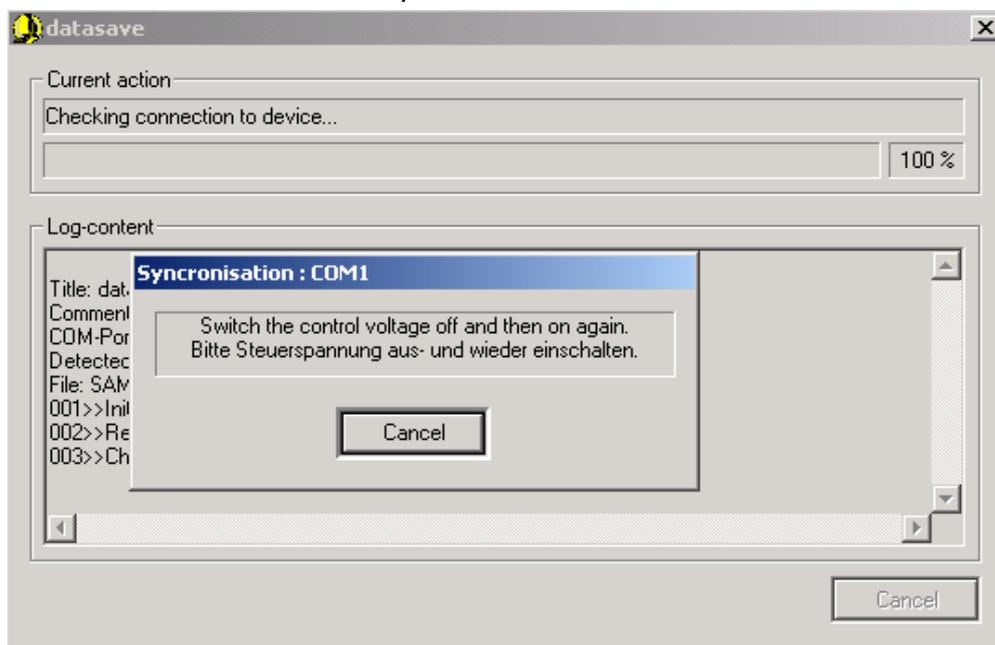
- Select the "SAM\_V110.inf" file and confirm with "Open".



- Select the used RS232 interface used on the laptop/PC, e.g. "COM1".



- If the system asks "Following subdirectory... Do you want to create it?" confirm twice with "Yes". The system will create two folders in the "C:\temp" directory.
- The setup program will request you to turn off and again on the power supply (miniature circuit breaker in the control cabinet or user's main switch) to the SIGMA AIR CONTROLLER in order to synchronize the interface.



- The system will automatically start the update upon switching on of the power supply. This requires 10 minutes approximately. The update is completed when SIGMA AIR MANAGER boots again. The message "Update completed successfully" will appear on the display of your laptop/PC.  
The new operating system version, e.g., SYSTEM v1.08(134), will be displayed at the SIGMA AIR MANAGER during the booting process. The boot up is complete when the pressure is displayed in large type.
- Close the update program on your laptop/PC with "Exit".
- Remove the null modem cable to disconnect the laptop/PC from the SIGMA AIR MANAGER.
- Specify the language at the SIGMA AIR MANAGER (main menu > F3).

### 7.3 Updating the KAESER software



The update to version v1.10 will require up to **25 minutes** (conversion to adaptive 3D-control).

The update is completed in two steps. In the first step, the settings are saved and the software update itself is performed. During the second step, the system is initialised and the saved setting parameters are restored or the default parameters are set.

Performing the update:

- Deactivate SIGMA AIR CONTROL *plus* in the "1.5.2 SIGMA AIR CONTROL plus" menu option [Main menu > F1 > F1 > F5 > F2] if it is activated. Wait until the message "SACplus is deactivated, you can switch off (H)" is displayed on SIGMA AIR MANAGER.
- Switch off the power supply to SIGMA AIR MANAGER (cutout in the control cabinet or the user's main power switch).
- Insert the loaded flashcard in the front PC card slot of the SIGMA AIR MANAGER as described below:
  - If a PC card modem is fitted, pull out the phone plug and carefully push in the modem's XJack connection until it latches.
  - Remove the cover plate of the PC card slot.
  - If a SIGMA AIR CONTROL *plus*-memory device is plugged in, release it by pressing the black knob beneath and pull it from the slot.
  - Insert the flashcard into the first (closer to the control panel) PC card slot. The side with the large print (manufacturer's trademark) and the small arrow pointing to corresponding slot must face the SIGMA AIR MANAGER control panel.
  - Carefully push the flashcard into the slot until the black knob underneath moves to the outside.
- If the SIGMA AIR CONTROL *plus* does not yet have the current version v1.10 it must be updated to this version. In this case, proceed as follows:
  - If a PC card modem is fitted, release it by pressing the black knob beneath and pull it out.
  - Insert the SIGMA AIR CONTROL *plus* memory device in the far (more removed from the control panel) PC card slot. The side with the large print (manufacturer's trademark) and the small arrow pointing to corresponding slot must face the SIGMA AIR MANAGER control panel.
  - Carefully push the SIGMA AIR CONTROL *plus* storage medium into the slot until the black knob underneath moves to the outside.
- Switch on the power supply to the SIGMA Air Manager.

- The system will execute the first step of the update. **FLASHING DEVICE...** will appear in the first lines of the display.
- The first step is concluded when **\*\*\* FLASHING COMPLETE! \*\*\*** appears. Switch the power supply to SIGMA AIR MANAGER off and on again to start the second stage of the update. The system will display **RESTORING PARAMETER...** if you perform an update with the import of customer-specific settings. In every other case, **SETTING PARAMETER...** will be displayed.
- When **\*\*\* UPDATE COMPLETE! \*\*\*** is displayed, switch off the power supply of the SIGMA AIR MANAGER and remove the flashcard as follows:
  - If a SIGMA AIR CONTROL *plus* storage medium is fitted for the update, press the black knob beneath to release the medium and then pull it out.
  - If the PC card modem had been removed for the SIGMA AIR CONTROL *plus* update and it is to be used again, re-insert this card in the rearmost slot. Carefully push the PC card modem into the slot until the black knob underneath moves to the outside.
  - Release the flashcard by pushing the black knob beneath and remove the flashcard.
  - If SIGMA AIR CONTROL *plus* is to be used again, plug the storage medium into the foremost PC card slot. Carefully push the storage medium into the slot until the black knob underneath moves to the outside.
  - Re-attach the cover plate of the PC card slot.
  - If a PC card modem is fitted, press the Xjack connection carefully until it unlatches and moves outwards. Subsequently, reconnect the telephone jack.
- Switch on the power supply to the SIGMA Air Manager. The new software version will appear on the display during boot-up; e.g. **STEP5 v1.10**.

### 7.4 Loading passwords

Switch off and on again the power supply to the SIGMA Air Manager. During the boot, the standard passwords for the current version will be loaded.

Verify the password for your authorization level by entering it in "Password/keylock" [main menu > F4]. If the system does not recognize the password, switch the SIGMA AIR MANAGER again off and on.

## 7.5 Specifying settings in SIGMA AIR MANAGER

After the boot-up, the SIGMA AIR MANAGER will display the pressure in large letters. Before switching the controller to Automatic mode, you must specify certain settings.

### 7.5.1 General settings

- Specify the language. Open the language selection menu [Main menu > F3], select your language with the F1 and F6 keys and close the menu with "Esc".
- In the "1.1.3 Country-specific settings" [Main menu > F1 > F1 > F1 > F3] set the units for pressure, temperature, FAD and volume.
- Check and correct where necessary the settings for slaves 27, 28 and 32 in the menu options "Profibus expander" [Main menu > F1 > F6 > F6 > F1 / F2].
- Check and correct the settings for the selectable point-to-point connection in the menu option "1.3.3 Modem" [Main menu > F1 > F1 > F3 > F3].
- For each conventionally connected compressor, check the pressure belonging to the defined consumption in the menu option "3.1.a Link to compressor" [Main menu > F1 > F3 > F1] in the "Consumption at pressure" field. If required, re-enter the pressure. Normally, this is the maximum working pressure of the compressor.
- The entry of a characteristic for VFD compressors with SIGMA CONTROL is mandatory. If a SIGMA CONTROL compressor was previously linked without a characteristic curve then a curve must be entered in menu option "3.3 VFD characteristic" [main menu > F1 > F3 > F3] and the characteristic assigned to the compressor in menu option "3.1.c Link to compressor" [main menu > F1 > F3 > F1 > F2]. See Section "Settings for VFD Machines (FC)" in the SIGMA AIR MANAGER service manual for the entry of the characteristic.
- With regard to the characteristics of VFD compressors with SIGMA CONTROL look in menu option "3.3 VFD characteristic" [Main menu > F1 > F3 > F3] to see whether the values of FAD and power consumption in the characteristic fields "max" and "7" are the same. If this is the case, then delete the characteristic entered in the "max." field (enter "0" as speed).
- Check and correct all settings of the SIGMA AIR MANAGER.
- Activate the interface in the "1.3.1 Profibus" menu option [Main menu > F1 > F1 > F3 > F1].
- If SIGMA AIR CONTROL *plus* is to be used, open the pages "Settings > Tarifff" and "Contact/Service" with the browser and check and correct the input fields.

### 7.5.2 Specifying settings for the adaptive 3D-control

- Open the "2 Control" menu option [Main menu > F1 > F2]. If the system displays "Registration code: -1" in the first line of the menu option, enter the valid release code. You will only then be able to switch the SIGMA AIR MANAGER to Automatic operation.

- **i** When setting the standard parameters take into account the maximum operating overpressure of the compressors.

Adjust the required pressure in the "2 Control" menu option [Main menu > F1 > F2] and, if required, the pressure range and the SFC control range ("2.1 Further settings" menu option [Main menu > F1 > F2 > F1]). The appropriate form is provided in Section 0.

- Adjust the Pressure low monitor in the "2 Control" menu option [Main menu > F1 > F2]. Use 0.2 bar to 0.5 bar as reference value for  $\Delta p$ .
- If pressure band expansion has been used previously, you must adjust the lowering value in the "2.1 Further settings" [Main menu > F1 > F2 > F1] in the "Lower required pressure by" field and select the respective compressor.
- Set the "Actual pressure value damping" to 1 second in the "4.2 System pressure" menu option [Main menu > F1 > F4 > F2].
- If required, set the delivery limit in the "4.4 Further settings" menu option [Main menu > F1 > F4 > F4] and activate the same.
- If required for heat recovery for instance, define the compressors to be always activated first in the "4.4 Further settings" menu option [Main menu > F1 > F4 > F4].
- If required for standby systems for instance, define the compressors to be always activated last in the "4.4 Further settings" menu option [Main menu > F1 > F4 > F4].
- If the clock is required, select the "5 Shift Clock" menu option [Main menu > F1 > F5]. Adjust the required pressure for the individual switching point and pre-select the desired compressors.

- **i** Using the clock when adjusting the switching sequence to the consumption (layers) is not required because the adaptive 3D-control automatically adjusts the selection of the compressors to be switched.

- If the SIGMA CONTROL controllers cannot be updated to at least version 81.00 (see Section 5) you must enter the times of the QUADRO control for the concerned compressors on the SIGMA AIR MANAGER in the "Memory access" menu option [Main menu > F2 > F6] according to the following address allocation:

Off period of compressor x:	D	B: 52	DW: 31+x =	time in s
Run time of compressor x:		DB: 52	DW: 47+x =	time in s
Venting period of compressor x:		DB: 52	DW: 63+x =	time in s

Example for compressor 6 with an off time of 450 s, a run time of 450 s and a venting period of 45 s:

Off period of compressor 6:		DB: 52	DW: 37 =	450d
Run time of compressor 6:		DB: 52	DW: 53 =	450d
Venting period of compressor 6:		DB: 52	DW: 69 =	45d

If, contrary to the recommendation, the concerned SC compressor is operated in DUAL control, you must enter the value 0d for off time and run time and the run-on time in seconds for the venting period.

- **i** The adaptive 3D-control automatically records the run-on time for conventionally connected compressors.

## 7.6 Switching to Automatic operation

- Preselect all required compressors with the preselect keys on the SIGMA AIR MANAGER (the LEDs in the preselect keys are lit).
- Switch the air system back to automatic mode with the AUTOMATIC key (the LED in the AUTOMATIC key is lit).
- SIGMA AIR MANAGER now controls the compressed air system.
- If messages are queued at the compressors with SIGMA CONTROL (up to software version 0.6x), acknowledge these messages and switch the compressors to remote operation using the remote key (LED of remote key is lit).
- Acknowledge any messages in the SIGMA AIR MANAGER.
- After several switching actions in automatic mode, you can reset the overall power consumption and the overall FAD (joint reset), the maximum pressure, the mean pressure and the minimum pressure (joint reset). With this action, you create a new starting point for the control analysis.

### 7.7 Specifying settings for SIGMA CONTROL compressors

In order to ensure that the compressed air system will automatically restart after a simultaneous power failure at the compressors and the SIGMA AIR MANAGER, you must specify the following setting (Communication > Profibus > Bus fault > Start td):

- Only in SIGMA AIR MANAGER without SIGMA AIR CONTROL plus:  
Set the time "Start td" from 15 s to 30 s in the parameters for a bus fault.
- Only in SIGMA AIR MANAGER with SIGMA AIR CONTROL plus:  
Set the time "Start td" from 15 s to 40 s in the parameters for a bus fault.

### 7.8 Checking the emergency operation of SIGMA CONTROL compressors

Check the following items for emergency operation: Information to functionality and settings of the emergency operation are provided in the operating manual of the SIGMA AIR MANAGER. Ensure that the emergency operation works correctly.

- Switch off the power supply to SIGMA AIR MANAGER (miniature circuit breaker in the control cabinet or the user's main power switch).
- The air system is in emergency mode. The compressors connected to SIGMA AIR MANAGER switch to their own internal control. The compressed air supply is ensured independently of the SIGMA AIR MANAGER.
- Switch on the power supply to the SIGMA Air Manager.
- The compressors switch to automatic mode. SIGMA AIR MANAGER controls the compressed air system.



Because of the internally cascaded pressure regulation settings on the compressors, system pressure will swing much further in emergency mode than in automatic mode with SIGMA AIR MANAGER.

### 7.9 Activating SIGMA AIR CONTROL plus

If SIGMA AIR CONTROL *plus* is to be used, activate it in the "1.5.2 SIGMA AIR CONTROL plus" menu option [Main menu > F1 > F1 > F5 > F2].

## 8. Documenting the software update

Record the new software versions in KAESER SAP in "Equipment" of the updated SIGMA AIR MANAGER and the updated SIGMA CONTROLS.

## 9. Updating the visualisation PC

The Sun Java Plugin JRE 6.0 Update 20 (1.6.0\_20) or higher must be installed in your visualisation PC if you want to use SIGMA AIR CONTROL. If this is not the case, you must install a current Sun Java plugin. See SIGMA AIR MANAGER operating manual, Section "Linking External PC to the master controller" for the installation.