

EC-Control Manual V3.0

PC control software 25714-2-0199 for bus-compatible fans

ebmpapst

The engineer's choice



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This manual has been compiled with the necessary diligence. Nevertheless we cannot accept any liability for its completeness or correctness.

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Change history

Date	Version	Change
6/4/2009	1.00	First version of manual
1/26/2011	2.00	Adaptation to EC-Control 2.00
10/11/2011	2.10	Adaptation to EC-Control 2.10
12/20/2012	2.11	Minor corrections (style and references)
6/21/2013	2.20	Adaptation to EC-Control 2.20
4/2/2014	2.30	Adaptation to EC-Control 2.30: Group timer, modified display setting dialog, display of scanned fans
6/19/2015	2.40	Adaptation to EC-Control 2.40: New parameters for ESM with MODBUS. Description of status line.
1/7/2016	3.00	Adaptation to EC-Control 3.00:

1 Introduction

EC-Control permits the visualization and parameterization of ebm-papst ebmBUS and MODBUS fan networks. The maximum number of devices possible on the bus system concerned is supported.

In particular, EC-Control permits the following activities:

- Setting of fan parameters such as operating mode, set value and control parameters
- Alteration of fan address
- Readout of fan parameters such as actual speed, serial number and date of manufacture
- Readout of failure status and fault memory
- Monitoring of fans, including the possibility of reporting failures by e-mail
- Management of multiple fans within one program installation
- Support of RS232/RS485, Ethernet/RS485, USB/RS485 interface converters and the Bluetooth adapter
- Simultaneous monitoring of ebmBUS and MODBUS-based fan components (requires multiple interface converters)
- Monitoring of ebmBUS-based fans with up to 4 x 7,905 fans and MODBUS-based fans with up to 4 x 247 fans.

1.1 Use of manual

How is it best to work with this manual?

- Read Chapters 1 and 2 in full prior to installation. Keep Chapter 3 to hand when installing and configuring your first fan and follow the instructions step by step.
- At least glance over Chapter 4 after configuring the fan, as this explains the general operating concepts of EC-Control.
- Consult the other chapters as required.
- The Annex provides brief explanations of the individual fan parameters and a useful reference table showing the authorization details for the individual user levels.
- Diagrams and screenshots show specimen data only. The actual configuration will differ from this.

1.1.1 Text conventions

Italics are used in this manual for user entries or predefined values in selection lists.

Text in italics and with dashed underlining is used in this manual to indicate menus, buttons and keyboard shortcuts.

1.2 New functions and functions modified since EC-Control 2.30

- Conversion of the program to one that uses Unicode. This means that it is no problem to use languages that do not correspond to the current system setting without having to change global system settings. Example: Execution of the Russian version on a German-language PC.
- Support of the energy-saving motor (ESM) with MODBUS interface. All parameters of the ESM with MODBUS product range have been implemented.
- Support of the MODBUS profile *ebm-papst product range V6.00* for the 2016 model generation of size 150. To achieve this, minor changes were made to certain input/output designations in the interests of standardization.
- Enhanced support of devices with MODBUS Lite, for example by hiding the non-available operating mode Closed Loop Sensor Control.
- Linking of third-party software to EC-Control is now basically possible. To provide a reference for implementation, OPC-DA interface software for linking to building management software is included.
- Option of activating a simple status website allowing the status of the monitored fan to be viewed from other PCs as well. In many cases there is then no need to use remote desktop software.
- On switching to *Closed Loop Speed Control* operating mode, a prompt has to be confirmed before the control parameters are set to fixed specified values.
- A warning will appear if an attempt is made to activate the setting *Save set value in EEPROM* for devices that do not correspond to the MODBUS profile *ebm-papst product range V6.00*. In extreme cases, careless use of this function in conjunction with external control systems could lead to failure of the device on account of an excessive number of write-accesses to the parameter memory of the motor.
- One control element each has been replaced in the dialog for the e-mail settings and on the failure list screen (*File/Failure list*). The failure list is now able to present the individual list entries against a background of the corresponding status color and can be scrolled via finger on touch screens.
- This manual can be conveniently opened from the EC-Control Help menu or alternatively using the key *F2*.
- For user accounts on authorization level *Demo*, individual settings can be made to determine whether or not a particular user is allowed to end the program.
- The default values for *Set value 1* and *Set value 2* in the I/O configuration dialog (*Options/I/O settings*) have been altered to 100 % to stop users inadvertently switching off fans at the start of the program.
- In addition to Ctrl +/Ctrl – it is also possible to use the key combinations Ctrl Scroll Up and Ctrl Scroll Down for zooming in the room plan, as the + and – keys required on the number pad are often not available on laptops.
- The configuration assistant makes it possible to set a separate communication timeout for each interface.
- A user account can be declared to be the so-called Auto-login user. This user is logged in automatically each time EC-Control is started. This permits the implementation of automatic PC restart after power failure scenarios in a clean room. The lock screen appears on completion of EC-Control login.
- Support of newer ebmBUS profiles in general

- Various problems have been resolved:
 - If, due to the fact that the user's own account did not have administrator rights, installation was carried out under a different user account, EC-Control did not adopt the language selection made in the installation program. In such cases, EC-Control always started with English on first start-up.
 - An error, which meant that automatic address assignment for MODBUS fans only used to function with a maximum of eight fans, has been corrected.
 - Errors in both the global and the IO group timer (see also [Chapter 5.9](#) and [Chapter 5.10](#)), which used to mean that not all fans were automatically switched under certain conditions, have been corrected.
 - An error in the colored status display in the structure tree has been corrected.
 - Unsuccessful restoration of a MODBUS fan back-up no longer results in an incorrect fan address in EC-Control.
 - No percentage bar was displayed on certain configuration assistant screens on devices with a screen scaling factor set to more than 100 % in the Windows display settings.
 - If the option to highlight recently scanned fans has been disabled the fans showing this status continued to show it when being displayed as bitmaps.

1.3 Safety information

Read this manual carefully before starting work. Malfunctions can result if the following warnings and instructions are not observed. Make sure the manual is always within reach at the place where the software is being used. On sale or transfer of the software, the installation instructions and the manual must be included. These installation instructions may be duplicated and distributed to inform about potential dangers and their prevention.



Use is subject to the industrial safety regulations of the country concerned.



Interference from electromagnetic radiation is possible. If impermissible radiation levels occur following installation, appropriate shielding measures must be taken by the user.



Take precautions to prevent inadvertent fan activation. This could result in serious or even fatal injury. Always operate fans with guard grills.



This software is not designed for use in facilities such as nuclear power plants, where safety is of critical importance. The software has no real-time capability.



It is not advisable to use fans in clean room fabs without constant monitoring (by whatever software). The monitoring PC must be provided with a UPS as a safeguard against sudden power failure.

Intended use

- Parameterization, control and diagnosis of ebm-papst fans with an RS485-based ebmBUS V3 or MODBUS with ebm-papst standard or ESM profile.

Improper use

- Use of the interface converters with interfaces not intended for them
- Use of the interface converters at higher voltages than those specified in the instructions
- Non-intended use of the interface converter cables
- Use in extremely humid environments (heavy rain or high humidity)
- Use in explosion-hazard areas
- Start-up of fans by way of software with the safety features not activated
- Deactivation of fan firmware safety functions due to incorrect parameterization
- Use of the software in facilities where safety is of critical importance
- Use of the Bluetooth adapter in areas for which restrictions apply with regard to the 2.4 GHz frequency band (2.402-2.48 GHz)

Non-supervised operation of the Bluetooth adapter. There must be visual contact with the fan and the Bluetooth adapter should be readily accessible.

2 Installation

This chapter describes all preparatory steps to be carried out before starting the application for the first time. In addition, it contains useful decision-making tools for setting up the fab and selecting the interface converter best suited to your needs.

2.1 System requirements

The system requirements depend on the size of your fab. However the following basic conditions are always the same:

Minimum computer specifications:

- Windows 7 or
- Windows 8.1 or
- Windows 10, October 2016 version
- Approx. 80 MB available capacity on hard disk; extra space is required for the driver if using the USB relay box
- Monitor with at least 1024 x 768 pixel resolution and 16-bit color depth
- CD ROM drive (only needed during installation)
- Mouse, trackball or comparable pointing device

The following requirements apply depending on the size of the fab:

- Processor at least Pentium IV 1 GHz or comparable. A faster processor is recommended for simultaneous operation with multiple interface converters!
- Minimum 1 GB main memory, we recommend at least 2 GB.
- An optional second monitor. This may have a lower resolution than the primary monitor, but a resolution of at least 800 x 600 pixels is recommended.
- An optional printer if a failure report is to be printed out each time a failure is detected.
- An optional ebm-papst USB relay box (Item no. 10450-1-0174) if signaling by an alarm relay is required when failures are detected.
- To send e-mails, an e-mail server connection is required. Details can be found in [Chapter 5.8](#).
- At least one interface converter of the following types:
 - RS232 (Item no. 21487-1-0174)
 - RS232 (Item no. 21495-2-0174)
 - Ethernet (Item no. 21488-1-0174)
 - Ethernet (UL-certified) (Item. no. 21489-1-0174)
 - Bluetooth adapter (Item no. 21501-1-0174)
 - USB (Item no. 21490-1-0174)

- When using the Bluetooth adapter, the following Bluetooth software stacks are supported:
 - Microsoft stack
 - Widcomm/Broadcom stack (version 5.6 or higher)
 - Toshiba stack (version 7.0 or higher)

Use of the Bluetooth adapter has been tested with different hardware and the above-mentioned software versions for PCs. Incompatibility or instability cannot however be ruled out in certain cases. It is not possible to test all the hardware and software combinations available on the market.



This software has not yet been fully optimized to support high DPI (*Dots per Inch*) settings. A higher DPI setting in Windows will make the screen display appear larger without any alteration to the physical monitor resolution.

DPI settings greater than 140 DPI are currently not recommended and may cause the content of the screen to be cut off by the automatic window scaling, especially with a vertical monitor resolution of 768 pixels.



Do not install this application if one of the following database server products has already been installed:

- Borland Interbase/CodeGear Interbase/Embarcadero Interbase
- Firebird

In such cases it is essential to consult your ebm-papst contact. EC-Control uses Firebird version 2.1.3.

2.2 Basic fab setup

The following information on fab setup and the notes in [Chapter 2.3](#) are intended to help users not yet in possession of one of the RS485 interface converters listed in [Chapter 2.1](#) select the converter best suited to their purposes.

EC-Control can manage two different types of fab. The type of fab sufficient for the majority of applications is the small size fab shown in Fig. 2-1. This consists of the computer, a single interface converter and the fans, all of which are connected to the computer via this interface converter. A printer or the USB relay box for signaling failures can be connected as an option. It is essential for all fans to have the same bus system (ebmBUS or MODBUS). Combined operation of different bus systems on one interface converter is not possible.

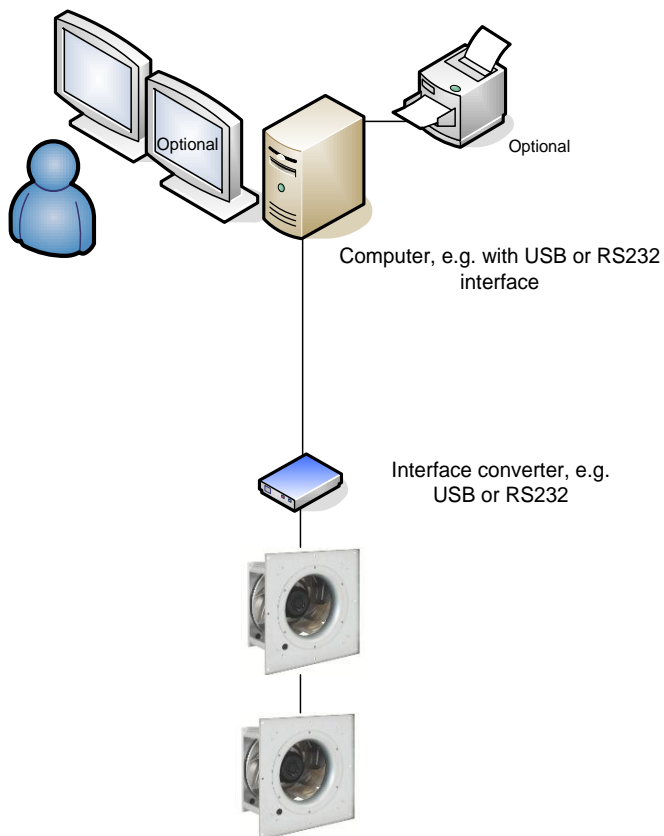


Fig. 2-1 Small size fab

For larger fabs (> 1,000 fans for ebmBUS or more than 247 fans for MODBUS), it is advisable to distribute the fans over several interface converters as shown in Fig. 2-2, preferably Ethernet/RS485 converters. In EC-Control, these have faster response times compared to other interface converter types. In the case of Ethernet/RS485 interface converters, a commercially available Ethernet switch may also be required to connect several interface converters to the PC or to integrate the converter into a larger network. For optimum performance in this case, the fans should be driven by a separate network card used specifically for this purpose. In addition to improved response time performance, the large size fab shown in Fig. 2-2 is also more reliable, as the failure of one interface converter only results in loss of access to the fans connected to the PC via this particular interface converter.

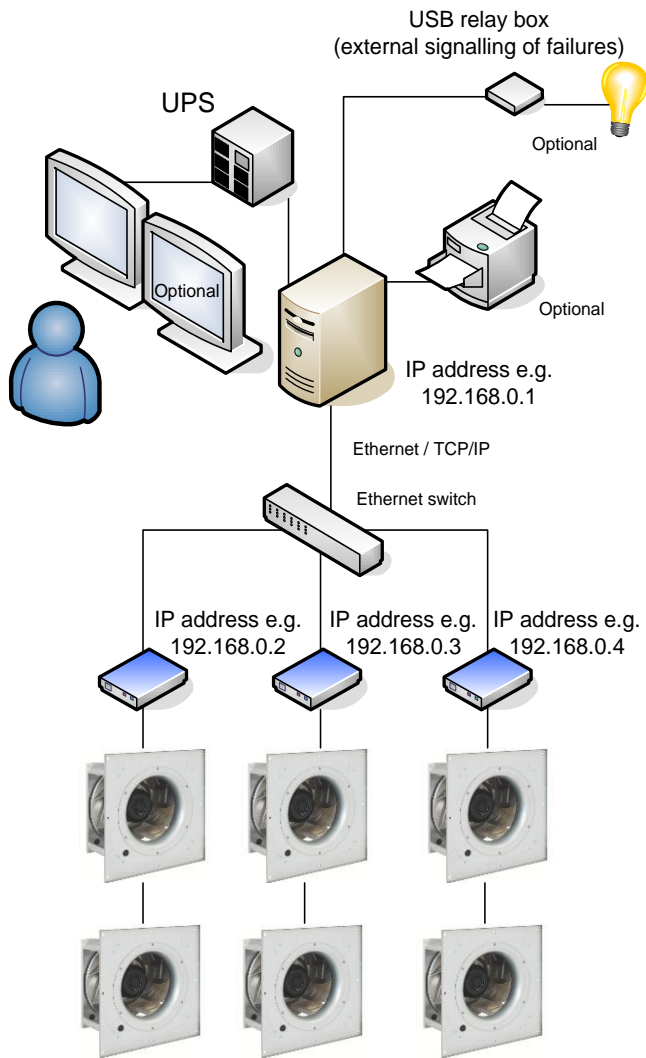


Fig. 2-2 Large size fab

Several Ethernet/RS485 interface converters are connected via a switch to the network card of the computer. The individual network segments are called subnets. Monitoring of the clean room fans is safeguarded by a UPS (*Uninterruptible Power Supply*).

All fans are connected to the interface converter concerned in either a linear or a star configuration. The printer and a second monitor are optional. Only fans of the same bus system (*ebmBUS or MODBUS*) are to be connected to each interface connector. However it is possible to combine different bus systems within one fab. EC-Control currently permits a maximum of four interface converters with MODBUS and a maximum of four interface converters with *ebmBUS* in one fab.

This configuration increases reliability and the scanning rate and is therefore particularly well suited to monitoring large-scale clean room fabs. In this case it is also advisable to safeguard the computer with a UPS to enable the fab monitoring system to register the fab status without any time delay in the event of power failure.

General rule:

In fabs with more than 31 *ebmBUS* fans, it may be necessary to use RS485 repeaters (Item no. 25708-1-0174) depending on the type of fan.

2.3 Notes on selection of the most suitable interface converter


Since version 2.0, EC-Control has supported a variety of different RS485 interface converters. The following points are intended to assist with selection.

- The USB interface converter is recommended for small size fabs. This is compact and needs no separate power supply and the electrical isolation protects the computer USB interface against possible interference on the RS485 bus line. Every modern computer or laptop has such an interface.
- If wireless mobility is required, use should be made of the Bluetooth adapter. Within a range of 10-20 m, depending on the ambient conditions, this permits freedom of movement without cumbersome cables. This wireless technology is already integrated into many current laptops; for all other laptops and desktop computers, this interface can be retrofitted using inexpensive USB Bluetooth adapters. We recommend devices that use Microsoft Bluetooth software. In principle, EC-Control also supports the Bluetooth software package from Toshiba.
- For large fabs with subnets, we recommend the Ethernet/RS485 interface converter (Item no. 21488-1-0174 or the UL version Item No. 21489-1-0174). This is electrically isolated and is supplied with a plug-in power supply suitable for use in many countries. The UL version Item no. 21489-1-0174 includes a plug-in power supply suitable for use with 115 V 60 Hz systems only. The advantages of the Ethernet interface converters are the faster response times compared to the other interface converter types and the option of integrating the interface converter into an existing computer network, thus also enabling the EC-Control computer to be installed at a remote location far away from the fans to be monitored.
- RS232 interface converters are now not recommended for new acquisitions, as more and more computers and laptops are no longer equipped with this interface. On account of the fact that Item no. 21495-1-0174 is not electrically isolated, severe interference on the bus cable can also damage the interface of the PC. This is not a problem with Item no. 21487-1-0174. However the plug-in power supply provided is only designed for use with continental European systems (Euro plug).



2.4 Installing

Insert the installation CD in the CD ROM drive. A menu should appear. If not, this means the Windows Autoplay function has been deactivated. The `cdmenu.exe` application should then be started manually on the CD ROM by way of the Windows Explorer.

 Administrator rights are required for installation. In Windows 7, a user account control (UAC) dialog allowing installation by way of an administrator account is automatically displayed on starting. In Windows XP, the user account employed for installation should have administrator rights for the duration of installation. Users not in possession of an administrator account password should consult their administrator.

An existing EC-Control installation can be updated using the same procedure as for new installation. All the settings made will then be retained.

The "CD menu" application contains this manual in all available languages, the EC-Control installation program, drivers for the USB interface converter and the USB relay box.

The EC-Control installation program is the same for all languages. On starting, select the dialog language required. EC-Control is always installed with all language packages. The default setting is the language selected on installation. The EC-Control language can be altered at any time in the login dialog. The version of the manual (PDF file) appropriate to the language selected is also installed. This can then be found in the Windows Start menu under *Start/Programs/EC-Control*. If the manual is not available in a particular language, the English version will be installed instead. The Adobe Reader program contained on the CD or alternative PDF viewer software is required for viewing.

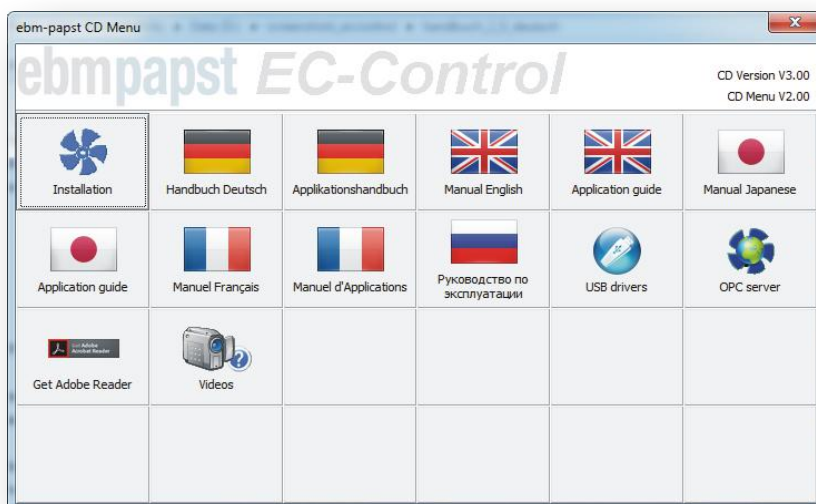


Fig. 2-3 CD menu

Click the installation program (*Installation*) and follow the instructions on the screen. The application can be installed over an existing installation of EC-Control. Existing user settings will then be retained.

During installation, the Firebird database system used by EC-Control is installed. If a previous EC-Control installation is found, a back-up copy will be made of the existing settings and fan failure lists. These are then adopted on first starting EC-Control. This process may take some time depending on the volume of data involved.

To be able to make use of the USB interface converter, the corresponding driver must first be installed from the EC-Control CD. To do so, start the *cdmenu.exe* application on the installation CD again. Click *USB drivers*. A sub-menu opens. Select *USB/RS485* and wait until the automatic installation process has been completed.

An appropriate driver also has to be installed to be able to use the USB relay box. First connect the relay box to the PC. If Windows displays a message indicating that it has found new hardware and wants to search for a driver, click *Cancel*.

Then start the *cdmenu.exe* application on the installation CD again. Click *USB-drivers*. A sub-menu opens. Select *Relay_box*. Follow the instructions of this installation program and connect the relay box on completion of installation.

2.5 Uninstalling


To uninstall EC-Control, call up *Start/Settings/Control panel*. Depending on the operating system, the list of installed applications can be found under *Software* (Windows XP) or *Programs and features* (Windows 7).

Select EC-Control from the list and then click the *Remove* button. Follow the instructions given by the setup program. After uninstalling EC-Control, the Firebird database used can be uninstalled in the same way as EC-Control.



On uninstalling, the database file in which EC-Control stores all its fab configurations and settings is deleted. These settings have to be made again if EC-Control is re-installed at a later date. **Uninstalling** is not necessary to update EC-Control to a later version. The database file is called *eccontrol.fdb* and, in Windows XP, is in the directory *C:\Documents and Settings\AllUsers\Application Data\eccontrol*.

3 Setting up your fab

 Should, on first starting EC-Control, a desktop firewall, such as the one integrated into Windows, request an exception for port 3050, this must be allowed.

After successfully installing the software, you can start EC-Control for the first time and configure your fab. EC-Control can be found as a link on your *Desktop* and under *Start/Programs/EC-Control/EC-Control*.

When started for the first time after installation, EC-Control converts the database in which all settings are stored. This also takes over existing settings from a previous installation. This may take some time depending on the volume of data involved. The following login dialog is then displayed:



Fig. 3-1 Login screen

The screen text language is a default setting made during installation. It can be changed here if required.

EC-Control allows multiple fabs to be stored on the same computer. Select the fab to be used on the login screen. Two fabs are pre-defined as standard. Only the *Customer* fab is intended for use by customers.

Enter your user name and password and click *Login*. The data for the selected configuration will be loaded.

The following user accounts are pre-defined for the *Customer* fab:

User name	Password	Purpose
<i>Demo</i>	<i>Demo</i>	User without the right to change settings. Ideal for non-supervised trade show demonstrations.
<i>Customer</i>	<i>Tiger</i>	User who is only allowed to change a few selected fan parameters. Suitable for monitoring fabs for example.
Administrator	ECisCOOL	Fab configuration can only be performed with this authorization level.

When logging into a fab for the first time, EC-Control asks whether the configuration assistant is to be activated. The answer to this question should normally be Yes. Experts can also employ the old configuration procedure if required. For further information, see [Annex B](#).

3.1 Configuration using the assistant

The assistant guides you through all the necessary steps for configuring the fab. It can also be started by way of *File/Configuration assistant* and used to change basic parameters following configuration of a fab or to add more fans on expanding the fab.

The following start screen appears:

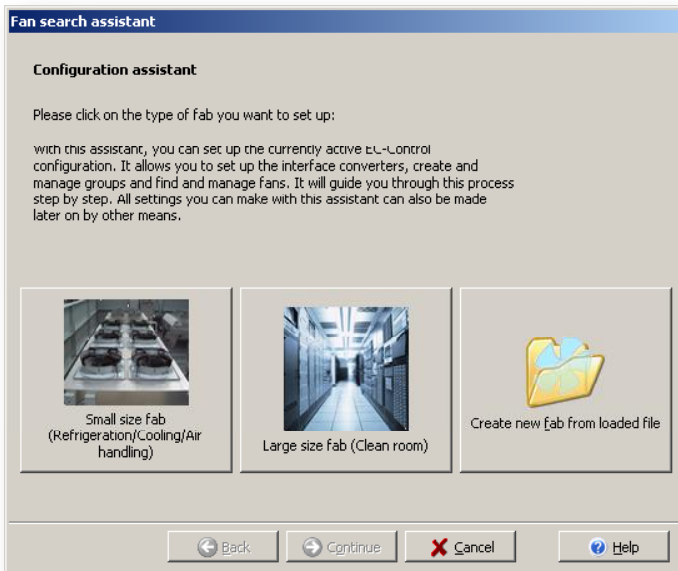


Fig. 3-2 Start screen of the configuration assistant

The assistant provides three different fab configuration options:

- **Small size fab** – This is a simplified version of the assistant specially tailored to the requirements of ventilation and refrigeration applications. It allows configuration of a single interface converter only. The room plan cannot be altered and no logical groups can be defined. When using the ebmBUS system, the search for fans is limited to the first five groups. This corresponds to the "Small size fab" diagram in [Chapter 2.2](#).
- **Large size fab** – This option allows you to use all the functions of EC-Control and is particularly useful for clean rooms and situations in which more flexibility is required. It is possible for users to use their own room plan. Logical groups can be defined to make fan management easier, and up to four interface converters can be configured for each bus system. In this way it is possible to increase the maximum number of fans that can be managed by EC-Control.
- **Load fab from file** – This enables data for the fab to be configured to be loaded from a CSV file. Suitable CSV files can be created by exporting a configured fab from EC-Control or manually using a spreadsheet program. Details can be found in [Chapter 3.3.4](#). Information on the structure of the CSV files can be found in [Annex C](#).

These three options are explained separately in the following sections. So it is only necessary to read the section describing the type of configuration you have selected.

3.1.1 Configuring a small size fab

1. The first step is to configure an interface converter. The following screen appears:



Fig. 3-3 Configuring an interface converter

2. Click Add. The following screen appears:

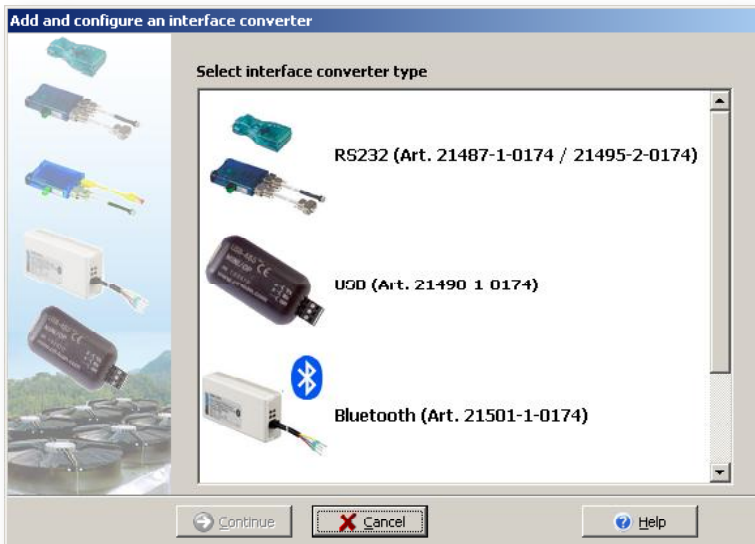


Fig. 3-4 Selecting the interface converter type to be added

For more information on configuring the various types of interface converter, see the applicable sections in [Chapter 3.2](#).

3. Click Continue after configuring the interface converter. The next step is to add the fans. Each fan must have a unique address. All ebm-papst fans have the same address when they are delivered. The following selection dialog then appears:



Fig. 3-5 Selecting the type of fan configuration

Select the first version to configure just one single fan. In this case, move on to [Chapter 3.3.1](#). Then continue with Item 4 in this chapter. If multiple fans are to be configured, select the second option and then click Continue. The following screen appears:



Fig. 3-6 Configuring multiple fans

If all the fans to be configured have already been assigned a unique address, choose the first option. The fans should already have been connected and the power supply established. Click Continue and move on to [Chapter 3.3.2](#). Then continue with Item 4 in this chapter.

In all other cases, select the second option. If MODBUS is being used as bus protocol and all the fans are capable of automatic address assignment (protocol version 5.00 or higher), the addresses required will be assigned automatically. In this case, all the fans should already have been installed in the order of their serial numbers (see nameplate) as well as connected up and supplied with power. Semi-automatic address assignment is employed for ebmBUS or MODBUS fans not designed for automatic addressing. In this case, the fans must be connected and identified in

sequence. The unique address required is assigned in this process. In the next step however, EC-Control will automatically determine which address assignment method is to be used. Click Continue and move on to [Chapter 3.3.3](#). Then continue with Item 4 in this chapter.

4. Once all fans have been added and addressed as necessary by EC-Control, click Continue. If new MODBUS fans have been added, EC-Control may read out additional information from these fans so that the fan settings mask will subsequently display only those functions that are actually featured by the fan concerned. This information is available for newer MODBUS devices only.
5. EC-Control then shows a message screen indicating that the information gathering process has been completed. Click Continue to proceed to the last configuration step.
6. The Save dialog is then displayed. This is the last opportunity to cancel configuration of the fab. The normal procedure is however to click Save. EC-Control then automatically determines positions for the fan icons in the room plan, saves all the relevant data and indicates the progress made, as the saving process may take a certain time depending on the number of fans added. Determination of the coordinates for positioning the fan icons makes allowance for existing fan icons if the configuration assistant has been used to modify an existing fab.
7. On completion of the saving process, a small message screen showing useful information appears. Click Finish to close the configuration assistant. EC-Control then loads the modified fab configuration and you can begin working with your EC fans immediately.

3.1.2 Configuring a large size fab

The mode for configuring a large size fab offers extended options as compared to small size fab mode.

1. The first screen displayed allows you to change the name of the root node of your fab and the room plan. The root node is the group node of your fab displayed at the very top of the structure tree.

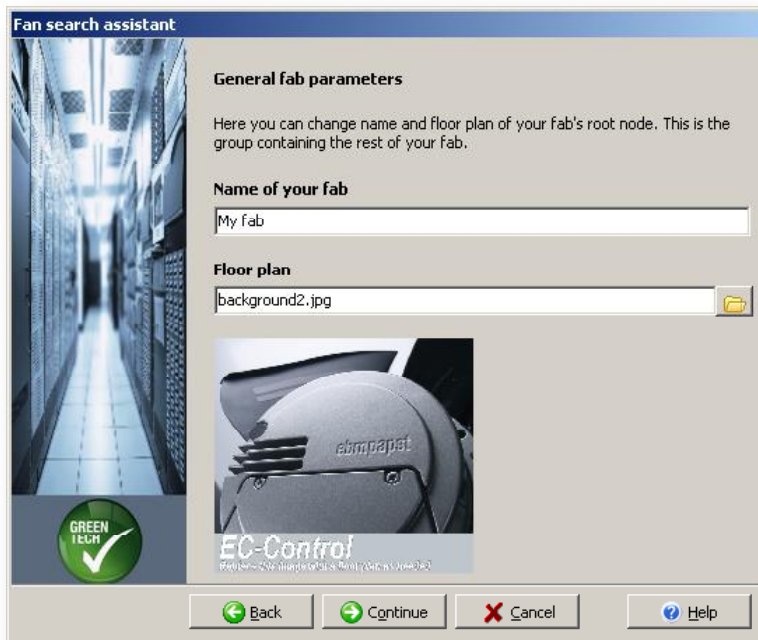


Fig. 3-7 Changing room plan

To replace a room plan, either enter the path and file name for the new room plan or select a suitable file using the Open button (📁) to the right of the input field. The graphic formats supported are JPG and BMP. It is not advisable to use graphic files that are too small (e.g. less than 320 x 240 pixels). Excessively large graphics should also be avoided (rule of thumb: not much larger than the screen resolution), as EC-Control would then require a large amount of main memory space and slow down the screen refresh process, particularly on slower computers. The selected room plan is shown as a preview in the dialog. When you have finished, click Continue to perform the next step.

We recommend using room plan graphics with a resolution of 1610x1060 pixels for monitors with a resolution of 1920x1080 pixels.

2. The next step is to add interface converters. In large size fab mode, up to four interface converters are permitted for each bus system (ebmBUS and MODBUS). These can be managed in the screen now displayed.



Fig. 3-8 Managing interface converters

3. Click Add to add new interface converters to the fab. A fab must have at least one interface converter. The following dialog appears:



Fig. 3-9 Selecting the interface converter type to be added

For more information on configuring the various types of interface converter, see the applicable sections in [Chapter 3.2](#).


Large size fab mode also provides options for removing existing interface converters from the fab and modifying or replacing an interface converter. An interface converter can only be removed from the fab if all the fans assigned to it can be assigned to a different interface converter. EC-Control shows you a corresponding selection dialog for this purpose. When replacing interface converters for example, you can replace one Bluetooth adapter with another or switch from an RS232 interface converter to a USB interface converter. The process is similar to that for configuring new interface converters. The only difference is that the settings for the existing converter are shown first in this case. To be able to change the interface converter type (e.g. from USB to Ethernet), click Back to switch to the selection dialog shown in Fig. 3-9.


- Once configuration of the interface converters has been completed, click Continue. The dialog for managing logical groups is displayed:



Fig. 3-10 Managing logical groups for an existing fab by way of example

Logical groups make it easier to locate fans in large fabs. These groups are displayed in the structure tree and can also be *dragged and dropped* from there to certain other dialogs (e.g. fan parameter dialog, filter dialog of failure list). All the sub-groups and the fans they contain are then added to the list of the other dialog.

 The logical groups are separate from the ebmBUS groups required for addressing fans. They can be named as desired. We would however advise against using any Asian or Arabic characters, as these are not currently supported.

 Logical groups may contain either sub-groups or fans. However not both at the same time.

For existing fabs, the tree shows not just the groups but also the fans to make orientation easier. Groups with a stored room plan are shown in light blue and the file name of the room plan graphics appears after the name.

To create one or more group(s), click the desired parent group and then Add. The dialog shown in Fig. 3-11 appears. In this dialog, you can specify the name for the group(s) and the number of groups to be created. If more than one group is specified, these will be numbered at the end in ascending order, starting with one. After confirming the dialog, the new groups can be seen in the tree.

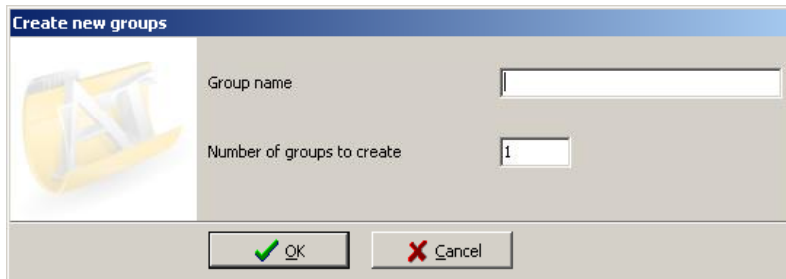


Fig. 3-11 Adding new logical groups

An existing group can only be removed if all the fans contained in this group can be assigned to another group. EC-Control simplifies this procedure by providing a dialog in which it is only necessary to click the new parent group. Confirm the change with OK. An error message will be displayed if there is no group corresponding to the requirements. This situation can be remedied by creating a new group. The fans can then be assigned to this group.

On completion of the group management operation, click Continue to start adding fans.

5. There are different ways of adding fans depending on the specific circumstances. The following screen appears:



Fig. 3-12 Adding fans to a large size fab

Please continue with the applicable section depending on the option selected here.

- If you select I have connected one single fan, continue reading at Item 6. This option is intended for identifying a single fan with an unknown address.
- If you select I have several fans, continue reading at Item 7. This option permits the addition of pre-addressed fans or the step-by-step addition of fans that still have the default address.
- If you select Do not add fans, the configuration of new fans is skipped completely and you can continue reading at Item 9.

6. As you are in *Large size fab* mode, a dialog is presented for selection of the logical group to which the fans are to be added in the following step.



Fig. 3-13 Selecting a logical group

Click a group containing no other sub-groups and then Continue. If you have selected I have connected one single fan, continue with [Chapter 3.3.1](#) and then Item 8.

7. The option *! have several fans* offers two further options. The following selection dialog is thus displayed:



Fig. 3-14 Options for configuring several fans

If all the fans are already wired and you have assigned different device addresses, select the first option. In all other cases or if you are not sure, select the second option.

If MODBUS is being used as bus protocol and all the fans are capable of automatic address assignment, the addresses required will be assigned automatically when using the second option. In the next step, EC-Control then checks whether this address assignment method can be employed. If not, a semi-automatic method is used.

Click Continue. The dialog for selecting a logical group shown under Item 6 in Fig. 3-13 appears. This is intended for selection of the logical group to which the fans added to the fab in this operation are to be assigned. It is only possible to select groups that have no other sub-groups. Later in the process, it is possible to split up the fans into different groups if this is required. After selecting a group, click Continue and then proceed with [Chapter 3.3.2](#) (first option) or [Chapter 3.3.3](#) (second option) depending on the option previously chosen (see Fig. 3-14). After reading the corresponding section, continue with Item 8.

8. After adding one or more fans to a group, it is possible to either add more fans to another logical group or to conclude configuration of the fab. To do so, click Continue in the dialog if you have not already done so. The following screen appears:

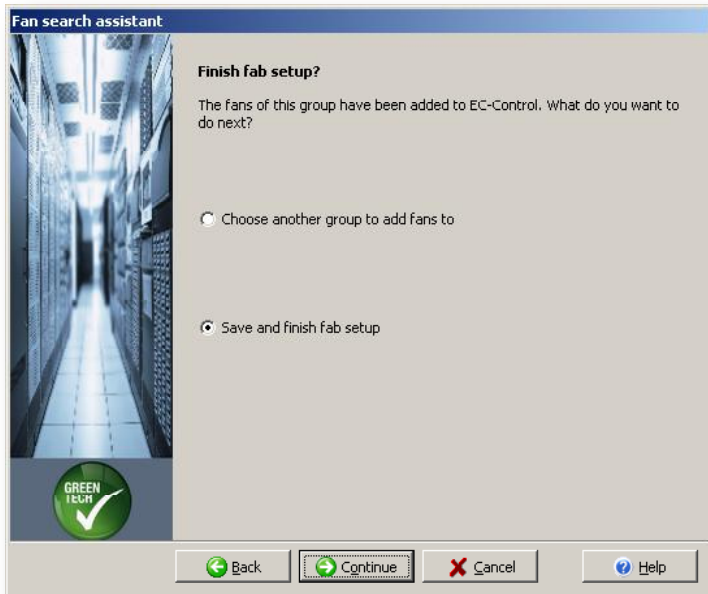


Fig. 3-15 Options after a search

If you select the first option and click Continue, the screen for selecting a logical group (Fig. 3-13) from Item 6 appears again and the Add process starts again. To conclude the process of adding fans, select the second option and click Continue.

9. If more recently manufactured MODBUS fans (as of approx. year of manufacture 2010) have been added to the fab, EC-Control will now read out detailed information on the capabilities of these devices. This process may take a moment. A message screen then appears notifying you that EC-Control has now collected all the necessary information and is ready to save the data.



Fig. 3-16 Finishing configuration

Click Save. EC-Control then saves all changes to the configuration. During this process, the following screen provides constant information on the status of the saving operation, as this may

take some time depending on the number of groups and fans added. On saving, the fans added are also automatically arranged in the room plan. The system ensures that no fan icons overlap and also takes existing fans into account. If the automatic arrangement of the fans is not appropriate to requirements, this can be manually altered afterwards using *File/Edit mode*. Detailed information on this can be found in the description of the old configuration process in [Annex B](#).

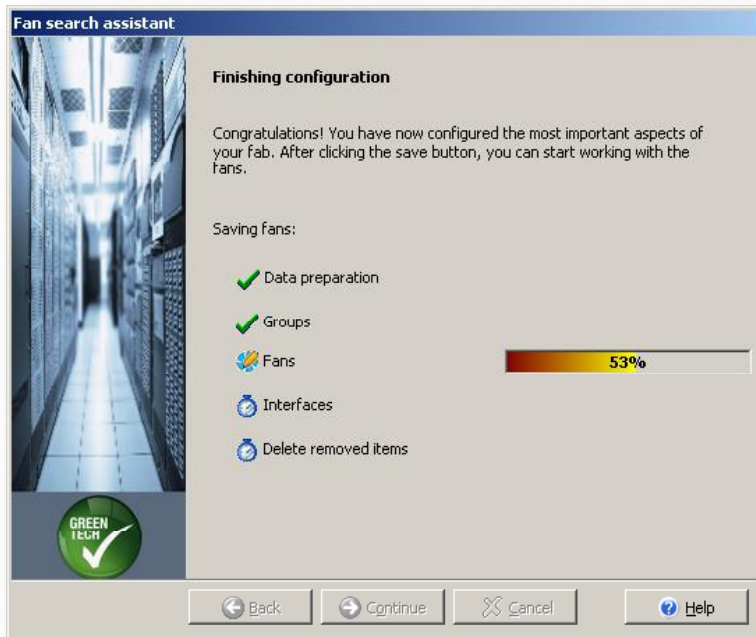


Fig. 3-17 Saving configuration

10. Once the data have been saved, EC-Control provides information on other functionalities that may be helpful. Close this dialog with *Finish*. EC-Control then loads the modified configuration. EC-Control is now ready for use.

3.1.3 Loading a saved fab

This option permits the convenient loading of a fab configuration from a CSV file. This is only possible if the fab has already been created in another EC-Control installation and exported as a CSV file (*Options/Save configuration in CSV file*) for your use or if you have manually created a CSV file in an Editor or a spreadsheet program of your choice. The structure of the EC-Control CSV file format is described in [Annex C](#).

All the relevant data for a fab are stored in the CSV file, including:

- Data of all interface converters to be configured (e.g. type and address)
- Name of all logical groups and their relationships to each other, as well as the path and file name of the room plan
- Name and address of all fans as well as their room plan position and group assignment

On calling up this option, the standard *File/Open* dialog of the operating system appears. Select the CSV file to be loaded and click Open. Loading may take some time depending on the volume of data contained. EC-Control then re-loads the active configuration, thus activating the loaded fab data.



If the CSV file contains a fab exported from another EC-Control installation, interface converters with the same addresses should be connected to the computer as far as possible when loading the file. If this is not the case, the interface converters have to be changed using the large size fab mode of the configuration assistant so that the addresses can be found. Otherwise, no communication is possible.

3.2 Details for configuring interface converters

The following sections describe the steps required for configuring each interface converter. [Chapter 3.2.5](#) only has to be heeded when working with the MODBUS protocol and if use is to be made of communication parameters (baud rate, parity, stop bits) other than those usually specified by MODBUS Standard. This is however not recommended.

Double click to select an interface converter type or click it once and then click *Continue*. Then continue with the appropriate section.

3.2.1 RS232 (Item no. 21487-1-0174 and 21495-1-0174)

The following screen appears:

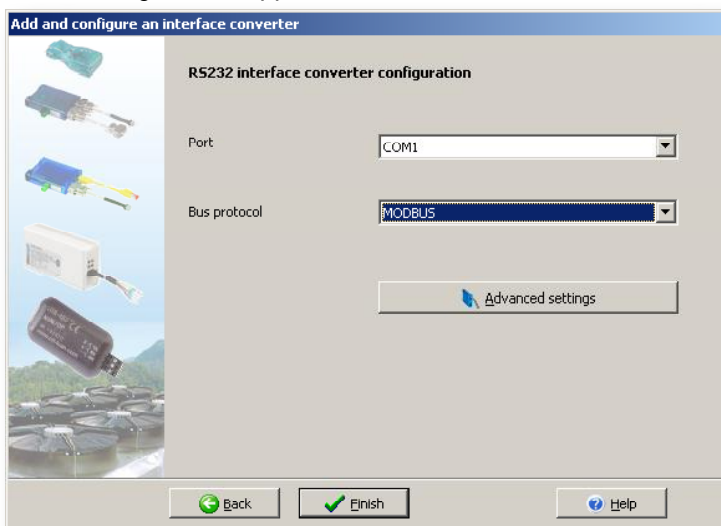


Fig. 3-18 Selecting COM port and bus protocol

Select the COM port to which the interface converter has been connected and the bus protocol to be used. Click *Finish*. Then return to [Chapter 3.1.2](#) or [3.1.3](#).

3.2.2 Ethernet (Item no. 21488-1-0174 and 21489-1-0174)

If you are using Windows XP and your user account does not have administrator rights, the following error message will appear:

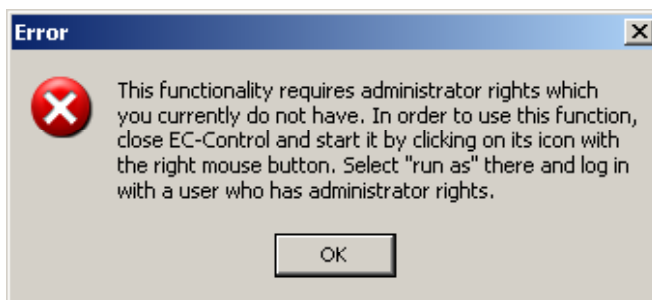


Fig. 3-19 Error message due to lack of administrator rights

In this case, close EC-Control and run it under a user account with administrator rights. If necessary, ask your system administrator for help. From the Desktop, you can conveniently run EC-Control in

another user account by opening the context menu (right click the EC-Control symbol) and selecting Run as.

The following screen normally appears:

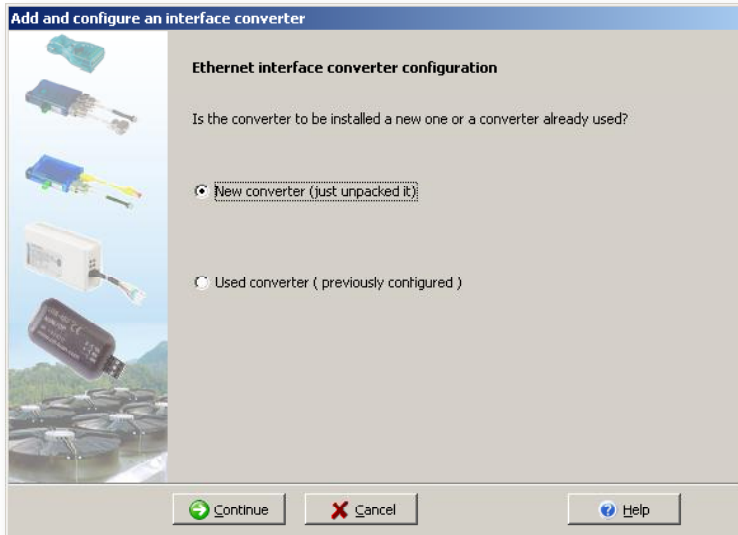


Fig. 3-20 Start screen for adding an Ethernet interface converter

A distinction is made between the following two options:

- Configuration of a brand new interface converter: continue reading with Item 1.
- Configuration of an interface converter that has already been used for some other purpose: continue reading with Item 5. This option can also be used to change the bus protocol of an existing interface converter.

1. Click Continue to start configuration of the new interface converter. The following screen appears:

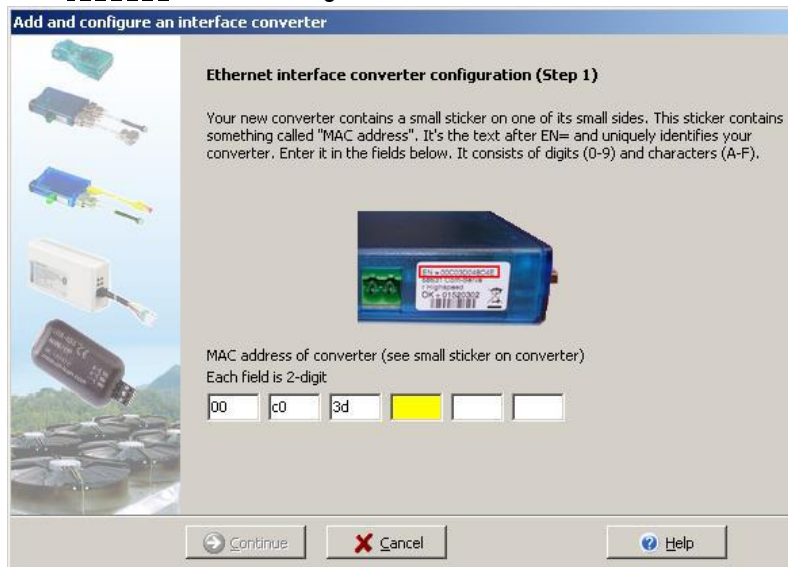


Fig. 3-21 Entering MAC address

Each Ethernet interface converter has a unique hardware address, referred to as the MAC (Media Access Control address). As you need to know this address to be able to configure the interface converter, it is printed on a label on the interface converter as shown in the dialog. The first three positions of the address are the manufacturer code and therefore already specified in EC-Control.

Simply enter the other three digit groups of the address in the blank fields and then click Continue. The digit groups of the MAC address consist of the numbers 0-9 and the letters a-f (not case-sensitive).

2. The dialog shown here is then displayed.



Fig. 3-22 Defining IP address

EC-Control addresses the interface converter by way of an IP address. This has to be entered here in the input field. What should this address be? The answer to this question will depend on your network environment. In case of doubt, ask your network administrator to help you with assignment.

If the interface converter is to be directly connected to the Ethernet interface of the computer, this should be done now, as Windows will not provide an IP address for this network connection if no physical connection has been made.

If the interface converter has been connected directly to the computer and the Ethernet interface is never used for any other purpose, a so-called static address has to be assigned for this interface. In this case, we recommend using *192.168.0.2* as the address for the computer. The interface converter is then assigned the address *192.168.0.3*. Instructions on how to configure a static IP address in Windows can be found in [Annex A – Configuring a static IP address](#). After configuring the static IP address in Windows, enter *192.168.0.3* in EC-Control and click Continue. Now read Item 3.

Incorporation of the interface converter into an existing network is somewhat more complicated. This depends on whether the network operates entirely with static IP addresses or assigns addresses automatically using DHCP (Dynamic Host Configuration Protocol). In the case of a completely static address configuration, the next unused IP address can simply be assigned to the interface converter. Type this in, click Continue and proceed with Item 3. However, if the addresses are assigned automatically in the network - as is usual in most corporate networks and for most DSL routers - the desired interface converter address has to be entered in the DHCP server or DSL router as static address. This step should be performed by your network administrator. Enter the static IP address reserved for you by the administrator in EC-Control and click Continue.

Suggest address checks the next 10 addresses for availability, starting from your own address. This is implemented employing the same technique as the operating system command *Ping*. If an available address is found and there is only one network interface on the computer, this will be

entered as the suggested value. Otherwise, a list of all the network interfaces of the computer and the corresponding available addresses found will be displayed. Select an address from this list and confirm with OK.

3. EC-Control now shows the following dialog:



Fig. 3-23 Selecting the bus protocol to be used

Select the bus protocol of the fans to be connected to this interface converter and click Continue. With the MODBUS protocol, it is also possible to adjust the configuration parameters on the bus using Advanced settings. Details can be found in [Chapter 3.2.5](#). We would however advise against this.

4. Click Continue again. The interface converter is now assigned the required IP address and the settings necessary for the selected bus protocol are made.

If you are using Windows 7, a user account control (UAC) dialog, in which you have to select one of the specified administrator user accounts and enter its password, is shown before the operation is executed. This is necessary because administrator rights are needed for an operating system function required by EC-Control.

To conclude, click Finish. Your Ethernet interface converter is now ready to use. We recommend that you write down the assigned IP address on the accompanying label. Insert the label in the plastic sleeve and affix the sleeve to the interface converter. You will then always have the IP address of the interface converter to hand when needed.

5. You have selected the option *Used interface converter*. The following dialog appears:

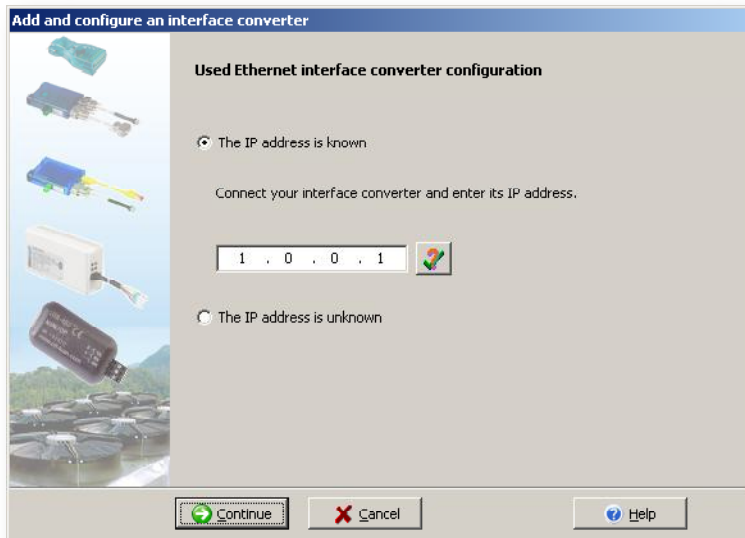


Fig. 3-24 Configuring a used Ethernet interface converter

The IP address of the interface converter will normally be known, as it should be entered on the small label in the plastic sleeve affixed to the converter. If this is not the case or you want to change the IP address, select the option *The IP address is unknown*. Then click Continue. Otherwise, enter the IP address, click Continue and proceed with Item 3.

6. As you have specified that you do not know the IP address, or because the assigned address no longer matches the active network environment, the following dialog appears:

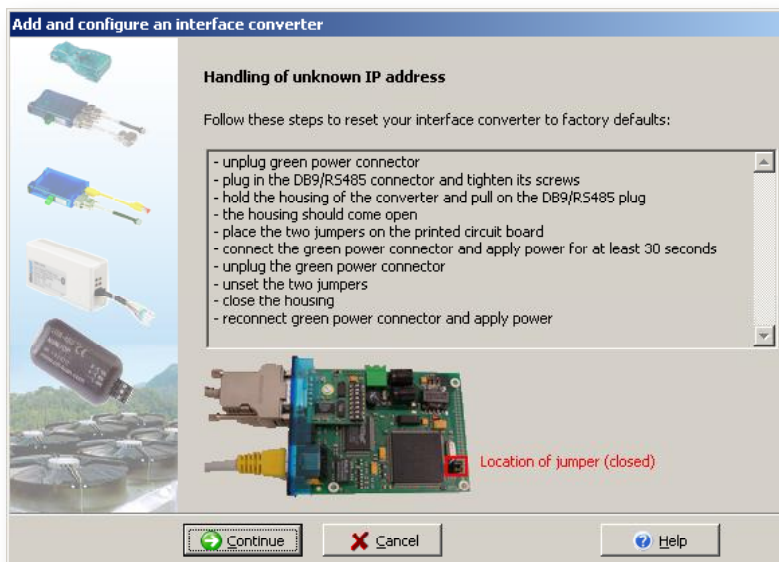



Fig. 3-25 Resetting an assigned IP address

Follow the instructions given for resetting the IP address and then click Continue. Continue reading with Item 1.

3.2.3 Bluetooth (Item no. 21501-1-0174)

 To configure the Bluetooth adapter on the PC it is *not* necessary to first configure it with the Bluetooth software (Bluetooth stack) of the PC. All configuration steps are carried out by EC-Control.

Before configuring the Bluetooth adapter, make sure Bluetooth is activated on your laptop or that a corresponding USB Bluetooth adapter is connected to your PC and the necessary drivers have been configured.

Now connect the ebm-papst Bluetooth adapter to your fan. Connect the red wire of the cable to +20 V or +15 V, the blue wire to ground (Gnd), the yellow wire to RSA and the white wire to RSB. Connect the adapter and cable together and switch on the fan. The green LED of the Bluetooth adapter should now light. If not, check the wiring and the power supply.

Then use the screen shown here as follows to configure your Bluetooth adapter.

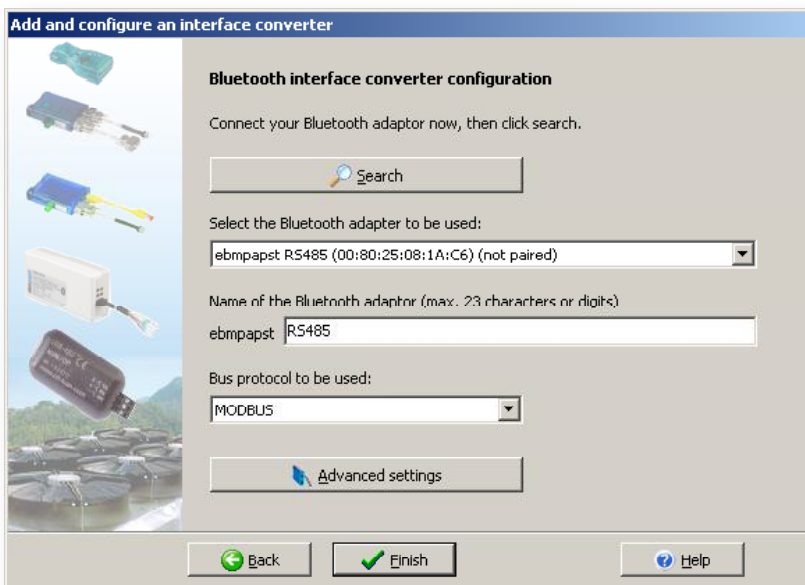


Fig. 3-26 Configuring a Bluetooth adapter

Click Search to start the search for accessible Bluetooth adapters. The search will take about 15 seconds. When the search is completed, the list should show all ebm-papst Bluetooth adapters that can be accessed in the area. If your adapter is not listed, repeat the search, as unfavorable conditions may cause the search to be unsuccessful. If no adapter is found even after repeating the search, check the following points:

- Is Bluetooth wireless activated on your computer? Laptops often have a mechanical On/Off switch for wireless connections
- Are all the necessary drivers/software components correctly installed?
- Is the green LED on the ebm-papst Bluetooth adapter lit?
- Is the adapter within the wireless range? Depending on the conditions, the range is approximately 10-20 m, but could be shorter in poor conditions. Try to reduce the distance between the computer and the Bluetooth adapter.

Select the desired Bluetooth adapter from the list of devices found. We also recommend changing the name of the Bluetooth adapter. This makes it easier to distinguish between multiple ebm-papst Bluetooth adapters. Finally, select the bus protocol to be used. After clicking *Finish*, the adapter is linked to the PC, re-named and prepared for using the bus protocol selected. These operations will take a few moments. During this process, the yellow and red LEDs of the adapter will also be lit.

From this point on make sure that, if required, Bluetooth wireless has been activated, the Bluetooth adapter has been connected to a fan and the fan switched on before starting EC-Control.

3.2.4 USB

To be able to configure the USB interface converter, the necessary USB driver must have been installed beforehand. This can be found on the EC-Control CD as described in [Chapter 2.4](#). EC-Control checks whether the driver has been installed and displays an error message if no driver is found.

Now connect the USB interface converter. Windows briefly displays a speech bubble stating *Found New Hardware*; the rest of the driver installation process is automatic.

The following screen appears in EC-Control:

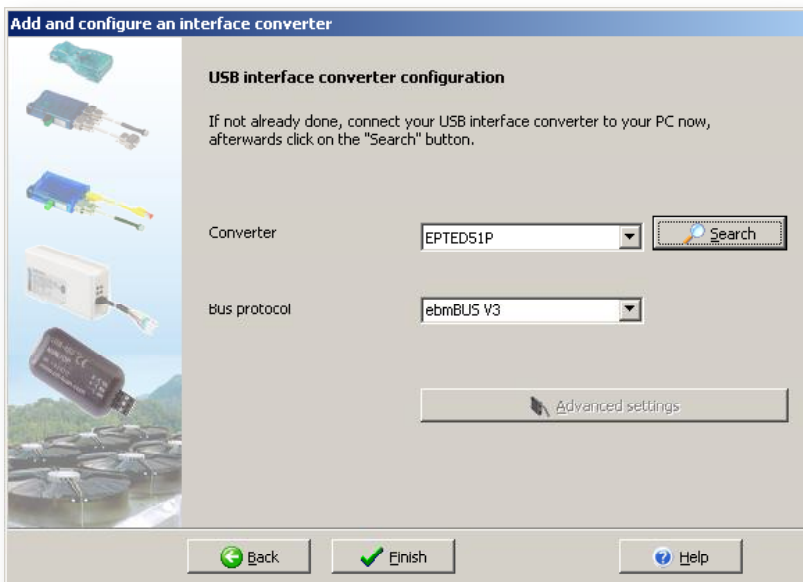


Fig. 3-27 Configuring a USB interface converter

Select the corresponding interface converter from the list and set the correct bus protocol. To conclude, click *Finish*.

3.2.5 Setting advanced communication parameters



Only expert users should call up the dialog for setting advanced communication parameters. In most cases, it will no longer be possible to communicate with your MODBUS fans if these settings are altered. The fans must have been set *beforehand* to the same parameters as the interface converter.

If necessary, the baud rate, parity and number of stop bits for interface converters using the MODBUS protocol can be altered here. The default settings for the MODBUS protocol are:

Baud rate	19200 baud
Parity	even
Stop bits	1 stop bit
Data bits	8 data bits, not adjustable

3.3 Detailed information on adding fans

The following sections explain all the possible alternatives for configuring new or existing fans.

3.3.1 Adding a single fan

If you have selected this option, the following window will appear:

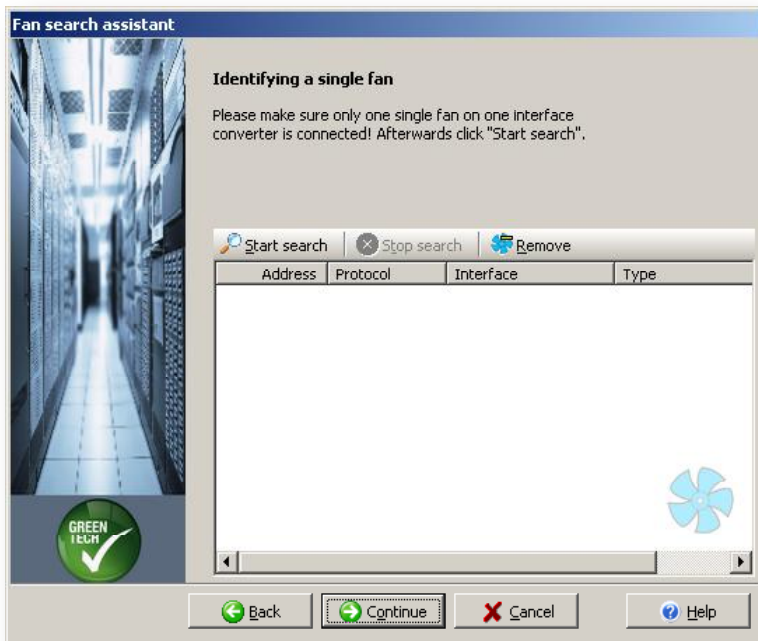



Fig. 3-28 Adding a single fan


Now connect the fan to be added to the bus and the power supply. Then switch on the fan power supply.

 With this type of fan configuration, only one single fan can be connected to a single interface converter. Non-compliance will have unforeseeable consequences.

Click Start search. When using the ebmBUS protocol, the search is implemented by way of a broadcast command and a fan will therefore soon be found. When using the MODBUS protocol, all 247 addresses at all connected interface converters must be checked individually. This can take over a minute depending on the address of the fan. If a fan is found, click Continue. If no fan is found, check the following:

- Is the bus port correctly wired? RSA and RSB must not be reversed.
- Is/are the interface converter(s) used ready to operate?
- Is the voltage supply to the fan correct?

After making any necessary corrections, the search can be re-started with Start search.

 If this search finds a fan with an address that has already been assigned in the fab, a message appears offering to automatically re-address the fan to the next available address. Answer the query with Yes to automatically resolve the address conflict detected. If the response to the query is No, the fan found will not be added to the fab on account of the address conflict.

If you are in *Small size fab* mode, continue reading in [Chapter 3.1.1](#) with Item 4. Otherwise, continue in [Chapter 3.1.2](#) with Item 8.

3.3.2 Adding pre-addressed fans

This is the correct option if your fans already have the necessary unique address and are already wired. Your fans must be connected to the power supply.

The following dialog appears:

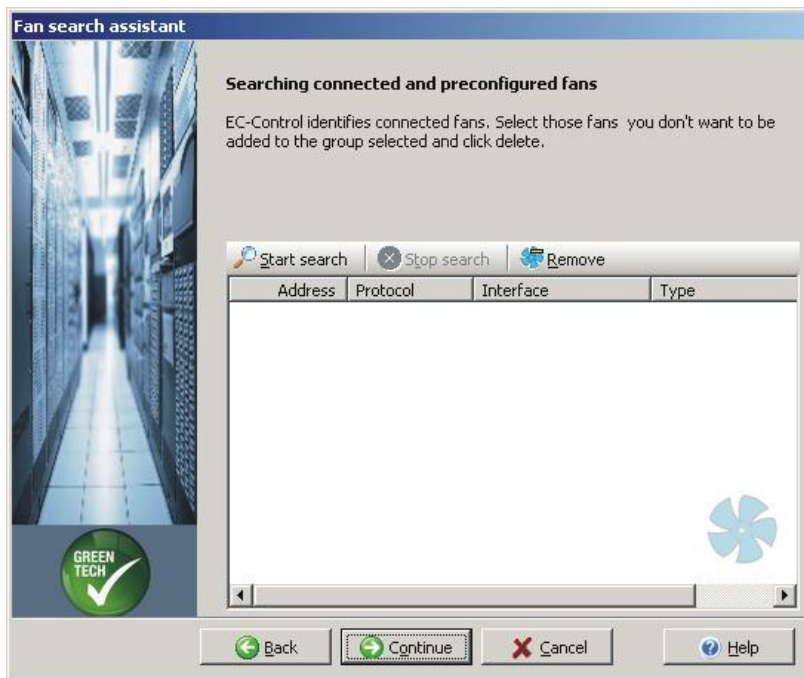


Fig. 3-29 Configuring pre-addressed fans

Click *Start search*. EC-Control then searches for fans at all configured interfaces. When using the MODBUS protocol, the entire possible address range (addresses 1-247) is searched each time. If you are using ebmBUS, the address range for the search depends on whether you have started the configuration assistant via the *Small size fab* or *Large size fab* option.

- For *Small size fabs*, only the first five fan groups are searched for existing fans. The search process is thus significantly shorter than for a large size fab.
- For *Large size fabs*, the entire ebmBUS address range is searched, i.e. all 255 groups and thus a maximum of 7,905 fans on each interface converter set to ebmBUS. Depending on the interface converter type used, this can take between 45 minutes and roughly one hour.

Any fans found are shown in the list. Fans found during the current search operation appear in green. Fans found in a previous search operation are shown in blue and fans already present before the configuration assistant was called up are displayed in black. For large size fabs, only the fans of the previously selected group are shown in each case.

A search can be prematurely terminated at any time using *Stop search*. This can considerably shorten the search time once it has become apparent that all existing fans have been found.

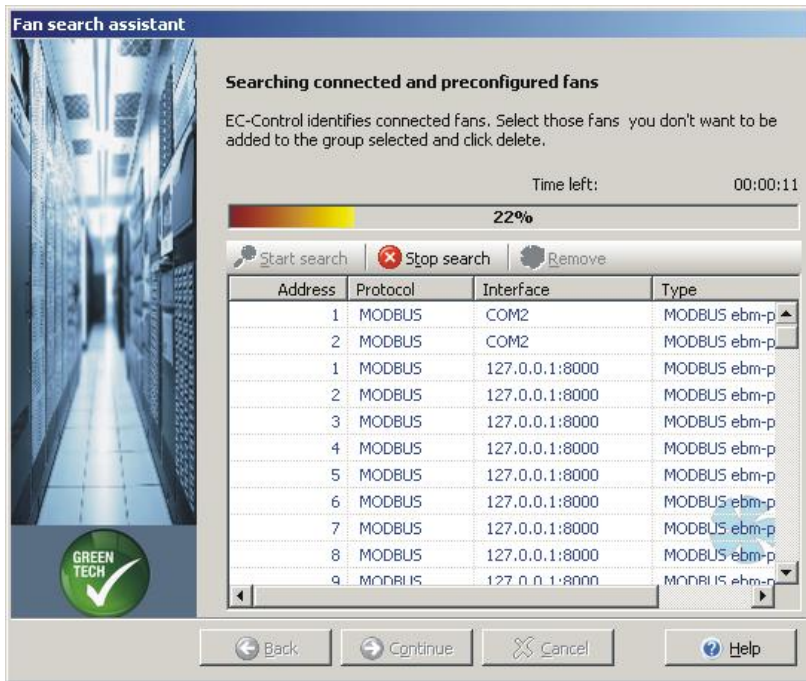


Fig. 3-30 Display of fans already found and search progress

If you are in *Small size fab* mode, continue reading in [Chapter 3.1.1](#) with Item 4. Otherwise, continue in [Chapter 3.1.2](#) with Item 8.

3.3.3 Adding brand new fans

This option makes it possible to configure brand new fans that all still have the same address. If more than one interface converter has been configured for the fab concerned, start by selecting the interface for which fans are to be configured. In this case, select the interface for which fans are to be configured in the dialog shown below and click Continue.

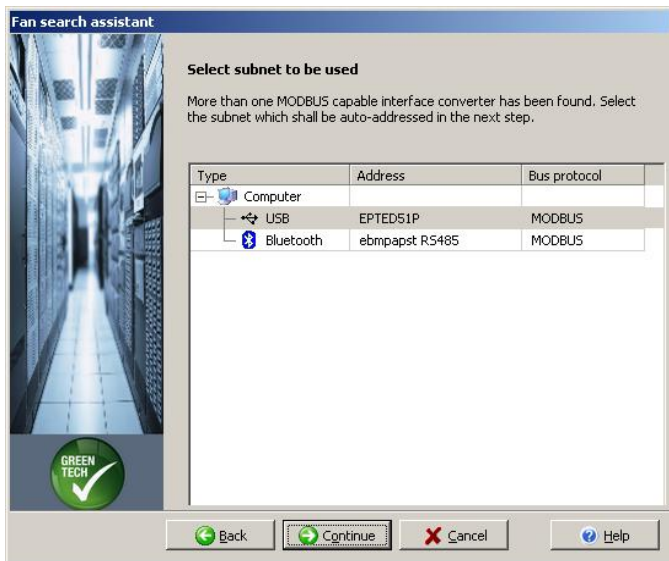




Fig. 3-31 Selecting subnet to be edited


The rest of the procedure depends on the following conditions:


- If the interface has been configured for MODBUS-compatible fans, EC-Control will check whether all fans are capable of handling the new automatic address assignment method. If fans that are not suitable for this method are detected at the interface, use is made of the same semi-automatic address assignment method as for ebmBUS. First read [Chapter 3.3.4](#). If the check reveals that automatic address assignment cannot be employed, read [Chapter 3.3.5](#).
- If the interface has been configured for ebmBUS-compatible fans, use is made of the semi-automatic address assignment method. In this case, read [Chapter 3.3.5](#).

3.3.4 Configuring brand new fans using automatic address assignment

 Checking of whether the automatic address assignment method can be employed results in all the fans connected to the previously selected interface converter losing their addresses. On completion of checking, the address of every fan is 1.

 Make sure that no MODBUS devices other than your ebm-papst fans are connected to the subnet/interface converter currently being edited.

 We regret that it is not possible at present to use auto-addressing to configure energy-saving motors with MODBUS. The semi-automatic method explained in the next chapter must be employed for these devices.

 To make it easier to associate the fitting location of the fan with the MODBUS address assigned, we recommend installing the fans in the ascending order of their serial numbers. The serial number can be found on the fan nameplate. It is structured as follows: *WWYY00XXXX* where *WW* is the week of manufacture, *YY* the year of manufacture and *XXXX* is a consecutive combination of alphanumeric characters.

The following message screen is displayed at the start of the process:

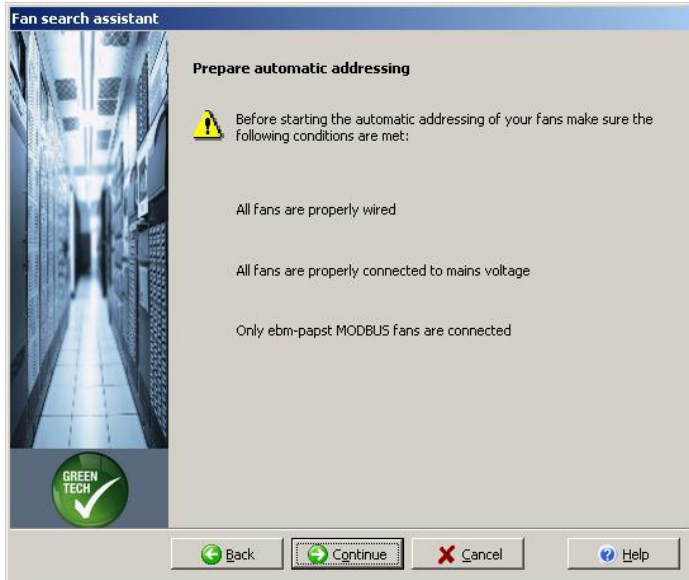



Fig. 3-32 Preparation for automatic address assignment

 If this has not already been done, connect the bus line of all the fans of the subnet to be edited and establish the power supply for the fans now.

Click Continue to start the check. The following screen appears briefly during the check:



Fig. 3-33 Checking of whether automatic address assignment can be used

If EC-Control has established that automatic assignment of the addresses is possible, the screen shown below will appear. Otherwise, the screen shown in [Chapter 3.3.5](#) will be displayed.

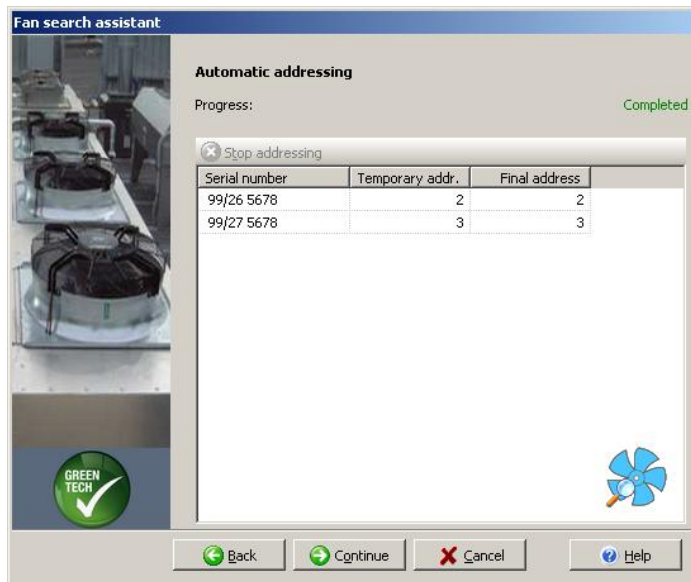


Fig. 3-34 Automatic address assignment

The automatic address assignment routine starts to search automatically for existing fans. Automatic address assignment takes place in two stages. All fans detected are shown in the list displayed and then addressed in ascending order of the serial numbers in the second automatic stage. The serial number displayed differs slightly from the one printed on the nameplate. The 00 between the *Date of manufacture* and the *alphanumeric part* is replaced by a blank space and the *Calendar week* and *Year* are separated by a slash.

The address assignment process may take several minutes. Due to the method used, it is unfortunately not possible to predict how long it will take. However, EC-Control shows the status above the dialog menu bar. On completion of the process, the Continue button becomes available again. The address assignment process can be terminated with Stop addressing. However, the corresponding fab component can then no longer be used until correct address assignment has been performed. Automatic address assignment can however always be re-started if necessary. To do so, you only have to go through the corresponding part of the configuration assistant. Click Continue on completion of automatic address assignment.


If you are in *Small size fab* mode, continue reading in [Chapter 3.1.1](#) with Item 4. Otherwise, continue in [Chapter 3.1.2](#) with Item 8.


3.3.5 Semi-automatic configuration of brand new fans

Brand new fans are devices still set to the default address 1 (MODBUS) or 1/1 (ebmBUS). If you have connected a fan that does not correspond to this criterion, EC-Control will not find any fans. If just one fan is involved, employ the procedure described in [Chapter 3.3.1](#). In the case of multiple fans that have already been assigned an address, take the action described in [Chapter 3.3.2](#).

EC-Control automatically checks whether MODBUS devices are suitable for the automatic address assignment method described in [Chapter 3.3.4](#). If at least one of the MODBUS fans is unsuitable, the semi-automatic configuration process described here is to be implemented. ebmBUS is not designed for fully automatic address assignment as per Chapter 3.3.4. Only semi-automatic configuration functions in this case.

A prerequisite for the semi-automatic method is that fans with the same address are not connected to the bus and the supply at the same time as they cannot then be unequivocally identified. The fans must be consecutively connected to the bus or line voltage so that **only** one new user with ebmBUS address **1/1** or MODBUS **1** is ever actively connected to the bus.

 Make sure that only one of the fans of this subnet with default address 1 or 1/1 to be configured is connected to the bus and/or the power supply.

 Following configuration, fans are briefly started by EC-Control to show that configuration has been successfully completed. The protective features (e.g. guard grills) must therefore be properly attached before starting up any fans.

The following message screen appears at the start of semi-automatic addressing:

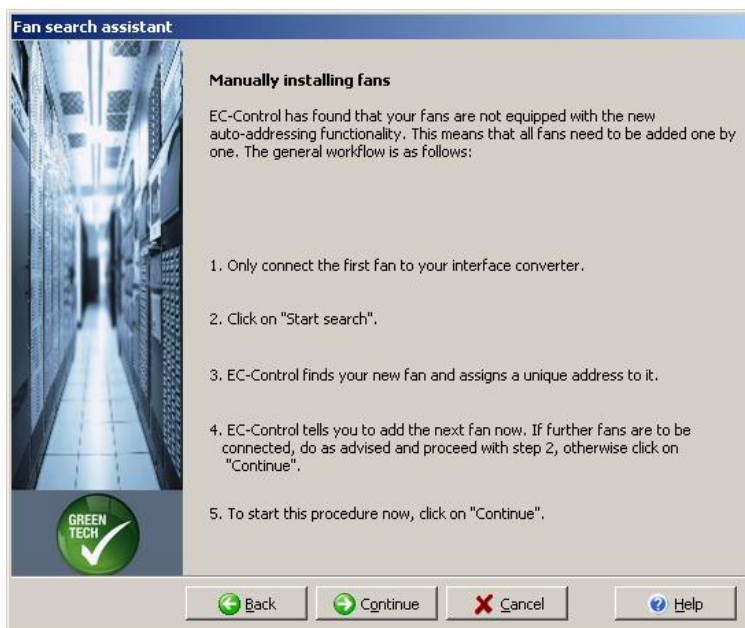


Fig. 3-35 Message screen for semi-automatic configuration

Click Continue to gain access to the actual dialog for the semi-automatic process.

The dialog looks like this:

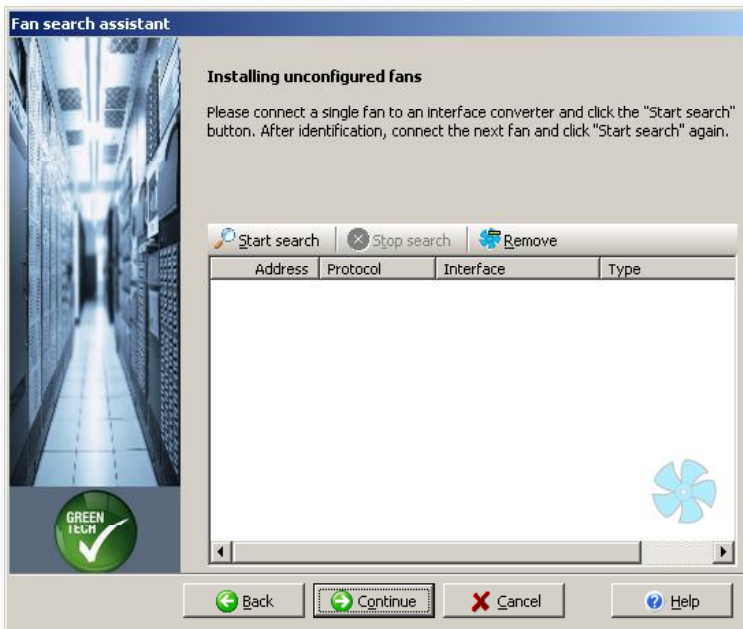


Fig. 3-36 Configuring brand new fans

Proceed as follows to perform configuration:

1. Connect the first fan to the interface converter and the line voltage. Switch on the fan.
2. Click Start search. The fan should now be found and automatically re-addressed to the next address available in EC-Control.
3. The new fan automatically starts for a few seconds to indicate that it has been added to the list. The user can thus see that EC-Control has configured the fan correctly even if the computer is out of sight. The next fan can then be immediately connected and EC-Control automatically continues searching.
4. Click Stop search and Continue once you have connected all fans.

If the assistant was started in *Small size fab* mode, continue in [Chapter 3.1.1](#) with Item 4 when all the fans have been added and addressed in this manner. Otherwise, continue in [Chapter 3.1.2](#) with Item 8.

4 Basic operation of the software

This chapter describes the most frequently used program functions. How to use the advanced functions and further customize the application to suit your requirements is explained in [Chapter 5](#).

4.1 Navigation/user interface

The three main sections of the EC-Control user interface are as follows:

- Main menu
- Room plan with fan icons on the right-hand side
- Structure tree usually docked on the left-hand side as shown here

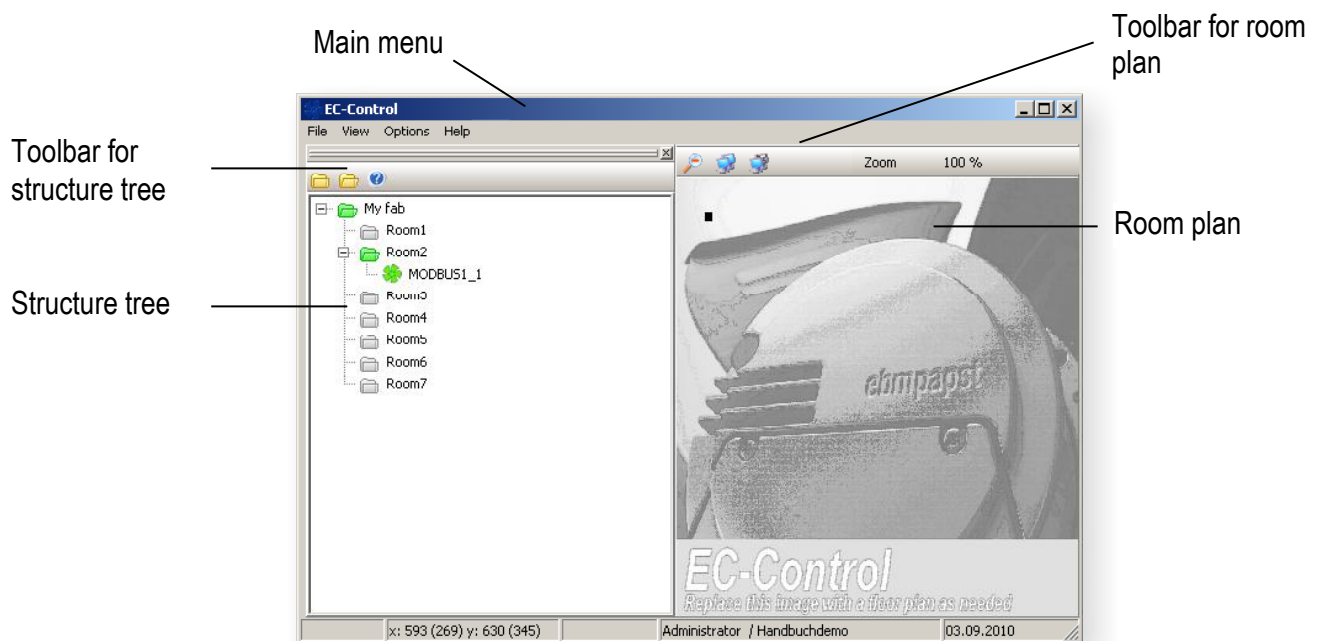


Fig. 4-1 EC-Control user interface

4.1.1 Main menu

This contains all program functions with the exception of the dialog for viewing and altering fan parameters. The menu items *File/Configuration assistant* and *File/Edit mode* are explained in [Chapter 3](#) and [Annex B](#). All other menu items that are not self-explanatory are described in [Chapter 5](#).

4.1.2 Room plan

In the room plan you can select a display size (zoom) between 100 and 3,000 % using either the mouse or the keyboard. The zoom options are as follows:

- Mouse wheel: The current position of the mouse cursor is used as the center point for starting to zoom in or out.
- Marking area with mouse: To do so, click the top left corner of the desired area and keep the left mouse button pressed. Then move the mouse cursor to the bottom right corner of the desired area and release the mouse button.

- Keyboard: Press *Ctrl*-<+> (Ctrl and plus key) to zoom in and *Ctrl*-<-> (Ctrl and minus key) to zoom out.

The scroll bars that appear at the edge of the room plan in the enlarged view can be used to move the section displayed.

Depending on the zoom level selected, fans are shown either as an icon or as a colored box. The meaning of the colors and the appearance of the icons can be adapted to your own requirements using [Settings/Display settings](#).

If the zoom factor is increased beyond an adjustable threshold, up to three information messages are displayed in text form under the fan icon. [Chapter 5.3](#) explains how to configure this information display, e.g. actual speed or status.

The box display colors (room plan view with low zoom factor) have the following standard meanings, but these can be altered. The corresponding icon in the enlarged view is also displayed and can be replaced with a different one if required as described in [Chapter 5.1](#):



Black or blue shading (configurable color palette, see [Chapter 5.2](#)) of the outer icon area of a green fan icon indicates: The fan is stopped or running. Blue shading indicates the actual speed of the fan in 10 % PWM increments. By default, black indicates 0 % PWM modulation level.



Red: The fan is signaling a failure state. The type of failure can be seen from either the fan settings mask (that can be called up with a double click) or the failure list (menu item [File/Failure list](#)). It is also possible to display the failure state in text form directly under the fan icon. Details can be found in [Chapter 5.3](#).



Yellow: The fan has a communication problem but has responded in the past. Check the fan power supply and bus wiring.



Orange: The fan is signaling a warning state, but in contrast to "Red" status it is still running. The shading around the impeller icon again indicates the actual modulation level. The warning may however be an indication that the device is likely to fail soon if the conditions causing the warning are not eliminated (e.g. motor temperature). As described above, details about the warning can be found in the fan settings mask or in the failure list.



Magenta: The fan has recently been scanned (status interrogation). This status is only displayed if activated under [Options/Display settings](#).



Gray: The status of the fan is not yet known as the fan has still not been scanned. When all the fans in the fab have been scanned at least once, no gray icons should be displayed.

These color symbols are repeated in the structure tree.

A double click on a fan icon opens the parameter settings mask for the fan concerned.

4.1.3 Structure tree

The structure tree contains all groups and their fans. Each fan in the system has two addresses:

- A *logic address* for administration in EC-Control. This can be assigned by the user as desired. This address is used in the structure tree to identify the fan.
- A *physical address*. This depends on the bus system used and is only to be assigned once for each interface converter. For communication to be possible, the physical address set in the fan must coincide with the one set in EC-Control.

The fan groups can be freely defined and hierarchically arranged, as they do not depend on the bus system. It must merely be ensured that a group only contains sub-groups or fans, but not further sub-groups and fans at the same time.

Example of hierarchical arrangement of some groups and fans:

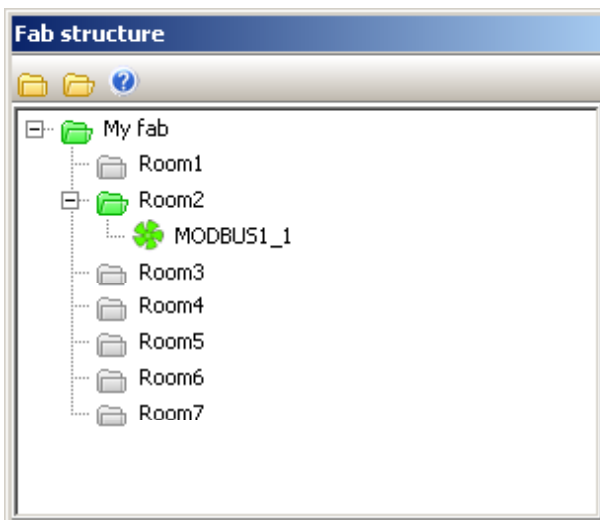


Fig. 4-2 Structure tree

Each node of the tree has a status icon. If a fan is found that is actively signaling a failure (red), actively signaling a warning (orange) or no longer responding (yellow), its icon will change from green to the appropriate color. If the status of the node is still unknown because this fan has not yet been scanned, the icon will be gray. The group of the fan and all parent groups will also assume this color. This enables failed fans to be located quickly. The following order of urgency applies:

Red → Yellow → Orange → Green → Gray

If highlighting of fans just scanned (status interrogation) is active, all recently scanned fans are displayed with a magenta-colored text, but this is not inherited by the group containing the fan.

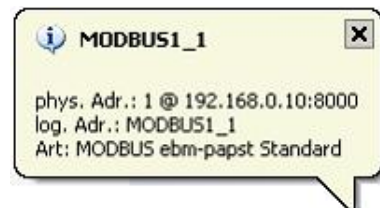


Fig. 4-3 Fan information

On clicking a fan in the structure tree, a speech bubble with the address data of the fan appears in the room plan at the fan position:

Right-clicking a node will open a context menu for calling up the settings dialog for the node or for all fans selected. If the node is a group, the window for all fans under this group will be opened. When the

settings dialog is open, further fans can be pulled into the list using drag and drop (Drag and Drop). The settings dialog is described in detail in [Chapter 4.3](#).

It is possible to select multiple nodes of a tree at the same time (fans and/or groups) by pressing and holding the *Ctrl* key while clicking the nodes to be selected with the mouse. Several adjacent nodes can be selected using a combination of *Shift* and *arrow* keys on the keyboard.

The structure tree can be undocked from the room plan and placed on the Windows Desktop as a separate window by dragging and holding with the mouse or using the View menu. This setting is automatically saved for the logged-in user on ending EC-Control.

4.1.4 Status bar

There is a status bar containing the following information at the bottom edge of the EC-Control window:

- Name of the logged-in user and the active configuration
- The coordinates of the mouse pointer position within the room plan. The value in parentheses relates to the screen resolution and the value not in parentheses refers to the original size of the room plan graphic in pixels. These coordinates may be useful when using File/Edit mode to move fan icons.
- If a timer is active, this is shown by an icon. For details see [Chapter 5.9](#) and [Chapter 5.10.3](#).
- If the USB relay box is being used, its status is also shown as an icon. For details see [Chapter 5.10.3](#).

4.2 Operation with two monitors

EC-Control is able to use a second monitor:

- To display an enlarged view of part of the fab while the overall fab continues to be displayed on the primary monitor (separate zoom window).

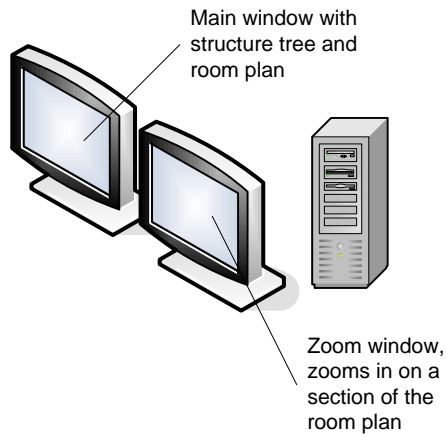


Fig. 4-4 Operation with two monitors

- To give a wider view of the fab (enlarged main window).

A graphics card with a second output is needed for this function to work. The second monitor may have a different resolution than the primary monitor and it must be recognized by Windows as an independent display. If all these requirements are satisfied, an empty window can be opened with View/Multimonitor/Separate windows. If a zoom area is marked with the mouse in the main window, this will appear enlarged in the separate window. This area is indicated by a red rectangle in the main window. Irrespective of this area, an area can now also be enlarged in the main window. In this way it is possible, for example, to enlarge completely different parts of the fab at the same time.

Zooming in the main window is however no longer to be performed by drawing a rectangle, as this area would then be displayed in the zoom window. For separate zooming in the main window, use the scroll wheel of the mouse or the key combinations Ctrl-<+> and Ctrl-<->.

This separate window can also be displayed and used if the computer concerned only has one monitor.

The separate window can be closed using View/Multimonitor/Off.

4.3 Setting fan parameters

The screen for setting fan parameters can be displayed in one of the following ways:

- Double click the fan symbol for the fan to be set in the room plan.
- Right-click any node of the structure tree to open the context menu. Select Set fan parameters. This opens the settings dialog with all the fans under the selected node. This permits faster scanning and setting of multiple fans in succession, as the settings dialog does not have to be closed and opened again each time. The desired fan can simply be selected from the list within the settings dialog.

The settings dialog is shown below. The parameters displayed depend on the capability of the fan concerned and user authorization:

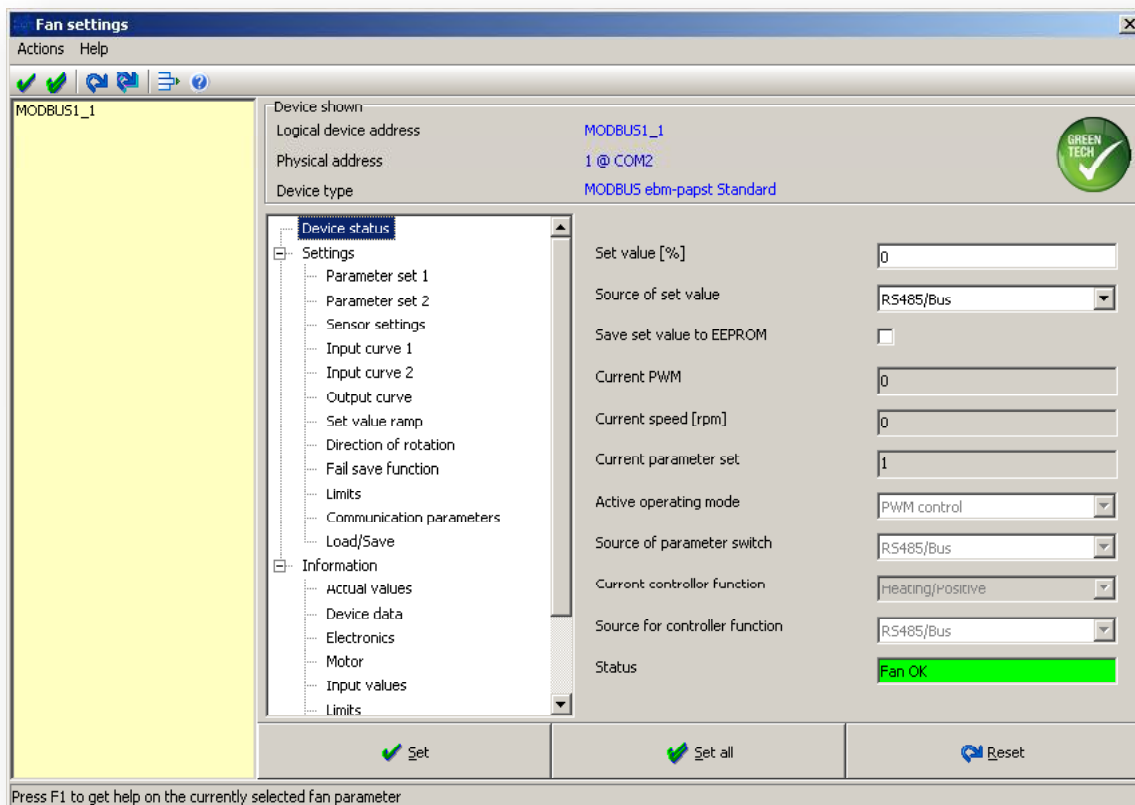



Fig. 4-5 Setting fan parameters

All fans currently selected are shown in the list on the left. You can switch between these with the mouse or with the keyboard. Further fans can be added to the list by dragging and dropping nodes from the structure tree.

 Only fans with the same bus protocol can be transferred to the settings dialog. This restriction is necessary to ensure proper functioning of the Set all function explained below. If an attempt is made to transfer fans with different protocols, the first different fan will result in termination of the process of transferring selected fans to the settings dialog. Termination is also indicated by an error message. In such cases, settings have to be made step-by-step.

Certain items of administration data for the device selected in the list displayed on the left with a yellow background are shown at the top on the right side of the window. All fan parameters are divided into groups that are shown in a tree view between the fan list and the parameters displayed. The *Overview* group is always shown first. Depending on the capabilities of the selected fan and the authorization level of the logged-in user, some parameter groups will be hidden. The dialog therefore only ever shows those parameters that can actually be set or displayed.

Click any parameter group to display its information or setting options. All parameters that are displayed but cannot be altered are constantly updated. Parameters that can be altered are only updated on calling up the mask or after changing the settings.



Please make sure you have deactivated the parameter *Save set value in EEPROM* if you wish to operate MODBUS or ebmBUS-compatible fans in future with a control system that transmits new set values at short intervals. This warning no longer applies as of MODBUS series version 6.00, as this function is implemented differently in the fan.

An English Help text exists for most parameters. To call up this text, click the parameter control element (e.g. input field, list field or check box) with the mouse to bring it into focus, or alternatively use the *tab* key. Then press the *F1* key. If no help text is displayed, none has been stored for this parameter. A brief description of all parameters can also be found in [Annex D](#) of this manual.

There are three buttons beneath the tree and the parameter display:

- *Set* activates the settings of the currently displayed parameter group that have been changed. Set can also be triggered by pressing the *Enter* key in an active text input field (e.g. in the Set value field).
- *Set all* has the same effect as the Set button but applies to all the fans in the list with a yellow background. This function can take a few moments.
- *Reset* sends a reset command to the selected fan.

The icon bar and the main menu also include functions for removing the selected fan from the selection list and sending a reset command to all fans in the list. A general Help topic for this screen can also be called up.

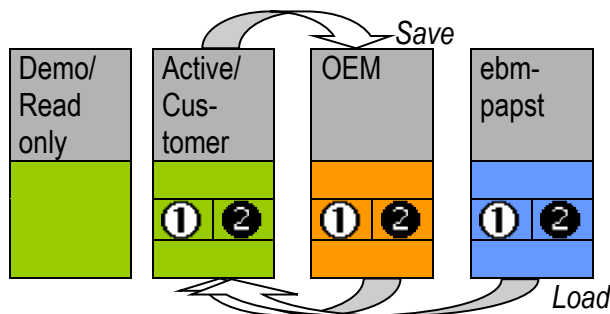
4.3.1 Special functions

The settings dialog contains the following special functions depending on the bus protocol:

- For MODBUS devices, the settings can be changed without losing the set value. For ebmBUS devices, the set value will be lost during the Set process if it has not been saved using the Save set value in EEPROM function.
- *Information* – Invariable fan parameters can be viewed here. The display is automatically updated at intervals.
- *Failure list* – The fan fault memory can be displayed here. For fans equipped with MODBUS, the failure time and failure status are displayed. For ebmBUS V3 fans, only the failure status is displayed.

- **Load/Save** – For fans equipped with MODBUS, the current settings can be stored here in a special area of the fan memory or restored from this. This function is not available for ebmBUS devices. It is also not possible to apply this function to multiple fans simultaneously using *.Set_all*.

The fan has three data records. Use is always made of the *Active/Custom* data record following login. Demo login provides a read-only view of the *Active/Custom* data record. The *OEM* and *ebm-papst* data records are back-up copies of the active data record and contain the same values as the *Active/Custom* data record when the fan is delivered. If any fan parameters are altered, these are only changed in the *Active/Custom* data record.



Depending on authorization, *Load/Save* makes it possible to back up the values of the active data record in the *OEM* data record or to load values from the *OEM* or *ebm-papst* data record into the active data record. All previously active settings are lost in this process. End customers with *Administrator* or *Customer* authorization level are only able to re-load the *OEM* data record.

- **Parameter set 1/2** – Certain parameters are duplicated with MODBUS-compatible devices. These are each grouped into one parameter set. Depending on the configuration, it is possible to switch between the two parameter sets by way of either the bus (e.g. EC-Control) or digital input. This is an easy way to implement daytime/night-time or summer/winter mode.

A list and explanation of the possible settings can be found in [Annex D](#).

4.3.2 Additional information on MODBUS-compatible fans

For MODBUS-compatible devices, the setting options vary depending on the version number of the fan operating software. The protocol version supported in the fan displayed can be read out under Information/Device data. The following list provides an outline of the most important new features of the protocol versions to date:

- Protocol version 3.02 (identifier 6)
 - Support of two-sensor mode for sensor control.
 - Functions that can be applied to digital inputs can now be applied to either Din2 or Din3. This also allows you to apply multiple options to the same digital input.
 - Support of change of rotation direction, either by bus command or digital input.
- Protocol version 4.00 (identifier 7)
 - Support of cable break detection for the analog set value input
 - Support of use of alternative communication parameters (baud rate, parity, stop bits)

4.3.3 Saving displayed fan settings

Actions/Log settings can be used to save the currently displayed fan settings as a CSV file to generate a log of the settings. These log files can be processed in table form using standard spreadsheet

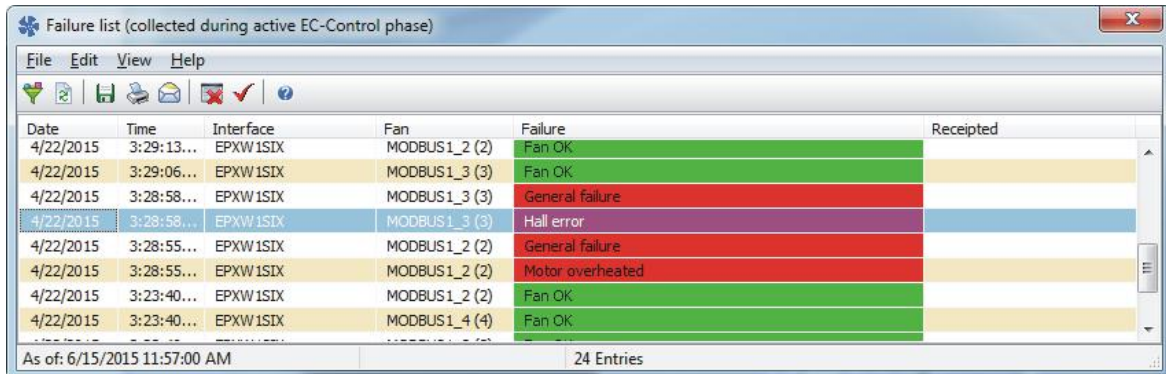
software. In these files, the character configured in the operating system is used as column separator. In Germany this is the semicolon. The log does not allow settings to be transferred to other fans.

If the contents of multiple views of a fan are to be stored in the same log, each of these views must first be called up and then stored using the same file name in each case. EC-Control then asks whether to overwrite the existing file or append the data.

4.4 Failure list

While EC-Control is running, it records all failure states of all connected fans. These are stored separately for each configuration in the database. The failure list thus only ever shows the failures applicable to the fab currently displayed. The failure list is separate from the fan fault memory.

The failure list can be called up with *File/Failure list*. The following window then appears:



The screenshot shows a window titled "Failure list (collected during active EC-Control phase)". It contains a table with the following data:

Date	Time	Interface	Fan	Failure	Receipted
4/22/2015	3:29:13...	EPXW 1S1X	MODBUS1_2 (2)	Fan OK	
4/22/2015	3:29:06...	EPXW 1S1X	MODBUS1_3 (3)	Fan OK	
4/22/2015	3:28:58...	EPXW 1S1X	MODBUS1_3 (3)	General failure	
4/22/2015	3:28:58...	EPXW 1S1X	MODBUS1_3 (3)	Hall error	
4/22/2015	3:28:55...	EPXW 1S1X	MODBUS1_2 (2)	General failure	
4/22/2015	3:28:55...	EPXW 1S1X	MODBUS1_2 (2)	Motor overheated	
4/22/2015	3:23:40...	EPXW 1S1X	MODBUS1_2 (2)	Fan OK	
4/22/2015	3:23:40...	EPXW 1S1X	MODBUS1_4 (4)	Fan OK	

At the bottom of the window, it says "As of: 6/15/2015 11:57:00 AM" and "24 Entries".

Fig. 4-6 Failure list

This table shows all failures and warnings for the fans in the fab that have occurred since last automatic or manual deletion. *Edit/Acknowledge* can be used to attach the user name of the logged-in user to marked failures to show that this user has examined the failure, for example. The background color of the cells in the *Failure* column corresponds to the status colors in [Chapter 4.1.2](#).

Further functions in this dialog are:

- Display of failures with defined criteria (*View/Filter*) such as period of time or reason for failure. The filter setting is not stored at present. An active filter is indicated by a filter symbol in the status bar.
- Updating of view (*View/Refresh* or *F5*).
- The content of the list can be printed or saved as a CSV file. The CSV files can be read by Microsoft Excel and by most other spreadsheet programs.
- The content of the list can be sent by e-mail. It will be sent to everyone who always automatically receives notification of failure by e-mail. See Chapter 5.8.
- *File/Failure reactions* can be used to alter the settings for the recording of failures. See Chapter 5.7.
- Multiple failures can be marked and deleted using *Edit/Delete selected failures*. Failure reaction settings can be used to define a period of time after which recorded failures are deleted.



Deletion always takes place on starting EC-Control or on changing the time period setting. Deletion can also be triggered manually with *Edit/Delete elapsed failures*.

5 Further configuration options

5.1 Display settings

Options/Display settings can be used to customize many aspects of the EC-Control display. The following list is arranged according to the tabs shown in Fig. 5-1.

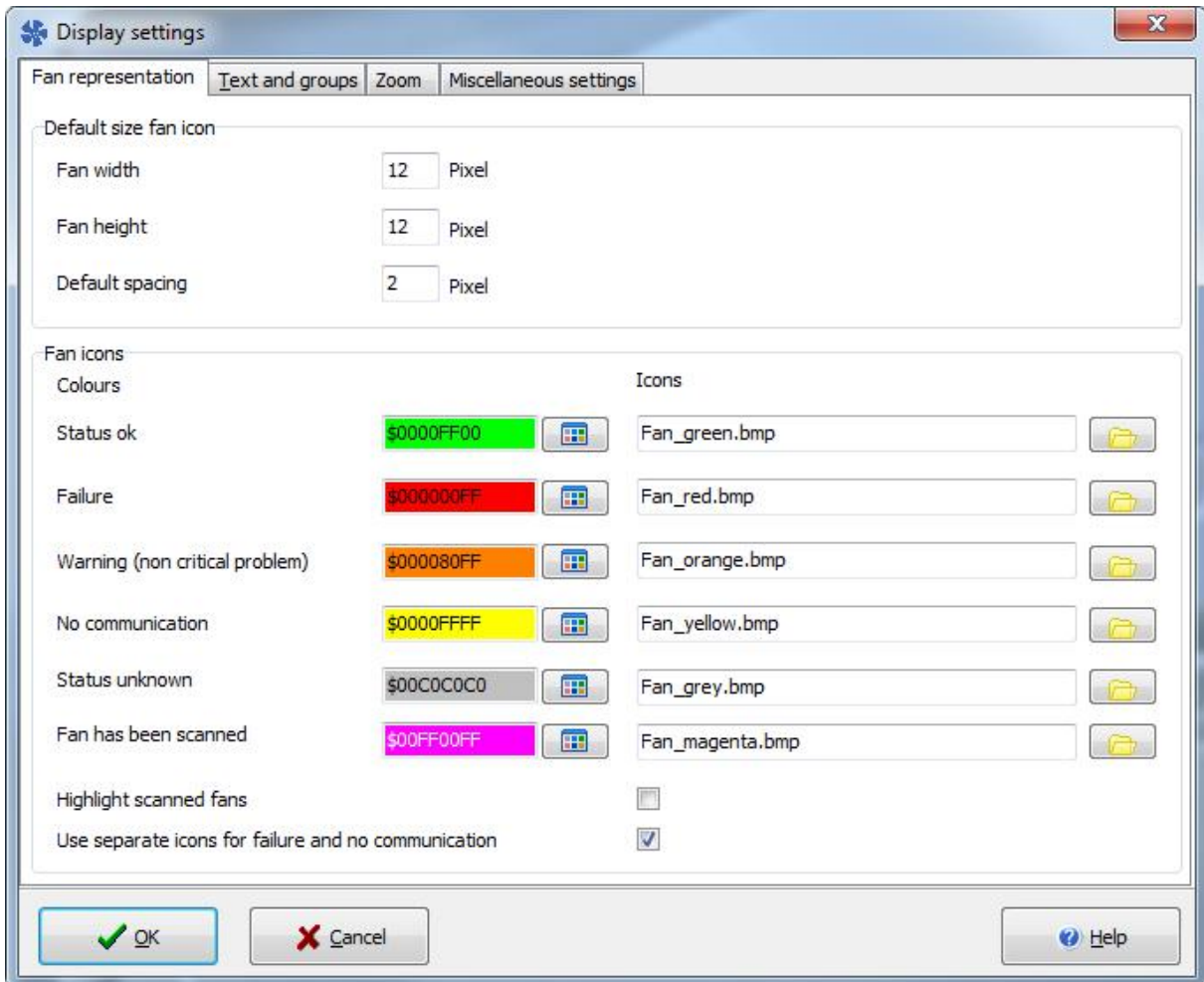


Fig. 5-1 Dialog for adapting display settings

Fan representation

- *Fan width*: Width of fan icon in box display, i.e. very small zoom factor in room plan. Given in pixels.
- *Fan height*: Height of fan icon in box display, i.e. very small zoom factor in room plan. Given in pixels.
- *Default spacing*: Spacing between two fan icons if these are created automatically by way of the fab configuration (e.g. 10 fans are automatically placed next to one another). Given in pixels.

It is possible to define the symbol used in the room plan for all fan states. With low zoom levels, fans are shown in the room plan as a colored box with no icon. This color can also be configured for each state.

- *Status ok*: Icon used to display a fan. If use is made of symbols other than those provided, the pixel in the top left corner of the icon should correspond to the color that can be replaced by the colored display of the actual modulation level. If the active zoom level is one in which only boxes are shown in the room plan and not icons, use will normally be made of the PWM color shading for fans in ok

status. The color that can be set here is therefore only used if no colors have been defined for the PWM display (see [Options/Color palette](#)).

- *Failure*: Indicates fans that can still be accessed but are signaling failure.
- *Warning*: Indicates fans actively signaling warnings but no failure states. As with *Status ok*, use is made of the background color of the symbol for indication of the actual modulation level.
- *No communication*: Indicates fans with which communication is no longer possible.
- *Status unknown*: Indicates fans whose status is not yet known.
- *Fan has been scanned*: Indicates fans whose status has recently been scanned. The color defined here may also be used as text color in the structure tree. This status only exists if [Highlight scanned fans](#) is active. In contrast to the other statuses, there is no upward inheritance of this status in the structure tree.
- *Use separate icons for failure and no communication*: If this option is not active, fan failures and loss of communication are not displayed separately, but rather treated as being the same status.

Text and groups

- *Font color*: Color used to display information under a fan symbol.
- *Text under fan icon*: If this check box is activated, the fan information will be displayed below the symbol. Otherwise, it appears above the symbol.
- *Maximize selected group*: If this check box is activated, groups clicked in the structure tree that directly contain fans will be displayed in enlarged form, filling the room plan.
- *Automatically mark groups*: If this check box is activated, groups will be highlighted on the basis of the settings [Color for groups](#) and [Transparency](#).
- *Color for groups*: If the node of a lowest-level group is selected in the structure tree (i.e. a group only containing fans), this can be displayed on a colored background in the room plan depending on the [Automatically mark groups](#) setting. This setting can be used to define the color. The group is always marked by a rectangle which, depending on the position of the fans, may also contain fans that do not belong to the group concerned.
- *Transparency*: This controller can be used to define the degree to which the room plan can be seen through the group marking. The scale ranges from 0 % (no transparency) to 100 % (marking completely transparent).

Zoom

- *Level 1*: Indicates the zoom level in per cent as of which the box display changes to the symbol display.
- *Level 2*: Indicates the zoom level in per cent as of which information is displayed under or on the fan icon with 6 point font size.
- *Level 3*: Indicates the zoom level in per cent as of which information is displayed under or on the fan icon with 8 point font size.
- *Level 4*: Indicates the zoom level in per cent as of which information is displayed under or on the fan icon with 10 point font size.
- *Change fan symbol when zooming*: If this check box is activated, the fan symbol will become larger or smaller on zooming. Otherwise, the symbol will always be displayed in its original size.
- *Standard zoom*: Indicates the zoom factor used as standard on opening the detail window in multimonitor mode. When the detail window is activated via [View/Multimonitor/Separate windows](#), this zoom factor is activated in the detail window.

Miscellaneous settings

- *Display time*: Time in seconds for which the speech bubbles, such as those used to display the fan position on clicking a fan in the structure tree, are visible.

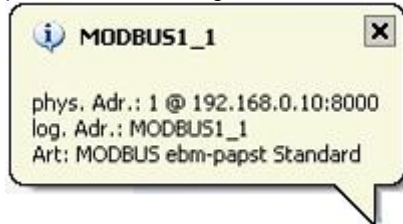


Fig. 5-2 Speech bubble for displaying fan position

- *Screen lock after*: Time in minutes after which the login dialog will appear after a period of user inactivity. The value 0 completely deactivates the screen lock.
- *Background image when no room plan is stored*: For larger fabs with several room plans, the nodes with the room plan should be positioned directly under the root node and no room plan can be assigned to the root node itself. If the root node in the structure tree is clicked in such cases, the image specified for this setting will be displayed instead of a room plan.

5.2 Color palette

In the room plan, EC-Control shows the actual modulation level of each fan in color in 10 % increments on the fan icon. These colors can be freely configured with Options/Color palette. Double click the line concerned to change the color. The color selection dialog shown on the right opens.

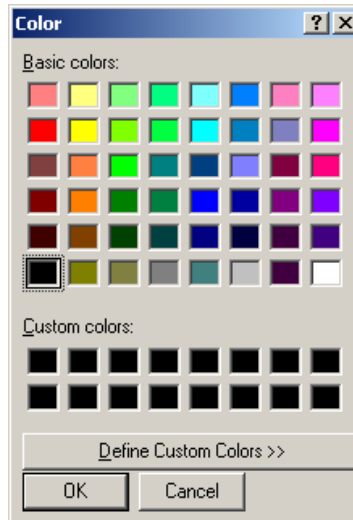
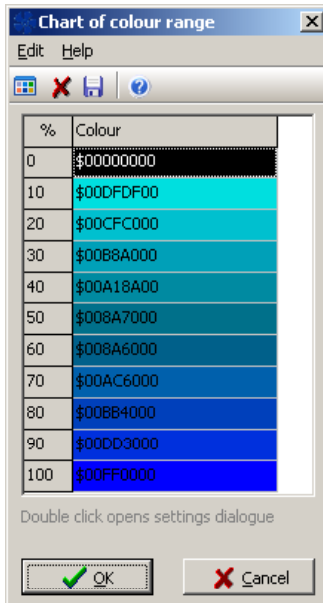



Fig. 5-3 Management of color palette Fig. 5-4 Selecting a color

The color setting active on installing EC-Control can be restored using Edit/Restore standard.

The color changes are activated on existing the dialog with OK.

 It is not advisable to set the same colors in this color palette as those used for signaling states such as failures and warnings. These colors are 100 % yellow, red, green and orange as well as light gray.

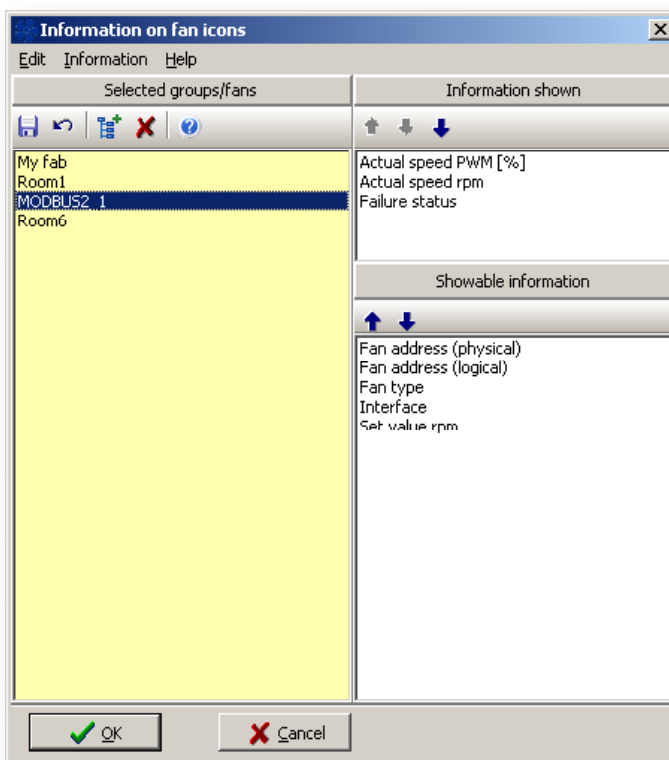
5.3 Fan information

Options/Fan information can be used to set the items of information to be displayed under a fan icon in the room plan. Up to three items of information are possible for each fan.

Information can be set for individual fans, individual groups or the entire fab. If settings are made for the entire fab and separate settings are also made for individual fans, these fans will retain their setting. The settings made for the entire fab will be applied to the other fans in the fab. If settings are made for a group, these will of course also be applied to all sub-groups and the fans they contain, unless separate settings have been made for these.

Fans and groups can be added to the list on the left side of the dialog by dragging and dropping from the structure tree. With *Edit/Transfer nodes selected in structure tree to Editing*, it is also possible to add structure tree nodes to the list using the keyboard.

The following dialog appears:



The list at the top contains all the information to be displayed for the entry selected in the list on the left. The gray arrow buttons above can be used to alter the display sequence. The blue Down arrow button (↓) can be used to take selected entries from this list and return them to the list at the bottom.


The list at the bottom contains the information that can basically be displayed, with the exception of the entries already contained in the list at the top. The blue Up arrow button can be used to take marked entries out of the list at the bottom and insert them in the list at the top. The Down arrow button (↓) reacts as described above.

Fig. 5-5 Setting text to be displayed under fan icons

5.4 Changing password

Options/Password can be used to change the password of the user currently logged in. Users with "Demo" authorization level cannot change their password.

The old password and the new password have to be entered in the dialog shown below. For security reasons, the new password has to be entered a second time. The new password is activated immediately with Change password and will then be valid for the next login procedure, e.g. if the screen lock has been activated.

 If forgotten, passwords can never be restored. If a password has been forgotten, the user has to be deleted by an administrator and re-created. Existing user settings and display settings will then be lost.

Please make sure you remember your password.



The image shows a dialog box titled "Change password" with a close button (X) in the top right corner. It contains three text input fields labeled "Old password", "New password", and "Confirm password". At the bottom, there are two buttons: "Change password" with a lock icon and "Cancel" with a red X icon.

Fig. 5-6 Changing own password

5.5 User administration

User and configuration administration share the same dialog. This can be called up with Options/Authorization and configurations. It contains a tree view with the existing configurations and the users for this configuration. Auto-login users are shown in orange in the tree. For details of this concept, see [Chapter 5.5.1](#).

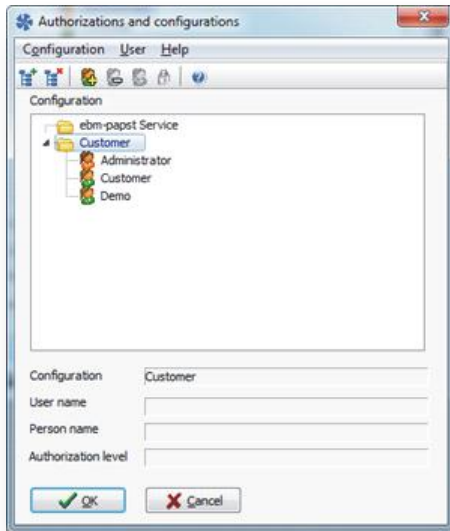


Fig. 5-7 Configurations and users



Fig. 5-8 Creating a user

The dialog shown in Fig. 5-8 can be called up with User/Create new user:

User name, *Authorization level*, *Password* and *Password confirmation* are mandatory fields. *Name of person* is used in failure e-mails. Users authorized to create other users can only create users on the same authorization level or on lower levels. A list of authorization levels and rights can be found in [Annex E](#).

For users of authorization level *Demo*, May close application can be used to specify whether, contrary to previous practice, the user concerned is allowed to end EC-Control.

If called up with User/Change user, the dialog also allows the properties of a user to be changed. The dialog shown in Fig. 5-8 appears with an extra feature for locking the user without having to delete this user. Locking can be used, for example, to temporarily suspend a user to prevent misuse of the user account during a temporary absence of the user.

5.5.1 Auto-login user

In EC-Control, one of the user accounts for the installation can be defined as so-called Auto-login user. This user is logged in automatically on starting EC-Control. The lock screen appears on completion of login.

This function is useful in clean room fabs to ensure that EC-Control can be automatically started and immediately starts monitoring the fab without user action following re-start of the EC-Control PC subsequent to power failure or updating. For this purpose, an EC-Control link should be created in the Windows Autostart folder, for example by copying an existing link. Windows should be configured such that it automatically logs in a Windows user.

To make a user into the Auto-login user, Automatic login must be checked in the dialog for creating or changing users. As EC-Control does not know the user passwords, the applicable password must be entered again if an existing user is changed. Auto-login users must not have any blank passwords. The password length is restricted to 32 ASCII characters. A secure password, ideally consisting of upper and lower case letters, numbers and special characters such as !, ? or @ contained in the ASCII character set, should nevertheless be defined for the Auto-login user. Blank spaces are not allowed.

To switch EC-Control back to manual user login, simply uncheck Automatic login for the Auto-login user.

5.6 Managing configurations

EC-Control supports the use of multiple independent configurations. This makes it possible to store a variety of fabs in one database on the same computer and log into one of the configurations as required. Sole restriction: EC-Control can only be run once on any computer at the same time, i.e. it is only possible to work with one configuration at a time.

The following settings and data are stored by EC-Control depending on the configuration:

- Fab layout/group structure
- Settings with respect to failure reactions
- E-mail settings
- Color palette
- Failure list

Display settings such as zoom levels etc. are stored depending on the configuration and user. This means that each user has their own display settings in every configuration.

User and configuration administration both use the dialog shown in Fig. 5-7. The basic structure of the dialog is described in [Chapter 5.5](#). The following dialog for creating a new configuration can be displayed with Configuration/Create configuration:

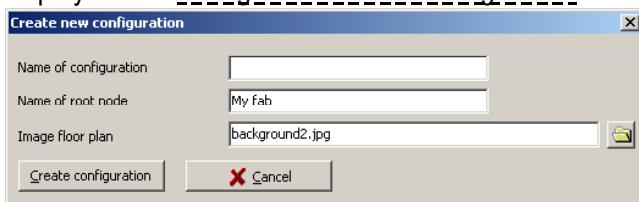


Fig. 5-9 Creating a new configuration

The dialog contains the following fields:

- *Name of configuration* – The name of the configuration as it is to be displayed in the Login dialog, for example, should be entered here.
- *Name of root node* – The name of the highest-order node (base structure or root node) in the structure tree is to be entered here. The structure tree requires at least this node. Groups or actual fans can subsequently be created under this.
- *Image floor plan* – A graphic must be stored for the node specified under Name of root node. If only sub-groups are to contain a room plan, a company logo can be stored here for example. The graphic formats currently supported are BMP and JPG.

After being created, a new configuration immediately contains a user account. This has the same login name as the user account currently being used and the same authorization level. The new user is given the following password: *init*



It is advisable to change the password of this user immediately and to create further users in the new configuration if applicable, for instance for colleagues who are to have fewer rights.

5.7 Reactions to fan failures

Options/Failure reactions can be used to define how EC-Control should react if fan failures have been detected. This does not depend on the type of failure and is only implemented for failures, not for warnings.

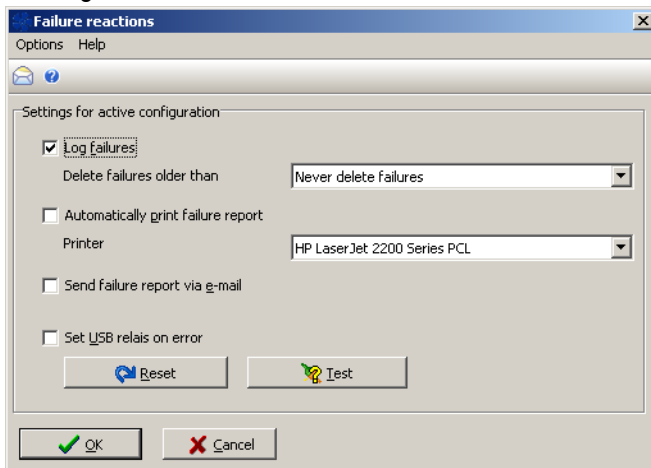


Fig. 5-10 Configuring failure handling

- ***Log failures*** – If this check box is activated, failures remain stored in a log for the time entered in *Delete failures older than*. Deletion takes place on login, after changing the failure reactions with this dialog or by way of manual deletion of the failure list using *File/Failure list*.
- ***Automatically print failure report*** – If this option is activated, a log will be printed for each failure on the specified printer. If the specified printer is not found, for example because it has been removed from the system, use is made of the Windows standard printer. The failure log is formatted for DIN A4. Please do not forget to switch on the printer and make sure there is enough paper.
- ***Send failure report by e-mail*** – This setting activates the sending of failure e-mails that can be further configured in *Options/E-mail settings*. If activated, an e-mail will immediately be sent to the stored distribution list the first time a failure occurs. Any further failures are signaled at 5-minute intervals in the form of a batch e-mail. For further details, see [Chapter 5.8](#).
- ***Set USB relay on failure*** – This option permits the signaling of fan failures detected by EC-Control by means of the USB relay box available as an accessory (ebm-papst Item no. 10450-1-0174). In the event of a failure, relay 0 is switched to enable a connected load to be switched on or off.

The relay box drivers have to be installed before this option can be used. These are provided on the EC-Control installation CD. The driver installation procedure is described in [Chapter 2.4](#).

If it has been triggered, failure signaling remains pending, i.e. the relay is not reset to the original condition.

- ***Reset*** – Allows the relay to be reset to its original condition after failure has been signaled. Only relay 0 is then reset. If applicable, the other relays can be reset using *Options/IO settings*.
- ***Test*** – This button can be used to switch 0 for test purposes.

5.8 Sending e-mail notification of fan failure

If activated under *Options/Failure reactions*, EC-Control automatically sends e-mail notification to defined persons in the event of fan failure. When the first failure is detected, an e-mail is sent immediately. After this, the failures are sent as batch e-mails in a 5-minute cycle. This prevents a flood of e-mails, e.g. in the event of failure of an entire fab.

The recipients and the necessary e-mail server are configured under *Options/E-mail settings*. The following dialog appears after calling up the menu item:

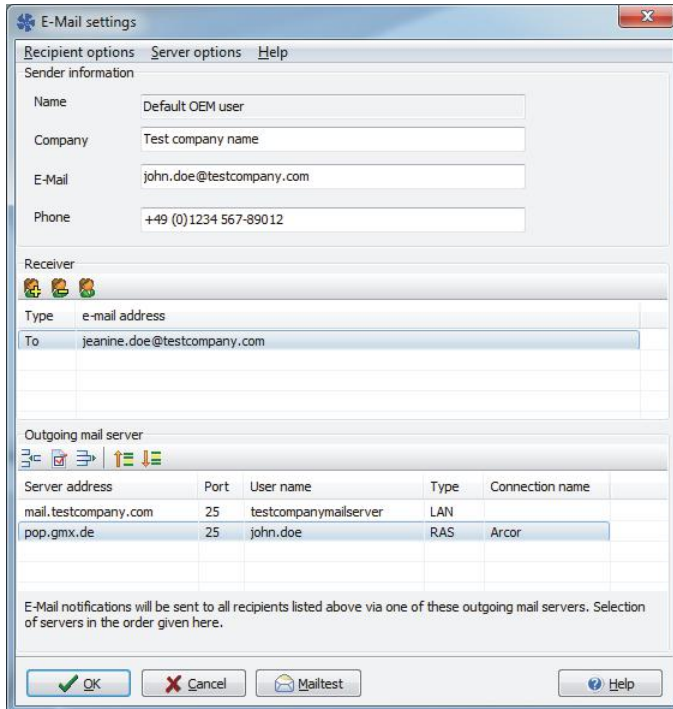


Fig. 5-11 Configuring e-mail notification

Under Sender information, you can specify contact information to enable the persons who receive e-mails via this mechanism to contact you as quickly as possible.

The e-mail addresses of the persons who are to receive the failure e-mails are entered in the Receiver section. The type of receiver (To, CC or BCC) can also be entered here. A recipient is added by way of the corresponding button or the menu item *Recipient options/Add*. The following screen appears:



Fig. 5-12 Adding a new e-mail recipient

Select a type of receiver and enter a valid e-mail address in [x@y.domain](#) format. Example of a valid e-mail address: [max.mustermann@meinefirma.de](#)

Following confirmation with OK, the recipient is added to the list.

To enable e-mails to be sent, EC-Control must set up a connection to an SMTP (Simple Mail Transport Protocol) outgoing mail server, also referred to as e-mail server. This server is either in the local computer network or can be accessed via the internet. The configuration of the connection differs slightly depending on which is the case.

A new connection to an outgoing mail server can be created by way of the corresponding button in the symbol bar or the menu item Server options/New outgoing mail server. The following screen appears:

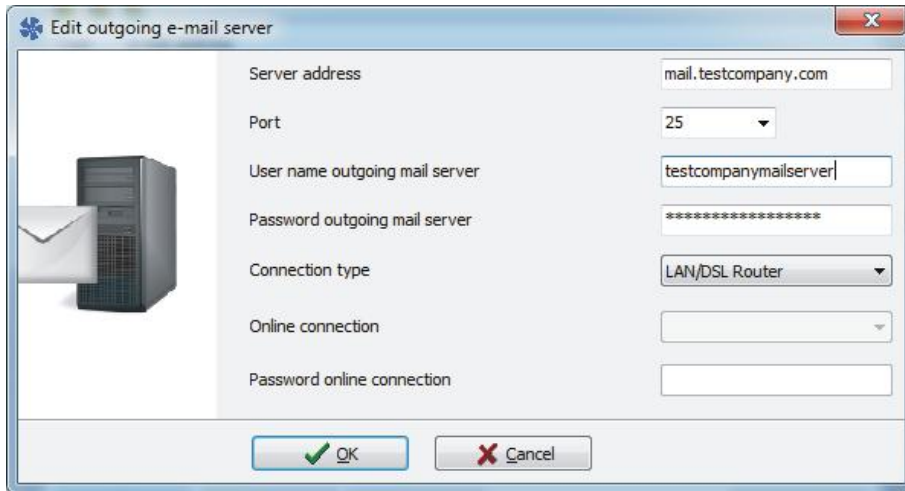


Fig. 5-13 Configuring a server for sending e-mails

If the server is located in the local network, enter the name of the computer on which the SMTP service operates under Server address. Otherwise, enter the internet address of the server. Example of a valid internet e-mail server address: *mail.gmx.net*

Port is the port number within the server on which the server expects e-mail communications. The preset value 25 is usually correct.

For reasons of security, many e-mail servers now demand a valid user account for sending e-mails. The name of this user account must be entered under User name outgoing mail server. Enter the corresponding password under Password outgoing mail server. If your server permits connections without a user name/password, simply leave both fields blank.

Connection type defines whether the server can be accessed directly (*LAN/DSL router* setting) or whether it first requires a dial-up connection (*RAS/RDT/Modem* setting). If a dial-up connection is required, this must first be configured in Windows. Information on how to do this can be found in the documentation for Windows or your communication equipment (e.g. modem/telephone system).

If you have not set *LAN/DSL router* as connection type, select the dial-up connection to be used under Online connection. Dial-up connections usually require a password. This is to be entered under Password online connection.


Several outgoing mail servers can be entered with EC-Control, in case one of them is not accessible. The order in which the outgoing mail servers are used can be changed with the arrow buttons in the symbol bar above the server list or using Server options/Uppgrade entry or Server options/Downgrade entry.

The Mail test button can be used to send a test e-mail to check the correct setting/accessibility of the outgoing mail servers and the recipients.


5.9 Global timer

EC-Control has a built-in global timer. EC-Control must be running when the timer is in use. The timer permits the following depending on the bus system used:



- For MODBUS: Switching between parameter set 1 and parameter set 2. This activates all the parameters of the corresponding parameter set at once.



 Parameter set switching is only possible if the *Parameter set source* for the fan is set to PS485.

- For ebmBUS and the energy-saving motor with MODBUS: Switching between two different evaluation factor values for the set value. Two different set value levels can thus be implemented.

 Fans with *Sensor control* operating mode should not be switched using the timer, as changing the evaluation factor (fan parameter *Evaluation*) results in unforeseen control action.

The status of the timer (On/Off) is indicated by the following two icons in front of the menu item Options/Timer:

-  Timer activated (if the global timer is activated, this icon also appears in the status line)
-  Timer deactivated

 The global timer is deactivated automatically as soon as an IO group is set to the input function *Timer*. The following icon then appears in the status line instead of the icon for the global timer: 

The timer can be configured under Options/Timer. The following window appears:

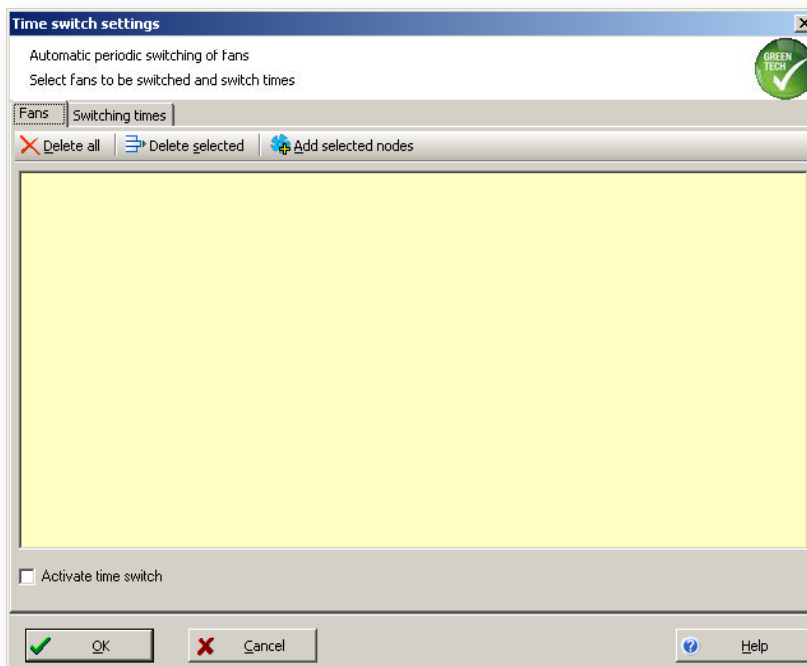


Fig. 5-14 Selecting users for timer operation

The fans and groups to be included in the automatic switching procedure can be selected here. The easiest way of doing this is to drag and drop elements of the structure tree into the list with the yellow background. Combinations of MODBUS and ebmBUS devices are possible. Depending on the bus system, the system switches back and forth between the parameter sets or the two evaluation values. Alternatively, you can also select elements in the structure tree and adopt them using the Add selected nodes button. Using the other two buttons, you can remove all or selected elements from this list.

The global timer is activated or deactivated by checking the Activate time switch box.

The Switching times tab contains the switching time setting and the values for the two evaluation levels between which switching takes place with ebmBUS:

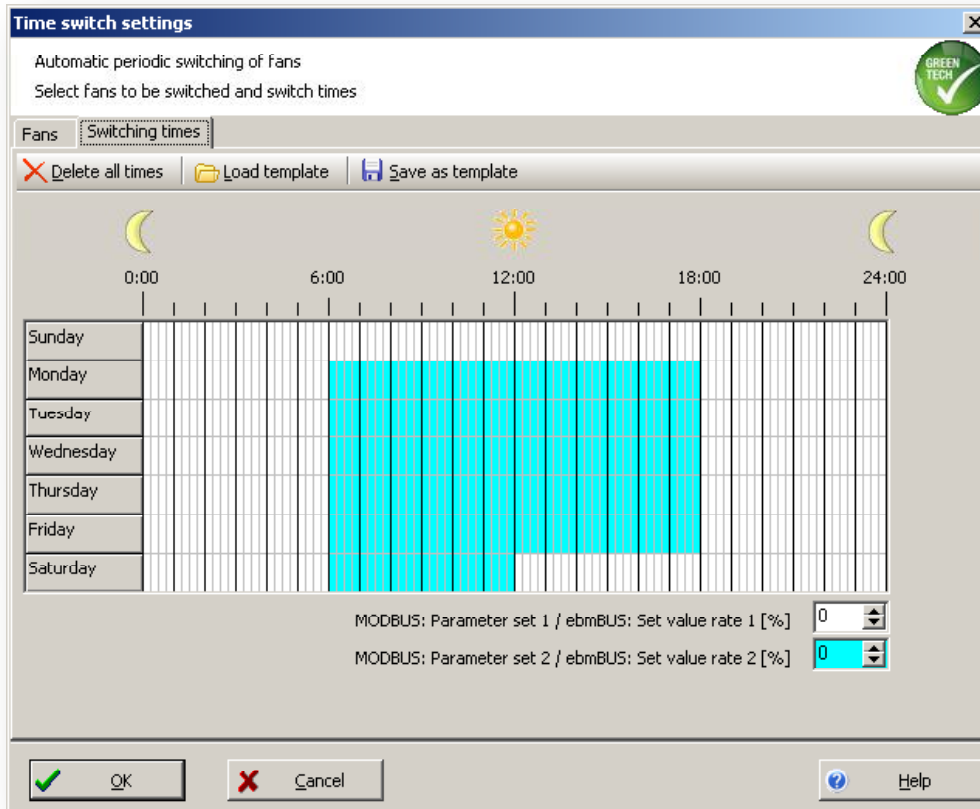


Fig. 5-15 Configuring switching times

The shortest possible switching interval is 15 minutes. As EC-Control has to switch the fans consecutively, this may take some time depending on the size of the fab. Use the mouse to select the boxes (blue) to which parameter set 2 or the 2nd evaluation level is to be assigned. The current selection can be discarded with Delete all times.

A selection can also be saved for further use in a different fab. If this is done by clicking Save as template, the current selection can be stored as a text file. This can be loaded later or in a different fab using Load template.

The two input fields under the weekly schedule only have to be filled in if ebmBUS fans are also to be switched by way of the timer.

Finally, confirm your settings using OK. If you have checked the box on the Fans tab, the timer starts running straight away. On starting EC-Control, all fans for which a timer is configured are also switched to the state valid at the time of starting.

5.10 IO functions

IO functions refers to the use of digital inputs 2-7 and relays 2-7 of the USB relay box 10450-1-0174 or alternatively the IO groups Timer(s).

This dialog appears after calling up the menu item:

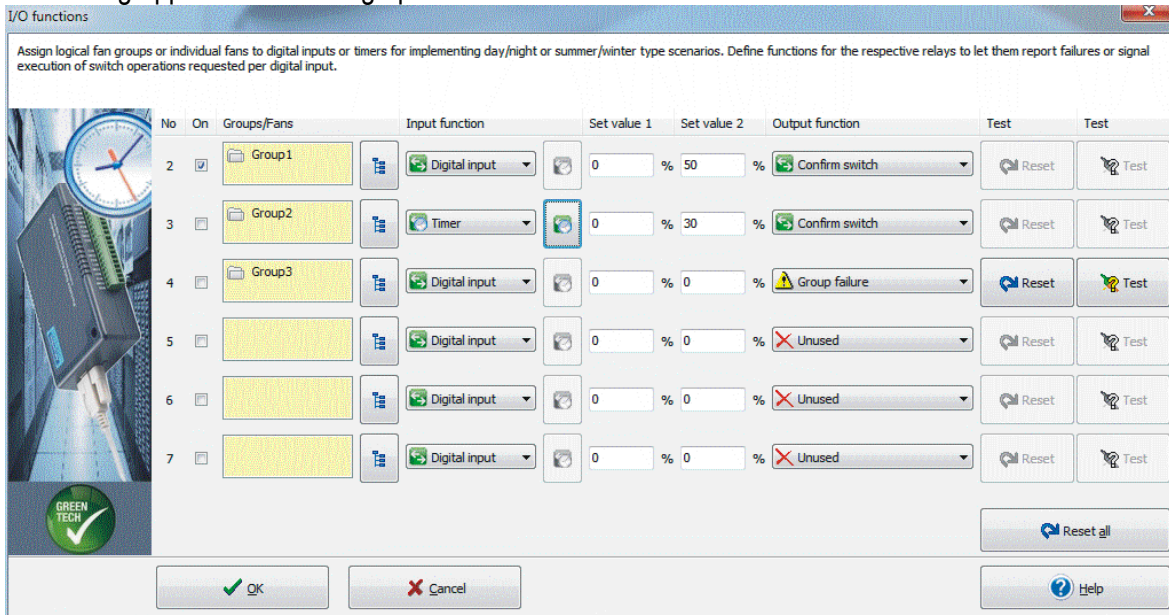



Fig. 5-16 Configuring IO functions


The *Output function* and the *Reset* and *Test* buttons of the menu item *Options/IO settings* for configuring this functionality are only available if EC-Control has detected a connected relay box.


The following functions can be configured or triggered here:

- Check the box in the *On* column to activate the assigned input and/or output. Uncheck the box to temporarily deactivate a configured input/output.
- The list in the *Groups/Fans* column indicates the parts of the fab to which the settings of this input/output (= IO group) apply. It is possible to assign not just groups (the settings then apply to all fans in the group), but also individual fans. To create these links, either drag and drop nodes from the structure tree or use the separate mask for managing links. Click the button to the right of the corresponding list to call up this mask (📄). One and the same group or the same fan can also be assigned to multiple inputs/outputs. If a fan is assigned to multiple IO groups, switching commands are executed in the order of the IO groups. This means that the last switching command always takes effect at the end.
- *Input function* is used to select the source of the signal for switching between *Set value 1* and *2* (these are explained in the following). The signal either comes from the corresponding *Digital input* of the relay box or EC-Control performs switching at definable times (*Timer*). The screen for defining the switching times appears immediately on selecting the timer. This dialog can however also be called up with the button (🕒) to the right of the selection field.


 Once the *Input function* *Timer* has been assigned to at least one IO group, the global timer, which can be defined with *Options/Timer* (see Chapter 5.9), is deactivated to prevent unintentional mutual influencing.

- Two percentage set values, that are switched with the digital input, can be defined in the columns Set value 1 and Set value 2. This has a different effect depending on the bus system:
 - With *ebmBUS* and the energy-saving motor with MODBUS, this effects switching between two reduction factors. A reduction factor of 100 % indicates a full set value and a reduction factor of 0 % leads to stoppage of the device if no *Min PWM* has been configured.
 - With *MODBUS*, percentage set values are sent.


 In *Speed control* operating mode, the calculation formula used leads to the resultant actual fan speed being approx. 2.4 % above that to be expected on the basis of the formula for speed set values. Example: Maximum fan speed 1000 rpm, set value 50 % will result in 512 rpm instead of the expected 500 rpm.

 In the interests of comprehensibility (complex calculation), it is not advisable to use this set value switching function in *Sensor control* operating mode.


- One of the following three functions can be selected in the Output function column:
 - *Unused*: The relay of this IO group is not used. However, if the IO group is activated by checking the On column, only the digital input or the timer is used for set value switching for this IO group.
 - *Group failure*: The relay is switched (NO connected to COM) if one of the fans assigned to the output signals a failure. After being triggered, the relay must be reset manually using the Reset button.
 - *Confirm switch*: When the set value is switched by way of the digital input or timer, this option causes the assigned relay to switch in accordance with the input or set value set by the timer once all "Set set value" commands have been sent. This corresponds to acknowledgment of set value switching.

 This function was not developed or certified in accordance with safety standards. Usage for applications where safety is critical is therefore not recommended, as actual execution of the commands sent cannot be guaranteed.

- The Reset button is used to reset a group failure message and is only available if the corresponding output function is *Group failure*.
- The Test button can be used to switch the relay manually and thus simulate the failure condition if the *Group failure* output function has been selected.
- The Reset all button resets all group failure messages at once.

 Closing the dialog with OK or starting EC-Control causes all the fans assigned to an IO group to be switched to the state defined by the digital input or the timer at this point in time. If a fan is assigned to multiple IO groups, the switching operations take place in the order of the IO groups.

5.10.1 Assigning groups and fans to an input

The following mask appears on clicking the button to the right of the *Groups/Fans* list ():

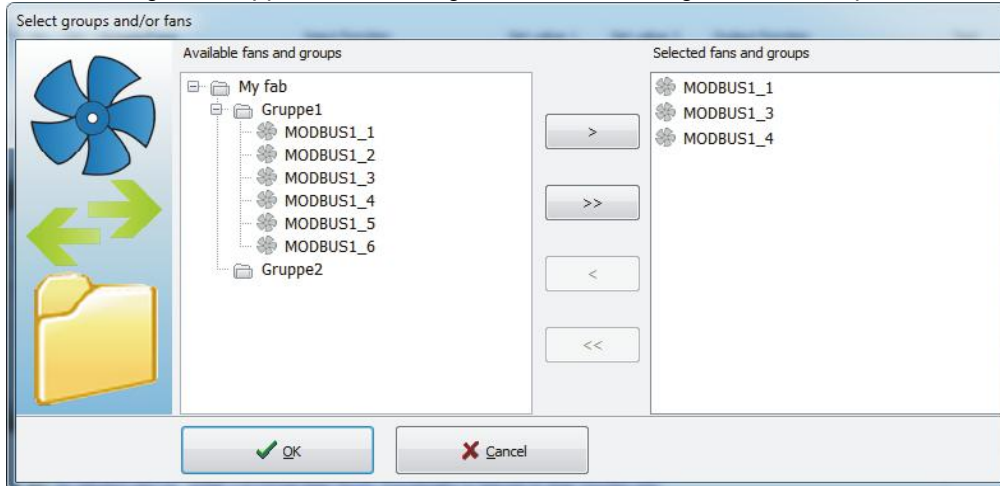



Fig. 5-17 Assigning groups and fans

The top arrow buttons (> and >>) in the center of the dialog can be used to transfer nodes selected in the tree to the selection list. The ">>" button" transfers all tree nodes. The bottom arrow buttons can be used to remove entries selected in the list on the right-hand side.

5.10.2 Definition of switching times

Clicking the switching times button () opens the following mask for defining the switching times of the corresponding IO group:

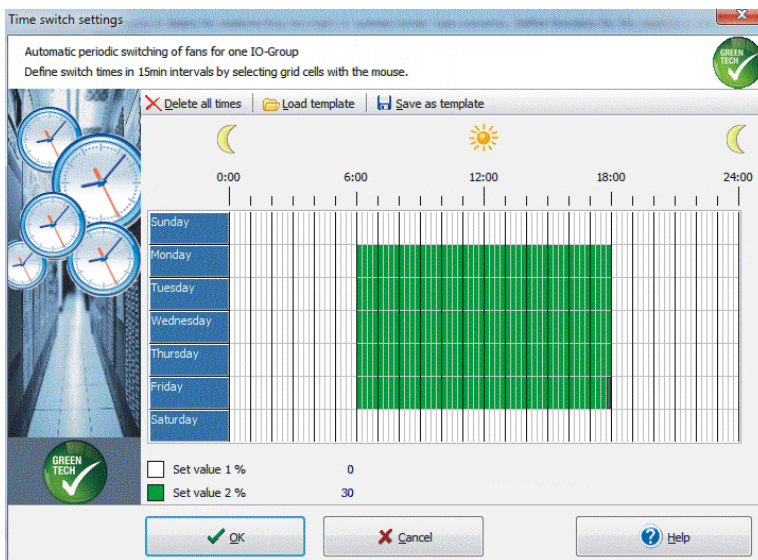


Fig. 5-18 Definition of switching times for an IO group

The switching times can be defined on a 15-minute basis for the specified week days. Clicking in a box with the mouse will assign the associated time interval to the other set value in each case. If it was previously set value 1, it will change to set value 2 and vice versa.

The *Delete all times* button resets all time intervals to set value 1. An existing time definition can be loaded from a text file with *Load template*. Use is then made of the same file format as for the global timer. The switching time configuration just defined can be saved to a text file with *Save template*.

5.10.3 Display of IO settings status in status line

Just like the icon in the main menu, an icon in the center of the status line indicates the status of the IO settings. The following status icons have been defined:



Relay box connected, active IO settings.



Active IO settings, no relay box connected. If configured, a group timer will be executed independently of the relay box.



Relay box connected, active IO settings; however at least one of the active inputs or outputs has no groups or fans assigned.



Active IO settings; however, one of the active inputs or outputs has no groups or fans assigned and there is no relay box connected.

No icon indicates that there are no IO settings regardless of whether or not a relay box has been connected. However, the icon for a connected relay box with active IO settings appears in the main menu in this case to make it easier to find the menu item.



This icon appears in the status line to the left of the IO settings icon as soon as at least one IO group is using the *Input function Timer*.

The icon is refreshed if the relay box is connected or disconnected in the course of operation.

If the global timer is also activated, its status icon appears next to the IO settings status in the status line.

5.11 Remote control settings

EC-Control permits linking with building management software (BM). The OPC/DA interface software *EC-OPC* to be separately installed for this is supplied. EC-Control provides a direct HTTP/REST-based interface for users wishing to connect up software that is not OPC-compatible. An English-language description of this interface can be provided on request. EC-Control also makes it possible to just display the fab status as a website in a web browser.

The following data can be scanned via the OPC/REST interface:

- Unique identifier for each logical group and each fan. This identifier permits individual scanning of groups or fans (*PhysicalAddress*).
- The descriptive name of the group or fan.
- For fans, the actual speed (*CurrentSpeed*) and the speed set value (*SetValue*); the operating mode is always assumed to be closed loop speed control.
- The maximum speed of the fan (*MaxSpeed*).
- A failure identifier: *Failure present/No failure* for each fan (*HasFailure*).
- For groups, the sum total of all communication errors of all fans in the group (*TimeoutCount*), the number of fans that have been set to set value 0 (*ZeroSpeedCount*) and the number of fans signaling some other failure (*OtherFailuresCount*).
- For groups, the number of fans displaying a warning (*WarningCount*) and the total number of fans contained in the group (*FanCount*) can be scanned.
- For groups, there is a counter which provides a sum total of the communication timeouts, the number of fans with set value 0 and of fans with some other failure (*ErrorSum*). Warnings are not included in this.

Speed set values (*SetValue*) can also be set for individual fans or entire groups.

If you wish to link EC-Control to external software via the OPC interface, first read Chapter [5.11.1 Installing OPC server EC-OPC](#).

The menu item *Options/Remote control settings* can be used to activate and configure the remote access interface and the status website independently of one another.

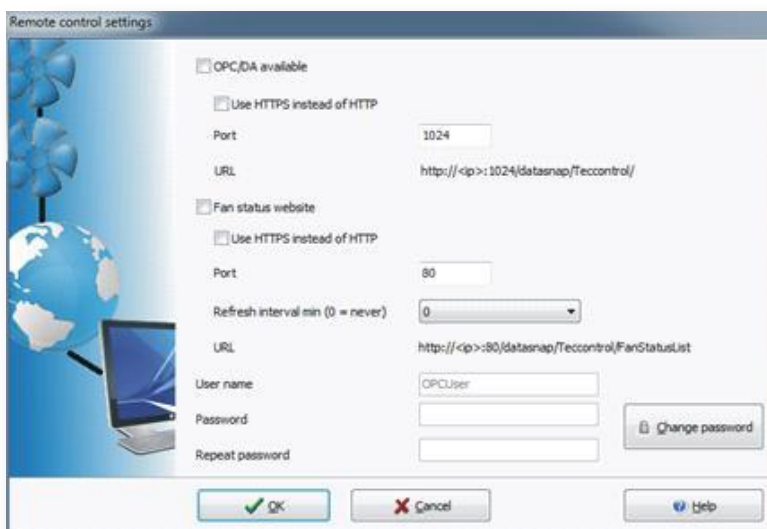


Fig. 5-19 Configuring remote control interfaces

- OPC/DA available activates or deactivates the interface for the external OPC server *EC-OPC* supplied or any other client for this REST interface.
- Use HTTPS instead of HTTP switches access to use of the SSL encryption method.



As use is made of a self-signed certificate, automatic verification of the issuer is not possible. The certificate can be verified manually using the web browser. Its fingerprint is be a3 12 d8 2b b0 f3 67 fc fa 4f 84 40 48 ff a2 e7 ce a0 c0 and it is valid until 7 December, 2035. Verification can be performed by activating and calling up the status website. Use HTTPS instead of http must again be activated for this. The details of the certificate can then be displayed via the web browser user interface.

- Port designates the port number on the EC-Control PC at which this interface can be accessed. An available number must be selected. In case of doubt, a list of all port numbers already in use can be obtained with the Windows command line command `netstat -p TCP`.
- URL indicates the address at which a client can access the interface. `<ip>` is a placeholder for the actual IP address or the DNS name of your PC in the network.
- Fan status website makes the status website available or deactivates it.
- Use HTTPS instead of HTTP switches access to use of the SSL encryption method. Use is made of the same self-signed certificate as for the OPC interface. Manual verification in the web browser can be performed as described in the Info block above.
- Port designates the port number at which the status website is available on the EC-Control PC. This is usually 80 when using http, port 443 has become generally established for HTTPS.
- Refresh interval is the time in seconds after which the status website is automatically re-loaded by the browser and thus updated. This does not involve having to enter the login data again. A time setting of 0 seconds deactivates automatic refreshing of the status website.
- URL indicates the address to be entered in the address line of the web browser to be able to call up the status website. The placeholder `<IP>` is then to be replaced with the IP address or the DNS name of the EC-Control computer in the network.
- User name is the user that is equally valid for both interfaces. Authentication with the user name given here is therefore also necessary for a program that is to use the http/REST interface. User name and password can only be changed after pressing the Change password button.
- Password/Repeat password: A new password for securing remote access can be defined by pressing the Change password button. A password must be defined before using the OPC interface or status website.

Close the dialog with OK to save the new settings. EC-Control has to be re-started if one of the port numbers has been changed.

5.11.1 Installing OPC server EC-OPC

Install the OPC-DA server software supplied before using the OPC link in EC-Control. The program can be found on the EC-Control installation CD. We recommend installing the software on the same PC as the building management system software (BMS) to be linked up. This should avoid configuration problems with Microsoft's DCOM technology.

In scenario A, just EC-Control is installed on the left-hand PC. EC-OPC and the BMS software are both located on the right-hand PC, at which the operator is working. In scenario B, all programs are installed on the same PC.

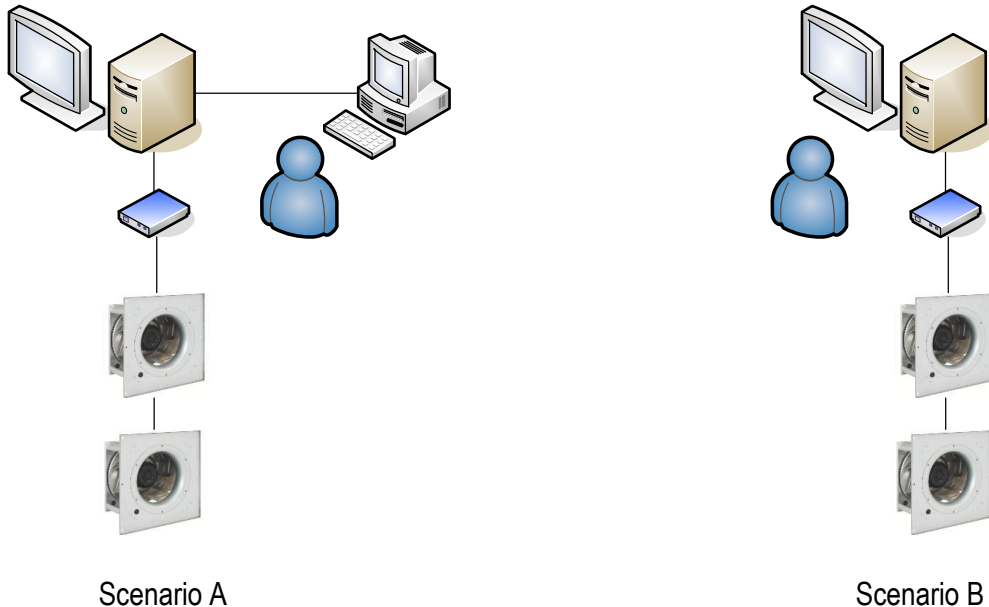


Fig. 5-20 Possible installation scenarios

To install EC-OPC, start the installation program and follow the instructions of the program. The software has no Desktop icon, as it is installed as a service and therefore starts automatically. The name of the service is *EC-Control OpcService*.

The OPC server has certain settings that can be configured by way of the file contained in *C:\ProgramData\EC-OPC* with the name *opc.ini*. EC-Control carries most of this configuration procedure automatically. Then set the configuration parameters as described in the main chapter and end the corresponding EC-Control dialog with OK. No further steps are required for EC-Control if installation is performed as shown in scenario B. The OPC server and all data items should be available in the BM software. Detailed information on configuration in the BM software can be found in the associated documentation.

If you have not installed EC-OPC on the same PC as EC-Control, a message screen will appear on closing the configuration dialog in EC-Control and you will have the opportunity to select the storage location for *opc.ini*. Please copy *opc.ini* to *C:\ProgramData\EC-OPC* on the PC on which you have installed EC-OPC. In this case, you will also have to adapt the *opc.ini* file. To do so, replace the *127.0.0.1* part of the *baseurl=* entry with the IP address or the URL of the EC-Control PC. If the EC-Control PC is protected by a firewall, you will have to enable access to the port you have set for the OPC interface in the firewall. Details can be found in the documentation of the firewall product used.

5.11.2 Statistics

In connection with the HTTP/REST remote monitoring interface, EC-Control records certain statistical data. These statistical data can be viewed by the user in the form of an overview. Given appropriate authorization, the statistics counters can be reset.

The following screen can be called up with *File/Statistics*:

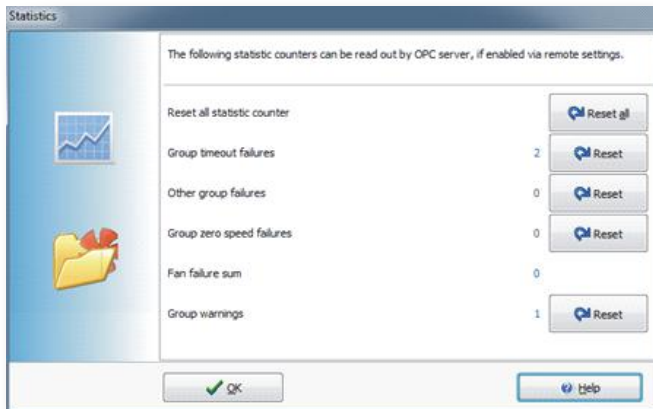


Fig. 5-20 Statistics counters

Reset all can be used to reset all statistics counters at once. The other *Reset* buttons only reset the directly assigned counter in each case.

The *Fan failure sum* is the sum total of *Group timeout failures*, "*Group zero speed failures*" *group failures* and *Other group failures*.

5.12 Configuration export and import

[Options/Save configuration in CSV file](#) can be used to save the entire configuration in a file format compatible with most spreadsheet programs, including *Microsoft Excel*.

With EC-Control it is also possible to import the configuration of a fab from a CSV file. This function can be found under [Options/Load configuration from CSV file](#). A configuration should only be loaded from a CSV file if the configuration does not yet contain any data, as existing configuration settings are deleted during import.

CSV files with fab data contain:

- All the necessary data on the existing interface converters
- Name and structure of groups
- Name, coordinate position and addresses of fans
- File names of room plans

A detailed description of the file structure can be found in [Annex C](#).

5.13 Integrated Help function

EC-Control has an integrated Help function. The Help texts are only available in English and full Help texts are unfortunately not yet available for all screens.

Almost all dialogs have a corresponding Help button or a Help menu item. The list of contents of the Help function can also be accessed directly with [Help/Index](#). The [F1](#) key can also be used to call up the Help function in most dialogs. The Help function also features a keyword index.

A brief Help text is also available for most of the parameters in the fan parameter dialog explained in [Chapter 4.3](#). If the control element in which the current parameter value is being displayed is clicked or selected with the tab key, the Help text for this parameter can then be called up with the [F1](#) key.

A Frequently asked questions

How do I make a back-up copy of the database used by EC-Control?

EC-Control stores all configurations and user settings and the failure list in a database file. This can be found in the application data directory of EC-Control *C:\ProgramData\EC-Control* under the name *eccontrol.fdb*.

The file can be copied for back-up purposes after completely shutting down EC-Control. Should it be necessary to re-load this copy, it must first be ensured that EC-Control is completely shut down, as the file could otherwise be blocked by the database system being used. In case of doubt, re-start the computer. The copy can then be copied using the *eccontrol.fdb* file in the above-mentioned directory. On starting EC-Control, the status will be exactly the same as at the time the back-up copy was made. Any changes made in the meantime will of course be lost.



Never load a back-up copy of the database file if a new version of EC-Control has been installed since the last back-up copy was made. EC-Control could crash or functionality could be lost.

B Configuring EC-Control using procedure from earlier version

This chapter contains all the information on configuring EC-Control from the manual for Version 1.00. It is taken from Chapter 2.5 and Chapter 3. This information has been retained, as the same procedure can still be employed to configure a fab in V2.00 and offers somewhat greater flexibility for experienced users.

B.1 Configuration of Ethernet/RS485 interface converters

With Ethernet interface converters it is basically possible to incorporate fans at any point in an existing computer network. It is however always necessary to configure the interface converter as described below. If problems are encountered when configuring and starting up an interface converter, contact your network administrator or get in touch directly with your contact at ebm-papst.

Obtain the following before starting up the interface converter:

1. The MAC (Media Access Control) address of the interface converter. This is printed on a small sticker on the interface converter (after the text EN=). It is a string of 6 characters that can be made up of the digits 0-9 and the letters A-F.
2. The *static/fixed IP address* to be assigned to the converter. EC-Control later uses this address to communicate with the converter. The format of the IP address is *aaa.bbb.ccc.ddd*. It is usually provided by your network administrator. If there is no network administrator, you will have to assign a free IP address yourself. The address can be determined easily if the interface converter is connected directly to a PC. In this case, only Ethernet interface converters obtained from ebm-papst should be connected to the network card concerned. An Ethernet Switch is required for the connection of multiple converters. You then only have to identify the IP address of your PC. This must not be used, as two devices in the network cannot have the same address.

Proceed as follows to determine your own IP address:

Call up Start/Run or use the key combination Windows key-R. Enter cmd.exe as the program to be executed and confirm with OK. A console window appears. Enter ipconfig /all and press the Enter key. The result should be something like this:

```


C:\WINDOWS\system32\cmd.exe
C:\>ipconfig /all
Windows-IP-Konfiguration

Hostname . . . . . : amd64
Primäres DNS-Suffix . . . . . :
Knotentyp . . . . . : Unbekannt
IP-Routing aktiviert . . . . . : Nein
WINS-Proxy aktiviert . . . . . : Nein

Ethernetadapter LAN-Verbindung:
Verbindungsspezifisches DNS-Suffix:
Beschreibung . . . . . : NUIDIA nForce Networking Controller
Physikalische Adresse . . . . . : 00-16-E6-8A-18-16
DHCP aktiviert . . . . . : Nein
IP-Adresse . . . . . : 192.168.0.4
Subnetzmaske . . . . . : 255.255.255.0
Standardgateway . . . . . : 192.168.0.1
DNS-Server . . . . . : 192.168.0.1
    
```

Fig. B-1


In the example shown above, the IP address of the computer is 192.168.0.4 and the interface converter must be assigned an available address between 192.168.0.2 and 192.168.0.254 in the format *aaa.bbb.ccc.ddd*. As the PC has the address 192.168.0.4, the *aaa.bbb.ccc* part of the IP address will be set to 192.168.0. For the last group of characters in this example, any value between 1 and 254 can be selected, with the exception of the numbers already assigned, namely 4 (own PC) and 1 (standard gateway). A possible address would be 192.168.0.3 for instance.

 The IP address assigned to the interface converter must not have been assigned to any other device in the network. Windows usually indicates this with the following message:

Windows system error

There is an IP address conflict with another system in the network

Select the bus protocol of the fans to be connected to the interface converter concerned in the configuration program. The configuration program can be found under Start/Programs/EC-Control. This is either MODBUS or the ebmBUS protocol and can be taken from the catalog if necessary.

 Administrator rights or network configuration operator rights are required to execute this program.

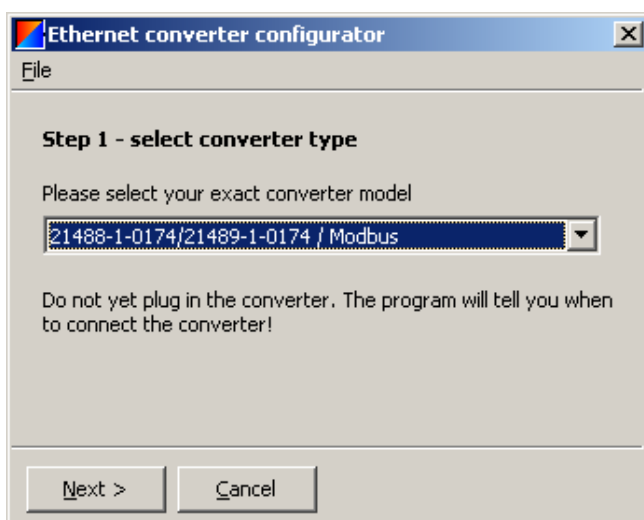



Abb. B-2

 Only fans using the same bus protocol are to be connected to any particular interface converter. Multiple interface converters will be required if simultaneous use is to be made of different protocols in a fab.

3. If you wish to integrate the interface converter into a company network, you will need a free and connected network socket.
4. Finally, you need a socket for the interface converter power supply and a slotted screwdriver to fasten the green connector to the power supply connector.

Once you have all the necessary information, you can start to configure the interface converter as follows:

1. Unpack the interface converter and connect the line voltage. To do so, screw the green connector to the small connector of the power supply. Do not yet connect the network cable.
2. Start the configuration program. This can be found under Start/Programs/EC-Control/Ethernet converter configurator.
3. Select the required bus protocol in the configuration program and click Next.

4. Connect the interface converter to the network.
5. Enter the MAC address of the interface converter described above.
6. Enter the IP address to be assigned to the converter in the bottom line. The following illustration shows a specimen configuration:



Fig. B-3

7. Click Next.
8. Click Next. The IP address entered is now assigned to the interface converter. Click Next again. The interface converter will now be configured for the selected bus protocol. After successful configuration, the message Configuration done. Click "finish" should appear. Click Finish to end the configurator. If further interface converters are to be configured, simply repeat all steps.

If configuration fails for any reason, check the following:

- Is the interface converter wired correctly?
- Is the interface converter switched on (green LED lit)?
- Is the IP address still available and is it in the same subnet as that of your computer (check subnet mask)?
- Is the MAC address entered correct?

After checking the possible sources of error listed above, repeat installation. If there are still problems, consult your network administrator or your contact at ebm-papst.

B.2 Basic fab setup in EC-Control

As already explained in Chapter 2.2, each fab configured in EC-Control (referred to as configuration) is made up of one or more interface converters. In addition, each fab has a tree-type administration structure (structure tree) that helps to locate individual fans quickly, particularly in large fabs.

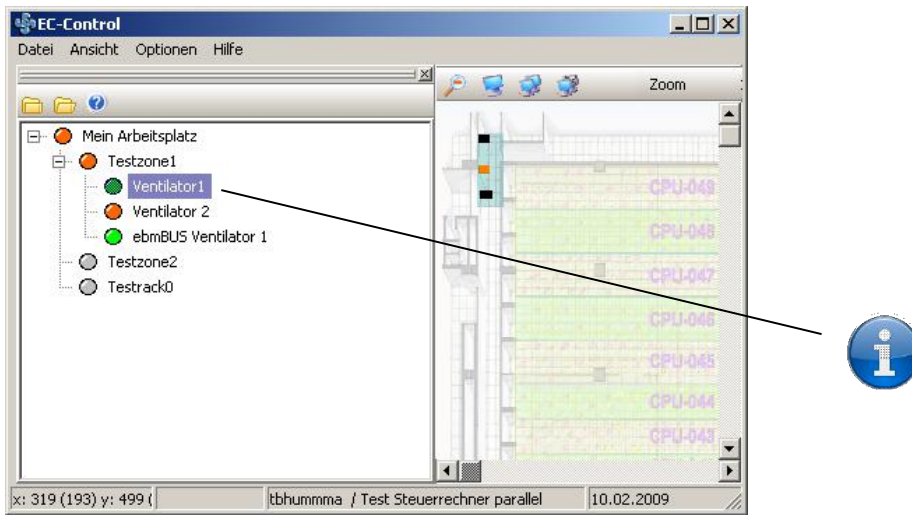


Fig. B-4

The structure tree starts with a root node. Apart from its name, the root node has subordinate group nodes or, in the case of small fabs, the actual fans. As the root node acts like a group, it can only contain either groups or fans, but not both at the same time. A room plan is usually also assigned to the root node. The fan icons are subsequently positioned on this room plan (a graphics file in BMP or JPG format). For small fabs, a completely white graphic may suffice. For larger fabs, it is however advisable to depict the actual layout of the building. The layout thus supports administration as well as diagnosis and trouble-shooting. Information on efficient use of the tree can be found in Chapter 4.

If possible, a room plan graphic should have the same height/length ratio as the screen on which you are using EC-Control. It is also advisable to select a higher resolution for the room plan graphic than that of the screen, as EC-Control can then display enlarged views (zoom) with a greater depth of detail. It should however be noted that large room plans utilize more of the system capacity, particularly on slower computers and that EC-Control will then not react as quickly in zoom mode.

If groups are assigned to the root node, these may also contain further groups or the actual fans. Here, the groups are completely independent of the address format of the bus system used and may therefore be given any desired alphanumeric name. The groups can also be configured with any required depth. In other words, a group may contain sub-groups, sub-subgroups etc. The structure of the tree does not have to be equally deep throughout. At one point, the root node may contain a group with further sub-groups finally containing the fans. At another point, the root node may contain just one sub-group to which the fans are directly assigned, i.e. it does not contain any further sub-groups.

B.3 First login

Following successful installation of the software and configuration of the interface converters if required, EC-Control can be started up for the first time and the fab configured.

EC-Control can be found as a link on your *Desktop* and under *Start/Programs/EC-Control/EC-Control*.

After starting EC-Control, the following login dialog appears first:



Fig. B-5

Select the language for the user interface (last dialog selection field) and the configuration to be used. EC-Control stores the last language setting and configuration selected. These will be selected as default settings on next login.

EC-Control sets up two configurations on installation. Setting up additional personalized configurations is described in Chapter 5.6. The pre-defined configurations are:

- *Customer* – You can use this for your first fab. Several pre-defined user accounts are provided. More detailed information on this and the corresponding passwords can be obtained from your ebm-papst contact.
- *ebm-papst Service* – This is only for ebm-papst service technicians. No login is available to you for this configuration.

Enter your user name and password and click Login. The data for the selected configuration will be loaded.

B.4 Registering interface converters

Your first fab does not yet have any knowledge of the interface converter(s) to be used. For this reason, you should first call up Options/Computer and interfaces. The following window appears:

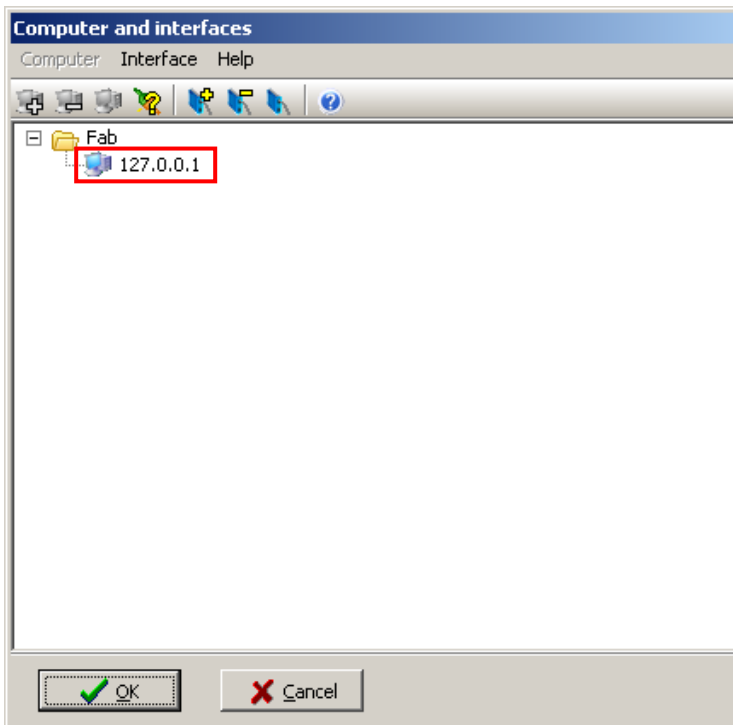


Fig. B-6

The computer entry designated *127.0.0.1* and highlighted in red in Fig. B-6 is your own computer. In TCP/IP computer networks the address *127.0.0.1* always indicates your own computer. Select this entry and either click the Add interface converter button (🔧) or call up the menu item Interface/Add. The following dialog appears:

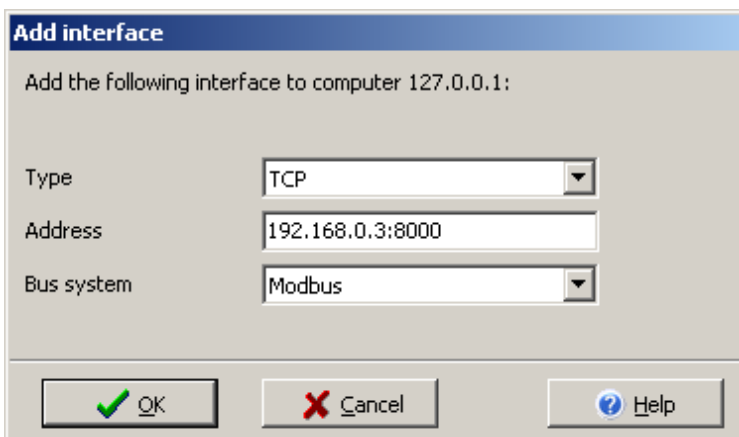


Fig. B-7

Select the type of interface and the bus protocol to be used and enter the interface address or the IP address of the interface converter. When using a serial RS232 interface, the interface address could be *COM1* for example. When using an Ethernet interface converter, a valid address could be *192.168.0.2:8000*. The part before the colon (:) is the address you have assigned to the interface converter and you should always add the digits: *8000*. The number *8000* is the same for all Ethernet interface converters.

If you wish to add further interface converters, simply select the computer entry 127.0.0.1 again and repeat the steps described above.

Once all interface converters have been added, close the dialog with OK. Cancel on the other hand will cancel all changes you have just made.

B.5 Configuring fab structure and fans

The next and final step is to configure the groups and fans in your fab. To do so, call up the menu item File/Edit mode. The following window appears:

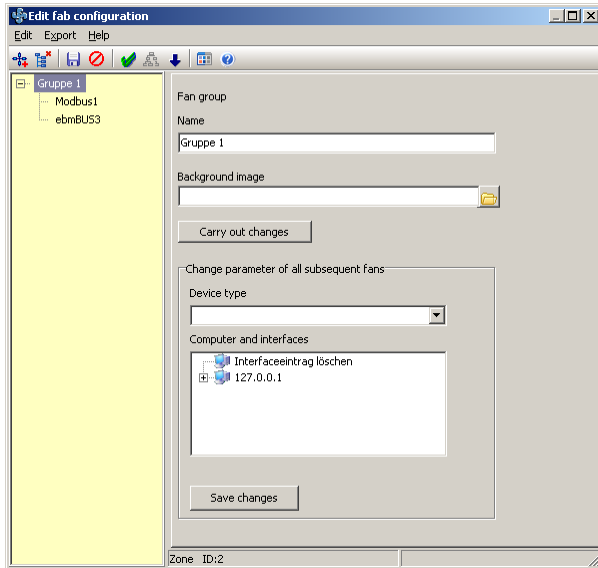


Fig. B-8

The window has three sections as follows:

- A context-based menu and a corresponding button bar
- A part of the structure tree is displayed in the area with a yellow background.
- The possible settings for the node clicked in the left-hand section are displayed in the right-hand section of the window.

This dialog has an Undo function. However, this does not make it possible to reverse individual changes, but merely to cancel all changes made since the last saving operation. This allows you to return to the same status as when the fab configuration was last saved.

On starting work, the fab consists of just one node, the root node. You can now add groups or fans directly to this.



It is not possible to configure groups at a later point in time if you have assigned fans directly to the root node.

B.5.1 Adding groups

To add one or more groups to the root node, call up Edit/Add groups. The following window appears:

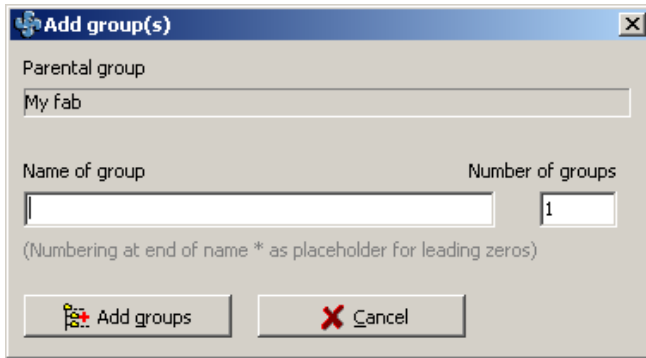


Fig. B-9

The dialog can be used to create a single group or to generate several groups at once, each only differing by one number at the end. If * characters are attached to the group name, these will be replaced by a consecutive number. If the number has fewer positions than there are * characters, leading zeros will be added.

By double clicking or using Edit/Structure hierarchy down, it is possible to make a group into the active group and so move down a level in the structure tree. Edit/Structure hierarchy up can be selected to return to the next higher level. It is also possible to drag groups from the entire EC-Control structure tree to the area with a yellow background. In each case, the "highest" level will become the active level.

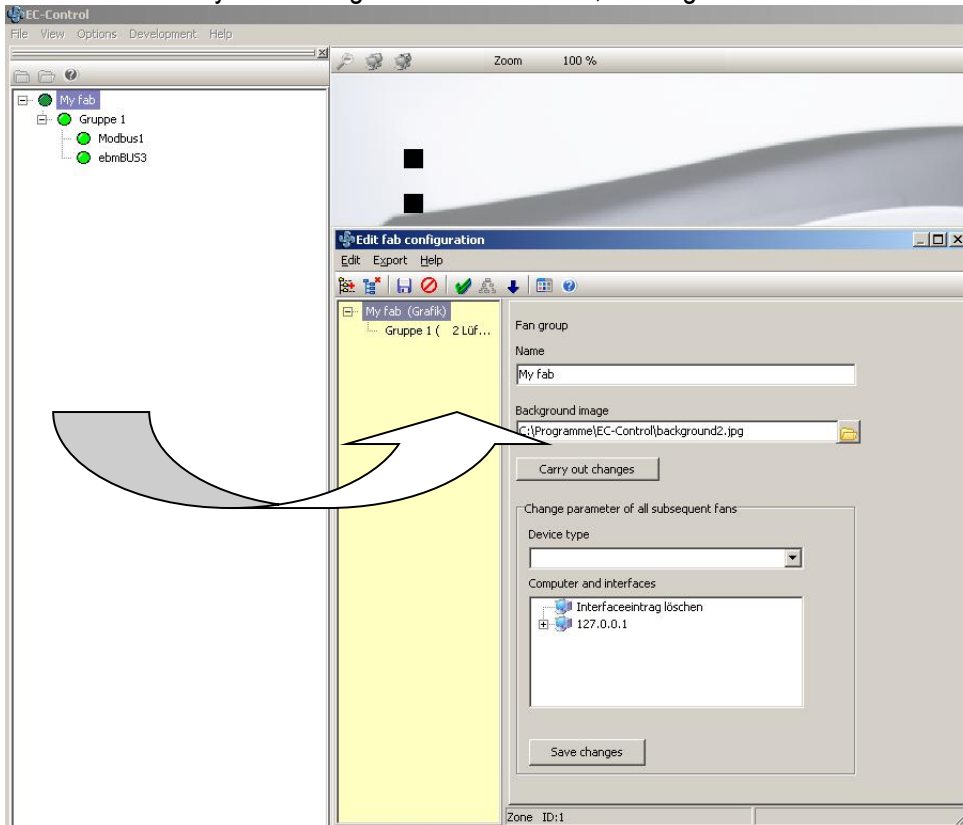


Fig. B-10

Once a group has been created and made into the active group, sub-groups can be created using Edit/Add groups. The procedure is identical to the one described above.

If you wish to delete a previously generated group, this can be done using Edit/Nodes.

B.5.2 Adding fans

Edit/Add fans can be used to add a fan or a whole series of fans to the active group. The following dialog appears:

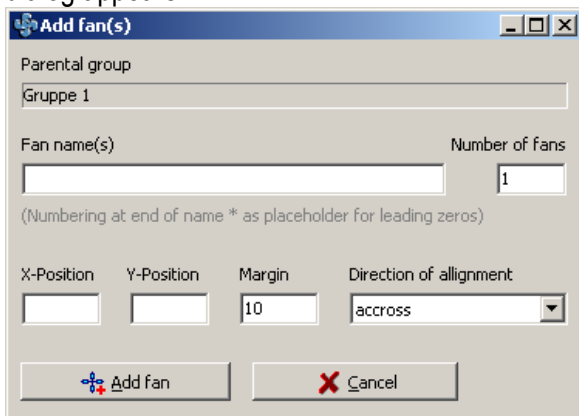


Fig. B-11

Parental group indicates the group to which the fans are to be assigned. Give your fan any name you wish. If you wish to create multiple fans at once, simply enter the required quantity under Number of fans. The fans will then use the name you have entered, supplemented by a consecutive number. If * characters are attached to the fan name, these will be replaced by a consecutive number. If the number has fewer positions than there are * characters, leading zeros will be added.

X-position and Y-position indicate the coordinates of the top left corner of the first fan to be added in the room plan stored for the group. These coordinates can easily be determined by moving the dialog to the side and moving the mouse over the room plan. The corresponding X and Y-coordinates are shown in the EC-Control status bar. If multiple fans are generated, the margin in pixels indicates the amount of space between the fan icons. If just one fan is created, any value greater than zero can be entered here. If multiple fans are generated, these will always be arranged in a line, either horizontally from left to right or vertically depending on the selection made in the field Direction of alignment.

While the configuration dialog shown in Fig. 3-5 is open, fan icons can also be simply moved around the room plan with the mouse. Just click the top left corner of the area to be moved with the left mouse button and pull out a red selection panel. This can then be moved with the mouse together with all the fan icons contained in it. EC-Control displays a grid to facilitate alignment. The grid can be adapted to suit requirements or deactivated completely with the View menu item.

After closing the dialog with the Add fan button, the new fans will be displayed in the tree section with a yellow background.



If required, individual fans can be deleted using Edit/Delete node.

The deletion operation is executed by saving the changes and then re-starting EC-Control.

B.5.3 Setting device type and interface

The fan(s) generated has/have now been created in the tree and on the room plan. However, three further settings are required to enable EC-Control to communicate with these. Each of these fans requires a *Device type* that defines the functions supported by the fan concerned. It is also necessary to specify the *Interface* with which EC-Control can communicate with the fan and a *physical fan address*, a

sort of house number for the fan. In physical terms, the interface takes the form of an interface converter and must have been created beforehand in EC-Control as described in Chapter 3.3.

Each fan in a fab requires a unique address. This is only to be assigned once within the fab, even if the fab uses multiple interface converters. All ebm-papst fans always have the same address when they are delivered. For MODBUS devices this address is 1 and for ebmBUS devices it is Group 1, Fan 1. To be able to start up the fab, the fans therefore have to be connected consecutively and the address of the fan last connected has to be altered each time before connecting the next fan. This can be done using the Fan parameters dialog shown in Chapter 4.3, Fig. 4-5. The address format for ebmBUS fans is G/L, where G is the group address (1-255) and L is the fan address within the group (1-31).

If the fan address is entered at this stage, it must be ensured on subsequent connection of the fans that the correct address is assigned to the devices in the Fan parameters dialog. Otherwise, the arrangement of the fans in the room plan will not coincide with the actual addresses. It is also possible to assign addresses at a later point in time by calling up File/Edit mode again.

Selection of the correct device type

- If your fan is equipped with MODBUS, always select "MODBUS Standard" as device type.
- If your fan has an ebmBUS interface, select "ebmBUS V3".



The assignment of an incorrect device type to a fan will invariably result in communication problems with the fan concerned. If necessary, you can find out which bus system your fan uses from the catalog.

Assigning the device type and interface can either be done for each fan individually or for whole groups of fans. For individual setting of these parameters, click the corresponding fan in the tree with the yellow background. The device type can now be selected from the list and the interface to which the fan is connected can be selected from the tree. Here it is also possible to numerically alter the position of the fan icon in the room plan, either in absolute coordinates or relative to the previous position. In each case the entry is made in pixels.

The illustration below shows the configuration dialog for a selected fan.

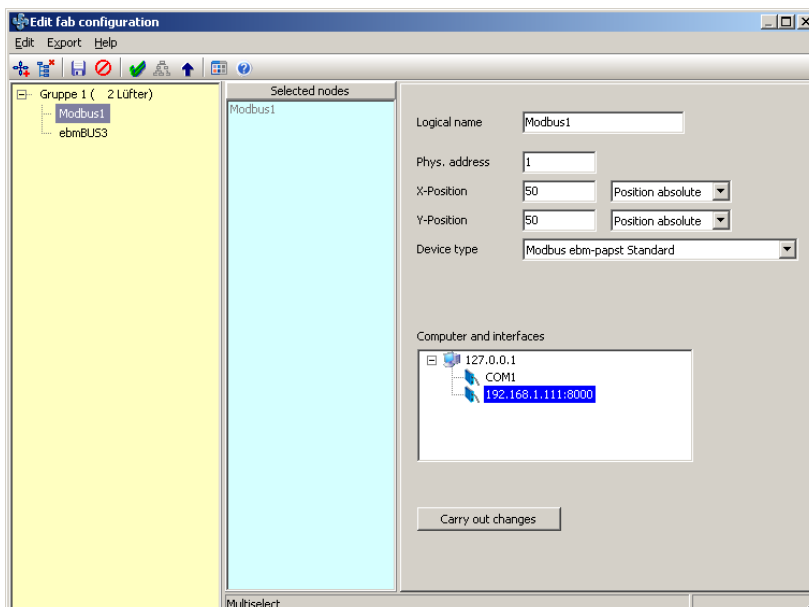


Fig. B-12

Carry out changes temporarily activates these settings, but they are only permanently stored with Edit/Save changes or by way of the corresponding button in the symbol bar. Until they are finally saved, the settings can be undone again with Edit/Cancel changes.



These settings are not permanently saved by the Carry out changes button under the Computer and interface tree. The settings will only be permanently stored when Edit/Save changes is selected.

The dialog will change to the following display if a group has been selected for the purpose of assigning the same settings for device type and interface to all the fans in this group:

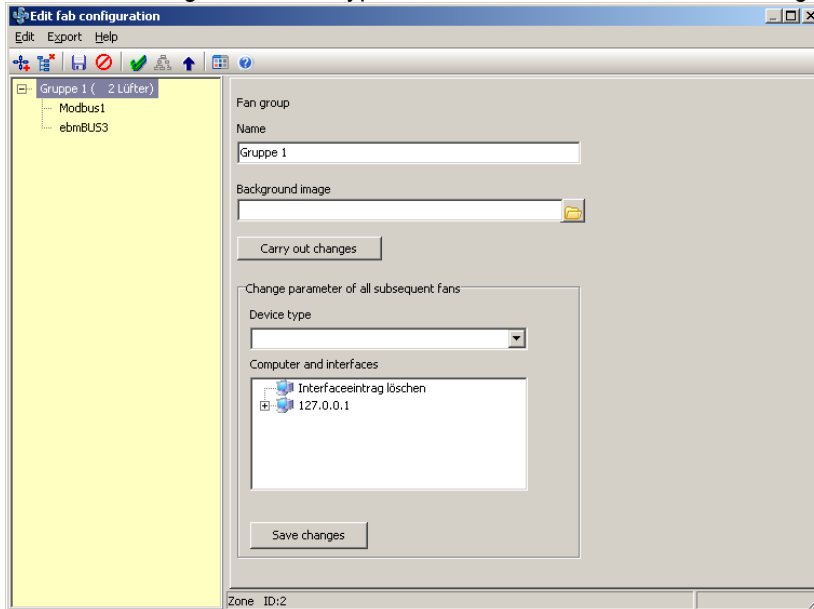


Fig. B-13

These settings can be made centrally for all fans in all the sub-groups of the group selected under Change parameter of all subsequent fans. The button Carry out changes activates these changes as described above but they are not yet permanently stored.



The setting made here applies to all fans in all sub-groups of the group currently selected.



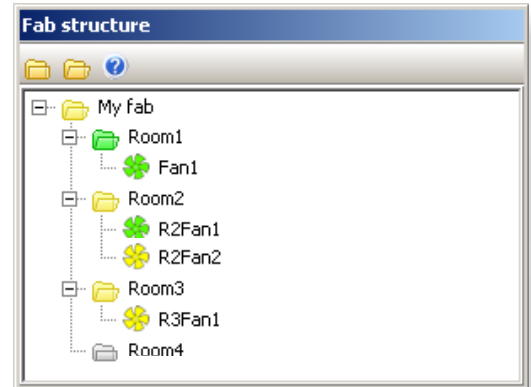
After saving the fab structure, EC-Control must be ended and re-started to ensure correct adoption of the settings.

C Structure of CSV file format

The structure of the CSV files that can be used for exporting and importing fab data is as described below. As separator between the columns, use is made of the character specified in the operating system under *List separator*. If necessary, this can be viewed and altered under *Start/Settings/Control panel/Regional and Language Options* by clicking *Customize*.

This is the specimen CSV file for the structure tree view shown on the right:

```
S;S
C; 0; 127.0.0.1
I; 1; 1; 1;"COM2"; 1
I; 2; 1; 4;"192.168.0.10:8000"; 2
I; 3; 1; 3;"EPTED51P"; 2
Z; 1; 0;"My fab";"background2.jpg"
Z; 2; 1;"Room1";
F; 5; 2; 50; 50;"1/1"; 4; 1;"Fan1"
Z; 3; 1;"Room2";
F; 6; 3; 50; 75;"1"; 1; 2;"R2Fan1"
F; 7; 3; 62; 75;"2"; 1; 2;"R2Fan2"
Z; 4; 1;"Room3";
F; 8; 4; 50; 100;"1"; 1; 3;"R3Fan1"
Z; 9; 1;"Room4";
```



The first column defines the type of information coded in the following columns. The following keys are currently defined:

- S** Separator (column separator): Determined by EC-Control from the above-mentioned system setting when writing the CSV file. If CSV files are generated using other software (e.g. spreadsheet programs), two columns containing S should be entered as first line. CSV files can then even be exchanged between systems with a different country setting.
- C** Computer entry: This is intended for future extensions and is optional.
- I** Interface converter definition (Interface): The second column specifies the consecutive ID of the interface converter. No 2 entries are allowed to have the same ID. At present, the third column must always contain the value 1. The fourth column defines the type of interface converter. The following types are currently defined:

- 1 RS232 (Item no. 21487-1-0174 and 21495-2-0174)
- 3 USB (Item no. 21490-1-0174)
- 4 Ethernet (Item no. 21488-1-0174 and 21489-1-0174)
- 5 Bluetooth (Item no. 21501-1-0174)

The fifth column must contain the address of the interface converter. This depends on the type:

- For RS232 interfaces, the COM port to which the interface converter is connected (e.g. COM1)
- For USB interface converters, the name/serial number of the interface converter. Unfortunately, this can only be determined by configuration in EC-Control.

- For Ethernet interface converters, the IP address of the interface converter followed by the port specification: 8000
- For Bluetooth adapters, the MAC address of the adapter, which is also usually only displayed during configuration in EC-Control. For certain Bluetooth stacks this may however also be shown in the stack-dependent Search dialog. The format of the MAC address is xx:xx:xx:xx:xx:xx, with xx standing for each hexadecimally coded part of the MAC address.

The sixth column specifies which bus protocol is used on the interface converter:

1. ebmBUS
2. MODBUS



For each bus system (ebmBUS or MODBUS), the maximum number of interface converters in one fab is four.

- Z** Logical group (zone): This entry defines a logical group. The second column specifies the unique ID of the group within the configuration and the third column the parent group for this group. The ID of the parent group of the root node is zero. There must be a single entry for the root node, even if no other logical groups are to be used.
The fourth column contains the name of the group as shown in the structure tree. A file name for a room plan can be stored in the fifth column. It is advisable to only store a room plan for the root node.
- F** Fan: This entry defines a single fan. The second column contains the unique ID of the fan; this must not overlap with the IDs of logical groups. The third column contains the ID of the logical group in which the fan is located.



Logical groups may contain either sub-groups or fans. However not both at the same time.

The fourth column contains the X-position of the fan icon in the room plan relative to the top left corner of the room plan. The fifth column contains the corresponding Y-position. Both must be specified in pixels.

The sixth column contains the physical address of the fan on the bus. This address differs depending on the bus protocol:

- For ebmBUS, the coding is Group/Fan, where Group can have values from 1-255 and Fan values from 1-31. Examples: 1/1 (Group 1, Fan 1) or 255/31 (Group 255, Fan 31)
- For MODBUS, the address is simply a number in the range 1-247.

The address must of course match the one set in the fan, as otherwise communication with the device is not possible. Each address must also only ever be used once per interface converter.

The seventh column specifies the device profile of the fan. This basically defines which parameters are known to the fan and how these are coded etc. Currently only the following two device profiles exist:

- 1 MODBUS ebm-papst standard
- 4 ebmBUS V3 standard profile

The eighth column contains the ID of the interface converter to which the fan is connected. The last column contains the logical name of the fan as shown in the structure tree.



Tip: First configure a simple fab in EC-Control and then export this as CSV file. You then have a template that you can use for later expansions.

The CSV files described here can be edited using a text editor and most spreadsheet programs. It must however be ensured that the file is stored in ANSI and not in Unicode format. At present, EC-Control cannot process any Unicode-coded files. Spreadsheet programs should be capable of automatically splitting the data into columns. This has been successfully tested using Excel 2003.



The CSV files created should only contain Latin characters.

D Power failure



For use as control center software in clean room fabs, the PC on which EC-Control is executed must always be operated with an uninterruptible power supply (UPS). The points to note are described in the following.



In the event of power failure, configured automatic failure signaling procedures such as printed report, e-mail or signaling by way of external devices connected to a USB relay box may no longer function.

On account of the configuration of the database program used by EC-Control, write operations are executed directly without any buffering of data in the main memory. If, however, power failure interrupts EC-Control while it is in the process of writing data such as failure log entries or the data of fans found in a search and added to the fab, such data may be lost.

The use of an uninterruptible power supply to safeguard the monitoring computer is intended to enable operators to shut down the computer without any loss of data. An uninterruptible power supply can also help to improve the quality of the power supply system to which the control center computer is connected.

Heed the following when using a UPS:

- The UPS is only to be used to operate product categories approved by the manufacturer, e.g. laser printers should not normally be connected to the UPS.
- In the event of power failure, it is often possible to perform UPS-controlled shutdown of the computer. EC-Control is not specially prepared for this. Use should nevertheless be made of this option. Make sure that any hardware required (for instance network switches) is connected to the UPS.

In the simplest case, use can also be made of a laptop as control and monitoring computer, as a laptop battery has the same effect as a UPS. The following must however be observed:

- When using a multi-monitor configuration, set up the laptop such that it can be properly used and thus shut down in the event of lengthy power failure by switching to the laptop display.
- Remember that permanently running the laptop on mains power with the battery installed can shorten the life of the battery. The battery is however not to be removed from the laptop, as it is intended to bridge brief periods of mains failure in this situation. To allow for increased wear, a spare battery should always be kept to hand.



Always check operation of the UPS or laptop in the course of fab configuration by simulating mains failure.

E Remote access

Remote access to EC-Control is desirable in certain clean room situations. EC-Control itself only provides a simple status website (see Chapter 5.11) without interaction for this application. The function can however easily be implemented using various low-cost or free software or software already integrated into Windows.

E.1 Remote desktop connection

Windows computers are supplied with Remote desktop connection software. If this software is to be used for remote access, it must be enabled on the EC-Control computer. To do so, proceed as follows:

1. Call up Start/Control panel/System and click the Remote tab. The following screen appears:

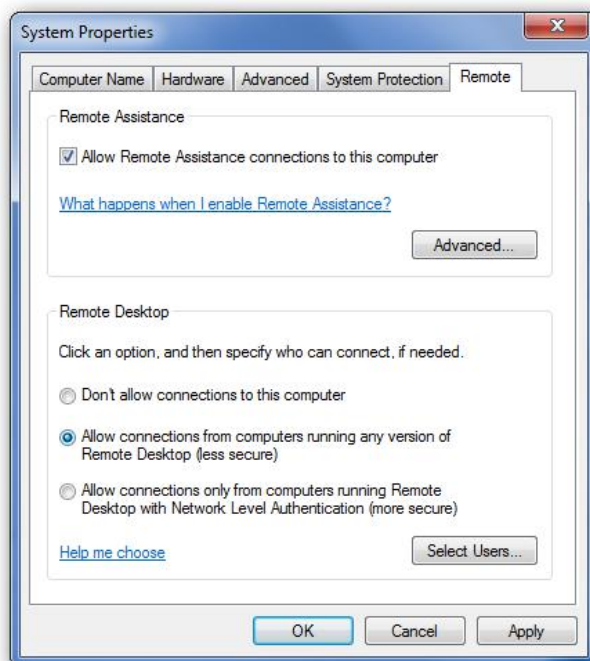


Fig. E-1 Server settings

2. Activate the Allow remote assistance connections to this computer box as shown.
3. Under Advanced, the Allow remote control of this computer box must be activated.
4. If only certain users are to be allowed to use the remote desktop connection, a list of authorized users can be kept under Select users...
5. Confirm these settings with OK. The server can now be controlled remotely in the local network.
6. For remote control of EC-Control from any computer within the same network, call up the Remote desktop client using Start/All programs/Accessories/Remote desktop connection. The following window appears:

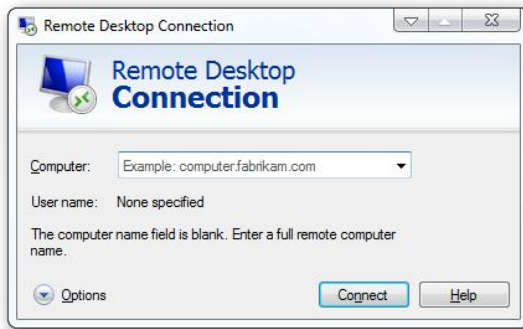


Fig. E-2 Establishing remote desktop connection

7. Enter the name of the EC-Control computer or its IP address in the input field and click Connect. Options can be used to call up a dialog for fine tuning of the connection settings such as the screen resolution for example.
8. Following successful connection, you will see the Desktop of the EC-Control computer together with all opened programs, however an operator sitting in front of the computer will only see the Windows lock screen. To end the Remote desktop session, simply close the client window and confirm the warning message that appears. The operator still sees the Windows lock screen. The operator can then continue working by logging in with his password.

E.2 VNC software

If it is not practicable to have a situation in which an operator sitting directly in front of the EC-Control computer is locked out during remote access and cannot see what is going on, use can be made of external software to enable the operator to precisely follow what the remote user is doing.

For the purpose of remote access, there is a so-called VNC protocol for which numerous server and client programs are available. We recommend one of the following versions depending on requirements:

- *UltraVNC* if Windows is used as operating system at both ends. This software is available free of charge at: <http://www.uvnc.com/>
- *RealVNC* if a client (referred to here as viewer) is also required for Linux, Mac OSX, iOS or Android. This software (subject to charge) for commercial use can be obtained from the following website: <https://www.realvnc.com> The Personal License is sufficient (as at March 2014 approx. 25€).

The server has to be installed on the EC-Control PC for this purpose. If provided, the options for registration as service and starting the service should be selected during installation. The VNC server will then be started automatically each time the EC-Control computer is started. A password should be specified in the settings. Display parameters can also be optimized here for smoother transmission of the screen content.

In the *UltraVNC* server settings it is also to select the Enable Java Viewer option. If this is active, a connection can be established directly without client installation by entering http://[IP address or name of EC-Control PC]:5800 in the web browser, provided that the Java plug-in for the web browser has been installed. Otherwise, the viewer has to be installed on the PC from which EC-Control is to be remotely accessed. For access, simply start the viewer and enter the computer name or the IP address of the EC-Control computer under VNC Server. Establish the connection with the Connect button.

F List of fan parameters

F.1 List of fan parameters

The parameters listed below can be shown or set with the software. If parameters are only available with one bus system, this is indicated in parentheses after the parameter name.

The corresponding version is given in parentheses for MODBUS protocol parameters only available as of a certain protocol version.

The order in the list does not correspond to the order shown on the screen.

- **Active parameter set (MODBUS)**
Shows the currently active parameter set. Further settings, such as operating mode, set value, Min and Max PWM and direction of action, depend on the parameter set. The device has two parameter sets.
- **Set value**
Default value for the fan as a percentage (*PWM control*), speed (*Speed control*) or sensor measurement quantity (*Sensor control*) depending on the operating mode.
- **Actual value**
Current speed value of the device.
- **Current sensor value**
Current value measured by the sensor, displayed in the physical unit of the sensor.
- **Evaluation (ebmBUS and ESM with MODBUS)**
A reduction value for the set value. Indicates the percentage at which the fan implements the value set by way of the set value.
- **Operating mode**
The operating mode determines the actuation procedure used by the fan. A distinction is made between the following operating modes:

 - ◆ *PWM control* of the motor output stage - The modulation level is given in per cent (equivalent to 0-10 V interface).
 - ◆ *Speed control* - A speed is specified directly in rpm.
 - ◆ *Sensor control* - An external sensor provides the controlled variable. This may be a temperature or a pressure for instance. The type of sensor can be freely defined. The setpoint is kept constant.

With MODBUS, the operating mode depends on the active parameter set.
- **Status**
Indicates the current status of the fan. If there is no failure, the text *Fan Ok* will appear. The field is given a colored background, with the color corresponding to the status. The default color for warnings for example is orange. Further information on these colors and color settings can be found in [Chapters 4](#) and [5.1](#).
- **Set value source**
The set value source to be used – analog input of fan or set value sent via RS485 bus - can be set here.
- **Parameter set source (MODBUS)**
This defines whether switching between the two parameter sets is performed via MODBUS (= *RS485/Bus*) or an external switch (= terminal *Din 2* or *Din 3*).
- **Parameter set (MODBUS)**
When switching the parameter set via the bus, this determines which of the two parameter sets is active.

■ **Save set value in EEPROM**

If this option is active, the last set value sent before a reset or power failure is automatically set again. After a power failure, the motor automatically starts up again with the last set value, provided that the Set value source is set to RS485/Bus.

■ **Motor stop enable (MODBUS/ESM-MODBUS)**

This option enables the motor to be stopped even with Min PWM set. A set value of 0 [rpm] or 0 % PWM must be set for this purpose in Speed control or PWM control. Set values between 0 [rpm] or 0 % and Min PWM are set to Min PWM.

■ **Min/Max PWM**

Minimum and maximum possible PWM modulation level. Roughly corresponds to minimum and maximum speed.

■ **Control parameters/P, I and D factor**

- ◆ Proportional component: This indicates the degree of response to a system deviation. The modulation is proportional to the system deviation.
- ◆ Integral action component: The modulation is proportional to the time integral of the system deviation. The system deviation is controlled to a mean time average, i.e. there is no steady-state deviation.
- ◆ Differential component: The modulation is proportional to the gradient of the deviation. This is normally 0. There is no differential component with MODBUS.

■ **Direction of action**

Direction of action sets whether the PID controller is used for heating or cooling purposes, i.e. whether a positive system deviation results in an increase (heating) or decrease (cooling) in speed.

■ **Minimum sensor value/Maximum sensor value/Sensor unit**

Here, the (linear) characteristic curve of a sensor connected to the 0-10 V (or 4-20 mA) input is applied to the sensor range. Any sensor can be defined by way of its minimum and maximum value. The physical unit is only relevant for display purposes.

■ **Sensor actual value source (MODBUS 3.02 or higher)**

The source of the sensor actual value can be set here. This also makes it possible to use two sensors of the same type simultaneously as the source for the actual value and to implement control to the maximum, minimum or average value of the two sensors.

■ **Control range**

The control range provides a simple means of setting the P factor when using a purely proportional controller (I factor = 0) in Sensor control operating mode. Low control range values yield a high P factor. When using the MODBUS protocol, the control range is available separately for both parameter sets.

■ **Output function (MODBUS)**

A voltage proportional to the current actual value is output at the analog output. This parameter defines whether this actual value corresponds to the modulation level (percentage PWM) or the actual speed (rpm).

■ **Output characteristic curve (MODBUS)**

The coordinates of two points can be numerically entered here to define the characteristic curve of the analog set value output. Scenarios such as cable break detection in Master-Slave mode are then easy to implement. This function works together with the Output function.

■ **Direction of action source (MODBUS)**

With MODBUS-compatible fans, the sensor control direction of action can be set either by way of the bus (= RS485/Bus) or with a hardware switch (= terminal *Din3* or *Din2*). The direction of action source specifies which switching mechanism is used.

■ **Set value (0-5 V)/Set value (5-10 V) (ebmBUS V3)**

If the set value input is set to digital, this function defines which set value is set with a level of 5-10 V applied to the set value input (set value high) and which set value is set with a level of 0-5 V (set value low).

- **Analog input function** (ebmBUS V3)
Switching between analog (0-10 V) and digital evaluation of the analog set value input. Can only be set if Set value source is analog.
- **Fan address/Device address**
The fan group and fan number or device address with MODBUS can be set here. If, for instance, multiple fans are interlinked, these should be connected successively and each set to a unique address. Initially, the factory setting for all fans is Group 1 Fan 1 with ebmBUS V3 or Address 1 with MODBUS.
- **Direction of rotation**
Running direction of the motor according to ebm-papst definition (viewed toward the rotor). For the energy-saving motor the direction of rotation is defined as the preferred or opposite direction of rotation.
- **Direction of rotation (factory setting)** (MODBUS)
Running direction of the motor on delivery according to ebm-papst definition (viewed toward the rotor).
- **Direction of rotation source** (MODBUS 3.02 or higher)
Either changing direction of rotation via MODBUS command (= RS485/Bus) or switching via digital input (*Din2* or *Din3*) can be selected here.
- **Maximum speed**
Reference speed for speed scaling, enables the configurable set value to be limited in Speed control operating mode, for example.
- **Max. permissible speed**
Maximum speed safety limit, cannot be adjusted by the customer.
- **Min. permissible PWM**
Limits the downward adjustment range of the Min. PWM parameter.
- **Max. permissible PWM**
Limits the upward adjustment range of the Max. PWM parameter.
- **Run-up time/Run-down time**
Defines the period of time between the fan being switched on and the maximum speed being reached or between maximum speed and fan standstill. This is particularly useful for configuring fan soft-start. For the energy-saving motor there is just one parameter that applies to both situations.
- **Input characteristic curve** The coordinates of two points can be numerically entered here to define the characteristic curve of the analog set value input. This permits implementation of scenarios such as "1 V at input produces full modulation level" and "10 V a modulation level of 0 % PWM" for example.
- **Emergency operation speed** (MODBUS)
This function can be used to automatically activate a fixed set value in the event of failure of bus communication with the fan. Communication is considered to have failed if no MODBUS query is received for a defined period of time. The emergency operation function can be activated and deactivated and the set value and the definable period of time (delay time) can be specified.
- **Emergency operation function direction of rotation** (MODBUS 5.00 or higher)
A separate direction of rotation can be defined here for emergency operation. It is however also possible to retain the direction of rotation in use prior to the start of emergency operation.
- **Open circuit detection voltage** (MODBUS 4.00 or higher)
The threshold as of which an open circuit is assumed with analog set value specification can be set here. If the value drops below this threshold, the emergency operation speed is activated.
- **Direction of action/Active direction of action**
Indicates the active direction of action. However this only applies in Sensor control operating mode.
- **Run monitoring speed limit** (MODBUS 4.00 or higher)
If the speed drops below the value set here, the fan evaluates this as being a failure and signals this at the alarm relay and via the bus.

- **Relay drop-out delay** (MODBUS 5.00 or higher)
 Failures are not signaled via the relay until they have been pending for at least the time set here. This prevents triggering of the failure relay for temporary failures.
- **Pre-heating temperature on/off** (MODBUS 5.00 or higher)
 The switch-on and switch-off temperatures for the motor pre-heating at low temperatures are set here. Pre-heating takes place if the temperature drops below the "on" value; heating is ended after the temperature exceeds the "off" value. While pre-heating is active, the fan shows a warning.
- **Shake-loose function** (MODBUS 5.00 or higher)
 This function can be activated to free frozen-up impellers by attempting to start in both directions of rotation alternately. While this function is active, a corresponding warning is issued for the respective fan.
- **Max. start PWM shake-loose function** (MODBUS 5.00 or higher)
 The impeller shake-loose function involves increasing the force applied by raising the PWM modulation level on each further starting attempt. This parameter defines the maximum modulation level used.
- **Max. number of starting attempts** (MODBUS 5.00 or higher)
 Defines how many shake-loose attempts are made before giving up and reporting a blocked fan failure.
- **Motor power limiter** (MODBUS)
 The Motor power limiter category combines a power module temperature-based and a motor temperature-based power limiter. The start and end temperatures of the limit and the maximum motor power at the end point of the limit are displayed. Motor temperature derating is only available for protocol generation 5.00 or higher.
- **Communication speed** (MODBUS 4.00 or higher)
 The baud rate used for communication with the fan can be set here. Note that switching also has to be performed for EC-Control. This setting should also not be altered without good reason.
- **Communication parity** (MODBUS 4.00 or higher)
 The parity used for communication with the fan and the number of stop bits can be set here. Note that switching also has to be performed for EC-Control. This setting should also not be altered without good reason.
- **Direction of rotation**
 Display of active direction of rotation according to ebm-papst standard (viewed toward rotor). Shown as preferred and opposite direction of rotation for the energy-saving motor.
- **Actual PWM/Actual speed/Current sensor value**
 Shows the current values in the applicable units.
- **Power**
 Indicates the approximate current power consumption of the fan in W. As this is determined in the so-called DC-link, there will always be a slight deviation from the actual power consumption.
- **DC-link voltage**
 Indicates the voltage in V currently being applied to the DC-link of the electronics.
- **DC-link current**
 Display of the current in A currently being measured at the DC-link of the electronics.
- **Output stage temperature**
 Current temperature of the electronics output stage in degrees Celsius.
- **Electronics temperature**
 Current temperature of the electronics in degrees Celsius.
- **Phase sequence** (MODBUS)
 Indicates the sequence of the mains phases (L1/L2/L3) of the 3-phase system.
- **Motor temperature**
 Shows the current temperature of the motor in degrees Celsius.
- **Motor temperature sensor** (MODBUS 5.00 or higher)
 Specifies the type of motor temperature sensor used.

- **Torque (MODBUS)**
Shows the approximate torque.
- **Operating hours**
The current value of the operating hours counter of the electronics is shown here.
- **Failures**
With ebmBUS V3, the last 3 fan failures are shown here; with MODBUS, the last 13 failures. These are saved in the non-volatile memory of the electronics, i.e. they are retained even without PDA or PC.
- **Day of manufacture/Week of manufacture/Month of manufacture/Year of manufacture**
Indicates the date of manufacture of the fan. The display depends on the bus system used.
- **Serial number**
Each fan is assigned a unique serial number during manufacture. This is shown here.
- **Protocol version (MODBUS)**
Shows the version of the bus protocol supported by the device. Only versions already known at the time of publication of EC-Control can be displayed.
- **Hardware identification (MODBUS)**
The identification is a sort of type identification which the software can use to determine the supported range of functions of the respective device.
- **Software bus controller/Software commutation controller (MODBUS)**
Indicates the software version of the operating software (firmware).
- **Device type (ebmBUS)**
Indicates the category of the device, e.g. "integrated" or "500 W external".
- **Fan model (MODBUS)**
Indicates the ebm-papst item no. of the device.
- **Fan address source (ESM-MODBUS)**
Selects the source of the MODBUS slave address for the energy-saving motor. For certain models, this can be defined using MODBUS or DIP switches.
- **Fan address relocation (ESM-MODBUS)**
If the DIP switches were selected as source for the fan address of the energy-saving motor, the address set using DIP switches can be shifted by the value specified here.
- **Autofunction mode (auto speed) (ESM-MODBUS)**
The energy-saving motor has the following automatic set value specification functions, of which only one can be active at a given time:
 - ◆ MODBUS: The set value comes via the bus. No automatic switching takes place.
 - ◆ Auto swit. Set val./Dir. of rot.: Automatic, time-controlled switching takes place between two set value levels and the direction of rotation is reversed at the same time. Note: Continuous operation in the opposite direction of rotation should be avoided, as the fan does not then attain optimum efficiency.
 - ◆ Auto swit. Set value: Automatic, time-controlled switching takes place between two set value levels, however without direction of rotation reversal.
- **Set value for time 1/Set value for time 2 (ESM-MODBUS)**
These parameters are used to set the set values for the two times between which switching can take place using the automatic function depending on the active operating mode.
- **Reverse running time on switch-on (ESM-MODBUS)**
If *Auto swit. Set val./Dir. of rot.* has been selected as automatic function, the energy-saving motor starts up in the opposite direction of rotation on switch-on for the purpose of unclogging filters. This parameter determines the blowing time in the opposite direction of rotation.
- **Time 1/Time 2 (ESM-MODBUS)**
If one of the two automatic functions is active, use is made of the *Time 1 Set value* for the duration of *Time 1*. Switching to *Set value 2* is then implemented for *Time 2* before switching back to *Time 1* and *Set value 1*.
- **Number of starting attempts (ESM-MODBUS)**
If an energy-saving motor detects a blockage, it attempts to implement the number of restart

attempts set here. The fan stops if restart is not possible after the number of attempts set here. If the value set is 255, the fan will attempt to implement an infinite number of restart attempts.

■ **Lifetime alert** (ESM-MODBUS)

Once the operating hours counter exceeds the value set here, the bus issues a "Service due" alert. Setting the value to 0 hours completely deactivates the alert.

F.2 Fan parameter reference table

This table lists all parameters and indicates the bus system in which the corresponding parameter is available.

Parameter	ebmBUS V3	MODBUS product range Bg84-Bg200	Energy-saving motor
Set value	X	X 1)	X
Actual value	X	X	X
Evaluation	X		X
Operating mode	X	X 1)	X
Set value source	X	X	
Parameter set source		X	
Parameter set		X	
Save set value in EEPROM	X	X	X
Motor stop enable		X 1)	X
Min PWM	X	X 1)	X
Max PWM	X	X 1) 2)	X 2) 5)
P factor	X	X 1)	X
I factor	X	X 1)	X
D factor	X		
Direction of action	X	X 1)	
Min/Max sensor value and sensor unit	X	X	
Sensor actual value source		X	
Control range	X	X	
Output function		X 2)	
Direction of action source		X	
High/low level at set value input	X		
Analog input function	X		
Direction of rotation	X	X 2) 3)	X
Direction of rotation source		X 3)	
Maximum speed	X	X 2)	X 2)
Max. permissible speed	X 4)	X 4)	X 4)
Min. permissible PWM	X 4)	X 4)	
Max. permissible PWM	X 4)	X 4)	
Run-up time/run-down time	X	X	X
Input characteristic curve		X 2)	
Emergency operation speed	X 3)	X 2)	X 2)
Emergency operation function direction of rotation		X 2) 3)	X 2)
Open circuit detection voltage		X 2) 3)	
Output characteristic curve		X 2)	
Analog output function			X 2)
Run monitoring speed limit			X 2) 3)
Relay drop-out delay			X 2) 3)
Pre-heating temperature on/off			X 2) 3)
Shake-loose function			X 2) 3)
Max. start PWM shake-loose function			X 2) 3)
Max. number of starting attempts			X 2) 3)
Motor power limiter			X 2) 3)
Fan address	X	X	X
Communication speed			X 3)
Communication parity			X 3)
Autofunction mode			X
Set value Time 1			X
Set value Time 2			X
Reverse running time on switch-on			X
Time 1			X
Time 2			X
Number of starting attempts			X
Lifetime alert			X
Fan deactivation			X 3)
Remote control 0-10 V			X 3)
Mode IO 1/IO 2/IO 3			X 3)
Disable input source			X 3)
Stored state for disable input			X 3)
Set value source switching			X 3)
Power limiter ramp			X 3)
DC voltage for additional devices			X 3)
RFID interface			X 3)
Position sensor calibration			X 3) 4)
<i>Parameter set switching</i>			X
<i>Active parameter set</i>			X
<i>Actual value</i>			X
<i>Direction of action source</i>			X
<i>Direction of action</i>	X	X	
<i>Direction of rotation</i>			X X
<i>PWM/modulation level</i>	X	X	X
<i>Current set value</i>	X	X	X
<i>Power</i>	X	X	
<i>DC-link voltage</i>	X	X	
<i>DC-link current</i>	X	X	
<i>Output stage temperature</i>	X 3)	X 3)	

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<i>Electronics temperature</i>	X 3)	X 3)	
<i>Phase sequence</i>		X	
<i>Status</i>	X	X	X
<i>Motor temperature</i>	X 3)	X 3)	
<i>Motor temperature sensor</i>		X 3)	
<i>Torque</i>		X	
<i>Operating hours</i>	X	X	X
<i>Failures</i>	X	X	
<i>Date of manufacture</i>	X	X	X
<i>Serial number</i>	X	X	X
<i>Hardware identification</i>		X	
<i>Softw. bus controller</i>		X	
<i>Softw. commut. controller</i>		X	
<i>Device type</i>	X		
<i>Fan model</i>		X	
<i>Protocol version</i>		X	X
<i>Software name</i>	X 3)		X
<i>Software version</i>	X 3)		X
<i>Current software source</i>		X 3)	
<i>Energy consumption counter</i>		X 3)	

Key:

Entries in gray italics are for information only and cannot be altered.

X This function/setting is supported.

- 1) This setting depends on the parameter set (MODBUS only).
- 2) This setting is only available as of a certain authorization level (MODBUS only).
- 3) This value is only displayed for electronics with corresponding functionality.
- 4) For safety reasons, this parameter can only be changed by ebm-papst.
- 5) This parameter is only available in PWM control operating mode.

G List of authorization levels

This list includes all options that are not fan-related.

Authorization designation	Administrator	User	Demo	Description of authorization
Update configurations	RW	R	R	Add, rename or delete configurations
Update hardware interfaces	RW	R	R	Add, change or delete hardware interfaces/converters
Update fan zones	RW	R	R	Add, change or delete fan groups
Update fan assignment	RW	RW	R	Add, change or delete assignment of fans to fan groups
Update fans	RW	RW	R	Add, change or delete fans
Export fab	RW			Export fab as CSV file
Import fab	RW			Import fab from CSV file
Temporarily change display settings	RW	RW	R	Change colors and other global display properties
Update fan information	RW	R	R	Define, change or delete information to be displayed on fan icon
Save display settings	RW	RW		Save colors and other changed global display properties
Update color palette	RW	R	R	Display and change color palette for visualization of air flow
Clean up failure list	RW	RW		Manually delete expired failure list entries
Failure reactions	RW	R	R	Response to fan failure
E-mail server	RW	R	R	Edit server settings for outgoing failure e-mails
E-mail recipients	RW	R	R	Administer recipients of failure e-mails
E-mail sender	RW	R	R	Contact details of sender of failure e-mails
Customization of user interface	RW	RW	R	Customization of user interface
User administration, own configuration	RW			Create/change user and administration of authorization (registered configuration)
Program language	RW			Change user interface language
Own password	RW	RW		Change own password
Log off	RW	RW	1)	User may log off and thus close the software
Block program	RW	RW		Block screen for inputs
List own authorization	RW	R		List all rights of own user
List other authorization	RW			List all rights of any user of current configuration
Acknowledge failure	RW	RW	R	Acknowledge fan failure in failure list
Set fan data	RW	RW		Change fan parameters
Timer settings	RW	R	R	Switch timer on and off and change settings
Log settings	RW			Write current settings to a CSV file
Set IO functions	RW	R	R	Change configuration of IO functions
Acknowledge collective error message	RW	RW	R	Acknowledge and test collective error messages
OPC and web access	RW	R	R	Changes to settings for OPC server link and web access
Reset OPC statistical data	RW	R	R	Reset statistics counters that can be scanned by OPC
Change Auto-login user	RW	R	R	Define or change user logged in automatically on program start

Key: R - Read authorization W – Write authorization

1) Can be individually granted for individual user accounts.

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