BELIMO®

Main document

User manual

English

General part

Air module

VAV compact module

Water module

VAV NMV-D2M module

VAV VRP-M module

BELIMO®

PC-Tool V3.1

User manual

English

General part

Table of contents

1 Basics

1.1 Introduction

The user manual describes the functions of the Belimo PC-Tool. The Belimo PC-Tool is a PC-based tool for parameterizing Belimo ...MFT(2), ...MP, and ...MF actuators, configuring them for the MP-Bus and monitoring their operation on the MP-Bus.

This document is designed to present basic information. Since the PC-Tool has a modular structure, the explanations for specific modules are given in the individual module documents.

Remark: The documentation of the individual modules can be accessed through the main document.

1.2 Information on using the manual

An arrow symbol shows the order of menu commands in sub-menus. For the function
　　　MP-Channel ▶ Trigger Scan (MP Strang ▶ Scan auslösen)
select MP-Channel in the main menu and then Trigger Scan in the sub-menu.

Notes are enclosed in separation lines.

Variant If a function can be triggered in several ways, variant ways are described in addition to the recommended way.

1.3 General structure of the user interface
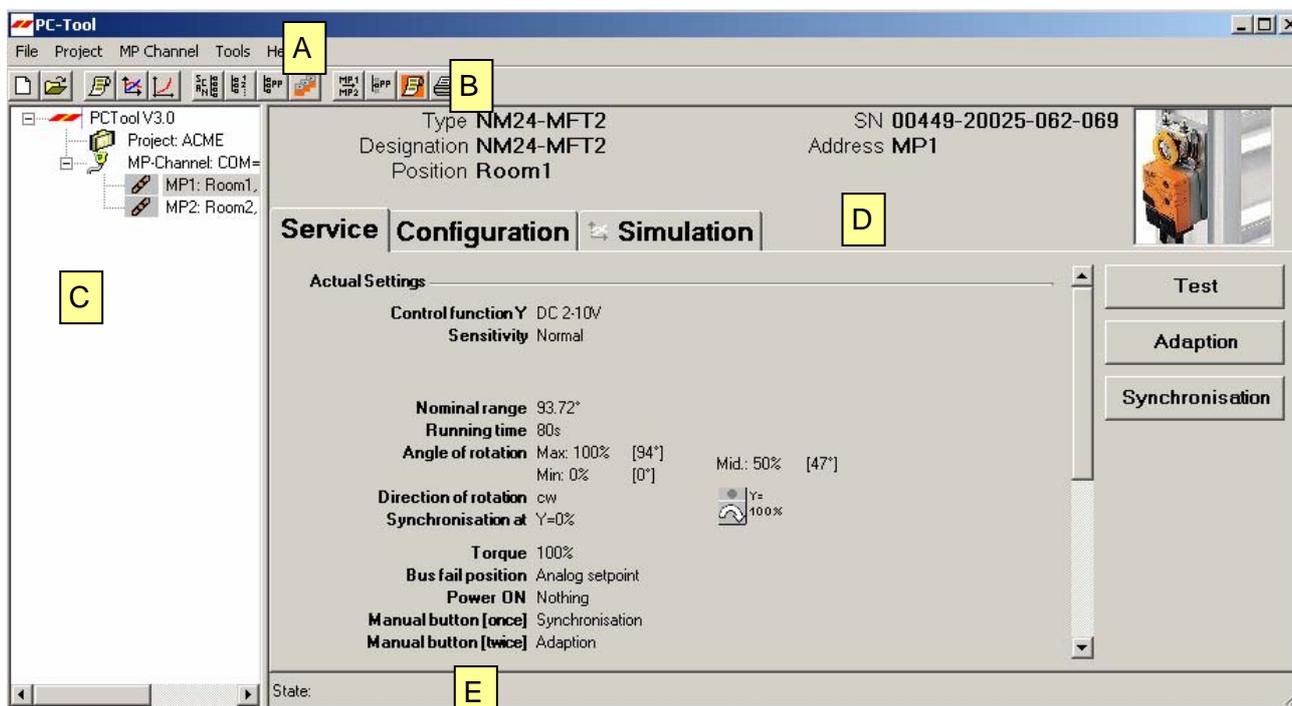
User interface of PC-Tool 3.0

The menu bar [A] and the toolbar [B] provide functions that affect the program as a whole. An explanatory text (tooltip) appears for each icon in the toolbar when you position the mouse pointer on it.

The MP-Channels and actuators belonging to the project are displayed in the outline bar [C] in the form of a tree (as in the Explorer). The object to be worked on is marked here. Depending on the selected object, pop-up menus offer corresponding functions at a click of the right mouse button.

Pop-up menu after clicking the right mouse button

The detail area [D] contains all the detailed information on the marked object. The values that are displayed and changed in this area are grouped as needed and distributed over several index cards.

The status bar [E] at the lower margin shows the current status of the connected device (e.g.: the actuator is carrying out a synchronization or adaptation.)

Missing or invalid entries are indicated by a flashing exclamation mark. If you move the mouse pointer to the exclamation mark, an explanatory text (tooltip) appears.

Project: [❗]
This field is required!

Inactive commands are displayed in gray letters (or as gray icons) according to the Windows standard.

Texts in fields with a black font on a gray background cannot be changed. You can mark the contents with the mouse, however, and copy them into the clipboard with CTRL+C, for example.

47 °
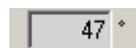
1.4 Modules and actuator types

Multifunctional damper actuators

The following actuator types can be parameterized with the program PC-Tool Version 3:

Generation	Type	MP-Bus	Sensors
NEW	MP	YES	active, passive, switch
	MF	No	(none)
OLD	MFT2	YES	active, passive, switch
	MFT	YES	active, switch

The manual is organized according to the application areas for actuators (modules). Detailed descriptions can be found in the module-specific sections (e.g. Air Module, Water Module, VAV Module).

2 Getting started with PC-Tool 3.0

2.1 Connecting the computer with the actuators

Connect the ZIP-RS232-Box to your computer via the serial interface (COM1).
The connection of the actuators to the ZIP box is explained in the Appendix.
If you use a different interface than COM1, you must subsequently adapt the
setting [⇨ 3.3.1 Serial interface].

For typical wiring diagrams see ⇨ 4.4 Typical wiring diagrams

2.2 Starting the program

Click the program icon on your desktop. A start screen appears.
Click Start Belimo PC-Tool (bottom right).

2.3 Adapting PC-Tool options

When you start the program for the first time, a dialog is displayed for adapting
the user-specific settings.
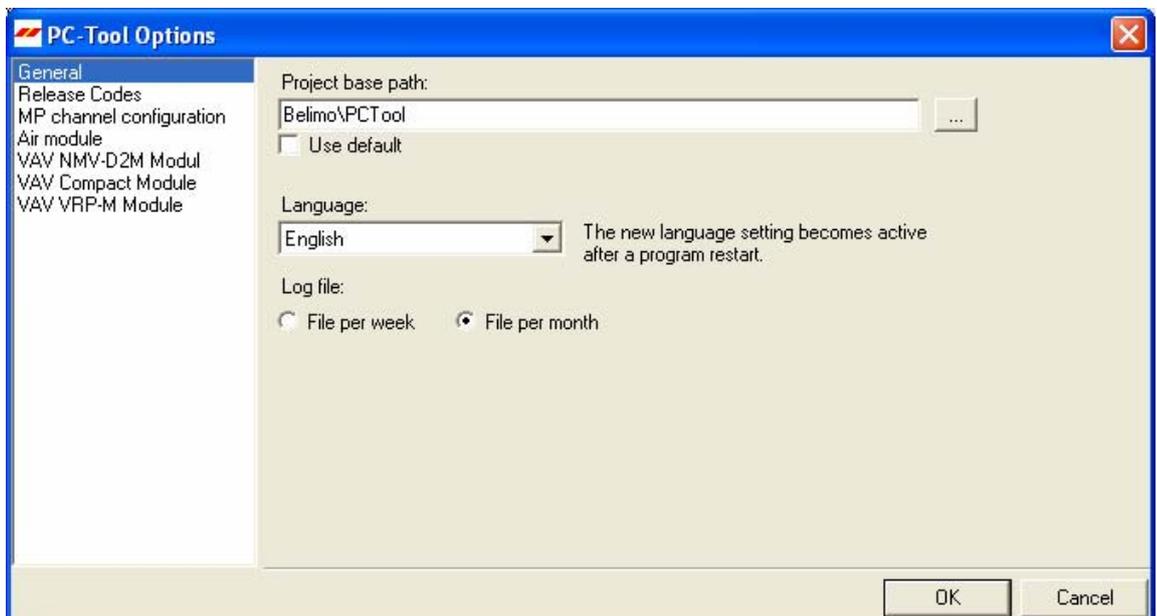
PC-Tool options

Select the desired language in the combobox here. If you change the language,
exit the program and restart it.

2.4 Creating a new project

To work with the program, you have to create a "project". The dialog for entering the project data is displayed. Click the radio button "New project".
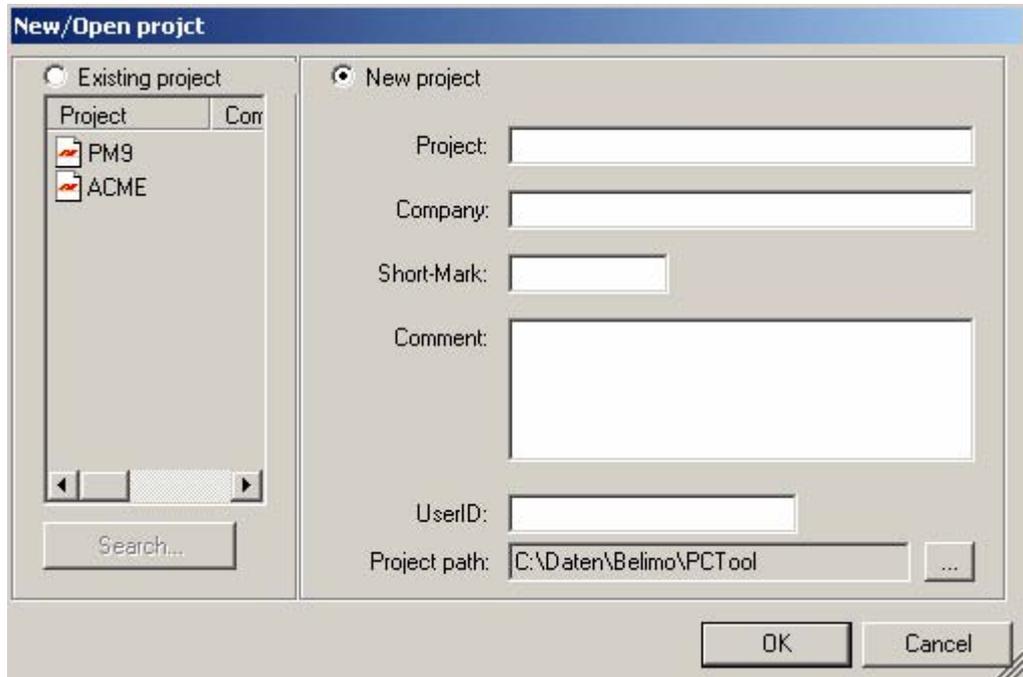
Creating a new project

The project name, company and user ID must be filled in; all other information is optional.

2.5 Setting up the program

The project and the MP-Channel can be seen in the outline bar [C]. The bus is scanned every 10 seconds by default.
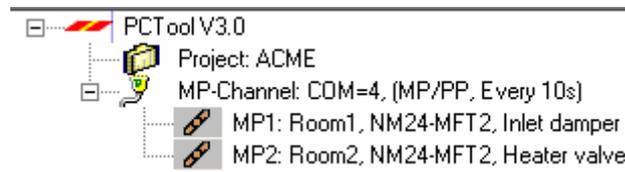
Outline bar [C]

If no actuators are shown after 10 seconds, you should check whether the ZIP-RS232-Box is connected to COMx. Adjust the settings for the serial interface if necessary [⇨ 3.3.1].

2.6 Displaying actuator parameters

Select the desired actuator in the outline bar [C] by clicking it with the mouse.

The current settings for the actuator are displayed in the detail area [D].
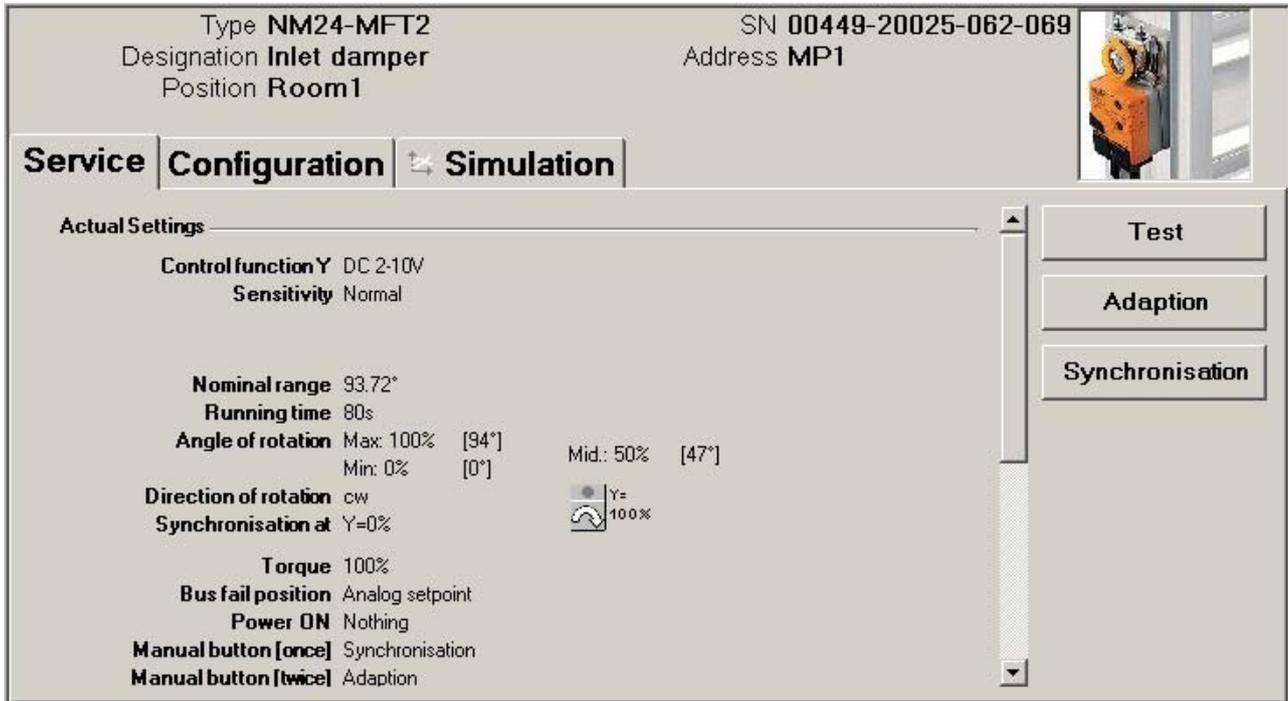
Example of detail area [D] (damper actuator)

2.7 Further actions

Read the descriptions for the following topics in chapter 3 Basic functions:

- Bus scan
- Setting the bus address
- Parameterization of actuators

Read the details for the application areas of the actuators in the descriptions of the following modules:

- Damper actuators (Air module)
- VAV controllers

3 Basic functions

3.1 Program start

After the program is started, a start screen is displayed.
Click Start Belimo PC-Tool.

Determine the project with which you want to work. You can either

- open one of the last projects listed,
- open an existing project from a file, or
- create a new project.

The defined MP-Channel is displayed and opened. A bus scan is started for each MP-Channel.

If only one actuator is connected, it is automatically selected and displayed.

Variant   If you cancel the project selection, the program will be started without a project. In this case, only the functions Help, File ▶ New Project (Hilfe, Datei ▶ Neues Projekt) and File ▶ Open Existing Project (Datei ▶ Bestehendes Projekt öffnen) will be available.

You can also start the program by opening a project file: In the Explorer, double click on a file with the extension .bptpj or on a corresponding link to a file.

In a network environment, the program should be installed on your workstation and started locally. Special authorizations are required to start the program on network drives.
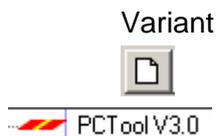
3.2 Projects

3.2.1 Project data

All user-specific data of the program are administered in the framework of projects. Each project has a project directory in the file system. The project files are stored in sub-directories of the project directory.

The storage place of the project files is described in the Appendix.

3.2.2 Creating a new project

Select File ▶ New Project in the main menu. Enter the new project data in the dialog. The project name, company and user ID must be filled in; all other information is optional. Click OK.

Since only one project can be active at a time, the currently displayed project will be closed and the new project opened.

Variant
You can also create a new project by clicking the "New Project" icon in the toolbar [B] or clicking the program icon in the outline bar [C] with the right mouse button and then selecting New Project.

3.2.3 Opening a project

Select File ▶ Open Existing Project (Datei ▶ Bestehendes Projekt öffnen) in the main menu. Mark a project from the list in the dialog or open any given project file (`*.bptpj`) with Find… (Suchen…). Click OK.

Since only one project can be active at a time, the currently displayed project will be closed and the selected project opened instead.

Variant
You can also open a project by clicking the "Open Project" icon in the toolbar [B] or clicking the program icon in the outline bar [C] with the right mouse button and then selecting Open Project.

3.2.4 Changing project data

Click the project in the outline bar [C] to display the project data. The "Edit" button (far right) displays a dialog in which you can change the data.

Variant
Click the project in the outline bar [C] with the right mouse button and select Properties (Eigenschaften).

The project name and path cannot be changed within the program. However, you can rename the project file (extension `.bptpj`) using Windows Explorer or move the entire project folder to another location. Afterwards, open the project again.

The project folder and project file can have different names – for example for backing up data. The name of the project file determines the project name.

3.2.5 Exporting a project

Copy the entire project folder in the Explorer, for example onto a floppy disk.

3.2.6 Copying a project

Copy the entire project folder to another location in the Explorer. Give the project folder a new name. Give the project file (<project>.bptpj) the same name within the new project folder.

3.2.7 Deleting a project

Delete the entire project folder in the Explorer. The project to be deleted must not be currently open in the program.

3.3 MP-Channel

3.3.1 Serial interface

MP-Strang:
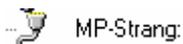
The ZIP level converter is connected to a serial interface (COM). To select the number of the serial interface used on your computer, click the MP-Channel icon in the outline bar [C] with the right mouse button and select Channel configuration.

For typical wiring diagrams, see ⇨ 4.4 Typical wiring diagrams

Now set the serial connection:

- If you activate the "Serial connection" field (as shown in the screenshot below), you can select a serial connection between COM=1 and COM=9 in the pull-down menu.
- If you activate the "Other" field, you can enter a serial connection number between 1 and 255 directly in the field (e.g. COM=12 for serial connection 12).
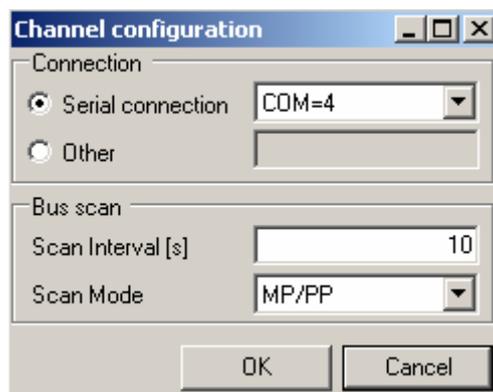
Channel configuration

3.3.2 Bus scan

In the bus scan section of the "MP-Channel settings" dialog, you can enter the time interval for the periodic bus scan in seconds. Permitted values are whole numbers between 1 and 9999.

The program can address actuators in two basic ways:

In multi-point mode (MP), up to 8 actuators of the types MP / MFT (2) can be individually digitally addressed.

In point-to-point mode (PP), only a single actuator can be activated. In this case, the "classic" operating modes are available with response voltage at connection D5.

The actuators of the MF type can only be connected in PP mode, all others either in PP or MP mode.

Select the type of bus scan in the bus scan section of the "MP-Channel settings" dialog.

PP Only	Connection of a single actuator in PP mode
MP / PP	First scan address 1 to 8 in MP mode; if no response in MP mode, switched to PP mode

Periodic bus scan

The periodic bus scan is active by default. To switch this off, click the MP-Channel with the right mouse button and select Interrupt Scanning (Scannen unterbrechen). Afterwards, you can switch the periodic scan back on again in the same way with the menu item Scan Every xx Seconds (Scan alle xx Sekunden).

Manual bus scan

Manually activate an immediate bus scan with the function button F5 ("Update") as needed. This is possible at any time, even when the periodic bus scan is active.

Variant   You can also select MP-Channel ▶ Trigger Scan in the main menu or activate the "Trigger scan" function by clicking the MP-Channel with the right mouse button.

If more than one actuator responds to the same MP address during a bus scan or if more than one actuator is connected in PP mode, a bus jam will occur. This situation is indicated by the program with a corresponding message.
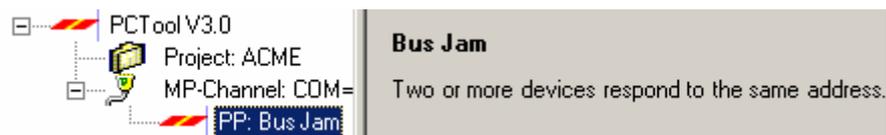
3.4 Setting the bus address

Each actuator with an MP-Bus interface (valid for all devices with MP-Bus interface, e.g. I/O modules etc.) can be assigned an address which it will use to communicate on the MP-Bus.

The setting of the bus address can be disabled on certain actuators, e.g. for the actuator types ...LON and ...ALON (for LONWORKS®).

3.4.1 Series addressing of devices

Click the "Address device" icon in the toolbar [B].

Variant   Click the MP-Channel with the right mouse button and select Address Device (Teilnehmer adressieren). Or select MP-Channel ▶ Address User (MP-Strang ▶ Teilnehmer adressieren) in the main menu.
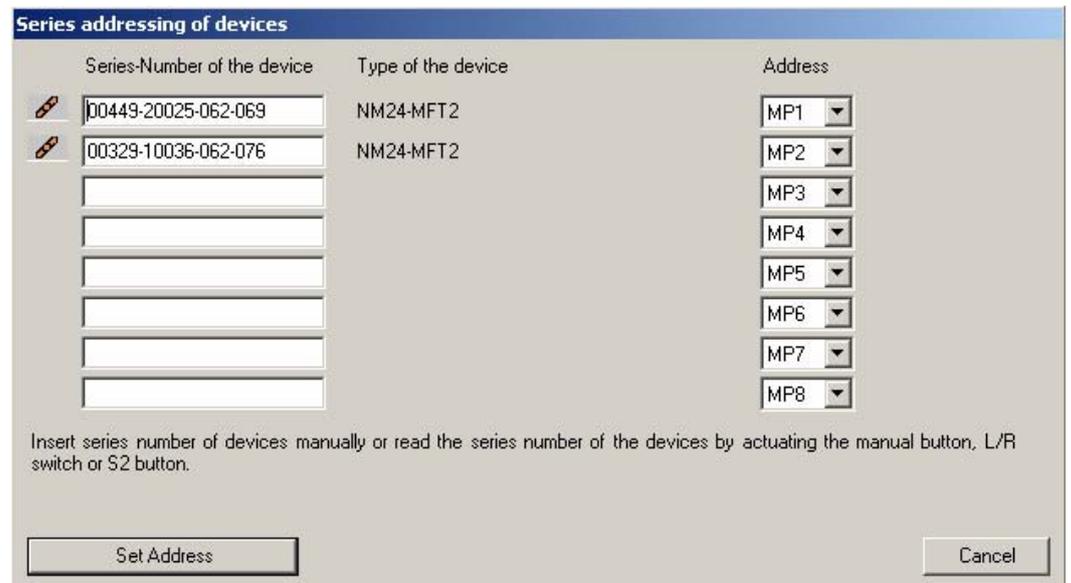
Series addressing of devices		
Series-Number of the device	Type of the device	Address
00449-20025-062-069	NM24-MFT2	MP1
00329-10036-062-076	NM24-MFT2	MP2
		MP3
		MP4
		MP5
		MP6
		MP7
		MP8

Insert series number of devices manually or read the series number of the devices by actuating the manual button, L/R switch or S2 button.

Set Address   Cancel

Series addressing

If you want to use something other than the default order, then select the desired addresses in the comboboxes on the right.

Reading in the serial numbers with acknowledgement on the actuator

Press the acknowledge button on the actuator that is to receive the first address. Depending on the type of actuator, this is the manual button, the L/R switch or the S2 button. (If the buttons are not accessible, enter the serial numbers directly as described below.)

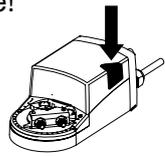| Actuator family	Actuator type	Acknowledge function
Actuators without spring return	NM24-MFT(2) AM24-MFT(2) GM24-MFT(2)	Press manual button once!
Actuators with spring return	LF24-MFT(2) AF24-MFT(2)	Move L/R switch back and forth once (within 4 seconds)!
Linear actuators for valves	NV24-MFT(2) NVF24-MFT(2) NVF24-MFT(2)-E	Actuate button S2 (under the housing cover) once!
Actuators of the New Generation	...MP ...MF ...ALON	Actuate the "Address" button
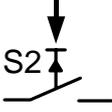
The serial number of the actuator is read out after the acknowledgement and written into the input field. The cursor jumps to the next line.

Repeat this process for all actuators that are to be addressed and then click "Set Address".

If one of the addresses is already assigned to another actuator, a message will be displayed:

Message when an address is already assigned (series addressing)

Click Yes to initially release the address. The actuator that used to occupy the address is set to PP.

If you select No, the actuator will also be set to the already assigned address, and a bus jam can occur.

Click Cancel to stop the series addressing at this point. You can now rearrange the addresses or end the entire process.

3.4.2 Addressing with known serial numbers

Each MP/MFT(2) actuator is delivered with a label containing its individual serial number. These serial numbers can be used to assign a PP or an MP1 ... MP8 address to the actuator. An additional, removable label with an identical serial number is supplied with the actuator. If the actuator is installed at a particular position in the system, this additional label can be affixed at the same position in the system diagram. This records where the actuator with the corresponding serial number is located in the building. These serial numbers can be used to assign the MP1 ... MP8 addresses to the actuators.

Therefore you can also fill in the input fields manually before clicking Set Address, for example when the buttons of the actuators are not accessible or you regularly take the serial numbers from your documents.

3.4.3 Resetting actuator addresses

If you want to reset actuators with MP addressing to PP, click to the right of the MP-Channel and select "De-address Device" ("Teilnehmer de-adressieren") in the pop-up menu.
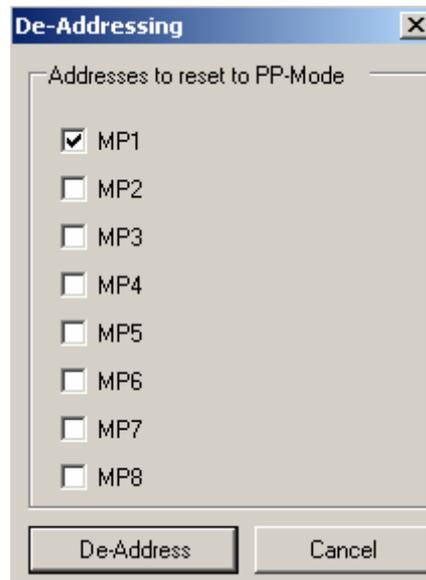
Selection of the addresses to be reset

Mark the addresses whose actuators are to be de-addressed.

When the bus scan is set to MP/PP, the de-addressed actuators are no longer visible in the outline bar [C] as long as there are still actuators with addresses.

If you set several actuators to PP, a bus jam will occur with the bus setting "PP Only".

3.4.4 Addressing a single actuator

Select the actuator in the outline bar [C] and click the "Change MP Address" icon in the toolbar [B].

Setting a new address

Variant   Click on the actuator with the right mouse button and select "Change MP Address" ("MP-Adresse ändern").

Select the new address in the combobox. If the address is already assigned to another actuator, a message will be displayed:

Message when an address is already assigned

Click Yes to initially release the address. The actuator that used to occupy the address is set to PP.

If you select No, the actuator will be set to the already assigned address, and a bus jam can occur.

3.5 Selecting a module

All actuators that are active and connected to an MP-Channel are displayed in the outline bar [C]. Select the desired actuator from this display.

The type of actuator is indicated by the icon:

Icon	Actuator type
	Damper actuator
	Valve actuator
FLS	Window ventilation actuator
	Actuator for fire and smoke dampers
	VAV (Variable Air Volume) controller actuator
THC	THC24-MP
UST	UST-3 I/O module
?	Unknown actuator

When an actuator is selected for the first time, the parameters are read out and displayed in the detail area [D].

In addition, the address for communication on the MP-Channel (MP or PP mode) and the name of the actuator type are displayed in the outline bar [C].

The complete information for identifying the selected actuator is found in the header of the detail area [D].

Display of the actuator identification

Note the difference between the current communication mode on the MP-Channel and the displayed address. An actuator with the address MP2 can be activated in PP mode during a bus scan, for example.

3.6 Actuator parameters

3.6.1 Displaying actuator parameters

The parameters of an actuator are displayed on the Service card in the detail area [D].
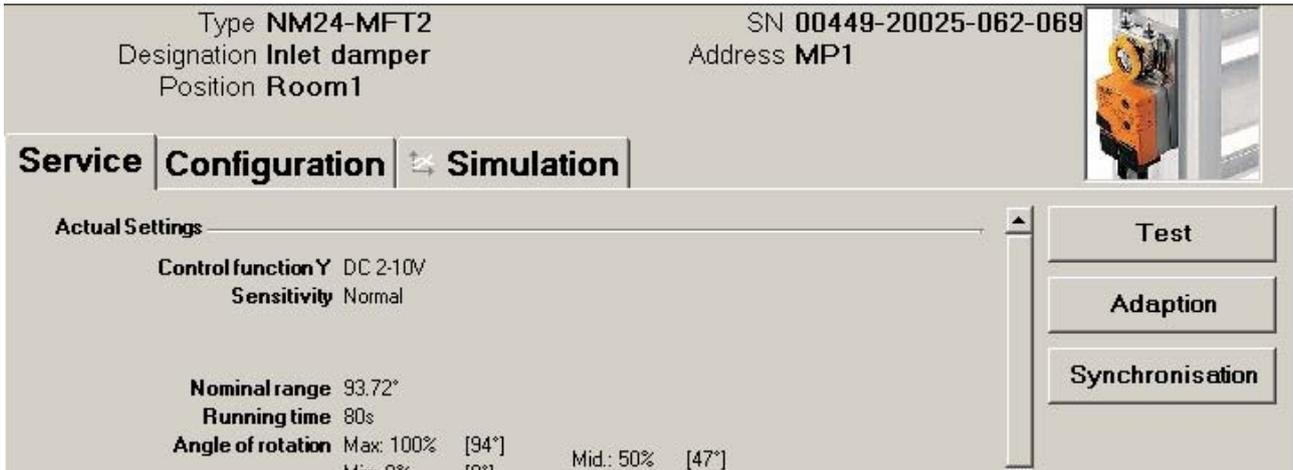
Example of the "Service" card (damper actuator)

The Test, Adaption and Synchronization functions are described for each respective module.

3.6.2 Printing out actuator parameters

The displayed actuator parameters can be printed out. Click the printer icon in the toolbar [B] or select Print Actuator Parameters (Antriebsparameter drucken) in the pop-up menu after clicking the actuator in the outline bar [C] with the right mouse button.

3.6.3 Deleting maintenance/error messages

When an actuator has created and saved maintenance or fault messages, these are displayed on the Service card.

Message display on the Service card

Use "Reset Messages" to delete the messages stored in the actuator.

3.7 Configuring an actuator

To change the parameters of an actuator, go to the Configuration card.

Example of the "Configuration" card (damper actuator)

The lower area with the basic settings can be displayed with the "More" ("er-weitern...") button and hidden again with the "Less" ("reduzieren") button.

When you change a value in an input field, the field turns yellow:

The status image on the right additionally shows whether all the displayed values match those stored in the actuator:

Display matches actuator   Values have been changed

Status image

Save the changed values in the actuator with the "Set" button underneath the status image.

You can read out the parameters currently saved in the actuator again with the "Read" button. Entries for values that you have not previously saved in the actuator will be lost as a result.

3.7.1 Saving a parameter file

You can store the displayed parameters in a file (with the extension .bptpar) with "Store to file…" on the "Configuration" card. The suggested name for the file consists of the serial number of the actuator, the current date and the time of day.

Since the content of the file corresponds to the values displayed on the screen, you can change individual values and save variants in files without loading them on the actuator.

The file can only be saved when all values on the screen are valid.

3.7.2 Loading a parameter file

The values of a saved parameter file can be read back into the input screen for the configuration with "Load from file…".

3.7.3 Copying parameters

Read out the parameters of an actuator that you want to copy and save them in a file. Change the actuator, load the saved parameters from the file and program the actuator with the copied values.

3.8 Parameterizing limited lots

You can parameterize x identical actuators (x depends on the power of the voltage supply) with the function "Parameterize Limited Lots".

To parameterize limited lots, save the parameter set to be programmed in a file.

With one parameter set, you can only program actuators from the same actuator family (e.g. MFT or NMV), i.e. the parameter set used must match the actuator family.

Connect the devices according to the following wiring diagram:
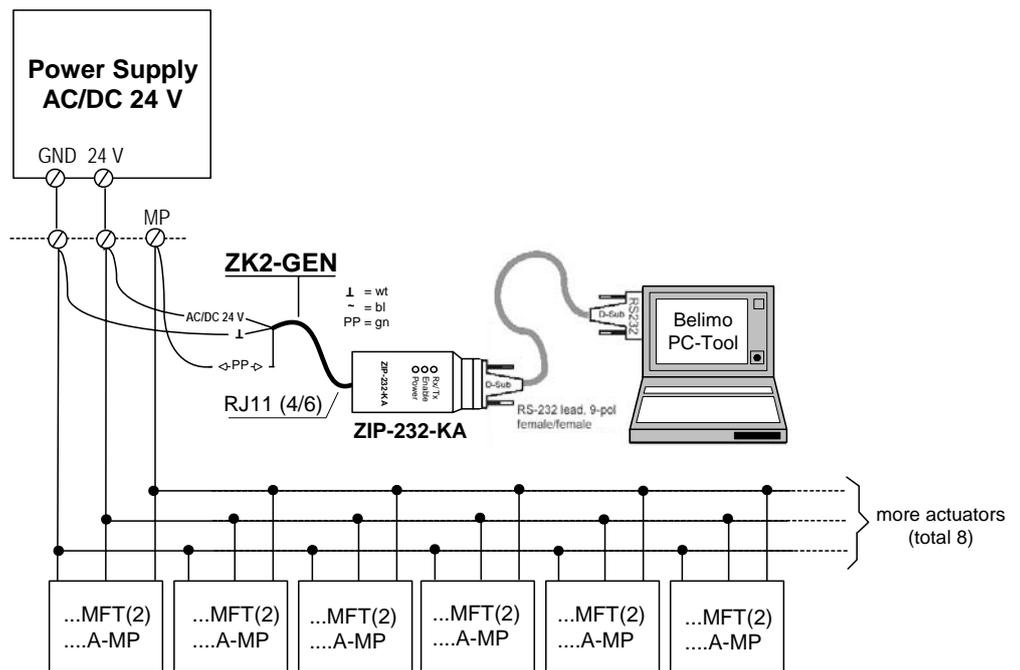
Mark the desired MP-Channel and click the "Parameterize Limited Lots" icon.

Variant   Click the MP-Channel with the right mouse button and select Parameterize Small Series. Or select MP-Channel ▶ Parameterize Limited Lots in the main menu.

Parameterize Limited Lots

Parameter file: 00449-20025-062-069_20050821_1340.bptpar ▼

Series Number	State
00449-20025-062-069	
00329-10036-062-076	

Insert series number of devices manually or by actuate manual Button, L/R switch or S2 button.

☑ Print Label   [Parameterize]   [Close]

Dialog for parameterizing limited lots

Select the file with the saved parameters in the dialog.

Position the cursor in the first input field for the serial number. Next, press the acknowledge button on the first actuator to be parameterized. If the buttons are not accessible, directly enter the serial numbers as described below.

The serial number of the actuator is read out after the acknowledgement and written into the input field. The cursor jumps to the next line.

Repeat the process for all actuators that are to be parameterized and mark the checkbox if you want to print labels after parameterization (see chapter 3.9 "Printing labels").

Click Parameterize.

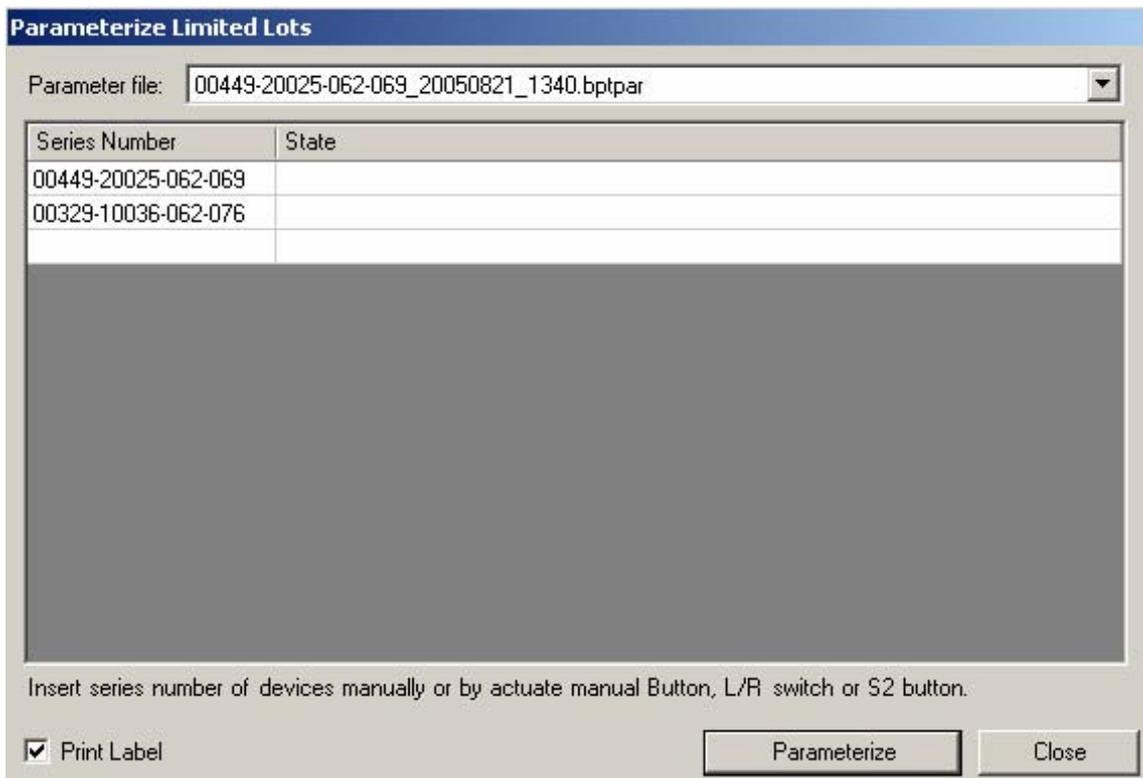The PC-Tool now asks for the file with the values to be written into the actuators.

The periodic bus scan is stopped for the duration of the parameterization. The actuators are successively set to the address MP1, programmed and finally set to PP addressing.

When the bus scan is set to MP/PP, the actuators in the outline bar [C] will not be visible. If the bus setting PP Only is used, a bus jam will result.

If an error occurs during programming, a corresponding text is displayed in the "State" column.

If the address MP1 is already assigned to an actuator, a message will be displayed:

Message when the address MP1 is already assigned (limited lot)

Click OK to initially release the address MP1. The actuator that used to be assigned to this address will be set to PP.

Click Cancel to stop the parameterization at this point.

Identification with known serial numbers

Naturally, you can also fill in the input fields manually before you click "Parameterize", for example when the buttons of the actuators are not accessible or you regularly take the serial numbers from your documents.

Programming further series

The actuators that have been successfully programmed are deleted from the list. You can enter further serial numbers in the list and click "Parameterize" again.

3.9 Printing labels

To identify actuators, you can write self-adhesive labels with the PC-Tool 3.0 program. A special printer may be necessary, depending on the type of label.

3.9.1 Setting up a configuration file

Labels are defined per project. To print labels, set place holders (number in braces) in the configuration file for the information to be printed.

The structure and storage location of the configuration files are described in the Appendix.
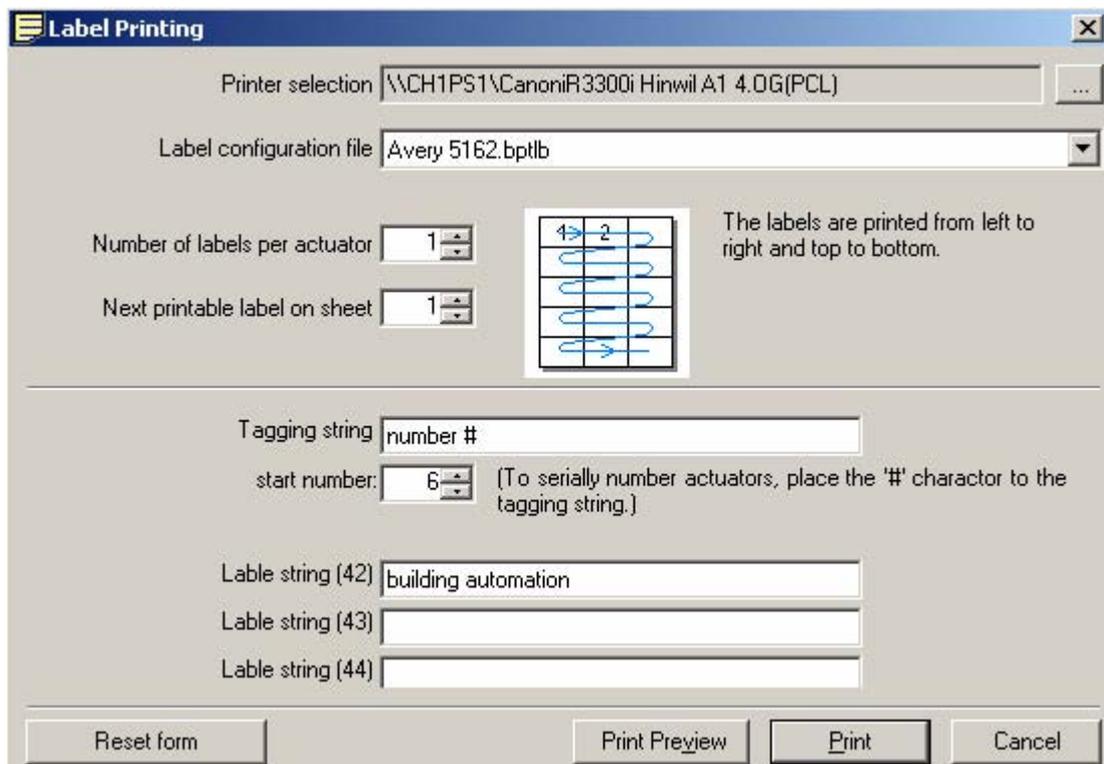
3.9.2 Printing labels

Select an actuator and click the "Print Label" icon (with an orange background).

Variant   Click an actuator in the outline bar [C] with the right mouse button and select "Label Printing".

Label printing dialog

Select a printer and a configuration file.

Enter the number of identical labels that are to be printed for "Number of labels per actuator". When parameterizing limited lots, the total number of printed labels is equal to this value times the number of actuators.

Enter the desired texts {41} – {43} that are to be printed, if necessary. A maximum of 50 characters are available per text field. In text with consecutive numbering, a number is entered instead of the place holder "#". This number is increased by one for each new actuator.

If labels have already been used from a label sheet, you can specify at what label position the printing should start (for example 4 when 3 labels have been used from the first row).

Your entries and the selected printer are preserved from one label printing process to the next (automatic saving). You can empty the input fields with "Reset Form".

The texts {41} – {44} must be present in the label configuration file in the form of place holders; otherwise they will not be printed out.

3.9.3 Printing labels offline

Labels can still be printed even if no actuator is connected. In this case, only the information from the project data, the texts entered in the dialog and the current date can be output. The start number is always used instead of the place holder #.

 Click the "Print Label" icon (with gray background).

Variant   Click the project in the outline bar [C] with the right mouse button and select "Print Label". Or select Project ▶ Print Label in the main menu.

For "Number of labels per actuator", enter the number of identical labels to be printed. The number with the placeholder "#" is NOT counted up. The further procedure is the same for printing actuator labels.

3.10 Transformation tables

Transformation tables are for converting the sensor value into another physical quantity, for example from resistance (in ohms) to temperature (in °C) for NTC resistors. Several frequently used transformation tables are supplied with the program.

Selecting a transformation table

Select a transformation table with the combobox. The corresponding converted value is displayed underneath the sensor value.

The measured sensor variable in the table must match the selected sensor type: volts for active sensors, ohms for sensor resistors, on/off for switches.
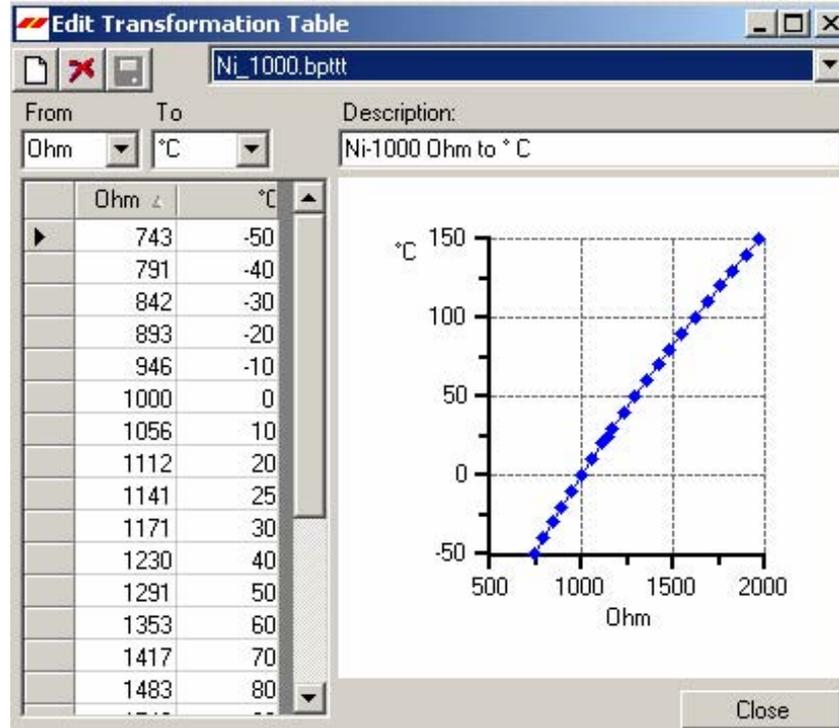
Adapting a transformation table

Click the transformation table icon.

Variant   Click the project in the outline bar [C] with the right mouse button and select Transformation Table. Or select Project ▶ Transformation Table in the main menu.

Dialog for editing transformation tables

Select an available transformation table using the combobox.

The sensor values and the converted values are displayed in the table on the left. On the right, you see a corresponding diagram with the sensor values on the horizontal axis and the converted values on the vertical axis. The table values are *linearly interpolated*; in other words, the points are connected by straight lines to calculate intermediate values.

During conversion, the first and last connection lines are extended beyond the range of entered points (*extrapolated*) so that even sensor values outside of this range are valid.

You can adapt each value in the table or add new value pairs in the last line, which is marked with an asterisk (*). Newly added value pairs are automatically sorted into the right place.

The following holds true for switches: Off = 0, On = 1.

Save the changes to the transformation table by clicking on the floppy disk icon.

When you change a transformation table in one project, the changes do not affect corresponding tables in other projects. However, you can return to the original project folder from all projects through the entry <Other...> (<Andere...>) in the combobox and open the changed table.

Setting up a new transformation table

When the dialog for editing a transformation table is open, you can create a new table with the "New" icon. Select the physical quantities for the sensor values and the converted values in the comboboxes above the table. You can also write any other quantities into the text fields of the comboboxes.

For the sensor values, only volts, ohms and on/off are meaningful input quantities, because only these sensor types are supported.

Enter a description in the text field and add new value pairs in the last line of each table, which is marked with an asterisk (*). A transformation table must have at least two lines.

For switches, you can define an on/off inversion table with the assignments $0 \rightarrow 1$ and $1 \rightarrow 0$.

Save the new transformation table by clicking on the floppy disk icon. The name that you enter in the "Save file as" ("Datei speichern unter") dialog will be subsequently offered as a selection in the combobox.

If the name of the new table does not appear in the combobox on the "Simulation" card, open the project again.

The new transformation table is not directly available as a selection in the combobox in other projects. However, you can return to the original project folder from all projects through the entry <Other...> (<Andere...>) in the combobox and open the new table.

Deleting a transformation table

When the dialog for editing a transformation table is open, you can use the Delete icon to delete a table that has been selected in the combobox.

If the name of the deleted table still appears on the "Simulation" card in the combobox, open the project again.

3.11 Displaying recorded trend data

Click the Trend Recall icon.

Variant   Click the project in the outline bar [C] with the right mouse button and select "Trend Recall". Or select Project ▶ Trend Recall in the main menu.
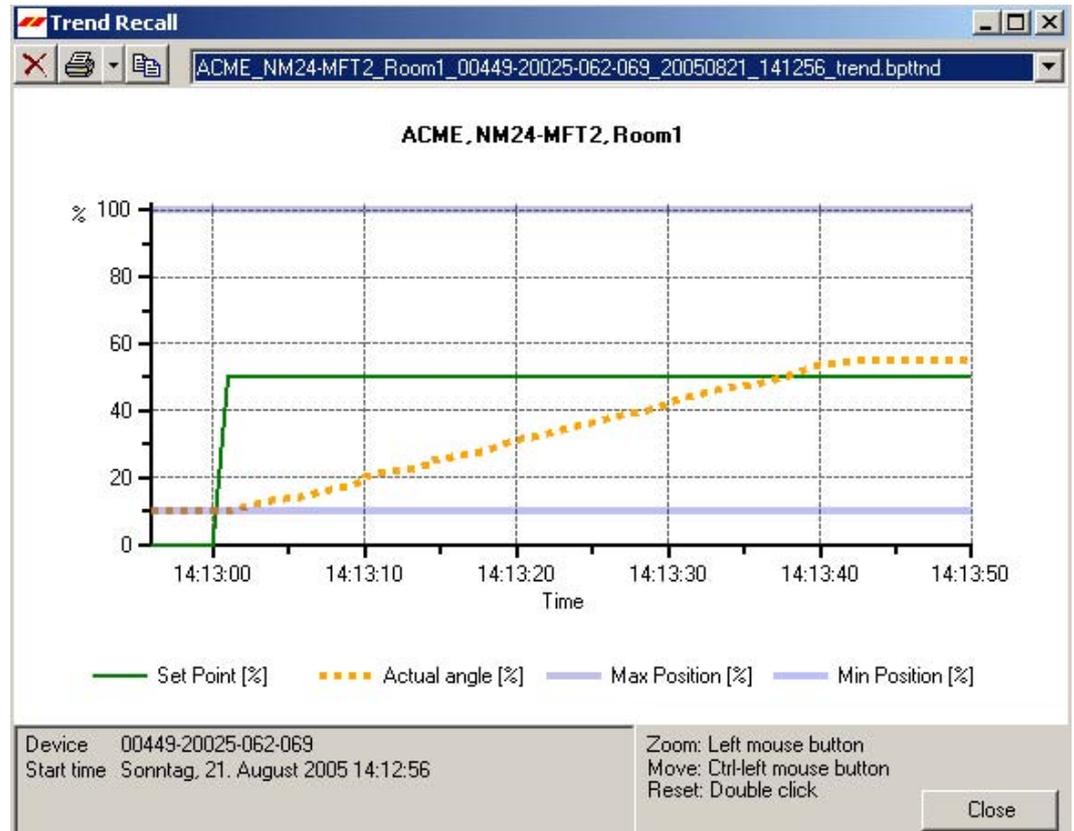
Trend recall

Select a trend file with the combobox.

The name of the file consists of the information
*project_devicetype_position_serialno_day_time_*trend.bpttnd

Keep the CTRL button pressed and pull the diagram to the left or right with the mouse to display values for other times.

You can use the copy button to insert the diagram into other documents via the clipboard.

Printing a trend

Click the Print icon or press the key combination CTRL-P.

Variant   In addition to the Print button, you can open a menu with the "down" key. In addition to printing, this allows you to display a preview or select several files for printing with "Print Multiple" ("Mehrfach Drucken").

3.12 PC-Tool options

Select Tools ▶ PC-Tool Options... in the main menu.
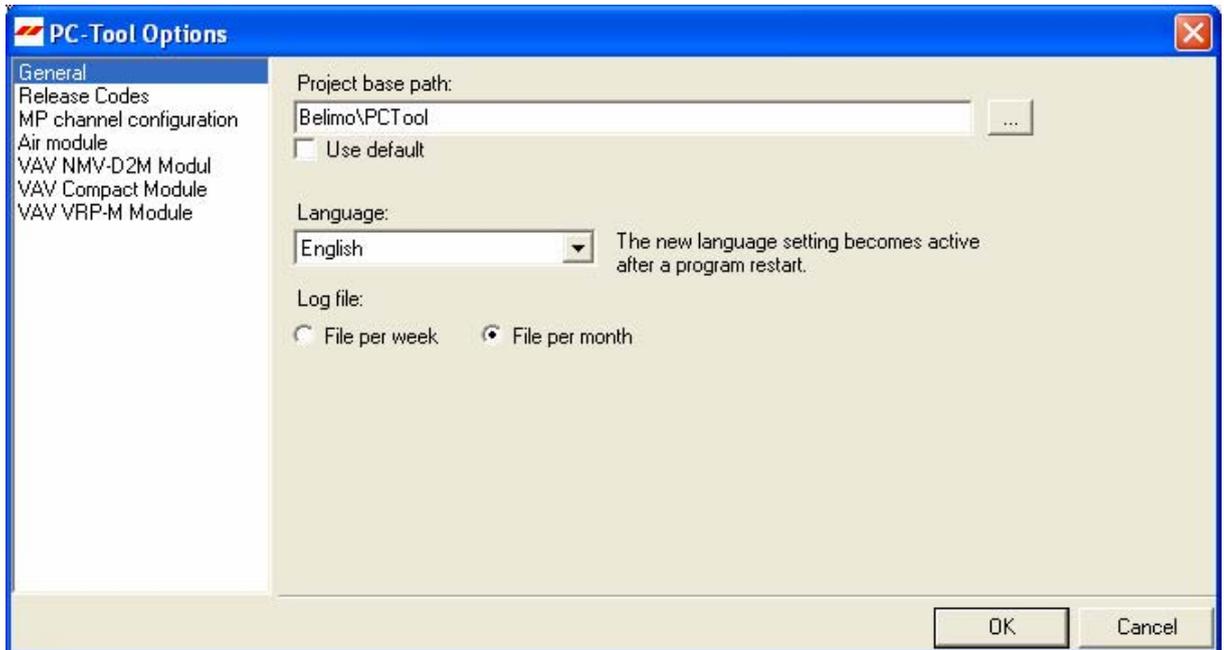
Variant   Click the right mouse button on the program icon in the outline bar [C] and select "Options…".

Dialog for basic settings (general)

"Project base path" sets the default directory in the file system, in which the new project folder will be saved. You can override this information when creating new projects, however.

When you mark the "Use default" checkbox, new projects will be saved in your user profile under "My Documents". With the operating system Microsoft Windows XP (English), this folder is located under

```
C:\Documents and Settings\<Name>\My Documents.
```

You can open the folder "My Documents" with the "My Computer" icon.

The language that you select in the combobox will be used the next time that you start the program.

In addition to "General", the names of the supported modules (actuator families) are displayed on the left side. Further information on the module-specific settings is found in the corresponding sections of this manual.

3.13 Log file

All activities with the PC-Tool software that influence the data stored in the actuator are recorded in a separate log file for every project. The time of each action is logged.

Configuring the log file

You can create a separate log file for each week or month of a project (default: File per week). To change this setting, select Tools ▸ Options in the main menu. You can select either 'File per week' or 'File per month' under 'General'.

Reading the log file

Click the "Read log file" icon in the toolbar.

Variants   Click the project icon in the outline bar [C] with the right mouse button and select 'Read log file'. Or select Project ▸ Read log file in the main menu.

Using the combo box 'Log file', you determine the file to read. The contents of the log file are displayed in a table in the top section (each action starts a new row).

By clicking a column title, you can sort the table according to the selected column. By clicking the same column title again, you reverse the sort direction: ascending (A-Z) or descending (Z-A).

Details

Click a table row to display details of this action in the bottom section.

You can print the text in the detail area ("Print…" button) or copy it to the clipboard ("Copy" button) and then paste it into another document.

4 Appendix

4.1 Storage locations of files

4.1.1 Project data

The default project is saved in the "Default project" sub-directory in the installation directory of the program.

The projects are user-specific and are stored as a sub-directory in the user profile under "My Documents". For an English-language version of Windows, this is

```
C:\Documents and Settings\<Name>\My Documents\Belimo\PCTool
```

This directory contains sub-directories with the project names.

4.1.2 Configuration files

The user-specific settings are stored in the user profile under "Application data". For an English-language version of Windows, this is

```
C:\Documents and Settings\<Name>\Application Data\Belimo\PCTool
```

This directory can be "hidden" under Windows. If it is not present, the settings will be queried upon starting.

4.2 Configuration files for printing labels

4.2.1 Storage location

The filenames have the extension `*.bptlb`. They are saved in the "label defini-tion" directory for each project. For an English-language version of Windows, this is

```
C:\Documents and Settings\<Name>\My Documents\Belimo\PCTool\ <Project>\label definition
```

4.2.2 Format

The configuration files for label printing are stored in XML format. You can edit these files with an editor program, for example "Notepad".

Configuration files for common Avery and Zweckform labels are supplied with the program.

Example of a configuration file

```xml
<?xml version="1.0" encoding="utf-8"?>
<LabelDefinition xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <PageSize Height="278" Width="214" />
  <PageBorder Top="18" Left="5" />
  <LabelSize Height="33" Width="100" />
  <LabelBorder Top="5" Left="5" />
  <Lines>
    <Line Text="" />
    <Line Text="{0} / {1}" />
    <Line Text="{20}" />    <Line Text="{21}" />
    <Line Text="{23}" />
    <Line Text="{41} / {42}" />
  </Lines>
</LabelDefinition>
```

4.2.3 Fields

You can adapt the values for the page layout (values in millimeters) for new label formats.

PageSize	Page size (height and width)
PageBorder	Border width (top and left) = distance from the top left corner of the first label to the page border
LabelSize	Size of an individual label
LabelBorder	Label border width (top and left) = distance of the lettering from the label border

In each line element <Line>, you can insert place holders where certain project and actuator characteristics will be added during printing.

{0}	Company name (from project data)
{1}	Project name
{10}	Actuator type
{11}	OEM designation
{12}	Position
{13}	Serial number
{14}	MP address
{20}	Control type Y
{21}	Feedback signal U5
{22}	Range of rotation min – mid – max
{23}	Running time
{24}	Direction of rotation (cw /ccw)
{25}	Position when bus failure occurs
{26}	Sensitivity
{27}	Synchronization at
{28}	Torque
{29}	Adapted rotation range
{30}	Calibration value
{31}	Vnom
{32}	Vmax
{34}	Vmin
{36}	Type of control
{37}	Mode
{40}	Printing date
{41}	Text with consecutive numbering
{42}	Freely definable text 1
{43}	Freely definable text 2
{44}	Freely definable text 3

You can define up to 50 lines. The program does not check whether the lines fit on a label.

When you define a new configuration file in a project, this configuration will not be directly available in other projects. However, you can return to the original project folder from all projects by using the entry <Other...> (<Andere...>) in the combobox, and then use the file.

4.2.4 Example of a label

The following example produces a label with W x H dimensions of 50 x 20 mm. The example is intended for an endless label printer that prints labels of the size 50 x 20 mm.

The company name, the project name, the actuator type, the type of control signal and the running time are printed on the label.

This data yields the following configuration file and the subsequently displayed label:

```xml
<?xml version="1.0" encoding="utf-8"?>
<LabelDefinition
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <PageSize Height="20" Width="50" />
  <PageBorder Top="0" Left="0" />
  <LabelSize Height="20" Width="50" />
  <LabelBorder Top="5" Left="5" />
  <Lines>
    <Line Text="{0}"/>
    <Line Text="{1}"/>
    <Line Text="Typ: {10}"/>
    <Line Text="{20} Running time: {23}"/>
  </Lines>
</LabelDefinition>
```

Label:
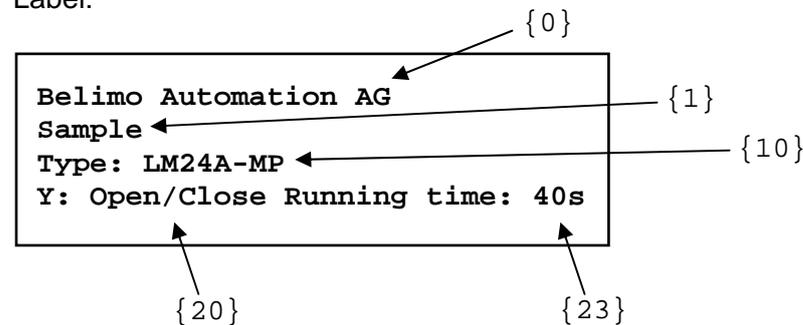
4.3 Troubleshooting and error messages

4.3.1 General

Problem   After the program starts, an MP-Channel is not opened but displayed closed with the "MP-Channel" icon.

Solution   The MP-Channel cannot be opened, for example because the selected serial interface is assigned to another application. Check whether a modem or a communication program is using this interface.

4.3.2 Error messages

Error message	Description
Adaption could not be started.	Communication failure on the MP-Channel or faulty actuator
Actuator cannot be acessed.	Communication failure on the MP-Channel or faulty actuator
Response contains too little data.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
Response contains too much data.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
Command has too few parameters.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
Command parameter outside of the expected range.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
Belimo library error code = ….	Internal fault.
The actuator does not recognize the command … .	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
The answer of the actuator was faulty.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
The PP function of the Belimo library does not recognize the MP command. … .	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
This device already has the address …	Re-addressing assigns an already existing address.
A transformation table has at least 2 data points.	A transformation table must have at least 2 lines to be able to calculate intermediate values.
Wrong actuator connected!	This fault occurs when actuators are changed during parameterization. Read out the parameters again.
Wrong MP-Channel: "...".	The MP-Channel has changed.
Faulty handle	Internal fault.
No response (possible bus jam).	Communication problem on the MP-Channel or faulty actuator.
No response from actuator.	Communication failure on the MP-Channel or faulty actuator.
Could not write data to the actuator!	Communication failure on the MP-Channel or faulty actuator.

Error message	Description
Could not copy sample project. Default project directory '...' does not exist! Please re-install application.	When a new project is created, configuration files and sub-directories are normally copied from the default project in the installation directory of PC-Tool 3.0. The default project has probably been accidentally deleted, moved or renamed.
Could not find PC-Tool V2.1. Do you want to search for it?	Affects VAV actuators. The old version of the program could not be found at the location specified in the PC-Tool options.
MP command … failed.	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date. MP command could be password-protected.
MP-Channel was closed.	The MP-Channel was closed during an asynchronously running function.
Not all data could be written.	Communication problem during writing of the parameter data, possibly due to bus jam. Check the connection and addressing of the actuators. An MP command is password-protected or the actuator does not recognize the command.
Not all data could be read out.	Communication problem while the parameter data was read, possibly due to bus jam. Check the connection and addressing of the actuators.
Not all entries are valid! Cannot write data.	One or more input values on the "Configuration" card is not valid. Look for a flashing exclamation mark. If you move the mouse pointer to the exclamation mark, an explanatory text (tooltip) with the valid range of values will usually appear.
OEM or BELIMO password necessary.	Parameters on the actuator can be protected with a password against changes. A password is necessary to overwrite them.
Problems opening the MP-Channel "...".	Error at the interface. Check the communication parameters and the cabling.
Transmission from ... to ... yielded the error code	Conflict between actuator and program. The program library (belipp.dll) may not be up-to-date.
Serial number is incorrectly formatted!	You have made a typing error while manually entering the serial number. Check the notation of the serial number.
Error messages could not be deleted.	Communication failure on the MP-Channel or faulty actuator.
Synchronization could not be started.	Communication failure on the MP-Channel or faulty actuator.
Test run could not be started.	Communication failure on the MP-Channel or faulty actuator.
Re-addressing check has failed.	The serial number is read before and after an actuator is re-addressed. These two numbers do not match. Another actuator probably answers to the programmed address.
Unknown MP-Channel "...".	The MP-Channel could not be identified.
Invalid or faulty parameter file '...'	The contents of the file could not be correctly interpreted. The format may no longer be valid. If possible, read out the parameters again and save them in a new file.
Unspecific error of the Belimo library.	Internal fault.

4.4 Typical wiring diagrams

4.5 Overview table

Typical wiring diagrams with ZIP-232-KA (ZIP cable)

| Typical wiring diagram	Cable	Actuator types				
		….-MF	…..-MP	...MFT(2)	…LON	...ALON
Typical wiring diagram 1 Connection via diagnostic socket with ZIP-232-KA; actuator is integrated in system	ZK1-GEN	x	x			x
Typical wiring diagram 2 Connection via connection cable with ZIP-232-KA; actuator is integrated in system	ZK2-GEN	x	x	x	x	x
Typical wiring diagram 3 Connection to MP-Bus via connection cable with ZIP-232-KA	ZK2-GEN		x	x		
Typical wiring diagram 4 Connection to MP-Bus via MP gateway with ZIP-232-KA	ZK4-GEN		x	x		

Typical wiring diagrams with ZIP-RS232

Typical wiring diagram	Cable	Actuator types				
		….-MF	...-MP	…MFT(2)	…LON	….ALON
Typical wiring diagram 5 Connection via diagnostic socket with ZIP-RS232; actuator is integrated in system	ZK3-GEN	x	x			x
Typical wiring diagram 6 Connection via connection cable with ZIP-RS232; actuator is integrated in system		x	x	x		
Typical wiring diagram 7 Connection via connection cable with ZIP-RS232; parameterization outside of system		x	x	x		
Typical wiring diagram 8 Connection via connection cable with ZIP-RS232; actuator is integrated in system					x	x
Typical wiring diagram 9 Connection via connection cable with ZIP-RS232; parameterization outside of system					x	x
Typical wiring diagram 10 Connection to MP-Bus via MP gateway with ZIP-RS232	ZKS-MP	x	x	x		

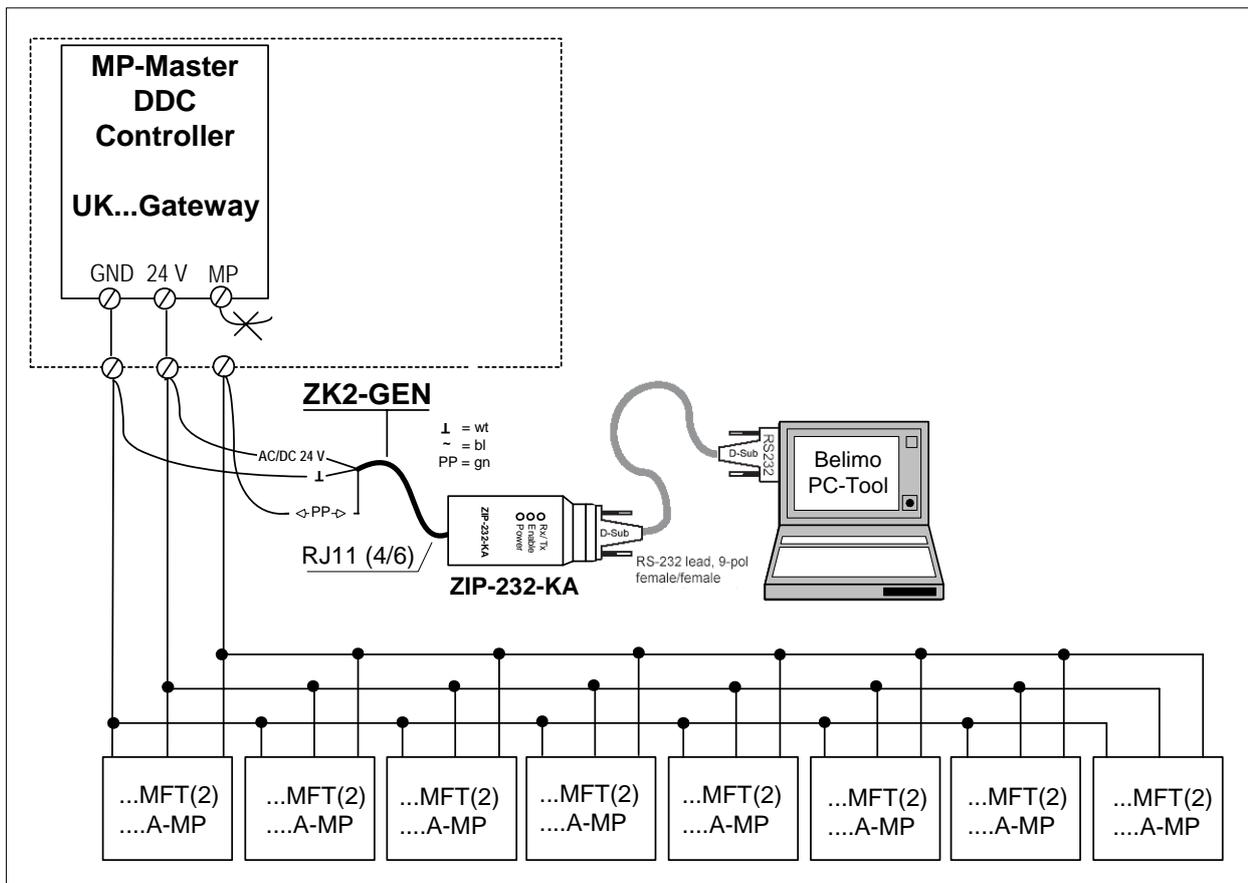## 4.5.1 Typical wiring diagrams

Typical wiring diagram 1
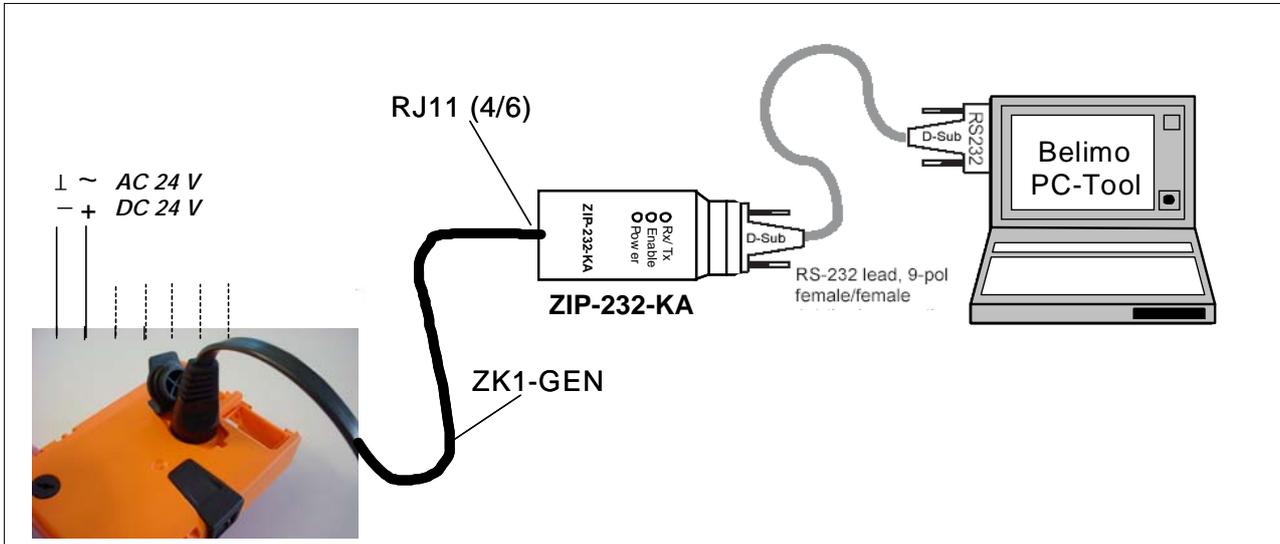
Typical wiring diagram 2
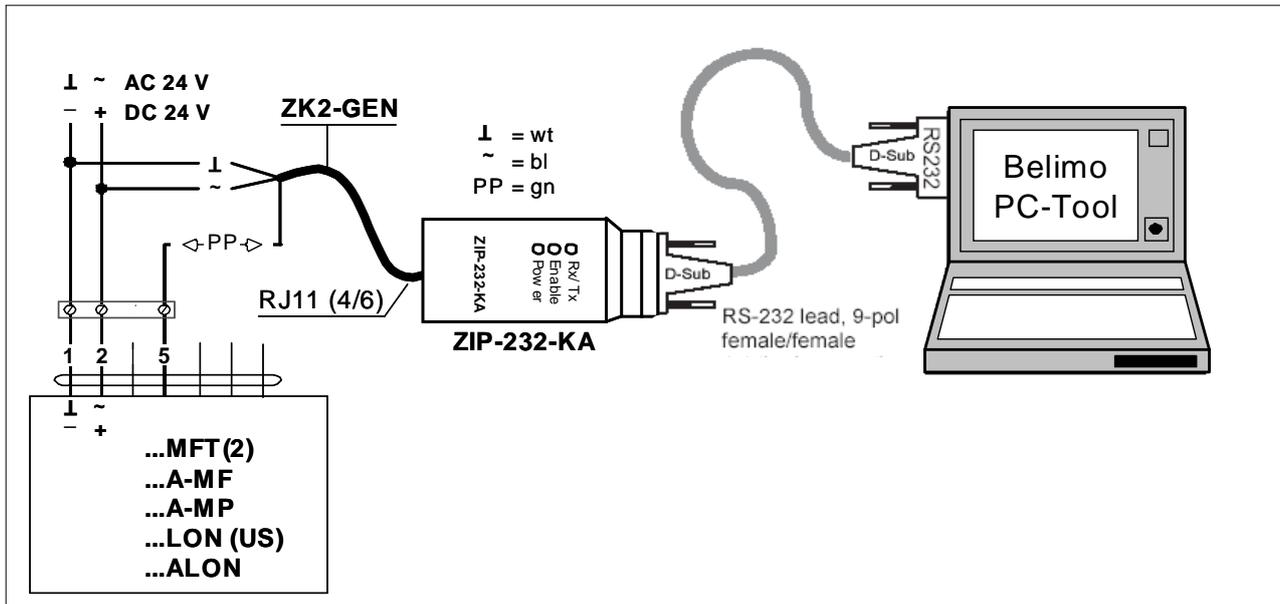
Typical wiring diagram 3

Typical wiring diagram 4

Typical wiring diagram 5
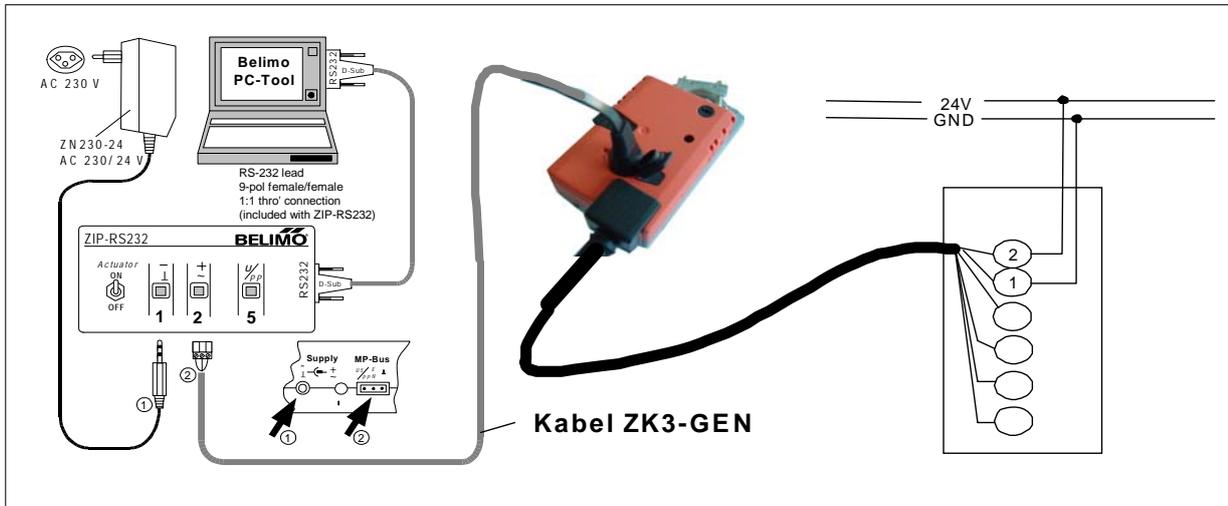
Typical wiring diagram 6
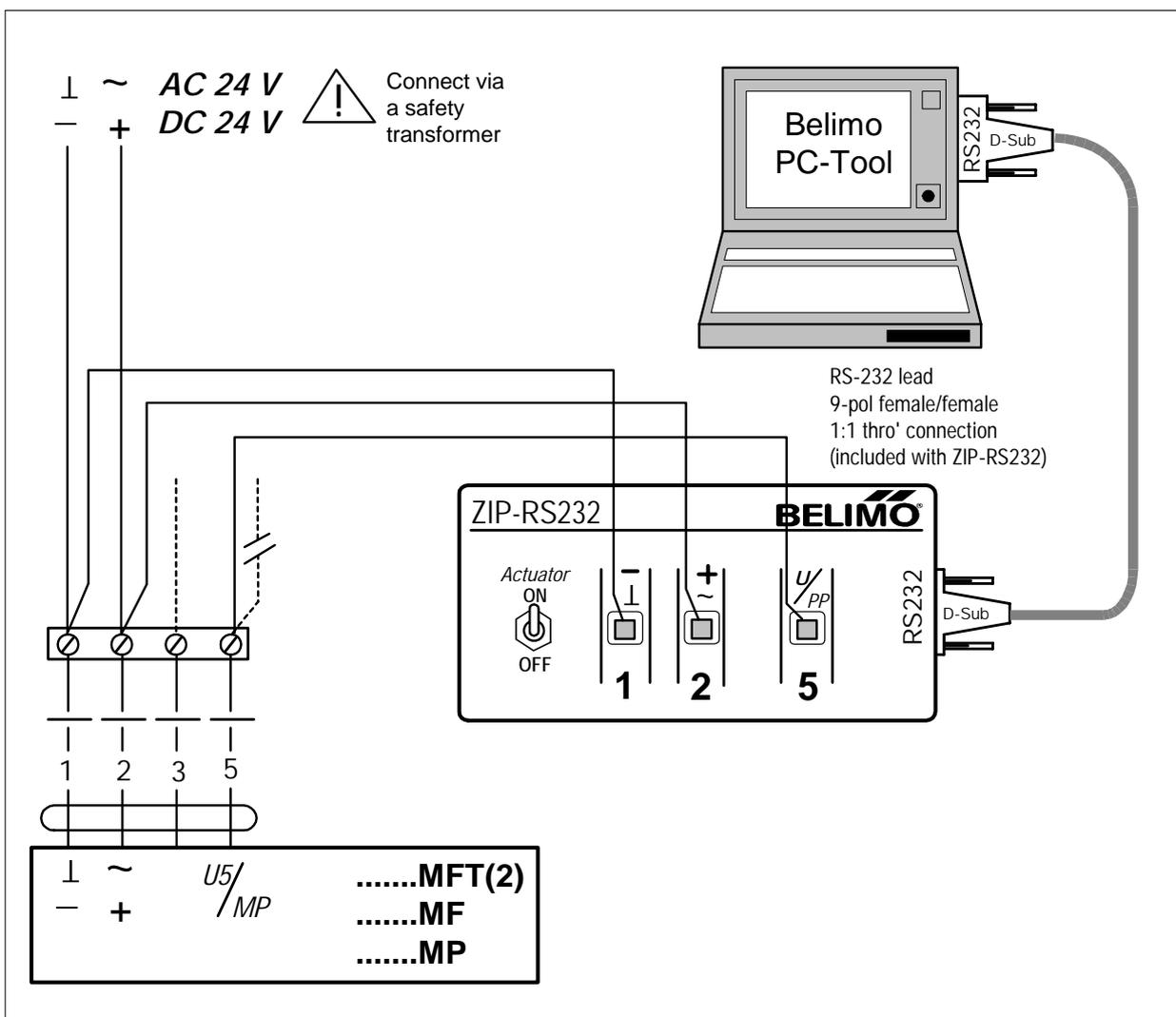
Typical wiring diagram 7
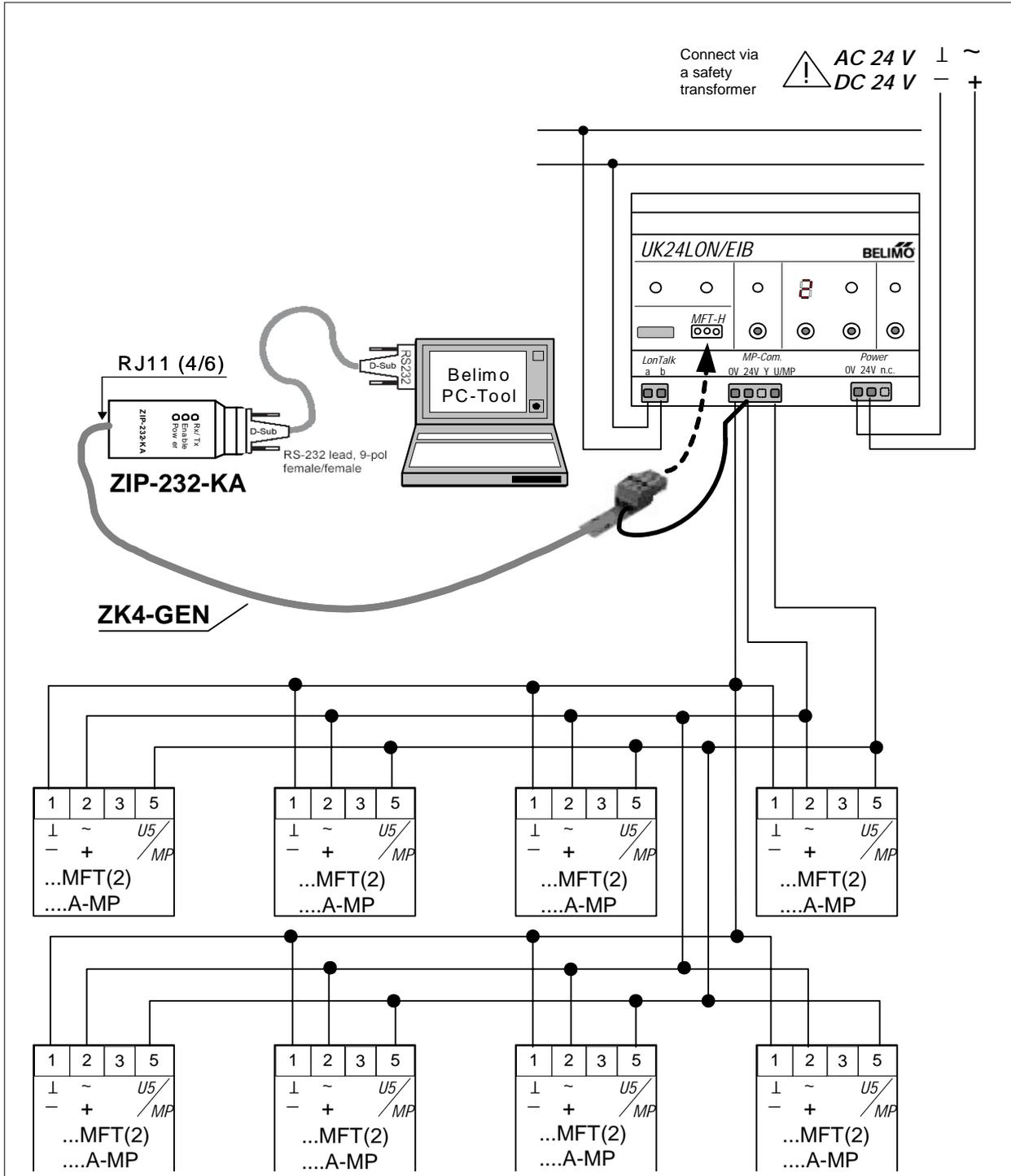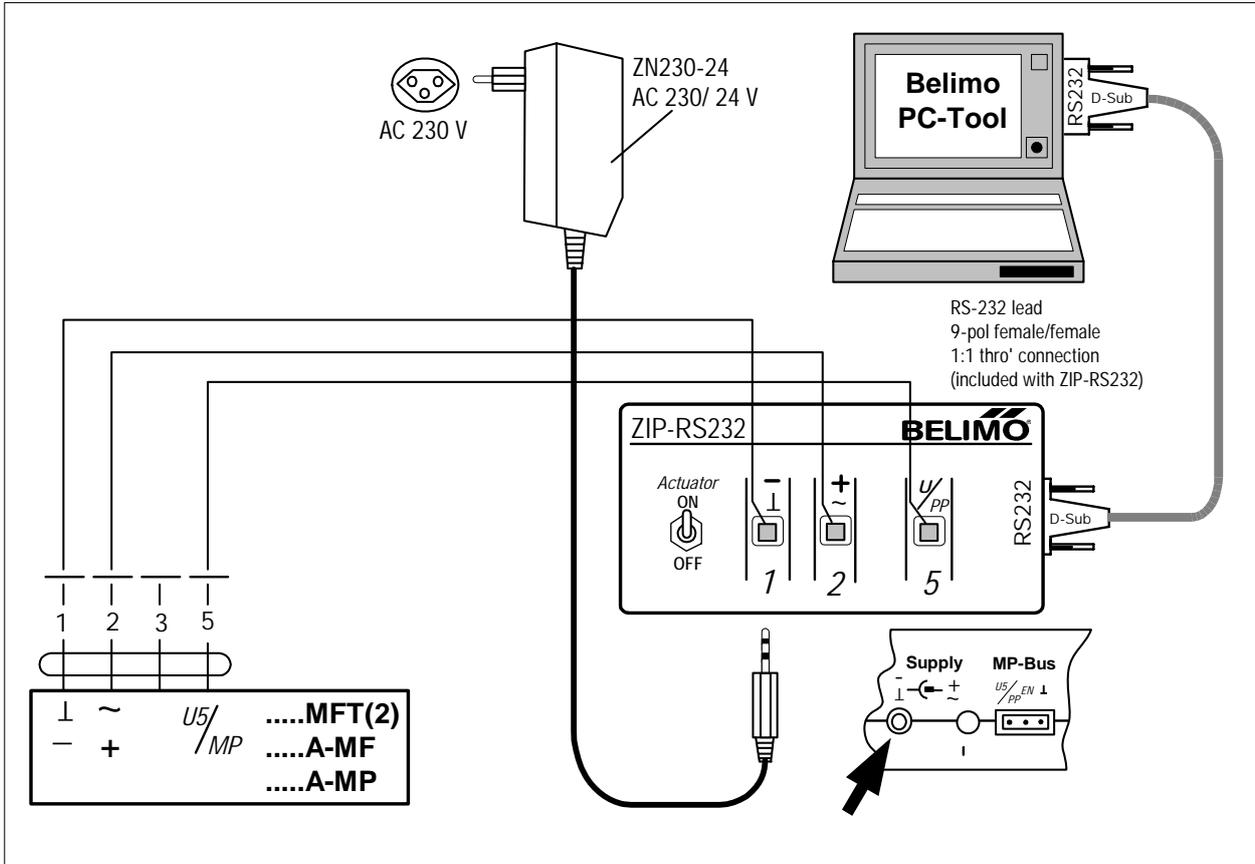

Typical wiring diagram 8
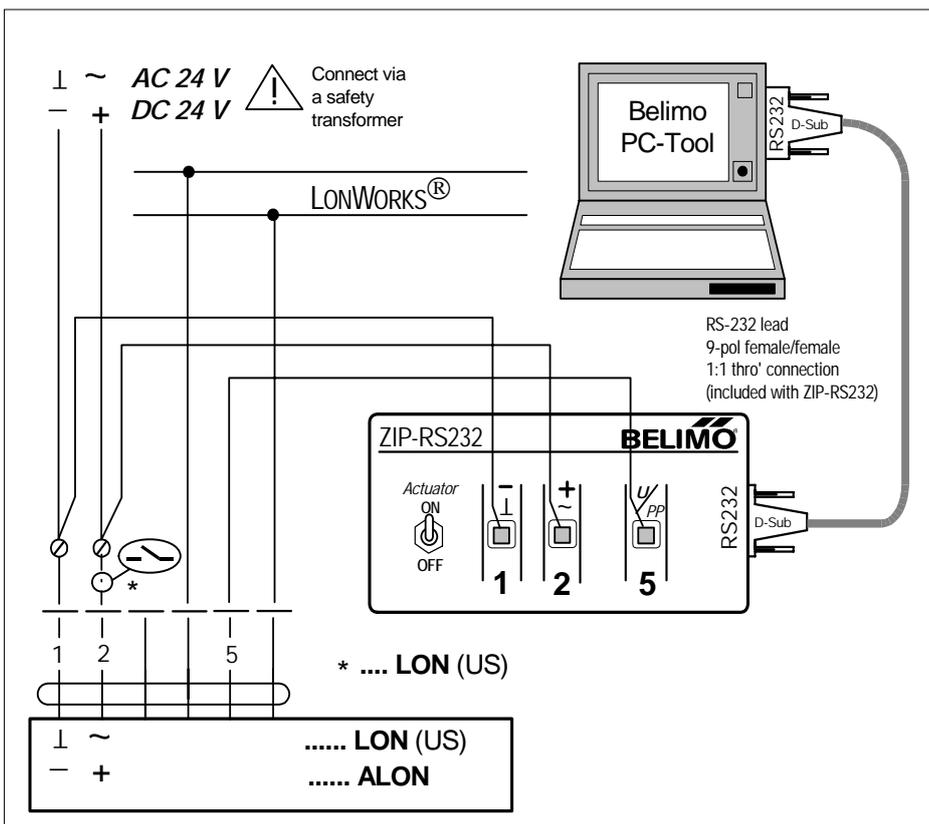
Typical wiring diagram 9

Typical wiring diagram 10

BELIMO®
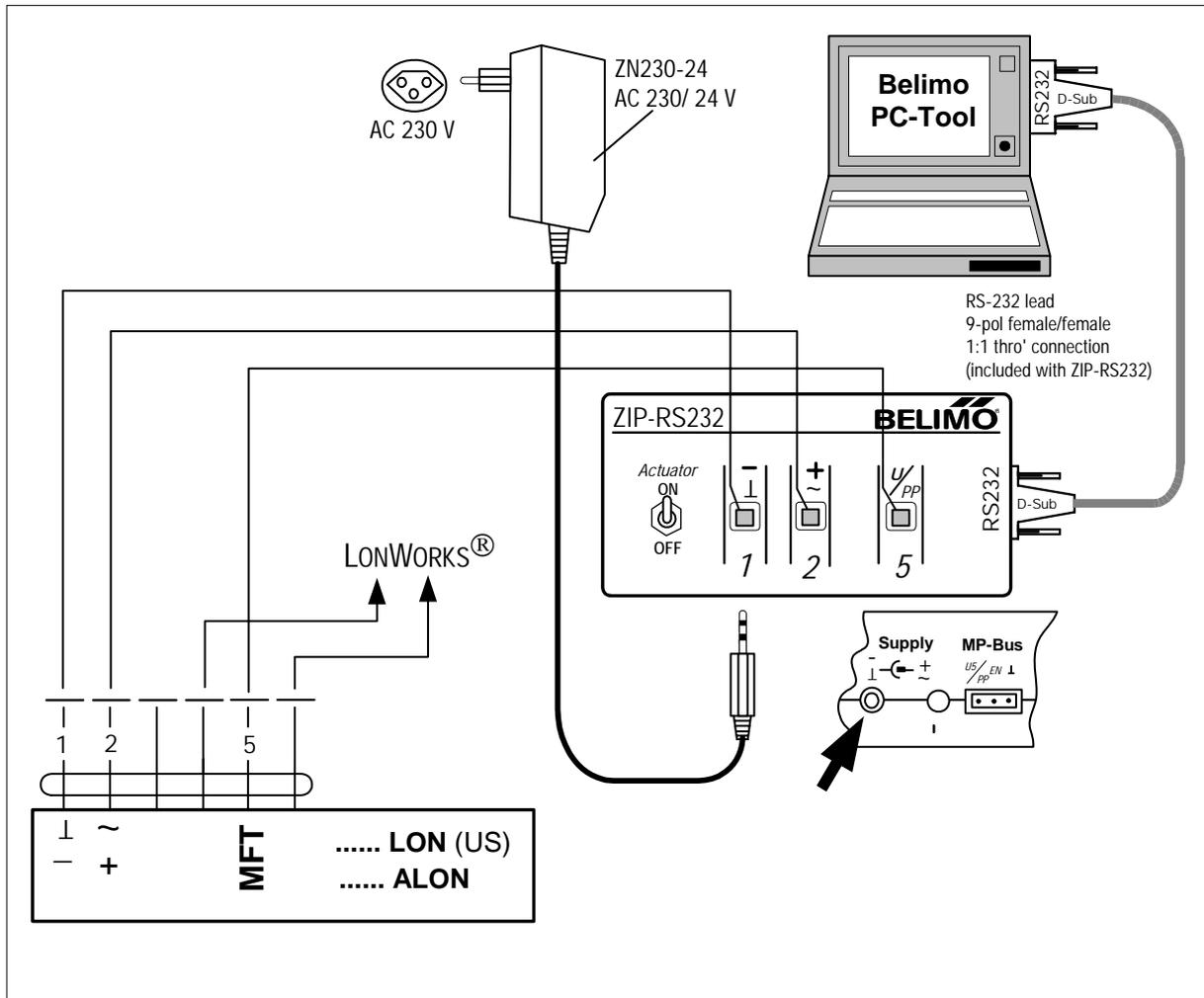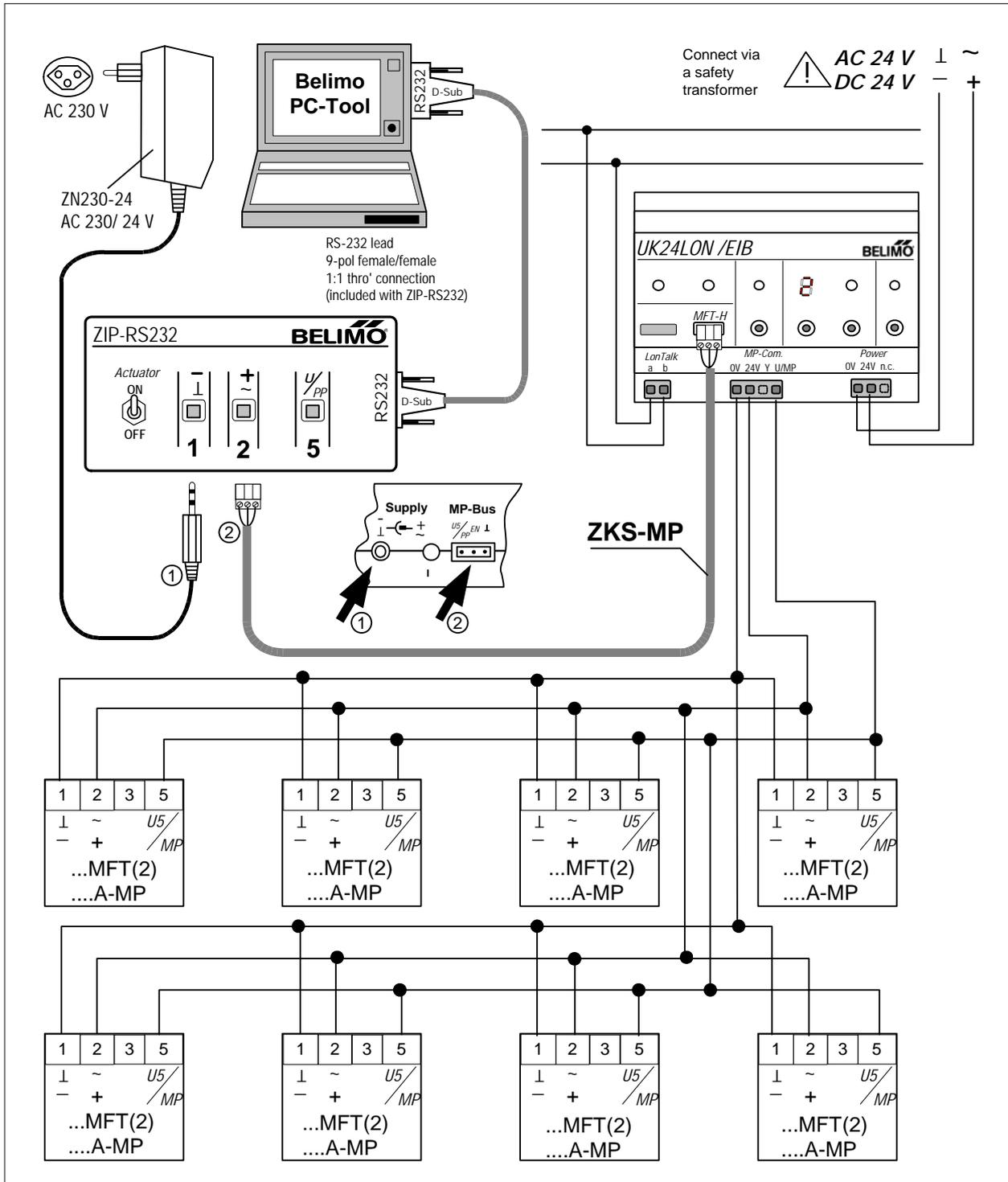
PC-Tool V3.0 Air module

for damper actuators

User manual

English

Table of contents

1 Introduction

The "Air module" user manual describes the detail area [D] of the Air module.
The documentation is divided according to the three index cards "Service", "Configuration" and "Simulation".

2 Service

2.1 Displaying settings

The Service card gives an overview of the current settings of the actuator.

Service card for damper actuators

Meaning of the settings

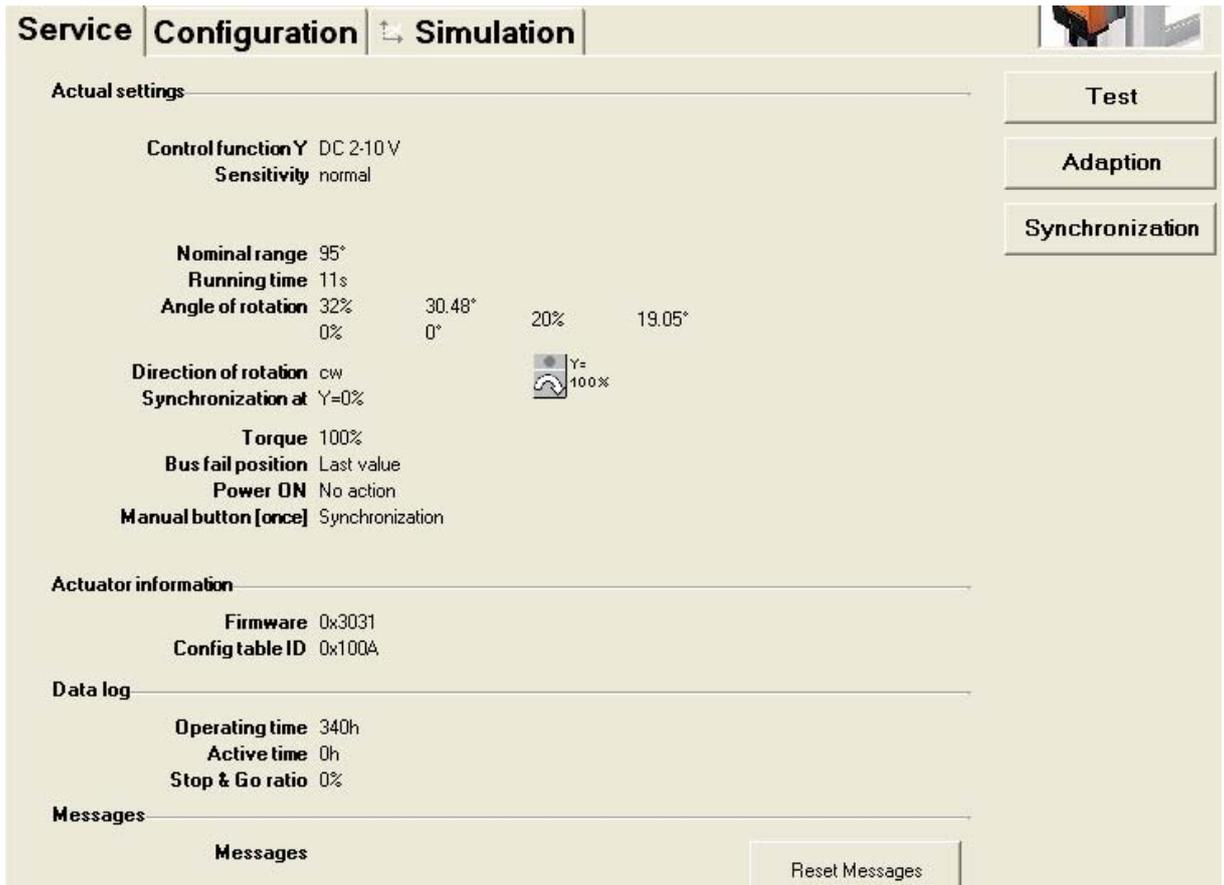| Control function Y	Type of control
Sensitivity	Response sensitivity and reversal hysteresis of the control function
Feedback U5	Type of feedback signal
Nominal range	Range of rotation within the mechanical limits
Running time	Time needed to pass through the rotation range
Angle of rotation	Programmed rotation range: Min / Mid / Max
Direction of rotation	Clockwise (cw) / counterclockwise (ccw)
Synchronisation at	Stop position 0 % or 100 %
Torque	In percent of the maximum torque
Bus fail position	Behavior when communication fails
Power ON	Behavior when the system is switched on
Manual button [once]	Function when pressed once
Manual button [twice]	Function when pressed twice (not present in "New Generation" actuators)
Firmware	Software version on the actuator
Config table ID	Identification of the configuration table
Operating time	Number of hours during which the actuator was connected to the power supply
Active time	Number of hours during which the actuator was mechanically in motion and connected to the power supply
Stop & Go ratio	Ratio of active time/operating time in percent. A high Stop & Go ratio indicates an unstable control

2.2 Adaption

In the case of adaption, the actuator determines the rotation range 0 % … 100 % by moving to the mechanical limits.

Click the "Adaption" button on the Service card.

Variant You can also trigger the adaption directly on the actuator. The buttons necessary for this can be programmed. For example, "Manual button [twice]" can be assigned the adaption function.

The progress of the adaption is displayed in the status line. The actuator first moves against the programmed direction of rotation to the zero stop and then to the end stop at the full angle of rotation.

Next, the absolute angles of rotation for a programmatically limited rotation range (minimum, mid-position, and maximum), the feedback signal U5, and the running time are recalculated and displayed.

2.3 Synchronization

In the case of synchronization, the actuator moves to a mechanical limit in order to determine the absolute angle of rotation.

For each actuator, it is possible to program whether synchronization will take place at the zero stop (0%) or at the full angle of rotation (100%).

Click the "Synchronization" button on the Service card.

Variant | You can also trigger the synchronization directly on the actuator. The necessary buttons for this can be programmed. For example, "Manual button [once]" can be assigned the synchronization function.

The progress of the synchronization is displayed in the status line. With the setting "Synchronization at: Y=0%", the actuator moves against the programmed direction of rotation to the zero stop, and with the setting "Synchronization at: Y=100%" to the end stop at the full angle of rotation.

2.4 Function test

The function test checks for complete opening and closing.

Click the "Test" button on the Service card. The standard display is covered by the test window.
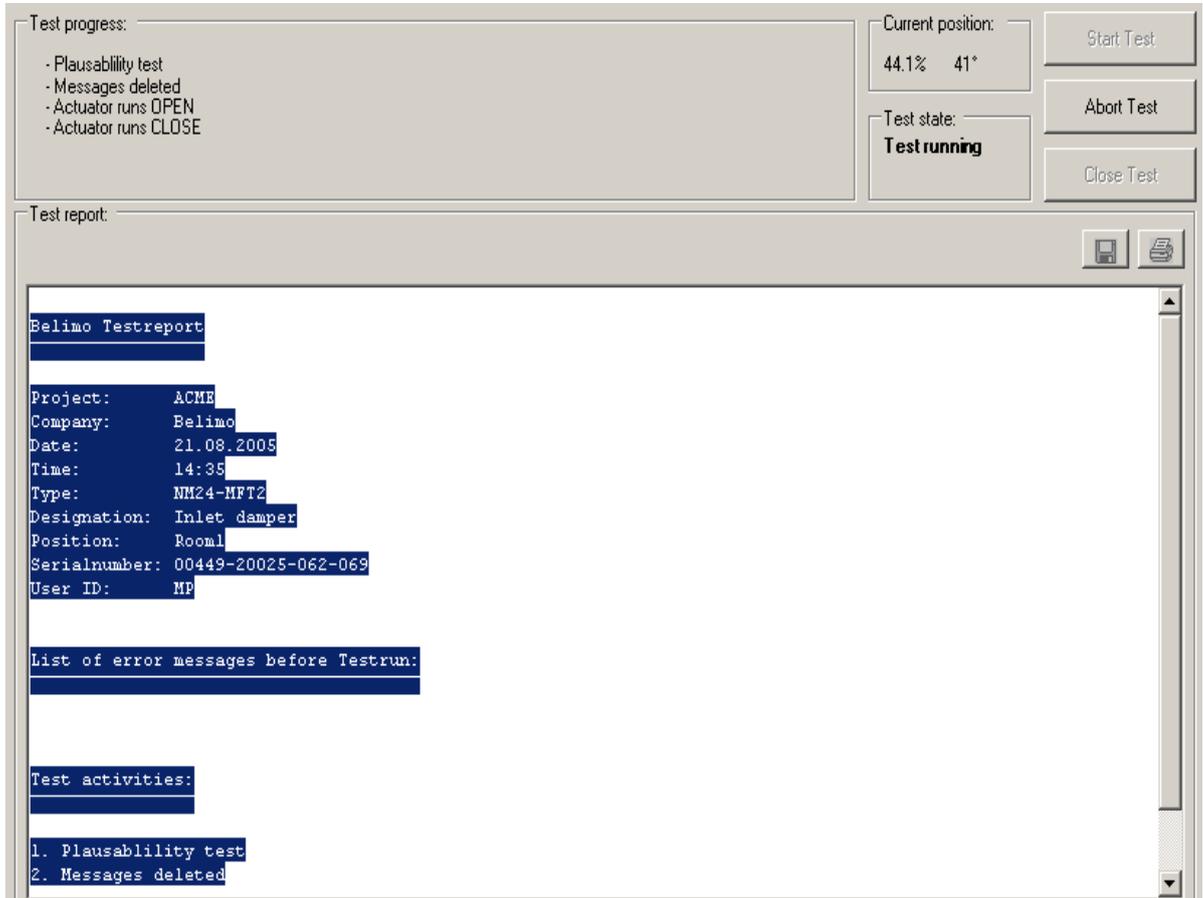
Display of test progress and test report

Click the "Start Test" button.

The progress and the current position are continuously displayed.

The test report contains
- information on the project,
- the identification of the actuator,
- a list of fault messages pending before the start of the test,
- the test steps and the test results, and
- the current actuator settings.

If the test reports an invalid actuator configuration, go to the "Configuration" card after ending the test. The values that are not allowed are marked with a flashing exclamation point.

You can save the test report as a file by clicking the floppy disk icon, and you can print it with the printer icon.

End the function test with the "Close Test" button. The program asks whether you want to save an unsaved test report now.
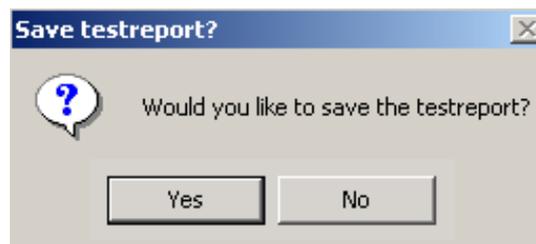
If you cancel the test early, the actuator will be reset to its original state. No test report will be created.

3 Configuration

On the "Configuration" card, you can read out parameter values from the actuator, change them and save them back to the actuator. The valid ranges for the parameter values are displayed in parentheses next to the input fields.
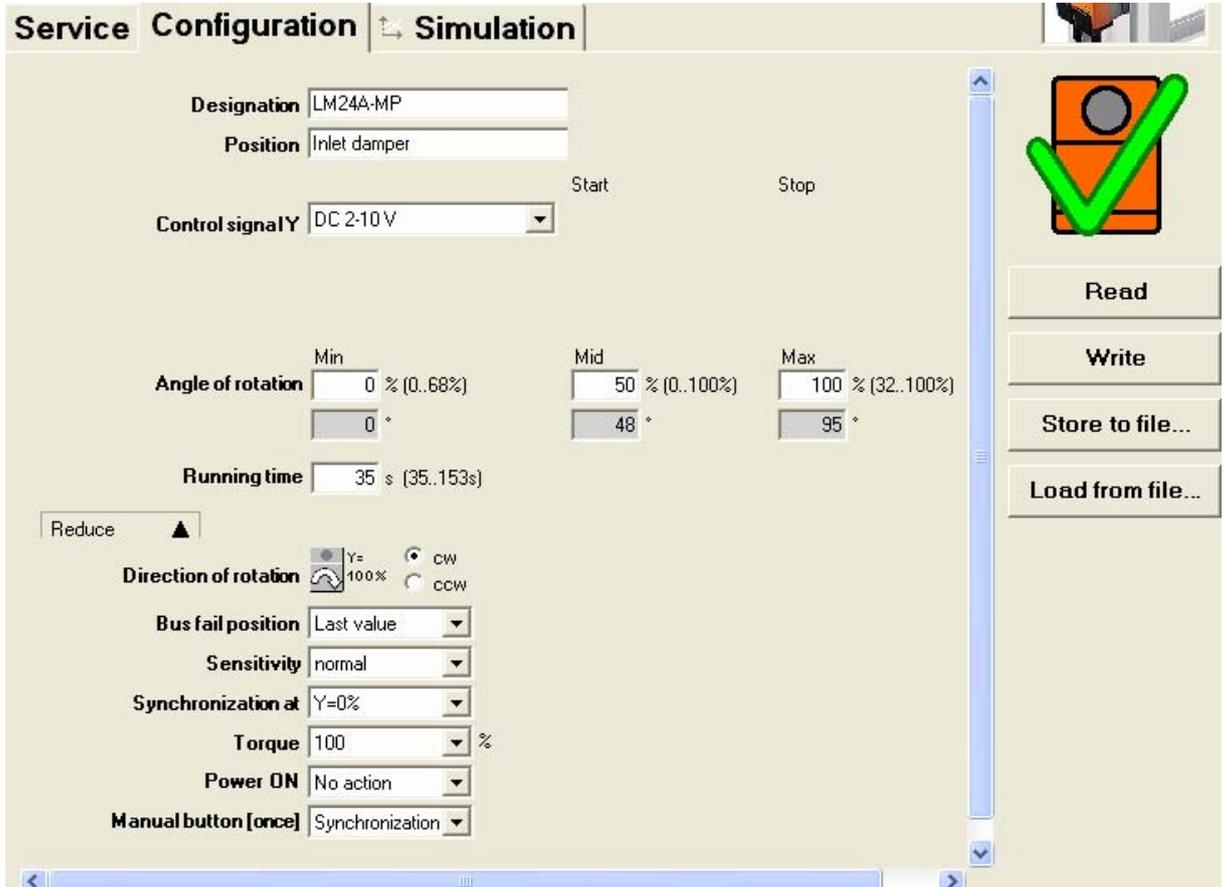
Configuration card for damper actuators

Note: The set running time is always in relation to the rotation range set with Min and Max.

Actuator number

Designation	16 characters of any text
Position	16 characters of any text

Control signal Y

3-point	AC voltage, positions: Open / neutral / closed
Open / closed	DC or AC voltage, 2-point
DC 0–10 V	(DC voltage) Fixed operating range DC 0–10 V
DC 2–10 V modulating	(DC voltage) Fixed operating range DC 2–10 V
DC variable	Start (Y=0%) 0.5 ... 30 V Stop (Y=100%) 2.5 ... 32 V Range between start and stop at least 2 V
PWM 0.02–5 s	Duration of the control pulse (pulse width modulation), fixed operating range
PWM 0.1–25.5 s	Duration of the control pulse, fixed operating range
PWM 0.59–2.93 s	Duration of the control pulse, fixed operating range
PW M 0.02–5 s	Duration of the control pulse, fixed operating range
PWM variable	Start (Y=0%) minimum 0.02 seconds Stop (Y=100%) maximum 50 seconds
VAV 4 +/- 6V	When this function is selected, the actuator is parameter-ized as a VAV actuator and can therefore be controlled by the VAV controllers VR.. . Note: When VAV (6 $\pm$ 4 V) is selected, the values for mini-mum, maximum, intermediate value, running time and angle of rotation are reset to the default values.

Feedback U5 (only active when the actuator address is set to PP)

DC 2 -10V	DC voltage measurement signal, fixed range
DC 0.5 -10V	DC voltage measurement signal, fixed range
DC variable	DC voltage measurement signal Start 0.5...8.0 V / Stop 2.5 ... 10.0 V Range between start and stop at least 2 V
...	*Certain actuators can define further feedbacks, which you cannot change, however.*

U5 scaling (only with "New Generation" actuator, MF or MP types)

Start	Angle of rotation in percent, corresponds to the start value of the feedback signal
Stop	Angle of rotation in percent, corresponds to the stop value of the feedback signal

Angle of rotation

Min	Programmatic lower limit of the rotation range
Mid	Mid-position of the rotation range
Max	Programmatic upper limit of the rotation range

Examples of settings for control signal Y / feedback U5

Control signal Y: 3...8 V Min: 30%, Max : 70%
Feedback U5 :   2...7 V Start: 20%, Stop: 90%
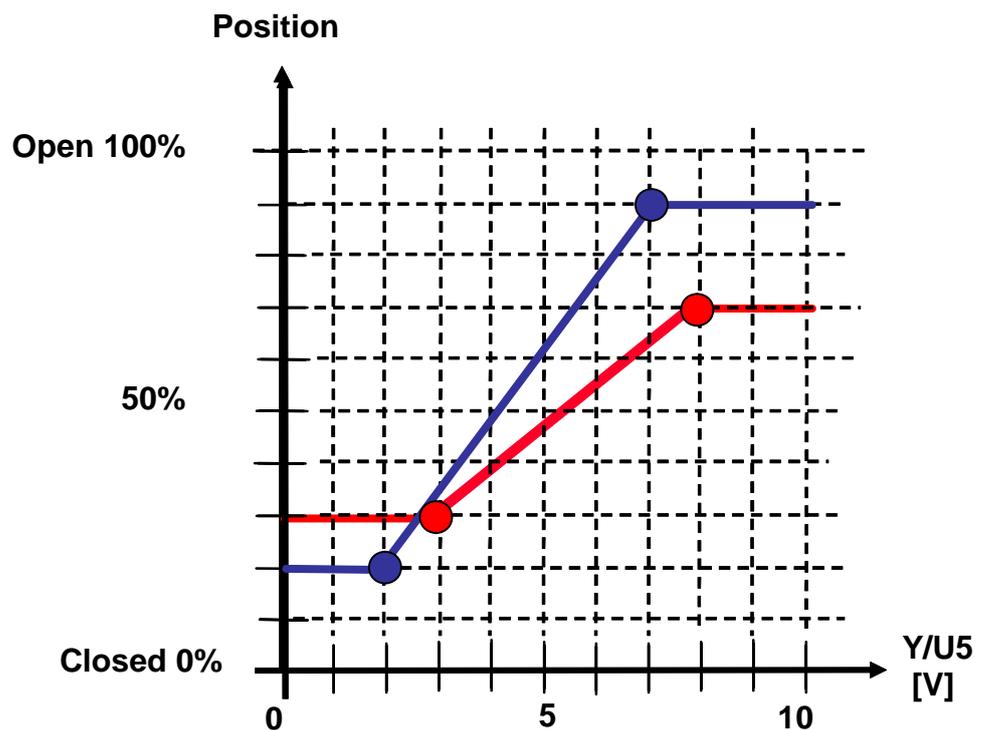
Running time

In seconds	Time needed to pass through the rotation range limited by Min and Max (the valid range of values depends on the actuator type and the rotation range)

Direction of rotation

cw	Clockwise
ccw	Counterclockwise

Bus fail position

Last value	Position according to control signal Y
Open	Move to full angle of rotation (100%)
Close	Move to zero stop
Fast close	Close with maximum speed

Sensitivity

Sensitivity	Actuators without spring-return: NM24-MFT(2) AM24-MFT(2) GM24-MFT(2)	Actuators with spring return: LF24-MFT(2) AF24-MFT(2)	Actuators of the New Generation: ..MF ..MP ..LON
Normal			
- Response sensitivity	1° angle of rotation	1° angle of rotation	1% @ operating range
- Reversal hysteresis	2.5° angle of rotation	2.5° angle of rotation	2.5% @ operating range
Damped			
- Response sensitivity:	2° angle of rotation	2° angle of rotation	2% @ operating range
- Reversal hysteresis	5° angle of rotation	5° angle of rotation	5% @ operating range

Synchronization at

Y = 0%	Moves to the mechanical limit at zero stop (depending on direction of rotation)
Y = 100%	Moves to the mechanical limit at full angle of rotation (depending on direction of rotation)

Torque

25% ... 100%	Can be set in increments of 25%.100% corresponds to the maximum torque for the actuator type (see nameplate)

Power ON

Synchronization	Moves to a mechanical limit (according to the setting "Synchronization at")
Adaption	Moves to both mechanical limits and recalculates angle-dependent parameters
Nothing	--

Manual button [once]/[twice]

Synchronization	Moves to a mechanical limit (according to the setting "Synchronization at") when the manual button is pressed once or twice respectively
Adaption	Moves to both mechanical limits and recalculates angle-dependent parameters when the manual button is pressed once or twice respectively

Note: The function "Manual button [twice]" is not present in "New Generation" actuators (types MF, MP)

Additional note on the item "Power ON":

You can programmatically limit the rotation range at one end by only changing the minimum or the maximum. If the value of Power ON is set to "Nothing", then the following holds true:

The mechanical limit that can still be attained within a rotation range limited at one end will be used for synchronization.

If you set the minimum angle of rotation to a value greater than 0%, the zero stop will no longer be in the rotation range. In this case, synchronization will take place at the end stop of the full angle of rotation (Y = 100%). If, on the other hand, you set the maximum angle of rotation to a value smaller than 100%, synchronization will take place at the zero stop (Y = 0%).

Synchronization when the angle of rotation is limited at both ends

If the minimum is greater than 0% AND the maximum is smaller than 100%, then you can select where the synchronization will take place. In this case, it is necessary to perform synchronization or adaption when you switch the device on (the setting "Power ON: Nothing" is considered an error).

4 Controller simulation

Go to the "Simulation" card.
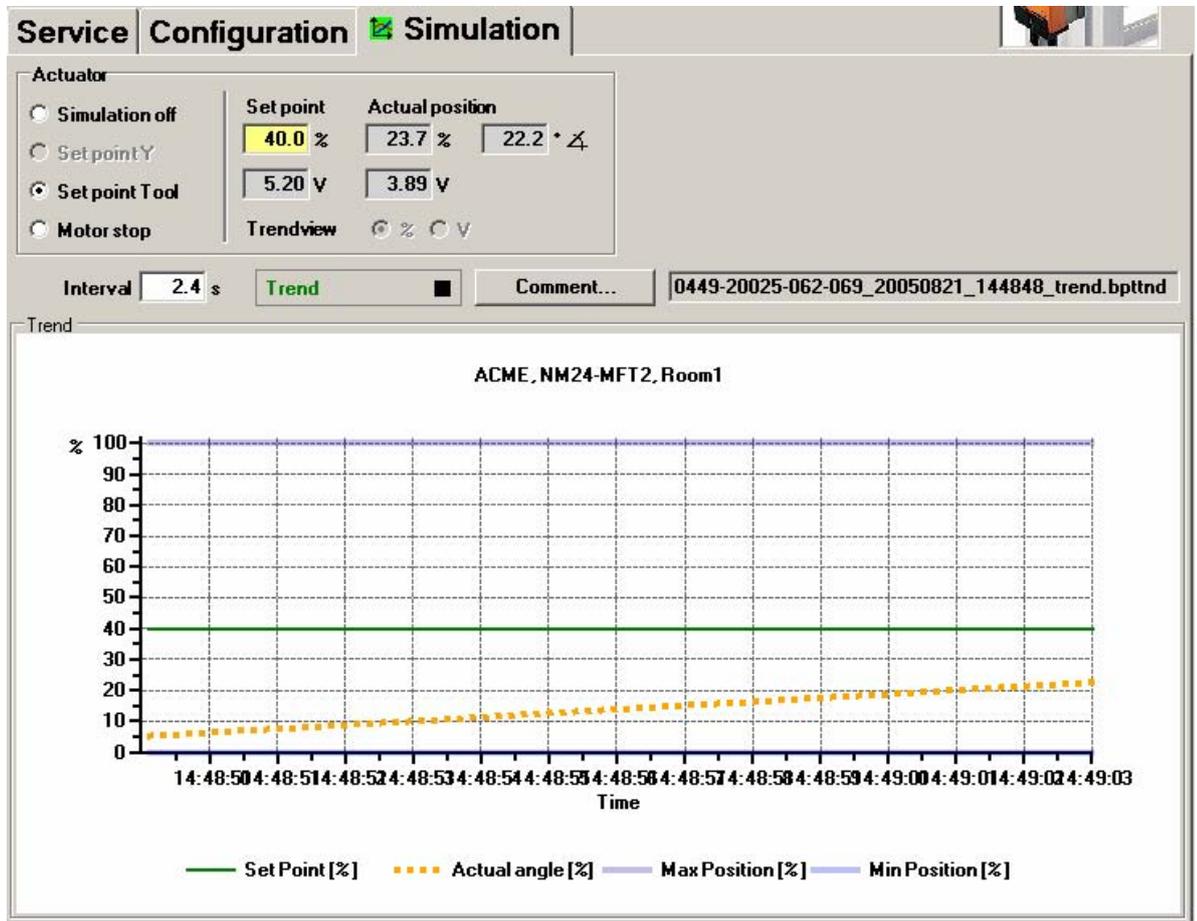
Simulation card for damper actuators

The controller simulation is not possible while the actuator is performing an adaption or synchronization.

4.1 Actuator control

Select the type of set point definition with the radio buttons.

- Set point Y (only available in PP mode): Control signal at connection Y according to selected control type (DC, PWM, open/close, 3-point).

- Set point Tool (not available with control type open/close or 3-point): The set point is entered in % of the programmed rotation range. 0% is the minimum, 100% the maximum. The input values are converted and displayed in the units of the corresponding control signal (volts or seconds).

The control is switched off when you click "Motor stop". This function is not available with the control types open/close and 3-point.

Measurement values

During the simulation, the current angle of rotation is displayed in % of the absolute (mechanically limited) rotation range and, converted according to the scale setting, as a feedback voltage in volts.

4.2 Reading out sensors and switches

The values of sensors and switches can be read out in MP mode. This function, however, must be activated in advance in the PC-Tool options under "Air module". Select Tools ▸ Options in the main menu.
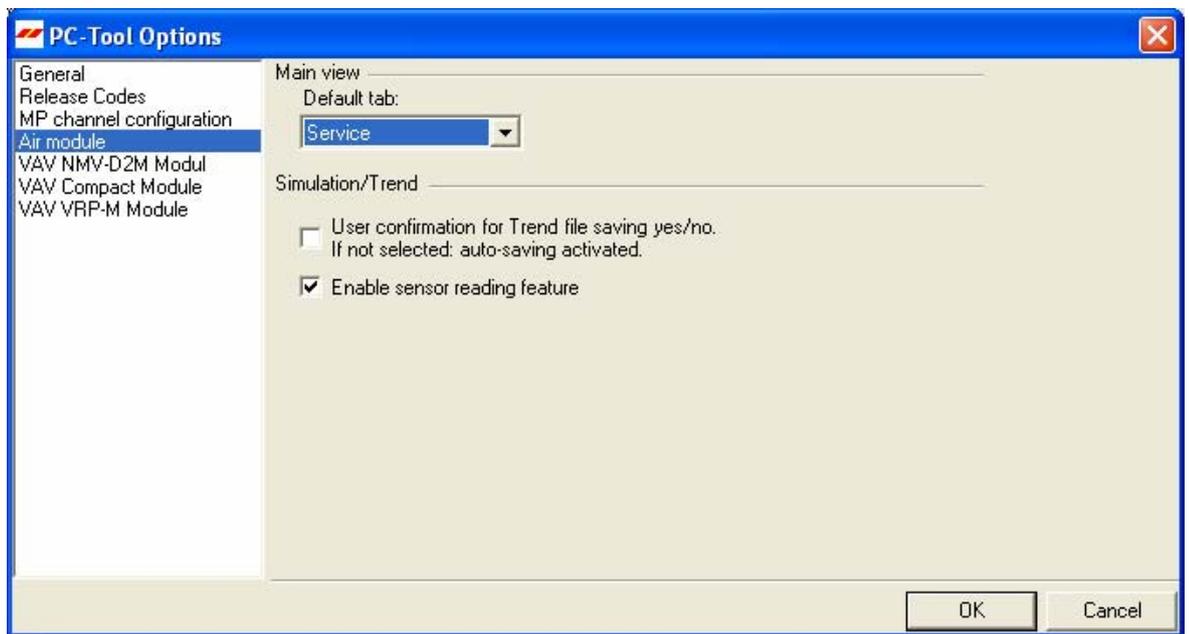
Settings for reading out sensors

On the Service card, a section with the sensor values is displayed to the right of the actuator control.
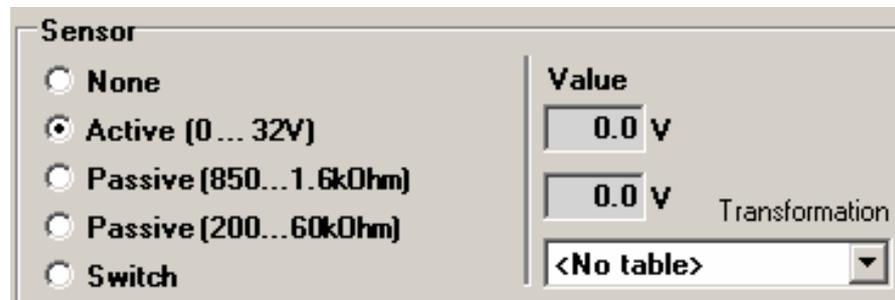
Sensor display in MP mode

Select the type of the connected sensor with the radio buttons. The value is either displayed in volts (active), ohms (passive) or as on/off (switch).

The transformation table allows you to additionally convert the raw value of the sensor into the corresponding measuring quantity (temperature etc…). (See the "Transformation table" chapter in the General User Manual)

4.3 Trend recording

During simulation, the time progress of the set points and actual values can be displayed in a plot. The values are saved in a trend file and can be displayed again at a later time. Furthermore, you can add any comment texts you would like.

In the PC-Tool options for the Air module, you determine whether the trend file is automatically saved when the recording is finished (checkbox not selected) or whether the program should ask you.

Click the "Trend" button during simulation. The display changes to a "flat" button. The recording stops when you click again.

The Trend View radio buttons allow you to set whether the display is given in percent of the full rotation range (%) or in volts (V).

The position is queried every second by default. You can change the query interval in an input field. The permitted values are 0 to 9999 seconds, whereby the value 0 means "no waiting time" (query as quickly as possible).
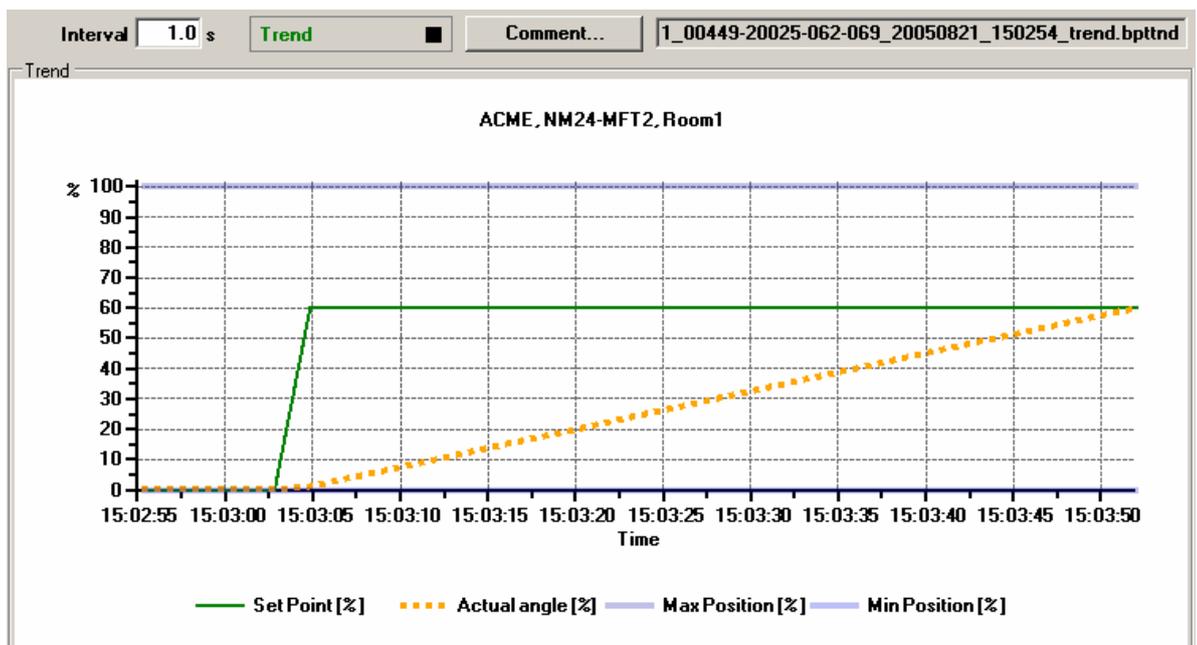
Trend plot

The Comment button allows you to enter a text at a defined time and the text is then saved in the trend file.

If you want to record a trend for more than one hour (long-term trend), enter a value of at least 2 seconds for the interval. If the interval is shorter, too many data points will result and the time for correcting the curve between the queries can become too short.

5 PC-Tool options for the Air module

Select Tools ▶ Options in the main menu.

Variant Click the right mouse button on the program icon in the outline bar and select "Options".
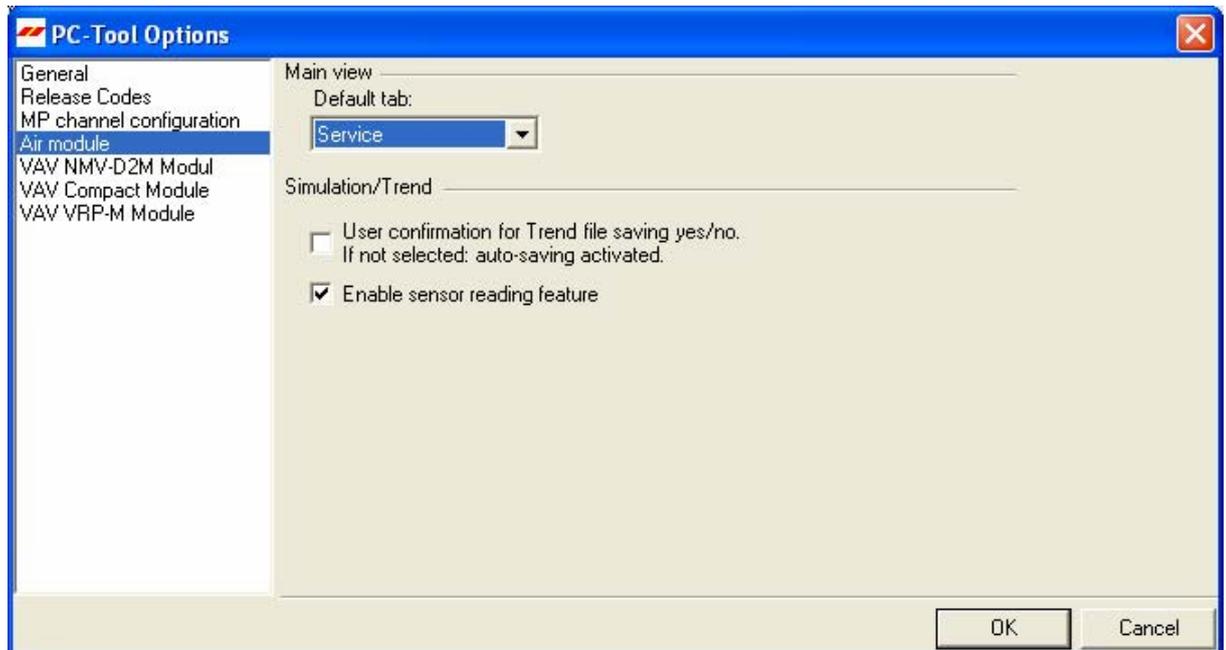
Dialog for basic settings (Air module)

Select "Air module" on the left.

Using the combobox "Default tab", you can select the index card you want to open by default when starting the program PC-Tool 3.0.

Use the upper checkbox to determine whether the trend file is automatically saved when the recording is finished (checkbox not selected) or whether the program should ask you.

You can activate the function for reading out the sensors with the lower checkbox.

PC-Tool V3.1 VAV compact module

for VAV controllers

User manual

English

Table of contents

1 Introduction

The "VAV module" user manual describes the detail area [D] of the VAV-Compact controller module. The documentation is divided according to the three tabs "Service", "Configuration", and "Simulation".

Note

For functions and wiring, refer to the product information for VAV-Compact LMV-D2-MP, NMV-D2-MP, and SMV-D2-MP.

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2 Service

2.1 Displaying settings

The Service tab gives an overview of the current settings of the VAV-Compact controller.
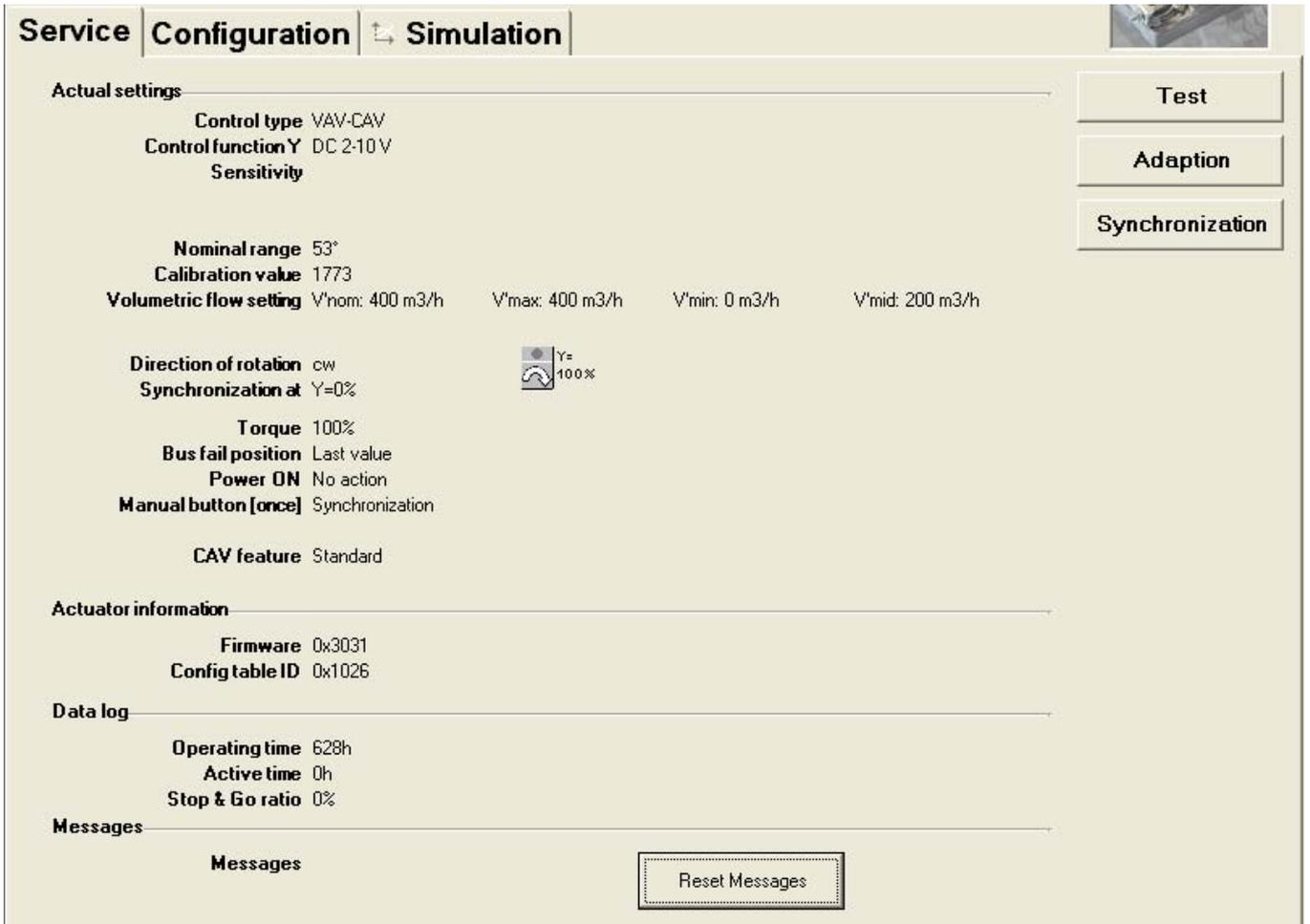
Service tab for VAV controllers

The General Part of this manual describes how to print out controller parameters [chapter 3.6.2.] and delete maintenance or error messages [chapter 3.6.3].

Meaning of the settings

Control type	VAV-CAV (variable air volume control) or open loop operation (operation with an external VAV controller, actuator and sensor functions)
Control signal Y	Type of control
Sensitivity	Response sensitivity and reversal hysteresis of the control signal ("open loop" control type only)
Feedback U5	Type of feedback signal (conventional operation)
Nominal range	Rotation range within the mechanical limits
Calibration value	Unit-specific parameter, set by the manufacturer
Volumetric flow setting	Operating volumetric flow settings: V'max / V'min / V'mid
Direction of rotation	Clockwise (cw) / counterclockwise (ccw) opening damper
Synchronization at	Stop position 0% or 100%
Torque	In percent of the maximum torque
Bus fail position	Behavior when communication fails
Power ON	Behavior when the system is switched on or in the event of a power failure
Manual button [once]	Function when the gear release button is pressed
CAV feature	Override steps: standard or compatible with NMV-D2M
Firmware	Software version of the VAV-Compact
Config table ID	Identification of the VAV-Compact configuration table
Operating time	Number of hours for which the actuator was connected to the power supply
Active time	Number of hours for which the actuator was mechanically in motion and connected to the power supply
Stop & go ratio	Ratio of active time/operating time in percent. A high stop & go ratio indicates unstable control

2.2 Changing the units for volumetric flow

Select Tools ▶ Options in the main menu.

Click "VAV-Compact Module" on the left.

Using the combobox "Flow Unit", you determine the physical units for the volumetric flow:

- m³/h (cubic meters per hour)
- l/s (liters per second)
- cfm (cubic feet per minute)

This setting is valid for all displays, printouts, labels, and entries in the log file [refer to the General Part of this manual].

2.3 Adaption

In the case of adaption, the actuator determines the available rotation range (0% … 100%) by moving to the mechanical limits.

Click the "Adaption" button on the Service tab to start.

The progress of the adaption is displayed in the status line. The actuator first moves against the programmed direction of rotation to the zero stop and then to the end stop at the full angle of rotation.

The actuators can be configured so that an adaption is automatically started when the power supply is switched on.

2.4 Synchronization

In the case of synchronization, the actuator moves to a mechanical limit in order to calibrate the position calculation.

For each actuator, it is possible to program whether synchronization will take place at the zero stop (0%) or at the full angle of rotation (100%).

Click the "Synchronization" button on the Service tab to start.

Variant
You can also trigger the synchronization directly on the actuator by pressing the gear release button.

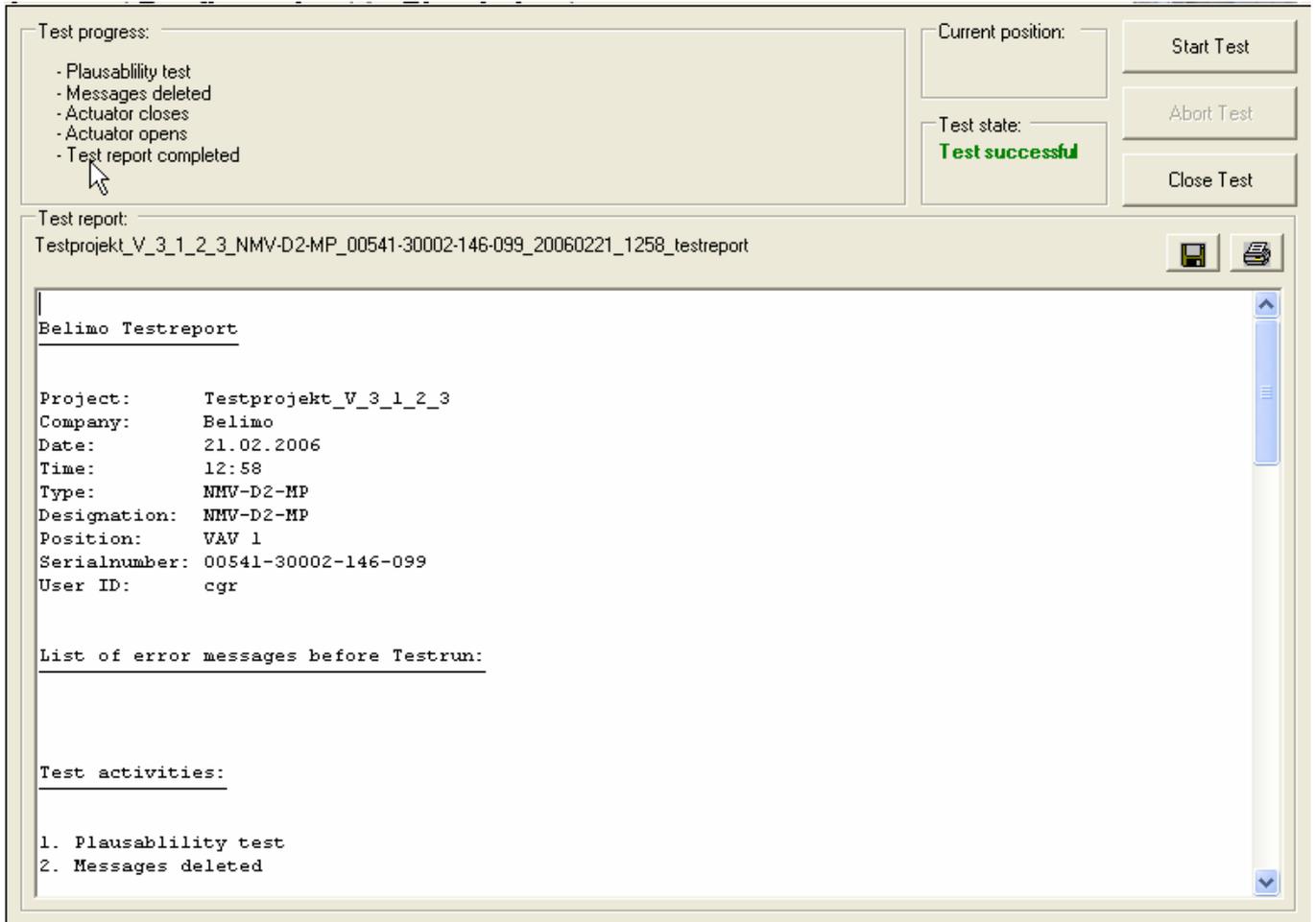The progress of the synchronization is displayed in the status line. With the setting "Synchronization at: Y = 0%", the actuator moves against the programmed direction of rotation to the zero stop, and with the setting "Synchronization at: Y=100%" it moves to the end stop at the full angle of rotation.

The actuators can be configured so that a synchronization is automatically started when the system is switched on.

2.5 Function test

The function test checks for complete opening and closing of the damper.

Click the "Test" button on the Service tab. The standard display is covered by the test window.


```
Test progress:
  - Plausablility test
  - Messages deleted
  - Actuator closes
  - Actuator opens
  - Test report completed

Current position:

Test state:
  Test successful

Start Test
Abort Test
Close Test

Test report:
Testprojekt_V_3_1_2_3_NMV-D2-MP_00541-30002-146-099_20060221_1258_testreport

Belimo Testreport


Project:      Testprojekt_V_3_1_2_3
Company:      Belimo
Date:         21.02.2006
Time:         12:58
Type:         NMV-D2-MP
Designation:  NMV-D2-MP
Position:     VAV 1
Serialnumber: 00541-30002-146-099
User ID:      cgr


List of error messages before Testrun:




Test activities:


1. Plausablility test
2. Messages deleted
```

Display of test progress and test report

Click the "Start Test" button.

The progress and the current position are continuously displayed.

The test report contains

- information on the project,
- the identification of the VAV-Compact controller,
- a list of error messages pending before the start of the test,
- the test steps and the test results, and
- the current controller settings.

If the test reports an invalid controller configuration, go to the "Configuration" tab after it has finished. The values that are not allowed are marked with a flashing exclamation point.

You can store the test report as a file by clicking the diskette icon and print it with the printer icon.

End the function test with the "Close Test" button. The program asks whether you want to store an unstored test report now.

If you cancel the test early, no test report will be created.

After ending or canceling the test, the actuator is reset to its original state.

3 Configuration

On the "Configuration" tab, you can read out parameter values from the VAV-Compact controller, change them and store them in a text file. The valid ranges for the parameter values are displayed underneath the input fields.

Configuration tab for VAV controllers

The enlarged input fields in the bottom part of the screen are visible if you click on "Enlarge".

3.1 Settings

Controller ID

Designation	16 characters of any text
Position	16 characters of any text

Volumetric flow, nominal

V'nom	Nominal volumetric flow (set by the manufacturer of the VAV unit)

Volumetric flow range for "VAV-CAV" control type

V'min	Lower limit of the operating volumetric flow setting
V'max	Upper limit of the operating volumetric flow setting
V'mid	CAV step between V'min and V'max
Shut-off operation	Sets V'min to a fixed value of 0 m³/h (shut-off operation – damper closed)

You can change the physical units for the volumetric flow by selecting Tools ▶ Options in the main menu [see chapter 2.2.].

The options also allow you to specify whether the volumetric flow for V'min and V'max can be entered in percent.

Control type

VAV-CAV	Constant (CAV) or variable (VAV) air volume control
Open loop	Operation with an external VAV controller (actuator and sensor functions)

Mode (control signal Y / feedback U5)

0 ... 10 V	Sets control signal Y = 0 … 10 V, feedback U5 = volumetric flow, 0 … 10 V
2 ... 10 V	Sets control signal Y = 2 … 10 V, feedback U5 = volumetric flow, 2 … 10 V
Other	The control signal Y and the feedback U5 are separately defined (see below)

Control signal Y

0 … 10 V	Fixed operating range 0 … 10 V
2 … 10 V	Fixed operating range 2 … 10 V
Variable	Start (Y=0%) 0 ... 8 V Stop (Y=100%) 4 ... 32 V Range between start and stop at least 2 V

Feedback U5 (only active when the actuator address is set to PP)

Damper position 0 … 10 V	Feedback, damper position 0 … 10 V
Damper position 2 … 10 V	Feedback, damper position 2 … 10 V
Variable damper position	Feedback, damper position Start 0 ... 8.0 V / Stop 2 ... 10.0 V Range between start and stop at least 2 V
Volumetric flow 0 … 10 V	Feedback, volumetric flow 0 … 100% V'nom = 0 … 10 V
Volumetric flow 2 … 10 V	Feedback, volumetric flow 0 … 100% V'nom = 2 … 10 V
Variable volumetric flow	Feedback, volumetric flow 0 … 100% V'nom Start 0 ... 8.0 V / Stop 2 ... 10.0 V Range between start and stop at least 2 V

Direction of rotation

cw	Clockwise opening damper
ccw	Counterclockwise opening damper

Angle of rotation

Adapted	Rotation range determined by the mechanical limits
Programmed to	Rotation range 30° ... 95°

Bus fail position

Last value	Volumetric flow is determined by the last set point received from the MP master
Open	Move to full angle of rotation (100%)
Close	Move to zero stop
Min / V'min	V'min volume
Max / V'max	V'max volume

Sensitivity ("open loop" control type only)

Normal	Normal response sensitivity and reversal hysteresis (values depend on actuator type)
Damped	Reduced response sensitivity and high reversal hysteresis (values depend on actuator type)

Synchronization at

Y=0%	Moves to the mechanical limit at zero stop (depending on direction of rotation)
Y=100%	Moves to the mechanical limit at full angle of rotation (depending on direction of rotation)

Torque

25% ... 100%	Can be set in increments of 25%. 100% corresponds to the maximum torque for the actuator type (see nameplate)

CAV feature

Standard	Override steps: • Damper closed • V'min • V'max • Damper open
NVD-D2M compatible	The CAV steps correspond to the predecessor, the NVD-D2M: • Damper closed • V'min • V'mid • V'max • Damper open

Power ON

Adaption	Moves to both mechanical limits and recalculates angle-dependent parameters
Synchronization	Moves to one mechanical limit (according to the setting for "Synchronization at")
No action	--

Gear release button

Synchronization	(Fixed for VAV-Compact actuators)

Note
For functions and wiring, refer to the product information for VAV-Compact LMV-D2-MP, NMV-D2-MP, and SMV-D2-MP.

3.2 Lockbit

Volumetric flow settings are preprogrammed by the manufacturer in every actuator and protected by an electronic seal – referred to as the "lockbit".

Icon for an intact lockbit

As soon as the V'min, V'mid, or V'max value is changed on the system, the lockbit is "broken". The lockbit icon then disappears from the status image.

The values specified by the manufacturer can be restored at any time with the "Reset to OEM basic values…" function (see below). The lockbit remains broken, however.
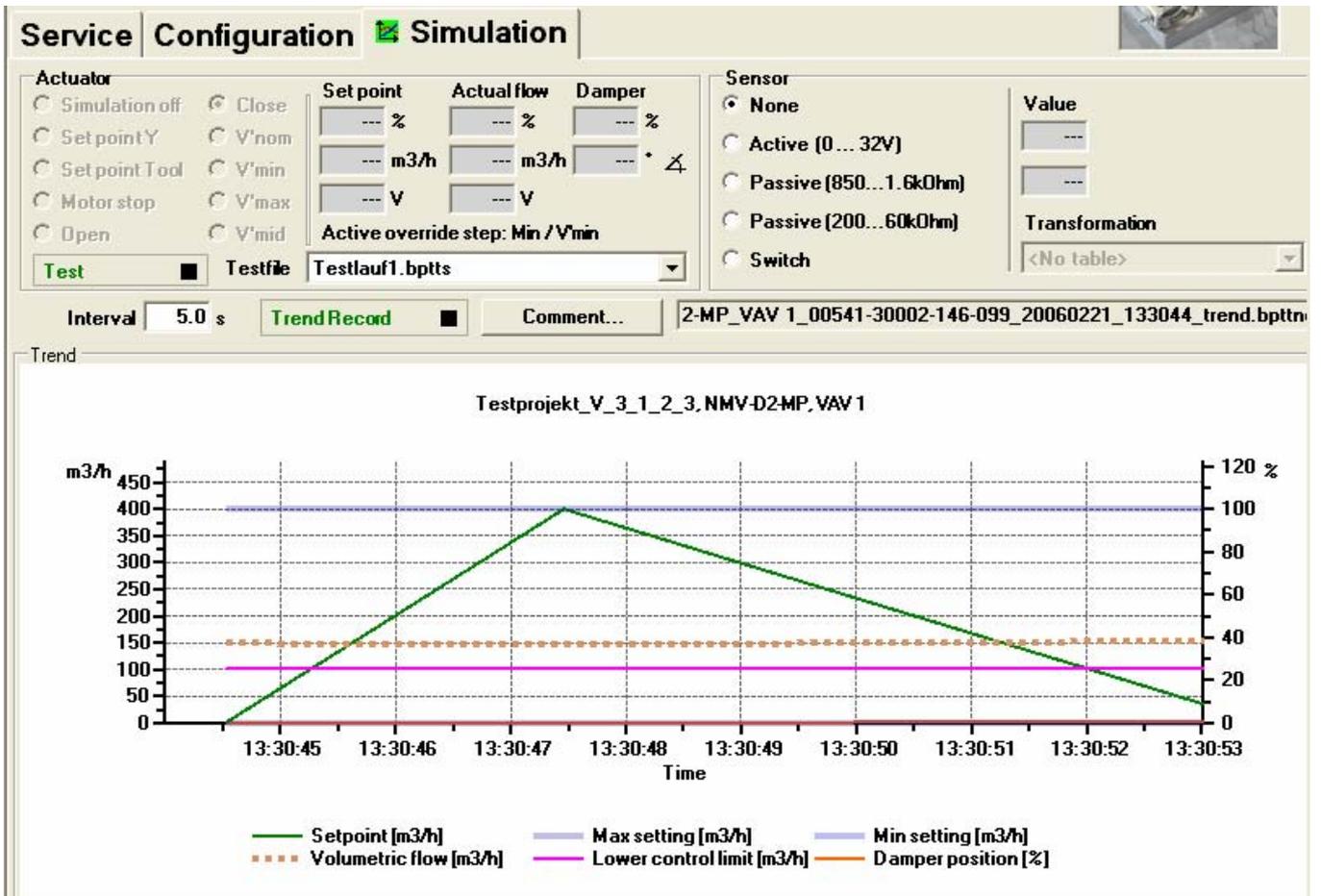
3.3 Resetting to the manufacturer's basic values

To restore the V'min, V'max, and V'mid values preprogrammed by the manufacturer, select File ▸ Reset to OEM Basic Values... in the main menu.

Variant   You can also activate this function with the function key F6 or by clicking on the "Reset to OEM basic values…" icon in the toolbar.

4 Controller simulation

Go to the "Simulation" tab.

Simulation tab for VAV controllers

The controller simulation will not work correctly if the actuator is performing an adaption or synchronization. The "Motor stop" function overrides an active adaption or synchronization.

4.1 Actuator control

Select the type of set point definition with the radio buttons.

- Set point Y (only available in PP mode): control signal at connection Y.

- Set point Tool: The set point can be entered as a percentage of the volumetric flow (0% corresponds to V'min and 100% to V'max), as a volumetric flow value or as a control signal (in V).

The control is switched off when you click "Motor stop".

The following override steps can be specified using the radio buttons.
- OPEN: Damper completely open
- CLOSE: Damper completely closed
- V'nom: Nominal volumetric flow
- V'min: V'min volumetric flow (0%)
- V'max: V'max volumetric flow (100%)
- V'mid: CAV volumetric flow V'mid

Measurement values

The following values are displayed:
- The current volumetric flow as 0 … 100% of V'nom,
- The actual volumetric flow in m³/h, l/s, or cfm,
- The feedback voltage in volts (U5 signal),
- The damper opening in %,
- The current angle of rotation in angular degrees,
- An active override step is displayed as text, regardless of whether it was specified by the PC-Tool or externally (control signal Y).

4.2 Test

The Test function facilitates structured testing of the VAV-CAV units.

Several consecutive commands [see 4.2.1] are defined in a test script file. A trend record is started when this function is activated.

To select a test file

Select the required script in the combobox "Test file".

To start the test script

Click the Test ▸ button.

Important note
Prior to starting the actual script, the application checks whether the air flow and system pressure are sufficient to test the actuator. (If sufficient system pressure is not present, this test may take up to three minutes.)


4.2.1 Test scripts

The following test scripts are available.

| Name of test file	Functions
Basic_Test Max-Min 5m.bptts	V'max – 2 minutes V'min – 2 minutes
Test_0 CAV (Open-Max-Min-Close) 8m.bptts	Open – 1 ½ minutes V'max – 2 minutes V'mid – 2 minutes V'min – 2 minutes Close – 1 ½ minutes
Test_Max-75-50-25-Min-Close 3h.bptts	Open – 2 minutes V'max – ½ hour Set point 75% – ½ hour Set point 50% – ½ hour Set point 25% – ½ hour V'min – ½ hour
Test_Max-Auto-Min 9m.bptts	V'max – 3 minutes Auto – 3 minutes V'min – 3 minutes
Test_Max-Auto 6m.bptts	V'max – 3 minutes Auto – 3 minutes
Test_Max-Mid-Min 9m.bptts	V'max – 3 minutes V'mid – 3 minutes V'min – 3 minutes
Test_Max-Min-Max[1_Percent] 37m.bptts	Set point 100% – 2 minutes (and subsequently in 1% steps) Set point 99%...0% – per 10 seconds Set point 1%...100% – per 10 seconds
Test_Max 3m.bptts	VMax – 3 minutes
Test_Open-Max-75-50-25-Min-Close22m.bptts	Open – 3 minutes V'max – 3 minutes Set point 75% – 3 minutes Set point 50% – 3 minutes Set point 25% – 3 minutes V'min – 3 minutes

4.3 Reading out sensors and switches

The values of integrated sensors and switches can be read out in MP mode. This function, however, must be activated in advance in the PC-Tool options under "VAV-Compact module". Select Tools ▶ Options in the main menu.
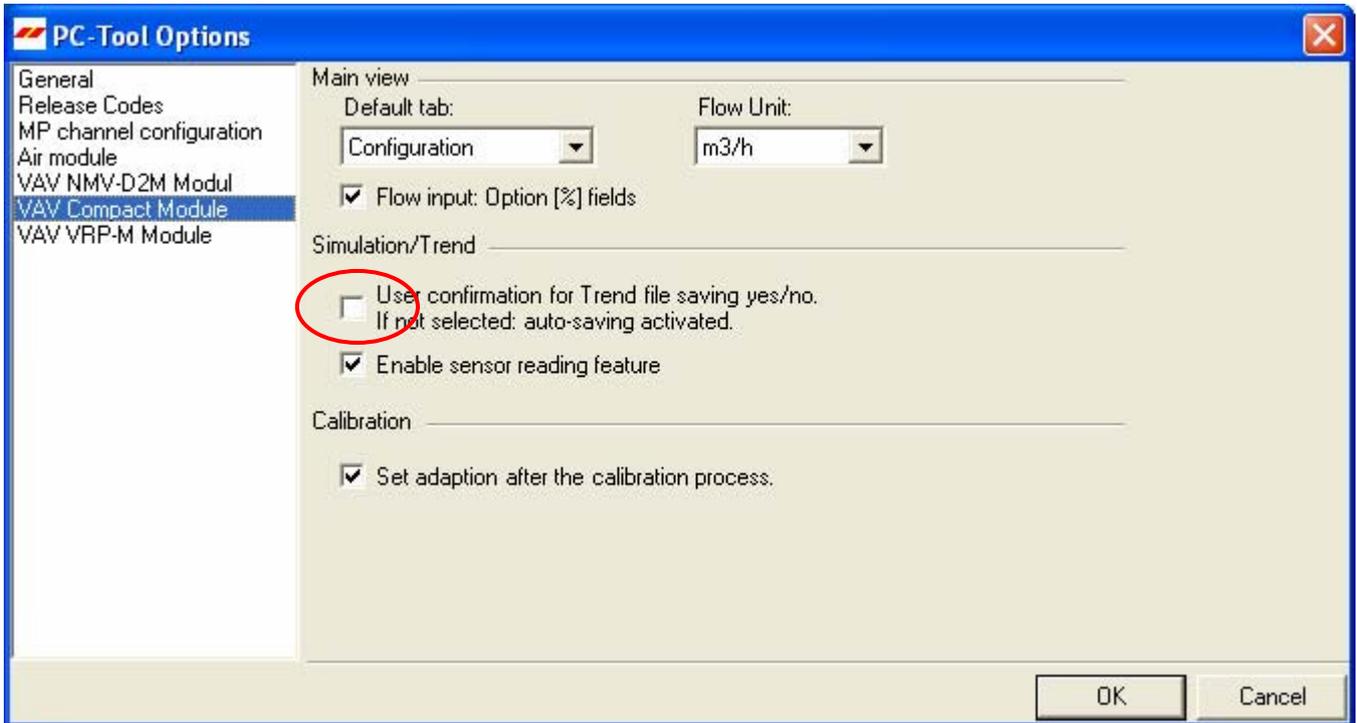
Settings for reading out sensors

On the Service tab, a section with the sensor values is displayed to the right of the actuator control.
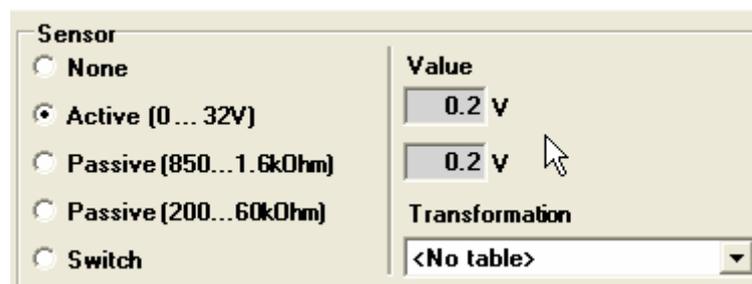
Sensor display in MP mode

Select the type of the connected sensor with the radio buttons. The value is displayed in volts (active), in ohms (passive) or as on/off (switch).

The transformation table allows you to additionally convert the raw value of the sensor into the corresponding measuring quantity (temperature etc…). (See the "Transformation table" chapter in the General User Manual.)

4.4 Recording a trend

During a simulation, the progress of the set points and actual values can be displayed in a plot. The values are stored in a trend file and can be displayed again later. You can also add any comment texts you like.

In the PC-Tool options for the VAV-Compact module, you determine whether the trend file should be automatically stored when the recording has finished (checkbox not selected) or whether the program should ask you first.
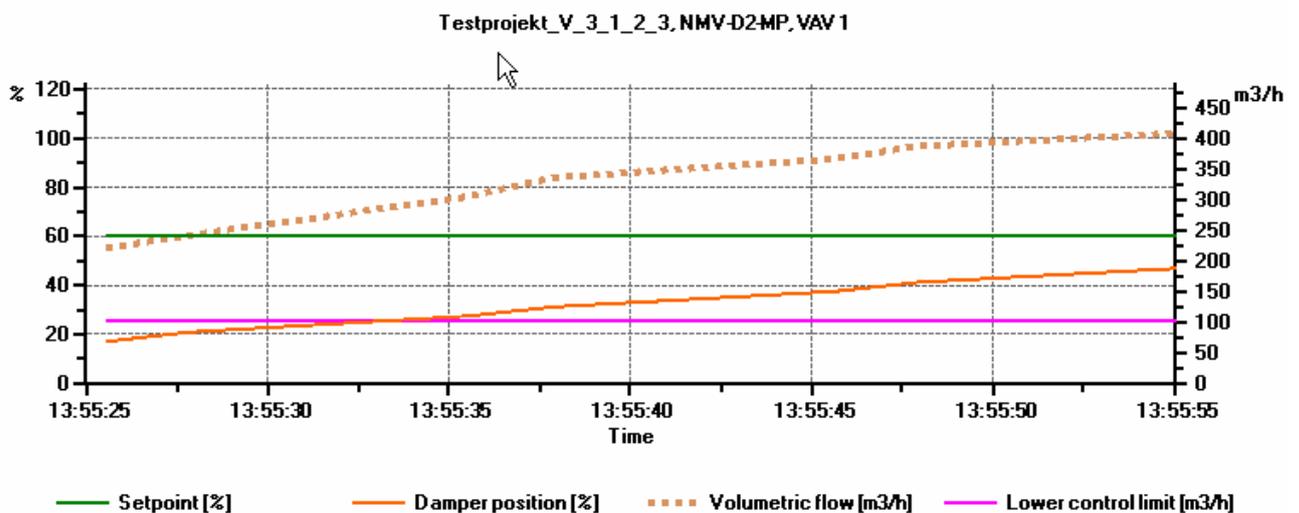
Trend Record ●

Click the "Trend Record" button during the simulation. The display changes to a "flat" button. The recording stops when you click again.

Trend Record ■

The position is queried every second by default. You can change the query interval in an input field. The permitted values are 0 to 9999 seconds, whereby the value 0 means "no waiting time" (query as quickly as possible).
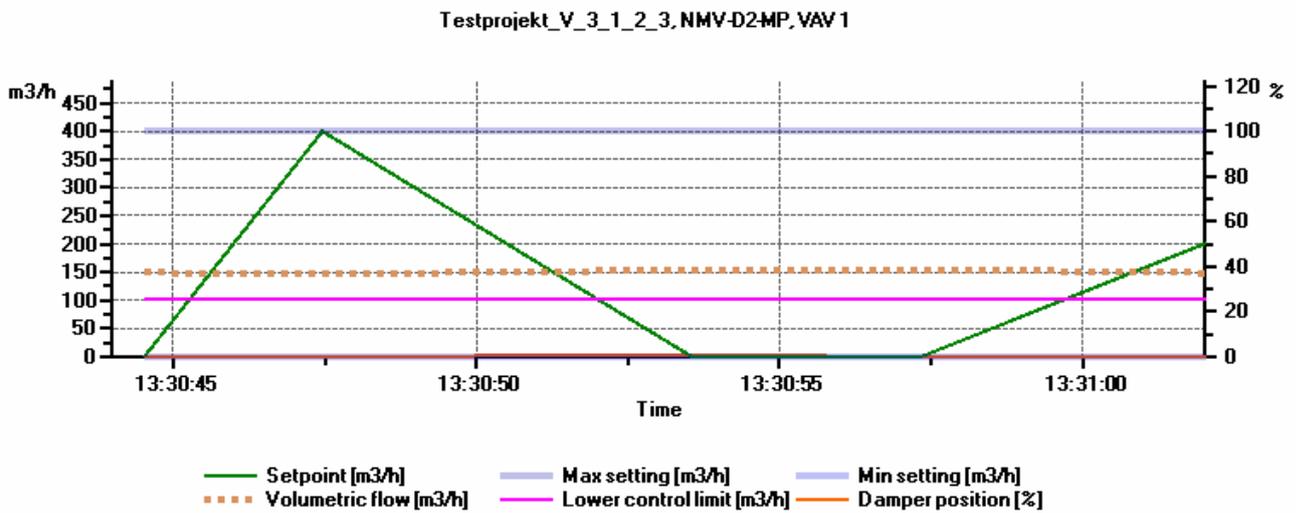
Trend plot for "VAV-CAV" control type

Trend plot for "open loop" control type

The Comment button allows you to enter a text at a defined time and the text is then stored in the trend file.

If you want to record a trend for more than one hour (long-term trend), enter a value of at least 2 seconds for the interval. If the interval is shorter, too many data points will result and the time for correcting the curve between queries may no longer be sufficient.

5 PC-Tool options for VAV module

Select Tools ▶ Options in the main menu.

Variant   Click the right mouse button on the program icon in the outline bar and select "Options".
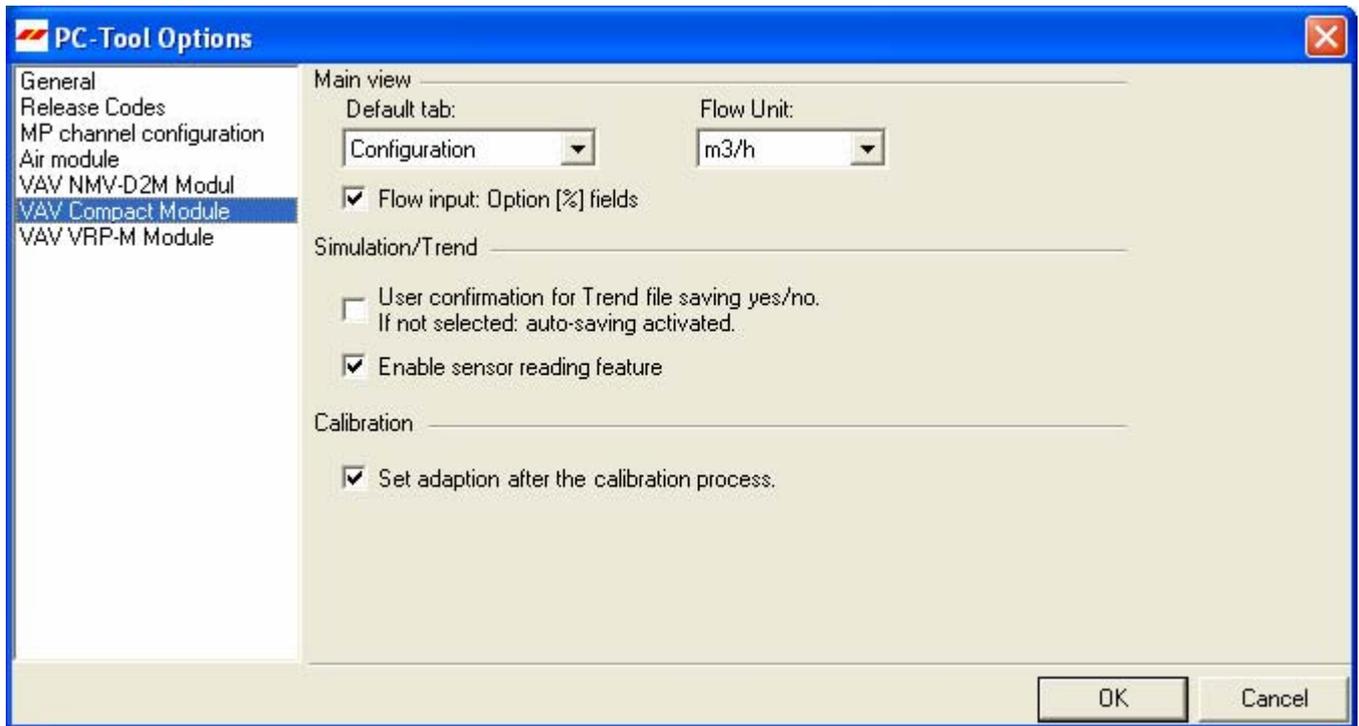
Dialog for basic settings (VAV-Compact module)

Click "VAV Compact Modul" on the left.

Main view

Using the combobox "Default Tab", you can select the index card you want to open by default when starting the program.

Using the combobox "Flow Unit", you select the physical units for the volumetric flow:
- m³/h (cubic meters per hour)
- l/s (liters per second)
- cfm (cubic feet per minute)

If you want to optionally enter the volumetric flow as a percentage, select the "Flow input: Option [%] fields" checkbox.

Simulation / Trend

Use the top checkbox to determine whether the trend file should be automatically stored when the recording has finished (checkbox not selected) or whether the program should ask you first.

You can activate the function for reading out the sensors with the bottom checkbox.

PC-Tool V3.x Water module

for globe valve actuators

User manual

English

1 Actuators for globe valves (Water module)

The current version of the program (PC-Tool 3.x) does not support this type of actuator yet. If you have installed the previous version (PC-Tool 2.1), you can use this instead.

This device is not supported by the current version of PCTool. You can use PC-Tool V2.1 to work with this device.
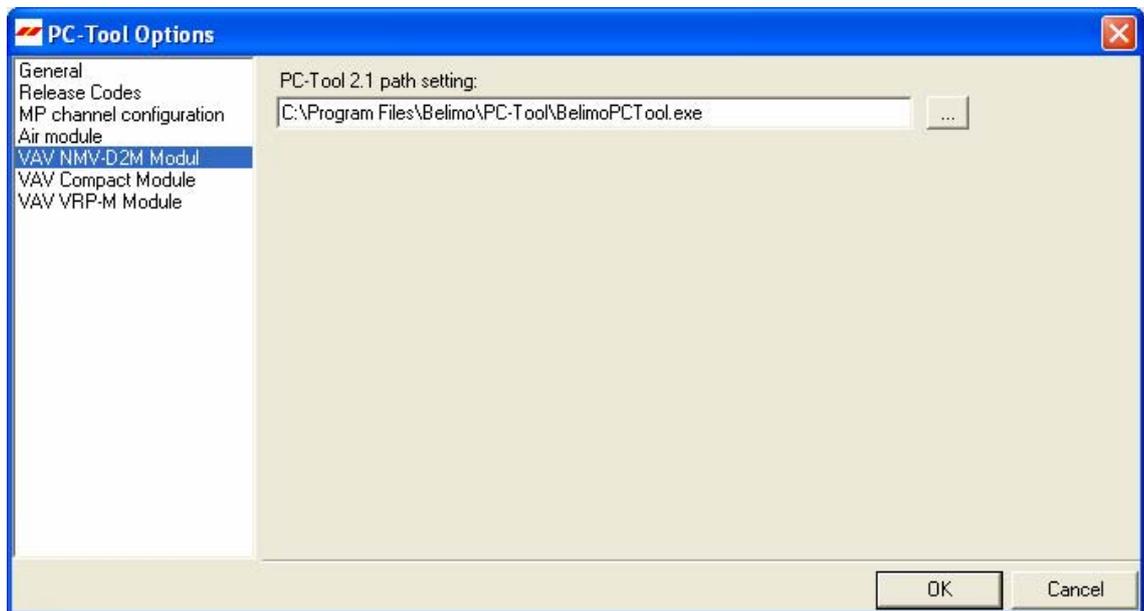
Run PC-Tool V2.1

In order to run PC-Tool V2.1 the current channel to the MP-bus has to be closed.
To continue working with this version of PC-Tool:
1) Close external tool
2) Choose 'Open' in the context menu of the channel in the tree

Switch-over option for non-supported actuators

To enter the storage location of the program PC-Tool V2.1, select Tools
▸ Options in the main menu. Mark the NMV-D2M module.

Variant   Click the right mouse button on the program icon in the outline bar and select "Options".

PC-Tool Options

General
Release Codes
MP channel configuration
Air module
VAV NMV-D2M Modul
VAV Compact Module
VAV VRP-M Module

PC-Tool 2.1 path setting:

C:\Program Files\Belimo\PC-Tool\BelimoPCTool.exe   ...

OK   Cancel

PC-Tool settings for Water module

To prevent a conflict from occurring at the serial interface of the computer, the MP-Channel is closed during the switch-over.

You have to open the MP-Channel again if you want to continue working with PC-Tool 3.x. To do this, click the right mouse button on the MP-Channel in the overview bar and select Open in the pop-up menu.

PC-Tool V3.x VAV NMV-D2M module

for VAV controllers

User manual

English

1 Actuators for VAV controllers NMV-D2M

The current version of the program (PC-Tool 3.x) does not support this type of actuator yet. If you have installed the previous version (PC-Tool 2.1), you can use this instead.

This device is not supported by the current version of PCTool. You can use PC-Tool V2.1 to work with this device.
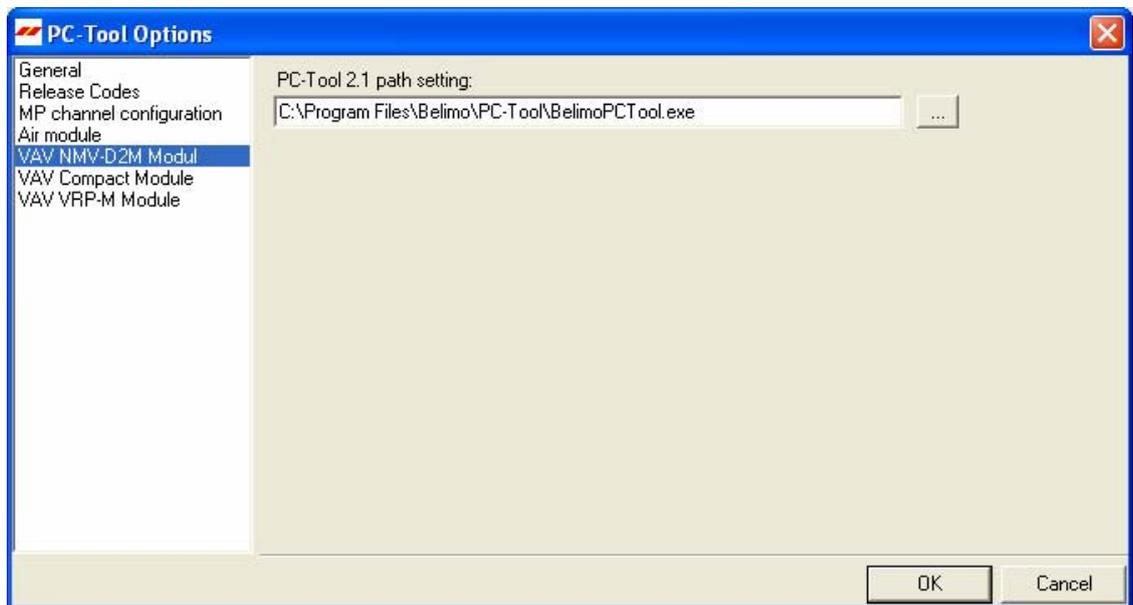
Run PC-Tool V2.1

In order to run PC-Tool V2.1 the current channel to the MP-bus has to be closed.
To continue working with this version of PC-Tool:
1) Close external tool
2) Choose 'Open' in the context menu of the channel in the tree

Switch-over option for non-supported actuators

To enter the storage location of the program PC-Tool V2.1, select Tools ▸ Options in the main menu. Mark the NMV-D2M module.

Variant   Click the right mouse button on the program icon in the outline bar and select "Options".

PC-Tool settings for VAV NMV-D2M module

To prevent a conflict from occurring at the serial interface of the computer, the MP-Channel is closed during the switch-over.

You have to open the MP-Channel again if you want to continue working with PC-Tool 3.x. To do this, click the right mouse button on the MP-Channel in the over-view bar and select Open in the pop-up menu.

PC-Tool V3.x VAV VRP-M module

for VAV controllers

User manual

English

1 Actuators for VAV controllers

The program (PC-Tool 3.x) does not support this type of actuator.
If you have installed the VRP-M Tool you can use this instead.

The VRP-M controller is not supported by the PC-Tool V3.x.
You can start now the VRP-M Tool to work with this device.

Run VRP-M Tool

The MP-Strang gets closed during the start from the VRP-M Tool.

To continue PC-Tool V3.x:
1) close the VRP-M Tool
2) 'open' the MP-Strang (A right on the MP-Channel icon opens the menu).

Switch-over option for non-supported actuators

To enter the storage location of the VRP-M Tool program,
select Tools ▶ Options in the main menu. Mark the VRP-M module.

Variant   Click the right mouse button on the program icon in the outline bar and select
"Options".

PC-Tool settings for VAV VRP-M module

To prevent a conflict from occurring at the serial interface of the computer, the
MP-Channel is closed when the switch-over occurs.

You have to open the MP-Channel again if you want to continue working with PC-
Tool 3.x. To do this, click the right mouse button on the MP-Channel in the over-
view bar and select Open in the pop-up menu.