

Operating manual

APT-COM™ 4 Multi Management Software

- ▶ Basic Edition
- ▶ Professional Edition
- ▶ GLP Edition

Multi Management Software
for temperature chambers from BINDER GmbH

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Notes on the operating manual

The following symbol indicates important information. Please consider these notes for optimal system function:

 Important note. Please note.

 Reference to further information.

This manual was created for the software version current at the time of printing.

Because updates of the software are issued regularly, it is possible that the operation of your software, in particular following the downloading of updates from the Internet, may deviate from the operation described here. Correspondingly, deviations in the illustrations are also possible, especially with regard to the represented version number, as this changes with each update.

The operating manual nonetheless remains valid until the publication of the subsequent edition.

In the event of questions or unclear matters concerning the operation of the software, please contact our Service.

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Please feel free to send us suggestions and ideas for corrections by e-mail.

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1. Product description

1.1 Functional description of the APT-COM™ 4 Multi Management Software

APT-COM™ 4 is a software for recording, programming and monitoring BINDER simulation chambers.

Editions: Depending upon the requirements, the BASIC, PROFESSIONAL, or GLP edition can be used. The functional scope extends from simple recording management through the management of up to 100 connected environment simulation chambers to manipulation-proof documentation of the recording values pursuant to the GLP/GMP guidelines, which correspond to the requirements of the FDA guideline 21 CFR 11.

The **chamber overview** provides a clear chamber system with several identification filters in a simple, intuitive menu. Several chambers can be created in one step. Recordings can be started with a click.

The **floor plan** is easily created by users themselves. The chambers are placed on an image file of the room in the background and can be quickly found and configured.

All recordings are available at a glance in the **recording overview**. The graphic representation of the recordings can be adapted, scaled, supplemented with notes, displays alarms and enables the selection of a section. The recordings of several chambers can be superimposed on one another as a meta-recording, and thus compared directly.

Three access hierarchies are available for **user management**. The assigning of user names and passwords conforms with 21 CFR 11. A blocking function ensures security against unsupervised software operation. Every user has the possibility of **individual configuration** with own profile settings. This encompasses, for example, the choice of language.

The **reminder and timer function** allows setting reminders with a comment field. The created comment is displayed upon expiration of the entered time. In addition, you can stop a recording and / or have a report created at this time.

The **program function** offers simple and fast programming possibilities through a graphic interface and manual entry of values in tabular form. Because the parameters for the chamber system are already recognized, the exceeding of limit values is eliminated.

Reports can be individually configured and created manually or automatically for the protocol issue of the recordings. They contain a customer-specific cover sheet and a free selection of graphic and tabular representations, alarms and notes, as well as the incorporation of photos.

Alarms are protocolled and can be confirmed in the **event overview**. A GLP-compatible **system log** documents all system interventions.

The **AlarmCenter** software (GLP-Edition) provides a control room function via TCP/IP: Parallel security level through a second monitoring computer in the network with independent monitoring software.

1.2 Delivery package of the APT-COM™ 4

The installation file of the APT-COM™ 4 Multi Management Software is available as a download, or optionally also a USB stick.

The following is installed:

- APT-COM™ 4 Multi Management Software
- GLP-Edition: "APT-COM 3-Import-Tool" to import recording data from APT-COM™ 3 into APT-COM™ 4
- With GLP Edition: Installation of the AlarmCenter software on the same computer as APT-COM or on a second computer (control room), from which the chambers are monitored. Optional Alarm-Kit hardware for alarm transmission.

Operating manuals (Order numbers in brackets) in pdf format:

- APT-COM™ 4 manual (7001-0378)
- "Converter RS232 / RS422-RS485 W&T" manual (7001-0101)
- "Converter USB / RS422-RS485 W&T" manual (7001-0168)
- "Converter Ethernet / RS422-RS485 W&T" manual (7001-0068)
- "Converter RS485 / RS422 W&T" manual (7001-0332)
- "Alarm-Kit" manual for "Alarm-Kit" hardware (7001-0379)

1.3 Program variants BASIC / PROFESSIONAL / GLP Edition

APT-COM™ 4 Multi Management Software is available in three different equipment variants: Basic Edition, Professional Edition, and GLP Edition.

1.3.1 APT-COM™ 4 BASIC Edition

The objective of the APT-COM™ 4 Basic Edition is the simple recording of data from 5 BINDER temperature chambers and the issuing of the recordings (tabular + graphic). The chambers are connected to a PC for bidirectional data exchange and remote controlled.

- Multilingual user interface (German, English, French, Spanish, Italian)
- Connection of 5 BINDER temperature chambers with interface RS232 (CVC 3000), RS422, RS485, or Ethernet to a PC or integration into an Ethernet network
- Remote control of the connected chambers: Setpoint value specification via PC
- Chamber management (create, archive, delete) with central chamber overview, graphic, and tabular
- Recording management (create, start, pause, end, archive, delete)
- Graphic and tabular representation of the recording values (temperature, humidity, pressure, CO₂ or O₂ concentration, fan speed), and alarms
- Graphic and numerical program editor
- Documentation and manual issuing of the recordings as a configurable report
- Documentation in the event that configurable tolerance limits are exceeded
- Block function (software lock) against unsupervised operation
- Optional program execution via APT-COM™
- Saving of the recordings in a manipulation-proof database
- Alarm message via e-mail. E-mail notification in the event that recording value limits are exceeded/not reached and for a restart of the APT-COM 4

1.3.2 APT-COM™ 4 PROFESSIONAL Edition

All functions of the BASIC Edition, plus:

- Central management of up to 100 connected chambers simultaneously
- Central overview of all chambers in a floor plan
- Setting of tolerance band limits, including documentation when exceeded
- User management and password protection, various authorizations of users (“Basic,” “Advanced”, “Administrator”)
- Automatic, timed issue of the recording values
- Reports for subsequent processing/archiving
- Automatic/manual backup and recovery

1.3.3 APT-COM™ 4 GLP Edition

All functions of the BASIC and PROFESSIONAL Editions, plus:

- Documentation of the recording values in a manipulation-proof file pursuant to the GLP/GMP guidelines
- Documentation of all system interventions as part of an audit trail
- GxP-compatible password protection

- Validatability pursuant to 21 CFR, Part 11 in the system including validation documents
- Electronic signatures
- Central overview of all chambers and control room functions via TCP/IP with “AlarmCenter” monitoring software. Parallel security level due to a second monitoring computer located in the network with independently functioning monitoring software.
- Remote alarm system via e-mail and/or with alarm kit option: Alarm contact. Documentation and remote alarms for exceeding of limit values and communication problems. Extensive possibilities for forwarding trouble reports through alarm contact by way of customer building notification systems, telephone network and e-mails, as well as remote monitoring of all recordings via web browser.
- These functions are not prescribed for the fulfillment of guideline 21 CFR 11. The usage of these functions requires possibilities for communication between the recording computer and other computers in the intranet or in the Internet. Depending upon the security philosophy of the operator and the related restrictions within the local network and possibilities for connection with the Internet, these functions can be used or must remain consciously omitted.
- Import of data from APT-COM™ 3
- Backup and recovery function of all data (recordings, system log (=trace file) etc.) on any network drives.
- Use of existing Ethernet network lines for connection between the recording computer and chambers with RS422 or RS485 interface through one or more COM servers (optional module).
- System log: documentation of all system interventions with user names and time stamp as an important part of an audit trail in addition to the commentable recording data
- Access to the APT-COM™ 4 is secured through the assignment of unique user names, each with an individual and secret password. The recording data and system settings are saved in an encoded, manipulation-proof database format pursuant to the GLP/GMP guidelines. These functions can be validated and correspond to the requirements of the FDA guideline 21 CFR, Part 11.
- All system interventions are documented through the creation of an automatic system log.

1.4 Reference to previous APT-COM™ versions

1.4.1 Overview of versions

APT-COM™ 4 Multi Management Software (since 2018)

APT-COM™ 4 Multi Management Software is not an update of APT-COM™ 3 DataControlSystem, but rather a completely new program.

! Chambers with the controllers SM, DICON 1000 (D2), DICON 1001 (PD2), and RD2 are not supported by APT-COM™ 4.

In the case of already existing networking of chambers with these controllers, we recommend retaining the setup with APT-COM™ 2 (RD2) or APT-COM™ 3.

The earlier program versions APT-COM™ 2 and APT-COM™ 3 remain unaffected by the installation of the APT-COM™ 4 Multi Management Software on the same computer. **Simultaneous** operation of earlier versions together with APT-COM™ 4 from the same PC and with the same chambers is, however, **not** possible.

GLP-Edition: The program “APT-COM 3-Import-Tool” (Ch. 13) permits importing recording data from APT-COM™ 3 into APT-COM™ 4.

APT-COM™ 3 DataControlSystem (2003-2018)

APT-COM™ 3 DataControlSystem is not an update of APT-COM™ 2, but rather a new program. Previous APT-COM™ 2 versions remain unaffected by the installation of APT-COM™ 3 on the same PC. A tool for program import from APT-COM™ 2 into APT-COM™ 3 is available through the program editor. Users of APT-COM™ 2 must thus receive the software in order to have the raw data created thus ready to call up at all times. Simultaneous measurement or control operation of APT-COM™ 2 together with measurement or control operation of APT-COM™ 3 from the same PC and/or with the same chambers is not possible. Please address questions concerning the status of the further development of the software to aptcom3@binder-wold.com or inform yourself under www.binder-world.com.

APT-COM™ 2 (1999 – 2002)

For the networking of chambers with RD2 controllers with the APT-COM™ 2, the corresponding hardware prerequisites for the computer are to be observed. The computer should be an older model in order to ensure problem-free communication. Recommended here, for example, a computer of the Pentium 2 class with WINDOWS NT4 as operating system. WINDOWS XP makes high requirements of computer performance and can therefore not be used. WINDOWS 2000 cannot generally be recommended for use with APT-COM™ 2. Systems with computers of the Pentium 2 and 3 classes of up to 800 MHz generally function, but faster systems no longer function.

1.4.2 New in APT-COM 4 Multi Management Software

For improvements see functional overview in Ch. 1.1

- Management of up to 100 environment simulation chambers
- Simple recording management
- Encoded database: High degree of encoding for a high level of security against manipulation
- User management with various access rights: Graduated usage rights for system configuration and handling for the control and recording data recording of individual chambers
- Automatic system log: All changes to the system configuration are saved with user names and time stamp in a file. Alarm messages and instructions provided by the system to the user are protocoled. The system log is saved in an encoded database file and can be secured with the backup function.
- Commentable recording data: Any running recording can be commented by hand at any time. The comments are an unalterable part of the raw data and are encoded, saved, and backed up together with this. Together with the automatically created system log, this thus results in a central element of an audit trail secured against retroactive manipulation.
- Recordings possible through USB camera: can be created automatically and incorporated into the recording protocol. In this way, changes to the chambers, such as door openings, changes to the setpoint values, recharging, interruptions of the recording sequence, etc. can be directly commented.
- Parallel security level (GLP Edition): A second computer connected with the recording computer via a network monitors correct communication between the recording computer and the chambers connected to it with a special monitoring program, as well as the observance of adjustable limit values for the recorded recording data. This monitoring computer can issue alarm messages via a building notification system and send alarm e-mails.
- Expanded backup (GLP Edition): Not only the recording database is backed up, but also the database of the automatic system log and all system settings that were active at the point in time of the backup. This makes it possible at any time to reconstruct the system as it was at the point in time at which the backup was created.
- E-mail service (Professional and GLP Edition): The user can be informed about the progression of his recordings and any instruction and alarm messages arising by e-mail and SMS. To this purpose you require an e-mail/SMS gateway, which can be made available by an e-mail provider. Please inquire with your provider about conditions and possible additional costs.

- Web server function (Professional and GLP Edition) : The recording computer can represent the current progression of the recording on a web page. This means that the progression of the recordings can be traced on other computers in the intranet via a web browser.

Please feel free to inform us of any other wishes you might have. We always do our best to improve our products in keeping with the wishes of our customers.

1.5 Directory of open source software components

The APT-COM™ 4 software uses the open source software components listed below.

Download sources and license conditions:

- File "Disclosure_APTCOM4.md", available in the APT-COM installation directory "Bin"
- qopen62541utils <https://github.com/qt/qtopcua.git>
- qsqlcipher-qt5 <https://github.com/sjemens/qsqlcipher-qt5>
- qtopcua <https://github.com/qt/qtopcua.git>
- qtwebapp <http://stefanfrings.de/qtwebapp/QtWebApp.zip>
- quazip <https://github.com/stachenov/quazip>

2. Preparation of the chambers for networking

A maximum total of 100 chambers with the RS422/ RS485 or Ethernet interface and the vacuum controller CVC3000 with the RS232 interface can be connected.

A complete list of all chambers supported by APT-COM 4 can be found at the end of this manual, see Ch. 15.1.

2.1 Addressing of the chambers with RS422 or RS485 interface

All chambers with RS422 or RS485 interfaces are connected with the computer by the same control and notification lines. In order that the software can address individual chambers in a targeted fashion. You must provide these with individual addresses in your network. The number of addresses available in the chamber controller may differ depending upon the controller type. The same address as in the controller must be assigned on the software side.

The address assigned individually at the controller will later be indicated for the chamber configuration in APT-COM™ 4. The factory setting for the chamber address is 1.

! The addresses must be assigned on the chamber controller before connection with the APT-COM computer.

! Addresses may not be assigned twice.

The procedure for setting the address differs depending upon the controller type.

Chambers with RS422 interface (standard or optional)	Controller
BD (E2), BF (E1), ED (E2), FD (E2 to 12/03), FED (E2)	R3 / R3.1 / R3.2
CB (E2, E3), KBF (E2, E3, E5x), KBF ICH (E2, E5x), KBF P (E5x), KBF LQC (E5x), KBWF (E2, E5x), KMF (E5x), M (E2), MDL (E2), MK (E2, E3x), MKT (E1, E3x), MKF (E1, E3x), MKFT (E3x)	MB1
FDL (E2x), FP, KB (E3x, E5x), KBW (E3x, E5x), VD (E2x), VDL (E2x)	RD3
CB (E6x), KT (E6x)	T 4.12 (BCW)

Chambers with RS485 interface (optional)	Controller
CB (E7), KBF (E6), KBF P (E6), KBF LQC (E6), KBW (E6), KBWF (E6), KMF (E6), MK (E4, E5), MKT (E4, E5), MKF (E4, E5), MKFT (E4, E5)	MB2

In the following you will find a brief overview of the address setting of various controller types



Please find the detailed instructions for setting the address in the operating manual of the respective chamber.

R3 / R3.1 / R3.2 controller

Hold key "X/W" pressed for approx. 5 seconds ► Display alternately shows "unit" and temperature unit ► Press "X/W" key again ► Display alternately shows "rASd" and setpoint value gradients ► Press "X/W" key again ► Display alternately shows "Adr" and the current setting for the chamber address ► Set the desired address from 1 to 30 with the arrow keys. The value set is automatically adopted after approx. 2 seconds.

RP1 controller

Normal display ► Press the "EXIT" and "MODE" keys simultaneously for 3 seconds ► Select "OP.U" with arrow keys ► Press "MODE" key ► Enter password ► Press "MODE" key ► Select operating function "Ad.r" with arrow keys ► Enter address (1 to 254)

MB1 controller

Normal display ► Press "CONFIG" key ► Menu "User-settings" ► Select "Instrument data" menu ► Press ENTER key ► Select "Address" ► Enter address (1 to 254)

MB2 controller

Main menu ► "Settings" ► "Serial interfaces" ► "Chamber address" ► Enter address (1 to 254) ► Confirm entry with 

RD3 controller

Normal display ► Press "X/W" key for 5 sec. ► Menu "PROGRAM EDITOR" ► Press "X/W" key for 5 sec. ► Menu "USER LEVEL" ► Press program key ► Menu "UserCod?" ► Enter user code ► Menu "Adress" ► Enter address (1 to 254) ► Press EXIT key or wait 120 sec.

T 4.12 (BCW) controller

Start view ► Press "Menu" key ► Select "Settings" menu ► Select menu point "RS 422 address" ► Enter address (1 to 254)

2.2 Chambers with Ethernet interface

Several steps are required to integrate BINDER chambers with an internal Ethernet interface into an Ethernet network.

2.2.1 Testing addressing on the chamber controller

No addressing on the chamber controller needs to be carried out for connection of the chambers with internal Ethernet interfaces. The chamber address should be 1 (Default setting). It must be identical in APT-COM™ 4 and on the chamber controller. The chamber is identified by APT-COM™ 4 by way of its MAC address in the network.

The procedure for checking the address differs depending upon the controller type.

Chambers with Ethernet interface (standard or optional)	Controller
BD (E3), ED (E3), FD (E3), BF (E3), FED (E3)	R4
C150 (E1 to 12/09), UF V (E1x, E2x).	RP1
CB (E3), KBF (E3, E5x, E6), KBF ICH (E3, E5x), KBF P (E5x, E6), KBF LQC (E3, E5x, E6), KBWF (E5x), KMF (E5x, E6), M (E2), MDL (E2), MK (E3x, E4), MKT (E1, E3x), MKF (E2, E3x, E4), MKFT (E3x)	MB1
KB (E5x), KBW (E5x),	RD3
C (E7), CB-S (E7), FP (E3.1), KB ECO (E6.2), KBF-S (E6), KBF-S ECO (E6), UF V (E3), VD (E3.1), VDL (E3.1)	RD4
CB (E6), KB (E4, E6), KT (E6x): No chamber address check required	T 4.12 (BCW)
CB (E7), KBF (E6), KBF P (E6), KBF LQC (E6), KBW (E6), KBWF (E6), KMF (E6), M (E3.1), MK (E4, E5), MKT (E4, E5), MKF (E4, E5), MKFT (E4, E5), VD (E3.1), VDL (E3.1)	MB2

In the following you will find a brief overview of the address setting of various controller types



Please find the detailed instructions for setting the dress in the operating manual of the respective chamber.

RP1 controller

Normal display ► Press the “EXIT” and “MODE” keys simultaneously for 3 seconds ► Select “OP.U” with arrow keys ► Press “MODE” key ► Enter password ► Press “MODE” key ► Select operating function “Ad.r” with arrow keys ► Check address

MB1 controller

Normal display ► Press “CONFIG” key ► Menu “User-settings” ► Select “Instrument data” menu ► Press ENTER key ► Select “Address” ► Check address.

MB2 controller

Main menu ► “Settings” ► “Serial interfaces” ► “Chamber address” ► Check address

RD3 controller

Normal display ► Press “X/W” key for 5 sec. ► Menu “PROGRAM EDITOR” ► Press “X/W” key for 5 sec. ► Menu “USER-LEVEL” ► Press program key ► Menu “UserCod?” ► Enter user code ► Menu “Adress” ► Check address

2.2.2 Display MAC address of the chamber

Each chamber with an Ethernet interface is identified by APT-COM™ 4 by way of its MAC address in the network.

Chambers with the controllers RP1, MB1, RD3: The MAC address is found on a sticker next to or beneath the Ethernet interface.

Chambers with the controllers R4, RD4, T 4.12 (BCW), MB2: The MAC address can be found in the respective controller menu.

In the following you will find a brief overview of the display of the MAC addresses of various controller types



Please find the detailed instructions in the operating manual of the respective chamber.

R4 controller

Normal display ▶ 5 x (chambers without fans) or 6 x (chambers with fans) Press up arrow ▶ Press **OK** key ▶ Enter password and press **OK** key ▶ 5 x up arrow ▶ “Ethernet” ▶ Press **OK** key ▶ “MAC-High” ▶ Press **OK** key ▶ “MAC-Med” ▶ Press **OK** key ▶ “MAC-Low”

RD4 controller

Normal display ▶ Press 2 x down arrow ▶ “Chamber info” ▶ Press **OK** and 4 x down arrow ▶ “Ethernet” ▶ Press **OK** key ▶ “MAC address” ▶ Press **OK** key

T 4.12 (BCW) controller

Start view ▶ Press “Menu” key ▶ Select “Settings” menu ▶ Select “Network settings” menu ▶ Select menu point “MAC address”

MB2 controller

Main menu ▶ “Chamber info” ▶ “Ethernet”

2.2.3 Identification of the Ethernet interface used

BINDER chambers with internal Ethernet interface can contain 2 different components, which can be seen from the MAC address: The first 6 places of the MAC address describe the identifier of the manufacturer (OUI = Organizational Unique Identifier):

- In the case of some older chambers with RD3 and MB1 controllers, a **W&T interface** was used: MAC address 00-C0-3D-xx-xx-xx. In this case, networking can take place as described under Ch. 3.2.5.



The precise configuration is described in the connection instructions for Art. No. 7001-0068 for the Ethernet / RS422-RS485 W&T converter. Download under www.binder-world.com.

- **Lantronix interfaces** are generally used with chambers with the RD3 and MB1 controllers: MAC address 00-20-4A xx-xx-xx

You can use the **Lantronix DeviceInstaller** with these chambers (Ch. 2.2.4).

BINDER chambers equipped with T4.12 (BCW), MB2, RD4, R4 controllers are equipped with an integrated network interface without any other components. The IP-address can be set in the corresponding controller menu.

2.2.4 Assignment of the IP address

The assignment of an IP address is required to enable communication with the connected chambers. Depending upon the existing Ethernet network type (with or without DHCP server), this can occur in several ways.

! The following settings should be made by the system administrator.

Ethernet network with DHCP server

The DHCP server automatically assigns a valid IP address to the chamber.

Procedure:

1. Connect chamber to the Ethernet network
2. Switch on chamber.
3. The IP address is automatically negotiated between the chamber and the DHCP server. No intervention on the part of the user is necessary here. Depending upon the load of the DHCP server, this procedure can take several minutes.
4. Following successful assignment of the address, when creating the chamber in APT-COM™ 4 you will find the MAC address and the IP address assigned to this chamber in a list box (Ch. 6.1).

Instructions for secure, permanent operation: It must be ensured that the DHCP server always assigns the same IP address to the BINDER chamber. If the IP address changes during operation, this can result in disruptions of communication between the chamber and APT-COM™. Ask the system administrator that administers the DHCP server.

The system administrator generally has at least the following 2 possibilities:

1. Fixed assignment of the IP address to the MAC address in the DHCP server
2. One or several IP addresses are excepted from the automatic IP address assignment of the DHCP server, meaning they are no longer administered by this. In case of chambers with a RD3 or MB1 controller, these IP addresses can be assigned permanently to the respective MAC address with the program **Lantronix DeviceInstaller** (see below). The IP address of chambers equipped with the T4.12 (BCW), MB2, RD4, R4 controllers can be assigned directly via the corresponding menu in the chamber controller.

Ethernet network without DHCP server

! The following settings should be made by the system administrator.

1. Manual assignment of an IP address for the APT-COM™ 4 computer in the operating system of the computer. For Windows® this takes place by way of the control panel.
2. Manual assignment of different IP addresses for each connected chamber. In case of chambers with a RD3 or MB1 controller, we recommend the program **Lantronix DeviceInstaller** to create the IP address. This only applies for the chambers with a Lantronix interface (for identification see Ch. 2.2.3). The IP address of chambers equipped with the T4.12 (BCW), MB2, RD4, R4 controllers can be assigned directly via the corresponding menu in the chamber controller.

Assignment of a defined IP address with the Lantronix DeviceInstaller (XPort Installer)

Lantronix DeviceInstaller Software:

http://txfaq.custhelp.com/app/answers/detail/a_id/644?_ga=2.54616424.2107418292.1537461880-1569161374.1537461880

Lantronix DeviceInstaller User Guide: https://www.lantronix.com/wp-content/uploads/pdf/DeviceInstaller_UG.pdf

In the following you will find an overview of the necessary steps.

! Hint: The program **Lantronix DeviceInstaller** can be updated at any time. Therefore, always be sure to follow the instructions of the manufacturer.

Start the DeviceInstaller.

In order to display the chambers, press the “Search” key with the magnifying glass symbol. The interfaces found are displayed and can be assigned to the chambers on the basis of their hardware addresses (MAC address). To display the MAC address on the chamber or in the controller, see Ch. 2.2.2.

If the IP address is “0.0.0.0”, or if an existing address is to be changed, mark the chamber and then click “**Assign-IP.**”

Select “Assign a specific IP address” (Assignment of a specific IP address). Continue with “Next.” Enter the desired IP settings in the next step. Continue with “Next.” Then select “Assign.” When the assignment is completed, click “Finish.”

! Note the set IP address in order to ensure that no address is assigned twice.

Further settings are not required, the factory settings are appropriate for operation.

3. Connection of the chambers

Vacuum controller CVC 3000

The vacuum controller CVC 3000 with series interface RS232 can be directly connected to a PC or incorporated into an existing network with suitable converters (Ch. 3.1).

Chambers with RS422 or RS485 interface

Individual chambers can be connected to a PC interface with suitable converters. Converters for connection to a series COM interface, a USB interface, or an Ethernet interface are available.

In order to connect several chambers, a plug distributor that can be expanded in modules, each with 10 connections per module, is interposed.

Alternatively, connections via existing Ethernet networks are possible. The recording computer in this case communicates with the Ethernet / RS422-RS485 converter (COM server), to which one or several chambers with RS422 or RS485 interface can be connected directly or via plug distributors.

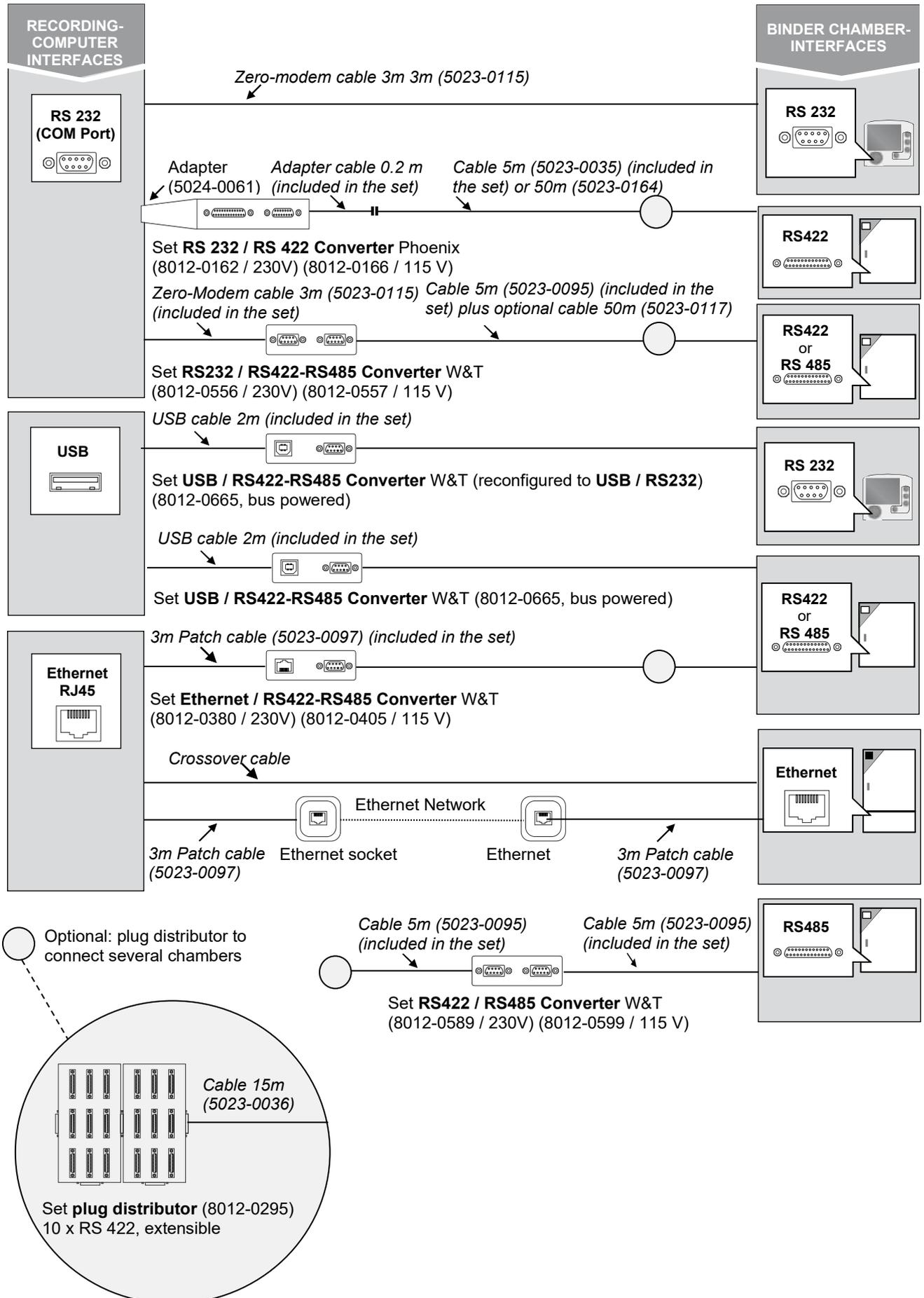
Chambers with Ethernet interface

Chambers with an integrated Ethernet interface can be directly connected to a PC with Ethernet card or to an existing Ethernet network.

Combinations as desired of up to 100 chambers are possible.

! Prior to networking, shut off all chambers and the computer and disconnect the power supply of the chambers.

APT-COM™ 4 network overview



3.1 Vacuum controller CVC 3000

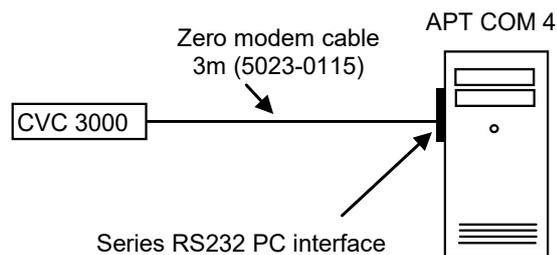
The vacuum controller CVC3000 has a RS232 interface. For the connection of the vacuum controller with a speed-controlled pump stand, please consider the settings on the vacuum controller pursuant to the original instructions of the vacuum controller, as well as the information in the operating manual of the vacuum drying chambers VD (E2.1).

You can directly connect the vacuum controller CVC 3000 to a series RS232 PC interface.

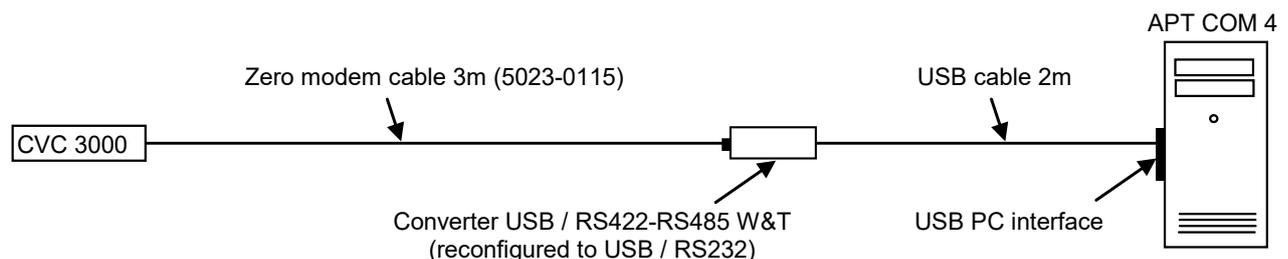
Required hardware:

- Zero modem cable 3 m (5023-0115)

Connection takes place from the connection socket on the pump stand PC3004 Vario via the zero modem cable to the series RS232 PC interface.



To connect to a USB PC interface, use the USB / RS422-RS485 W&T converter, reconfigured to USB / RS232.



3.2 Chambers with RS422 or RS485 interface

The chambers can be connected with the existing PC interface or incorporated into existing networks with suitable converters.

The converters are always to be operated with the provided power adapter.

! In the case of converters with an external power supply, note the correct mains voltage for the power adapter of the converter. The converters are available in varying voltage variants (115 V and 230 V).

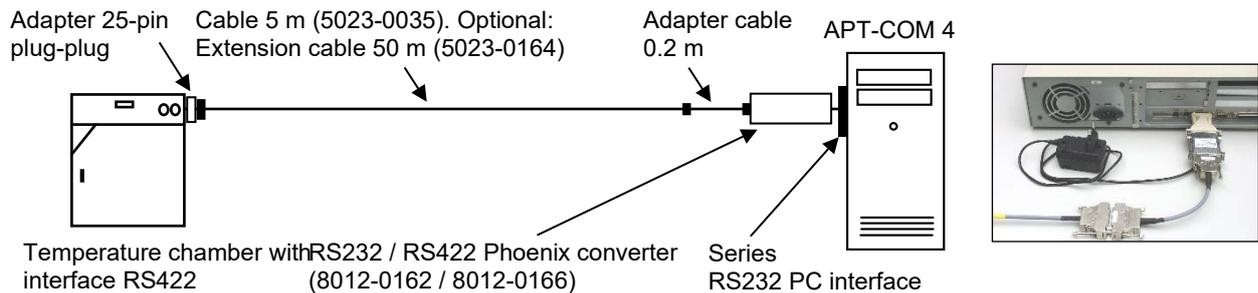
3.2.1 RS232 / RS422 Phoenix converter: Connection to a series RS232 PC interface

The Phoenix converter is no longer available, but can still be used. It is used for connecting chambers with an RS422 interface to a series RS232 PC interface.

Required hardware:

- Set converter RS232 / RS422 Phoenix – 230 V (Art. no. 8012-0162 or 115V (Art. no. 8012-0166):
 - converter RS232 / RS422 with power adapter
 - Adapter cable 20 cm
 - Adapter socket 9-pin to 25-pin plug
 - Connection cable 5 m for connection from the interface converter to a single chamber or to a plug distributor RS422 from BINDER, with adapter 25-pin plug-plug
 - (Optional: Connection cable 50 m (8012-0164), with adapter 25-pin plug-plug.

- For the connection of several chambers: Plug distributor that can be expanded in modules (8012-0295). Several 15 m cables (5023-0036) to the chamber interfaces.



The converter RS232 / RS422 Phoenix requires a 25-pin plug sub-D connection on the computer. If only a 9-pin connection is present or free, connection can take place via an adapter (9-pin socket to 25-pin plug). The connections of a possibly existing RS232 expansion port (CPU module) can also be used.

! The sequence shown must absolutely be observed. Deviations result in error messages.

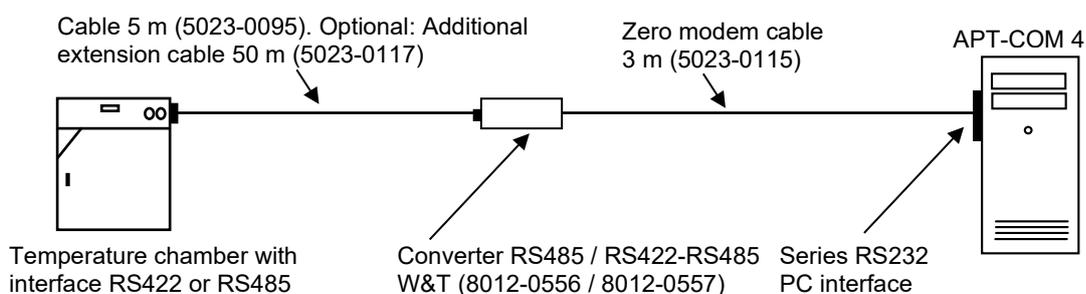
! Check the setting of the sliding switch on the converter RS232 / RS422: Switch (DCE/DTE) in DTE position.

3.2.2 RS232 / RS422-RS485 W&T converter: Connection to a series RS232 PC interface

The converter RS232 / RS422-RS485 is suitable for networking chambers with an RS422 or RS485 interface via a series RS232 PC interface.

Required hardware:

- Set converter RS232 / RS422-RS485 W&T – 230 V (Art. no. 8012-0556 or 115 V (Art. no. 8012-0557):
 - Converter RS232 / RS422-RS485 with original instructions of the manufacturer W&T (only required for problems with commissioning)
 - Zero modem cable 3 m for connection to the RS232 interface
 - Connection cable 5 m for connection from the interface converter to a single chamber or to a plug distributor RS422 from BINDER
 - Instructions for connection of interface converter RS232 / RS422-RS485
- Optional: Extension cable 50 m (5023-0117) for connection of the connection cable 5 m to a single chamber or to a plug distributor RS422 from BINDER
- For the connection of several chambers: Plug distributor that can be expanded with modules (8012-0295), several 15 m cables (5023-0036) to the chamber interfaces.



The precise configuration is described in the connection instructions for Art. No. 7001-0101, which accompany the RS232/ RS422-RS485 converter. Download under www.binder-world.com.

3.2.3 RS485 / RS422 W&T converter: Integration into existing RS422 networks.

The converter RS485 / RS422 is suitable for integrating chambers with RS485 interfaces into existing RS422 networks.

Required hardware:

- Set converter RS485 / RS422 W&T – 230 V (Art. no. 8012-0589 or 115 V (Art. no. 8012-0599):
 - Converter RS485 / RS422 with original instructions of the manufacturer W&T (only required for problems with commissioning) incl. power adapter
 - 2X connection cable 5 m for connection from the interface converter to a single chamber or to a plug distributor RS422 from BINDER
 - Instructions for connection of converter RS485/RS422

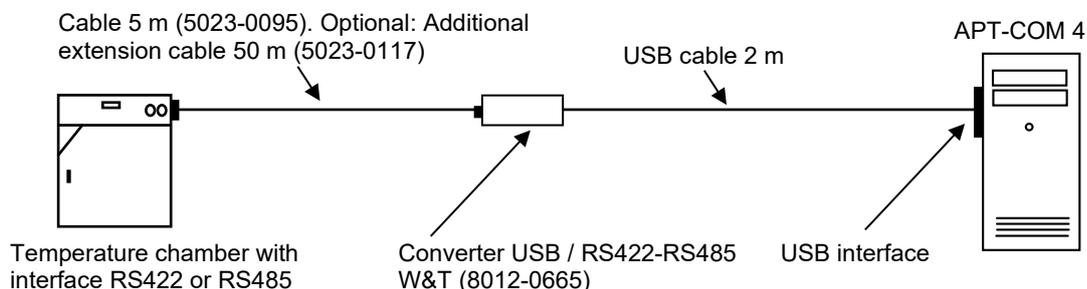
	<p>The precise configuration is described in the connection instructions for Art. No. 7001-0332, which accompany the RS485/ RS422 converter. Download under www.binder-world.com.</p>
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3.2.4 USB / RS422-RS485 W&T converter: Connection to a USB interface

The converter USB / RS422-RS485 is suitable for networking chambers with an RS422 or RS485 interface via a USB interface of the computer.

Required hardware:

- Set converter USB / RS422-RS485 W&T (Art. No. 8012-0665)
 - Converter USB/RS422-RS485 with original instructions of the manufacturer W&T (only required for problems with commissioning)
 - USB cable 2 m for connection to the USB interface of the computer and CD with driver software for Windows 2000, XP.
 - Connection cable 5 m for connection from the interface converter to a single chamber or to a plug distributor RS422 from BINDER
 - Instructions for connection of interface converter USB/RS422-RS485
- Optional: Extension cable 50 m (5023-0117) for connection of the connection cable 5 m to a single chamber or to a plug distributor RS422 from BINDER
- For the connection of several chambers: Plug distributor that can be expanded with modules (8012-0295), several 15 m cables (5023-0036) to the chamber interfaces.



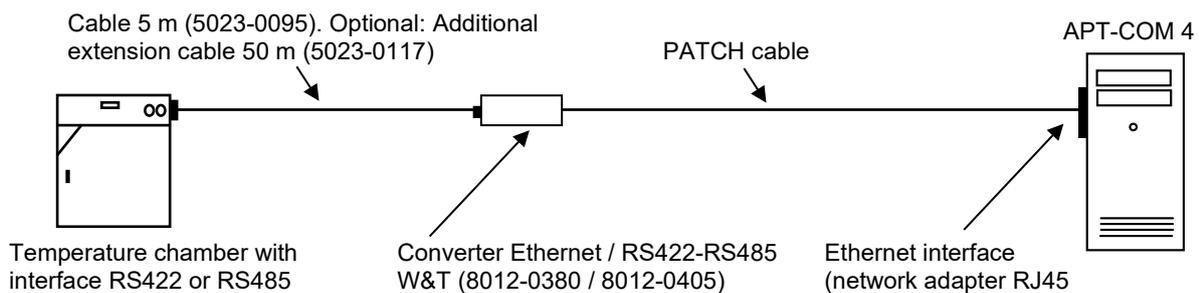
	<p>The precise configuration is described in the connection instructions for Art. No. 7001-0168, which accompany the USB / RS422-RS485 converter. Download under www.binder-world.com.</p>
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3.2.5 Ethernet / RS422-RS485 W&T converter: Connection to an Ethernet PC interface or an Ethernet network

The converter Ethernet / RS422-RS485 is suitable for networking chambers with an RS422 or RS485 interface via an existing Ethernet network. The direct connection of a chamber to an Ethernet-PC interface is also possible.

Required hardware:

- Set converter Ethernet / RS422-RS485 W&T – 230 V (Art. no. 8012-0380) or 115 V (Art. no. 8012-0405):
 - Interface converter Ethernet / RS422-RS485 with original instructions of the manufacturer W&T (only required for problems with commissioning) with power adapter
 - Patch cable 3 m for connection to the Ethernet network
 - Connection cable 5 m for connection from the interface converter to a single chamber or to a plug distributor RS422 from BINDER
 - Instructions for connection of interface converter RS485/RS422
- Optional: Extension cable 50 m (5023-0117) for connection of the connection cable 5 m to a single chamber or to a plug distributor RS422 from BINDER
- The connection to the Ethernet takes place via a RJ45 CAT5/CAT6 cable. A hub / switch or a crossover cable may also be required for connection to the Ethernet. Ask your system administrator about this.



 The precise configuration is described in the connection instructions for Art. No. 7001-0068, which accompany the Ethernet / RS422-RS485 converter. Download under www.binder-world.com.

3.2.6 Use of 50 m extension cables

When connecting several chambers via a plug distributor, the 50 m cable 5023-0017 or 8012-0164 should principally be installed before and not after the plug distributor. When installing after the plug distributor, the wave impedance changes, resulting in reflections in the bus system. When the structural circumstances of the customer allow for nothing else, and the 50 m cable therefore must be installed after the plug distributor, it is necessary to install a repeater between the plug distributor and the 50 m cable for safe operation without problems. A repeater is a signal regenerator that receives a signal, prepares it anew and transmits it again. The RS422 Repeater Art. 5021-0020 “RS422-Isolator Industry (230V)” with cable 5023-0111 was tested by BINDER in the system.

3.3 Chambers with Ethernet interface

In the case of chambers with MB1 controllers, the RS422 interface is the standard or is replaced optionally by an internal Ethernet interface. The additional RS422 interface is provided with the “Service only” sticker and only serves service purposes, meaning not for connection of the chamber to APT-COM 4.

The computer must be equipped with an Ethernet network adapter. Connection to the Ethernet takes place via a RJ45 CAT5/CAT6 cable analog with the connection of a computer to the Ethernet. Ask your system administrator about this. If no network is present, please address your questions to BINDER Service.

4. Installation, updates, deinstallation

4.1 System requirements

Component	Minimum requirement	Recommended	Note
Operating system	Microsoft® Windows® 7 64 Bit (incl. current service pack and patches), Windows® 7 Professional/Ultima/Enterprise	Windows® 10	Also Windows® 11. All other operating systems (e.g. Windows® NT 4.0, Windows® 2000, Windows® XP 64 Bit, Windows® Vista, Windows® 7 Starter, Windows® 8, Windows® Server 20xx, Linux, Android, Mac OS, IOS, etc.) are not supported.
Processor	Dual-core, e.g. Intel® Core 2 Duo or comparable AMD® processor	Quad-core	No processors from the power class "Intel® Atom™" or similar
Random access memory	4 GB RAM	8 GB RAM	
Network connection	100 Mbps	1000 Mbps	100 Mbps is adequate for recording of only a few chambers, dependent upon the recording interval, among other factors
Hard drive	HDD with 7200 RPM min. 500 MB free	SSD min. 500 MB free	Minimum requirement for installation, more memory required for further operation, depending upon number of chambers, recording intervals, etc.
Screen resolution	1280x720 pixel	1400x1050	
Interface	COM port or Ethernet or USB 2.0		for the connection of the chambers
Power supply	Building power supply	Uninterrupted power supply (UPS)	for PC / screen components and possibly power adapter of the converter

Depending upon possible additionally installed software on your system, power requirements higher than the minimum requirements described here may be required. For example, the operation of a virus scanner may significantly reduce the performance of your computer. This can result in slower processing speeds of the APT-COM™ 4 processes; when using many (up to 100) chambers, it may no longer be possible to uphold an update interval of 1 min.

Hints:

Qualification by BINDER can only be carried out with the purchase of the APT-COM™ 4 GLP Edition.

The system prerequisites apply both to the recording computer on which APT-COM™ 4 is running, and to the monitoring computer on which the monitoring software “AlarmCenter” is running.

Inform yourself of potential access restrictions to your PC within your network. You may require administrator rights for the installation of the APT-COM™ 4 software.

! In order to ensure the recording of the recording data without gaps and the continuation of program operation during and after failure of the power supply, we recommend connecting the PC and the power adapters of all hardware components to an uninterrupted power supply.

! The power adapters of the accessory (converter, Alarm Kit) have a power input of < 20 W

! BINDER GmbH excludes any liability claims for data losses.

4.2 Security aspects and recommendations to be regarded prior to installation

! Virus scanners can cause problems (e.g. APT-COM™ 4 files may be deleted or APT-COM™ 4 may not start after installation), so we recommend deactivating virus scanners for the duration of the installation

Depending on the degree of use of APT-COM™ 4 the future APT-COM™ 4 administrator and the system administrator should agree on the security measures to be taken for the entire system prior to installation.

Regarding the choice of a suitable operating system and other system requirements, see Ch. 4.1.

The following overview summarizes the properties and functionality of APT-COM™ 4 that are to be considered at this stage.

1. When taking the record of APT-COM™ 4 and, with GLP Edition, Alarm Center installation, some system modifications need to be considered.
2. APT-COM™ 4 can communicate with the connected BINDER temperature chambers via Ethernet, USB, or COM port (RS232). Depending on the interface type, connection to the computer is established via an interface converter. Interface converters are available at BINDER.

APT-COM™ 4 saves all recording data together with system settings selected by the APT-COM™ administrator or a user to a secured database.

3. If accordingly configured by the APT-COM™ 4 administrator, APT-COM™ 4 GLP Edition can periodically copy the recording data and configuration settings database to another directory (backup routine). Backup directories can be created on all sort of storage medium to which the operating system has access and can create directory structures. Following creation by APT-COM™ 4 the backup directories can be manually copied to any data medium for security reasons. Backups can be restored.
4. APT-COM™ 4 GLP Edition: Following functions are selectable by the APT-COM™ 4 administrator and not necessary for the basic functions of the APT-COM™ 4 software.

Recording supervision carried out independently from APT-COM™ 4 and, if desired, from a different location is offered by the Alarm Center. This program monitors from the same or a second network computer if the tolerance limits of the parameters of each recording are respected, if the computer is operating without any error, and if the communication between APT-COM™ 4 and the connected BINDER chambers runs without any error.

If the Alarm Center is used, data from APT-COM™ 4 are read from the recording computer to the monitoring computer on which Alarm Center is running.

Recommendation: The recording computer should have access in the local network (intranet) to a server sufficiently protected according to the security requirements of the user in order to generate backup files (GLP Edition). Local storage media (e.g., a second hard disk, USB-Stick) can be used as well. It must be possible for APT-COM™ 4 to generate directory structures and files on those media.

-
5. If accordingly configured by the APT-COM™ 4 administrator APT-COM™ 4 Professional and GLP Edition offer an e-mail service. APT-COM™ 4 communicates with the internal e-mail server (SMTP host).

Depending on the configuration of the internal computer network, automatically generated e-Mails can be sent via Intranet and Internet. The used port is adjustable, not predefined. APT-COM™ 4 will not receive e-mails. The e-mail messages inform the receiver, depending on the selected configuration, about the recording course, a leaving of tolerance limits, and error messages.

The monitoring program Alarm Center also provides an e-mail service. Alarm messages are transmitted independently from APT-COM™ 4 to an e-mail address configured in the Alarm Center. A modified configuration (chambers, recordings) in APT-COM will also take effect on the AlarmCenter.

Recommendation: By using the Alarm Center monitoring software (GLP Edition) the existence of a wrong functioning can be automatically transmitted to staff qualified to remove the error cause, e.g., a service technician. Examples are communication errors between BINDER chambers and the recording computer or between the recording and monitoring computer or a failure of the APT-COM™ 4 software or of the recording computer. Other errors are possible wrong functions of the temperature chambers that lead to exceed the set tolerance limits. Information transfer is done by use of the e-mail system of the Alarm Center or via the Alarm Kit.

4.3 Installation of APT-COM™ 4

! Secure your data with a system backup, as BINDER GmbH is not liable for potential data losses. The installation of APT-COM™ 4 should take place in the presence of the system administrator.

! NEVER cancel an ongoing installation process. If you have any problems, contact BINDER service.

Start the computer with the potentially newly installed hardware components (Ch. 3).

In the event that you carry out installation from a USB stick, connect this with the computer.

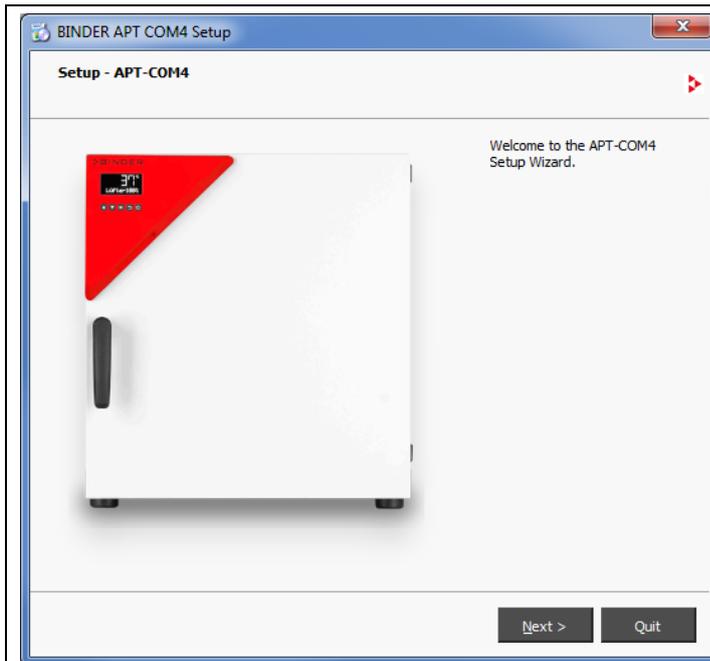
You can choose between 2 options:

- manual installation via setup assistant (recommended)
- automatic installation

Manual installation with setup assistant

Choose the directory “APT-COM4” and start the file “AptCom4-Installer.exe” there. The setup assistant opens.

! Follow the instructions of the wizard. The representation depends on the national language of your operating system.

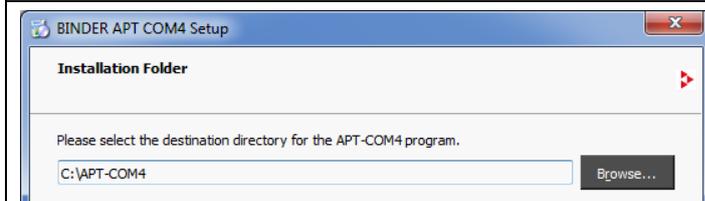


(Sample pictures)

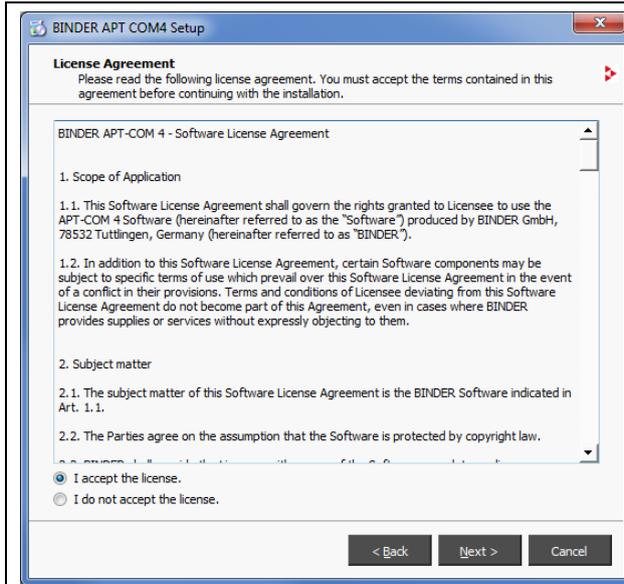
Start the installation procedure with “Next”.

In the following windows you can accept the entries or suggestions respectively with “Next” and continue the individual steps of the installation or return to the previous step with “Back”.

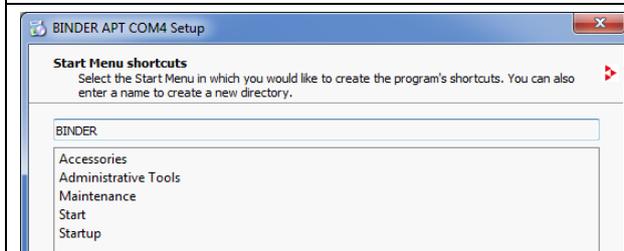
With “Cancel” you can end the installation at any time. In this case confirm the confirmation message with “Yes”.



An installation directory is suggested. You can accept the recommended directory or enter a different path. To the next step with “Next”.

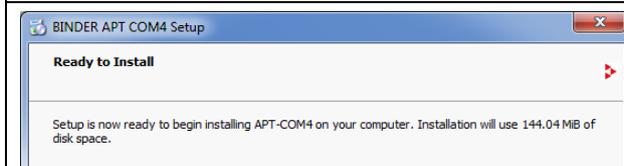


Confirm the license agreement. To the next step with “**Next**”.

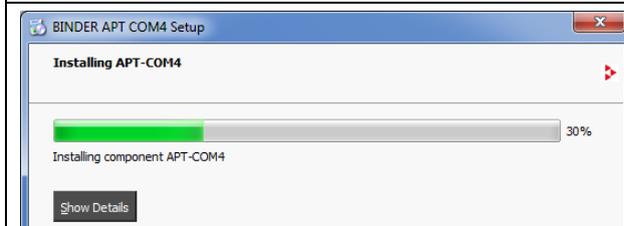


Here you can assign a name for the shortcut in the start menu and on the desktop.

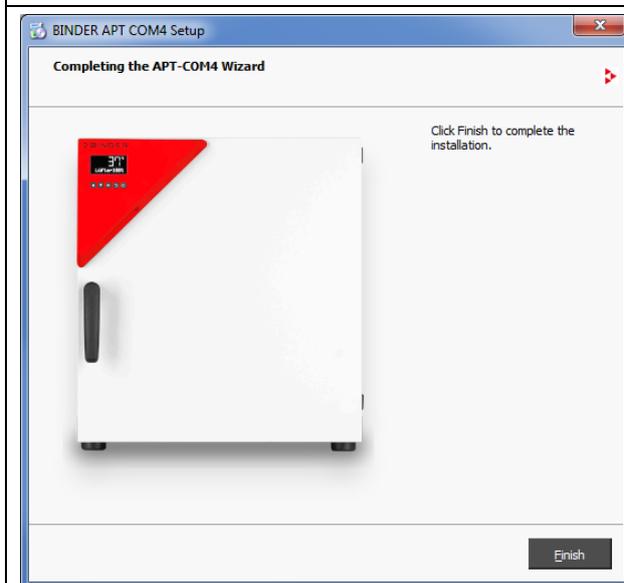
To the next step with “**Next**”



The memory required for installation is displayed. Select “**Install**”.



The software is installed.



A window subsequently shows the successful installation of APT-COM 4.

Click “**Finish**” to end the installation program.

If you want to use the trial version “APT-COM™ 4 DEMO” the installation is now completed.

You can use the trial version for 30 days.

In order to use the purchased edition BASIC, PROFESSIONAL, or GLP, or in case you want to use the AlarmCenter monitoring software on a monitoring computer, you need to select the desired edition in the APT-COM™ 4 configuration menu “Licenses” and activate it (Ch. 4.4).

4.3.1 Automatic installation

Open the Windows command prompt.

Start the installation program and append the transfer parameter “Auto=on”:

```
APTCOM4_Installer_xx_yyy_zzzzz.exe Auto=on
```

After confirming with Enter, the installation is carried out automatically and then terminated.

4.3.2 Automatic installation and registration

Open the Windows command prompt.

Start the installation program and append the transfer parameter “Auto=on” in order to run the installation automatically and then to exit, and append the registration information:

```
APTCOM4_Installer_xx_yyy_zzzzz.exe Auto=on LicenceVersion=Basic Or  
Professional Or GLP SerialNumber=xxxxxx-xxxxxx-xxxxxx-xxxxxx-xxxxxx-xxxxxx  
"Company=Company Name" Country=NameOfYourCountry EMailAddress=your.email-  
address@company.xyz
```

After confirming with Enter, the installation is carried out automatically and then terminated. When starting APT-COM™ 4 for the first time, the registration is carried out automatically.

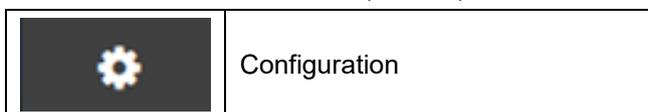
4.4 Selecting and activating BASIC, PROFESSIONAL, or GLP Edition or the AlarmCenter monitoring software

Following installation of APT-COM™ 4 the license status is the trial version “APT-COM™ 4 DEMO”. To be able to use the BASIC, PROFESSIONAL or GLP edition or in case you want to use the AlarmCenter monitoring software on a monitoring computer, you must first change the license status.

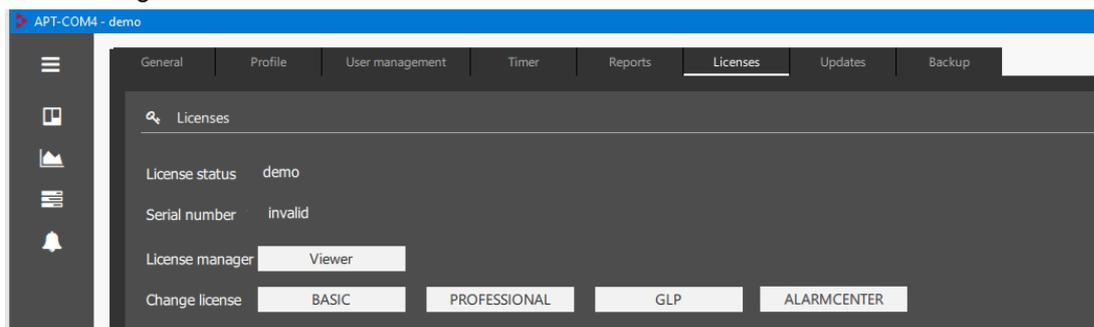
Required authorization: Administrator

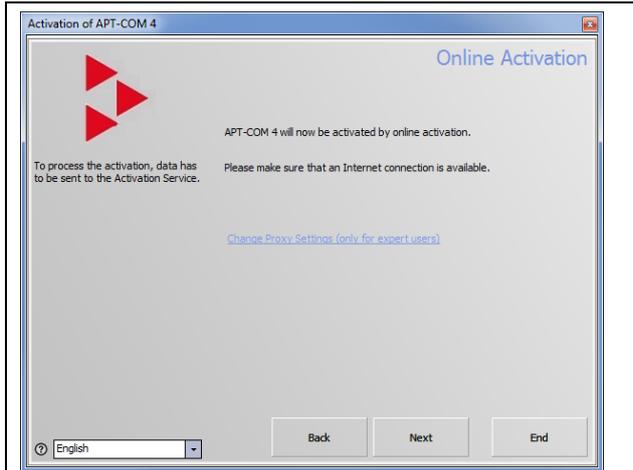
4.4.1 Selecting the edition

Start up APT-COM™ 4 and enter the password as described in Ch. 5.1 and 5.2. Select the “Configuration” menu in the overview window (Ch. 5.3).



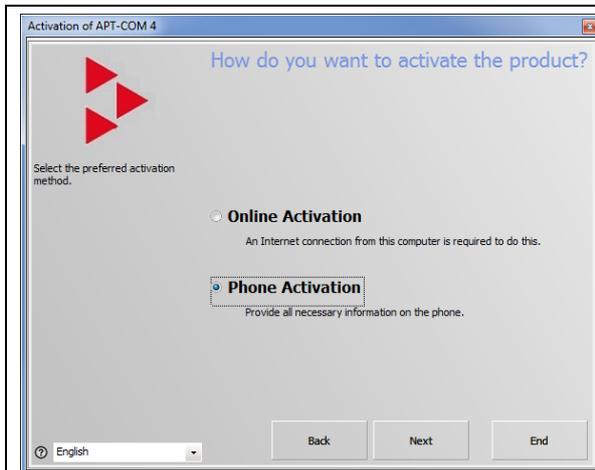
In the configuration menu “Licenses” the license status “demo” is indicated.



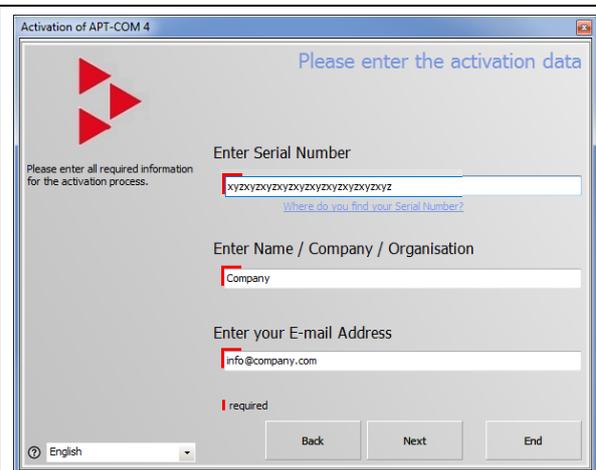


The activation starts now. Ensure that an Internet connection exists. To the next step with **"Next"**

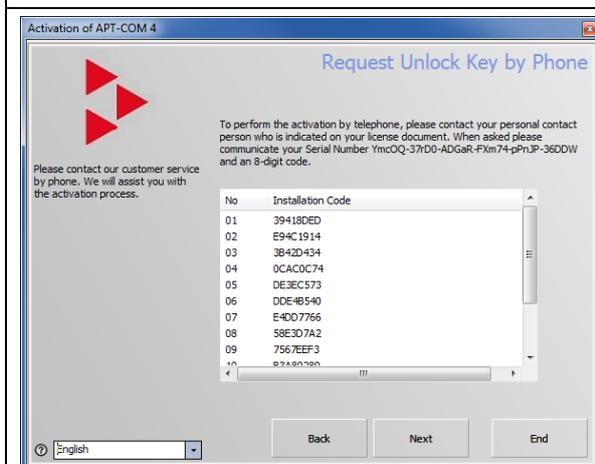
Activation by telephone



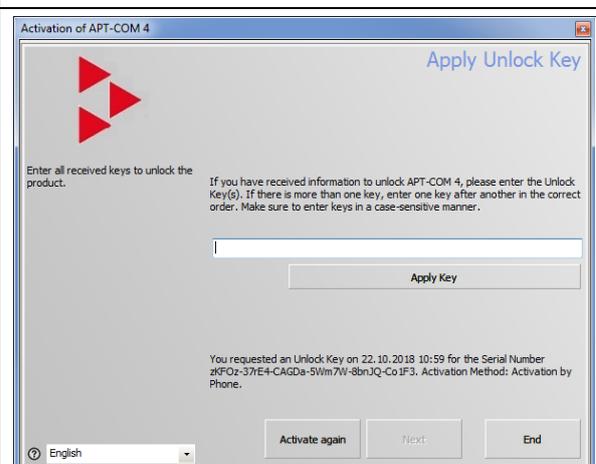
Select the activation method. To the next step with **"Next"**



Enter the information required for activation. The fields marked red are mandatory fields. To the next step with **"Next"**

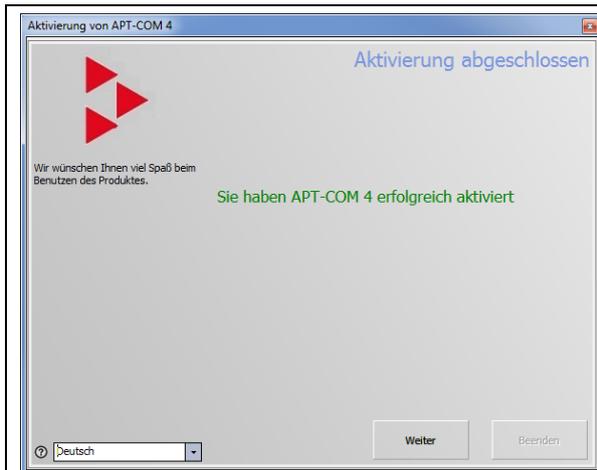


Select an appropriate phone number and dial it. Note down the code. To the next step with **"Next"**.

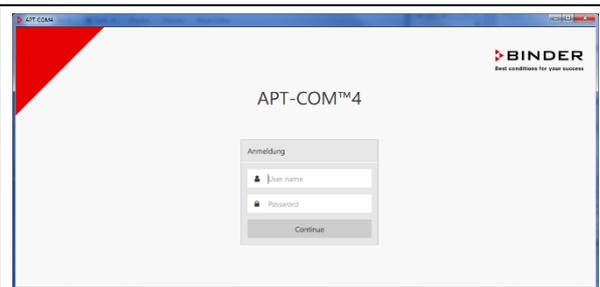


Now enter the key you received by phone. and press **"Apply key"**. To the next step with **"Next"**.

Completing activation



Activation is completed. In order to start APT-COM™ 4, select “Next”.

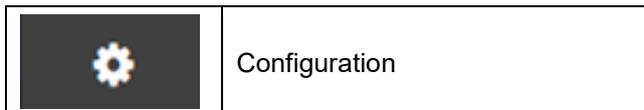


Starting APT-COM™ 4 is described in Ch. 5.

The start screen appears. Enter the password as described in Ch. 5.2.

Then the desired range of functions is available.

4.5 Updates of APT-COM™ 4



Updates of APT-COM™ 4 are published at regular intervals, so that you can bring your version up to the current state of development and it is ensured that you have access to all features of the software.

! When carrying out an update, the configuration settings for the connected chambers and all recordings are retained.

If the internal configuration of the database is updated during an APT-COM™ 4 update, APT-COM automatically creates a backup of the existing database with all its contents beforehand. Backups can be deleted manually if necessary. During the next automatic backup in the course of an update, the previous backup will be overwritten.

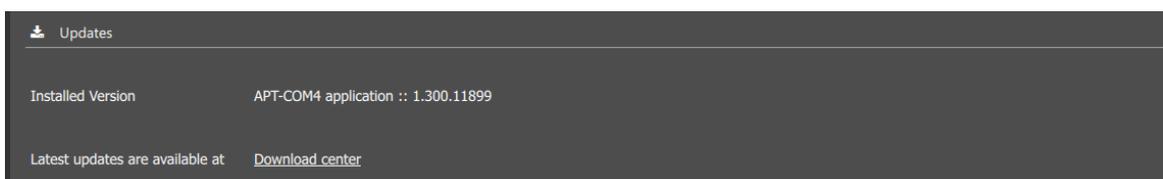
4.5.1 Identification of the present version of APT-COM™ 4

Required authorization to display the versions: Basic / Advanced / Administrator

Required authorization for updates: Administrator



The current versions of the program components are indicated under “Installed versions”.



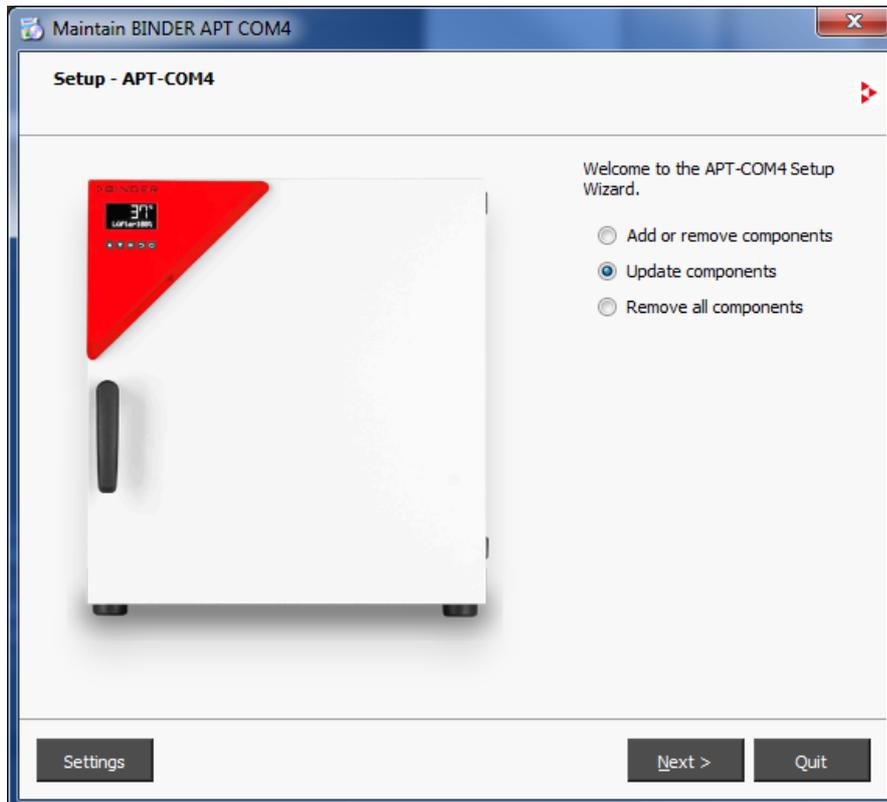
Note: To perform the update, APT-COM™ 4 must be closed.

4.5.2 Carrying out an update

Required authorization: Administrator

Program updates are provided via the configuration menu “Updates” (Ch. 4.5.1) and on the BINDER website www.binder-world.com and can be downloaded and installed.

! Follow the instructions of the wizard. The representation depends on the national language of your operating system.



(Sample picture)

Starting APT-COM™ 4 after an update might result in the appearance of a notification message that informs about a necessary update of the internal database. Confirm the notification message. APT-COM™ 4 will perform the required update and restart automatically.

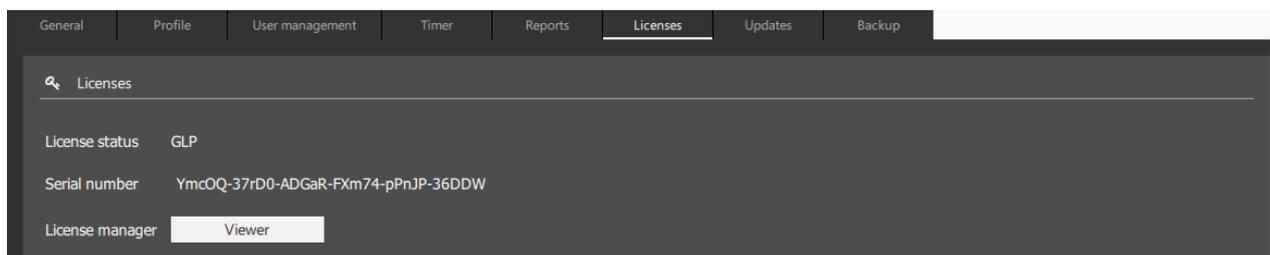
4.5.3 Information on the installed version

Required authorization: Basic / Advanced / Administrator

Serial number of the APT-COM and current license

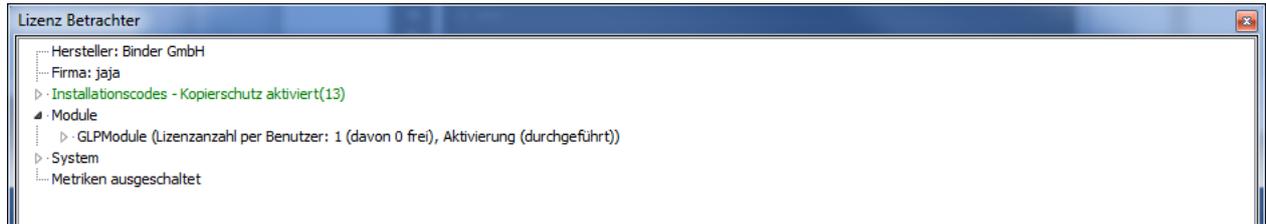
	Configuration	<u>L</u> icenses
---	---------------	------------------

In the “Licenses” menu, the edition (BASIC, PROFESSIONAL, or GLP) or ALARMVENTER on the monitoring computer and the serial numbers of the software are indicated.



Select the **“Viewer”** button to view further information.

The **“Lizenz Betrachter”** (Licence viewer) opens (sample image):



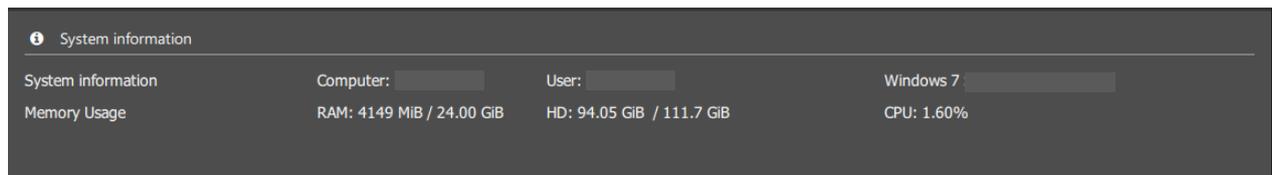
This is a purely informational window. Select the **“Close”** button to close it.

Note: If the window **“Lizenz Betrachter”** remains open for more than 20 minutes, APT-COM 4 will be closed.

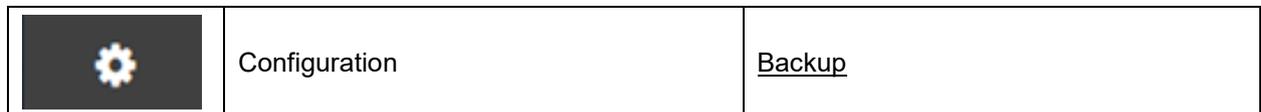
System information



In the **“System information”** menu, data is provided for the computer on which APT-COM 4 is installed.



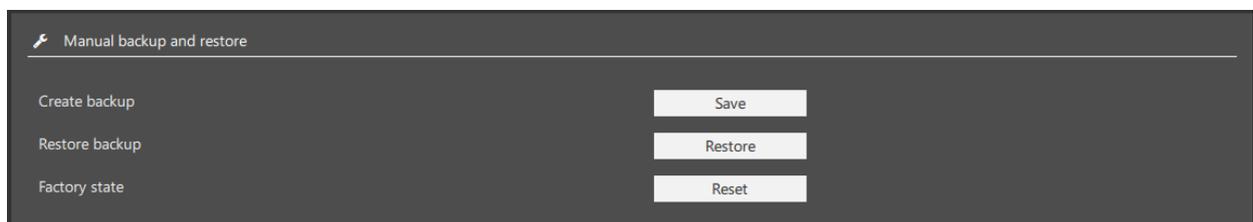
4.6 Data backup and resetting to factory settings



Required authorization: Administrator

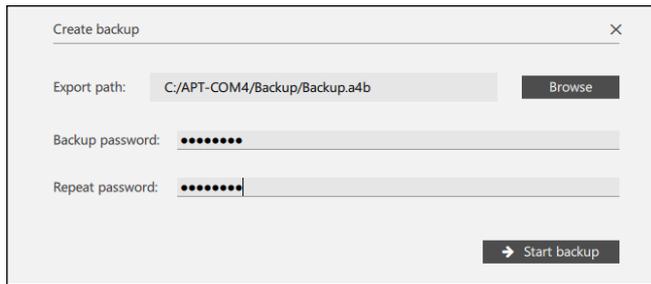
You can select between manual and automatic backup creation.

4.6.1 Manual backup



In the **“Manual backup and restore”** menu you can create backups of the entire APT-COM 4 configuration with all data and restore them. It is also possible to reset the software to the factory settings.

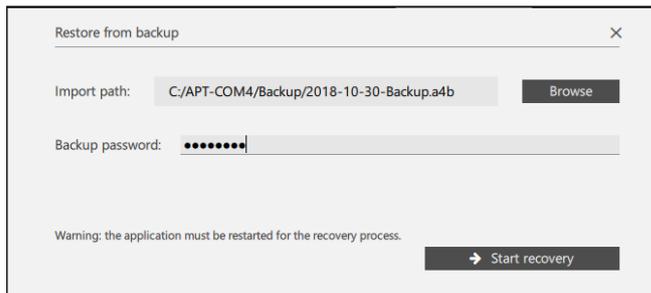
- **“Create backup”**: Select the **“Save”** button to open the menu **“Create backup”**.



Enter the path and a password for the backup file to be created.

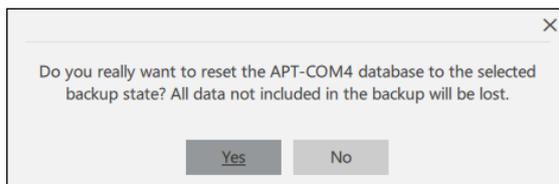
Then select the **“Start backup”** button. The backup is created. When it is complete, the message **“Backup successful”** briefly appears.

- **“Restore backup”**: Select the **“Restore”** button to open the menu **“Restore from backup”**.

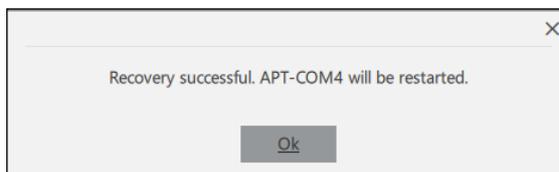


Enter the path and password for the existing backup file.

Then select the **“Start recovery”** button.



Confirm the security question with **“Yes”**. The recovery starts.



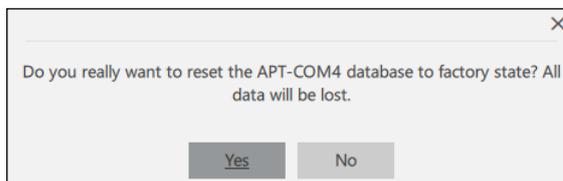
When the recovery is complete, the message **“Recovery successful”** appears..

Confirm the note window with **“Ok”**.

APT-COM 4 shuts down and then restarts.

! After restoring a backup, the passwords are also up to date with the creation of the backup.

- **“Factory state”**: Select the **“Reset”** button to reset the entire APT-COM™ 4 to factory settings

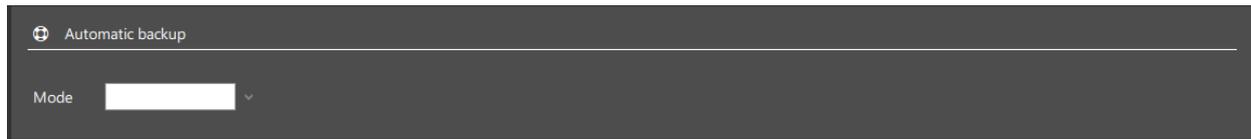


Confirm the security question with **“Yes”**.

All existing data is deleted.

! If you select **“Yes”**, all chamber data, recordings, programs, and configurations are deleted!

4.6.2 “Automatic backup”



In the “Automatic backup” menu you can configure and activate the automatic backup.

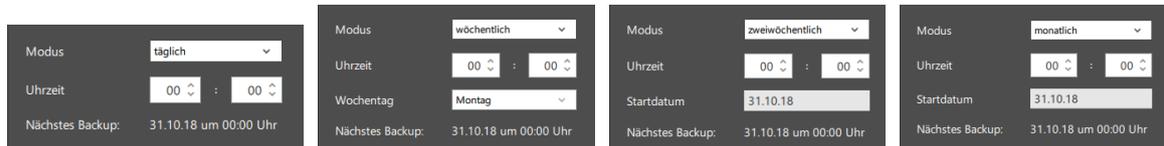
- **“Mode”**: Selection between “deactivated” (no automatic backup) and the intervals “daily,” “weekly,” “biweekly,” and “monthly.”

Having selected the desired mode, further setting options are available.



The “Apply” button only becomes active once a password for the backup has been entered.

- How to **select the desired interval** depends on the selected mode.



- **“Backup directory”, “Backup password”, “Repeat password”**: Enter the path and a password for the backup files to be created.
- **“Keep backups”**: Selection between “All” (all backups will be kept), number of backups (only the last backups up to the desired quantity will be kept) and the backup age in days (older backups will be deleted).

Select the **“Apply”** button to apply all settings.

4.7 Uninstallation of APT-COM™ 4

! Uninstalling APT-COM™ 4 is NOT recommended as a solution to software problems. Uninstalling and then reinstalling will result in license problems and data loss. If you have any problems, contact BINDER Service.

There are two possibilities to uninstall the APT-COM™ 4 software:

- Manual uninstallation via the Windows® control panel
- Automatic uninstallation using an uninstallation program

4.7.1 Manual uninstallation

Uninstall the program APT-COM™ 4 via the Windows® control panel as required.

4.7.2 Automatic uninstallation

Go to the Windows command prompt. Call up the uninstallation program, which is located by default in the “Bin” directory in the APT-COM™ 4 installation directory, and append the transfer parameter “AutoRemover=on”:

`maintenancetool.exe AutoRemover=on`

After confirming with Enter, APT-COM™ 4 is uninstalled automatically.

5. Start, settings, user management

5.1 Start APT-COM™ 4

Double-click with left mouse button on the “APT-COM4” icon (or selected name) on the desktop or the corresponding link in the start menu.

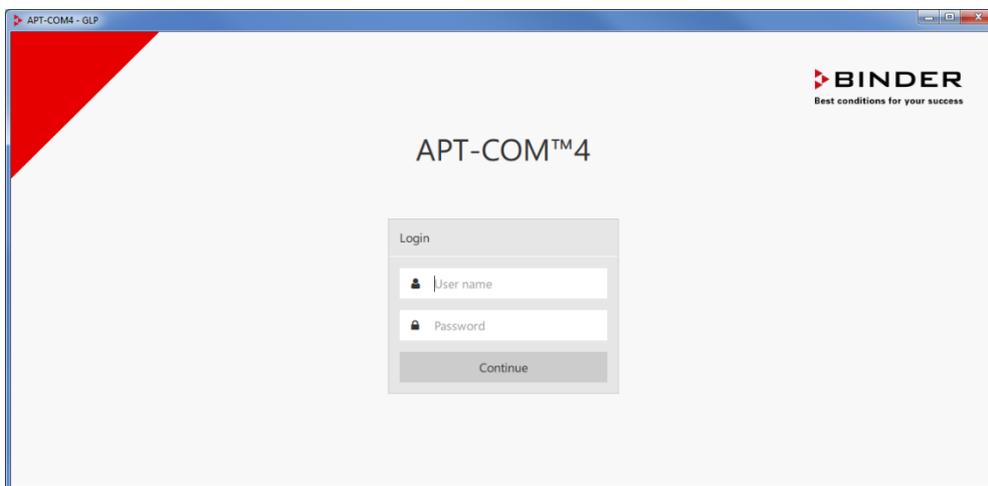
Activation must first take place when starting APT-COM 4 for the first time (Ch. 4.4.2).

5.2 Password entry

! APT-COM™ 4 cannot be operated prior to entry of the correct password or user name and password.

The login window appears following the start of the program. Enter user name and password.

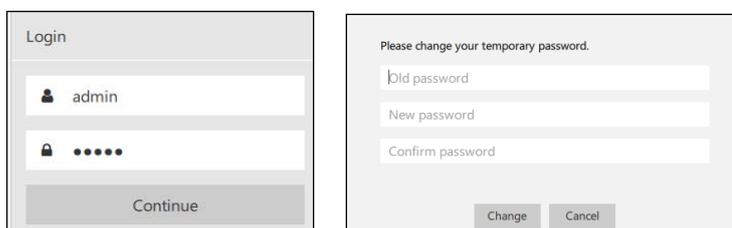
! The windows may appear in a different language for the very first login.



You can log in as administrator with your previously entered password.

This also applies for other users, insofar as these were created prior in the configuration settings. Confirm with “Continue”.

! **When calling up the program for the first time:**
Enter “admin” as user name and “admin” again as a temporary password and confirm with “Continue”. You are now prompted to assign a new password.



Criteria for a suitable password:

- Upper/lower case letters are differentiated. It must contain at least one upper case letter.
- All ASCII characters can be used, meaning letters, numbers, spaces, and special characters
- The password must have at least 8 characters
- It must contain at least one number.

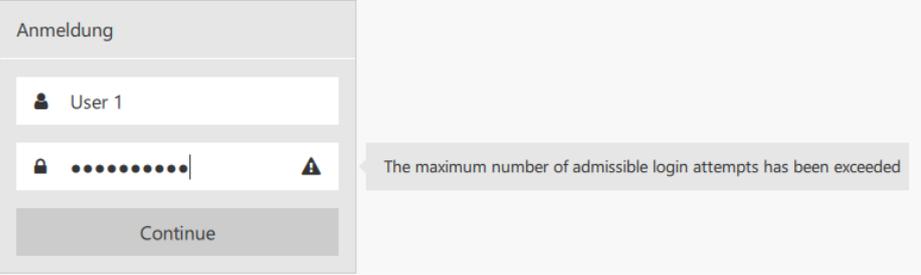
If the entered password does not meet the criteria for a suitable password, these criteria are additionally displayed in red at the bottom of the dialog window.

Choose a suitable password.

! Please note the position of the caps lock key of your computer keyboard when entering the password.

! The combination of user name and password fulfills the criteria of an electronic signature pursuant to the FDA guideline 21 CFR 11, Part C. Pursuant to 21 CFR 11 §11.100 (c) (1), the electronic signature serves as a replacement for a handwritten signature. Their use is to be submitted in paper form and with a traditional handwritten signature to the Office of Regional Operations (HFC-100), 5600 Fishers Lane, Rockville, MD 20857.

Error messages:

<p>A corresponding error message appears if the password is incorrect.</p> <p>Enter the password again.</p>	
<p>A corresponding error message appears when an incorrect password is entered three times.</p> <p>Close the program.</p>	

Following three false entries of the password, the corresponding user name is identified as locked (“Unlock”) in the user overview menu and must first be cleared by the administrator. (Ch. 5.4.8).

The overview window appears following a correct login (Ch. 5.3).

Password expiration:

If your password has expired, after logging in with your previous password, a window will appear asking you to enter a new password.

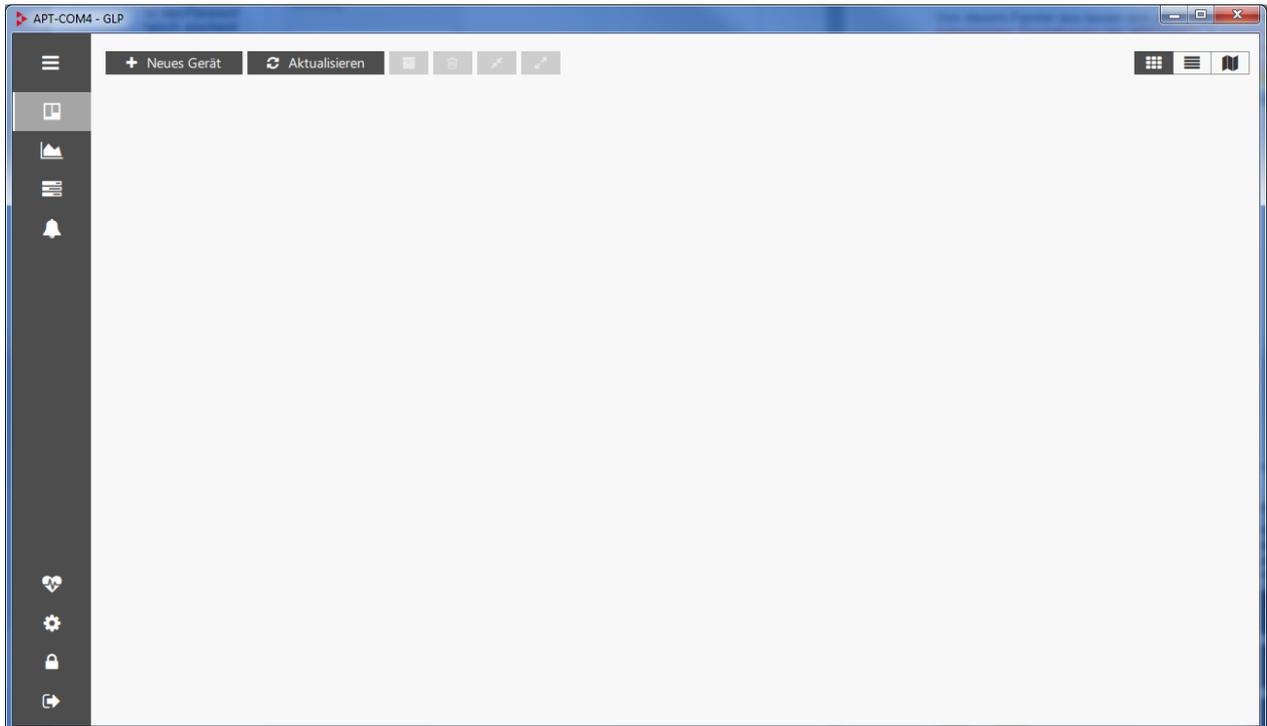
The process of changing a password is logged (note: the passwords themselves are not logged).

5.3 The overview window

Following the start of APT-COM 4 and a successful login, the overview window appears in the chamber view.

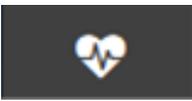
All program functions can be called up from the overview window. Here you can change the settings of APT-COM™ 4. **Hint:** Depending upon your existing APT-COM™ 4 edition (BASIC, PROFESSIONAL, GLP) and the assigned user rights (“Basic,” “Advanced,” “Administrator”), the number of menus contained in the program varies. There can also be differences in the individual menus that correspond to the functional scope of the respective edition.

Hint: When not otherwise indicated, the illustrations in this manual correspond to the APT-COM 4 GLP version and the authorization “Administrator”.



A menu bar at the left edge of the window allows access to all program functions.

When you click on a symbol, the overview window shows the corresponding view. When you click on the symbol again, the legend for this is displayed (toggle function, meaning that one click opens the legend and clicking again closes it again. A double-click would thus mean that the legend opens and closes again consecutively).

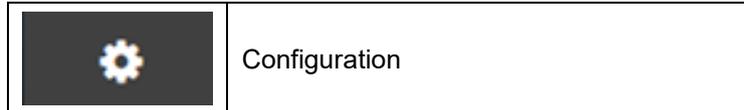
	Display legend for the symbols of the menu bar		System log
	Chamber overview Chamber management		Configuration
	Recordings		Lock screen Entry of password necessary
	Time programs		Log out user
	Event overview		

5.4 User management and individual configuration

All created users are listed under “**User management**”. Here the administrator has the possibility to create new users and to provide them with access rights, assign and change passwords, and to delete users.

Under “**General**,” the administrator can select the program language and make other country-specific settings. These are overwritten by individual user settings.

Under “**Profile**,” any user can select their language in their own profile and make other country-specific settings.



5.4.1 Access rights

APT-COM™ 4 makes three access hierarchies available in normal program operation.

“**Basic**” and “**Advanced**” are defined for persons who work with the chambers created by the administrator, meaning especially, those that carry out recordings. Each user logs in with their own user name and password and then has access only to those recordings they have created themselves

The “**Administrator**” configures the software, creates chambers, and manages users. He should not carry out any recordings himself, in order to maintain the separation between administrator and user level.

Basic

- Create, start, and stop recordings
- Start and stop programs

Advanced

- Create, start, and stop recordings
- Create, start and stop programs

Administrator

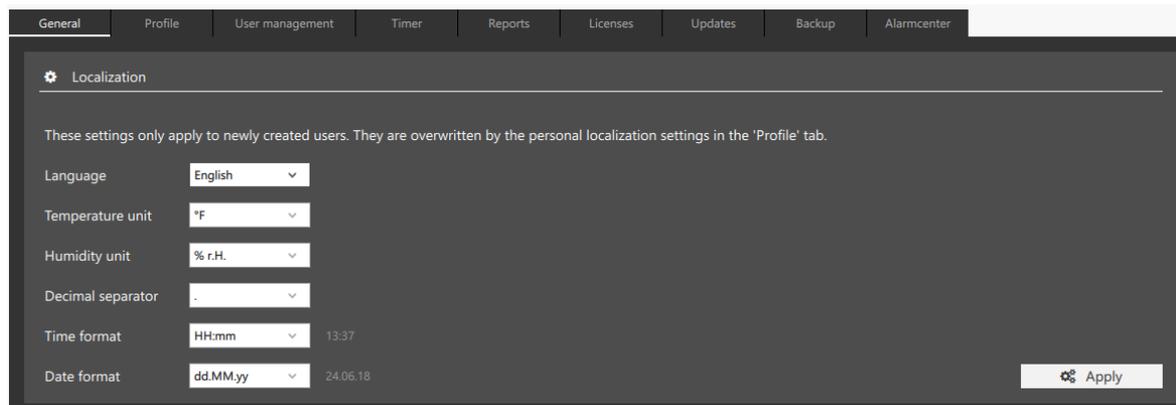
- Configuration
- User management: Create user
- Access to the system log
- Configure and create reports
- Create, configure, archive, and delete chambers. Manage room plan
- Create, start, stop, archive, and delete recordings
- Create, start and stop programs

Only one person at a time can work with the APT-COM™ 4 software. So-called simultaneous multi-user operation isn't possible.

5.4.2 General, country-specific settings

The program language can be chosen and additional country-specific settings made in this menu. These initially apply for all users. As soon as individual users have made individual settings (Ch. 5.4.4), these are adopted accordingly following the login.

Required authorization: Administrator



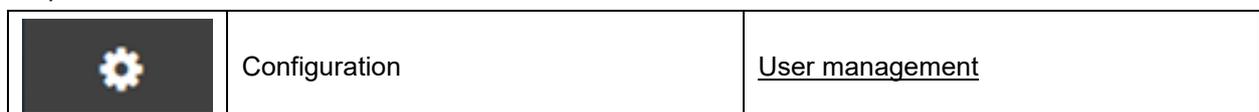
- “Language”: Language choice of German, English, French, Spanish, Italian
- “Temperature unit”: degree Celsius, degree Fahrenheit, Kelvin
- “Humidity unit”: % r.H., % r.F.
- “Decimal separator”: , .
- “Time format”: HH:mm, HH:mm:ss, h:mm AP, h:mm:ss AP
- “Date format”: dd.MM.yy, M/d/yy

Select the **“Accept”** button to accept changed settings.

5.4.3 Creating users

All created users are listed under the tab “User management” in the configuration menu. Here it is possible to create new users and to provide them with access rights, assign and change passwords, and to delete users.

Required authorization: Administrator

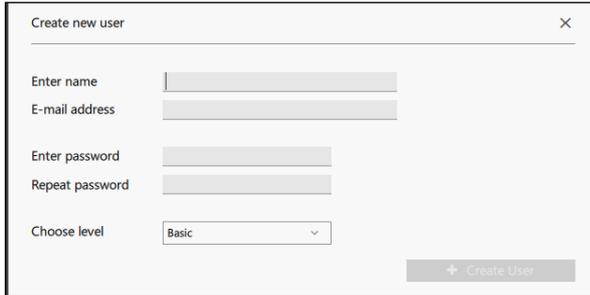
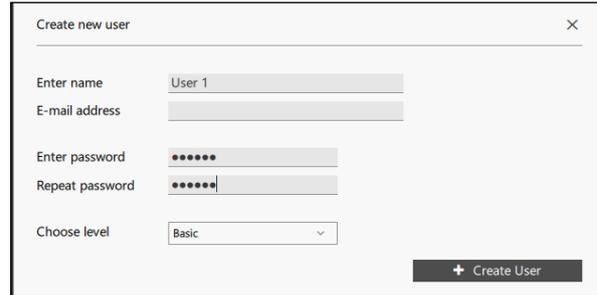


User management

- Add user
- List of users with rights

With the function **“ + Add,”** new users can be created in the APT-COM™ 4.

Note: When using the Basic Edition, only 1 user can be created.

- **“Enter name”**: Enter a user name
- **“E-mail address”**: If desired, enter an e-mail address (not required).
- **“Enter password” “Repeat password”**: Enter a password and repeat the entry.

As soon as the password has been entered twice, the **+ Create user** is active.

Hint: This is a temporary password. When logging in for the first time, the user is prompted to assign a new password.

- **“Choose level”**: Select the desired authorization level of the user “Basic,” “Advanced,” “Administrator”.

! Criteria for a suitable password:

- Upper/lower case letters are differentiated. It must contain at least one upper case letter.
- All ASCII characters can be used, meaning letters, numbers, spaces, and special characters
- The password must have at least 8 characters
- It must contain at least one number.

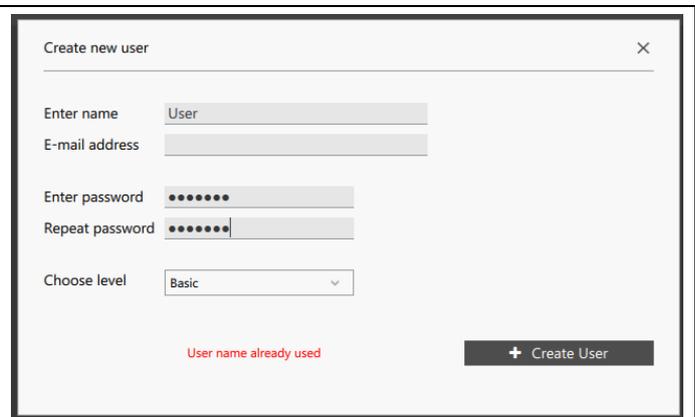
Select the button **+ Create user**. The new user is displayed in the overview:

User management				
User name	E-mail address	Level	Valid from	Valid until
admin		Administrator	22.10.18	21.11.18
User 1		Basic	23.10.18	22.11.18

Error messages:

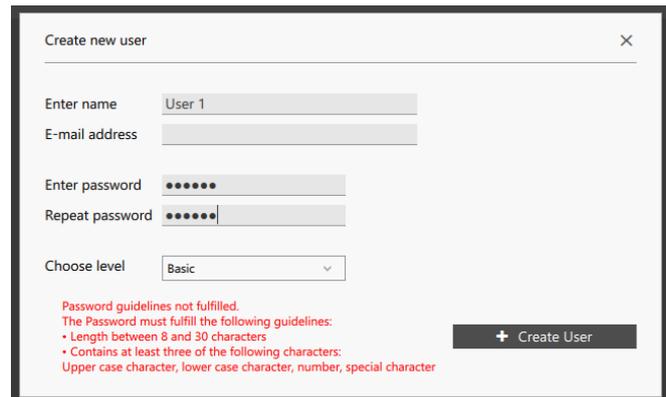
Each user name may only be used once. With repeated entry a corresponding red message appears.

Enter a different user name.

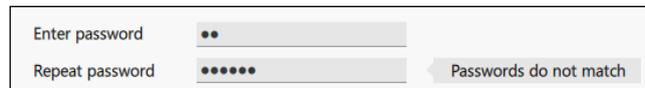


In the event that the password does not correspond to the entry criteria, a corresponding red notice appears stating the password guidelines.

Enter a suitable password.



A corresponding error message appears in the event of a deviation of the first from the second password entry. Enter the password again.



5.4.4 E-mail configuration

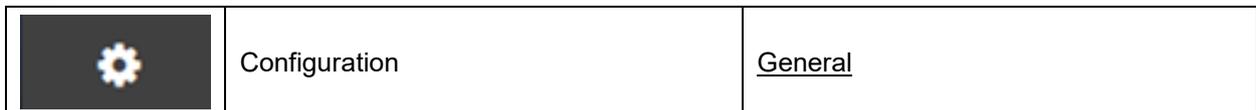
In this menu you can select and configure an e-mail address. As soon as a correct confirmation has been entered, starting APT-COM™ 4, program start and program end and alarm events (collective alarm, communication alarm, tolerance limit violation, Ch.11.1) will trigger e-mails to be sent to the address specified when creating the user (Ch. 4.5.3).

The e-mail is sent to the user who is currently logged in. If no user is logged in, the e-mail is sent to the administrator.

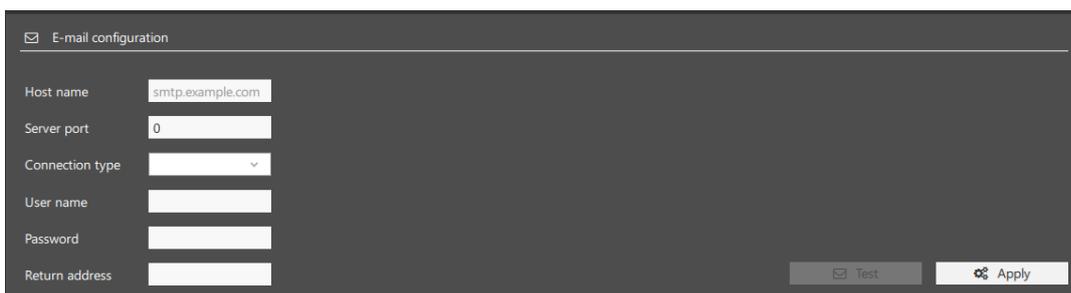
If no e-mail address has been configured, no e-mail will be sent.

Notification when starting APT-COM™ 4 is only available to users with administrator authorization.

Required authorization: Administrator



In the "User management" menu (chap. 5.4.3) a valid e-mail address must be entered for the registered user.



- **"Host name"**: Name or IP address of the customer's e-mail server
- **"Server port"**: Port of the customer's e-mail server
- **"Connection type"**: Select between TCP, TLS, SSL
- **"User name", "Password"**: Authentication information for the customer's e-mail server
- **"Return address"**: Freely selectable address (no reply), e.g., APT-COM4@company.com

Select the **"Apply"** button to apply the settings.

You can use the **"Test"** button to send a test e-mail.

5.4.5 Sending e-mails via external providers

It is possible to send e-mails from APT-COM 4 or the alarm center via external providers. Note: The figures below show fictitious example addresses.



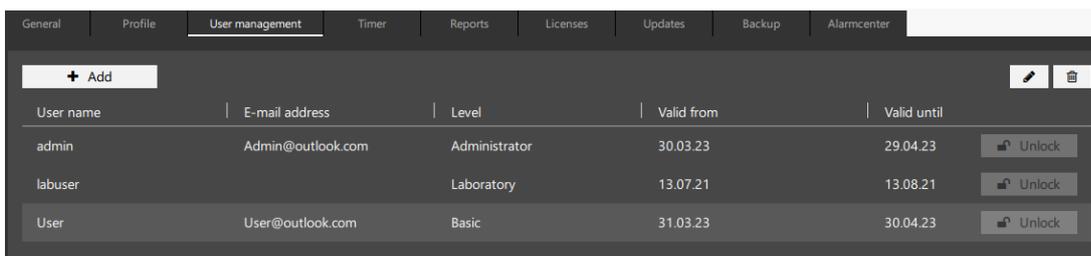
Select the "Email configuration" menu.

Enter your username and password and select the appropriate connection type

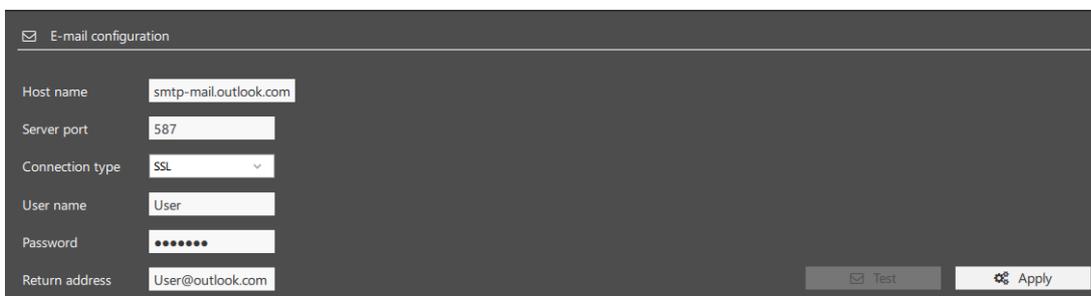


example

An e-mail address, also for the registered person, must have been entered in the "User Management" tab for the test button to become active.



example



Select "Apply". The "Test" button then becomes active and you can send a test e-mail.

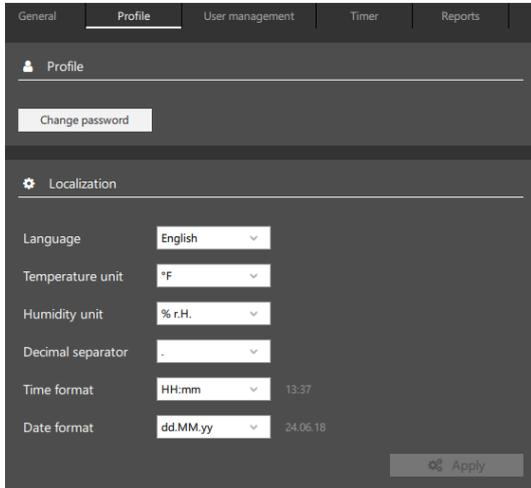


5.4.6 User-specific settings

In this menu, each user can change his password assigned by the administrator.

Any user can select their language in their own profile and make other country-specific settings. The settings are adjusted with the login. Changes can be made at any time.

Required authorization: Basic / Advanced / Administrator



Profile of the logged in user

- Change password

Localization of the logged in user

- “Language”: German, English, French, Spanish, Italian
- “Temperature unit”: degree Celsius, degree Fahrenheit, Kelvin
- “Humidity unit”: % r.H., % r.F.
- “Decimal separator”: , .
- “Time format”: HH:mm, HH:mm:ss, h:mm AP, h:mm:ss AP
- “Date format”: dd.MM.yy, M/d/yy

Select the “**Accept**” button to accept changed settings.

5.4.7 Changing of user data by the administrator

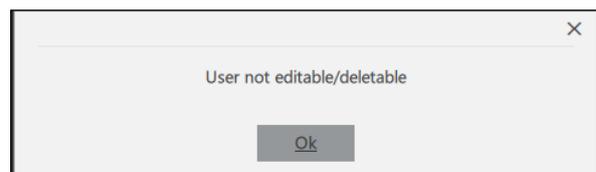
Required authorization: Administrator



In order to change a password of a user, select a user from the user overview and click on the “Edit user” button.

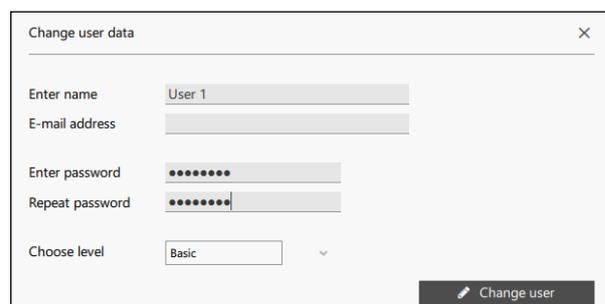
This function cannot be applied to the preset administrator “admin,” and in this case a note window appears.

Confirm the note with “**Ok**”.



The “Change user data” window appears. You can change the e-mail address, password, and authorization level of the selected user.

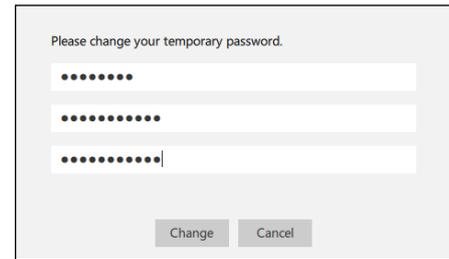
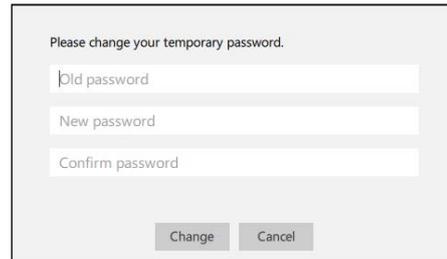
Confirm the changes with “**Change user**”.



5.4.8 Changing of user data by the user

Required authorization: Basic / Advanced / Administrator

The password assigned by the administrator when creating a user is a temporary password. When logging in for the first time, the user is prompted to assign a new password.



Select the **“Change”** button to change the password.

5.4.9 Unlocking of users following invalid login attempts

Required authorization: Administrator

After the maximum number (3) of login attempts have been exceeded due to incorrect entry of the password, the user can no longer log in himself.

He is identified in the user overview by the notification **“Unlock”**.



Select the button **“Unlock”**. The user is now once again cleared for login and can log in with his password.



5.4.10 Deletion of users

Required authorization: Administrator

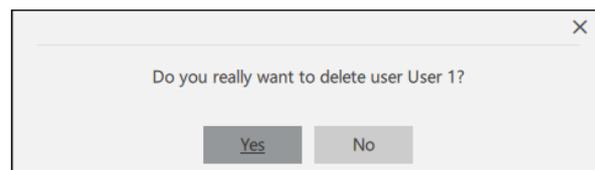


In order to delete a user, select the user in the user overview and click the button **“Delete user”**.

Before users are deleted, a reason is requested (minimum length of 20 characters).

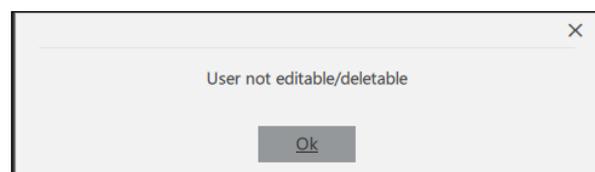
Confirm the confirmation message with **“Yes”**.

The selected user is removed from the user overview and thus no longer has access authorization to the APT-COM™ 4.



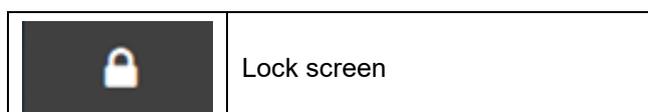
This function cannot be applied to the preset administrator **“admin,”** and in this case a note window appears.

Confirm the note with **“Ok”**.

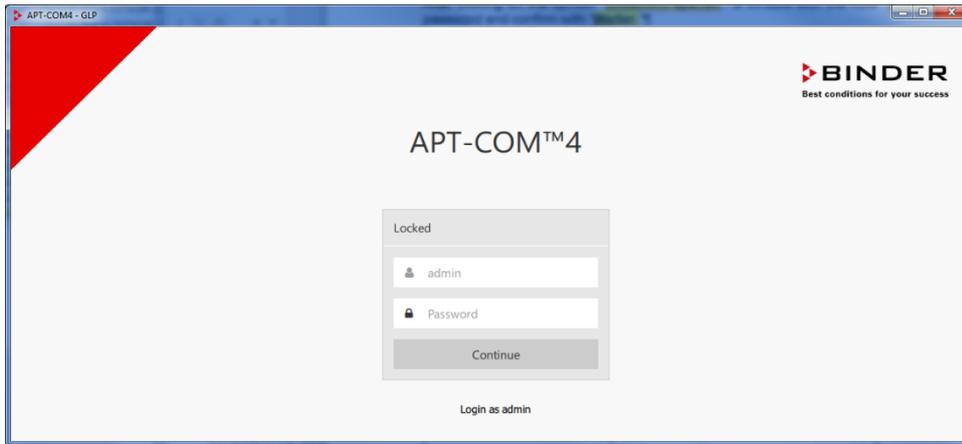


5.5 Lock screen

Required authorization: Basic / Advanced / Administrator



After clicking on the symbol **“Lock screen,”** a window with the note **“Locked”** appears. Enter the password and confirm with **“Continue”**.



! APT-COM™ 4 cannot be operated prior to entry of the correct password. Previously started recordings and other processes remain active. This also ensures operation protected against unauthorized access when the user is absent.

After crash and restart of the APT-COM 4, the recordings will continue automatically, even without user login.

General information on enabling APT-COM™ 4 auto start after a power failure:

- Change the PC BIOS to enable automatic PC restart after a power failure, according to the PC user manual
- Configure Windows® for Auto-Login
- Place a link to APTCOM4.exe in the Windows® Auto Start folder

5.5.1 Safety settings

Required authorization: Administrator

In this menu you can enter a period of validity for the user passwords. In addition, an automatic screen lock after an adjustable time can be activated.

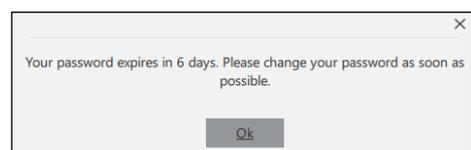


- **“Period of validity”**: Enter the validity period for passwords in days. Setting range: 30 up to 999 days. Factory setting: 30 days.

Before the validity period expires, a corresponding message appears after login every time the APT-COM™ 4 is started.

If the password is not changed within the validity period, the access will be blocked!

For the procedure in this case, see Ch. 5.5.2



- **“Time until automatic screen lock”**: Enter the duration in minutes. Once a time has been entered, the automatic screen lock will be activated.
- **“Maximum number of incorrect logins”**: Enter the number of permitted incorrect login attempts until the user is locked. Factory setting: 1 up to 10 trials (adjustable).
- Basic and Professional Edition: **“Access control”**: The password function can be switched off. This gives every user access to APT-COM™ 4 without entering a password. This function is not available in the GLP edition.

5.5.2 Procedure in case of blocked access due to expiration of the password

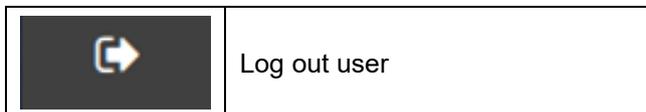
If the validity period of the password has expired, access to APT-COM™ 4 will be blocked. If this concerns the admin password, you can proceed as follows:

- When using a licensed APT-COM™ 4 version (Basic, Professional, GLP) send the serial number of your APT-COM™ 4 to BINDER Service. BINDER Service will send you a temporary valid password.
- When using the DEMO version send the database ("C:\APT-COM4\Database\apt-com4.sqlite3") to BINDER Service. BINDER Service is going to reset the locked user and sends the database file back to you. Then please copy the database to the specified (see above) directory.

Alternatively, you can also uninstall and then reinstall APT-COM™ 4. However, in this case, all recordings and configurations will be deleted. To do this, first save the license file ("C:\APT-COM4\Licence\APT-COM4.lic") to another location. After uninstalling and reinstalling APT-COM™ 4 you need to copy the saved license file to the specified directory (see above).

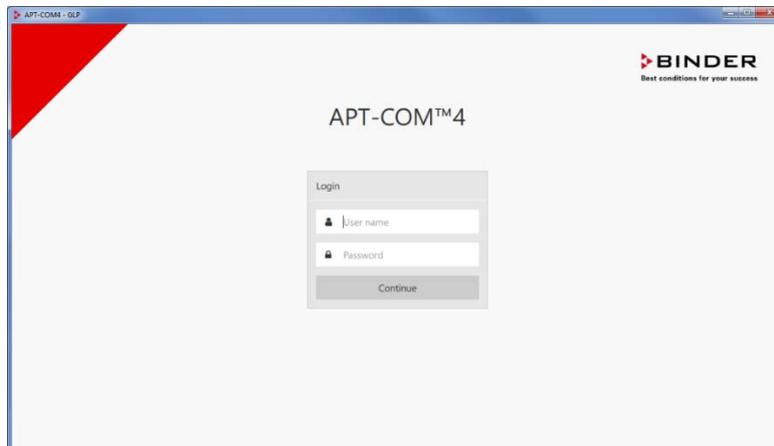
5.6 Log out user

Required authorization: Basic / Advanced / Administrator



The login window appears after clicking. The language depends on the configuration settings. In order to log in again, enter the user name and password and confirm with **"Continue."**

User login and logout is logged.



(Sample picture)

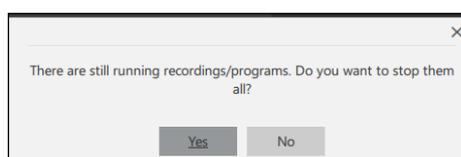
5.7 End APT-COM™ 4

Required authorization: Basic / Advanced / Administrator

In order to end APT-COM™ 4, close the overview window by selecting the "x" button in the top right corner of the program window.



As soon as at least one recording is running, a confirmation message prevents the accidental closing of the program window, and thus the interruption of the recordings.



Select "Ok" and initially end the running recordings and/or programs.

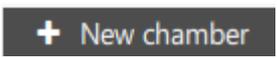
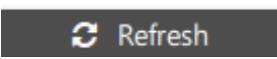
Before the APT-COM™ 4 is closed, a query appears, confirm this.

6. Creating, configuring, and displaying chambers

APT-COM 4 enables a clearly structured chamber system with several identification filters. A simple, intuitive menu offers easy identification of the chamber (e.g. Via the article number). The representation appears following selection with an image of the chamber. Multiple selection enables the creation of several chambers in one step.

	Chamber overview
---	------------------

When the program starts, the overview window always opens in the “Chamber overview” view.

	Add chamber (Ch. 6.1)
	Update recording values (Ch. 7)

6.1 Create new chamber

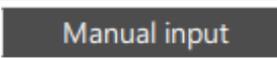
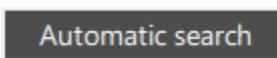
Required authorization: Administrator

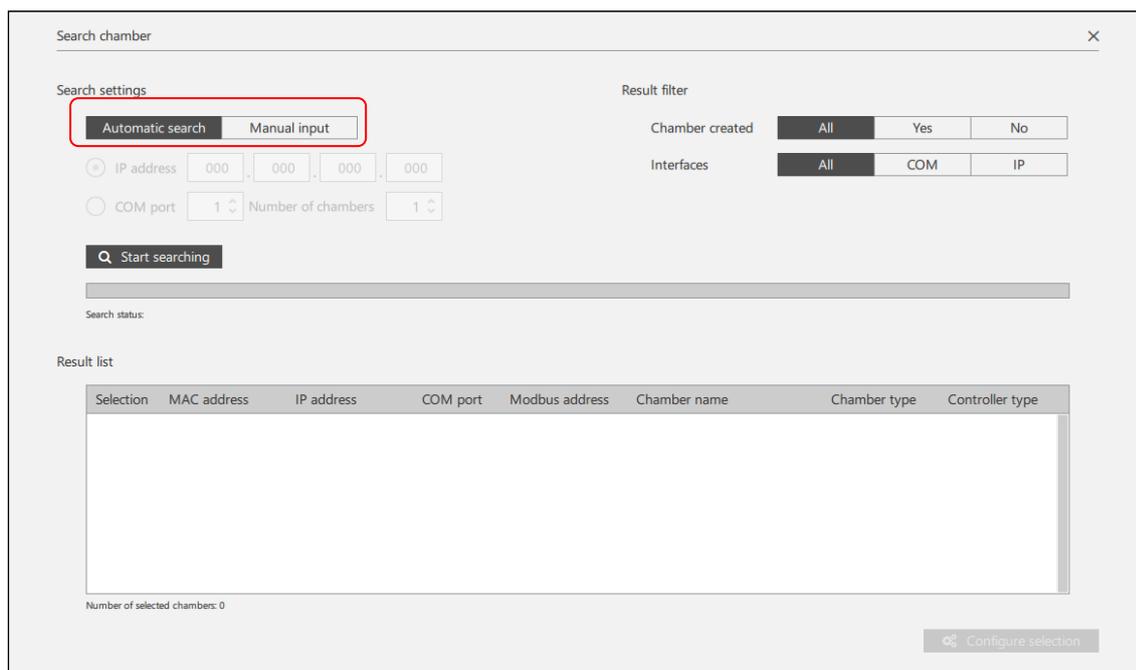
In order to create a new chamber, select the “+ **New chamber**” button and change to the “Search chamber” menu.

This menu serves the purpose of creating chambers in APT-COM™ 4. The chambers must be connected to an interface of the computer via a converter or be available in the network. As soon as a chamber has been created, it is available to any user for recordings.

Settings for chamber selection

Choose the type of chamber selection under “Search settings.”

	Direct entry of the connection data for the desired chamber
	Selection out of all available chambers



Search chamber

Search settings

Automatic search Manual input

IP address 000 . 000 . 000 . 000

COM port 1 Number of chambers 1

Start searching

Search status:

Result filter

Chamber created All Yes No

Interfaces All COM IP

Result list

Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type

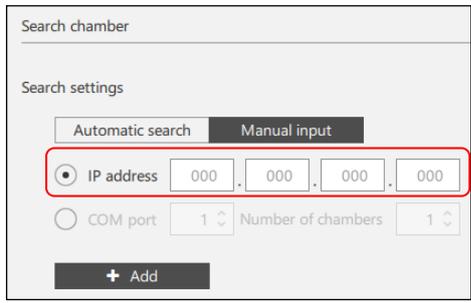
Number of selected chambers: 0

Configure selection

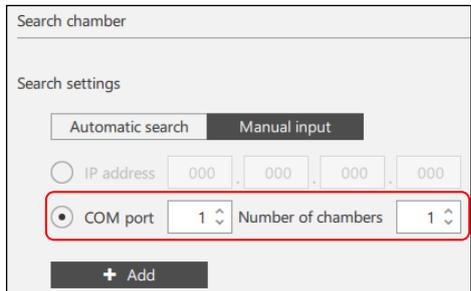
6.1.1 “Manual input”: Direct entry of the connection data for the desired chamber

For this method, you must know the connection data of the chamber (e.g. IP address).

Select the connection type of the chamber:



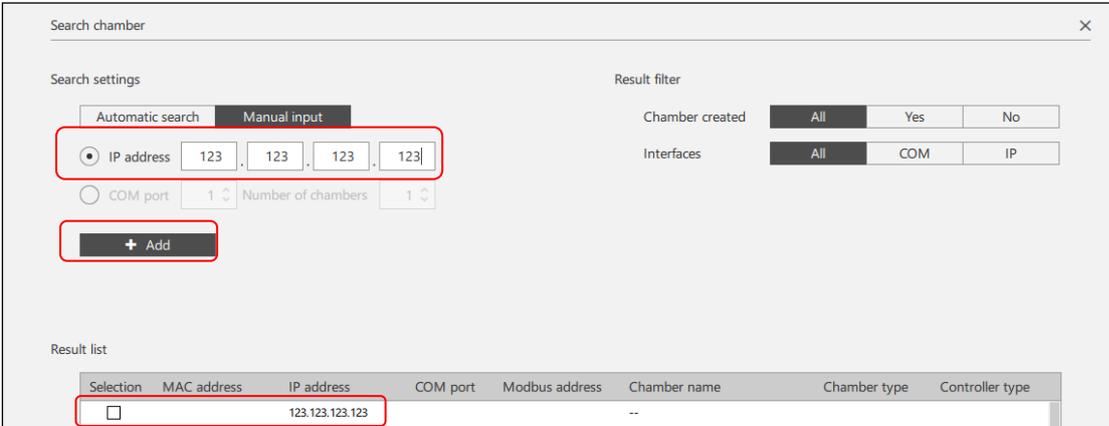
“IP address”:
Connection via an Ethernet network



“COM port”:
Connection via converter
to an interface of the computer

Example: Manual entry of the IP address

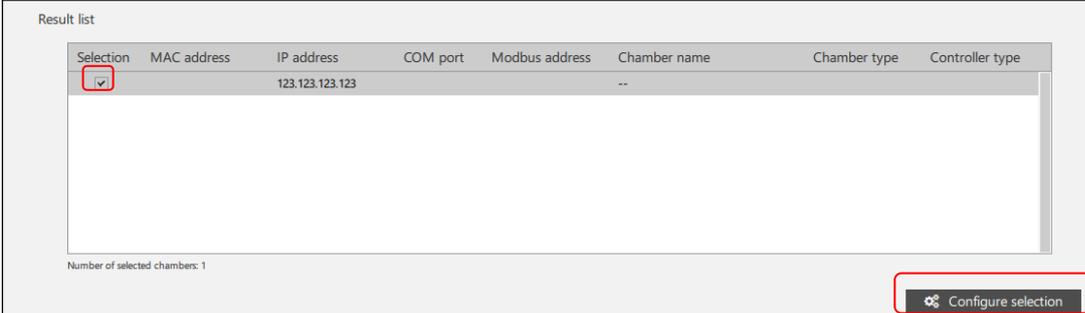
Enter the connection data in keeping with your selection and select the “+ Add” button. The chamber is added to the results list.



Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type
<input type="checkbox"/>		123.123.123.123			--		

You can add further chambers to the results list.

Select the desired chambers by marking the box under “Selection” and select the “Configure selection” button.



Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type
<input checked="" type="checkbox"/>		123.123.123.123			--		

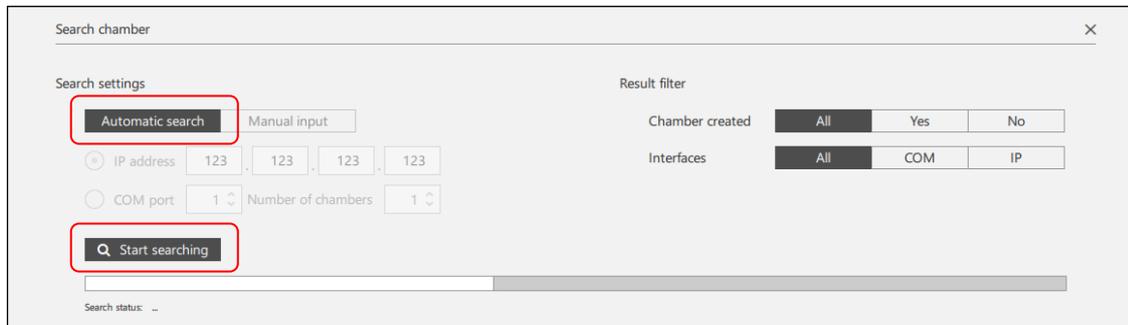
Number of selected chambers: 1

6.1.2 “Automatic search”: Selection of all available chambers

Make use of this possibility when you don't know the connection data (e.g. IP address of the chamber) or don't want to enter it manually.

APT-COM 4 carries out an automatic search and displays all connected chambers or chambers available in the network for selection.

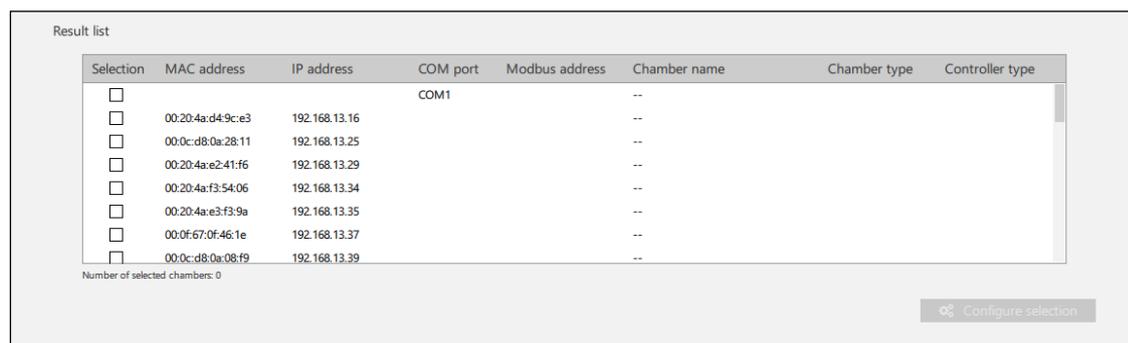
Select “**Start searching**”



The “Search status” bar indicates that existing COM ports and chambers connected via the Ethernet are being searched for.

Result list

Shows chambers that are connected via the COM port of the computer or the Ethernet.

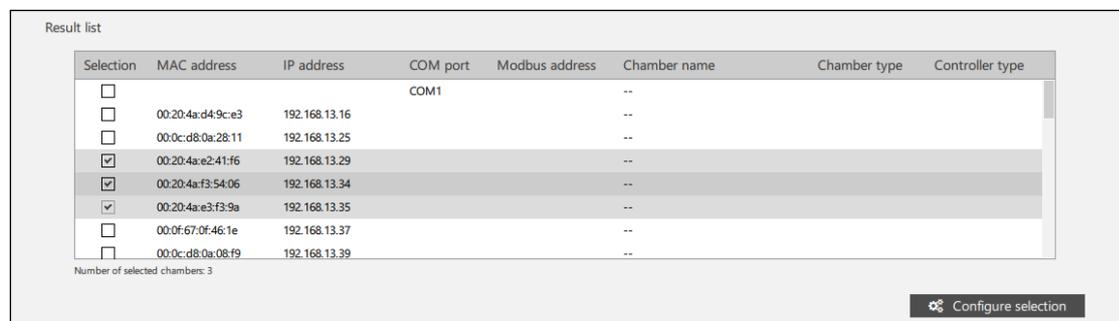


Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type
<input type="checkbox"/>			COM1	--	--		
<input type="checkbox"/>	00:20:4a:d4:9c:e3	192.168.13.16		--	--		
<input type="checkbox"/>	00:0c:d8:0a:28:11	192.168.13.25		--	--		
<input type="checkbox"/>	00:20:4a:e2:41:f6	192.168.13.29		--	--		
<input type="checkbox"/>	00:20:4a:f3:54:06	192.168.13.34		--	--		
<input type="checkbox"/>	00:20:4a:e3:f3:9a	192.168.13.35		--	--		
<input type="checkbox"/>	00:0f:67:0f:46:1e	192.168.13.37		--	--		
<input type="checkbox"/>	00:0c:d8:0a:08:f9	192.168.13.39		--	--		

Number of selected chambers: 0

In this menu you can either select the appropriate COM port of your computer, to which the selected chamber is connected, or directly address this chamber via its IP / MAC address, in the event that it is equipped with an internal Ethernet interface or is connected via the W&T Ethernet / RS422-RS485 converter.

You can select and simultaneously create several chambers.



Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type
<input type="checkbox"/>			COM1	--	--		
<input type="checkbox"/>	00:20:4a:d4:9c:e3	192.168.13.16		--	--		
<input type="checkbox"/>	00:0c:d8:0a:28:11	192.168.13.25		--	--		
<input checked="" type="checkbox"/>	00:20:4a:e2:41:f6	192.168.13.29		--	--		
<input checked="" type="checkbox"/>	00:20:4a:f3:54:06	192.168.13.34		--	--		
<input checked="" type="checkbox"/>	00:20:4a:e3:f3:9a	192.168.13.35		--	--		
<input type="checkbox"/>	00:0f:67:0f:46:1e	192.168.13.37		--	--		
<input type="checkbox"/>	00:0c:d8:0a:08:f9	192.168.13.39		--	--		

Number of selected chambers: 3

- **Connection of chambers with RS422 / RS485 interface via RS232 / RS422 Phoenix converter, RS232 / RS422-RS485 W&T converter, or USB / RS422-RS485 W&T converter:**
 - Select the COM connection of the computer to which the converter is plugged for all chambers.
 - The chambers are recognized by their RS422 / RS485 MOD bus addresses

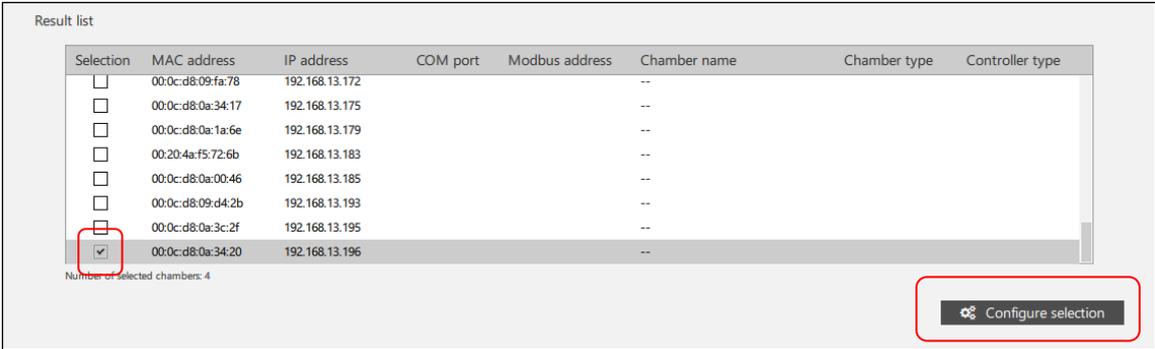
- **Connection of chambers with RS422 / RS485 interface via the external Ethernet converter W&T (TCP port 8000):**
 - Select the MAC address of the converter.
 - The chambers are recognized by their RS422 / RS485 MOD bus addresses.
 - APT-COM™ 4 uses UDP port 8513 to locate the chambers. A broadcast telegram is sent in the process. When APT-COM communicates with the chambers through a firewall, it must be ensured that this port is open.
- **Connection of chambers with Ethernet interface and MB1, MB2, RD3, R4, RD4 controller (TCP port 10001):**
 - Select the MAC address indicated on the chamber or in the controller.
 - The chambers are recognized through their IP addresses.
 - APT-COM™ 4 uses UDP port 30718 to locate the chambers. A broadcast telegram is sent in the process. When APT-COM communicates with the chambers through a firewall, it must be ensured that this port is open.
- **Connection of chambers with Ethernet interface and T4.12 controller (BCW) (TCP Port 9000):**
 - APT-COM™ 4 uses UDP port 9001 to locate the chambers. A broadcast telegram is sent in the process. When APT-COM communicates with the chambers through a firewall, it must be ensured that this port is open.

Note regarding networking via the Ethernet:

APT-COM™ 4 saves the relevant IP address for each chamber. In the event of a changed IP address, communication with the chamber is no longer possible. It must first be created again.

- The IP address for each chamber must thus be assigned permanently via the DHCP server.
- In the event that no IP address is recognizable for the selection of the IP address (representation IP 0.0.0.0), this means that no IP address has as of yet been assigned for the relevant chamber. In the case of chambers with an internal Ethernet interface (Lantronix X-Port), you can, for example, assign the IP address yourself with the Lantronix DeviceInstaller software (Ch. 2.2).
- In the event of a chamber with a T 4.12 controller (BINDER Controller World) with Ethernet interface, additional information on the chamber type and controller is displayed.

Select the desired chambers by marking the check box under “Selection” and start the configuration with the **“Configure selection”** button.



The screenshot shows a 'Result list' window with a table of chamber data. The table has columns for Selection, MAC address, IP address, COM port, Modbus address, Chamber name, Chamber type, and Controller type. One row is selected, and a 'Configure selection' button is visible at the bottom right.

Selection	MAC address	IP address	COM port	Modbus address	Chamber name	Chamber type	Controller type
<input type="checkbox"/>	00:0c:d8:09:fa:78	192.168.13.172			--		
<input type="checkbox"/>	00:0c:d8:0a:34:17	192.168.13.175			--		
<input type="checkbox"/>	00:0c:d8:0a:1a:6e	192.168.13.179			--		
<input type="checkbox"/>	00:20:4a:f5:72:6b	192.168.13.183			--		
<input type="checkbox"/>	00:0c:d8:0a:00:46	192.168.13.185			--		
<input type="checkbox"/>	00:0c:d8:09:d4:2b	192.168.13.193			--		
<input type="checkbox"/>	00:0c:d8:0a:3c:2f	192.168.13.195			--		
<input checked="" type="checkbox"/>	00:0c:d8:0a:34:20	192.168.13.196			--		

Number of selected chambers: 4

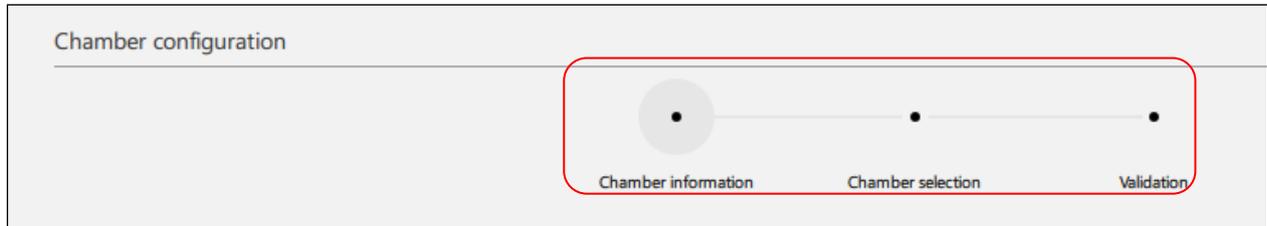
Configure selection

6.1.3 Configure selected chamber

Chamber configuration takes place in three steps:

- Entry of chamber information
- Selection of the device type
- Checking the entered data

For purposes of orientation, the phase you are presently in will be shown to you during these steps at the top in the window:



With **“Continue,”** the information is adopted and the configuration is continued. You can cancel the procedure with the **“Finish configuration”** button.

1st step: Chamber information

IP address and MAC address of the chamber are displayed. You can enter a chamber name and the serial number of the chamber.

The **Chamber name** can be chosen as desired. It can have a maximum length of 240 characters and may consist of numbers and letters, as well as empty spaces. Each name may only be used once.

The **Serial number** may have the syntax XX-YYYYY or XXXYYYYYYYYYYY.

To the next step with **“Continue.”**

Chamber information

Chamber name:

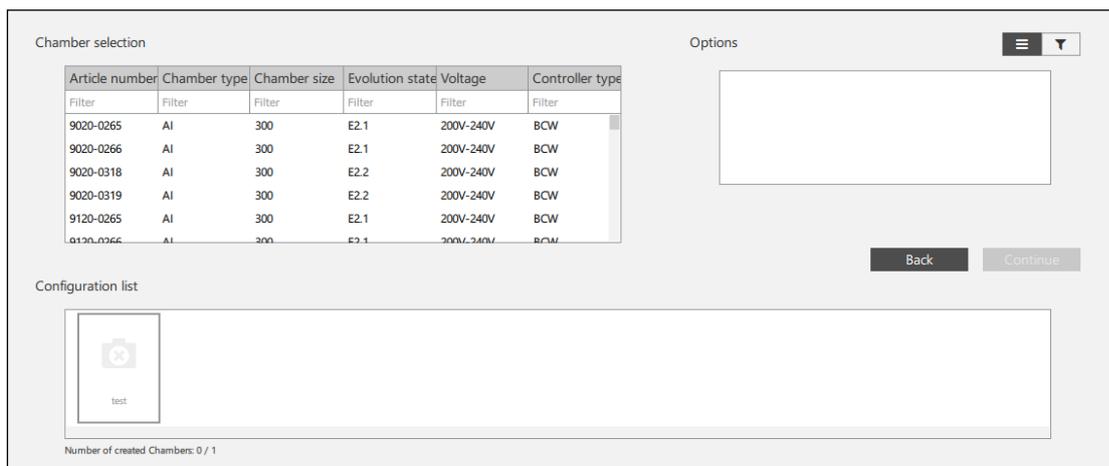
IP address:

MAC address:

Serial number:

2nd step: Chamber selection

A list of all of the BINDER chambers available in APT-COM 4 is shown. Select the appropriate chamber type by scrolling.



The screenshot shows the 'Chamber selection' screen. It features a table of chamber specifications, an 'Options' section with a search box, and a 'Configuration list' section with a 'test' button. At the bottom, it shows 'Number of created Chambers: 0 / 1'.

Article number	Chamber type	Chamber size	Evolution state	Voltage	Controller type
Filter	Filter	Filter	Filter	Filter	Filter
9020-0265	AI	300	E2.1	200V-240V	BCW
9020-0266	AI	300	E2.1	200V-240V	BCW
9020-0318	AI	300	E2.2	200V-240V	BCW
9020-0319	AI	300	E2.2	200V-240V	BCW
9120-0265	AI	300	E2.1	200V-240V	BCW
0120-0266	AI	300	E2.1	200V-240V	BCW

Filter:

Under **“Chamber selection”** you can enter some information about the chamber into the list in order to find your chamber quickly:

- Article number (e.g. 9020-0322)

- Chamber type (e.g. KBF)
- Chamber size (e.g. 240)
- Development status (e.g. E6)
- Voltage variants (e.g. 200-230 V)
- Controller type (e.g. MB2)

Chamber selection

Article number	Chamber type	Chamber size	Evolution state	Voltage	Controller type
Filter	KB	Filter	Filter	Filter	Filter
9020-0067	KB	720	E3	230V	RD3
9020-0069	KB	53	E3	230V	RD3
9020-0071	KB	115	E3	230V	RD3
9020-0073	KB	240	E3	230V	RD3
9020-0075	KB	400	E3	230V	RD3

Example: Selection with 1 filter:
Chamber type: KB

Chamber selection

Article number	Chamber type	Chamber size	Evolution state	Voltage	Controller type
Filter	KBF	240	E6	Filter	Filter
9020-0322	KBF	240	E6	200V-230V	MB2
9120-0322	KBF	240	E6	200V-230V	MB2
9020-0332	KBF LQC	240	E6	200V-230V	MB2
9020-0333	KBF LQC UL	240	E6	200V-240V	MB2
9120-0332	KBF LQC	240	E6	200V-230V	MB2
9120-0333	KBF LQC UL	240	E6	200V-240V	MB2

Example: Selection with 3 filters:
Chamber type: KBF
Chamber size: 240
Development status: E6

Under “**Options**” you can select the optional equipment of the chamber. Only chamber types equipped with these options will be displayed in the chamber list.

	Hide options
	Show options

Options ☰ ▼

Options ☰ ▼

Time program
 Week program
 Interpreted time program
 Interpreted week program

Then mark the desired chamber to select it. An illustration of the chamber appears in the “Configuration list.” The possible equipping of this chamber type is shown to you under “Options.” This also includes existing program functions of the chamber

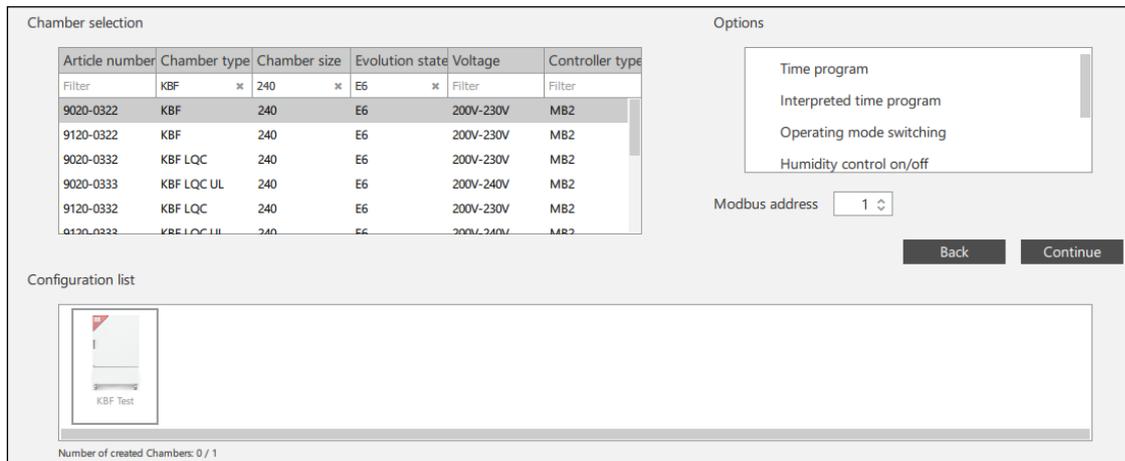
Hint: Article numbers that start with “90...” refer to a standard setting of the chamber. Article numbers that begin with “91...” are assigned to option chambers.

Entry of the chamber address (RS422 or RS485 modbus address)

Depending upon the chamber type, you can enter the chamber address that was previously assigned in the controller of the chamber under “Modbus address”.

- Chambers with RS422 or RS485 interface: Chambers that are connected via the same COM port must each receive their own RS422 or RS485 modbus address. This address (Ch. 2.1) individually assigned at the controller is now entered under “Modbus address.” In the event that the entered address has already been assigned in combination with the COM port, a corresponding error message appears during the check.

- Chambers with BCW controller T4.12 and Ethernet interface: There is no input window here.
- Chambers with integrated Ethernet interface (except with BCW T4.12 controller): The default setting of the address in the chamber controller and in APT-COM™ 4 is “1.”



Article number	Chamber type	Chamber size	Evolution state	Voltage	Controller type
9020-0322	KBF	240	E6	200V-230V	MB2
9120-0322	KBF	240	E6	200V-230V	MB2
9020-0332	KBF LQC	240	E6	200V-230V	MB2
9020-0333	KBF LQC UL	240	E6	200V-240V	MB2
9120-0332	KBF LQC	240	E6	200V-230V	MB2
9120-0333	KBF LQC UL	240	E6	200V-240V	MB2

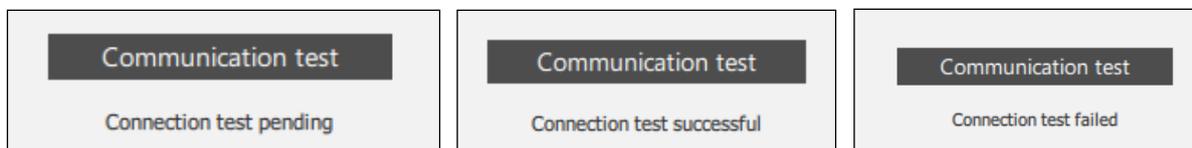
To the next step with “**Continue**”.

3rd step: Check

The entered data is displayed in the following view. You can carry out a communications test. APT-COM 4 also checks whether the entered data has already been used before and if it is plausible.

Communications test

With the “**Communication test**” button you can test whether all data has been correctly entered and whether the computer or APT-COM™ 4 has a connection with the chamber.



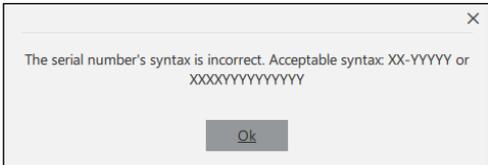
To the next step with “**Continue**”.

Error messages

In the event that the entered chamber information (1st step) is incorrect, an error message with a reference to the cause will be issued. In this case, the input window “Information” (1st Step) appears again. Enter the correct data.

Possible errors:

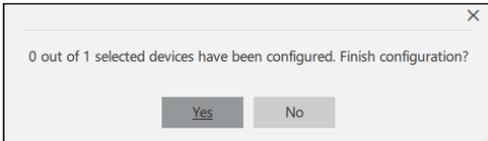
- Impermissible syntax of the serial numbers
- Chamber name already used
- IP address already used





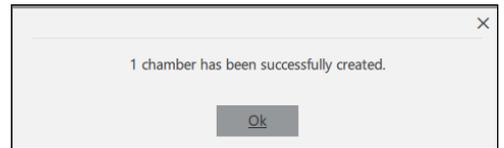
Cancel configuration

With the “Finish configuration” button, you can stop the creation of a new chamber at any time. A confirmation message follows.



Confirmation

A confirmation message appears when all data is correct. The chamber has been created.



All chambers connected to the APT-COM™ 4 computer are thus configured consecutively and the connection is tested.

All created chambers are subsequently displayed in the chamber overview. In the event that several chambers have been configured, you can select any chamber by clicking the line and have the information displayed.

6.2 Display chambers

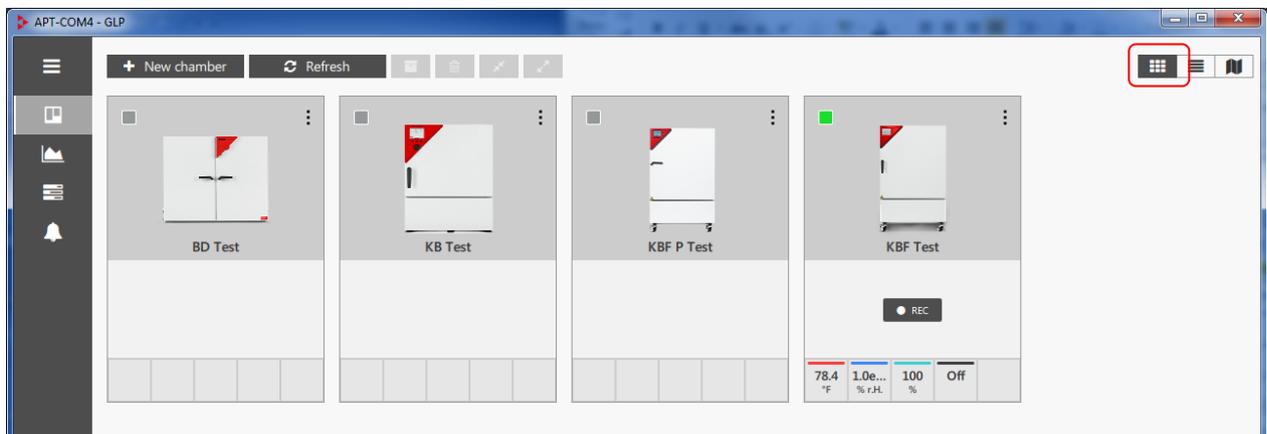
Required authorization: Basic / Advanced / Administrator

All created chambers are displayed in the “Chamber overview”.

	Chamber overview (Standard view)
	Chamber list: Tabular representation
	Floor plan, see Ch. 6.5
	Open context menu (in the individual chamber windows)

6.2.1 Standard view

This clearly structured representation shows all created chambers in individual chamber windows.



Active chambers (meaning a connection exists between controller and APT-COM) are identified by a green signal. The actual values are shown directly in the overview representation. A settings menu is called up by clicking on a value. A quick recording is possible.

To activate and deactivate the connection, please refer to Ch. 7.1.4.

Change to the floor plan view: As soon as a chamber is represented in the room plan, a change to its representation in the floor plan can be made by clicking on the chamber.

Quick recording: As soon as a connection with the created chamber exists, the immediate recording can be started with the “**REC**” button. This takes place with a click, without a recording having to be created.

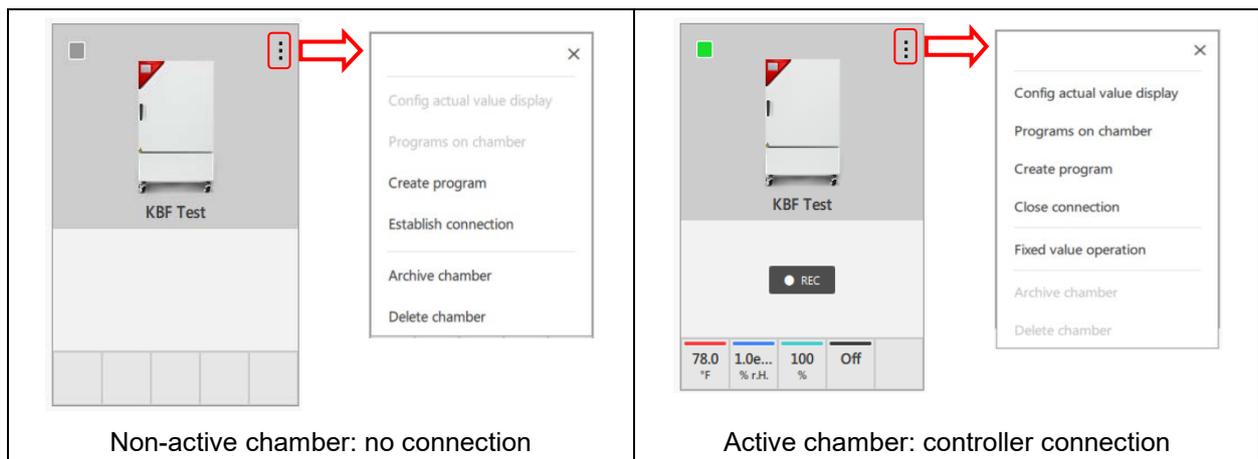
	Archive symbol: Archive chamber
	Delete symbol: Delete chamber

	Establish connection (for non-active chambers)
	Disconnect connection (for active chambers)

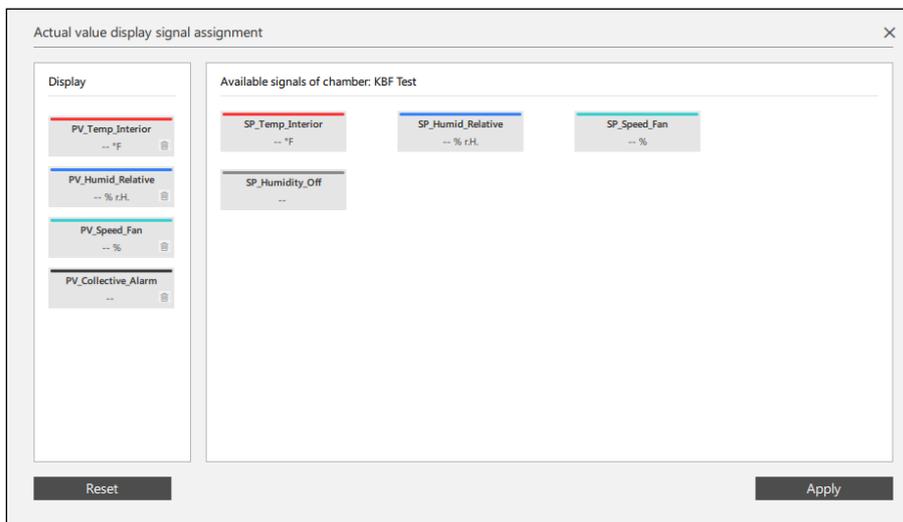
It is possible to select several chambers and then perform the desired function for these chambers together.

Context menu

Irrespective of whether a connection with the created chamber exists, the available functions in the context menu differ.



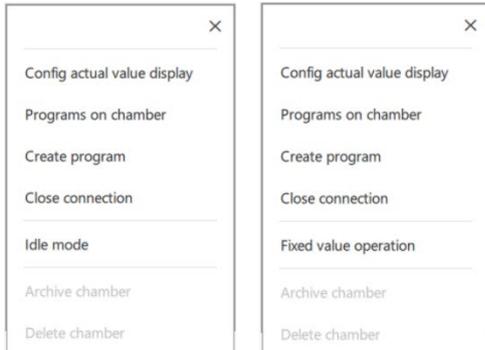
- Select **“Configure actual value display”**. The window **“Actual value display signal assignment”** opens. You can move the parameters to be displayed in the chamber window by drag-and-drop. Select button **“Apply”** to adopt the changes.



- **“Programs on chamber”**: The window **“Programs on chamber”** shows the current programs on the chamber controller. They can be transferred to APT-COM™ 4 (Ch. 12.2.1) and started via APT-COM™ 4 in the chamber controller and will then run completely on the chamber (Ch. 12.3.1).
- **“Create program”**: You go to the menu **“Program settings”** where you can configure a program (Ch. 12.1.1).
- Use **“Close connection”** and **“Establish connection”** to activate and deactivate the connection to the chamber controller (Ch. 7.1.4).
- Select **“Archive chamber”** to archive the chamber (Ch. 6.3).
- Select **“Delete chamber”** to delete the chamber (Ch. 6.4).

Chambers with RD4 / MB1 / MB2 controller:

- When the chamber is in fixed value operating mode, select **“Idle mode”** to change to “Idle mode” operating mode. This is then indicated by a standby symbol. 
- When the chamber is Idle mode, select **“Fixed value operation”** to change to fixed value operating mode. This is then indicated by a hand symbol. 



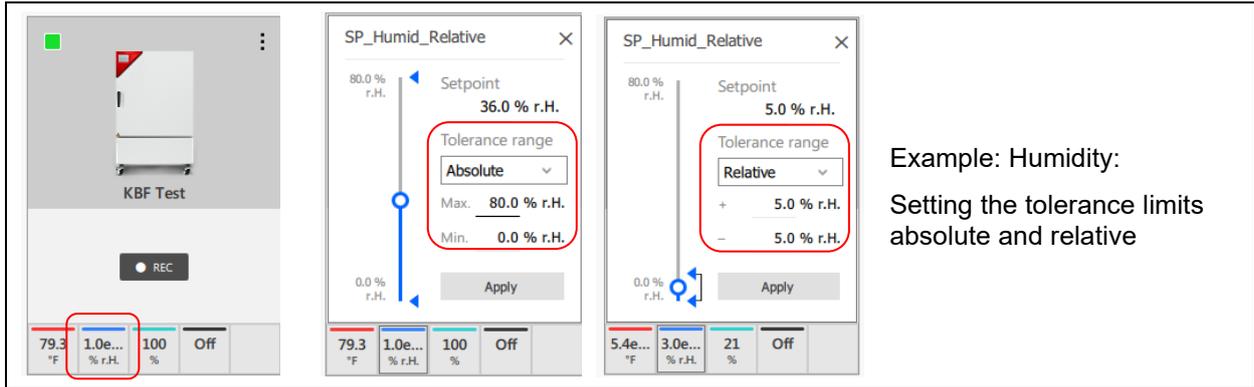
This function is not available for UF V (E3).

Setpoint value entry and definition of limit values

In the case of active chambers, the settings menu for these parameters are called up by clicking on a parameter in the representation of the actual values. With this, the values can be changed directly in the overview representation.

- **“Setpoint”**: Numerical entry or setting with the slider bar. A reason (minimum length of 20 characters) must be entered for manual setpoint changes.
- **“Tolerance range”**: Entry of limit values (minimum and maximum value). Setpoint values can then no longer be set outside of these limits.

		<p>Example: Temperature Setting the setpoint value</p>
		<p>Example: Humidity: Setting the setpoint value and tolerance limits</p>



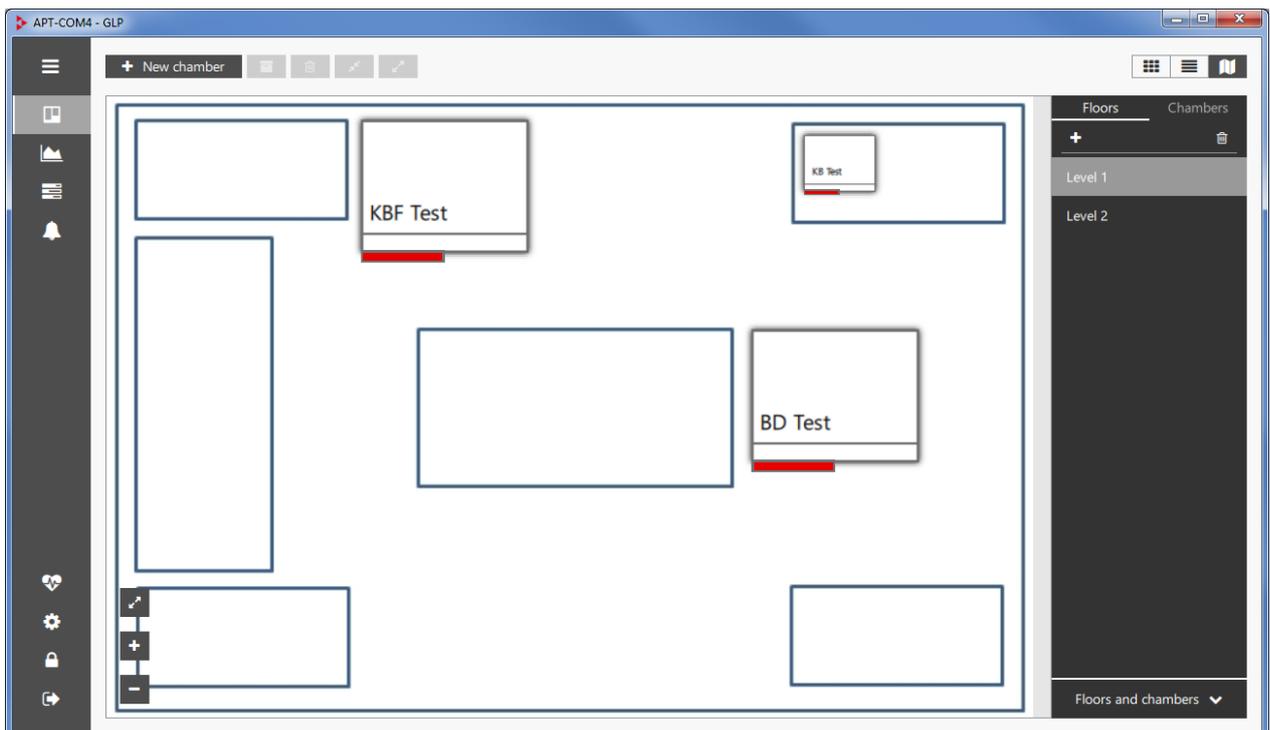
Select button “**Apply**” to adopt the changes.

6.2.2 List view



Active chambers (meaning a connection exists between controller and APT-COM): These are identified by a green signal and the chamber status “Online” or “Connecting....”

6.2.3 Floor plan view



For configuration see Ch. 6.5.

6.3 Archiving and restoring a chamber

	Archive chamber
	Show archive
	Hide archive

Recordings are always linked with the respective chamber. All related recordings must therefore also be deleted when deleting a chamber. If you would like to retain the recordings, you can archive the recordings (Ch. 7.1.5) and the chamber.

Archiving chambers

- In the standard overview representation: Call up the context menu (Ch. 6.2.1) and select “Archive chamber”.
- In the standard overview representation or list representation: Mark the chamber and then click on the archive symbol.



+ New chamber						
Chamber name	Chamber state	Recording	User name	Location	Interface	Cha
<input type="checkbox"/> BD Test	Connecting...	--	--		111.111.222.33	▼
<input checked="" type="checkbox"/> KB Test	Connecting...	--	--		111.222.33.44	▼
<input type="checkbox"/> KBF P Test	Connecting...	--	--		111.111.33.55	▼
<input type="checkbox"/> KBF Test	Online	--	--		192.168.13.192	▼

The chamber is no longer displayed in the overview list.

Restoring chambers

Select the “Archive” button. The archived chambers are displayed in an overview list.



Restore						
Chamber name	Chamber state	Recording	User name	Location	Interface	Cha
<input type="checkbox"/> KB Test	Connecting...	--	--		123.123.12	Restore ▼

Mark the desired chamber in the overview list and select the “Restore” button.

6.4 Delete chamber

! End all recordings for this chamber before deleting a chamber, disconnect the connection, and delete all recordings that use this chamber (Ch.7.1.6)

- In the standard overview representation: Call up the context menu (Ch. 6.2.1) and select “Delete chamber”.
- In the standard overview representation or list representation: Mark the chamber and then click on the delete symbol.



Chamber name	Chamber state	Recording	User name	Location	Interface	Cha
<input type="checkbox"/> BD Test	Connecting...	--	--		111.111.222.33	▼
<input checked="" type="checkbox"/> KB Test	Connecting...	--	--		111.222.33.44	▼
<input type="checkbox"/> KBF P Test	Connecting...	--	--		111.111.33.55	▼
<input type="checkbox"/> KBF Test	Online	--	--		192.168.13.192	▼

Please state a reason for deletion:

Cancel Ok

Please state a reason for deletion:

xx

Cancel Ok

You will then be prompted to enter a reason for the deletion of the chamber. This must be at least 20 characters long, or an error message will appear. The reason will be saved in the system log.

Unable to delete chamber KBF Test, deletion comment must have at least 20 characters

Ok

Then click on the “Ok” button. The chamber is deleted.

Chambers with an active connection:

As long as there is an active connection to the chamber controller, the chamber cannot be deleted in APT-COM™ 4.

Deactivate the connection (Ch. 7.1.4). Then you can delete the chamber.

Chambers in current recordings:

A chamber cannot be deleted when it is used in a recording. A corresponding error message appears.

Go to the “Recordings” menu and delete the recording. Then you can delete the chamber.

Chambers with active alarms in the event list:

Active alarms are automatically deleted from the event list. The deleted alarms are recorded in the system log.

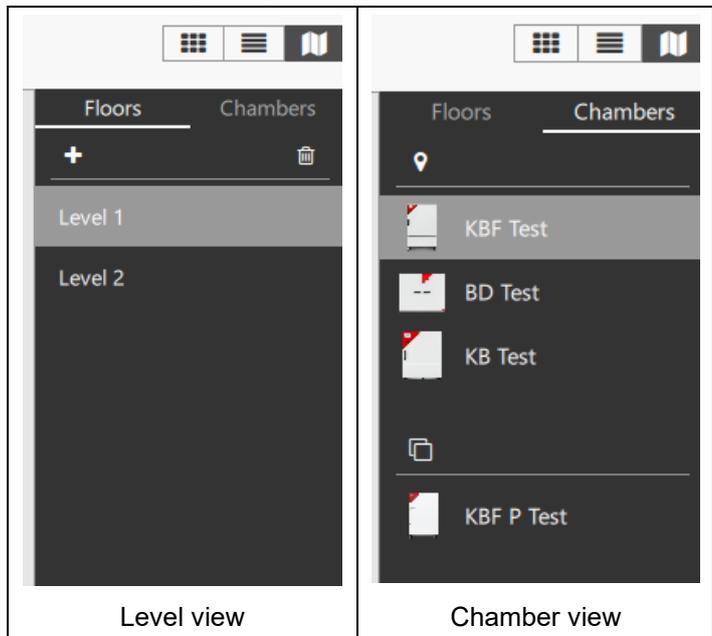
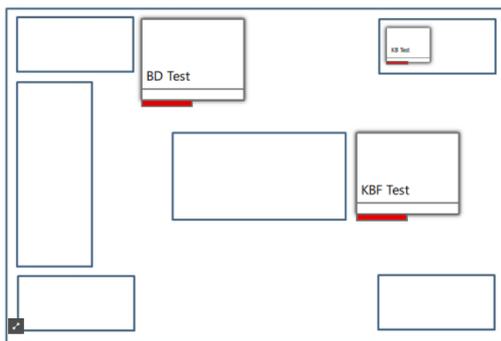
6.5 Floor plan



The floor plan can be easily created and configured. Various setup areas (levels) can be created. An image file (.jpg) is thereby loaded for each room. The chambers can then be placed in this background view. This makes it possible to quickly find a particular chamber. With a double-click on a chamber in the floor plan it is possible to configure this in the standard view of the chamber overview. Conversely, from there you can change back to the representation of the chamber in the floor plan by clicking on the chamber.

In the **level view** it is possible to create various rooms or levels.

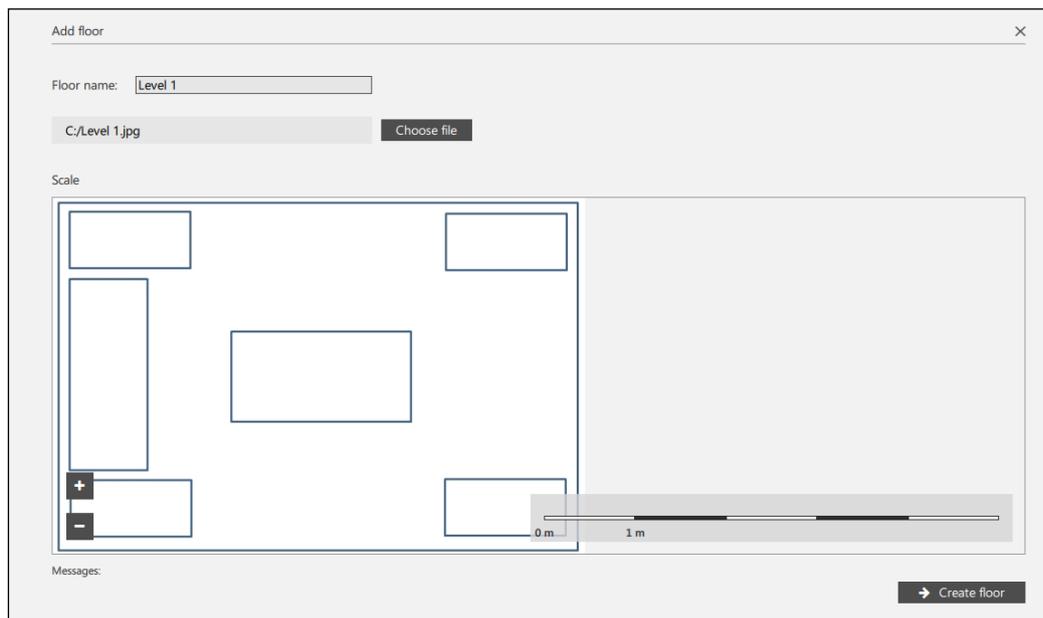
The created chambers are represented in the **chamber view**. They can be placed in the levels.



6.5.1 Create level

In the level view, select the “+” symbol to create a new level and to go to the “Add floor” menu.

- **“Floor name”**: Enter a name for the setup area.
- **“Choose file”**: Here you can load the desired background image.
- **“Scale”**: Choose the desired scale of the illustration.



Then select the **“Create floor”** button.
 The level will now be displayed in the level view.



6.5.2 Delete level

In order to delete a level, mark the desired level in the level view and click on the **“Delete”** button.
 The level is removed from the list.



6.5.3 Layout of the chambers in the room plan

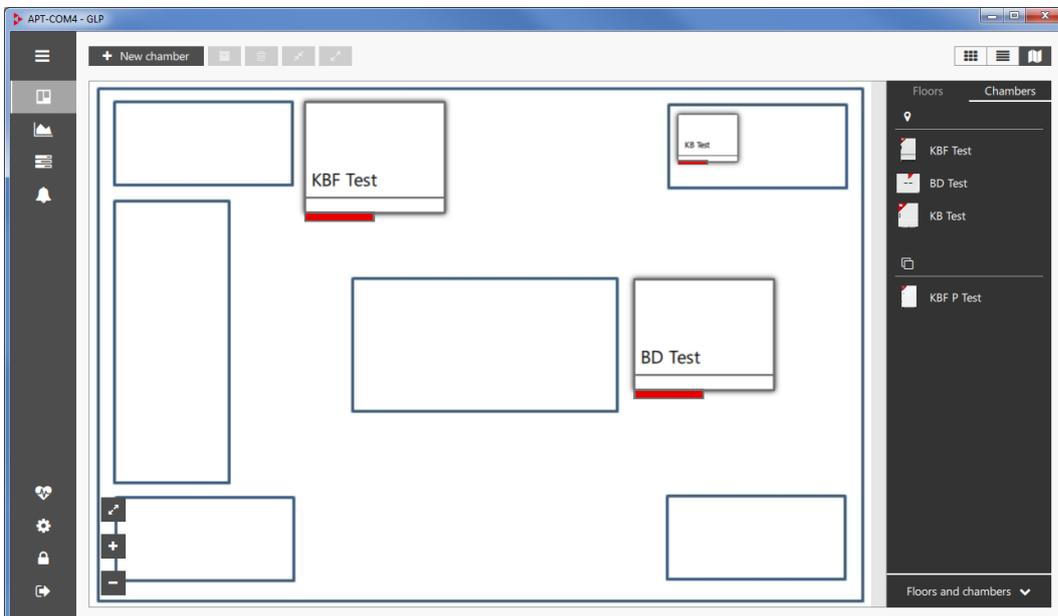
Change to the chamber view. You can see all created chambers on the right side of the window.

	Location symbol: Chambers that have already been placed on a level
	Level choice symbol: Chambers that cannot yet be placed on arbitrary levels

	<p>Already placed chambers are represented under the location symbol.</p> <hr/> <p>Chambers that can still be placed on arbitrary levels in the floor plan are represented under the level choice symbol</p>
<p>Example: Level 1 Level 2</p>	

Place chamber in the room plan

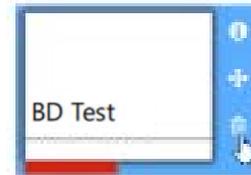
Drag the desired chambers into the plan with the mouse and place them at the desired location.



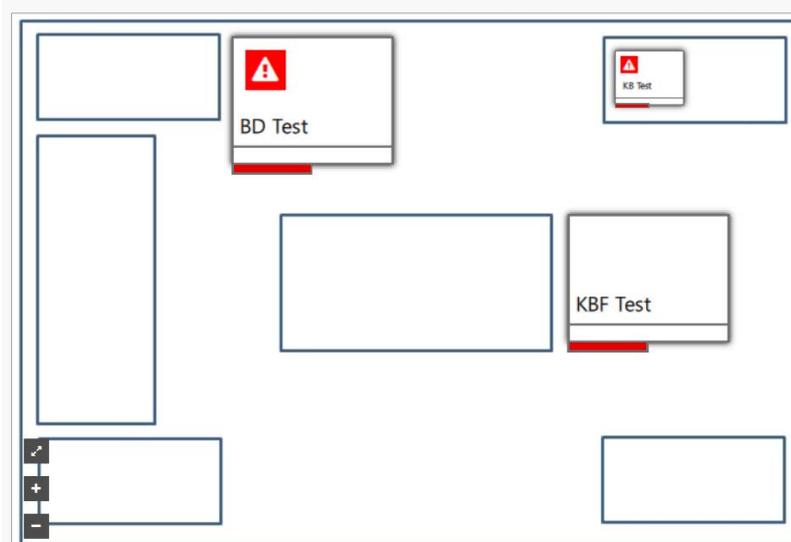
Relocate chamber in the room plan

In order to retroactively relocate a chamber, click on the chamber and relocate it with the plus symbol.

To delete a chamber, click on the trash can icon.

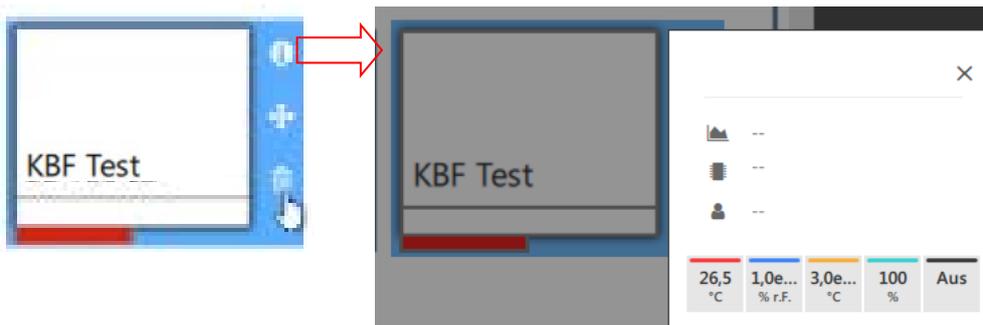


Display of alarm messages



Display of nominal and actual values

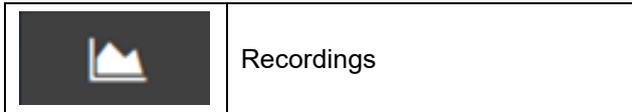
Click on the chamber and select the "i" button.



Remove chamber from the room plan

In order to remove a chamber from the room plan, simply drag it out of the plan. It will then once again be displayed underneath the level choice symbol on the right side of the window and is available for renewed placement on any level desired.

7. Recordings



Functions: Documentation and graphic representation of the recording values for all parameters (temperature, relative humidity, pressure, CO₂, O₂, controller outputs...) of up to 100 connected chambers

Graphic representation of the recording values

- Recordings of all chambers, combination via meta-recordings
- Display of the remaining time until the next recording value
- The representation can be chosen freely. Line type and line colors can be set
- Freely scalable
- Range information: Following the selection of two points, the resulting delta, the time and the minimal and maximal values are displayed.

Comments

- Notes concerning data points can be added to the graphic.

Alarms

- Alarms are represented in the graphic. The period of time is marked

Setting options

- Setpoint values and switching states of the control contacts can be set directly

7.1 Create and manage recordings

In the overview window, change to the "Recordings" view.

 Recording	Create a new recording
 Rec. based on controller da	Create a new recording from data already found in the controller
 Stop All	Stop all recordings

	Start selected recordings
	Stop selected recordings
	Archive selected recordings
	Delete selected recordings
	Create meta-recording from the selected recordings
	Create reports for the selected recordings (see Ch. 10.2)
	Expand (detail view)
	Collapse (overview representation)

7.1.1 Create new recording for an active chamber

Required authorization: Basic

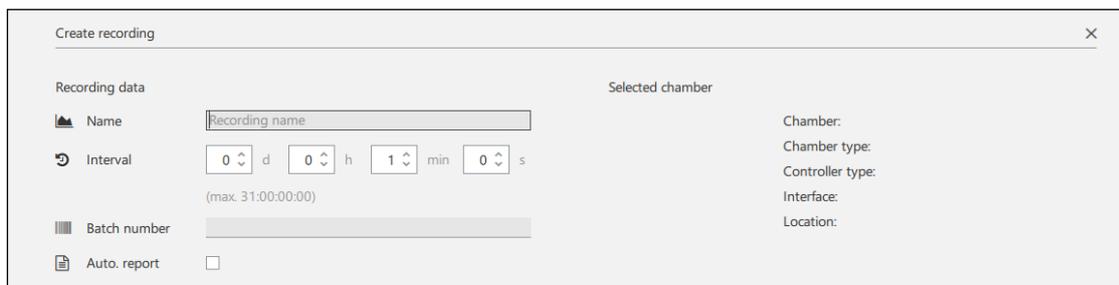
This menu serves the purpose of creating recordings in APT-COM™ 4. At least one chamber must be created prior to this (Ch. 6.1) in order to be available for recordings.

To create a new recording, select the “+ Recording” button in the “Recordings” view and go to the “Create recording” menu.

Configure recording

Enter the following information to configure the new recording:

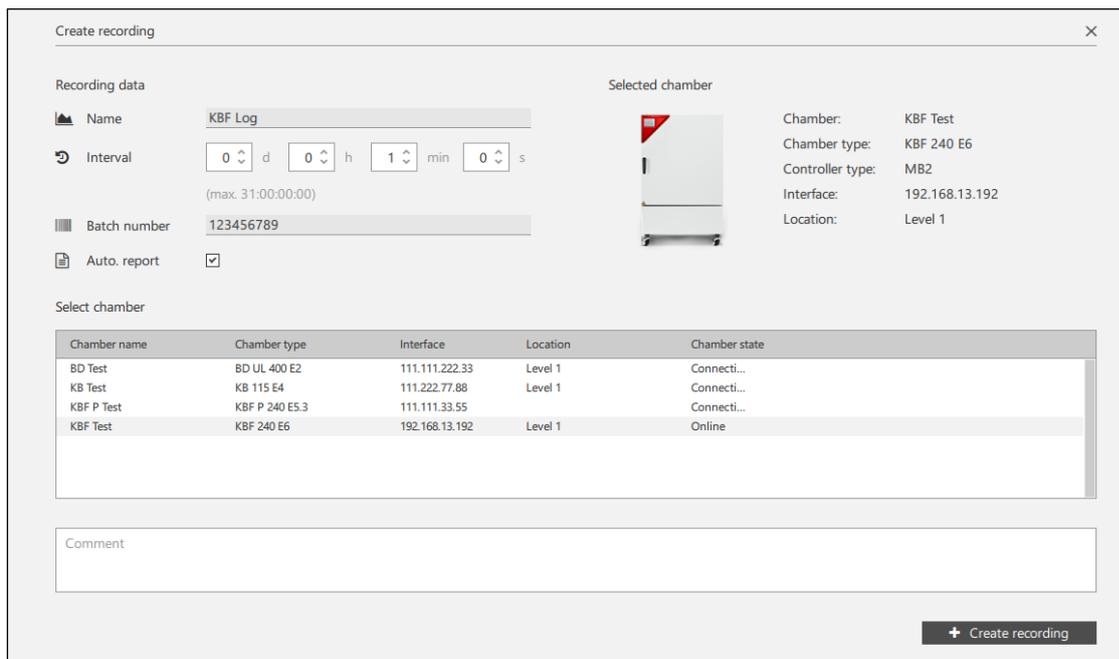
- “**Name**”: Enter the recording under the desired name.
- “**Interval**”: you can enter how often data is read from the chamber controller and saved (default value: 1 minute). Minimum: 1 minute.
- “**Batch number**”: Here you can enter any information for the recording
- “**Auto. report**”: An automatic report is created when you activate the box. See Ch. 10.2.2.



Select chamber

Under “Select chamber,” select the chamber from the list of already created chambers for which the recording should be created. The selected chamber can be online or offline.

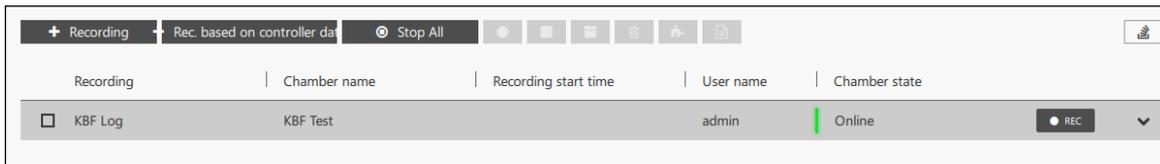
Information about this chamber is displayed under “Selected chamber.”



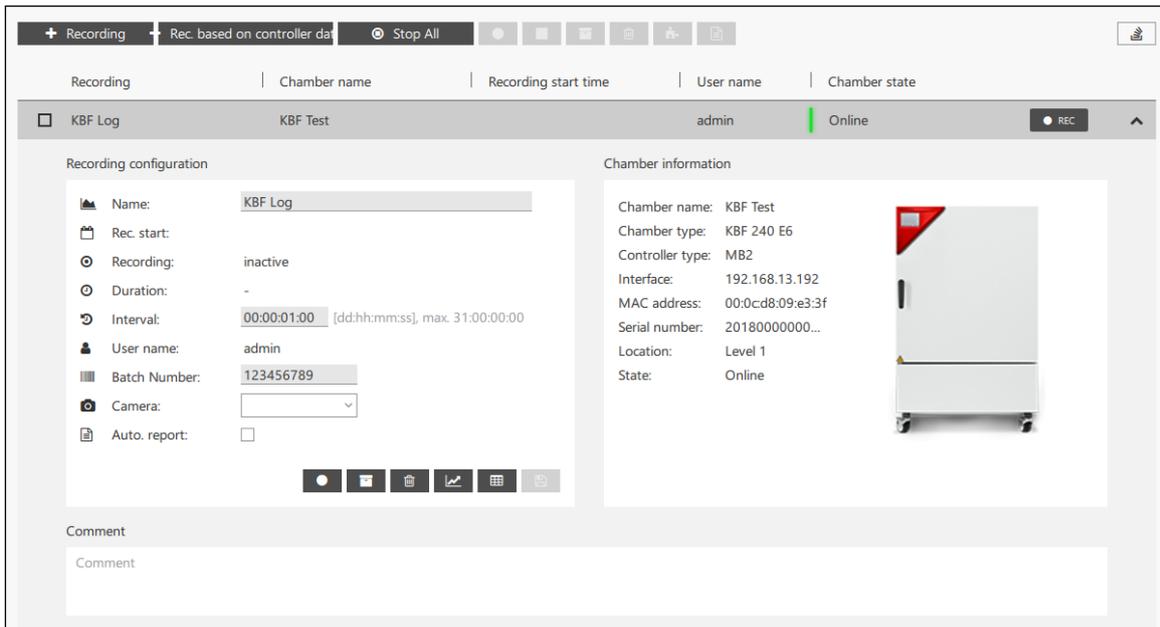
Chamber name	Chamber type	Interface	Location	Chamber state
BD Test	BD UL 400 E2	111.111.222.33	Level 1	Connecti...
KB Test	KB 115 E4	111.222.77.88	Level 1	Connecti...
KBF P Test	KBF P 240 E5.3	111.111.33.55	Level 1	Connecti...
KBF Test	KBF 240 E6	192.168.13.192	Level 1	Online

Then select the button “+ Create recording”.

The recording is now displayed in the list of recordings:



Select the “Expand” button to go to the detail view



- **“Name”**: Name of the recording
- **“Rec. start”**: Start of the recording
- **“Recording”**: active / inactive
- **“Duration”**: Duration of the recording
- **“Interval”**: Frequency of reading and saving data from the chamber controller
- **“User name”**: Name of the user who created the recording
- **“Batch number”**: Any entered information for the recording
- **“Camera”**: Selection of the USB camera

If access to the camera is prevented by the Windows settings, a corresponding notification message will be displayed

- **“Auto. report”**: Creation of an automatic report

7.1.2 Create a new recording from data already found in the controller

Required authorization: Basic

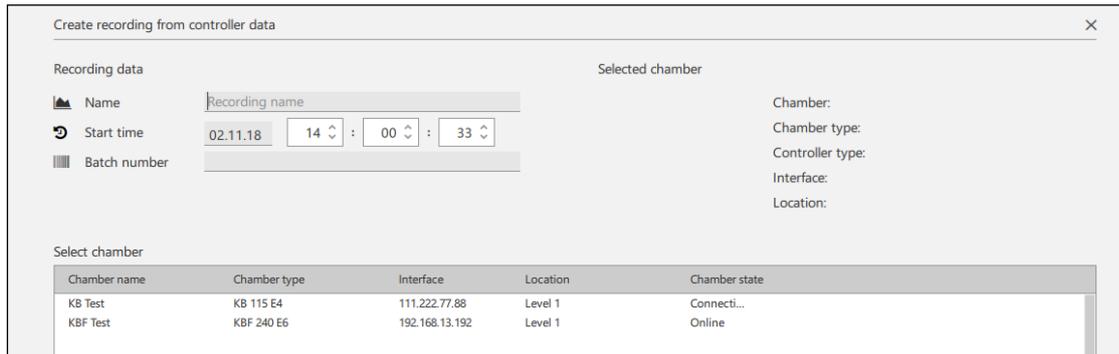
This function is only available for chambers that have controllers with internal memory. The data from this internal memory is read out and is then available in APT-COM 4 as a recording.

The desired chamber must have already been created (Ch. 6.1) in order to be available for the recording.

To create a new recording, select the **“+ Rec. based on controller data”** button in the “Recordings” view and go to the “Create recordings from controller data” menu.

Note: For reasons of data consistency, recordings from controller data can not be continued. The REC button remains inactive.

Configure recording



Chamber name	Chamber type	Interface	Location	Chamber state
KB Test	KB 115 E4	111.222.77.88	Level 1	Connecti...
KBF Test	KBF 240 E6	192.168.13.192	Level 1	Online

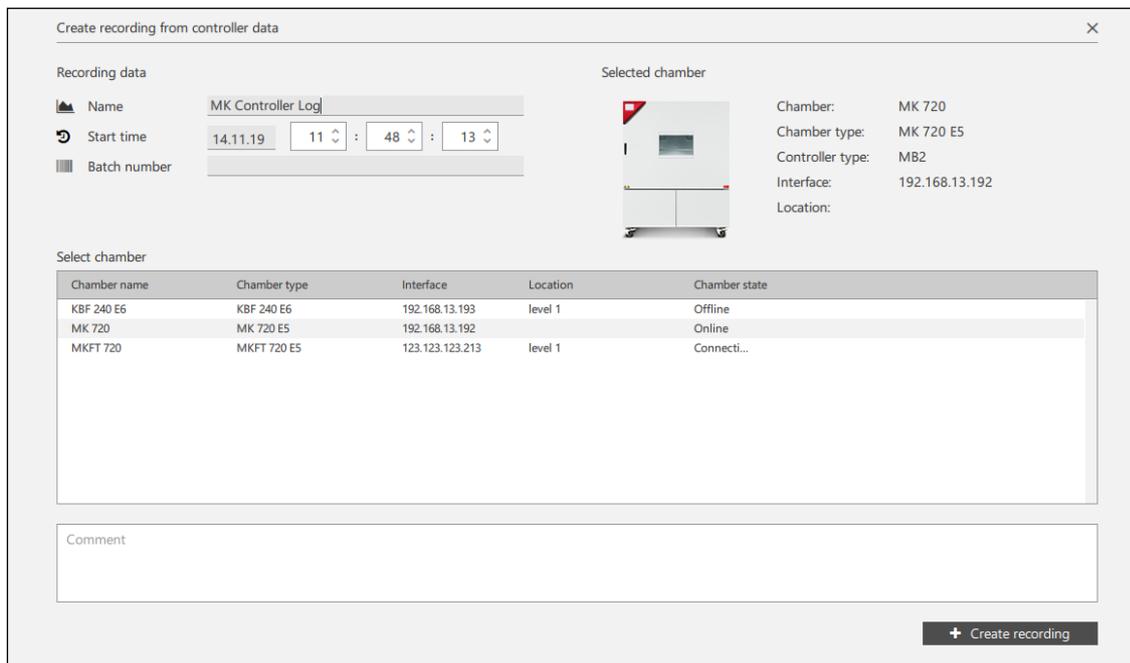
Enter the following information to configure the new recording:

- **“Name”**: Enter the recording under the desired name.
- **“Start time”**: Enter the date and time to define the commencement of the imported recording data.
- **“Batch number”**: Here you can enter any information for the recording

Select chamber

Under “Select chamber,” select the chamber from the list of already created chambers for which the recording should be created. The selected chamber can be online or offline.

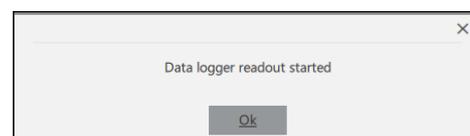
Information about this chamber is displayed under “Selected chamber.”



Chamber name	Chamber type	Interface	Location	Chamber state
KBF 240 E6	KBF 240 E6	192.168.13.193	level 1	Offline
MK 720	MK 720 E5	192.168.13.192		Online
MKFT 720	MKFT 720 E5	123.123.123.213	level 1	Connecti...

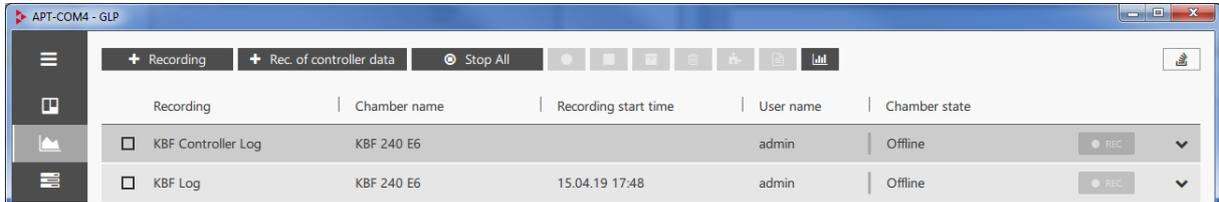
Then select the button “ **+ Create recording**”

An information window indicates that the recording creation has started.



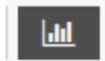
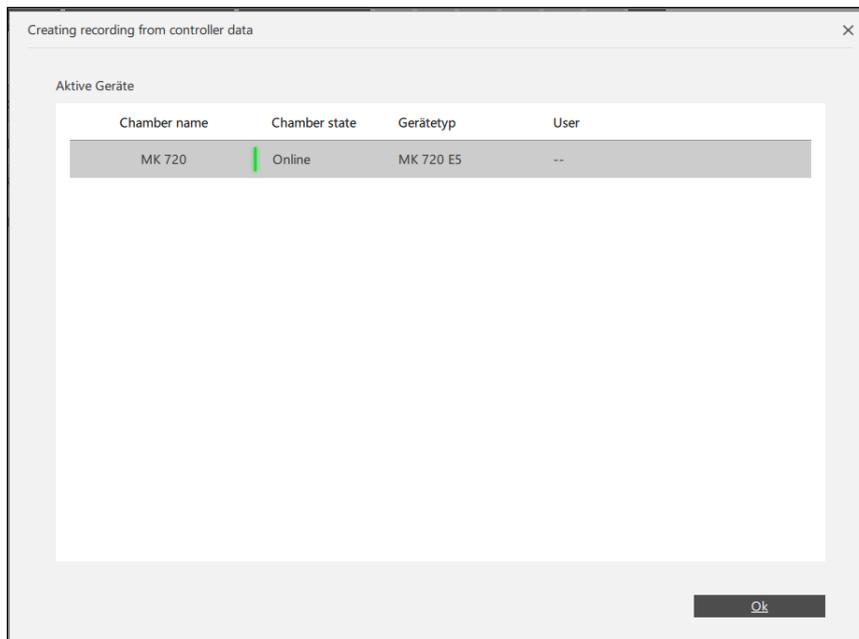
Representation of a recording creation in the recording view

During a recording creation from controller data the icon indicating a running recording creation is highlighted



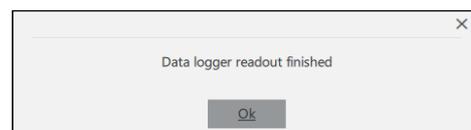
Recording	Chamber name	Recording start time	User name	Chamber state	
<input type="checkbox"/> KBF Controller Log	KBF 240 E6		admin	Offline	● REC
<input type="checkbox"/> KBF Log	KBF 240 E6	15.04.19 17:48	admin	Offline	● REC

Select this button. The information window “Creating recording from controller data” opens and indicates the running data transfers.

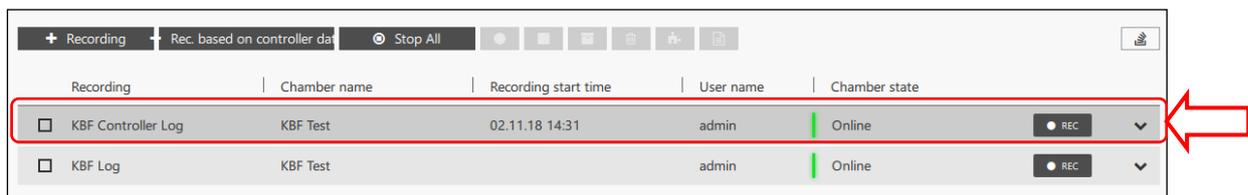



Chamber name	Chamber state	Gerätetyp	User
MK 720	Online	MK 720 E5	--

An information window indicates that the recording creation is finished.



The recording is now displayed in the list of recordings:



Recording	Chamber name	Recording start time	User name	Chamber state	
<input type="checkbox"/> KBF Controller Log	KBF Test	02.11.18 14:31	admin	Online	● REC
<input type="checkbox"/> KBF Log	KBF Test		admin	Online	● REC

7.1.3 Create meta-recording

In order to be able to directly compare the recordings of several chambers, these can be represented together in a meta-recording.

Examples:

- The recordings from one vacuum drying chamber and the vacuum pump can be linked with one another within the meta-recording.
- Several chambers with an identical work flow can be drawn together in one graphic. You can, for example, superimpose the temperature curves of all recordings on top of one another and determine any deviations at a glance.

Mark the desired recordings in the overview list and select the “Create meta-recording” button.



Recording	Chamber name	Recording start time	User name	Chamber state
<input checked="" type="checkbox"/> BD Log	BD Test		admin	Connecting...
<input type="checkbox"/> KB Controller Log	KB Test	02.11.18 14:35	admin	Connecting...
<input type="checkbox"/> KBF Controller Log	KBF Test	02.11.18 14:31	admin	Online
<input checked="" type="checkbox"/> KBF Log	KBF Test		admin	Online

The desired meta-recording is now displayed in the list of recordings:

Recording	Chamber name	Recording start time	User name	Chamber state
<input type="checkbox"/> BD Log	BD Test		admin	Connecting...
<input type="checkbox"/> KB Controller Log	KB Test	02.11.18 14:35	admin	Connecting...
<input type="checkbox"/> KBF Controller Log	KBF Test	02.11.18 14:31	admin	Online
<input type="checkbox"/> KBF Log	KBF Test		admin	Online
<input type="checkbox"/> Meta recording_KBF Log_B...			admin	

Select the “Expand” button to go to the detail view



Recording	Chamber name	Recording start time	User name	Chamber state
<input type="checkbox"/> BD Log	BD Test		admin	Connecting...
<input type="checkbox"/> KB Controller Log	KB Test	02.11.18 14:35	admin	Connecting...
<input type="checkbox"/> KBF Controller Log	KBF Test	02.11.18 14:31	admin	Online
<input type="checkbox"/> KBF Log	KBF Test		admin	Online
<input type="checkbox"/> Meta recording_KBF Log_B...			admin	

Meta recording configuration

 Name: Meta recording_KBF Log_BD Log

 User name: admin

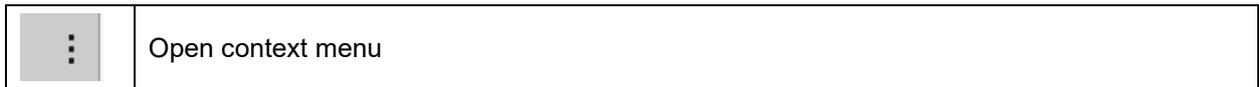
 Included: KBF Log
BD Log



Notes

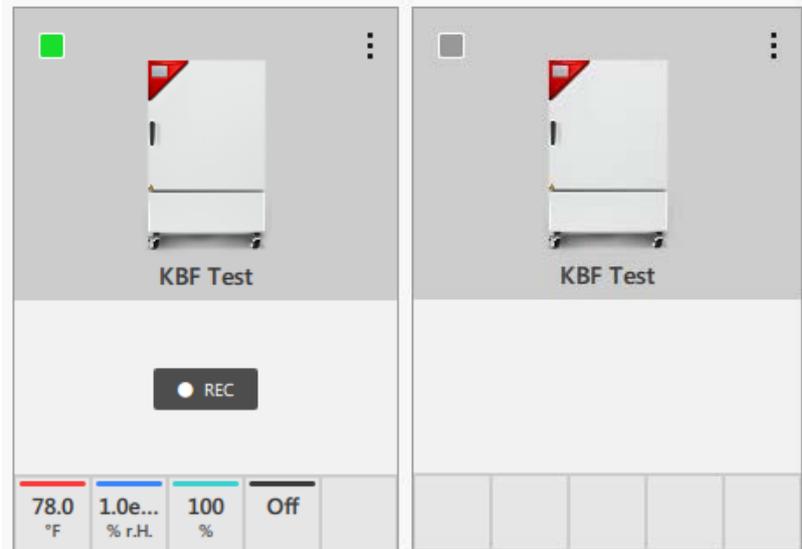
Notes

7.1.4 Activating and deactivating the connection to the chamber controller



Active connection:

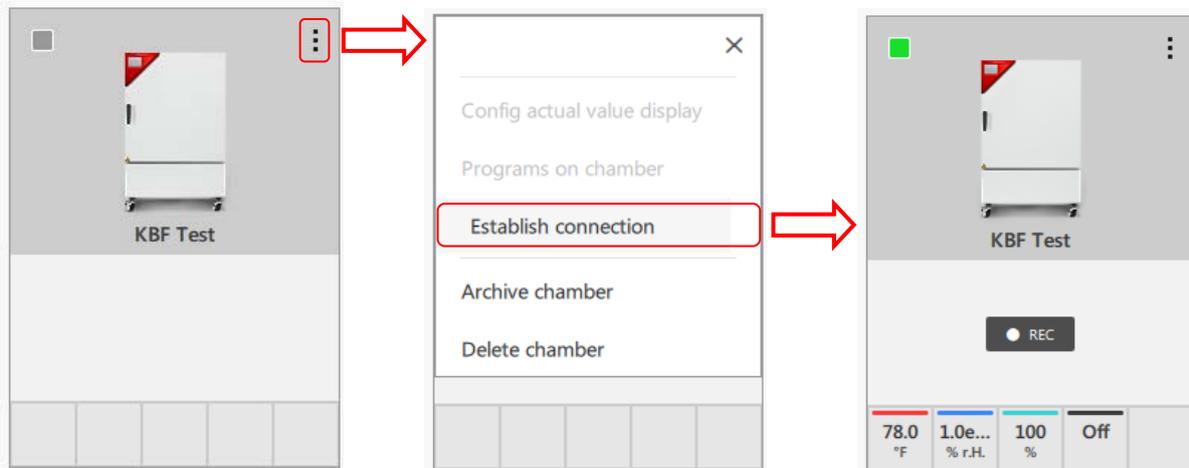
- The green indicator in the chamber window is lit
- The current values are shown below in the chamber window
- The “REC” button can be used to start a recording



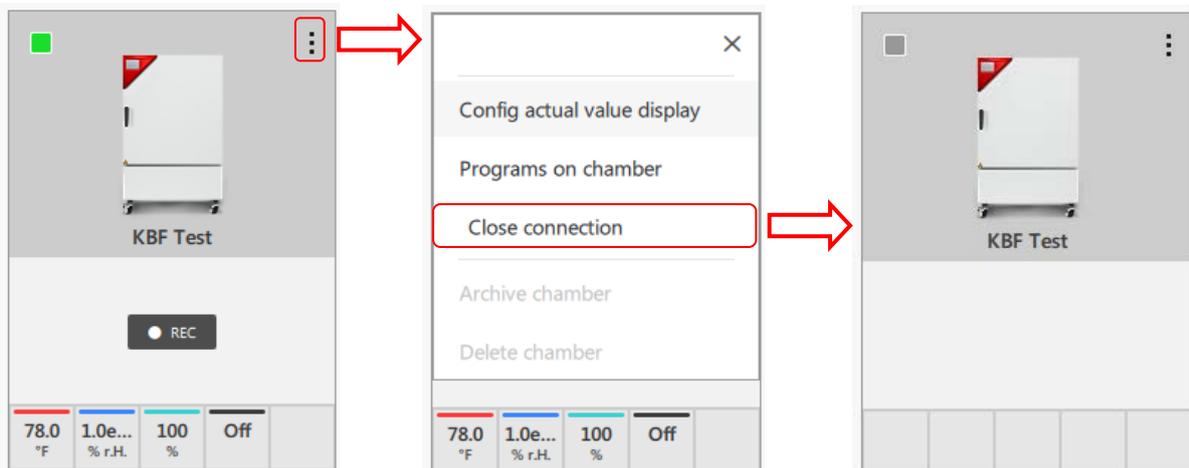
No connection:

- The green indicator in the chamber window is off or flashing slowly
- No values are shown in the chamber window

To establish the connection to the chamber controller, select the “Open context menu” button. In the context menu select “**Establish connection**”.



To disconnect the connection, select the “Open context menu” button. In the context menu select “**Close connection**”.



7.1.5 Archiving and restoring recordings

Recordings are always linked with the respective chamber. All related recordings must therefore also be deleted when deleting a chamber. If you would like to retain the recordings, you can archive the recordings and the chamber (Ch. 6.3).

	Archive recording
	Show archive
	Hide archive

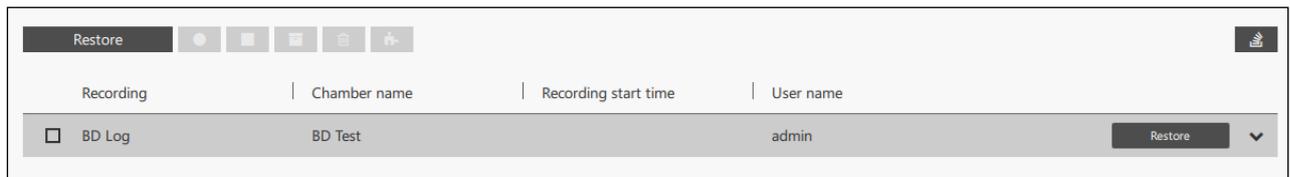
Archive recordings

Mark the desired recordings in the overview list and select the “Archive selection” button.



Restore recordings

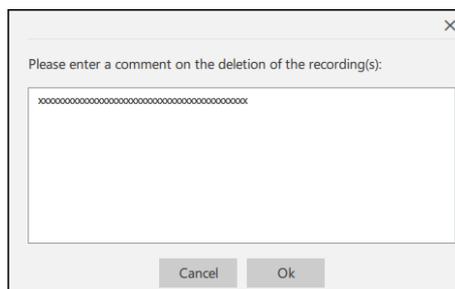
Select the “Archive” button. The archived recordings are displayed in an overview list.



Mark the desired recording in the overview list and select the “Restore” button.

7.1.6 Delete recordings

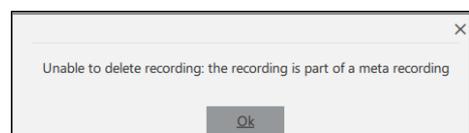
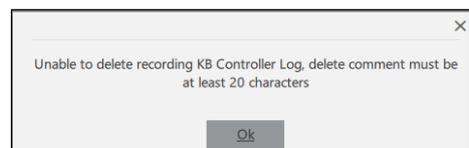
Mark the desired recordings in the overview list and select the “Delete selection” button.



You will then be prompted to enter a reason for the deletion of the recording(s). This must be at least 20 characters long, or an error message will appear. The reason will be saved in the system log.

If the recording is part of a meta-recording, it can not be deleted.

First delete the meta-recording.



Then click on the “**Ok**” button. The recording is deleted.

The recording is now no longer displayed in the list of recordings. All of the related recording data has been deleted!

Hint: All of the recordings belonging to a chamber must be deleted before the chamber can be deleted (Ch. 6.4).

7.2 Configuration of the quick recording

A quick recording can be started from the overview of the recordings with the “**REC**” button (Ch. 7.3.1). This takes place in accordance with the implemented configuration.

Required authorization: Administrator

	Configuration	<u>General</u>
---	---------------	----------------

⊙ Quick recording configuration

Standard interval d h min s

max. 31:00:00:00

Template for naming

Datum
Uhrzeit
Benutzername

- “**Standard interval**”: Definition of the recording interval
- “**Template for name**”: Adjustment of the standard name of the recording

Select the “**Apply**” button to apply the settings.

7.3 Start, and stop recordings

Required authorization: Basic / Advanced / Administrator

7.3.1 Start recording

In the overview list:

- Select the “**REC**” button to start a single recording. The chamber status must be “**Online**”
- In order to start a single or several recordings, mark the desired recordings and select the “**Start selection**” button.



In the recording window:

- The recording window opens when you click on the name of the recording. Select the “**Start recording**” button.



7.3.2 Start meta-recording

In order to be able to start the created meta-recording, all chambers for the incorporated individual recordings must be online.

Recording	Chamber name	Recording start time	User name	Chamber state	
<input type="checkbox"/> BD Log	BD Test	02.11.18 17:12	admin	Online	<input checked="" type="radio"/> REC
<input type="checkbox"/> KB Controller Log	KB Test	02.11.18 14:35	admin	Connecting...	<input type="radio"/> REC
<input type="checkbox"/> KBF Controller Log	KBF Test	02.11.18 14:31	admin	Online	<input checked="" type="radio"/> REC
<input type="checkbox"/> KBF Log	KBF Test	02.11.18 17:08	admin	Online	<input checked="" type="radio"/> REC
<input checked="" type="checkbox"/> Méta recording_KBF Log_BD Log			admin	Online	<input checked="" type="radio"/> REC

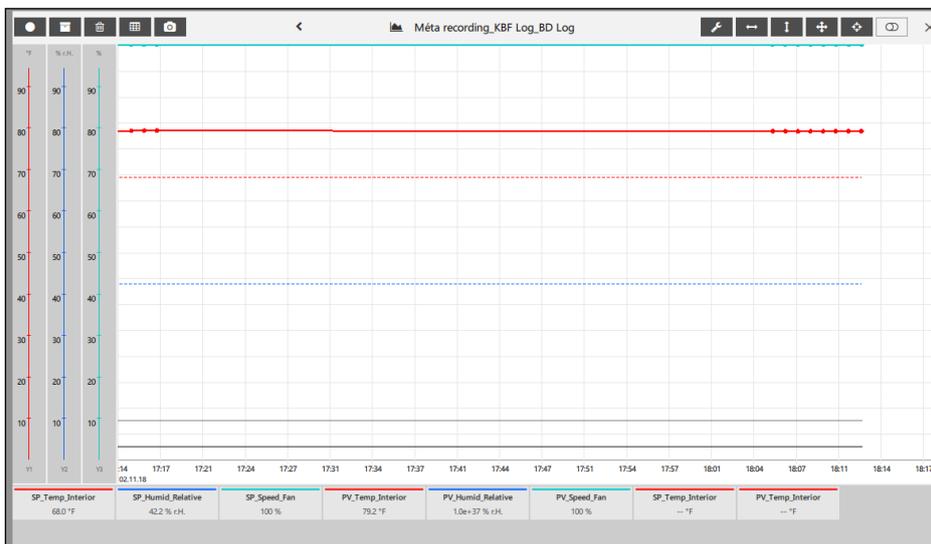
In the overview list:

- You can start the meta-recording directly with the “REC” button.
- Mark the desired meta-recording and select the “Start selection” button.



In the recording window:

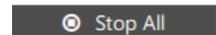
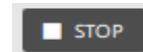
- The recording window opens when you click on the name of the recording. Select the “Start recording” button.



7.3.3 Stop recordings

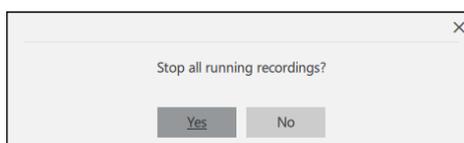
In the overview list:

- Select the “STOP” button to end a single recording.
- In order to end a single or several recordings, mark the desired recordings and select the “Stop selection” button.
- In order to end all running recordings simultaneously, select the “Stop all” button.



In the recording window:

- The recording window opens when you click on the name of the recording. Select the “Stop recording” button.



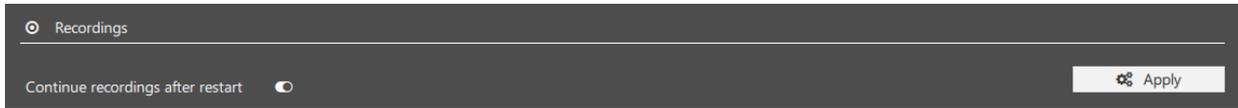
Confirm the confirmation message with “Yes.”

! Before you can end APT-COM 4, all running records must be stopped.

7.3.4 Continue recordings automatically after restart



To automatically continue running recordings after APT-COM restart, activate the function „Continue recordings after restart“.



Select the **“Apply”** button to apply the settings.

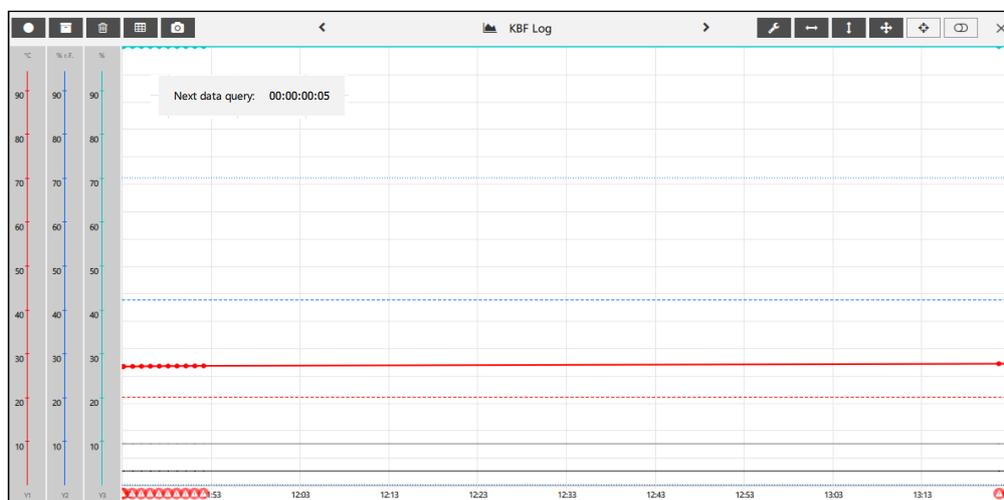
7.4 Recording window

The name of the actual recording is shown at the top of the recording window. You can change to other active recordings with the arrows:



	Start recording
	Stop recording
	Archive recording
	Delete recording
	Change to the graphic view (from the tabular view)
	Change to the tabular view (from the graphic view)
	Record camera image

7.4.1 Graphic view



	Configuration of the graphic view
	Scale X-axis
	Scale Y-axis
	Scale X-axis and Y-axis
	Activate auto scroll
	Deactivate auto scroll
	Display curve selector switch
	Hide curve selector switch

Under “Next data query” the remaining time according to the selected recording interval (Ch. 7.1.1, 7.2) is indicated, until data is read from the chamber controller and saved (default value: 1 minute).

The time of the next data query is displayed correctly when changing from summer to winter time and vice versa.

Adjust representation of the graphic view

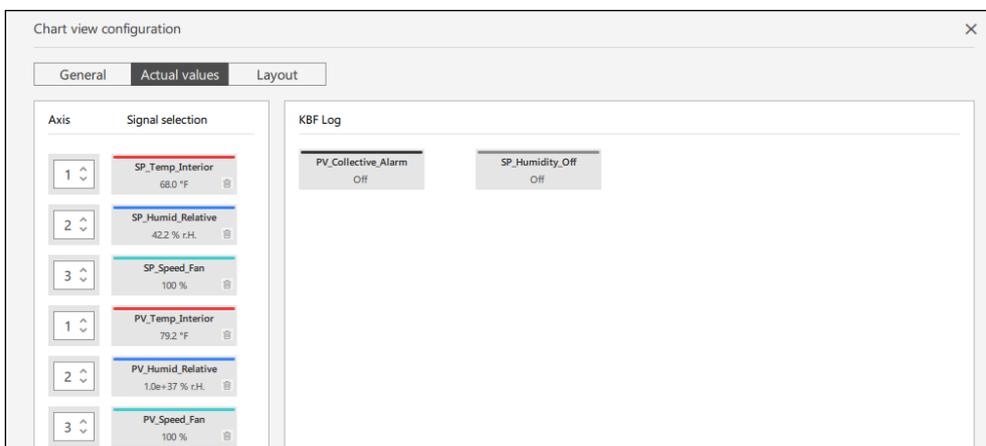
Select the “Configuration” button to adjust the graphic view in accordance with your wishes. You change to the “Chart view configuration” menu.



- **“General”**: You can choose whether limit value violations should be marked with colors and select a background color for the graphic view.



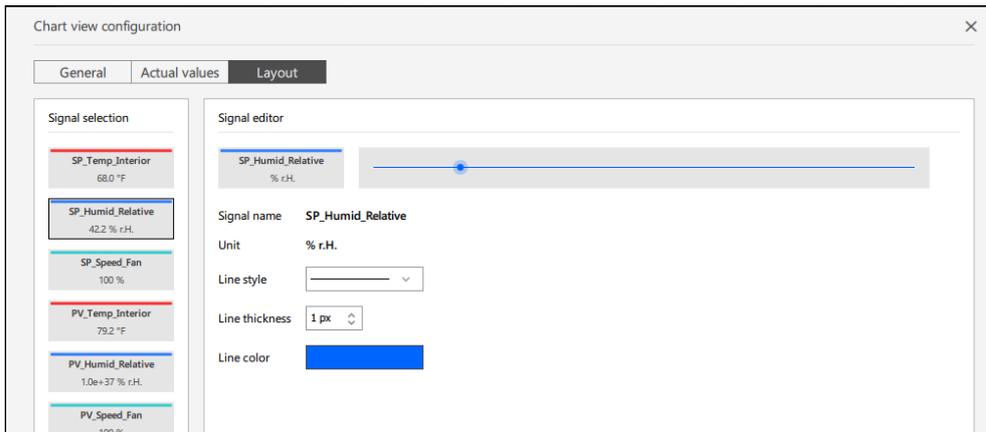
- **“Actual values”**: Selection of which values should be displayed



The values in the left field are represented in the graphic. In order to remove a value, mark it and select the “Delete” symbol. The value is then moved to the right window.

The values in the right field are not represented in the graphic. In order to display a value, move it into the left window with the mouse.

- **“Layout”**: Adjust the representation of the individual parameters



Mark the desired value in the left field. You can adjust the line representation in the “Signal editor” menu.

All settings are adopted immediately.

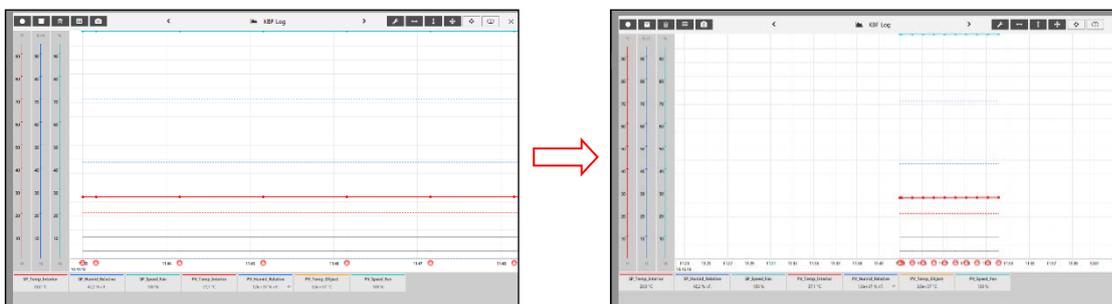
Close the menu with the close button in the top right corner or with the **“Close”** button.

With the **“Reset”** button, the adjustments made in the currently open tab in the “Chart view configuration” menu are reset to the factory settings.

When the recording window is closed, the adjustments of the graphic view are saved.

Scaling the graphic view

As soon as the mouse cursor is in the recording window, you can scale the representation via the X-axis by turning the mouse wheel:



As soon as the mouse cursor is on the Y-axis of the respective parameter (e.g. humidity), you can scale the representation of this parameter via the Y-axis by turning the mouse wheel:

The displays can also be moved in the window with a pressed mouse button.

For user-defined scaling, select the respective button to scale the graphic view according to your wishes.



Scale X-axis: The desired period of time can be selected:



The scaling takes place in such a way that all recording values are visible.



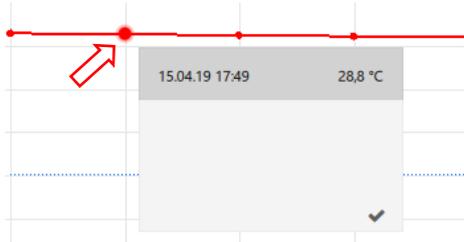
Scale Y-axis: The scaling takes place in such a way that all recording values are visible.



Scale X-axis and Y-axis

Display of the point of time of individual recording values

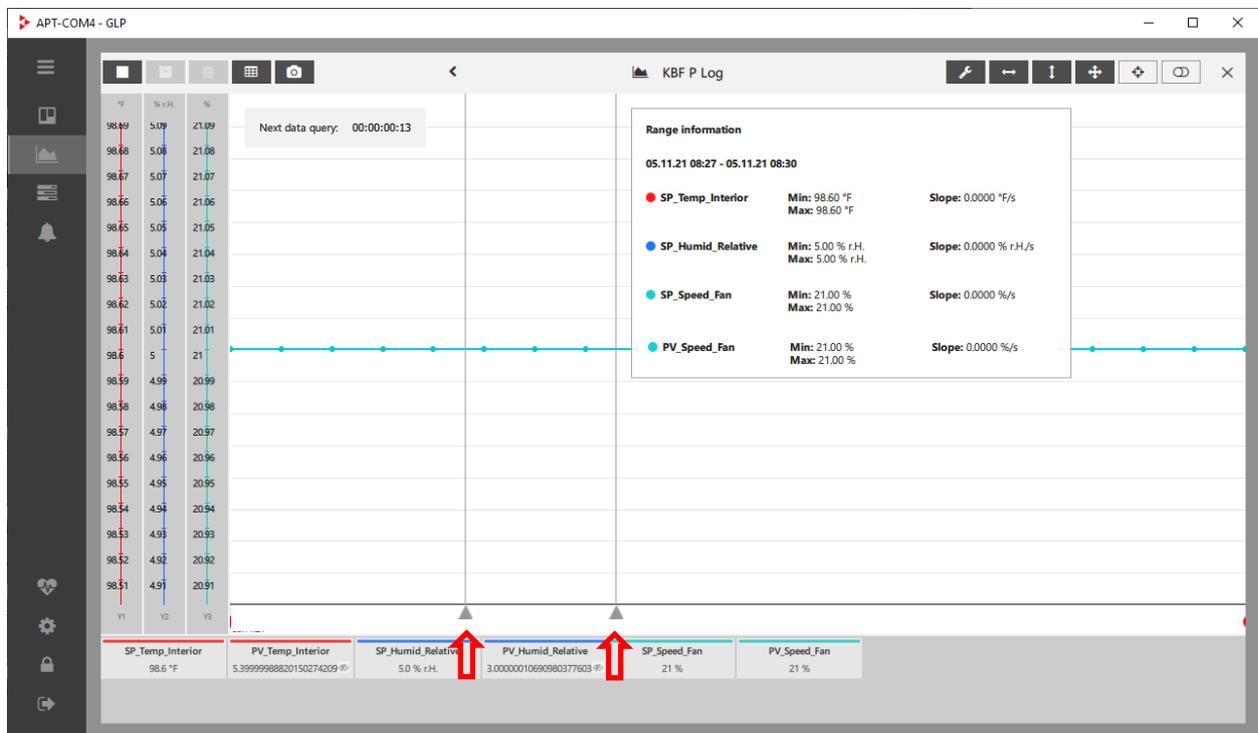
When you click on a recording point, you will be shown the related point of time and the parameter value:



Displays on the ranges of record values

To select the area for which you want more information, left-click on the desired starting point in the timeline, then hold down the control key (Ctrl) and click with the left mouse button on the desired end point.

The area information window opens. You can scroll here to display any other signals that may be present.



Automatic adjustment of the display

In the case of the activated “Autoscroll” function, new recording values are added in the graphic view and the window excerpt moves automatically in accordance with the chosen scaling, so that the new values are always visible.

Select the “Autoscroll on” button to switch on the Autoscroll function



Select the “Autoscroll off” button to switch off the Autoscroll function again



! If the “Autoscroll” function is activated, it will be deactivated by manually selecting a value or by manually moving it with the mouse.

Showing and hiding individual curves

The curves of all parameters and functions are shown in the graphic view as a standard. With this function you can hide individual curves (e.g. for collective alarm).

Select the “Show curve selector switch” button to activate the selection option. Blue curve selector switches appear in the window, with which you can show and hide the related curves individually.



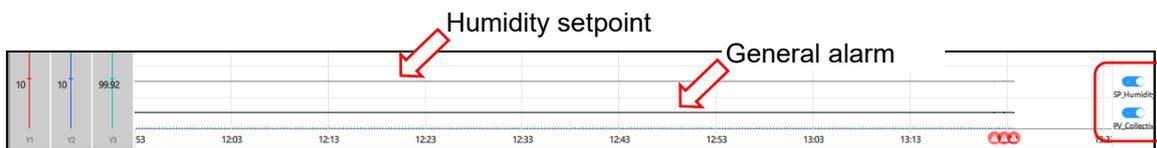
Then use the curve selector switches to show or hide the desired curve in the graphic view.



	Curve shown
	Curve hidden

Example: In the case of KBF, the curves for the humidity setpoint value and the collective alarm are activated as a standard. With the curve selector switches “SP_Humid_Relative” or “PV_Collective_Alarm,” you can show and hide these displays independently of one another.

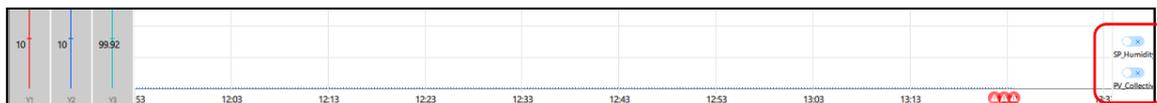
- Humidity setpoint value display and collective alarm display shown:



- Collective alarm display shown, humidity setpoint value display hidden



- Humidity setpoint value display and collective alarm display hidden:



When you subsequently deactivate the selection option again, the curve selector switch is no longer visible. The setting made remains in effect.

Select the “Show curve selector switch” button to deactivate the selection option.



7.4.2 Tabular view

Zeitstempel	SP_Temp_Interior 20.0 °C	SP_Humid_Relative 42.2 % r.F.	SP_Speed_Fan 100 %	PV_Temp_Interior 27.6 °C	PV_Humid_Relative 1.0e+37 % r.F.	PV_Temp_Object 3.0e+37 °C	PV_Speed_F 100 %	Notizen
10.10.18 11:43	20.0	42.2	100	27.0	1.0e+37	3.0e+37	100	
10.10.18 11:43	20.0	42.2	100	27.0	1.0e+37	3.0e+37	100	
10.10.18 11:44	20.0	42.2	100	27.0	1.0e+37	3.0e+37	100	
10.10.18 11:45	20.0	42.2	100	27.0	1.0e+37	3.0e+37	100	
10.10.18 11:46	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:47	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:48	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:49	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:50	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:51	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 11:52	20.0	42.2	100	27.1	1.0e+37	3.0e+37	100	
10.10.18 13:22	20.0	42.2	100	27.6	1.0e+37	3.0e+37	100	
10.10.18 13:23	20.0	42.2	100	27.6	1.0e+37	3.0e+37	100	
10.10.18 13:24	20.0	42.2	100	27.6	1.0e+37	3.0e+37	100	

	Configuration of the graphic view (in the table view without a function)
	Only display data points with warning messages
	Activate Autoscroll (in the table view without a function)
	Deactivate Autoscroll (in the table view without a function)
	Collapse: change to the notice view
	Expand: Restore standard view
	Sorting: Oldest values first
	Sorting: Newest values first

Change between standard and notice view

Select the “Collapse” or “Expand” button to change between the standard view and the notice view:

Standard view

Notice view

Select the “Sorting” button to change the sequence of the displayed values

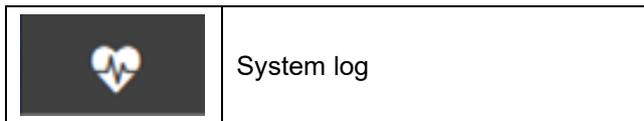


7.4.3 Close recording window

You close the recording window with the plus in the top right corner and you will once again see the overview of all created recordings in the “Recordings” view.

! Note: When the recording window is closed, the adjustments of the graphic view are reset. They are not saved.

8. System log



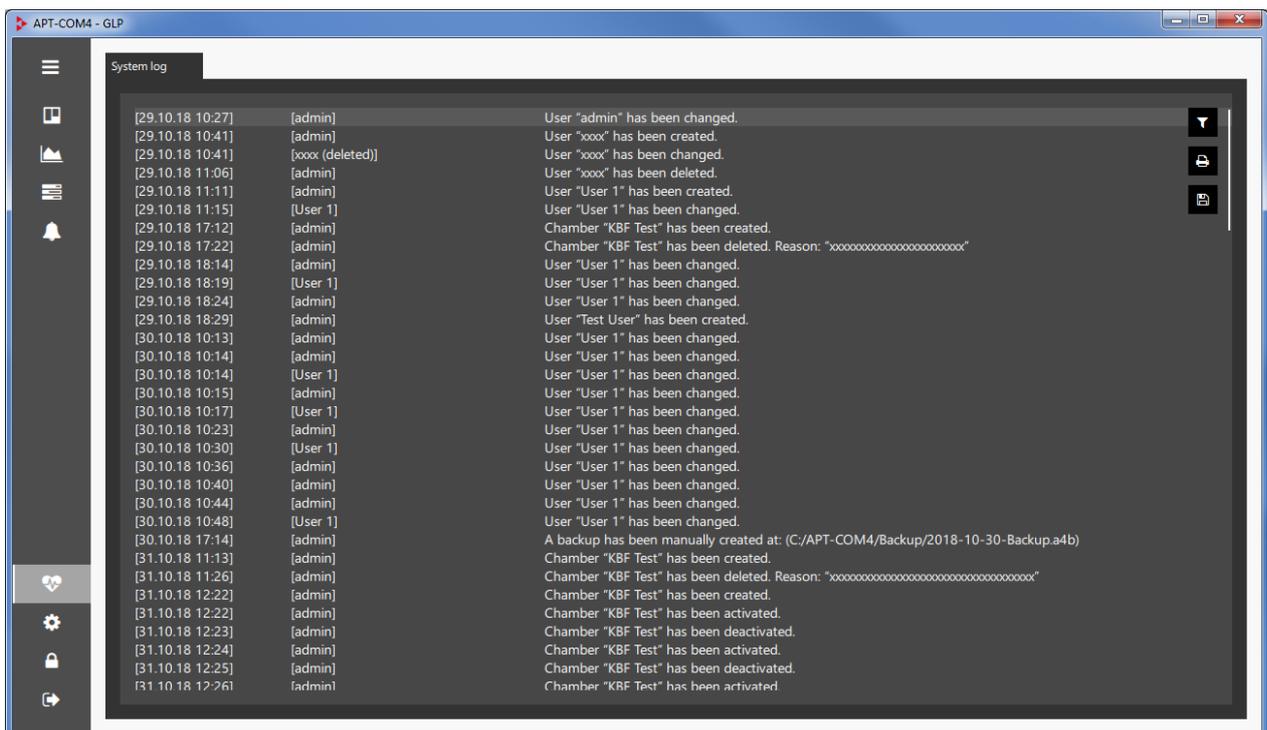
The automatically created system log shows an overview of important procedures, which are automatically documented by the system. This data, together with the commentable recordings, is a central component of the audit trail. The most recent entry is always displayed when opening the system log window.

No data can be deleted from the system log.

	Select display period
	Print system log
	Save system log (export)

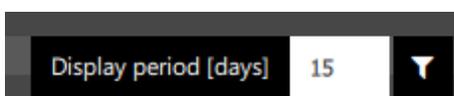
8.1 Display system log

Required authorization: Basic / Advanced / Administrator



8.1.1 Selection of the display period

To select the display period, select the “Display period” button



In the case of the “1 day” selection, the procedures of the last 24 hours are displayed.

8.2 Issue system log

You can print out the data of the system log for a desired period of time or save it in a file. Independently of this, the complete system log is saved encoded with all data and configurations of APT-COM™ 4.

8.2.1 Print system log

For issuing on the Windows standard printer, select the “Print system log” button

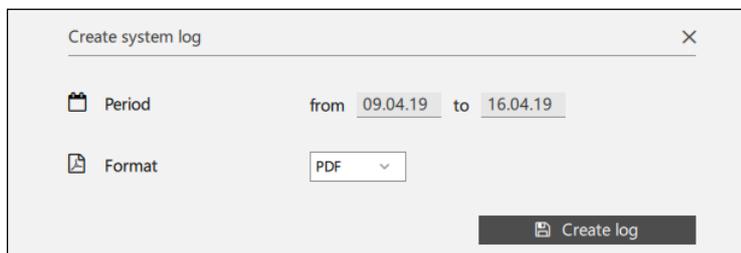


In order to print the data of the selected period (Ch. 8.1.1), select the “**Create log**” button.

- “Period”: Select the desired period of the system log for the printout

8.2.2 Save system log

Save system log



In order to save the data of the selected period (Ch. 8.1.1), select the “**Create log**” button.

- “Period”: Select the desired period of the system log
- “Format”: Select the file format csv, pdf or html

The system log is stored in the APT-COM™ 4 installation directory in the “Reports” folder under the name “systemprotocol.xxx” (extension according to the selected file format)

9. Reminder and timer function

In this menu, any user can create reminders that appear upon expiration of a selected period of time as a reminder notification. In addition, you can stop a recording and / or have a report created at this time.

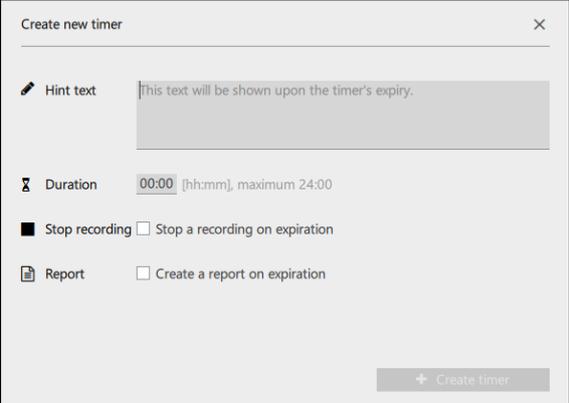
You can activate up to 10 reminders.

Required authorization: Basic / Advanced / Administrator

	<p>Configuration</p>	<p><u>Timer</u></p>
---	----------------------	---------------------

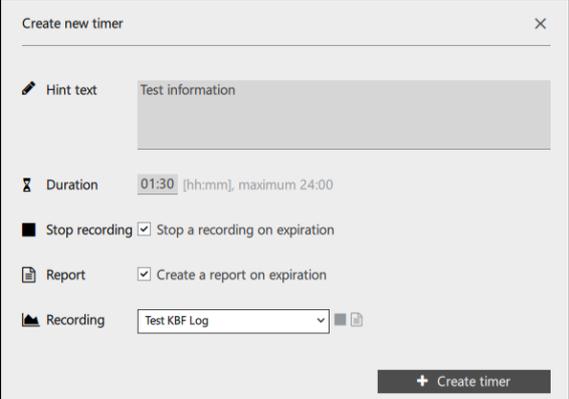


Select the button “ **+ Add**” to open the “Create new timer” menu and create a new reminder.



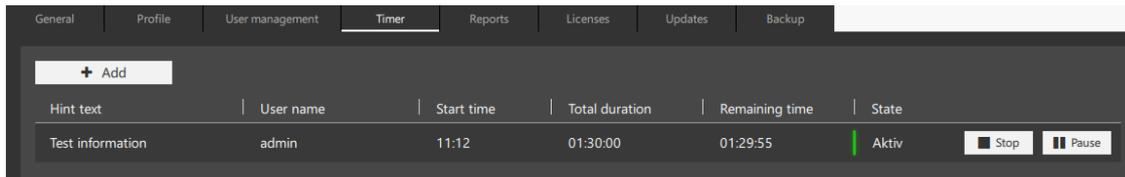
- “**Hint text**”: Enter the desired text for the reminder notification.
- “**Duration**”: enter the desired duration until the appearance of the reminder notification
- “**Stop recording**”: Check the box to stop recording when the timer time expires.
- “**Report**”: Check the box to generate a report when the timer time expires
- “**Recording**” (visible only if the “Stop recording”: and / or “Report” fields are enabled):
Select the desired recording for these functions.

Note: You can select only active recordings.



Select the button “ **+ Create timer**”.

The created reminder is now displayed with some information in the list of created reminders:



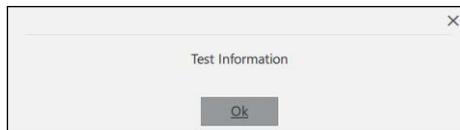
- Hint text: entered reminder text
- User name: logged in user who created the reminder
- Start time, Total duration, Remaining time: Information concerning the passage of time
- State:
 - Green marking and "Active" message: The time until the reminder message is running
 - "Inactive" message: The passage of time has been stopped (pause function)



You can stop the passage of time (pause function) and continue it or delete the reminder:

	The reminder is deleted
	The passage of time is stopped
	The pause ends, the passage of time continues

The reminder notification appears as soon as the entered period of time expires:



Confirm with "Ok." The reminder is deleted from the list.

10. Reports: Protocol issue / documentation

APT-COM 4 offers a GLP-compatible system log that is suitable for the documentation of manipulation-free data. This documentation with a customer-specific cover sheet can be compiled individually. You can record graphic representations, values, alarms, notices, and photos and incorporate an electronic signature.

10.1 Configure template

In this menu you can configure the content and format of the reports.

Required authorization: Administrator

	Configuration	Reports
---	---------------	-------------------------

In the “Report configuration” menu you can make the following settings:

Definition of the file format:

- “Default file format”: pdf, csv, html
- “Default file prefix”: Any text

Selection from the available content

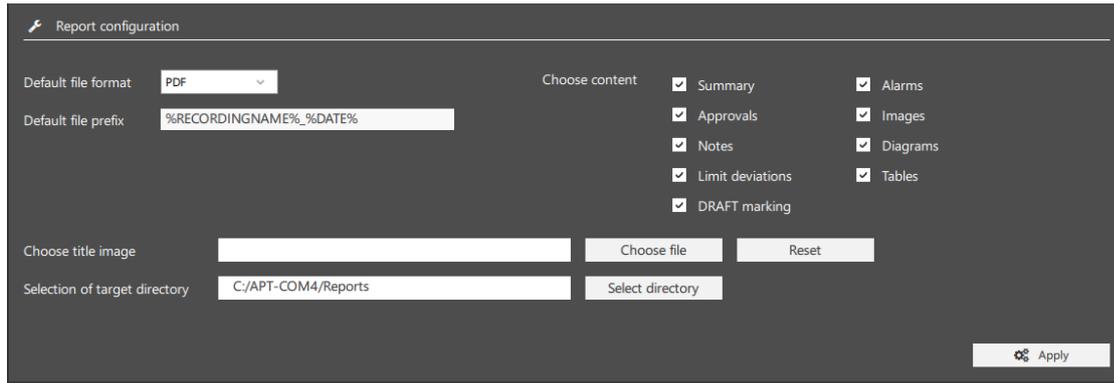
- “Summary”: Overview data of report, user, chamber, and load, recording, notices, alarms.
- “Approvals”: List of employees responsible for the approval of the report, who enter themselves with name, qualification, creation date of the report, and signature fields.
- “Notes”: List of the values of the entered notices to be defined with indication of date, time of day, recording value, and notice text
- “Limit deviations”: List of the limit deviations with indication of date, time of day, deviation, and tolerance limits
- “Alarms”: List of additional alarms with indication of date, time of day, type of alarm, and duration
- “Images”: Photos (recordings can be created automatically with a USB camera and incorporated into the recording protocol)
- “Diagrams”: Graphics of the writer representation with all selected parameters and indication of the recording and the period of time
- “Tables”: List of the recording values with all selected parameters and time stamp

Incorporating a logo

- “Choose title image”: Load image file (jpg, png) for the title of the report

Selecting the storage location

- “Selection of target directory”: Specification of the selected path to the storage location. This can be selected using the “Select directory” button.



The name of the generated file is generated automatically:

“%RECORDINGNAME%_%DATE%_%USERNAME%_%REPORTDATE%”

- RECORDINGNAME = Name of the recording
- DATE = Creation date of the recording
- USERNAME = Currently logged in user who is creating the report
- REPORTDATE = Date of the recording

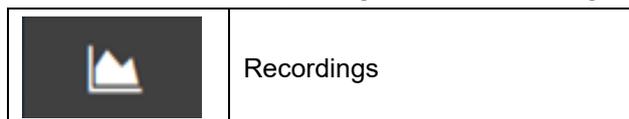
Select the “**Apply**” button to apply the settings.

When a report is generated from a recording that is still in progress, it is by default marked with a “DRAFT” watermark. In order not to embed this identification, the corresponding function can be deactivated (unmark checkbox).

10.2 Create report

After the template has been configured (Ch. 10.1), you can have a report created for all created recordings.

In the overview window, change to the “Recordings” view.



Mark the desired recordings in the overview list and select the “Create report” button.

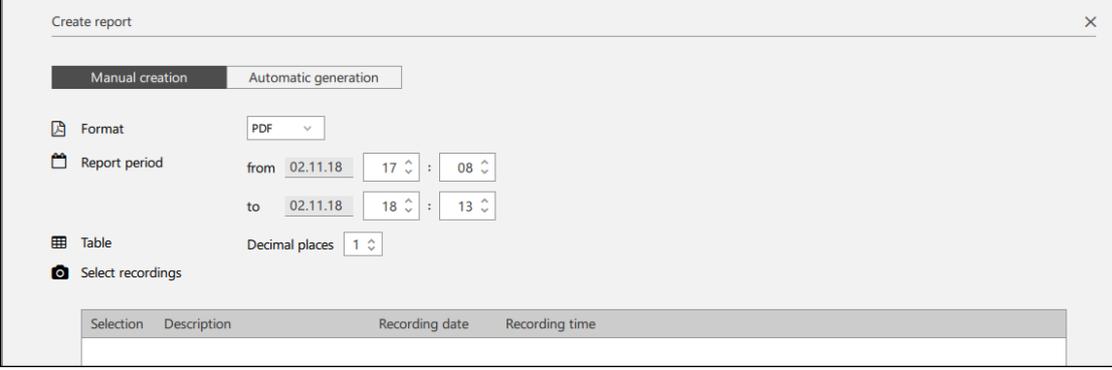


In the “Create report” menu, select the type of creation of the report.

Manual creation	Direct creation of an individual report
Automatic generation	Regular, automatic creation of reports

10.2.1 “Manual creation”

A report for the selected recording can be created at any time with this method.



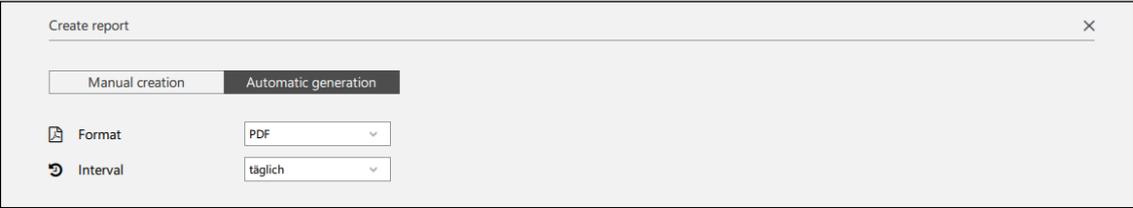
- **“Format”**: Definition of the file format (Selection: pdf, csv, html). This can deviate from the standard format of the report template (Ch. 10.1).
- **“Report period”**: Indicate the date and time of day for the beginning and the end of the period of time for which the report should be created.
- **“Table”**: Entry of the decimal places of the recording values (Selection: 0, 1, 2, 3 decimal places)
- **“Select images”**: Select camera recordings from the list

Select the **“Preview”** button to see the report in a preview.

Select the **“Create report”** button to create the report in the desired format.

10.2.2 “Automatic generation”

Regular, automatically issued reports for the selected recording can be configured with this method. As soon as the first report has been created with the “Create report” button, additional reports are automatically issued at the entered intervals.



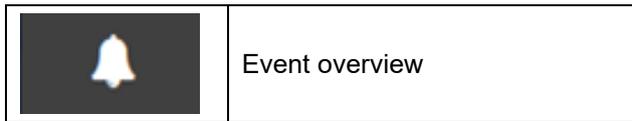
- **“Format”**: Definition of the file format (Selection: pdf, csv, html). This can deviate from the standard format of the report template (Ch. 10.1).
- **“Interval”**: Frequency of the automatic issue of reports (Selection: daily, weekly, monthly, when recording stops)

Select the **“Apply”** button to save the report settings.

APT-COM 4 checks the selected settings daily at 0.00 pm and then generates the report accordingly:

- If “daily” is selected, the report is generated daily at 0.00 pm.
- If “weekly” is selected, the report is generated every Monday at 0.00 pm.
- If “monthly” is selected, the report is generated on the 1st of each month at 0.00 pm.

11. Event overview



	Alarm symbol
	Confirm alarm
	Expand (detail view)
	Sort by name

	Information symbol
	Delete event
	Collapse (overview representation)
	Sort by time

11.1 Representation of events

Active alarm (unconfirmed):

- Emphasis of the line in red
- Identification with the alarm symbol
- “Alarm active”: “Yes”
- The “Confirm alarm” button is shown



<input type="checkbox"/>	Event	Info	User	Date	Active alarm	Chamber name
<input type="checkbox"/>	Tolerance limit violation	Grenzwertverletzung	admin	11.11.19 13:35	Yes	MK
<input type="checkbox"/>	Tolerance limit violation	Grenzwertverletzung	admin	15.04.19 17:48	No	KBF

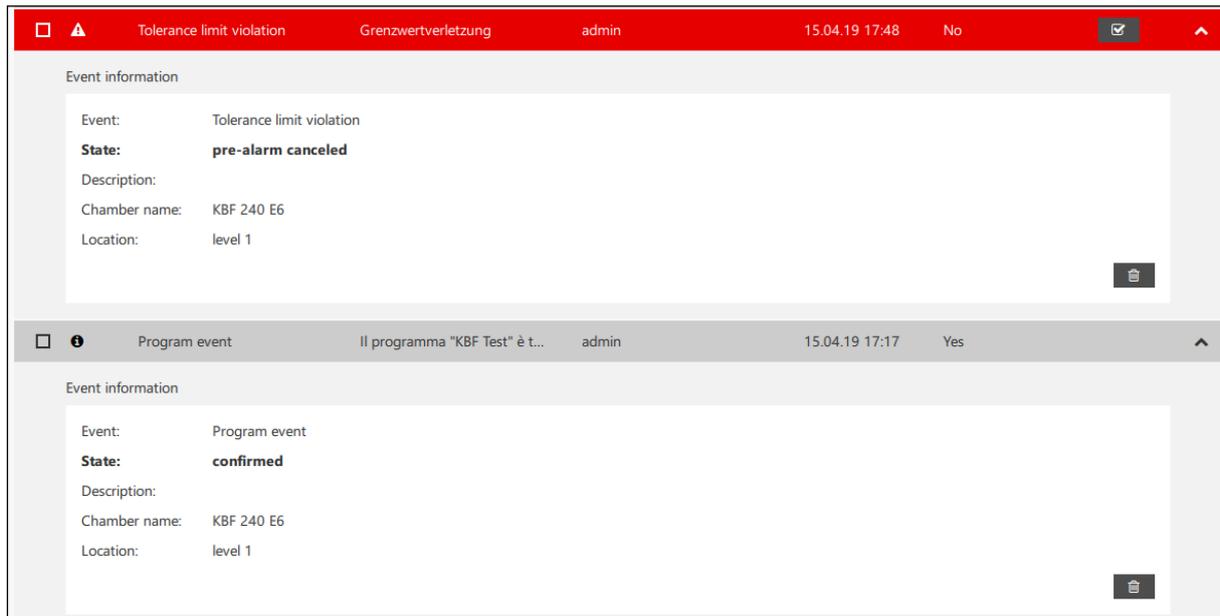
Confirmed alarm:

- Identification with the information symbol
- “Alarm active”: “Yes”, as long as the cause of the alarm exists
“No”, when the cause of the alarm no longer exists
- The “Confirm alarm” button is no longer shown



<input type="checkbox"/>	Event	Info	User	Date	Active alarm	Chamber name
<input type="checkbox"/>	Tolerance limit violation	Grenzwertverletzung	admin	11.11.19 13:35	Yes	MK

Display of detail information



The general nature of the alarm is displayed under “Event”. Detailed information is given under “Info”. Examples:

Event: Tolerance limit violation | Info: Limit violation

Event: Communication Alarm | Info: Communication error

Event: Collective alarm | Info: Chamber alarm

Event	Info
Tolerance limit violation	Limit violation

If configured accordingly, an e-mail will be sent (Ch. 5.4.4).

11.2 Confirmation of an active alarm

Confirm individual alarm:

Select the “Confirm alarm” in the message line to confirm the alarm message.



It doesn't play a role whether the alarm is displayed in the detail view or the overview representation.

Confirm alarms in the overview:

You can confirm individual or multiple alarms in the overview.

Mark the corresponding line(s) and select the “Confirm alarm” button.



Note: In the case of collective alarms, the alarm message is caused and generated by the chamber. Therefore, it is not sufficient to reset the message only in APT-COM™ 4. Collective alarms must be reset at the BINDER chambers, too. Otherwise APT-COM 4 will generate a new alarm (display and e-mail, if configured) after max. 1 minute.

11.3 Delete event

Delete an individual event in the detail view:

You can delete the event as soon as the alarm has been confirmed. To this purpose, select the “Delete event” button in the detail view.



Delete events in the overview:

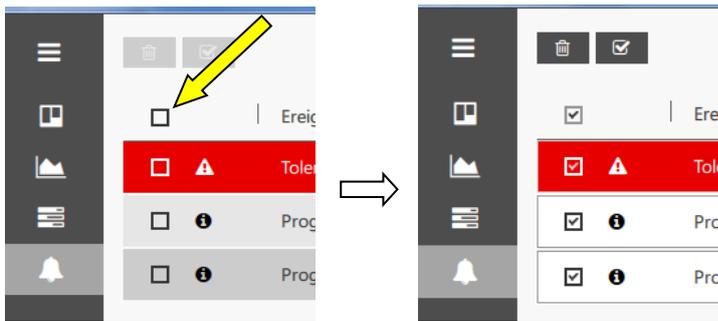
You can delete individual or multiple events in the overview, irrespective of whether the alarm has been confirmed.

Mark the corresponding line(s) and select the “Delete event” button.



Delete all events in the overview:

Mark the checkbox in the headline. The checkboxes in all lines are marked simultaneously.



Then select the “Delete event” button.



11.4 Configuration of event messages

Required authorization: Administrator

	Activated repetition function (factory setting)
	Deactivated repetition function
	Activated
	Deactivated

- **“Repeat unacknowledged events”**: Activating the repetition function
- **“Repetition interval of events”**: the entered interval becomes effective when the repetition function is activated.

Activation:

Set the switch to position “Activated repetition function” and enter the desired interval In.



Select the **“Apply”** button to apply the settings.

12. Time program function

The “Time programs” menu offers a **program editor** to create programs and transfer them to the chamber controller.

To control **program operation** via APT-COM™ 4, there are basically two options:

- **Program operation in APT-COM™ 4 (“interpreted program”)**

The program runs in APT-COM™ 4, the individual setpoints and other configurations (e.g., switching states of the operation lines) are sent to the chamber controller in real time at the beginning of the respective program section. This also allows running programs on chambers that do not bear a program controller. Another advantage is that in this way larger programs can be executed which exceed the number of program sections available on the chamber controller.

For VD and VDL with RD4 program controller: with interpreted programs, program tolerances and repetitions of sections can additionally be used.

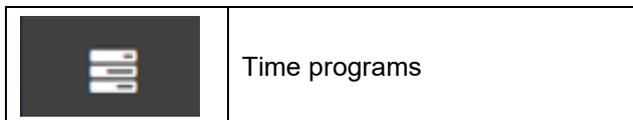
The program is started in the “Time programs” menu in the program editor (Ch. 12.3.2).

- **Program operation in the chamber controller**

The program is located in the chamber controller and is started there via APT-COM™ 4. For this, the device must have a program controller. After starting the program runs in the controller independent on the connection to APT-COM™ 4. This connection is required to record the values; and the program can be stopped via APT-COM™ 4.

The program is started in the view “Chamber overview” via the context menu of the standard view of the chamber (Ch. 12.3.1).

12.1 Program editor



The time program editor offers the possibility to create, change, and save time programs for temperature chambers and to transfer them to the chamber controller. The creation of the program is thus possible in a simple, graphic manner or through numerical value entries. Individual program segments can also be copied or deleted.

Chamber-specific creation of the program: Set those parameters (temperature, humidity, fan rotational speed, CO₂, etc.) and values that are in the performance scope of the chamber.

Limit values therefore can't be exceeded, as the parameters are preallocated chamber-specific.

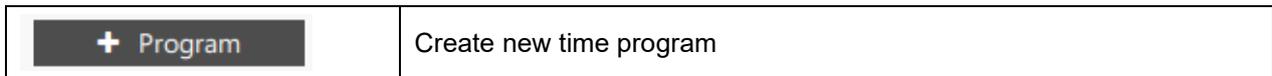
Graphic or numerical programming: Simple and quick programming possibility directly in the graphic. The numerical values can then be adjusted in the table. Manual entry of values in tabular form is also possible.

Tolerance range: Entry takes place directly in the programming menu.

It is also possible to create, modify and save programs for **non-programmable chamber controllers**.

12.1.1 Create new time program

Required authorization: Advanced / Administrator

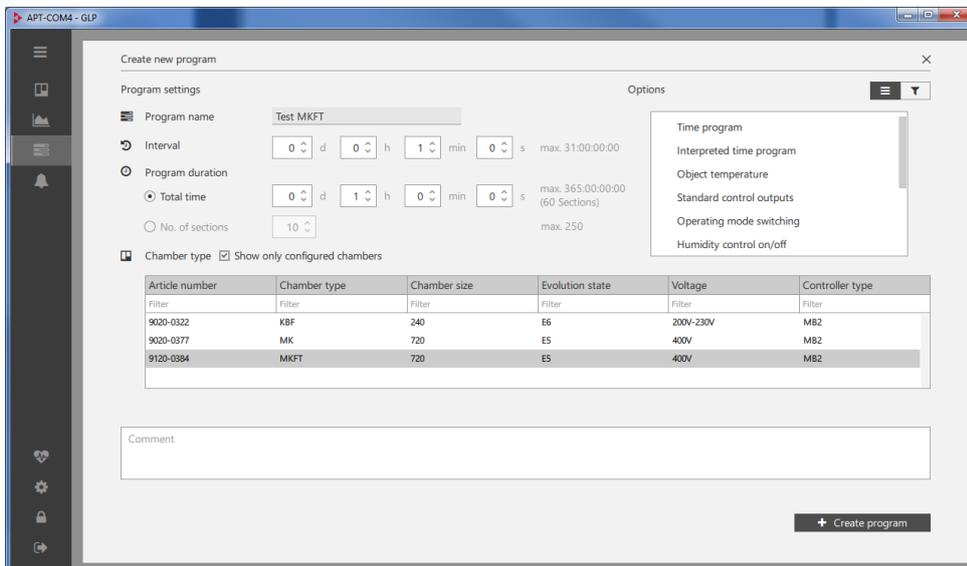


In order to create a new time program, select the “+ Program” button and change to the “Create new program” menu. A program can be configured here, where it is configured and assigned to a chamber type. The values are entered at a later point in time (Ch. 12.1.3).

You can configure the program in the “Program settings” in the menu:

- “**Program name**”: Enter a name for the program.
- “**Interval**”: Entry of the time after the expiration of which the program should be repeated
- “**Program duration**”: Entire running time of the program and number of program sections
- “**Chamber type**”: Select the chamber type for which the program should be created. All chambers appear in the selection list, even when they have not yet been configured in the software.

If you select “**Show only configured chambers**” only configured chambers will appear in the selection list.



When the program has been configured, select “+ Create program”.

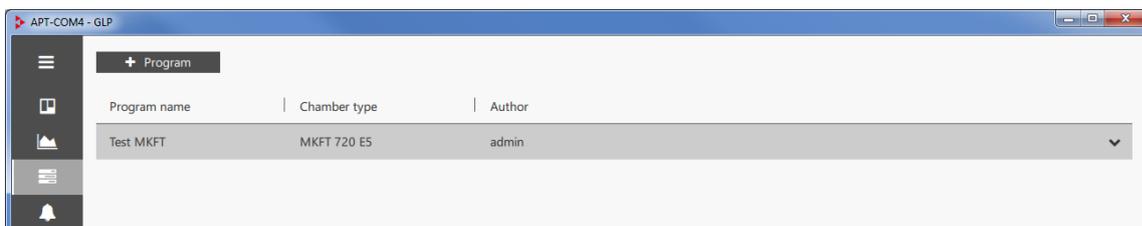
The program now appears in the list of programs.

It is also possible to create the program directly from the context menu of the standard view. To do this, select the menu point “**Create program**” (Ch. 6.2.1).

12.1.2 Information on program management

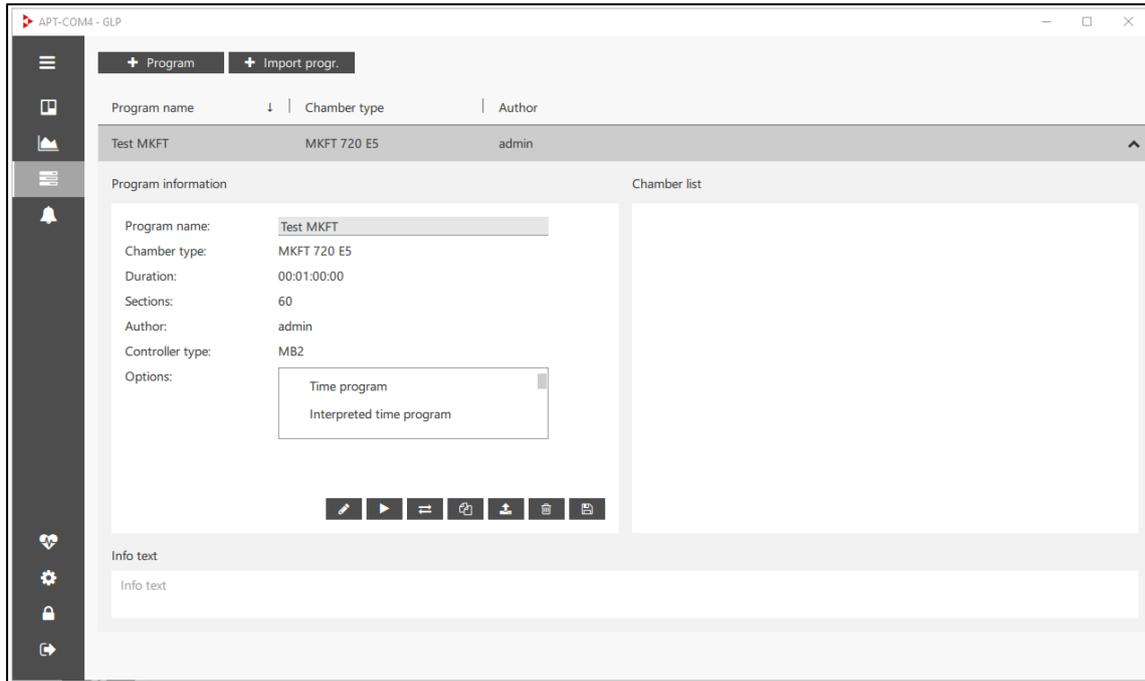
Programs can be sorted in ascending or descending order by program name, chamber type or author.

After the program is marked in the list of programs, more information can be displayed by expanding.



Select the “Expand” button to go to the detail view





Under “Program information” the program name, chamber type, program duration, number of program sections, author of the program, controller type, and program options are displayed. Here you will find the buttons for entering values (Ch. 12.1.3).

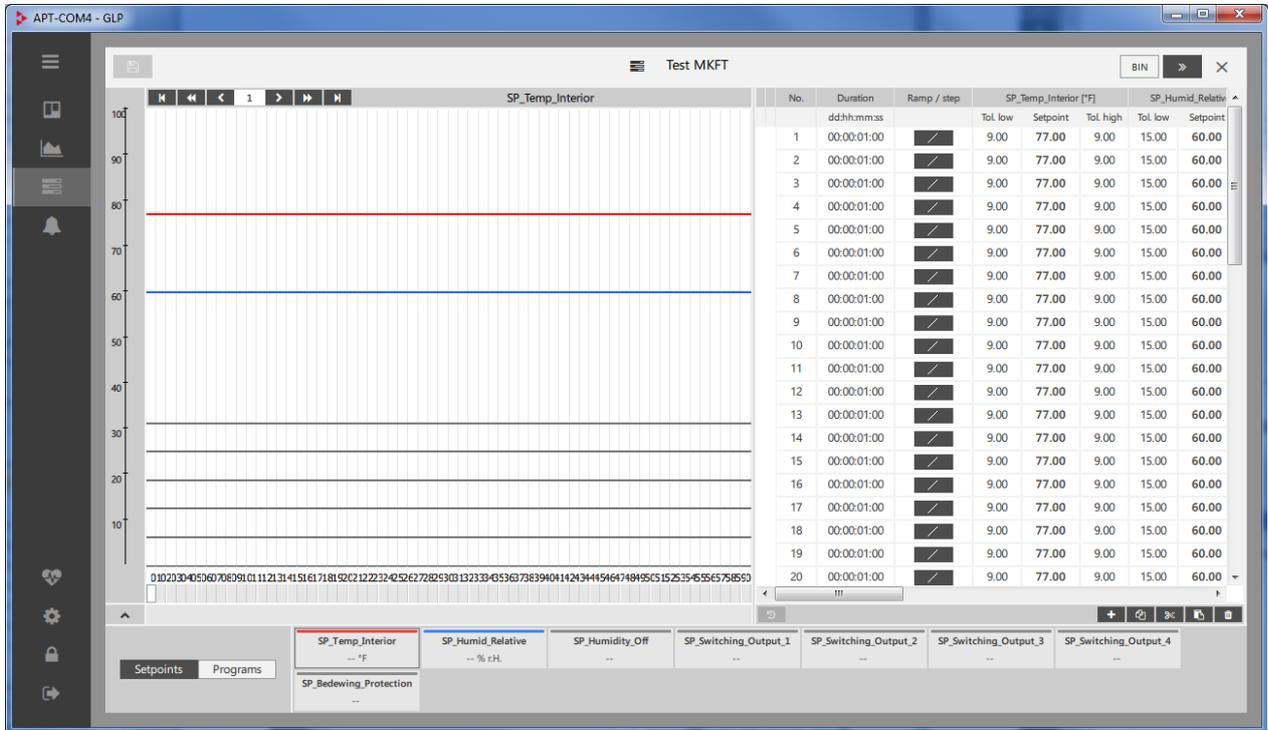
Under “Chamber list” the chambers will be shown onto which programs have already been transferred.

	Edit program (Ch. 12.1.3)
	Start program in APT-COM™ 4 (Ch. 12.3.2)
	Transfer program to chamber (Ch. 12.2.2)
	Copy program (Ch. 12.1.4)
	Export program (Ch. 12.5.2)
	Delete program
	Save changes

! Newly created, imported and copied programs can be deleted without a security query as long as no changes or editing have taken place

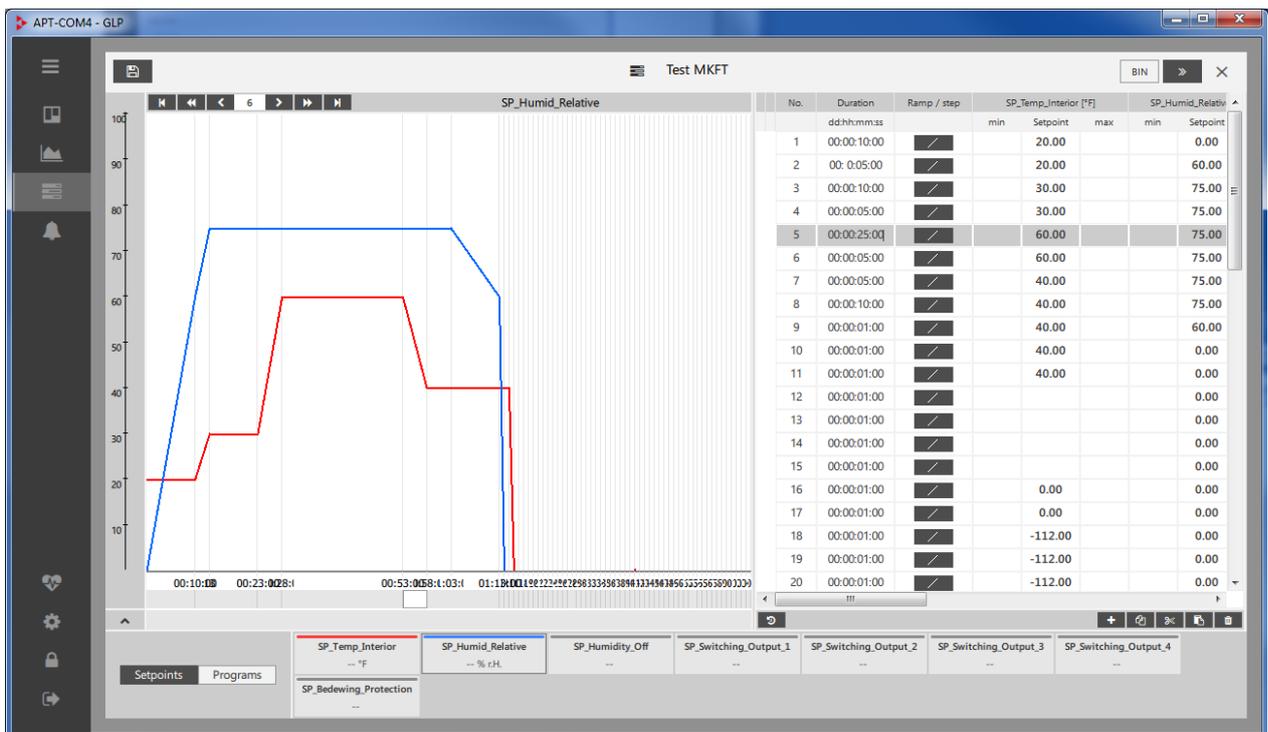
12.1.3 Value entry

Select the “Edit program” button.



The display of the programmable parameters corresponds to the selected chamber type (e.g. temperature, humidity, fan speed, CO₂, O₂, anti-condensation...).

You can now enter the program values graphically and/or numerically into the program window.



Each parameter is represented in graphical form. At the right side of the graphical display, the corresponding values are listed in a table. Values can be entered either into the graphic by dragging with the mouse (entry of parameter value and section length) or numerically into the table.

The graphical value entry is suitable for the approximate design of the program. For precise input, use the tabular value entry, which allows entry of further variables concerning the program section

Information on numerical entry (table view):

- **“No.”**: Section number
- **“Duration”**: Section duration
- **“Ramp/step”**: Setpoint course
With controllers RD3, MB1, MB2, the selected setpoint course applies to the entire program.
- **“SP_Temp_Interior”**: Temperature setpoint

Further parameters depending on the chamber type.

! Save the settings before closing the program window.

	Save program
	Information on controller type: MB1 / MB2 / RD3
	Information on controller type: T4.12 (BCW)
	Fold table
	Add line
	Copy selection
	Cut selection
	Paste selection
	Delete selection. Not all lines of a program can be deleted.

12.1.4 Copying a program

This function is available in the program editor.

Mark the desired program and select the “Expand” button to go to the detail view



Select the “Copy program” button.



The copied program now appears in the list of programs.

+ Program		
Program name	Chamber type	Author
Test MKFT	MKFT 720 ES	admin
Test MKFT_copy	MKFT 720 ES	admin



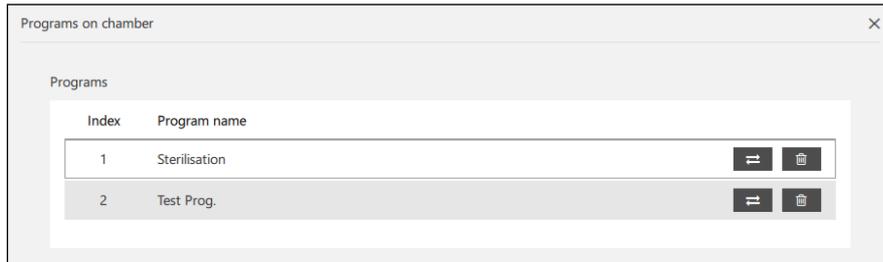
12.2 Program transfer

12.2.1 Program transfer from the chamber controller to APT-COM™ 4



In the standard view of the chamber overview: Open the context menu (Ch. 6.2.1) and select “Programs on chamber”. The window “Programs on chamber” opens.

Under “Programs” the programs on the chamber controller are displayed.

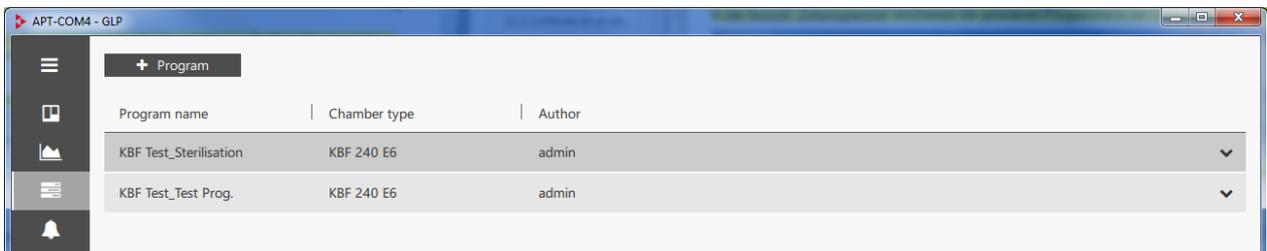


Select the “Download program from chamber” button.



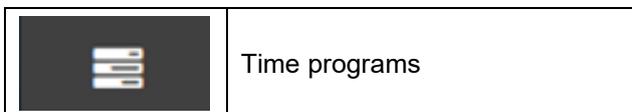
Note: Each program must be transmitted individually.

In the “Time programs” view the loaded programs appear in the list of programs.



Each program can now be edited with the program editor, transmitted back to the chamber controller, started in APT-COM™ 4 and executed or deleted.

12.2.2 Program transfer from APT-COM™ 4 to the chamber controller



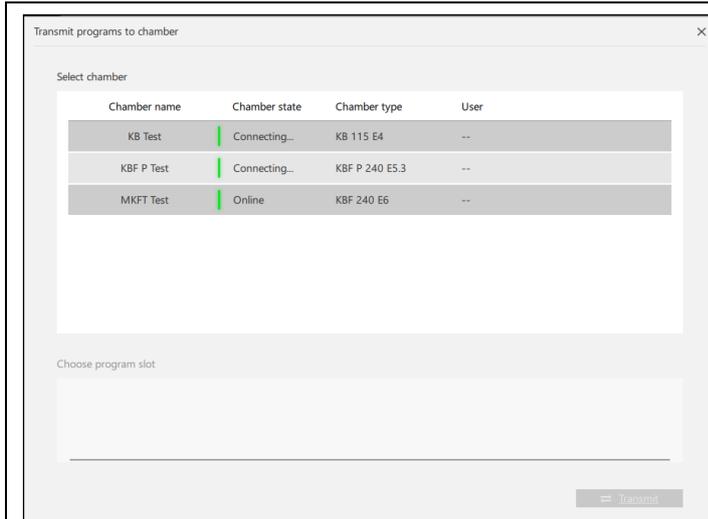
This function is available in the program editor.

Mark the desired program and select the “Expand” button to go to the detail view.

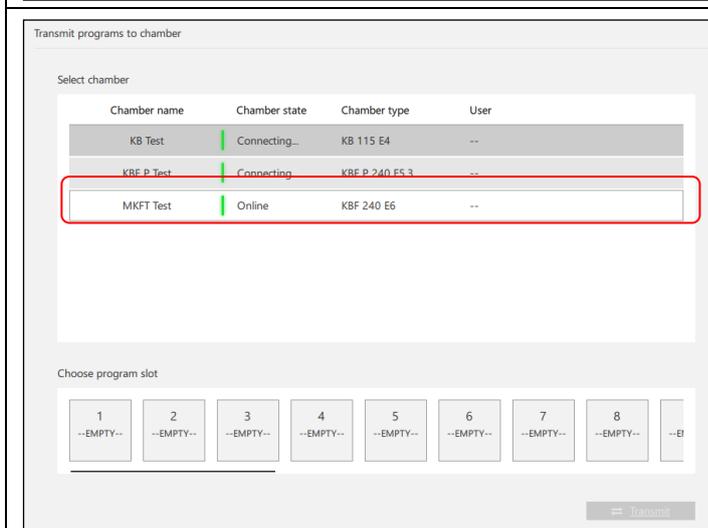


Select the “Transfer program to chamber” button.

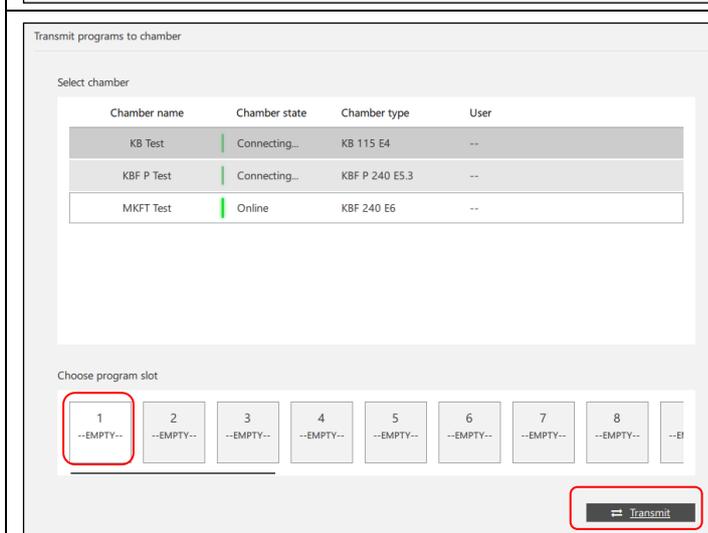




The menu "Transmit programs to chamber" opens.

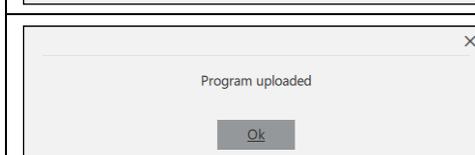


Under "Select chamber" select the desired chamber to which the program is to be transferred.

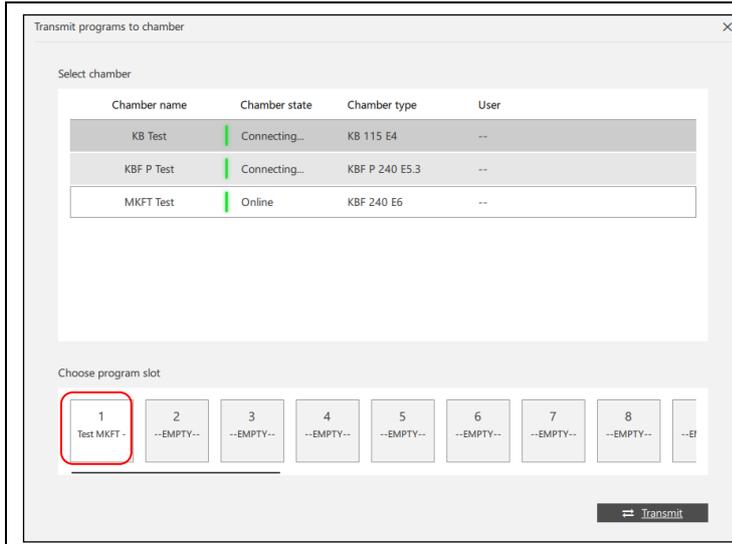


Under "Choose program slot" select the program slot of the chamber to which the program is to be transferred. The memory slot should be marked as "EMPTY", otherwise the program existing there will be overwritten.

Select the "Transmit" button. The program is transferred to the chamber controller.



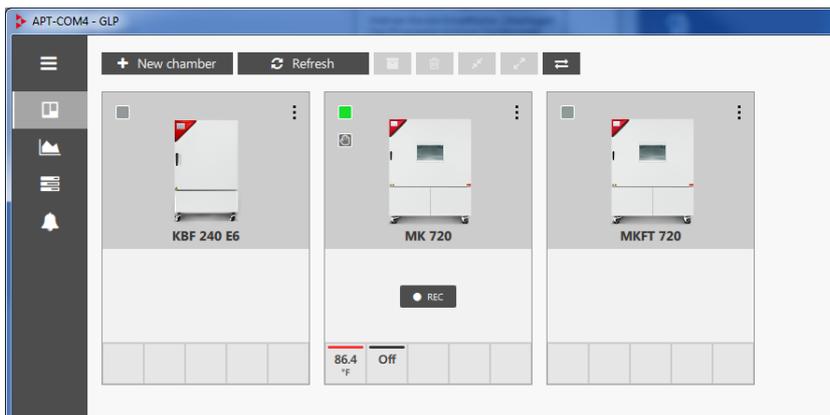
An information message indicates the successful transfer of the program.



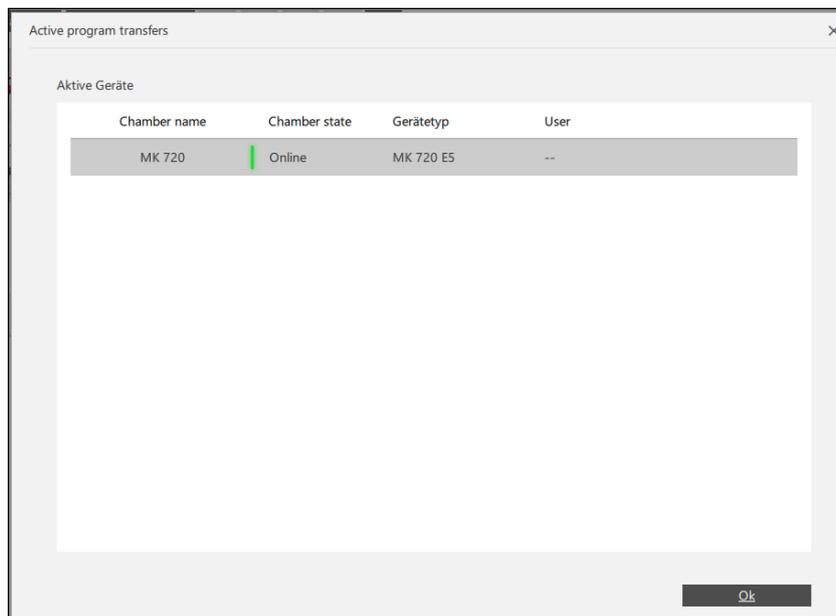
In the menu “Transmit programs to chamber” the selected memory slot now shows the name of the transmitted program.

12.2.3 Representation of program transfers in the standard chamber view

During a program transfer the icon indicating a running transfer is highlighted.



Select this button. The information window “Active program transfers” opens and indicates the running transfers.



12.3 Starting and executing a program

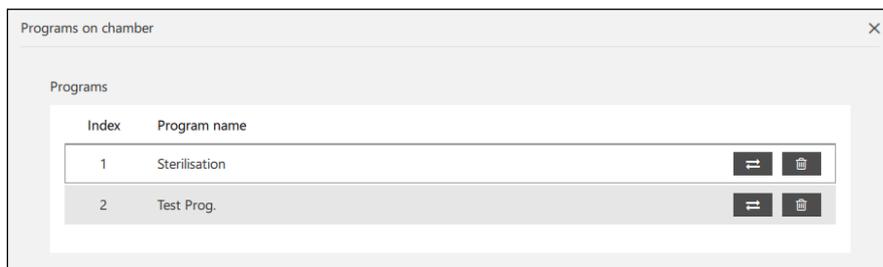
12.3.1 Starting and executing a program on the chamber



In the standard view of the chamber overview: Open the context menu (Ch. 6.2.1) and select “Programs on chamber”. The window “Programs on chamber” opens.

Under “Programs” the programs on the chamber controller are displayed.

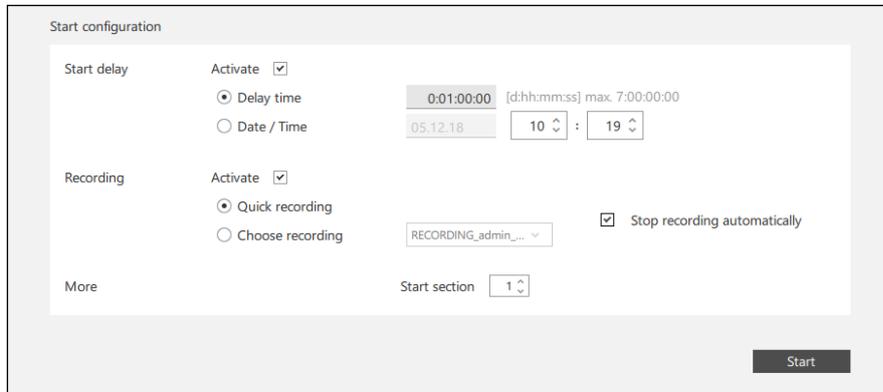
! If the program was created and / or edited in the program editor, it must first be transferred to the chamber controller (Ch. 12.2.2).



Mark the desired program.

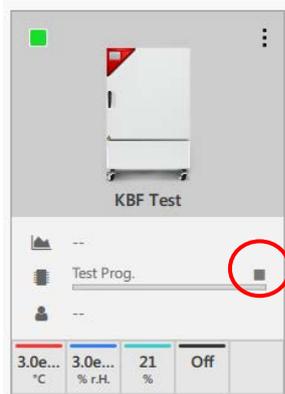
Under “**Start configuration**” you can make further settings for this program.

If a program is currently running, these settings are inactive. First close the running program (see below).



- “**Start delay**”: Configure a start delay.
 - “Delay time”: Enter a duration after which the program shall start
 - “Date/Time”: Enter date and time of the start moment.
- “**Recording**”: Configure program recording.
 - “Quick recording”: Start quick recording
 - “Choose recording”: Continue an existing recording
 - “Stop recording automatically”: When the program is finished, recording will stop automatically.
- “**More**”:
 - “Start section”: Select the program section for the program start

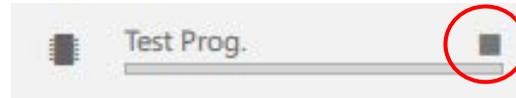
Select button “**Start**” to start the program. The program is running on the chamber controller.



The window “Programs on chamber” is closed

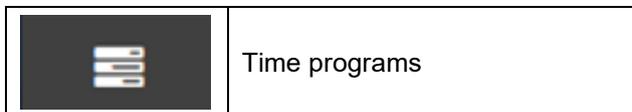
In the standard view of the chamber overview the program progress is displayed.

To cancel the program, press the button in the upper right corner above the progress bar (see illustration).



(sample picture)

12.3.2 Starting and executing a program in APT-COM™ 4



This function is available in the program editor.

Mark the desired program and select the “Expand” button to go to the detail view.

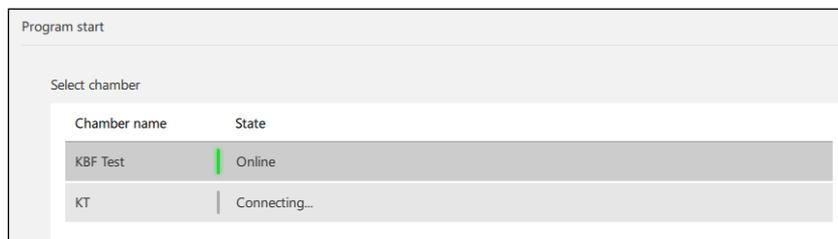


Select the “Start program” button.

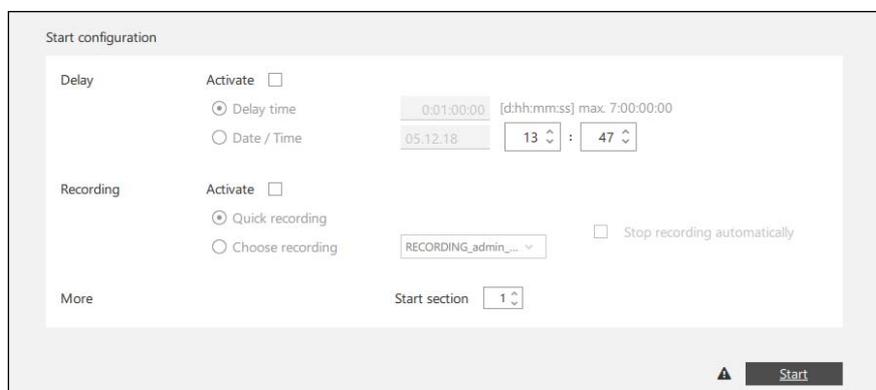


The “Program start” window opens.

Select the chamber on which the program shall run, under “Select chamber”.



Under “Start configuration” you can make further settings for this program.



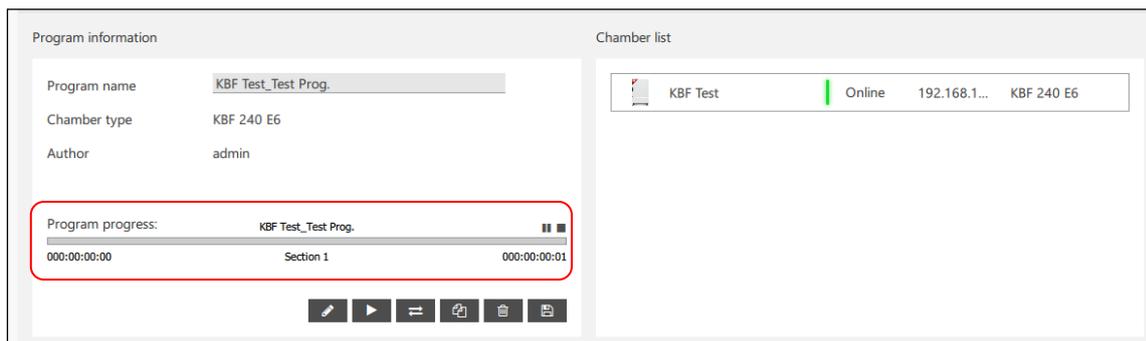
- **“Delay”**: Configure a start delay.
 - “Delay time”: Enter a duration aftr which the program shall start
 - “Date / Time”: Enter date and time of the start momen.

- **“Recording”** (optional): Configure the program recording.
 - “Quick recording”: Start quick recording
 - “Choose recording”: Continue an existing recording
 - “Stop recording automatically”: When the program is finished, recording will stop automatically.
- **“More”**:
 - “Start section”: Select the program section for the program start.

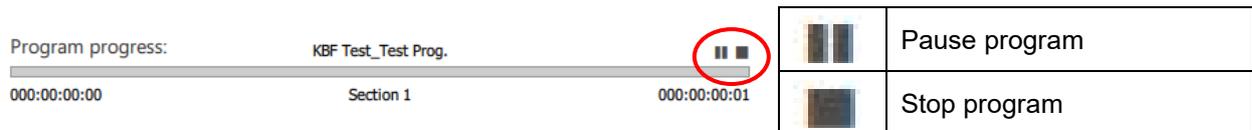
Select the **“Start”** button to start the program. The message “Program started” appears briefly.

The program is now executed in APT-COM 4.

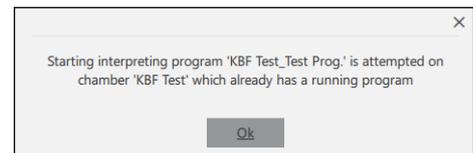
The program progress is displayed under “Program information”.



You can pause or stop the program in this view:



If you try to start a running program again on the same chamber, an error message appears



If you want to end the program, a confirmation prompt appears. Confirm with “Yes”.



12.4 Deleting a program

12.4.1 Deleting a program from the chamber controller

Before programs are deleted, a reason is requested (minimum length of 20 characters).



In the standard view of the chamber overview: Open the context menu (Ch. 6.2.1) and select “Programs on chamber”. The window “Programs on chamber” opens.

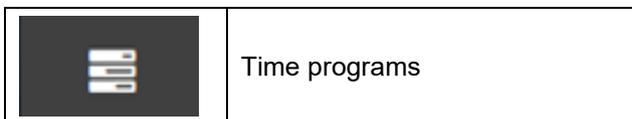
Under “Programs” the programs on the chamber controller are displayed.

Mark the desired program and select the “Delete program” button.



The program is deleted from the chamber controller.

12.4.2 Deleting a program from APT-COM™ 4



This function is available in the program editor.

Mark the desired program and select the “Expand” button to go to the detail view.



Select the “Delete program” button.



The program is deleted from APT-COM 4.

12.5 Importing and exporting programs

12.5.1 Importing programs

This feature is available in the window time programs.



Select the button “Import progr.”.

The program directory opens so you can select the desired program for import.

12.5.2 Exporting programs

This function is available in the program editor.

Mark the desired program and select the “Expand” button to go to the detail view.



Select the “Export program” button.



The program directory opens so you can save the desired program (by default program name).

13. Importing recordings from APT-COM™ 3 (GLP-Edition)

The program “APT-COM 3-Import-Tool” can be used to import recordings created with APT-COM™ 3 into APT-COM™ 4. The data is then available in APT-COM™ 4 and can be viewed and exported as a report.

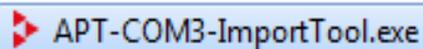
General procedure

To import recordings, the following steps must be carried out in this order:

- Create the chamber in APT-COM™ 4
- Close APT-COM™ 4
- Start the import tool
- Perform the import
- Close the import tool
- Open APT-COM™ 4

13.1 Procedure for importing records

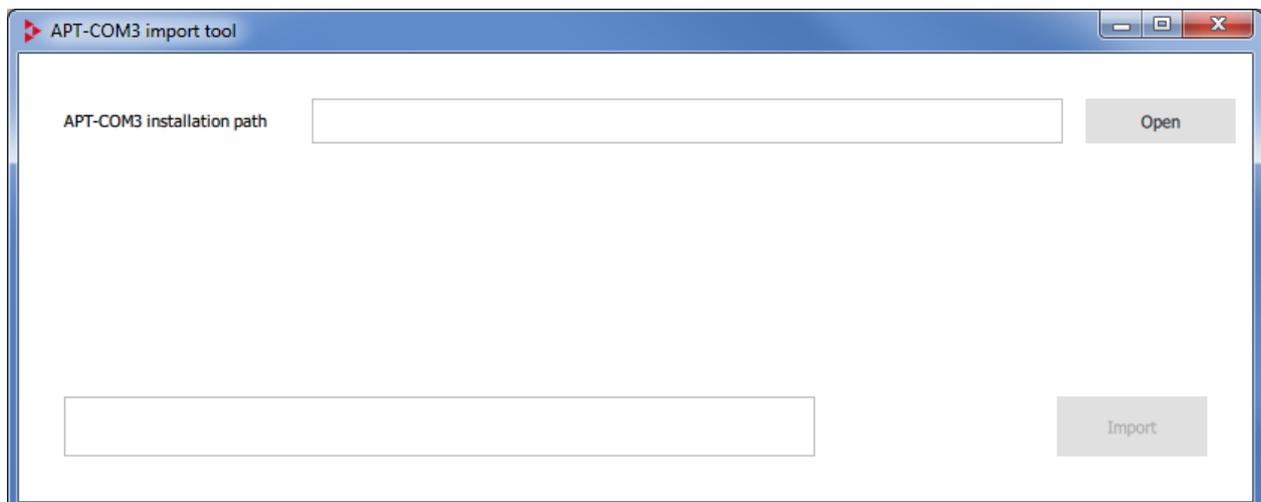
You can find the import tool in your APT-COM™ 4 installation folder in subdirectory “Bin”. You can create a shortcut on your desktop or in any directory



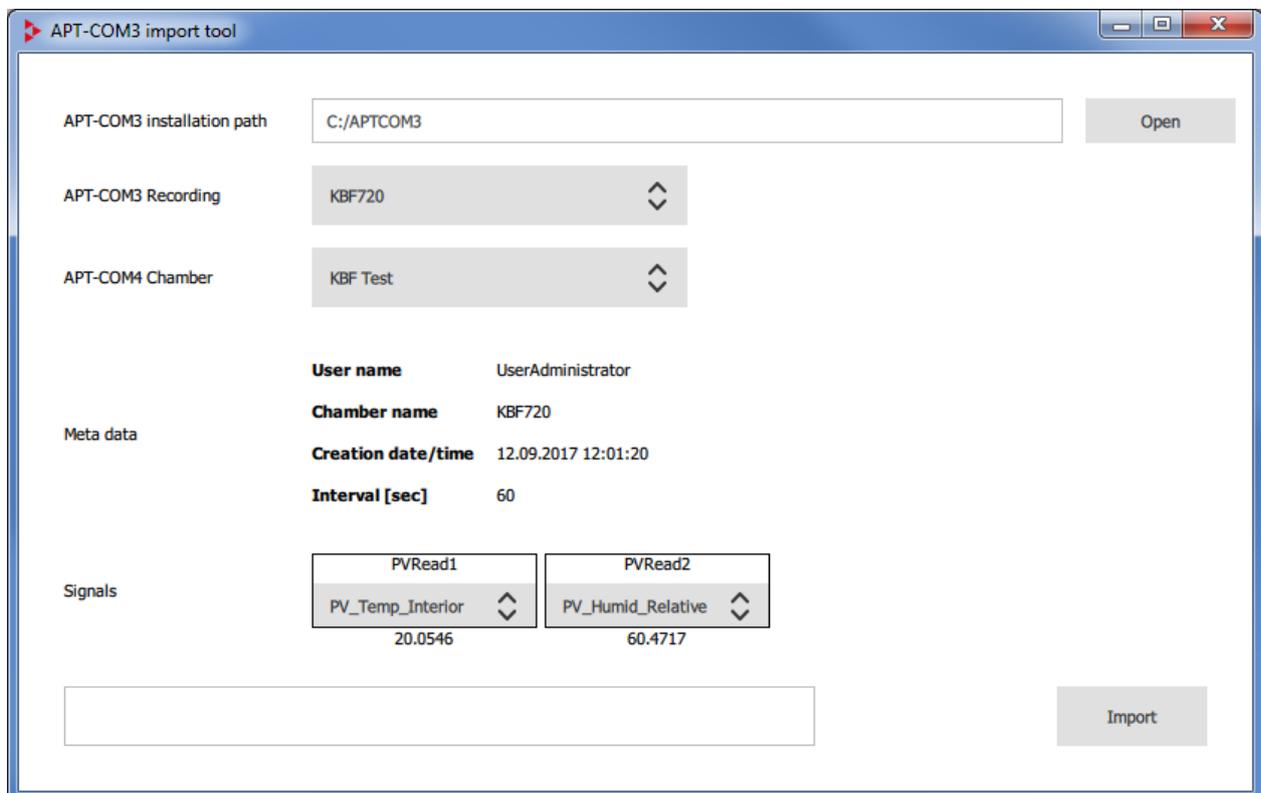
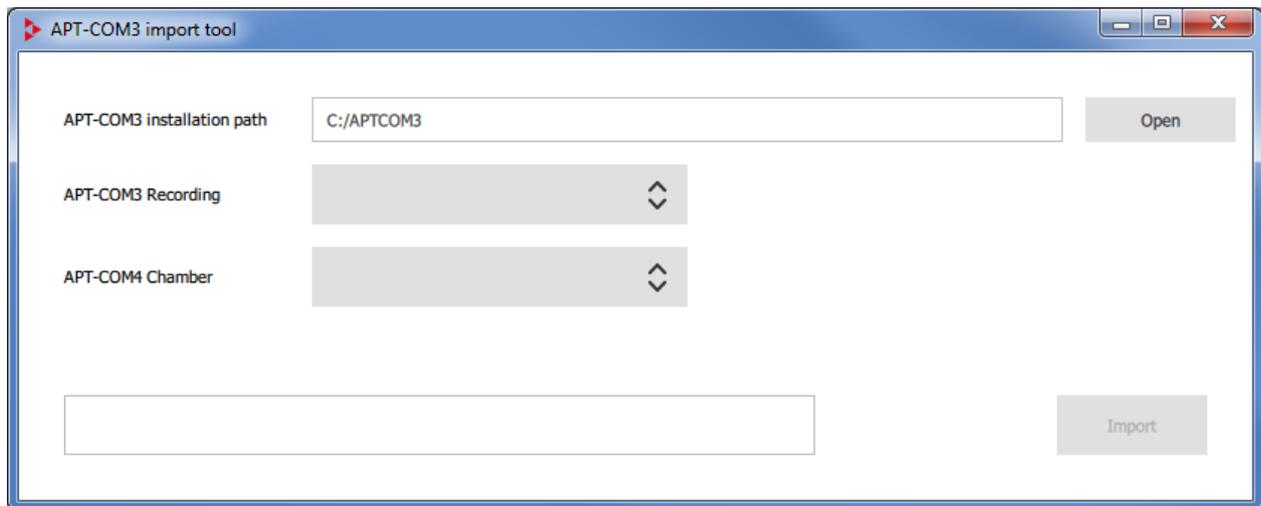
Note: Before starting the import tool, APT-COM™ 4 must be closed.

Start the file “APT-COM 3-Import-Tool.exe”.

! The representation takes place in the national language of your operating system.



Select the **“Open”** button to select the installation path of APT-COM™ 3.



- **“APT-COM3 installation path”**: Select the path of APT-COM™ 3
- **“APT-COM3 Recording”**: Select the desired recording from APT-COM™ 3
- **“APT-COM4 Chamber”**: Select a suitable chamber in APT-COM™ 4 to which the recording is to be assigned
- **“Meta data”**: In addition, the following information about the recording is displayed:
 - “User name”: User who created the recording in APT-COM™ 3
 - “Chamber name”: Name of the chamber on which the recording was created in APT-COM™ 3
 - “Creation date/time”: Moment of creation of the recording in APT-COM™ 3
 - “Interval [sec]”: Data recording interval
- **„Signals”**: Select the desired parameters for which recording data shall be imported.

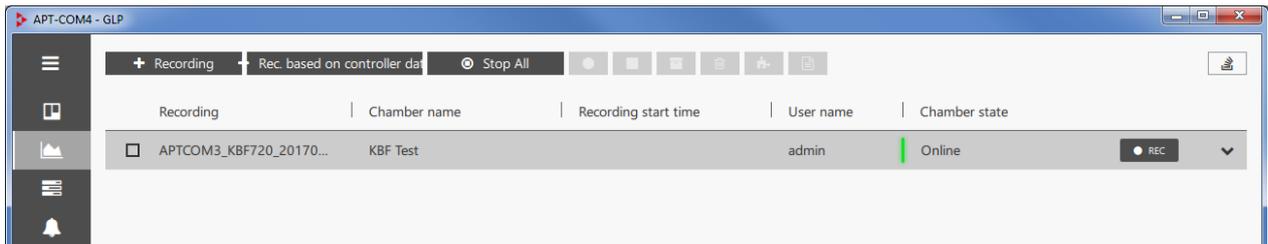
To start importing the recording, select the **“Import”** button.
 You can then exit the import tool and open APT-COM™ 4.

13.2 Imported records in APT-COM™ 4

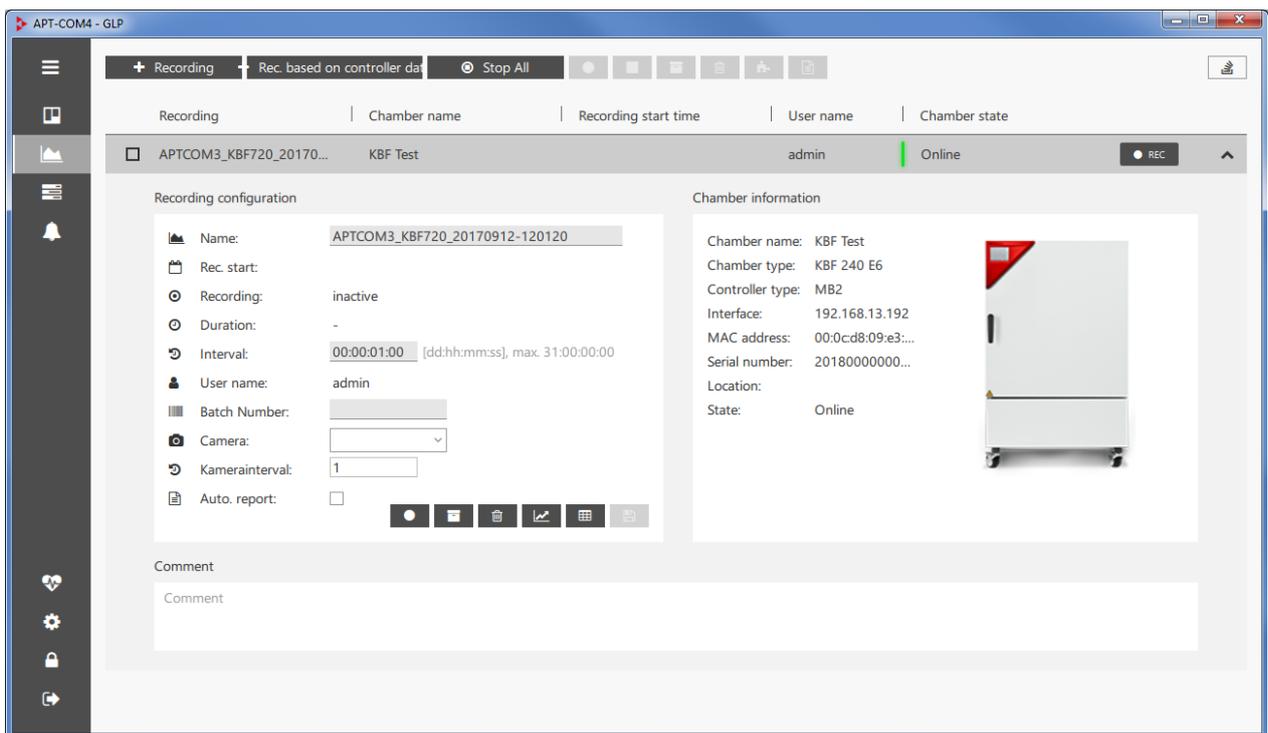
The imported record is displayed in the “Recordings” window.

The name of the recording contains an indication of APT-COM™ 3, the name of the chamber on which the recording was made in APT-COM™ 3, and the creation date.

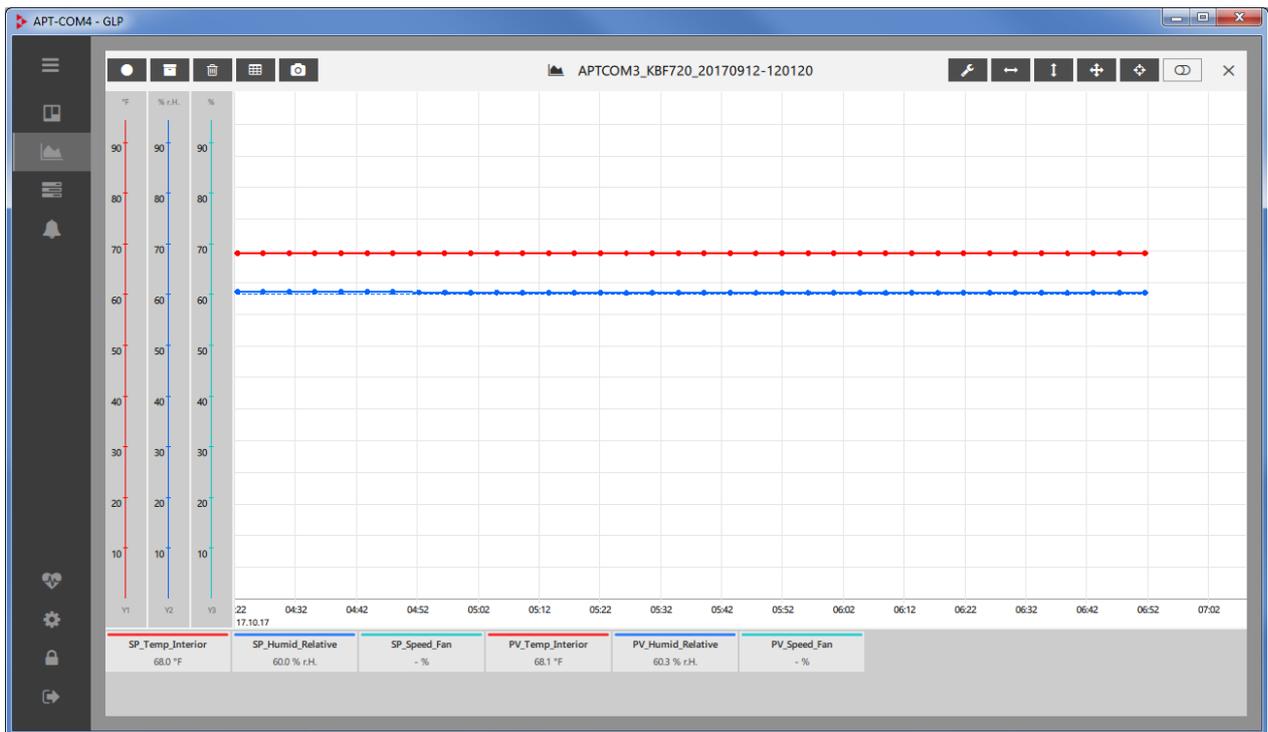
Further metadata will not be imported.



Select the **“Expand”** button to go to the detail view



Click on the name of the recording to open the recording window.



13.3 Notes on data security

13.3.1 Metadata of the imported recording

The name of the recording contains an indication of APT-COM™ 3, the name of the chamber on which the recording was made in APT-COM™ 3, and the creation date.

Further recording metadata will not be imported.

The name of a recording in APT-COM™ 4 can generally be changed by the administrator.

If you do not want to continue using APT-COM™ 3 in the future, we recommend that you also save the recording in APT-COM™ 3 using the export function, e.g., as a printout, so that the metadata (creator, creation date, etc.) can be stored safely.

13.3.2 Manipulation and access security

The import tool reads the data directly from the protected APT-COM™ 3 database. This ensures that only unmanipulated original data are imported.

Then the imported records are created in APT-COM™ 4. Here they can be viewed by all users and exported in the form of a report. The administrator can also delete the recordings.

If an access protection of the imported data against other authorized users of the APT-COM™ 4 is desired (for reasons of confidentiality), the use of the import tool might not be considered appropriate. In this case, we recommend that you remove or move the import tool from the installation directory of APT-COM™ 4 so that it is only available to users with the required authorization.

This also applies if APT-COM™ 3 shall continue to be used in the future and APT-COM™ 4 is only used as a test.

14. Measures for data security (GLP Edition)

The following is an overview about the software functions of APT-COM™ 4 GLP Edition that have been described in this manual, as far as security aspects are concerned as those needed to comply with GMP / GLP (Good Manufacturing Practice / Good Laboratory Practice) guidelines or with guideline 21 CFR part 11 released by the American “Food and Drug Administration” (FDA).

Admission control: Access to APT-COM™ 4 is limited by determination of a group of authorized users.

Selective assignment of rights of use: Next to the users that can carry out configurations only with respect to their recordings, an administrator will do all system configurations. Each user has access only to his own data.

Electronic signature: Every user must authenticate himself by his individual username and secret password in order to get access to the user interface. The combination of user name and password meets the conditions of an electronic signature according to FDA guideline 21 CFR 11T part C. According to 21 CFR 11 §11.100 (c) (1), an electronic signature serves to replace a handwritten signature.

Raw data format protected against manipulation: The recording and system data are saved in an encrypted database format. These databases are protected by a software internal password and encrypted. Manipulating the raw data by use of an editor is not possible.

Automatic backups of recording and system data: The automatic backup system assures that the recording data file, the automatically generated system log and all system settings are saved as a backup in intervals of choice on any network directory. A backup can easily be related to the moment of its creation. Backup copies allow to restore the backed-up data.

Automatic part of the Audit Trail: Comments can be added to the recording data during the recording course. These comments become part of the raw data. They are equally encrypted and saved together with the recording data in the recording database. Actions in the recording important for documentation can thus be comfortably documented. So, explanations for modification of the software settings can become part of the raw data. System modifications executed at the software are automatically recorded in an event database (“trace” file). The commented recording data together with the time synchronous system log form the part of the des Audit Trail that can be automatically supplied by this sort of documentation software.

Periodically and automatically generated printouts or electronic documents supply protocols easily to overlook for each recording. The respect of tolerance limits which can be defined as well as alarm events are already summarized for the reported.

Process security: The continuity of recording data acquisition and the respect of the tolerance limits that can be defined for each controlled parameter of each recording and connected chamber is monitored by many supervision and alarm functions. Also, a crash of the recording computer or any communication error between temperature chambers and the recording computer as well as in the connection of the monitoring computer will be reported as an alarm.

A second computer with a monitoring program supplies an independent second security level for the data communication and respect if tolerance limits.

All alarm messages can be actively transmitted in different manners (alarm contact, e-mail) also over long distances. The automatic generation of a homepage as an information platform of all running recordings (functions can be added for each individual recording) – if the recording computer or its APT-COM™ partition has been allowed to be shared – allows remote monitoring of the recording by each computer with a standard browser that is connected to the network.

15. AlarmCenter monitoring software

The AlarmCenter functionality is integrated in the APT-COM™ 4 (GLP Edition). In addition, the AlarmCenter can be operated as a standalone version on a separate PC (monitoring computer) (control room function). A separate license (serial number) is required for this, which is included in the scope of delivery of the GLP Edition. The Alarm-Kit hardware, which forwards alarms can be connected to the monitoring computer

The AlarmCenter provides a control room function via TCP/IP: Parallel security level through a second monitoring computer in the network with an independent monitoring software.

APT-COM™ 4 and the AlarmCenter both indicate deviations visually and can send alarms via e-mail.

When operated on the recording computer or on a separate monitoring computer, the AlarmCenter enables not only the visual display functions, but also an e-mail list that includes not only the logged-in user or administrator, as well as the use of the Alarm-Kit hardware.

When installed on a monitoring computer (control room function), the AlarmCenter also monitors whether APT-COM™ 4 is running.

When installed on a monitoring computer the AlarmCenter monitoring software allows monitoring running measurements independent of APT-COM™ 4. It has no control over the recording computer running APT-COM™ 4 or over the chambers connected to it.

- **Monitoring the communication between APT-COM / chamber controller and the AlarmCenter**

The actual value controller signal, which is received via APT-COM, is continuously monitored. If communication with the controller is interrupted, an alarm will be triggered after 3 minutes. This also applies to an interruption due to power failure

Note: In the event of a power failure, the zero-voltage relay alarm contacts of the Alarm-Kit hardware are switched directly. Obtaining an alert by the AlarmCenter software during the power failure, e.g. by e-mailing, requires the computer running the AlarmCenter software to be connected to an uninterruptible power supply (UPS).

- **Monitoring the individual tolerance ranges for each available parameter**

The desired upper and lower limits for the parameters available depending on the chamber type are entered directly in the AlarmCenter software for each chamber.

15.1 Installation and activation

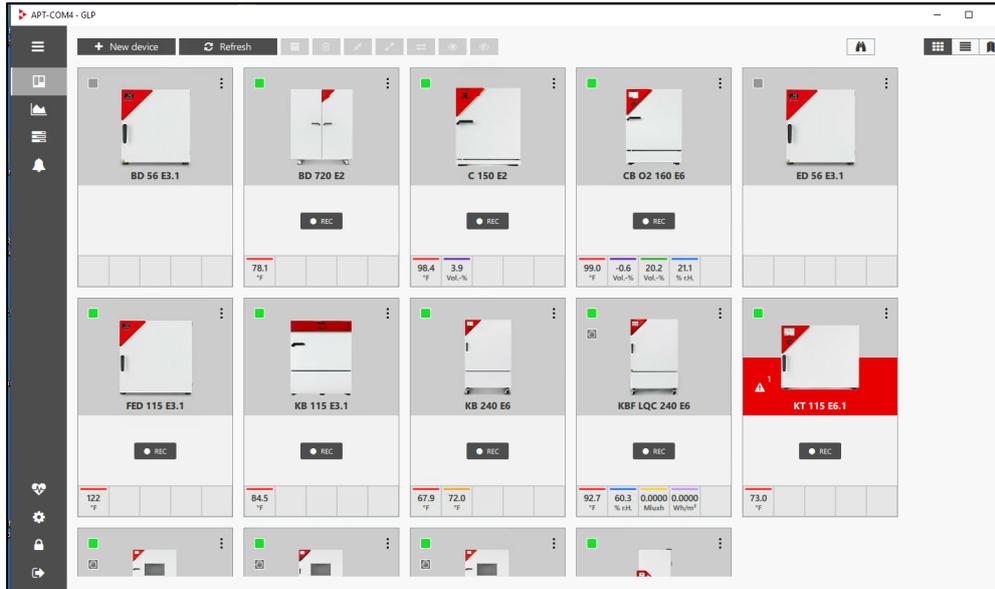
If you would like to use the AlarmCenter monitoring software as an additional functionality of your GLP Edition on the recording computer, no further steps are required. You can call up the view directly from the overview window.

If you would like to use AlarmCenter on a separate PC, the so-called monitoring computer (control room function), then proceed to install the APT-COM on that computer as described in chap. 4.3. You can then select the AlarmCenter software as described in chap. 4.4.1 and activate it with the license included in the scope of delivery of your GLP Edition (chap. 4.4.2).

15.2 AlarmCenter start

When installed on a monitoring computer, the AlarmCenter opens directly.

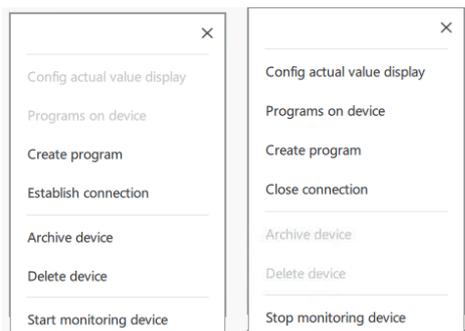
After starting the APT-COM 4 on the recording computer and successfully logging in, the overview window appears in the chamber view. All created chambers are displayed here.



Here you can switch on and off the monitoring:



Open the context menu of the desired chamber and select "Start monitoring device" or "Stop monitoring device"

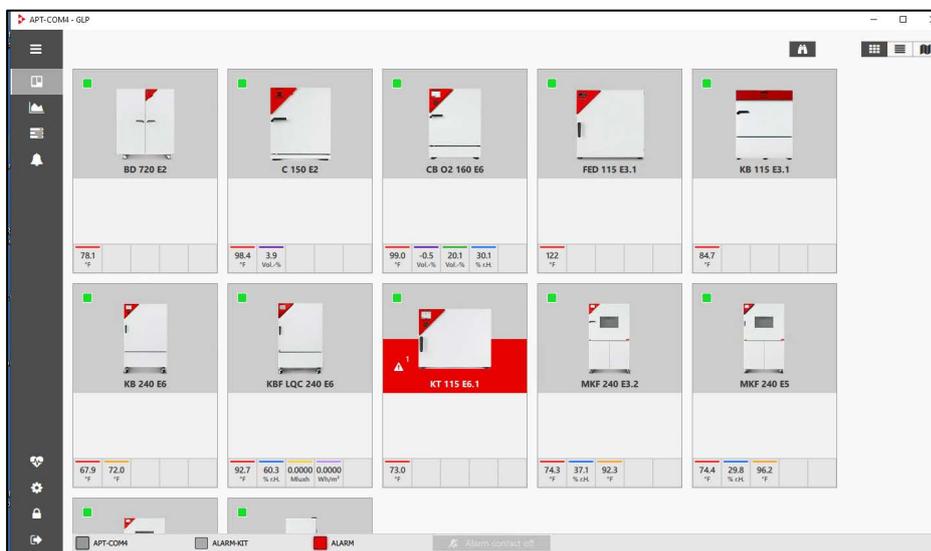


The AlarmCenter can be called up from the overview window:



Select the button with the binoculars icon

In the alarm center view, the monitored chambers are displayed with the signals configured for monitoring:



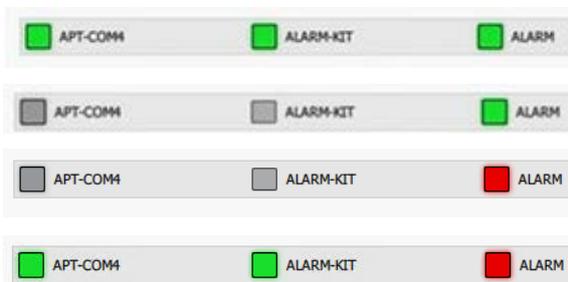
15.3 AlarmCenter display

The monitored chambers are displayed in the AlarmCenter view.

The following LEDs are located in the footer:

- APT-COM4 LED:
At the recording computer (APT-COM): connection to the monitoring computer with alarm kit
At the monitoring computer: connection to the APT-COM
- ALARM-KIT LED (only active on the monitoring computer)
Chamber alarm or (along with other red indicators) communication failure
- ALARM LED: Connection of monitoring computer (AlarmCenter) with recording computer (APT-COM 4)

Examples:



AlarmCenter on monitoring computer, connected with APT-COM and Alarm-Kit

AlarmCenter on recording computer, no alarm

AlarmCenter on recording computer, alarm

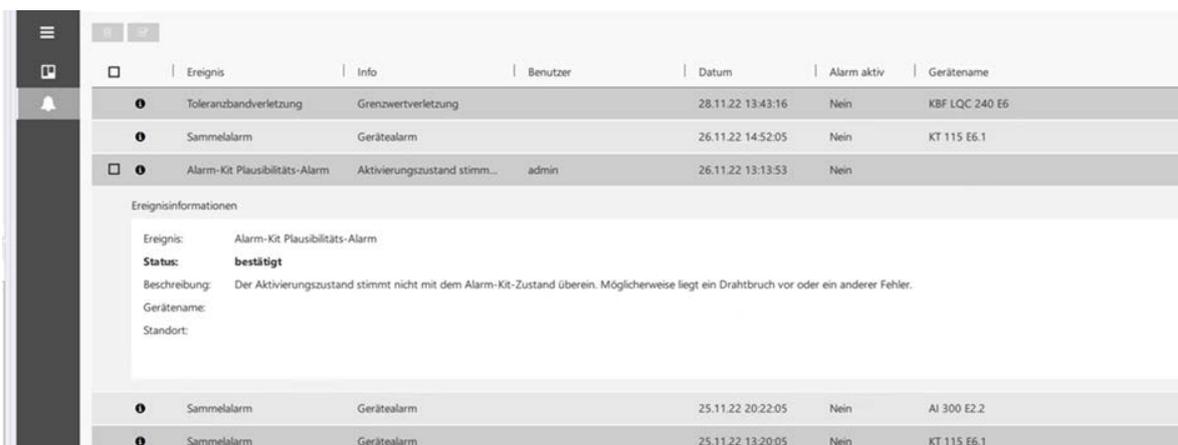
AlarmCenter on monitoring computer, connected with APT-COM and Alarm-Kit, alarm

15.4 Confirmation of alarms

Alarms are forwarded to the AlarmCenter by APT-COM. If alarms are confirmed in APT-COM, the confirmation also takes place in the AlarmCenter.

In the AlarmCenter, only those alarms that were generated by the AlarmCenter itself can be confirmed:

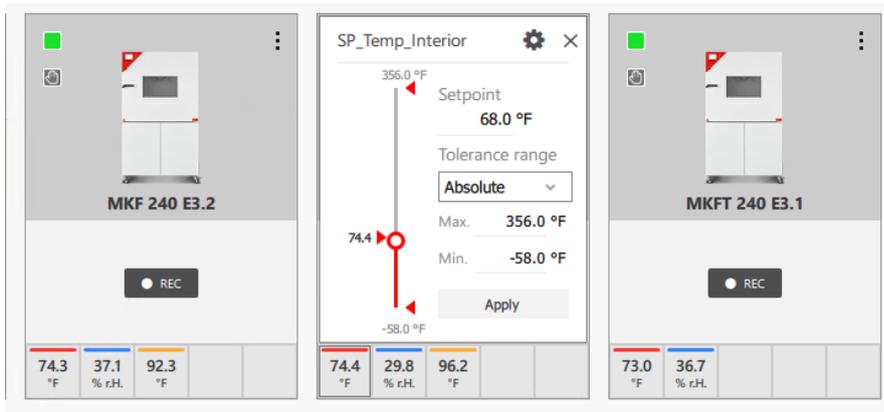
- AlarmCenter connection alarm: connection to the APT-COM or to the Alarm-Kit
- Plausibility: connection to the alarm kit does not show up as expected:



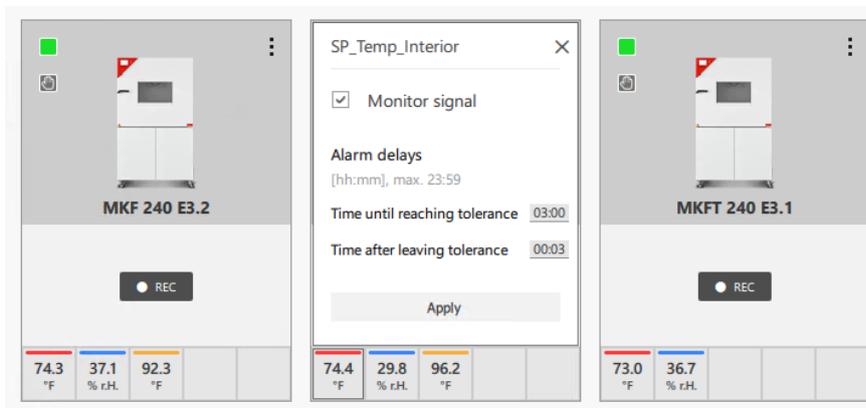
15.5 Setting alarm values and alarm delay times

This setting is made in the APT-COM overview window.

Here you can define the tolerance range and enter the values.



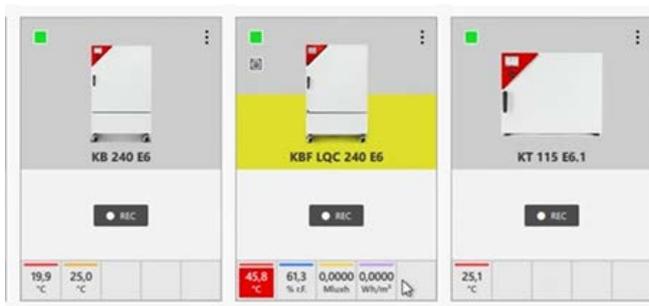
To adjust the delay times, select the gear icon.



Enter the desired delay times and press the "Apply" button.

15.6 Chamber display

The chamber display in the overview window and in the AlarmCenter can have a yellow or red background. If a value is **outside the tolerance range**, the chamber is displayed in yellow. Affected signals are colored red:



After the selected alarm delay time, the color changes to red:



At the same time, the alarm LED in the AlarmCenter turns red.

15.6.1 Alarm contact (with installation on the monitoring computer)



If there is an alarm, the "Alarm contact off" button becomes active (black background). You can press it to turn off a connected horn, for example.

As soon as the alarm contact is switched off, the alarm LED flashes red. The "Alarm contact off" button is now inactive (grey background).



If another alarm occurs, the alarm LED will turn continuously red again and the "Alarm contact off" button will be active again

15.7 Settings in the "Configuration" menu

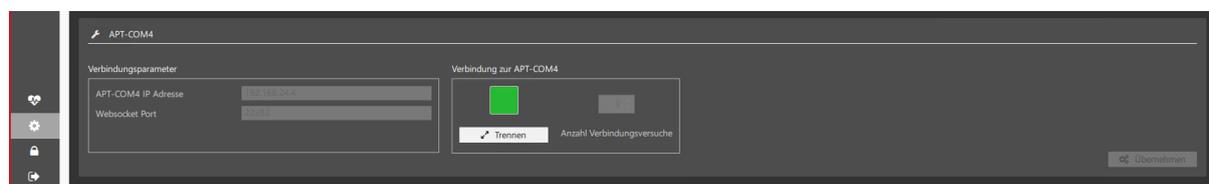


To be able to configure the AlarmCenter software, APT-COM™ 4 must be running. At least one chamber has to be created and connected in APT-COM™ 4.

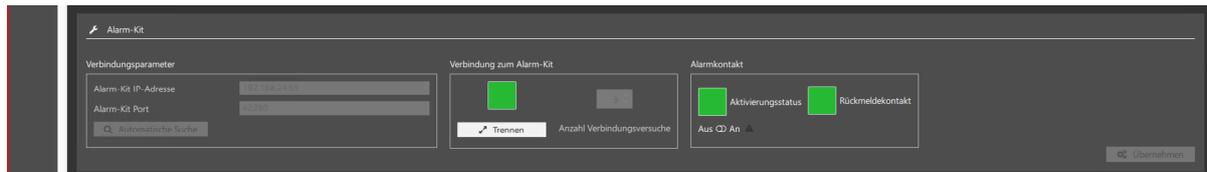


Under "E-mail list", enter the desired addresses that should be notified by the AlarmCenter. You will be notified of all reports.

Menu to connect APT-COM (only with AlarmCenter installation on the monitoring computer)



Alarm-Kit menu (only with Alarm-Kit hardware connected)



Here you can disable the connection to the Alarm-Kit or switch on the alarm contact manually (test alarm).

Normal state (no alarm):

The indicators under "Alarm contact" are green



The three alarm LEDs on the Alarm-Kit hardware light up. The Alarm-Kit hardware is ready for operation and reporting.

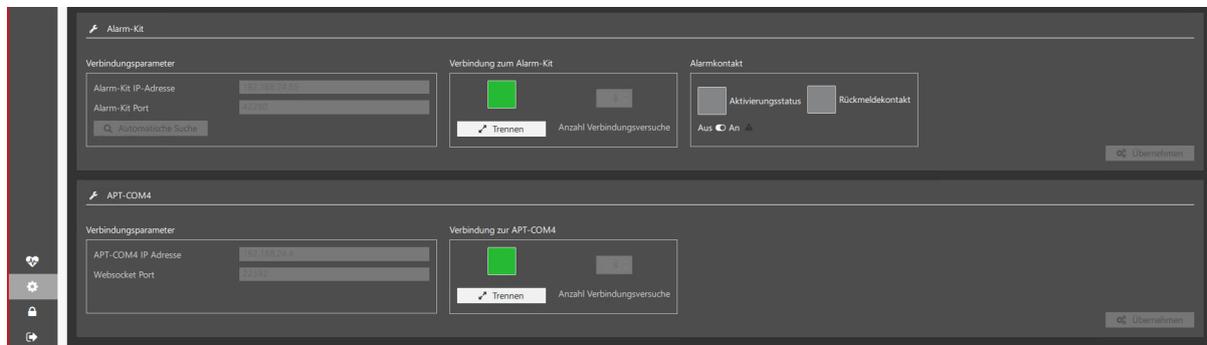


State of alarm

In the event of an alarm, the indicators under "Alarm contact" are not green (inverted to prevent wire breakage).

The red alarm status LED is activated in the AlarmCenter

Display when there is an alarm:



15.7.1 Establishing the connection to APT-COM 4 (monitoring computer)

After starting both APT-COM™ 4 () and the AlarmCenter, you can establish the connection between the AlarmCenter and APT-COM™ 4.

Under „Connection parameters“ enter the IP address of the computer on which APT-COM 4 is running, and the corresponding port and adopt the settings with **“Apply”**.

To disconnect the connection, select the **“Disconnect”** button.

15.8 Closing the AlarmCenter (monitoring computer)

First disconnect the connection to APT-COM (chap. 4.3.1).

Otherwise, a confirmation prompt appears. Confirm with **“Yes”**.

Before the AlarmCenter software is closed, a query appears, confirm this.

The connection is disconnected and the AlarmCenter software shuts down.

15.9 Matrix of actions/states in case of errors

LEDs:  APT-COM4  ALARM-KIT  ALARM

- APT-COM4 LED: Connection of monitoring computer with Alarm-Kit
- ALARM-KIT LED: Alarm of a chamber or (together with other red LEDs) communication failure
- ALARM LED: Connection of monitoring computer (AlarmCenter) with recording computer (APT-COM 4)

E-Mail:

- ✓ to administrator / connected user
- ✓✓ additionally to e-mail distribution lists from AlarmCenter.

Cause / time	Alarm condition on Alarm-Kit	ALARM LED	APT-COM4 LED	ALARMKIT-LED	Chamber display	Parameter display	E-mail	Log entry
Connection to APT-COM4 lost	no alarm						✓	✓
• Restored (before the attempts expire)	no alarm						✓	✓
• Attempts exhausted (alarm)	Alarm						✓	✓
• Alarm confirmed without reconnecting	Alarm						✓	✓
• Restored (alarm unconfirmed)	no alarm						✓	✓
• Restored and alarm confirmed	no alarm						✓	✓
Connection to alarm kit lost	--						✓	✓
• Restored (before the attempts expire)	no alarm						✓	✓
• Attempts exhausted (alarm)	--						✓	✓
• Alarm confirmed without reconnecting	--						✓	✓

Cause / time	Alarm condition on Alarm-Kit	ALARM LED	APT-COM4 LED	ALARMKIT-LED	Chamber display	Parameter display	E-mail	Log entry
• Restored (alarm unconfirmed)	Alarm						✓	✓
• Restored and alarm confirmed	no alarm						✓	✓
Tolerance range exceeded (on monitored signal without active recording)	no alarm						✓✓	✓
• Exceeding over	no alarm						✓✓	✓
Tolerance range exceeded (on monitored signal with active recording) (pre-alarm)	no alarm						✓✓	✓
• Exceeding over (no alarm yet)	no alarm						✓✓	✓
• Timer expired (alarm)	Alarm						✓✓	✓
• Alarm confirmed without ending the exceeding	Alarm						✓✓	✓
• Exceeding over (alarm unconfirmed)	Alarm						✓✓	✓
• Exceeding over and alarm confirmed	no alarm						✓✓	✓
Tolerance range exceeded (unmonitored chamber with active recording)	no alarm						✓	✓
• Exceeding over (no alarm yet)	no alarm						✓	✓
• Timer expired (alarm)	no alarm						✓	✓
• Alarm confirmed without ending the exceeding	no alarm						✓	✓
• Exceeding over (alarm unconfirmed)	no alarm						✓	✓
• Exceeding over and alarm confirmed	no alarm						✓	✓

Cause / time	Alarm condition on Alarm-Kit	ALARM LED	APT-COM4 LED	ALARMKIT-LED	Chamber display	Parameter display	E-mail	Log entry
Communication alarm/collective alarm (on monitored chamber with active recording)	Alarm						✓✓	✓
• Alarm condition ended (alarm unconfirmed)	Alarm						✓✓	✓
• Alarm confirmed without ending the condition	Alarm						✓✓	✓
• Alarm condition ended and confirmed	no alarm						✓✓	✓
Communication alarm/collective alarm (on unmonitored chamber with active recording)	no alarm						✓	✓
• Alarm condition ended (alarm unconfirmed)	no alarm						✓	✓
• Alarm confirmed without ending the condition	no alarm						✓	✓
• Alarm condition ended and confirmed	no alarm						✓	✓
General								
• Alarm unconfirmed and active	Alarm						✓	✓
• Alarm unconfirmed and inactive	Alarm						✓	✓
• Alarm confirmed and active	Alarm						✓	✓
• Alarm confirmed and inactive	no alarm						✓	✓
General (without AlarmCenter)								
• Alarm unconfirmed and active	---	---	---	---			✓	✓
• Alarm unconfirmed and inactive	---	---	---	---			✓	✓

Cause / time	Alarm condition on Alarm-Kit	ALARM LED	APT-COM4 LED	ALARMKIT-LED	Chamber display	Parameter display	E-mail	Log entry
• Alarm confirmed and active	--	--	--	--			✓	✓
• Alarm confirmed and inactive	---	---	---	---			✓	✓

16. Appendix

16.1 List of BINDER chambers for configuration in APT-COM™ 4

If you cannot find your chamber in this list, or if you are not sure, please contact the BINDER Service. This is especially important if your chamber has been modified with a project not listed here.

Model	Article No.	Voltage	Equipment
AI (E2.1)			
AI 300 (E2.1)	9020/9120-0265	200V-240V	
AI 300 (E2.1)	9020/9120-0266	200V-240V	
AI 300 (E2.2) Top	9020/9120-0318	200V-240V	
AI 300 (E2.2) Bottom	9020/9120-0319	200V-240V	
AI 300 (E3.1) Top	9020/9120-0457	200V-240V	
AI 300 (E3.1) Bottom	9020/9120-0456	200V-240V	
C (E2) MB1 controller			
C 150 (E2)	9040/9140-0078	230V	
C UL 150 (E2)	9040/9140-0079	115V	
C 150 (E2)	9040/9140-0080	100V	
C 150 (E2)	9040/9140-0081	230V	
C UL 150 (E2)	9040/9140-0082	115V	
C 150 (E2)	9040/9140-0083	100V	
C (E3) MB1 controller			
C 170 (E3)	9040/9140-0112	230V	
C UL 170 (E3)	9040/9140-0113	120V	
C 170 (E3)	9040/9140-0115	230V	
C UL 170 (E3)	9040/9140-0116	120V	
C RU 150 (E3)	9040/9140-0117	230V	
C RU 150 (E3)	9040/9140-0118	230V	
C (E7) RD4 controller			
C 150 RU (E7)	9040/9140-0194 9640-0001-RU	200-230 V	
C 170 (E7)	9040/9140-0163	230V	
C 170 (E7)	9040/9140-0164	120V	
CB-S (E7) RD4 controller			
CB-S 170 (E7)	9040/9140-0189	230V	
CB-S 170 (E7)	9040/9140-0190	120V	
CB-S 260 (E7)	9040/9140-0191	230V	

Model	Article No.	Voltage	Equipment
CB-S 260 (E7)	9040/9140-0192	120V	
CB (E2) MB1 controller			
CB 150 (E2)	9040/9140-0012	230V	
CB 150 (E2.2)	9040/9140-0014	230V	copper
CB UL 150 (E2.2)	9040/9140-0056	115V	copper
CB UL 150 (E2)	9040/9140-0016	115V	
CB 150 (E2)	9040/9140-0020	230V	divided glass door
CB UL 150 (E2)	9040/9140-0024	115V	divided glass door
CB UL 150 (E2)	9040/9140-0030	115V	Fail-Safe
CB 150 (E2)	9040/9140-0032	100V	
CB 210 (E2)	9040/9140-0013	230V	
CB 210 (E2)	9040/9140-0015	230V	copper
CB UL 210 (E2)	9040/9140-0017	115V	
CB 210 (E2)	9040/9140-0021	230V	divided glass door
CB UL 210 (E2)	9040/9140-0025	115V	divided glass door
CB 210 (E2)	9040/9140-0033	100V	
CB O2 150 (E2)	9040/9140-0018	230V	O ₂ control
CB O2 UL 150 (E2)	9040/9140-0022	115V	O ₂ control
CB O2 150 (E2)	9040/9140-0026	230V	O ₂ control, divided glass door
CB O2 UL 150 (E2)	9040/9140-0028	115V	O ₂ control, divided glass door
CB O2 210 (E2)	9040/9140-0019	230V	O ₂ control
CB O2 UL 210 (E2)	9040/9140-0023	115V	O ₂ control
CB O2 210 (E2)	9040/9140-0027	230V	O ₂ control divided glass door
CB O2 UL 210 (E2)	9040/9140-0029	115V	O ₂ control, divided glass door
CB (E3) MB1 controller			
CB 53 (E3)	9040/9140-0069	230V	
CB 53 (E3)	9040/9140-0073	230V	divided glass door
CB UL 53 (E3)	9040/9140-0070	100V-120V	
CB UL 53 (E3)	9040/9140-0074	100V-120V	divided glass door
CB 150 (E3)	9040/9140-0038	230V	
CB 150 (E3)	9040/9140-0068	100V	
CB 210 (E3)	9040/9140-0039	230V	
CB 210 (E3)	9040/9140-0041	100V	
CB UL 150 (E3)	9040/9140-0042	115V	
CB UL 210 (E3)	9040/9140-0043	115V	
CB 150 (E3)	9040/9140-0046	230V	divided glass door
CB 210 (E3)	9040/9140-0047	230V	divided glass door
CB UL 150 (E3)	9040/9140-0050	115V	divided glass door
CB UL 210 (E3)	9040/9140-0051	115V	divided glass door
CB O2 53 (E3)	9040/9140-0071	230V	O ₂ control
CB O2 UL 53 (E3)	9040/9140-0072	100V-120V	O ₂ control
CB O2 53 (E3)	9040/9140-0075	230V	O ₂ control, divided glass door
CB O2 UL 53 (E3)	9040/9140-0076	100V-120V	O ₂ control, divided glass door
CB O2 150 (E3)	9040/9140-0044	230V	O ₂ control
CB O2 210 (E3)	9040/9140-0045	230V	O ₂ control
CB O2 UL 150 (E3)	9040/9140-0048	115V	O ₂ control
CB O2 UL 210 (E3)	9040/9140-0049	115V	O ₂ control
CB O2 150 (E3)	9040/9140-0052	230V	O ₂ control, divided glass door
CB O2 210 (E3)	9040/9140-0053	230V	O ₂ control, divided glass door
CB O2 UL 150 (E3)	9040/9140-0054	115V	O ₂ control, divided glass door
CB O2 UL 210 (E3)	9040/9140-0055	115V	O ₂ control, divided glass door

Model	Article No.	Voltage	Equipment
CB (E6 + E6.1) T4.12 (BCW) controller			
CB 60 (E6, E6.1)	9040/9140-0088	200V-240V	
CB UL 60 (E6, E6.1)	9040/9140-0089	100V-120V	
CB O2 60 (E6, E6.1)	9040/9140-0090	200V-240V	O ₂ control
CB O2 UL 60 (E6, E6.1)	9040/9140-0091	100V-120V	O ₂ control
CB 60 (E6, E6.1)	9040/9140-0104	200V-240V	divided inner door
CB UL 60 (E6, E6.1)	9040/9140-0105	100V-120V	divided inner door
CB O2 60 (E6, E6.1)	9040/9140-0106	200V-240V	divided inner door, O ₂ control
CB O2 UL 60 (E6, E6.1)	9040/9140-0107	100V-120V	divided inner door, O ₂ control
CB 160 (E6, E6.1)	9040/9140-0092	200V-240V	
CB UL 160 (E6, E6.1)	9040/9140-0093	100V-120V	
CB O2 160 (E6, E6.1)	9040/9140-0094	200V-240V	O ₂ control
CB O2 UL 160 (E6, E6.1)	9040/9140-0095	100V-120V	O ₂ control
CB 160 (E6, E6.1)	9040/9140-0100	200V-240V	divided inner door
CB UL 160 (E6, E6.1)	9040/9140-0101	100V-120V	divided inner door
CB O2 160 (E6, E6.1) Isolator	9040/9140-0114	230V	O ₂ control
CB O2 160 (E6, E6.1)	9040/9140-0102	200V-240V	divided inner door, O ₂ control
CB O2 UL 160 (E6, E6.1)	9040/9140-0103	100V-120V	divided inner door, O ₂ control
CB 220 (E6, 6.1)	9040/9140-0096	200V-240V	
CB UL 220 (E6, 6.1)	9040/9140-0097	100V-120V	
CB O2 220 (E6, E6.1)	9040/9140-0098	200V-240V	O ₂ control
CB O2 UL 220 (E6, E6.1)	9040/9140-0099	100V-120V	O ₂ control
CB 220 (E6.1)	9040/9140-0108	200V-240V	divided inner door
CB UL 220 (E6, E6.1)	9040/9140-0109	100V-120V	divided inner door
CB O2 220 (E6, E6.1)	9040/9140-0110	200V-240V	divided inner door, O ₂ control
CB O2 UL 220 (E6, E6.1)	9040/9140-0111	100V-120V	divided inner door, O ₂ control
CB RU 53 (E6, E6.1)	9040/9140-0119	200V-240V	
CB RU 53 (E6, E6.1)	9040/9140-0120	200V-240V	divided inner door
CB O2 RU 53 (E6, E6.1)	9040/9140-0121	200V-240V	divided inner door, O ₂ control
CB O2 RU 53 (E6, E6.1)	9040/9140-0122	200V-240V	O ₂ control
CB RU 150 (E6, E6.1)	9040/9140-0123	200V-240V	
CB RU 150 (E6, E6.1)	9040/9140-0124	200V-240V	divided inner door
CB O2 RU 150 (E6, E6.1)	9040/9140-0125	200V-240V	divided inner door, O ₂ control
CB O2 RU 150 (E6, E6.1)	9040/9140-0126	200V-240V	O ₂ control
CB RU 210 (E6, E6.1)	9040/9140-0127	200V-240V	
CB RU 210 (E6, E6.1)	9040/9140-0128	200V-240V	divided inner door
CB O2 RU 210 (E6, E6.1)	9040/9140-0129	200V-240V	divided inner door, O ₂ control
CB O2 RU 210 (E6, E6.1)	9040/9140-0130	200V-240V	O ₂ control
CB (E7) MB2 controller			
CB RU 53 (E7)	9040/9140-0187 9640-0005-RU	200-230 V	
CB 56 (E7)	9040/9140-0167 9640-0005	200-230 V	
CB O2 RU 53 (E7)	9040/9140-0188 9640-0006-RU	200-230 V	O ₂ control 0-20%
CB O2 56 (E7)	9040/9140-0168 9640-0006	200-230 V	O ₂ control 0-20%
CB 56 (E7)	9040/9140-0169	100-120 V	
CB O2 56 (E7)	9040/9140-0170	100-120 V	O ₂ control 0-20%
CB RU 150 (E7)	9040/9140-0135 9640-0009-RU	200-230 V	

Model	Article No.	Voltage	Equipment
CB 170 (E7)	9040/9140-0131 9640-0009	200-230 V	
CB 170 (E7)	9040/9140-0139 9640-0011	100-120 V	
CB O2 RU 150 (E7)	9040/9140-0136 9640-0010-RU	200-230 V	O ₂ control 0-20%
CB O2 170 (E7)	9040/9140-0132 9640-0010	200-230 V	O ₂ control 0-20%
CB O2 170 (E7)	9040/9140-0140 9640-0012	100-120 V	O ₂ control 0-20%
CB RU 150 (E7)	9040/9140-0137	200-230 V	Active humidification
CB 170 (E7)	9040/9140-0133	200-230 V	Active humidification
CB 170 (E7)	9040/9140-0141	100-120 V	Active humidification
CB O2 RU 150 (E7)	9040/9140-0138	200-230 V	Active humidification O ₂ control 0-20%
CB O2 170 (E7)	9040/9140-0134	200-230 V	Active humidification O ₂ control 0-20%
CB O2 170 (E7)	9040/9140-0142	100-120 V	Active humidification O ₂ control 0-20%
CB 210 RU (E7)	9040/9140-0183 9640-0013-RU	200-230 V	
CB 260 (E7)	9040/9140-0147 9640-0013	200-230 V	
CB 260 (E7)	9040/9140-0152 9640-0015	100-120 V	
CB 210 O2 RU (E7)	9040/9140-0184 9640-0014-RU	200-230 V	
CB O2 260 (E7)	9040/9140-0148 9640-0014	200-230 V	O ₂ control 0-20%
CB O2 260 (E7)	9040/9140-0153 9640-0016	100-120 V	O ₂ control 0-20%
CB 260 (E7)	9040/9140-0149	200-230 V	Active humidification
CB 260 (E7)	9040/9140-0154	100-120 V	Active humidification
CB O2 260 (E7)	9040/9140-0150	200-230 V	Active humidification O ₂ control 0-20%
CB O2 260 (E7)	9040/9140-0155	100-120 V	Active humidification O ₂ control 0-20%
CBF (E7) MB2 controller			
CBF 170	9040/9140-0133 9640-0017	200-230 V	
CBF 170-O2	9040/9140-0134 9640-0018	200-230 V	O ₂ control 0-20%
CBF 170	9040/9140-0141 9640-0019	100-120 V	
CBF 170-O2	9040/9140-0142 9640-0020	100-120 V	O ₂ control 0-20%
CBF 260	9040/9140-0149 9640-0021	200-230 V	
CBF 260-O2	9040/9140-0150 9640-0022	200-230 V	O ₂ control 0-20%
CBF 260	9040/9140-0154 9640-0023	100-120 V	
CBF 260-O2	9040/9140-0155 9640-0024	100-120 V	O ₂ control 0-20%

Model	Article No.	Voltage	Equipment
CB-S (E7) RD4 controller			
CB-S 170	9040/9140-0189 9640-0001	200-230 V	
CB-S 170	9040/9140-0190 9640-0002	100-120 V	
CB-S 260	9040/9140-0191 9640-0003	200-230 V	
CB-S 260	9040/9140-0192 9640-0004	100-120 V	
Vacuum controller CVC 3000			
CVC 3000 (hPa)		230V	
CVC 3000 (mbar)		230V	
CVC 3000 (hPa)		115V	
CVC 3000 (mbar)		115V	
BD (E2) R3, R3.2 controller			with RS422 interface
BD 23 (E2)	9010/9110-0187	230V	
BD UL 23 (E2)	9010/9110-0189	115V	
BD 53 (E2)	9010/9110-0081	230V	
BD UL 53 (E2)	9010/9110-0179	115V	
BD 115 (E2)	9010/9110-0088	230V	
BD UL 115 (E2)	9010/9110-0181	115V	
BD 240 (E2)	9010/9110-0095	230V	
BD UL 240 (E2)	9010/9110-0183	115V	
BD 400 (E2)	9010/9110-0073	230V	
BD UL 400 (E2)	9010/9110-0176	115V	
BD 720 (E2)	9010/9110-0074	230V	
BD UL 720 (E2)	9010/9110-0177	115V	
BD (E3, E3.1) R4 controller			also with optional object temperature display
BD 56 (E3.1)	9010/9110-0323	230V	
BD UL 56 (E3.1)	9010/9110-0324	115V	
BD 115 (E3.1)	9010/9110-0325	230V	
BD UL 115 (E3.1)	9010/9110-0326	115V	
BD 170 (E3)	9010/9110-0327	230V	
BD UL 170 (E3)	9010/9110-0328	115V	
BD 260 (E3.1)	9010/9110-0329	230V	
BD UL 260 (E3.1)	9010/9110-0330	115V	
BD 720 (E3.1)	9010/9110-0331	230V	
BD UL 720 (E3.1)	9010/9110-0332	240V	
BD RU 53 (E3.1)	9010/9110-0350	230V	
BD RU 240 (E3.1)	9010/9110-0351	230V	
BF (E1) R3.1, R3.2 controller			
BF 53 (E1)	9010/9110-0235	230V	
BF UL 53 (E1)	9010/9110-0236	115V	
BF 115 (E1)	9010/9110-0237	230V	
BF UL 115 (E1)	9010/9110-0238	115V	
BF 240 (E1)	9010/9110-0239	230V	
BF UL 240 (E1)	9010/9110-0240	115V	
BF 400 (E1)	9010/9110-0241	230V	

Model	Article No.	Voltage	Equipment
BF UL 400 (E1)	9010/9110-0242	115V	
BF 720 (E1)	9010/9110-0243	230V	
BF UL 720 (E1)	9010/9110-0244	115V	
BF (E3, E3.1) R4 controller			also with optional object temperature display
BF 56 (E3.1)	9010/9110-0313	230V	
BF UL 56 (E3.1)	9010/9110-0314	115V	
BF 115 (E3.1)	9010/9110-0315	230V	
BF UL 115 (E3.1)	9010/9110-0316	115V	
BF 170 (E3)	9010/9110-0317	230V	
BF 170 (E3)	9010/9110-0318	120V	
BF 260 (E3.1)	9010/9110-0319	230V	
BF UL 260 (E3.1)	9010/9110-0320	115V	
BF 720 (E3.1)	9010/9110-0321	230V	
BF UL 720 (E3.1)	9010/9110-0322	240V	
BF RU 53 (E3.1)	9010/9110-0352	230V	
BF RU 240 (E3.1)	9010/9110-0353	230V	
ED (E2) R3, R3.2 controller			with RS422 interface
ED 23 (E2)	9010/9110-0191	230V	
ED UL 23 (E2)	9010/9110-0193	115V	
ED 53 (E2)	9010/9110-0079	230V	
ED UL 53 (E2)	9010/9110-0132	115V	
ED 115 (E2)	9010/9110-0097	230V	
ED UL 115 (E2)	9010/9110-0165	115V	
ED 240 (E2)	9010/9110-0101	230V	
ED 240 (E2) Fresenius	9010/9110-0163	230V	
ED UL 240 (E2)	9010/9110-0167	208V	
ED 400 (E2)	9010/9110-0075	400V	
ED UL 400 (E2)	9010/9110-0168	208V	
ED 720 (E2)	9010/9110-0076	400V	
ED UL 720 (E2)	9010/9110-0169	208V	
ED (E3, E3.1) R4 controller			also with optional object temperature display
ED 56 (E3.1)	9010/9110-0333	230V	
ED UL 56 (E3.1)	9010/9110-0334	115V	
ED 115 (E3.1)	9010/9110-0335	230V	
ED UL 115 (E3.1)	9010/9110-0336	115V	
ED 170 (E3)	9010/9110-0337	230V	
ED UL 170 (E3)	9010/9110-0338	240V	
ED 260 (E3.1)	9010/9110-0339	230V	
ED UL 260 (E3.1)	9010/9110-0340	240V	
ED 720 (E3.1)	9010/9110-0341	400V	
ED RU 53 (E3.1)	9010/9110-0344	230V	
ED RU 240 (E3.1)	9010/9110-0345	230V	
FD (E2) R3, R3.2 controller			with RS422 interface
FD 23 (E2)	9010/9110-0195	230V	
FD UL 23 (E2)	9010/9110-0197	115V	
FD 53 (E2)	9010/9110-0083	230V	

Model	Article No.	Voltage	Equipment
FD UL 53 (E2)	9010/9110-0135	115V	
FD 115 (E2)	9010/9110-0103	230V	
FD 115 (E2) MTT	9010/9110-0251	230V	
FD UL 115 (E2)	9010/9110-0149	115V	
FD 240 (E2)	9010/9110-0107	230V	
FD 240 (E2) Otto Bock	9010/9110-0198	230V	
FD 240 (E2) MTT	9010/9110-0252	230V	
FD UL 240 (E2)	9010/9110-0150	208V	
FD 400 (E2) Otto Bock	9010/9110-0199	400V	
FD UL 400 (E2)	9010/9110-0151	208V	
FD 720 (E2) MTT	9010/9110-0253	400V	
FD 720 (E2) MTT	9010/9110-0254	400V	reinforced
FD 720 (E2) Otto Bock	9010/9110-0245	400V	
FD UL 720 (E2)	9010/9110-0161	208V	
FD (E3, E3.1) R4 controller			also with optional object temperature display
FD 56 (E3.1)	9010/9110-0303	230V	
FD UL 56 (E3.1)	9010/9110-0304	115V	
FD 115 (E3.1)	9010/9110-0305	230V	
FD UL 115 (E3.1)	9010/9110-0306	115V	
FD 170 (E3)	9010/9110-0307	230V	
FD UL 170 (E3)	9010/9110-0308	240V	
FD 260 (E3.1)	9010/9110-0309	230V	
FD 260 (E3.1) Otto Bock	9010/9110-0174	230V	
FD UL 260 (E3.1)	9010/9110-0310	240V	
FD 720 (E3.1)	9010/9110-0311	400V	
FD RU 53 (E3.1)	9010/9110-0346	230V	
FD RU 240 (E3.1)	9010/9110-0347	230V	
FDL 115 (E2) RD3 controller			
FDL 115 (E2)	9010/9110-0269	230V	
FDL 115 (E2.1) RD3 controller			
FDL 115 (E2.1)	9010/9110-0292	230V	230V
FED (E2) R3.1, R3.2 controller			
FED 23 (E2)	9010/9110-0208	230V	
FED 23 (E2)	9010/9110-0209	115V	
FED 53 (E2)	9010/9110-0210	230V	
FED UL 53 (E2)	9010/9110-0211	115V	
FED 115 (E2)	9010/9110-0212	230V	
FED UL 115 (E2)	9010/9110-0213	115V	
FED 240 (E2)	9010/9110-0214	230V	
FED UL 240 (E2)	9010/9110-0215	208V	
FED 400 (E2)	9010/9110-0216	400V	
FED UL 400 (E2)	9010/9110-0217	208V	
FED 720 (E2)	9010/9110-0218	400V	
FED UL 720 (E2)	9010/9110-0219	208V	
FED 240 (E2) Otto Bock	9010/9110-0248	208V	
FED 400 (E2) Otto Bock	9010/9110-0249	208V	
FED 462 (E2) Otto Bock	9010/9110-0277	400V	

Model	Article No.	Voltage	Equipment
FED 720 (E2) PM-DM	9010/9110-0250	230V	
FED (E3, E3.1) R4 controller			also with optional object temperature display
FED 56 (E3.1)	9010/9110-0295	230V	
FED UL 56 (E3.1)	9010/9110-0296	115V	
FED 115 (E3.1)	9010/9110-0293	230V	
FED UL 115 (E3.1)	9010/9110-0294	115V	
FED 170 (E3)	9010/9110-0297	230 V	
FED UL? 170 (E3)	9010/9110-0298	240 V	
FED 260 (E3.1)	9010/9110-0299	230V	
FED UL 260 (E3.1)	9010/9110-0300	240V	
FED 720 (E3.1)	9010/9110-0301	400V	
FED UL 720 (E3.1)	9010/9110-0302	208V	
FED RU 53 (E3.1)	9010/9110-0348	230V	
FED RU 240 (E3.1)	9010/9110-0349	230V	
FP (E1) RD3 controller without week program timer			also with optional object temperature display
FP 53 (E1)	9010/9110-0225	230V	
FP UL 53 (E1)	9010/9110-0226	115V	
FP 115 (E1)	9010/9110-0227	230V	
FP UL 115 (E1)	9010/9110-0228	115V	
FP 240 (E1)	9010/9110-0229	230V	
FP UL 240 (E1)	9010/9110-0230	208V	
FP 400 (E1)	9010/9110-0231	400V	
FP UL 400 (E1)	9010/9110-0232	208V	
FP 720 (E1)	9010/9110-0233	400V	
FP UL 720 (E1)	9010/9110-0234	208V	
FP (E1.1) RD3 controller with week program timer			
FP 53 (E1.1)	9010/9110-0153	230V	
FP UL 53 (E1.1)	9010/9110-0175	115V	
FP 115 (E1.1)	9010/9110-0255	230V	
FP 115 (E1.1) TTC	9010/9110-0290	230V	
FP UL 115 (E1.1)	9010/9110-0262	115V	
FP 240 (E1.1)	9010/9110-0263	230V	
FP UL 240 (E1.1)	9010/9110-0264	208V	
FP 400 (E1.1)	9010/9110-0265	400V	
FP UL 400 (E1.1)	9010/9110-0266	208V	
FP 720 (E1.1)	9010/9110-0267	400V	
FP UL 720 (E1.1)	9010/9110-0268	208V	
FP (E3.1) RD4 controller			also with optional object temperature display
FP 56 (E3.1)	9010/9110-0363	230V	
FP UL 56 (E3.1)	9010/9110-0367	120V	
FP 115 (E3.1)	9010/9110-0364	230V	
FP UL 115 (E3.1)	9010/9110-0368	120V	
FP 260 (E3.1)	9010/9110-0365	230V	
FP UL 260 (E3.1)	9010/9110-0369	240V	
FP 720 (E3.1)	9010/9110-0366	400V	

Model	Article No.	Voltage	Equipment
FP UL 720 (E3.1)	9010/9110-0370	208V	
KB (E3) RD3 controller			
KB 23 (E3)	9020/9120-0095	230V	
KB UL 23 (E3)	9020/9120-0098	115V	
KB 53 (E3)	9020/9120-0069	230V	
KB UL 53 (E3)	9020/9120-0070	115V	
KB 115 (E3)	9020/9120-0071	230V	
KB UL 115 (E3)	9020/9120-0072	115V	
KB 240 (E3)	9020/9120-0073	230V	
KB UL 240 (E3)	9020/9120-0074	115V	
KB 400 (E3)	9020/9120-0075	230V	
KB UL 400 (E3)	9020/9120-0076	115V	
KB 720 (E3)	9020/9120-0077	230V	
KB 720 (E3) PM-DM	9020/9120-0067	230V	
KB UL 720 (E3)	9020/9120-0078	115V	
KB (E3.1) RD3 controller with week program timer			
KB 23 (E3.1)	9020/9120-0112	230V	
KB UL 23 (E3.1)	9020/9120-0113	115V	
KB 53 (E3.1)	9020/9120-0114	230V	
KB 53 (E3.1)	9020/9120-0243	230V	
KB UL 53 (E3.1)	9020/9120-0115	115V	
KB UL 53 (E3.1)	9020/9120-0252	115V	
KB 115 (E3.1)	9020/9120-0116	230V	
KB 115 (E3.1)	9020/9120-0242	230V	
KB UL 115 (E3.1)	9020/9120-0117	115V	
KB UL 115 (E3.1)	9020/9120-0253	115V	
KB 240 (E3.1)	9020/9120-0118	230V	
KB UL 240 (E3.1)	9020/9120-0119	115V	
KB 400 (E3.1)	9020/9120-0120	230V	
KB UL 400 (E3.1)	9020/9120-0121	115V	
KB 720 (E3.1)	9020/9120-0122	230V	
KB 720 (E3.1) PM-DM	9020/9120-0126	115V	
KB UL 720 (E3.1)	9020/9120-0123	115V	
KB (E4) T4.12 (BCW) controller			
KB 53 (E4)	9020/9120-0199	230V	
KB UL 53 (E4)	9020/9120-0302	115V	
KB 115 (E4)	9020/9120-0397	230V	
KB UL 115 (E4)	9020/9120-0398	115V	
KB (E5) RD3 controller with week program timer			
KB 240 (E5)	9020/9120-0136	200V-240V	
KB UL 240 (E5)	9020/9120-0137	100V-120V	
KB (E5.1) RD3 controller with week program timer			
KB 240 (E5.1)	9020/9120-0162	200V-240V	
KB 240 (E5.1)	9020/9120-0241	200V-230V	
KB UL 240 (E5.1)	9020/9120-0163	100V-120V	
KB UL 240 (E5.1)	9020/9120-0254	100V-120V	
KB 400 (E5.1)	9020/9120-0178	200V-230V	

Model	Article No.	Voltage	Equipment
KB UL 400 (E5.1)	9020/9120-0179	100V-120V	
KB 720 (E5.1)	9020/9120-0111	200V-230V	
KB UL 720 (E5.1)	9020/9120-0167	200V-240V	200-240V
KB (E6) T4.12 (BCW) controller			
KB 240 (E6)	9020/9120-0202	200V-	
KB UL 240 (E6)	9020/9120-0304	100V-120V	
KB 400 (E6)	9020/9120-0203	200V-230V	
KB UL 400 (E6)	9020/9120-0305	100V-120V	
KB 720 (E6)	9020/9120-0204	200V-230V	
KB UL 720 (E6)	9020/9120-0306	200V-240V	
KB ECO (E6.2) RD4 controller			
KB ECO 240 (E6.2)	9020/9120-0423	200V-230V	
KB ECO-UL 240 (E6.2)	9020/9120-0426	200V-240V	
KB ECO 400 (E6.2)	9020/9120-0465	200V-230V	
KB ECO-UL 400 (E6.2)	9020/9120-0466	200V-240V	
KB ECO 720 (E6.2)	9020/9120-0424	200V-230V	
KB ECO-UL 720 (E6.2)	9020/9120-0427	200V-240V	
KB ECO 1020 (E6.2)	9020/9120-0425	200V-230V	
KB ECO-UL 1020 (E6.2)	9020/9120-0428	200V-240V	
KBF (E2) MB1 controller without program			
KBF 115 (E2)	9020/9120-0038	230V	with optional program controller (8012-0352, 8012-0352, 8012-0352)
KBF 240 (E2)	9020/9120-0039	230V	with optional program controller (8012-0352, 8012-0352, 8012-0352)
KBF 720 (E2)	9020/9120-0040	230V	with optional program controller (8012-0352, 8012-0352, 8012-0352)
KBF (E2.1) MB1 controller, program			
KBF 115 (E2.1)	9020/9120-0093	230V	
KBF UL 115 (E2.1)	9020/9120-0155	115V	
KBF 240 (E2.1)	9020/9120-0094	230V	
KBF UL 240 (E2.1)	9020/9120-0103	240V	
KBF 720 (E2.1)	9020/9120-0096	230V	
KBF UL 720 (E2.1)	9020/9120-0153	240V	
KBF Datacolor (E2.1) MB1 controller			
KBF 115 Datacolor (E2.1)	9020/9120-0097	230V	Datacolor with lights
KBF 115 Datacolor (E2.1)	9020/9120-0135	230V	Datacolor without lights
KBF Datacolor (E2.2) RP1 controller			
KBF 115 Datacolor (E2.2)	9020/9120-0101	230V	Datacolor without lights
KBF 115 Datacolor (E2.2)	9020/9120-0102	230V	Datacolor with lights
KBF (E3) MB1 controller, program			
KBF 240 (E3)	9020/9120-0099	230V	
KBF (E5) MB1 controller, program			
KBF 240 (E5)	9020/9120-0105	200V-240V	
KBF UL 240 (E5)	9020/9120-0144	200V-240V	
KBF (E5.1) MB1 controller, program			
KBF 240 (E5.1)	9020/9120-0109	200V-240V	

Model	Article No.	Voltage	Equipment
KBF UL 240 (E5.2)	9020/9120-0176	200V-240V	
KBF (E5.2) MB1 controller, program			
KBF 115 (E5.2)	9020/9120-0139	200V-240V	
KBF UL 115 (E5.2)	9020/9120-0184	200V-240V	
KBF 240 (E5.2)	9020/9120-0150	200V-240V	
KBF UL 240 (E5.2)	9020/9120-0176	200V-240V	
KBF 720 (E5.2)	9020/9120-0108	200V-240V	
KBF UL 720 (E5.2)	9020/9120-0168	200V-240V	
KBF (E5.3) MB1 controller, program			
KBF 115 (E5.3)	9020/9120-0267	200V-230V	
KBF UL 115 (E5.3)	9020/9120-0268	200V-240V	
KBF 240 (E5.3)	9020/9120-0269	200V-230V	
KBF UL 240 (E5.3)	9020/9120-0270	200V-240V	
KBF 720 (E5.3)	9020/9120-0271	200V-230V	
KBF UL 720 (E5.3)	9020/9120-0272	200V-240V	
KBF 1020 (E5.3)	9020/9120-0264	200V-230V	
KBF 1020 (E5.3)	9020/9120-0315	200V-240V	USA
KBF (E6) MB2 controller			also with optional object temperature display
KBF 115 (E6)	9020/9120-0320	200V-230V	
KBF 115 (E6) Datacolor	9020/9120-0190	200V-240V	Datacolor with lights
KBF 115 (E6) Datacolor	9020/9120-0129	200V-240V	Datacolor without lights
KBF UL 115 (E6)	9020/9120-0321	200V-240V	
KBF 240 (E6)	9020/9120-0322	200V-230V	
KBF UL 240 (E6)	9020/9120-0323	200V-240V	
KBF 720 (E6)	9020/9120-0324	200V-230V	
KBF UL 720 (E6)	9020/9120-0325	200V-240V	
KBF 1020 (E6)	9020/9120-0326	200V-230V	
KBF 1020 (E6)	9020/9120-0327	200V-240V	USA
KBF-ICH (E2.1) MB1 controller, program			
KBF ICH 240 (E2.1)	9020/9120-0066	230V	
KBF ICH UL 240 (E2.1)	9020/9120-0104	240V	
KBF ICH 720 (E2.1)	9020/9120-0068	230V	
KBF ICH UL 720 (E2.1)	9020/9120-0154	240V	
KBF-ICH (E5) MB1 controller, program			
KBF ICH 240 (E5)	9020/9120-0133	200V-240V	
KBF-ICH (E5.1) MB1 controller, program			
KBF ICH 240 (E5.1)	9020/9120-0160	200V-240V	
KBF ICH UL 240 (E5.1)	9020/9120-0106	200V-240V	
KBF-ICH (E5.2) MB1 controller, program			
KBF ICH 240 (E5.2)	9020/9120-0160	200V-240V	
KBF ICH UL 240 (E5.2)	9020/9120-0106	200V-240V	
KBF ICH 720 (E5.2)	9020/9120-0143	200V-240V	
KBF ICH UL 720 (E5.2)	9020/9120-0169	200V-240V	
KBF P (E5.2) MB1 controller, program			
KBF P 240 (E5.2)	9020/9120-0160	200V-240V	
KBF P 240 (E5.2)	9020/9120-0244	200V-240V	
KBF P UL 240 (E5.2)	9020/9120-0106	200V-240V	

Model	Article No.	Voltage	Equipment
KBF P 720 (E5.2)	9020/9120-0143	200V-240V	
KBF P 720 (E5.2)	9020/9120-0246	200V-240V	
KBF P UL 720 (E5.2)	9020/9120-0169	200V-240V	
KBF P (E5.3) MB1 controller, program			
KBF P 240 (E5.3)	9020/9120-0273	200V-230V	
KBF P UL 240 (E5.3)	9020/9120-0274	200V-240V	
KBF P 720 (E5.3)	9020/9120-0275	200V-230V	
KBF P UL 720 (E5.3)	9020/9120-0276	200V-240V	
KBF P (E6) MB2 controller			also with optional object temperature display
KBF P 240 (E6)	9020/9120-0328	200V-230V	230 V
KBF P UL 240 (E6)	9020/9120-0329	200V-240V	200-240V
KBF P 720 (E6)	9020/9120-0330	200V-230V	230 V
KBF P UL 720 (E6)	9020/9120-0331	200V-240V	200-240V
KBF ICH (E2.1) with light integration option (8012-0409) MB1 controller, program			
KBF ICH 240 (E2.1)	9020/9120-0066	230V	
KBF ICH UL 240 (E2.1)	9020/9120-0104	240V	
KBF ICH 720 (E2.1)	9020/9120-0068	230V	
KBF ICH UL 720 (E2.1)	9020/9120-0154	240V	
KBF-LQC (E2.1) MB1 controller, program			
KBF LQC 240 (E2.1)	9020/9120-0157	230V	
KBF LQC 720 (E2.1)	9020/9120-0158	230V	
KBF-LQC (E5) MB1 controller, program			
KBF LQC 240 (E5)	9020/9120-0159	200V-240V	
KBF-LQC (E5.1) MB1 controller, program			
KBF LQC 240 (E5.1)	9020/9120-0177	200V-240V	
KBF LQC UL 240 (E5.1)	9020/9120-0161	200V-240V	
KBF-LQC (E5.2) MB1 controller, program			
KBF LQC 240 (E5.2)	9020/9120-0177	200V-240V	
KBF LQC 240 (E5.2)	9020/9120-0248	200V-240V	
KBF LQC UL 240 (E5.2)	9020/9120-0161	200V-240V	
KBF LQC 720 (E5.2)	9020/9120-0171	200V-240V	
KBF LQC 720 (E5.2)	9020/9120-0249	200V-240V	
KBF LQC UL 720 (E5.2)	9020/9120-0170	200V-240V	
KBF-LQC (E5.3) MB1 controller, program			
KBF LQC 240 (E5.3)	9020/9120-0277	200V-230V	
KBF LQC UL 240 (E5.3)	9020/9120-0278	200V-240V	
KBF LQC 720 (E5.3)	9020/9120-0279	200V-230V	
KBF LQC UL 720 (E5.3)	9020/9120-0280	200V-240V	
KBF-LQC (E6) MB2 controller			also with optional object temperature display
KBF LQC 240 (E6)	9020/9120-0332	200V-230V	230 V
KBF LQC UL 240 (E6)	9020/9120-0333	200V-240V	200-240 V
KBF LQC 720 (E6)	9020/9120-0334	200V-230V	230 V
KBF LQC UL 720 (E6)	9020/9120-0335	200V-240V	200-240 V
KBF S (E6) RD4 controller			
KBF S 240 (E6)	9020/9120-0366	200V-230V	

Model	Article No.	Voltage	Equipment
KBF S UL 240 (E6)	9020/9120-0367	200V-240V	
KBF S 720 (E6)	9020/9120-0368	200V-230V	
KBF S UL 720 (E6)	9020/9120-0369	200V-240V	
KBF S 115 (E6)	9020/9120-0370	200V-230V	
KBF S UL 115 (E6)	9020/9120-0371	200V-240V	
KBF S 1020 (E6)	9020/9120-0372	200V-230V	
KBF S UL 1020 (E6)	9020/9120-0373	200V-240V	
KBF-S ECO (E6) RD4 controller			
KBF-S ECO 240 (E6)	9020/9120-0416	200V-230V	
KBF-S ECO -UL 240 (E6)	9020/9120-0420	200V-240V	
KBF-S ECO 400 (E6)	9020/9120-0463	200V-230V	
KBF-S ECO 400-UL (E6)	9020/9120-0464	200V-240V	
KBF-S ECO 720 (E6)	9020/9120-0418	200V-230V	
KBF-S ECO -UL 720 (E6)	9020/9120-0421	200V-240V	
KBF-S ECO 1020 (E6)	9020/9120-0419	200V-230V	
KBF-S ECO -UL 1020 (E6)	9020/9120-0422	200V-240V	
KBW (E3) with light control by 3 operation contacts, RD3 controller without week program timer			illumination 3 steps
KBW 240 (E3)	9020/9120-0084	230V	
KBW 240 (E3)	9020/9120-0085	115V	
KBW 400 (E3)	9020/9120-0087	230V	
KBW 400 (E3)	9020/9120-0088	115V	
KBW 720 (E3)	9020/9120-0090	230V	
KBW 720 (E3)	9020/9120-0091	115V	
KBW (E3) with dimming, RD3 controller without week program timer			dimming
KBW 240 (E3)	9020/9120-0086	230V	
KBW 400 (E3)	9020/9120-0089	230V	
KBW 720 (E3)	9020/9120-0092	230V	
KBW (E3.1) RD3 controller with week program timer			illumination 3 steps
KBW 240 (E3.1)	9020/9120-0124	230V	
KBW 240 (E3.1)	9020/9120-0125	115V	
KBW 400 (E3.1)	9020/9120-0127	230V	
KBW 400 (E3.1)	9020/9120-0128	115V	
KBW 720 (E3.1)	9020/9120-0130	230V	
KBW 720 (E3.1)	9020/9120-0131	115V	
KBW (E5) RD3 controller with week program timer			illumination 3 steps
KBW 240 (E5)	9020/9120-0140	200V-240V	
KBW UL 240 (E5)	9020/9120-0141	100V-120V	
KBW (E5.1) RD3 controller with week program timer			illumination 3 steps
KBW 240 (E5.1)	9020/9120-0164	200V-240V	
KBW 240 (E5.1)	9020/9120-0256	200V-230V	
KBW 400 (E5.1)	9020/9120-0180	200V-230V	
KBW 720 (E5.1)	9020/9120-0172	200V-230V	
KBW (E6) MB2 controller			also with optional object temperature display
KBW 240 (E6)	9020/9120-0338	200V-230V	
KBW 400 (E6)	9020/9120-0339	200V-230V	

Model	Article No.	Voltage	Equipment
KBW 720 (E6)	9020/9120-0340	200V-230V	
KBWF (E2) MB1 controller, program			
KBWF 240 (E2)	9020/9120-0051	230V	
KBWF 720 (E2)	9020/9120-0052	230V	
KBWF (E5) MB1 controller, program			
KBWF 240 (E5)	9020/9120-0149	200V-240V	
KBWF (E5.1) MB1 controller, program			
KBWF 240 (E5.1)	9020/9120-0166	200V-240V	
KBWF (E5.2) MB1 controller, program			
KBWF 240 (E5.2)	9020/9120-0166	200V-240V	
KBWF 240 (E5.2)	9020/9120-0251	200V-240V	
KBWF 720 (E5.2)	9020/9120-0173	200V-240V	
KBWF 720 (E5.2)	9020/9120-0247	200V-240V	
KBWF (E5.3) MB1 controller, program			
KBWF 240 (E5.3)	9020/9120-0281	200V-230V	
KBWF 720 (E5.3)	9020/9120-0282	200V-230V	
KBWF (E6) MB2 controller			also with optional object temperature display
KBWF 240 (E6)	9020/9120-0336	200V-230V	
KBWF 720 (E6)	9020/9120-0337	200V-230V	
KMF (E5.1) MB1 controller, program			
KMF 240 (E5.1)	9020/9120-0145	200V-240V	
KMF UL 240 (E5.1)	9020/9120-0182	200V-240V	
KMF (E5.2) MB1 controller, program			
KMF 115 (E5.2)	9020/9120-0187	200V-240V	
KMF UL 115 (E5.2)	9020/9120-0188	200V-240V	
KMF 240 (E5.2)	9020/9120-0145	200V-240V	
KMF 240 (E5.2)	9020/9120-0219	200V-240V	new refrigeration
KMF UL 240 (E5.2)	9020/9120-0182	200V-240V	
KMF 720 (E5.2)	9020/9120-0185	200V-240V	
KMF 720 (E5.2)	9020/9120-0245	200V-240V	
KMF UL 720 (E5.2)	9020/9120-0186	200V-240V	
KMF (E5.3) MB1 controller, program			
KMF 720 (E5.3)	9020/9120-0192	200V-240V	
KMF (E5.4) MB1 controller, program			
KMF 115 (E5.4)	9020/9120-0193	200V-230V	
KMF 115 (E5.4)	9020/9120-0307	200V-240V	USA
KMF 240 (E5.4)	9020/9120-0189	200V-230V	
KMF 240 (E5.4)	9020/9120-0308	200V-240V	USA
KMF 720 (E5.4)	9020/9120-0191	200V-230V	
KMF 720 (E5.4)	9020/9120-0309	200V-240V	USA
KMF (E6) MB2 controller			also with optional object temperature display
KMF 115 (E6)	9020/9120-0341	200V-230V	
KMF 115 (E6)	9020/9120-0342	200V-240V	
KMF 240 (E6)	9020/9120-0343	200V-230V	
KMF 240 (E6)	9020/9120-0344	200V-240V	
KMF 720 (E6)	9020/9120-0345	200V-230V	

Model	Article No.	Voltage	Equipment
KMF 720 (E6)	9020/9120-0346	200V-240V	
KT (E6) T4.12 (BCW) controller			
KT 53 (E6)	9020/9120-0250	200V-240V	
KT UL 53 (E6)	9020/9120-0255	100V-120V	
KT 115 (E6)	9020/9120-0209	200V-240V	
KT UL 115 (E6)	9020/9120-0227	100V-120V	
KT (E6.1) T4.12 (BCW) controller			T4.12 (BCW)
KT 53 (E6.1)	9020/9120-0311	200V-230V	
KT UL 53 (E6.1)	9020/9120-0312	100V-120V	
KT 115 (E6.1)	9020/9120-0313	200V-230V	
KT UL 115 (E6.1)	9020/9120-0314	100V-120V	
KT 170 (E6.1)	9020/9120-0289	200V-230V	
KT UL 170 (E6.1)	9020/9120-0310	100V-120V	
LIT MK (E5) MB2 controller			
LIT MK 240	9020/9120-0402	400 V	
LIT MK 720	9020/9120-0403	400 V	
M (E2) MB1 controller, program			also with optional object temperature display (8012-0334) also with object temperature control (cascade control) (proj. 04-329, 06-165, 04-186)
M 53 (E2)	9010/9110-0201	230V	
M 115 (E2)	9010/9110-0202	230V	
M 115-PM (E2)	9010/9110-0247	230V	
M 240 (E2)	9010/9110-0203	230V	
M 400 (E2)	9010/9110-0204	400V	
M 720 (E2)	9010/9110-0205	400V	
M (E3.1) MB2 controller, program			also with object temperature display and object temperature control options
M 56 (E3.1)	9010/9110-0371	230V	
M 115 (E3.1)	9010/9110-0372	230V	
M 260 (E3.1)	9010/9110-0373	400V	
M 720 (E3.1)	9010/9110-0374	400V	
MDL (E2) MB1 controller, program			also with optional object temperature display
MDL 115 (E2)	9010/9110-0200	400V	
MK (E2, E2.1) MB1 controller, program			also with object temperature control (cascade control) (proj. 04-026, 04-098)
MK 53 (E2)	9020/9120-0006	230V	
MK 240 (E2)	9020/9120-0021	400V	
MK 720 (E2)	9020/9120-0027	400V	
MK (E3) MB1 controller, program			
MK 115 (E3)	9020/9120-0146	400V	
MK 240 (E3)	9020/9120-0148	400V	
MK 720 (E3)	9020/9120-0156	400V	
MK (E3.1) MB1 controller, program			

Model	Article No.	Voltage	Equipment
MK 115 (E3.1)	9020/9120-0175	400V	
MK 240 (E3.1)	9020/9120-0181	400V	
MK 720 (E3.1)	9020/9120-0197	400V	
MK (E4) MB2 controller			also with optional object temperature display
MK 56 (E4)	9020/9120-0316	230V	
MK 56 (E4)	9020/9120-0395	240V	USA
MK 115 (E4)	9020/9120-0201	400V	
MK 240 (E4)	9020/9120-0205	400V	
MK 720 (E4)	9020/9120-0206	400V	
MK (E5) MB2 controller			
MK 56 (E5)	9020/9120-0374	230V	
MK 56 (E5)	9020/9120-0388	240V	USA
MK 115 (E5)	9020/9120-0375	400V	
MK 240 (E5)	9020/9120-0376	400V	
MK 400 (E5)	9020/9120-0406	400V	
MK 720 (E5)	9020/9120-0377	400V	
MK 1020 (E5)	9020/9120-0407	400V	
MKF (E2) MB1 controller, program			
MKF 240	9020/9120-0100	400 V	
MKF (E3) MB1 controller, program			also with optional object temperature display also with object temperature control (cascade control)
MKF 240 (E3)	9020/9120-0132	400V	
MKF 720 (E3)	9020/9120-0147	400V	
MKF (E3.1) MB1 controller, program			also with optional object temperature display also with object temperature control (cascade control)
MKF 115 (E3.1)	9020/9120-0107	400V	
MKF 240 (E3.1)	9020/9120-0183	400V	
MKF 720 (E3.1)	9020/9120-0198	400V	
MKF (E3.2) MB1 controller, program			also with optional object temperature display also with object temperature control (cascade control)
MKF 115 (E3.2)	9020/9120-0283	400V	
MKF 240 (E3.2)	9020/9120-0285	400V	
MKF 720 (E3.2)	9020/9120-0287	400V	
MKF (E4) MB2 controller			also with optional object temperature display
MKF 56 (E4)	9020/9120-0317	230V	
MKF 56 (E4)	9020/9120-0396	240V	
MKF 115 (E4)	9020/9120-0207	400V	
MKF 240 (E4)	9020/9120-0208	400V	
MKF 720 (E4)	9020/9120-0210	400V	
MKF (E5) MB2 controller			
MKF 56 (E5)	9020/9120-0389	240V	

Model	Article No.	Voltage	Equipment
MKF 56 (E5)	9020/9120-0378	230V	
MKF 115 (E5)	9020/9120-0379	400V	
MKF 240 (E5)	9020/9120-0380	400V	
MKF 400 (E5)	9020/9120-0408	400V	
MKF 720 (E5)	9020/9120-0381	400V	
MKF 1020 (E5)	9020/9120-0409	400V	
MKFT (E3.1) MB1 controller, program			
MKFT 115 (E3.1)	9020/9120-0152	400V	
MKFT 240 (E3.1)	9020/9120-0080	400V	
MKFT 720 (E3.1)	9020/9120-0083	400V	
MKFT (E3.2) MB1 controller, program			
MKFT 115 (E3.2)	9020/9120-0284	400V	
MKFT 240 (E3.2)	9020/9120-0286	400V	
MKFT 720 (E3.2)	9020/9120-0288	400V	
MKFT (E4) MB2 controller			also with optional object temperature display
MKFT 115 (E4)	9020/9120-0211	400V	
MKFT 240 (E4)	9020/9120-0212	400V	
MKFT 720 (E4)	9020/9120-0228	400V	
MKFT (E5) MB2 controller			
MKFT 115 (E5)	9020/9120-0382	400V	
MKFT 240 (E5)	9020/9120-0383	400V	
MKFT 720 (E5)	9020/9120-0384	400V	
MKT (E1) and MKT (E1.1) MB1 controller, program			
MKT 240 (E1.1)	9020/9120-0079	400V	
MKT (E3) MB1 controller, program			
MKT 240 (E3)	9020/9120-0110	400V	
MKT (E3.1) MB1 controller, program			
MKT 115 (E3.1)	9020/9120-0151	400V	
MKT 240 (E3.1)	9020/9120-0196	400V	
MKT 720 (E3.1)	9020/9120-0082	400V	
MKT (E4) MB2 controller			also with optional object temperature display
MKT 115 (E4)	9020/9120-0229	400V	
MKT 240 (E4)	9020/9120-0230	400V	
MKT 720 (E4)	9020/9120-0258	400V	
MKT (E5) MB2 controller			
MKT 115 (E5)	9020/9120-0385	400V	
MKT 240 (E5)	9020/9120-0386	400V	
MKT 720 (E5)	9020/9120-0387	400V	
UF V (E1, E1.1) RP1 controller			RP1
UF V 500 (E1)	9020/9120-0174	230V	door hinged right
UF V 700 (E1)	9020/9120-0134	230V	door hinged right
UF V 700 (E1.1)	9020/9120-0134	230V	door hinged right
UF V UL 700 (E1)	9020-0217	115V	door hinged right
UF V UL 700 (E1)	9020-0215	208V	door hinged right
UF V (E2) RP1 controller			RP1
UF V 500 (E2)	9020/9120-0232	230V	door hinged right

Model	Article No.	Voltage	Equipment
UF V UL 500 (E2)	9020/9120-0221	115V	door hinged right
UF V (E2.1) RP1 controller			RP1
UF V 500 (E2.1)	9020/9120-0236	230V	door hinged right, with RFID
UF V 500 (E2.1)	9020/9120-0213	230V	door hinged left, with RFID
UF V 700 (E2.1)	9020/9120-0233	230V	door hinged right, with RFID
UF V 700 (E2.1)	9020/9120-0237	230V	door hinged left, with RFID
UF V 500 (E2.1)	9020/9120-0259	230V	door hinged right, with water cooling
UF V 500 (E2.1)	9020/9120-0260	230V	door hinged left, with water cooling
UF V 700 (E2.1)	9020/9120-0261	230V	door hinged right, with water cooling
UF V 700 (E2.1)	9020/9120-0262	230V	door hinged left, with water cooling
UF V UL 500 (E2.1)	9020/9120-0235	115V	door hinged right
UF V UL 500 (E2.1)	9020/9120-0222	115V	door hinged left
UF V UL 500 (E2.1)	9020/9120-0234	208V-240V	door hinged right
UF V UL 500 (E2.1)	9020/9120-0220	208V-240V	door hinged left
UF V UL 700 (E2.1)	9020/9120-0239	115V	door hinged right
UF V UL 700 (E2.1)	9020/9120-0218	115V	door hinged left
UF V UL 700 (E2.1)	9020/9120-0238	208V-240V	door hinged right
UF V UL 700 (E2.1)	9020/9120-0216	208V-240V	door hinged left
UF V 500 (E2.1)	9020/9120-0263	208V	Japan
UF V 700 (E2.1)	9020/9120-0138	208V	Japan
UF V (E3) RD4 controller			
UF V 350 (E3)	9020/9120-0453	230V	
UF V 500 (E3)	9020/9120-0347	230V	
UF V 700 (E3)	9020/9120-0348	230V	
UF V 500 (E3)	9020/9120-0349	230V	with water cooling
UF V 700 (E3)	9020/9120-0350	230V	with water cooling
UF V UL 350 (E3)	9020/9120-0454	120V	
UF V UL 500 (E3)	9020/9120-0351	120V	
UF V UL 700 (E3)	9020/9120-0352	120V	
UF V UL 350 (E3)	9020/9120-0455	208V-240V	
UF V UL 500 (E3)	9020/9120-0353	208V-240V	
UF V UL 700 (E3)	9020/9120-0354	208V-240V	
VD (E2) RD3 controller without week program timer			also with optional object temperature display
VD 23 (E2)	9030/9130-0017	230V	
VD UL 23 (E2)	9030/9130-0023	115V	
VD 23 (E2)	9030/9130-0020	230V	acid resistant
VD 53 (E2)	9030/9130-0018	230V	
VD UL 53 (E2)	9030/9130-0024	115V	
VD 53 (E2)	9030/9130-0021	230V	acid resistant
VD 115 (E2)	9030/9130-0019	230V	
VD UL 115 (E2)	9030/9130-0025	115V	
VD 115 (E2)	9030/9130-0022	230V	acid resistant
VD (E2.1) RD3 controller with week program timer			also with optional object temperature display

Model	Article No.	Voltage	Equipment
VD 23 (E2.1)	9030/9130-0029	230V	
VD 23 (E2.1)	9030/9130-0032	230V	acid resistant
VD 23 (E2.1)-UL	9030/9130-0035	115V	
VD 23 (E2.1)-UL	9030/9130-0041	115V	acid resistant
VD 53 (E2.1)	9030/9130-0030	230V	
VD 53 (E2.1)	9030/9130-0033	230V	acid resistant
VD 53 (E2.1)-UL	9030/9130-0036	115V	
VD 53 (E2.1)-UL	9030/9130-0042	115V	acid resistant
VD 115 (E2.1)	9030/9130-0031	230V	
VD 115 (E2.1)	9030/9130-0034	230V	acid resistant
VD 115 (E2.1)-UL	9030/9130-0037	115V	
VD 115 (E2.1)-UL	9030/9130-0043	115V	acid resistant
VD (E3) RD4 controller			
VD 23 (E3)	9030/9130-0044	230V	
VD 53 (E3)	9030/9130-0045	230V	
VD 115 (E3)	9030/9130-0046	230V	
VD 23 (E3)-UL	9030/9130-0047	120V	
VD 53 (E3)-UL	9030/9130-0048	120V	
VD 115 (E3)-UL	9030/9130-0049	120V	
VD (E3.1) RD4 controller, option MB2			
VD 23 (E3.1)	9630-0001	200-230V	
VD 53 (E3.1)	9630-0002	200-230V	
VD 115 (E3.1)	9630-0003	200-230V	
VD 23 (E3.1)-UL	9630-0005	100-120V	
VD 53 (E3.1)-UL	9630-0006	100-120V	
VD 115 (E3.1)-UL	9630-0007	100-120V	
VDL (E2) RD3 controller without week program timer			53 + 115 also with optional object temperature display All also with EX 2 option
VDL 23 (E2)	9030/9130-0026	230V	
VDL 53 (E2)	9030/9130-0027	230V	
VDL 115 (E2)	9030/9130-0028	230V	
VDL (E2.1) RD3 controller with week program timer			also with optional object temperature display
VDL 23 (E2.1)	9030/9130-0038	230V	
VDL 53 (E2.1)	9030/9130-0039	230V	
VDL 115 (E2.1)	9030/9130-0040	230V	
VDL (E3) RD4 controller			
VDL 23 (E3)	9030/9130-0050	230V	
VDL 53 (E3)	9030/9130-0051	230V	
VDL 115 (E3)	9030/9130-0052	230V	
VDL UL 23 (E3)	9030/9130-0053	120V	
VDL UL 53 (E3)	9030/9130-0054	120V	
VDL UL 115 (E3)	9030/9130-0055	120V	
VDL (E3.1) MB2 controller, option RD4			
VDL 23 (E3.1)	9630-0009	200-230V	
VDL 53 (E3.1)	9630-0010	200-230V	
VDL 115 (E3.1)	9630-0011	200-230V	

Model	Article No.	Voltage	Equipment
VDL 23 (E3.1)-UL	9630-0013	100-120V	
VDL 53 (E3.1)-UL	9630-0014	100-120V	
VDL 115 (E3.1)-UL	9630-0015	100-120V	
VDL EX (E2.1) RD3 controller with week program timer			
VDL EX 23 (E2.1)	9030/9130-0002	230V	
VDL EX 53 (E2.1)	9030/9130-0003	230V	
VDL EX 115 (E2.1)	9030/9130-0005	230V	