

# BACeye

## MANUAL

*Visualisation and analysis of BACnet networks*

# Contents

1. Foreword .....	1
2. COPYRIGHT & Contact Information .....	2
Copyright .....	2
Contact information .....	2
3. After starting .....	3
4. Navigation .....	4
5. Navigation window .....	5
Navigation .....	5
Detail window .....	7
6. Detail window .....	8
Networks .....	8
Devices .....	8
Objects .....	10
7. Writing values .....	17
Changing values .....	17
Sending values .....	20
Command .....	24
8. BACKUP & RESTORE .....	28
Create backup .....	28
Perform Restore .....	30
9. PROPERTIES .....	33
Network settings .....	33
Foreign Device .....	34
Network scan .....	34
Communication settings .....	34
Static Device Address Binding .....	36
BACeye device object .....	37
10. ALARMING .....	39
Entry in recipient lists .....	39
Display of messages received .....	44

Confirmation of messages .....	46
11. Monitoring list and zoom .....	48
Entering objects in the monitoring list .....	48
Removing objects from the monitoring list .....	50
Displaying the monitoring list .....	51
Displaying the monitoring history .....	53
Zoom.....	57
12. EDE and CSV export .....	59
Configuring EDE export .....	59
Performing an EDE export.....	60
Configuring a CSV export .....	62
Perform CSV export .....	64
13. Diagnosis .....	67
Pcap OptionS.....	67
Run Pcap .....	69
14. Proprietary text assignment.....	70
Naming proprietary object types .....	71
Naming proprietary properties.....	72
Naming proprietary enumerations.....	73

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# 1. Foreword

Thank you for using BACeye for visualisation and analysis of BACnet networks

**This manual describes the BACeye software**

## BACEYE

BACeye allows easy access to BACnet devices and their objects and properties. In addition, it offers the possibility of generating EDE files ('BACnet data point lists') and reading graphically displaying and exporting trend log data, among other things. Schedulers can also be clearly represented and modified. Typical BACeye applications include commissioning BACnet installations, analysis of observed problems and monitoring and operating BACnet devices.

**BACnet networks:** Using the BACnet Who-Is/I-Am services, devices in the network can be identified simply and a copy of the device properties and objects can be imported. A detailed display of all objects allows access to the object properties.

**Schedulers:** With BACeye, BACnet Calendar and Schedule objects can be comfortably displayed and modified. The weekly schedule and the exception schedule can be modified separately. The combined display provides an overview of the actual effective value.

**EDE files:** It is very easy to generate EDE files. An EDE file (Engineering Data Exchange) is a format for a BACnet data point list, specified by the BACnet Interest Group Europe (BIG-EU).

**Alarms:** Receive and display BACnet event notifications (error and operating messages). Confirm BACnet event notifications.

**Monitoring list:** The monitoring list shows the most important properties of selected objects. Objects can be compiled from the same device or from different devices.

**Trend data:** Read trend data. Display trend data as a curve or as a list.

### Additional features/supported functions

- Modify values in the BACnet properties
- Zoom: Individual object properties are displayed in large type in a separate window (full screen) and are dynamically updated. This allows changes in the properties to be observed on the screen from great distances.
- Backup/restore: BACeye can perform BACnet backup and restore. This allows data to be backed up and restored on BACnet devices.
- BACnet interface: The BACnet network connection is provided by TCP/IP. This requires a LAN or WLAN connection between the network and the BACnet devices. The BACnet UDP port settings can be changed. BACeye supports the
- "ForeignDevice" (FD) function for coupling to an existing BBMD.

More information on BACeye is available at: <http://www.baceye.com>

## 2. COPYRIGHT & Contact Information

### COPYRIGHT

©2015 MBS GmbH | Römerstraße 15 | D-47809 Krefeld

Telephone: +49 / 21 51 / 72 94 – 0

Telefax: +49 / 21 51 / 72 94 – 50

Email: [info@mbs-software.de](mailto:info@mbs-software.de)

Internet: <http://www.mbs-software.de>

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### CONTACT INFORMATION

MBS GmbH  
Römerstraße 15  
47809 Krefeld

Tel. +49 21 51 72 94-0  
[info@mbs-software.de](mailto:info@mbs-software.de)

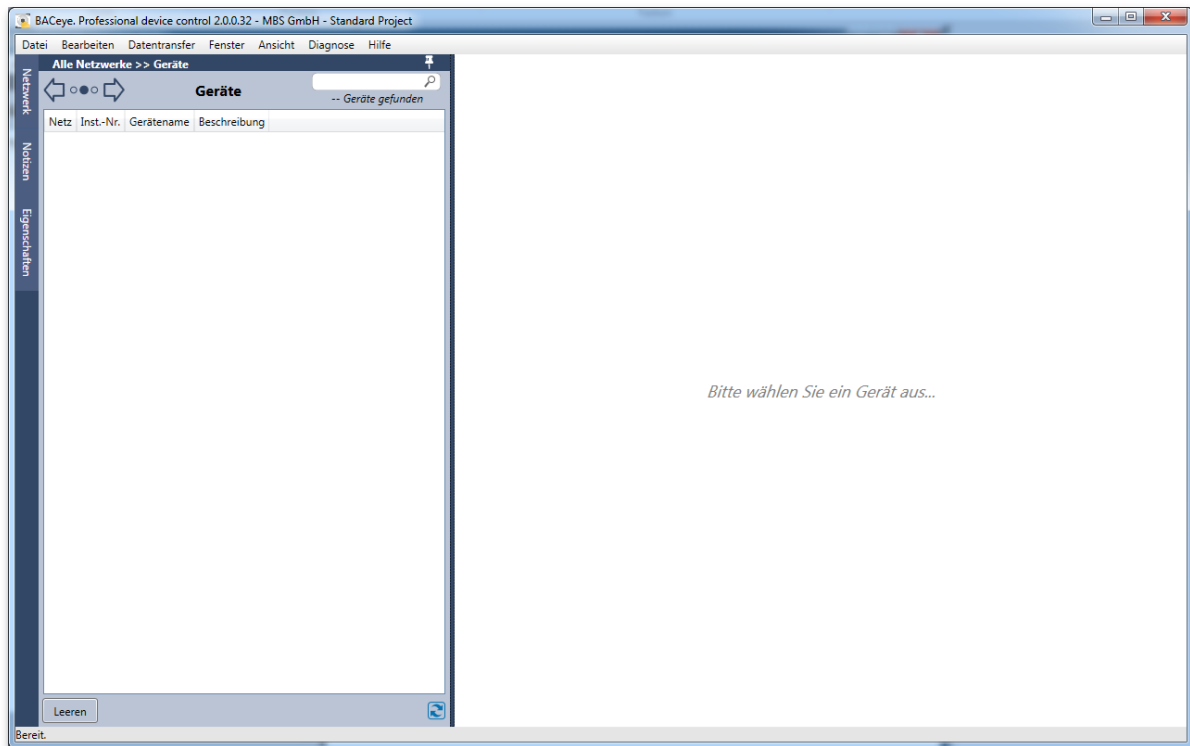
<http://www.baceye.com>

#### **Support**

+49 21 51 72 94-0  
[support@mbs-software.de](mailto:support@mbs-software.de)

### 3. After starting

After starting BACeye the primary BACnet Explorer user interface appears.



The left part of the window contains the device list, the right section the object list of any device selected.

The network is not automatically scanned when BACeye is started. This prevents any unintended loads in the network. However, if an automatic scan is desired when the program starts, the default behaviour of BACeye can be defined in "Settings".

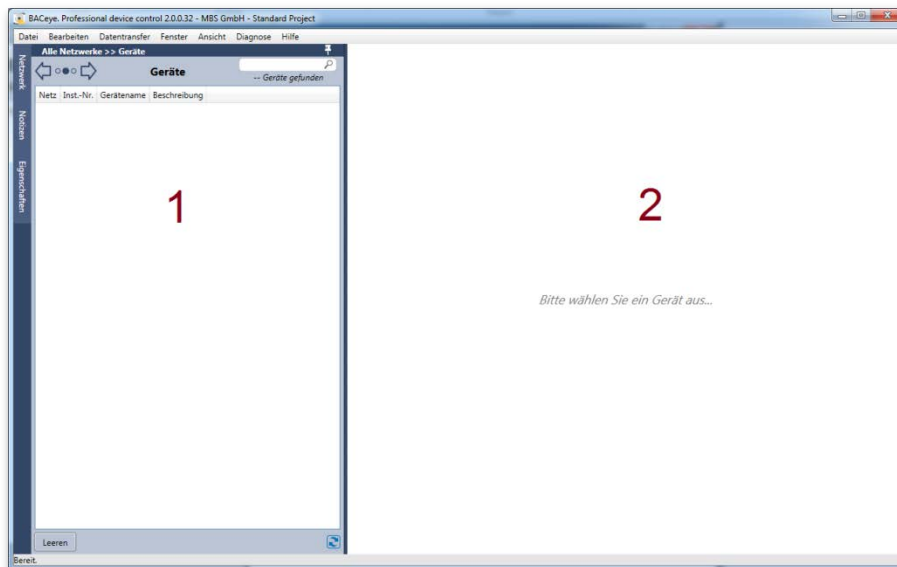


Pressing the "Refresh" button starts the network scan and BACnet communication.

## 4. Navigation

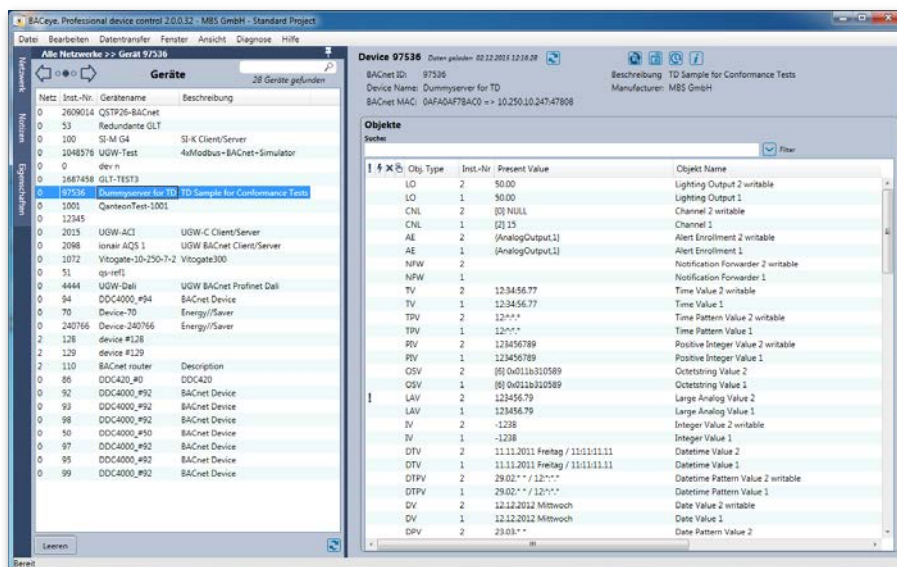
The BACeye user interface is divided up into two primary subsections.

1. Navigation window
2. Detail window



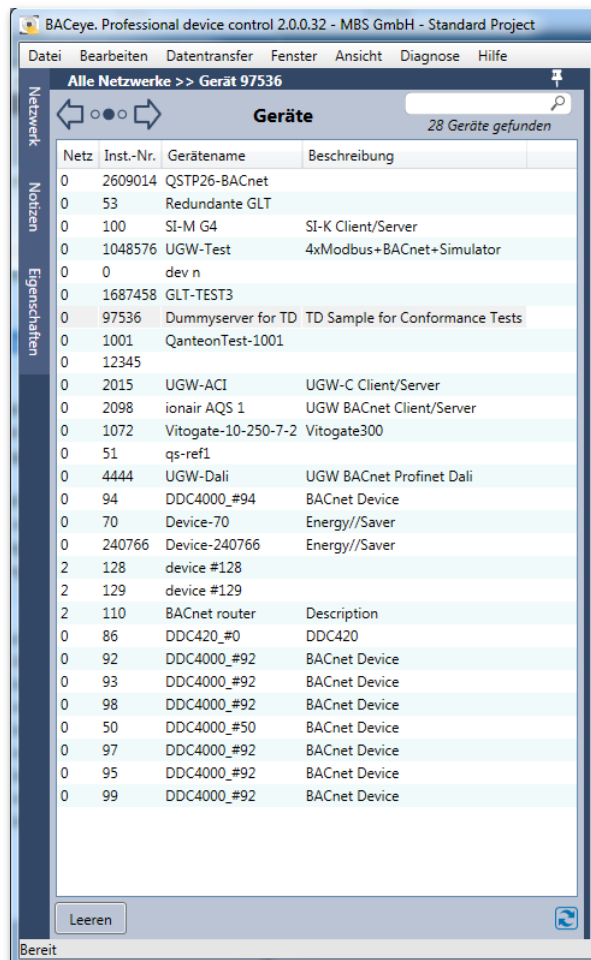
Both of these working areas can display different contents when working BACeye, allowing convenient navigation through the data found.

The left area of the user interface shows the present top level entries. For example, after starting a network scan, these are the devices found. The entries in the left section can be marked to view the associated details in the detail window.



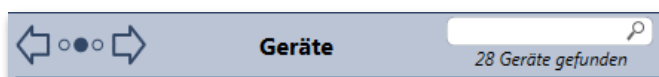
## 5. Navigation window

After starting the network scan, the device list shows all devices found in the navigation window. The network, instance number, device name and description are shown for each device. The device list can be sorted using the column heading.



### NAVIGATION

The BACeye navigation bar is located in the upper section of the navigation window. The actual navigation control with navigation indicator is located on the navigation bar.



The navigation control has two cursors for navigation as well as a navigation indicator to mark the present position.

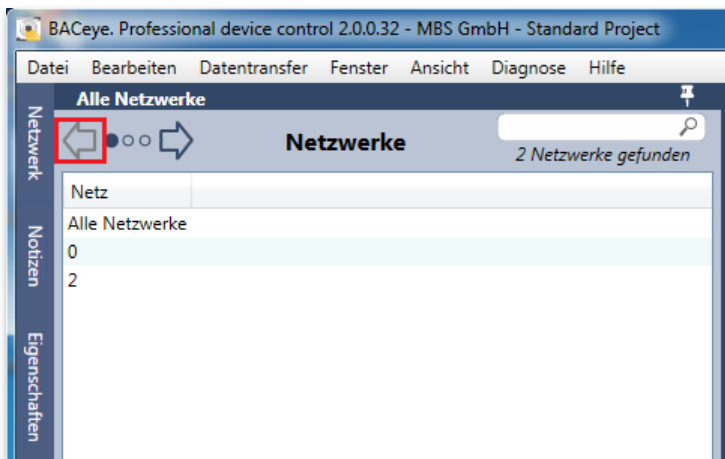


BACeye uses a three-stage navigation hierarchy:

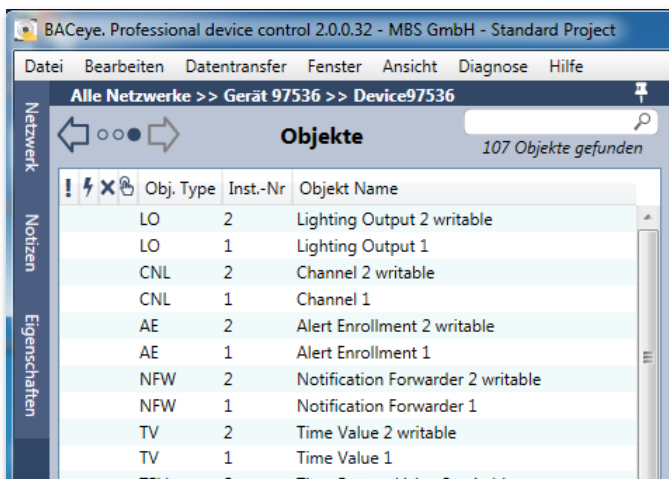
1. Networks
2. Devices
3. Objects

When BACeye is started the navigation is set to the "Device" level and displays all devices in the present BACnet networks.

Clicking the "Back" button navigates to the "Network" view.



In the network window all BACnet networks found are displayed together with the additional entry "All networks". When an entry is double-clicked BACeye navigates to the "Device" hierarchy level - using the desired selection. Here all devices matching the selection are then displayed.



When "Device" is double-clicked, BACeye navigates to the "Object" hierarchy level. BACeye displays all objects found in the selected device in the object list.

The object list displays:

- Alarm (!)

- Fault (⚡)
- OutOfService (✖)
- Overridden (👤)
- Object Type
- Instance Number
- Object Name

## DETAIL WINDOW

If an entry in the navigation window is clicked once, a detail window containing associated details appears in BACeye. Various details are shown depending on the hierarchy level selected in the navigation window. Double-clicking navigates to the next level in the hierarchy.

Navigation window	Detail window
Networks	Devices
Devices	Objects
Objects	Properties

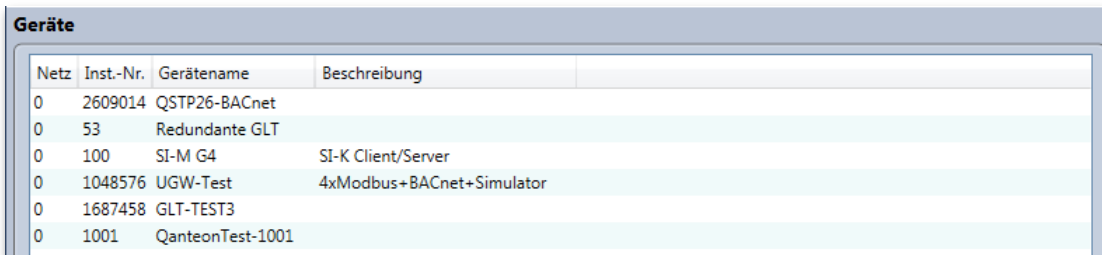
## 6. Detail window

The detail window in BACeye shows the details on the specific entry selected in the navigation window.

Navigation window	Detail window
Networks	Devices
Devices	Objects
Objects	Properties

### NETWORKS

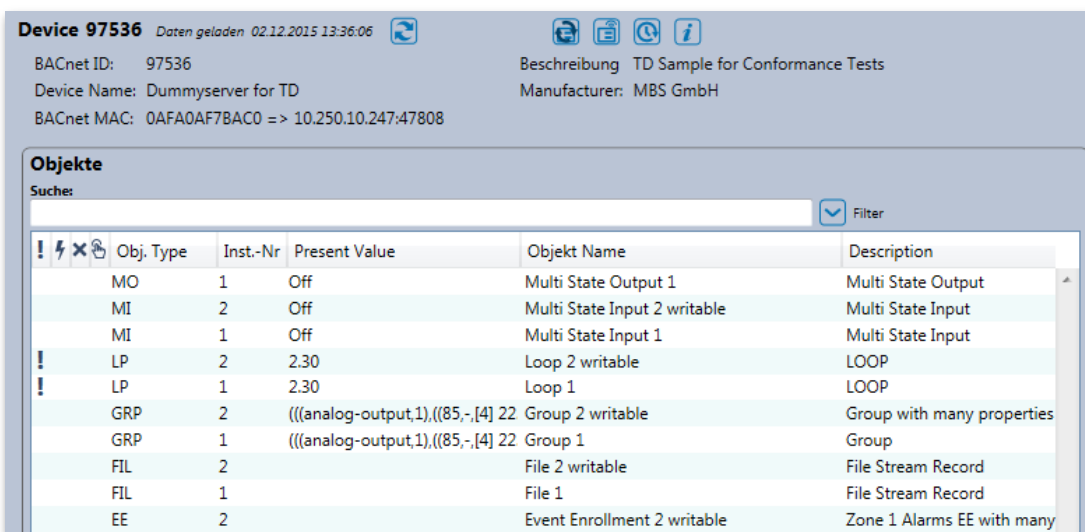
When the navigation window is set to the "Network" hierarchy level, the devices found in the network selected are listed in the detail window.



Netz	Inst.-Nr.	Gerätename	Beschreibung
0	2609014	QSTP26-BACnet	
0	53	Redundante GLT	
0	100	SI-M G4	SI-K Client/Server
0	1048576	UGW-Test	4xModbus+BACnet+Simulator
0	1687458	GLT-TEST3	
0	1001	QanteonTest-1001	

### DEVICES

When the navigation window is set to the "Device" hierarchy level, the objects found in the device selected are listed in the detail window. The object list can be sorted, searched and filtered by the user.



**Device 97536** Daten geladen 02.12.2015 13:36:06

BACnet ID: 97536      Beschreibung: TD Sample for Conformance Tests  
 Device Name: Dummyserver for TD      Manufacturer: MBS GmbH  
 BACnet MAC: 0AFA0AF7BAC0 => 10.250.10.247:47808

**Objekte**

Suche:

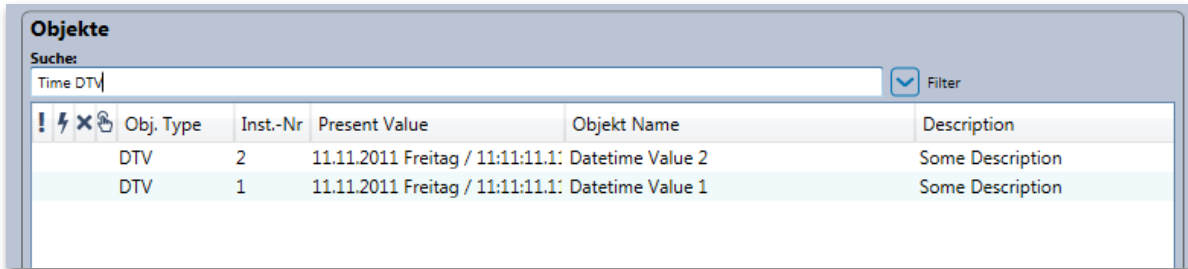
Obj. Type	Inst.-Nr.	Present Value	Objekt Name	Description
MO	1	Off	Multi State Output 1	Multi State Output
MI	2	Off	Multi State Input 2 writable	Multi State Input
MI	1	Off	Multi State Input 1	Multi State Input
LP	2	2.30	Loop 2 writable	LOOP
LP	1	2.30	Loop 1	LOOP
GRP	2	(((analog-output,1),((85,-,[4] 22	Group 2 writable	Group with many properties
GRP	1	(((analog-output,1),((85,-,[4] 22	Group 1	Group
FIL	2		File 2 writable	File Stream Record
FIL	1		File 1	File Stream Record
EE	2		Event Enrollment 2 writable	Zone 1 Alarms EE with many

#### Sorting

Sorting is possible by "Clicking" on the specific column heading. Holding the SHIFT key enables sorting over several columns.

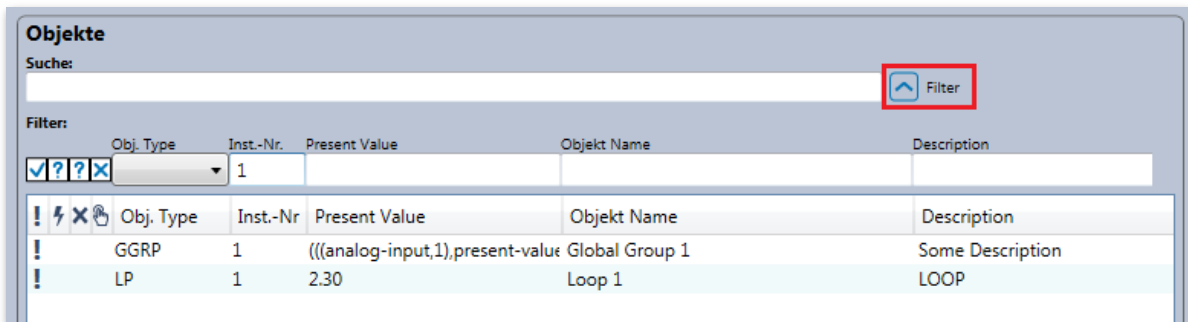
### Search

When text is entered in the "Search" field, BACeye performs a full text search. All columns displayed are searched - individual search terms can be entered separated by spaces. If a number of terms are separated from one another in this manner, BACeye displays those lines with ALL search terms.



### Filter

The "Filter" button allows display of additional control elements and filtering with the result list.



A filter remains active until the control element is suppressed by actuating the button again.

Any column displayed can be filtered with the BACeye filter. Various methods are used depending on the type of column.

### Status flags

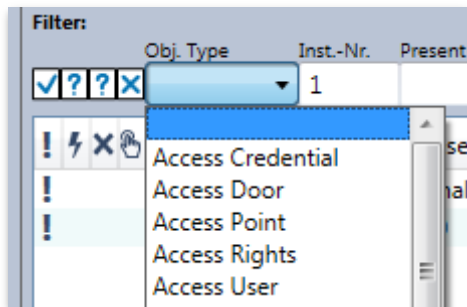


A checkbox allows the status flags "Alarm", "Fault", "OutOfService" and Overridden to be filtered for three states.

Each checkbox shows one of three possible symbols:

- **Check** - Filter requires presence of attribute.  
Only those lines are shown, for which the specific status flag is set.
- **Question mark** - Filter considers attribute to be neutral.  
All lines are displayed, independent of whether the respective status flag is set.
- **X** - Filter requires absence of attribute.  
Only those lines are shown, for which the specific status flag is NOT set.

## Object type



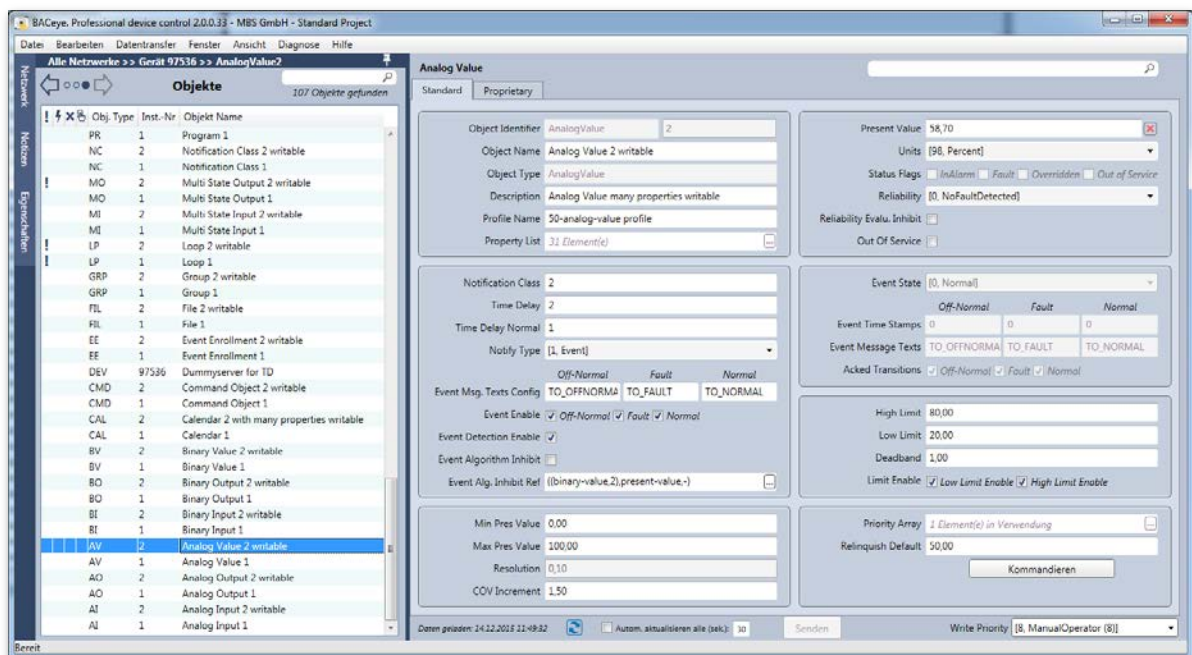
The object type can be filtered using a selection list. The list includes all possible object types. This also includes all types of proprietary objects if the device defines them.

## Inst No, Present Value, Object Name, Description

All other fields are filtered using a text entry. All lines are displayed in which columns contain the associated filter text or correspond to it. This is not case-sensitive.

## OBJECTS

If the navigation window is set to the "Object" hierarchy level, the properties of the selected object are displayed in the detail window.



In the detail window, BACeye displays under the *<Standard>* tab all properties of the object that are possible according to BACnet standard. Any additional manufacturer-specific (proprietary) properties can be listed under the *<Proprietary>* tab.

## Standard

The individual properties are consolidated to logical groups and always displayed. If an object does not implement optional properties, those not implemented are displayed in grey with a line through them. This clearly shows the user that the object could use this property, even though it is not presently in use.

**Analog Value**

Standard Proprietary

Object Identifier: AnalogValue 2

Object Name: Analog Value 2 writable

Object Type: AnalogValue

Description: Analog Value many properties writable

Profile Name: 50-analog-value profile

Property List: 31 Element(e)

Present Value: 58,70

Units: [98, Percent]

Status Flags:  InAlarm  Fault  Overridden  Out of Service

Reliability: [0, NoFaultDetected]

Reliability Evalu. Inhibit:

Out Of Service:

Notification Class: 2

Time Delay: 2

Time Delay Normal: 1

Notify Type: [1, Event]

Event State: [0, Normal]

	Off-Normal	Fault	Normal
Event Time Stamps	0	0	0
Event Message Texts	TO_OFFNORMA	TO_FAULT	TO_NORMAL
Acked Transitions	<input checked="" type="checkbox"/> Off-Normal	<input checked="" type="checkbox"/> Fault	<input checked="" type="checkbox"/> Normal

Event Msg. Texts Config:  TO\_OFFNORMA  TO\_FAULT  TO\_NORMAL

Event Enable:  Off-Normal!  Fault  Normal

Event Detection Enable:

Event Algorithm Inhibit:

Event Alg. Inhibit Ref: ((binary-value,2),present-value,-)

High Limit: 80,00

Low Limit: 20,00

Deadband: 1,00

Limit Enable:  Low Limit Enable  High Limit Enable

Min Pres Value: 0,00

Max Pres Value: 100,00

Resolution: 0,10

COV Increment: 1,50

Priority Array: 1 Element(e) in Verwendung

Relinquish Default: 50,00

Kommandieren

## Search for properties

BACEye also has a search feature for objects in the detail window. This search feature allows the user to find a certain property quickly in the detail window.

When a search term is entered, BACEye marks the matches in the name of all properties found. The search also includes the contents of the control elements and marks them if they contain the search term. The search is not case-sensitive.

**Analog Value** P|  X

Standard **Proprietary**

---

Object Identifier

Object Name

Object Type

Description

Profile Name

Property List

**Present Value**

Units

Status Flags  InAlarm  Fault  Overridden  Out of Service

Reliability

Reliability Evalu. Inhibit

Out Of Service

---

Notification Class

Time Delay

Time Delay Normal

Notify Type

Event Msg. Texts Config

Event Enable  Off-Normal  Fault  Normal

Event Detection Enable

Event Algorithm Inhibit

Event Alg. Inhibit Ref

Event State

	Off-Normal	Fault	Normal
Event Time Stamps	0	0	0
Event Message Texts	TO_OFFNORMA	TO_FAULT	TO_NORMAL
Acked Transitions	<input checked="" type="checkbox"/> Off-Normal	<input checked="" type="checkbox"/> Fault	<input checked="" type="checkbox"/> Normal

High Limit

Low Limit

Deadband

Limit Enable  Low Limit Enable  High Limit Enable

---

Min Pres Value

Max Pres Value

Resolution

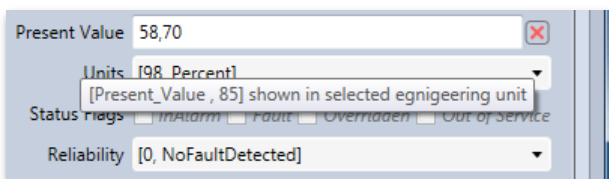
COV Increment

**Priority Array**

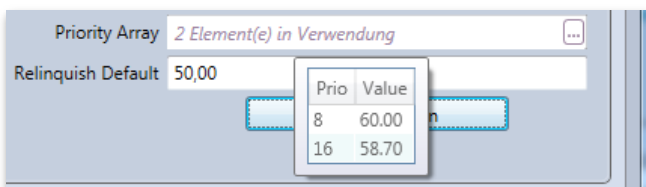
Relinquish Default

### Tool tips

If the user moves the mouse pointer over the name of a certain property, BACeye shows the associated tool tip text.



The tool tip consists of the name of the property, followed by the property ID and, where applicable, further information (e.g. associated units).



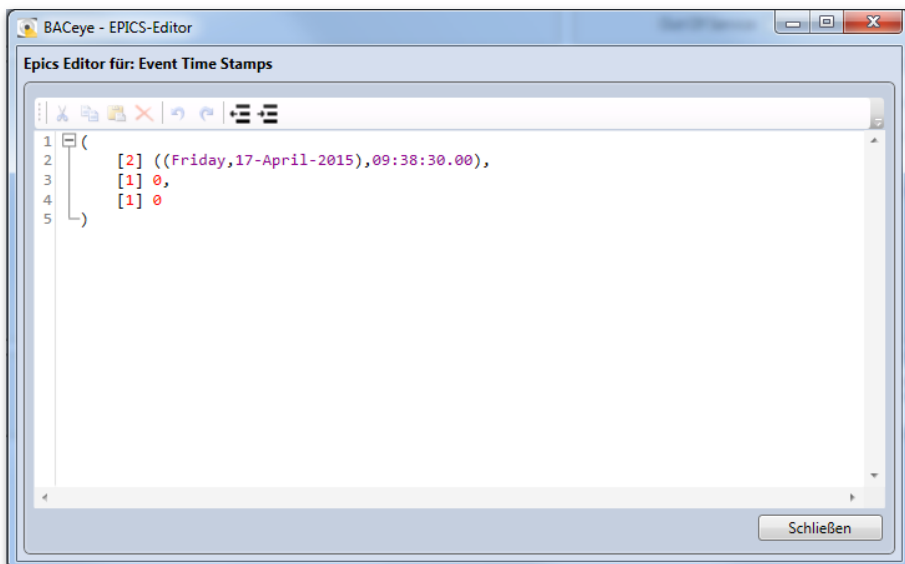
A tool tip is also normally displayed when the user moves the mouse pointer over the input field of a property. The tool tip then contains the complete value of the property. When there are several values, these are shown in list form in the tool tip.

### EPICS display

The value of a property can be called in EPICS display. For this, the user moves the mouse cursor to the desired value and selects either *<Copy EPICS>* or *<Display EPICS>* in the context menu.

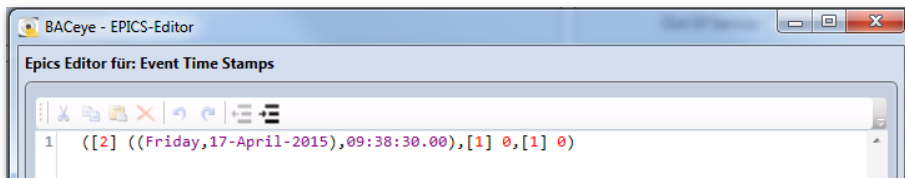
For copying, the EPICS string is copied to the Windows clipboard, from where it can be inserted into any desired word processing.

For displaying, the EPICS string is output in the BACeye's own EPICS editor. If the type of data displayed is a complex type, the EPICS string can be scrolled further using the editor in order to obtain better depiction. When the editor is called the first level of a complex data type is opened.



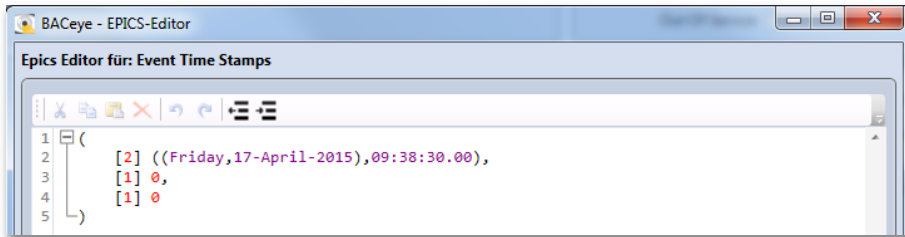
### Example:

Level 0:

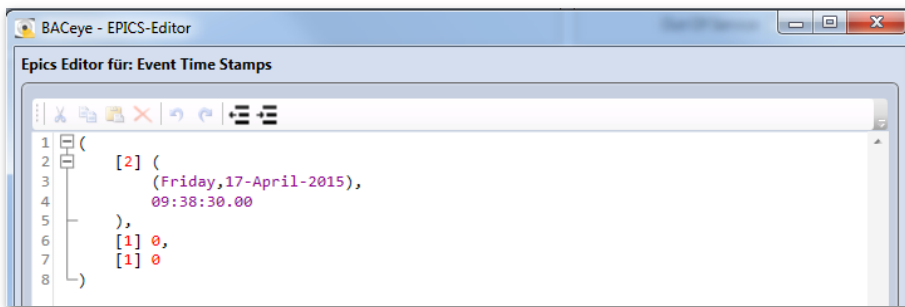


Level 1:





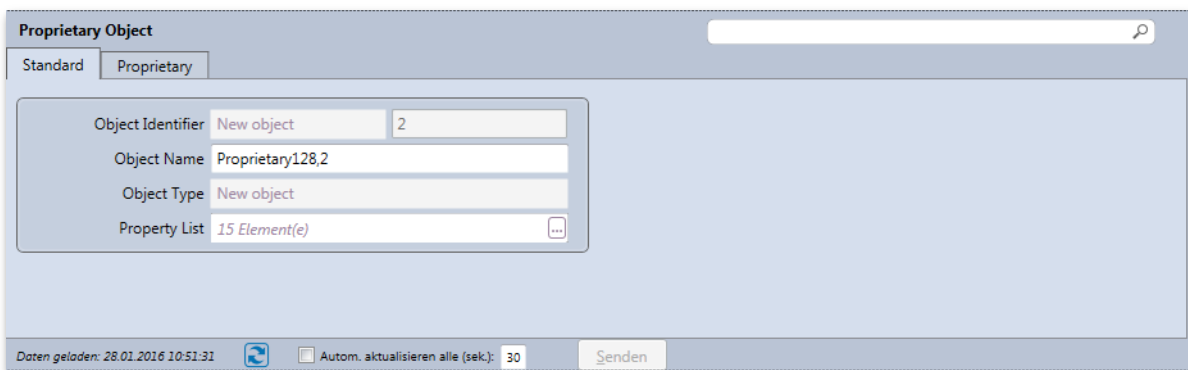
Level 2:



### Proprietary objects

It is possible that so-called proprietary objects are defined on a manufacturer-specific basis.

In the "Standard" tab, the detail view of proprietary objects contains only the information about object identifier, name and type, along with the property list. The standard designation of the type of a proprietary object is "proprietary <number of the type>". The permissible value of the type of proprietary object extends from 128 to 1024. The type of a proprietary object can be freely named via the BACeye function "Proprietary text assignment".



### Proprietary

The proprietary properties of an object are listed under the "Proprietary" tab of the detail view. However, the list can also contain standard properties that, according to the standard, are not part of the object. This applies to both standard objects and proprietary objects.

The list contains the ID and name of the properties, as well as the last values scanned. The name of a proprietary property is output in the form "proprietary <ID of the property>", whereby the permitted range

of values of the IDs extends from 512 to 4194303 (hex. 3FFFFFF). The naming of proprietary properties can be defined via the BACeye function "Proprietary text assignment". If a proprietary property is an enumeration, this also offers the possibility of naming its values. If this is the case, the value of the property that is normally output in EPICS form like all values in the list is displayed with the associated name.

PropertyId	Property Name	Wert	EPICS-String
505051	proprietary-505051	[4] 47.110001	...
524	proprietary-524	[12] (analog-input,12)	...
523	proprietary-523	[11] 11:11:11.11	...
522	proprietary-522	[10] (Sunday, 1-January-2012)	...
521	An enumeration property	[9, Nine]	...
520	proprietary-520	[8] (T,F,T,F,T,F,T,F)	...
519	proprietary-519	[7] "myString"	...
518	New property	[6] 0x12345678bac0	...
517	proprietary-517	[5] 5.550000	...
516	proprietary-516	[4] 4.440000	...
515	proprietary-515	[3] -60	...
514	proprietary-514	[2] 2	...
513	proprietary-513	[1] T	...
512	proprietary-512	[0] NULL	...
28	Description	[7] "Description for (Proprietary1020,4711)!"	...

Bitte geben Sie die proprietären Properties an, die manuell abgefragt werden sollen:

Daten geladen: 26.01.2016 10:31:58  Autom. aktualisieren alle (sek.): 30

### Manual scanning of proprietary properties

If a device does not support a read-property multiple or if the use of a read-property multiple is deactivated in the communication settings of BACeye, no proprietary properties are automatically listed if the device also does not support Revision 14 of the BACnet standard.

For this eventuality, below the list there is an input field in which the property IDs of the listed properties can be entered separated by commas. The scan is then started with the **<Send>** button next to it on the right. The progress of this operation is indicated by a bar in the button. The normally green bar flashes red if errors occur during a scan, e.g. if a property is not present. The scan can be repeated as often as necessary, with newly determined properties being added to the list and existing ones being updated.

The detail window's update function then also takes effect for the properties recorded in this way.

**Proprietary Object** 🔍

Standard Proprietary

PropertyId	Property Name	Wert	EPICS-String
28	Description	[7] "Description for (Proprietary1020,4711)!"	...
512	proprietary-512	[0] NULL	...
513	proprietary-513	[1] T	...
515	proprietary-515	[3] -60	...
518	proprietary-518	[6] 0x12345678bac0	...

Bitte geben Sie die proprietären Properties an, die manuell abgefragt werden sollen:

512, 513, 515, 518, 28, 756 Senden

Daten geladen: 18.01.2016 12:44:33 🔄  Autom. aktualisieren alle (sek.): 30 Senden

## 7. Writing values


With BACeye it is possible to write as well as read values of the properties of objects.

### CHANGING VALUES

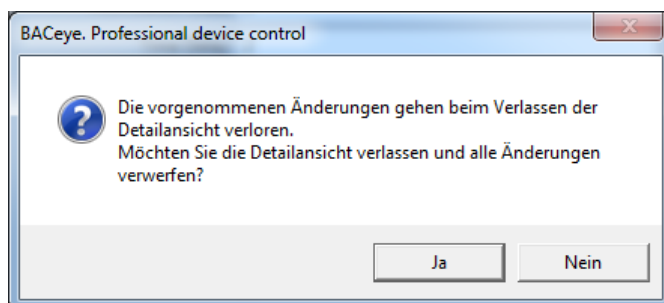
In the detail window of a currently selected object, BACeye allows value changes to be made to writeable properties.

If properties are changed, BACeye shows this by displaying the name of the property in bold face.

The **<Send>** button on the bottom edge of the detail window is activated as soon as changes have been made. This can be used to execute the write command.

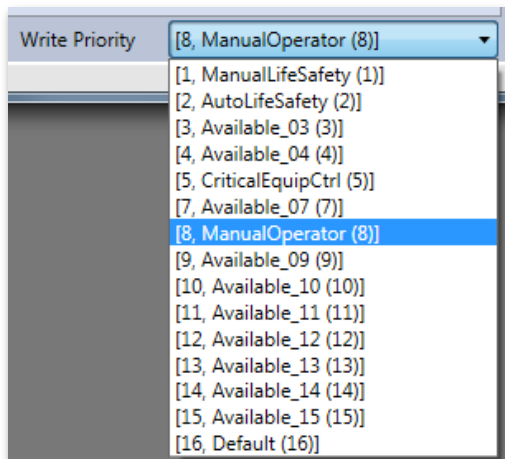
If you wish to reject all changes, this can be done by updating the detail view using the  button. A notice appears informing you that this will result in the changes being lost. The update is not made until after this message is acknowledged with **<OK>**, otherwise the detail view remains in the changed state.

Changes are also lost if another object is selected or if you navigate to another display level. Here too, a notice informs you that this will result in the changes being lost. If this message is acknowledged with **<No>**, you remain in the detail view with the changes. Otherwise, the detail view changes and the changes are lost.



### Changing values in the priority array

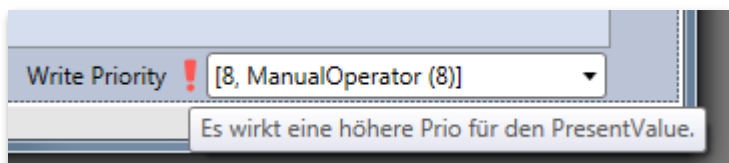
In the case of objects that can be commanded, BACeye writes the "present value" with a priority that the user can choose via the "Write Priority" selection list.



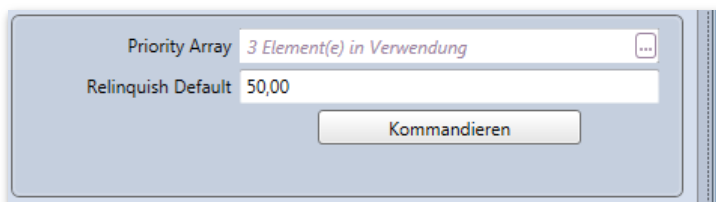
The standard priority is defined in the communication properties in the "WriteProperty Priority" field. "**8 - ManualOperator**" is the standard setting here. According to the BACnet standard, priority "6" is reserved and cannot be used for write commands.

If the "write priority" is changed, the "present value" is marked as changed and is written with the chosen priority when the next write command is issued. The "write priority" is reset to the standard priority after writing.

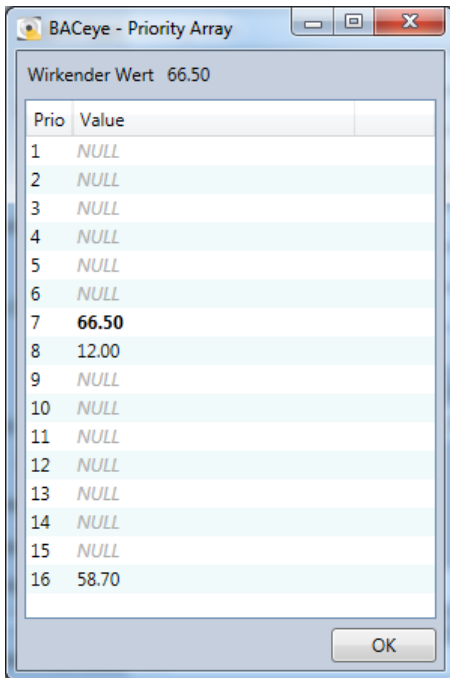
The "present value" always contains the active value. This is the value with the highest priority. If this priority is higher than the currently selected "Write Priority", BACeye highlights this with a red exclamation mark in the send bar:



All values are listed in the "Priority Array" property with the associated priority. Objects with a "Priority Array" also have a "Relinquish Default" property. Its value defines the value of the Present Value if no value is set in the Priority Array, i.e. all values are "ZERO".




All 16 priorities are always listed in the "Priority Array" display, which can be called up with the < ... > button. The active value is highlighted in bold face and is again shown separately above the list.

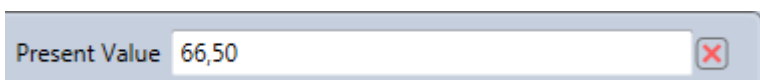


The displayed PriorityArray contains 3 used values, whereby the value with the priority 7 is active:

- [7 : 66.50]
- [8 : 12.00]
- [16 : 58.70]

### Cancellation of effects - deleting PriorityArray entries

If the active value is to be cancelled or a certain PriorityArray field deleted, this can be done with the "Zero" button  of the PresentValue field.



Actuating this button causes the value ZERO to be written for the set priority for the PresentValue during the next write operation. If this was the active value, the value with the next highest priority is now active. If this was the last value, the RelinquishDefault takes effect.

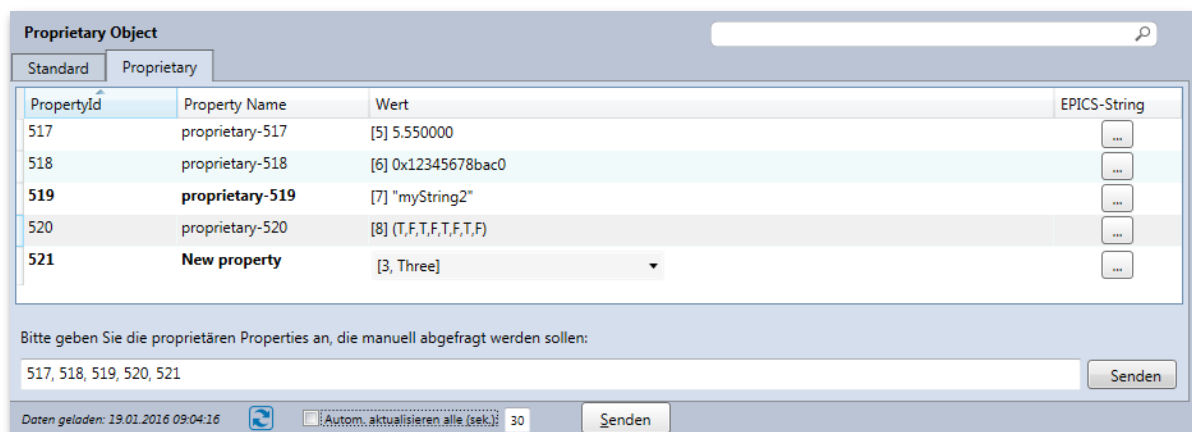
With the **<Command>** button located below the input field for the RelinquishDefault, BACeye provides a convenient possibility for editing the PriorityArray. This function is described separately in the COMMAND section.

### Editing proprietary properties

If an object has proprietary properties, double clicking on a line in the list under the "Proprietary" tab enables the EPICS editor to be called up to edit the value of the relevant property. This is also done by pressing the **< ... >** button in the "EPICS string" column. Furthermore, for proprietary properties of the type enumeration, the

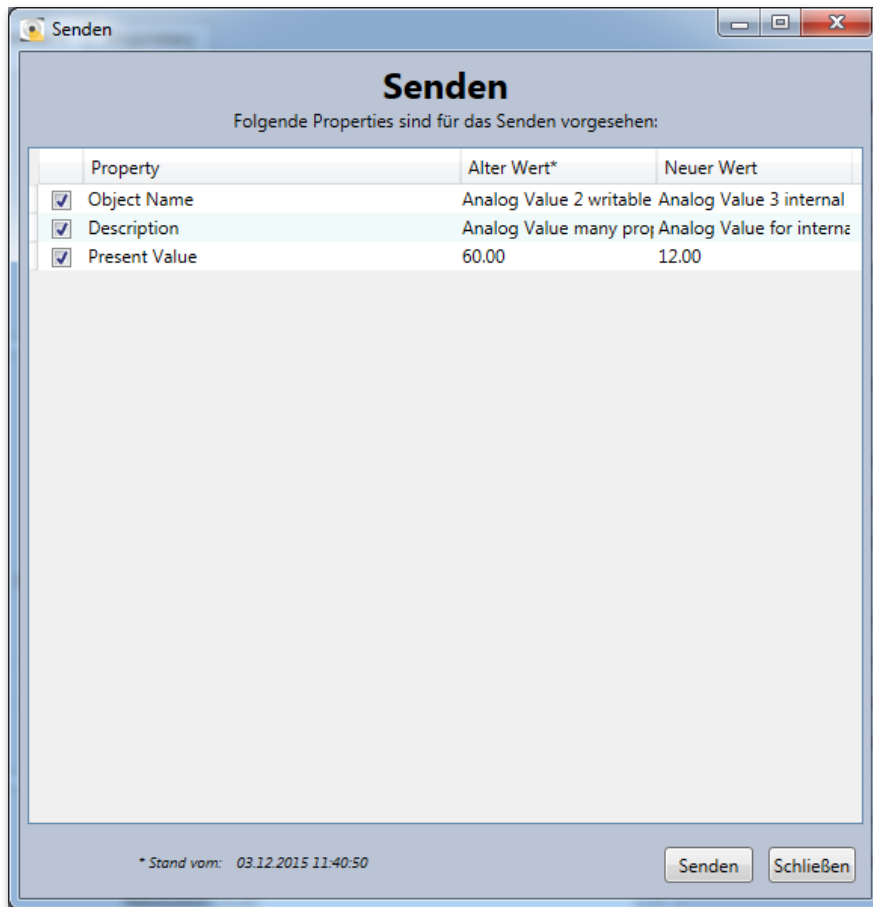
possibility exists to select a new value via combo-box if the enumeration and its values were named via the "Proprietary text assignment" function.

The ID and name of edited properties are highlighted in bold face in the list. As soon as changes have been made, the **<Send>** button on the bottom edge of the detail window can be pressed in order to write changed values.

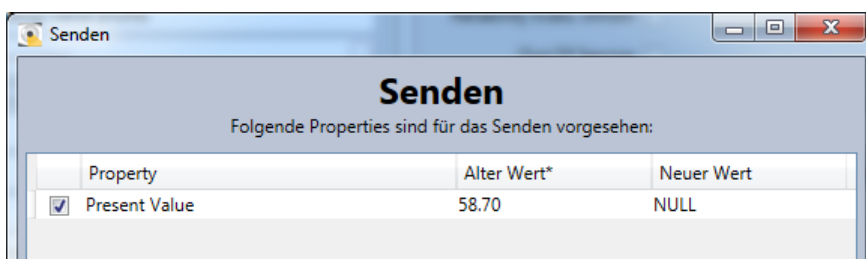


## SENDING VALUES

The actual write operation is initiated with the **<Send>** button. In the default setting, BACeye opens a "Send" dialog when the **<Send>** button is pressed.



In the dialog, all properties that BACeye intends to write are shown with the old and new value. If the PresentValue of an object that can be commanded is written, the old value is the active value and the new value is the entered value that should be written with the currently selected "Write Priority". The new value is ZERO if the value with the selected priority should be deleted.



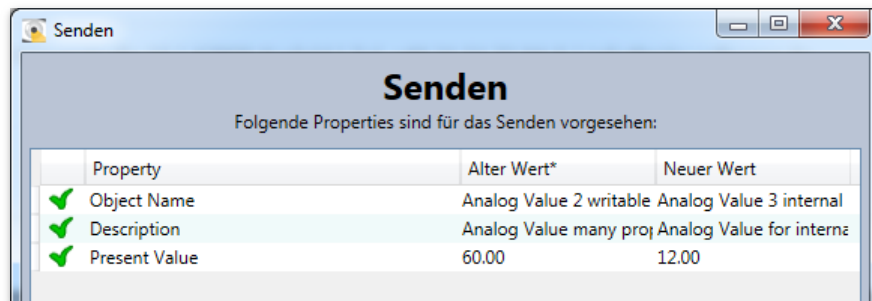
At this point and via the checkboxes to the right, it is possible for the user to deselect individual properties and not yet write them. If properties are deselected, the changes made are not lost; they remain available for a further write process.

Pressing the **<Send>** button in the dialog finally starts the send process. The values are written successively.

### Successful send process

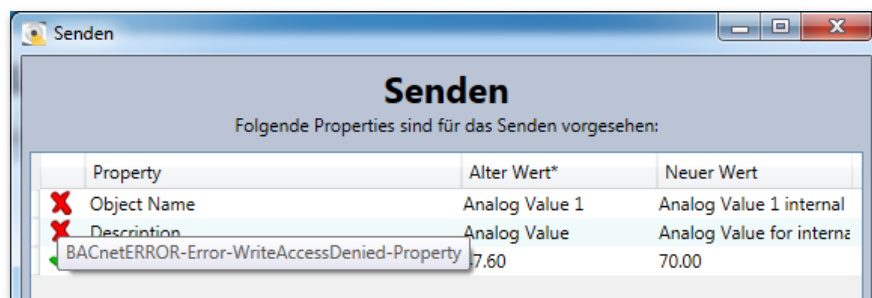


If the send process was fully successful, every sent property is then identified by a green tick. After the dialog is closed, BACeye again reads in all values of the object affected by the changes so that the detail view has the current status of the values.

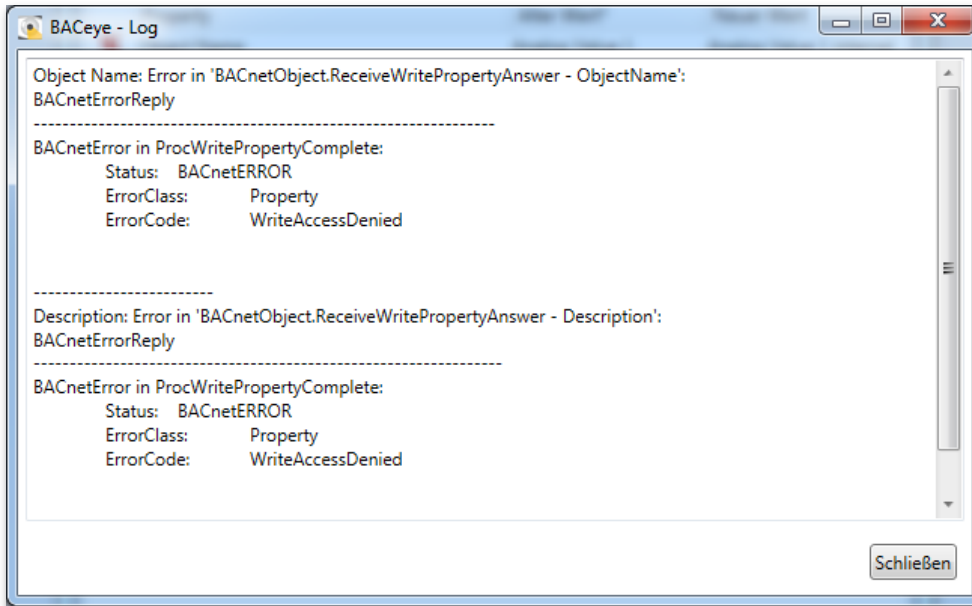


### Unsuccessful send process

If the send process for a property is not successful, BACeye identifies this property with a red cross. A tool tip with the symbol provides the reason for the error.



It is possible to also use the <Log> button to find out the reason why the send process was not successful. The transmission log can be called with the <Log> button to obtain further information on the problem which has occurred.

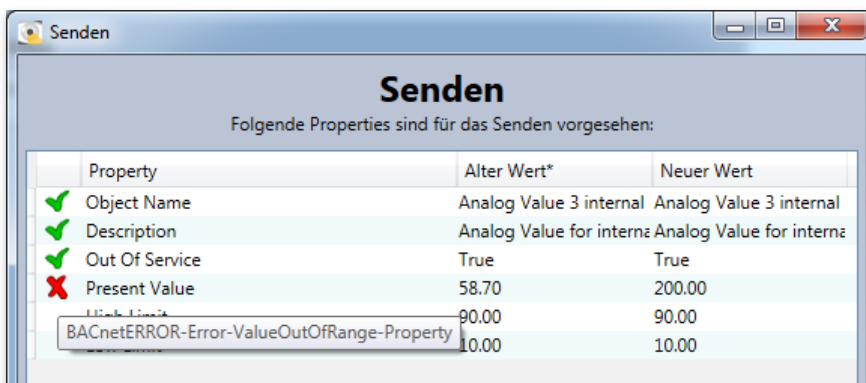


If the send operation of a property was not successful, this has no direct influence on the send operation of other properties if values are not written by means of "Write Property Multiple".

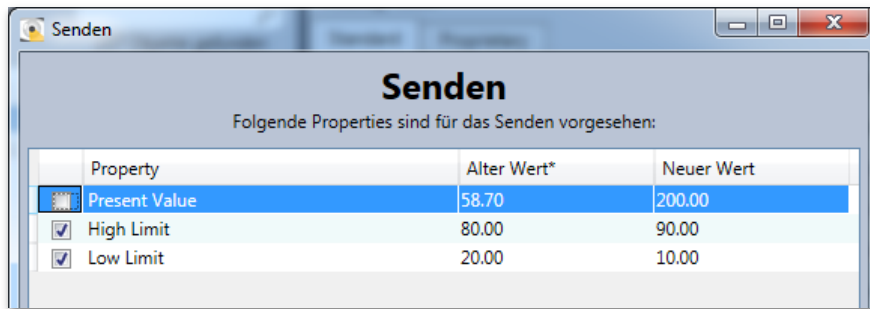
### Sending with "Write Property Multiple"

Whether "Write Property Multiple" is used depends on whether the device supports this BACnet service and whether its use is configured in the communication settings of BACeye under "Activate WritePropertyMultiple".

When writing with "Write Property Multiple", all values being sent are transferred to a device via a write command. The write command is aborted if an error occurs and BACeye marks the affected property with the error. The values of all other properties remain unwritten.

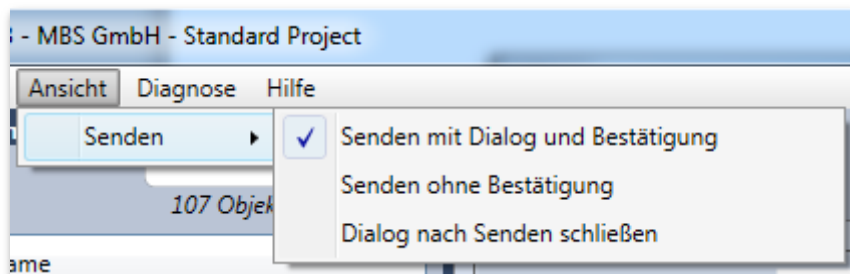


Depending on the error, its cause can now be remedied e.g. by correcting the value. If this is not possible but if the values of the remaining properties should be written, the affected property must be deselected for the next send.



### Configuring send properties

With the default setting, the "Send" dialog in which the previously changed properties can be checked and deselected appears during each send operation.



You can change this by selecting other send properties in the "View" menu.

- **Send with interactive window and confirmation:** This is the default mode. The interactive send window opens before sending. In the interactive window the values can be checked again before selecting send. After sending, the interactive window remains open displaying the send results.
- **Send without confirmation:** The interactive send window opens and sends all changes without reconfirmation. After sending, the interactive window remains open.
- **Interactive window closes after sending:** The interactive window is opened, sends the values and is then closed automatically when all send operations were successful. If errors occurred during sending, the interactive window remains open.

### Send with hotkey

Changed values can also be sent using the hotkey combination ALT+S This can save a great deal of time depending on the configuration of the interactive send window. This mode is particularly practical in combination with "Close window after sending".

## COMMAND

The **<Command>** button can be used to call up the "Command" function in the detail window for objects that can be commanded. The function opens a dialog that enables the object's PriorityArray to be edited conveniently.

It must be remembered that current value changes in the detail window are lost when the dialog is opened. Notification of this situation is then issued by way of a corresponding check question.

The current value of the PresentValue is displayed at the top in the "Command" dialog. Underneath there is a list containing 16 entries for the PriorityArray. Since the priority 6 must not be used for write commands, its line is deactivated. The current value of the RelinquishDefault is displayed under the list, and can also be edited via a separate input field. On the bottom edge of the dialog there are control elements for manual or automatic updating of the displayed values, of the type also familiar from detail views.

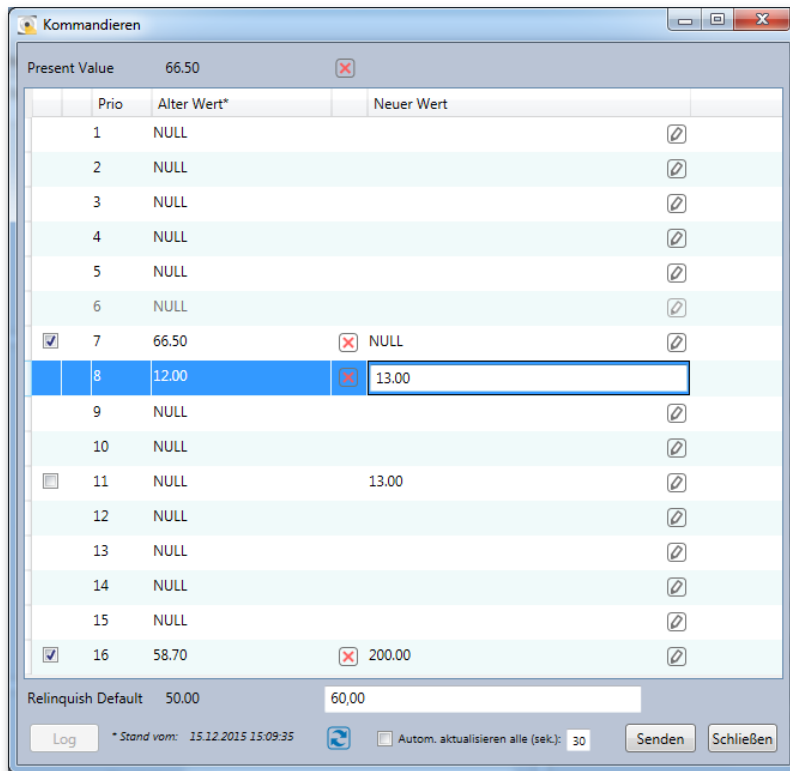
Prio	Alter Wert*	Neuer Wert
1	NULL	
2	NULL	
3	NULL	
4	NULL	
5	NULL	
6	NULL	
7	66.50	
8	12.00	
9	NULL	
10	NULL	
11	NULL	
12	NULL	
13	NULL	
14	NULL	
15	NULL	
16	58.70	

Relinquish Default 50.00

Log \* Stand vom: 15.12.2015 11:58:50  Autom. aktualisieren alle (sek): 30

### Entering values

Values can be entered in the "New value" column. The entry appears as soon as the pencil button is pressed or the desired line is clicked on twice. The entry depends on the type of PresentValue, but matches the entry for changing the RelinquishDefault. If the entry is an edit box, a value is accepted as soon as the edit box loses the entry focus. If selection with a combo-box is selected, a value is accepted as soon as a selection is made. If a value is entered via a dialog, it is accepted as soon as the entry there is confirmed with **<OK>**. As soon as a new value has been entered, a marked checkbox appears on the left in the line. This offers the possibility of subsequently excluding the value from being sent.



### Zeroing values

The "Zero" buttons  enable entries in the PriorityArray that have a value to be reset to ZERO. For this function, the button at top right next to "Present Value" sets all corresponding entries to ZERO. Entries edited in this way are also marked for sending.

### Sending values

As soon as new values have been set, they can be written via the **<Send>** button. The values are then written successively ("Write Property Multiple" is not used) and the entries are marked according to the success or failure of the writing. This also applies to the RelinquishDefault.

In the same way as with the Send dialog, in the event of an error a tool tip for the symbol provides the reason for the error, and the Send log can be called up along with additional details with the **<Log>** button.

After sending, the dialog is updated so that "Present Value", the "Old Value" column and "Relinquish Default" are up to date in line with the success of the writing operation. Priorities that could not be written or that were deselected can be written with the same value or a changed value by selecting (again). Whether or not they have already been sent, all other entries can be edited again as described.

Kommandieren

Present Value 13.00

	Prio	Alter Wert*	Neuer Wert	
1		NULL		∅
2		NULL		∅
3		NULL		∅
4		NULL		∅
5		NULL		∅
6		NULL		∅
✓ 7		NULL	NULL	∅
✓ 8		13.00	13.00	∅
9		NULL		∅
10		NULL		∅
☐ 11		NULL	13.00	∅
12		NULL		∅
13		NULL		∅
14		NULL		∅
15		NULL		∅
☐ ✗ 16		58.70	200.00	∅

Relinquish Default 60.00  ✓

Log \* Stand vom: 15.12.2015 15:13:52  Autom. aktualisieren alle (sek.): 30

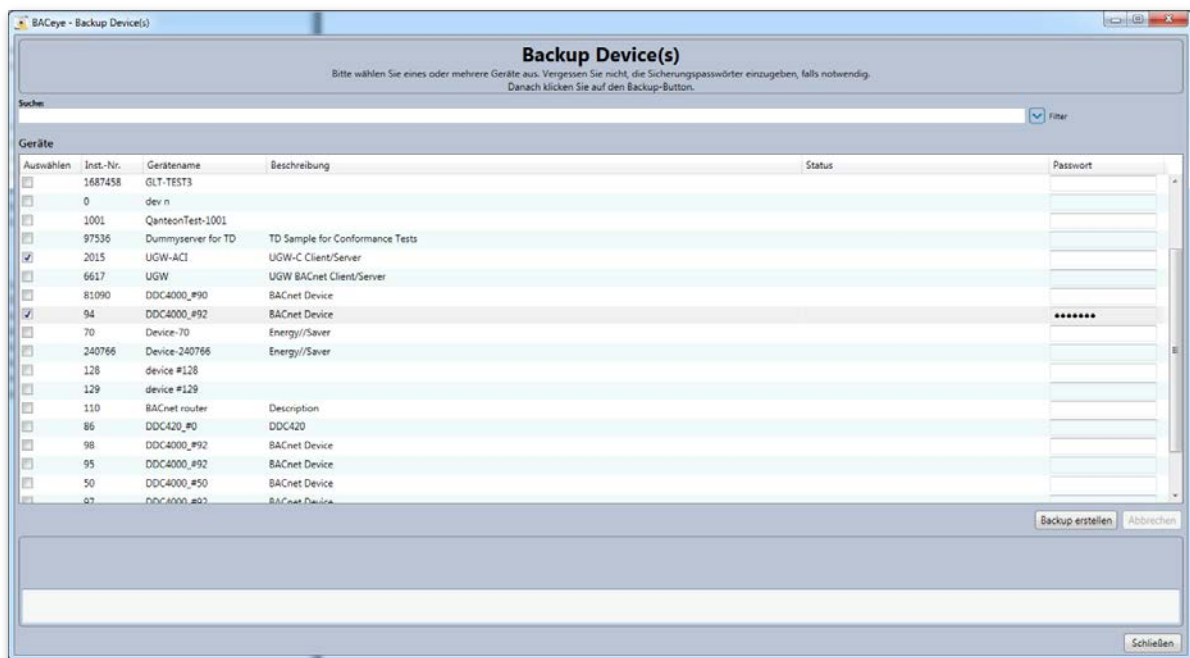
## 8. BACKUP & RESTORE

The BACnet Backup&Restore procedure serves for backing up the data in one of the devices or loading an existing data backup into a device. BACeye can serve as a backup and restore client on BACnet devices. The procedure is defined in the BACnet standard. The content of the backup is, however, the sole responsibility of the device manufacturer. The precise scope of the restore is also the responsibility of the device manufacturer. BACeye simply relays the data, however cannot interpret or modify it.

### CREATE BACKUP

The backup dialog is called up via the menu point *<Data transfer><Backup>* .

The dialog contains a list of the currently registered devices. Entries from devices whose registration has not yet been completed remain deactivated (greyed out) until this process is completed. Then, only the devices are displayed that support the BAnet service ReinitializeDevice. The instance number, the name and the description of the devices is given.



#### Devices

The list of registered devices offers the possibility of using the checkbox on the left to mark the devices of which a backup should be created. As soon as a device is marked, the *<Backup>* button is active. If a password is required for a device in order to create a backup, this must be entered first in the marked line in the "password" column. If a backup or a restore has already been performed with a password, this password is maintained. The password is then remembered for as long as the device is registered in BACeye.

The device selection can be sorted by clicking on the respective column heading.

#### Search

When text is entered in the **<Search>** field, a full text search is performed. The search relates to the instance no., device name and description columns. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

### Filter

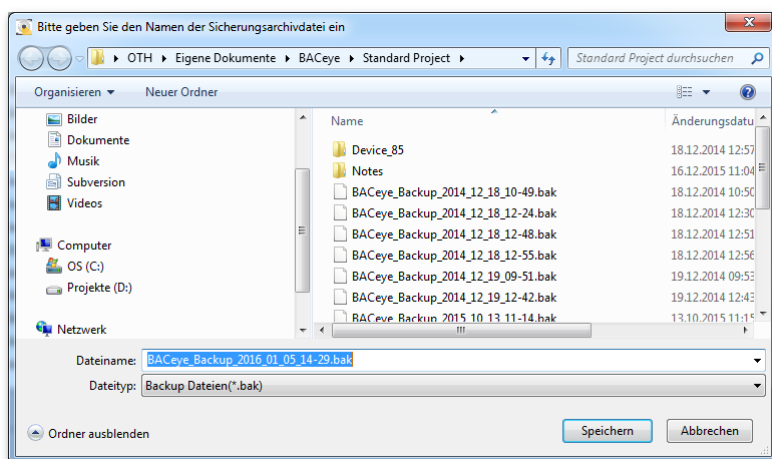
The **<Filter>** button can be used to show a line with control elements that allow column-by-column filtering via the result list.

The filter remains active until the line is hidden again by pressing the button once more.

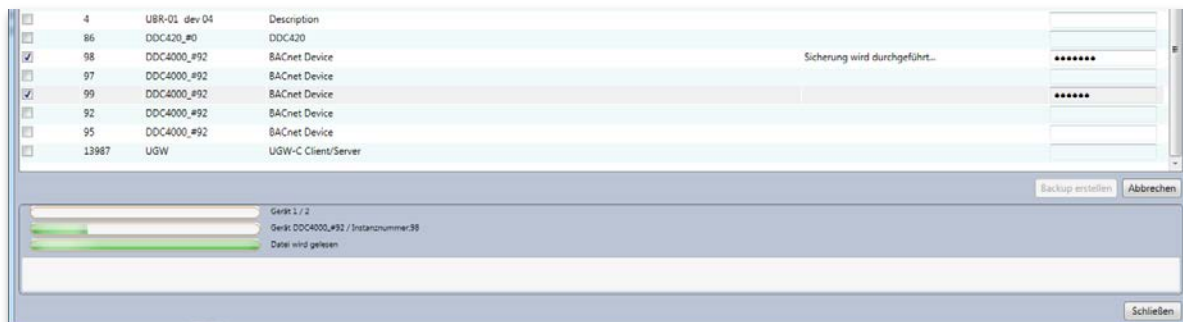
### Create backup

The backup process for the selected devices can be started with the **<Backup>** button.

First it is necessary to select, via a file selection dialog, the location and under what name the backup file is to be created. Initially, the current date and the current system time are used to suggest as the destination a file in the format "BACeye\_Backup\_yyyy\_MM\_dd\_HH-mm.bak" in the project folder. If a different folder is selected, this is maintained during the next backup. If a file is selected that already exists, overwriting of this file must still be confirmed.

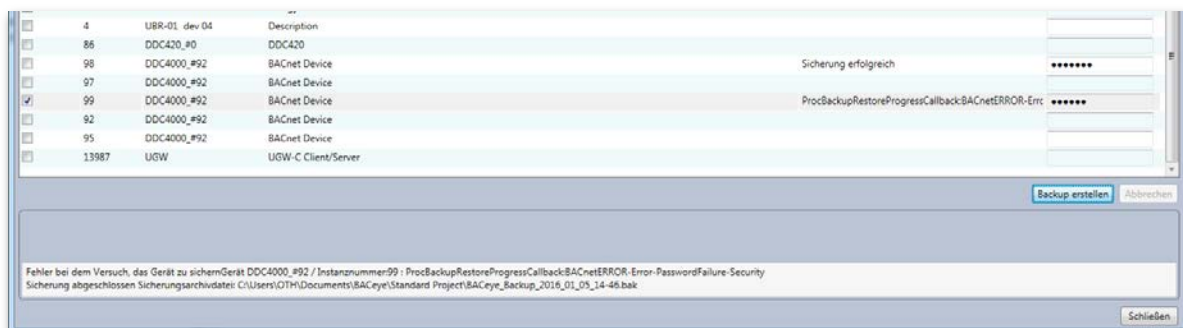


The backup is started after the destination file is selected. The operation's progress is indicated by three progress bars. The top one shows the overall progress across all selected devices, the middle one shows the progress for each device and the bottom one shows the progress for each file of the current backup. The operation can be cancelled with the **<Cancel>** button.

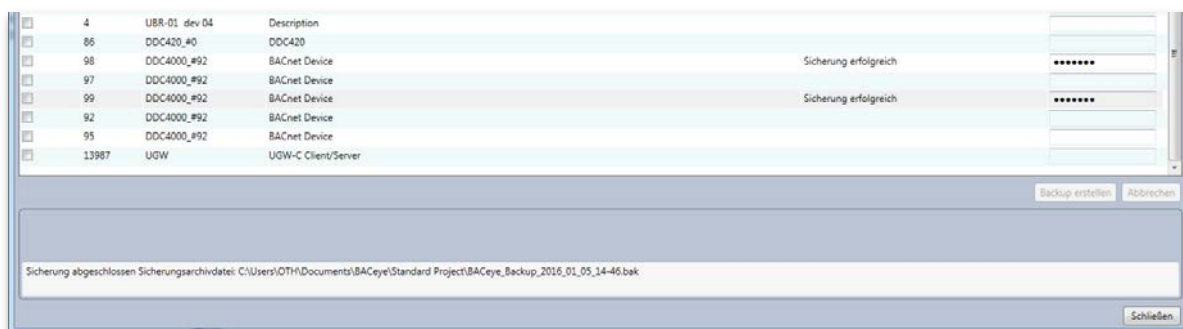




The status of the backup of the respective device and its result is shown in the Status column. In addition, information about errors and about completion of the operation is shown in the text field below the progress display.



After the backup has been completed, the backup file contains all successfully completed backups. Unsuccessful backups can be repeated by pressing the <Create backup> button again. There is no new check of the destination file here. Instead, if a repetition is successful, the backups are added to the existing backup file. The same applies if other devices are marked after a backup has been created. However, existing backups are not replaced by renewed marking of the corresponding devices.



### Backup file

The backup file created allows the backups that it contains to be imported back into the associated devices via BACeye itself. BACnet backup does not have a general exchange format allowing general exchange of the backup files between different clients.

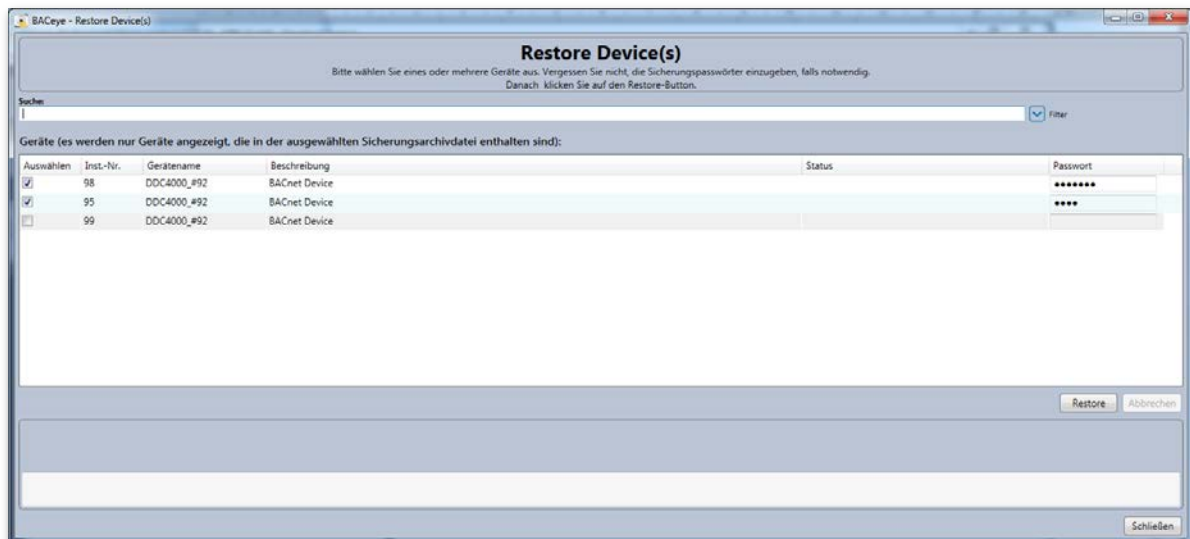
The backup file is a zip archive. The archive contains one directory for each device backed up. The directory for each device contains for each file object of a device a file with the downloaded data and an additional file in XML format that describes the content and scope of the backup.

## PERFORM RESTORE

The function for reading back in backups that had previously been created with BACeye is called up via the menu point <Data transfer><Restore> .

The backup file containing one or more backups that is/are to be restored is polled here first via the file selection dialog.

The dialog that then appears is the same as the one for performing the backup. However, this one lists only devices whose backups are in the selected file and were previously identified by a network scan. The instance number of the device, on the basis of which a backup can be assigned, is definitive here.



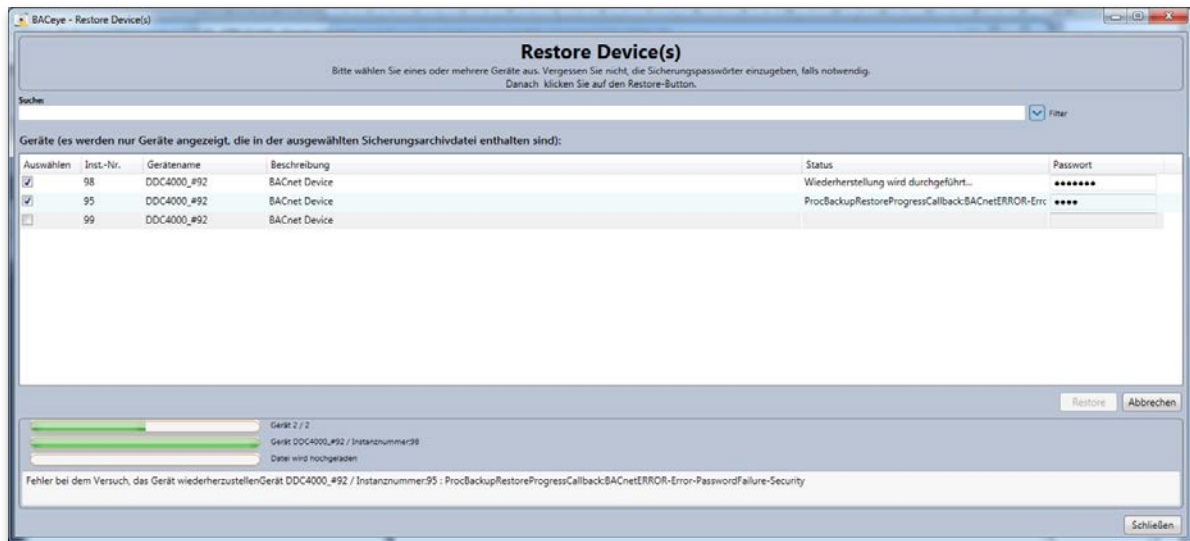
## Devices

The list of devices offers the possibility of using the checkbox on the left to mark the devices for which a restore should be performed. As soon as a device is marked, the **<Restore>** button is active. If a password is required for a device in order for the restore to be performed, this must be entered first in the marked line in the "password" column. If a backup or a restore has already been performed with a password, this password is maintained. The password is then remembered for as long as the device is registered in BACeye.

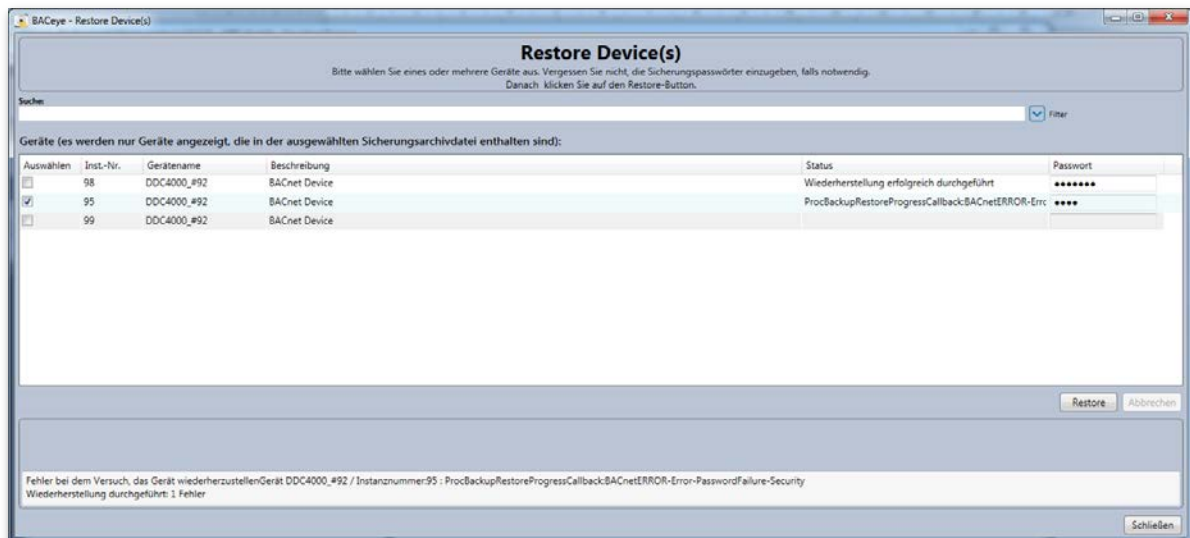
## Restore

The Restore process for the selected devices is started with the **<Restore>** button.

The operation's progress is indicated by three progress bars. The top one shows the overall progress across all selected devices, the middle one shows the progress for each device and the bottom one shows the progress for each file of the backup being read in. The operation can be cancelled with the **<Cancel>** button.



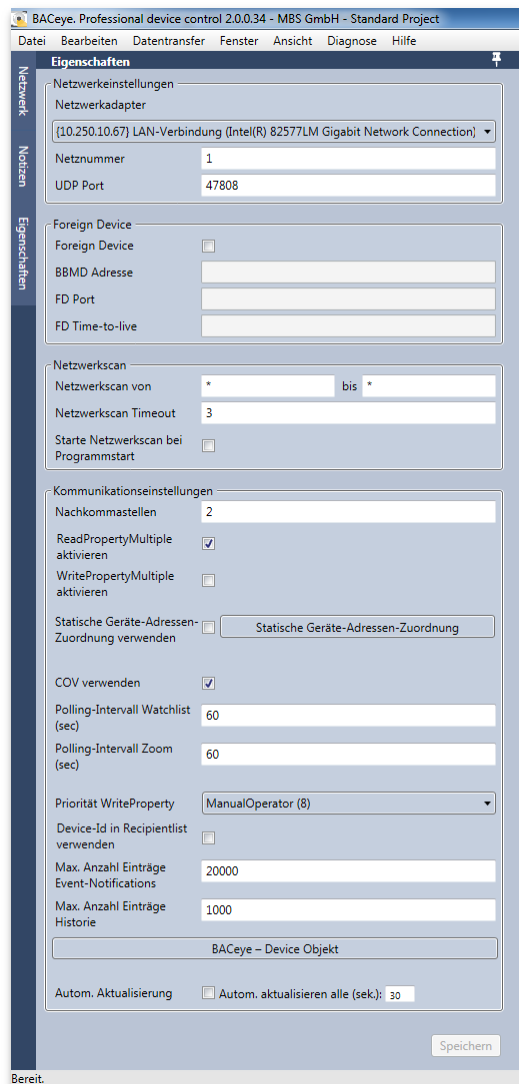
The status of the restoration of the respective device and its result is shown in the Status column. In addition, information about errors and about completion of the operation is shown in the text field below the progress display.



The restore can be repeated with the same device or a different one.

## 9. PROPERTIES

The properties of BACeye can be selected on the "Properties" tab next to the navigation window. The Properties tab provides access to all BACeye settings.



### NETWORK SETTINGS

In the network settings area, BACeye offers the possibility of selecting a certain network card from the list of available network adapters, In combination with the network card, network numbers for the BACnet network as well as the UDP port for BACnet communication are specified

When BACnet communication is started, BACeye indicates whether the combination of network adapter + UDP port is already linked elsewhere (e.g. MBS BACnet OPC server). In this case it is necessary to terminate the second BACstack or select a different network adapter + port combination.

## FOREIGN DEVICE

BACeye can be configured as FD in a BACnet network in the "Foreign Device" section. The configuration can be activated or deactivated in the "Foreign Device" checkbox.

For configuration give the address of the BBMD in the network as well as the FD port and time at which the FD is to be unregistered.

## NETWORK SCAN

The "Network scan" section allows you to define which range BACeye should scan. The range comprises the valid BACnet address range.

Both ranges can be expanded to the maximum range with a wild card "\*". When entry of a range is required, BACeye outputs appropriate WHO\_IS queries. BACeye uses a multiple stage process to reach the maximum number of subscribers possible. After polling the entire range, BACeye waits a certain time and then polls specifically the ranges between the devices which have replied. This process is repeated a number of times.

### Start network scan on program start

BACnet communication is not accomplished initially when BACeye is started. BACnet communication starts only when the network scan is actuated by the user. This was implemented to prevent unintentional disruptions in slow networks - this operation can be overridden with the checkbox. When the checkbox is checked, BACeye starts BACnet communication automatically after starting and actuates a BACnet scan of the set range.

## COMMUNICATION SETTINGS

Basic settings for BACeye can be made in the communication settings.

Kommunikationseinstellungen

Nachkommastellen

ReadPropertyMultiple aktivieren

WritePropertyMultiple aktivieren

Statische Geräte-Adressen-Zuordnung verwenden

COV verwenden

Polling-Intervall Watchlist (sec)

Polling-Intervall Zoom (sec)

Priorität WriteProperty

Device-Id in Recipientlist verwenden

Max. Anzahl Einträge Event-Notifications

Max. Anzahl Einträge Historie

Autom. Aktualisierung  Autom. aktualisieren alle (sek.):

### Significant digits

This defines the number of significant digits with which BACeye is to operate. The default setting is two. All analogue values are represented in this form.

### Activating ReadPropertyMultiple (RPM)

If the "Activate RPM" checkbox is marked, BACeye polls devices using RPM to the extent supported by the devices. This checkbox can be deactivated, if use RPM is not desired for analysis purposes. BACeye then polls the properties of all devices individually. BACeye also has a fallback process. If a device generally supports RPM and a call fails (e.g. data quantity too large), BACeye falls back to reading the individual properties for this device.

### Activate WritePropertyMultiple (WPM)

If the "Activate WPM" checkbox is marked, BACeye always tries to send values using WPM. If WPM fails, the values are written individually. This relates to the Send function of the detail views of BACnet objects.

### Static device address binding

The static device address binding can be activated here. Details are given in the Chapter "Static Device Address Binding"

### Using COV

BACeye offers a number of possibilities for monitoring changes in the values of properties. Individual properties can be monitored with the zoom window (see Chapter "Zoom Window") or complete objects can be monitored in the watch list (See Chapter "Watch List") If supported, BACeye uses COV or COV-P for monitoring properties.

If COV is not supported the values are polled by BACeye. The COV checkbox allows the user to set whether BACeye should attempt to receive value changes via COV or generally use the polling procedure.

#### **Polling interval for watchlist**

Here it is possible to set the interval values for polling when objects are added to the watchlist.

#### **Polling interval for zoom window**

Here it is possible to set the interval values for polling when they are observed in a zoom window. If the property to be observed is already on the watchlist, the watchlist interval is effective. The property is not polled multiply.

#### **WriteProperty priority**

Setting for standard BACeye priority for writing the PresentValue property for commandable objects. The default value is "8 - ManualOperator".

#### **Using device ID in recipient list**

BACeye usually enters itself in the recipient list for objects using the network number + BACnet MAC address. If this checkbox is activated, BACeye enters itself in the recipient list with the DeviceID instead.

#### **Max. number of event notifications**

If BACeye is entered in the recipient list, event notifications are collected and buffered. This entry indicates the maximum number of notifications to be buffered before older events are deleted from the memory.

#### **Max. number of history entries**

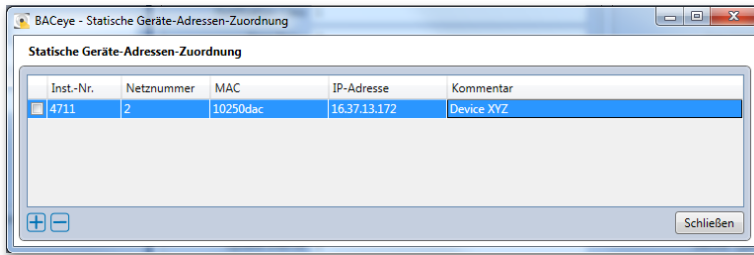
The value determines the maximum number of entries in the history of an object registered in the monitoring list. The oldest entries are deleted when this number is reached.

#### **Automatic updating**

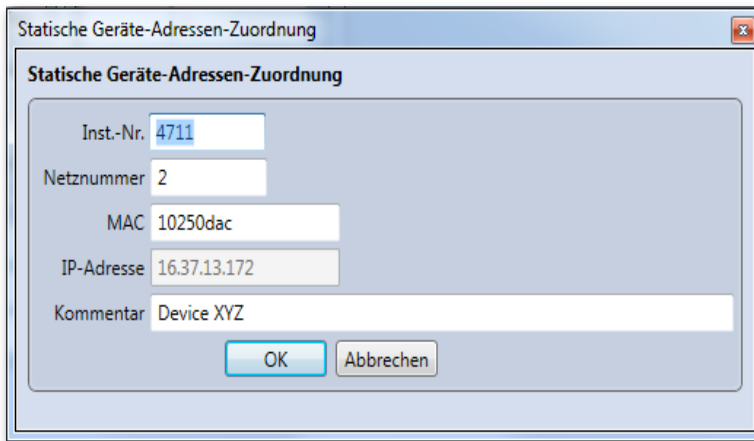
If automatic updating is activated, the detail views of BACnet objects are initialised and updated when called up with a corresponding update interval.

## **STATIC DEVICE ADDRESS BINDING**

Normally, BACeye finds BACnet devices using so-called "dynamic device address binding". This means BACeye sends a "Who Is" telegram as broadcast and devices reply with an "I Am" telegram. These replies allow BACeye to recognise the devices present in the network and the addresses under which the devices can be reached. However there are some situations, where this mechanism is not sufficient. Some devices, particularly MS/TP slaves, do not support "I Am". Moreover transfer of broadcast telegrams can be disrupted. This happens particularly when BBMD devices are not completely installed in a BACnet IP network with different IP subnetworks. As an option, BACeye also supports so-called "static device address binding" to successfully communicate with devices even in such special situations. In this case the devices are made identifiable for BACeye by means of manual configuration with their addresses. For further BACeye functions, the devices entered using static device address binding behave in exactly the same manner as devices which have been found automatically by means of dynamic device address binding. Configuration for static device address binding is done using the "static device address binding" dialog, which can be called under the "Properties" tab.

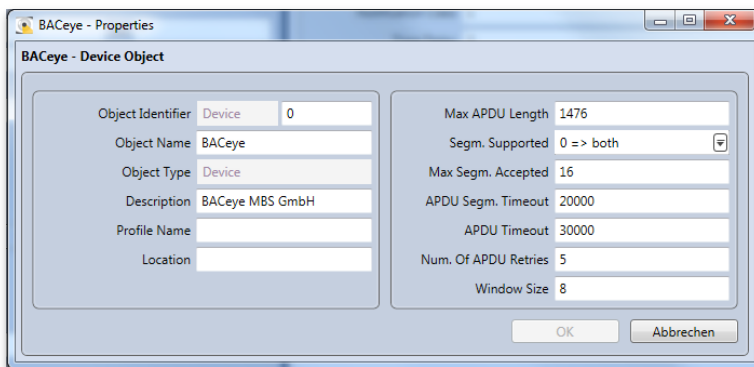


Entries can be added or removed with the "+" and "-" buttons. Present entries can be edited by double-clicking on the line in question. After completing entries, they can be activated individually in the list. All activated entries become effective at the moment they are activated in the "Static device address binding" checkbox on the Settings tab. This means that it is not necessary to delete entries when not required temporarily; they can simply be deactivated.



## BACEYE DEVICE OBJECT

The interactive "BACeye device object" window allows the settings to be edited for the device object with which BACeye identifies itself to other subscribers.





The most important settings for the device object can be made in the interactive window:

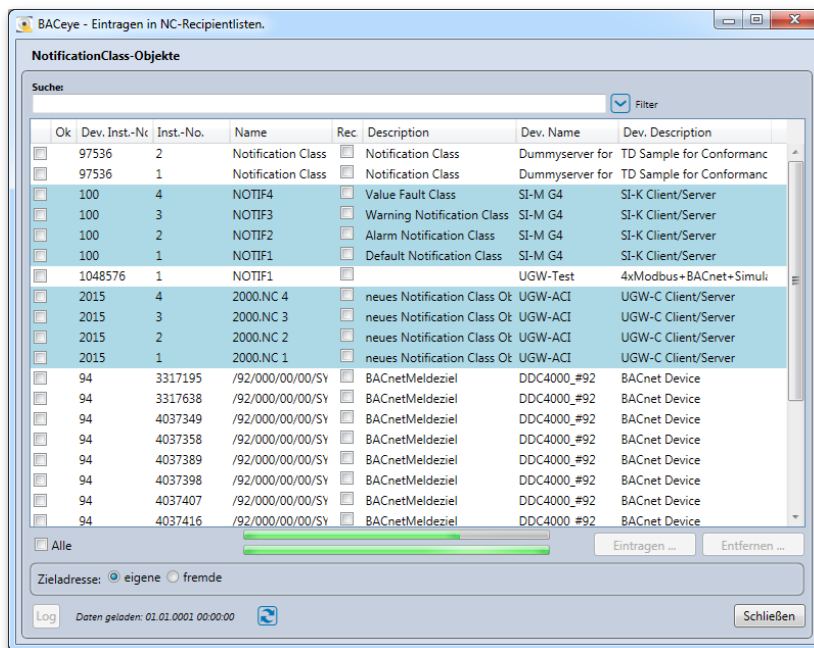
- **Object Identifier:** Instance number of own device object
- **Object Name:** Name of own device object
- **Object Type:** Type of own device object
- **Description:** Description of own device object
- **Profile Name:** Text field for setting profile name. This property is used to document that the device in question is set according to a defined pattern. This setting does not have any particular relevance for BACeye.
- **Location:** Location is a text property serving to document the installation location of the device. Other BACnet clients in the network can be informed where the BACeye device is located with the aid of this property.
- **Max APDU Length:** Maximum number of bytes, BACeye is to support in one telegram. Generally this is set to the maximum supported by all connected BACnet networks. Usually values of 1476 are used when only BACnet IP is used and 480 when the BACnet network also contains MS/TP devices.
- **Segm. Supported:** It is possible to set whether BACeye is to support segmented transfer.
- **Max Segm. Accepted:** The maximum number of segments is configured which BACeye is to support in the event of segmented transfer. Values between 1 and 255 are permissible. It is rarely necessary to change the default value of 16.
- **APDU Segm. Timeout:** Time BACeye is to wait for a segment before retrying. This value is expressed in milliseconds. The default value of 2000 therefore corresponds to 2 seconds. It may be necessary to increase this value if the BACnet network is very slow or contains overloaded subnetworks or very slow devices.
- **Num. Of APDU Retries:** Number of retries to be attempted by BACeye when the device does not reply to the poll.
- **Window Size:** Number of segments to be received during segmented transfer before sending a confirmation. Only in very rare cases is it necessary to change the default setting of 8.

## 10. ALARMING

BACnet has mechanisms which can evaluate and recognise device alarm states automatically and transfer this information on to clients accordingly in the form of event notifications. BACeye supports this BACnet feature as client.

### ENTRY IN RECIPIENT LISTS

NotificationClass objects serve to determine the clients to which a server sends an event notification. Each of these NC objects has a property recipient list containing a list of target addresses and sending criteria. BACeye receives event notifications only from those NC objects for which the BACeye address or a matching broadcast address is projected in the Property recipient list. These recipient lists can be processed in BACeye or in the completely normal manner with the edit and send functions of the NC objects detail window. However, there are also special convenience features for which BACeye determines all NC objects in question and then enters its own address selectively in a number of recipient lists that can be selected.



The dialog for this convenience feature is started with the menu point **<Edit><Enter BACeye in Recipient Lists>**. When the dialog is opened, BACeye first reads all NC objects out of all devices identified in a network scan and then displays the objects in a list. Readout can require some time. As long as the operation is ongoing, its progress is shown by two progress bars below the list. The top one shows the overall progress across all known devices, the bottom one shows the progress for each device. The list is filled successively. As soon as a NC object is displayed, this can be edited without having to wait for the end of the entire scanning operation.

### NotificationClass object selection

The list of identified NC objects enables the objects in whose recipient list an entry should be made or removed to be marked on the left with the checkbox. If several objects are selected simultaneously, the marking of one

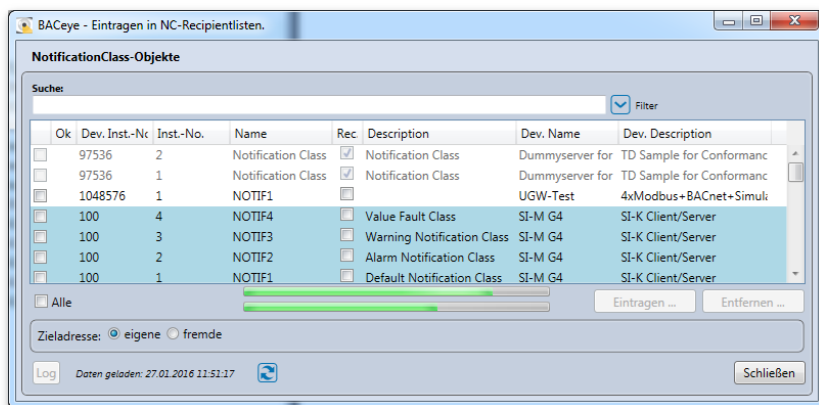
of the objects is applied to the others. The <All> checkbox allows all objects to be marked or all markings to be cancelled.

The device selection can be sorted by clicking on the respective column heading. When sorting based on the instance number of the devices ("Dev. Inst. No."), grouping on the basis of devices is achieved by changing the background colour accordingly.

The list contains the following fields:

- **Ok** : After entry or removal, indicates whether the operation in relation to the object was successful (✔) or not (✘).
- **Dev. Inst.-No.** : Instance number of a device
- **Inst.-No.** : Instance number of the NC object
- **Name** : Name of the NC object
- **Rec** : Identifies whether (ticked) or not there is an entry in the recipient list. This refers either to BACeye's own address or an external address defined under **target address**.
- **Description** : Description of the NC object
- **Dev. Name** : Name of the device
- **Dev. Description** : Description of the device

When the dialog is opened again, all NC objects for which entries had previously been made via the same function are initially listed as deactivated. As soon as these NC objects are detected again, they are listed normally. Otherwise they remain greyed out. The information about entries which have been made is not continued beyond the running of BACeye and is no longer available after a restart.



## Search


When text is entered in the <Search> field, a full text search is performed. The search refers to all columns. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

## Filter

The <Filter> button can be used to show a line with control elements that allow column-by-column filtering via the result list.

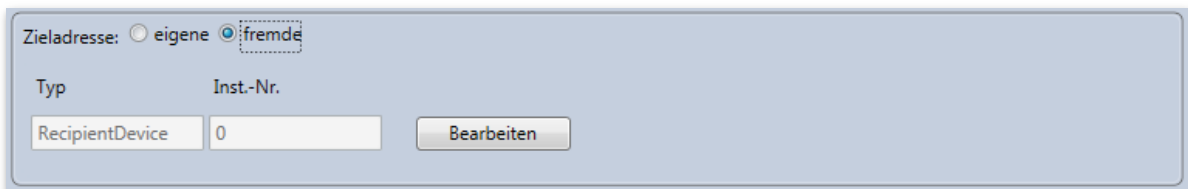
The filter remains active until the line is hidden again by pressing the button once more.

## Updating

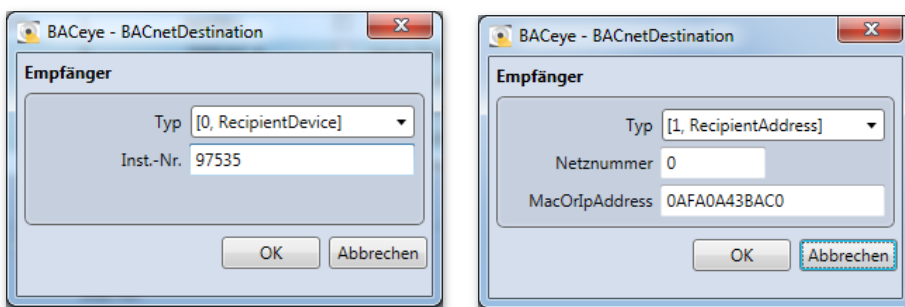
The list of NC objects can be updated with the Refresh button . This updates the existing list entries and/or adds newly identified NC objects. The "data loaded" time stamp is updated accordingly.

## Target address

The dialog offers the option of BACeye entering an external address in the recipients list instead of its own address. If `<external>` is selected in the target address group, the range is extended and the address data that appears is used.



The `<Edit>` button can then be used to change this address in a separate dialog. It is possible to select whether the instance number of a device or its BACnet MAC / IP address including the network number is used as the address.

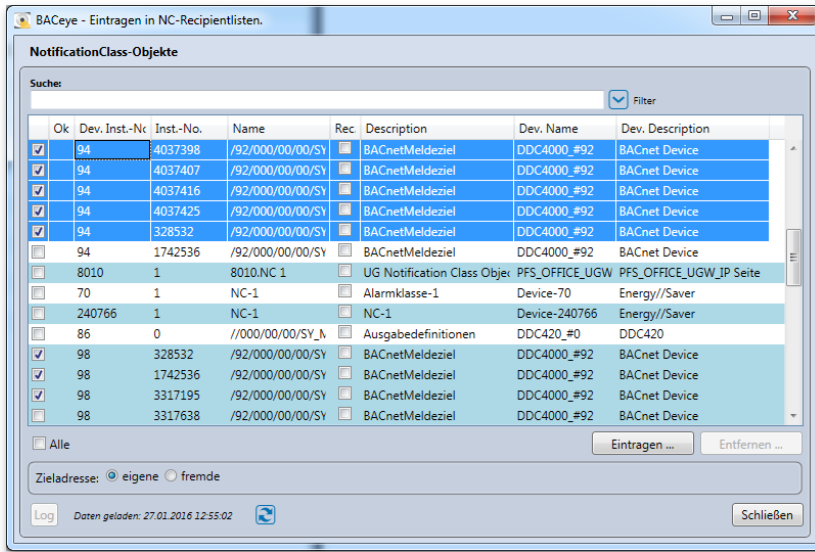


The recipient identifier in the NC object list is updated according to which target address is specified, depending on the recipient lists in which the address is or is not entered.

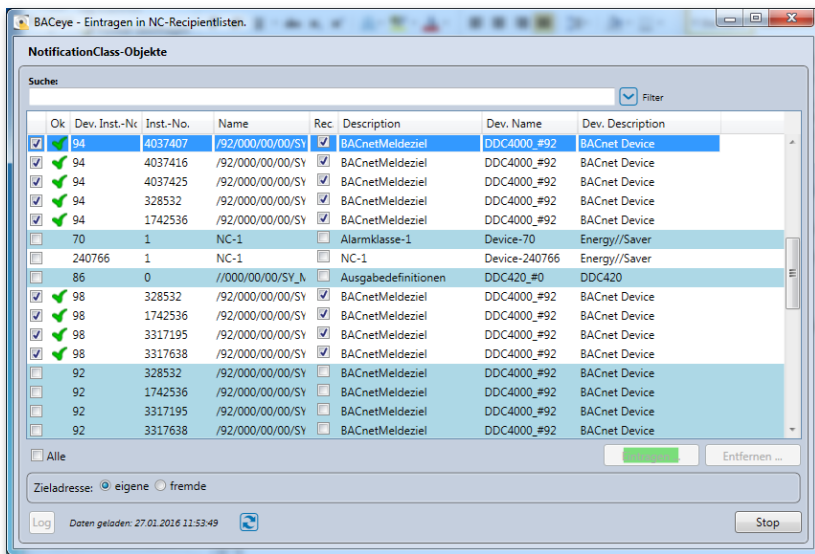
`<own>` is selected as the standard target address. Whether BACeye in this case identifies itself via its device ID (instance number specified in the communication settings in the BACeye device object) or the IP address is specified in the communication settings via the "Use device ID in recipient list" switch. This identifier is not set as standard.

## Enter

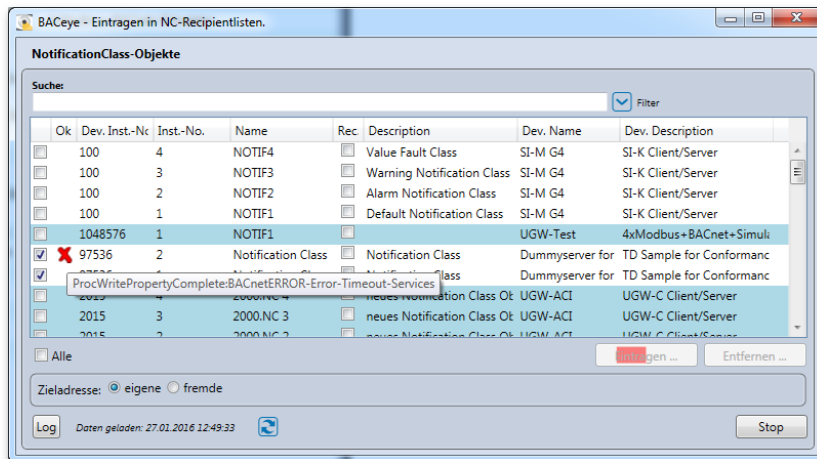
The `<Enter ...>` button is active as soon as a NC object is marked for which the recipient identifier is not set, i.e. the target address has not been entered.



If the <Enter...> button is pressed, this starts entry of the target address for all marked objects for which the recipient identifier is not set. The progress of the operation is indicated by a green progress bar in the button. As soon as an entry has been made for a NC object, the recipient identifier is set for this in the list and success is indicated by a green tick (✓).



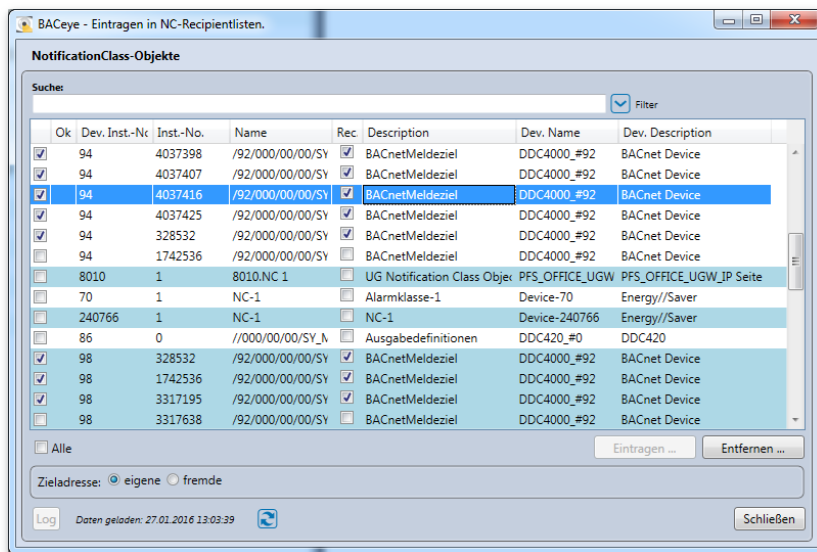
If an error occurs, the progress bar turns red until the next step and the affected NC object is marked with a red cross (✗). The symbol has a tool tip that describes the error. The <Log> button can then be used to display details of errors that have occurred.



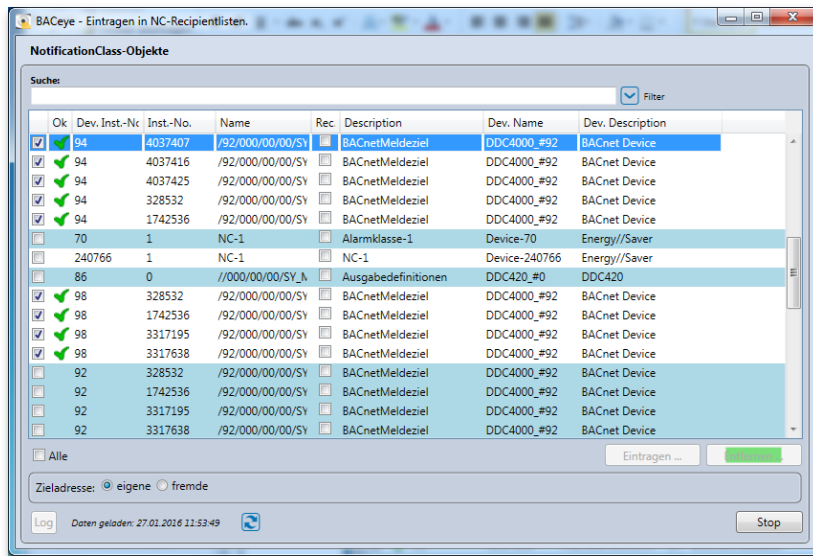
The marking of the NC objects remains after the entry is made (whether successful or not), so that further functions (enter or remove) can be performed on it.

### Remove

The <Remove...> button is active as soon as a NC object is marked for which the recipient identifier is set and the target address is therefore entered.



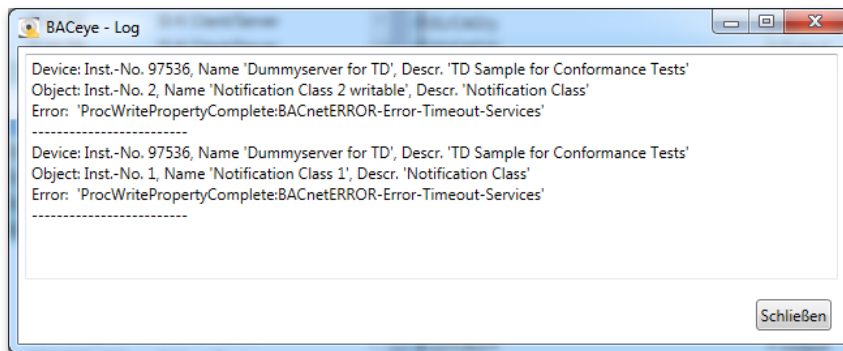
If the <Remove...> button is pressed, this starts removal of the target address for all marked objects for which the recipient identifier is set. The progress of the operation is indicated by a green progress bar in the button. As soon as an entry for an NC object has been deleted, the recipient identifier is removed for this in the list and success is indicated by a green tick (✓).



If an error occurs, the progress bar turns red until the next step and the affected NC object is marked with a red cross (X). The symbol has a tool tip that describes the error. The <Log> button can then be used to display details of errors that have occurred.

### Log display

The <Log> button is active as soon as errors occur during the adding or removal of entries in the recipient lists. It opens a window in which the errors that have occurred during the last operation are logged in detail.

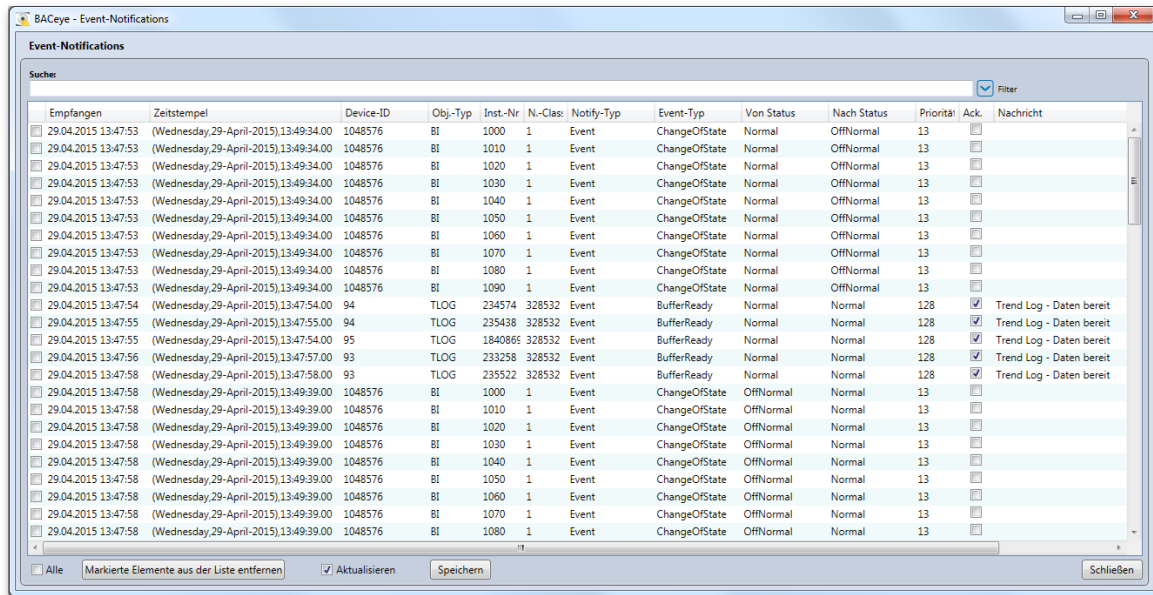


## DISPLAY OF MESSAGES RECEIVED

As soon as BACeye is registered as a recipient for NotificationClass objects, it can receive notifications of these in the form of event notifications. These event notifications are given a receipt time stamp and are kept in the memory while BACeye is running until they are deleted either due to the limit on the number of entries or deliberately by the user. The limit on the number of entries is defined in the communication settings of BACeye by the value "Max. number of event notifications entries" and is preset to 20000 entries. When the maximum number is reached, the respective oldest entry is then deleted each time a new message is received.

If BACeye is restarted, the detection commences as soon as the first network scan is performed. If this is done automatically when BACeye starts up, the detection also starts directly.

The menu **<Window><Display Event Notifications>** allows an interactive window to be opened containing the list of all alarms and events received. If the window is already open, it can be moved to the foreground via the menu point.



Each line in the list represents an event notification and contains the following columns:

- **Receive** : Time stamp of the time at which BACeye received the event notification.
- **Time stamp** : Time stamp of the event notification.
- **Device ID** : ID of the device from which the notification originates.
- **Obj. Type** : Type of object that generated the notification.
- **Inst. No** : Instance number of the object that generated the notification.
- **N. Class** : ID of the notification class object that sent the notification.
- **Notify Type** : Type of notification (Alarm, Event or Acknowledge).
- **Event Type** : Type of event or alarm.
- **From status** : Original status of the object that generated the notification.
- **To status** : New status of the object that generated the notification.
- **Priority** : Priority of the notification.
- **Ack.** : "Acknowledged Required" identifies whether acknowledgement of the notification is necessary.
- **Message** : Text message containing the notification.

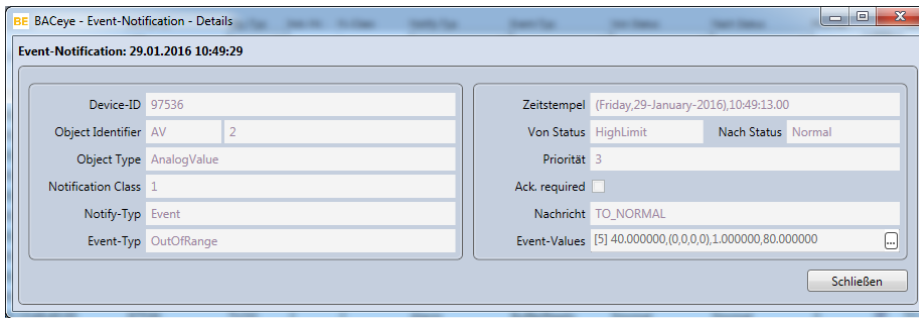
### Sorting

Ascending or descending list sorting is possible by repeatedly clicking on a column head. Holding the SHIFT key enables sorting over several columns. The arrangement of the columns can be changed by dragging the column heads. This arrangement is part of the project backup.

### Event notification details

Double-clicking on a line in the list opens a detail dialog for this event notification. Besides the list data, this also contains the **event values**. These can be displayed via the EPICS editor.





## Search

When text is entered in the **<Search>** field, a full text search is performed. The search refers to all columns. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

## Filter

The list can also be filtered according to column content. When the **<Filter>** symbol at the top right is clicked, an additional line appears in which a filter criterion can be selected for each column in the list. Only lines satisfying the filter criteria are displayed. Clicking the **<Filter>** symbol again causes the filter line to fold back up. The filter is then no longer effective. However the criteria set are retained.

The search text and filter settings are part of the project backup and are therefore saved beyond the time for which BACeye runs, so that they can be restored when it runs again.

## Removing marked elements from the list

Marked messages can be deleted from the list in the BACeye memory with the button **<Delete marked elements from list>**. In this case the event notifications are removed only from the list in the main BACeye memory. There is no retroactive effect on the system whatsoever. Normally it is not necessary to delete these entries; this feature serves only for removing messages which disturb an overview.

## Updating

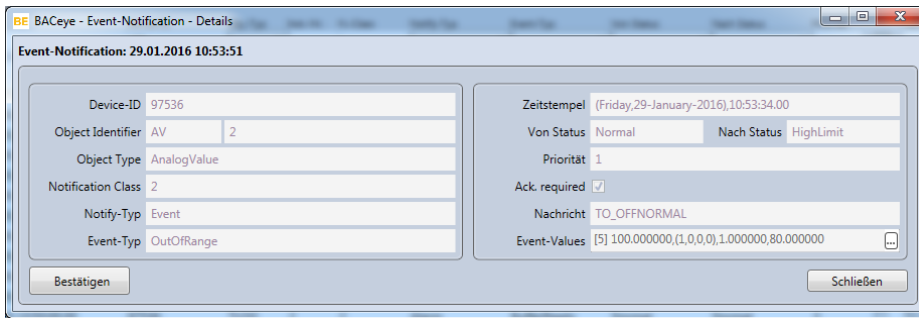
An optional feature allows the list to be updated dynamically. This option can be activated with the **<Update>** checkbox. It may be expedient to switch off the update feature when, for example, the user wants to find or review data already received. In such cases updating could be distracting if the events being reviewed are changed. This setting does not affect collection of the received event notifications in the background.

## Saving

The event notifications received can be saved for further processing externally or can be archived as files in XML format. Saving is initiated with the **<Save>** button. A file selection window then allows the user to decide where the data is saved. The set filter criteria apply to the saving. Search text and/or filter values are, if set, part of the export.

## CONFIRMATION OF MESSAGES

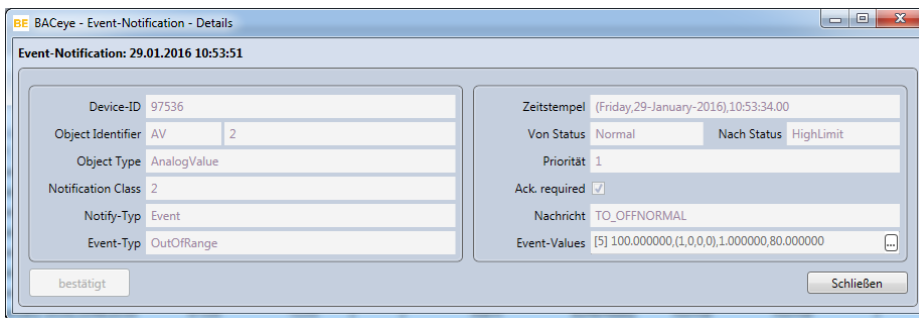
BACnet offers the option of managing confirmations for alarm and event notifications. BACeye can send such confirmations. When the "AckRequired" flag is set for an event notification, a confirmation can be sent to the device from the detail dialog with the **<Confirm>** button. Confirmation details are generated automatically by BACeye.



The progress of the confirmation is indicated by a green progress bar in the deactivated **<Confirm>** button. If an error occurs, this turns red and a message notifies the user of the error. An unsuccessful confirmation can be repeated.



If a confirmation is successful, the button remains deactivated and its text changes to "confirmed".



# 11. Monitoring list and zoom

BACeye offers the possibility of displaying values of object properties in special views in real time.

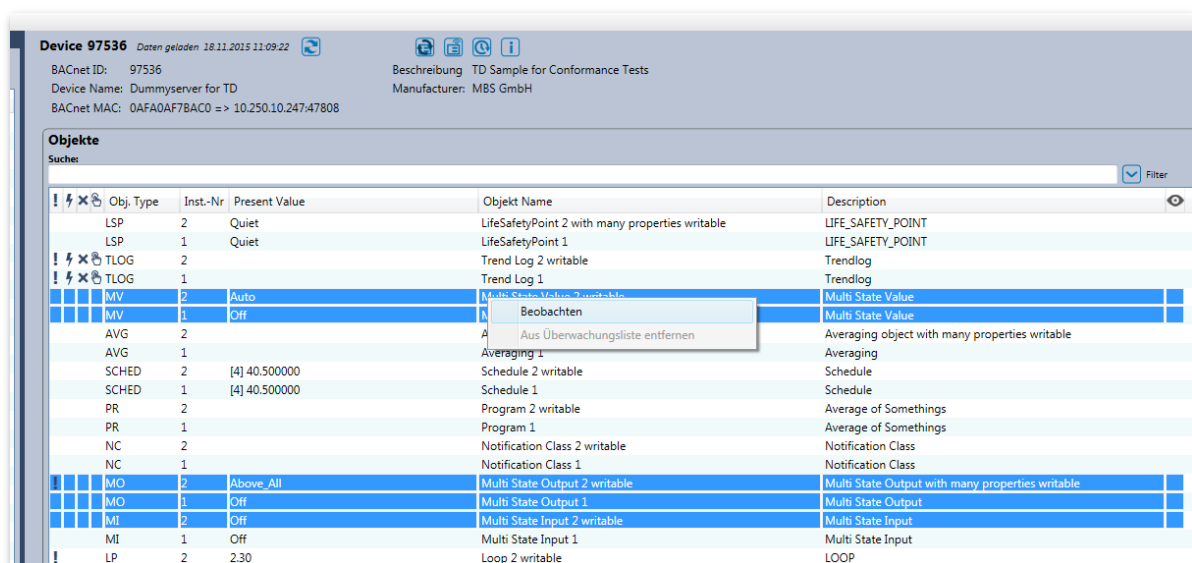
In the monitoring list, it is possible to bring together objects of different devices in order to observe important properties. These properties include the status flags and the present value. It is also possible to display the history of the value updates.

The Zoom function enables the value of any desired properties to be specifically displayed in its own window in a variable size.

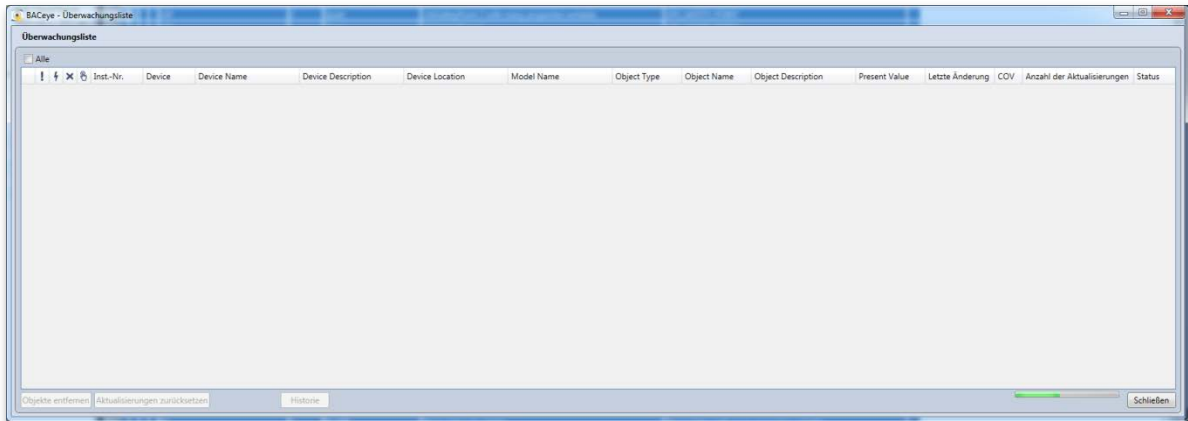
## ENTERING OBJECTS IN THE MONITORING LIST

Objects are entered in the monitoring list by selecting the objects in the object list in the navigation or detail window. This requires the objects to be selected in the respective list. The entry can then be made via the **<Observe>** function in the context menu of the object list.

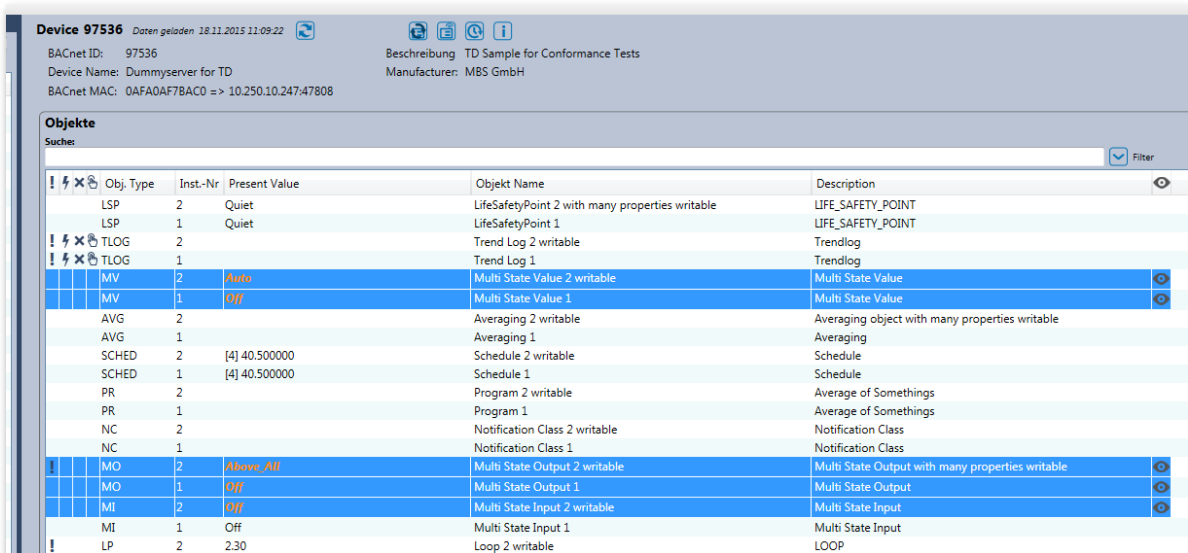
The function is then only available if one of the marked objects has one of the properties being observed (StatusFlags and/or PresentValue). Otherwise, the menu point is deactivated.



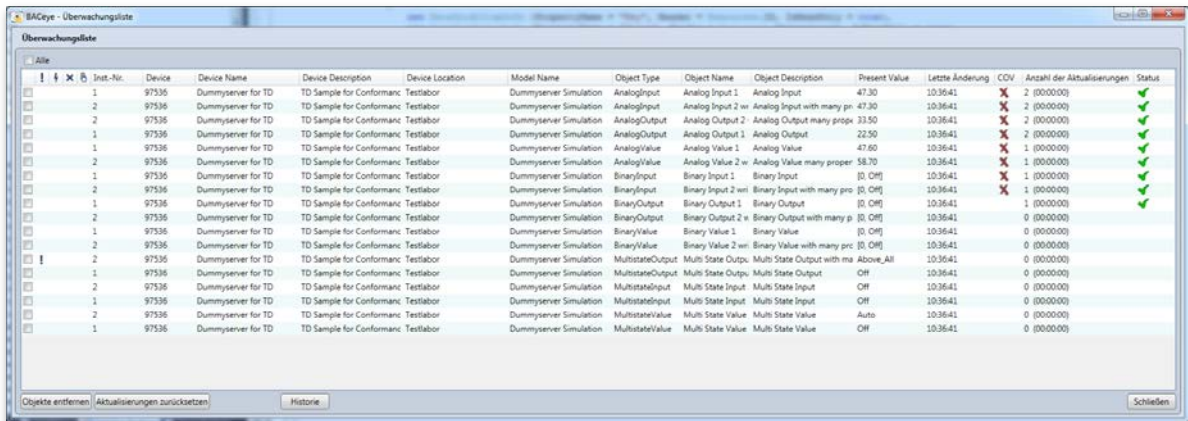
After the **<Observe>** function is called up, a dialog appears (if it is not already open) in which the marked objects are entered as soon as the registration for monitoring has been performed. The progress of the registration is indicated by a progress bar at the bottom right of the dialog.



At the same time, the "Present Value" values of the object being monitored are highlighted in orange in the object list in the detail window, and the monitoring symbol (eye) appears.



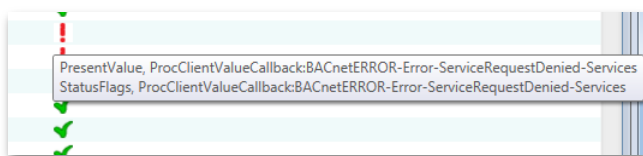
When the registration is completed, the (newly) registered objects appear in the monitoring list.



Besides the information also contained in the object list, the monitoring list contains data relating to the device of the respective object (instance number, name, description, location, model name).

The following values are given as characteristics of the monitoring:

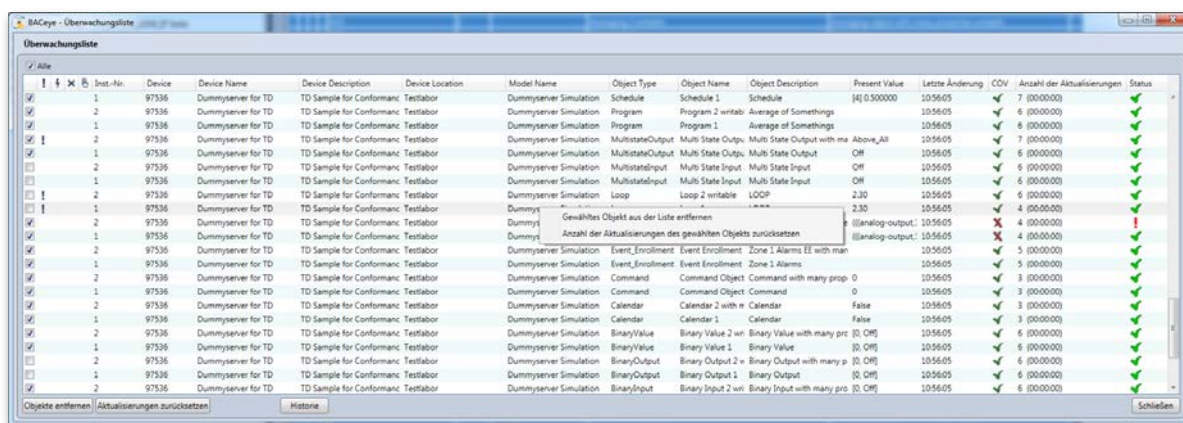
- **Last change:** Last change of a monitored value (i.e. a status flag or the present value).
- **COV:** Indicates whether the value update is done via COV (✓) or if polling is performed (✗). If the field is empty, this means that the registration has not yet been confirmed.
- **Number of updates:** Shows the number of updates that have been performed since registration or since the last reset by using the *<Rest update>* button. Updates are detected values (not just changes) that relate to the monitored values and/or to the status, and that are logged in the history.
- **Status:** Identifies whether the registration was successful (✓) or not (!). If it was not successful, a tool tip belonging to the icon provides information about which errors occurred. These errors can be temporary if the device rejects a registration for COV, followed by the fall-back to polling value detection. If the field is empty, this means that the registration has not yet been confirmed.



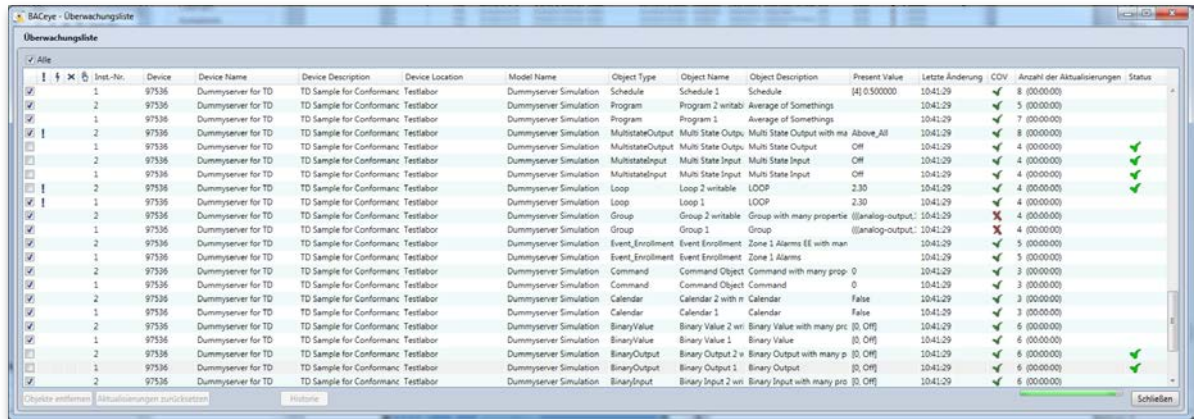
## REMOVING OBJECTS FROM THE MONITORING LIST

There are three ways of removing objects from the monitoring list again.

One is to call up the menu point *<Remove selected object from list>* for the selected object in the context menu of the list. Another is to mark the objects in the monitoring list via the selection checkboxes on the left and then to press the *<Remove objects>* button.



The progress of the registration cancellation is indicated by a progress bar at the bottom right of the dialog.



At the same time, the highlighting of the "Present Value" values of the affected objects is cancelled in the detail window, and the monitoring symbol (eye) is removed.

The objects are deleted from the monitoring list if the operation has been completed.

Another way of removing objects from the monitoring list is to select them in the object list in the navigation or detail window and then to call up the *<Remove from monitoring list>* function in the context menu of the object list.



## DISPLAYING THE MONITORING LIST

The current monitoring list can be called up via the menu point *<Window><Display monitoring list>*. If the window with the monitoring list is still open, it is moved to the foreground. Otherwise, it is opened again.

The menu point is only available if objects are currently entered in the monitoring list. Since the monitoring list is part of the project backup, this menu point is then also available again after a BACeye restart.

It is necessary to distinguish between four cases when the monitoring list is re-opened:

- Objects are already registered for monitoring.
- Objects are loaded but not registered for monitoring.
- Objects are not loaded.
- Devices of the objects have not been scanned or deleted.



The current status of the monitoring is shown for objects that were already previously registered for monitoring.

If objects to be monitored are loaded but not registered, they are automatically registered again and shown accordingly when the monitoring list is displayed.

If objects to be monitored are not loaded but the associated devices are known, i.e. they have previously been detected by a network scan, the necessary objects are loaded and registered. This operation can take some time and is shown by two progress bars. The top one refers to affected devices, the bottom one refers to the objects being loaded for each device.

Inst.-Nr.	Device	Device Name	Device Description	Device Location	Model Name	Object Type	Object Name	Object Description	Present Value	Letzte Änderung	COV	Anzahl der Aktualisierungen	Status
296339	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11.12.56	✓	2 (11.12.11)	✓
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11.12.56	✓		✓
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Helligkeit	70.00	11.12.56	✓		✓
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11.12.56	✓	4 (11.12.11)	✓
235083	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
3677324	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Input	89.04	11.13.01	✓	4 (11.12.11)	✓
1712123	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/53	Wärmeerstellung A	0.00	11.12.56	✓	4 (11.12.11)	✓
2048590	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/00/00/51	Batterie Spg	3.10	11.12.56	✓	4 (11.12.11)	✓
1712081	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Heizventil	0.00	11.12.56	✓	4 (11.12.11)	✓
1841808	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/00/00/51	USV-Spannung	4.23	11.12.56	✓	4 (11.12.11)	✓
1841804	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/00/00/51	Innentemperatur	43.50	11.12.56	✓	4 (11.12.11)	✓
1770439	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Input	89.05	11.13.01	✓	4 (11.12.11)	✓
234910	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
296911	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/01/53	Wärmeerstellung A	0.00	11.12.56	✓	4 (11.12.11)	✓
234884	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Input	88.70	11.13.01	✓	4 (11.12.11)	✓
235024	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
234991	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Input	88.53	11.13.01	✓	4 (11.12.11)	✓
234965	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
234856	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
234780	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P	Y Output	87.85	11.13.01	✓	4 (11.12.11)	✓
296303	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/01/53	Wärmeerstellung A	0.00	11.12.56	✓	4 (11.12.11)	✓
1742909	95					BinaryInput							

If objects to be monitored are not loaded because the associated devices are not known because a network scan has possibly not yet been performed or the device list has been deleted, the objects are listed with the information known from the project backup (instance number of the object and of the device, and the object type).

Inst.-Nr.	Device	Device Name	Device Description	Device Location	Model Name	Object Type	Object Name	Object Description	Present Value	Letzte Änderung	COV	Anzahl der Aktualisierungen	Status
1	97536					Loop							✓
2	97536					BinaryOutput							✓
1	97536					Loop							✓
1	97536					AnalogInput							✓
1	97536					MultistateInput							✓
1	97536					BinaryOutput							✓
1	97536					AnalogOutput							✓
2	97536					AnalogInput							✓
2	97536					AnalogOutput							✓
2	97536					AnalogValue							✓
1	97536					MultistateInput							✓
2	97536					MultistateInput							✓
1712093	95					AnalogOutput							✓
1048591	95					AnalogOutput							✓
1712097	95					AnalogOutput							✓
1712101	95					AnalogOutput							✓
891549	95					AnalogOutput							✓
296315	95					AnalogOutput							✓
296307	95					AnalogOutput							✓
296367	95					AnalogOutput							✓
296339	95					AnalogOutput							✓
1712105	95					AnalogOutput							✓

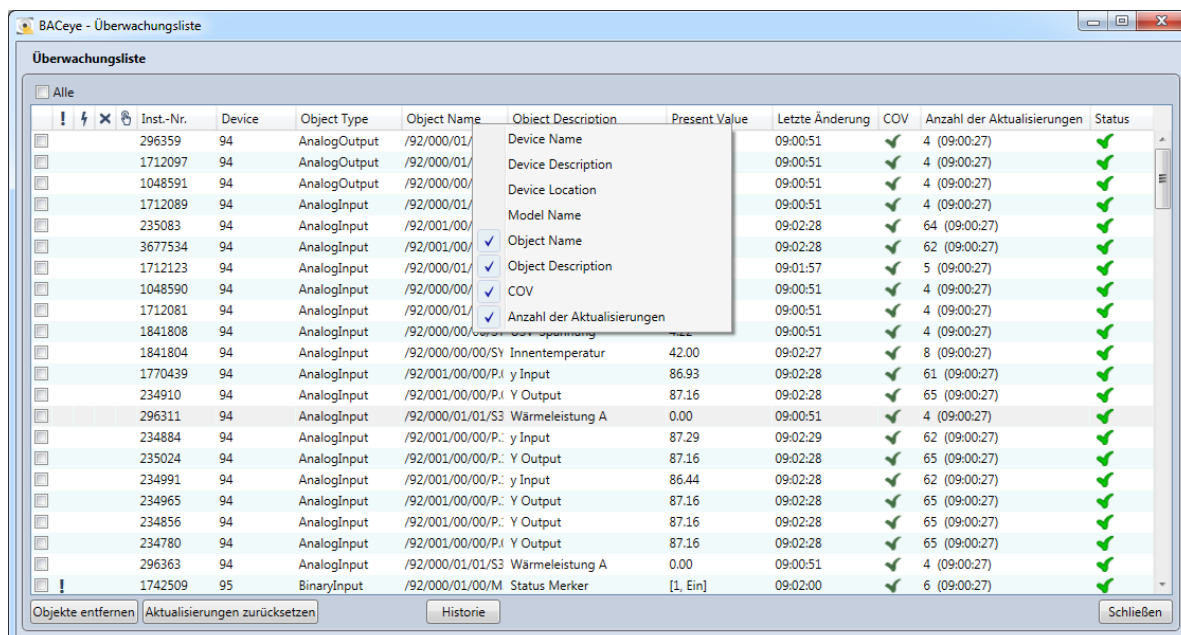
If a network scan is performed in this status and the objects to be monitored are then loaded, these are afterwards entered in the monitoring list and registered.

It is possible to configure the columns contained in the monitoring list. The context menu that can be called up in the list's header offers the possibility of deactivating and activating the display of certain fields. The columns with a ticked menu point are displayed. When one of these menu points is selected, the ticks disappear along

with the associated column, and they reappear when a new selection is made. This setting is part of the project backup and is kept until a new change is made. All columns are visible in the default setting.

The following columns can be selected

- Device Name
- Device Description
- Device Location
- Model Name
- Object Name
- Object Description
- COV
- Number of updates:



## DISPLAYING THE MONITORING HISTORY

Pressing the **<History>** button in the window of the monitoring list displays the "Monitoring list – History" dialog. This lists the monitoring history for all objects currently being monitored since the start of monitoring or since the last time the history was deleted.



The screenshot shows a software window titled "BACeye - Überwachungsliste - Historie". It contains a table with the following columns: Inst.-Nr., Device, Device Name, Device Description, Device Location, Model Name, Object Type, Object Name, Object Description, Present Value, Zeitstempel, COV, and Status. The table lists multiple entries for different devices and objects, including temperature sensors, light sensors, and door sensors, with their current values and timestamps.

Inst.-Nr.	Device	Device Name	Device Description	Device Location	Model Name	Object Type	Object Name	Object Description	Present Value	Zeitstempel	COV	Status
296359	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11:22:10.658		✓
296359	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11:22:13.396		✓
296359	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11:22:13.410		✗
296359	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11:22:13.419		✓
296359	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/01/53	Wärmemenge A	6002.00	11:22:13.419		✓
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11:22:11.973		✓
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11:22:13.454		✓
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11:22:13.454		✗
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11:22:13.467		✓
1712097	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/01/00/52	Y2 min	10.00	11:22:13.497		✓
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/00/00/51	Helligkeit	70.00	11:22:11.829		✓
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/00/00/51	Helligkeit	70.00	11:22:13.435		✓
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/00/00/51	Helligkeit	70.00	11:22:13.437		✗
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/00/00/51	Helligkeit	70.00	11:22:13.452		✓
1048591	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogOutput	/92/000/00/00/51	Helligkeit	70.00	11:22:13.452		✓
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11:22:11.948		✓
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11:22:13.309		✓
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11:22:13.315		✗
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11:22:13.328		✓
1712089	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/000/01/00/52	Klappe	20.00	11:22:13.328		✓
235083	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P:	Y Output	96.49	11:22:10.966		✓
235083	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P:	Y Output	96.49	11:22:10.241		✓
235083	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P:	Y Output	96.88	11:22:10.241		✓
235083	94	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogInput	/92/001/00/00/P:	Y Output	97.87	11:22:13.275		✗

If objects are re-registered for monitoring, their history is listed automatically. Conversely, as soon as the monitoring of objects is ended, their history is removed from the list.

An entry in the history is made every time a monitoring list entry is updated. When this occurs, the data from the monitoring is saved together with the update time stamp.

This data is

- Alarm Status (!)
- Fault Status (⚡)
- OutOfService Status (✗)
- Overridden Status (👤)
- Object Instance Number
- Device Instance Number
- Device Name
- Device Description
- Device Location
- Model Name
- Object Type
- Object Name
- Object Description
- Present Value
- Time stamp: In the format <hh:mm:ss:ms>
- COV : Value updating via COV (✓) or polled (✗)
- Status: Registration successful (✓) or not (!).

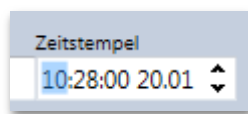
The number of entries in the history for each monitored object is limited. The maximum number is defined by the value "Max. number of history entries" in the BACeye communication settings. This is preset to 1000. The maximum number of entries in total is therefore the set value multiplied by the number of objects currently being monitored.

## Search

When text is entered in the <Search> field, a full text search is performed. The search refers to all columns containing text. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

## Filter

The <Filter> button can be used to show or hide a line with control elements that allow column-by-column filtering of the history. When the dialog is opened, the filter is active and the filter of the time stamp is set so that only entries from the last hour are displayed. The time limit can be controlled via the control element by direct entry or via the spin button. The time limit refers to the date and time (e.g.: 10.28 a.m., 20th Jan.). Deleting the entire contents of the control element cancels the time limit.

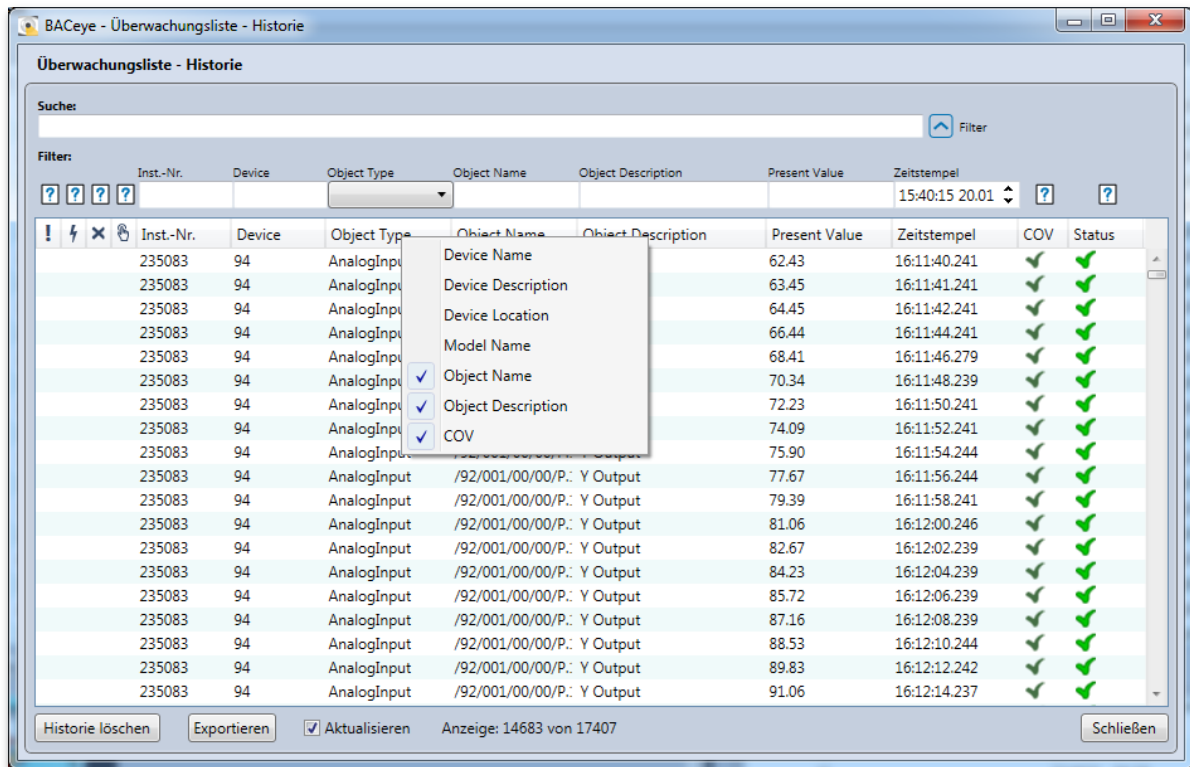


## History List

It is possible to configure the columns contained in the list display of the history. The context menu that can be called up in the list's header offers the possibility of deactivating and activating the display of certain fields. The columns with a ticked menu point are displayed. When one of these menu points is selected, the ticks disappear along with the associated column, and they reappear when a new selection is made. This setting is part of the project backup and is kept until a new change is made. All columns are visible in the default setting.

The following columns can be selected

- Device Name
- Device Description
- Device Location
- Model Name
- Object Name
- Object Description
- COV



### Delete history

The <Delete history> button deletes the entire history after confirmation.

### Export

The <Export> button enables the displayed history to be exported in CSV format.

### Update

The <Update> checkbox can be used to define whether the history display should be continuously updated or not. The updating is activated when the history is opened.

### Display

The field indicates how many entries the history contains. If these are not all listed because filtering and/or the lack of an update prevent this, the amount of entries listed from the total number is shown.

BACeye - Überwachungsliste - Historie

Überwachungsliste - Historie

Suchen

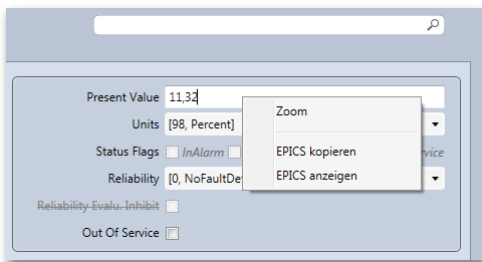
Filter

Inst.-Nr.	Device	Device Name	Device Description	Device Location	Model Name	Object Type	Object Name	Object Description	Present Value	Zeitstempel	COV	Status
2661606	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	MMM Fühler 1	0.00	11:21:39.751		✓
2661606	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	MMM Fühler 1	0.00	11:21:43.630		✓
2661606	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	MMM Fühler 1	0.00	11:21:43.714		✗
2661606	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	MMM Fühler 1	0.00	11:21:44.552		✓
2301023	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Q1	10.00	11:21:39.656		✓
2301023	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Q1	10.00	11:21:43.578		✓
2301023	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Q1	10.00	11:22:43.352		✗
2301023	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Q1	10.00	11:22:43.367		✓
1477794	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Tabelle X2	0.00	11:21:39.630		✓
1477794	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Tabelle X2	0.00	11:21:43.565		✓
1477794	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Tabelle X2	0.00	11:21:43.567		✗
1477794	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Tabelle X2	0.00	11:21:44.527		✓
1477794	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/01/53	Tabelle X2	0.00	11:21:44.528		✓
1048579	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	th	6.00	11:21:39.522		✓
1048579	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	th	6.00	11:21:43.495		✓
1048579	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	th	6.00	11:21:43.546		✗
1048579	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	th	6.00	11:21:44.519		✓
1048577	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	Regelgröße	0.00	11:21:39.481		✓
1048577	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	Regelgröße	0.00	11:21:43.490		✓
1048577	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	Regelgröße	0.00	11:21:43.493		✗
1048577	95	DDC4000_#92	BACnet Device		Kieback&Peter DDC4000	AnalogValue	/92/000/01/00/52	Regelgröße	0.00	11:21:44.505		✓

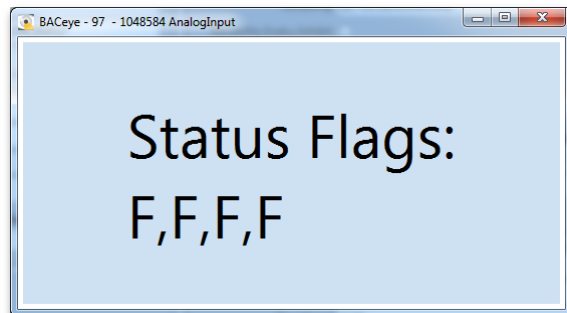
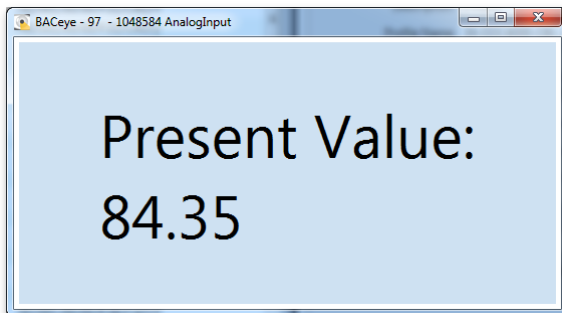
Historie löschen Exportieren Aktualisieren Anzeige: 2207 von 16344 Schließen

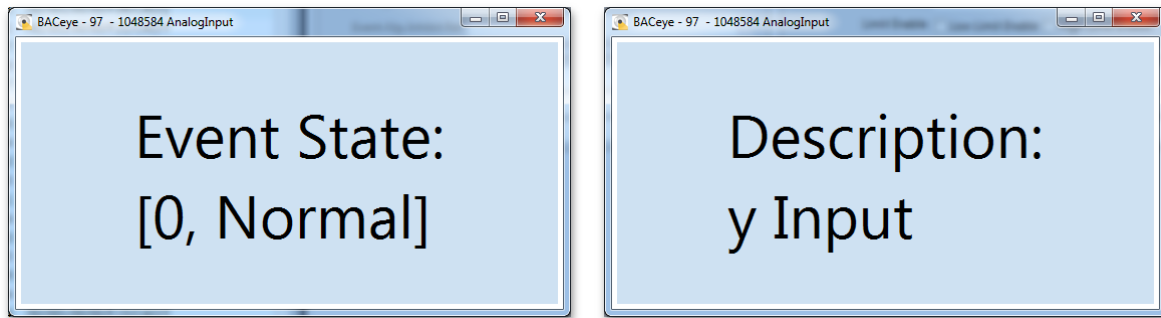
## ZOOM

One or more zoom windows can be called up in the detail window of each object for all detected properties. To do this, activate the context menu there in the area where the value is shown and run the menu point **<Zoom>**.



A window appears in which the designation and under that the current value of the property is displayed large. The device's instance number, followed by the instance number and type of the object, is shown in the title of the window. If the size of the window is changed, its contents are scaled accordingly.





The display of the property's value is updated in real time. The updating speed depends on the mechanism used to determine the value (COV or polling). If COV or COV-P is not supported for the value or if the use of COV in the network configuration is generally deactivated, the value is checked cyclically (polling). The cycle time corresponds to the value set in the communication settings under "Polling Interval Zoom".

Exceptions here are properties of objects that are already registered in the monitoring list (i.e. Present Value and/or Status Flags). If these are then displayed in zoom windows, the mechanism used in the monitoring list to determine values takes effect.

All currently opened zoom windows can be closed via the **<Windows><Close all zoom windows>** menu. The **<Windows><Display all zoom windows>** menu can be used to move to the foreground all currently open zoom windows if they are concealed by other windows. Each zoom window also gets its own menu point **<Window><BACeye - ...>** via which it can be moved deliberately into the foreground.

## 12. EDE and CSV export

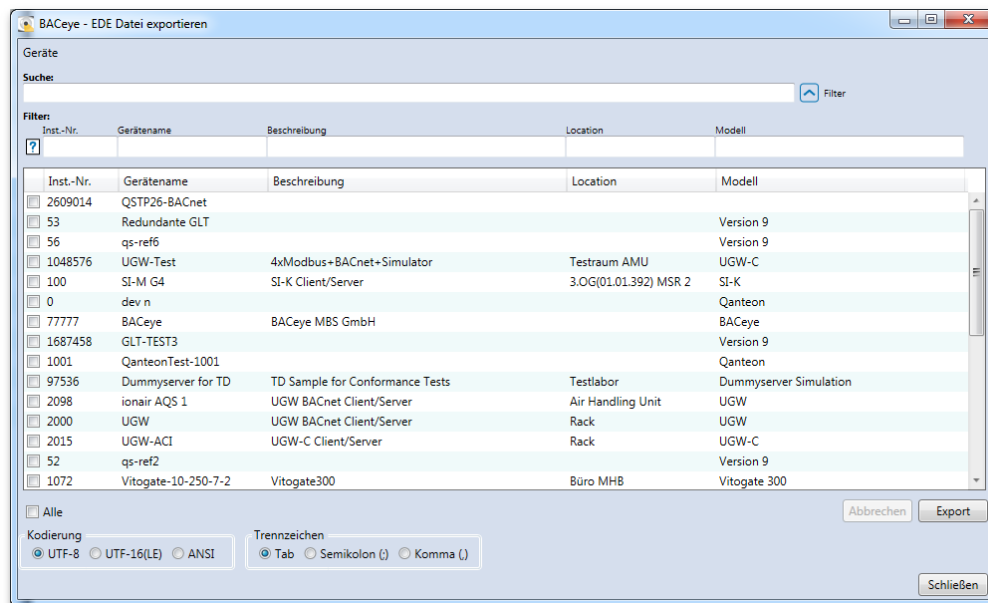
BACeye has functions for exporting BACnet data point lists in two different formats.

One is the EDE (Engineering Data Exchange) format, specified by the BACnet Interest Group Europe (BIG-EU). The other is the simple CSV (comma-separated values) format, which in terms of content can be adapted to user-specific requirements.

### CONFIGURING EDE EXPORT

The EDE export function is called up via the menu point <Data transfer><EDE Export ...>. The function can be called up as soon as devices have been detected by a network scan.

A dialog appears containing a list of the currently detected devices. Entries from devices whose detection has not yet been completed remain deactivated (greyed out) until this process has been completed.



The "Export EDE file" dialog contains the following control elements for configuring the EDE export:

#### Device selection

The list of detected devices offers the possibility of using the checkbox on the left to mark the devices whose data points should be exported. The <All> checkbox can be used to mark all devices or to cancel all markings.

The device selection can be sorted by clicking on the respective column heading.

#### Search

When text is entered in the <Search> field, a full text search is performed. The search refers to all columns. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

### **Filter**

The <Filter> button can be used to show a line with control elements that allow column-by-column filtering via the result list.

The filter remains active until the line is hidden again by pressing the button once more.

### **Coding**

The <Coding> selection defines which text coding is used for the EDE export. The last selection made is part of the project backup.

The following selections are available:

- UTF-8 (default)
- UTF-16 (Little Endian)
- ANSI (local code page)

### **Separator**

The <Separator> selection defines which separator is used to separate the values for the EDE export. The last selection made is part of the project backup.

The following selections are available:

- Tab (tabulator, default)
- Semicolon
- Comma

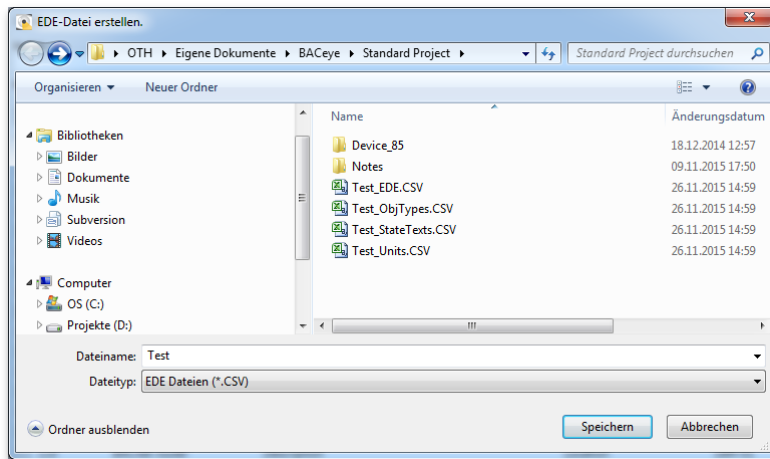
## **PERFORMING AN EDE EXPORT**

When the devices, coding and separator have been selected, the EDE export can be performed with the <Export> button.

First, the name of the export is obtained via a file selection dialog. Since the export consists of four files (in CSV format), the name is used in the following form to create the individual file names:

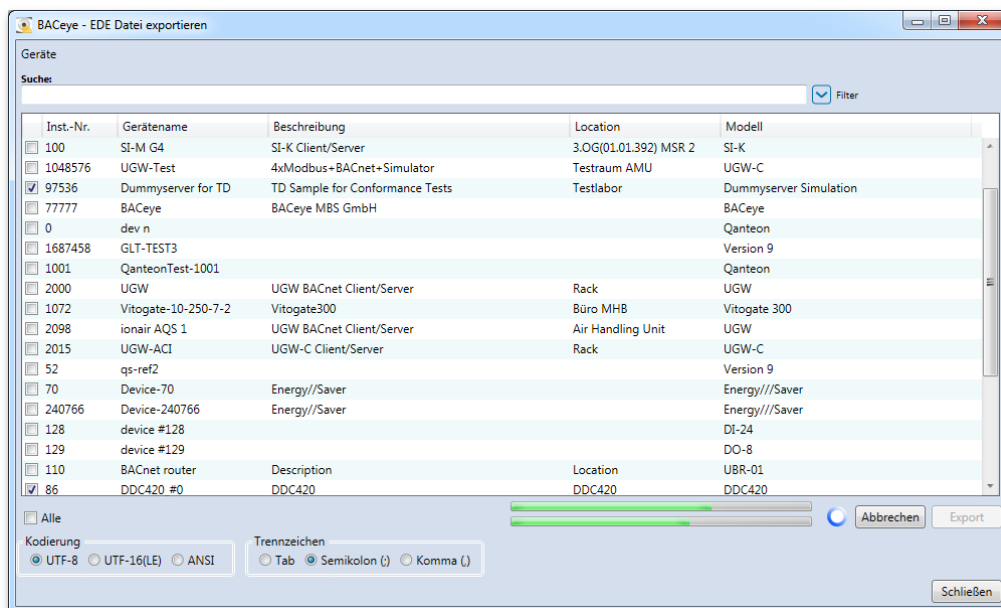
<Name>\_EDE.CSV  
<Name>\_ObjTypes.CSV  
<Name>\_StateTexts.CSV  
<Name>\_Units.CSV

If an existing EDE export is to be overwritten, it is sufficient to select one of the existing files of the old export. A confirmation check then appears to confirm whether the files really should be overwritten.

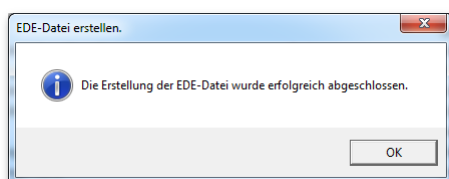


The export is started when the file selection is closed with the **<Save>** button.

The object lists of the devices are scanned one device at a time. This can take some time. The operation is accompanied by two progress bars. The top progress bar represents the overall progress. The bottom one shows the progress of the scan for each device's objects. The operation can be cancelled prematurely with the **<Cancel>** button.



Completion of the EDE export is indicated immediately.

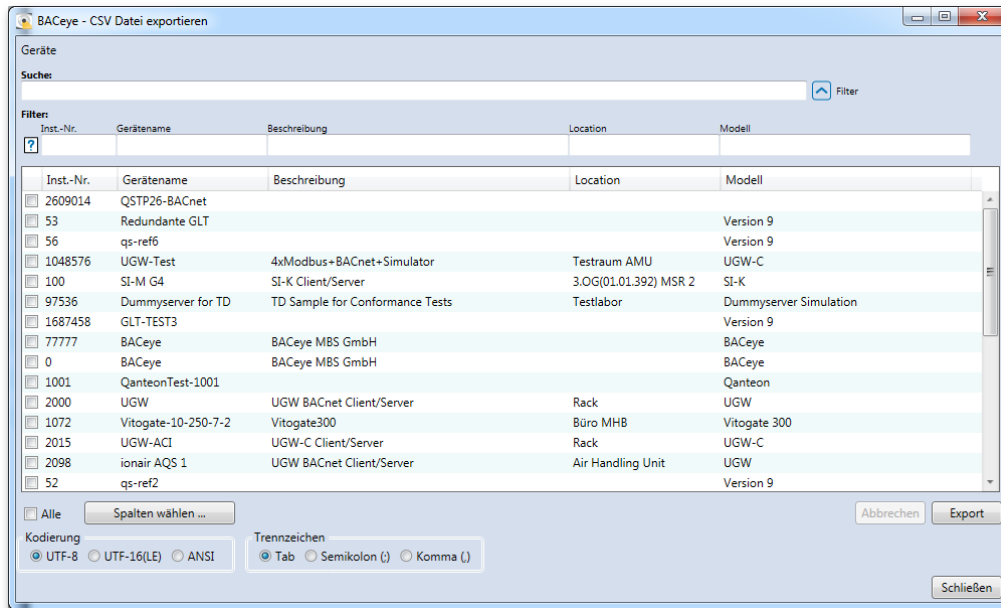




## CONFIGURING A CSV EXPORT

The CSV export function is called up via the menu point **<Data transfer><CSV Export ...>**. The function can be called up as soon as devices have been detected by a network scan.

A dialog appears containing a list of the currently detected devices. Entries from devices whose detection has not yet been completed remain deactivated (greyed out) until this process has been completed.



The "Export CSV file" dialog contains the following control elements for configuring the CSV export:

### Device selection

The list of detected devices offers the possibility of using the checkbox on the left to mark the devices whose data points should be exported. The **<All>** checkbox can be used to mark all devices or to cancel all markings.

The device selection can be sorted by clicking on the respective column heading.

### Search

When text is entered in the **<Search>** field, a full text search is performed. The search refers to all columns. Individual search terms are entered separated by spaces. If several terms are entered, the lines are shown to which ALL search terms apply.

### Filter

The **<Filter>** button can be used to show a line with control elements that allow column-by-column filtering via the result list.

The filter remains active until the line is hidden again by pressing the button once more.

### Coding

The **<Coding>** selection defines which text coding is used for the EDE export. The last selection made is part of the project backup.

The following selections are available:

- UTF-8 (default)
- UTF-16 (Little Endian)
- ANSI (local code page)

### Separator

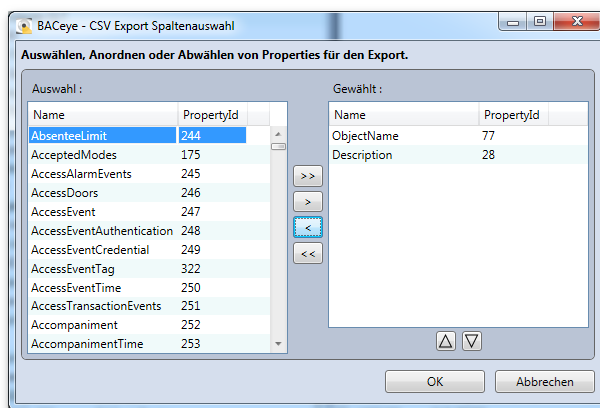
The **<Separator>** selection defines which separator is used to separate the values for the EDE export. The last selection made is part of the project backup.

The following selections are available:

- Tab (tabulator, default)
- Semicolon
- Comma

### Select columns

The **<Select columns ...>** button is used to open a dialog that allows configuration of the export's data content.



The **<Selection>** list on the left makes all BACnet properties of Revision 14 available for selection that are not in the **<Selected>** list on the right. The property selection can be sorted by name or property ID by clicking on the respective column heading.

The buttons in between enable either all **<">>">** or all selected **<">">** properties to be chosen from the selection on the left, or on the right all **<"<<">** or all selected **<"<">** properties to be deselected. Selected properties are appended at the end of the list on the right.

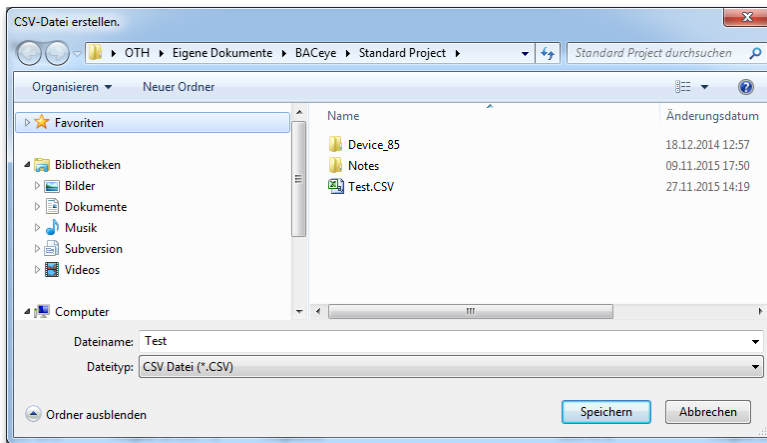
The columns for the values in the CSV are written according to the order of the properties selected here. To enable this order to be changed, below the list of selected properties there are two buttons with which the existing order can be changed. Each time the buttons are pressed, all selected properties in the list on the right are moved one position in the corresponding direction.

The **<OK>** button accepts the column configuration for the export. The column configuration of the CSV export is part of the project backup. Use of the properties ObjectName and Description in that order is set as the default.

## PERFORM CSV EXPORT

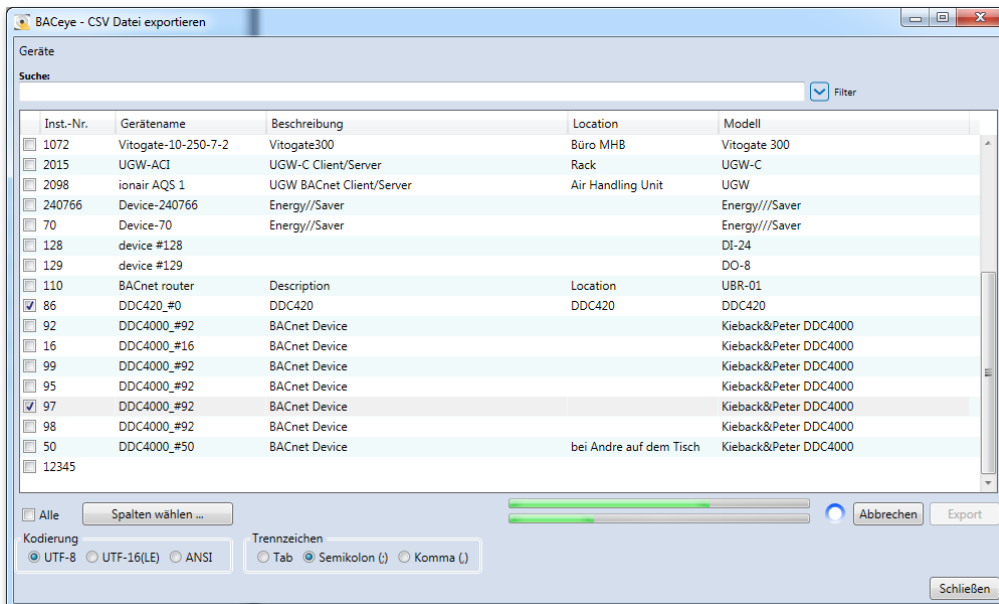
When the devices, columns, coding and separator have been selected, the CSV export can be performed with the <Export> button.

First, the name of the export is obtained via a file selection dialog.

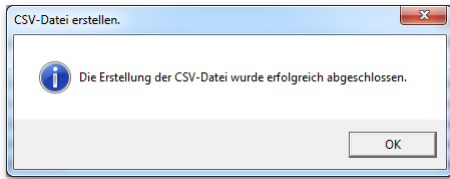


The export is started when the file selection is closed with the <Save> button.

The object lists of the devices are scanned one device at a time. This can take some time. The operation is accompanied by two progress bars. The top progress bar represents the overall progress. The bottom one shows the progress of the scan for device's objects. The operation can be cancelled prematurely with the <Cancel> button.



Completion of the CSV export is indicated immediately.



The content of the CSV export is as follows:

Line	
1	The separator used (sep=?).
2	The version of BACeye with which the file was created.
3	Compilation date.
4	Column name (# keyname, DeviceObjInstance, ...)
n	<p>Data point lines:</p> <p>Data points are listed device by device, with the information from the device object being in each first line.</p> <p>Each line always starts with the key name, comprised of the object type plus the object's instance number in brackets, followed by the device's instance number. This is followed by the property values, as configured.</p> <p>The following applies to column contents:</p> <ul style="list-style-type: none"> <li>- Complex data types are output in EPICS form.</li> <li>- Texts are set in quotation marks.</li> <li>- List types are output in the form "{value} =&gt; {name}".</li> <li>- For floating point values, the dot is the decimal character.</li> </ul>

CSV export as text:

```

sep=
VERSION_OF_BACEYE:2.0.0.31|
DATE_OF_CREATION:30.11.2015
# keyname;DeviceObjInstance;ObjectName;Description;PresentValue;units
"Device(97536)":97536;"dummyserver for TD";"TD Sample for Conformance Tests";;
"LightingOutput(2)":97536;"Lighting Output 2 writable";"Description Lighting W";50.00;
"LightingOutput(1)":97536;"Lighting Output 1";"Description Lighting";50.00;
"Channel(2)":97536;"Channel 2 writable";"Description Channel W";"[0] NULL";;
"Channel(1)":97536;"Channel 1";"Description Channel";"[2] 15";;
"AlertEnrollment(2)":97536;"Alert Enrollment 2 writable";"Description Alert Enrollment W";"{AnalogOutput,1}";;
"AlertEnrollment(1)":97536;"Alert Enrollment 1";"Description Alert Enrollment";"{AnalogOutput,1}";;
"NotificationForwarder(2)":97536;"Notification Forwarder 2 writable";"Description Notification Forwarder W";;
"NotificationForwarder(1)":97536;"Notification Forwarder 1";"Description Notification Forwarder";;
"TimeValue(2)":97536;"Time Value 2 writable";"Some Description";"12:34:56.77";;
"TimeValue(1)":97536;"Time value 1";"Some Description";"12:34:56.77";;
"TimePatternValue(2)":97536;"Time Pattern Value 2 writable";"Some Description";"12:*:*.*";;
"TimePatternValue(1)":97536;"Time Pattern Value 1";"Some Description";"12:*:*.*";;
"PositiveIntegerValue(2)":97536;"Positive Integer Value 2 writable";"Some Description";"123456789;"95 => Nounits";;
"PositiveIntegerValue(1)":97536;"Positive Integer value 1";"Some Description";"123456789;"95 => Nounits";;
"OctetstringValue(2)":97536;"Octetstring value 2";"Some Description";"[6] 0x011b310589";;
"OctetstringValue(1)":97536;"Octetstring value 1";"Some Description";"[6] 0x011b310589";;
"LargeAnalogValue(2)":97536;"Large Analog Value 2";"Some Description";"123456.79;"62 => DegreesC";;
"LargeAnalogValue(1)":97536;"Large Analog Value 1";"Some Description";"123456.79;"62 => DegreesC";;
"IntegerValue(2)":97536;"Integer Value 2 writable";"Some Description";"-1238;"98 => Percent";;
"IntegerValue(1)":97536;"Integer Value 1";"Some Description";"-1238;"98 => Percent";;
"DateTimeValue(2)":97536;"Datetime value 2";"Some Description";"11.11.2011 Freitag / 11:11:11.11";;
"DateTimeValue(1)":97536;"Datetime value 1";"Some Description";"11.11.2011 Freitag / 11:11:11.11";;

```

CSV export in tabular form:

VERSION OF BACEYE	2.0.0.31				
DATE OF CREATION	30.11.2015				
#keyname	DeviceObjInstance	ObjectName	Description	PresentValue	Units
Device(97536)	97536	Dummyserver for TD	TD Sample for Conformance Tests		
LightingOutput(2)	97536	Lighting Output 2 writable	Description Lighting W	50.00	
LightingOutput(1)	97536	Lighting Output 1	Description Lighting	50.00	
Channel(2)	97536	Channel 2 writable	Description Channel W	[0] NULL	
Channel(1)	97536	Channel 1	Description Channel	[2] 15	
AlertEnrollment(2)	97536	Alert Enrollment 2 writable	Description Alert Enrollment W	(AnalogOutput,1)	
AlertEnrollment(1)	97536	Alert Enrollment 1	Description Alert Enrollment	(AnalogOutput,1)	
NotificationForwarder(2)	97536	Notification Forwarder 2 writable	Description Notification Forwarder W		
NotificationForwarder(1)	97536	Notification Forwarder 1	Description Notification Forwarder		
TimeValue(2)	97536	Time Value 2 writable	Some Description	12:34:56.77	
TimeValue(1)	97536	Time Value 1	Some Description	12:34:56.77	
TimePatternValue(2)	97536	Time Pattern Value 2 writable	Some Description	12:*.*.*	
TimePatternValue(1)	97536	Time Pattern Value 1	Some Description	12:*.*.*	
PositiveIntegerValue(2)	97536	Positive Integer Value 2 writable	Some Description		123456789 95 => NoUnits
PositiveIntegerValue(1)	97536	Positive Integer Value 1	Some Description		123456789 95 => NoUnits
OctetstringValue(2)	97536	Octetstring Value 2	Some Description	[6] 0x011b310589	
OctetstringValue(1)	97536	Octetstring Value 1	Some Description	[6] 0x011b310589	
LargeAnalogValue(2)	97536	Large Analog Value 2	Some Description	123456.79	62 => DegreesC
LargeAnalogValue(1)	97536	Large Analog Value 1	Some Description	123456.79	62 => DegreesC
IntegerValue(2)	97536	Integer Value 2 writable	Some Description		-1238 98 => Percent
IntegerValue(1)	97536	Integer Value 1	Some Description		-1238 98 => Percent
DatetimeValue(2)	97536	Datetime Value 2	Some Description	11.11.2011 Freitag / 11:11:11.11	
DatetimeValue(1)	97536	Datetime Value 1	Some Description	11.11.2011 Freitag / 11:11:11.11	

## 13. Diagnosis

BACeye offers the possibility of making recordings of the network communication for diagnosis purposes.

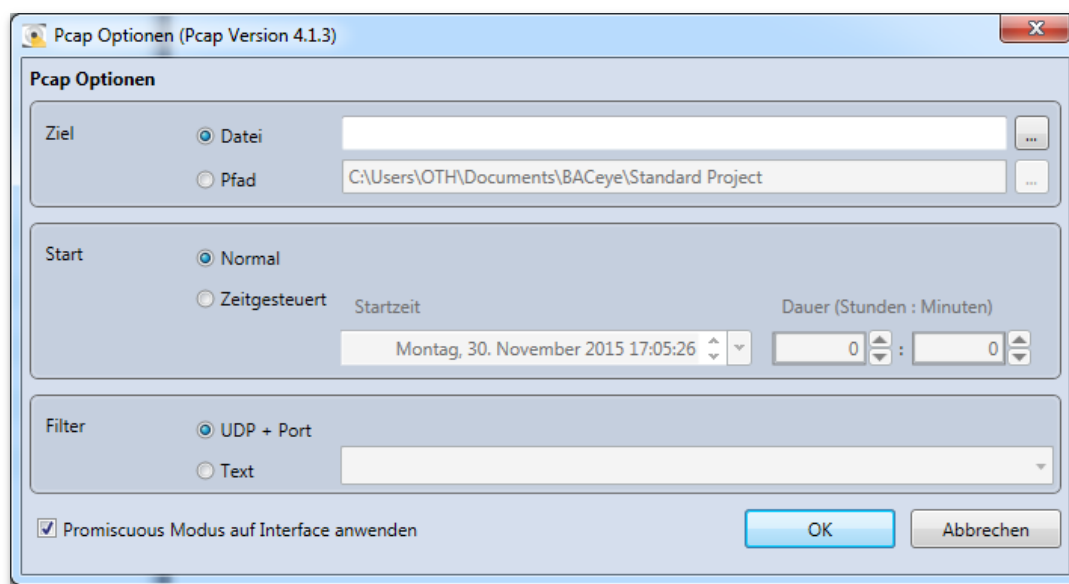
The tool that BACeye uses for this is WinPcap ([www.winpcap.org](http://www.winpcap.org)). The BACeye setup offers the option to also install WinPcap.

**ATTENTION:** The possibility of recording network communication depends on the respective security guidelines at the place of use. For information about this, please contact the person responsible at the company.

The functions described below are only available if WinPcap is installed.

### PCAP OPTIONS

The menu point **<Diagnosis><Pcap><Options>** is used to call up a dialog that allows settings relevant to running WinPcap to be made. All settings made in this dialog are part of the project backup.



The dialog shows in the title the currently installed version of WinPcap.

#### Destination

The options **<File>** or **<Path>** are for defining the memory location for the network recordings

**File:** An actual destination file (\*.pcap) for the network recording can be defined via the file selection dialog by using the **< ... >** button. All network recordings are then written to this file, whereby an existing file is overwritten every time a new network recording starts. If no file is defined, the destination file is requested via the file selection dialog every time a network recording starts. This is the default setting.

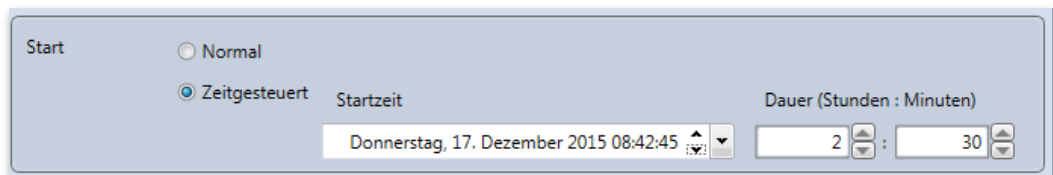
**Path:** A destination folder for saving the network recordings can be defined via the folder selection dialog by using the < ... > button. The current standard project path of BACeye is preset here. The file names are generated automatically with the aid of the current system time. This means that when the system time is 26.10.2015 09:35:46.860, a file name 20151026\_093546\_860.pcap is issued. This ensures that a new file is created every time a network recording starts.

### Start

A choice of <Normal> or <Time-controlled> is available as the start option.

**Normal:** A network recording is started via the menu point <Diagnosis><Pcap><Start>. This is the standard setting.

**Time-controlled:** A network recording starts at a defined time (max. +25 days) and is of a defined duration (max. 23 hours + 59 minutes).



The screenshot shows a dialog box titled "Start". It contains two radio buttons: "Normal" (unselected) and "Zeitgesteuert" (selected). Below "Zeitgesteuert", there are two fields: "Startzeit" with a dropdown menu showing "Donnerstag, 17. Dezember 2015 08:42:45" and "Dauer (Stunden : Minuten)" with two spinners showing "2" and "30".

Time control requires an actual file or a folder to be configured as the destination. If BACeye is not run at the defined time or if a network recording started in the normal way is running at this time, the start does not take place.

### Filter

<UDP + Port> or <Text> are available as filter options.

**UDP + Port:** The filtering is done on UDP (User Datagram Protocol) and the port number set in the communication settings under "UDP Port". This is the default setting.

**Text:** Allows the free entry of filters in BPF (Berkeley Packet Filter) syntax. The last 10 filters used are marked and are available for selection via the combo-box. Leave the field blank if no filter is to be used.



The screenshot shows a dialog box titled "Filter". It contains two radio buttons: "UDP + Port" (unselected) and "Text" (selected). Below "Text", there is a text input field containing the text "udp port 47825".

A description of the BPF syntax can be found at [www.winpcap.org/docs](http://www.winpcap.org/docs) under "The WinPcap manual and tutorial..." in the "WinPcap user's manual" in the section "Filtering expression syntax".

### Promiscuous mode

Via the <Apply Promiscuous mode to interface> checkbox, Pcap is given the ability to read the entire incoming data traffic at the network interface set up in this mode. This option is activated in the standard setting.

## RUN PCAP

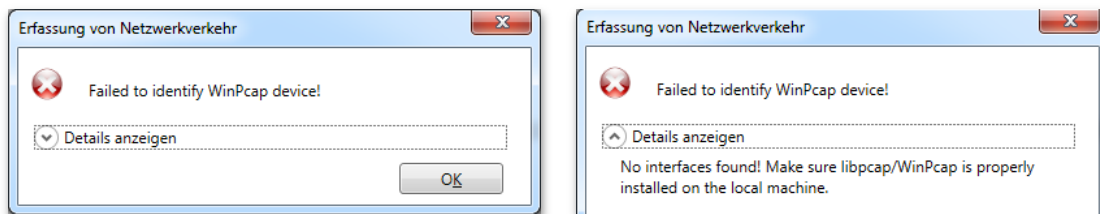
A network recording can be started via the menu point *<Diagnosis><Pcap><Start>*.

If "File" is selected as the destination in the Pcap options but if no file is specified, the destination file is now scanned for this network recording via the file selection dialog. If a destination file is defined in the options and if it already exists, the user is asked whether this file may be overwritten.

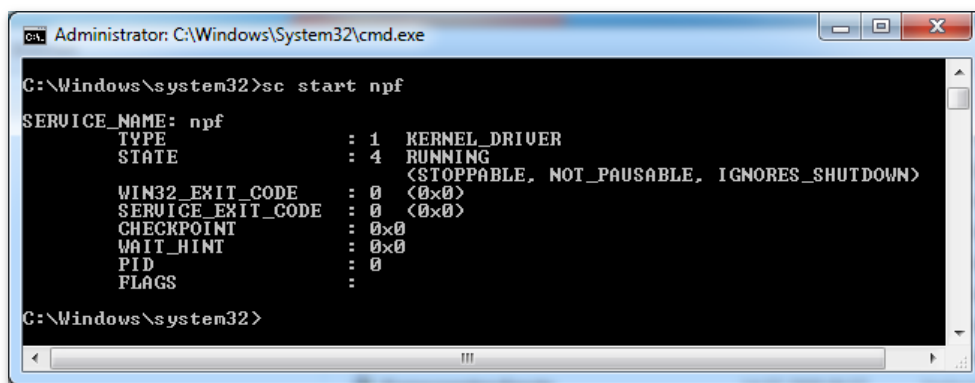
As soon as the network recording is running, it can be ended again via the menu point *<Diagnosis><Pcap><Stop>*. This also applies if the network recording was automatically started with time control.

Network recordings made in this way can be read and analysed via tools such as Wireshark ([www.wireshark.org](http://www.wireshark.org)).

If the NPF (NetGroup packet filter) driver is not run at the time when a network recording starts, the following error message appears.



When Pcap is installed, it is possible to determine whether the NPF driver should be started automatically. If not, it must be started manually before the start of a network recording. This requires the command line entry to be called up as Administrator and then run the command "sc start npf" in it.



The driver can be ended again later via "sc stop npf".

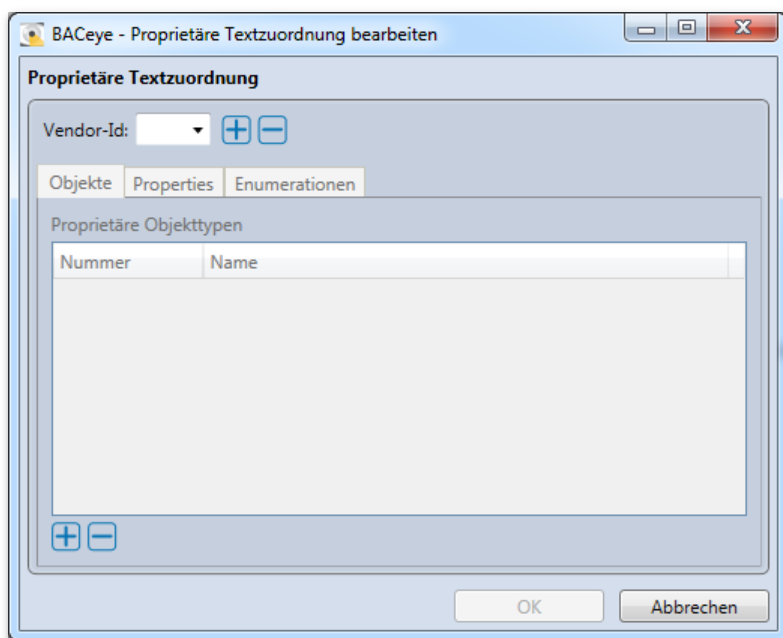


## 14. Proprietary text assignment

The "Proprietary text assignment" function enables BACeye to name proprietary object types, properties and enumerations.

Proprietary object and properties are manufacturer-specific extensions. The number range reserved for proprietary object types extends from 128 to 1024, and that of the proprietary properties ID extends from 512 to 4194303 (hex. 3FFFFFFF). In BACeye, the proprietary object types and properties are designated as standard in the form "proprietary <number or ID>". This designation can be defined via the proprietary text assignment.

The proprietary text assignment is configured via the menu point **<Edit><Proprietary text assignment>**. An "Edit proprietary text assignment" dialog is called up that initially appears as follows.






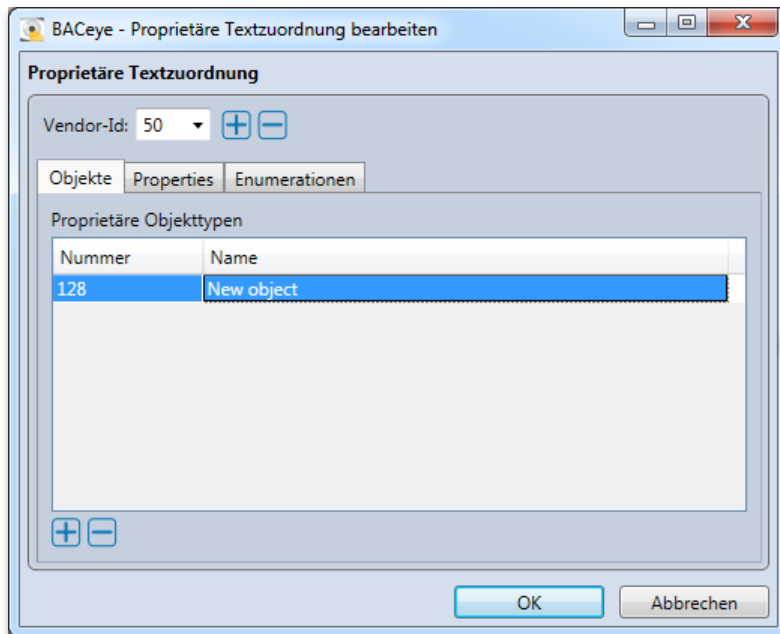
The **<OK>** button is used to save changes. The button is active as soon as the user has made a change. **<Cancel>** rejects changes. An appropriate warning notice is issued in this case.

### Vendor ID

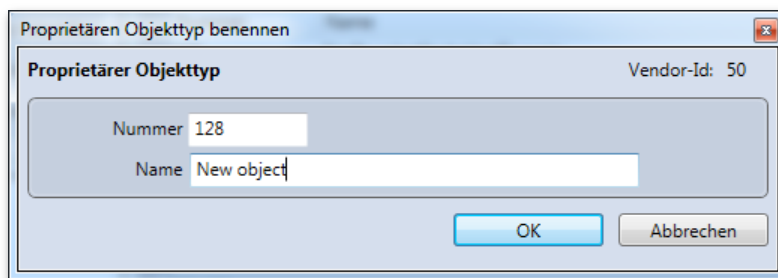
The manufacturer's unique identification number must be entered in the "Vendor ID" field. This can be found in the detail view of a device object in the "Vendor Identifier" field. The **+** button to the right of the field is used to add the entered Vendor ID to the list of known IDs. This is then located in the selection of the field and associated data can be entered in the tab control underneath. The tab control contains tabs for managing the text assignments of proprietary object types, properties and enumerations with regard to the respective selected Vendor ID. A selected vendor ID and the associated data can be deleted again after confirmation by using the **-** button.

## NAMING PROPRIETARY OBJECT TYPES

The list of text assignments of proprietary object types is managed under the "Objects" tab. The  and  buttons can be used to add new entries to the list or to delete existing ones. To delete, select the entries to be deleted in the list and confirm the safety question after pressing the  button. Alternatively, *<Delete selected text assignments>* can be run via the context menu. Double clicking on an entry calls it up for editing.



To create or edit the text assignment of a proprietary object type, a "Name proprietary object type" dialog is opened that enables the object type number and the name to be used for this type to be entered.

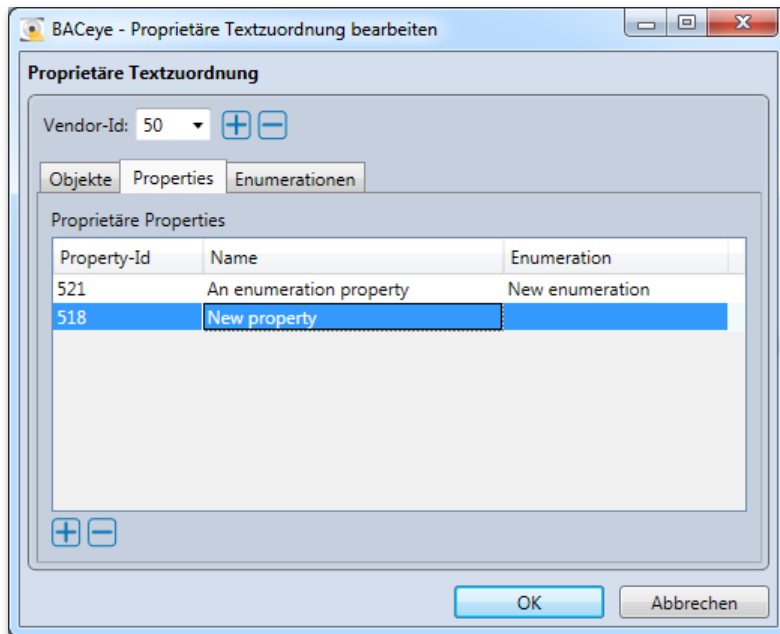


Confirming the entry with *<OK>* validates that

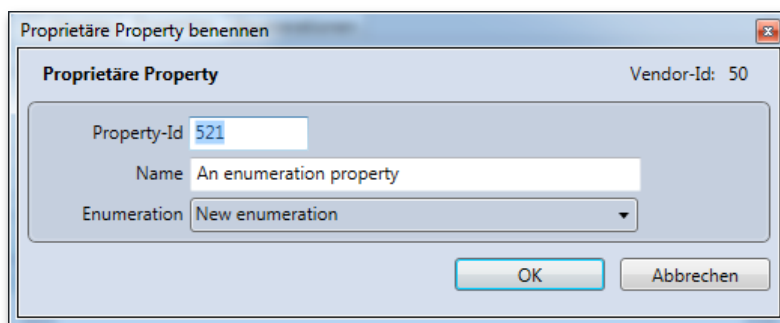
- the number is unique, in other words is not already taken by another name.
- the number has a valid value in the range of 55 to 1024. The first unused value in the standard was set as the lower limit, rather than 128.
- the name is not blank or contains only spaces.
- the name has not already been issued.

## NAMING PROPRIETARY PROPERTIES

The list of text assignments of proprietary properties is managed under the "Properties" tab. The **+** and **-** buttons can be used to add new entries to the list or to delete existing ones. To delete, select the entries to be deleted in the list and confirm this after pressing the **-** button. Alternatively, *<Delete selected text assignments>* can be run via the context menu. Double clicking on an entry calls it up for editing.






To create or edit the text assignment of a proprietary property, a "Name proprietary property" dialog is opened that enables the property's ID and the name to be used for this property to be entered. If the property has an Enum type, a corresponding named enumeration can be assigned as an option.

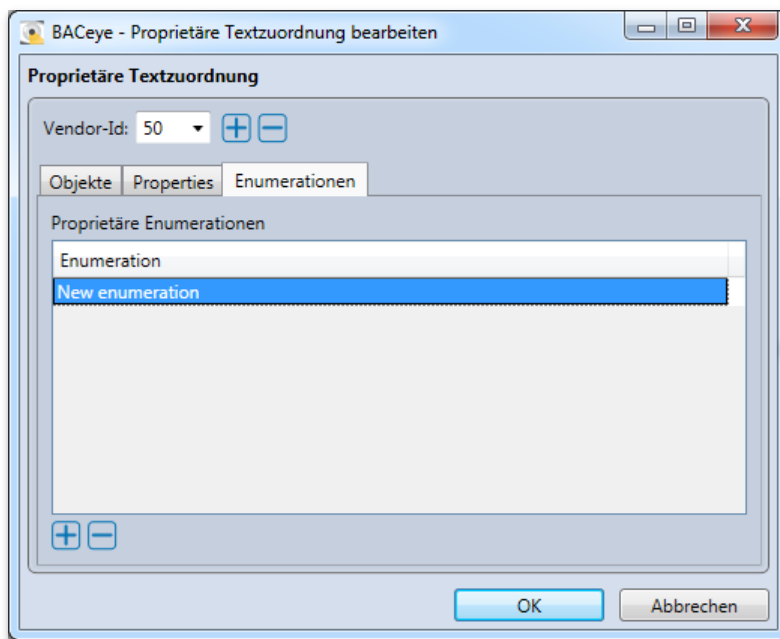






Confirming the entry with **<OK>** validates that

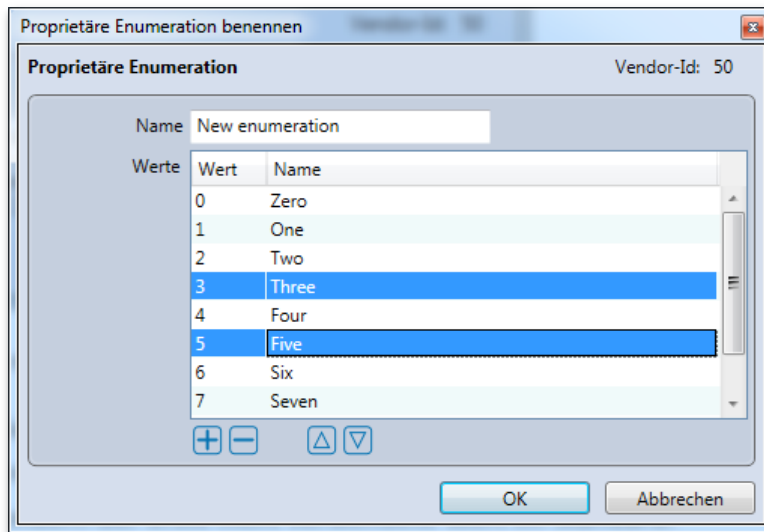
- the property ID is unique, in other words is not already taken by another name.
- the property ID has a valid value in the range of 387 to 4194303. The first unused value in the standard was set as the lower limit, rather than 512.
- the name is not blank or contains only spaces.
- the name has not already been issued.

## NAMING PROPRIETARY ENUMERATIONS

The list of text assignments of proprietary enumerations is managed under the "Enumerations" tab. The  and  buttons can be used to add new entries to the list or to delete existing ones. To delete, select the entries to be deleted in the list and confirm this after pressing the  button. Alternatively, *<Delete selected text assignments>* can be run via the context menu. No deletion is performed as long as one of the selected enumerations is being used by a property. A corresponding message appears for this. Double clicking on an entry calls it up for editing.



To create or edit the text assignment of a proprietary enumeration, a "Name proprietary enumeration" dialog is opened that enables the name to be entered and the list of the enumeration values to be edited. The  and  buttons can be used to add new values there or to remove selected ones. Deleting is also possible with the <Del> key on the keyboard. The values of the enumeration are assigned consecutively, starting with 0. The designation of the associated value can be edited by clicking twice on a field in the "name" column. The  and  buttons can be used to move the names of selected entries in the list in the direction of the arrow.



Confirming the entry with **<OK>** validates that

- the name is not blank or contains only spaces.
- the name has not already been issued.
- all values are named.