User manual

AEToolbox

GB

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1 User guidance

This user manual contains a summary of the information needed for commissioning and operation. Read the user manual entirely and do not use the product unless you have understood its content.

1.1 Target group

The user manual is intended for skilled technicians and trained and certified operating personnel. The contents of this user manual must be accessible to people tasked with the installation and operation of the software.

1.2 Warnings

Structure of the warnings
Warnings are structured as follows:

⚠ SIGNAL WORD!	**Nature and source of the danger.** Consequences if instructions are not obeyed. ➲ Actions to avoid the danger.

Types of warnings
Warnings are distinguished by the type of danger they are warning against:

⚠ DANGER!	Warns of an immediately impending danger that can result in death or serious injuries when not avoided.

⚠ WARNING!	Warns of a potentially dangerous situation that can result in death or serious injuries when not avoided.

⚠ CAUTION!	Warns of a potentially dangerous situation that can result in fairly serious or light injuries when not avoided.

NOTICE!	Warns of a potentially dangerous situation that results in material or environmental damage when not avoided.

1.3 Tips

Tips on the appropriate use of the device or software and recommendations.

1.4 Other symbols

Instructions

Structure of the instructions:

- Instructions for an action.
  - Indication of an outcome, if necessary.

Lists

Structure of unnumbered lists:

- List level 1
  - List level 1

Structure of numbered lists:

1) List level 1
2) List level 1
   1. List level 2
   2. List level 2

1.5 Applicable documentation

For the safe and correct use of the AETToolbox Software, observe the additional documentation that is delivered with the system, as well as the relevant standards and laws.

1.6 Storage

Store the user manual, including the supplied documentation, readily accessible near the system.

2 Safety information

Safety information relating to work with AEToolbox:

⚠ **CAUTION!**	Read the user manual carefully before you use AEToolbox. AEToolbox has a multitude of functions, even though the user interface appears rather simple. You can only use the software to its full extent if you have a comprehensive understanding of all the features, as well as mouse and keyboard commands.

⚠ **CAUTION!**	Back up all your data before you use AEToolbox. If you are not completely familiar with the software's mode of operation and/or in order to prevent unexpected results when it is used, please make a backup of your data beforehand. Or use formatted, empty data media at first.

⚠ **CAUTION!**	Only operate AEToolbox on computers with adequate computing power and a supported operating system. Instructions about the right hardware and software can be found under the topic Hardware and software requirements 10.

Safety information relating to work with devices which AEToolbox supports:

- Observe the user manual for the device.
- Always store the device's user manual near the device.
- Ensure that the device is only operated in fault-free condition.
- Ensure that only qualified personnel operate the device.
- Only connect the device according to regulations.
- Ensure that the device is not operated in a way that exceeds its rated values.
- Do not operate the device in environments in which explosive gases, dust or vapours may be found.
- Ensure that protective coverings are in place and are functioning properly.
- Ensure that the five safety rules according to DIN VDE 0105 are always observed.
- Only clean the device using commercially available cleansers.

3 Introduction

This section provides general information on AEToolbox, current hardware and software requirements as well as a short manual for a quick start.

3.1 What is AEToolbox?

AEToolbox is a software for technical personnel in high voltage technology facilities. It supports devices in the *REGSys* and *EORSys* product groups manufactured by *A. Eberle GmbH & Co. KG*. The devices can be configured with the help of the software. AEToolbox also makes it possible to read historical measurement values and log files out of the devices and display them graphically. AEToolbox also has an Online function, with the help of which device-specific measurement and operation values can be remotely requested and displayed.
There are no restrictions in AEToolbox regarding the quantity of devices that are set up. Accordingly, it is possible to administer multiple devices of the respective *A. Eberle GmbH & Co. KG product groups* in one project.
Through the connection using a *TBoxServer* installed along with the application it is possible to access end devices which are connected serially to other PCs in the network.

3.2 Hardware and software requirements

Hardware requirements (minimum)

- Intel or AMD Dual Core CPU
- Graphic card with 1GB RAM minimum, screen resolution 1280 x 800 or higher recommended
- 8 GB RAM
- Network connection 100 MBit/s
- Serial adapter cable (USB-RS232, brand FTDI Chip or MOXA)

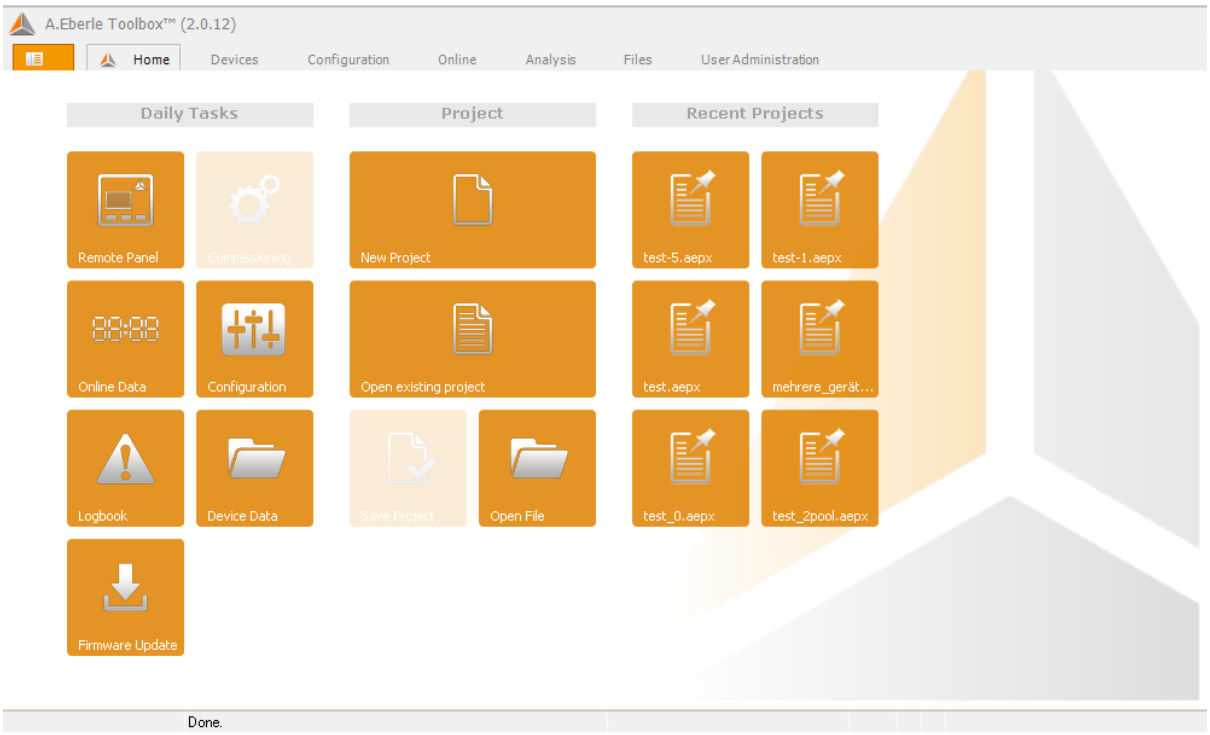
Supported operating systems

- Microsoft® Windows® 10 (64-bit*)

*The application runs in 32-bit mode on a 64-bit operating system.

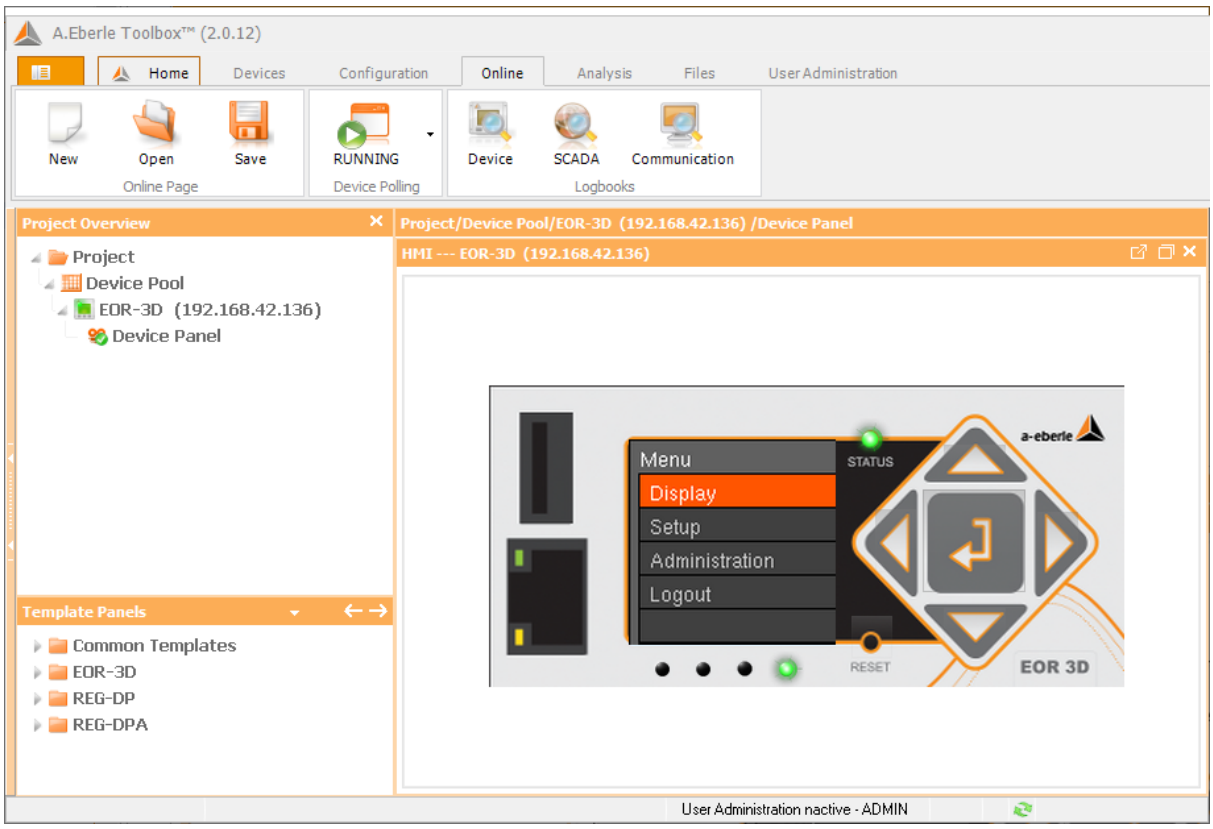
3.3 First steps

This section explains the quickest way to get started with AEToolbox.
After the program initialises, the start screen of AEToolbox appears in tablet mode, which contains the main functions at a glance.



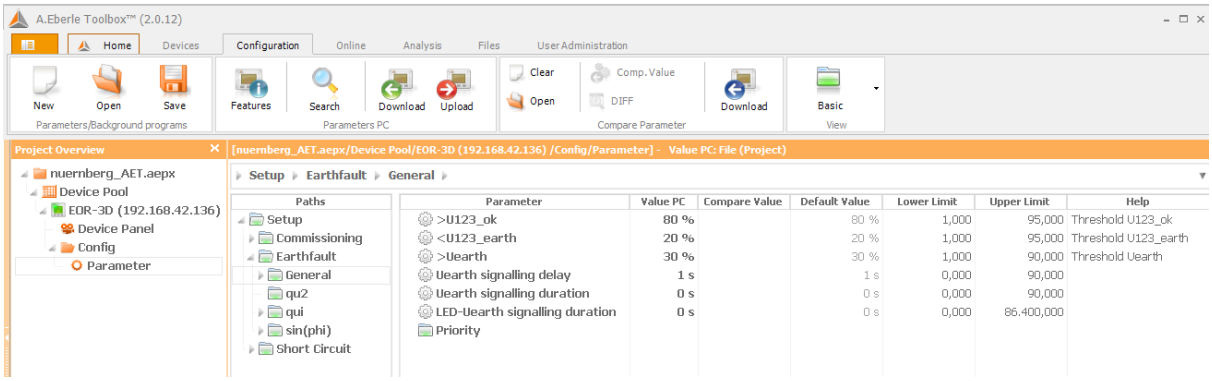
1) Establish a connection to a device to check its current status
Once it is certain that the device is physically connected to the PC (e.g. via TCP/IP), AEToolbox can initiate connection set up. The quickest way to get started is to use the *Remote panel* icon.

The input of the necessary connection data is carried out in four steps with the help of the so-called *connection wizard*[103]. After a connection to the device is successfully established, AEToolbox switches to the *online* view, where the virtual front control panel is displayed.



2) Device configuration
To display the parameter set of the device in the factory settings, switch from the *online* view to the *configuration* view. Click in the upper panel on the *Configuration* tab.
The device-type-dependent parameter set in the factory settings is loaded and placed in the project overview in the *Config* folder of the device. Clicking on individual paths of the loaded

parameter file causes their data with default values and limit values to be displayed. Editing the parameter values is possible in the *PC value* column.



If necessary, the parameter file can be saved on your PC. Mark the file in the project overview and click on the *Save* button.

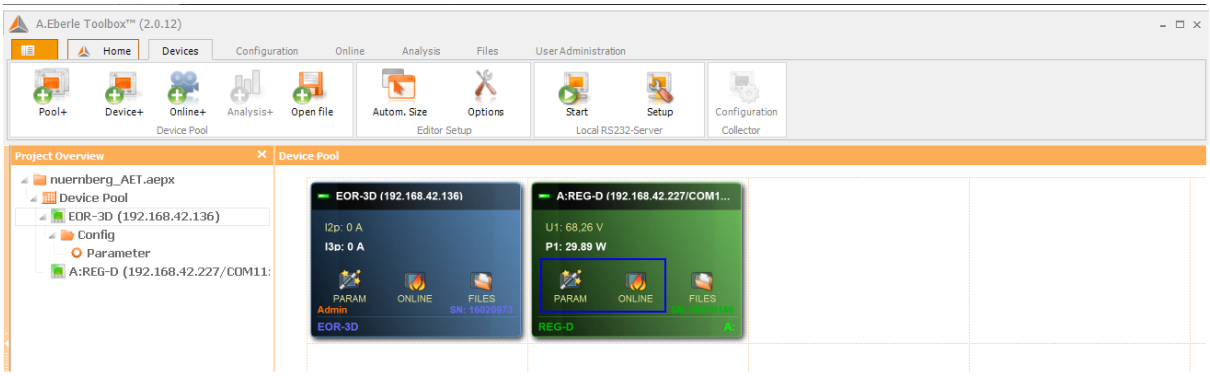
To be able to use external parameter sets for device configuration, click the *Open* button in the *configuration* view and select the parameter file saved on your PC with the file extension *.aedx.*

The parameter file will be placed in a new *Config_1* folder in the project and is ready for further editing and a subsequent new parametrisation of the device.
Other AEToolbox functions are explained in detail in the *Configuration* 36 section.

3) Add more devices

To set up more devices in the open project/in the current *device pool*, first switch to the *device* view. Click in the upper panel on the *Devices* tab and then on the *Device+* button.

Once the necessary connection data has been entered in the *connection wizard,* 103 the device will be set up in the project overview. The *device* view now displays two *device widgets* 32 in the *device pool*. To display the device panel or the parameter set of the newly set up device, mark the device in the project overview and then click the *Online* or the *Configuration* tab. Alternatively, these functions can also be called up directly using the *ONLINE* or *PARAM* icons on the *device widget*.
Further device-setup options can be found in the *Device toolbar with functions* 25 .



4) Other AEToolbox functions

AEToolbox offers many functions for the following subject-related work areas:

- Working with devices: Monitoring, configuration, firmware update (see *Device*[25], *Configuration*[36] , Firmware update[118] sections);
- Monitoring measurement and process values with control commands for the device panel, terminal, set-value switching (see *Online*[61] section);
- Analysis of historical device data: Display and evaluation (see *Analysis*[176] section);
- Replacing device files: Record, *SCADA*, log, config, *LUA*, service and statistics files (see *Files*[87] section);
- Administration of user roles (see *User administration*[94] section).

5) Save project

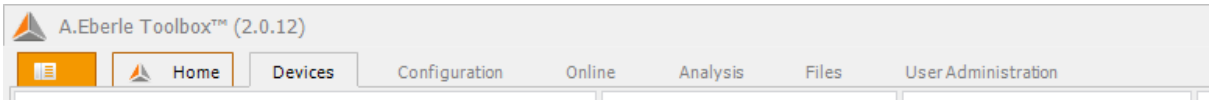
The currently generated project, along with any devices that were set up and parameter sets, and all its changes and its related views can be saved locally. Click the *Main menu* tab and then the *Save as* button and select the target path on your PC, where you want to place the *(.aepx)* project file.

NOTE!	When establishing a connection to an *EORSys* device with an authorisation concept, you will be prompted to enter the user name and password. The access privileges may change depending on the role assigned on the device and especially limit the AEToolbox upload and download functions. On devices without an authorisation concept the user has administrator privileges and can therefore carry out uploads and downloads with AEToolbox to the full extent (see *User administration*[94] section).

4 Program module

AEToolbox has a modular structure. The multitude of functions and features is thematically grouped in modules according to work area, each with its own graphic user view.
These are the control module *(Main menu)*, operator module *(Home)* as well as section modules for individual work areas *(Devices, Configuration, Online, Analysis, File, User administration)*.

The program and section modules are positioned in the upper panel of the application as individual tabs.



Description of the program modules
Please refer to the following table for a description and classification of the modules.

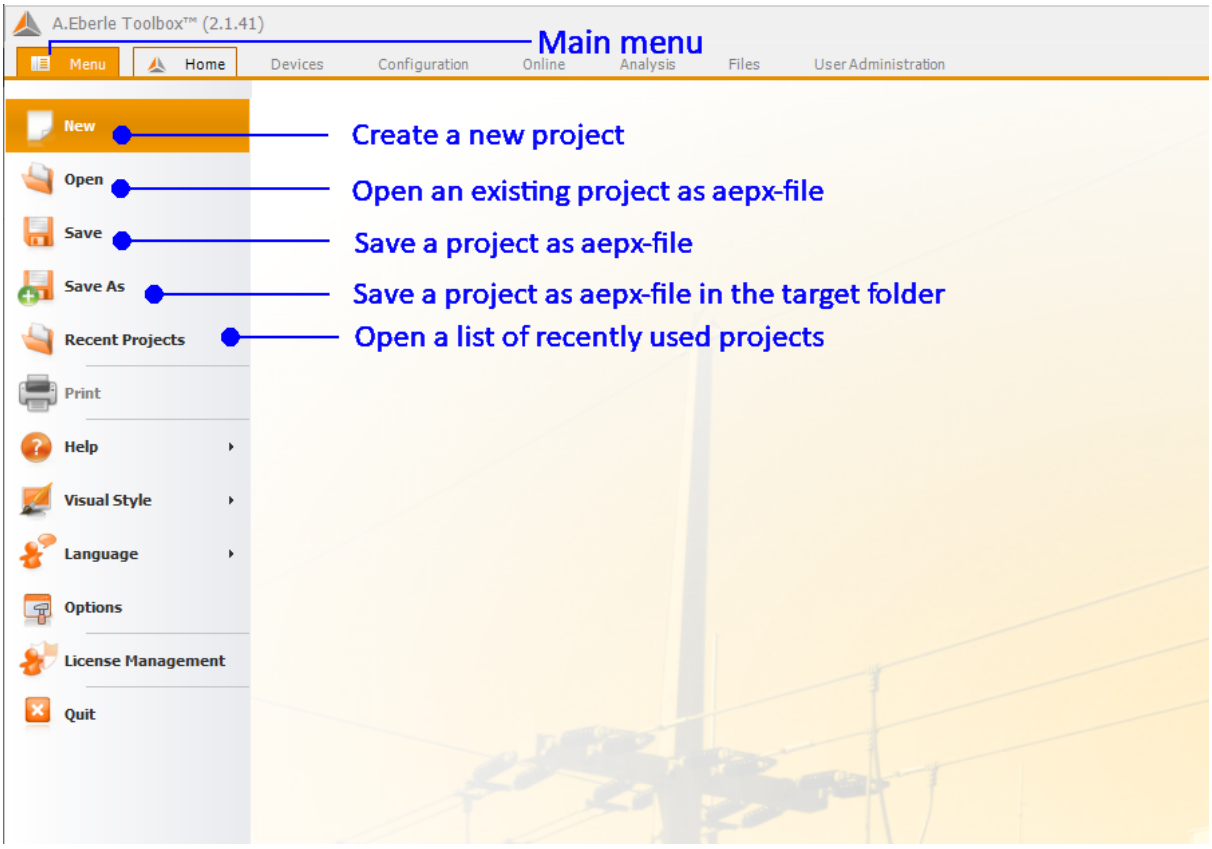
No.	Module	Description of the work area
1)	***Main menu*** 16 (control module)	Menu to control overarching processes of AEToolbox.
2)	***Home*** 18 (operator module)	Start screen for quick entry into the main functional tasks of AEToolbox (tablet mode).
3)	***Devices*** 25 (section module)	Work area for setting up devices, monitoring the connection, as well as general device functions, such as firmware update, RAM backup and RAM restoration.
4)	***Configuration*** 36 (section module)	Work area for device configuration, editing of parameter sets, analysis of comparison parameter sets, as well as downloading and uploading parameters.
5)	***Online*** 61 (section module)	Work area for monitoring: ▪ Devices (device panel) ▪ Measurement and process values ▪ LT networks of multiple devices *(Modbus)* ▪ Device-specific *log* entries (LT, system, device *logs*) ▪ Application-specific *log* entries (Interface *log*) In *online* mode it is also possible to perform simulations and to control devices.

6)	***Analysis*** 77 (section module)	Work area for the analysis of historical device data, including graphic display and statistical analysis.
7)	***Files*** 87 (section module)	Work area for exchanging device files: *Record*, *SCADA*, *log*, *config*, *LUA*, *service* and *statistics* files.
8)	***User administration*** 94 (section module)	Work area for the administration of user roles on the device.

4.1 Control module Main menu

The main menu is used to control overarching processes in AEToolbox.

AEToolbox project
All the work steps you perform with AEToolbox can be saved as a AEToolbox project on your PC. AEToolbox generates a file with the extension *.aepx*. The following figure depicts the corresponding functions for project work.



Other options and settings in the main menu

- ***Print*** parameter sets

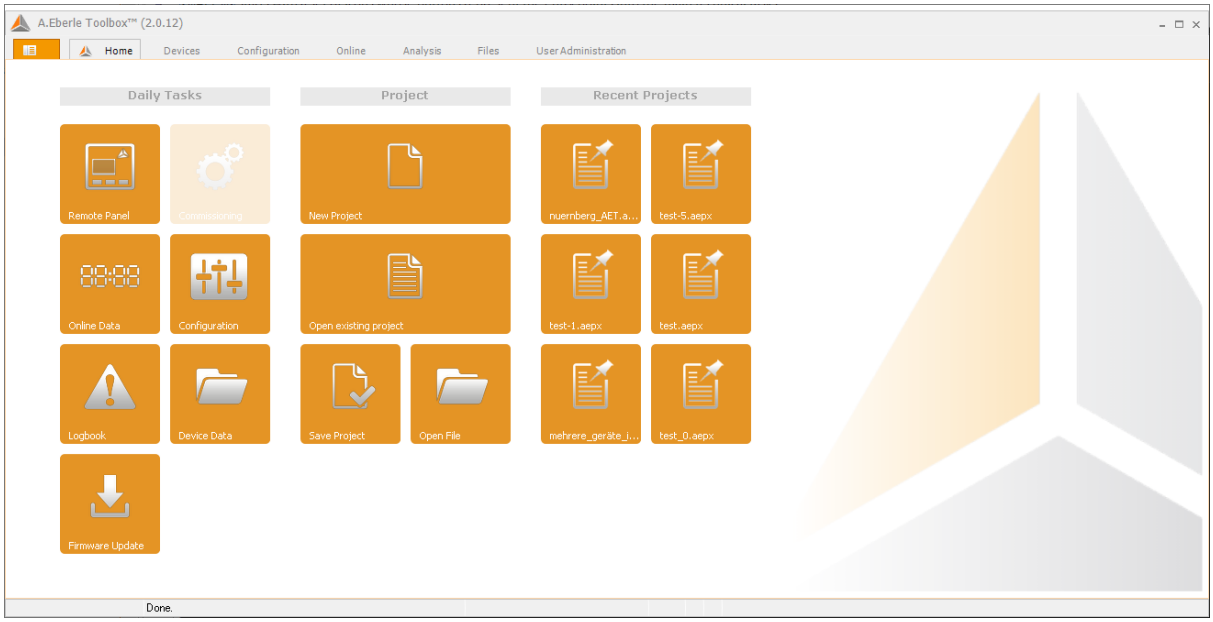
NOTE!	Please note that the ***Print*** button can only be activated after the parameters have been successfully loaded. To do this, click the *Configuration* tab and follow the instructions. Once a parameter set has been loaded and selected, click the *Main menu* tab and then the activated *Print* button.

- ***Help*** contains an interactive user manual as well as information on the AEToolbox software.
- ***Visual style*** offers multiple colour-coordinated design templates for AEToolbox
- ***Language*** to select your language
- ***Options*** for general settings of the device widgets and logbooks (also see Options 140)
- ***Licence administration*** is used to unlock AEToolbox that may be subject to a fee.

NOTE!	Please contact *A. Eberle GmbH & Co. KG* regarding technical advice for determining the optimum selection of features for you in AEToolbox.

4.2 Operator module Home

AEToolbox starts with a set of icons whose buttons represent the entry points into the main technical tasks.



Daily tasks: Description of individual icons
The icons in the *Daily tasks* section offer quick entry into the main section modules or individual features of AEToolbox.

NOTE!	Please note that • after a click on the icons the interactive setup of a connection using the *connection wizard,* [103] is first started; • access data may be requested (user name, password) if a connection is set up with a device that has an active authorisation concept.

The *Remote panel* icon opens a virtual front control panel for the device, which replicates graphic output components of the hardware (display, LEDs) with low latency. Input components (front buttons) are also emulated. After clicking the *Remote panel* icon and successful setup of the connection to the desired device, its digital control panel appears with the current output.

The *Online data* icon serves as a direct entry point into the *Online*[61] module of AEToolbox, which offers device-specific work areas for monitoring measurement and process values, logbook entries as well as for functions, which vary according to the type of device (*device* context). It starts after the successful setup of the connection to the device is finished.

After the successful setup of the connection, the *Parametrisation* icon opens the *Configuration*[36] section module. A device-specific factory parameter set is automatically set up here and opened.

Clicking the *Logbook* icon causes the *logs*[70] view to appear. This view displays device-specific logbooks (e.g. *SCADA*, system log, devices log) as well as a interface logbook for the connection between AEToolbox and end device.

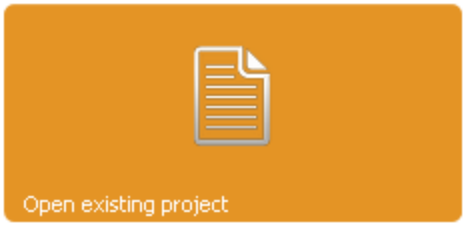
The *Device data* icon takes you to the work area for "file exchange" between PC and device. The *Files*[87] section module starts after the successful setup of the connection to the device is finished.

The *Firmware update* icon starts a macro to install firmware on the device (see also the *Firmware update*[118] *section)*

Project: Description of individual icons

All the technical work steps you perform with AETToolbox can be saved as a project on your PC. AETToolbox generates a file with the extension *.aepx*. The following icons offer quick access to project files and enable efficient management:

The *New project* icon starts a dialogue to set up a new AEToolbox project.



The *Open existing project* icon starts a dialogue to open an existing AEToolbox project. The connections to the devices set up in the target project are established automatically. To eliminate avoidable security risks, the access data is requested again for devices with a user role concept.

The *Save project* icon starts a dialogue to save the current project on your PC.

The following file types can be opened using the *Open file* icon:

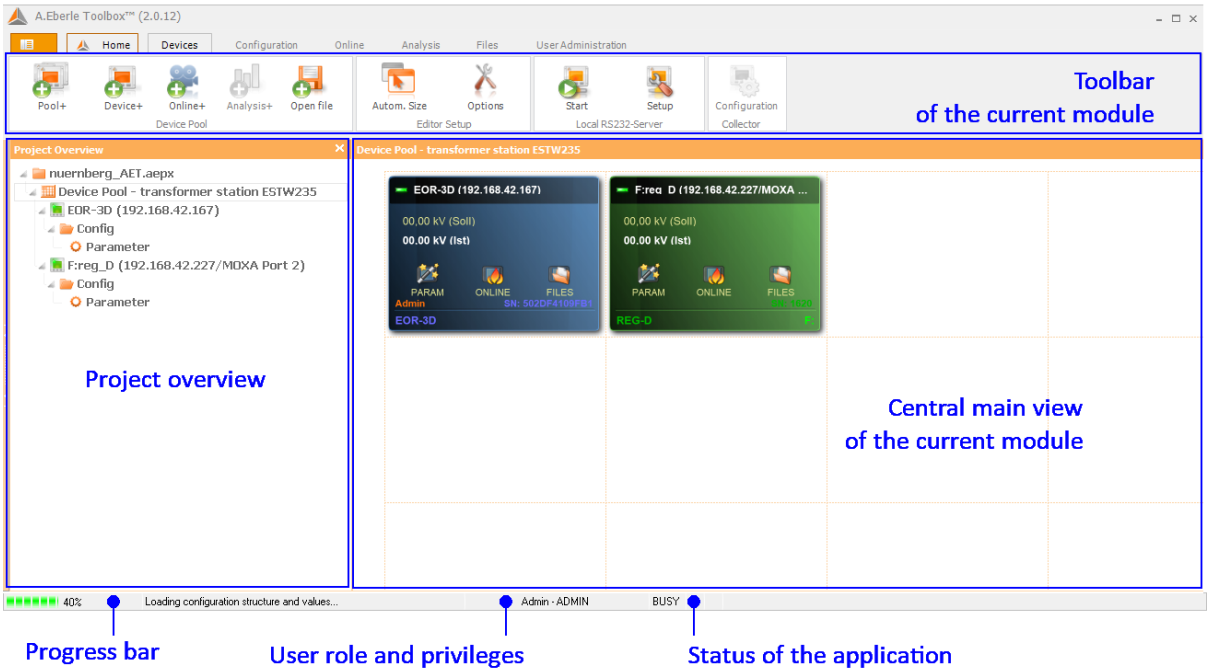
- AEToolbox files *(.aepx, .aepoex, .aedeex, .aevsex, .aedx, .aelog);*
- Device-specific parameter files *(.ini);*
- Recorder, fault record files *(.rec, .rvt, .rvd);*
- Logbook files *(.log, .reglog);*
- Background programs *(.lua);*
- External parameter files *(.prm, .mdb, .weor).*

For more information on file import and export, please refer to the File import/export 121 section.

Recent projects
This area displays recently used projects for quick access.

5 Section modules

The section modules of AEToolbox – *Devices*[25], *Configuration*[36], *Online*[61], *Analysis*[77], *Files*[87], *User administration*[94] – cover different work areas. The graphic user views of the section modules have an analogous structure, to make working with the software as intuitive and user-friendly as possible.



General structure of user views using the *Devices* section module as example
The graphic structure of all section modules consists of the following components:

- **Toolbar** provides module-specific functions.
- **Project overview** is used to quickly execute work steps on a device and store individual module, function and file call ups in the current AEToolbox session. The display is a hierarchical tree structure similar to *Microsoft® Windows® Explorer*. Right-clicking individual entries causes a dropdown menu to appear with further functions that match the entry. These are described in more detail in the respective section module.
- **Central main view** of the current module displays work results. In the *Devices* section module the device pool is displayed with the devices set up and connected as in the following figure:

  - EOR-3D (blue device widget)
  - REG-D (green device widget)

- **Progress bar** displays the current progress of asynchronous tasks, for example during the loading, saving or importing of parameters or files.
- **User role and privileges** reports the assigned user role of the currently marked device.
- **Status of the application** completes the output of the progress bar as information about the current workload of the application.

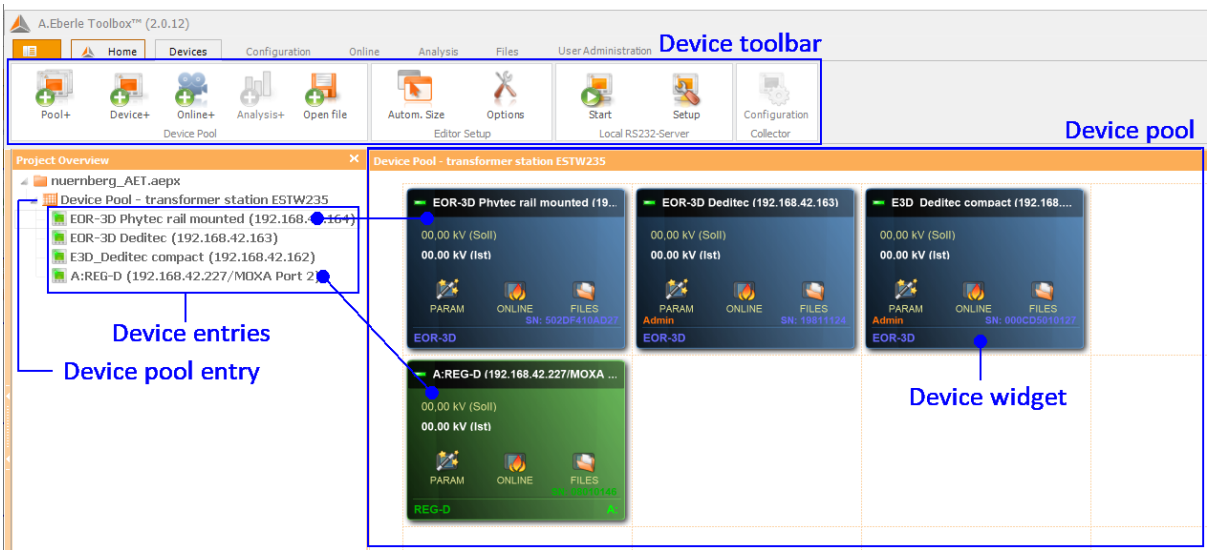
The individual section modules are described in the subsequent sections.

5.1 Devices

The *Devices* section module provides a work area for setting up devices, for monitoring device connections and select measurement values, as well as for preparing and performing firmware updates.

The *Devices* module is called up exclusively in the *device pool* context. This means that any *device* entries that are generated are placed in the project overview under the *device pool*.

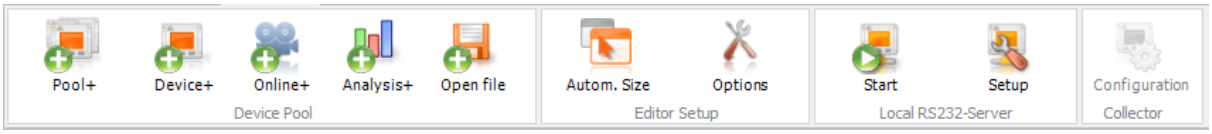
The following sections describe the functions of the *Device toolbar* that pertain to *device* entries and *device pools*.



5.1.1 Device toolbar with functions

This section describes the functions of the *Device toolbar*. These functions are activated when

1) a *device* entry is marked in the project overview;
2) a *device pool* entry is marked in the project overview;
3) the *Devices* section module is called up from another section module via the respective tab.

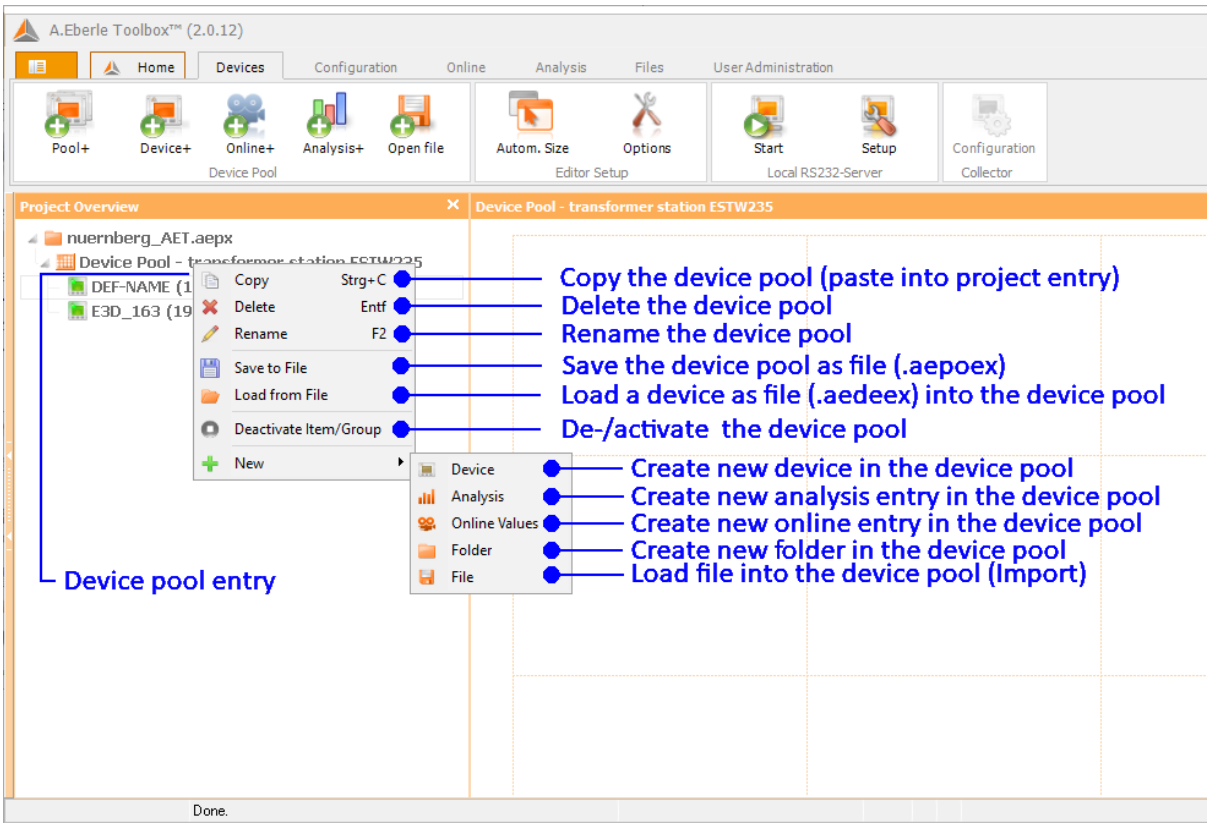


Pool+

This function sets up a new *device pool* and can be used to group multiple devices together (e.g. field, voltage level, ...). After clicking the *Pool+*

button a new *device pool* entry is generated in the project overview and an associated empty main view is displayed.

A right-click on the *device pool* entry causes a dropdown list with further functions to appear, as depicted in the following figure:



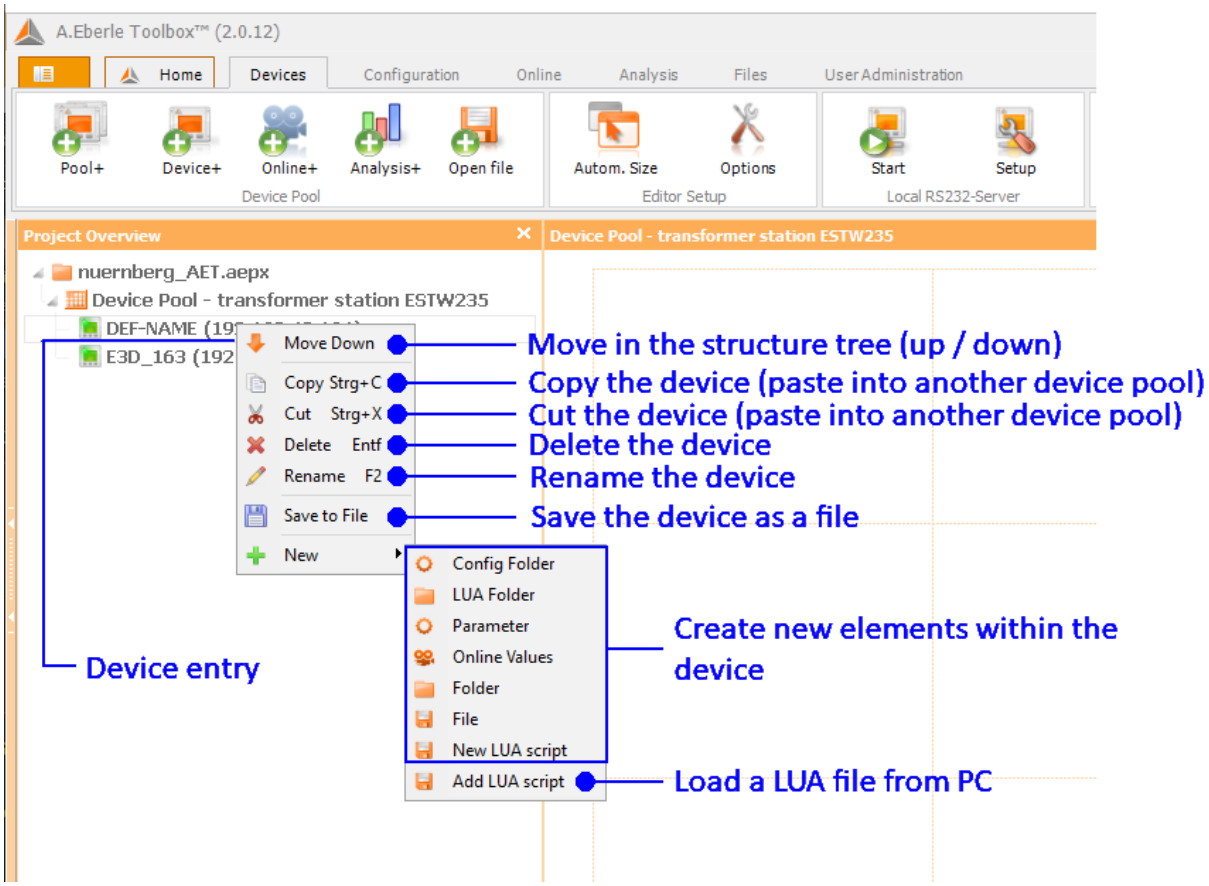
Device+

This function sets up a new device in the *device pool*. After ensuring that the device is physically connected to the PC, click the *Device+* button.

The connection is set up in several steps with the help of the *connection wizard*[103]. After the successful setup of the connection a new *device* entry appears in the project overview, and a device widget in the central main view (see also device widget with functions[32]).

Alternatively, you can set up a new device by right-clicking the *device pool* entry via drop-down list set up *new.*

A right-click on the *device* entry in the project overview causes the following dropdown lists with further functions to appear, as depicted in the following figure:



Online+

This function calls up the *Online* module for the marked device. After clicking the *Online+*

button AEToolbox switches to the *Online* section module. In the project overview device-dependent *online* entries are generated, such as *online values*, *ModbusMaster* and *logs* , and a standardised view of the *Online* panel is set up in the central main view (see *Online* 61 section for a more detailed description of this section module).

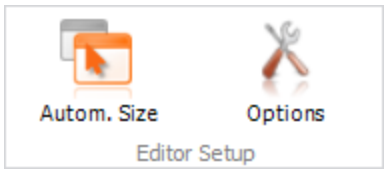
Analysis+
This function calls up the *Analysis* module under the *device pool*. After marking a desired *device pool*, click on

AEToolbox switches to the *Analysis* section module. In the project overview a new *analysis* entry appears *in the device pool* context. The associated main view first displays an empty *Chart* panel. For info on how to continue to work with data sources in the *Analysis* module, please refer to the *Analysis*[77] section.

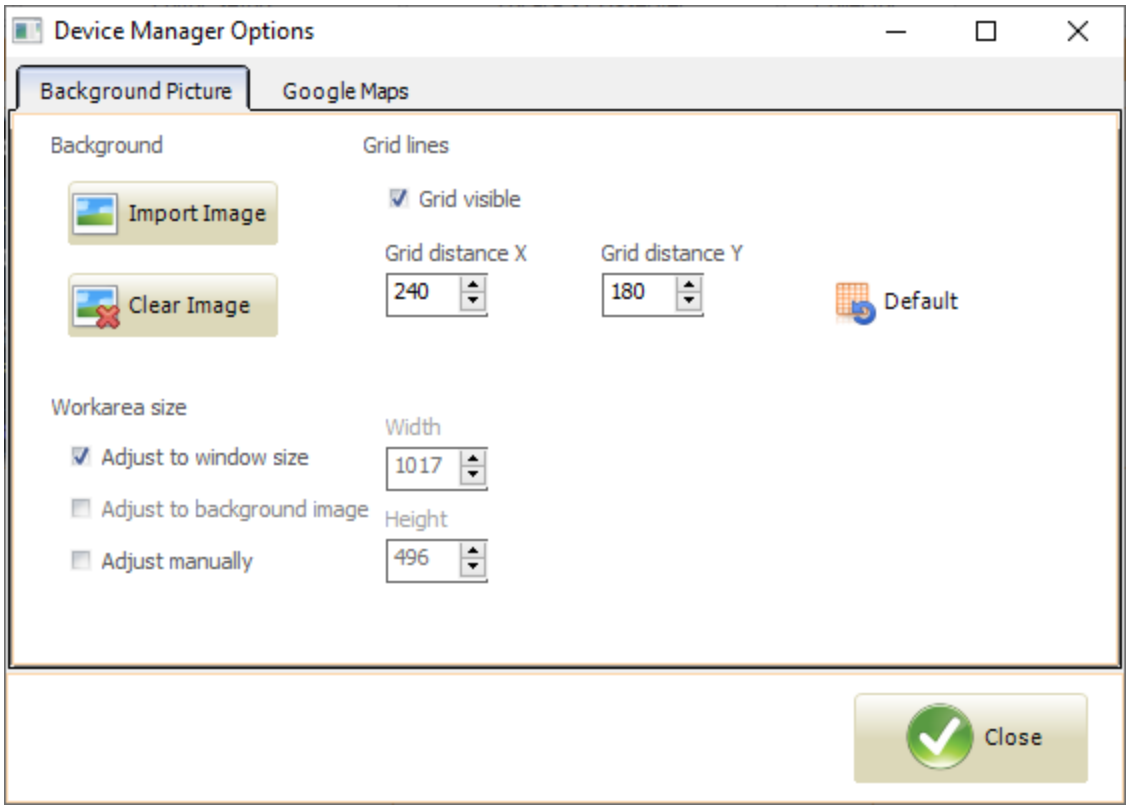
Open file
This function imports a device-specific or AEToolbox file in the project overview, and opens it in a corresponding editor.

Principally all files from a local PC directory are offered for import (*.*). The arrangement of the file in the structure tree as well as how it is displayed in the corresponding AEToolbox editor depends on the file type detected. For example, files unknown to AEToolbox are placed in the *Local files* folder and not opened by an editor. *LUA* files are placed in the *device* context under the device in the *LUA SCRIPTS* folder and displayed in the editor in the central main view. When *LUA* files are imported outside of a *device* context, a so-called *temporary device* is set up in the project overview. See File import/export[121] section for more detailed explanations.

Editor settings
The editor settings refer to adjustments to the *device widgets* and their positioning in the main view.



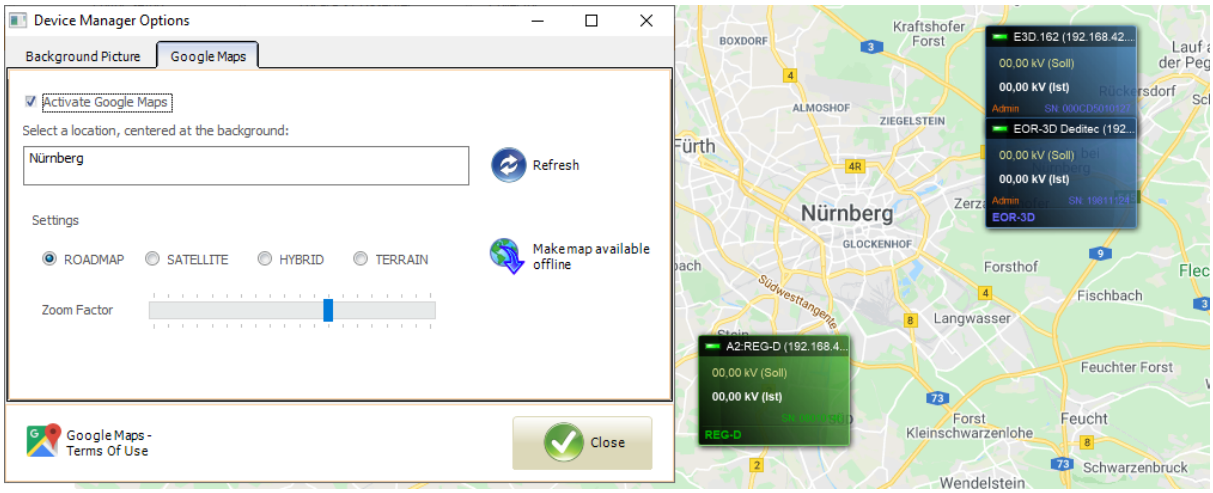
The *Autom. Size* button activates the automatic enlargement of *device widgets*, when the mouse hovers over the widget. This option is useful when setting up multiple devices in a device pool, especially with topographical arrangement.
Clicking on the *Options* button causes a window to appear for device manager settings, to adjust widget positioning and to select the background image. Alternatively, these settings can also be called up by double-clicking the grid in the main view.



The *Background Picture* tab in the device manager offers the following functions:

- Replace the background image;
- Adjust the size of the work window;
- Switch the positioning grid on/off;
- Manually adapt the grid size, or reset the grid size to the default size.

With the *Google Maps™* tab you can load a map as the background image. This can be useful if you want to assign geographic locations to your virtual devices *(device widgets)*.

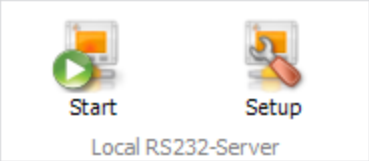


First, select the checkbox to activate *Google Maps™* and then enter a location or postcode to specify the desired map section. After that click on the *Refresh* button. Once the map is loaded you can continue with the positioning of your *device widgets*. You can also change settings for the display of the map *(ROADMAP, SATELLITE, HYBRID, TERRAIN)* and change the zoom factor.

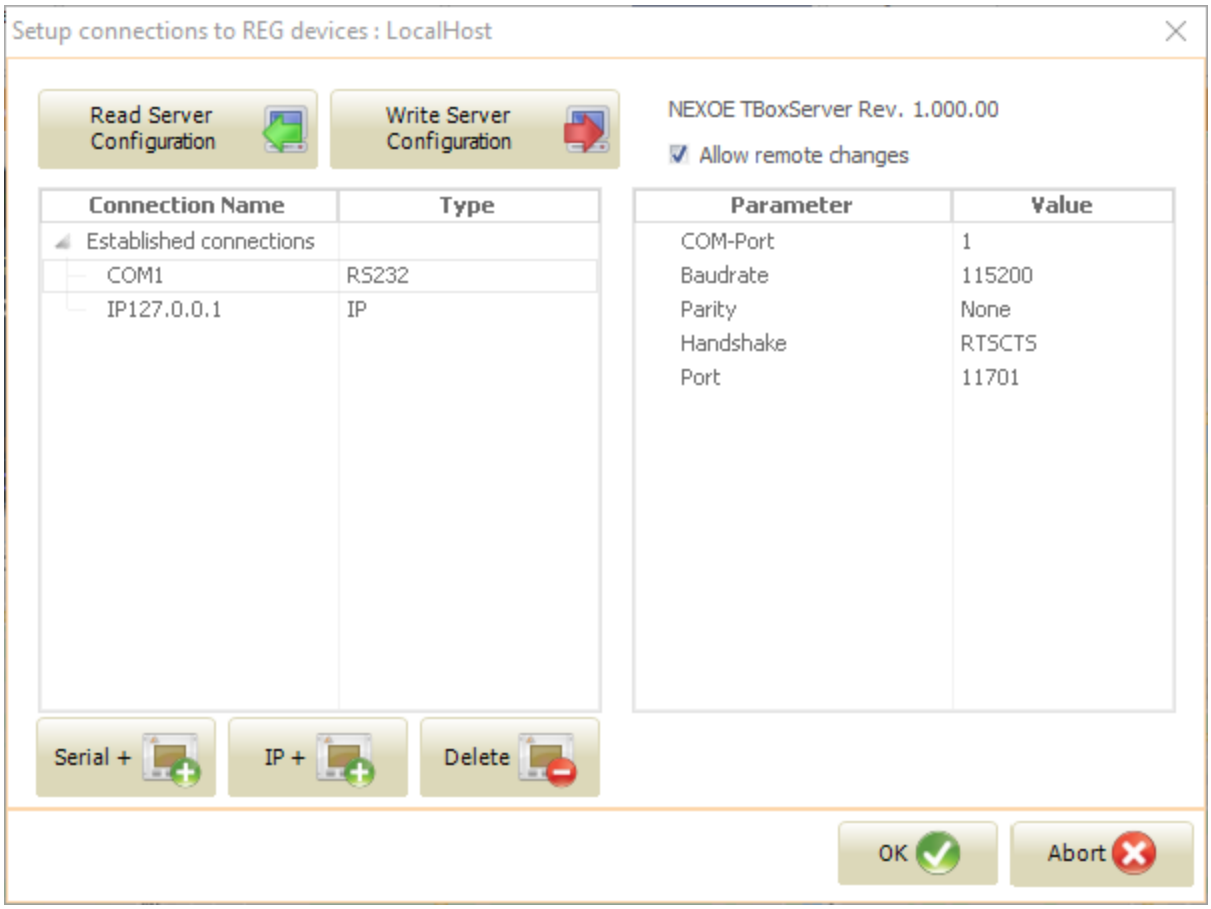
The map or the relevant map section can also be saved in the project. This can be useful if work on the project is to continue in an offline setting, or if a resource-saving work method is to be followed. To save the map in the project (offline), first set up the required map section as desired (online). Then click on the *Make map available offline* button. A message appears to confirm the successful conversion of the map. This means that the loaded and positioned map section was added to the project as the background image. On the *Google Maps™* tab the buttons to activate the map, and the *Refresh* and *Make map available offline* buttons are simultaneously deactivated. To remove this background image again, please click the *Background Picture* tab and then the *Clear Image* button. The default view is restored.

Local connection server settings

To establish a connection to end devices which use serial communication or their own COM server to communicate with the PC (e.g. *REG-D, REG-DP*), a so-called L*ocal RS232 server* is activated. This is a *TCP/IP* communication server, which can administer multiple parallel *RS232* and *COM server* connections to end devices. This allows multiple *RS232* end devices to be addressed via one *TCP* connection (1 to n), and one serial end device to be reached in parallel from multiple remote PCs (n to 1). This means that with the help of this technology you can access serial devices over other PCs in the network, as long as AEToolbox is running on the remote work station. The *RS232 server* is supplied along with AEToolbox and automatically installed.

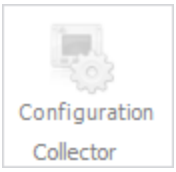


The *Start* button can be used to manually restart the server. A message is displayed if the server is already running.
The *Setup* button opens the following window for server configuration:



Here, an existing server configuration can be read, edited and overwritten (*Read server configuration, Write server configuration* buttons). With the *Serial+* or *IP+* buttons a new serial connection or a new COM server connection is added. Changes to individual connection values can be made in the columns *Parameter* and *Value*.

Collector

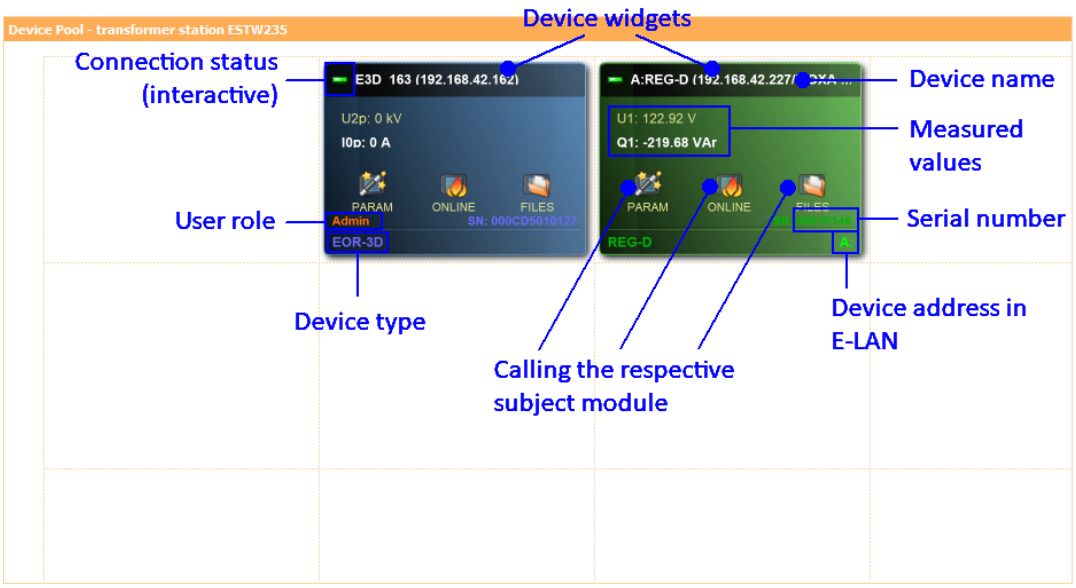


The *collector* is a stand-alone service program which reads out long-term measurement data from devices with recorders S1 and S2 (e.g. *REG-D*) and writes it into a local database. AEToolbox detects the *collector,* if the program was installed locally. The *Collector* button is activated and the settings are unblocked for configuration. If the *collector* was not pre-installed, the button remains inactive, as shown above.

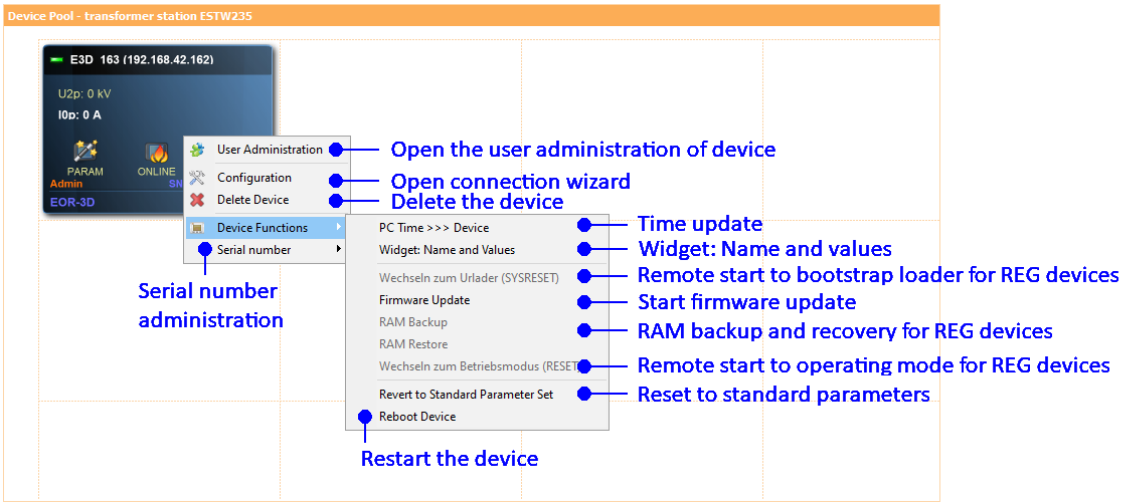
5.1.2 Device widget with functions

This section describes the *device widget* with its functions.

The *device widget* contains the name, type, connection status and serial number of the device as well as the designation of the User role (if available). Measurement values can also optionally be placed on the widget. The functions to call up *Configuration*, *Online* and *Files* modules can be called up directly using the *PARAM, ONLINE* and *FILES* icons on the *device widget*.



A right-click on the *device widget* causes a dropdown list with further functions to appear, as depicted in the following figure:

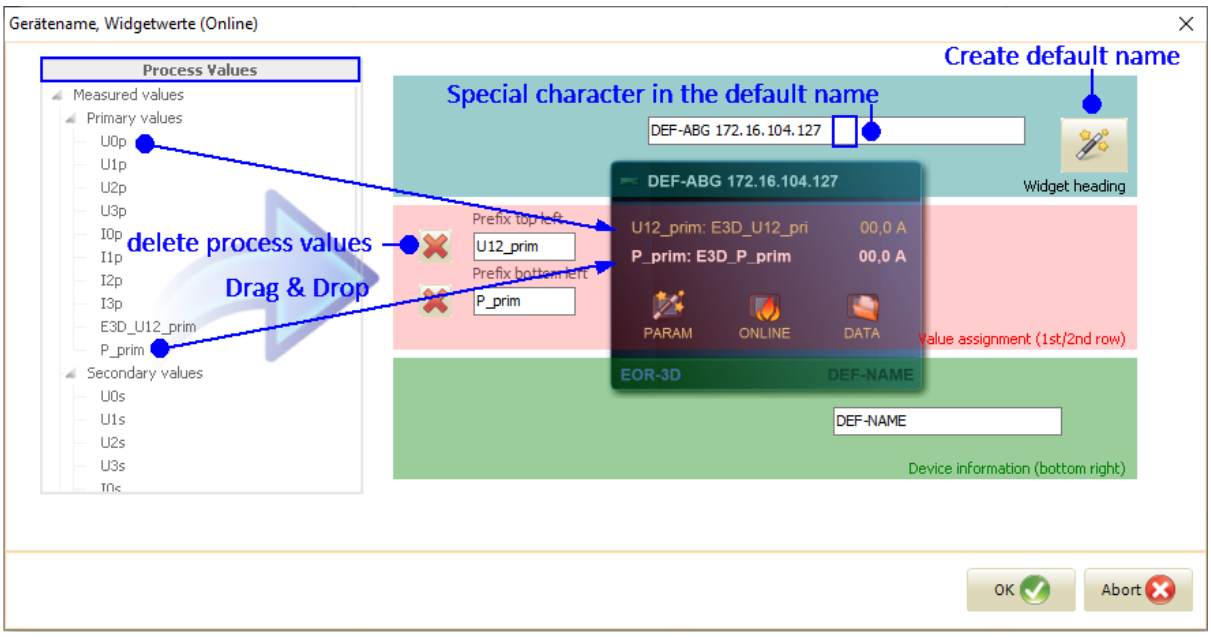


Description of select widget functions

1) Connection status
The LED button is interactive. Clicking on the LED causes the connection to the device to be re-established or switched off. There are three different states:

- LED green - connection established;
- LED orange - making connection;
- LED black - connection interrupted, device in offline state.

2) Widget: Name and values
Clicking this *device function* causes the following editor to appear.



The following settings can be configured:

- Select up to 4 process values for placement on the *device widget.* Use the *drag & drop* function to drag the process values from the list into the row on the *device widget* intended for them;
- Delete process values;
- Input of user-defined device names;
- Restore the default device name (*Magic wand* button);
- Input of user-defined device information

NOTE!	All default device names have a special character at the end of their identifier, which is displayed to you as empty space. This has the effect of updating the name every time the device is re-connected (e.g. EOR3D: name and IP address of the device). To give the device a permanent name please delete this special character when writing over the name in the *Set device name* input window. This way the device name you enter will be retained even after a re-connection.

3) Serial number
The *serial number* function allows you to switch from a fixed device serial number to a variable one for the purpose of transferring device data to multiple devices, each with the same connection configuration. The serial number can subsequently be reset to the original serial number (*Reset serial number* function).

4) Firmware update
This function opens a dialogue for updating the internal device firmware. A connection to the target device is established, and then the firmware dialogue is started in which you select the new firmware and install it (see also Firmware update 118).

5) Reset to standard parameters
This function starts the restoration of the standard parameter set on the target device. First, a suitable standard parameter set is loaded in the project overview. After the parameter differences are displayed and the changes are acknowledged the values of the target device are overwritten.

6) Restart device
This function performs a restart of the device

7) Switch to bootstrap/operating mode (only *REG* devices)
These functions switch the device to bootstrap loader mode (SYSRESET) and back to operating mode (RESET).

NOTE!	Please check the remote-start capability of the *REG* device and corresponding activation of the *Remote start of bootstrap* function on the device.

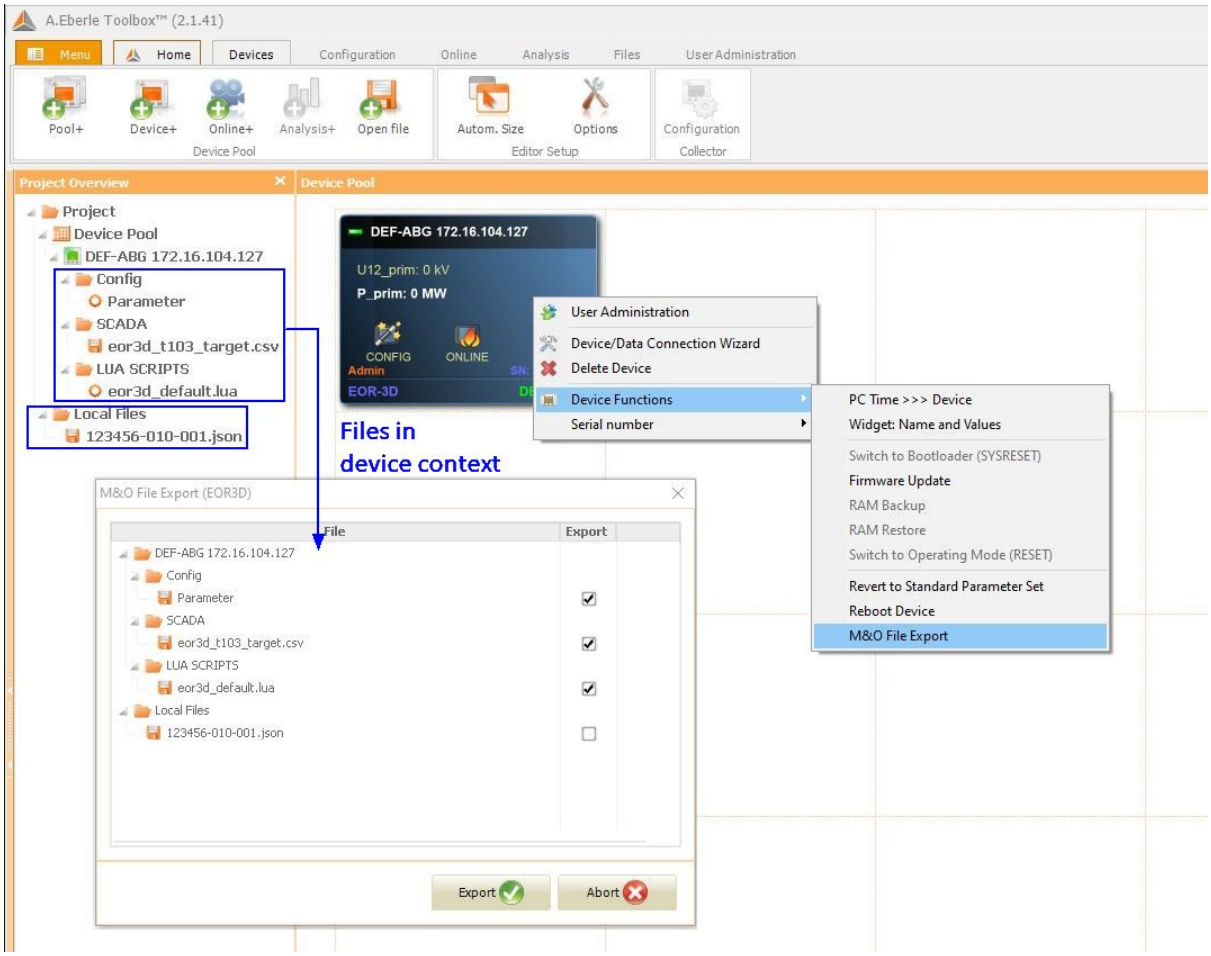
8) RAM backup / RAM restore (only *REG* devices)
The *RAM backup* function performs a backup of RAM while the device is running. The backup is performed in an internal memory chip (flash ROM). The restoration of the RAM (*RAM restore* function) then starts from this flash ROM.

9) M&O files export (only EOR-3D devices)

With help of the M&O export function, it is possible to save configuration files in *aedx-/SCADA-/LUA*- and also *JSON*-formats compressed on the PC. Make sure, that before the export, the files which will be exported are available in the project overview:

- the *aedx-/SCADA*- and *LUA*-files in the device context;
- *JSON*-files in the local files folder (transfer to the project overview from *Windows*-Explorer via *Drag&Drop*).

After calling the M&O-export function a dialog window opens with the recognized files from the project overview. There the file selection can be specified.

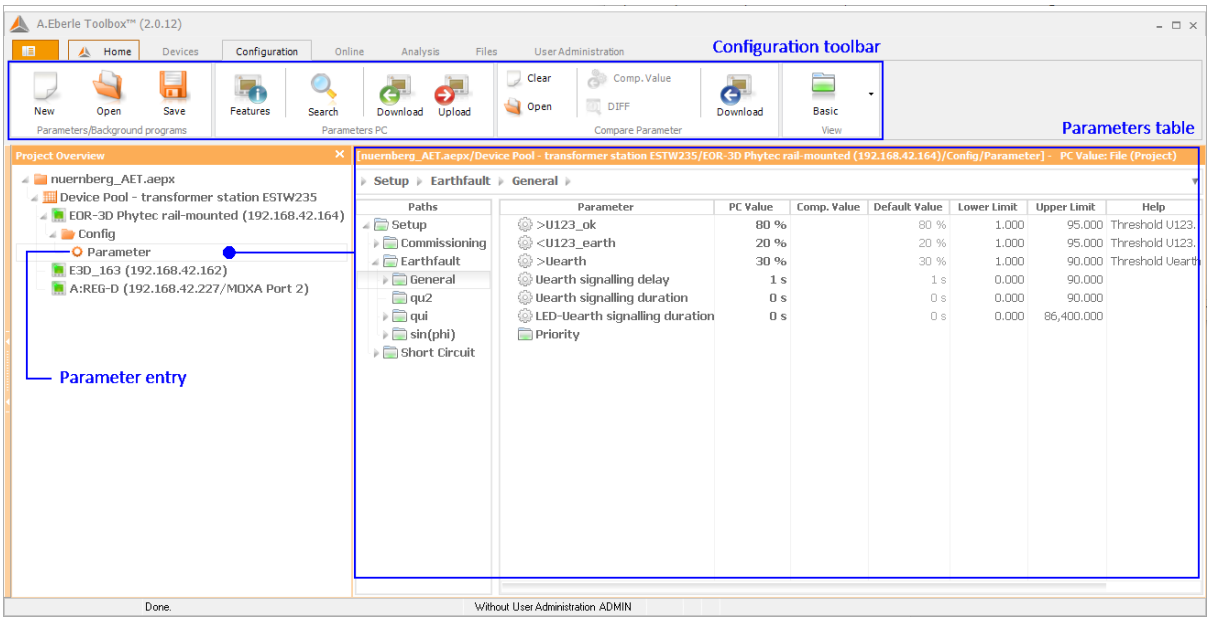


5.2 Configuration

The *Configuration* section module is a work area for the parametrisation of the devices. Here, you can import and edit parameter sets, and start an alignment of parameters with the help of AEToolbox functions. Depending on the assigned user role, download and upload functions are available which allow parameters to be received/sent from/to the end device.

The *Configuration* module is called up exclusively in the *device* context. This means that any *parameter* entries that are generated are placed in the project overview under the respective device.

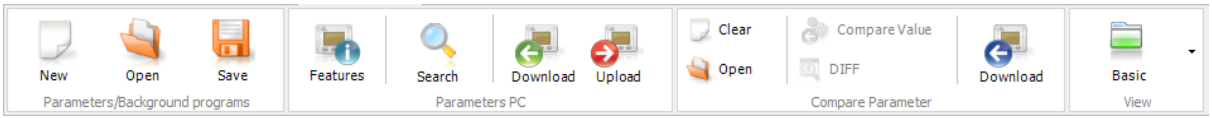
The following sections describe functions of the *Configuration toolbar* and the structure of the *Parameters table*.



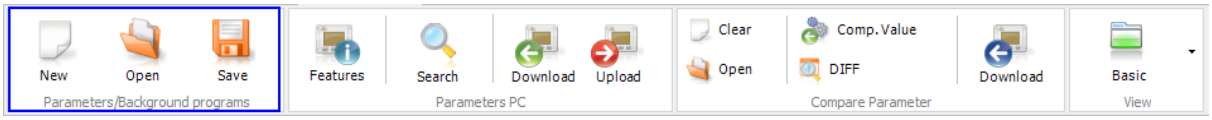
5.2.1 Configuration toolbar with parameter functions

This section describes the functions of the *Configuration toolbar* which pertain to work with parameter sets and background programs. These functions are activated when

1) a *parameter* entry is marked in the project overview;
2) a background program is marked in the project overview ;
3) the *Configuration* section module is called up from another section module via the respective tab;
4) a parameter set is set up using the *Parametrisation* button in the *Home* module;
5) the *Configuration* section module is called up using the *PARAM* icon on the *device widget*.



5.2.1.1 Generating, opening and saving parameter files and background programs

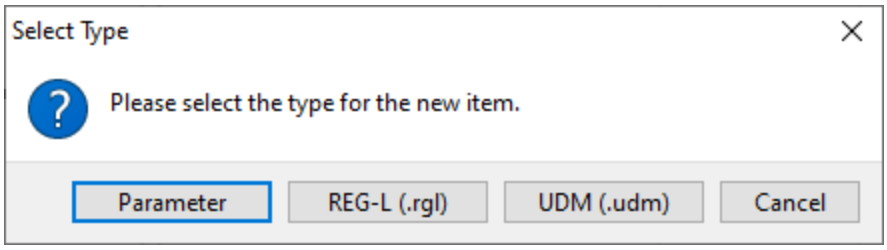


New

The *New* button sets up a new device-specific parameter set in factory settings or a new device-specific background program.

- With *EORSys* devices, after clicking the *New* button a new *Config* folder is set up in the project overview with a corresponding *parameter* entry. In the central main view the *Parameters table* appears with parameter values. For information on how to create a device-specific background program *(LUA)*, please refer to the Background program 134 section.

- With *REG* devices, a device-specific query is first made. For example, with a *REG-D* device you can choose between a parameter file and two background programs (*REG-L* and *UDM*), as depicted in the following figure.



Parameter. When setting up a parameter file, after clicking the *Parameter* button a so-called *Device features wizard*[130] is activated. With the device connected, it then loads features and important function settings from the device and displays them in a table. With the help of this wizard, attention is drawn to the checking of certain parameter features as well as the option to change them if necessary.

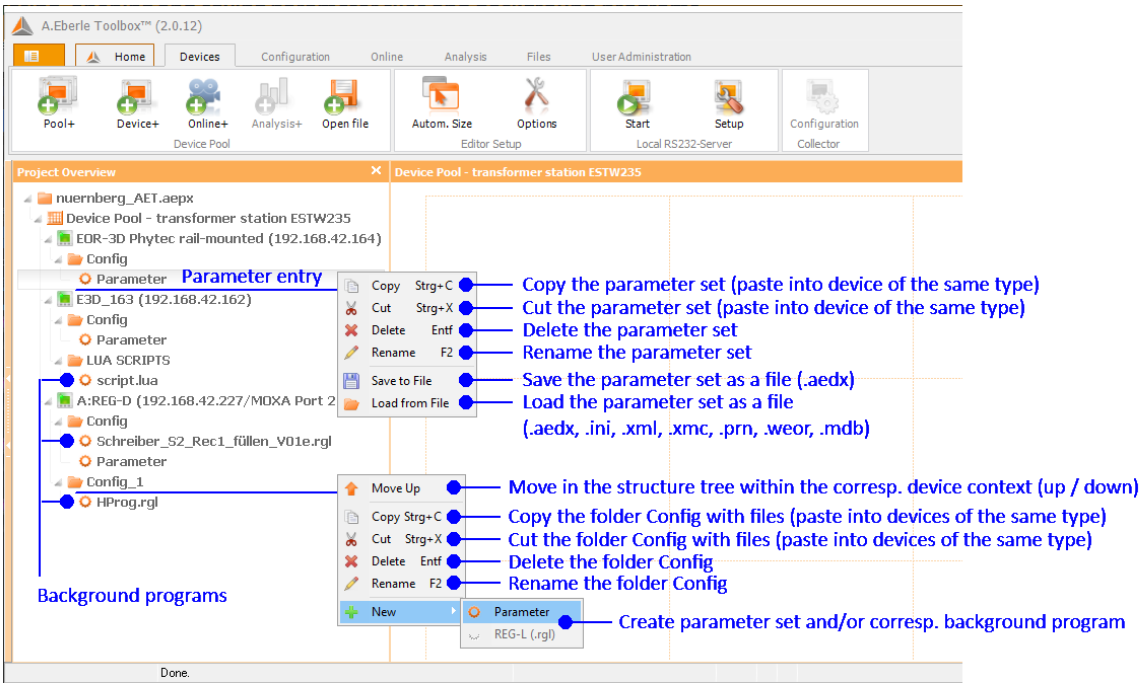
NOTE!	The following parameter features can be checked in the *Device features wizard*[130] and changed as required. ▪ Firmware and hardware versions, and the serial number of the device ▪ Already-licensed parameter features ▪ New licences for parameter features

After the output of information on parameter differences (relevant, for example, after licence entry) your changes from the *Device features wizard*[130] are adopted in the *Parameters table*. In the central main view this *Parameters table* appears with parameter values.

Background programs (REG-L, UDM). When setting up a background program the *RGL* or *UDM* file appears in the *Config* folder. The central main view displays the associated program code in the AEToolbox text editor. In the *Configuration toolbar* the text editor functions[51] now appear.

NOTE!	Please note, that operations with UDM-files are only possible on REG devices, which are used as access point (AA:).

Once the *parameter* entries have been generated in the structure tree, you can use the other functions of the project overview. The corresponding drop-down list s with functions are called up with a right-click on the *Config* folder, the *parameter* entry or the background program. The following figure gives a quick overview of these additional functions.



Open

The *Open* button imports a device-specific parameter set or a background program.

The following table summarises the importable file types.

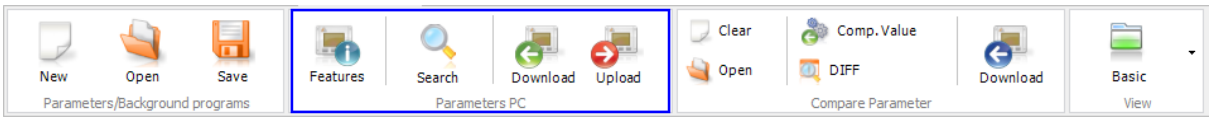
Device type	File	File extension
EOR-3D	AEToolbox Parameter file	.aedx
	Device-internal parameter file	.ini, .xml, .xmc
	Background program	.lua
REG-D (A), PAN-D	AEToolbox Parameter file	.aedx
	Background program	.rgl, .udm
	External parameter file *WinReg*	.prm
REG-DP (A)	AEToolbox Parameter file	.aedx
	Background program	.dpl
	External parameter file *WinReg*	.prm
	External parameter file *WinEDC*	.mdb
	External parameter file *WinEDC*	.weor

Refer to the File import/export 121 section for more information.

Save

The *Save* button saves a marked parameter file or background program in a local directory. Alternatively, you can call up this export function by right-clicking a *parameter* entry via *Save to file.*

5.2.1.2 Working with parameter sets and background programs

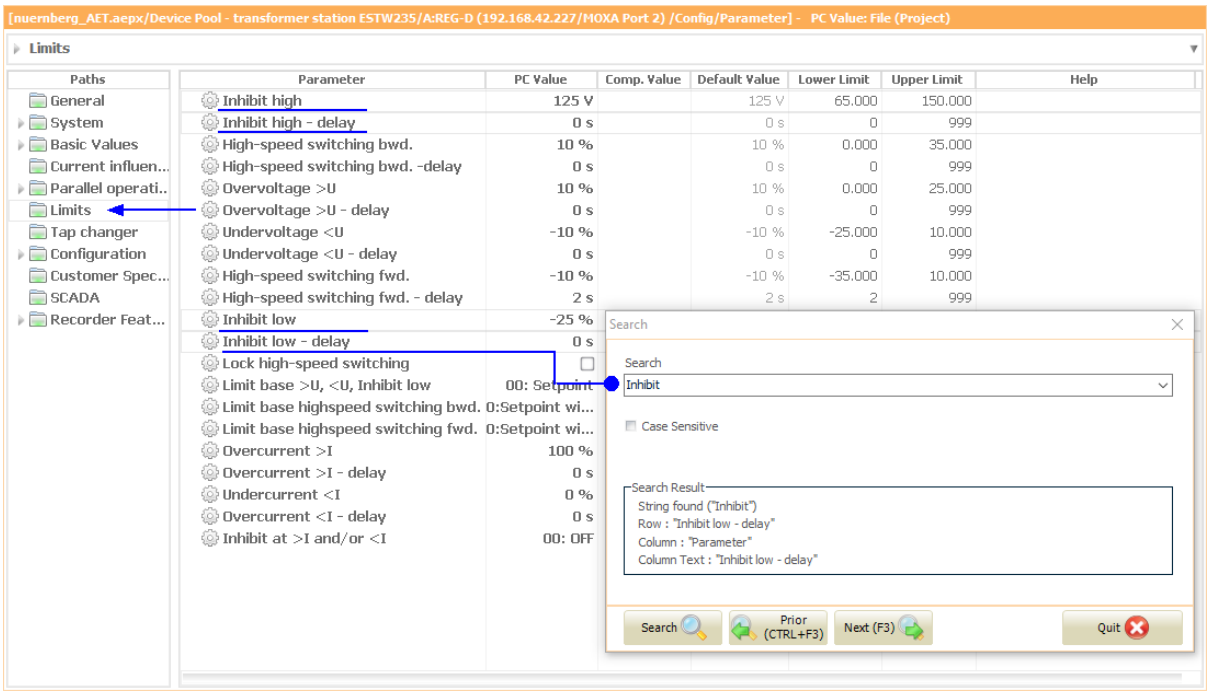


Features

The *Features* button calls up the *Device features wizard*[130] . Here, features can be activated and deactivated as needed and additional device functions enabled.

Search

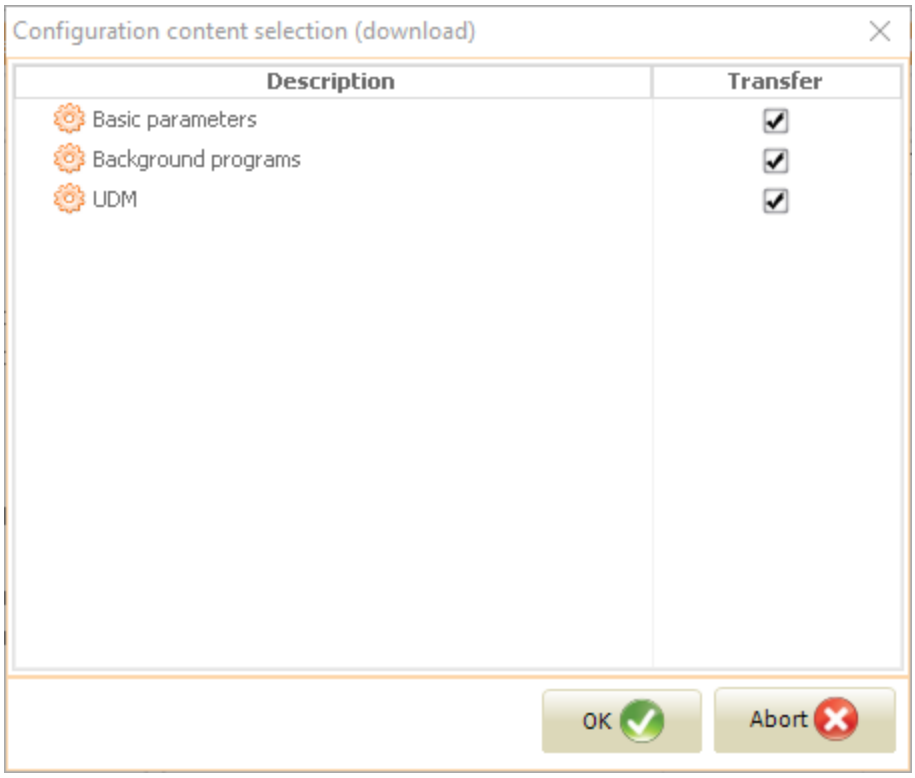
The *Search* button opens the window for the parameter keyword search. Enter a partial or full term in the *Search* input window. The first hit will be displayed in the *Parameters table*. For further search navigation use the *Previous* and *Next* buttons in the parameter search window.



Download

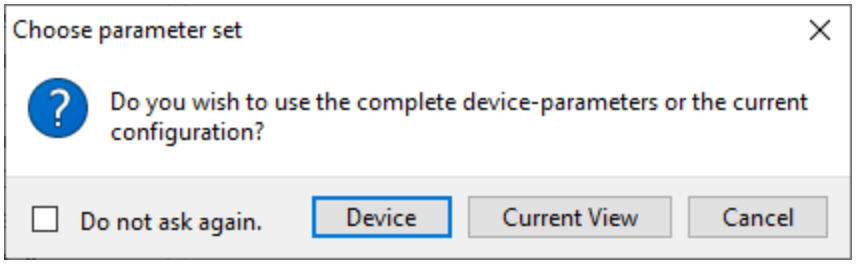
The *Download* button allows parameter sets and device-specific background programs to be loaded from the device. The execution of this function is different for the *EORSys* and *REG* device series.

- With *REG* devices, after clicking the *Download* button you will immediately be taken to the selection of configuration content. Depending on the processor-type of the *REG-D* device (firmware 2.xx / 3.xx), the *UDM* file will be offered for download in addition to the parameter file and background program. Any background programs already in the project overview can be overwritten.

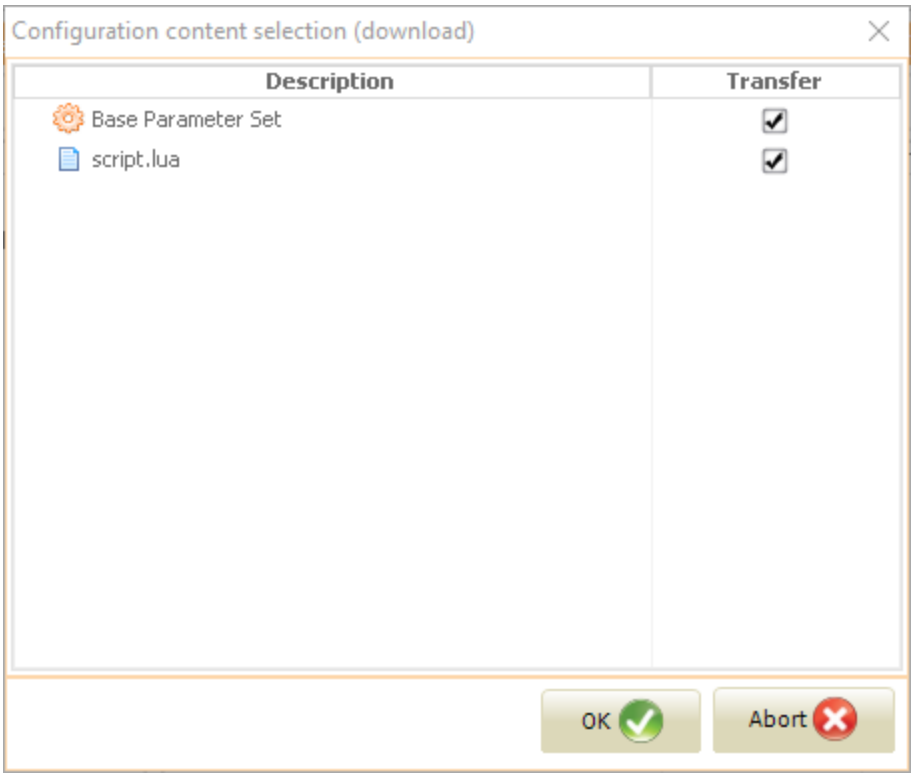


NOTE!	Please note, that operations with UDM-files are only possible on REG devices, which are used as access point (AA:).

- With *EORSys* devices, you are first queried as to how the parameter file is to be loaded in the table:



Selecting the *Device* button causes any existing parameter set in the project overview to be completely replaced by the parameter set of the device firmware, including tree structure. New parameters may be added, and others may be deleted. Selecting the *Current view* button causes the device parameter values to be loaded into the tree structure of the parameter set that already exists.
Optionally you can also use the download function to load other files from the device (device-specific). For example, when downloading from a EOR3D device *LUA* files are also offered for download. These are then placed in the *LUA SCRIPTS* folder.

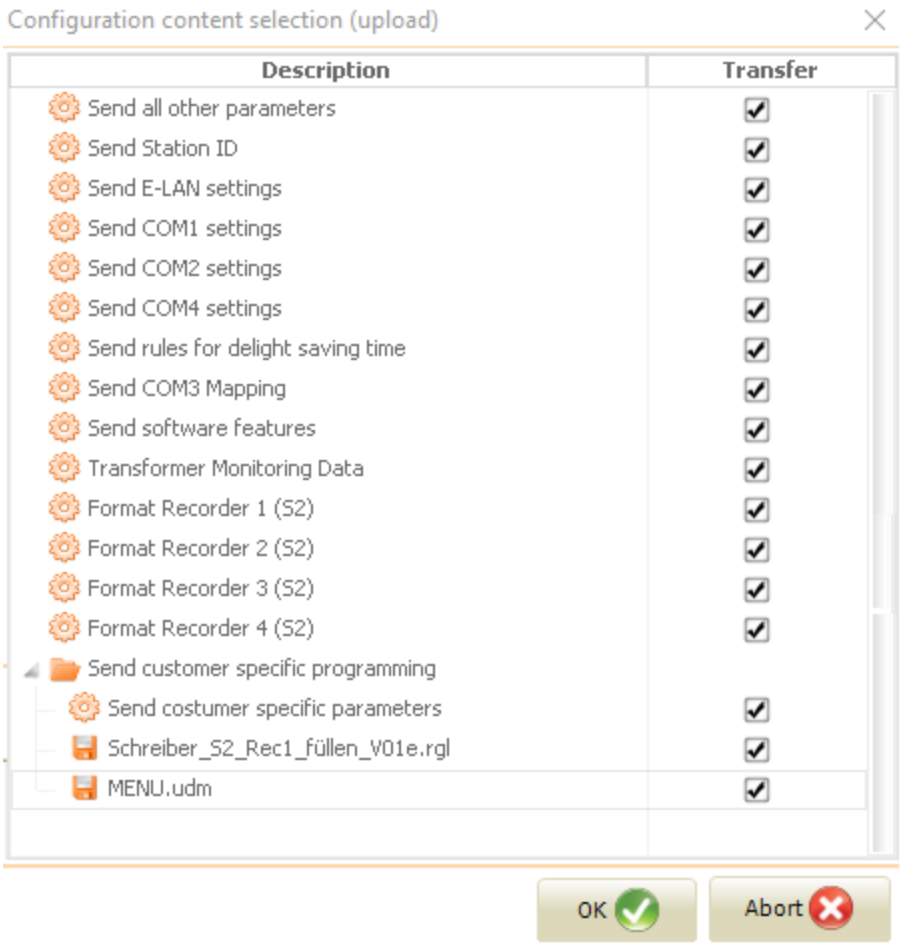


To download **individual parameter values** from the device, mark the desired parameter in the *Parameters table* and use the keyboard shortcut Ctrl + R[196]. Once the parameter has been loaded from the device, the colour of the parameter icon in the *Parameters table* changes to green. Now, the progress bar outputs: "Parameter successfully received".

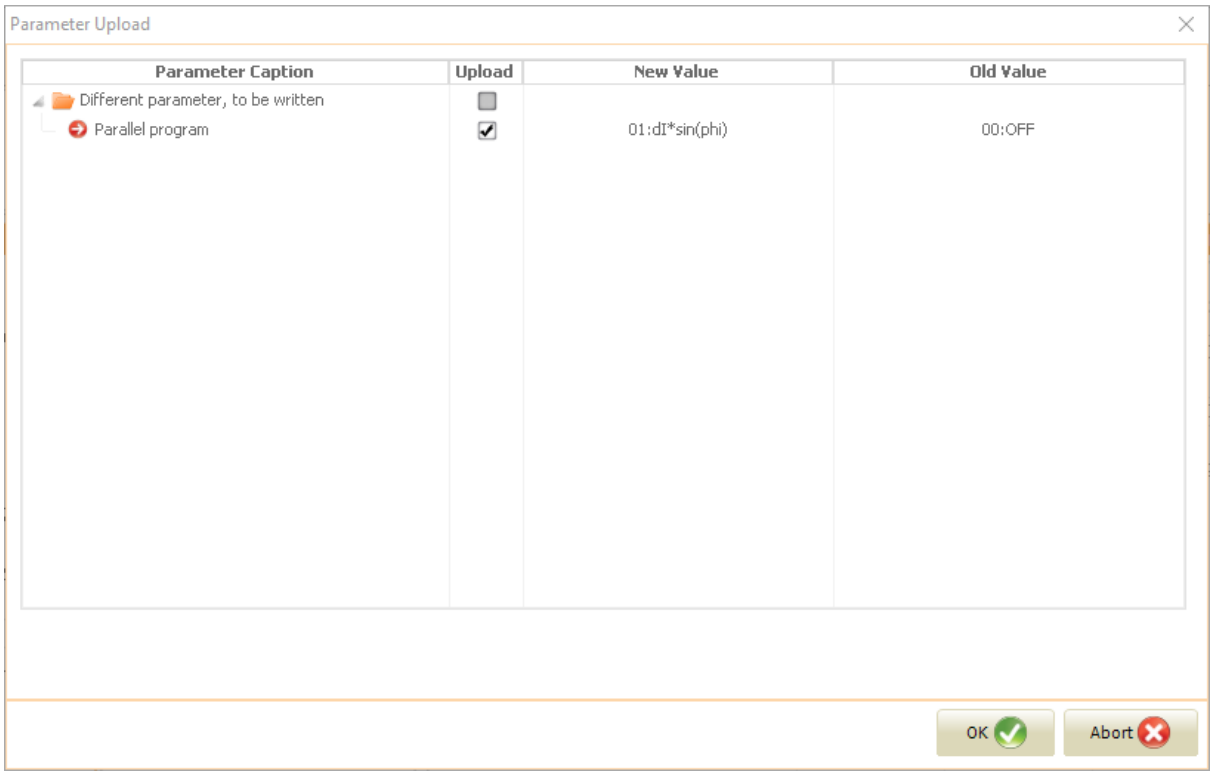
Upload

Once parameter sets are finalised technically, they can be loaded on to the desired device. If the parameter changes that were made only affect a certain section of the parameter set, you have the option (after clicking the *Upload* button) of limiting the upload to this area in the window *selection of the configuration contents*. Available background programs are detected by the *Upload* routine and are also offered for selection.

For example, the following figure depicts the selection categories which are offered during a parameter upload to a *REG-D* device. They may however differ for other device types.



Before finally being overwritten on the device, all modified parameters which differ from the parameters in the device are summarised in the overview window of the *Upload* routine (aka DIFF). The following overview window shows an example of a change made in the parallel program. The state of the program in the device was set to *switched off (00:OFF)*. The change of the parameter value and the subsequent upload causes the device to switch to the parallel program *01: dI*sin(phi)*.



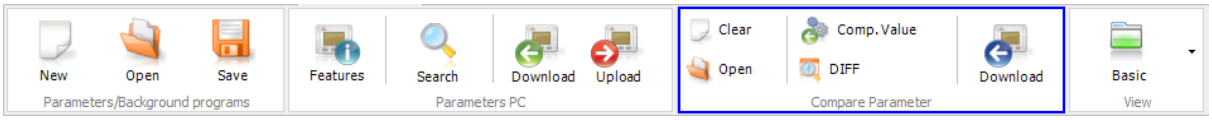
It is possible to identify the differences in the *parameter table*. For this, click on a line in the *DIFF*-window and the associated parameter is displayed in the *parameter table.*

To send **individual parameter values** to the device mark the desired parameter and use the keyboard shortcut Ctrl + E[196] . Once the parameter has been sent to the device, the colour of the parameter icon in the *Parameters table* changes to green. Now, the progress bar outputs: "Parameter successfully sent".

NOTE!

Please note that no upload is possible in the *User* role with *READ ONLY* privileges. The *Upload* button is deactivated.

5.2.1.3 Working with comparison parameter sets



The visible parameter values of the parameter set open in the *Parameters table* (see visibility settings[49]) can be compared with another parameter set (comparison parameter set). The comparison parameter set can be loaded from a local directory as an *.aedx* file or directly from the device.

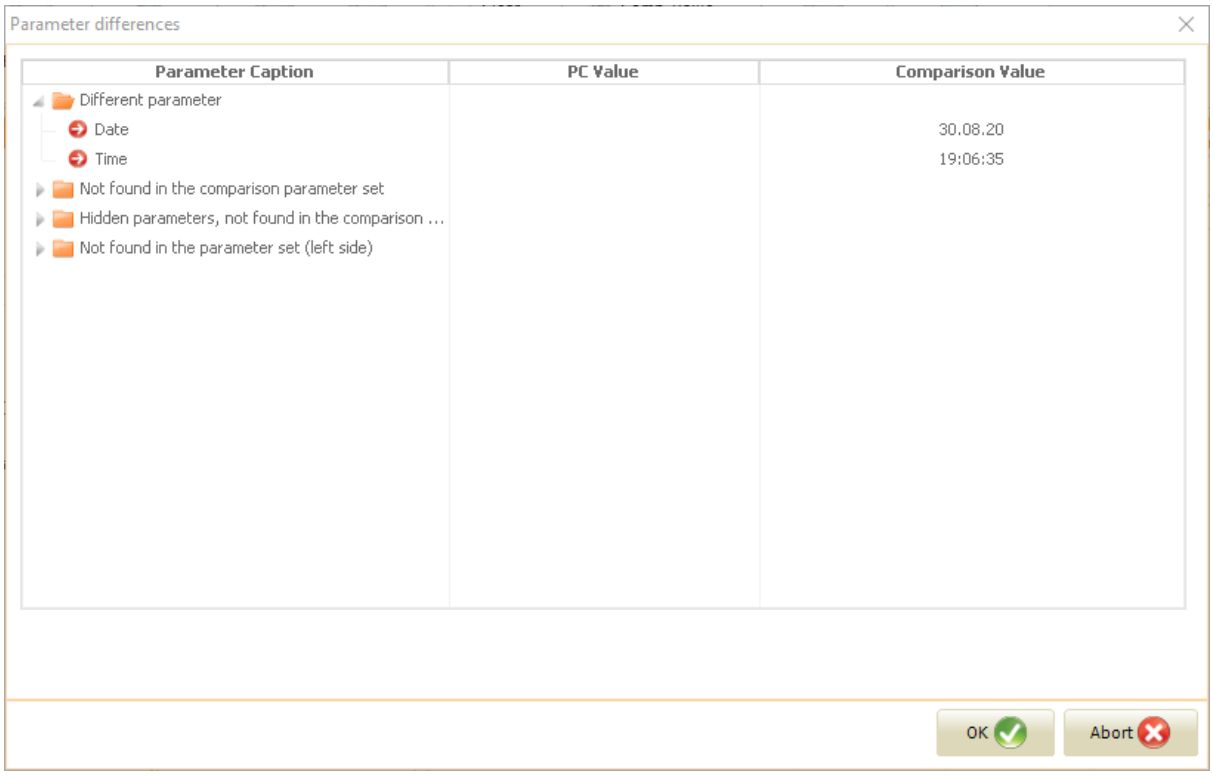
Open

The *Open* button loads the comparison parameter set as an *.aedx* file (or a device-specific import format, cf. opening parameter files[37]) from a local PC directory.

Download

The *Download* button loads the comparison parameter set from the device.

After a comparison parameter set has been opened or loaded, the *parameter differences* window appears. The following figure depicts how the parameter differences are sorted in folders. In the *PC value* column the parameter values of the opened parameter set can be found. In the *Comparison value* column the values of the comparison parameter set can be found.

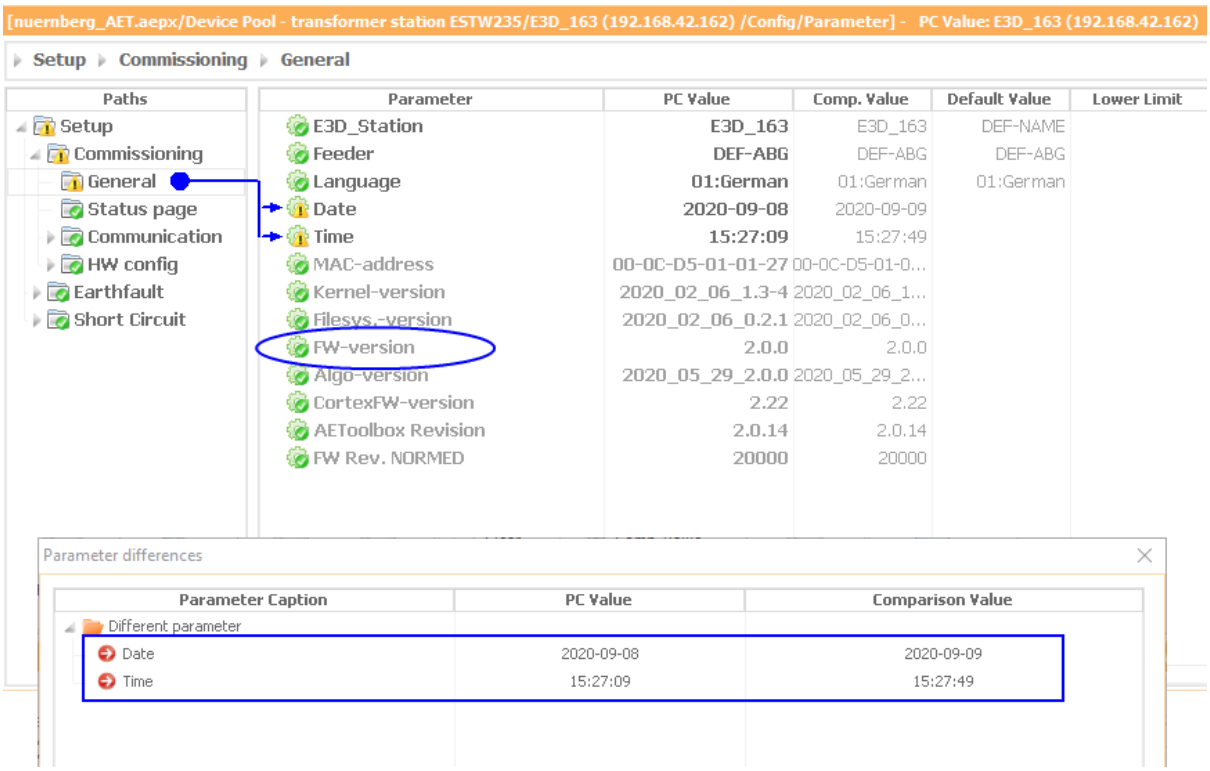


1) The *different parameters* folder registers parameters that have the same *ID* and different parameter values.
2) The *not in the comparison parameter set* folder registers parameter values which are only contained in the *PC value* column.
3) The *hidden parameters, not in the comparison parameter set* folder registers parameter values in the *PC value* column which are only contained in the *PC value* column and, due to visibility settings *(basic, advanced, full)*, still don't appear in the *Parameters table*.

NOTE!	Please note that in the visibility setting *full*, hidden parameters may still appear. These parameters are only relevant for the manufacturer, and can be ignored.

4) The *not in the parameter set (on the left)* folder registers parameter values which can only be found in the comparison parameter set.

Clicking one of the different parameters in the *different parameters* window causes the parameter to be marked in the *Parameters table*. Here, all different parameters and their sub-folders (paths) are marked with an *exclamation mark* icon.
Example: In the following figure it is the *date* and *time* parameters with the path *Setup/Commissioning/General.* The parameters with the same values are marked with a green *tick mark* in the *Parameters table* (here i.a.: the *FW-version* parameter).



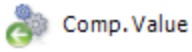
Once a comparison parameter set has been loaded in the *Parameters table*, the *DIFF* and *Comparison value* functions are activated in the toolbar. The *parameter differences* window can be closed, and can be called up again at any time with the *DIFF* button.

DIFF

The *Diff* button opens the *parameter differences* window after it has been closed. The contents of the last comparison of the parameter sets is retained.

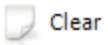
It is possible to identify the differences in the *parameter table*. For this, click on a line in the *DIFF*-window and the associated parameter is displayed in the *parameter table.*

Comparison value



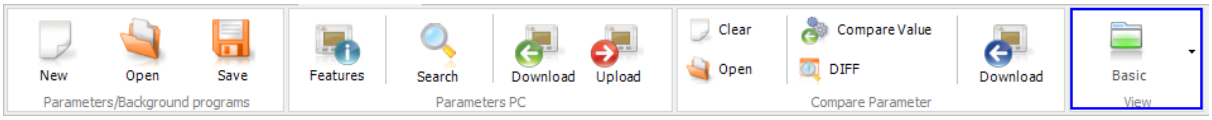
The *Comp. value* button replaces the parameter value in the *PC value* column with the parameter value from the opened/loaded comparison parameter set (*Comparison value* column). Mark the parameter (or folder) and click the *Comp. value* button. Now the replaced parameter values are also marked with a green tick mark.

Clear

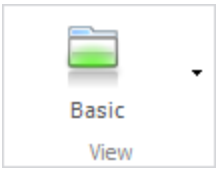


The *Clear* button removes the comparison parameter set that was last opened or loaded from the device from the *Parameters table*, while the original values of the *Parameters table* are retained. All markings are removed. The *DIFF* and *Comp. value* buttons are activated.

5.2.1.4 Visibility settings



View

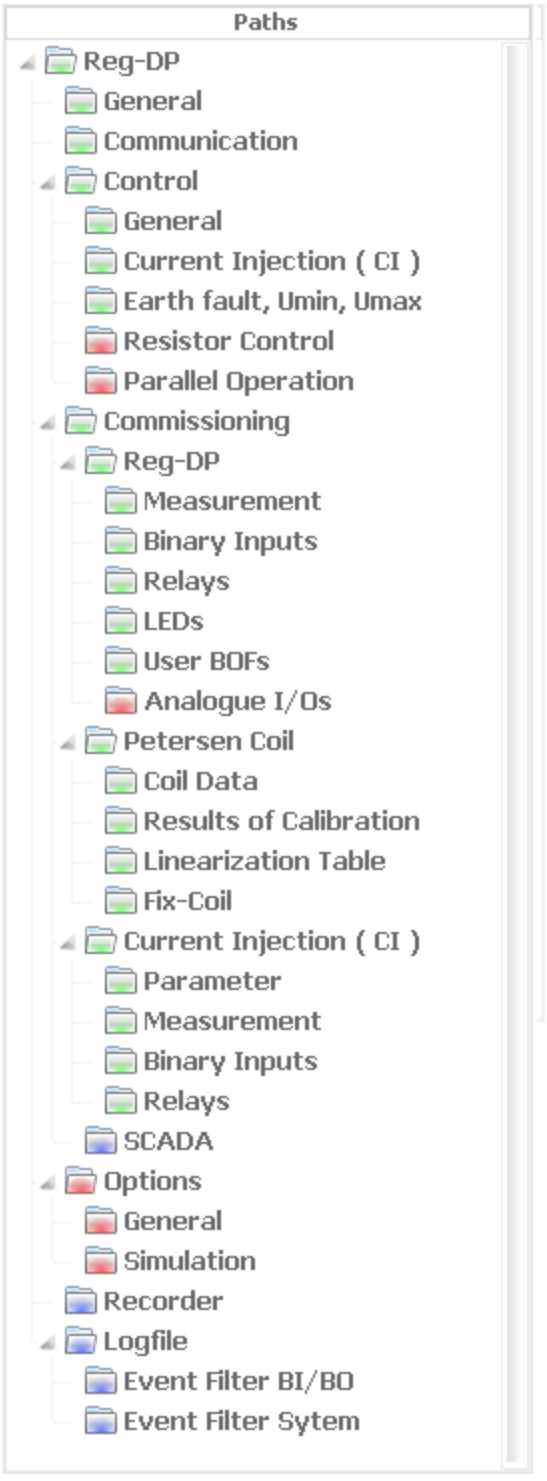


1) The button *View* in the device toolbar with parameter functions

The *View* button opens a drop-down list to select the following visibility levels in the *Parameters table*:

- Basic (the parameters visible here are definitely relevant for initial commissioning);
- Advanced (the parameters added here are recommended for checking when commissioning);
- Full (the parameters added here include special functions or functional enhancements).

Depending on the visibility level the parameter set in the *Paths* column is assembled in standard, extended or full form.
Example: If the parameter set of a REG-DP is fully assembled, the structure tree is displayed as follows:



2) The button *View* in the device toolbar wit text editor functions

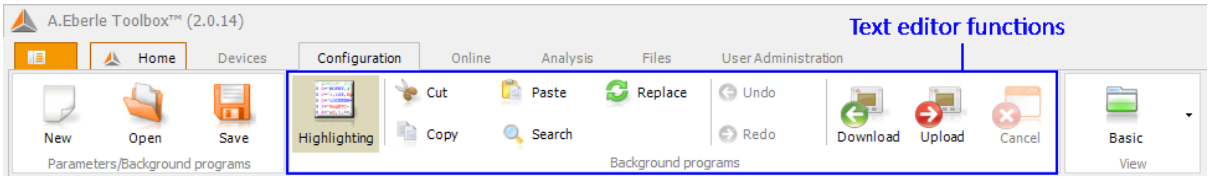
In connection with text editor functions the button *View* has a number of functions for the work with background programs:

- Basic and Advanced. The *View* level only allows *reading* mode in the text editor. In *REG*-devices background programs only the file header is displayed.
- Full. The *View* level enables the *writing* mode. The background program can be changed.

5.2.2 Configuration toolbar with text editor functions

This section describes the functions of the *Configuration toolbar* that pertain to work with background programs. The text editor functions are activated when

1) a background program that exists in the project overview is marked;
2) a background program is opened using the right-click on a *device-/device pool* entry over drop-down list *New* and the *File* function;
3) a background program is imported using the *Open file* button in the *Home* module;
4) a background program is opened using the *Open file* button in the *Devices* module.



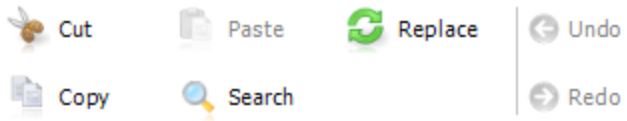
Highlighting

The *Highlighting* button switches the colour highlighting of syntax-dependent keywords on and off. The following figure depicts highlighted syntax for the *Script* language in the text editor (highlighting switched on).

nuernberg_AET.aepx/Device Pool - transformer station ESTW235/E3D_163 (192.168.42.162) /LUA SCRIPTS/eor3d_conmaster.lua

```
#!/usr/bin/lua
require("lib_eor3d_lua")

os.exit()

-- printf
printf = function(s,...)
           return io.write(s:format(...))
         end -- function

--
-- SCRIPT EXAMPLES START
--
printf("EOR3D CONAMSTER * START * MAIN\n")

-- INVERT vBE for main
for i = 1,96,1
do
        line = eor3d_command("E3D_vBE " .. i)
        tmp = tonumber(line)
        if(tmp == 0) then
                tmp = 1
        else
                tmp = 0
        end
        eor3d_command("E3D_vBE " .. i .. " = " .. tmp)

        line = eor3d_command("E3D_vBE " .. i)
```

Group of functions for editing program code



The following editing functions are available:

- Cutting a section of program code and subsequent pasting;
- Copying a section of program code and subsequent pasting;
- Searching for a character string in the program code;
- Replacing a character string in the program code;
- Undoing last change in the program code;
- Redoing last change in program code.

The usual keyboard shortcuts are also available for use in the text editor (see keyboard shortcuts[196]).

Download, Upload, Cancel

These buttons pertain exclusively to the download and upload of the background program that is currently being edited in the text editor.
The *Download* button is active when the background program open in the text editor exists on the device (name comparison). If the name of the program was changed in the project overview,

AEToolbox won't find the program on the device any more and doesn't offer download for the marked background program (*Download* button inactive).
Clicking the *Upload* button causes the background program open in the editor to be loaded on the device.
Clicking the *Cancel* button causes the running *upload* routine to be cancelled.

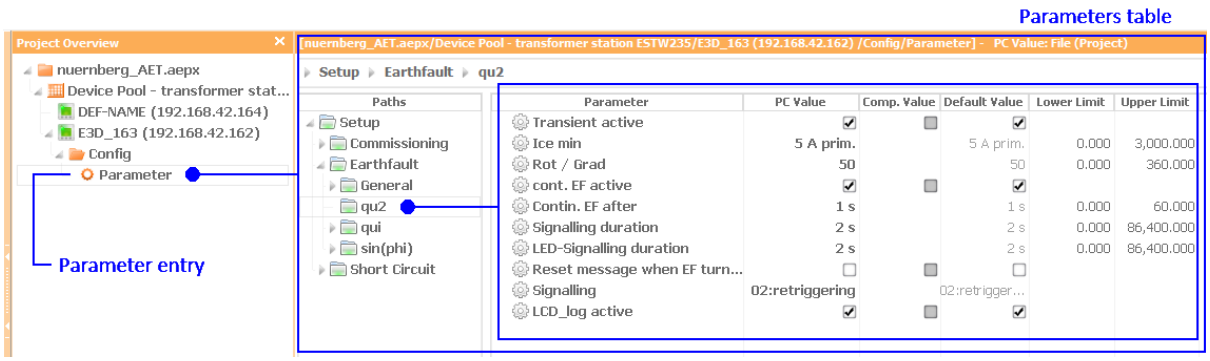
NOTE!	Please note that • the *upload* routine may be time-consuming for large files (see progress bar output); • in the case of *REG* devices it may only be possible to place one *REG-L* and *UDM* on the device. In this case the *upload* routine would overwrite any file on the device; • adequate privileges for the use of the *Upload* function may be required (starting with *Operator* user role). Otherwise the *Upload* button remains inactive.

In AEToolbox the background programs and files on the device can be verified in the *Files*[87] section module.

5.2.3 Parameters table

This section describes the *Parameters table*, which makes the contents of a parameter file visible and editable for the user.

The contents of a parameter file are displayed in the *Parameters table* when a *parameter* entry is marked in the project overview. The following figure depicts an example of a parameter file under the *device* entry *EOR-3D Deditec (192.168.42.163).* The structure of the parameter set can be seen in the *Paths* column as *a* tree structure. When a folder is marked (e.g. *qu2* under *earth fault*), parameters and parameter values become visible (as well as other sub-paths, as folders) in the table on the right.



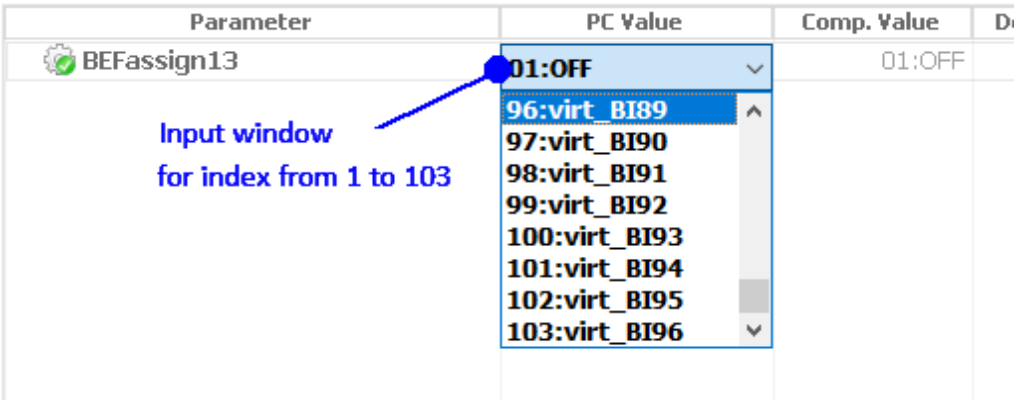
Description of the individual columns of the *Parameters table*

- *Parameter* column - parameter names;
- *PC value* column - editable parameter values of the parameter set from the project overview;
- *Comp. value* column - parameter values of the comparison parameter set (see also Working with comparison parameter sets 46 section);
- *Default value* column - standard values recommended by manufacturer;
- *Lower limit* column - lower limit of threshold value range for editable parameter values from the *PC value* column;
- *Upper limit* column - upper limit of threshold value range for editable parameter values from the *PC value* column;
- *Help* column - comments of the manufacturer, or linked documents for further clarification.

Editing the parameter values

To adjust a parameter click the cell in the *PC value* column. The parameter values in the *PC value* column can be edited as follows:

1) Direct input of the values within the threshold value range;
2) Selecting/deselecting the checkbox for Boolean values;
3) Selecting the parameter value from the available drop-down list s. An index-based search function is integrated in the drop-down list s. After the drop-down list folds down, the index is entered in the input window and displays the associated value. This is particularly helpful with long selection lists.



After a parameter value has been adjusted, the colour of the parameter icon changes to red.

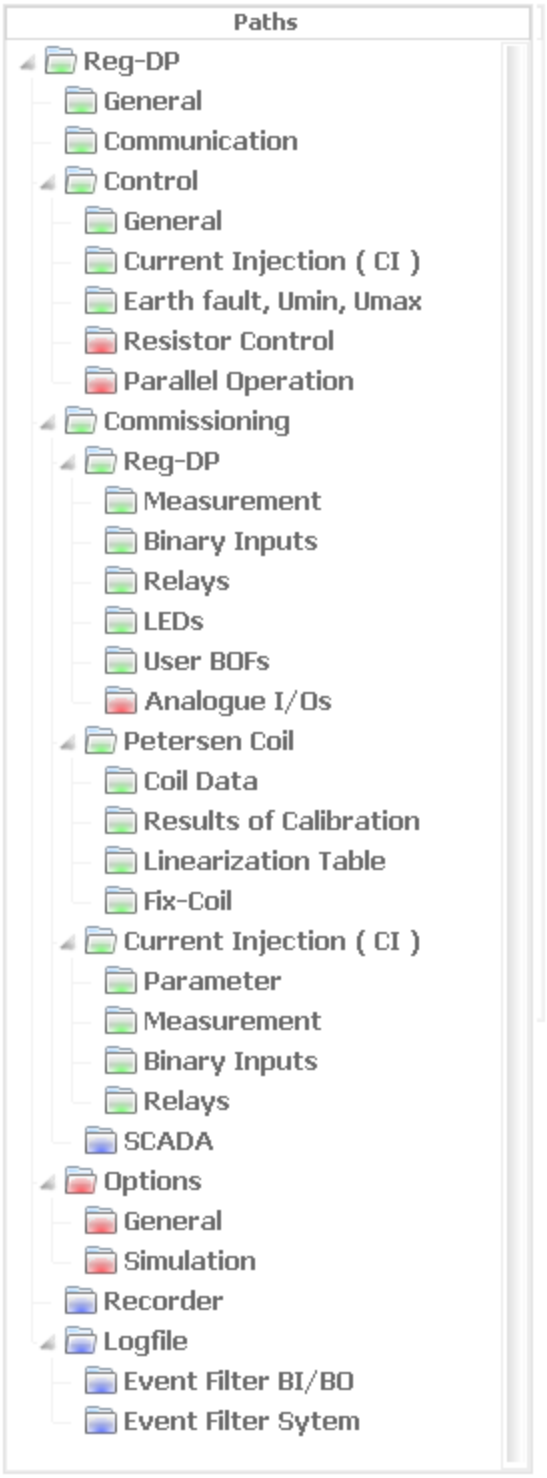
Visibility concept of the *Parameters table*

To better organise the table, three visibility levels were introduced:

- Basic;
- Advanced;
- Full.

The button to select these levels can be found on the right in the *Configuration toolbar* (see also visibility settings 49).

Each visibility level is represented by a colour in the *Parameters table*. For example, in the full structure of the parameter set the paths are displayed as follows:

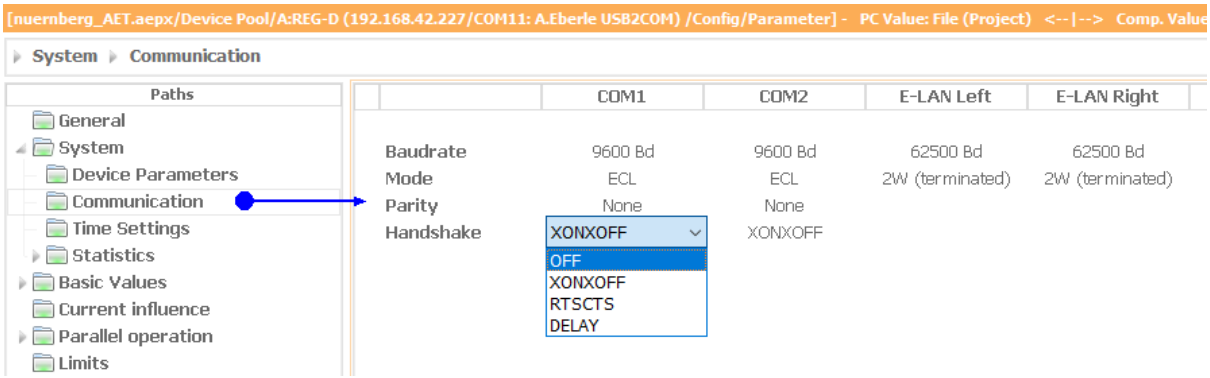


Printing the parameter list
To print a parameter list from the *Parameters table*, refer to the Printing a parameter list 166 section.

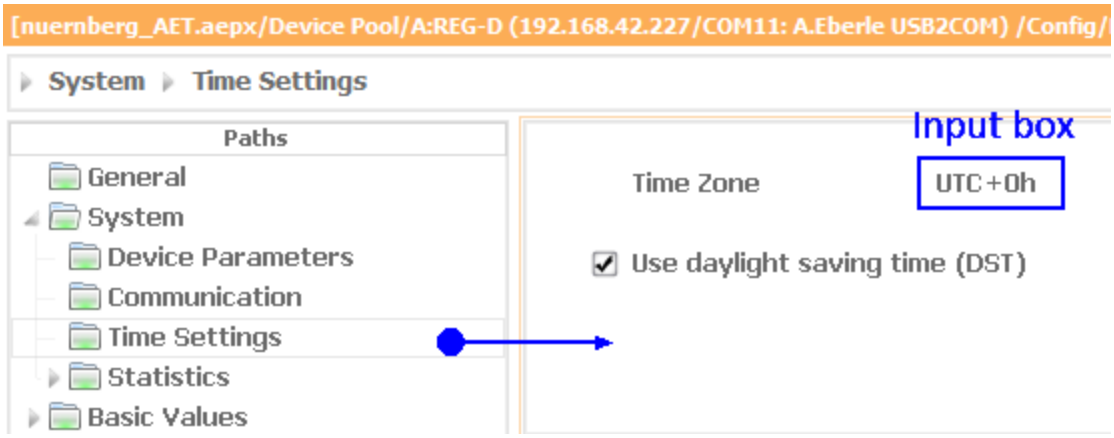
5.2.4 Special editors for the Parameters table

For select parameter groups for *REG* devices special editors were developed in AEToolbox which go beyond the typical table view of the *Parameters table*. The main special editors are explained below:

1) *Editor for communication settings*
The *editor for communication settings* pertains to the *communication* parameter group. Here it is possible to configure the settings for baud rate, mode, parity and handshake per COM port, as well as E-LAN parameters.

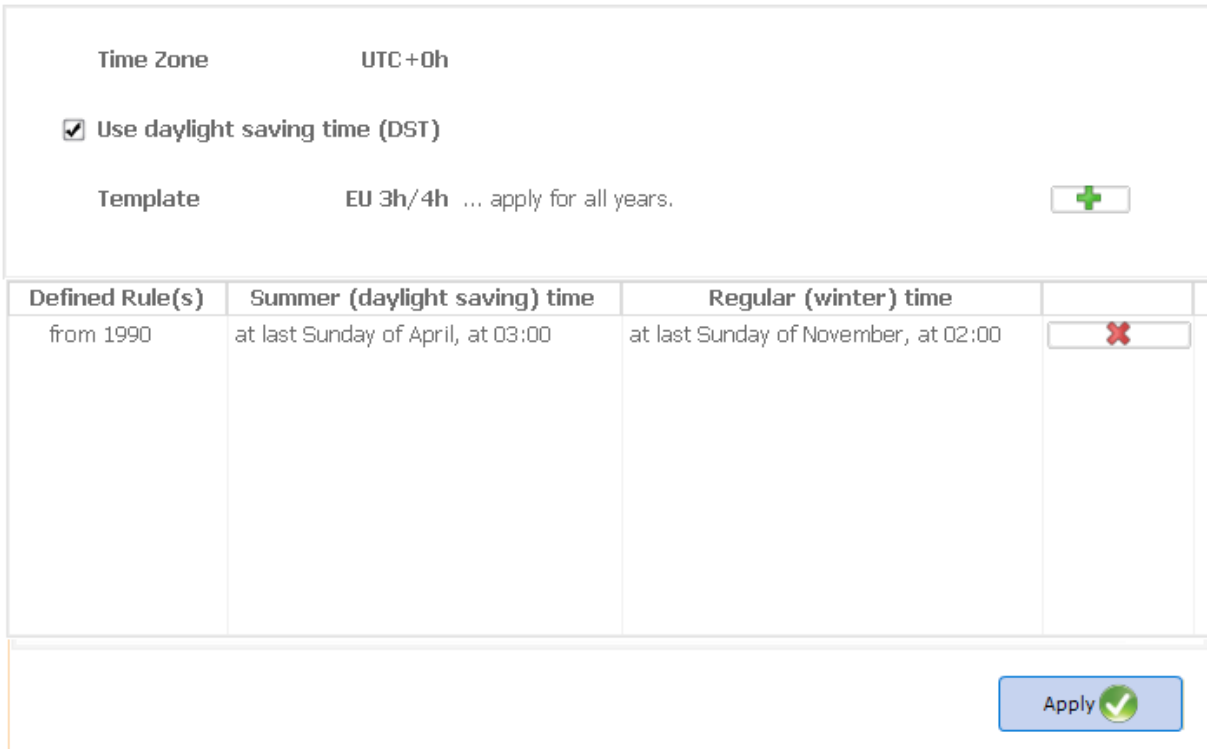


2) *Daylight savings/normal time editor*
REG devices can accept one rule per year for adjusting from daylight savings to normal time (and back) in a period of time from 1990 to 2078. This editor pertains to the *time settings* parameter group and contains settings for the local time zone and time changes on the end device. The general time zone contains an offset of the local device time to UTC.



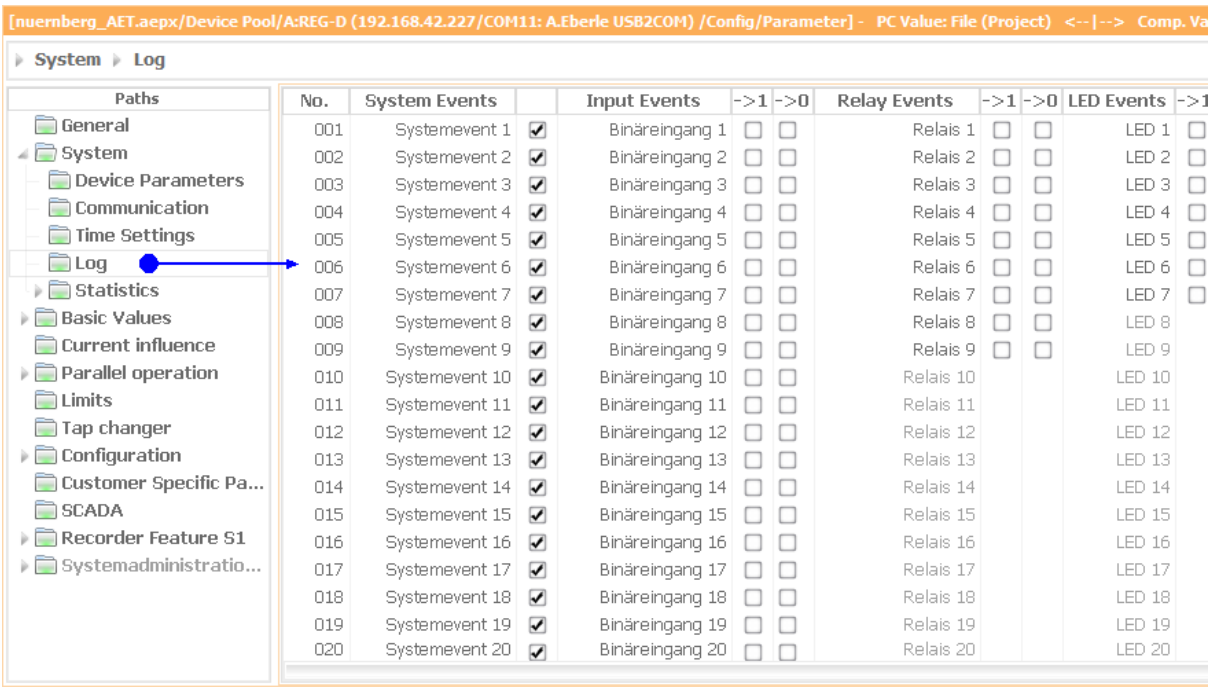
By selecting the checkbox you activate *Adjust daylight savings/normal time*. A table appears which displays existing rules for time adjustment. In the templates you can use the + button to

create new rules or the **X** button to discard the rules. An option is available to generate the template for all years, for the current year, or for all years starting at a certain time (year).



3) *Log event editor*

With the help of the *log event editor* you can define which system events and binary signals are to be recorded in the log of a device (*logbook* parameter group). In the first column, *System events*, you can specify whether a system event is to be recorded. For binary signals (*Input events, Relay events, LED events* columns) you can specify whether the onset of an event (->1) or the end of an event (->0) or both are to be logged.

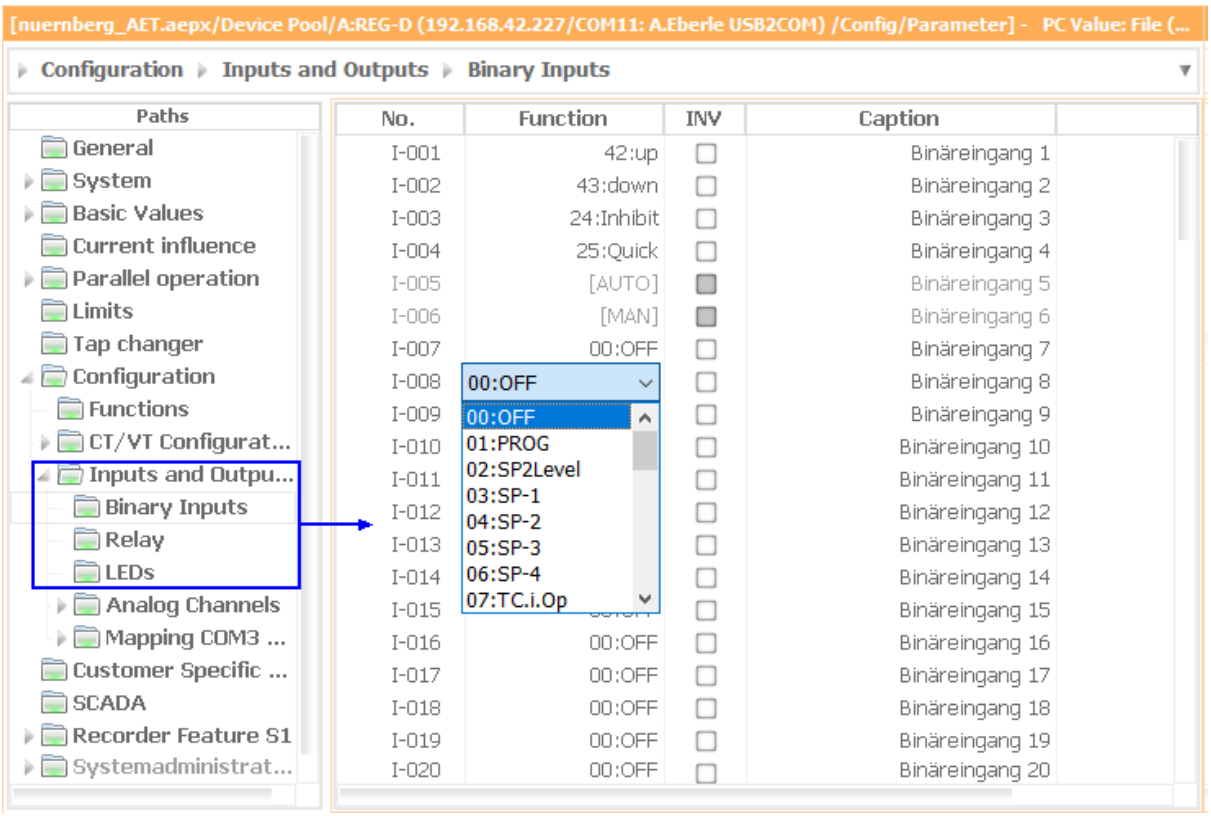


4) *Binary signal editor*

With the help of the *binary signal editor* you can define the software function that is to be allocated to a binary signal of the device. The allocation is made for the following parameter subgroups in the *Inputs and outputs* folder:

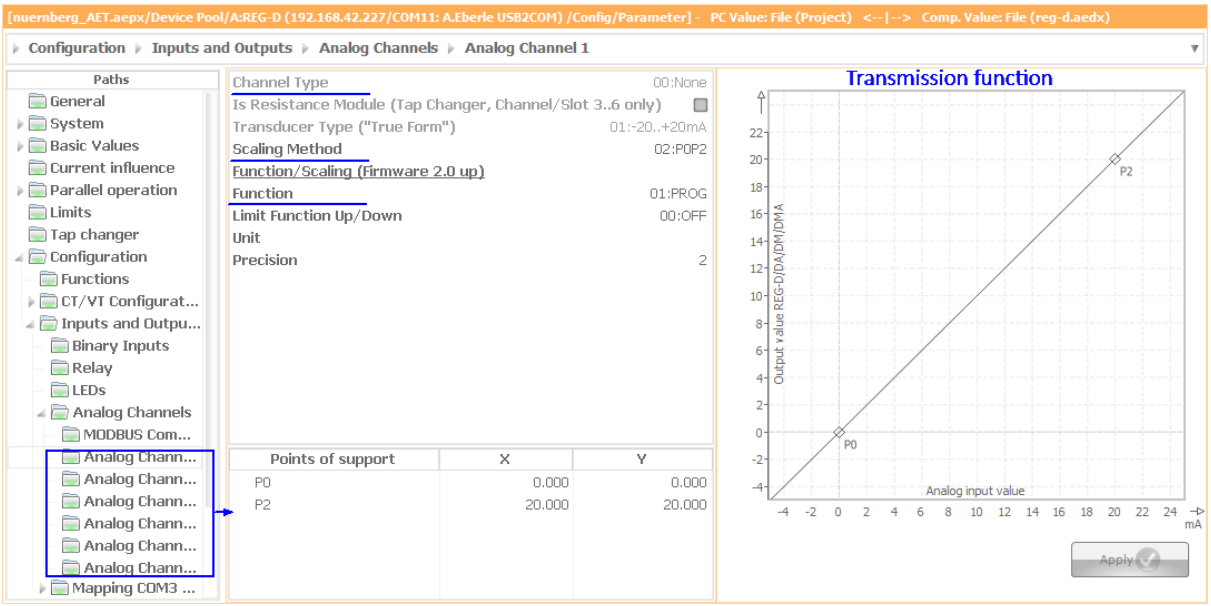
- Binary inputs;
- Relays;
- LEDs.

The following figure depicts the view of a *binary signal editor* for the parameter subgroup *binary inputs*. By double-clicking the Function column of a binary signal a selection of all available functions is displayed (e.g. AUS, PROG, SW2Pegel, SW-1, etc.). In the *INV* column you can invert corresponding binary signals.



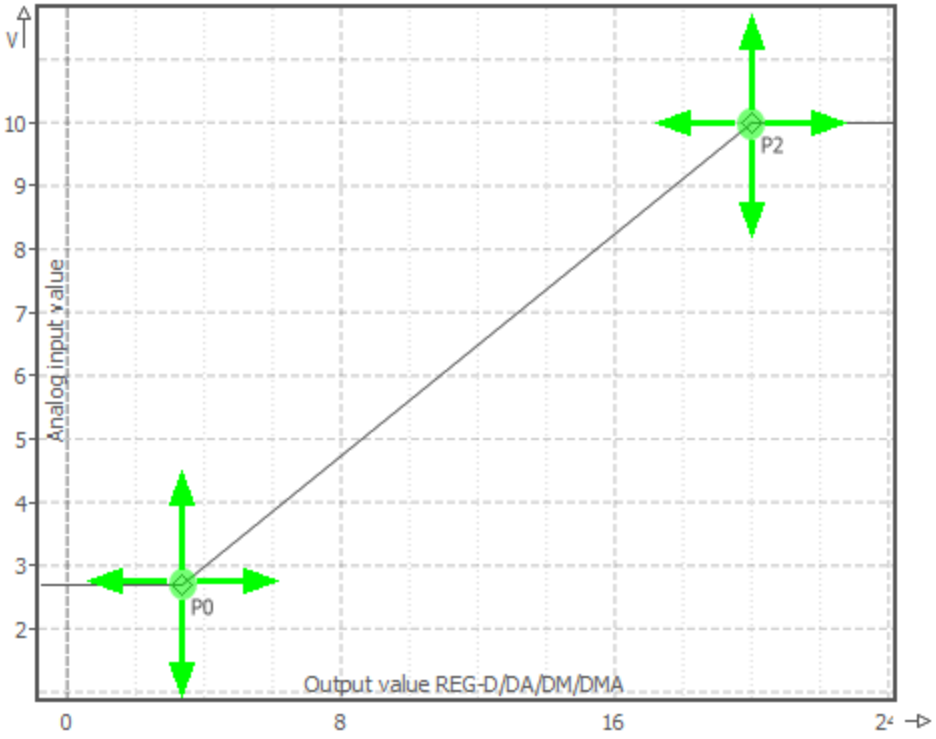
5) *Analogue channel editor*

With the help of the *analogue channel editor* analogue channels are configured in the *REG* device. The configuration is available for parameter subgroups *analogue channel 1* ... *N* in the *Inputs and outputs* folder.



The *analogue channel editor* principally offers three groups of settings: Channel type, scaling type and functions of the scaling (starting at firmware 2.0). The relevant scaling type changes along with corresponding functionality depending on the channel type set (hardware-dependent).
The scaling type describes the transmission function displayed in the graphic, with corresponding reference points (see *Points of support* table). After selecting the scaling method the graphic is updated.

Changes to the transmission function in the graphic display: To move a point, click and hold it with the left mouse button and move it to the target position. Releasing the mouse button will place the point in the corresponding position.

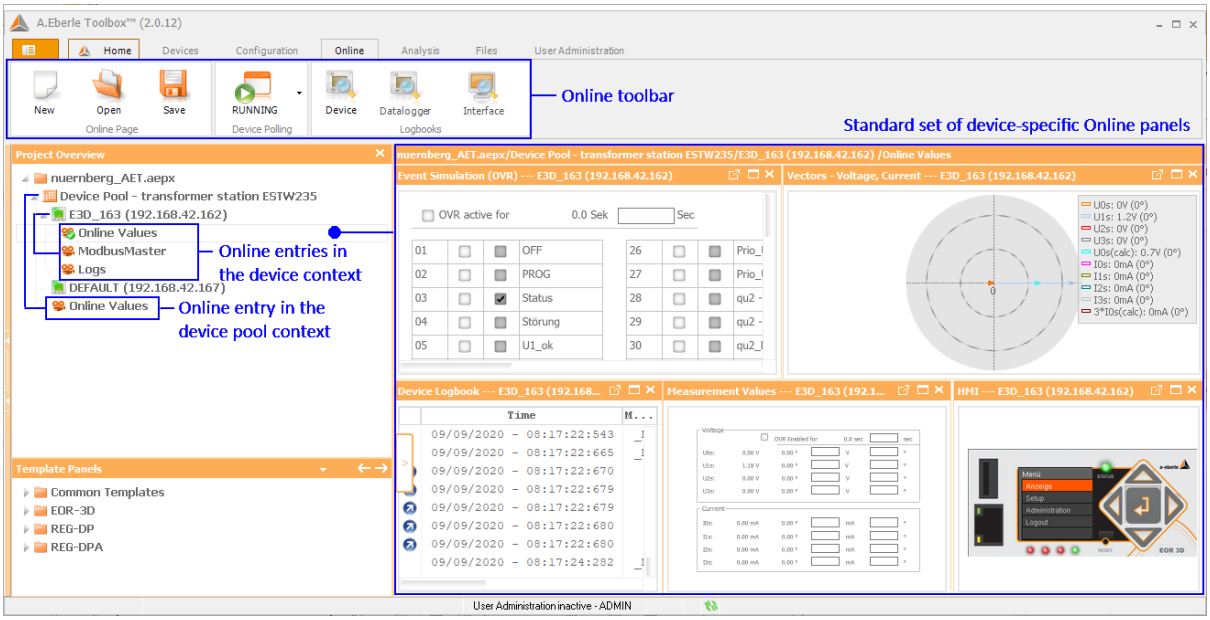


5.3 Online

The *Online* section module provides a work area for the remote virtual display of front control panels, measurement and process values, LT networks of multiple devices (Modbus), as well as device-specific and AEToolbox-specific logs. The signal transmission has a latency of approx. 1 second. It is also possible to perform control commands for front control panels, terminal commands, changes to set values as well as simulations.

The *Online* module can be started in the *device* context or in the *device pool* context. Select the desired *device* or *device pool* entry and call up the *Online values* function (right-click *device/device pool* entry in the project overview, *New* function and then *Online values* function).

Starting the *Online* section module in the *device* context generates a set of *online* entries in the current project, each dependent on the device type. For example, in the *device* context of an *EOR-3D* device, three subsequent *online* entries are set up in the project overview: *Online values, ModbusMaster* and *Logs.* Each of these entries has a standardised and device-specific arrangement of *Online* panels, which are displayed in the main view. The *Online* panels display measurement and process values, the device logbook as well as the front panel of the *EOR-3D* device, for example, as depicted in the following figure.



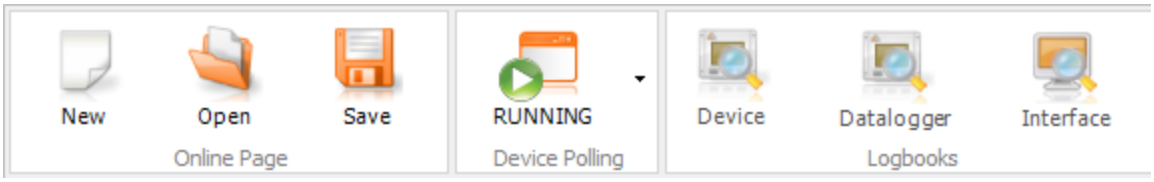
Calling up the *Online* module in the *device pool* context only generates one entry: *Online values*. This provides a device-independent workspace, where *Online* panels of different devices can be allocated manually (see Online panels and templates 65 section).

The following sections describe functions of the *Online toolbar* and work with different *Online* panels and templates.

5.3.1 Online toolbar with functions

This section describes the functions of the *Online toolbar*. The *Online toolbar* is activated when

1) an *online* entry that exists in the project overview is marked;
2) the *Online* section module is called up from another section module via the respective tab;
3) the *Online* section module is called up via the *Online data* icon in the *Home* module;
4) the *Online* section module is called up via the *ONLINE* icon on the device widget.

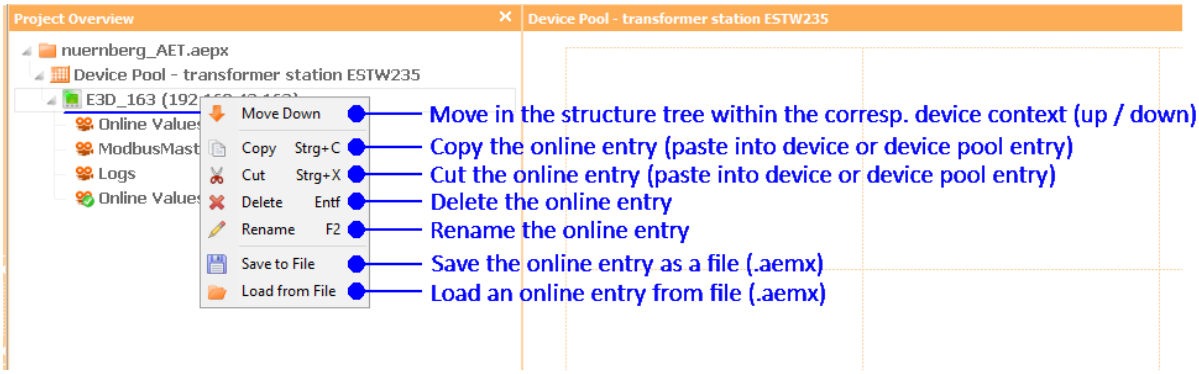


Generating, opening and saving *online* entries

New

The *New* button generates a new set of device-type-dependent *online* entries in the project overview. The entries are set up under the device in which the *Online* module was currently opened.

Once the *online* entries have been generated in the structure tree, you can use the other functions of the project overview. The related drop-down list with functions is called up by right-clicking one of the *online* entries. The following figure gives an overview of these additional functions.



Open

The *Open* button imports a locally saved *.aemx* file. The *.aemx* format was developed for saving workspaces in the *Online* module. The file is imported in the current *device* or *device pool* context.

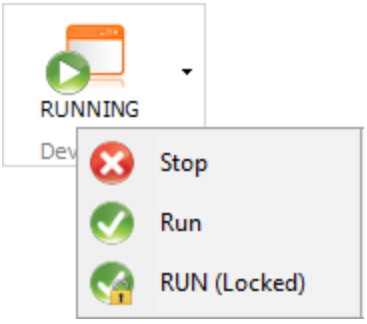
NOTE!	Please note that after loading an *.aemx* file, it may still be necessary to allocate the loaded panel to the65 respective device.

Save

The *Save* button saves the *online* entry that is currently open in your local directory as an *.aemx* file. The device allocations as well as the selection and arrangement of *Online* panels are saved as well.

Polling of measurement and process values: Start and stop

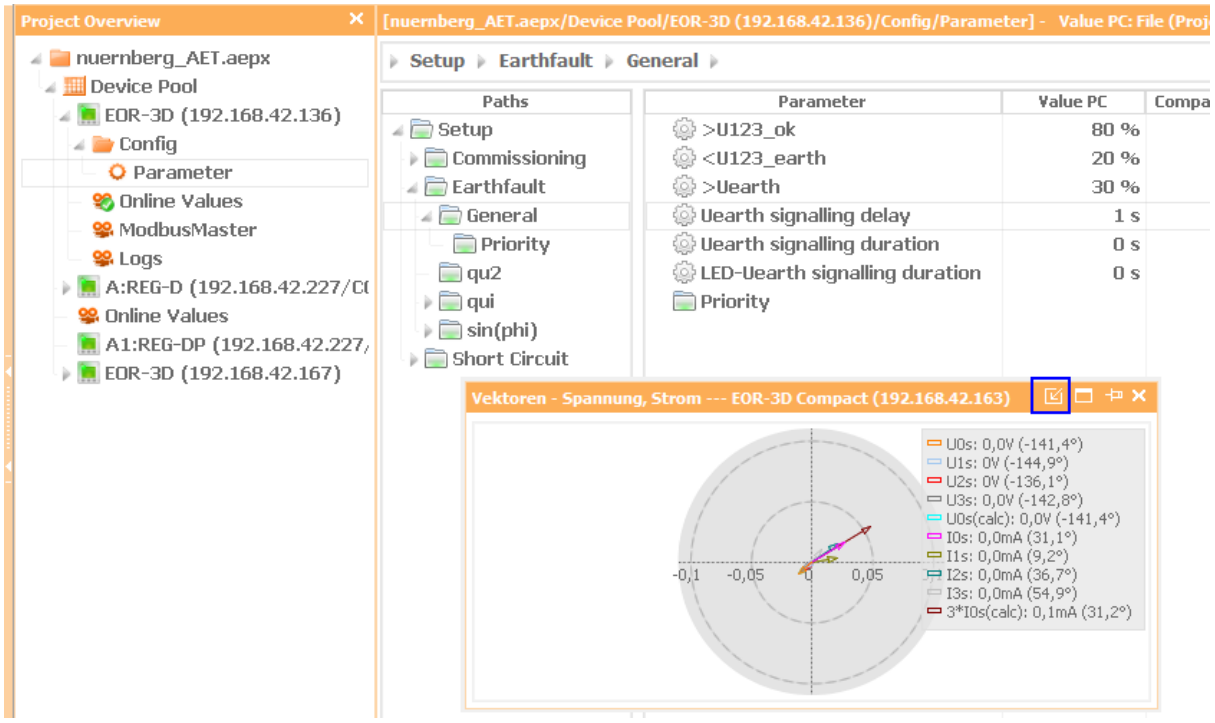
The automatic start of cyclic queries of measurement and process values is achieved by calling up the *Online* module in the *device* context. Using the following button with drop-down list it is possible to manually control the polling for selected *online* entries.



The button itself displays the current polling status of the marked *online* entry. drop-down list offers the following manual settings:

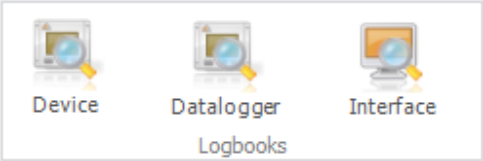
Polling setting	Description	Output on the button
Stop	Polling is suspended manually	*STOPPED*
Run	Polling is started manually and runs until the current *online* view is exited	*STARTED*
Run (Locked)	Polling is started manually and runs until the queries are stopped manually	*STARTED (L)*

The *Run (Locked)* setting can be helpful, for example, when the *Configuration* module is opened and measurement values are to be observed simultaneously in one or multiple *Online*panels. To achieve this an *Online* panel is placed outside of the *Online* module (or outside of the minimised AEToolbox application window). First switch on the polling setting *Run (locked)* for the relevant *online*workspace. Then click the *docking* icon at the upper right on the panel edge. Now you can switch to the parametrisation and place the panel anywhere on the screen, as depicted in the following figure.

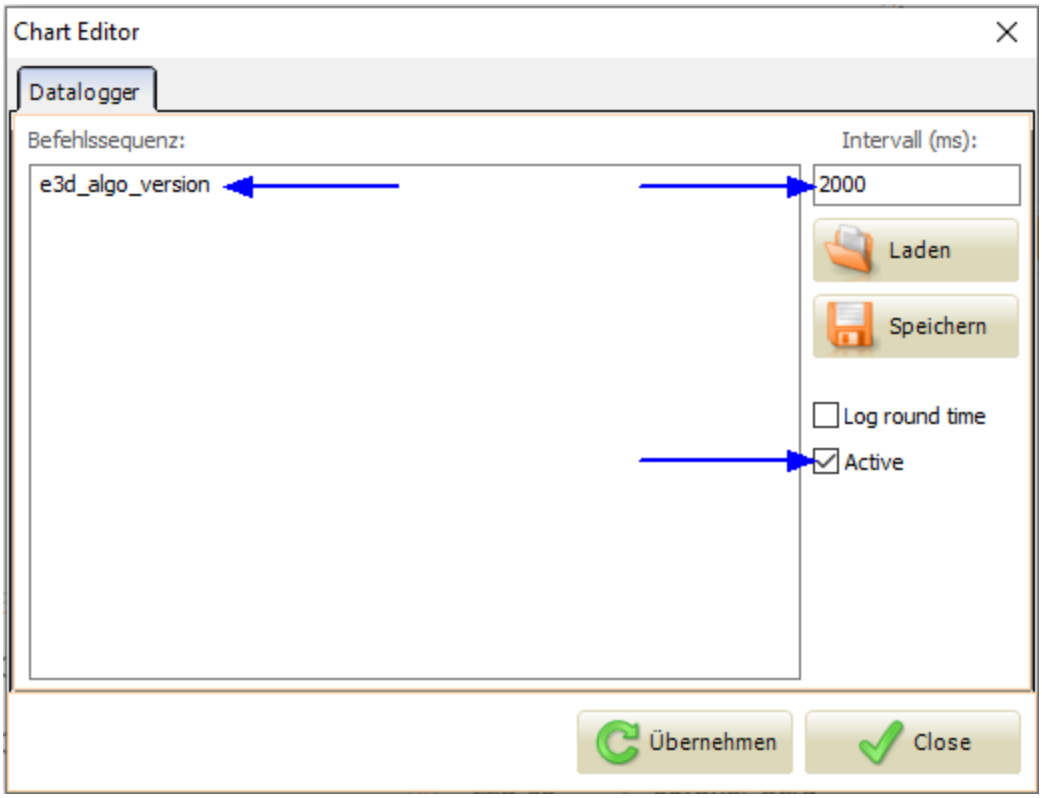


Panels for logbooks

The *Device, Datalogger and Interface* buttons add the respective logbooks to the currently opened *online* workspace.



The logbooks *Device* and *Interface* are event based. The logbook *Datalogger* displays an output of device answers on cyclic commands. To configure the request, please click first on the button *Datalogger* and then double click in the *Datalogger*-logbook. Enter a command sequence (e. g. for the EOR-3D "e3dalgo_version") and the interval for the cyclic request in the *Chart Editor* window. Then activate the configuration with the according check and press the button *Close*.



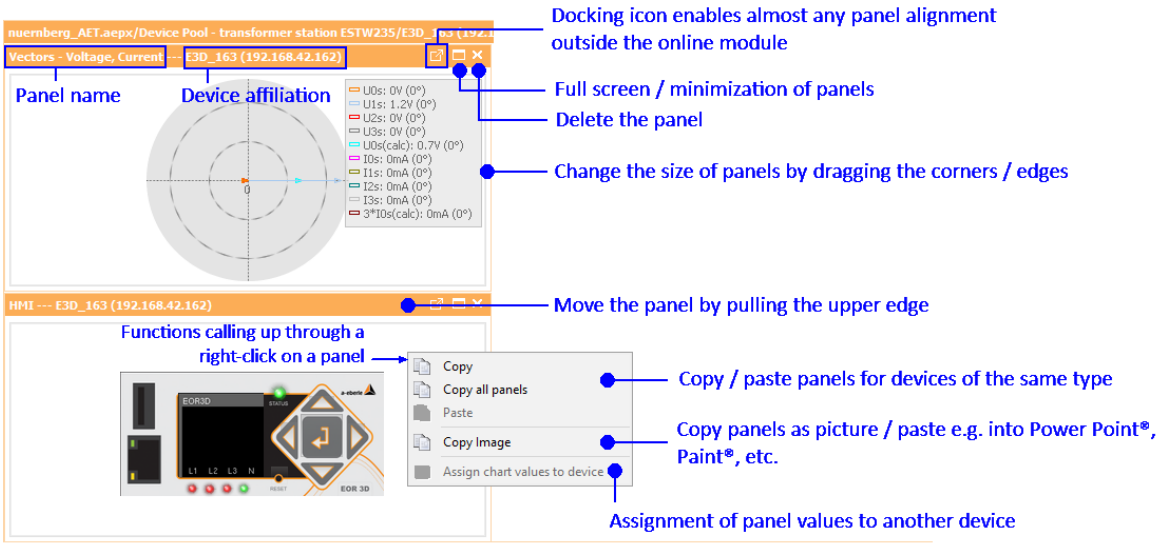
5.3.2 Online panels and templates

Each device-specific *online* entry has a standardised arrangement of *Online* panels which is displayed in the central main view after the start of the *Online* module. The *Online* panels display measurement and process values, logbook entries, device panels (front display) etc. Using special *Online* panels it is also possible to send control commands via the front control panel, with a

terminal, or by switching set values. It is also possible to perform simulations for measurement and status values on the end device (device-dependent).

Operations with *Online* panels in the main view

After calling up the module the arrangement of *Online* panels can be changed as desired. The following figure depicts a modified arrangement of *Online* panels and provides a quick overview of the main functions in the main view.

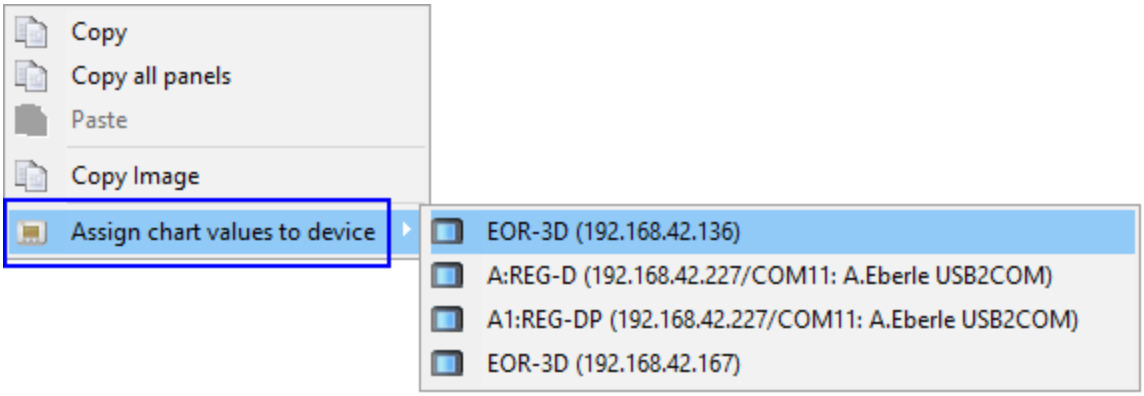


Working with templates

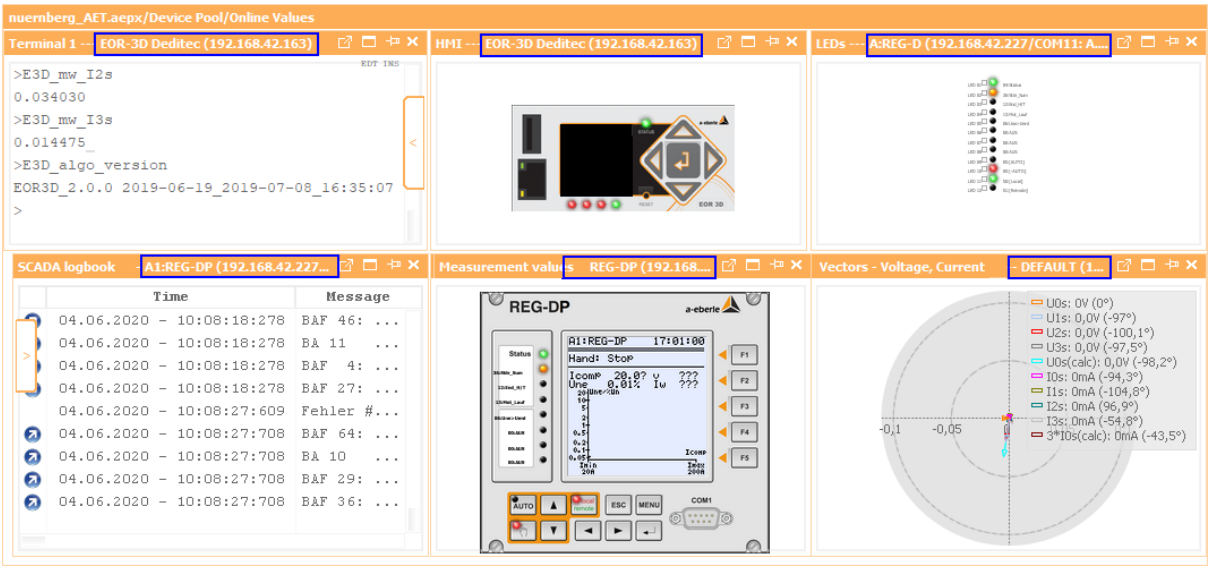
After starting the *Online* module a template work area appears under the project overview.

All the *Online* panels that are available in the standard arrangement in the main overview are contained in the respective device folder (*EOR-3D, RED-D/DP,* etc.) or in the *General templates* folder as panel templates.

Select one of the panel templates and use *drag & drop* to drag it into the central main view. If the chosen device type is correct the new *Online* panel will automatically be filled with values.
If the *Online* module was called up in the *device pool* context the new *Online* panels can be allocated to different devices (multiple types). Right-clicking the *Online* panel calls up the *Assign chart values to device* function; after that select the desired device.



The following figure depicts the cross-device arrangement of different *Online* panels in the device pool context.



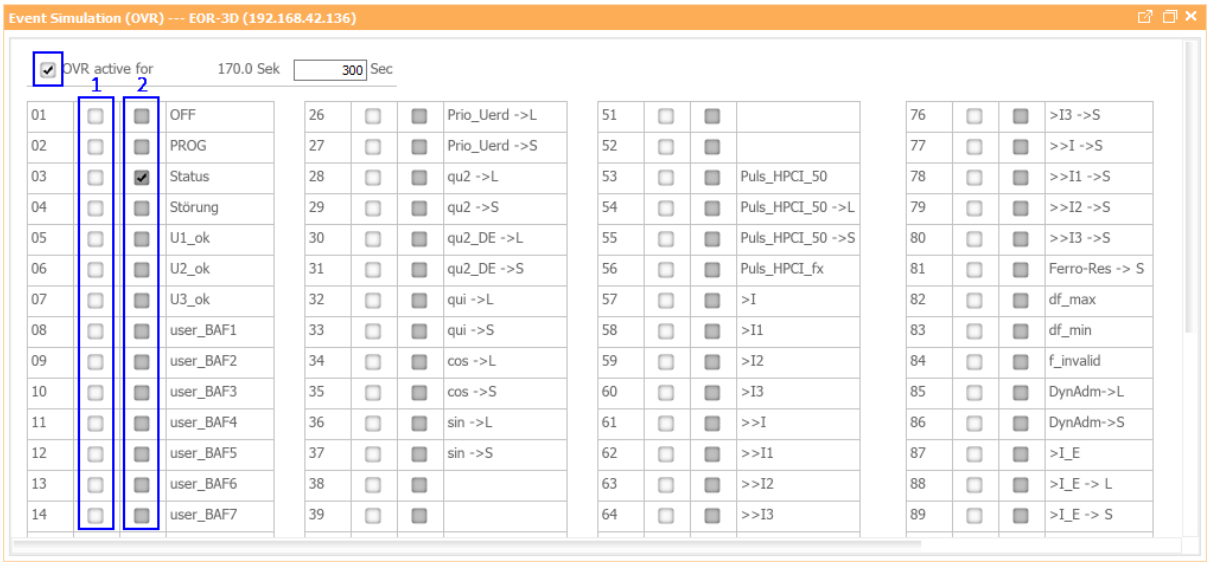
NOTE!	Please note that a cross-device arrangement of *Online* panels is not possible if the *Online* module was started in the *device* context. To be able to allocate *Online* panels to multiple devices, start the *Online* module in the *device pool* context. Select the *device pool* entry and call up the *Online values* function (right-click *device/device pool* entry in the project overview, *New* function and then *Online values* function).

5.3.3 Selected online panels

The following sections describe selected types of *online* panels.

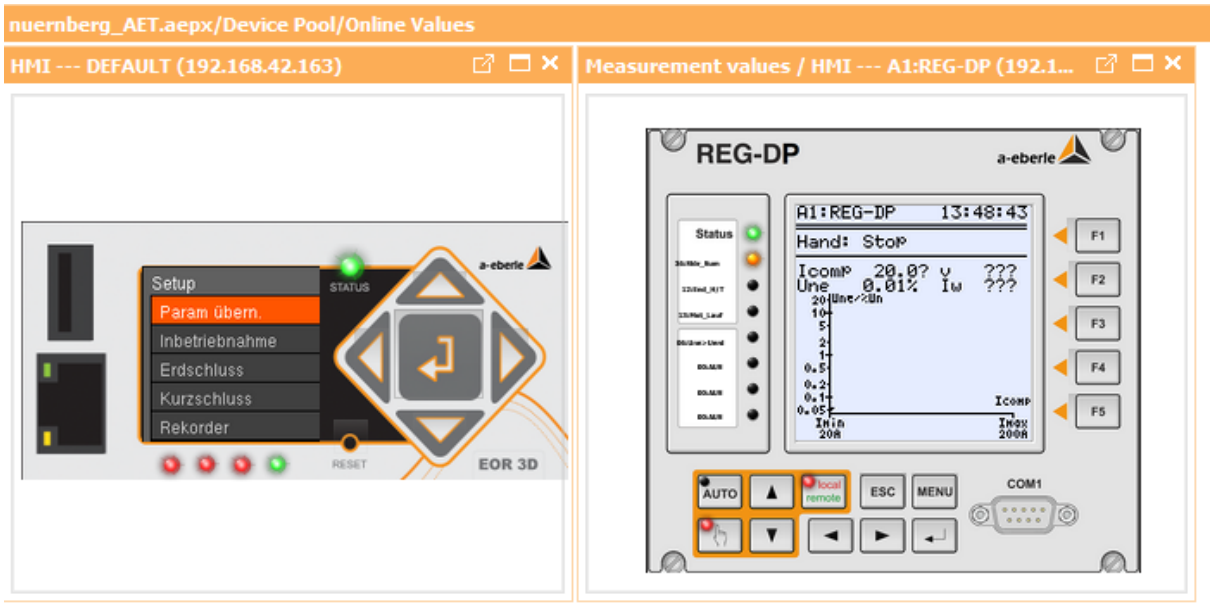
5.3.3.1 Event simulator (OVR)

With the help of the *Event simulator* it is possible to simulate certain status values (binary process values) of the device. This can be helpful, for example, when testing signal transmission to *SCADA* when commissioning. To do this, activate *OVR* mode using the associated checkbox and/or enter the time interval for the duration of the simulation. After that you can activate the functions available in the Simulation column (command direction, marked with 1 in the figure) and verify the device's acknowledgement of status (response direction, marked with 2 in the figure).



5.3.3.2 HMI (device panel)

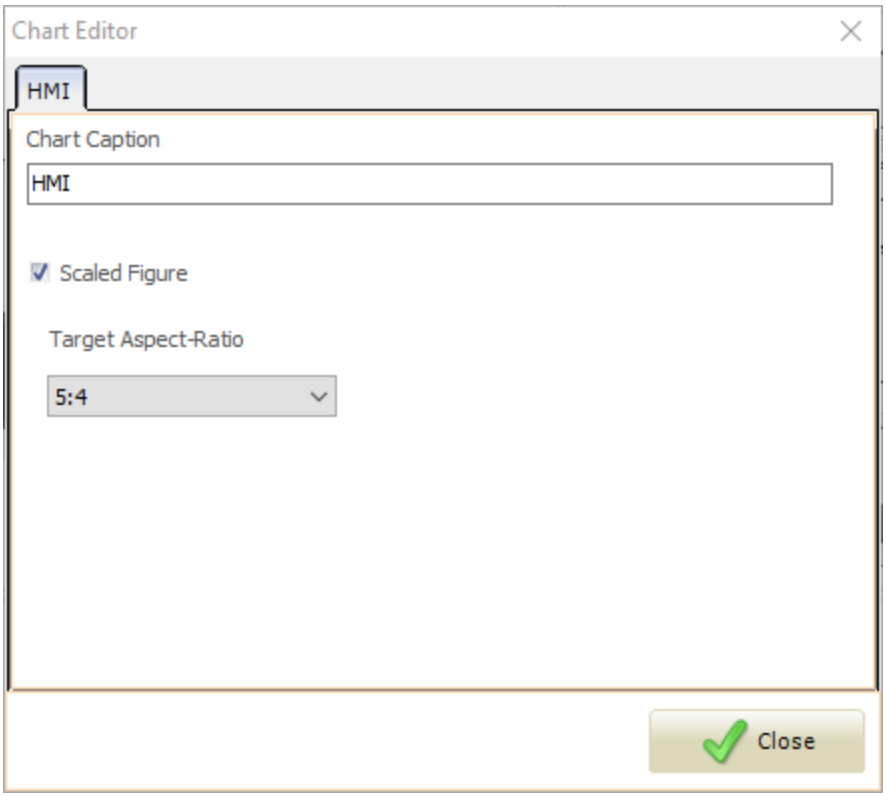
The *HMI* panel depicts a virtual front user interface for the device. The panel contains interactive buttons, *LEDs*, and displays etc., which are linked to the device in command and response direction. This permits constant monitoring, and also even allows remote control of the device to some extent. The following figure depicts examples of device panels of *EOR-3D* and *REG-DP* devices.



⚠CAUTION!	Use the command direction functions with caution. Note that a click on the buttons of the virtual front control panel can sometimes even directly perform system management operations, if the device is integrated in ongoing grid operations.

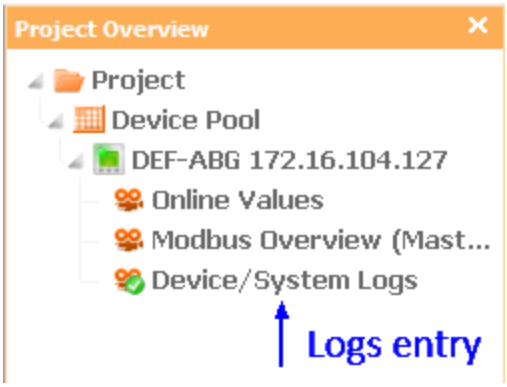
Chart editor

Double-clicking the *HMI* panel calls up the *chart editor*. Here you can rename the *Online* panel and alter settings for scaling and image size.



5.3.3.3 Logbooks

Logbook panels allow the inspection of the running processes on the device and the interface between device and AEToolbox. The *Logbook* panels can be added using the buttons on the *Online*[62] *toolbar* or by using the general templates.

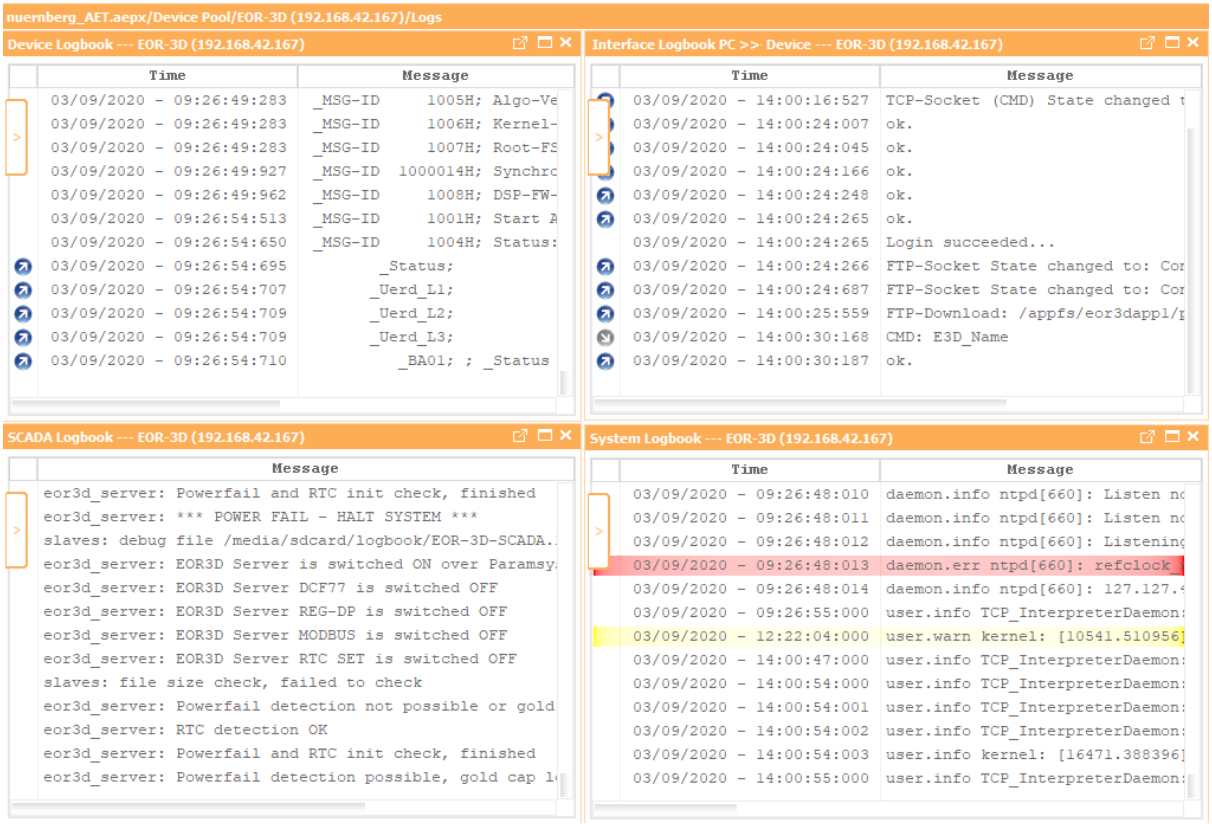


The following figure depicts a standard view of the *logs* entry, which was automatically generated in the *device* context for an *EOR-3D* device with the name *EOR-3D (192.168.42.136)*:

- Device logbook;
- *SCADA* logbook;

- System logbook;
- Interface logbook.

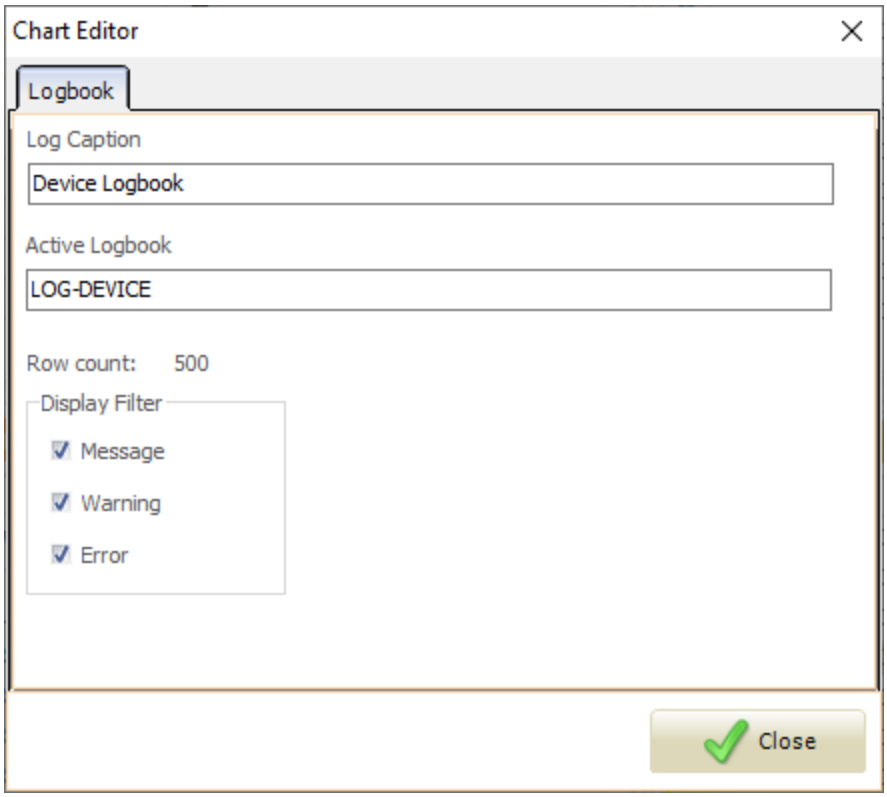
This offers you a quick overview of the running internal processes, error messages (marked red), and warnings (marked yellow). The blue and grey arrows indicate incoming or outgoing messages.



Functions of the *Logbook* panel

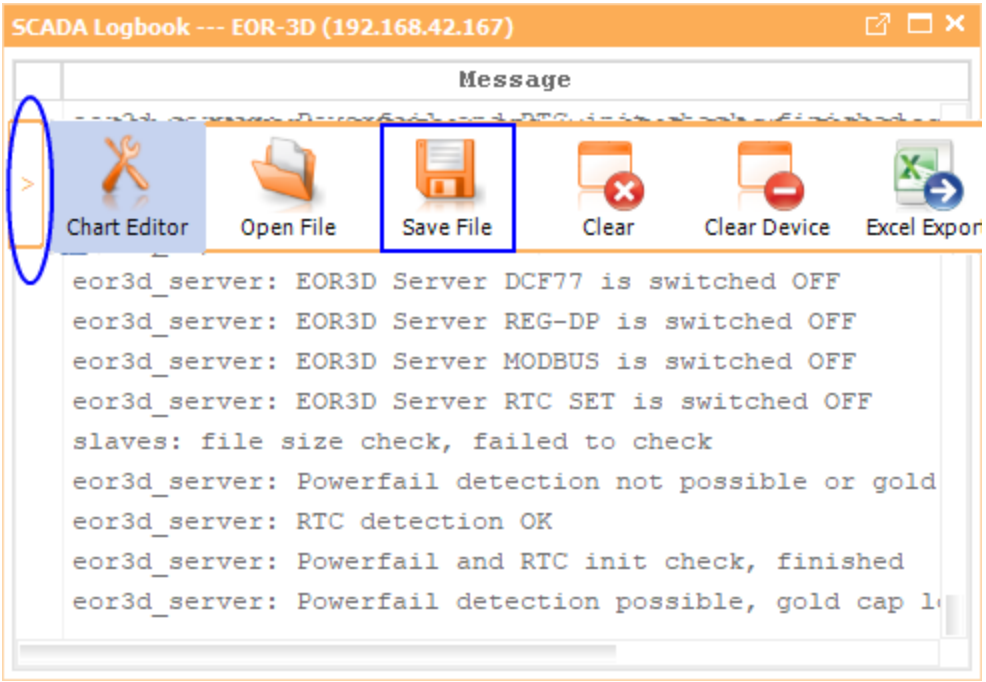
1) *Chart editor*

Double-clicking the *Logbook* panel calls up the *chart editor*. Here you can rename the *Logbook* panel and set filters for displaying log entries.



2) Side function panel

The side function panel can be found to the upper left in every *Logbook* panel. Move the cursor over the side element, which is marked with the blue circle in the figure. The function panel is expanded.



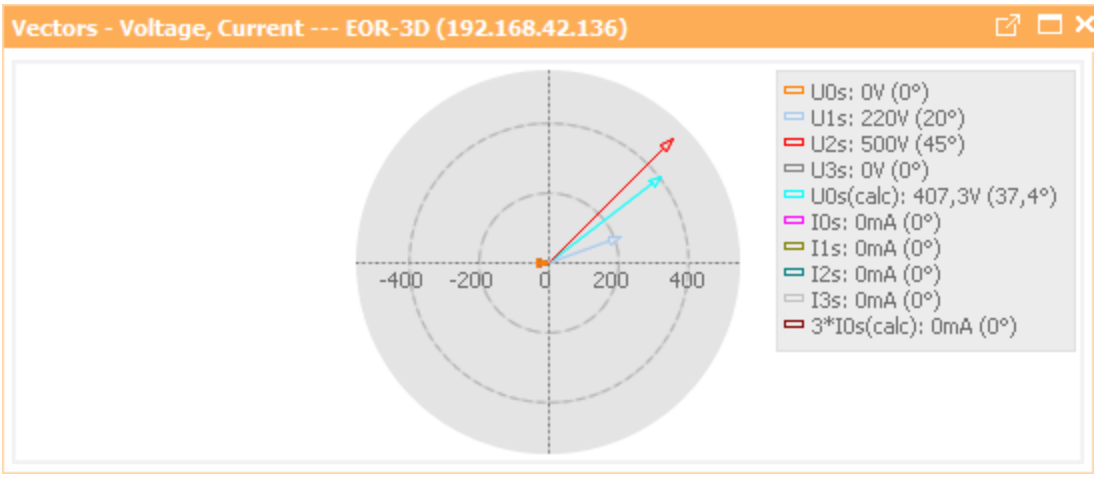
The following functions are available:

- Call up the *chart editor*;
- Open a previously-saved *logbook* file *(.aelog, .log, .reglog);*
- Save *the* current *logbook* messages as a file *(.aelog);*
- Delete the current *logbook* messages;
- Delete *logbook* messages on the device (currently only available for certain device types);
- Export the current *logbook* messages to *Microsoft® Excel®*.

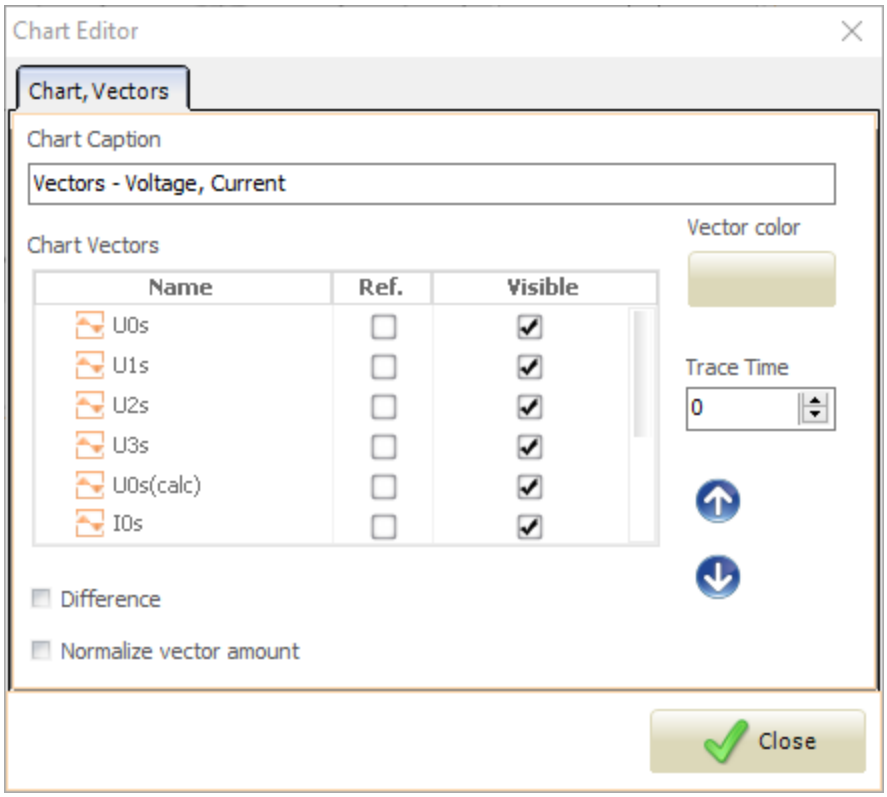
5.3.3.4 Vectors

Vector panels offer a graphic display of angular differences (phase shift) of select electrical variables in the grid. On one hand the *Vector* panel is displayed when the *Online* module is called up for an *EORSys* device, but it can also be inserted using *EOR-3D*-specific templates.

The following figure depicts the standard vector panel for an *EOR-3D*.



Functions of the *Vector* panel
1) *Chart editor*
Double-clicking the *Vector* panel calls up the *chart editor*.



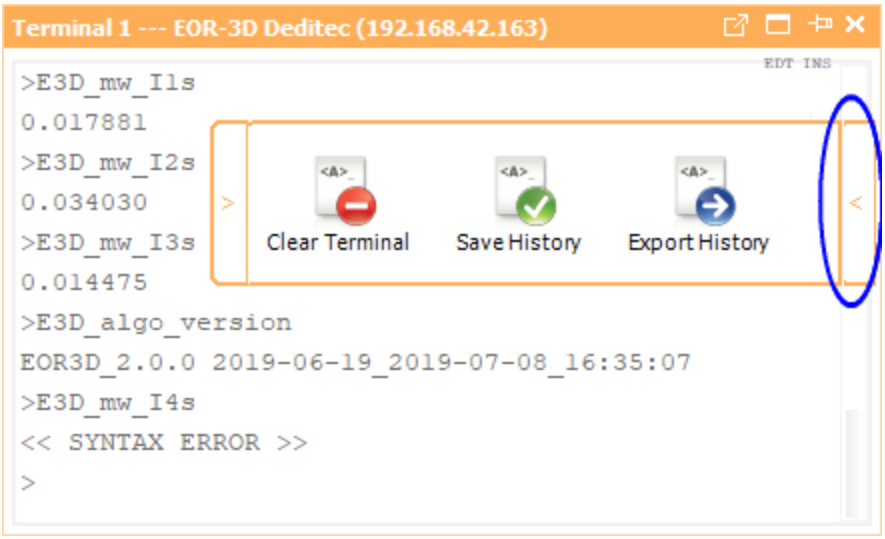
Here the following settings can be configured:

- Rename panel;
- Rename individual vectors;
- Delete individual vectors (select vector, *Del* button);
- Change the reference vector. The marked reference vector itself lies on the positive x axis (angle = 0°). All other vectors are rotated by the difference between the reference vector and the zero axis.
- Adjust visibility and order of individual vectors;
- Change the lag time. The lag time determines how long old values of a vector remain displayed in the window when this vector is refreshed. Old vector values can be recognised by the more faded colour of the vector arrow. A value of 0 causes the lag to disappear;
- Change colours;
- Select display of the vectors as difference. At the time this function is activated AEToolbox makes a one-off snapshot of the vector values and angles. In the ongoing display the difference between this one-off snapshot and the actual vector is shown;
- Standardised depiction of the vectors.

5.3.3.5 Terminal

With the help of the panel it is possible to send commands directly to the device and to register its direct response (terminal mode). This panel is always available to you in the general templates. Simply drag this template to any position in your current *Online* view.
The following figure depicts an example of a command-response sequence with an *EOR-3D* device.

Functions of the *Terminal* panel
The side function panel can be found to the upper right in every *Terminal* panel. Move the cursor over the side element, which is marked with the blue circle in the figure. The function panel is expanded.



The following functions are available:

- Clear terminal;
- Save current history as text file *(.txt);*
- Export current history into an available text editor.

Alternatively, you can export the history into an available text editor using Ctrl + C and Ctrl + V.

NOTE!	Please note that the history cannot be imported into the *Terminal* panel.

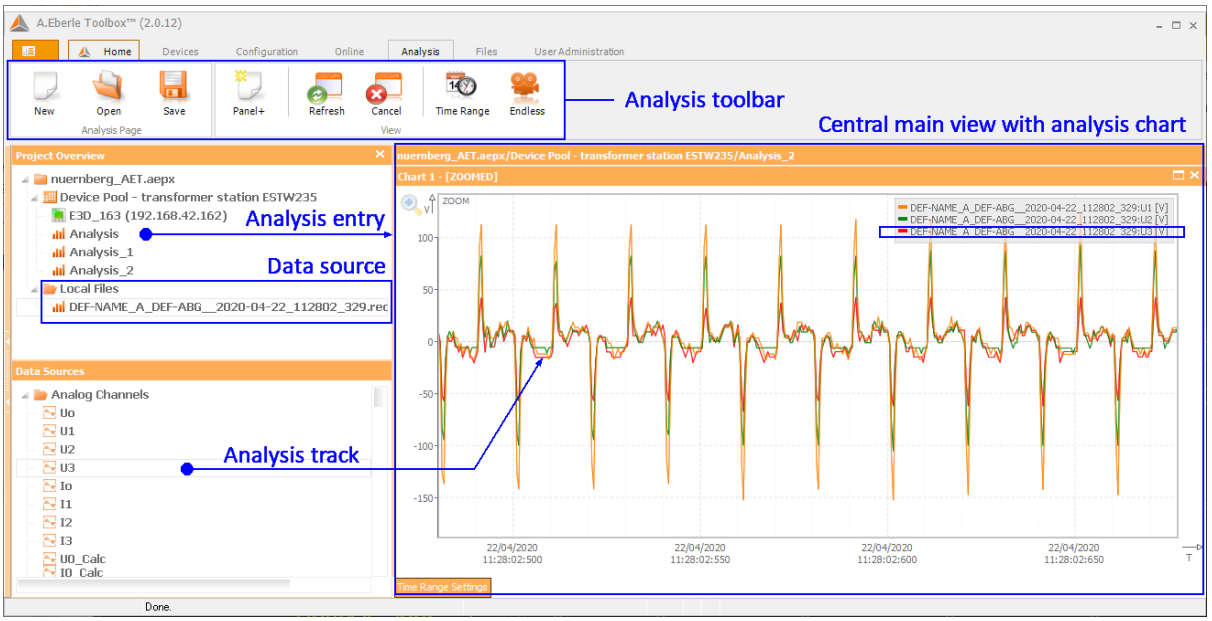
To repeat commands, use the cursor keys to go to the command line to be repeated (or mark this line with the left mouse button), and press *ENTER*.
The repeated command and the device response will now be listed at the end of the terminal list.

5.4 Analysis

The *Analysis* section module is a work area for the presentation and statistical evaluation of historical device data These may be long term measurement series, transient recorder data or fault records.

The *Analysis* module is called up exclusively in the *device pool* context. This means that any *analysis* entries that are generated are placed in the project overview under the *device pool*. After opening recorder and/or fault record files *(.rec, .rvt, .rvd, .csv, .dat, .cfg)* in the project overview they are adopted as data sources and displayed as so-called *analysis* tracks (see Analysis charts and data sources 82 section).

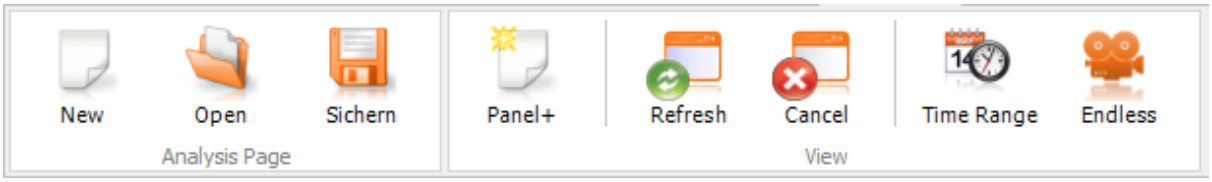
The following sections describe functions of the *Analysis toolbar* as well as how to work with different *analysis* charts and data sources.



5.4.1 Analysis toolbar with functions

This section describes the functions of the *Analysis toolbar*. The *Analysis toolbar* is activated when

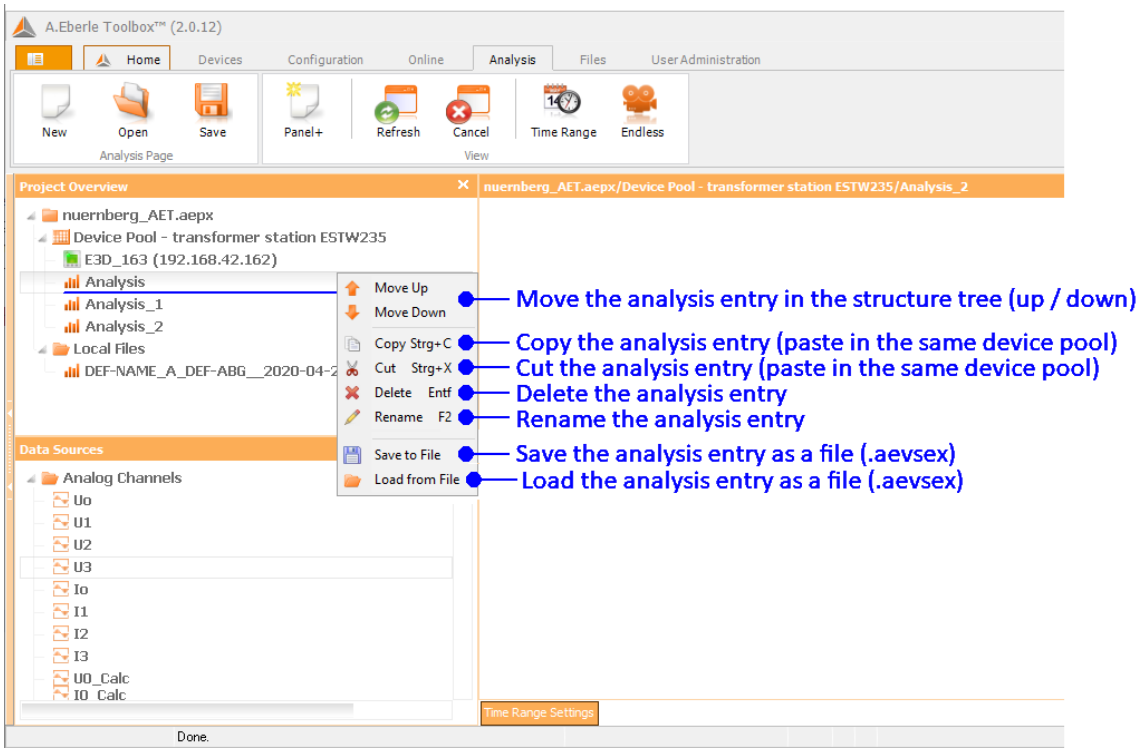
1) the *Analysis* function is called up through a right-click on a *device pool* entry over drop-down list *New*;
2) the *Analysis+* 25 button on the *Device toolbar* is clicked in the *device pool* context;
3) an *analysis* entry that exists in the project overview is marked;
4) a recorder or fault record file *(.rec, .rvt, .rvd, .csv, .dat, .cfg)* is marked;
5) the *Analysis* section module is called up from another section module via the respective tab.



New

The *New* button generates a new *analysis* entry in the project overview. It is set up in the *device pool*. After the *analysis* entry is generated, corresponding data sources for display must be loaded in the central main view (cf. *Open* button later in this section , or the Analysis charts and data sources 82 section).

Once the *analysis* entry has been generated in the structure tree, you can use other functions of the project overview. The related drop-down list with functions is called up by right-clicking the *analysis* entry. The following figure gives an overview of these additional functions:



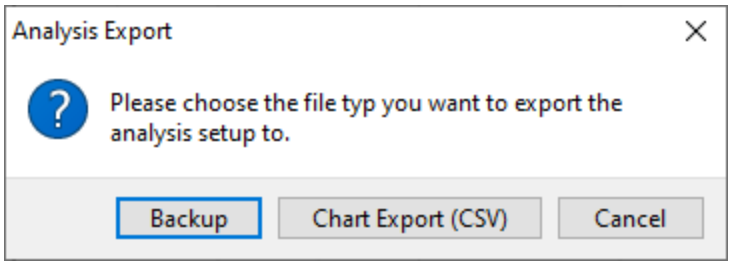
Open

The *Open* button imports the following files as data sources:

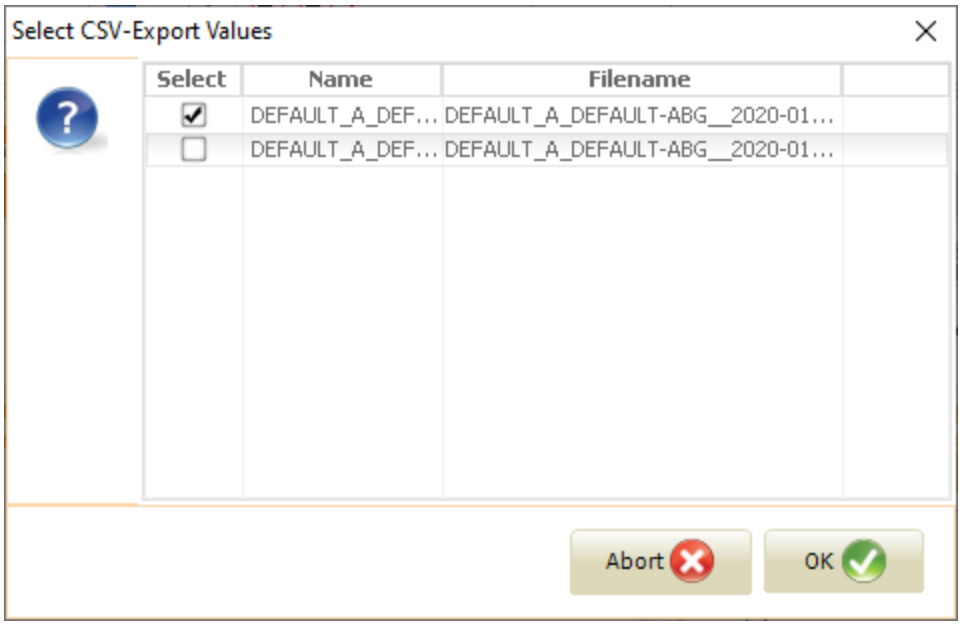
1) device-specific recorder, fault record and statistics files *(.rec, .rvt, .rvd, .csv, .dat, .cfg)*. The files are placed in the project overview in the *Local files* folder.
2) AEToolbox-specific file format for the import/export of *analysis* entries *(.aevsex)*. The *.aevsex* file is loaded in the selected *analysis* entry and contains all the *analysis* tracks loaded in the charts, along with view settings.

Save

The *Save* button saves the current *analysis* entry in the local directory. Two methods are offered in the export dialogue:



1) Button *Backup.* The entire *analysis* entry is saved as an *.aevsex* file. All view settings and *analysis* tracks displayed in the chart (data sources) are also saved.
2) Button *Chart Export (CSV)*. The *analysis* tracks (which were loaded in the *analysis* chart) are saved individually as *.csv* files. You can select the tracks and decide whether to export the values from the visible area of the chart or the complete *analysis* track (e.g. for further processing in *Microsoft® Excel®*).



Panel+

The *Panel+* button generates a new *analysis* chart in the current view.

Refresh

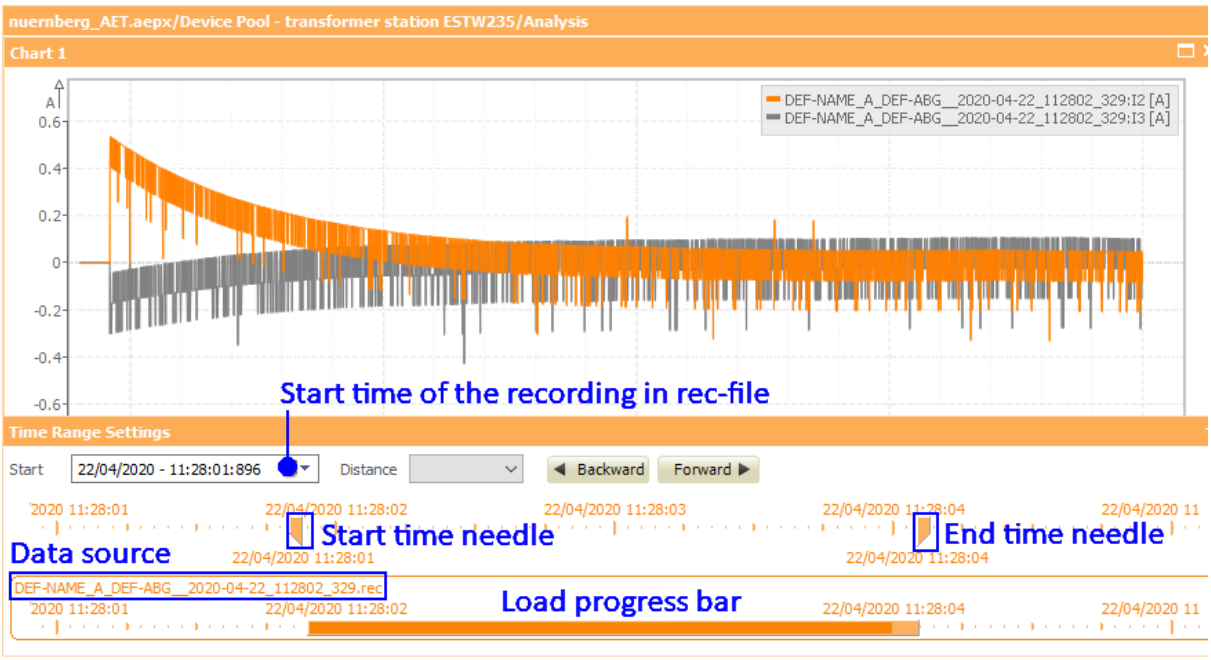
The *Refresh* button updates the asynchronous retrieval from data sources in the current view (restarts the reading of data).

Cancel

The *Cancel* button stops the loading of *analysis tracks* in *the analysis* chart (stops the reading of data). Please monitor the output in the progress bar.

Time range

The *Time range* button opens the *Time range settings* panel beneath *analysis* charts. When loading *analysis* tracks the time range is adjusted automatically.

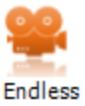


The *Time range settings* panel offers multiple options to configure the visible time range:

- Enter the start time of the value range in the input window*;*
- Move the value range incrementally using the *Backward* and *Forward* buttons;
- Move the *start* and/or *end time needle* along the time axis;
- Configure a time offset to other data sources by moving the *Load progress* bar. This can be useful for comparing tracks from multiple data sources.

With the help of the *Load progress* function it is possible to display how much data has been loaded in which time ranges.

Endless

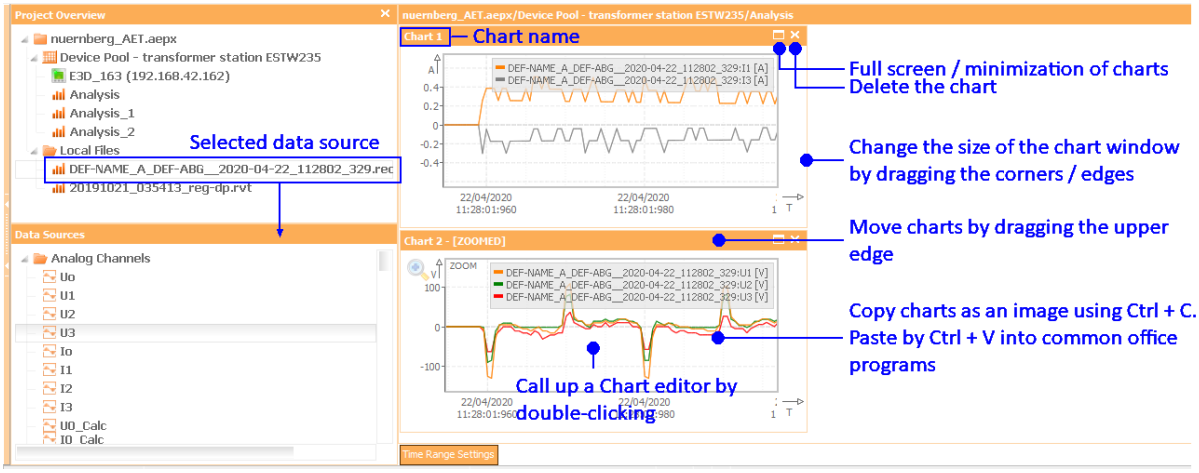


The *Endless* function moves the visible value range along the time axis. Place the start and end time needles somewhat closer together, click the *Continuous* button, and use the mouse to slightly drag the chart in a certain direction, and then let go of the mouse during the motion (similar to the swipe gesture on a tablet). The value range moves until the start or the end of the recording is reached. You can cancel this sliding at any time by clicking in the chart again.

5.4.2 Analysis charts and data sources

After starting the *Analysis* module and creating an *analysis* entry in the project overview (see Analysis toolbar with functions 77 section), a standardised main view with an empty *analysis* chart is displayed. To display the data in the charts, first open a recorder or fault record file *(.rvt, .rvd, .csv, .dat, .cfg)* by clicking the *Open* button in the *Analysis toolbar*. The file you chose will be placed in the *Local files* folder in the project overview. Alternatively, you can mark a file that has already been imported into the project. The data rows available in this file appear in the *data sources* area (*analysis* tracks).
Move the individual *analysis* tracks into the chart using *drag & drop* and adjust the visible value range (*Time range* button in the *Analysis toolbar*).

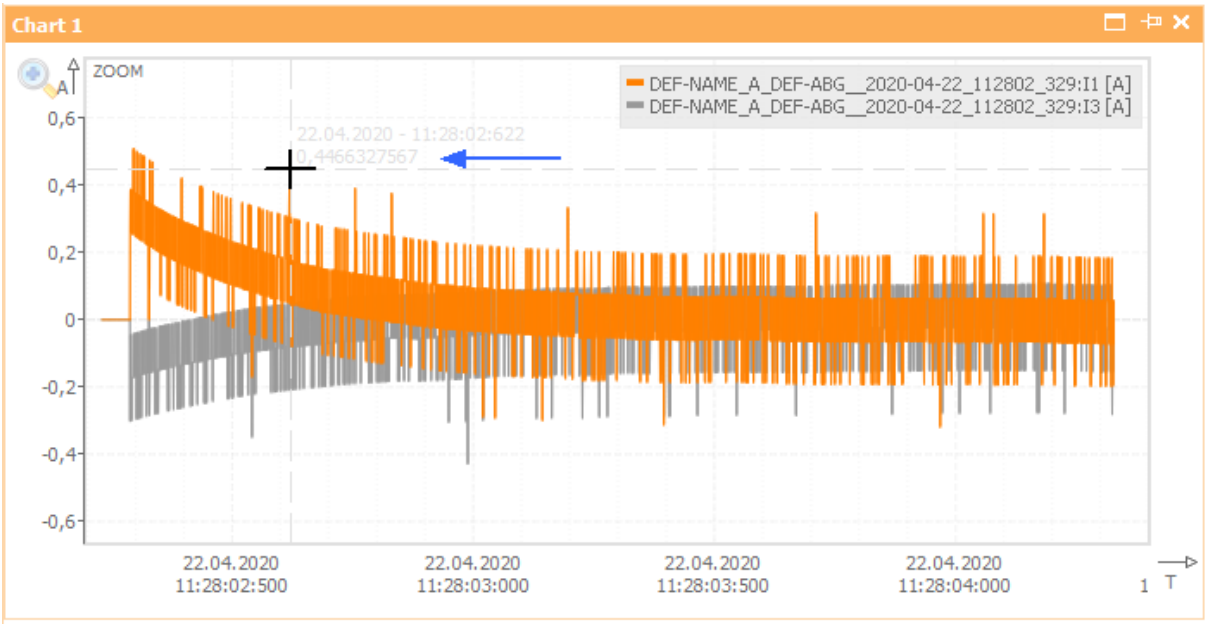
The following figure depicts an example arrangement of *analysis* charts with loaded tracks and gives an overview of the operations with chart windows.



NOTE!	Please note: • A data source or file can be made available to multiple *analysis* entries and charts in different *device pools*; • After the removal of a data source from the project overview its *analysis* tracks cannot be displayed in the charts anymore.

Additional chart functions

1) Reading out the values
To read out exact values from an *analysis* track press and hold the *Ctrl* key and place the cursor at the desired position in the chart, as shown in the example figure below.



2) Modification of the value range

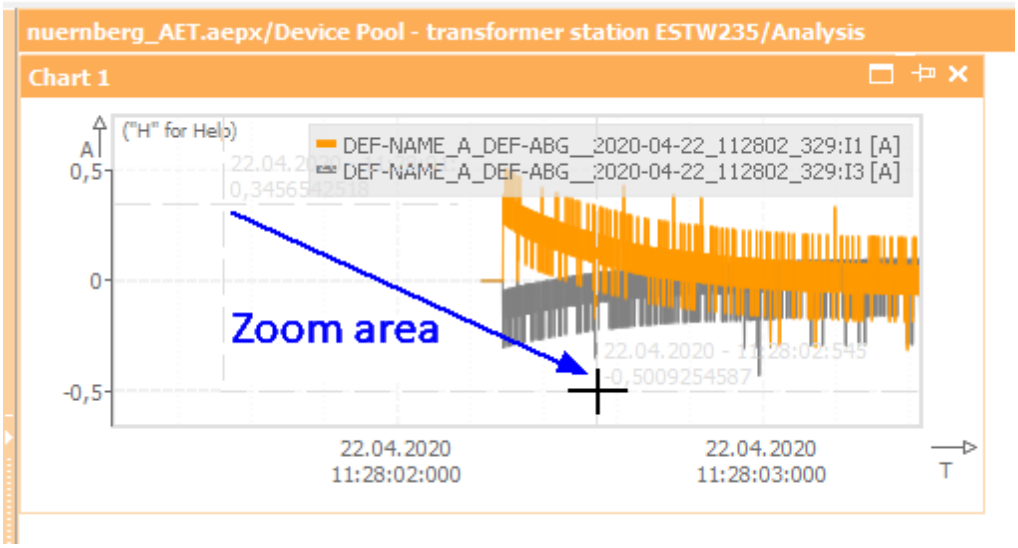
- **Moving along the x axis.** The value range of the *analysis* tracks can be moved along the x axis. Click in the chart, press and hold the mouse button, and move the mouse to the right or the left.

- **Automatic scrolling along the x axis.** Press and hold the *SHIFT* key and drag the chart slightly in any direction with the mouse. The value range moves until the start or the end of the recording has been reached, or until you release the *SHIFT* key.

Alternatively, automatic scrolling can be started with a click on the *Continuous* button in the *Analysis toolbar*.

- **Zoom, x/y axis.** To get a closer look at the course of *analysis* tracks press and hold the *Ctrl* key and, after pressing the left mouse button, move the cursor to the right or left to determine the zoom area, as shown in the example figure below. When you let go of the mouse button, the zoom area is set.

Alternatively, the x/y zoom can be adjusted using the mouse wheel. Position the cursor at the point that is to be enlarged or reduced. Press and hold the *Ctrl* key and turn the mouse wheel in the desired zoom direction. After releasing the *Ctrl* key, the zoomed track will be portrayed.



- **Zoom, x axis.** Press and hold the *Ctrl* and *SHIFT* keys simultaneously and, after clicking, move the cursor to the right or left.

- **Reset zoom.** To return a zoomed value range to the original state, right-click the chart.

- **Moving axes** The x and y axes can be moved with the help of the coordinates border. Click the respective axis with the mouse and move it in the desired direction.

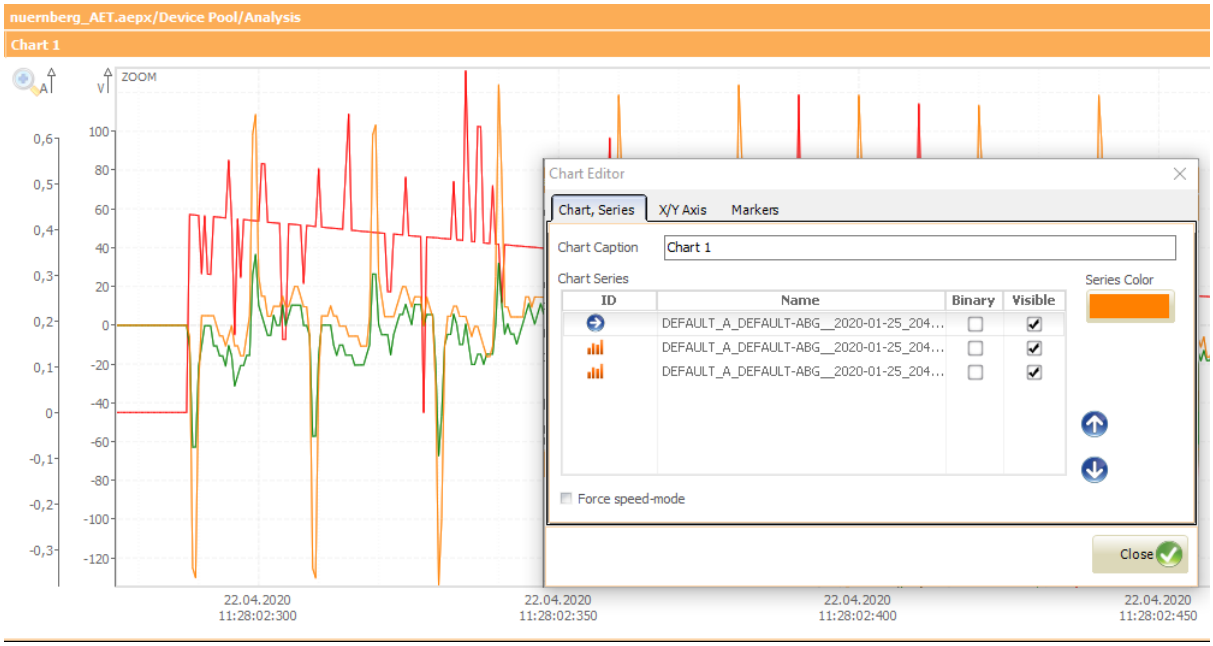
- **Stretching / compressing axes** The x and y axes can be stretched / compressed by pressing and holding the *Alt* key while moving the coordinates border with the mouse.

NOTE!	The changes to the value range are performed in all charts which display *analysis* tracks from the same data source.

NOTE!	You can get help on the available functions of the chart by clicking into the chart and then holding down the "H" key.

3) *Chart editor*

Double-clicking an *analysis* chart starts the *chart editor*.



In the *chart editor* the following settings can be configured:

1. Chart, rows.

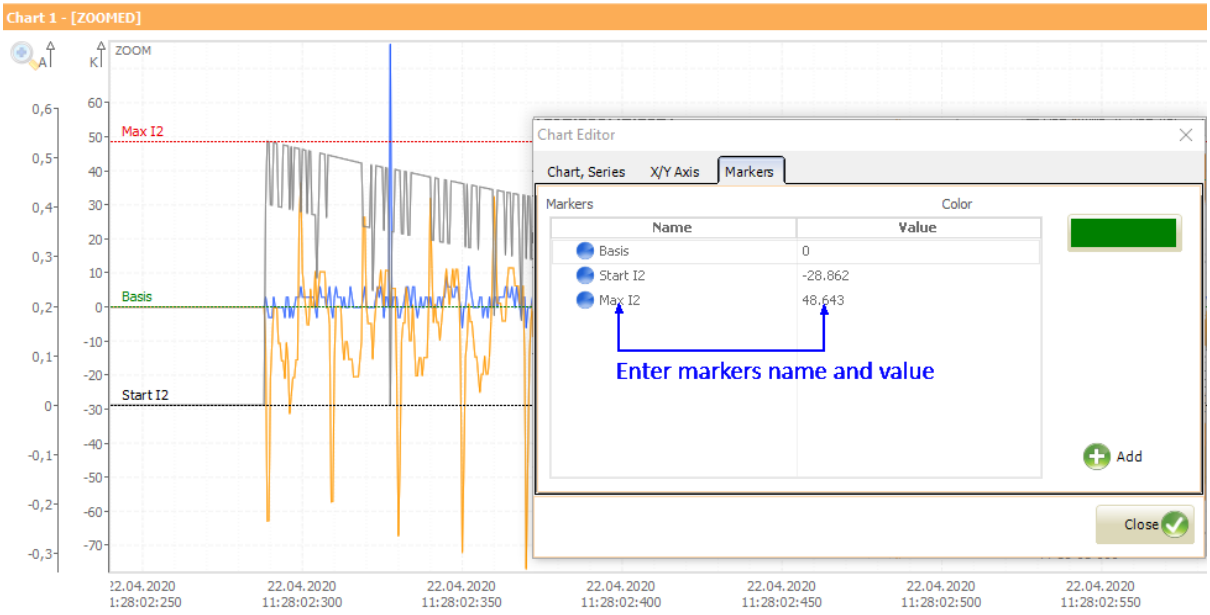
- Give the *analysis* chart a name;
- Give individual *analysis* tracks a name using F2 or by double-clicking in the *Name* column;
- Switch *analysis* tracks to binary view (activate *Binary* column);
- Switch *analysis* tracks to visible/invisible (de-/activate *Visible* column);
- Change colour of *analysis* tracks (mark track + click on function colour);
- Delete *analysis* tracks (mark track + *Del* key);
- Specify order of *analysis* tracks (mark track + blue arrows).

2. x/y axis.

- Input or rename axis units (*Unit* column). The corresponding unit will now be displayed directly on the axis;
- Input axis min / max;
- Lock scaling of the y axis (*Lock* column)
- Optimise scaling of axes (button in *Optimise* column) With the help of this function the value range of the axis is set in such a way that all data lies within the visible area.

3. Y axis markings.

Markings can be created for the first Y-axis. The following figure depicts a chart with the following markings placed in it: *Max 12, basis, start I2*. To apply this, first click on the *New* button in the*chart editor.* After that enter the name and value of the marking on the x axis. It is also possible to choose the colour of the marking. To delete a marking, select it and then press the *Del* key.



5.5 Files

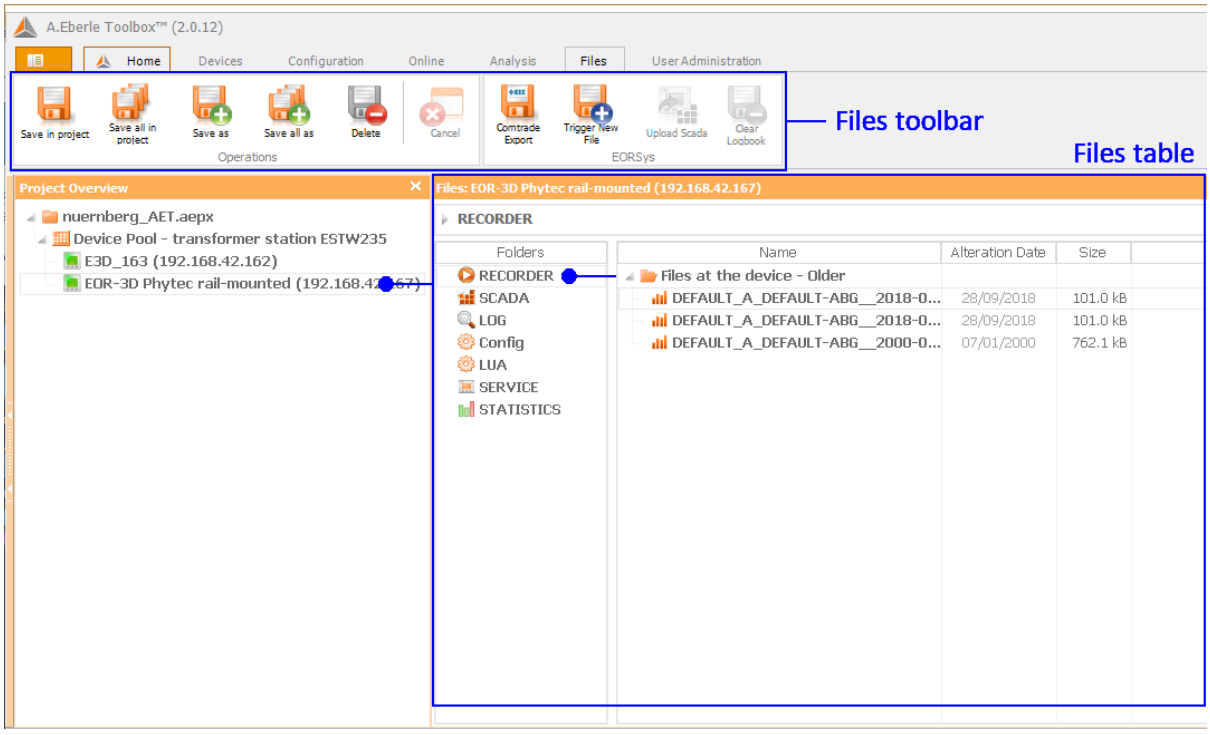
The *Files* section module provides a work area for the exchange of device-specific files between the device and your PC.

The module is called up exclusively in the *device* context after the set up of a device.

NOTE!	Please note that the meaningful use of this section module is only possible with a physically connected end device.

AEToolbox divides all available device files into device-specific categories, for example as is depicted in the following figure for an *EOR-3D* device: *Recorder*, *SCADA*, *Log*, *Config*, *LUA*, *Service* and *Statistics.* These categories are displayed in the *Files table* in the *Paths* column. After marking, each category displays the files available on the device *(e.g. .rec, .csv, .xml, .log, .ini, .lua*), or, for example, commissioning documentation *(.pdf)*.

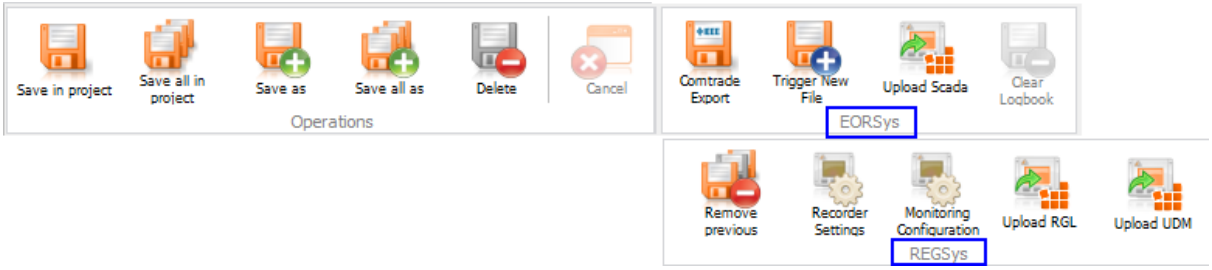
The following sections describe functions of the *Files toolbar* and the *Files table*.



5.5.1 Files toolbar with functions

This section describes the functions of the *Files toolbar*. The *Files* toolbar is activated when

1) the *Files* section module is called up using the *Device data* button and an associated device set up in the *Home* module;
2) the *Files* section module is called up from another section module via the respective tab;
3) the *Files* section module is called up via the *FILES* icon on the *device widget*.



Activation/deactivation of the buttons on the *Files toolbar* depends on the device and file category which is currently being used. First, the cross-device operations will be described and then the device-specific buttons for *EORSys* and *REG* device series.

1) Cross-device operations

Save in project

The *Save in project* button transfers the files selected in the table (multiple selection with *SHIFT* or *CTRL* keys) into the project overview. The files are placed in a corresponding folder in the *device* context.

Save all in project

The *Save all in project* button transfers all files from a selected category folder into the project overview. The files are placed in a corresponding folder in the *device* context.

Save as

The *Save as* button transfers the files selected in the table (with *SHIFT* or *Ctrl* keys) into a local directory on your PC.

Save all as

The *Save all as* button transfers all files from a selected category folder into a local directory on your PC.

Delete

The *Delete* button deletes from all the files selected in the table (with *SHIFT* or *Ctrl* keys) from the device.

Cancel

The *Cancel* button interrupts running transfer processes. Please not the output in the progress bar.

2) Device-specific functions of the *EORSys* device series

Comtrade export

The *Comtrade export* button converts from the device-specific recorder format into the general *Comtrade* format, and saves the file(s) in the target format *(.cfg, .dat)* in a local directory on your PC. After selecting a recorder file in the *Files table*, click on the *Comtrade export* button and then select a suitable target folder on your PC.

Trigger new file

The *Trigger new file* button starts a simulated recording of recorder data on the device to check the functionality of the recorder. The file that is generated is saved in the table in the current folder.

Upload SCADA

The *Upload SCADA* button uploads a *SCADA* file from your PC to the device. The file then appears in the associated *SCADA* category folder for the table.

Upload Sensor Config

The *Upload Sensor Config* button uploads a *JSON*-file from your PC to the device. The file then appears in the associated *Configuration* category folder for the table.

Clear logbook

The *Clear logbook* button removes log entries from the device. This function is envisaged for future firmware versions and is currently deactivated.

3) Device-specific functions of the *REG* device series

Remove previous

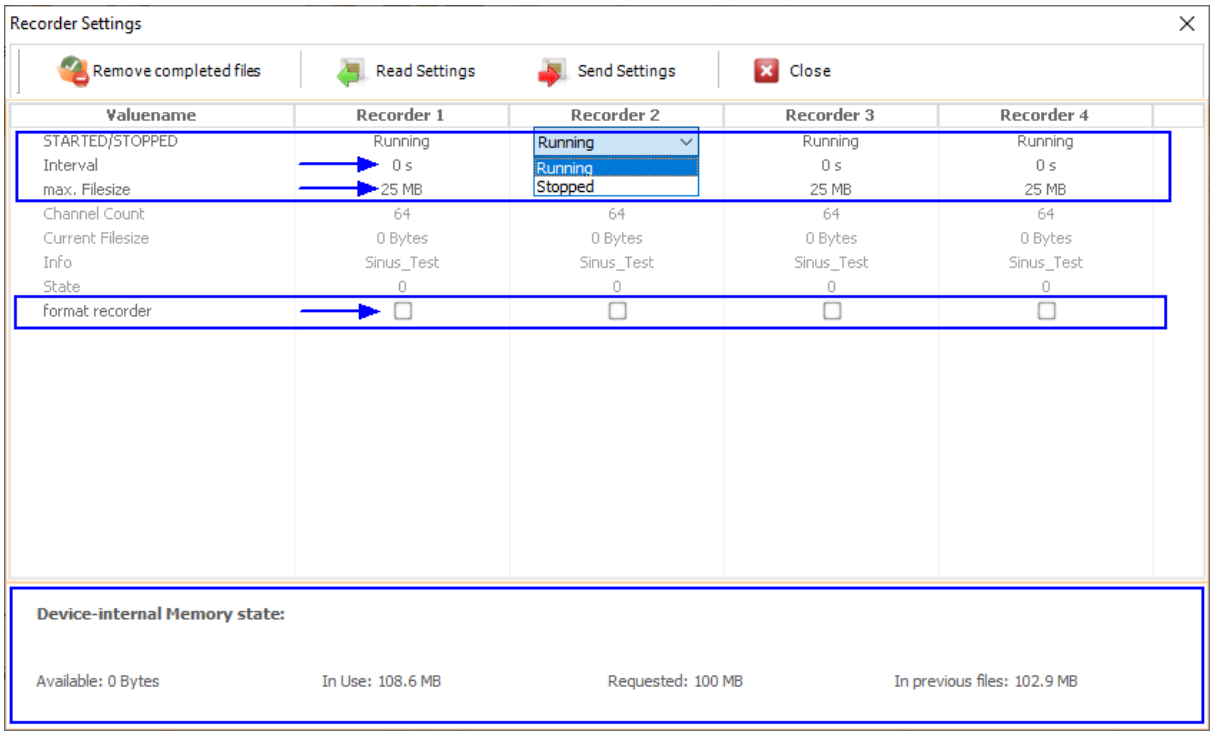
The *Remove previous* button deletes closed recorder files of the *S2 (.rvd)* recorder from the device.

NOTE!	Closed S2 recorder files have a green icon and device files of recordings currently running have red icons.

Recorder settings

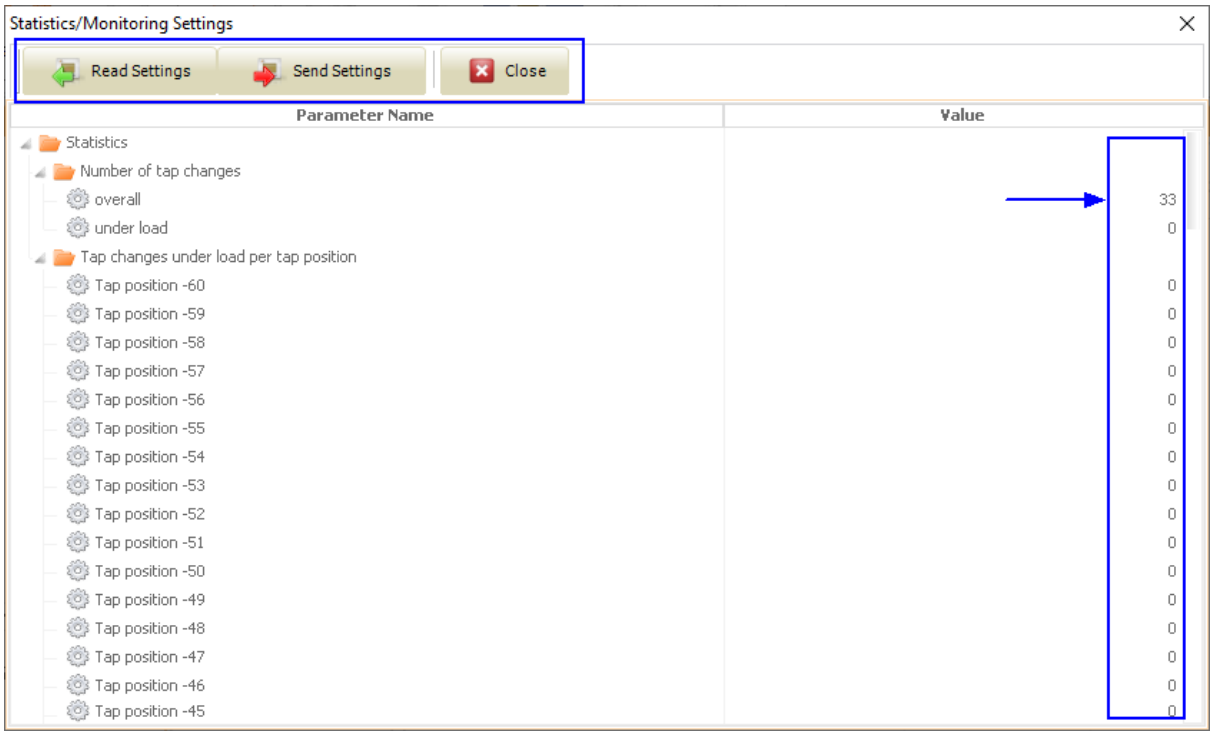
The *Recorder settings* button calls up the settings for the *S2* recorder. Here it is possible to (1) delete closed recordings; (2) read and change configuration settings and send them to the

appropriate recorder units (1 to 4); (3) format recorder tracks; and (4) check the status of the internal device memory.



Monitoring configuration

The *Monitoring configuration* button is used to call up settings for collecting statistical data through tap-changers. Here, the settings can be read, edited and sent to the device.



Upload RGL

The *Upload RGL* button uploads a background program *(.rgl)* from your PC to the device. The file then appears in the *Config* category folder of the *Files table*.

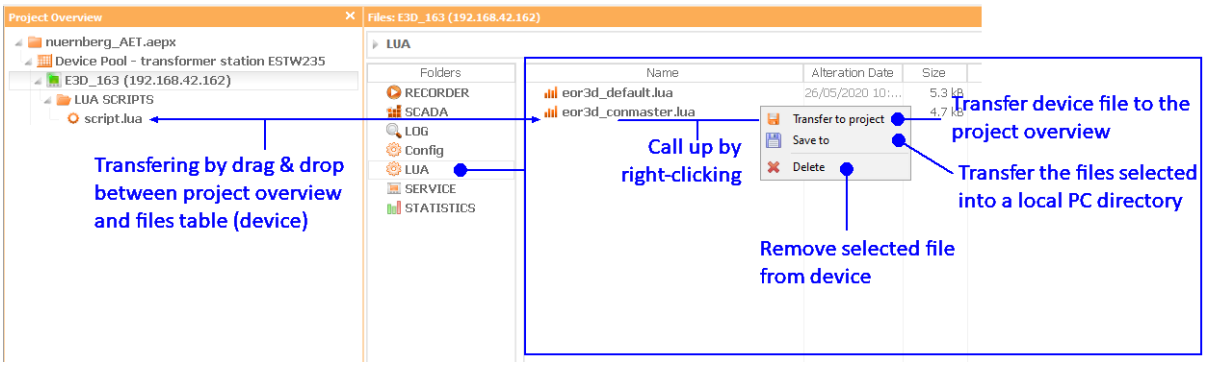
Upload UDM

The *Upload UDM* button uploads a background program *(.udm)* from your PC to the device. The file then appears in the *Config* category folder of the *Files table*.

NOTE!	Please note, that operations with UDM-files are only possible on REG devices, which are used as access point (AA:).

5.5.2 Files table

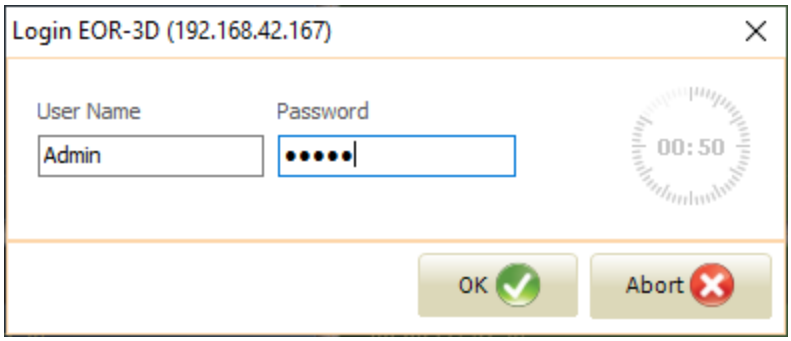
The *Files table* lists all the files of a device-specific category that are available on a device. The name, modification date and size are displayed on the device. In addition to functions of the *Files toolbar* the *Files table* offers different ways of managing and exchanging files. These are depicted in the following figure.



The files can be selected individually or in groups as usual using the *Ctrl* or *SHIFT* keys .

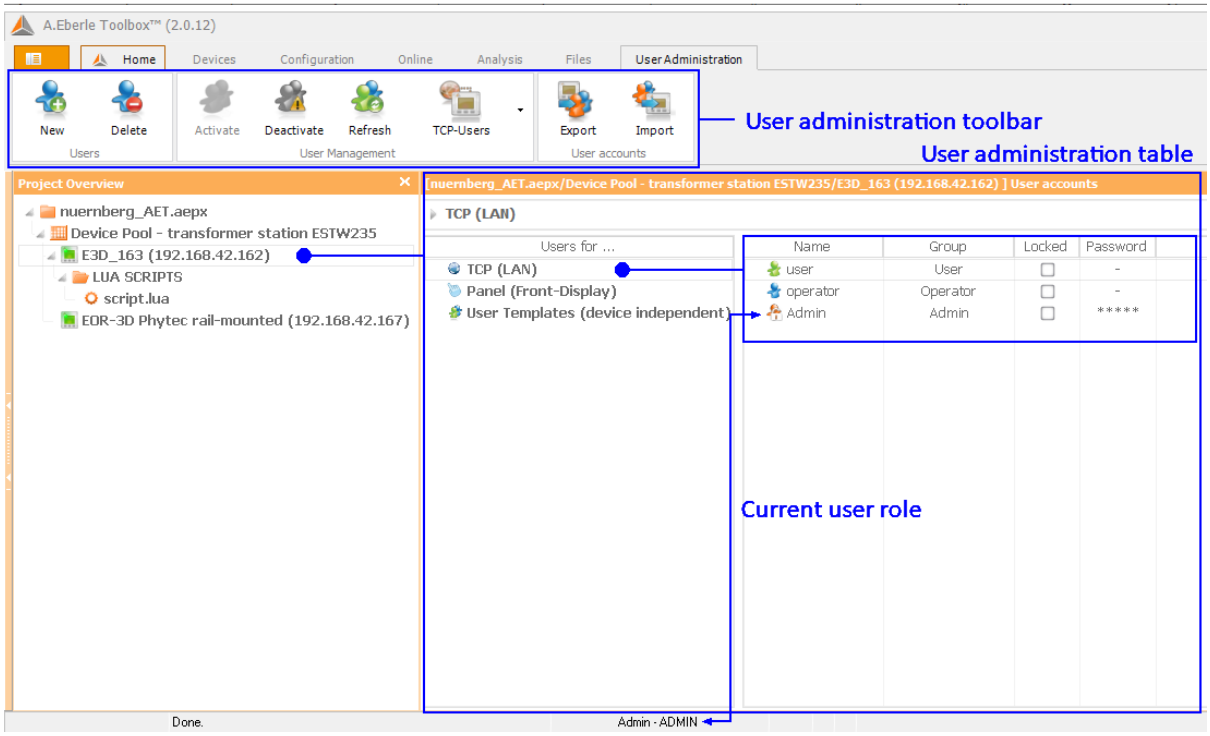
5.6 User administration

The *User administration* section module provides a work area for the administration of users with their roles on the device. Administration only works on devices whose firmware supports a corresponding authorisation concept (or user administration system). This currently applies to *EOR-3D* devices starting at firmware version *2.0.0*. When establishing a connection to a device with user administration enabled, you are prompted to enter the user name and password. The default user name and password for *EOR-3D* devices is "Admin".



Depending on the allocated role, restrictions for certain AEToolbox areas may exist (affects upload/download as well as list queries for device files). On devices without an authorisation concept, or where the concept is deactivated, the user can perform all file functions without restriction.

Admin privileges are required to administer user accounts on the device i.e. it is necessary to log in with Admin privileges when the connection is established. The following figure depicts the structure of the *User administration* module after a user logs in with the *Admin* role.



All the information about existing user accounts is displayed in tables. Principally there are two categories of user accounts:

1) *TCP* users. The device is operated via the AEToolbox.
2) *Panel* users. The device is operated locally through the front display.

Accounts for *TCP* users can be conveniently transferred to multiple devices using cross-device user account templates.

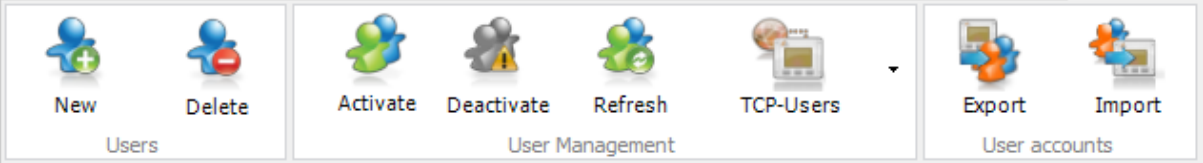
NOTE!	A user logged in on the device in the *User* or *Operator* role can only change their own password in the *User administration* module. The toolbar functions as well as the table layout of user accounts are deactivated or invisible for these users.

The following sections describe further functions of the *User administration toolbar* as well as how to work with user accounts and templates.

5.6.1 User administration toolbar

This section describes the functions of the *User administration toolbar*. The toolbar is activated when

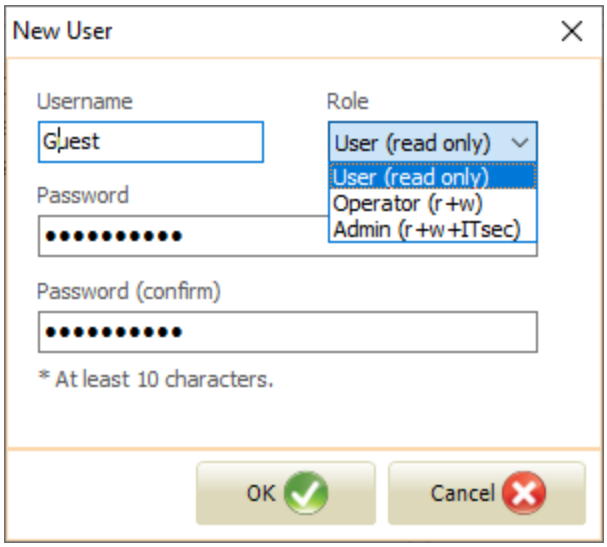
1) the *User administration* function is called up with a right-click on the *device widget*;
2) the *User administration* section module is called up from another section module via the respective tab.



Activation/deactivation of the buttons on the *User administration toolbar* depends, first of all, on the rights the current user has. Currently, operations with user accounts are reserved for roles with *Admin* privileges. Secondly, it is important which user category is currently being worked with. For *panel* users two standardised accounts are provided *(Panel user* and *Panel operator),* so in this category only password assignment or account locking or unlocking are possible (see User accounts and templates 99 section).

New

The *New* button generates a new *TCP* user account. First select the *TCP* user category in the main view. After clicking the *New* button the *New user* input window starts, where the properties of the new account can be specified.



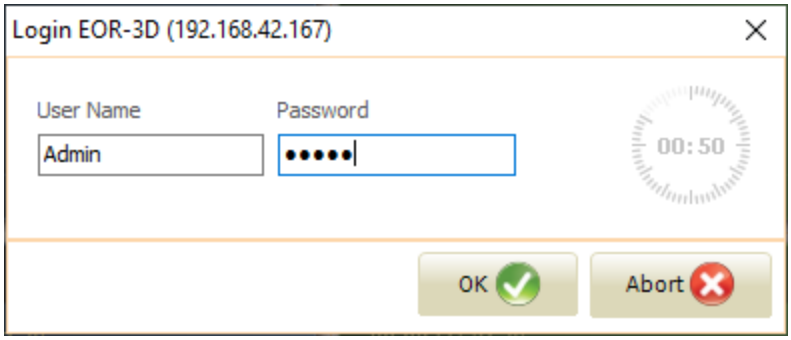
Once the necessary entries have been made, the newly set up account appears in the overview for *TCP* user accounts. This also indicates that the account has been successfully set up on the device.

Delete

The *Delete* button removes a *TCP* user account from the device.

Activate

The *Activate* button activates user administration on the device, if it was previously deactivated. As a result, a new connection to the machine is established and the current login information (user name and password) is entered.



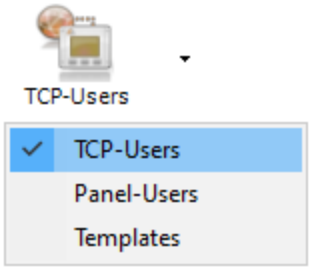
Deactivate

The *Deactivate* button deactivates user administration on the device, if it was previously activated. When a new connection to the machine is established, all user account administration functions are disabled. The overview of the available user accounts is now displayed in read-only mode. The login information (user name and password) is no longer required, so when a connection to the machine is established, this information is no longer requested.

Refresh

Clicking the *Refresh* button causes a reconciliation (overwriting) of the of the user accounts in the table with data from the device.

Drop-down list *TCP-Users, Panel-Users, Templates*



The drop-down list allows the switching of the current user category to view the corresponding users in the table. This function is identical to a click on a user category in the "*Users for...*" column.

Export

The *Export* button transfers all *TCP* user accounts on a device into the templates.

Import

The *Import* button transfers all *TCP* user accounts in the templates to a target device.

NOTE!	To successfully transfer user accounts to a target device (import) the following requirements need to be checked • *Admin* privileges on the target device; • User administration is activated (see *Activate* button in the toolbar); • In some cases the transfer can be time-consuming. In order to transfer all users without errors, a stable connection to the target device must be ensured.

5.6.2 User accounts and templates

The administration of user roles can only be performed with *Admin* privileges on the target device. The device equipped with the authorisation concept offers two categories of user accounts:

1) *TCP* users. The device is operated via the AEToolbox;
2) *Panel* users. The device is operated locally through the front display.

***TCP* user category**
In this category a series of user accounts with user name, privileges (*Group* column), the current status of the role (*Locked* column) and password can be set up and administered. Currently, *TCP* accounts can be assigned to three privilege groups:

- *Admin* group with read, write and security privileges;
- *Operator* group with read and write privileges;
- *User* group with read privileges.

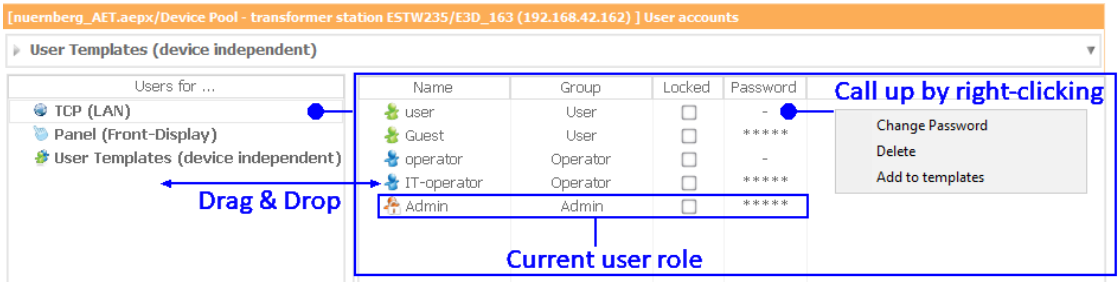
The users in the *Admin* group set up new user accounts, allocate appropriate privileges and assign initial passwords. They can also lock users of other groups *(User, Operator)* and unlock such users again, for example in cases of automatic account locking by the device.

NOTE!	Please note that an account is automatically locked by the device if a false password is entered three times. Only *Admin* users can unlock the account again.

Users that were set up can be transferred to other *EOR-3D* devices with an authorisation concept. To do this they are first transferred to the templates via *drag & drop* or via the *Export* button on the toolbar. After logging in with *Admin* privileges on a target device the user accounts are then imported from the templates (via *drag & drop* or via *Import* button on the toolbar). The current status and passwords are retained during the transfer.

NOTE!	Passwords are only transferred if they were also assigned in the current AEToolbox session. Copying users of a device at a later date requires the manual re-entry of all passwords on the target device.

The following figure depicts the working view for users of the *Admin* group. The account that is currently logged in is marked with a lock icon (i.e. it cannot be deleted). Alongside the functions in the toolbar, the table layout offers even more ways to administer and transfer user accounts.



A user in the *Operator* or *User* role can only change their own password in the *User administration* module. The toolbar functions as well as the table layout of user accounts are deactivated or invisible for these users.

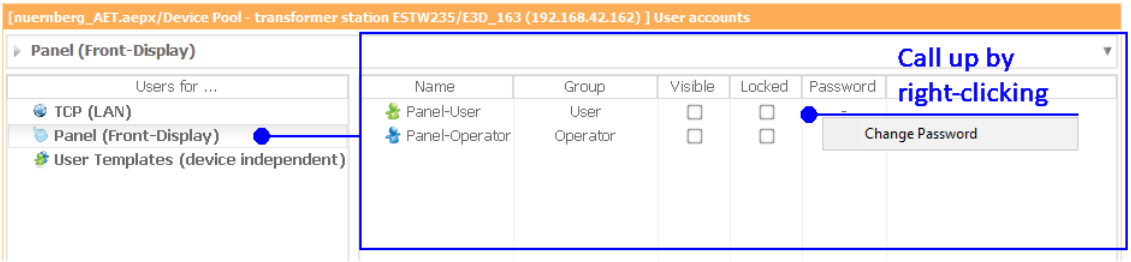
***Panel* user category**
In this category only two standardised accounts are provided:

- *Panel user;*
- *Panel operator.*

A Panel user logs in with his/her password on the front control panel using a special input mask, which prior to this allows the choice of user role. It is not necessary to additionally enter a name. Following a successful login on the front control panel, the device can now be operated locally.

The standardised accounts can only be administered in the *Admin* user role, and only in AEToolbox. The following options are possible:

1) Password assignment;
2) Locking as well as unlocking of the account after an automatic locking action;
3) Enabling the visibility of the account for selection on the front display of the device (*Visible* column).



NOTE!	*Panel user* accounts cannot be transferred to other devices as templates.

6 Tutorials

This section includes assistance and guides for various actions which you can perform in the modules of the AEToolbox software.

6.1 General

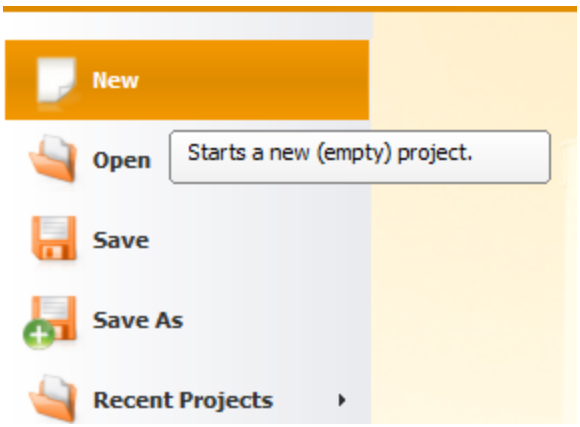
This section explains general and module-independent program functions, and those of project and device administration in particular.

6.1.1 Creating a project

All the technical work steps you perform with AEToolbox can be saved as a AEToolbox project on your PC. AEToolbox generates a file with the extension *.aepx*.

The following methods are offered for creating a new AEToolbox project:

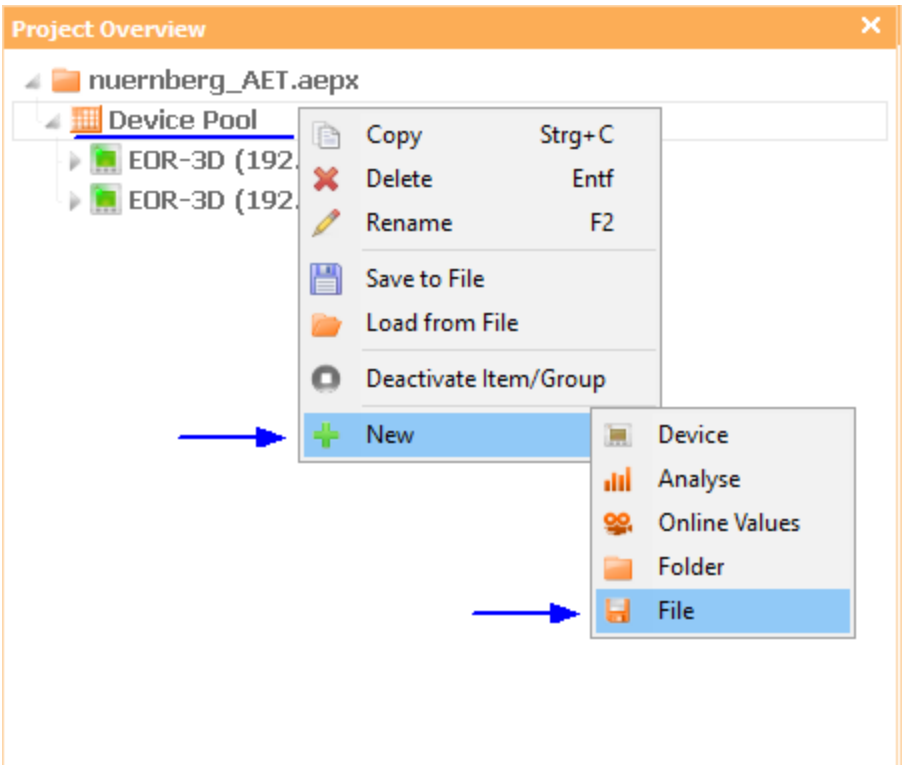
1) In the Control module *Main menu*[16] via the *New* button.



2) In the *Home*[18] operator module using the *New project* button.

3) Loading an *.aepx* file in the project overview

Right-click an existing *device pool* entry. In the drop-down list first select the *New* function and then the *File* function.

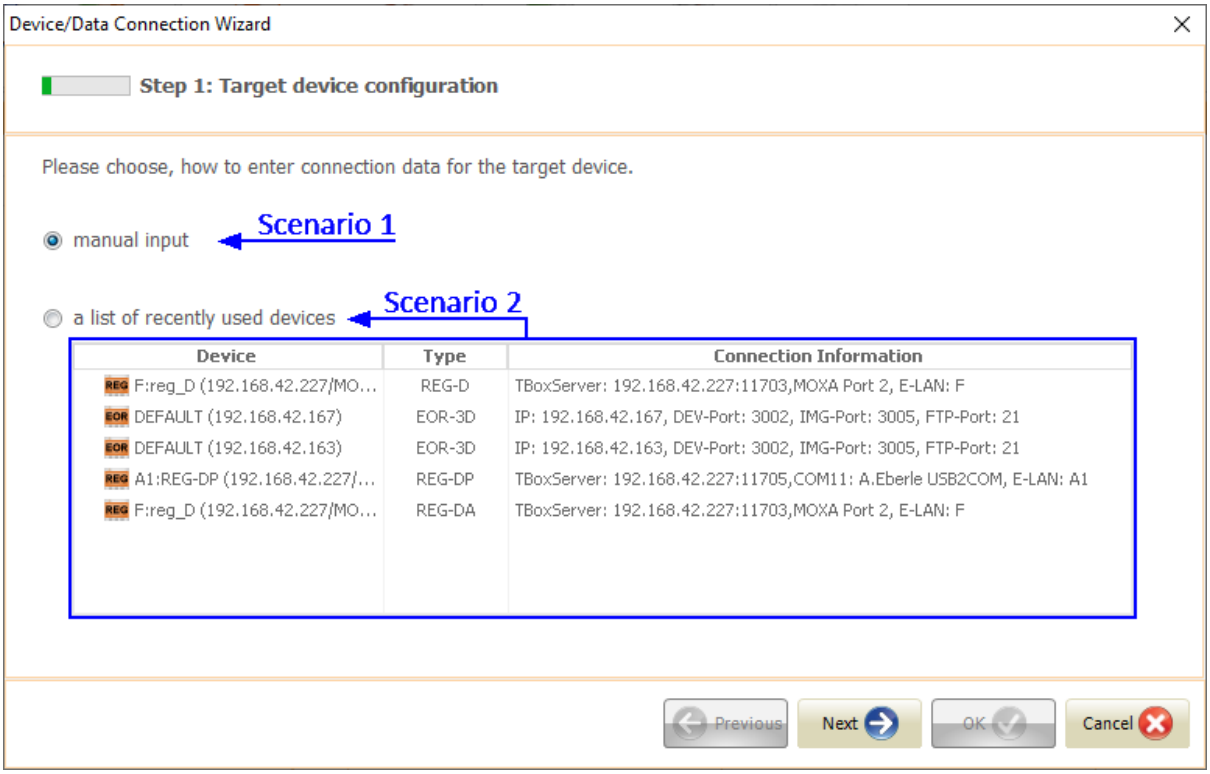


Now you can select a project file that has already been set up. Before the file is loaded in the project overview, you are first asked whether the changes in the current AEToolbox project are to be saved or discarded.

6.1.2 Connection wizard

The *Connection wizard* offers assistance in establishing a connection to a device, particularly regarding special technical features of *REG* and *EORSys* device series.

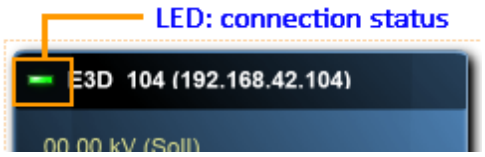
The connection is established in steps and starts with the configuration of the target device, which can be performed either by manually entering connection data (scenario 1) or by selecting a device that has already been connected before (scenario 2).



6.1.2.1 Calling up the connection wizard

When a device is set up the *connection wizard* is called up automatically. The *Configuration* function can also be started on the *device widget*[32] (right-click the *device widget)*.

It is also possible to quickly check the connection status on the *device widget* over the LED button. You can cut the connection and establish it again by clicking this button.

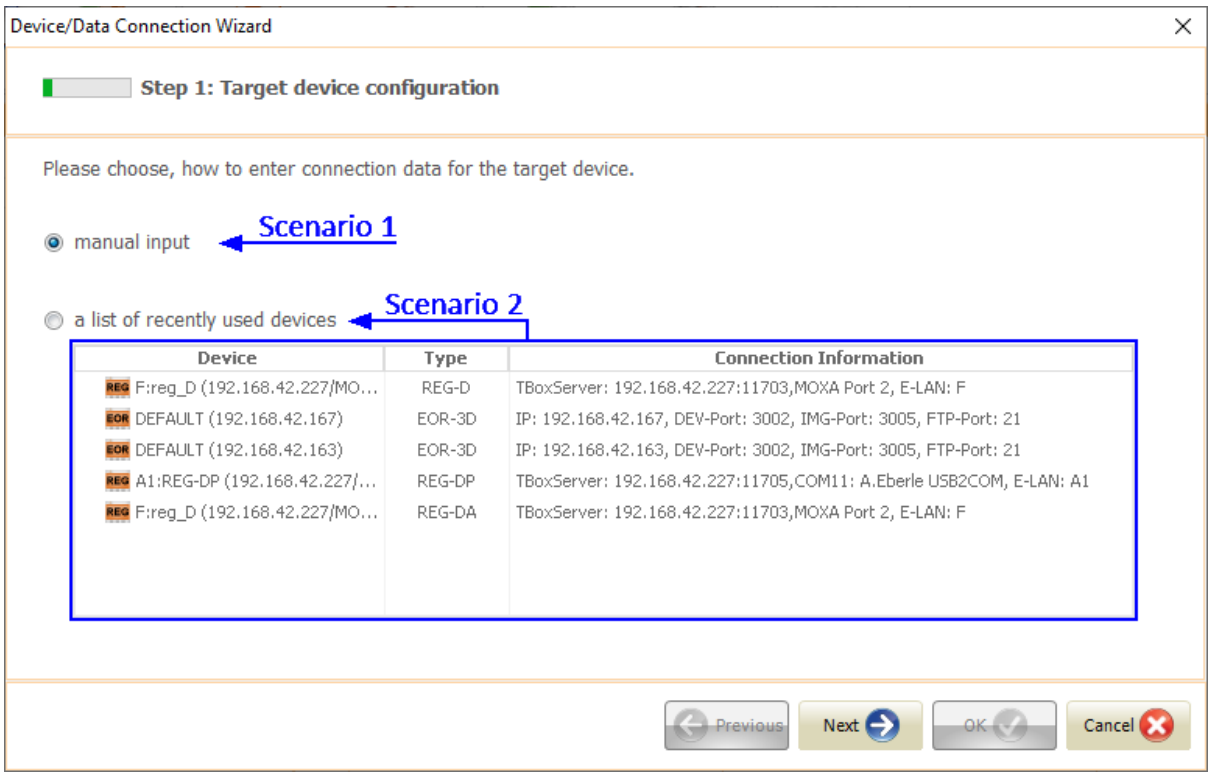


1) LED green – the device is connected;
2) LED orange – a connection is being established;
3) LED red – the connection to the device is cut; an error occurred while connecting;
4) LED black – the connection to the device is cut.

6.1.2.2 Connection using the data of a known device

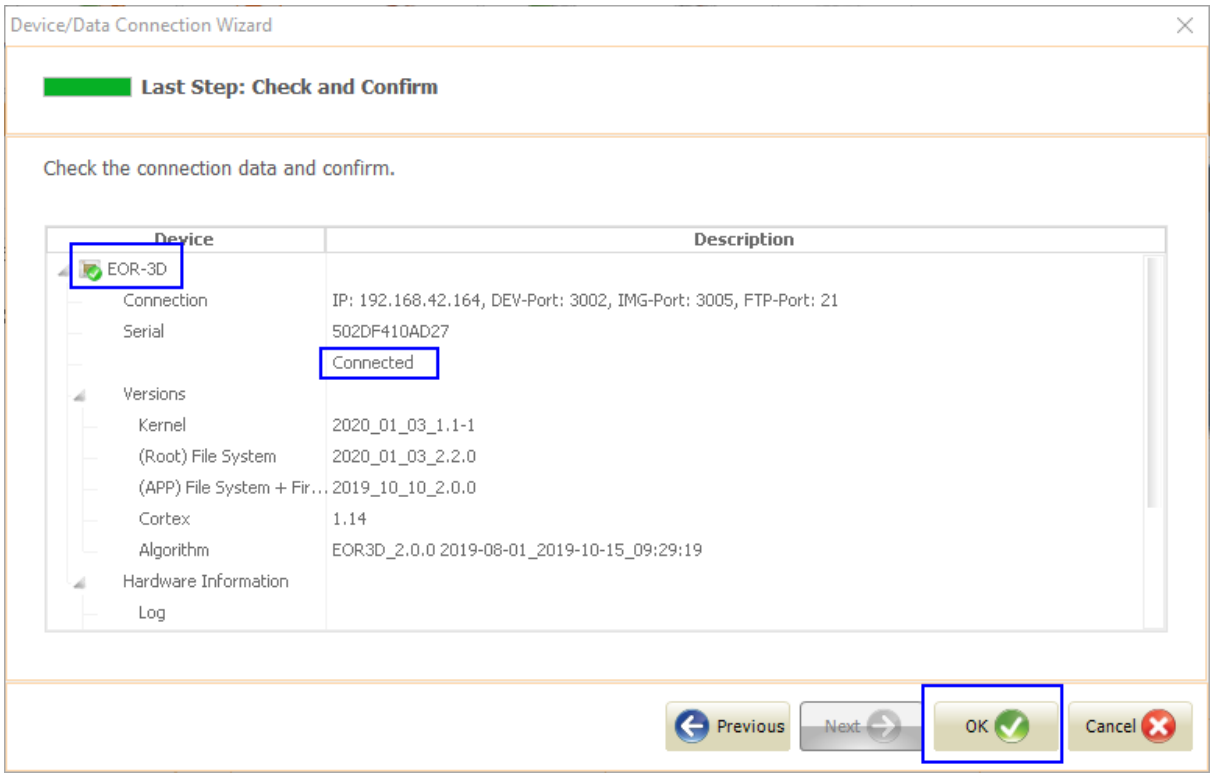
The connection is established in steps and starts with the configuration of the target device, which can be performed either by manually entering connection data (scenario 1) or by selecting a device that has already been connected before (scenario 2).

This section describes the establishment of a connection to a known target device (scenario 2).



Connection data of recently used devices is saved in a list and is offered for new connections. After selecting a recently used device by clicking in the list, you go directly to the final step in the

connection wizard. If the connection data of the target device is correct and the device is physically connected in the network a valid connection is displayed and the *OK* button is activated to acknowledge it (see following figure). If the *OK* button is not activated and the output indicates *Disconnected*, potential causes and remedies can be found in the Error handling and user messages 199 section.



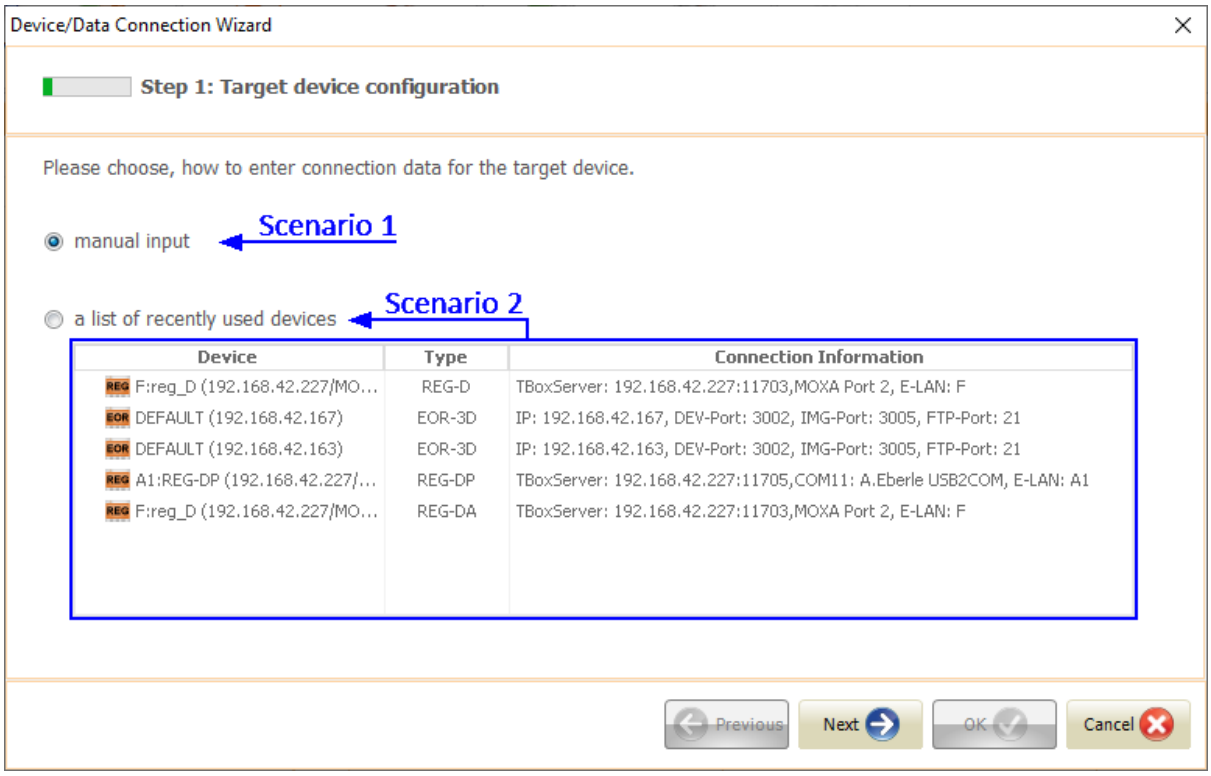
After clicking the *OK* button the AEToolbox user view switches to the *Devices* 25 module, where the connected device is displayed in the project overview and as active *device widget* 32 in the central main view.

Scenario 1 is explained in steps in the Manual connection for EORSys devices 105 and Manual connection for REG devices 109 sections.

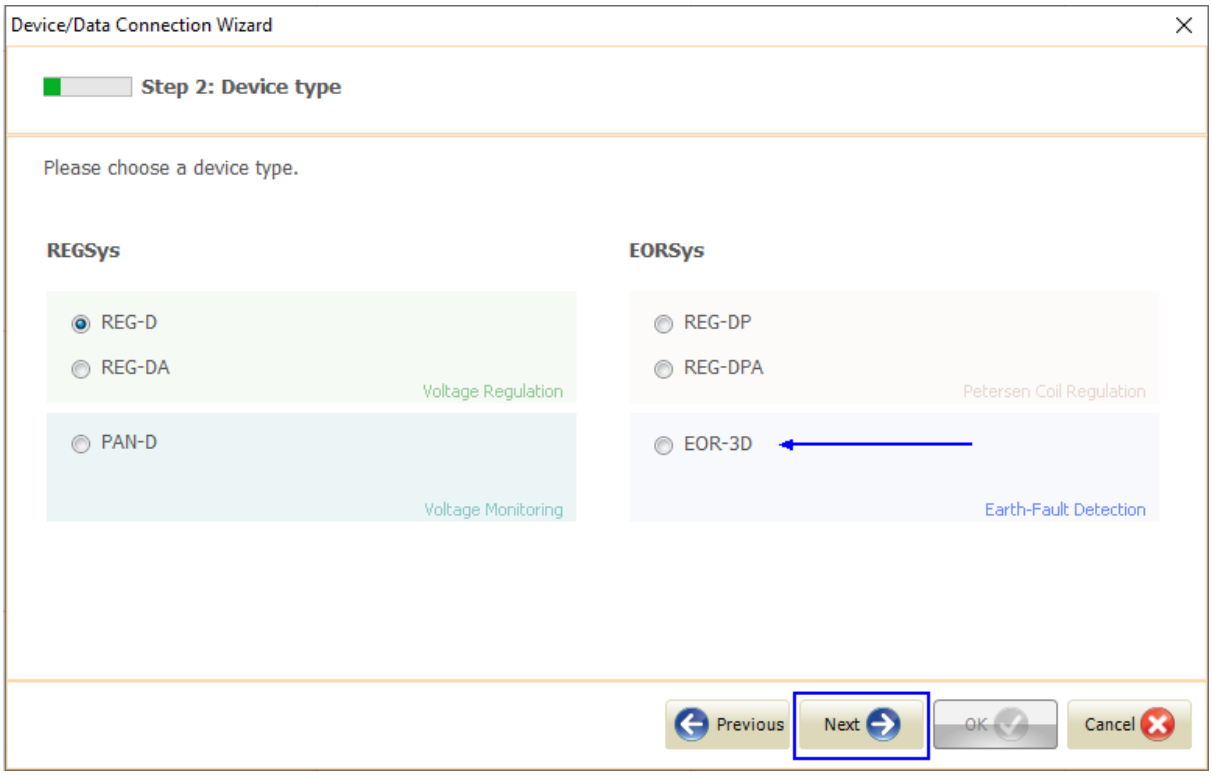
6.1.2.3 Manual connection for EORSys devices

The connection is established in steps and starts with the configuration of the target device, which can be performed either by manually entering connection data (scenario 1) or by selecting a device that has already been connected before (scenario 2).

This section describes how to manually set up a connection to a target device in the *EORSys* series (scenario 1).

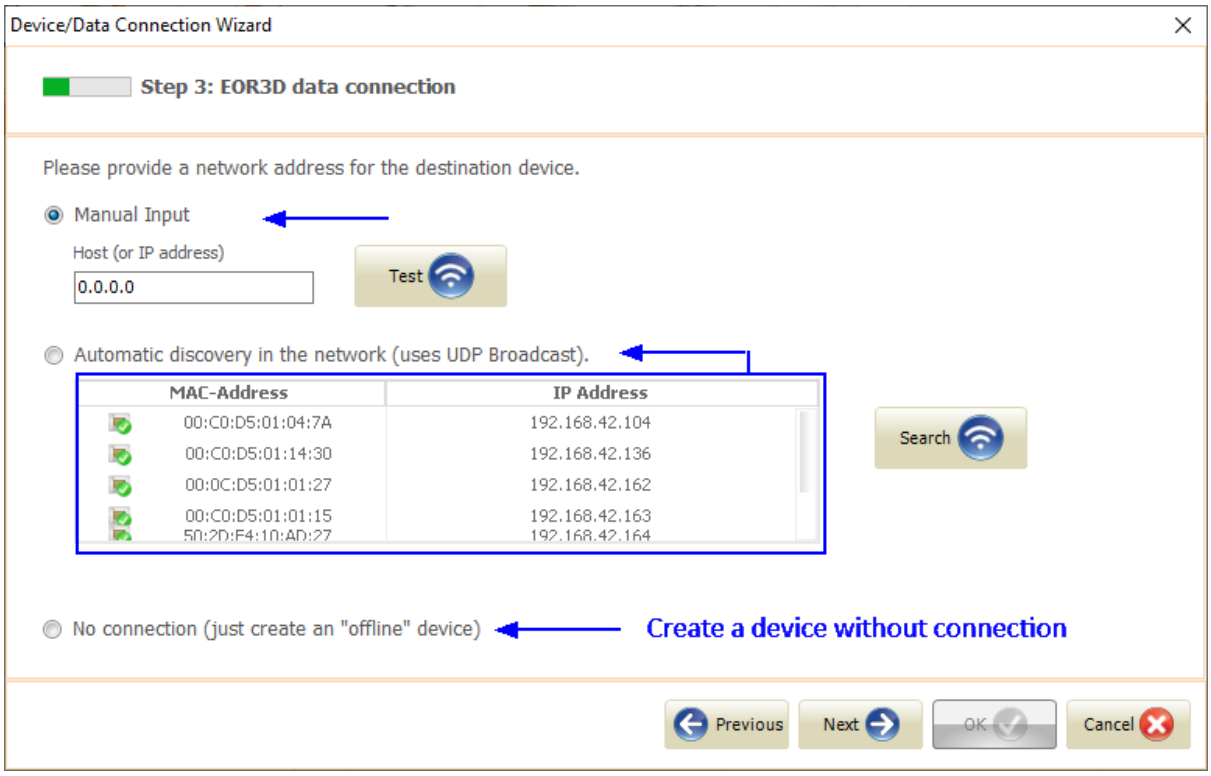


After clicking *manual input* (scenario 1) you are taken to the second step of the connection wizard: selection of the device type. Choose your target device type *(e.g. EOR-3D)* and click on the *Next* button.



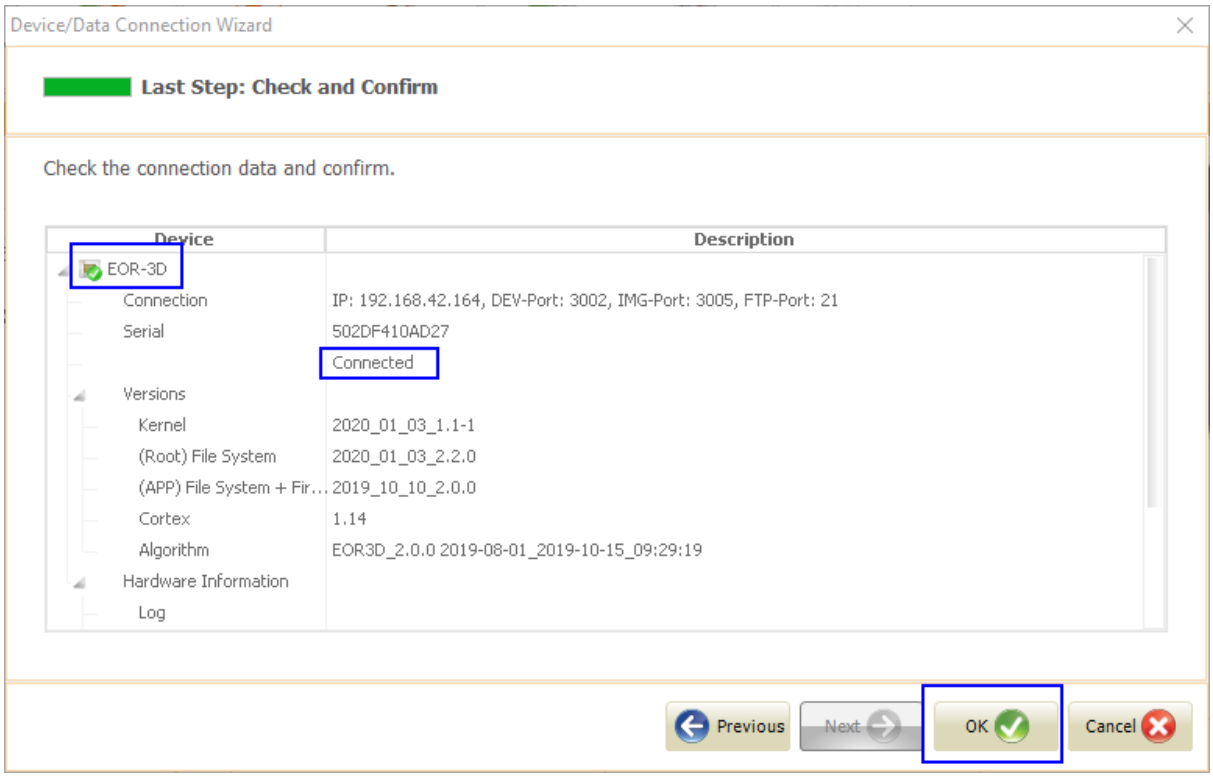
In the next step the network address of the target device is entered. This can be done through (1) manual input of the *IP* address or (2) automatic detection in the network (via UDP broadcast). If the devices in the network are not immediately displayed or if you want to search again, click the *Search* button to the right of the table.

When connecting to a device in a **remote network**, it is recommended to activate the function *slow data connection.* The connection set-up is extended with Timeouts for the slow rate.



NOTE!	Alternatively, you can set up a device without an active connection – a so-called *offline* device – which can be used, for example, to edit templates for parameter sets for commissioning. The *offline* device is displayed in the *Devices* 25 module and in the project overview as an inactive *device widget* 32 (LED switched off).

After input/determination of the network address of the target device the connection can be checked and confirmed in the final step of the connection wizard (see following figure). If the *OK* button is not activated and the output indicates *Disconnected*, potential causes and remedies can be found in the Error handling and user messages 199 section.

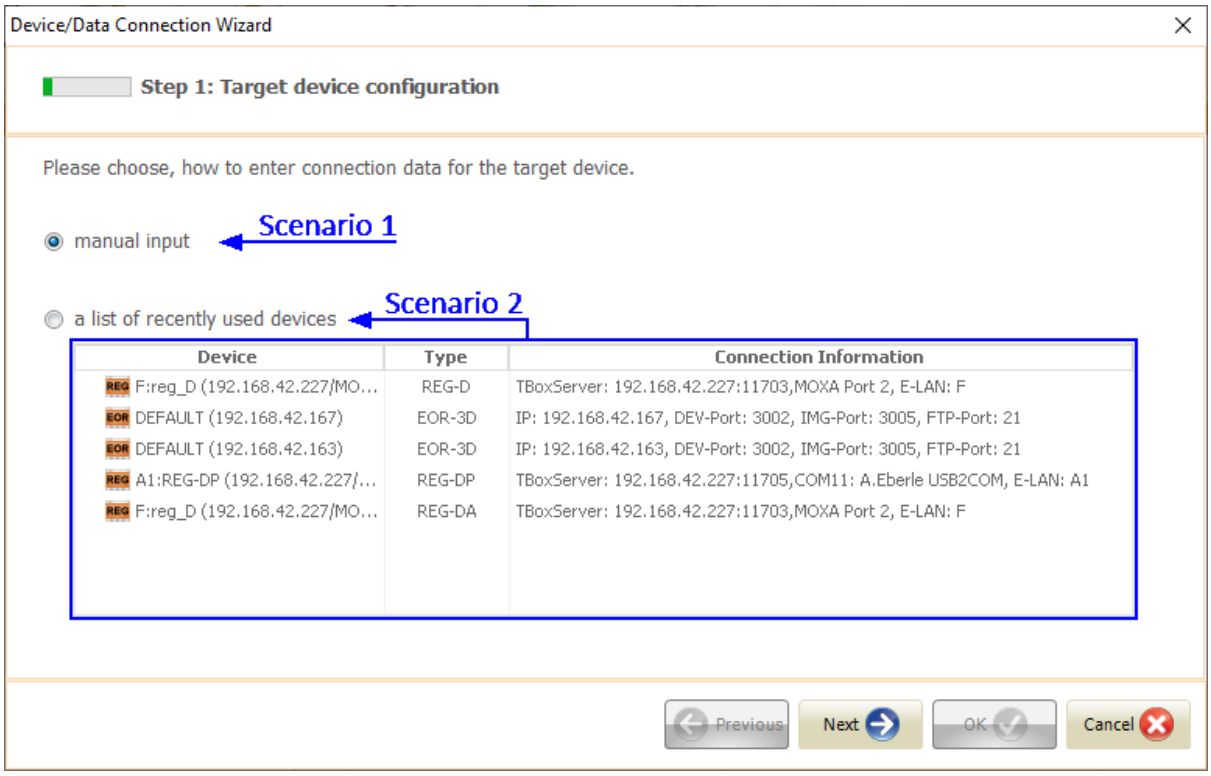


After clicking the *OK* button the user view of AEToolbox switches to the *Devices*[25] module, where the connected device is displayed in the project overview and as an active *device widget*[32] in the central main view.

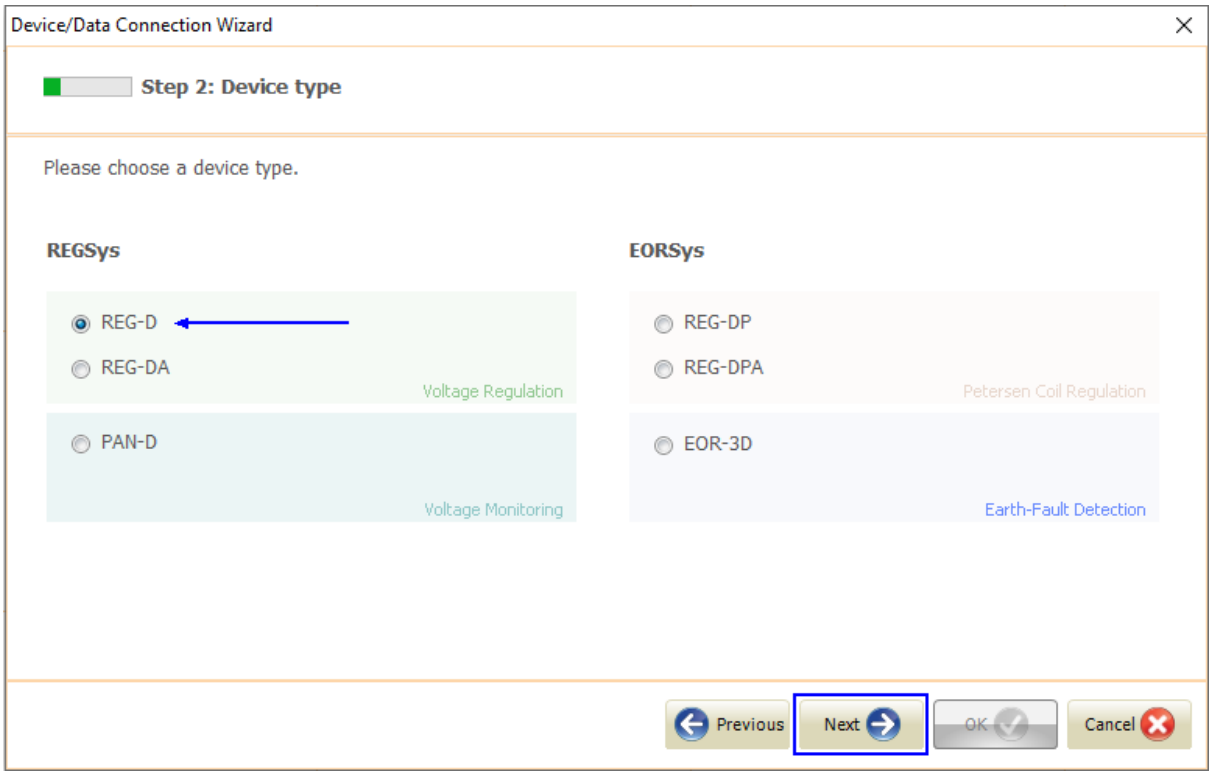
6.1.2.4 Manual connection for REG devices

The connection is established in steps and starts with the configuration of the target device, which can be performed either by manually entering connection data (scenario 1) or by selecting a device that has already been connected before (scenario 2).

This section describes how to manually set up a manual connection to target devices of the types REG-D(A), REG-DP(A), and EOR-3D as well as other devices with serial connection (scenario 1).



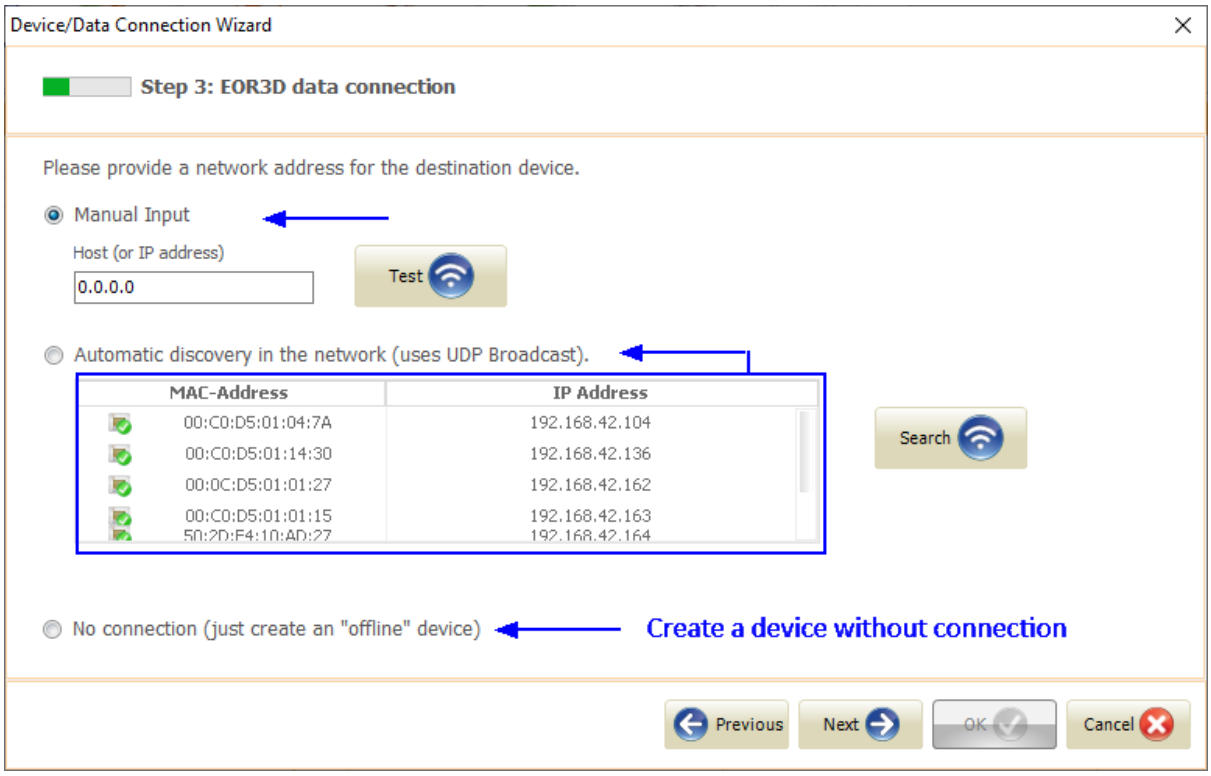
After clicking manual input (scenario 1) you are taken to the second step of the connection wizard: selection of the device type. Choose your target device *(e.g. REG-D)* and click on the *Next* button.



In the next step you configure the physical connection to the access point of your E-LAN network. This is done with the help of the communication server installed with AEToolbox or running on a remote PC. This so-called *TBoxServer (more info can be found here[25])* allows among other things parallel connections of multiple serial devices as well as parallel access to one serial end device. Configuration can be done through (1) manual input of the *IP* address of the *TBoxServer* or (2) automatic detection in the network (via UDP broadcast). If the available *TBoxServers* in the network are not immediately displayed, click the *Search* button again, to the right of the table.

NOTE!	For a serial connection you must configure the *TBoxServer* on whose PC the end device is physically connected. In the simplest scenario it is your current PC. In the case of a connection over a *COM server* the PC of the *TBoxServer* must be in the same subnetwork as the end device.

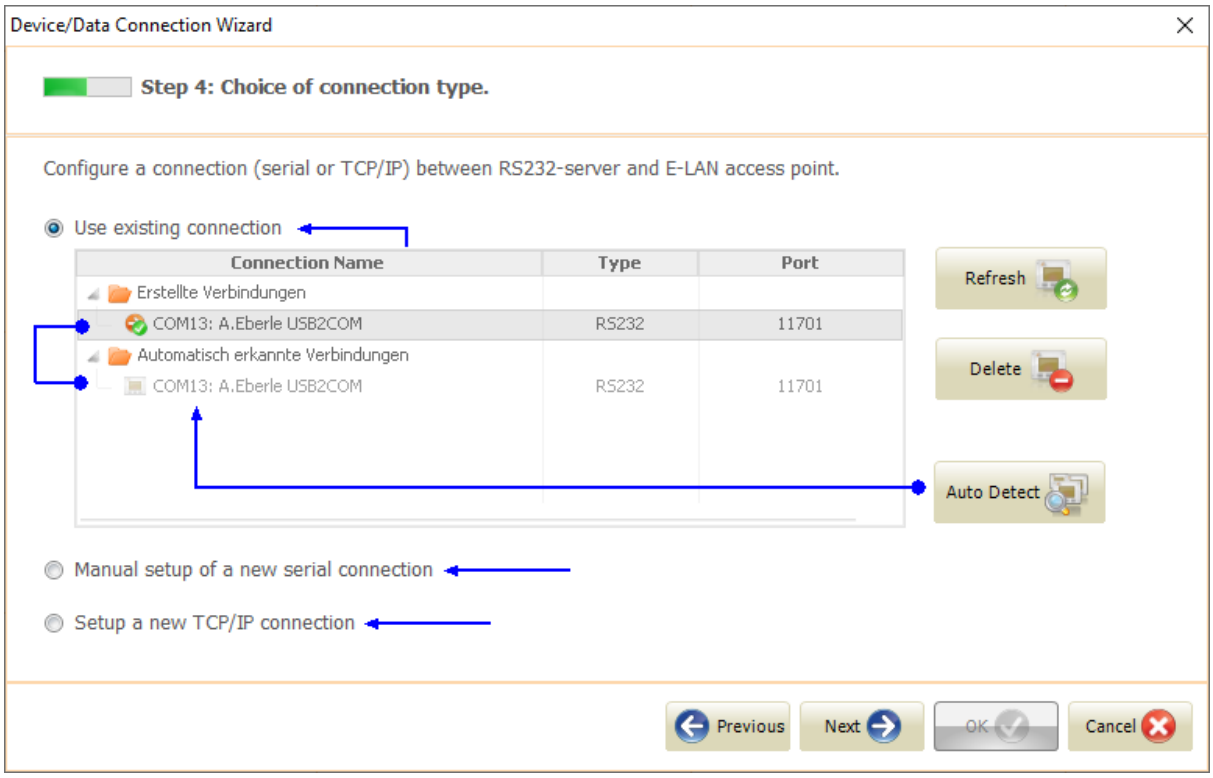
When connecting to a device in a **remote network**, it is recommended to activate the function *slow data connection.* The connection set-up is extended with Timeouts for the slow rate.



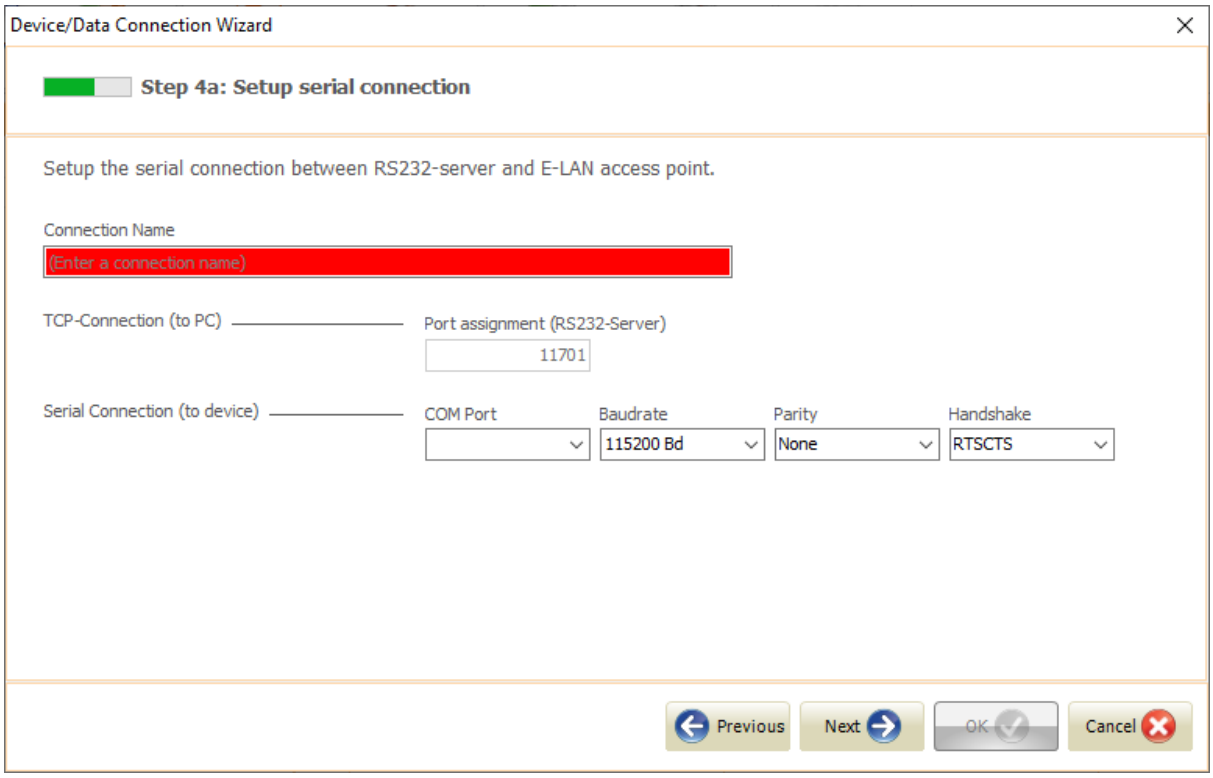
NOTE!	Alternatively, you can set up a device without an active connection – a so-called *offline* device – which can be used, for example, to edit templates for parameter sets for commissioning. The *offline* device is displayed in the *Devices* 25 module and in the project overview as an inactive *device widget* 32 (LED switched off).

After determining the associated *TBoxServer* for the target device, in the next step a serial connection is configured. Here, you can make use of end device connections of this *TBoxServer* that have already been set up, and proceed to the next step with the *Next* button.

After determining the associated *TBoxServer* for the target device, in the next step a serial connection is configured. Here, you can make use of end device conections of this *TBoxServer* that have already been set up, which are tabulated displayed after their type and port. Alternative it is possible to automatically detect existing *FTDI*-connections. For this, click on the *Auto Detect* button. When an automatically detected connection already exists, e. g. connection *COM13: A.Eberle USB2COM* in the picture below, the connection is greyed out for not selectable. At the same time, the connection gets a green overlay-icon for an active connection under existing connections.
All active connections can be refreshed wit the *Refresh* button or with the *Delete* button deleted.

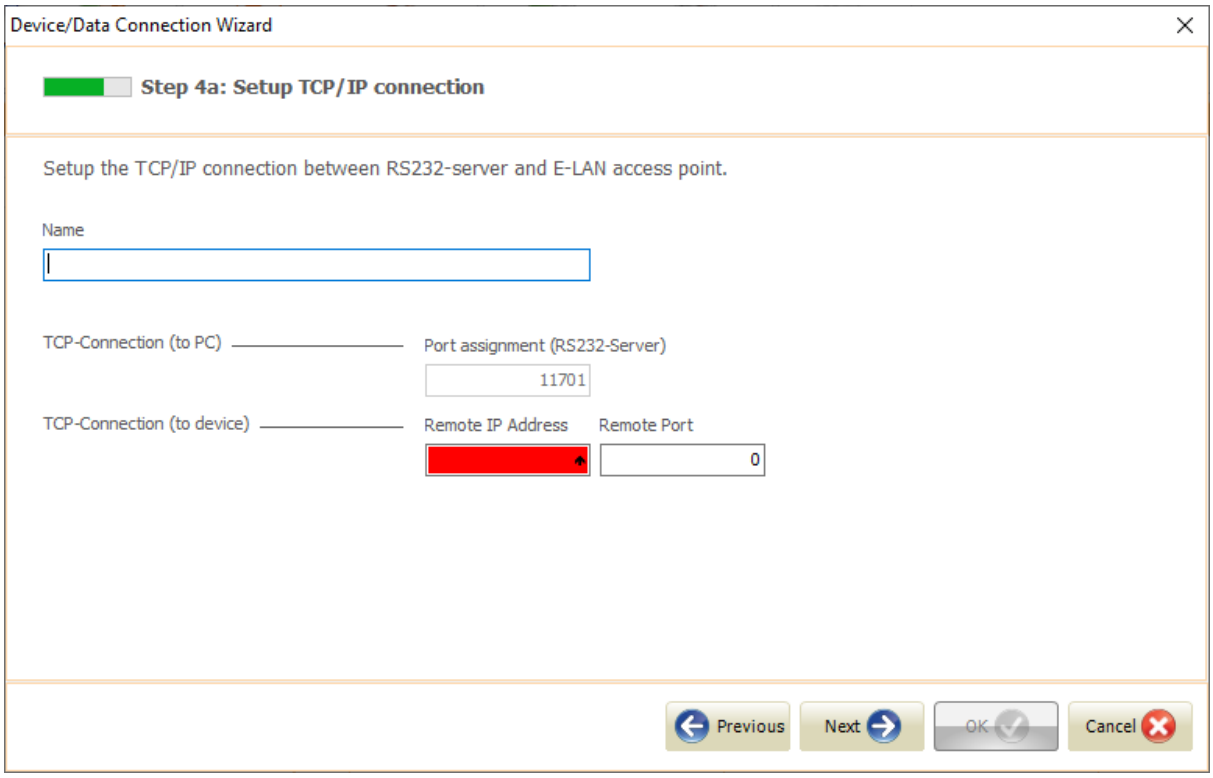


If no connections are available, you can choose between the configuration of a new serial or a *TCP/IP* connection.
To configure a new serial connection enter the connection name as well as COM port, baud rate, parity and handshake. The port allocation of the TBoxServer will be determined automatically and cannot be changed.

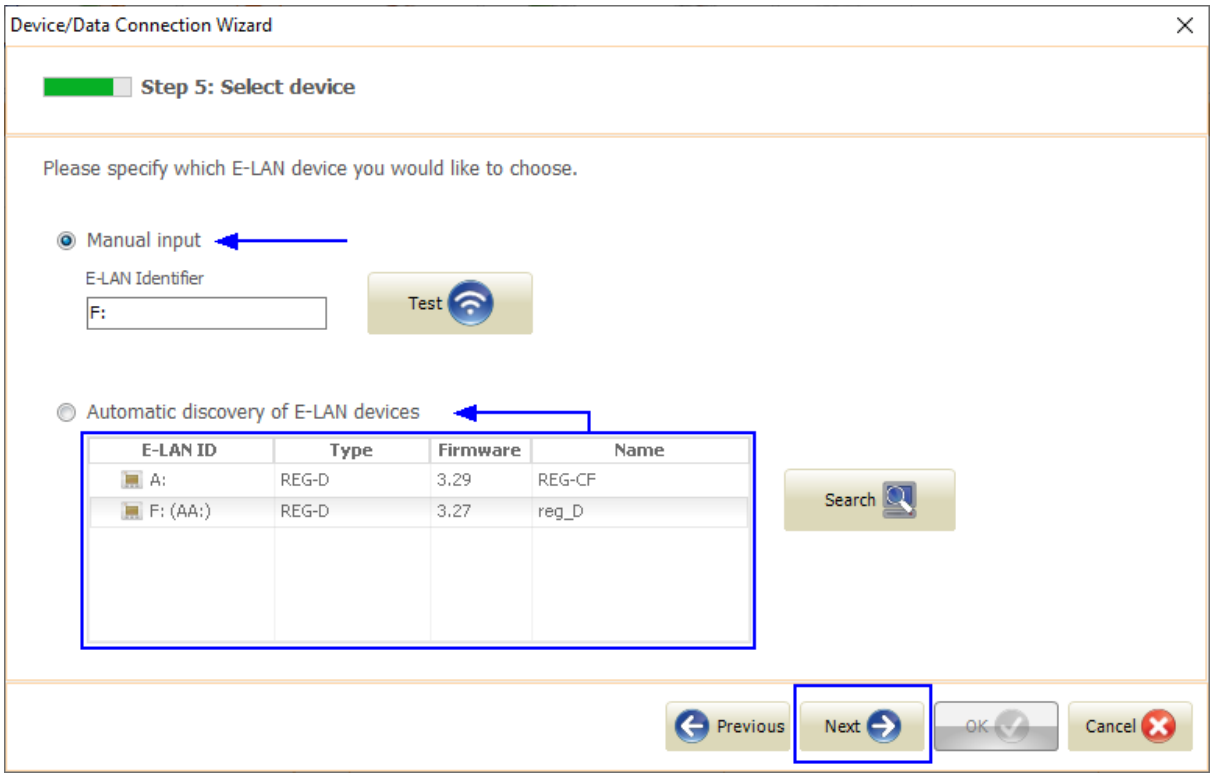


When the connection to a modem brand *MOXA* is not detected, go back to the connection wizard. Step 4 gives you the possibility to find the right COM port with help of the auto detect function. Click on the *Auto Detect* button and wait for the detecting process. Then select *Manual setup for a new serial connection* and click on the *Next* button. In step 4a the list of COM ports is refreshed. Now you can choose the according *MOXA* COM port.

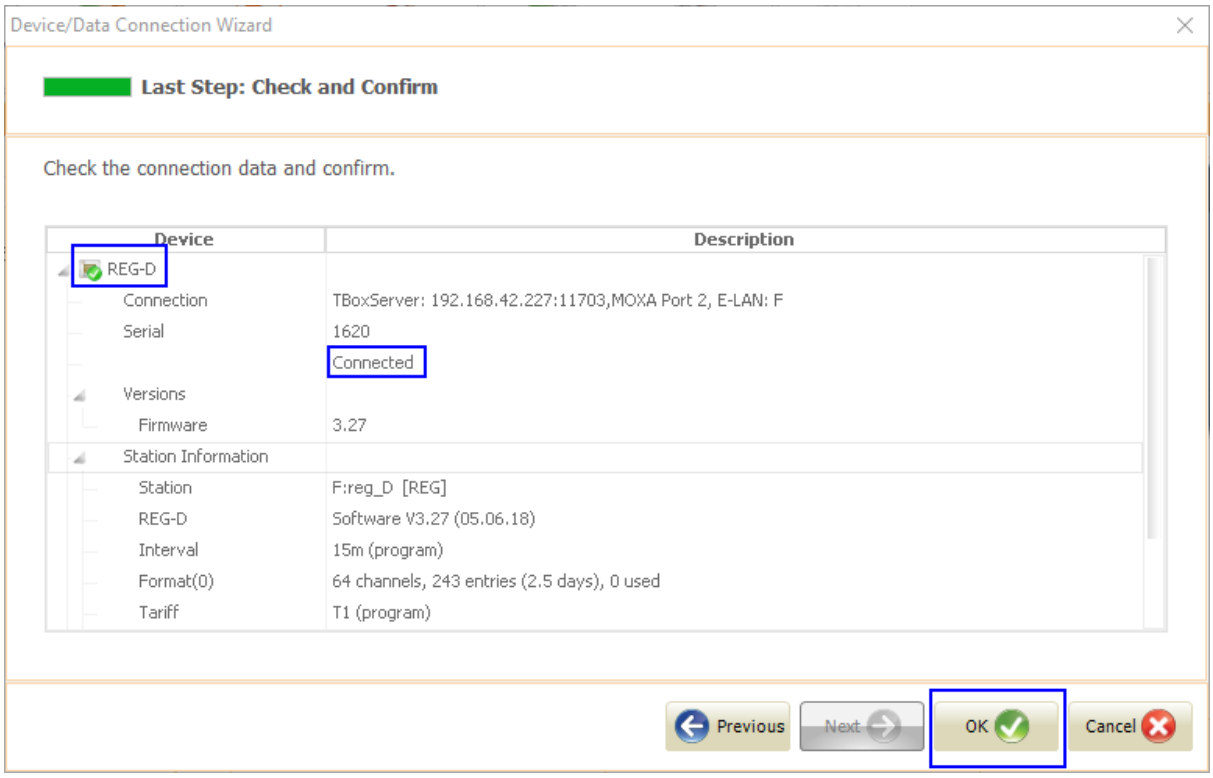
When configuring a new *TCP/IP* connection enter the connection name as well as the remote IP address and the remote port of the COM server. The port allocation of the TBoxServer will be determined automatically and cannot be changed.



Once the configuration of the connection to the access point of your E-LAN network is complete, all devices automatically detected in this E-LAN will be displayed. Devices which may have been detected in the E-LAN, but do not match the target device type chosen in step 1 (here e.g. a *REG-DP* device) will also be displayed here. These will be greyed and cannot be selected.
Alternatively, you can select the target device through the manual input of the E-LAN identifier.



After selection of the target device in the E-LAN the connection data can be checked and confirmed in the final step of the connection wizard (see following figure). If the *OK* button is not activated and the output indicates *Disconnected*, potential causes and remedies can be found in the Error handling and user messages[199] section.



After clicking the *OK* button the user view of AEToolbox switches to the *Devices*[25] module, where the connected device is displayed in the project overview and as an active *device widget*[32] in the central main view.

6.1.3 Firmware update

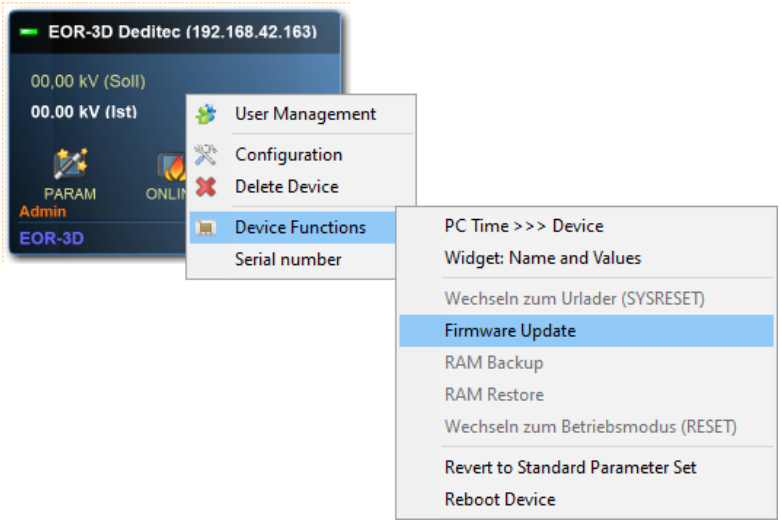
The *Firmware update* function allows the device firmware to be updated. A connection to the target device is established, and then the firmware dialogue is opened in which you can select and install the new firmware (file).

⚠ **CAUTION!**	Before you perform the firmware update, back up all of your device data. This is only intended for the rare case where firmware updates don't execute properly and you may have to send the device to the manufacturer. We particularly recommend a backup of the current configuration[158] .

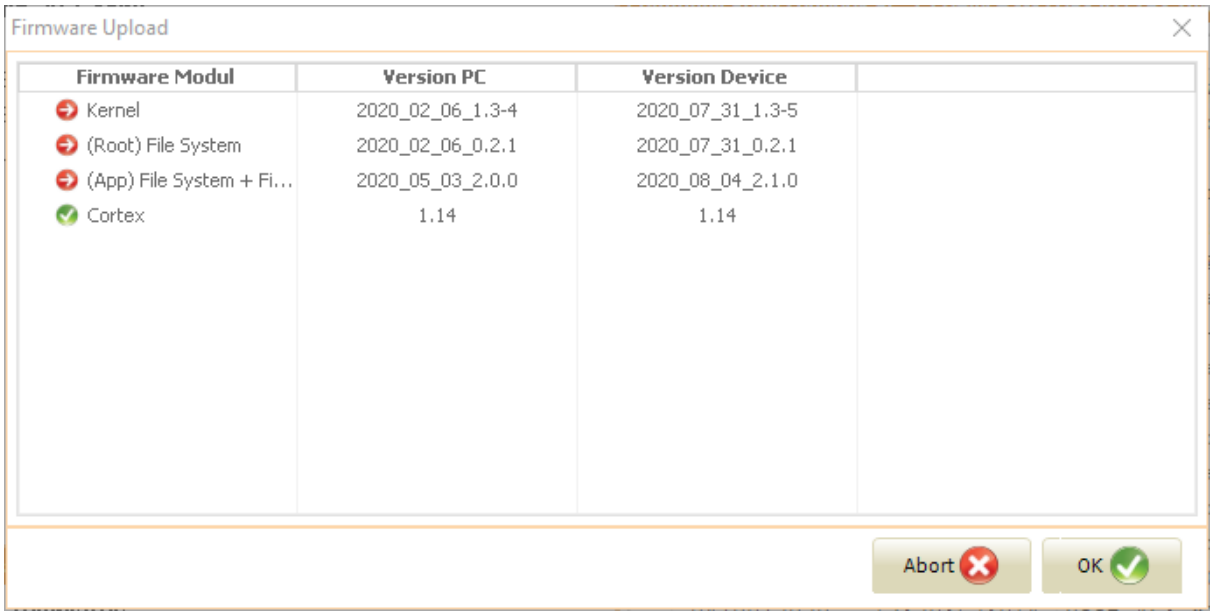
There are two methods for starting the firmware update routine:

1) Via the *Home* operator module and the *Firmware update*[18] button. Please note that before the start of the firmware dialogue, a connection is first made with the help of the connection wizard[103] .

2) A right-click on the *device widget,* from the drop-down list of the device functions.

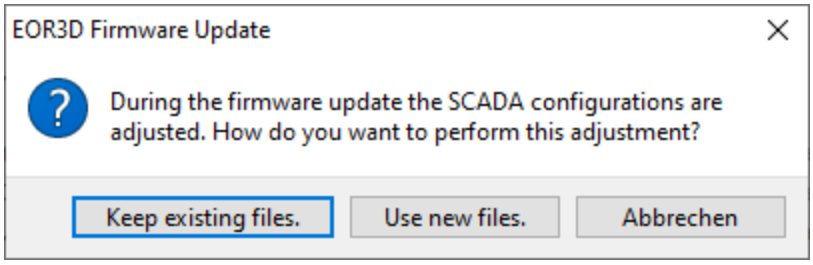


The firmware dialogue first prompts you to select the firmware file. After this file is loaded by AEToolbox and verified, the differences in the firmware versions (file vs. device) are displayed as follows:



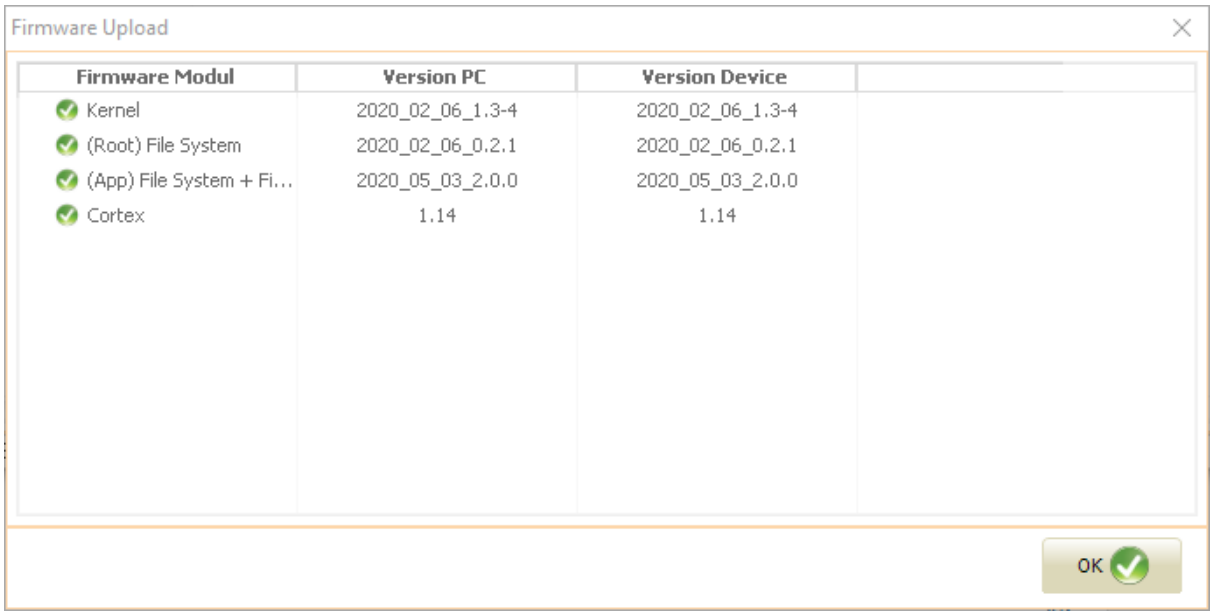
If the loaded firmware file is correct, the *OK* button is enabled and the firmware routine can start. The progress is displayed in the *Interface logbook* in the central main view as well as in the progress bar. Please observe the individual messages on progress.

For *EOR-3D* devices it is asked for the *SCADA*-files handling, before the firmware routine starts. You can keep the present *SCADA*-configuration of the device (before the firmware update) or get a new *SCADA*-configuration with the firmware update. During this, the "old" *SCADA*-files are moved in the folder *SCADA (archive)* on the device.



NOTE!	If the firmware update routine doesn't start in this step, please refer to the Error handling and user messages 199 section for possible causes and their rectification.

If the firmware update routine completes successfully, information on the firmware status on the device is outputted as follows:



After acknowledging, the device is ready for use right away.

NOTE!	If the firmware update doesn't work properly, restart it. Please only contact the manufacturer if the firmware update doesn't run correctly several times. An export of the firmware update log beforehand is very useful here for an error analysis. Please always archive this on your PC.

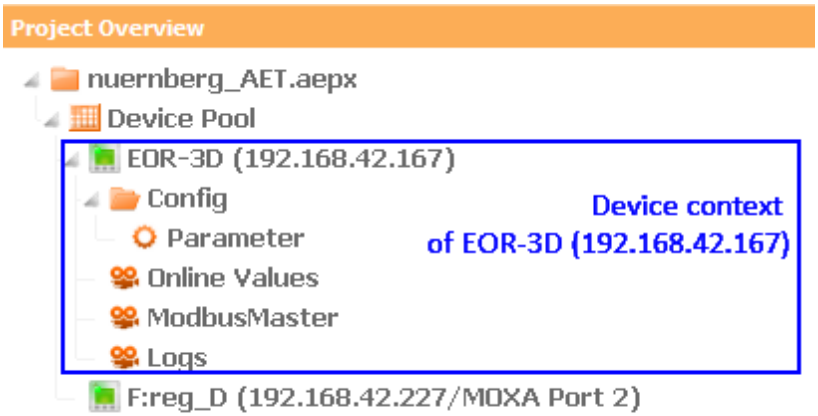
6.1.4 File import/export

This section contains a summary of information on import and export options for all the file formats which are supported in AETToolbox.

Principally there are two operating ranges for import/export functions:
1) Operating range of the PC.
Here, import means that files are loaded from your PC into AETToolbox and displayed in the project overview or in the main view. An export goes from the project overview into local directories on your PC.
2) Operating range of the device.
In this area files are exchanged between the device and AETToolbox. The loading of files from/to the device is explained in the *Files*[87] section module. Further options for *upload* and *download* functions are also described in the Background programs[134] section.

6.1.4.1 File import/export in device context

The following section describes import/export functions in the *operating range of the PC,*[121] which relate to import/export in the *device* context.



Importing in the *device* context is carried out using the universal import functions of AETToolbox:

- *Open file*[25] button in the *Devices* module;
- *Open file*[18] button in the *Home* operator module;
- *File* function, which can be called up with a right-click on the *device* or *device pool* entry through the *New* function.

The following tables summarise the importable files which are displayed in the *device*context.

Parameter/device files and background programs

EOR-3D:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions;	Existing device	File in *Config* folder, contents in the *Parameters table*
Device-internal parameter file	.ini .xml .xmc	(3) Universal import functions of AEToolbox	Temporary device	
background program	.lua	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions; (3) Right-click on *device* entry, add *New, LUA script* function;	Existing device	File in the *LUA SCRIPTS* folder, contents in the text editor
		(4) Universal import functions of AEToolbox	Temporary device	
Device-internal logbook	.log	(1) Open, Save *buttons*[70] in the side function panel of a *Logbook* panel;	Existing device	Contents in the *Log book* panel
		(2) Universal import functions of AEToolbox	Temporary device	File in *LOG* folder, Contents in the *Log book* panel

NOTE!	Please note that for importing parameter files in older formats (.ini, .xml, .xmc), method (1) is specifically recommended: using the *Open*[37] button in the *Configuration* module.

REG-D:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions;	Existing device	File in *Config* folder, contents in the *Parameters table*
External parameter file *WinReg*	.prm	(3) Universal import functions of AETOolbox	Temporary device	
background program	.udm	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions	Existing device	File in *Config* folder, Contents in text editor
background program	.rgl	Right-click on existing RGL file, *Load from file, Save to file* functions		
Device-internal logbook	.reglog	(1) Open, Save *buttons*[70] in the side function panel of a *Logbook* panel;	Existing device	Contents in the *Log book* panel
		(2) Universal import functions of AETOolbox	Temporary device	File in *LOG* folder, Contents in the *Log book* panel

NOTE!

Please note that for importing parameter files in older formats (.prm), method (1) is specifically recommended: using the *Open*[37] button in the *Configuration* module.

REG-DP:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions;	Existing device	File in *Config* folder, contents in the *Parameters table*
External parameters Files: *WinReg EOR-D/Reg-DP WinEDC*	.prm .mdb .weor	(3) Universal import functions of AEToolbox	Temporary device	
background program	.dpl	Right-click on existing DPL file, *Load from file, Save to file* functions	Existing device	File in *Config* folder, Contents in text editor
Device-internal logbook	.reglog	(1) Open, Save *buttons*[70] in the side function panel of a *Logbook* panel;	Existing device	Contents in the *Log book* panel
		(2) Universal import functions of AEToolbox	Temporary device	File in *LOG* folder, Contents in the *Log book* panel

NOTE!	Please note that for importing parameter files in older formats (.prm, .mdb, .weor), method (1) is specifically recommended: using the *Open*[37] button in the *Configuration* module.

PAN-D:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions;	Existing device	File in *Config* folder, contents in the *Parameters table*
External parameters Files: *WinReg*	.prm	(3) Universal import functions of AEToolbox	Temporary device	
background program	.dpl	Right-click on existing DPL file, *Load from file, Save to file* functions	Existing device	File in *Config* folder, Contents in text editor
Device-internal logbook	.reglog	(1) Open, Save *buttons*[70] in the side function panel of a *Logbook* panel;	Existing device	Contents in the *Log book* panel
		(2) Universal import functions of AEToolbox	Temporary device	File in *LOG* folder, Contents in the *Log book* panel

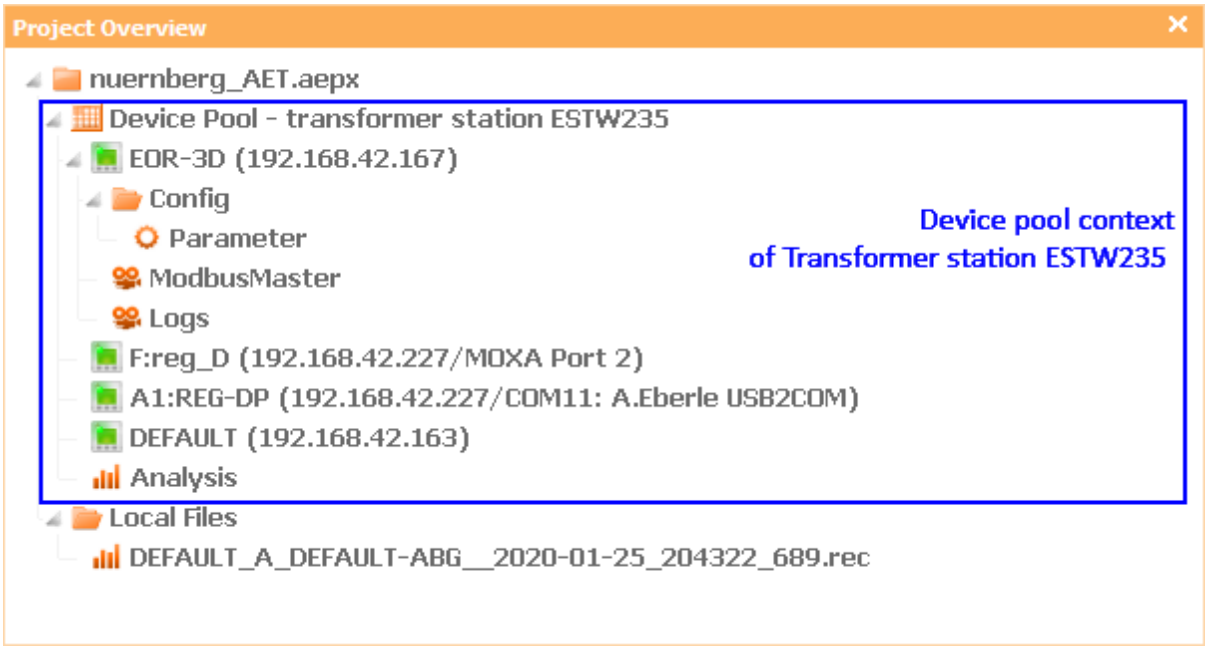
NOTE!	Please note that for importing parameter files in older formats (.prm, .mdb, .weor), method (1) is specifically recommended: using the *Open*[37] button in the *Configuration* module.

***Online* files**

File		Import / export	Import result	
Online entries as a file of AEToolbox	.aemx	(1) Open, Save *buttons*[62] in the *Online* module;	New *online* entry	Contents in the *Online* panel
		(2) Right-click on *online* entry, *Load from file, Save to file* functions	Existing *online* entry	
Logbook messages as a file of AEToolbox	.aelog	(1) Open, Save *buttons*[70] in the side function panel of a *Logbook* panel	Contents in the *Logbook* panel	
Terminal history	.txt	(1) Save history *button*[75] in the side function panel of a *Terminal* panel	Text file in the PC directory	

6.1.4.2 File import/export in the device pool context

The following section describes import/export functions in the operating range of the PC,[121] which relate to import/export in the *device pool* context.



Importing in the *device pool* **context is carried out using the universal import functions of AEToolbox**:

- *Open file*[25] button in the *Devices* module;
- *Open file*[18] button in the *Home* operator module;
- *File* function, which can be called up with a right-click on the *device* or *device pool* entry through the *New* function.

When importing in the *device pool* context the file is placed in an existing or a newly created entry. Through the associated section module, the contents of the file can be displayed in its main view.

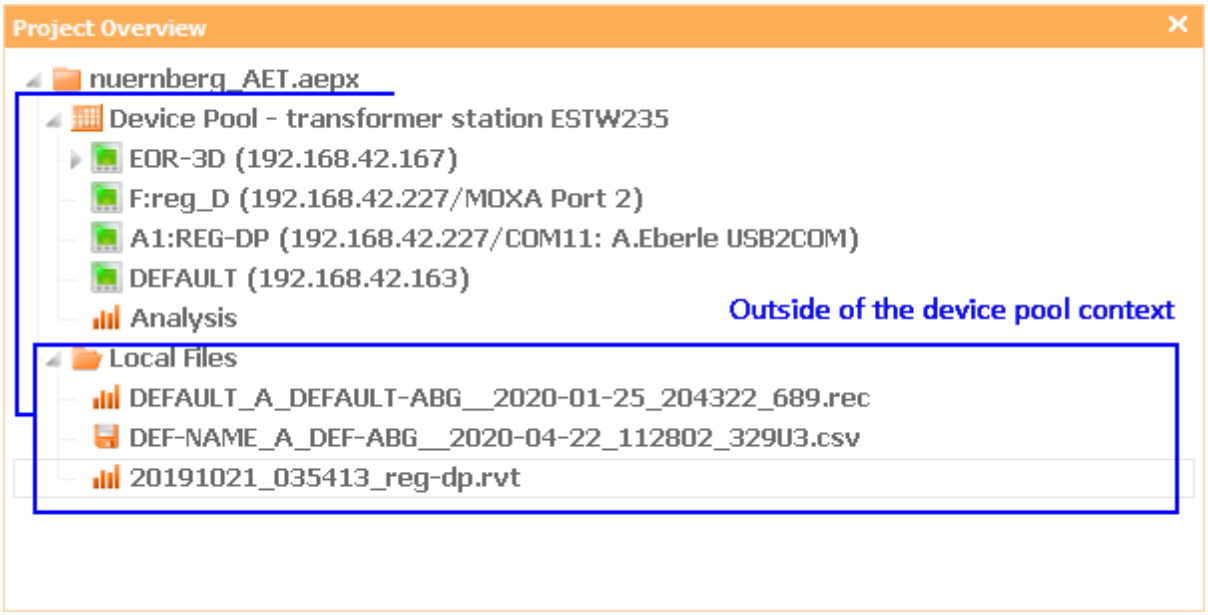
The table summarises the importable files which are displayed in the *device pool*context.

File		Import / export	Import result	
Device entry	.aedeex	(1) Right-click *device pool* entry, *Load from file* function, right-click *device* entry, *Save to file* function;	New *device* entry	*Device widget*
		(2) Universal import functions of AEToolbox		
Online entry as a file of AEToolbox	.aemx	(1) Open, Save *buttons*[62] in the *Online* module; (2) Right-click *online* entry, *Load from file, Save to file* functions;	New *online* entry	Contents in *Online* panel (see following note)
			Existing *online* entry	
		(3) Universal import functions of AEToolbox	New *online* entry	
Logbook messages as a file of AEToolbox	.aelog	Open file, Save file *buttons*[70] in the side function panel of a *Logbook* panel.	Existing *online* entry	Contents in the *Logbook* panel
Device-internal logbook	.log .reglog	Open file, Save file *buttons*[70] in the side function panel of a *Logbook* panel.	Existing *online* entry	Contents in the *Logbook* panel
Analysis entry	.aevsex	(1) Open, Save *buttons*[77] in the *Analysis* module;	Existing *analysis* entry	Contents in the *analysis* chart
		(2) Universal import functions of AEToolbox		

NOTE!	After the import of an *online* entry as a file *(.aemx)* in the *device pool* context, the displayed *Online* panels are displayed without values, because after the import the original allocation to devices is missing. To be able to display the values, first set up the corresponding devices in the *device pool*. After that allocate the *Online* panels to the devices (see allocating *chart values to a device*[65]*)*.

6.1.4.3 File import/export outside of the device pool context

The following section describes import/export functions in the **operating range of the PC,**[121] which relate to import/export outside of the *device pool* context.



Importing outside of the *device pool* context is carried out using the universal import functions of AEToolbox:

- *Open file*[25] button in the *Devices* module;
- *Open file*[18] button in the *Home* operator module;
- *File* function, which can be called up with a right-click on the *device* or *device pool* entry through the *New* function.

An import outside of the *device pool* context results in a *Local files* folder being set up, where the import file is placed (exception: *.aepoex* format).

The table summarises the importable files which are displayed outside of the *device pool* context.

Type	File		Import / export	Import result
All	*Device pool* entry	.aepoex	(1) Universal import functions of AEToolbox;	*Device pool* entry in the *project* structure tree,
			(2) Right-click *project* entry, *Load from file* function	*Device pool* with *device widgets* in the main view
EOR-3D	*SCADA formats:*			
	IEC60870-5-101	.csv	Universal import functions of AEToolbox	File in *Local files* folder, Content is displayed in common *Office* programs
	IEC60870-5-103	.csv		
	IEC60870-5-104	.csv		
	Conmaster	.csv		
	DNP3.0	.csv		
	IEC61850-8-1 (GOOSE)	.xml		File in *Local files* folder, Content is displayed in a special *SCL* editor
	Fault records	.rec		File in *Local files* folder, Content is displayed as a data source in *Analysis* module
	Comtrade formats	.dat .cfg		
	Statistics	.csv		
REG-D/DP	Background program	.rgl, .udm .dpl .pnl	Universal import functions of AEToolbox	File in *Local files* folder, Content is displayed in common *Office* programs
	Monitoring, tap-changer	.csv		File in *Local files* folder, Content is displayed in common *Office* programs
	S2 recorder	.rvd		File in *Local files* folder, Content is displayed as a data source in *Analysis* module
	S1 recorder	.rvt		
	Comtrade formats	.dat .cfg		

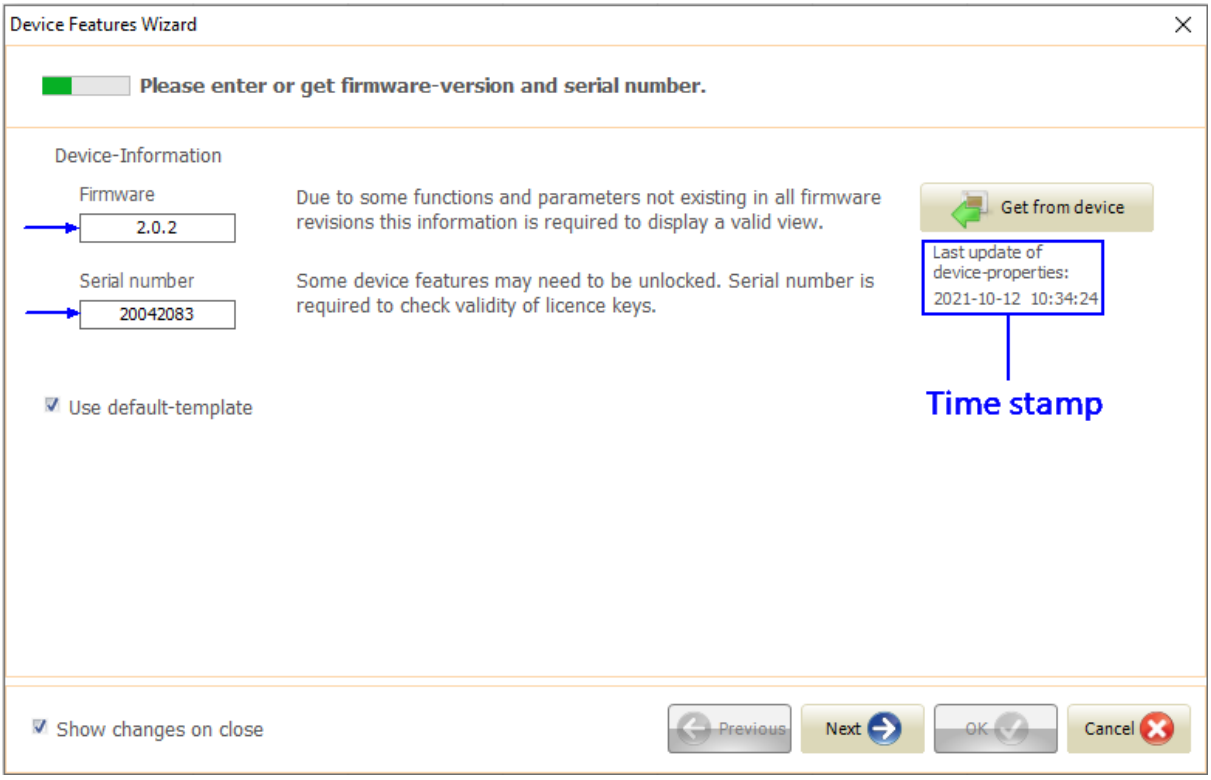
6.1.5 Device features wizard

The *Device features wizard* is used to unlock functions subject to licensing as well as for selecting features in the device as default for working with parameter sets. It is called up using the *Features*40 button in the *Configuration toolbar* or during the process of creating a new parameter set for *REG* devices.

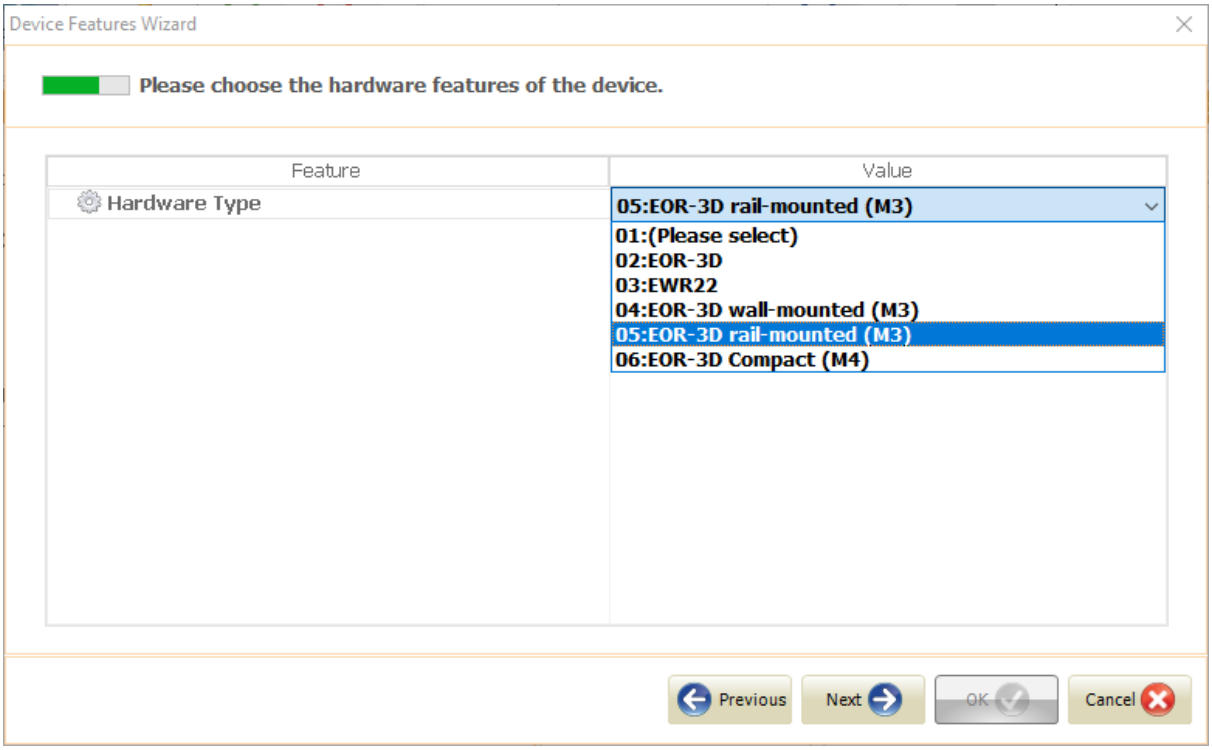
NOTE!	When creating a new parameter set and opening it for the first time in the main view of the *Configuration* section module the firmware version and the serial number as well as all features and licensed functions are loaded from the connected device.

The wizard is structured in steps:

1) Device information
On the first page the firmware version and the serial number can be checked and edited as necessary (this should only be necessary in cases of *offline* devices). The time stamp of the last update of this information by the device is displayed.
Editing the firmware version ensures correct display of the parameter set, because some functions and parameters don't exist in all firmware versions.
The serial number is used to check the licence key, in case device functions (licensed software features) are to be unlocked.

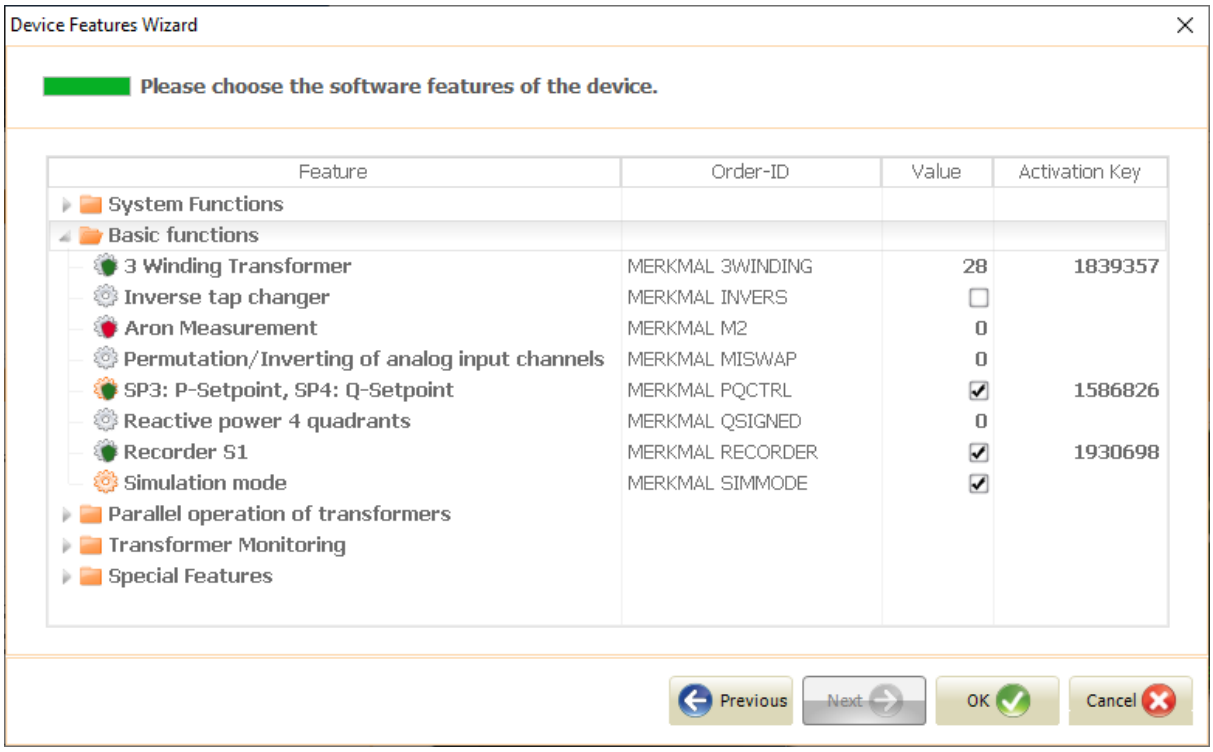


In the case of *EOR-3D* devices hardware information is offered on a separate page for selection; this is also for the purpose of correctly displaying the parameter set.



2) Activating/deactivating select software features in the parameter set
In the next step, free and licensed software features can be activated/deactivated.
The following figure depicts an example of the *Basic functions* folder of a *REG-D-* device with

- free software features: *inverse tap changer, permutation/inverting of analog input channels, reactive power 4 quadrant* and *simulation mode;*
- licensed software features, unlocked with licence key: *3-winding transformer, SP3: P-Setpoint, SP4: Q-Setpoint, recorder S1;*
- licensed, still locked software features: *Aron measurement*.

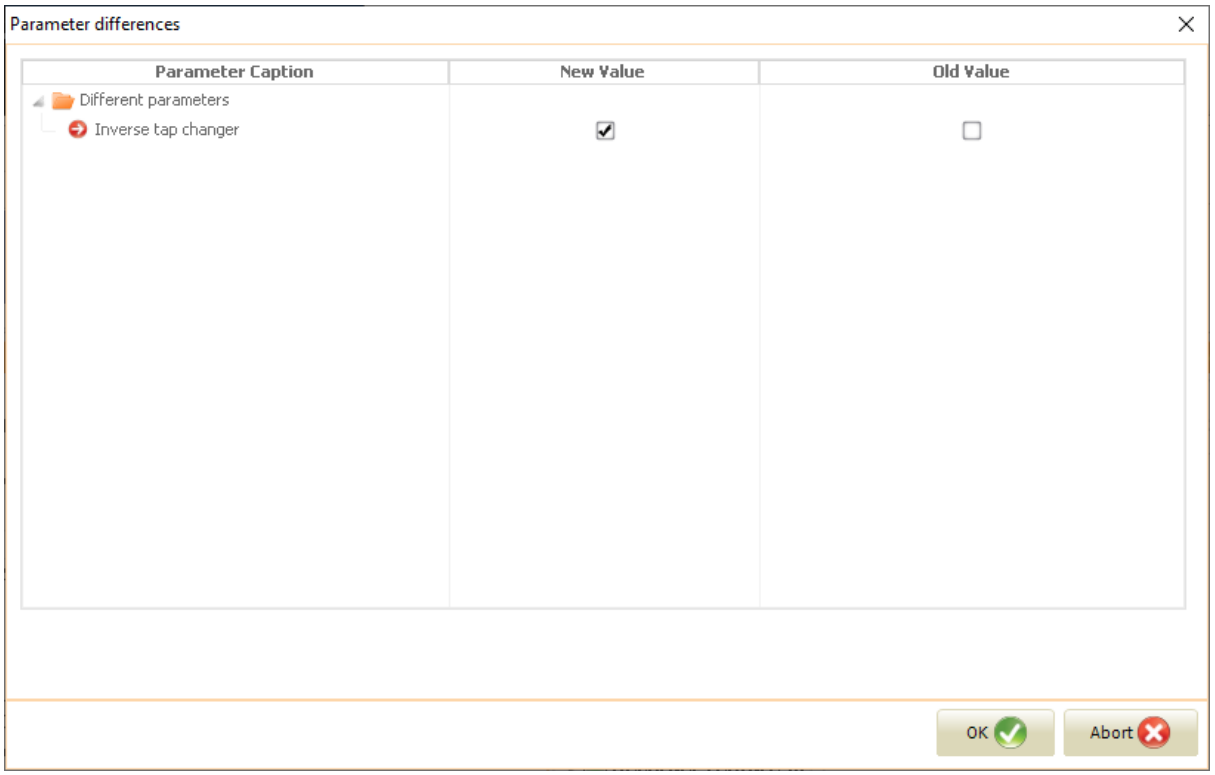


To activate a free software feature enter a value or select a checkbox in the *Value* column.
To activate a licensed software feature enter the number combination of the licence key in the *Activation key* window. After entry, the icon of the software feature turns green and the device function is unlocked. You can now change the parameter value.

NOTE!	Please contact *A. Eberle GmbH & Co. KG* regarding technical advice for determining the optimum selection of features for your system as well as for the required licence key.

3) Parameter differences

In this step all of the parameter changes undertaken are summarised for checking in the *Parameter differences* window. For example, with the activation of the *inverse tap changer* feature the following will be displayed:



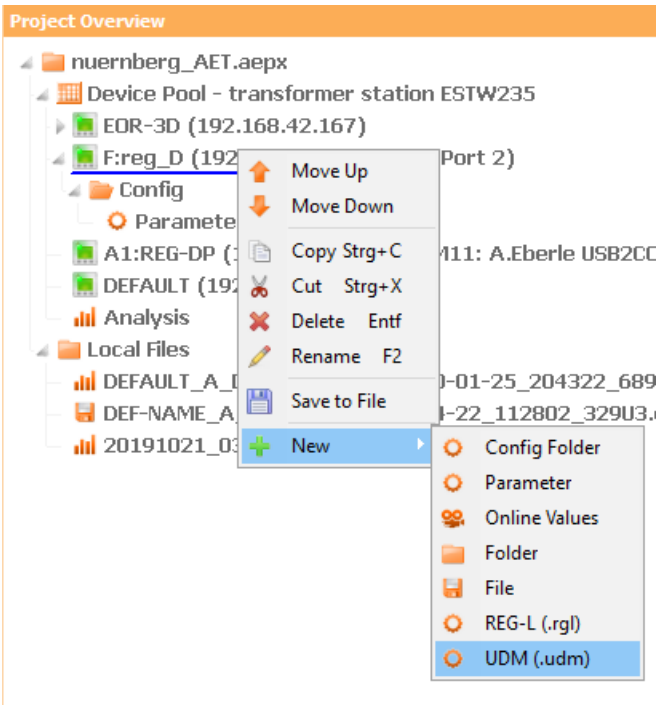
After acknowledging the differences by clicking the *OK* button the entered data and its dependencies will be added to the parameter set.

6.1.6 Background programs

This section describes how to work with the following background programs: *LUA, RGL, UDM, DPL.*

Create new background program
When creating a new background program please note the following differences between the *REG* and *EORSys* device series.

1) For all devices in the ***REG* series** new background programs are created by right-clicking the *device* entry (or the *Config* folder) and then selecting the *New* function, and the sub-functions *REG-L (.rgl), REG-L (.dpl), UMD (.udm),* as depicted in the figure for a *REG-D* device with processor type 3.xx.

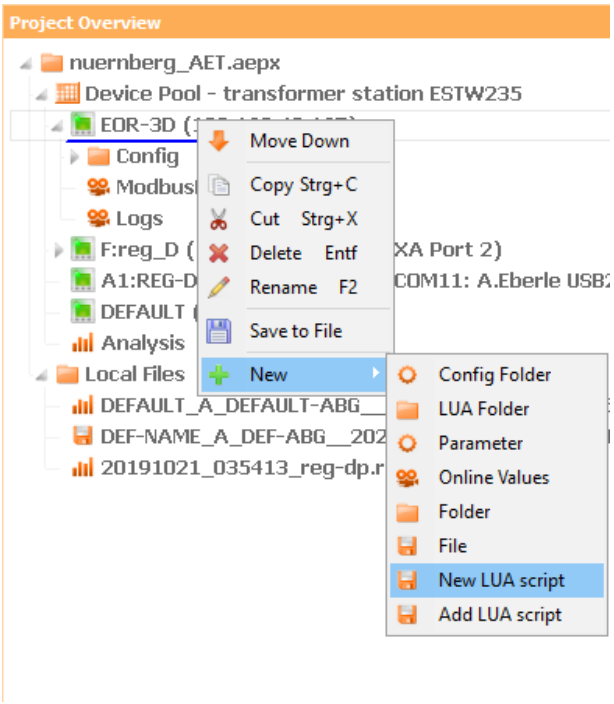


Alternatively, new device-specific background programs can be created by clicking on the *New*[37] button in the *Configuration toolbar*.

NOTE!	The *UDM* program *(.udm)* for *REG-D* devices with processor type 3.xx can also be created when downloading, [40] if you select *UDM* loading in the *Select configuration content* window. If the device doesn't have any *UDM* files yet, the download routine will generate an empty *UDM* file in the project overview.

Newly created background programs are placed in the project overview in a new folder or in a *Config* folder that already exists. Since each *Config* folder can only contain one parameter file and one *REG-L* or *UDM* background program, in the same *device* context, additional *Config* folders can be added, to make it possible to generate more of these files.

2) For all devices in the ***EORSys* series** new *LUA* background programs can be created by right-clicking the *device* entry (or the *LUA scripts* folder) and selecting the *New* function, and sub-function *New LUA script* , as depicted in the figure.



The newly created *LUA* background program is placed in the project overview in a new *LUA scripts* folder or one that already exists. You can generate as many *LUA* background programs as you like in a folder; only one *LUA scripts* folder is set up in the device context.

Open background program as a file
To open a background program available on your PC AEToolbox offers the following options:

1) Call up using the *File* function:

➲ Right-click *Device* or *Device pool* entry
➲ drop-down list *New*
➲ Function *REG-L (.rgl), REG-L (.dpl), UDM (.udm)*
➲ Function *Add LUA script*

2) Call up using the *Load from file* function
➲ Right-click on a background program that already exists in the project
➲ drop-down list *Load from file*

3) Call up using the *Open*[37] button in the *Configuration toolbar*

4) Call up using the *Open file*[18] button in the *Home* module

5) Call up using the *Open file*[25] button in the *Devices* module

Load background program from device
To load a background program directly from the device, the following options are available in the *device* context:

1) Select the background program in the *download* process in the module *Configuration*[40];
2) *Download* function for individual background programs with the help of text editor functions[51];
3) In the *Files*[88] section module one or more background programs can be loaded directly into the local directory of your PC (see *Save as* button and *Save all as* button);
4) In the *Files*[88] section module one or more background programs can be loaded in the project overview (see *Save in project* and *Save all in project* buttons or additional functions in the *Files table*[93]).

Edit and save background programs
All background programs are opened in a text editor in *configuration* mode (see also text editor functions[51]). The changes are immediately saved when the editor is exited (e.g. by clicking on another entry in the project overview) or when starting a download or upload.

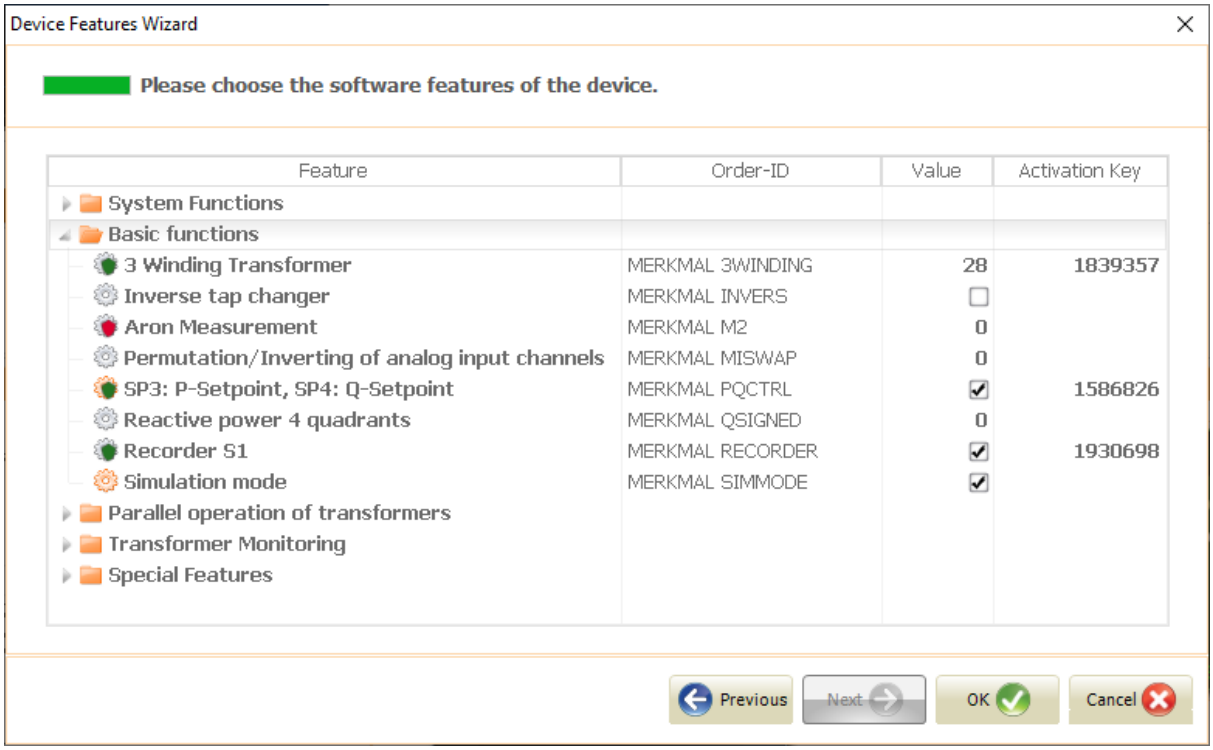
Uploading background programs to the device

To upload background programs within a *device* context the following options are available:

1) Select the background program in the *upload* process in the module *Configuration*[40];
2) *Upload* individual background programs, with the help of text editor functions[51] ;
3) In the *Files* [88]section module individual background programs can be loaded directly from your PC to the device (see *Upload RGL* button and *Upload UDM* button);
4) In the *Files* [88]section module individual background programs can be loaded from the project overview onto the device via *Drag&Drop* (see additional functions of the *Files table*[93]).

6.1.7 Licence key

In *A. Eberle GmbH & Co. KG devices* there is a series of licensed functions or commercial software features. To activate these you need a licence key from the manufacturer.
Free and licensed device functions are administered with a so-called *Device features wizard*, which is called up with the *Features*[40] button in the *Configuration* section module. Since device functions are device-dependent, an example with a *REG-D* device is used in the following figure to depict the administration of these functions.



The *REG-D* device functions are organised thematically in the respective folders. Clicking the *Basic functions* folder, for example, makes the following free and licensed software features visible and editable:

- free software features: *inverse tap changer, permutation/inverting of analog input channels, reactive power 4 quadrant* and *simulation mode;*
- licensed software features, unlocked with licence key: *3-winding transformer, SP3: P-Setpoint, SP4: Q-Setpoint, recorder S1;*
- licensed, still locked software features: *Aron measurement*.

To activate a licensed software feature enter the number combination of the licence key in the *Activation key* column. After entry, the icon of the parameter feature turns green after and the device function is unlocked.

NOTE!	Please contact *A-Eberle GmbH & Co. KG* regarding technical advice for determining the optimum selection of features for your system as well as for the required licence key.

Saving licence keys in AEToolbox
The following options are available for saving the licence keys entered in the *Device features wizard*:

- **AEToolbox project.** After entering all the necessary licence keys and subsequently checking all the parameter changes, the *Parameter differences* window is acknowledged by clicking the *OK* button and the *<%GERAETEMERKMALEWIZARD%>* is exited. After that, save the current AEToolbox session as a project. The number combinations that have been entered will be saved with it. The device functions only remain unlocked in the framework of this specific project;

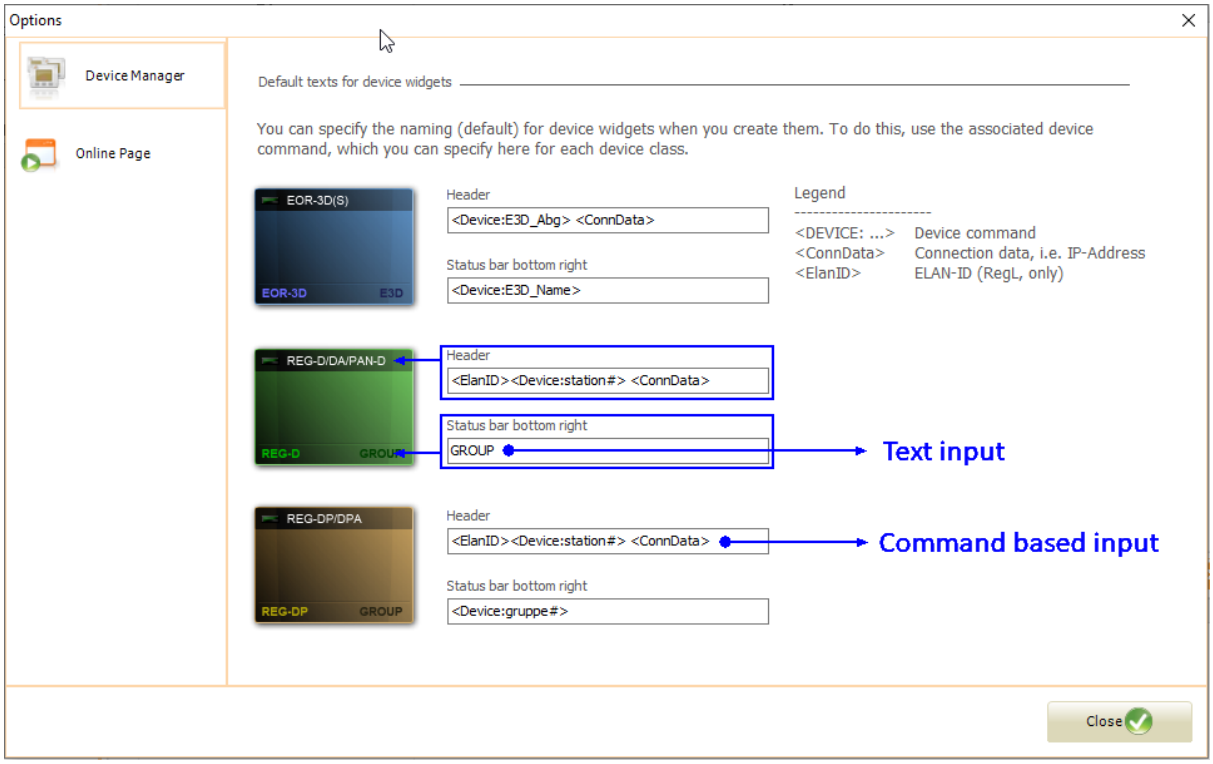
- **End device.** To transfer the unlocked device functions to the allocated device, perform a parameter upload after acknowledging the *Parameter differences* window. This way the licence keys will be transferred to the device and will be available on this device from now on.

NOTE!	Should you only want to upload licence keys onto the device, it is recommended you do a complete download of the current device parameters before performing the upload. This way you ensure that no faulty parameters accidentally find their way onto the device along with the licences.

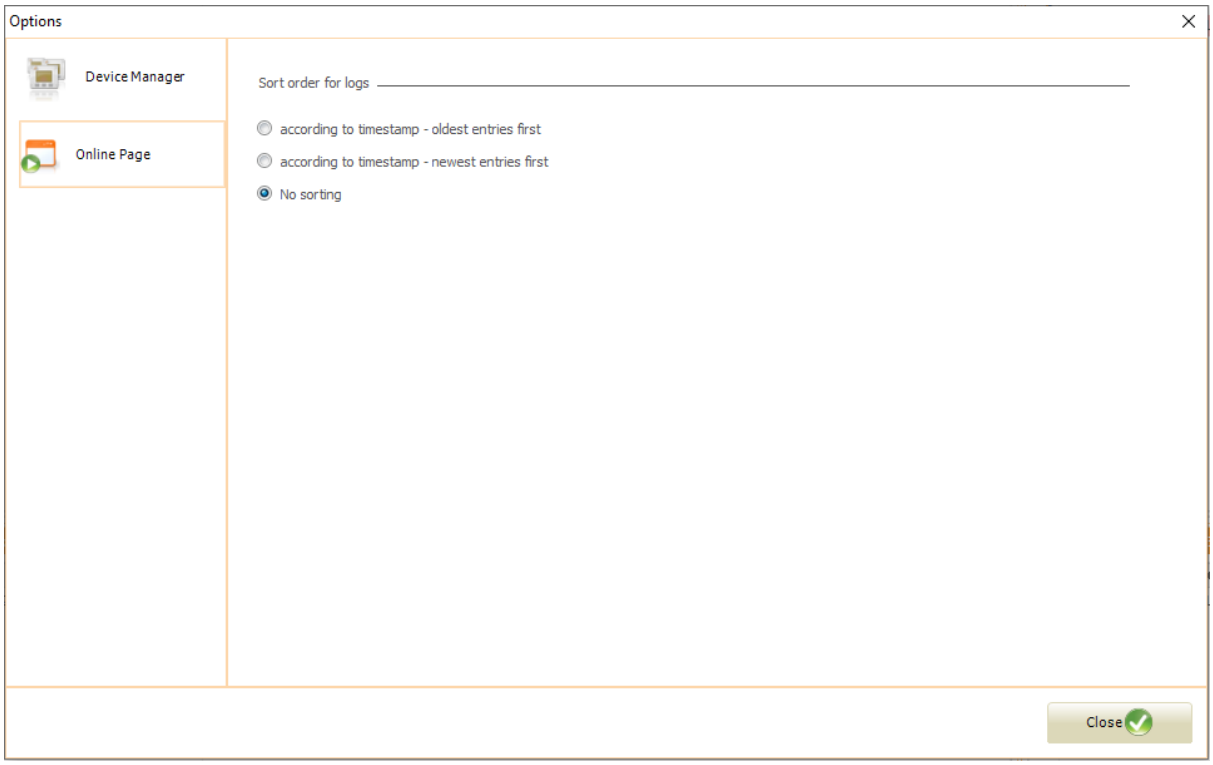
6.1.8 Options

Options are general settings for the AEToolbox, which e. g. apply on all devices.

1) Device Manager
In the *Device Manager* the standard texts for the device widgets are set. In each device group there is a header and a status bar which are set with a device specific command (or an order of commands). Instead of commands it is possible to use a static text output.



2) Online Page
The settings for the *Online* page includes different filters for sorting the entries in the logbooks.

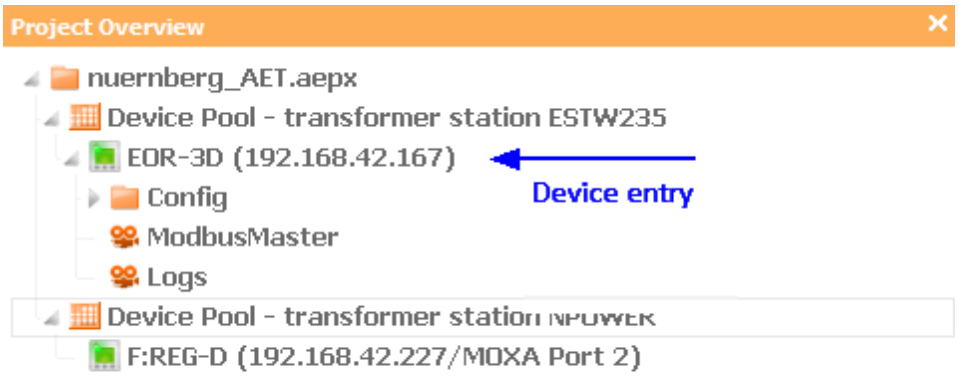


6.2 Devices

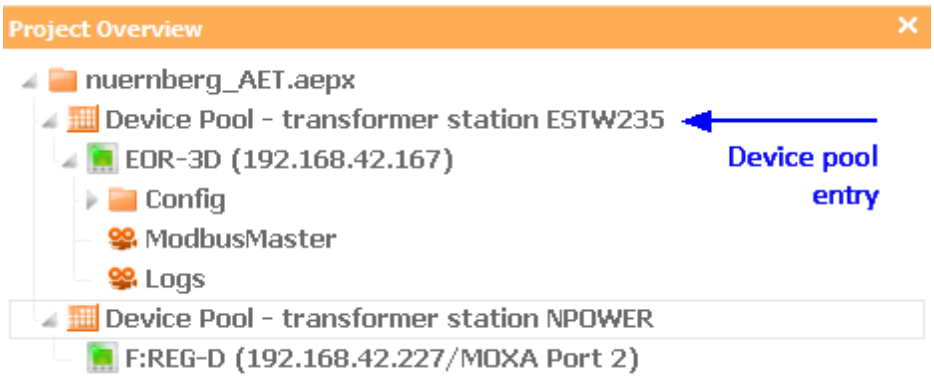
6.2.1 Calling up the Devices module

To call up the *Devices* module, AEToolbox offers the following options:

1) Mark a *device* entry in the project overview



2) Mark the *device pool* entry in the project overview



3) Click the *Devices* tab

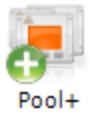
6.2.2 Generating a device pool entry

For setting up a new *device pool*, AEToolbox offers the following options:

1) Initial *device pool*
The initial *device pool* is set up when AEToolbox starts or when a new project is set up, and is displayed in the *Devices* module. To call up the *Devices* module, click the *Devices* tab.

➲ Start AEToolbox
➲ Click the *Devices* tab

2) *Pool+* button in the *Device toolbar*



➲ Click the *Devices* tab
➲ Click the Button ***Pool+*** 25

3) Import a *device pool* from a file *(.aepoex)*
The import of a *device pool* includes all devices, files and settings.

Method 1:
➲ Right-click an initial *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select *device pool* file *(.aepoex)*

Method 2:
➲ Right-click *project* entry in the project overview
➲ *Load from file* function
➲ Select *device pool* file *(.aepoex)*

Method 3:
➲ *Open file* 25 button in the *Devices* module

➲ Select *device pool* file *(.aepoex)*

Method 4:
➲ *Open file* 18 button in the*Home* operator module

➲ Select *device pool* file *(.aepoex)*

For more information on the subject of *imports* please refer to the File import/export outside of the device pool context 128 section.

6.2.3 Saving a device pool as a file

A *device pool* can be saved as a file *(.aepoex)* with all devices, files and settings in your current directory.

Proceed as follows to save a *device pool* entry:

***Save to file* function**
➲ Right-click the *device pool* entry in the project overview
➲ *Save to file* function

6.2.4 Copying a device pool entry

A *device pool* is copied with all devices, files and settings and pasted into the existing project tree structure.

Proceed as follows to copy a *device pool* entry:

Copy/Paste functions
➲ Right-click the *device pool* entry in the project overview
➲ *Copy* function
➲ Right-click *project* entry in the project overview
➲ *Paste* function

6.2.5 Renaming a device pool entry

It is possible to change the default name of the *device pool* entry.

Proceed as follows to rename a *device pool* entry:

***Rename* function**
➲ Right-click the *device pool* entry in the project overview (or mark the entry + F2 key)
➲ *Rename* function
➲ Enter a new name for this *device pool* entry
➲ *Enter* or click other entries in the project overview

6.2.6 Deleting a device pool entry

A *device pool* entry can be deleted from the project overview.

NOTE!	Please note: • All devices and files which have been set up in the *device pool* context are deleted; • A final *device pool* entry in the project overview cannot be deleted.

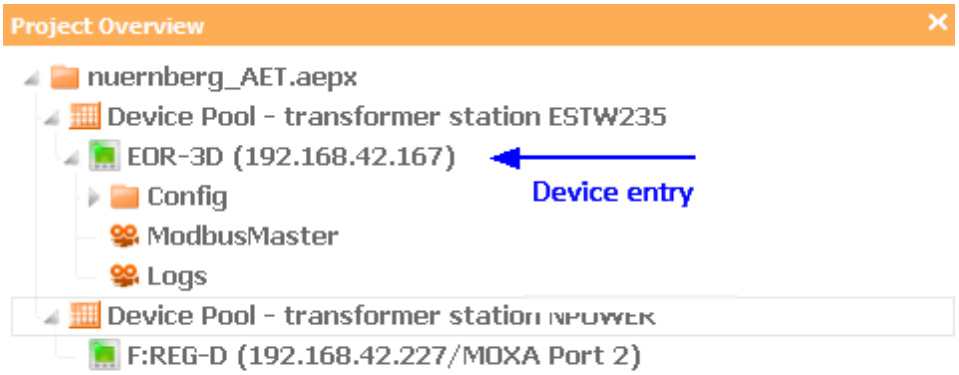
Proceed as follows to delete a *device pool* entry:

***Delete* function**
➲ Right-click the *device pool* entry in the project overview
➲ *Delete* function

6.2.7 Generating a device entry

A *device* entry is generated when you use AETool box to connect to a target device. After a successful connection process using the *connection wizard* 103 your target device will be "set up" in the project overview (*device* entry). In the main view of the *Devices* module a digital image of the device is displayed in the form of a *device widget* 32 .

A device can only be set up in the *device pool* context.

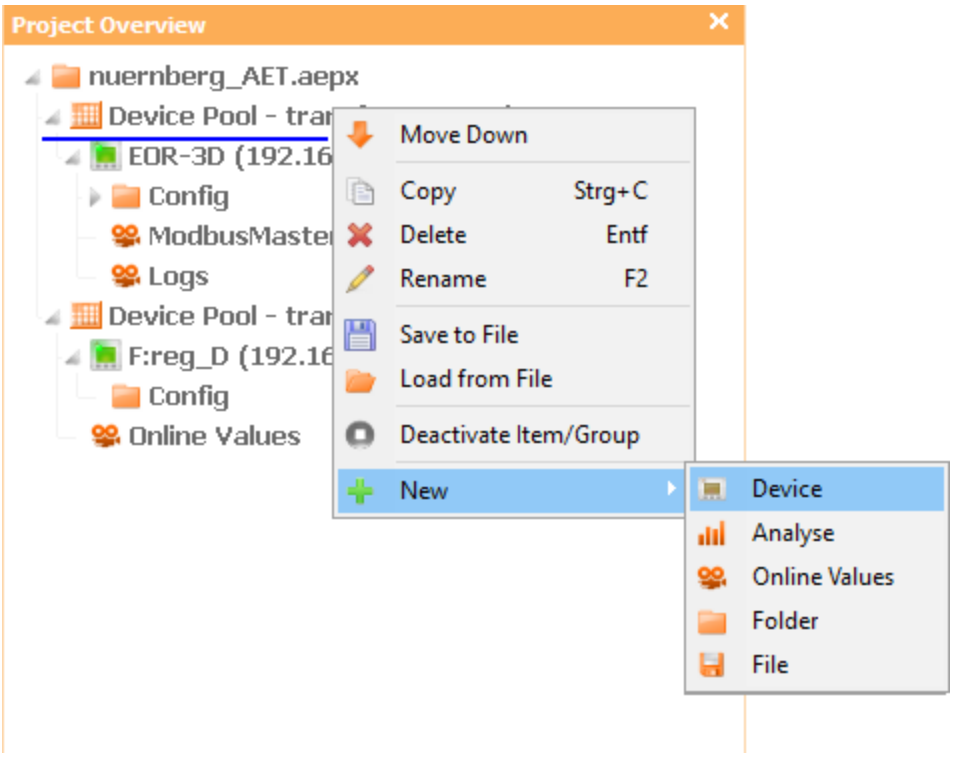


For generating a *device* entry, AETool box offers the following options:

1) *Device+* button in the *Device toolbar*

➲ Click the *Devices* tab
➲ Click the *Device+* button
➲ Run the *connection wizard* 103

2) *Device* function



➲ Right-click the *device pool* entry
➲ *New* function
➲ *Device* function
➲ Run the *connection wizard*[103]

3) Import a *device* entry as a file *(.aedeex)*
Method 1:
➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select file with *.aedeex* extension

Method 2:
➲ *Open file*[25] button in the *Devices* module

➲ Select file with *.aedeex* extension

Method 3:
➲ *Open file*[18] button in the *Home* operator module

➲ Select file with *.aedeex* extension

For more information on the subject of *imports* refer to the File import / export in the device context[121] section.

6.2.8 Saving a device entry as a file

A *device* entry can be saved as a file *(.aedeex)* with all files and settings of its *device context* in your current directory.

Proceed as follows to save a *device* entry:

***Save to file* function**
➲ Right-click *device* entry in the project overview
➲ *Save to file* function

6.2.9 Copying a device entry

Device entry is copied with all files and settings and pasted into the existing project tree structure.

Proceed as follows to copy a *device* entry:

Copy/Paste functions
➲ Right-click *device* entry (source) in the project overview
➲ *Copy* function
➲ Right-click the *device pool* entry (destination) in the project overview
➲ *Paste* function

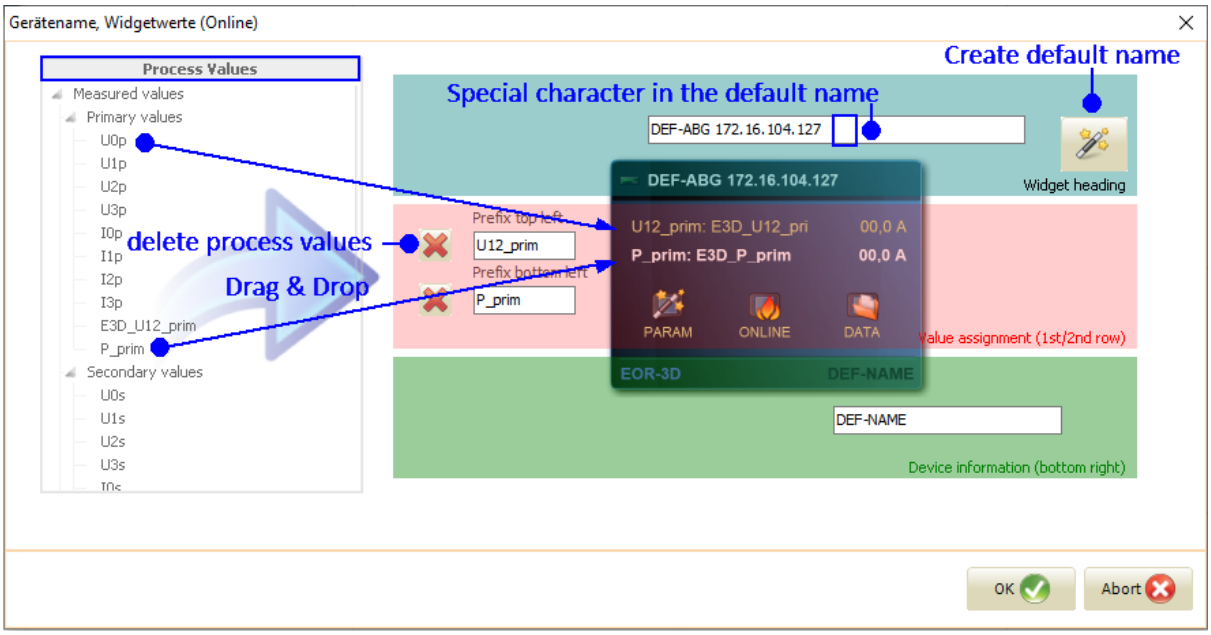
6.2.10 Renaming a device entry

It is possible to change the default name of the *device* entry. The new name is automatically adopted by the *device widget*[32] .

To change the device name, AEToolbox offers the following options:

1) *Rename* function
➲ Right-click the *device* entry in the project overview (or mark and F2 key)
➲ *Rename* function
➲ Enter a new name for this *device* entry
➲ *Enter* or click other entries in the project overview

2) *Widget* function: *Name and values*
➲ Right click the *device widget*
➲ *Device-function* function
➲ *Widget* function: *Name and values*
➲ In the following editor window user-defined device names can be entered:



NOTE!	All default device names have a special character at the end of their identifier, which is displayed to you as empty space. To give the device a new name, please delete this special character in the input window. This way the device name you enter will be retained even after a re-connection.

6.2.11 Deleting a device entry

A *device* entry with all its subfolders can be deleted from a project. The related *device widget*[32] in the central main overview is deleted along with it.

NOTE!	All files which have been set up in the *device* context are deleted.

To delete a *device* entry or *device widget*[32] from the project you can proceed as follows:

1) *Delete* function
➲ Right-click *device* entry in the project overview
➲ *Delete* function

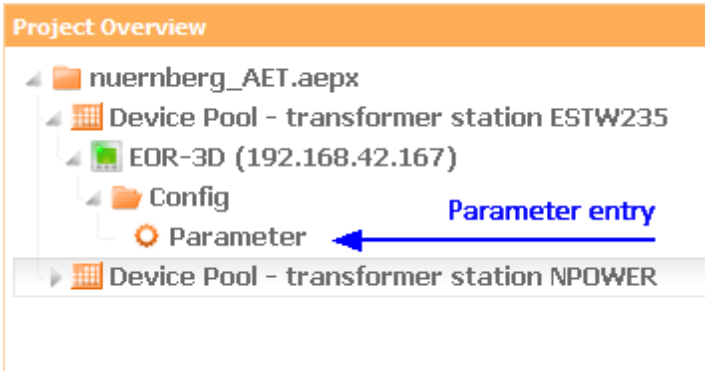
2) *Delete device* function on the *device widget*
➲ Right click the *device widget*
➲ *Delete device* function

6.3 Parametrisation

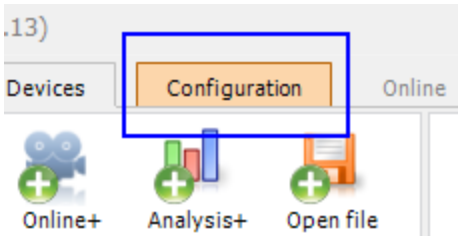
6.3.1 Calling up the Configuration module

To call up the *Configuration* module, AEToolbox offers the following options:

1) Mark the *parameter* entry in the project overview



2) Click the *Configuration* tab



NOTE!	The first call up of the *Configuration* module in the device context over the *Configuration* tab causes a *parameter* entry to be created in the project overview and the loaded parameter set to be displayed in the *Parameters table* in the main view (see *Configuration*[36] module section).

3) *Parametrisation* button in the *Home* module

4) *CONFIG* icon on the *device widget*

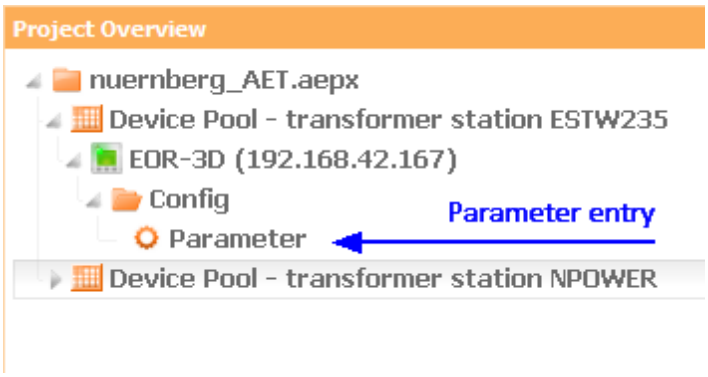
6.3.2 Generating a parameter entry

A *parameter* entry is a parameter set file set up in the project overview. A *parameter* entry is generated in the *device* context in the *Config* folder. In the *Config* folder only one *parameter* entry can be set up. To set up multiple parameter sets under a device, multiple *Config*folders can be set up (see Setting up a folder 156).

For generating a *parameter* entry, AEToolbox offers the following options:

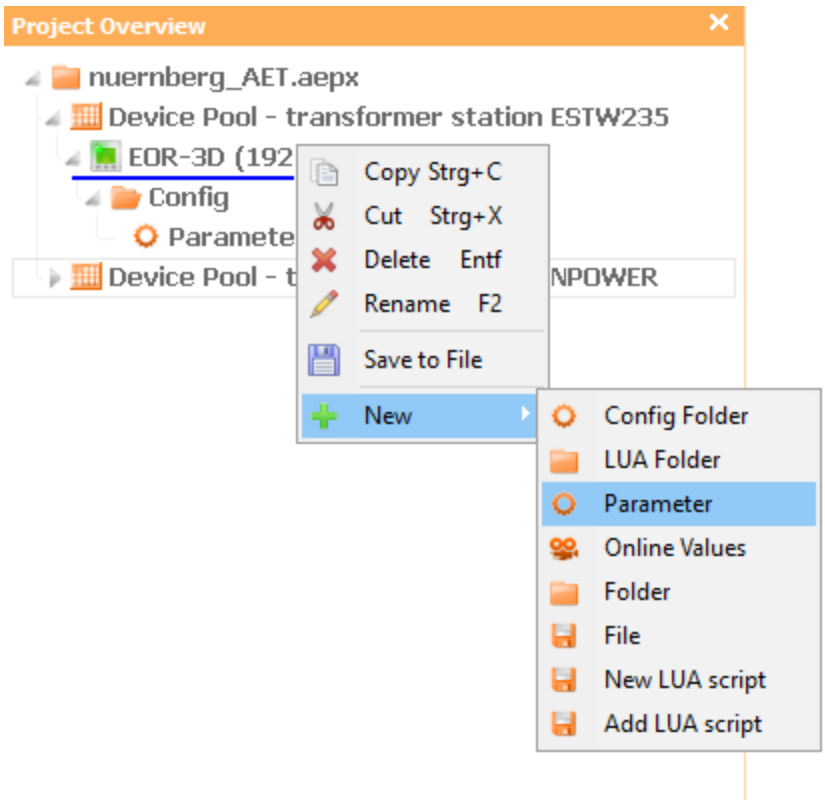
1) Call up the *Configuration* module
➲ Set up device
➲ Click the *Configuration* tab

The first call up of the *Configuration* module in the device context over the *Configuration* tab causes a *parameter* entry to be created in the project overview and the loaded parameter set to be displayed in the *Parameters table* in the main view (see *Configuration* 36 module). A standard set of the device's parameters in the factory settings is set up.



2) *Parameter* function

When the *Parameter* function is called up a standard set of the device's parameters in the factory settings is set up.



➲ Right-click the *device* entry or a *Config* folder that already exists
➲ *New* function
➲ *Parameter* function

3) *Parametrisation* icon in the *Home* module
Clicking the *Parametrisation* icon causes a device with a parameter set in the factory settings to be set up.

4) *PARAM* icon on the *device widget*
Clicking the *PARAM* icon causes a parameter set in the factory settings to be set up. If such a *parameter* entry has already been set up in the existing *device* context, it will be opened.

5) *New*[37] button in the *Configuration toolbar*
Clicking the *New* button causes a standard set of the device's parameters in the factory settings to be set up.

➲ Click the *Configuration* tab
➲ *New* button
➲ Follow the dialogue for device-dependent setup of the parameter set.

6) Import a parameter set as a file *(.aedx, .ini., .xml, .xmc, .prm, .mdb, .weor)*

Method 1:
➲ ***Open***[37] button in the *Configuration* module

➲ Select *parameter* file

Method 2:
➲ Right-click *parameter* entry in the project overview
➲ *Load from file* function
➲ Select *parameter* file

NOTE!	When a *parameter* file with the *.aedx* extension is loaded in an existing *parameter* entry a message may appear regarding a different serial number, then the differences will be displayed in the *Parameter differences* window. At this point you can cancel loading by clicking the *Cancel* button.

Method 3:
➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select *parameter* file

Method 4:
➲ *Open file*[25] button in the *Devices* module

➲ Select *parameter* file

Method 5:
➲ *Open file*[18] button in the*Home* operator module

➲ Select *parameter* file

NOTE!	Please note that for importing parameter files in older formats (.ini, .xml, .xmc), method (1) is specifically recommended: using the *Open*[37] button in the *Configuration* module. For more information on the subject of *imports* refer to the Importing a parameter set[156] section.

6.3.3 Saving a parameter entry as a file

A *parameter* entry can be saved on your PC as a file *(.aedx)*.

Proceed as follows to save a *parameter* entry:

1) *Save to file* function
➲ Right-click the *parameter* entry in the project overview
➲ *Save to file* function

2) *Save*[37] button
➲ Open *Configuration* module
➲ Mark *parameter* entry
➲ Click *Save* button and follow instructions

6.3.4 Copying a parameter entry

A *parameter* entry can be copied in the project overview and pasted into the existing project tree structure. The parameter set copy is set up in a new *Config* folder (e.g. in the same *device* context).

Proceed as follows to copy a *parameter* entry:

1) Copy/Paste functions
➲ Right-click *parameter* entry in the project overview
➲ *Copy* function
➲ Right-click *device* entry in the project overview
➲ *Paste* function

2) *Drag & drop* the *parameter* entry
➲ Use drag & drop to drag the entry in the project overview onto the target device

6.3.5 Renaming a parameter entry

It is possible to change the default name of the *parameter* entry.

Proceed as follows to rename a *parameter* entry:

***Rename* function**
➲ Right-click the *parameter* entry in the project overview (or mark and F2 key)
➲ *Rename* function
➲ Enter the new name for the *parameter* entry
➲ *Enter* or click other entries in the project overview

6.3.6 Delete parameter entry, folder

It is possible to delete a *parameter* entry and/or folder.

Proceed as follows to delete a *parameter* entry and/or folder:

***Delete* function**
➲ Right-click *parameter* entry or folder in the project overview
➲ *Delete* function

6.3.7 Setting up a folder

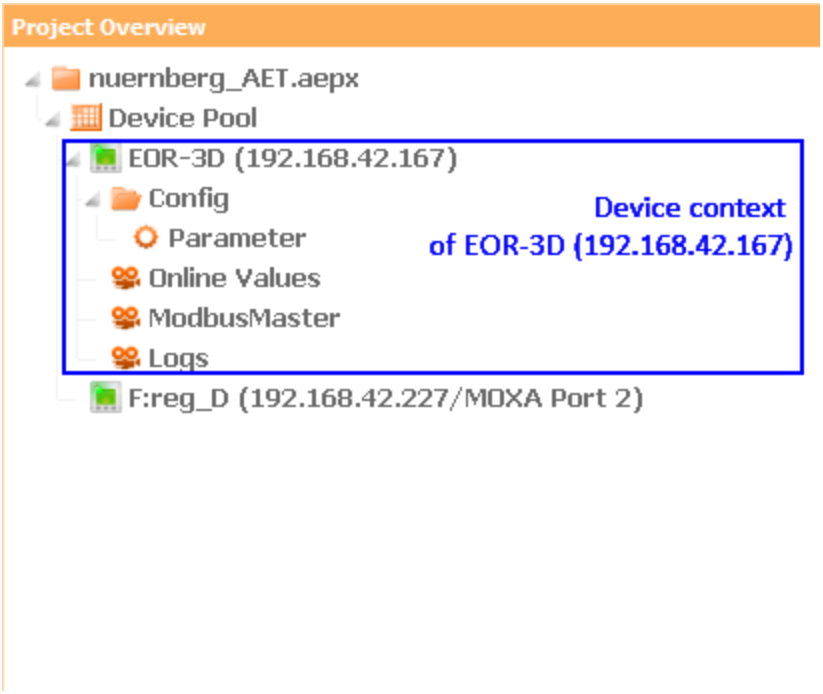
To set up a folder in the project overview, first choose the appropriate level in the project structure tree. After right-clicking the *device* or *device pool* entry, click the *New* function. The following selection of folder functions is available to you, depending on device type.

- *Folder*
- *Config folder*
- *LUA folder*

It is possible to set up multiple folders in the *device* or *device pool* context.

6.3.8 Importing a parameter set

Parameter sets are imported exclusively in the *device* context.



1) All file formats
To import parameter files you have three options:

- *Open file*[25] button in the *Devices* module;
- *Open file*[18] icon in the *Home* operator module;
- *File* function, which can be called up with a right-click on the *device* or *device pool* entry via the *New* function.

The following tables summarise all importable parameter files which are supported in AEToolbox.

EOR-3D:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module; (2) Right-click on *parameter* entry, *Load from file, Save to file* functions;	Existing device	File in *Config* folder, contents in the *Parameters table*
Device-internal parameter file	.ini .xml .xmc			
		(3) Universal import functions of AEToolbox	Temporary device	

REG-D:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module;	Existing device	File in *Config* folder, contents in the *Parameters table*
External parameter file *WinReg*	.prm	(2) Right-click on *parameter* entry, *Load from file, Save to file* functions;		
		(3) Universal import functions of AEToolbox	Temporary device	

REG-DP:

File		Import / export	Import result	
Parameter entry as a file of AEToolbox	.aedx	(1) Open, Save *buttons*[37] in the *Configuration* module;	Existing device	File in *Config* folder, contents in the *Parameters table*
External parameter files: *WinReg* *EOR-D/Reg-DP* *WinEDC*	.prm .mdb .weor	(2) Right-click on *parameter* entry, *Load from file, Save to file* functions;		
		(3) Universal import functions of AEToolbox	Temporary device	

NOTE!	When a *parameter* file with the *.aedx* extension is loaded in an existing *parameter* entry a message may appear regarding a different serial number, then the differences will be displayed in the *Parameter differences* window. At this point you can cancel loading by clicking the *Cancel* button.

2) Older file formats: .ini, .xml, .xmc, .prm, .mdb, .weor
To import these formats the method using the *Open*[37] button in the *Configuration* module is specifically recommended (method 1 in in the tables depicted above).
First set up a device in the project. Then click the *Configuration* tab to start parametrisation. Select the generated parameter set and click the *Open* button. Select the import file and follow the further instructions in the *Import* dialogue.

NOTE!	To import background programs please refer to the Background programs[134] section.

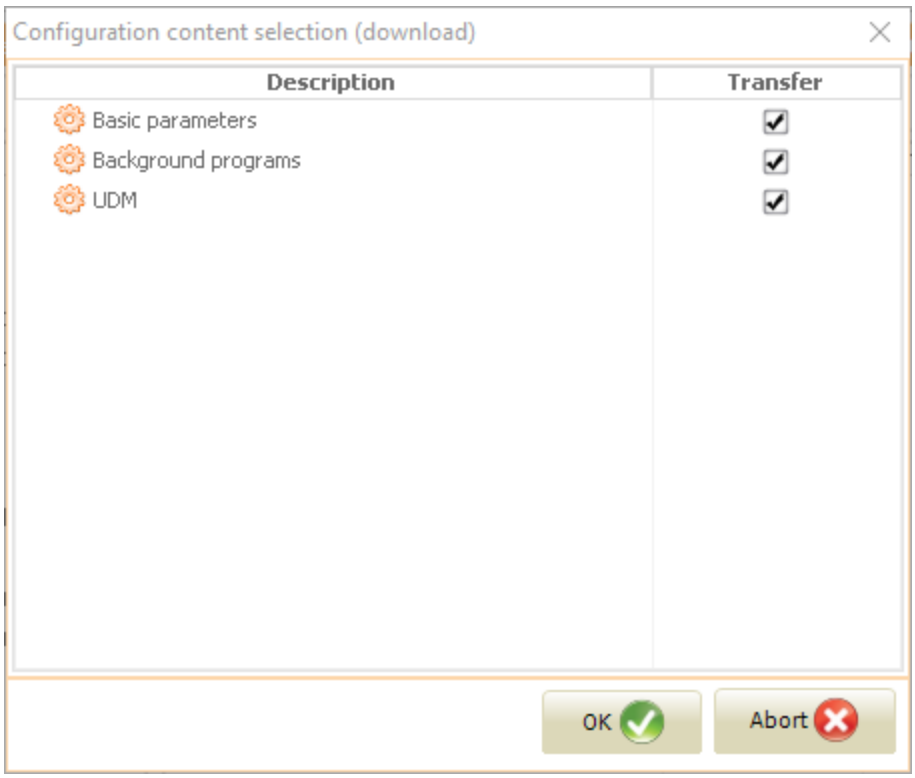
6.3.9 Loading a parameter set from the device

It is possible to load a device-internal parameter set from the device into the *parameter* entry currently marked in the project overview.

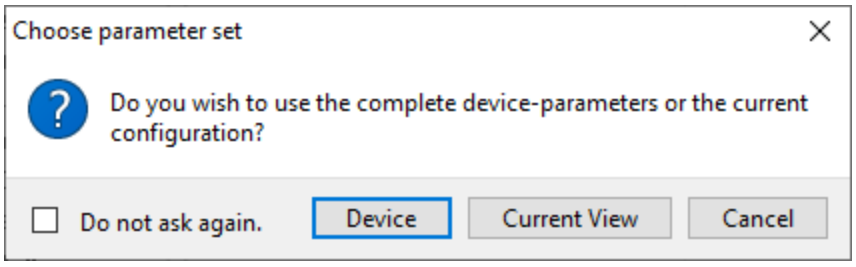
Proceed as follows to load a device-internal parameter set from the device:

1) All parameters
➲ Start the *configuration* module
➲ Mark the existing *parameter* entry
➲ Click the *Download* [40] button in the *Configuration toolbar*. At this point the *download* routine differentiates between devices in the *REG* and the *EORSys* series.

- With *REG* devices, after clicking the *Download* button you will immediately be taken to the *selection of configuration content.* To load a device-internal parameter set from the device, select *Basic parameters*.

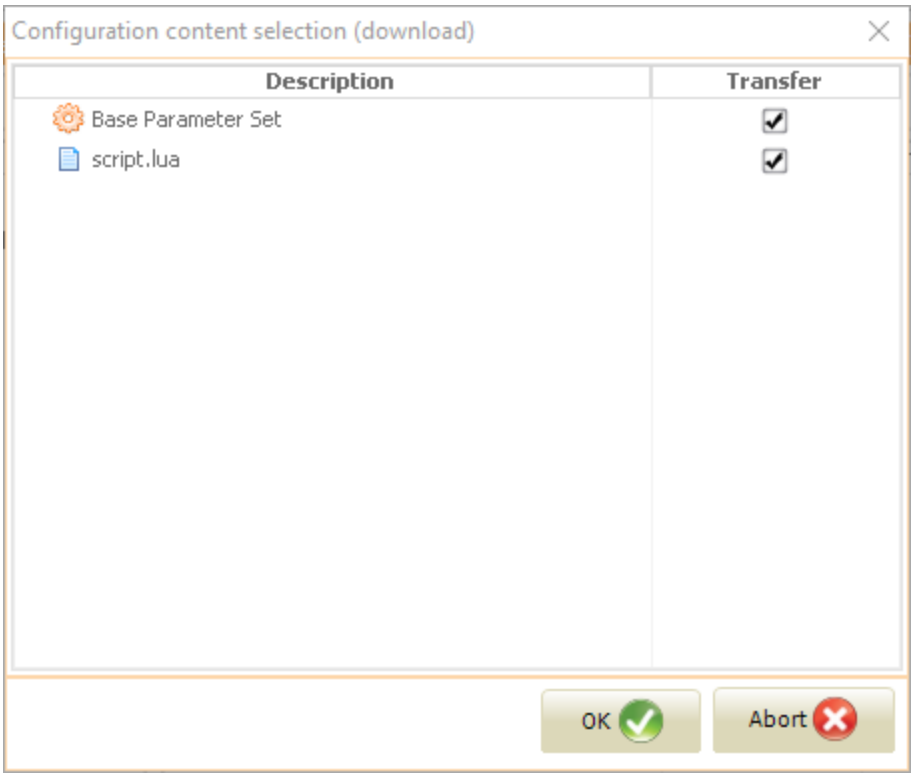


- With *EORSys* devices, you are first queried as to how the parameters are to be loaded.



Selecting the *Device* button causes any existing parameter set in the project overview to be completely replaced by a parameter set from the device, including its tree structure. Selecting

the *Current view* button causes the device parameter values to be loaded into the tree structure of the parameter set that already exists. To load the device-internal parameter set from the device, select *Base parameter Set*.



2) Individual parameters

To download individual parameter values from the device, mark the desired parameter in the *Parameters table* and apply the Ctrl + R[196] keyboard shortcut. Once the parameter has been loaded from the device, the color of the parameter icon in the *Parameters table* changes to green. Now, the progress bar outputs: "Parameter successfully received".

NOTE!	The values in the *PC value* column of the *Parameters table* are overwritten by the parameters loaded from the device. In cases of any errors and/or warnings that occur related to the *Download* operation a log entry is also generated.

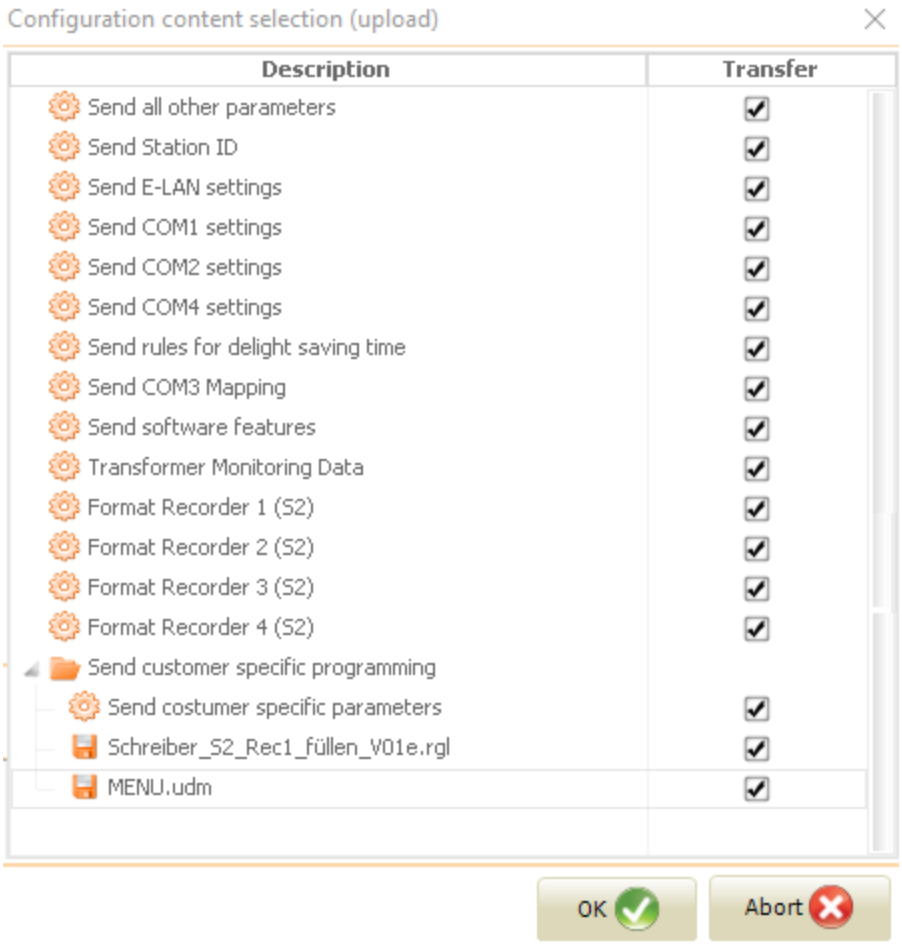
6.3.10 Sending parameters to a device

It is possible to send a parameter set from the project overview to a target device.

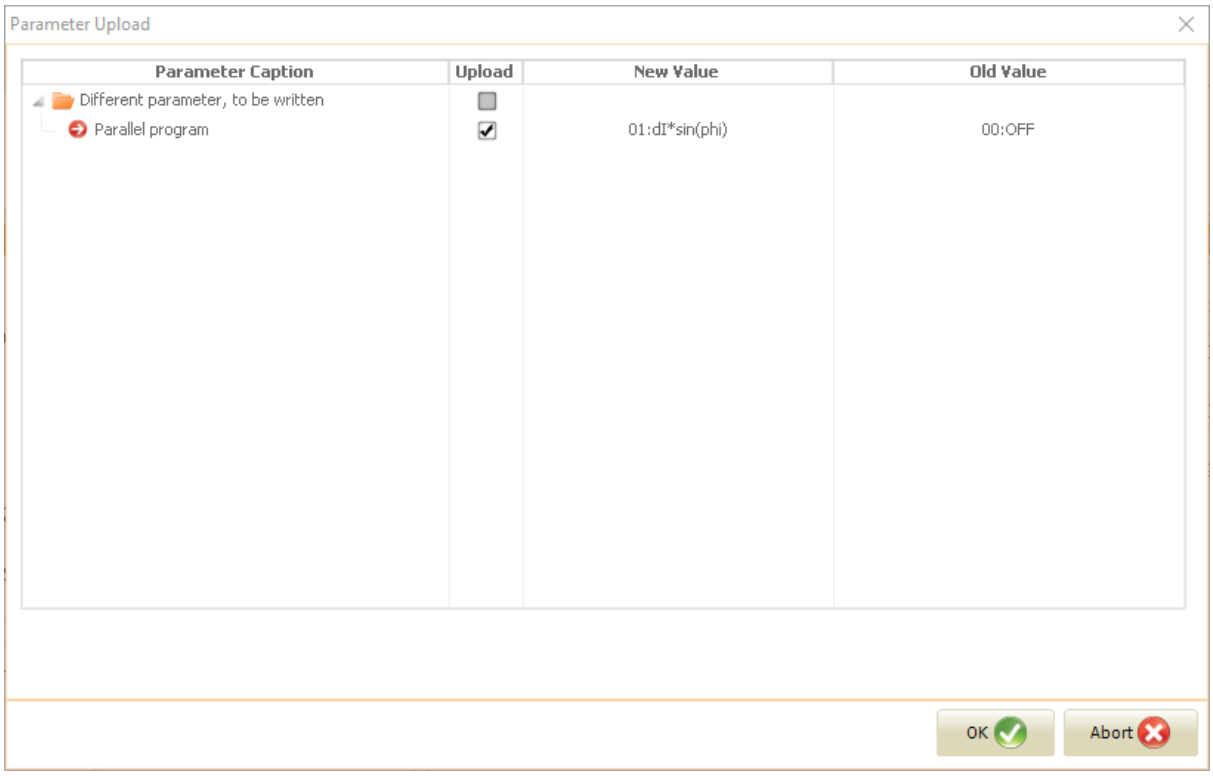
Proceed as follows to send a device-internal parameter set to the device:

1) All parameters
➲ Start the *Configuration* module
➲ Mark the parameter set -- i.e. *parameter* entry – in the project overview
➲ Click the *Upload* [40] button in the *Configuration toolbar*. The *upload* routine offers the option of limiting the scope of the *upload* in the *Select configuration content* window.

For example, the following figure depicts the selection categories which are offered during a parameter upload to a *REG-D* device:



Before finally being overwritten, all parameters whose value differs from the parameter on the device are summarised in the overview window of the *upload* routine. The following overview window shows an example of a change made in the parallel program. The state of the program on the device was set to *switched off (00:OFF)*. The change of the parameter value and the subsequent upload causes the device to switch to the parallel program *dI*sin(phi)*.



2) Individual parameters

To send **individual parameter values** to the device mark the desired parameter and use the Ctrl + E[196] keyboard shortcut. Once a parameter has been sent to the device, the colour of the parameter icon in the *Parameters table* changes to green. Now, the progress bar outputs: "Parameter successfully sent".

NOTE!	Please note that no upload is possible in the *User* role with *READ ONLY* privileges. The *Upload* button is deactivated. Sending individual parameters to the device causes an error message.

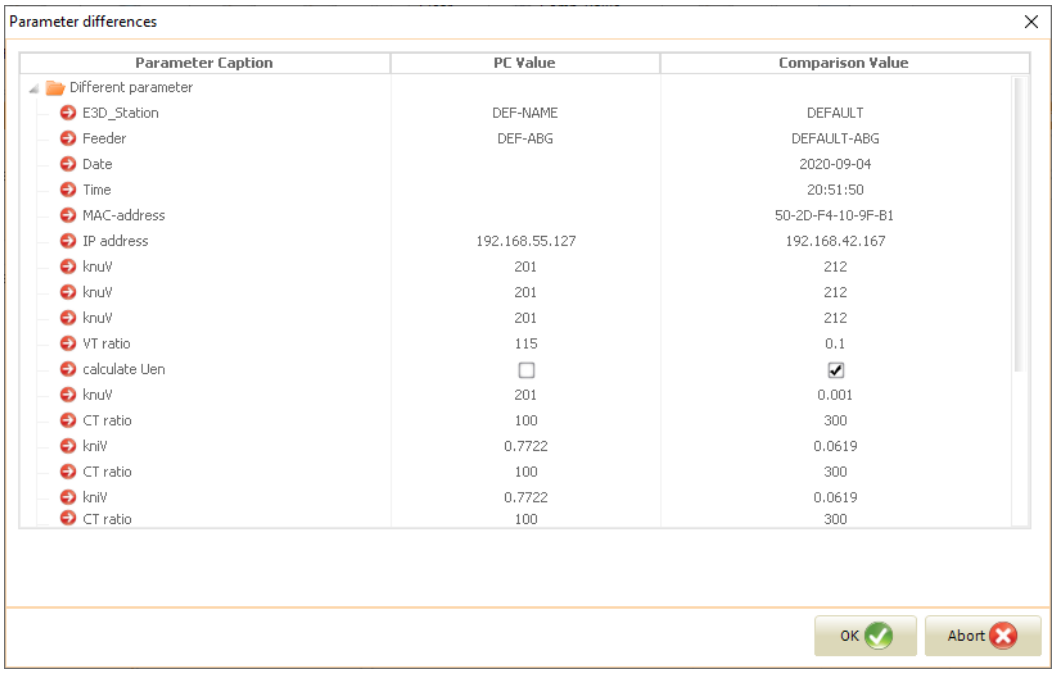
6.3.11 Comparing parameter sets

In AEToolbox it is possible to compare two parameter sets. A parameter file from the project overview (*parameter* entry) is compared with a so-called comparison parameter set. The latter can be generated from two sources.

1) Comparison parameter set as a file on your PC
Proceed as follows to load a comparison parameter set from the PC:
➲ Start the *Configuration* module
➲ Mark the existing *parameter* entry, which you want to compare
➲ Click the *Open*[46] button for comparison parameters in the *Configuration toolbar* and select the parameter file for comparison.

2) Comparison parameter set from the device
Proceed as follows to load a comparison parameter set from the device:
➲ Start the *Configuration* module
➲ Mark the existing *parameter* entry, which you want to compare
➲ Click the *Download*[46] button for comparison parameters in the *Configuration toolbar* and follow the *download* routine.

In the final step in the *Parameter differences* window the differences between the two parameter sets are summarised.



In the *Parameter table*, parameters with a difference are marked with a warning and parameters with no difference are marked with a green tick mark. The parameter values from the comparison parameter set can be found in the *Comparison parameter* column.

NOTE!	To continue working with comparison values (deleting comparison values, adopting, displaying *Parameter differences* window again) , please refer to the Working with comparison parameter sets 46 section.

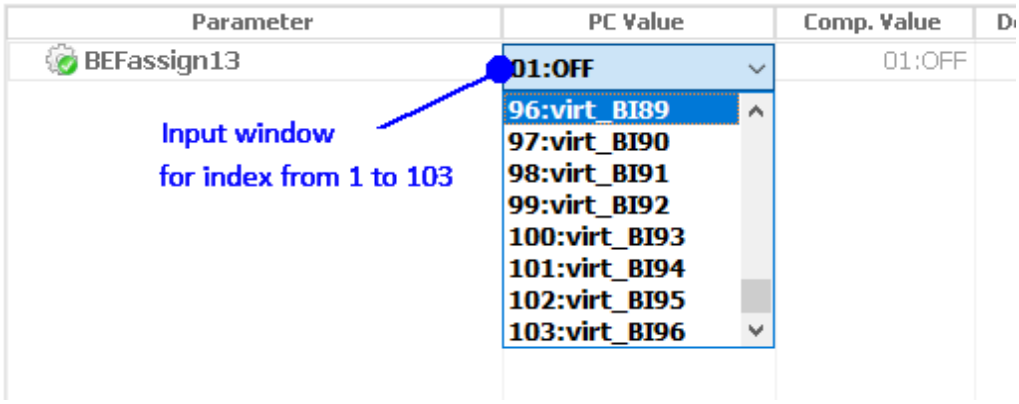
6.3.12 Changing parameter values

The parameter values in the *PC value* column are editable (exception: greyed out values, these are "read only"). The values can be changed by clicking in the cell of the parameter (*PC value*).

The following options are available for changing the value, depending on the value type:

1) Free input of the value (texts);
2) Adjusting the value within the threshold value range (numerical values);
3) Activating/deactivating the parameter (checkbox, Boolean values);
4) Selecting the parameter value from the available drop-down list s (selection).

The drop-down list s have an integrated index-based search function. After the drop-down list folds down, the index is entered in the input window and displays the associated value. This is particularly helpful with long selection lists.



After a parameter value is edited the colour of the parameter icon changes to red.

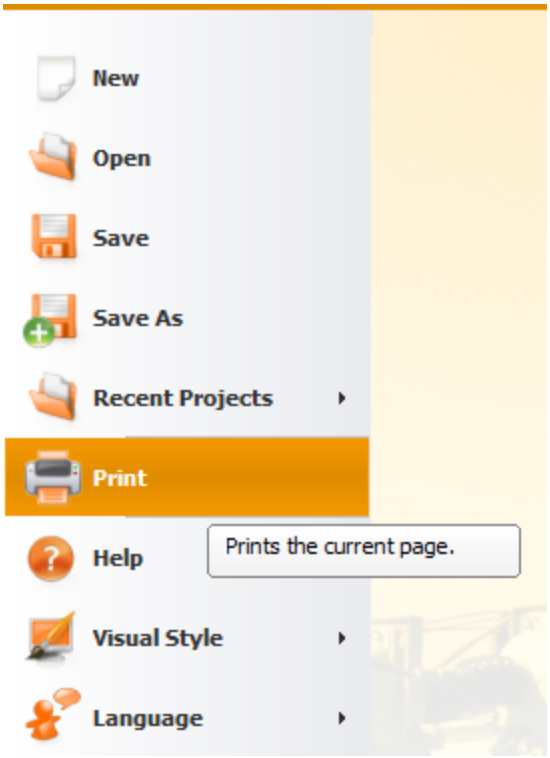
NOTE!	If values are entered in the two columns “Upper limit” and “Lower limit”, the new parameter value must lie within these limits. Otherwise it won’t be adopted.

For more functions of the *Parameter table*, please refer to the sections *Parameter table* 53 and Special editors for the Parameter table 56.

6.3.13 Printing a parameter list

Proceed as follows to print a parameter list or a parameter overview from the *Parameters table*:

➲ Start the *Configuration* module
➲ Mark a parameter set
➲ Click the *Main menu* tab
➲ Click the *Print* button and configure the print settings.



6.4 Online

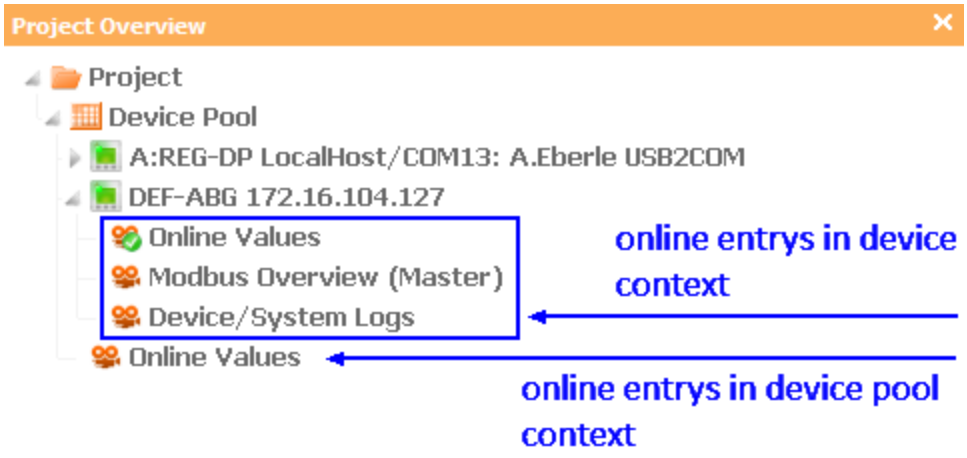
6.4.1 Calling up the Online module

The *Online* module can be started in both the *device* context as well as in the *device pool* context (*Online* tab). For the respective placement, it is necessary to mark the *device* entry or the *device pool* entry in the project overview beforehand.

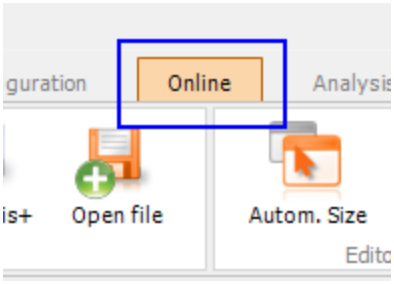
- Starting the *Online* module in the *device* context causes a set of device-specific *online* entries to be created in the project overview, as well as a standardised display of *Online* panels in the main overview, which are already allocated to a device (see *Online* 61 section).
- Starting the *Online* module in the *device pool* context causes an *online* entry to be created in the project overview, with an empty view in the main overview. Here, *Online* panels can be allocated to multiple devices (see *Online* 61 section).

To call it up, AEToolbox offers the following options:

1) Mark the *online* entry in the project overview



2) Click the *Online* tab



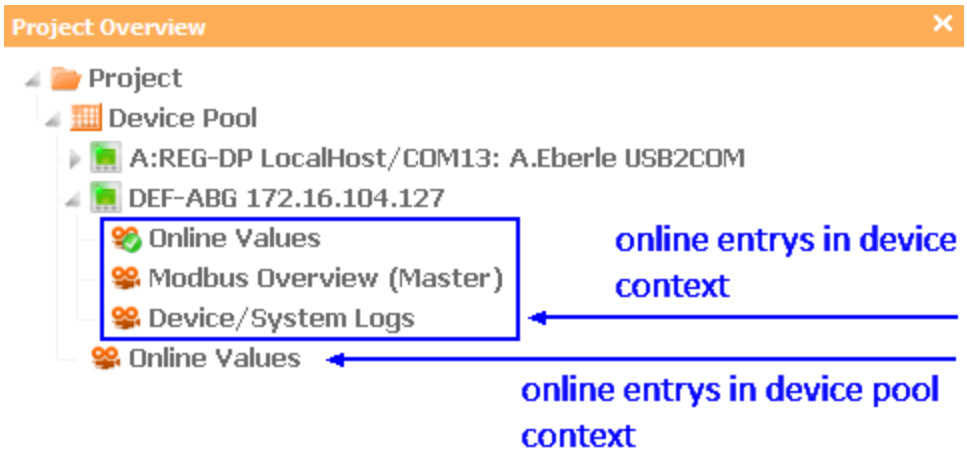
3) *Online data* button in the *Home* module

4) *ONLINE* icon on the *device widget*

6.4.2 Generating an online entry

An *online* entry can be generated in both the *device* context as well as in the *device pool* context. Whether it was the *device* entry or the *device pool* entry that was previously marked is decisive for its placement.

- When creating an *online* entry in the *device pool* context a cross-device *online* entry is created, where the *Online* panels of multiple devices can be allocated (see *Online*[61] section).
- When creating an *online* entry in the *device* context a set of device-specific *online* entries is created, where all *Online* panels are already allocated to a device (see *Online*[61] section).



NOTE!	The setup of a new *online* entry doesn't always result in the automatic start of the *Online* module in the central main view. Depending on the situation, a click on the newly created *online* entry may be necessary.

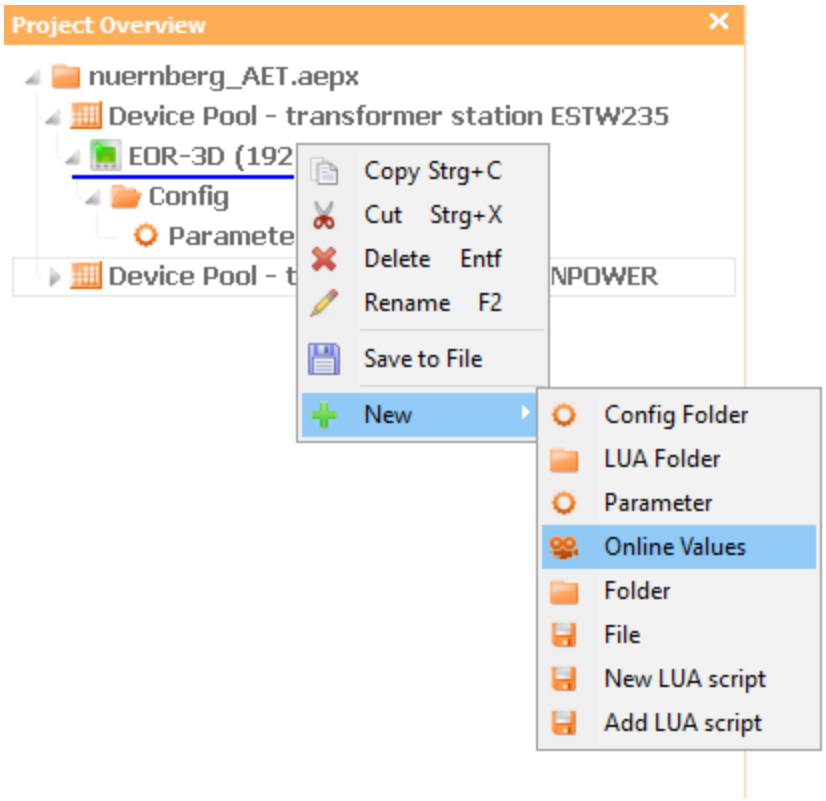
For generating an *online* entry, AEToolbox offers the following options:

1) Call up the *Online* module
Clicking the *Online* tab generates an *online* entry contingent on the respective context marking (see above), should no *online* entry have been created beforehand. If an *online* entry already exists in the respective context, it is opened.

2) *Online+* button
The *Online+* button creates an *online* entry contingent on the respective context marking.

➲ Click the *Devices* tab
➲ *Online+* button

3) *Online values* function
Calling up the *Online values* function causes an *online* entry to be created contingent on the respective context.



➲ Right-click *device* entry or *device pool*
➲ *New* function
➲ *Online values* function

4) *Online data* icon in the *Home* module
Clicking the *Online data* icon causes a device to be set up with a corresponding set of device-specific *online* entries.

5) *ONLINE* icon on the *device widget*
Clicking the *ONLINE* icon causes a corresponding set of device-specific *online* entries to be set up. If such a set has already been set up in the existing *device* context, it will be opened.

6) *New*[62] button in the *Online toolbar*

Clicking the *New* button causes an *online* entry to be set up contingent on the respective context marking.

➲ Click the *Online* tab
➲ Mark the *device* or *device pool* context
➲ *New* button

7) Import of an *online* entry as a file *(.aemx)*

Method 1:

➲ *Open*[62] button in the *Online* module

➲ Select *online* file

Method 2:

➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select *online* file

Method 3:

➲ *Open file*[25] button in the *Devices* module

➲ Select *online* file

Method 4:
➲ *Open file*[18] button in the*Home* operator module

➲ Select *online* file

For more information on the subject of *imports* refer to the File import / export in the device context[121] section and to the File import / export in the device pool context[126] section.

6.4.3 Saving an online entry as a file

An *online* entry can be saved on your PC as a file *(.aemx)*.
Proceed as follows to save an *online* entry:

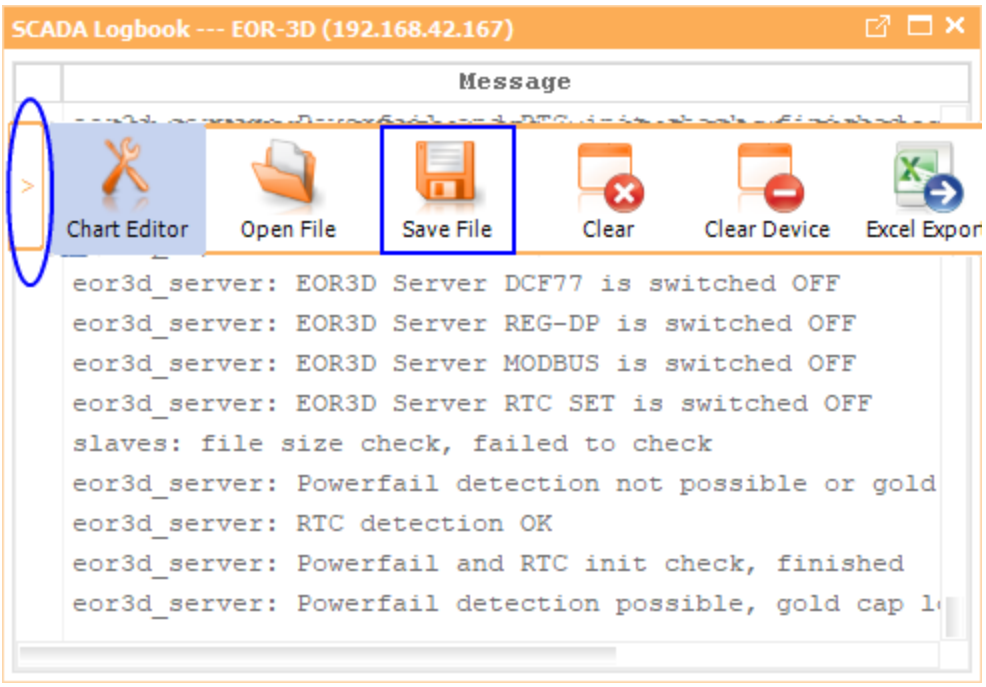
1) *Save to file* function
➲ Right-click *online* entry in the project overview
➲ *Save to file* function

2) *Save*[62] button
➲ Open *Online* module
➲ Mark *online* entry
➲ Click *Save* button and follow instructions

6.4.4 Saving the Log book panel as a file

The messages from the *Logbook* panel can be saved as a file *(.aelog)* on your PC.
Proceed as follows to save *log* messages:

***Save file* button**
➲ Open a *Logbook* panel
➲ Move the cursor over the side element, which is marked with the blue circle in the figure. The function panel is expanded.
➲ Click the *Save file* button and follow the further instructions.



6.4.5 Copying an online entry

An *online* entry can be copied in the project overview and pasted again in the existing project tree structure. The copy can be pasted in the current *device* context, in a *device* context of the same device type, or in the *device pool* context. After pasting in the *device pool* context, a reallocation of the *Online* panels to the devices is required.

NOTE!	Please note that pasting *online* entries in the *device* context of other device types leads to the cancellation of value polling, because *Online* panels are device-type-dependent.

Proceed as follows to copy an *online* entry:

***Copy/Paste* functions**
➲ Right-click the *online* entry in the project overview
➲ *Copy* function
➲ Right-click a *device* entry or a *device pool* entry in the project overview
➲ *Paste* function

6.4.6 Renaming an online entry

It is possible to change the default name of the *online* entry.
Proceed as follows to rename an *online* entry:

***Rename* function**
➲ Right-click the *online* entry in the project overview (or mark and F2 key)
➲ *Rename* function
➲ Enter a new name for the *device* entry
➲ *Enter* or click other entries in the project overview

6.4.7 Deleting an online entry

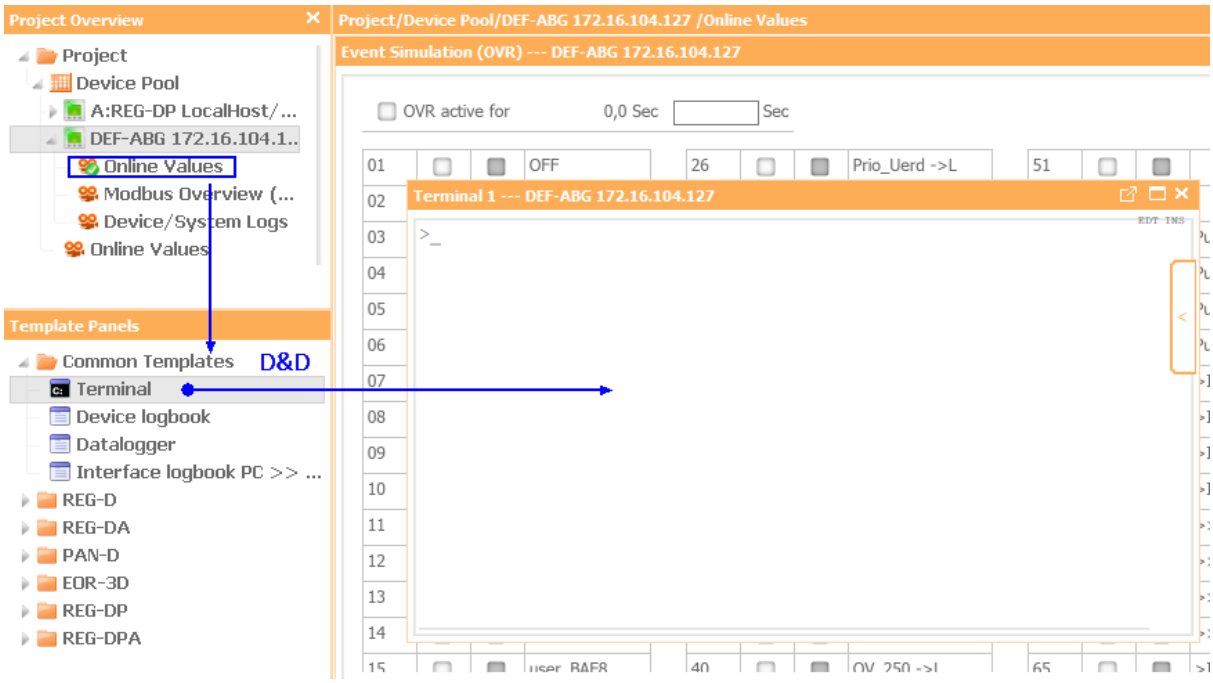
It is possible to delete an *online* entry.
Proceed as follows to delete an *online* entry:

***Delete* function**
➲ Right-click the *online* entry in the project overview
➲ *Delete* function

6.4.8 Generating an Online panel

Proceed as follows to create a new *online* panel in the main overview:

➲ Call the *Online* module
➲ Select the *Online* panel from one of the template folders. All available *Online* panels can be found in the *templates (panels)* area.
➲ Use *drag & drop* to drag the *Online* panel into the central main view.


Project Overview
Project
Device Pool
A:REG-DP LocalHost/...
DEF-ABG 172.16.104.1..
Online Values
Modbus Overview (...
Device/System Logs
Online Values
Template Panels
Common Templates
D&D
Terminal
Device logbook
Datalogger
Interface logbook PC >> ...
REG-D
REG-DA
PAN-D
EOR-3D
REG-DP
REG-DPA
Project/Device Pool/DEF-ABG 172.16.104.127 /Online Values
Event Simulation (OVR) --- DEF-ABG 172.16.104.127
OVR active for
0,0 Sec
Sec
Terminal 1 --- DEF-ABG 172.16.104.127

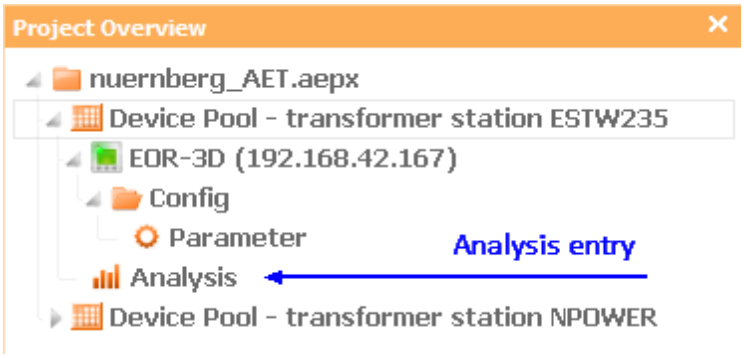
6.5 Analysis

6.5.1 Calling up the Analysis module

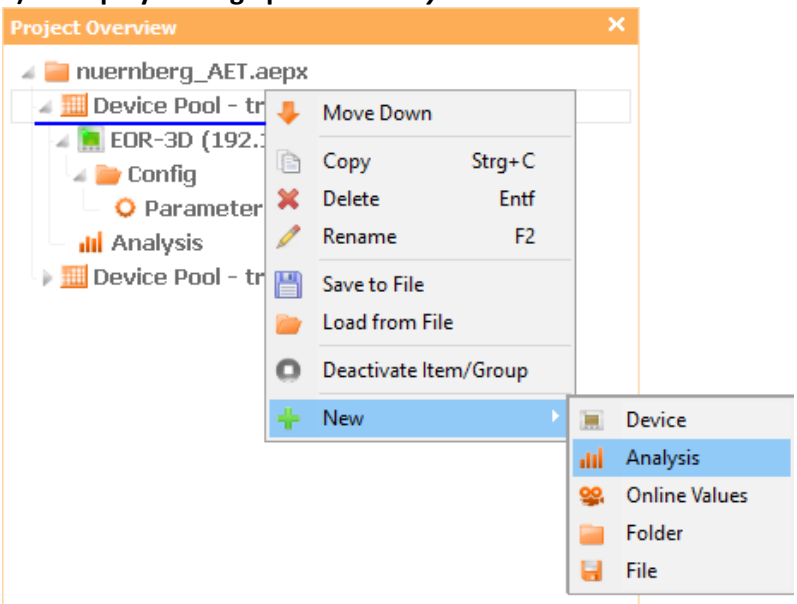
The *Analysis* module is called up in the *device pool* context. Here, an *analysis* entry is created in the project overview which displays an empty *analysis* chart in the main overview (see *Analysis*[77] section).

To call it up, AEToolbox offers the following options:

1) Mark an existing *analysis* entry in the project overview



2) Call up by setting up new – *Analysis* function

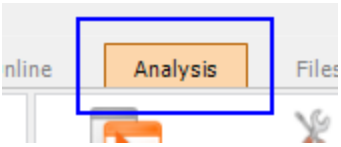


➲ Right-click a *device pool* entry
➲ *New* function
➲ *Analysis* function

3) Call up by setting up new – *Analysis+* function

➲ Click the *Devices* tab
➲ Click the *Analysis+* button on the *Device toolbar*

4) Call up or set up new – Click the *Analysis* tab



5) Call up or create new – Open or mark a recorder, fault record or statistics file (.rec, .rvt, .rvd, .csv, .dat, .cfg)

Method 1:
➲ *Open file* [25] button [25] in the *Devices* module

Method 2:
➲ *Open file* [18] icon in the *Home* operator module

Method 3:
➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select file

6.5.2 Generating an analysis entry

The *Analysis* module is called up in the *device pool* context. The first time it is called up, an *analysis* entry is created in the project overview which displays an empty *analysis* chart in the main overview (see *Analysis* 77 section).

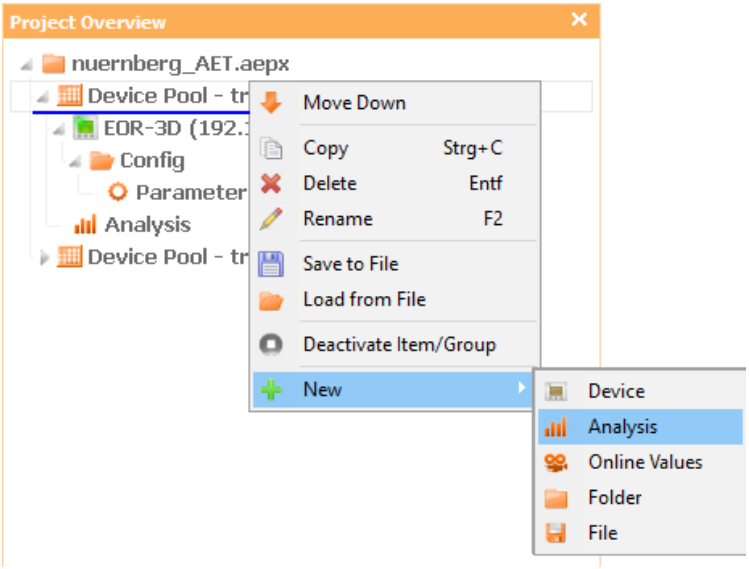
For generating an *analysis* entry, AEToolbox offers the following options:

1) Call up the *Analysis* module
Clicking the *Analysis* tab generates an *analysis* entry, if no *analysis* entry has been previously created in the *device pool*. If an *analysis* entry already exists in the respective *device pool* context, it will be opened.

2) *Analysis+* button
The *Analysis+* button creates an *analysis* entry.

➲ Click the *Devices* tab
➲ *Analysis+* button

3) *Analysis* function
When the *Analysis* function is called up a new *analysis* entry is created.



➲ Right-click the *device pool* entry
➲ *New* function
➲ *Analysis function*

4) *New*[77] button in the *Analysis toolbar*
Clicking the *New* button causes a new *analysis* entry to be created.

➲ Click the *Analysis* tab
➲ *New* button

5) Opening or marking a recorder, fault record or statistics file (.rec, .rvt, .rvd, .csv, .dat, .cfg)
Method 1:
➲ *Open file*[25] button in the *Devices* module

Method 2:
➲ *Open file*[18] icon in the*Home* operator module

Method 3:
➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select file

6) Importing an *analysis* entry as a file *(.aevsex)*
Method 1:
➲ *Open*[77] button in the *Analysis* module

➲ Select *analysis* file

Method 2:
➲ Click a *device pool* entry in the project overview
➲ *New* function
➲ *File* function
➲ Select *analysis* file

Method 3:
➲ *Open file*[25] button in the *Devices* module

➲ Select *analysis* file

Method 4:
➲ *Open file*[18] icon in the *Home* operator module

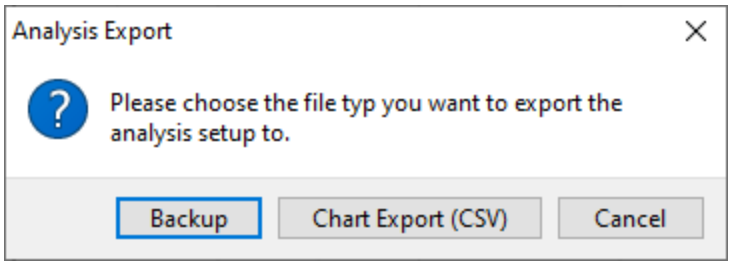
➲ Select *analysis* file

For more information on the subject of *imports* please refer to the File import / export in the device pool context[126] section.

6.5.3 Saving an analysis entry as a file

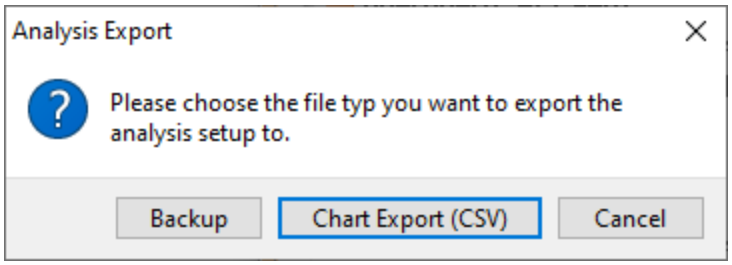
An *analysis* entry can be saved as both a complete file in *.aevsex* format as well as individual data series in the *.csv* format on your PC.

1) Saving in *.aevsex* format
Proceed as follows to save an *analysis* entry in *.aevsex* format:
➲ Open *Analysis* module
➲ Mark *analysis* entry
➲ Click the *Save*[77] button in the *Analysis toolbar*
➲ Select the *Backup* button

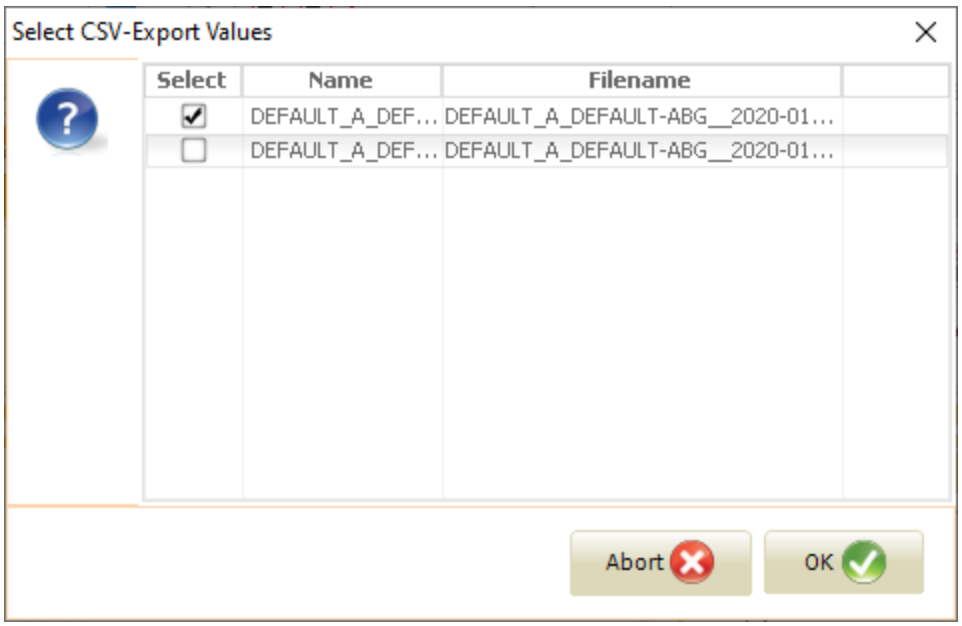


2) Saving individual data series in *.csv* format
Proceed as follows to save individual data series in *.csv* format:
➲ Open *Analysis* module
➲ Mark *analysis* entry

➲ Click the *Save*[77] button in the *Analysis toolbar*



➲ Select the *Chart export (CSV)* button
➲ Select data series and confirm



6.5.4 Copying an analysis entry

An *analysis* entry can be copied in the project overview and pasted into the existing project tree structure.
Proceed as follows to copy an *analysis* entry:

***Copy/Paste* functions**
➲ Right-click the *analysis* entry in the project overview (source)
➲ *Copy* function
➲ Right-click a *device pool* entry in the project overview (destination)
➲ *Paste* function

6.5.5 Renaming an analysis entry

It is possible to change the name of the *analysis* entry.
Proceed as follows to rename an *analysis* entry:

***Rename* function**
➲ Right-click the *analysis* entry in the project overview (or mark and F2 key)
➲ *Rename* function
➲ Enter the new name for the *analysis* entry
➲ *Enter* or click other entries in the project overview

6.5.6 Deleting an analysis entry

It is possible to delete an *analysis* entry. Proceed as follows to delete an *analysis* entry:

***Delete* function**
➲ Right-click the *analysis* entry in the project overview
➲ *Delete* function

6.5.7 Generating an analysis chart

You can create as many *analysis* charts as you like in the central main view of an *analysis* entry.
Proceed as follows to generate a new *analysis* chart:

***Panel+* button**
➲ Call up the *Analysis* module
➲ Click the *Panel+* button in the *Analysis toolbar*

For more chart operations, refer to the Analysis charts and data sources 82 section.

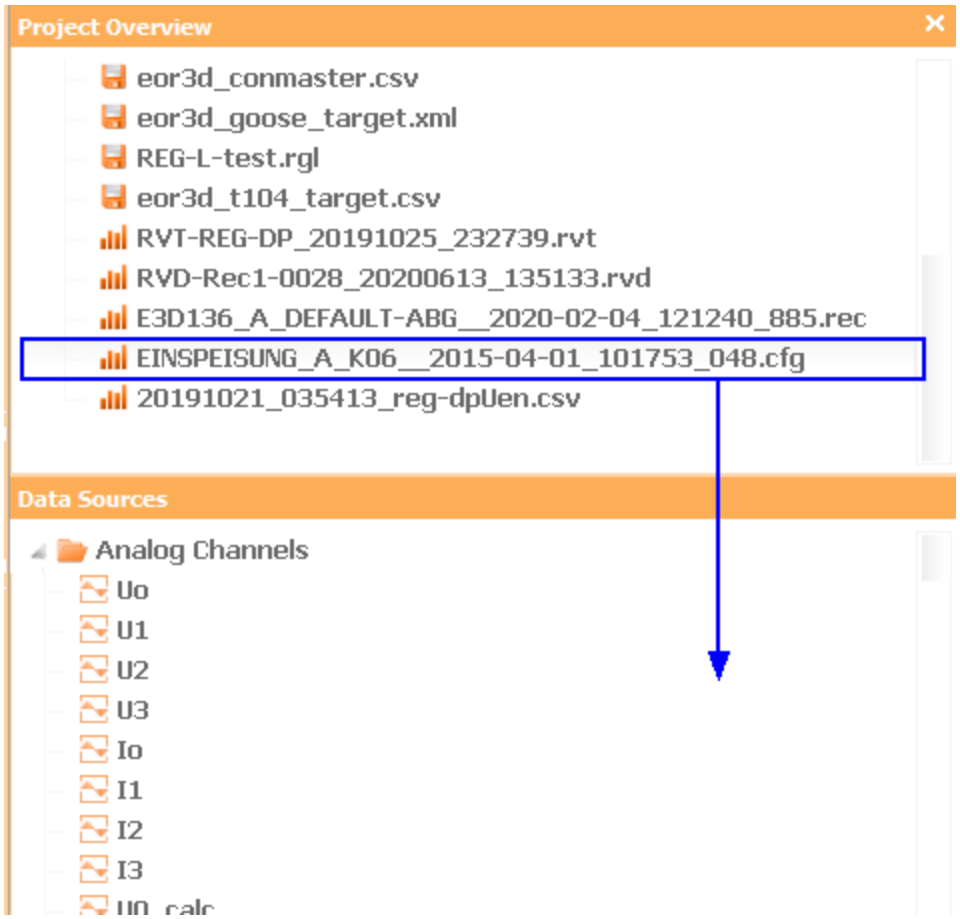
6.5.8 Creating analysis charts with tracks

After opening recorder and/or fault record files *(.rec, .rvt, .rvd, .csv, .dat, .cfg)* in the project overview they are adopted as data sources and displayed as so-called *analysis* tracks (see Analysis charts and data sources 82 section).

To display *analysis* tracks in a chart proceed with these steps:

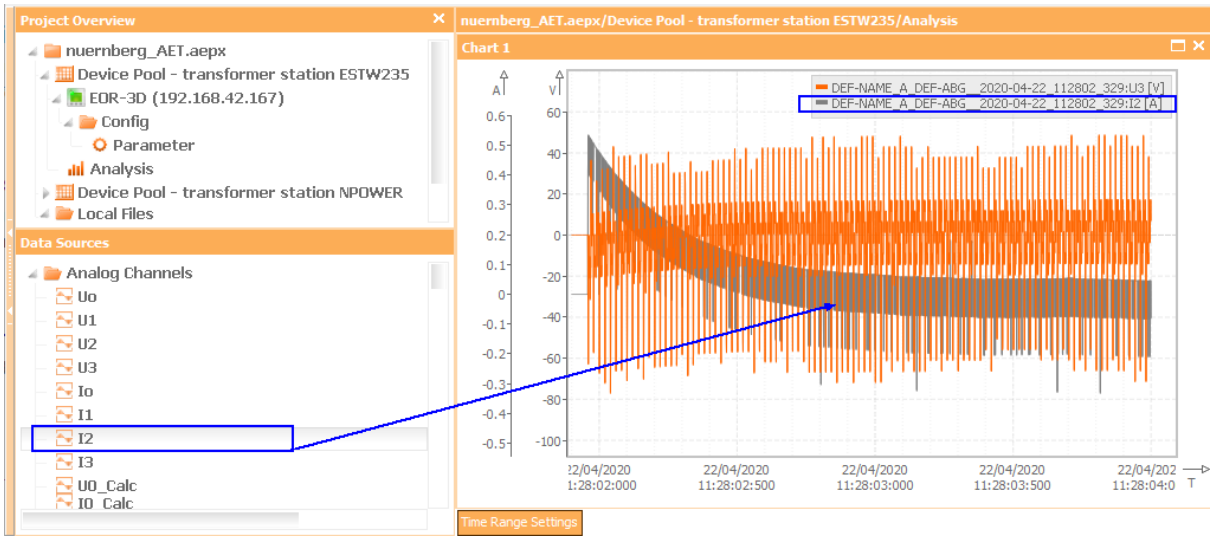
1) Load data sources in the project overview
➲ Call up the *Analysis* module

➲ Load a recorder, fault record or statistic file (.rec, .rvt, .rvd, .csv, .dat, .cfg) using the *Open*[77] button in the *Analysis* module. The file is placed in the *Local files* folder.
➲ After marking the file, its individual tracks are displayed in the *Data sources* area.



2) Display in the chart

➲ Drag individual *analysis* tracks into a chart using *drag & drop*.



NOTE!	This process can be time consuming for larger data series. Please note the display in the progress bar.

3) Adjust the value range

➲ Click the *Time range settings* button under the chart

➲ Optimise the visible value range (see more info on chart and axis settings in the Analysis charts and data sources 82 section).

6.5.9 Log book messages in the analysis chart

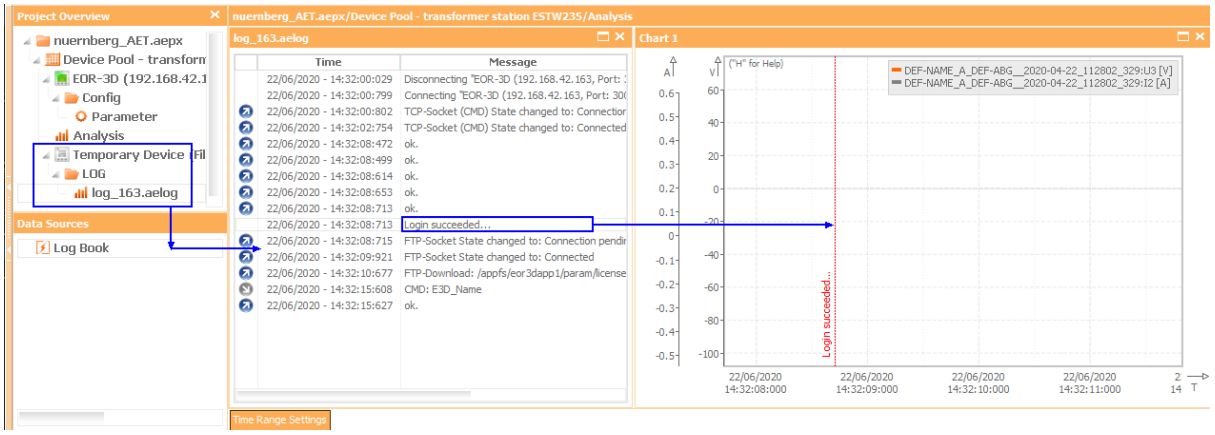
Proceed as follows to display the logbook messages *(.aelog, .log, .reglog)* in the *analysis* chart:

➲ First import the logbook file in the project overview (see the File import / export in the device context 121 section)

➲ Start the *Analysis* module

➲ Select the logbook file so that it is displayed as a data source in the *Analysis* module

➲ Use *drag & drop* to drag the *logbook* track into the main view.


Project Overview
nuernberg_AET.aepx
Device Pool - transform
EOR-3D (192.168.42.1
Config
Parameter
Analysis
Temporary Device (Fil
LOG
log_163.aelog
Data Sources
Log Book
nuernberg_AET.aepx/Device Pool - transformer station ESTW235/Analysis
log_163.aelog
Time
Message
22/06/2020 - 14:32:00:029 Disconnecting "EOR-3D (192.168.42.163, Port:
22/06/2020 - 14:32:00:799 Connecting "EOR-3D (192.168.42.163, Port: 30(
22/06/2020 - 14:32:00:802 TCP-Socket (CMD) State changed to: Connectior
22/06/2020 - 14:32:02:754 TCP-Socket (CMD) State changed to: Connected
22/06/2020 - 14:32:08:472 ok.
22/06/2020 - 14:32:08:499 ok.
22/06/2020 - 14:32:08:614 ok.
22/06/2020 - 14:32:08:653 ok.
22/06/2020 - 14:32:08:713 ok.
22/06/2020 - 14:32:08:713 Login succeeded...
22/06/2020 - 14:32:08:715 FTP-Socket State changed to: Connection pendir
22/06/2020 - 14:32:09:921 FTP-Socket State changed to: Connected
22/06/2020 - 14:32:10:677 FTP-Download: /appfs/eor3dapp1/param/license
22/06/2020 - 14:32:15:608 CMD: E3D_Name
22/06/2020 - 14:32:15:627 ok.
Time Range Settings
Chart 1
("H" for Help)
DEF-NAME_A_DEF-ABG__2020-04-22_112802_329:U3 [V]
DEF-NAME_A_DEF-ABG__2020-04-22_112802_329:I2 [A]
Login succeeded...
22/06/2020 14:32:08:000
22/06/2020 14:32:09:000
22/06/2020 14:32:10:000
22/06/2020 14:32:11:000

6.6 Files

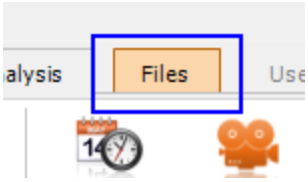
6.6.1 Calling up the Files module

The *Files* module is called up in the *device* context, without creating a corresponding entry in the project overview. Since the *Files* module is used to display device-internal files, the corresponding *device* entry must always be selected beforehand in the project overview.

To call it up, AEToolbox offers the following options:

1) *Device data* button in the *Home* module
If no *device* entry is marked beforehand or if no device exists in the project overview, the *connection wizard* 103 starts and sets up a new device.

2) Click the *Files* tab



3) *FILES* icon on the *device widget*

6.6.2 Transferring a parameter file

Proceed as follows to transfer a *parameter* file in the *Files* module:

From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ Via *drag & drop* into the project overview

2) Sending from PC to device
Using *drag & drop* the parameter file can be sent to the device. In the process an upload routine starts (please refer to the Working with parameter sets and background programs 40 section, *Upload* function).

For more import/export functions, refer to the File import/export outside of the device pool context 128 section.

6.6.3 Transferring a recorder file

The following options are available for transferring a recorder or fault record file in the *Files* module:

From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ *Comtrade export* button (will be saved on PC)

For more import/export functions, refer to the File import/export outside of the device pool context 128 section.

6.6.4 Transferring a SCADA file

The following options are available for transferring a file in *SCADA* format in the *Files* module:

1) From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ Via *drag & drop*

2) From PC to device
➲ *Upload SCADA* button

3) From the project overview to the device
➲ Via *drag & drop* into the *SCADA* folder in the *Files table*

For more import/export functions, refer to the File import/export outside of the device pool context 128 section.

6.6.5 Transferring an LUA file

The following options are available for transferring a file in *LUA* format in the *Files* module:

1) From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ Via *drag & drop*

2) From the project overview to the device
➲ Via *drag & drop* into the *LUA* folder in the *Files table*

For more import/export functions, refer to the File import/export outside of the device pool context 128 section.

6.6.6 Transferring a LOG file

The following options are available for transferring a device-internal *LOG* file in the *Files* module:

From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ Via *drag & drop*

For more import/export functions, refer to the File import/export outside of the device pool context 128 section

6.6.7 Transferring a statistics file

The following options are available for transferring a file in *statistics* format in the *Files* module:

From the device to the project overview
Method 1:
➲ Right-click the file in the *Files table*
➲ *Transfer to project* function

Method 2:
➲ Buttons in the *Files toolbar*: *Save in project*, *Save all in project*

Method 3:
➲ Via *drag & drop*

For more import/export functions, refer to the File import/export outside of the device pool context 128 section.

6.6.8 Transferring a JSON file

The following options are available for transferring a file in *JSON* format in the *Files* module:

1) From the PC to the device
➲Button Upload Sensor Config

For more import/export functions, refer to the device widget with functions 32 section.

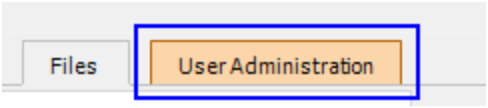
6.7 User administration

6.7.1 Calling up the User administration module

The *User administration* module is called up in the *device* context, without creating a corresponding entry in the project overview. Since the *User administration* module is used to display and administer device-internal user accounts, the corresponding *device* entry must always be selected beforehand in the project overview.

To call it up, AEToolbox offers the following options:

1) Click the *User administration* tab



2) *User administration* function

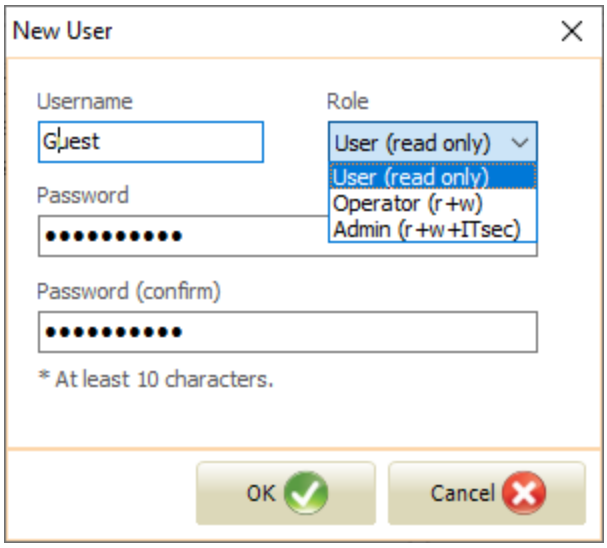
➲ Right click the *device widget*
➲ *User administration* function

6.7.2 Setting up a user account

Proceed as follows to set up a new *TCP* user account:

***New* button**
➲ Log in on the device with *Admin* privileges
➲ Click the *User administration* tab
➲ If necessary activate user administration (*Activate* button)
➲ Mark the *TCP* user category
➲ Click the *New* button

After clicking the activated *New* button, the *New user* input window starts, where the properties of the account are specified.



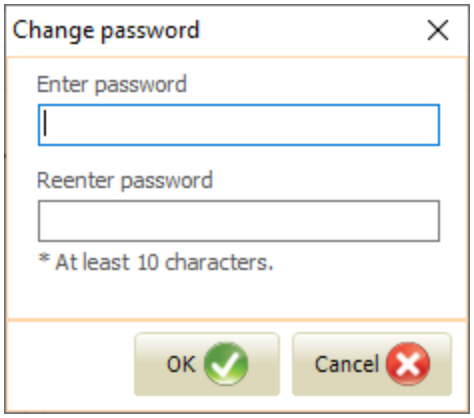
Once the necessary entries have been made, the newly set up account appears in the overview for *TCP* user accounts. This also indicates that the account has been correctly set up on the device.

For more functions of the user administration system, refer to the *User administration* 94 section.

6.7.3 Changing a password

Proceed as follows to enter a new password or change a password for a *TCP* user account:

1) Change for a third-party device account
➲ Log in on the device with *Admin* privileges
➲ Click the *User administration* tab
➲ If necessary activate user administration (*Activate* button)
➲ Mark the *TCP* user category
➲ Select user account
➲ Double-click or right-click in the *Password* column



2) Change for your own device account
➲ Log in on the device with your own login
➲ Click the *User administration* tab
➲ Select your own user account (this may be the only user available for selection)
➲ Double-click or right-click in the *Password* column

For more functions of the user administration system, refer to the *User administration* 94 section.

6.7.4 Unlocking a user

Proceed as follows to unlock a user account (*TCP* user or *Panel* user):

Locked* column in the *User administration table
➲ Log in with *Admin* privileges
➲ Click the *User administration* tab
➲ If necessary activate user administration (*Activate* button)
➲ Select, mark the *TCP* user or *Panel* user category
➲ Select user account
➲ Remove the tick in the *Locked* column

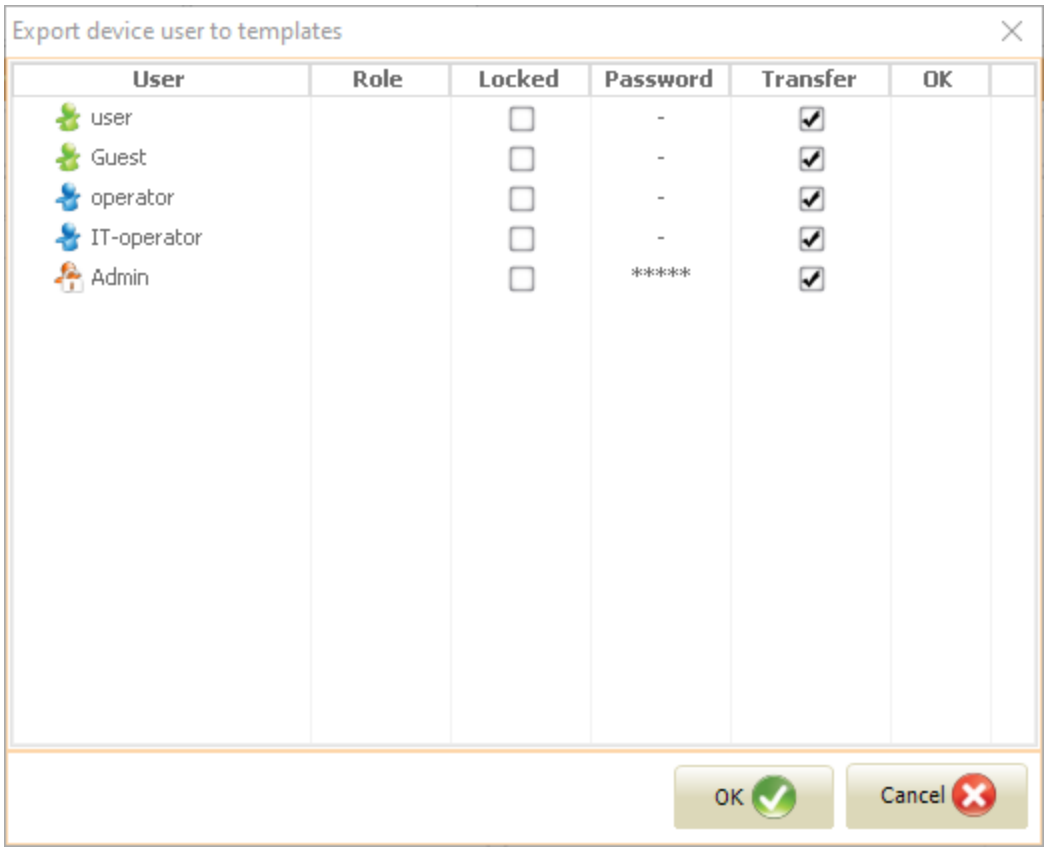
NOTE!	Please note that an account is automatically locked if a false password is entered three times. Only *Admin* users can unlock the account again.

For more functions of the user administration system, refer to the *User administration* 94 section.

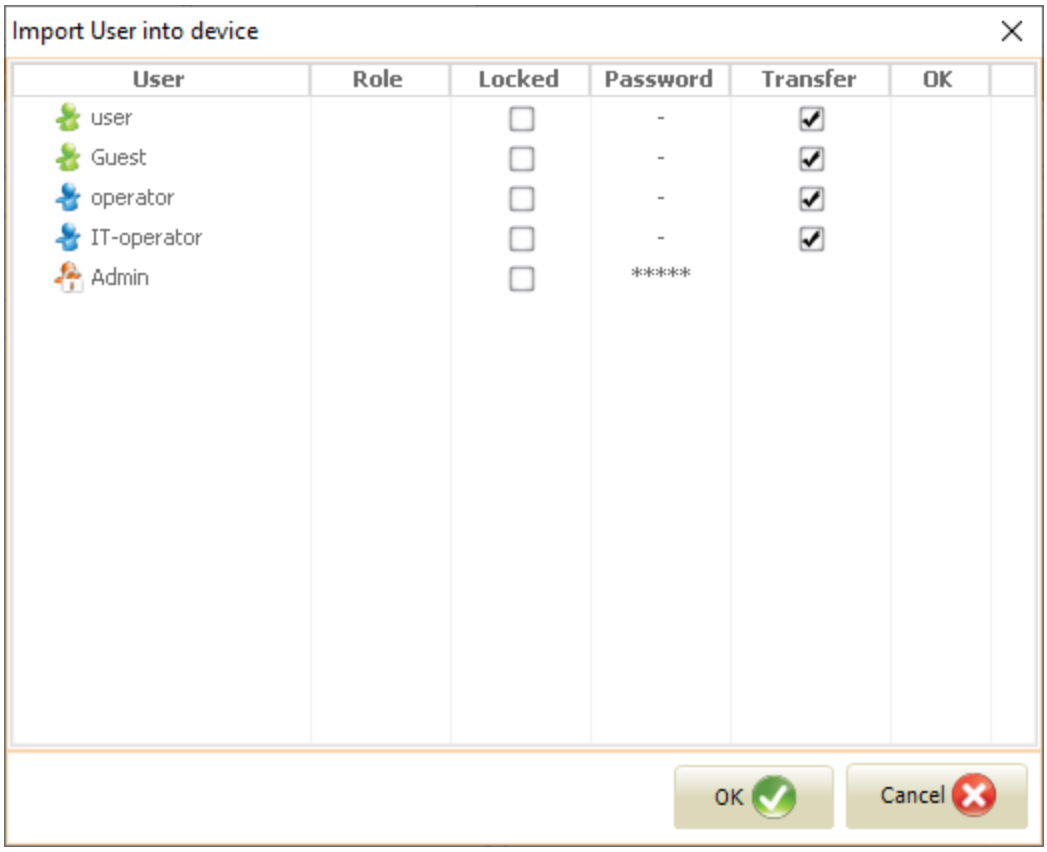
6.7.5 Transferring user accounts

Proceed as follows to transfer *TCP* user accounts to a different device:

Export/Import functions
➲ Log in with *Admin* privileges
➲ Click the *User administration* tab
➲ If necessary activate user administration (*Activate* button)
➲ Mark the *TCP* user category
➲ Click the *Export* button. The user accounts are moved to the templates.



➲ Log in on the target device with *Admin* privileges
➲ Click the *User administration* tab
➲ If necessary activate user administration (*Activate* button)
➲ Click the *Import* button. The user accounts in the templates are transferred to the target device.



NOTE!	Please note that the passwords must be entered again.

For more functions of the user administration system, refer to the *User administration* 94 section.

7 Keyboard shortcuts

AEToolbox includes general keyboard commands and section module-specific keyboard shortcuts, which are listed as follows:

Function	Keyboard shortcut	Comment
General		
Interactive help	F1	The relevant sections of the user instructions are displayed in the help window.
Project overview		
Copy, entry	Ctrl + C	Copying entries. Paste in the available structure tree using Ctrl+V, according to the device type (and/or section module).
Cut, entry	Ctrl + X	Cutting entries. Paste in the available structure tree using Ctrl+V, according to the device type (and/or section module).
Delete, entry	Del	Deleting entries.
Rename, entry	F2	Renaming the entries in the structure tree.
Copy, project overview	Ctrl + C	Copying the path of the structure tree. The tree structure must already be “marked” through a click in the table area. Paste using Ctrl+V in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).
***Configuration* section module**		
Parameters table		
Download, parameter	Ctrl + R	Receiving an individual parameter.
Upload, parameter	Ctrl + E	Sending an individual parameter.
Search, parameter	Ctrl + F	Searching for character strings in the *Parameters table*.
Copy	Ctrl + C	Copying the contents of the complete *Parameters table* as text. The table must already be “marked” through a click in the table area. Paste using Ctrl+V in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).
Text editor		
Select	Shift + cursor	Select
Select all	Ctrl + A	Select all
Copy	Ctrl + C	Copy
Cut	Ctrl + X	Cut

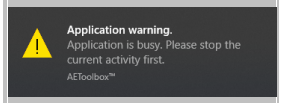
Paste	Ctrl + V	Paste
Search	Ctrl + F	Search
Undo, written code	Ctrl + X	Undoing written code
Undo, pasted code	Ctrl + Y	Undoing pasted code
***Online* section module**		
Copy as an image	Ctrl + C	Copying an *Online* panel as an image. The panel must already be "marked" through a click in the panel area. Paste in *PowerPoint, Word, Excel, Paint*, etc.
Copy, *logbook* messages	Ctrl + C	*Logbook* messages are copied as text. The panel must already be "marked" through a click in the panel area. Paste in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).
Copy, *terminal* history	Ctrl + C	History from the *Terminal* panel is copied as text. The panel must already be "marked" through a click in the panel area. Paste in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).
***Analysis* section module**		
Rename, charts	F2	Renaming charts in the chart editor
Rename, track	F2	Renaming individual tracks in the chart editor
Copy as an image	Ctrl + C	Copying an *analysis* chart as an image. The chart must already be "marked" through a click in the chart area. Paste in *PowerPoint®, Word®, Excel®, Paint®*, etc.
Delete, *analysis* tracks	Del	Deleting marked *analysis* track in the chart editor
Delete, marked items	Del	Deleting marked items in the chart editor
Read out, value	Ctrl + cursor	Read out a certain value in the chart
Zoom	Ctrl + left-click + mouse to left/right	Zooming in on a value range (x and y axis)
Zoom, horizontal	Ctrl + SHIFT + left-click + mouse to left/right	Zooming in on a value range (x axis)
Scrolling	SHIFT + mouse to left/right	Scrolling the value range to the start or end of the recording
Stretch / compress, x/y axis	Alt + move coordinate border with mouse	Stretching and compressing x/y axes
Display Inplace help, chart	Press and hold H key	Displaying Inplace help in the chart, in which other functions can be performed
***Files* section module**		
Select, in groups	SHIFT + cursor	Selecting multiple files in the table

Select, individually	Ctrl + cursor	Selecting individual files in the table
Copy	Ctrl + C	Copying the contents of the *Files table* as text. The table must already be “marked” through a click in the table area. Paste using Ctrl+V in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).
***User administration* section module**		
Copy	Ctrl + C	Copying the contents of the *User administration table* as text. The table must already be “marked” through a click in the table area. Paste using Ctrl+V in common *Office* programs (*PowerPoint®, Word®, Excel®, Paint®*, etc.).

8 Error handling

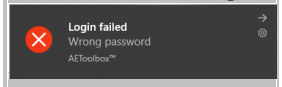
This section offers assistance for when errors and operating problems occur, and suggests possible causes and corrective measures.

Errors, operating problems	Probable cause Event	Corrective measure
General		
AEToolbox won't start	⚠ Cancellation of the installation process or incorrect installation.	➔ Remove installed AEToolbox from the PC applications. Repeat installation process.
Connection not/not correct recognized. Connection unstable	⚠ not enough voltage on the USB port.	➔ Don't overload the USB ports, especially when using MOXA-adapters. Reduce the amount of connected USB-adapters or ather external USB-devices-
Firmware update won't start	⚠ Firmware update unnecessary (no differences in the firmware version).	➔ Check messages in the logbook. Check the firmware file and the firmware version on the target device.
The firmware update aborts during the process.	⚠ Physical connection to the target device not possible or interrupted.	➔ Check messages in the logbook. Check the cable connections. Check the connectivity of your PC adapter (driver, setup, anti-virus app, ...). For TCP connections, please check the network settings of your PC adapter and the device (subnet mask, TCP filtering, ...). Contact your network administrator about it if necessary.
	⚠ Parallel work process of other users are interrupting the connection to the target device.	➔ Ensure that no other users are accessing the target device during the update procedure.
	⚠ The start of other functions or commands or AEToolbox modules during the firmware update procedure.	➔ Refrain from working with other AEToolbox modules during the firmware update.

	Firmware file doesn't match the device type.	Check messages in the logbook. Check the firmware file and the firmware version on the target device.
	Firmware file is faulty, other errors.	Contact *A. Eberle GmbH & Co. KG.*
Application not responding. AEToolbox message:  	The functions or commands were executed too quickly in succession.	Wait until a function or command is executed by the AEToolbox application. Monitor the output in the progress bar. **The following functions are time-consuming, so they are performed asynchronously:** ▪ Establishing a connection to a device; ▪ Opening, importing parameter sets or parameter files; ▪ Opening the *Configuration* section module; ▪ Opening the *Online* section module; ▪ Up-/downloading parameter sets and background programs; ▪ Loading an *analysis* track in the *analysis* chart; ▪ Transferring large recorder files, device logbooks, parameter sets, etc. from the device to the project overview (running device operation!); ▪ Firmware updates.
***Devices* section module**		
No connection established in the final step of the connection wizard, with output	Interruption of physical connection to target device.	Try to set up the connection one more time. Check messages in the logbook. Check the cable connections. Check the connectivity of your

Disconnected. *OK* button deactivated.		PC adapter (driver, setup, anti-virus app, ...). For TCP connections, please check the network settings of your PC adapter and the device (subnet mask, TCP filtering, ...). Contact your network administrator about it if necessary.
	The target device is switched off or is in boot mode.	Check the target device. Switch it to operating mode manually.
	A firmware update is running on the device.	Wait until the firmware update is completed.
	Set up connection using old connection data in the connection wizard from recently used devices.	Check the connection data. If necessary, try to set up the device with new connection data.
No connection established. Target device not detected in E-LAN. *Next* button deactivated.	The connection is being established to a device in bootstrap loader mode.	Check the target device. Switch it to operating mode manually.
	Incorrect E-LAN settings in the rack.	Check the E-LAN settings of the devices: All E-LAN addresses unique? E-LAN connections left/right - baud rate identical? Forgot termination?
	Physical cable is too long (low voltage).	Replace the serial cable with a shorter one if necessary. In general serial cables should not be longer than 1.5m.
	Faulty connection configuration: COM port, baud rate, parity, handshake.	Check the settings in the connection wizard.
	The target device has an internal error.	Carry out one of the following steps to rectify the situation: 1. Reboot the device 2. Update the device firmware 3. Contact *A. Eberle GmbH & Co. KG*.
	Changes to communication parameters in the parameter set and subsequent upload to the target device.	Connect the device with the new connection data.

Analysis+ button deactivated	You are currently in the *device* context.	Mark the *device pool* entry.
***Configuration* section module**		
Upload button deactivated (*Configuration toolbar* with parameter functions)	You have User privileges on the device, which are insufficient for the upload procedure.	Log in with *Operator* or *Admin* privileges.
Download button deactivated (*Configuration toolbar* with text editor functions)	The background program currently selected in the structure tree does not exist on the target device (name comparison).	File renaming. To verify the background program names on the target device, click on the *Files* tab and then on the folder which contains these background programs.
***Online* section module**		
Polling of *online* values in various panels is slow	The logbook messages are currently being loaded.	Wait until the logbook messages are completely loaded. This can sometimes be time consuming.
No *logbook* messages *(no data...)*	The *logbook* messages were removed *(Clear* 70 button*).*	Logbook messages cannot be restored. If possible, create a new logbook on the device.
	The connection to the serially-connected device was interrupted.	Replace the serial cable with a shorter one if necessary. In general serial cables should not be longer than 1.5m.
	The connection to the device was interrupted.	Try to set up the connection one more time. Check messages in the interface logbook. Check the cable connections. Check the connectivity of your PC adapter (driver, setup, anti-virus app, ...). For TCP connections, please check the network settings of your PC adapter and the device (subnet mask, TCP filtering, ...). Contact your

	⚠ The *aelog* file was opened in the *temporary device*. Allocation to device missing.	→ network administrator about it if necessary. → Open the *aelog* file in the Logbook panel[70] of a device.
***Analysis* section module**		
Analysis+ button deactivated	⚠ You are currently in the *device* context.	→ Mark the *device pool* entry.
Loading a file *(.rec, .rvt, .rvd, .csv, .dat, .cfg)* takes a long time	⚠ Reading process is asynchronous.	→ Schedule sufficient time for the loading operation. With a file size of 1 MB you should schedule approx. 20 sec per track.
***Files* section module**		
Reading file list or transferring files not possible	⚠ *User* privileges on the target device inadequate.	→ Check messages in the interface logbook. Log in on the target device with adequate user privileges.
	⚠ No stable connection to target device.	→ Try to set up the connection one more time. Check messages in the interface logbook. Check the cable connections. Check the connectivity of your PC adapter (driver, setup, anti-virus app, ...). For TCP connections, please check the network settings of your PC adapter and the device (subnet mask, TCP filtering, ...). Contact your network administrator about it if necessary.
***User administration* section module**		
Login failed. AETOolbox message: 	⚠ Incorrect password entered multiple times. Account automatically locked.	→ Locked account can only be unlocked by a user with *Admin* privileges. See *User administration* module, in the

		User accounts and templates[99] section.
	The target device is switched off.	Check the device.
	The target device has an internal error.	Carry out one of the following steps to rectify the situation: 1. Reboot the device 2. Update the device firmware 3. Contact *A. Eberle GmbH & Co. KG*.
Delete button deactivated	You didn't select a user account.	Select a user account which is not your current account. Your current account cannot be deleted.
New, *Delete*, *Import*, *Export* buttons deactivated	User administration is deactivated.	Activate the user administration by clicking the *Activate*[96] button.
All buttons activated.	You have inadequate user privileges.	Log in with *Admin* privileges.

9 Licence information

This section contains information on the third-party libraries used by AEToolbox, the use of which requires express mention in the product documentation.

9.1 NXInstrumentation

Product name:	NXInstrumentation - Suite
Authors:	NEXOE Applications GmbH
Licence text:	NXInstrumentation is licensed for use at AEToolbox (A. Eberle GmbH & Co. KG), as Commercial License ©2017-2020 NEXOE Applications GmbH

9.2 Graphics32

Product name:	Graphics32
Authors:	Andre Beckedorf, Alex Denisov, Angus Johnson, Christian-W. Budde, Mattias Andersson, Michael Bunk, Michael Hansen Buur
Link to the licence used:	http://www.mozilla.org/MPL/1.1/
Link to the product page:	http://graphics32.org/wiki/
Licence text:	Graphics32 is licensed under the Mozilla Public License (MPL) 1.1

9.3 NativeXML

Product name:	NativeXML

Authors:	Nils Haeck M.Sc. (SimDesign B.V.)
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9.4 OpenSSL

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