ecoExplorer go

Manual

Weidmüller

Foreword

Revision History

Version	Date	Change
0.0	07/2016	First Edition
1.0	09/2016	Chapter 4.1.3.6 correction
2.0	03/2017	Chapter 3.4.13 and 3.5.1 deleted
3.0	02/2018	Page 7, device list extended

Contact Address

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 16
32758 Detmold
Germany

Phone +49 (0) 5231 14-0
Fax +49 (0) 5231 14-292083
info@weidmueller.com
www.weidmueller.com

Contents

1 Applications

The visualisation software ecoExplorer go is designed for the management of measurement devices and the measurement values they capture.

ecoExplorer go currently supports the following measurement devices made by Weidmüller Interface GmbH & Co. KG:

- Energy Meter 520
- Energy Meter 525
- Energy Meter 610
- Energy Meter 610-PB
- Energy Meter 700-PN
- Energy Meter 750
- Energy Meter D370
- Energy Meter D370-CBM
- Energy Meter D370-UL
- Energy Meter D650

- Energy Analyser 550
- Energy Analyser 750
- Energy Analyser D550

- Energy Logger D550

What ecoExplorer go can do

- Manage measurement devices.
- Map measurement devices in a topology.
- Program measurement devices.
- Provide direct graphic representation of measurement values from different measurement devices.
- Read out measurement values saved in measurement devices and save these to a database.
- Read out measurement values saved in a database and display these graphically.
- Read out measurement values saved in a database and search these for transients.
- Read out measurement values saved in a database and search these for events.
- Program customer-specific applications.
- Update measurement device firmware.

NOTE: Some of the listed functions are not available for every measurement device!

2 Supported operating systems

The visualisation software ecoExplorer go can be installed on computers/PCs with a minimum resolution of 1280 x 960 pixels and with the following operating systems:

- Windows XP® (from Service Pack 3)
- Windows Vista® (from Service Pack 1)
- Windows 7® (32Bit, 64Bit)
- Windows 8® (32Bit, 64Bit)
- Windows Server® (from Version 2003 R1)

3 Working with ecoExplorer go

3.1 First steps with ecoExplorer go

3.1.1 Welcome window

The Welcome window can be opened under the menu item “Window/Welcome” and provides support to initial steps when working with ecoExplorer go.

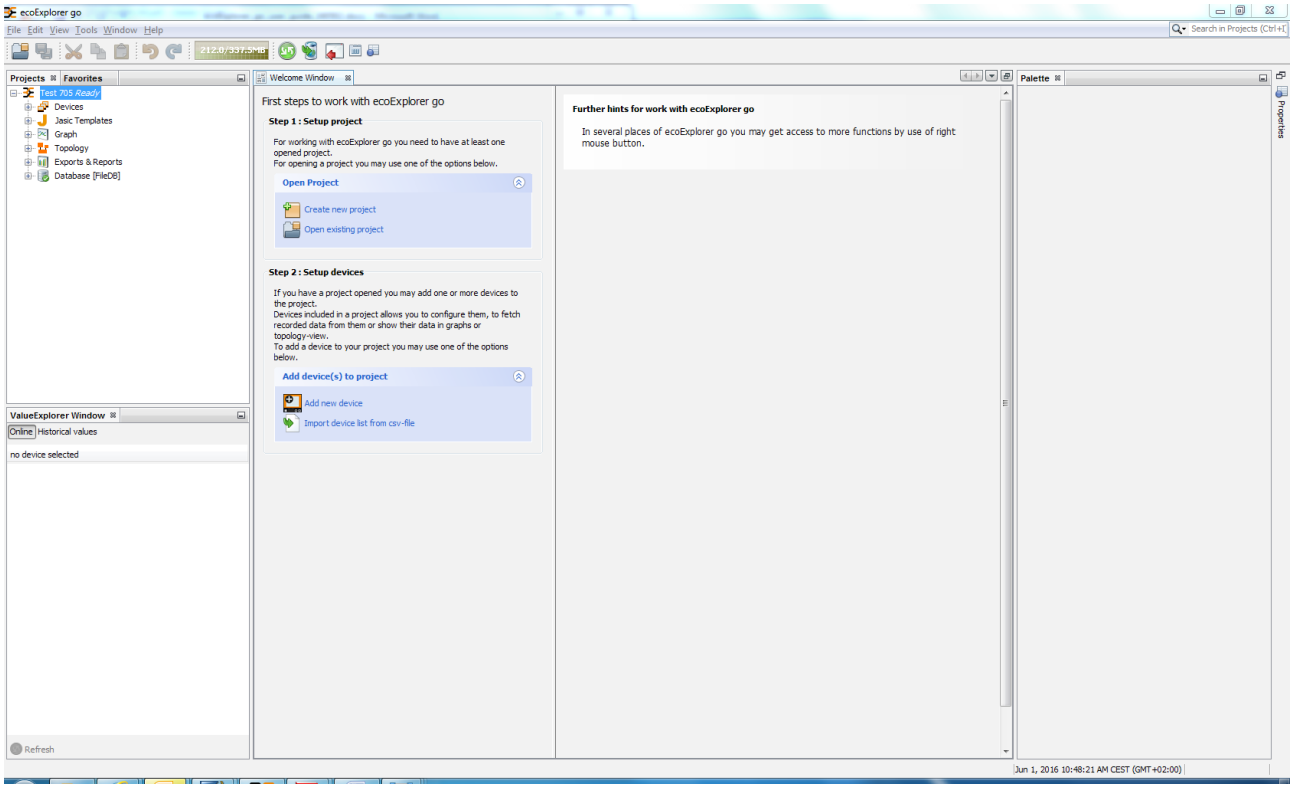

Fig.: Welcome window

Creating a project

To be able to work with ecoExplorer go, at least one project must be open.

- Create new project
- Open existing project
- Import of older versions

Adding devices

One or more devices can be added once a project has been opened.

- Create new device
- Import a device list from a CSV file

If the Welcome window does not appear when starting, it can be opened using the menu item Window/Welcome.

3.1.2 Creating new project

- New projects are created under the menu item File/New project or via the “Welcome window”.
- Set the selection to “Database project” in the “Projects” pane and confirm the selection with “Next”.

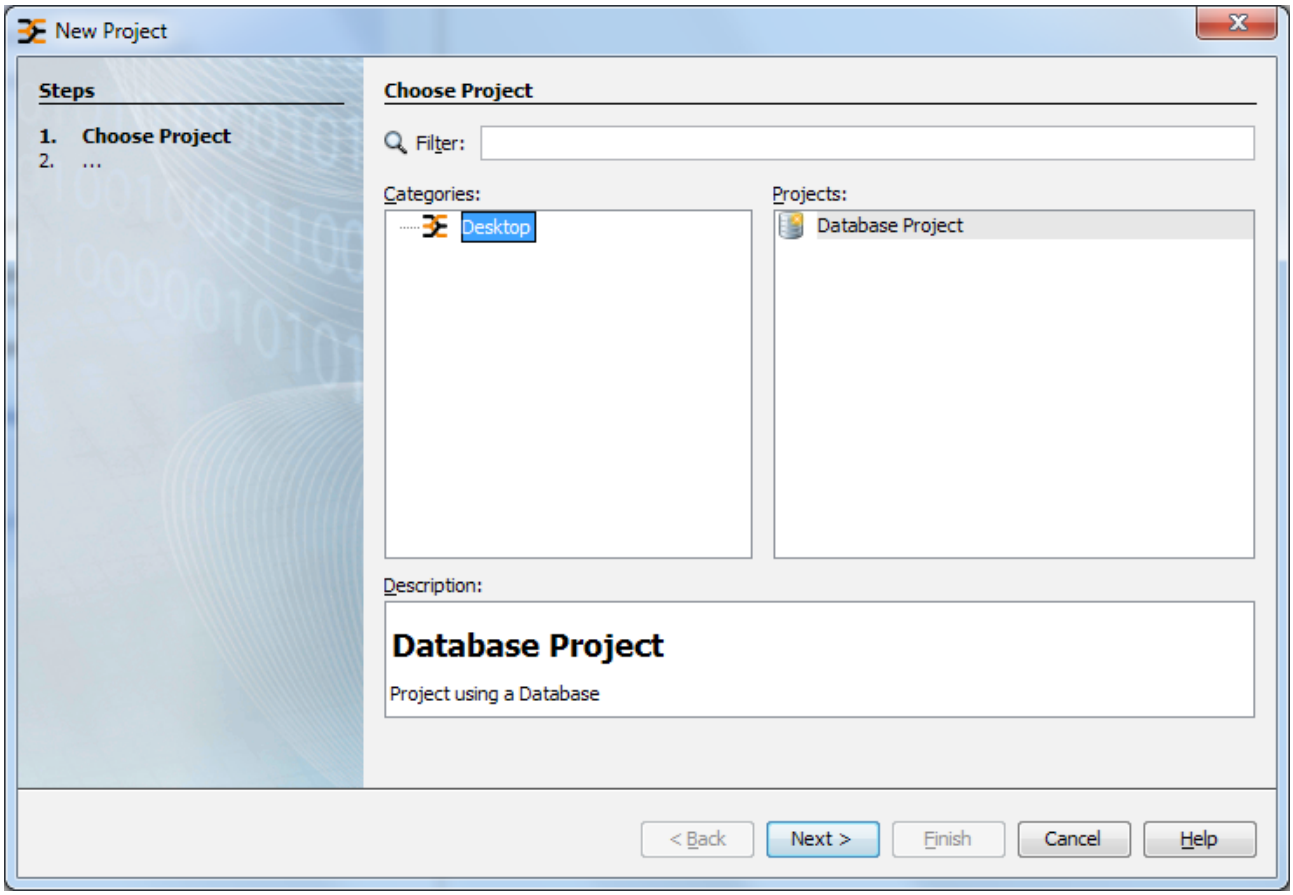

Fig.: New project

- Give the project a name and identify the location it is to be saved to. The “Browse” button can also be used to find and specify the location the project is to be saved to.
- For smaller projects with only a few devices and little data, you can use the File DB database included in the scope of delivery. When using the standard database (File DB), clicking on “Finish” saves the project.
- Enter the required information and confirm it with the “Finish” button.

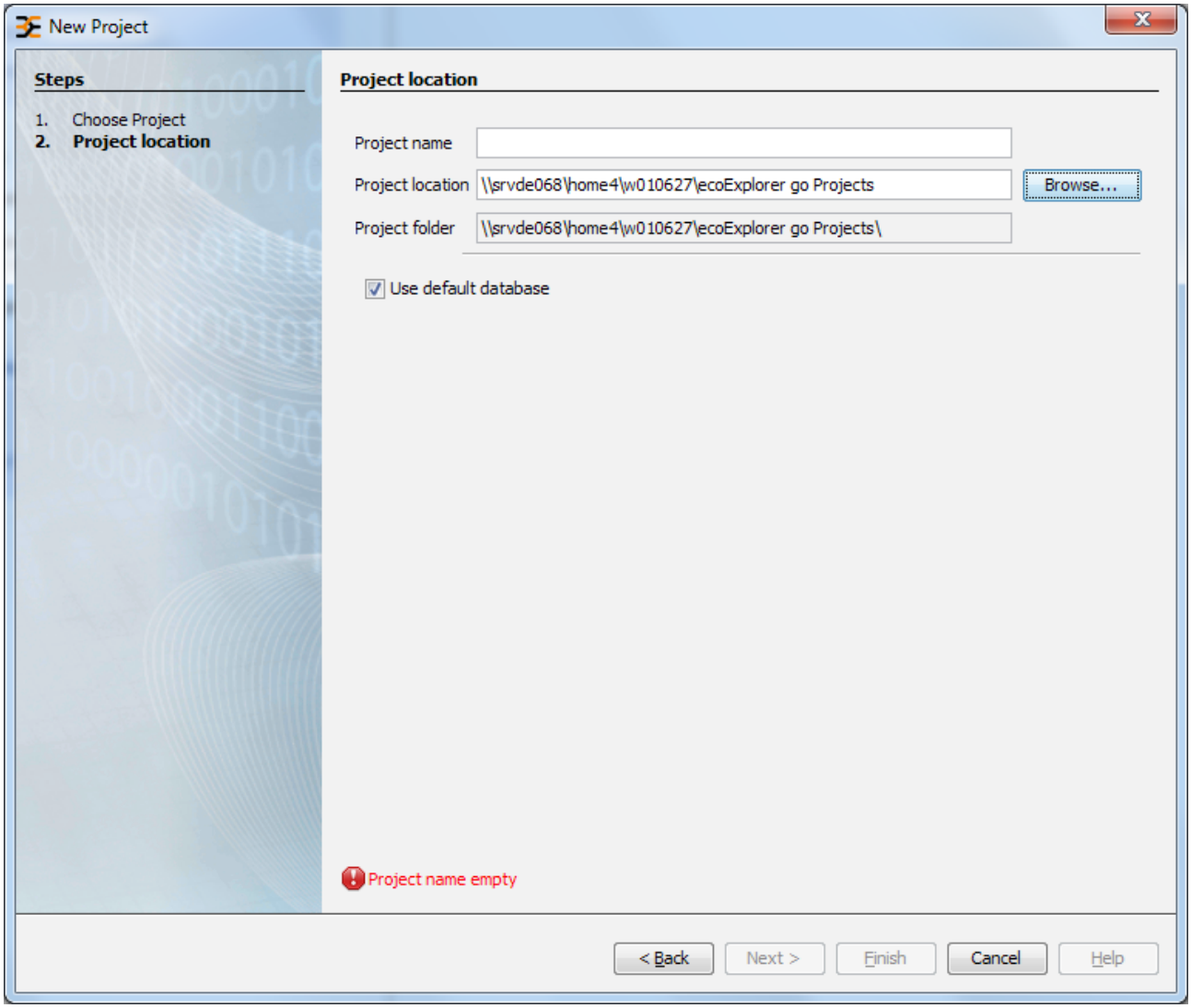

Fig.: Project memory location

3.1.3 Opening existing project

- Use the menu item “File/Open project” to select and open an existing ecoExplorer go project (projects from Version 2.x).
- Select the desired project in the selection window and open it by clicking on the “Open project” button.

3.1.4 Creating new device

- If a project has been created, a device can be added for example using the menu item “File/New file”.
- Select the type of device, listed under the device category, and confirm the selection with “Next”.

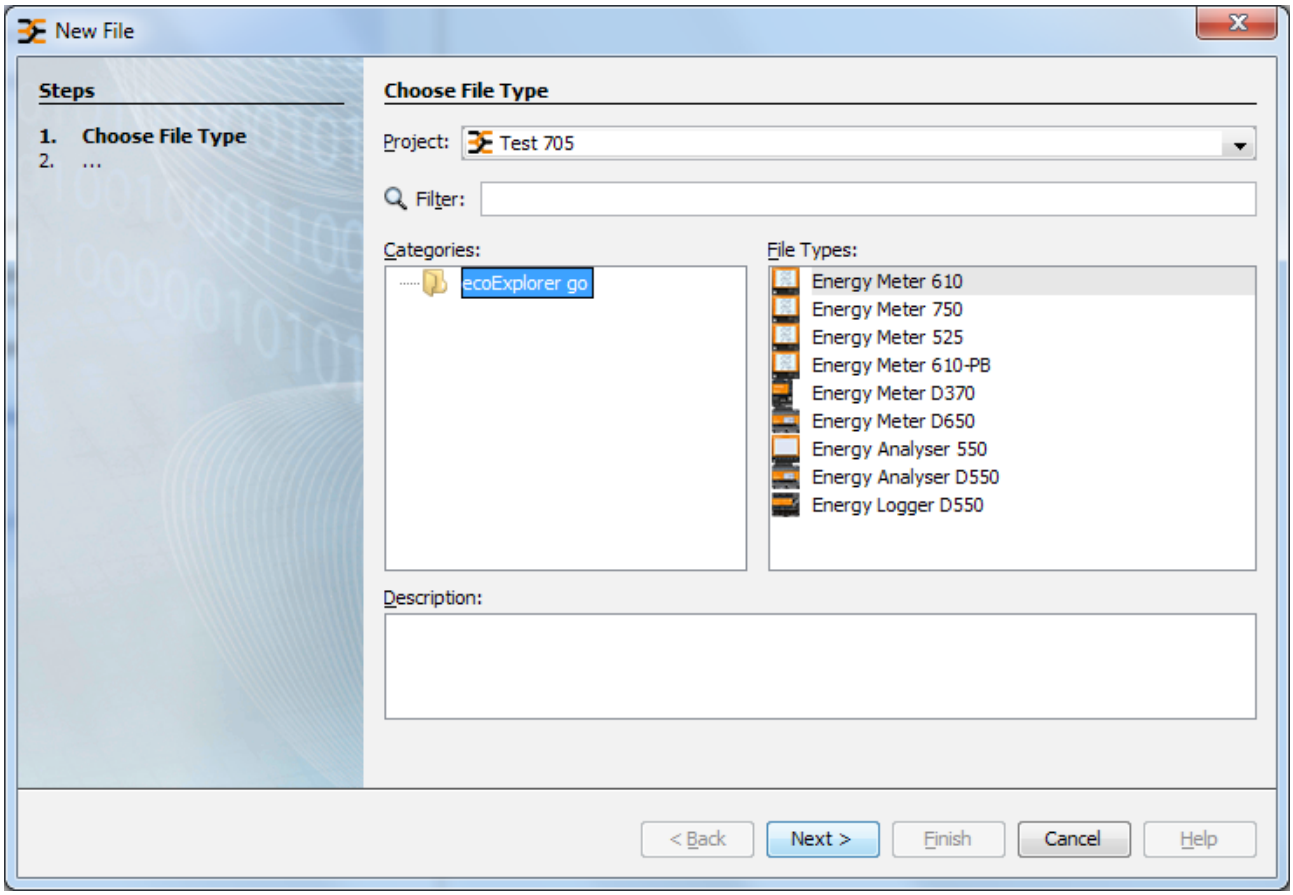

Fig.: Device selection

- Different types of connections will be offered depending on the type of device.
- Depending on the type of connection, once the appropriate connection has been selected and any address inputs have been entered, communication with the device can be tested using the “Connection test” button.

The following connection types are available for selection, according to device type:

- Without connection
- Modbus RTU (RS485/RS232)
- Ethernet TCP/IP
- Ethernet gateway (e.g. for devices connected to the RS485)
- Secured TCP/IP
- USB

- Connection type “No connection”
  Devices can be installed without a connection type - e.g. for a pre-configuration of the ecoExplorer go software.
  With this connection type, measurements of voltages, currents etc. are not possible.

- Connection type “Modbus RTU”
  Devices, which should communicate via Modbus, can be activated via this connection. Interface, baud rate and device address must be known.
  NOTE: The baud rate should be the same in the bus and the device address should be unique.

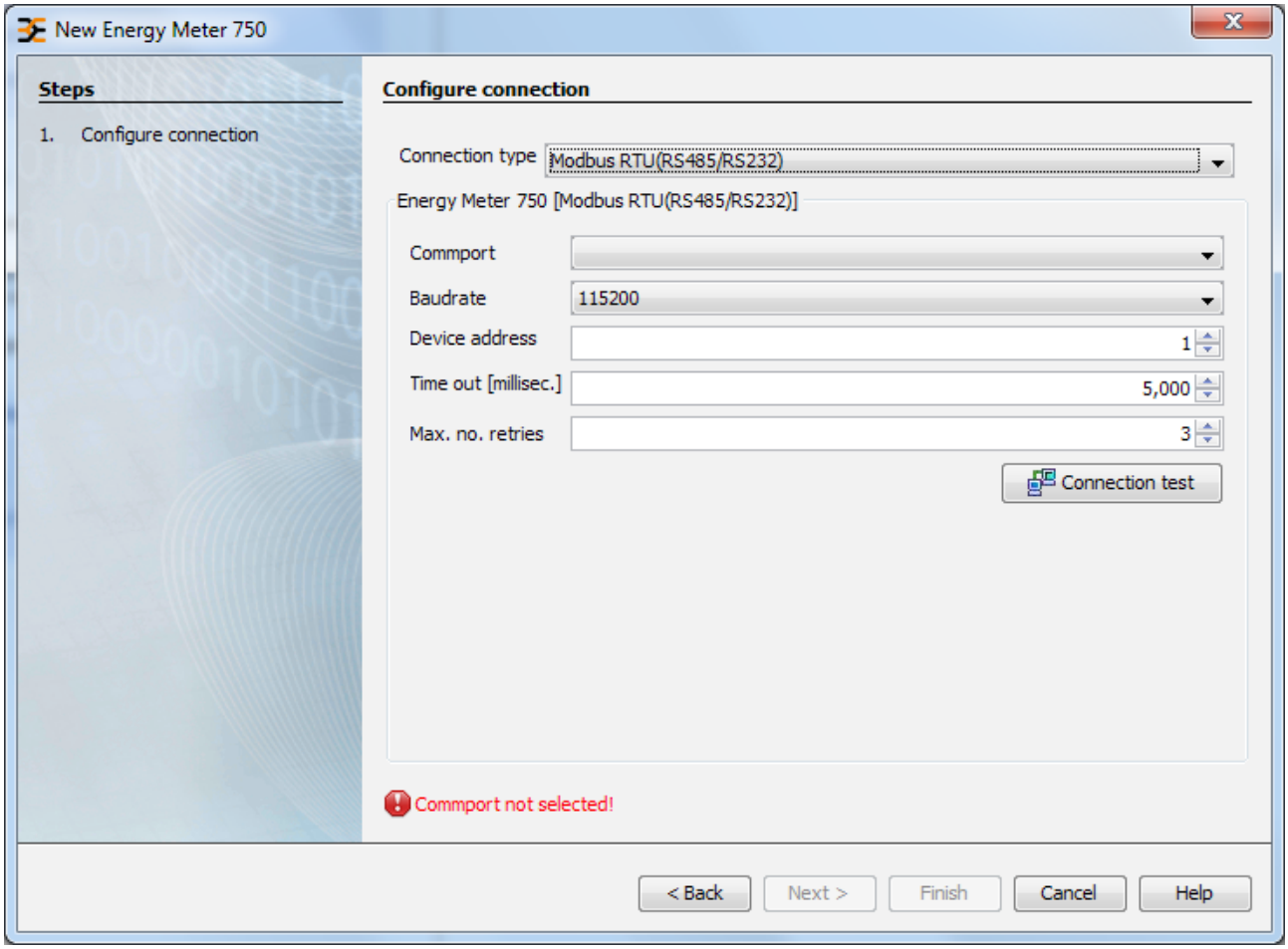

Fig.: Modbus connection configuration

- Connection type “Ethernet TCP/IP”
  Devices with an Ethernet interface and known Ethernet address can be integrated via the connection type “Ethernet” in ecoExplorer go.
  The TCP / IP device address must be known for this purpose.

- Connection type “Ethernet gateway (e.g. for devices on the RS485)”
  Devices that are connected via the RS485 as slave to a master device are activated via this connection type.
  In the process the TCP/IP address of the master and the device address of the slave device are to be transferred to the settings. For longer master/slave communication paths, the timeout setting is to be increased.

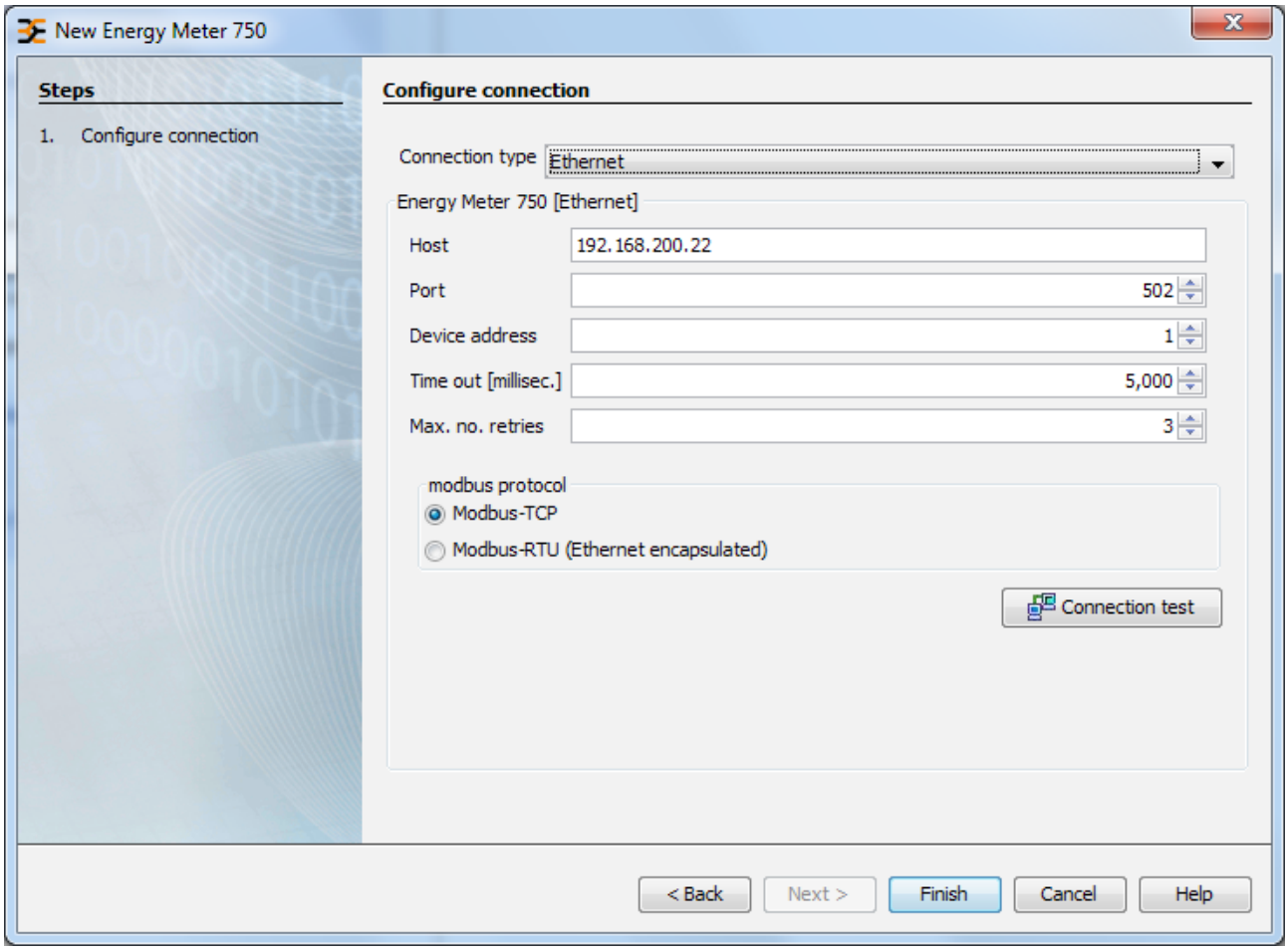

Fig.: Ethernet connection configuration

- Connection type “secured TCP/IP”
  Via a secured connection to the device, the homepage and configuration, for example, can be protected via a password.
  To this end, the user and password should be entered when encryption is activated.
  When a connection is successfully established, an additional “Passwords” button appears with which rights can be set.

  NOTE: If a password has been assigned on the device, then the password can be reset via a secured ecoExplorer go device connection.

- Connection type “USB”
  Via this connection type, communication is established with devices, which have a USB interface.
  To this end the interface operated by the drivers (COM1, COM2...) must be known.

3.1.5 Overview window

The overview window provides a clearly organised overview of the most important device actions and information about the devices organised by the types of devices/device groups selected in the project window.

- To open the navigation window, select the menu item “Window/Navigation”.
- To open the project window, select the menu item “Window/Projects”.
- Directly selecting a device in the project window facilitates displaying and changing the information in the overview window.
- Selecting the group “By Type” displays an overview of all of the devices incl. their current status

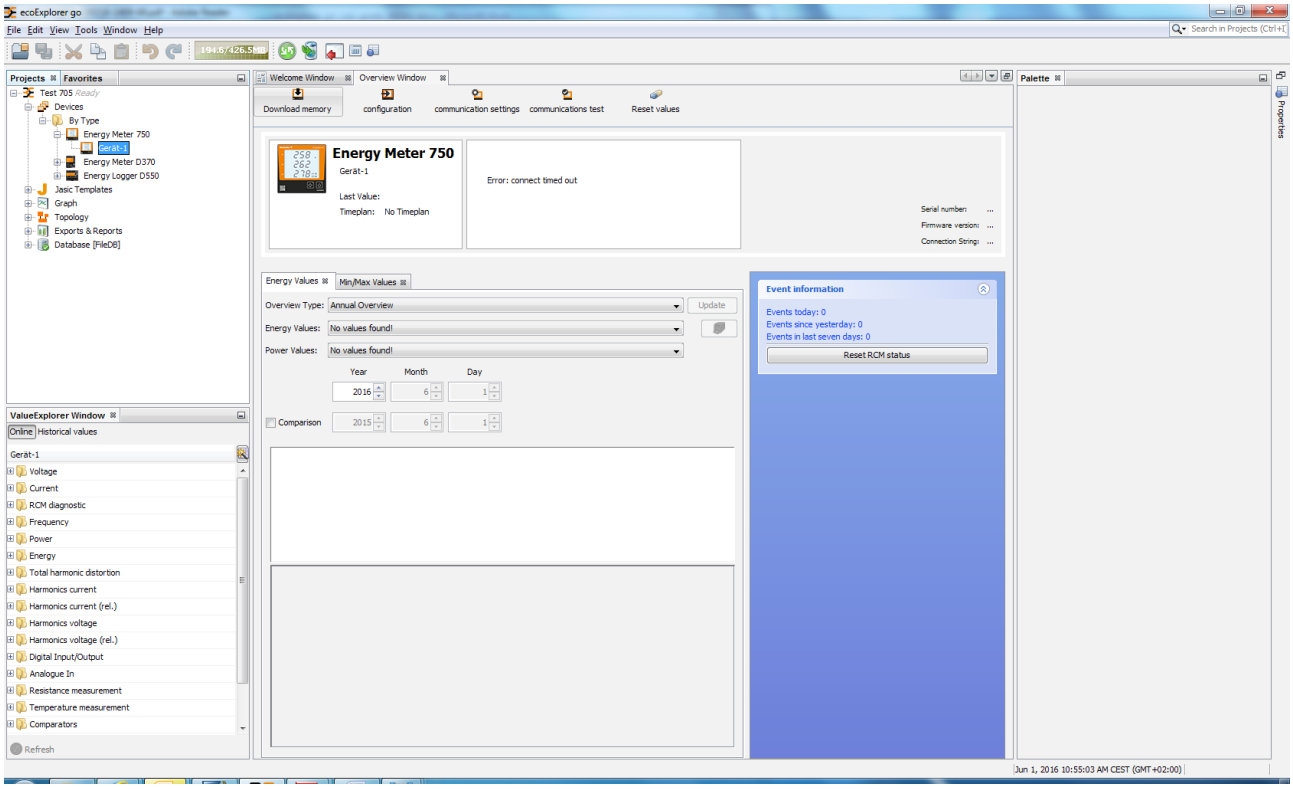

Fig.: Overview window (device information)

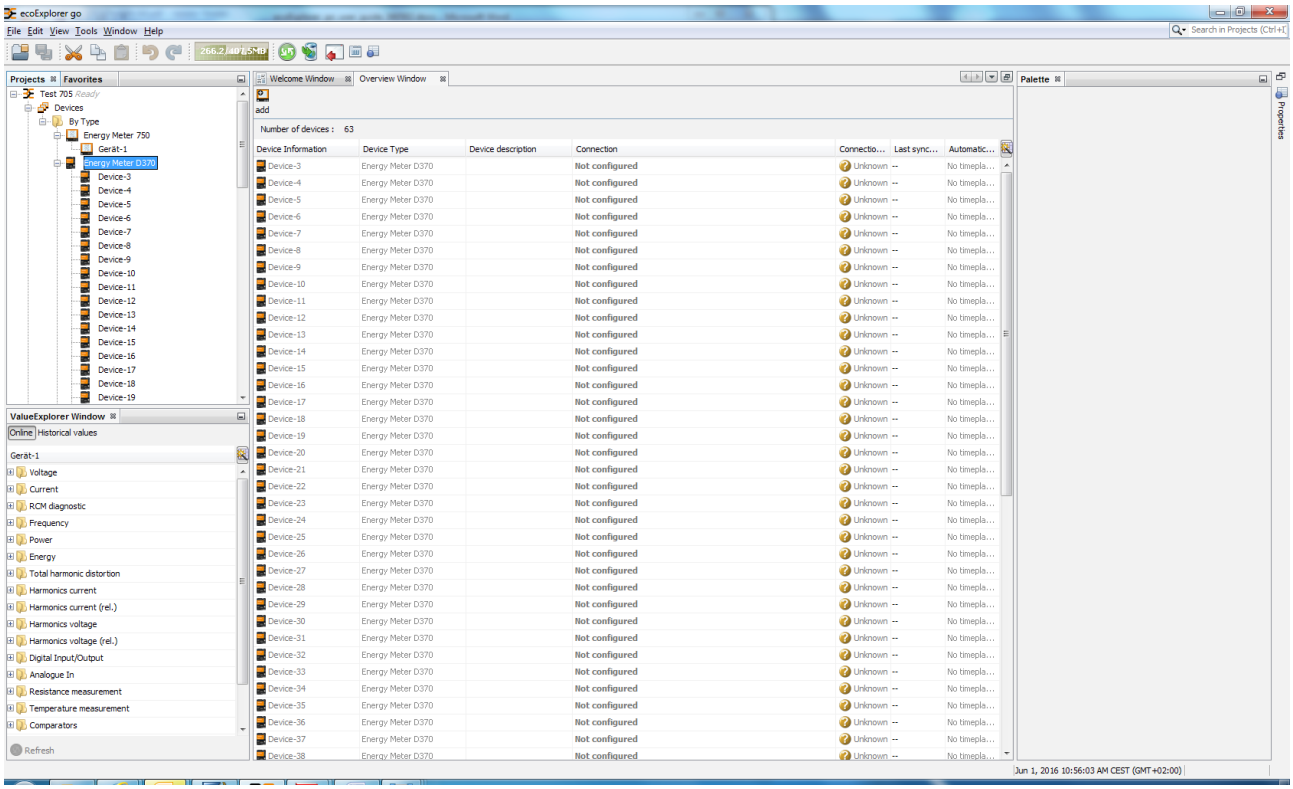

Fig.: Overview window (device type view)

3.1.6 Displaying graphs

Selected measurement values can be visualised in a graph window by selecting “Graphs” in the project window.

- Measurement values from devices can be displayed directly in a graph.
- Measurement values from different devices can be displayed in a single graph.
- No more than two different kinds of measured value types (e.g. current and voltage) can be displayed in a single graph.
- To open the project window, select the menu item “Window/Projects”.
- To open the navigation window, select the menu item “Window/Value tree”.
- Select the item Graphs in the project window.
- Then select the item Devices in the project window to select the device.

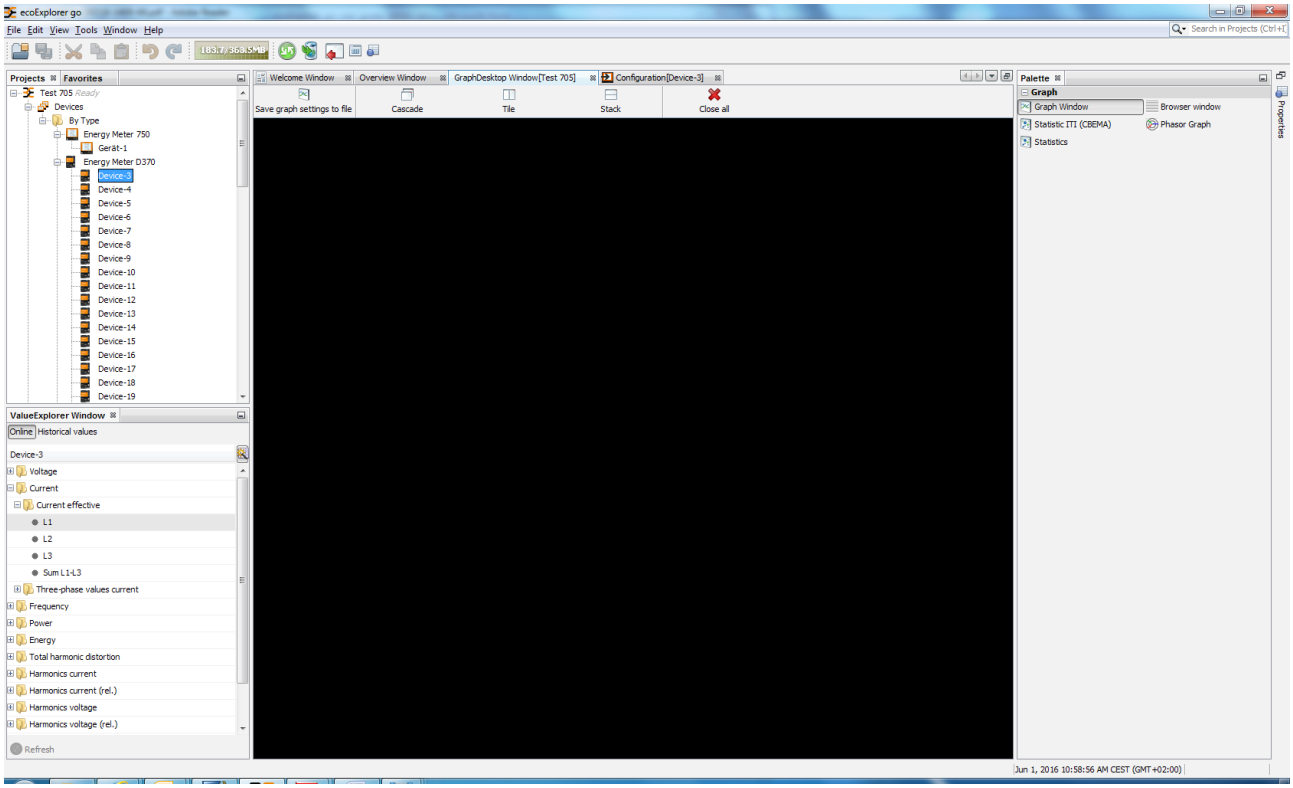

Fig.: Project window, value tree and graph window

- Using Open groups in the value tree window, select the desired measurement values (holding the <Ctrl> key down allows the selection of more than one measurement value).
- Using the mouse, drag the selected measurement values into the graph window.
- ecoExplorer go imports the measurement values directly from the device and displays these in a graph.
- The button Save graph setting to a file saves the current view which can be opened again under Graphs in the project window.
- To display the historical values (in the value tree window under “Historical values”), the respective device must first have been read out.

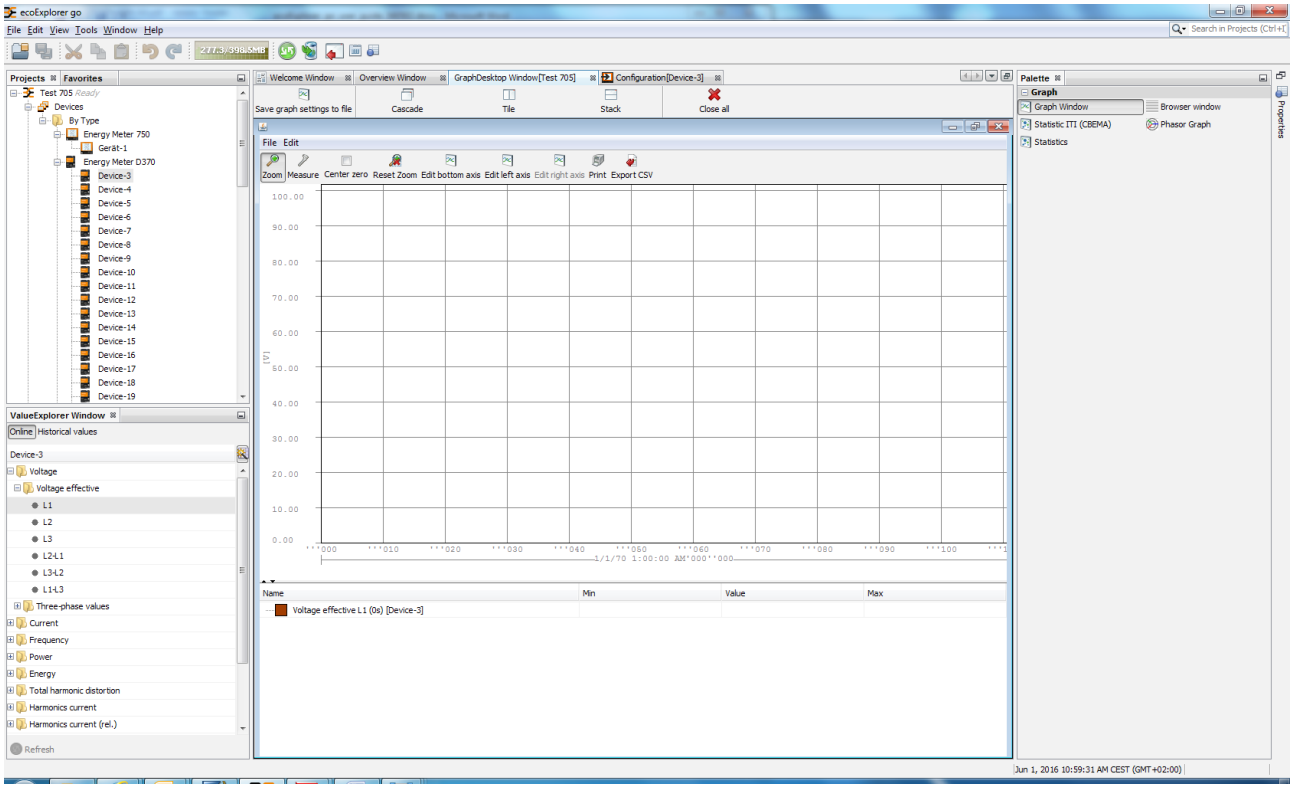

Fig.: Graph display

3.1.7 Adding topology

A new topology page, used to visualise devices and measurements, can be created by selecting and right clicking on Topology in the Projects window.

- Devices, online measurements, links, texts and images can be incorporated in a single topology page.
- To open the project window, select the menu item “Window/Projects”.
- To open the value tree, select the menu item “Window/Value tree”.
- Right click “Topology” in the project window to create a new topology page, then click on the Edit button to activate the edit mode.
- For example, select: a device and drag the device from the project window to the topology window. Pulling the object’s corner in or out makes it smaller or larger.
- Select a device, for example, in the project window. Select one or more online measurements in the value tree window and drag these to the topology window.

  NOTE: Holding the <Ctrl> key down allows the selection of more than one measurement value. An area is selected with the <Shift> key and a start and end mouse click.
- You can find other elements in the palette window. To display the elements within the topology, the elements should be dragged out of the palette window into the topology window with the mouse.
- Individual elements can be shifted, deleted and configured with the mouse:
  - To shift an element, click it with the mouse and drag it with the mousekey pressed down.
  - Delete the element by clicking it with the mousekey and then deleting it with the “Remove” key or use the entry “Remove value” or “Remove device” in the right mousekey flyout menu (clicking the corresponding element).
  - Value, text, link and active image elements can be individually adjusted via the menu item “Configuration“ of the flyout menu (right mousekey on the element) (e.g. colours, frame display, colour/image change or boundary value input).
  - Displayed values for a device element can be deleted via the menu item “Delete values from display”.
  - Work and power values of all displayed devices can be scaled via the menu item “Edit scaling”.
- The “Change background” button can be used to place a background image (e.g. a building plan in JPG format) into the window background.
- Use the Display button to switch into display mode.

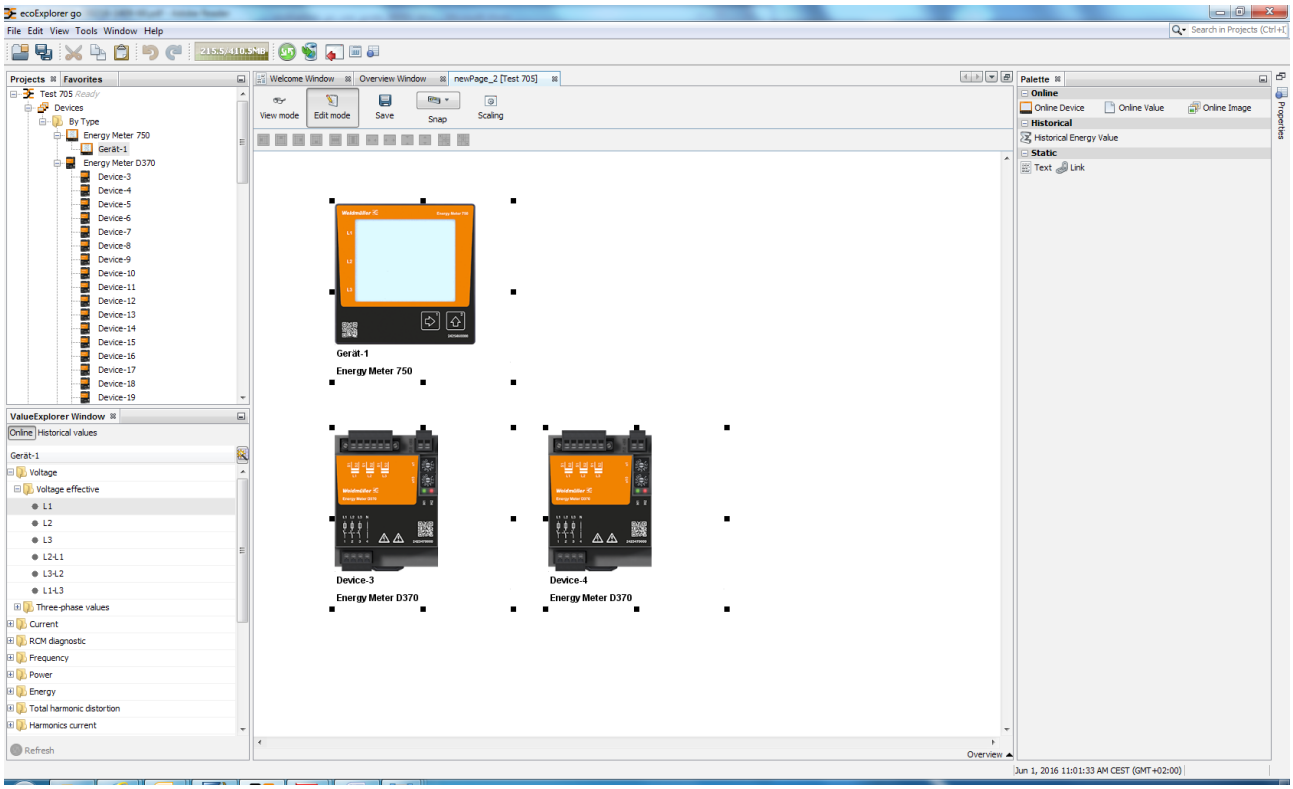

Fig.: Topology window

3.2 ecoExplorer go menu

3.2.1 File menu

3.2.1.1 New Project

- New projects are created under the menu item File/New project or via the “Welcome window”.
- Set the selection to “Database project” in the “Projects” pane and confirm the selection with “Next”.

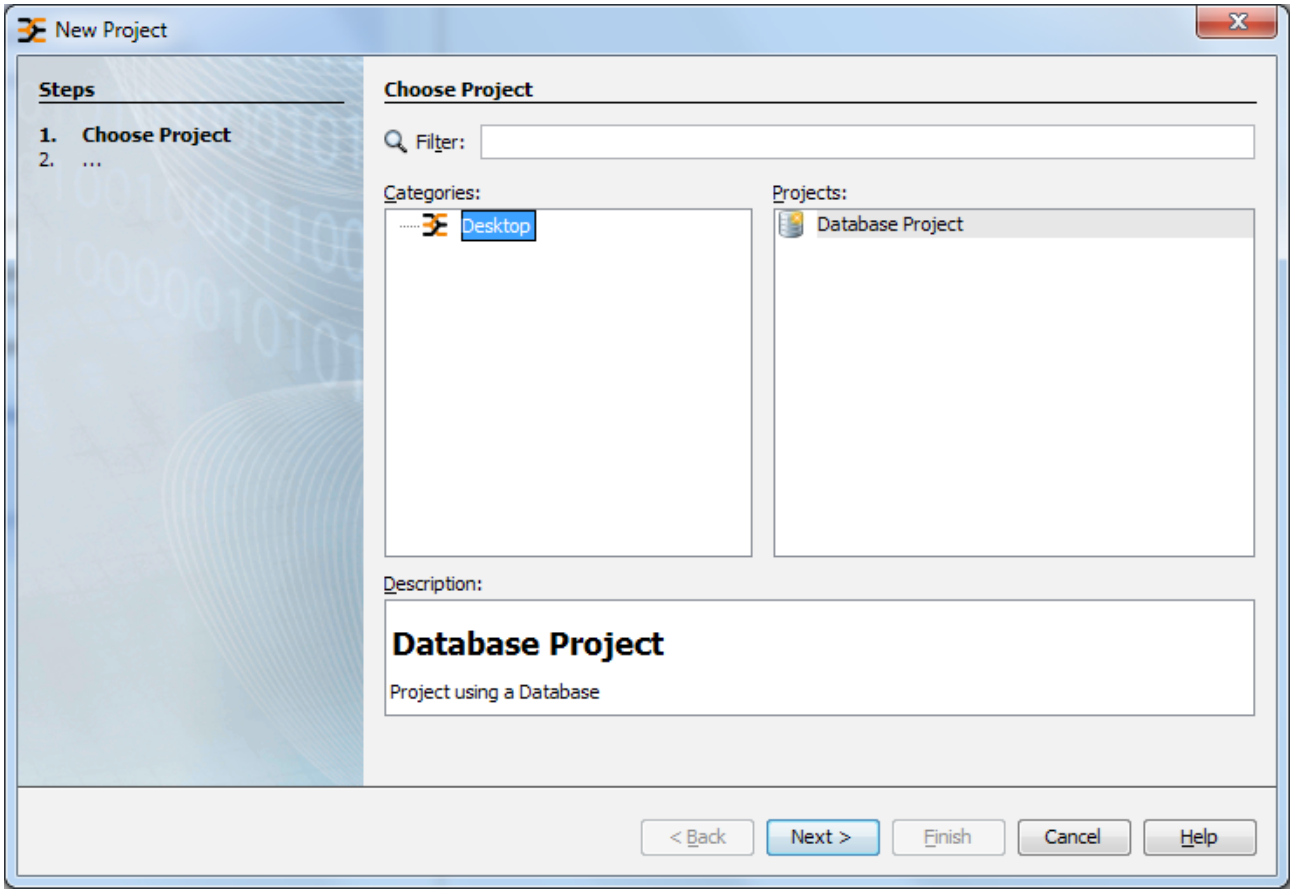

Fig.: New project

- Give the project a name and identify the location it is to be saved to. The “Browse” button can also be used to find and specify the location the project is to be saved to.
- For smaller projects with only a few devices and little data, you can use the File DB database included in the scope of delivery. When using the standard database (File DB), clicking on “Finish” saves the project.
- Enter the required information and confirm it with the “Finish” button.

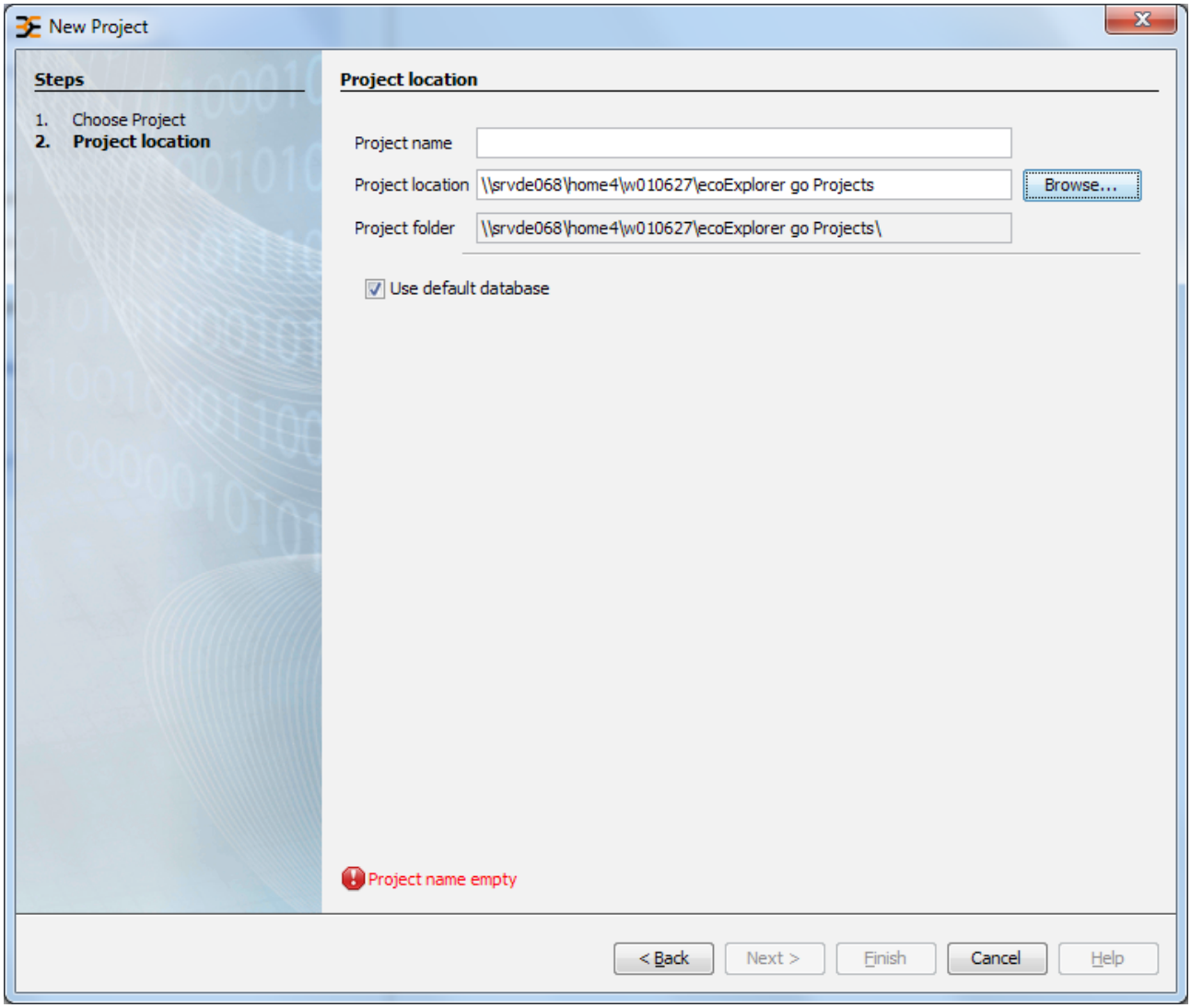

Fig.: Project memory location

3.2.1.2 New File

- If a project has been created, a device can be added for example using the menu item “File/New file”.
- Select the type of device, listed under the device category, and confirm the selection with “Next”.

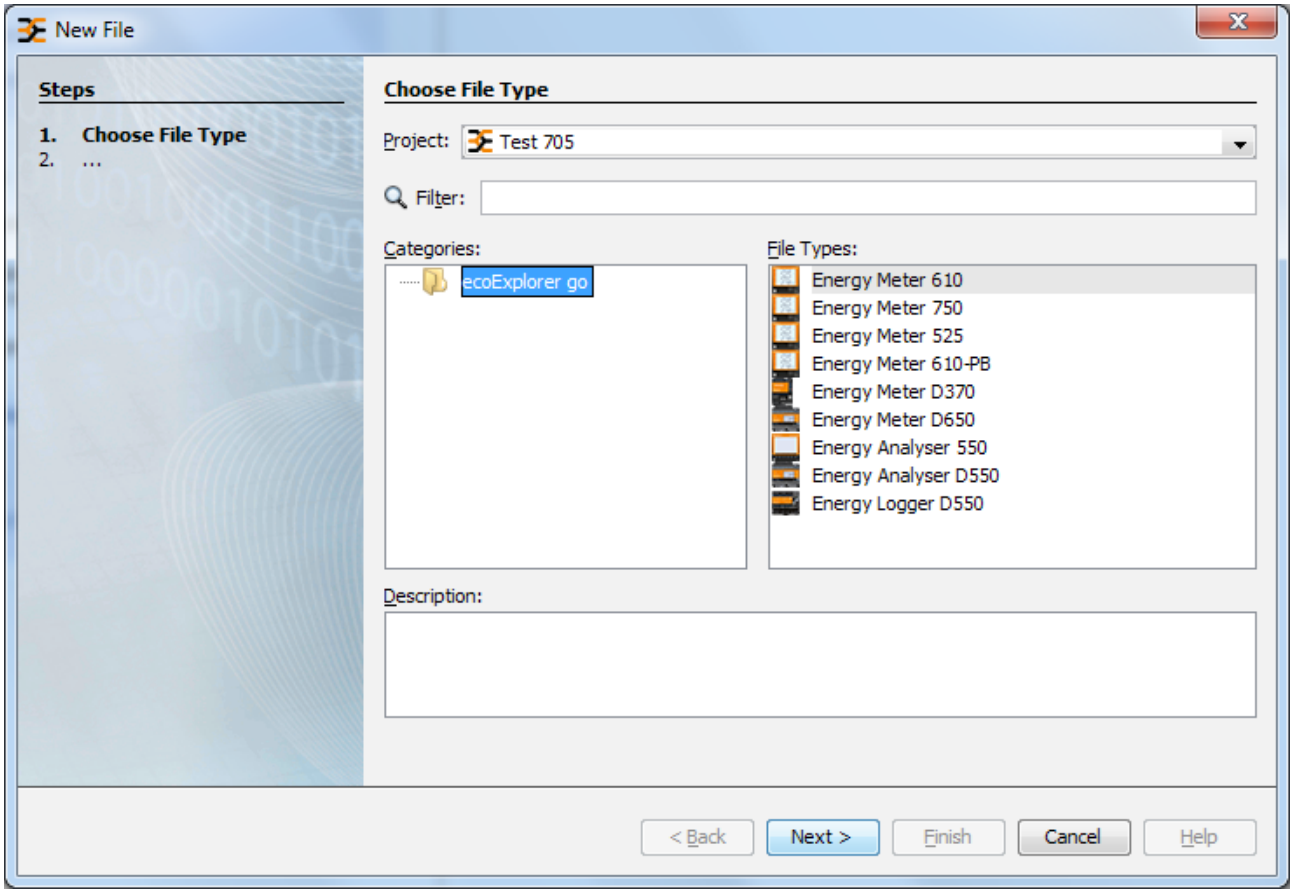

Fig.: Device selection

- Different types of connections will be offered depending on the type of device.
- Depending on the type of connection, once the appropriate connection has been selected and any address inputs have been entered, communication with the device can be tested using the “Connection test” button.
- The following connection types are available for selection, according to device type:
  - Without connection
  - Modbus RTU (RS485/RS232)
  - Ethernet TCP/IP
  - Ethernet gateway (e.g. for devices connected to the RS485)
  - Secured TCP/IP
  - USB

- Connection type “No connection”
  Devices can be installed without a connection type - e.g. for a pre-configuration of the ecoExplorer go software.
  With this connection type, measurements of voltages, currents etc. are not possible.

- Connection type “Modbus RTU”
  Devices, which should communicate via Modbus, can be activated via this connection. Interface, baud rate and device address must be known.
  NOTE: The baud rate should be the same in the bus and the device address should be unique.

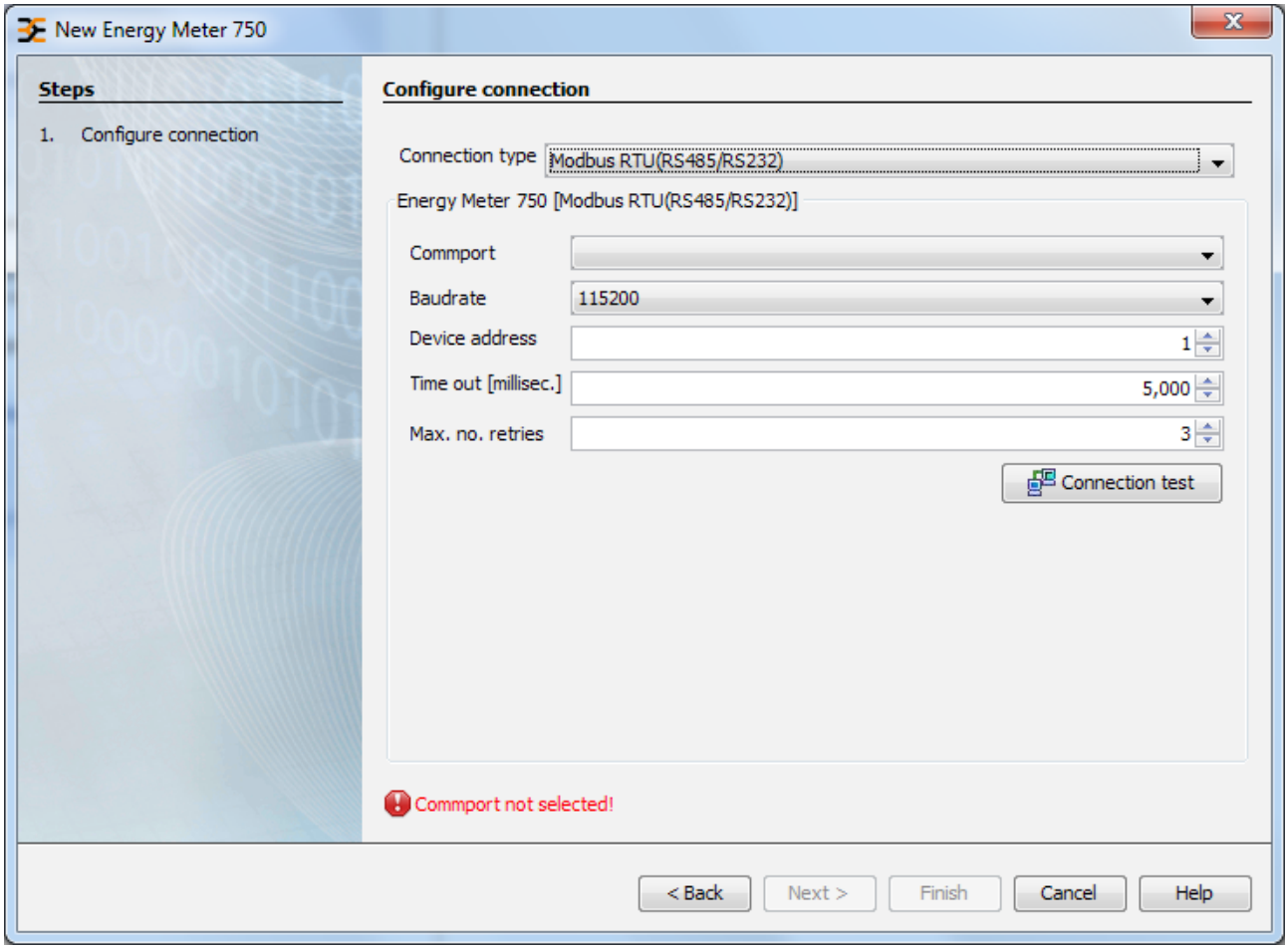

Fig.: Modbus connection configuration

- Connection type “Ethernet TCP/IP”
  Devices with an Ethernet interface and known Ethernet address can be integrated via the connection type “Ethernet” in ecoExplorer go.
  The TCP / IP device address must be known for this purpose.

- Connection type “Ethernet gateway (e.g. for devices on the RS485)”
  Devices that are connected via the RS485 as slave to a master device are activated via this connection type.
  In the process the TCP/IP address of the master and the device address of the slave device are to be transferred to the settings. For longer master/slave communication paths, the timeout setting is to be increased.

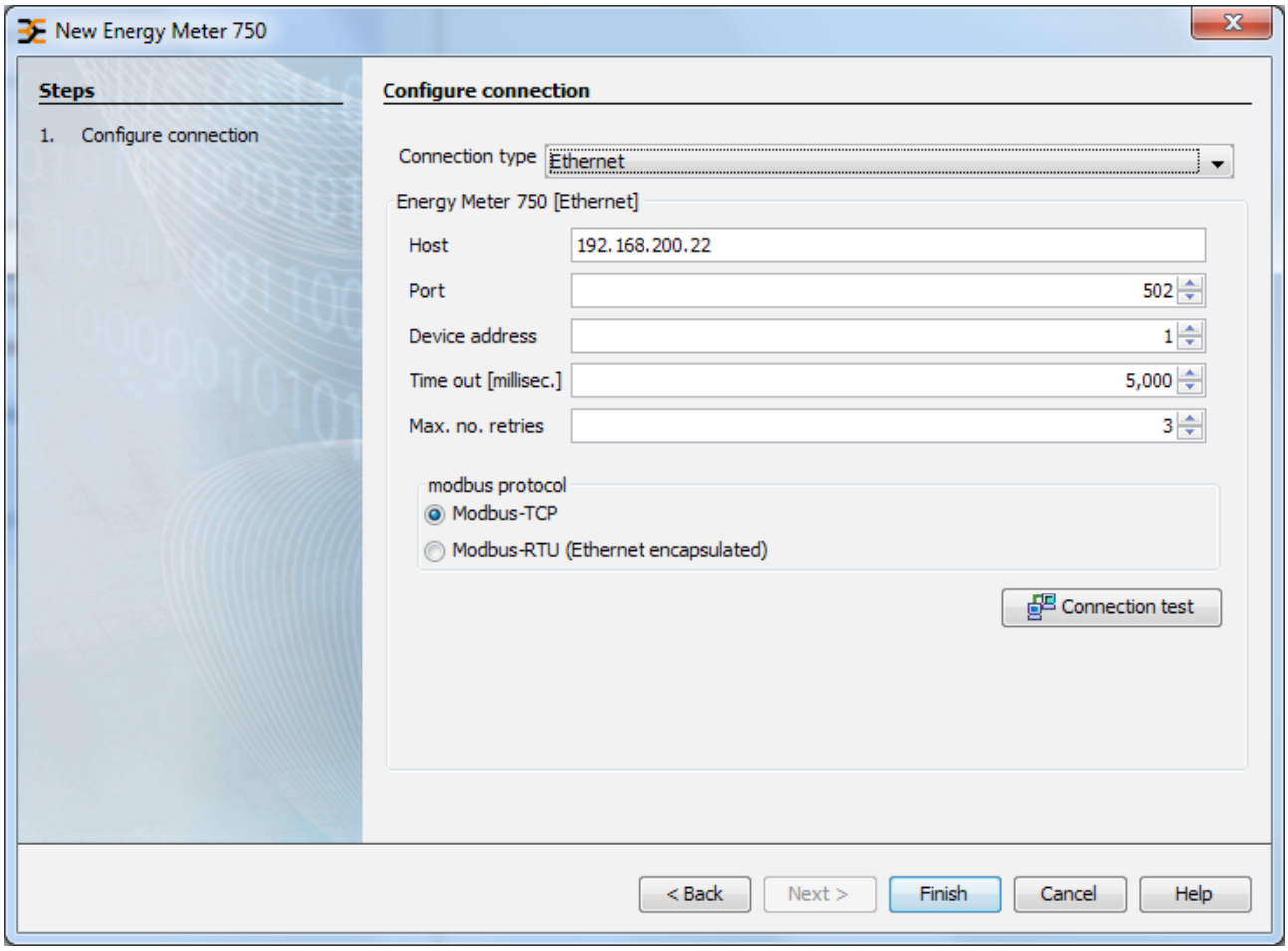

Fig.: Ethernet connection configuration

- Connection type “secured TCP/IP”
  Via a secured connection to the device, the homepage and configuration, for example, can be protected via a password.
  To this end, the user and password should be entered when encryption is activated.
  When a connection is successfully established, an additional “Passwords” button appears with which rights can be set.

  NOTE: If a password has been assigned on the device, then the password can be reset via a secured ecoExplorer go-device connection.

- Connection type “USB”
  Via this connection type, communication is established with devices, which have a USB interface.
  To this end the interface operated by the drivers (COM1, COM2...) must be known.

3.2.1.3 Opening project

- Use the menu item “File/Open project” to select and open an existing ecoExplorer go project (projects from Version 2.x).
- Select the desired project in the selection window and open it by clicking on the “Open project” button.

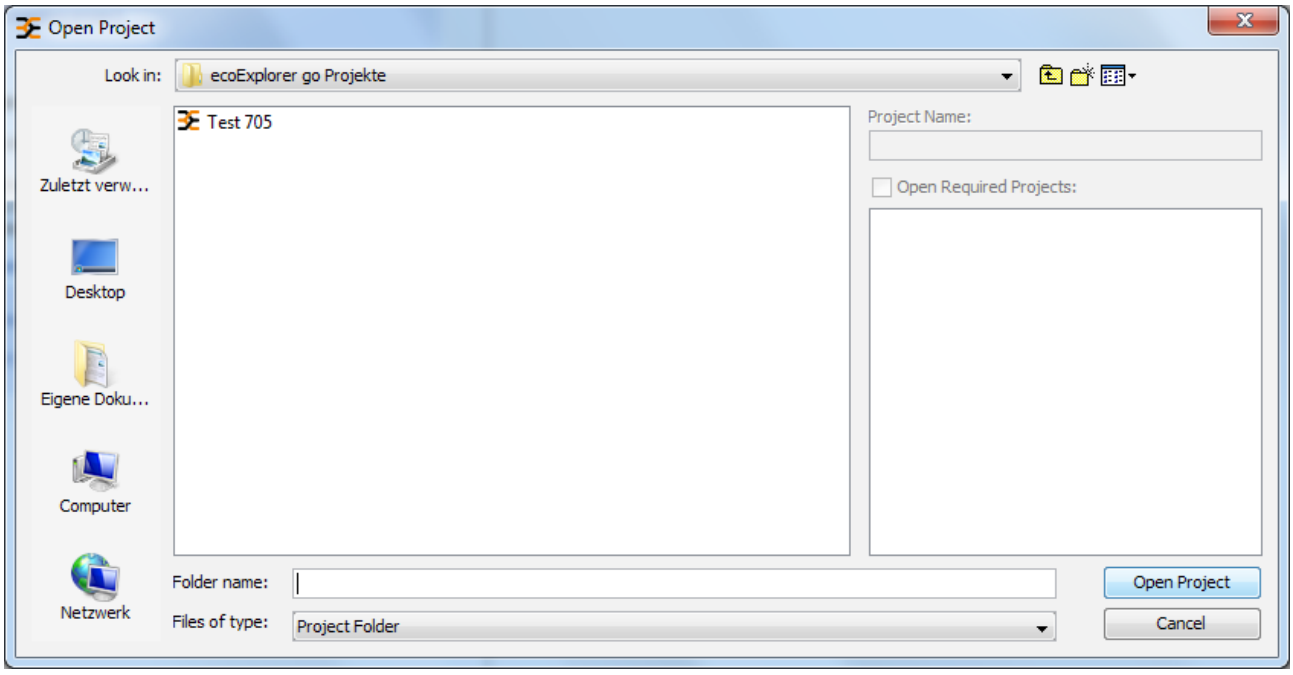

Fig.: “Open project” option window

3.2.1.4 Recent projects window

- The most recently used projects can be directly accessed via this menu item. In the process, the selected project is also listed in the Projects window.

3.2.1.5 Closing project

- The project selected in the projects window is closed via this menu selection. If several projects are selected in the projects window, these will all be closed.

  Several projects can be selected by:
  - the <Ctrl> followed by a mouse-click (individual selection) or
  - via the shift key followed by a mouse-click (marking a range, indicating start and finish)

3.2.1.6 Opening file

- Opens a selectable file in the integrierten text editor.

3.2.1.7 Project group

- A project group is a combination of several projects that can be presented together in ecoExplorer go.
- Project groups can be managed under the menu item “File/Project group”.
- To create a new group, select “New group...”
- Give the new project group a name.
- Select from among the available options with:
  - Free Group
    Includes any project.
  - Project and All Required Projects
    Contains the primary project and all projects associated with the latter.
    By selecting this option and using Browse a primary project can be selected.
    The group integrates the primary project and all of the projects that are related to it.
  - Folder of Projects
    Includes all projects found in a given directory.
    By selecting this option and using Browse, a directory can be selected.
    The group integrates all of the projects in this directory.
  - Confirm the selection with Create group.
- The name of the group can be edited via the menu “File/Project Group/Project Group Properties”.
- The current group can be deleted under the menu item “File/Project Group/Delete Group”.

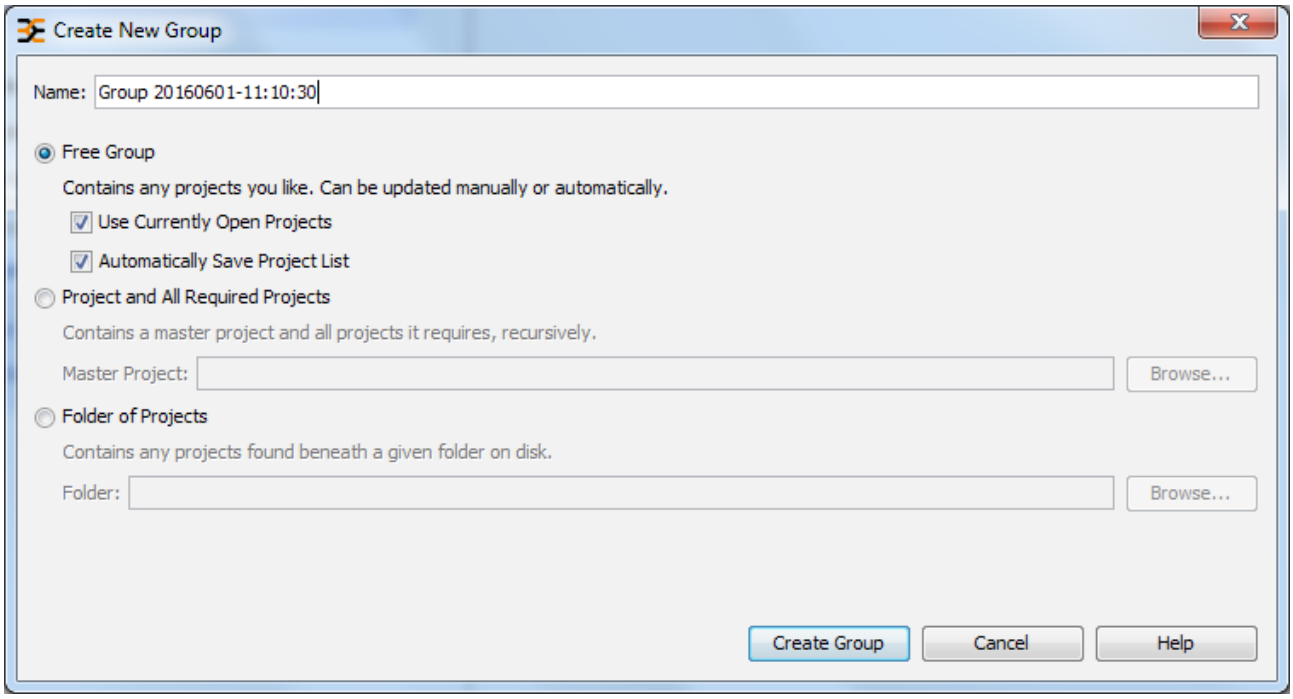

Fig.: Create New Group

3.2.1.8 Project group properties

- Specific project-related properties can be defined via the menu “File/Project Properties”:

- Project Description
  Enables the current project to be individually described.

  Password
  Enables assignment of an individual password or activates user management for the current project.
  - Under Category, select “Password”.
  - Then select the desired method to protect the project (project password or user management)
    If the project is to be protected via a project password, then a password must be assigned.

- Project startup
  Enables a device and connection test at the project start.

  Connection test:
  When a project is started, all connections of devices that are integrated in this project are tested and presented in a list.
  Under Categories, select “Project’s startup “ and check the appropriate option.

  Device test:
  Devices can be managed by other services, which do not run in the background (e.g. ecoExplorer go Service). In this case, the local application is no longer responsible for the device.
  A device test informs you about device management when the project starts (see screenshot).
  Under Categories, select “Project’s startup “ and check the appropriate option.

- Device synchronization
  Enables the maximum number of simultaneously readable devices. If the device number is set too high, this may result in system bottlenecks.
  Under the category “Device synchronization“, select the required input box and define the maximum number.

- Scheduling
  Certain events can be set and planned via this category.

  Schedules
  Reports, for example, can be prepared at regular intervals by creating schedules to manage them.

  Device read out
  To ensure that a device’s memory does not “overflow” and that the data in the database is always current, the device can be set up to be read out automatically.

  Online recording
  Measurement values read from ecoExplorer go can also be saved to the database (useful for devices not equipped with their own memory).

  Set time
  Activating this option is recommended to facilitate comparing certain events from different measurement locations.

Watchdog
This function enables other JASIC-compatible devices (with a separately installed extension) to monitor ecoExplorer go.
A schedule for the watchdog event and the device must be selected in this case.

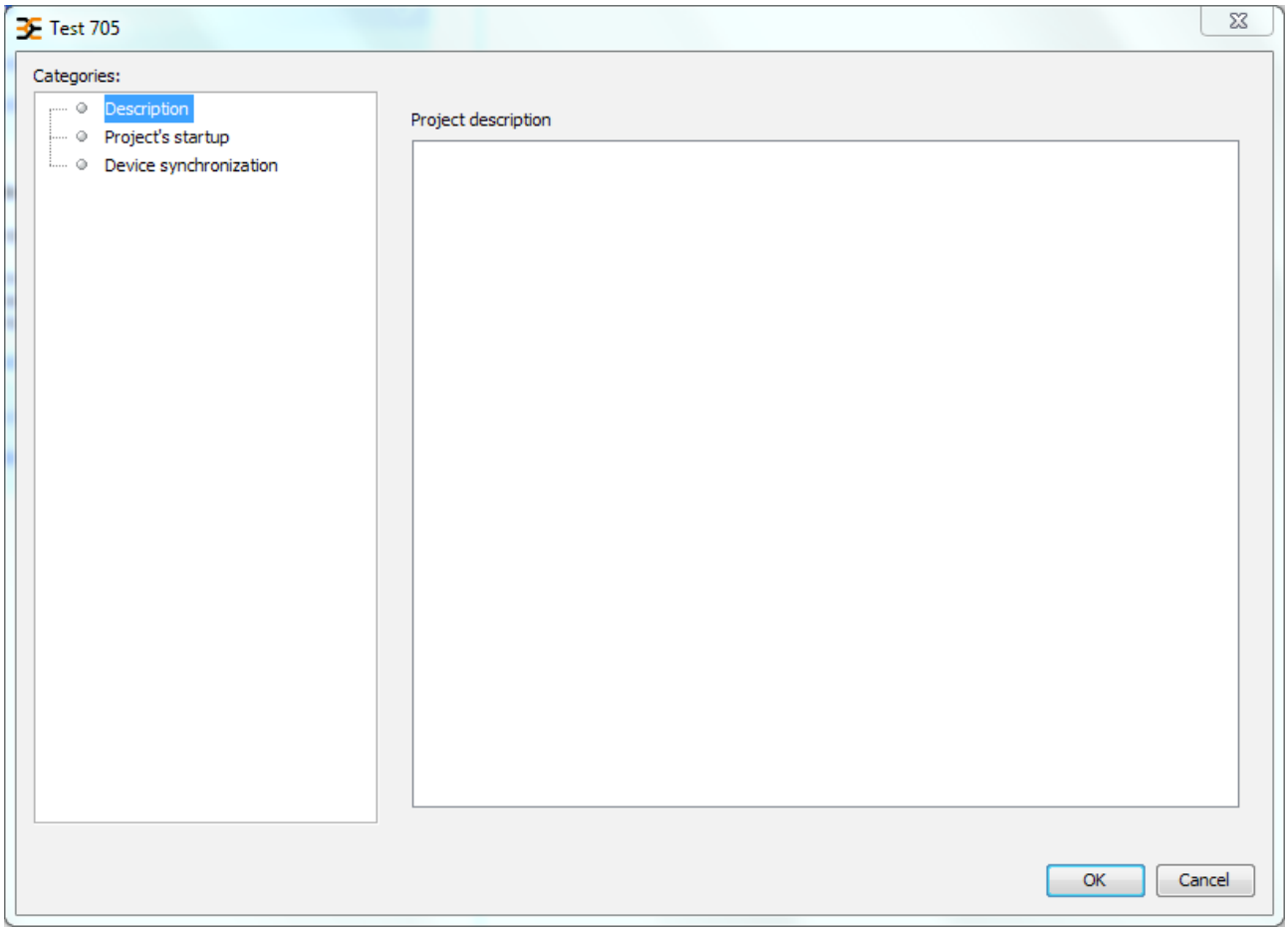

Fig.: Project properties / Description

3.2.1.9 Saving

- These functions enable the saving of JASIC files or topology views, for example.
- The “Save as” function also enables a file name to be entered (e.g. for JASIC files).

3.2.1.10 Setting up print page

- Enables a printer page to be configured in terms of paper, alignment and borders. More information can be found in your printer's documents.

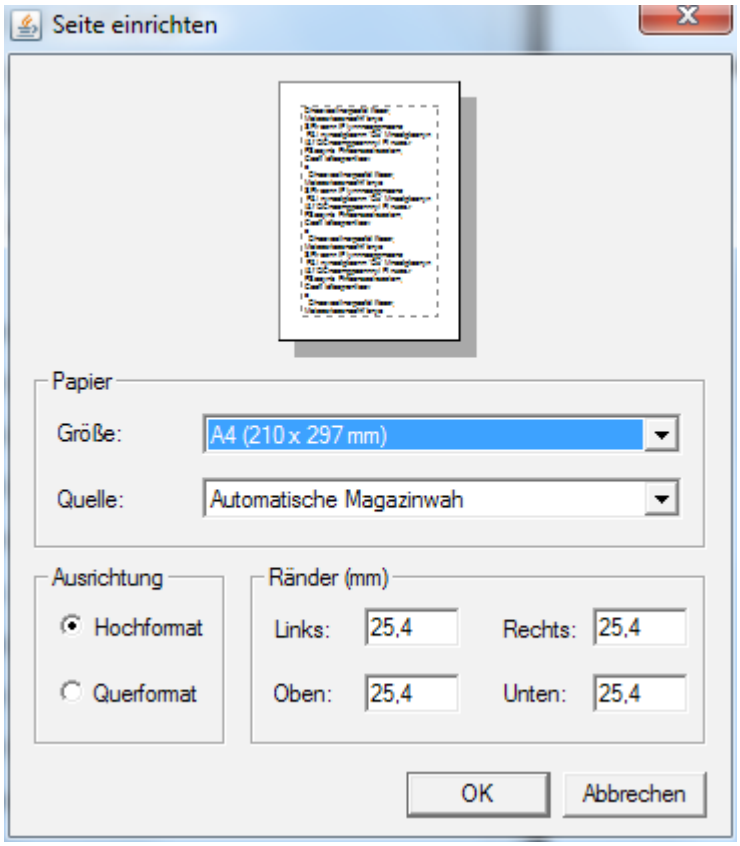

Fig.: Setting up pages for printer

3.2.1.11 Quitting

- ecoExplorer go is closed via this menu item.
  If there are unsaved JASIC files or topology views, a prompt will appear

3.2.2 Edit menu

3.2.2.1 Editing

- “Undo” menu
  Last action is reversed.
- “Repeat” menu
  Last action is repeated.
- “Cut” menu
  Move highlighted texts, objects, etc. to the clipboard
- “Copy” menu
  Copy highlighted texts, objects, etc. to the clipboard
- “Paste” menu
  Move highlighted texts, objects, etc. out of the clipboard
- “Delete” menu
  Delete selected texts, objects, etc.

3.2.3 View menu

3.2.3.1 View menu

- “Editors” menu
  Toggling between the graphic and editor views in the Jasic environment.
- “ecoExplorer go Log” menu
  Opens the ecoExplorer go log window.
- “Toolbars” menu
  For adjusting the toolbar.
- “Show editor-toolbars” menu
  Hides/shows the editor toolbar in the Jasic environment.
- “Show line numbers” menu”
  Shows the line numbers in the editor in the Jasic environment
- “Show unprintable characters” menu
  Shows the control characters (e.g. hard return) in the editor in the Jasic environment
- “Full screen” menu
  Full screen ecoExplorer go display

3.2.4 Extras menu

3.2.4.1 Updating devices

Project devices can be updated with new firmware by selecting “Update devices” in the “Extras” menu.

- A path and filename for the update file can be entered by selecting “...”.
- Then select the devices to be updated with firmware and define the update areas.

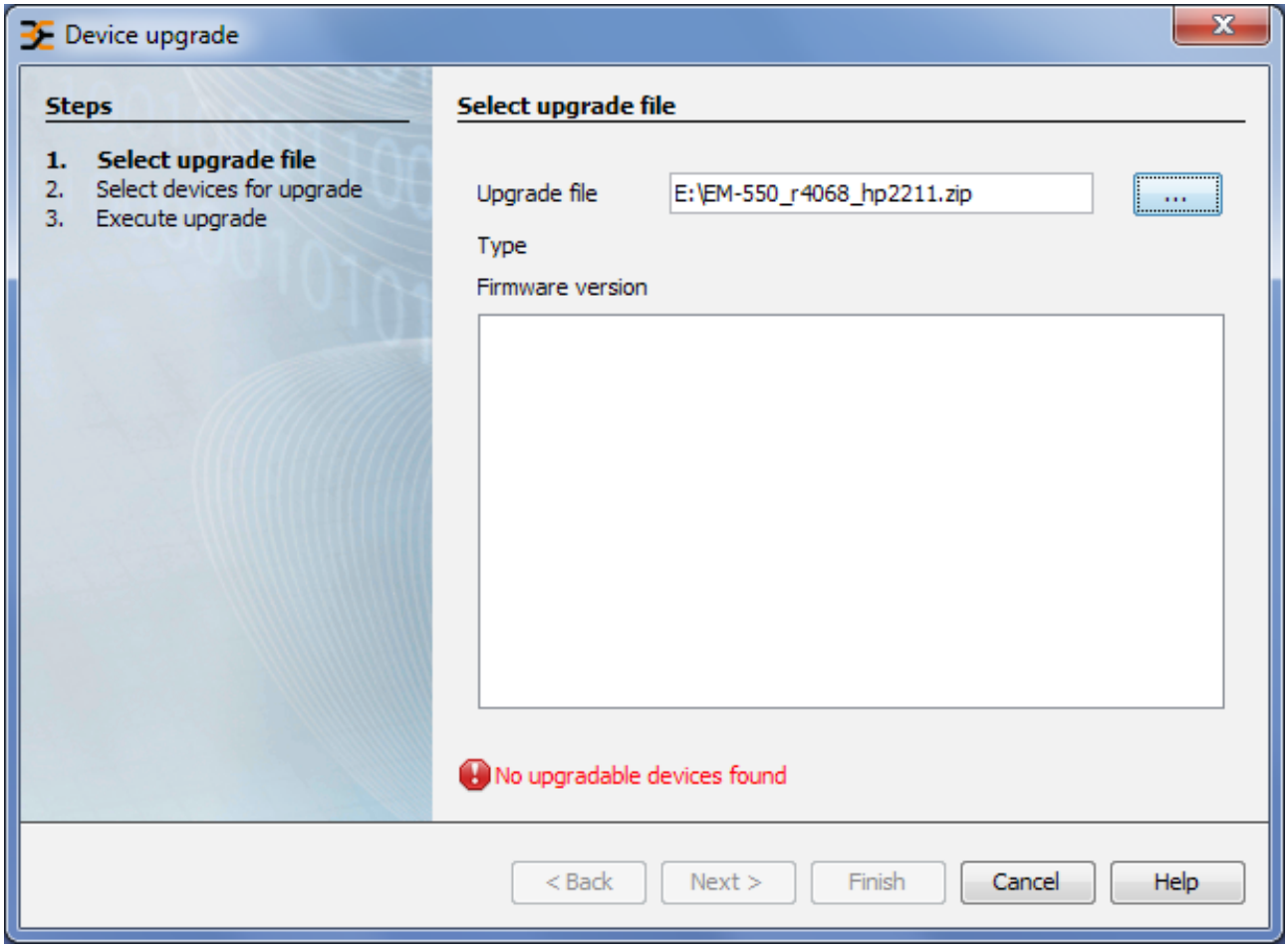

Fig.: Selecting update file

3.2.4.2 Exporting device list

Project devices with their addresses etc. can be exported to a text file by selecting “Export device list” in the “Extras” menu.

Using Import device list, this device file can be integrated into other projects. It can also be imported into other programs.

- To export the device list, select the menu item Extras/Export device list.
- Select the source project in the selection field.

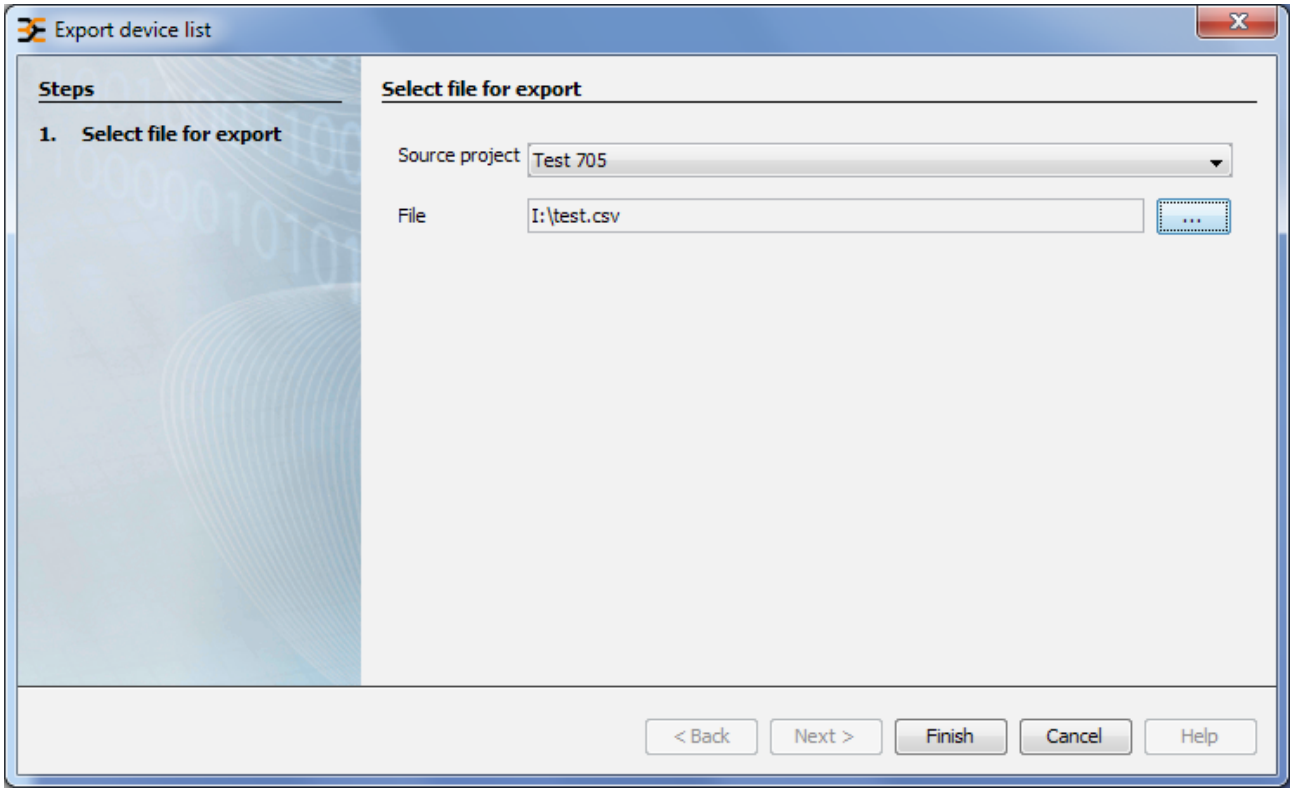

Fig.: „Export device list” menu

- The path and filename can be entered by selecting “...”.
- Give the file a unique name and select a file type.
- Save returns you to the previous window.
- Finish the action with Finish.

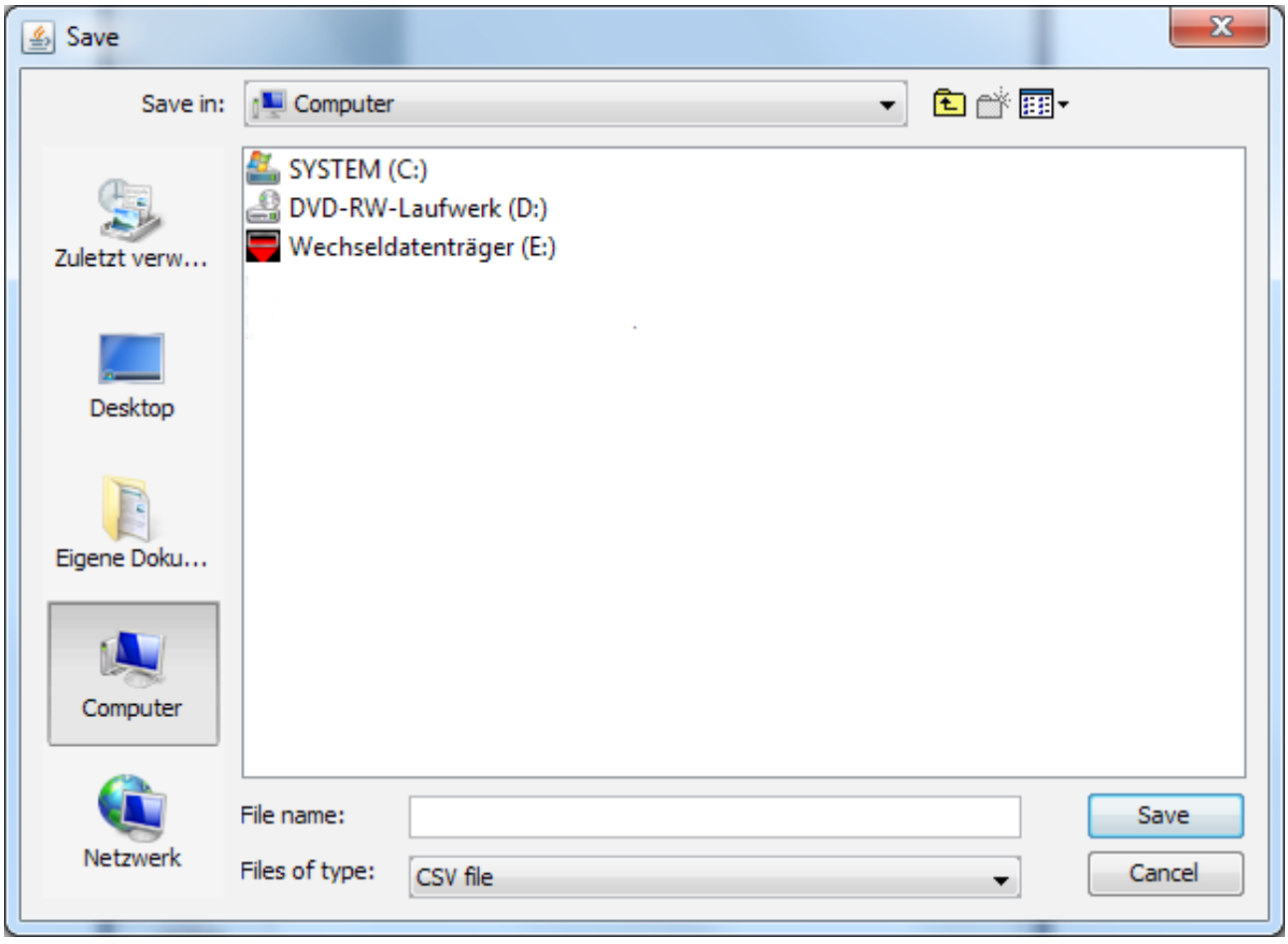

Fig.: „Path and file name” selection

3.2.4.3 Importing device list

A project device list can be added by selecting “Import device list” und er the “Extras” menu.

- To import the device list, select the menu item “Extras/Import device list”.

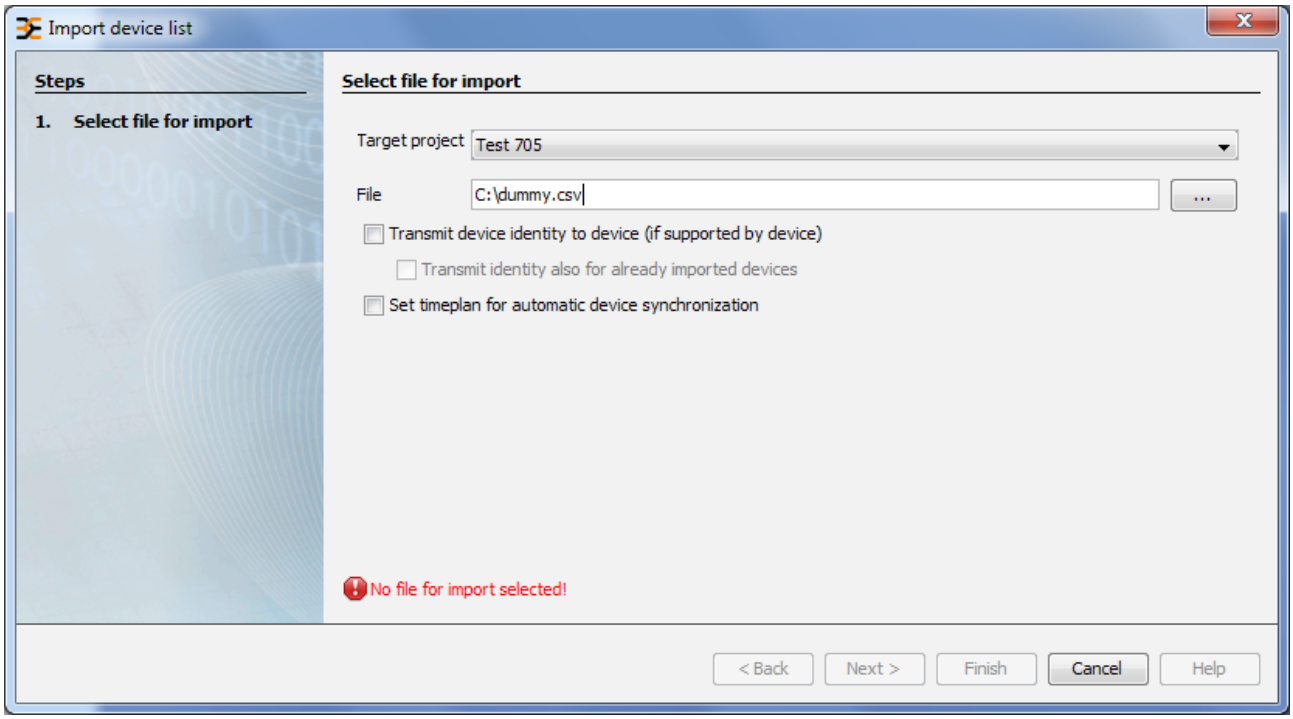

Fig.: Importing device list

- In the selection field, select the project in which the device is to be integrated.
- The path and the filename for the device list to be opened can be entered under “...”.
- Select an existing device list.

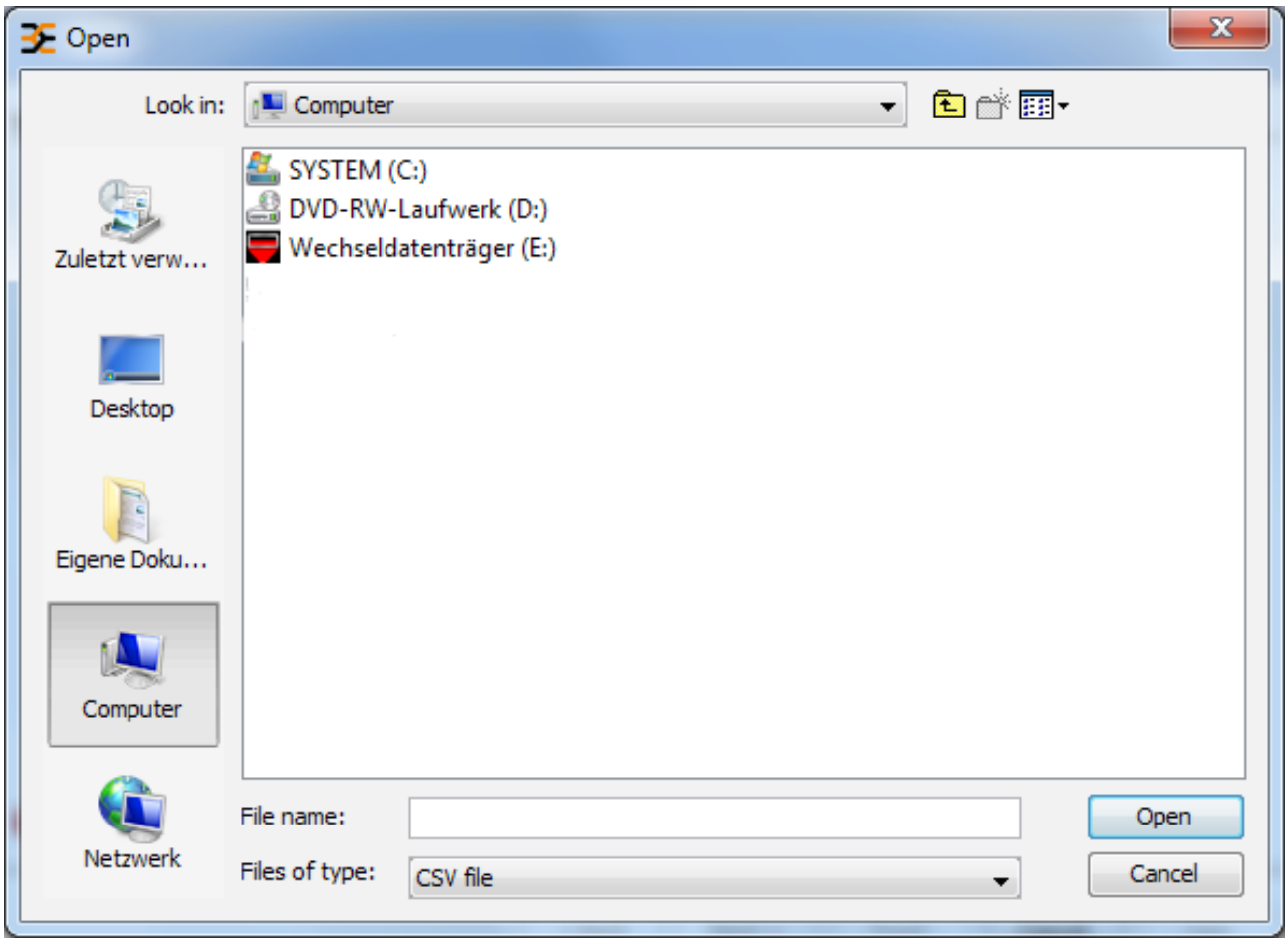

Fig.: Selecting device list

- Clicking Open returns you to the previous window.
- Selecting Finish starts the importing of the device list.

A message window shows how much of the list has been imported and notifies you about possible errors, warnings and information you should be aware of. You can find more information under “Show me”.

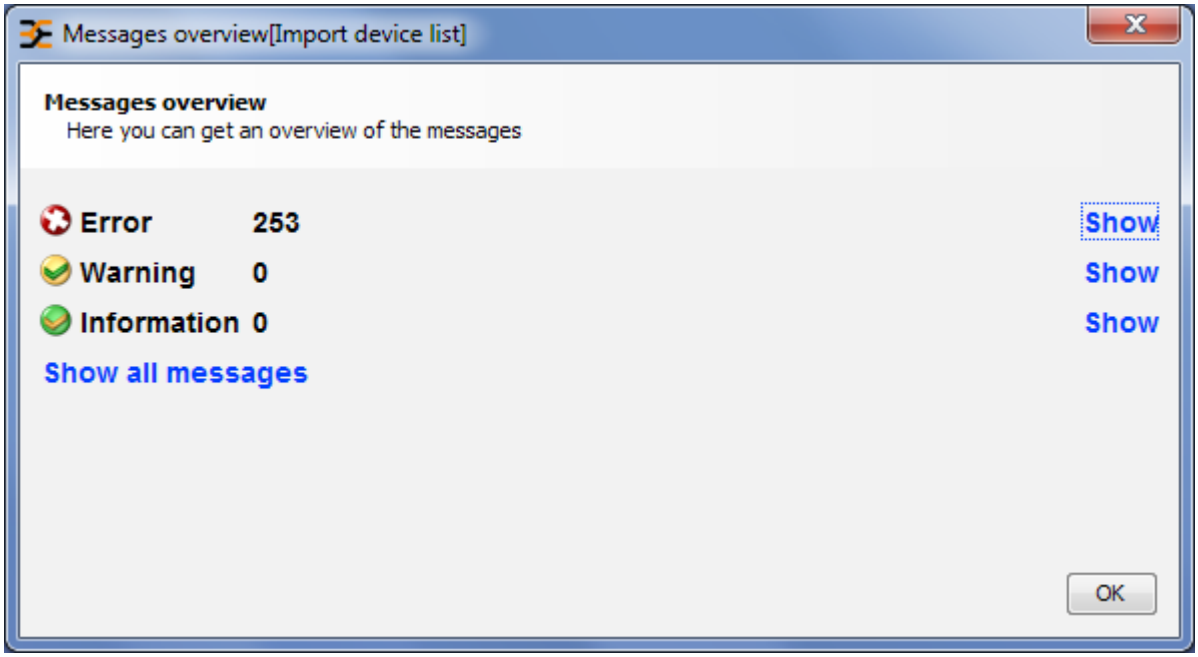

Fig.: List of import messages

3.2.4.4 Options

- General
  Enables configuration of proxy settings for special internet access.

- Miscellaneous
  Enables settings of the internal assignment of file name extensions, import/export of ecoExplorer go-settings and general display settings.

- File assignments
  NOTE: The internal assignment of extensions should only be modified if the person responsible has sufficient expertise!

- Export/Import function
  With these buttons ecoExplorer go settings (e.g. toolbars, graph colours, templates) can be exported/imported.
  For this purpose, the data is saved in a ZIP file that can be imported to other ecoExplorer go versions.
  NOTE: Exported settings may contain saved passwords!

- Appearance
  Enables various settings determining the appearance of windows.

- Graphs
  Graph properties settings for memory depth, background and graph colour.
  - Background colours for graphs can be selected in the colour palette using the “Change colour” button.
  - The colour can be customised by selecting a graph in the node structure and then selecting the corresponding colour field with “Click to change colour” colour panel.
    The changes will not appear until a new graph is added.

- Topology
  Basic value scale settings with an optional view of the device screen in the topology window.

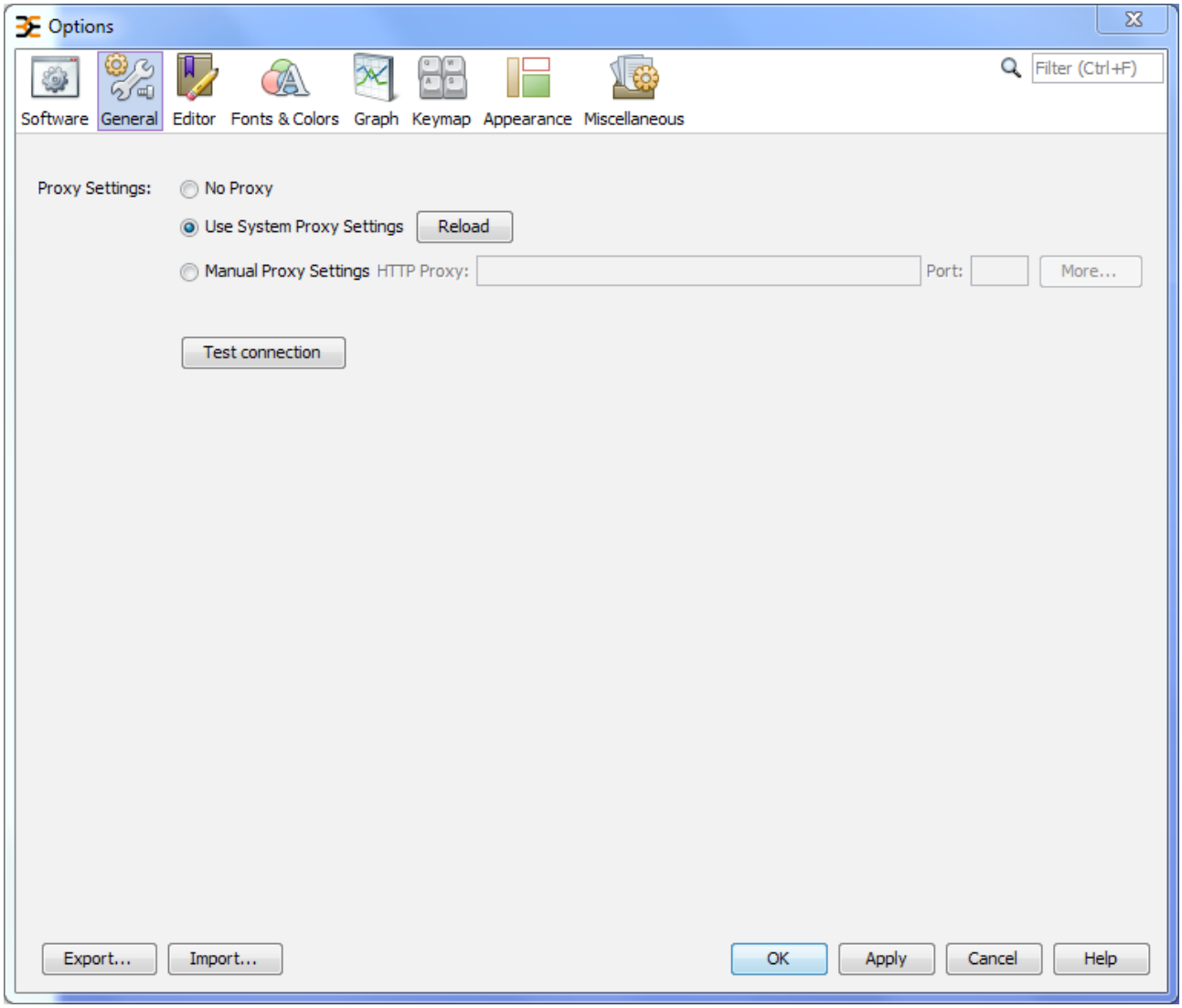

Fig.: Internet access settings

3.2.5 Window menu

3.2.5.1 Window

- “Overview” menu
  Opens the navigation window and provides specific information relevant to the selected device group or device.
  Devices can be added, deleted, synchronised, configured and their links tested in the navigation window.

- “Value tree window”
  Opens the value tree window with the value graph options relevant to the respective devices.
  Via the buttons “Online values” or “Historical values” it is possible to toggle between the current measurement values and those saved by the device.
  NOTE: The device must be previously read out for historical data!

- “Welcome window” menu
  Opens a support window that provides an introduction to working with ecoExplorer go.

- “Projects” menu
  Opens the project window in which projects with all categories are shown in a tree structure.

- “Files” menu
  Opens a window with the project-specific file structure.

- “Favourites” menu
  Opens a window with the saved favourites.

- “Palette” menu
  Opens a window with the Jasic component palette.

- “Properties” window
  Displays additional information according to selection in the projects window (device, Jasic template or topology page).
  Example: Opens an information window in the project window relevant to the selected device.

- “Task” menu
  Opens the ecoExplorer go log window.

- “Configure window” menu
  The current and opened windows are configured via this menu item.

- “Maximise window” and “Minimise window”:
  Maximises or minimises the view of the current window.

- “Float window” and “Dock window”
  The “Float” / “Dock” commands pin or unpin the current window to or from the main ecoExplorer go window. Floated windows can be moved on the Windows desktop as desired.

- “Float Group” and “Dock Group”
  The current window group is undocked from ecoExplorer go or redocked (see “Float window” and “Dock window”).

  Create tabulator for new document group (“New Document Tab Group”) and delete it (“Collapse Document Tab Group”):
  Creation of document groups (window group), each of which is displayed in a lower level area.
  If several document windows (e.g. navigation windows with several graphs and topology windows) are displayed, then a generic tab group (window group) can be created via the “New Document Tab Group” function. Via the “Collapse Document Tab Group” function, the window group is recombined.

- “Close Window” menu
  Closes all of the document windows except for the current window.

- “Close all documents” menu
  Closes all of the document windows such as the navigation window and the graphic and topology windows.

- “Close other Documents” menu
  Closes all of the document windows except for the current window.

- “Documents” menu
  Opens the document window manager used to administer the document windows.

- “Reset Windows” menu
  Resets the window configuration to an original position.

- “Generate GSD file for Energy Meter 610-PB” menu
  Generates a GSD file for the Energy Meter 610-PB device for connection to the Profibus.

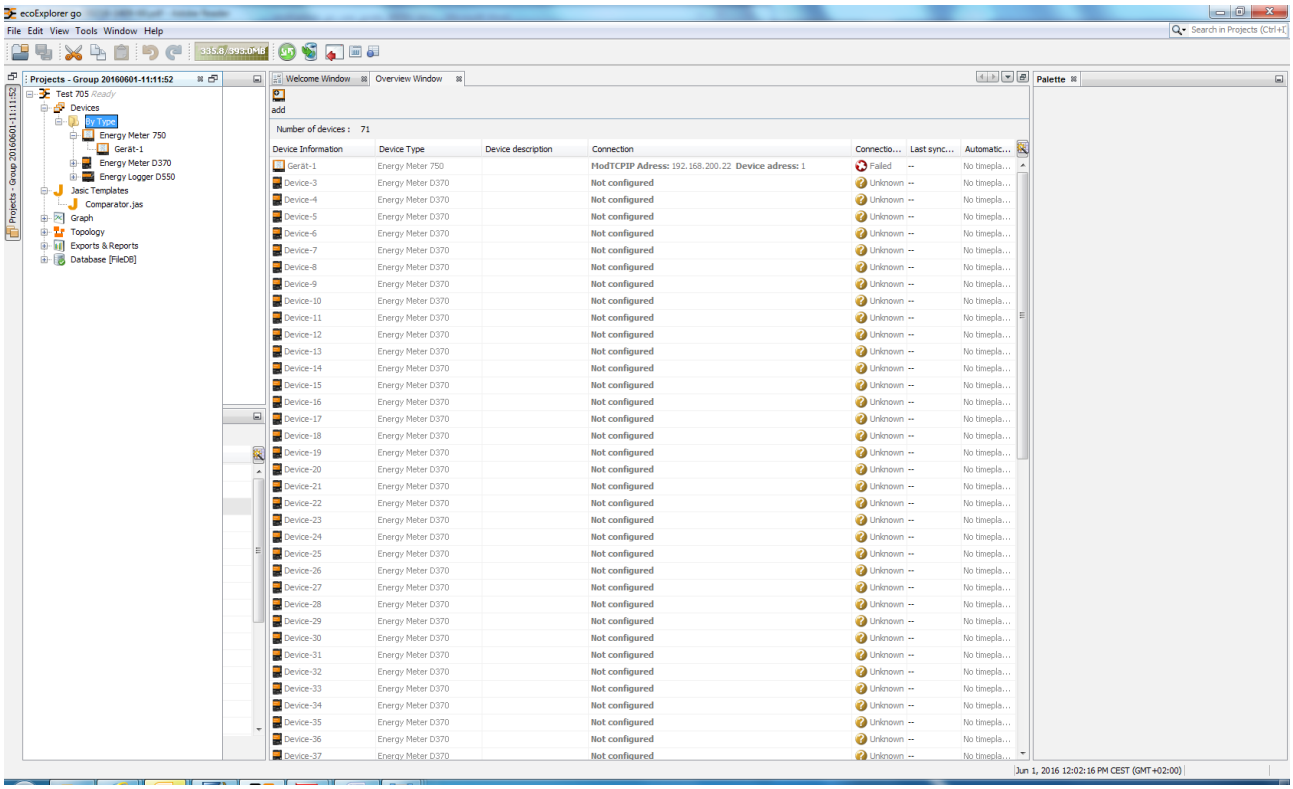

Fig.: Navigation window

3.3 ecoExplorer go windows

3.3.1 Window management

The current window in the ecoExplorer go user interface can be unpinned using the menu item Window/Unpin window or by dragging the window to the Windows desktop (unpinning). Unpinned windows can be moved on the Windows desktop as desired.

If active, unpinned windows can be reintegrated in the ecoExplorer go user interface using the menu item Window/Pin window.

3.3.2 Welcome window

The Welcome window can be opened under the menu item Window/Welcome and provides support to initial steps when working with ecoExplorer go.

Activiation

Each installation of ecoExplorer go software requires activation. To do this, the licence manager can be created via a request file and an online activation performed with this.

- Show the license manager

Creating a project

To be able to work with ecoExplorer go, at least one project must be open.

- Create new project
- Open existing project
- Import of older versions

Adding devices

One or more devices can be added once a project has been opened.

- Create new device
- Import a device list from a CSV file

If the Welcome window does not appear when starting, it can be opened using the menu item Window/Welcome.

3.3.3 Projects window

Display of the open projects incl. the corresponding tree structure.

- Devices
  List of all devices used in the project. Further devices can be added to the project (Creating new device) via the menu item “File/New file”.
  Double-clicking on a subnode opens the document navigation window with additional information.

- Jasic templates
  List of all Jasic programs integrated in the project. New Jasic files can be added to the project by right-clicking.
  Jasic templates can be edited by double-clicking on the Jasic file nodes.

- Graphs
  Selecting graphic document windows opens them. Using the values tree window, the measurement values for the active device can be displayed in this window (Adding graphs).
  Saved views are visible as subnodes in the graphic nodes.

- Topology
  The graphic representation of devices and measurement values in a project must be created using the node topology.
  Saved topology pages appear as subnodes (Topology view).

- Reports
  Quality control and cost reports are prepared via this node.
  Saved reports are visible as subnodes and can be managed via Schedules.

- Database
  Configuration, administration and optimization of the connected database.

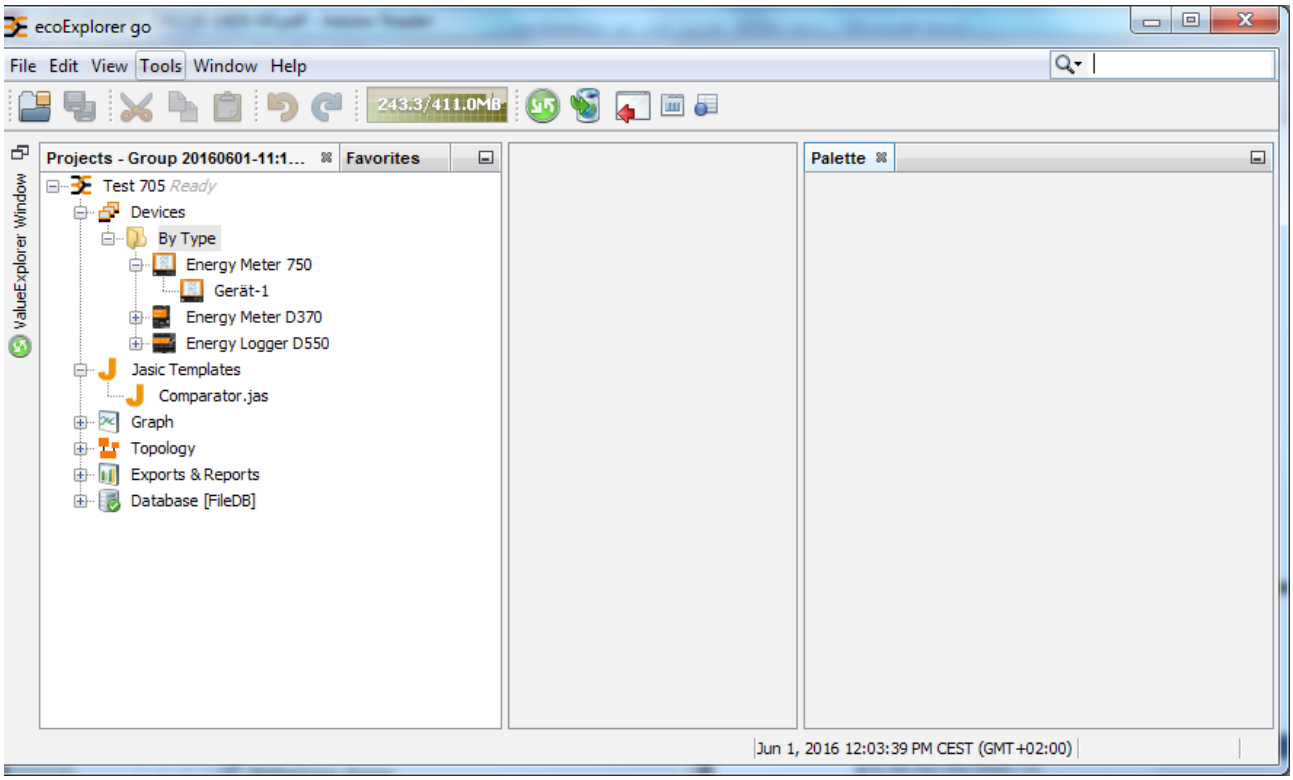

Fig.: Projects window

3.3.4 Value tree window

Display in a tree structure of possible measurement values for the current device. By opening a branch, measurement values can be highlighted using the mouse and dragged, for example, to a graph or topology window for visualisation (Adding graphs, Topology view).

- “Online values”
  Presentation of all current measurement values in a tree structure.

- “Historical values”
  Presentation of all measurement values saved in the device in a tree structure (records).

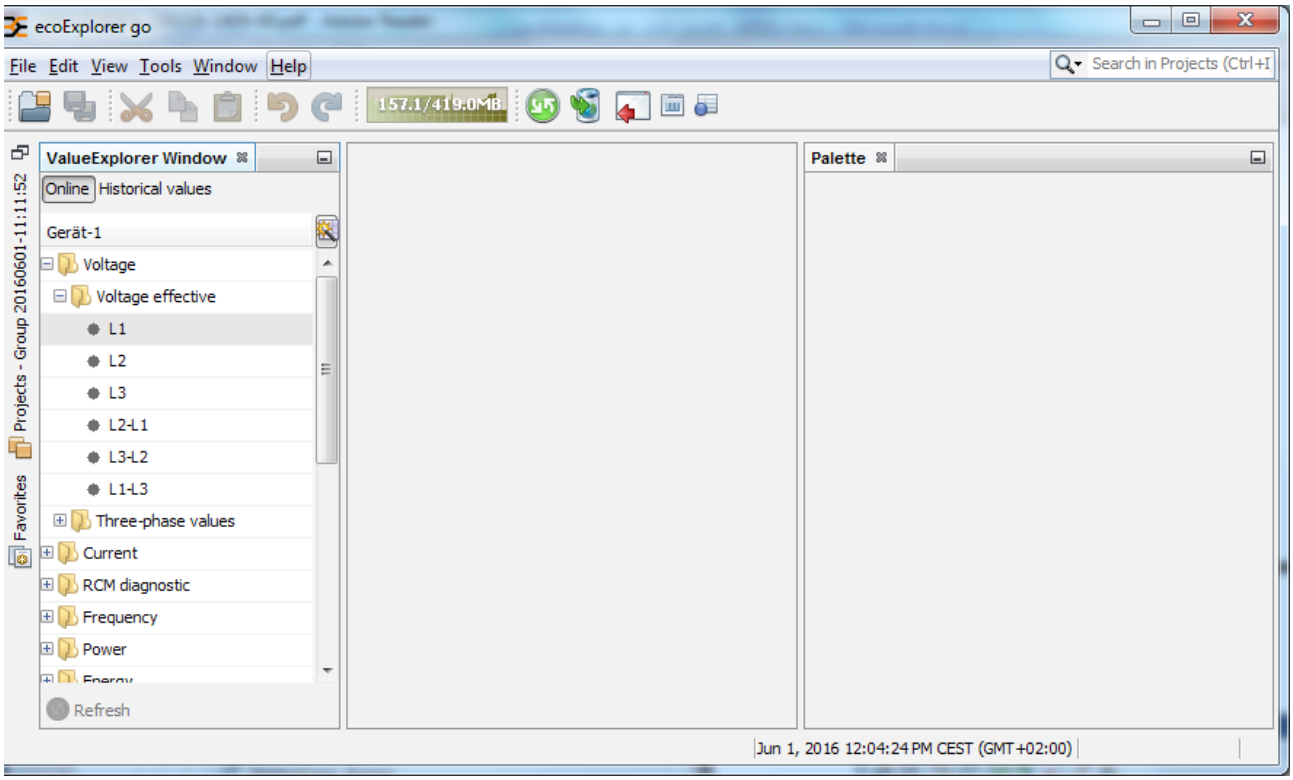

Fig.: Value tree window

3.3.5 Navigation window

View of the most important device actions/information, depending on the types of devices/device groups selected in the projects window (First steps).

- Adding a new device
- Reading out memory
- Configuring device
- Configuring connection
- Connection test
- Resetting (resetting device values)
- Printing report

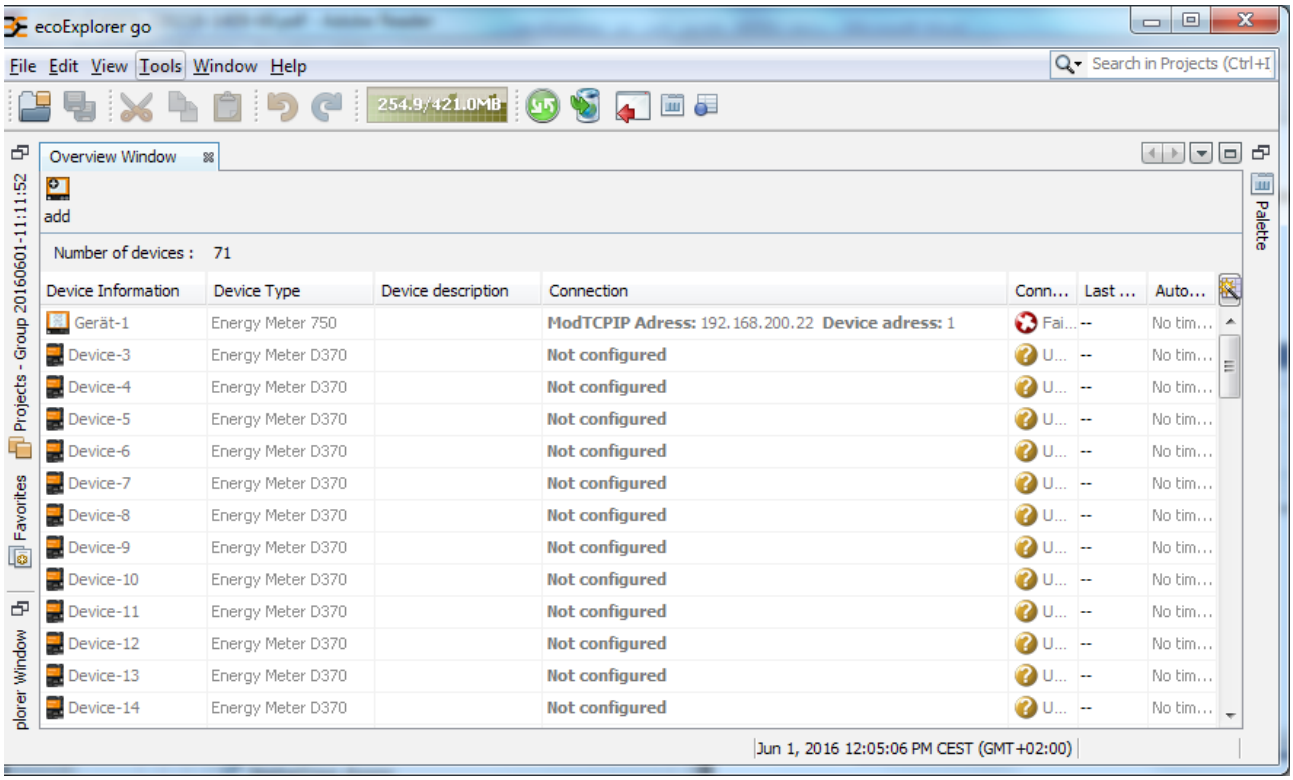

Fig.: Device group (device type) navigation window

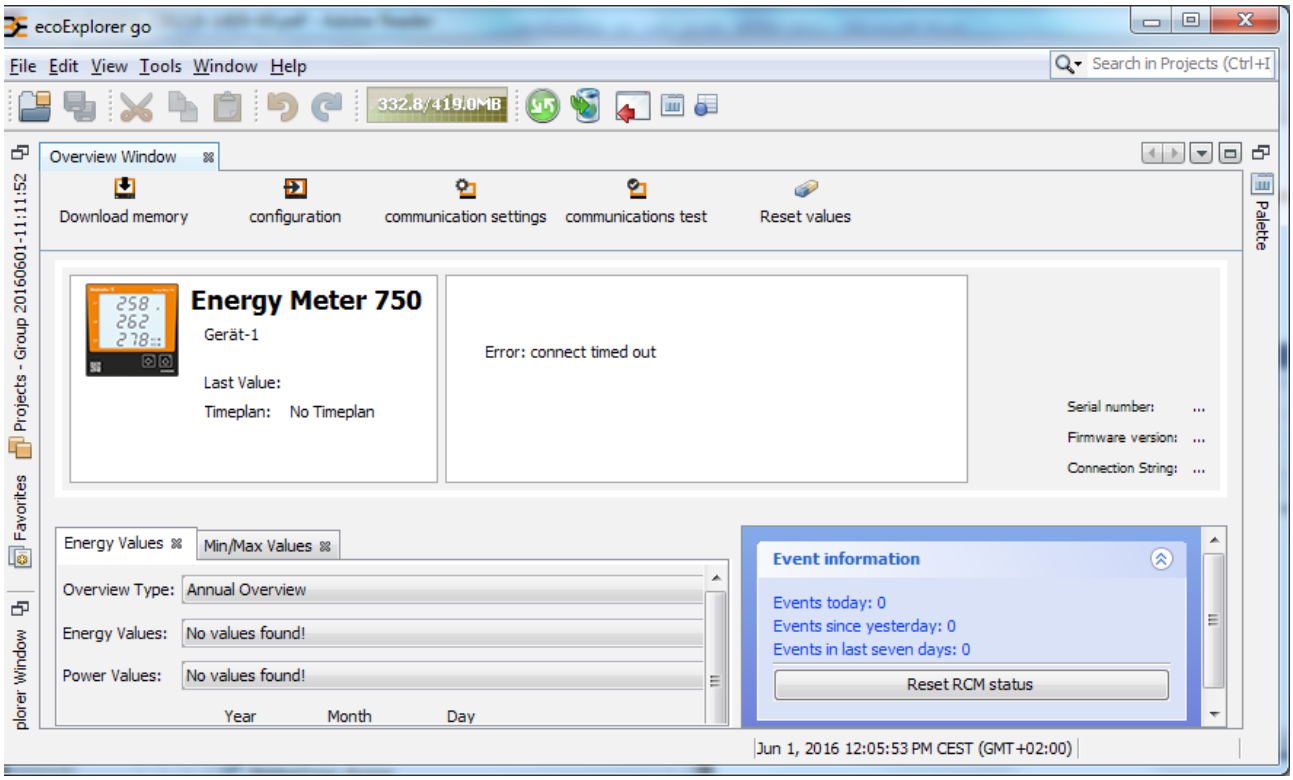

Fig.: Device navigation window

3.3.6 Files window

The file window shows the project-specific file structure in a tree structure. A file can, for example, be opened, renamed or deleted by right-clicking it.

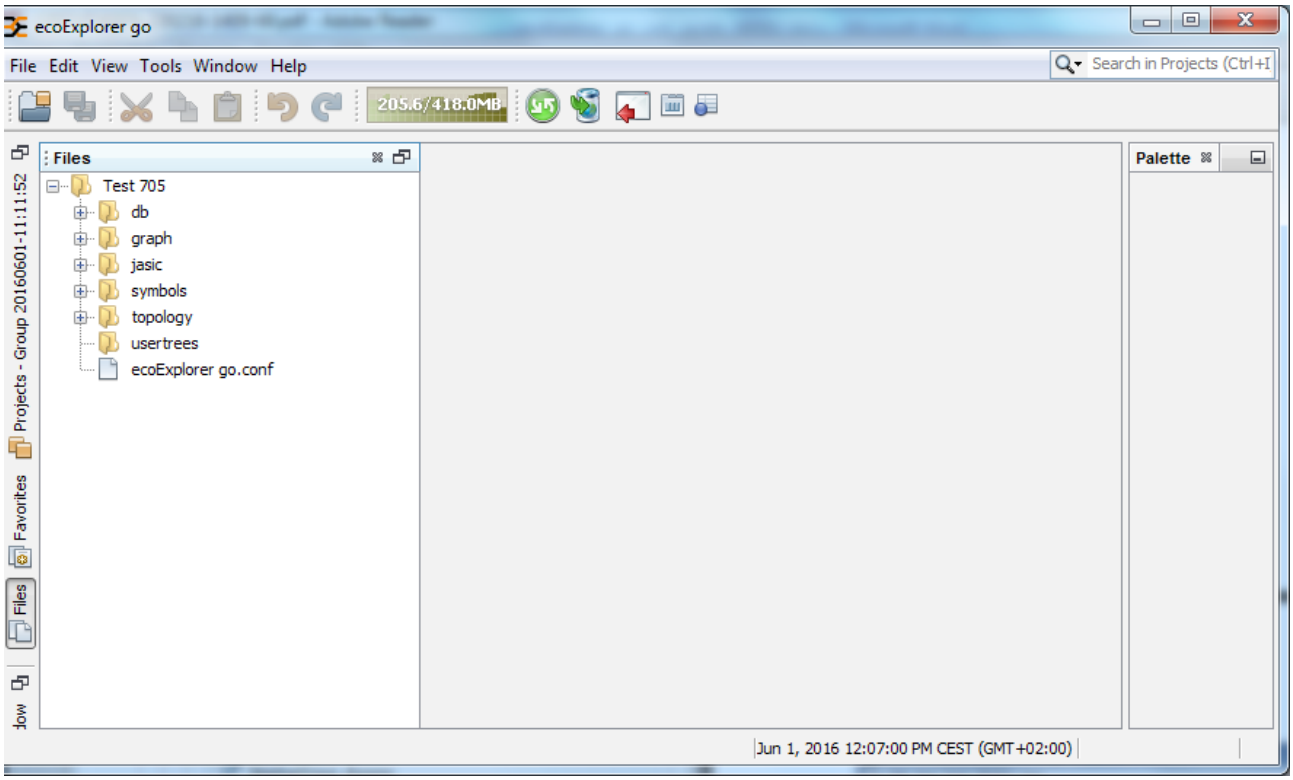

Fig.: Files window

3.3.7 Favourites window

Favourites are links to folders, saved graphs and to Jasic and topology pages. Favourites are selected and managed (right click) in the Favourites window (Add to favourites)

- Saving file-folder as favourite
  A file-folder is saved as a favourite by clicking in the favourites window with the right mousekey. A folder is selected via the pop-up menu “Add to favourites”.

- Saving graphs, Jasic or topology pages as favourites
  In order to define saved graphs, Jasic and topology pages as favourites, the page must be selected in the projects window and then saved as a favourite in the “Tools” menu under “Add to favourites”.

  NOTE: The menu item “Add to favourites” does not appear until the corresponding page has been selected in the projects window.

3.3.8 Palettes window

Providing for additional functions (e.g. within the graphic view or in the Jasic programming).

The palette functions can be used by selecting a function module and then by dragging the icon onto the graphic or Jasic interface.

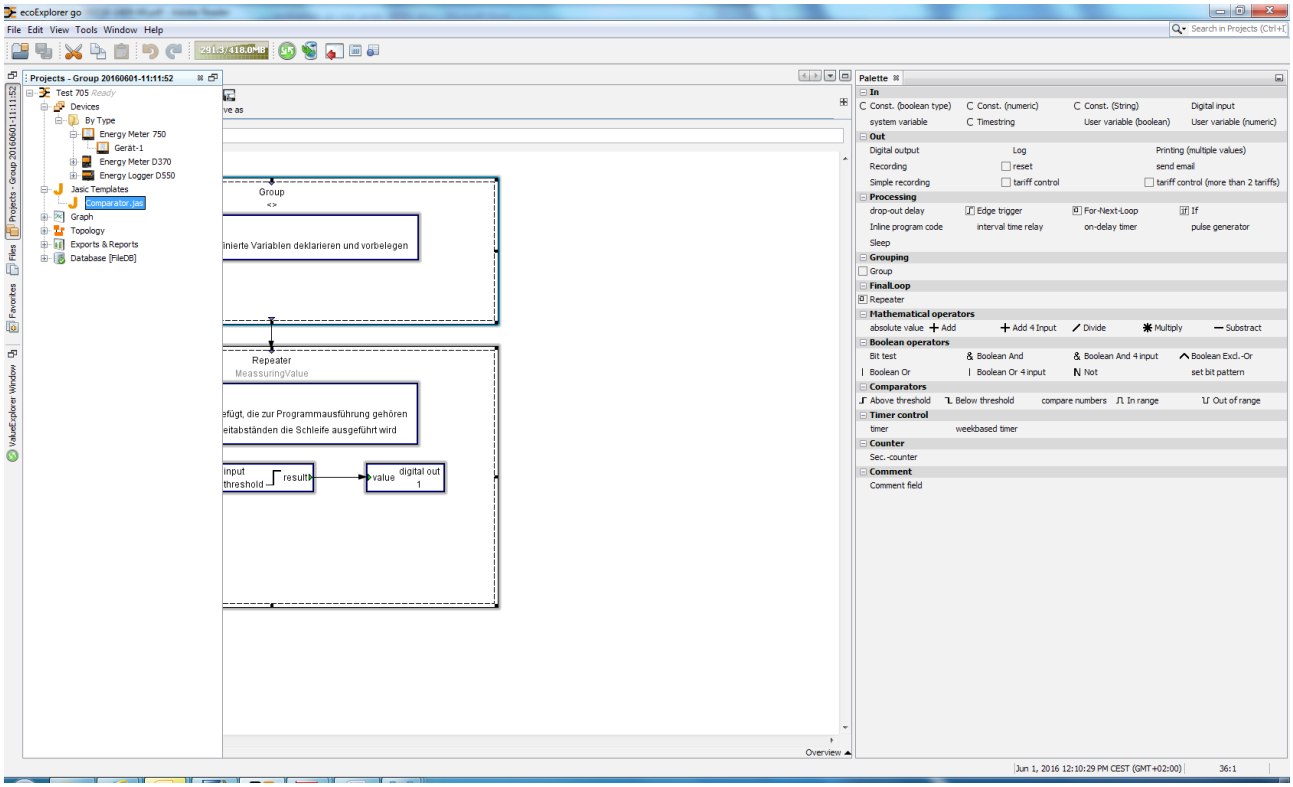

Fig.: Projects, Jasic and palettes windows

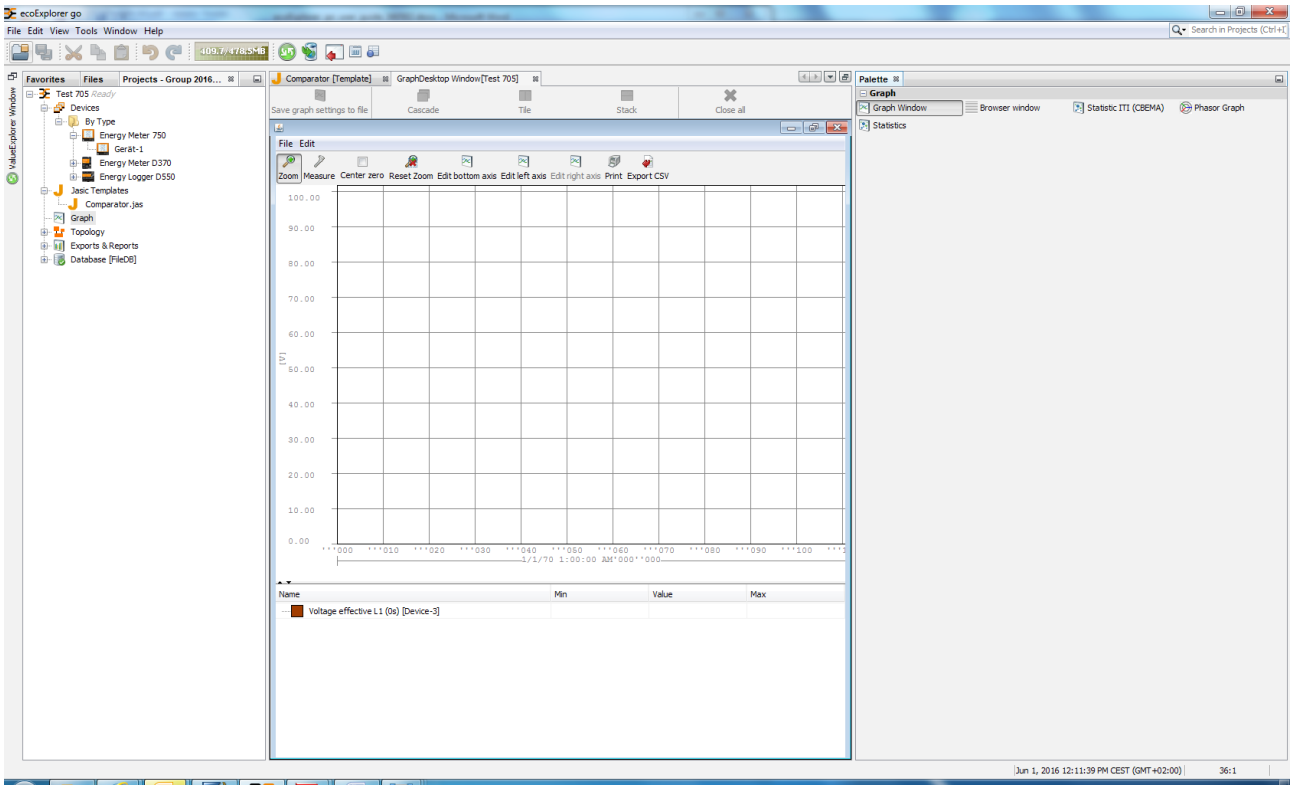

Fig.: Projects, graphs and palettes windows

3.3.9 Properties window

Display of selected object properties (e.g. the device properties) as a function of the selection made in a project window (e.g. of a device).

Properties for a device selection with display of:

- Device type
- Device name
- Device description
- Instance management
- Supported device standards
- Device connection

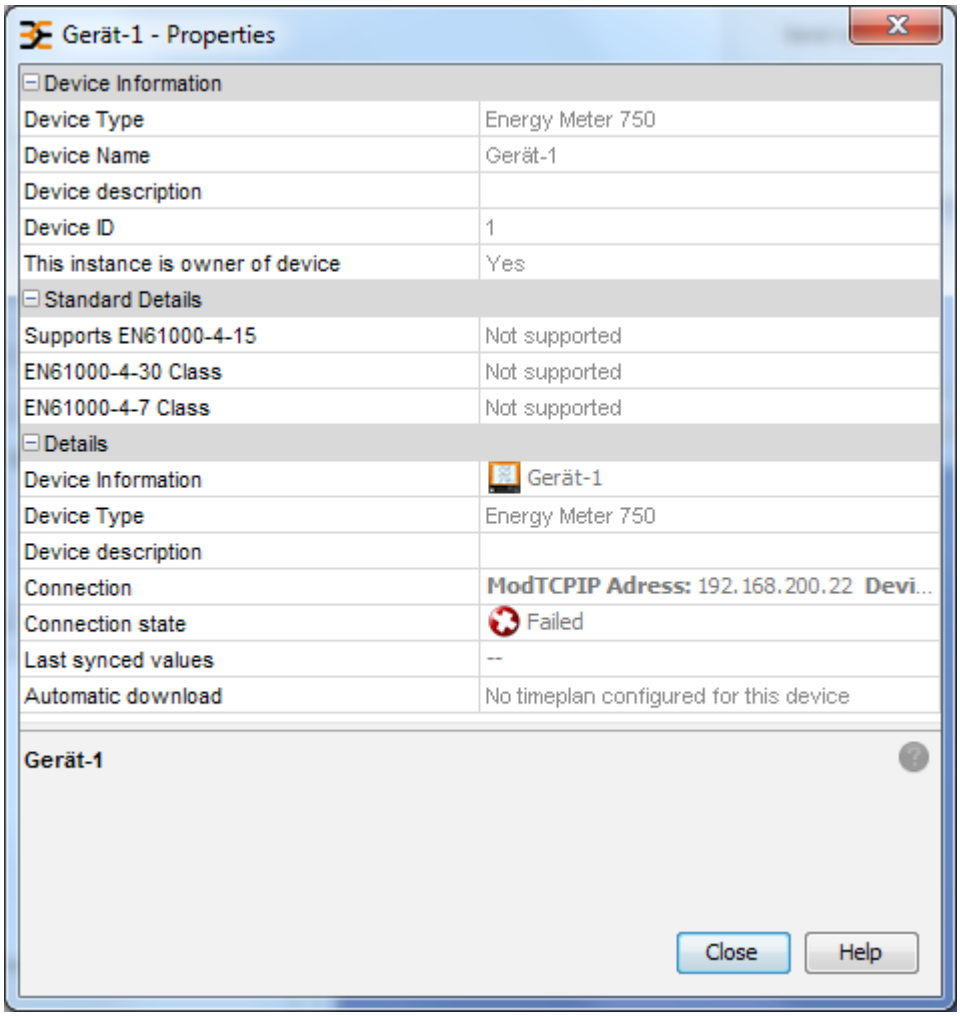

Fig.: Device properties window

3.3.10 Configuration window

Device configuration overview, e.g. IP configuration and device name.

- Via the pop-up menu
  - Select a device in the projects window.
  - Right-click the device to open the pop-up menu and select “Configuration”.

- Via the navigation window
  - Select a device in the projects window.
  - Via the menu “Windows/Overview”, open the overview window and then click the “Configuration” button.

    NOTE: Double-clicking a device in the projects window, directly opens the navigation window.

The device is configured via the corresponding buttons and can be processed via the following prompts:

- Transfer
  Set configuration is transferred to the active device.

- Transfer to...
  The set configuration has been transferred to several devices.

- Reload
  Read out the device configuration from the device.

- Works settings
  Reset the configuration to standard values.

- Save in file
  Save the set configuration to a file.

- Load from file
  Load the saved configuration file to ecoExplorer go.

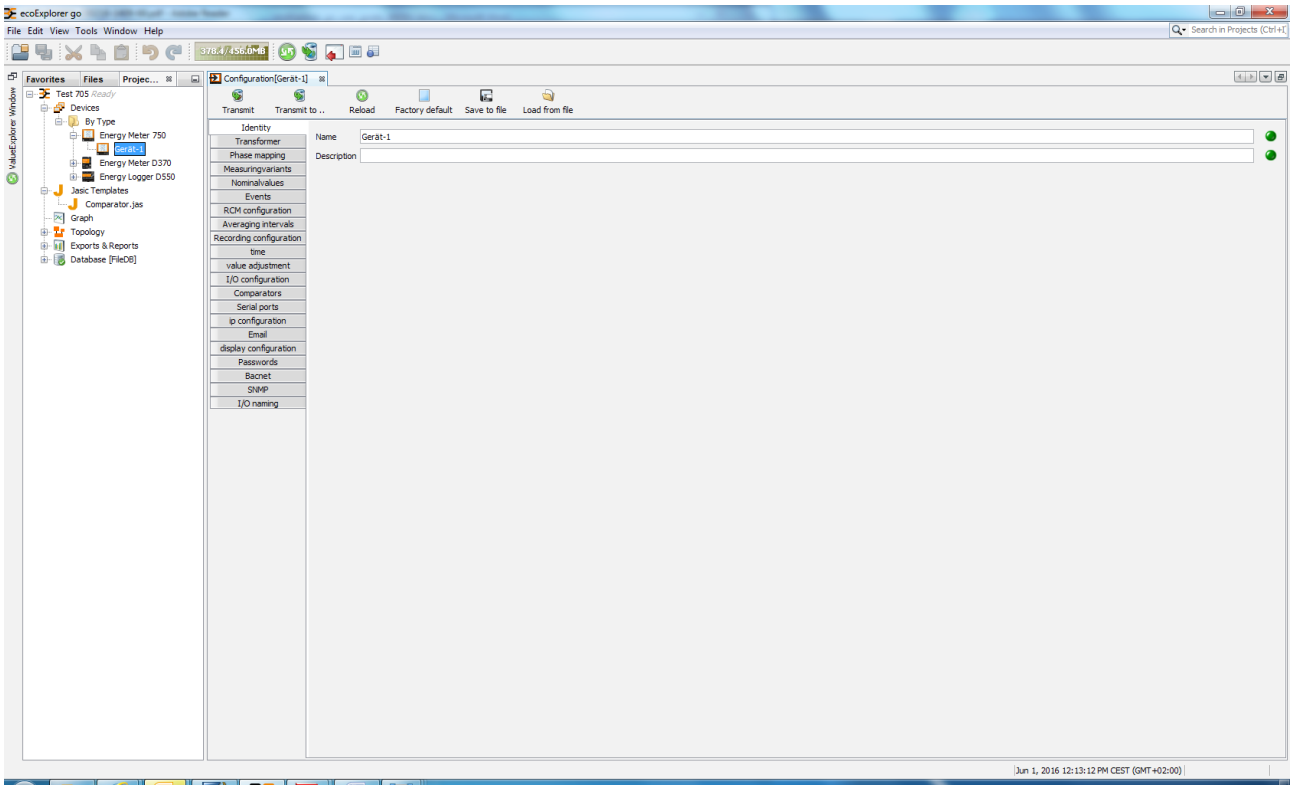

Fig.: Device configuration window

3.3.11 Jasic environment window

View of the Jasic environment used to program and manage Jasic templates. Jasic is similar to the programming language Basic and is supported by various devices. Programs can be programmed in ecoExplorer go in text mode or graphically.

- Graph / Editor view
  Graphic or editor-based view of the Jasic environment.

- Save (in file)
  Saves the current Jasic template

- Transmit to... (transfer to device(s)
  Transfer of current Jasic template to one or more devices.

- Load from file
  Load the saved configuration file to ecoExplorer go.

- Save as
  Save the current Jasic template to a file.

Objects in the graphic programming interface can be moved with the mouse and set by double-clicking. Using the palette window, commands, actions and variables can be selected and, using the mouse, integrated in the graphic interface.

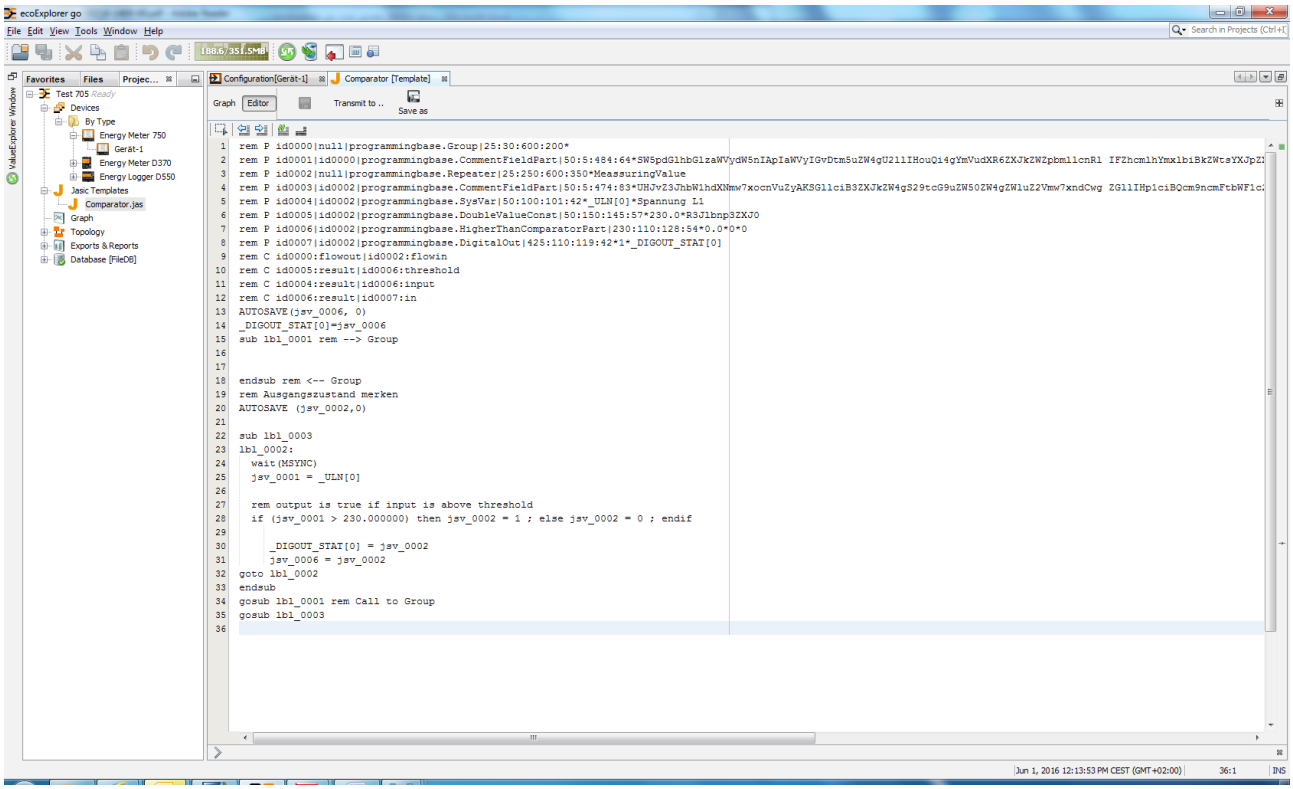

Fig.: Jasic environment

3.3.12 Graphs window

The graph window

Displays measurement values that were retrieved via an online connection or from a database in a graph (Adding graphs). Save graph settings to a file saves the created views and lists them as an additional node under Graphs.

- The measurement values can be derived from different devices.
- No more than two different kinds of measured value types (e.g. current and voltage) can be displayed in a single graph.
- More than one graph can be opened at a time.

Graphs bar

- Zoom
  Enlarges a selected area of the graph.
  Select the area by holding the left mouse button and pulling the mouse from the upper left to the lower right to highlight the area. Shrink a selected area by proceeding as explained above but in reverse (by holding the left mouse button and pulling the mouse from the lower right to the upper left).

- Measure
  Measures time and amplitude spectrum differences. Using the left mouse button, highlight an area within

the graph. This displays the measured amplitude spectrum difference relative to the time difference in the highlighted area.

- Center zero
  Alignment of the amplitude spectrum centre with a centred zero baseline within the graphs.

- Reset zoom
  Resets the zoomed graph display.

- Edit bottom axis
  Sets the visible time interval on the x axis.

- Edit left axis
  Sets the amplitude spectrum display using a minimum and a maximum value.

- Edit right axis
  Using two different measurement value types, the view of the right axis can be controlled using a minimum and a maximum value.

- Print
  Prints the selected graph window.

Legend

Changing advanced graph properties is performed by right-clicking on the name of the graph

- Change the graph colour
- Show or hide the graph
- Move the graph into the foreground or into the background
- Remove the graphs from the window
- Adjust time scale of a graph
- Display graphs using different graph types (e.g. line or bar chart)
- Switch between minimum and maximum display
- Restore graphs (restart)
- Graph displaying the time based mean value within the graph window
- Export the graphed measurement values to a CSV file

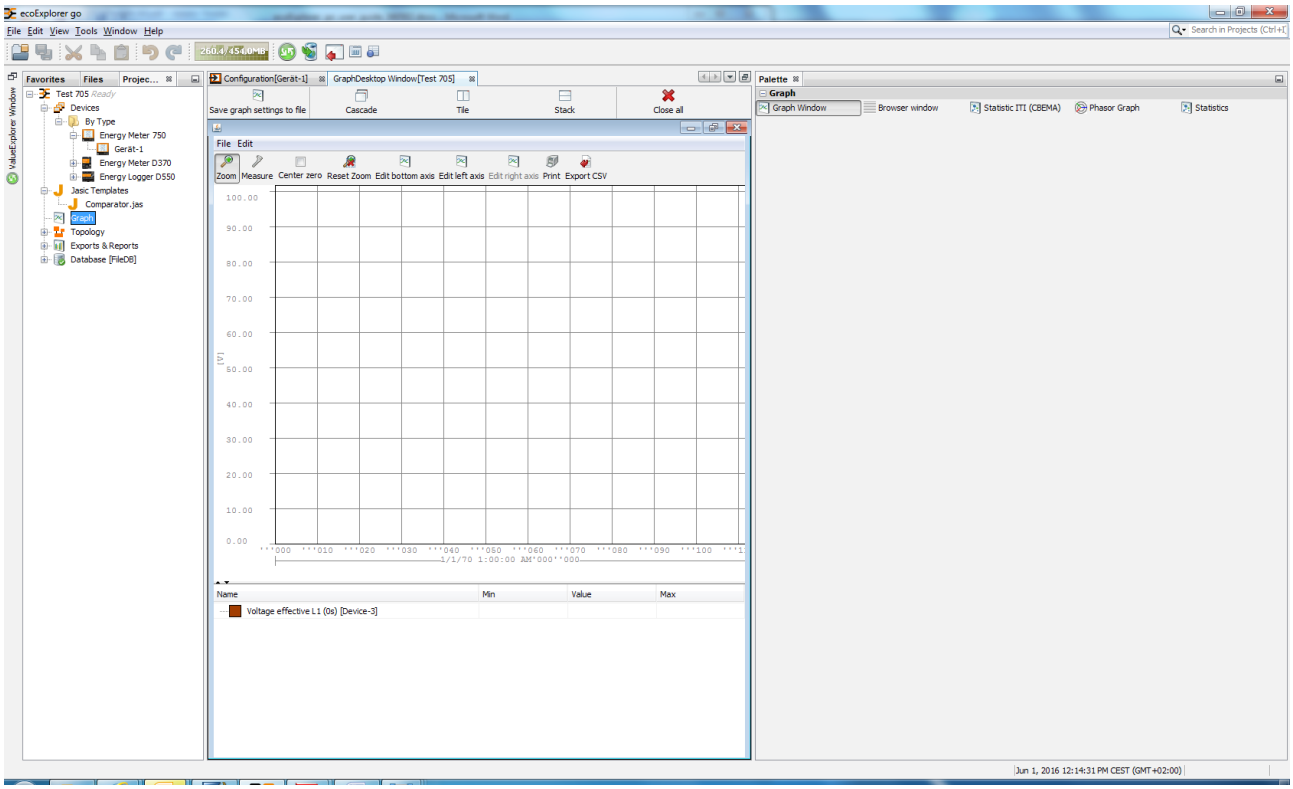

Fig.: Graphs window (display of voltage)

3.3.13 Report overview window

Representation of saved tasks used in the preparation of reports. Reports can be prepared, saved and planned in the project window with the selection of a report group.

- Execute report
  A report preparation assistant starts after a quality control or cost report is selected in the project window using “Execute”. The report is displayed in a preview window.

- Save report
  A report preparation assistant starts after a quality control or cost report is selected in the project window using Saving a report. The task is then saved under any chosen name and appears under the report group in the project window.

- Schedule report
  Saved report tasks can be automated using a time plan with the “Schedule” button (schedules).
  NOTE: Saved reports can be viewed using the File window in the “Reports” folder.

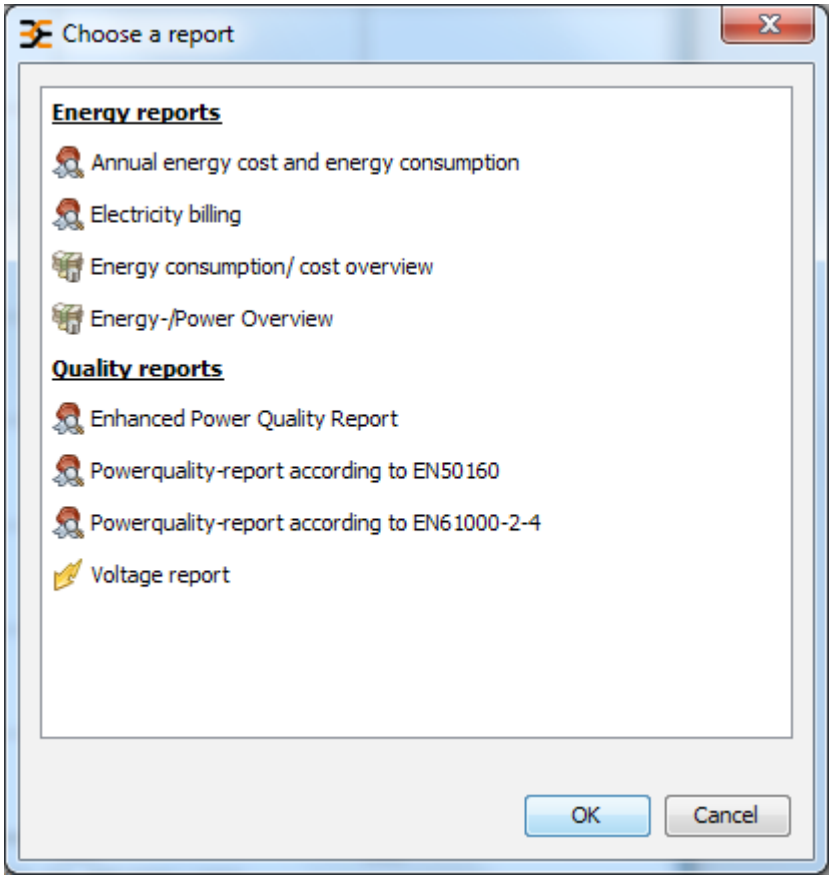

Fig.: Report overview

3.3.14 Topology window

Representation of topology structures.

Added (Adding topology) and saved topology views appear as additional nodes below Topology in the project window.

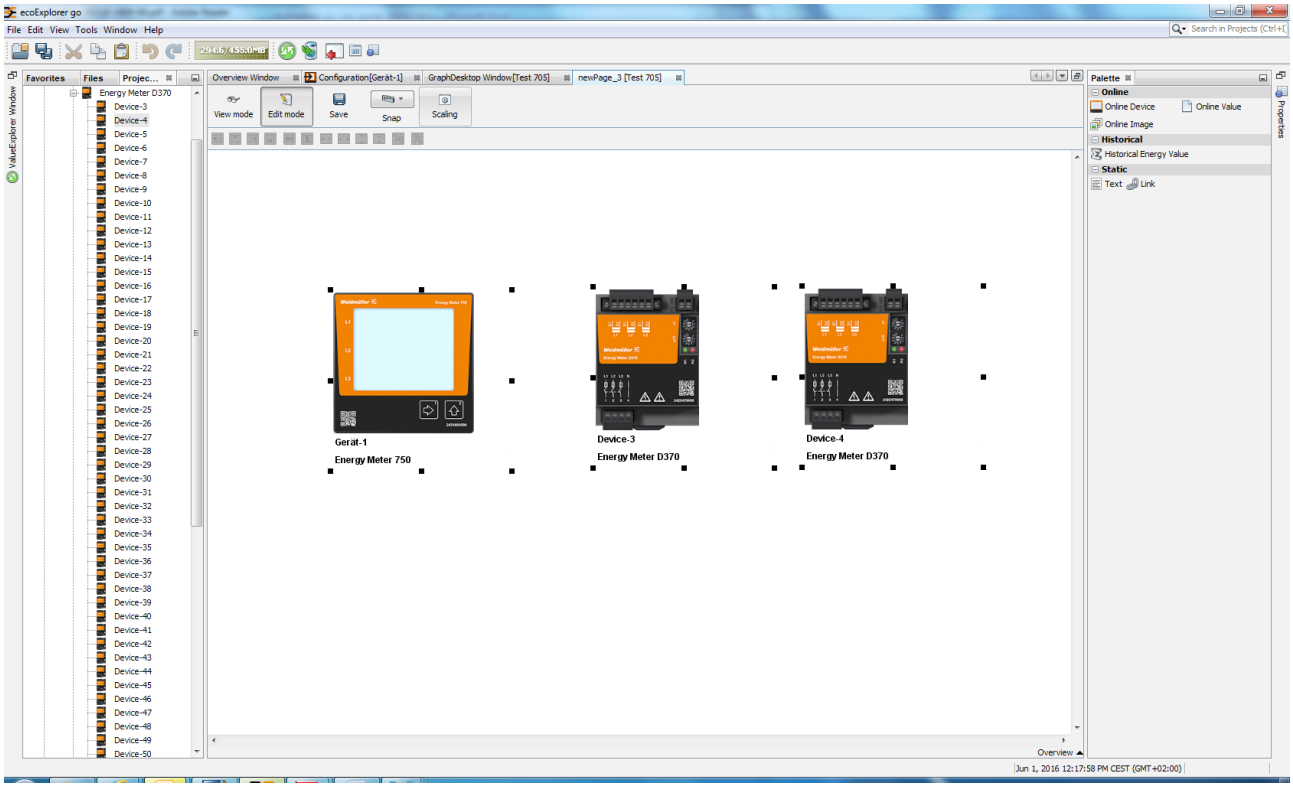

Fig.: Topology window

3.4 Graphic programming

3.4.1 Jasic start

Starting JASIC

The Jasic environment provides the interface for the programming and administration of Jasic templates.

- Jasic is similar to the program language Basic. Jasic code can be processed by various devices made by Weidmüller GmbH & Co. KG.
- Jasic templates are programmed either graphically or with text in ecoExplorer go.
- The Graph or Editor buttons in the Jasic environment are used to switch between the views.

How:

- Select the “Jasic templates” node in the project window.
- Right-click on “Jasic templates” and select “Add new Jasic file “ then select the sub items “single.jas”, “repeater.jas” or “Com parator.jas”.
- Give the file a name.

Using the menu item Window/Palette, open the “Palette window”.

Graphic programming basics:

- Jasic programs are assembled by “dragging” the Jasic modules from the Palette window to the graphic programming window.
- Two components are linked by clicking the coloured triangle of a module, keeping the mouse key pressed down and “Drag with the mouse to the triangle of another module until the link perceptibly “snaps in”. The type of connection (colour of triangle) and the direction in which the connection is made must be taken into account.
- Additional parameters can be set by double-clicking on a module.
- Components can be copied or removed by right-clicking on them.
- Connecting lines can be deleted via the corresponding mouse context menu.
- Brief information appears when the mouse cursor is briefly held on a component.

Establishing a connection

3.4.2 Repeater / Single template

Repeater

The repeater provides the framework for the Jasic program, i.e. once the delay has run its course, the repeater's program code (combination of function modules) is executed and further processed. Program modules external to the repeater are executed only once. Repeaters cannot be interconnected and may be used a max. of once in the program.

Single (Group)

The Single forms another frame for the Jasic program. In this case the program code (functional modules) is executed only once - in contrast to the repeater.

The Group module ensures that all contained modules are executed before the subsequent module connected with it is executed. Connected modules within the Group module are executed in sequence. The sequence of execution of non-connected modules within a Group module is undefined. Some program execution structures (such as if, for example) do not allow any elements that are neither within a repeater nor within a Group module--> program code that should only be executed 1x must in this case be part of a Group module and cannot be alone outside a repeater.

3.4.3 Comparator template

The Jasic example comparator creates a Jasic framework in order, for example, to compare measured values with a boundary value. If the boundary value is exceeded, the system switches to the digital output 1.

You will require the following modules for this: "Sys-Var", "Const. (Numeric)", Comparator "Above threshold value" and "Digital output". The various modules are configured by double-clicking the respective module.

Example:

- Open the properties of the module "SysVar", "Const. (numeric)", by double clicking it.
- Click the button "Select values".
- Select a measured value within the tree structure and confirm it with "OK"
- Open the properties of the module "Const. (numeric)", by double clicking it.
- Enter the value of the constants (e.g. a boundary value).
- Open the properties for the Comparator module "Above threshold value" and set the desired hysteresis width, pre-run and after-run time.
- Open the module properties of the "Digital output" and set an output.

3.4.4 Group

A group identifies a module with which programming can be managed more easily. A group module has only one input and one output. It ensures that all its inner components have been executed before the module that is downstream of it is run.

- Repeaters have two group modules which are processed one after the other.
- Repeaters have two group modules of which only one is processed, as a function of the status of the digital input 1.

3.4.5 Variables

Three groups of variables are available for programming: The user variables (global or local), the constants (Boolean, numeric) and the system variables (measurement values).

- User variables:
  User variables are variables which are personally set up and can be maintained locally or globally. A local variable is only retrievable again in the program in which it was defined and can therefore only be used locally. If a variable has been declared a global variable, it can also be retrieved in another program code and can also be read out or written using the Modbus register. The auto save function saves the value if a power failure occurs (persistence). User variables can be set up as Boolean variables (digital 1/0) or as numeric variables.

- Constants:
  Constants are fixed values with which it is possible to work in program code. Double-clicking (left mouse key) the variable box opens the configuration level, whether the fixed value can be assigned. Here too, variables can be set up as Boolean variables or as numeric values. The exception is the string variable: A text can be saved with this.

- System variables:
  System variables are measurement values provided by the device. All measurement data and calculated values, such as consumption, can be retrieved with these variables and can be processed in the program code.

3.4.6 Processing time

The following processing times (repetitions) can be set by double-clicking on a free area in the repeater module:

- No delay (default setting)
- Measurement interval (200 ms)
- Second
- Minute
- Hour
- Day

3.4.7 Colour definition

Colours have the following meanings when used in the graphic programming (e.g. module inputs/outputs):

- red - numeric type,
- green - Boolean type,
- yellow - string type,
- black - numeric, Boolean or string type,
- blue - program flows.

3.4.8 Log function

The log function can be used for:

- Error searches
- Commissioning programs

Program example: The result at digital input 1 is to be output in a log file.

The log target can be set by double-clicking on the log module and can, for example, be checked in the Debug log.

3.4.9 Debug log

In debug mode, a Jasic program which has been transferred to a device can record and output debugging information, using the log function for example.

Example:

- Create a program in the graphic Jasic environment using Log function.

- Transfer the program in the Jasic environment using the “Transmit to....” button.
- Select an active device and an available location in the program and end the action with “Finish”.
- Open the Overview window and select the device in the Projects window.

Selecting the program just transferred, under “Jasic information”, loads the program to ecoExplorer go and displays it in another program window.

- Select the “Debug log” button in the program window and start the debugging information by clicking the “Enable debug log” button.

Debug buttons

- Empty: This deletes the contents of the Debug window.

Enable debug log: The debugging information is displayed or disabled via this button.

3.4.10 Time-controlled starting of procedures

Switching on/off delay, pulse generator and slip contact

Scheduled starting of procedures

- Activation delay
  A switch in accordance with the set switch on delay occurs once the scheduled delay time has expired - which in turn changes the status. Using Start or End, additional procedures can be initiated when starting or when finishing a switching event. If the input is switched off during the delay (T), the active delay will be deleted.

- Shutdown delay
  A switch to the Status and Start outputs occurs when an input event starts. Once the input event has finished, the set delay starts and switches the Status and End outputs on expiry of the delay period. If the input is switched again during the delay, the active delay will be deleted and started again.

- Pulse generator
  An output switch occurs when an input event starts. Once the pulse time (T1) has lapsed, a switch occurs again and the preset time for the length of the pause (T2) starts. The outputs switch again once the duration set for the pause has lapsed. The pulse activity continues for as long as the input is present.

- Slip contact
  The outputs are switched when an input event starts. If there is an input event, the outputs will be switched again once the preset time for the slip contact has lapsed.

3.4.11 Example: Deleting work

Deleting the effective and the apparent consumption metersusing the time switch.

The “Reset” function provides the following selections, for example for a Energy Analyser D550:

- Resetting all effective and apparent consumption meters.
- Resetting all reactive consumption meters.
- Resetting all minimum and maximum values.
- Resetting the measurement period for EMAX.

3.4.12 Example: Sending e-mail

Sending an email in the event of an undervoltage of < 200 V in phases L1, L2 or L3.

Recipient’s address: martin.musterman@server.de
Sender address: energymeter750@gmx.de

Additional information: Voltage values from the 3 phases at the time of the undervoltage

- Create the Jasic program as shown in below graphic (see Jasic start).
  - Required components provided in the Palette window:
  - Repeater, group, system variables, constants (numeric), comparator above the threshold value, Boolean OR links 4xOn, flank trigger sequence control and email outbox.
  - Assign the respective voltages to the system variables and assign desired value to the constants (in this case 200 V).
  - Establish the connections between the components.
  - Open the “Send email” module by double-clicking and configure this with:
    - information about your outgoing mail server (server, authentification mode, user and password). Ask your administrator about this!
    - with the recipient’s e-mail
    - with the sender address, the subject line and the content of the respective e-mail.
    - Using the “Add measurement values” button, select the voltages L1, L2 and L3 for the email attachment.
    - Drag the selected measurement values to the email messages field.
    - You can now insert further text in the message.
- Save the program on the Energy Analyser D550 via the button “Transmit” or “Transmit to...”.
- Save the program with “Save as” as a Jasic template or “Save under” as a file on your computer.

NOTE: Information about your outgoing mail server and the authentication mode can be obtained from your mail provider or by your system administrator.

3.5 Functions

3.5.1 Deleting user-defined tree

How:

- When a user-created tree via the right context menu

Brief description:

- Deletes the user-created tree with all elements underneath the tree.

Steps:

- Select a user-created tree in the projects window, right click to open the pop-up menu and select “Delete tree”.
- In the following prompt is acknowledged with “Yes”, the tree is deleted.

3.5.2 Database properties

How:

- On selection of the element “Database” in the projects window and “Properties” in the pop-up menu

Brief description:

- Shows additional information (database type, host, port, name, user and password) on the current database.

Steps:

- Select the entry “Database” in the projects window, right click to open the pop-up menu and select “Properties”.

3.5.3 Configuring the database

How:

- On selection of the element “Database” in the projects window and “Configure database” in the pop-up menu

Brief description:

- Enables a change to the database configuration by providing database type, address, port, username, password and path to the database or database name.

Steps:

- Select the entry “Database” in the projects window, right click to open the pop-up menu and select “Configure database”.
- Set the parameters according to the database system, change the settings as required and complete by clicking the “Finish” button.

3.5.4 Optimising database

How:

- On selection of the element “Database” in the projects window and “Optimize database” in the pop-up menu

Brief description:

- Enables optimisation of the database in order to improve its performance for example, for example.

Steps:

- Select the entry “Database” in the projects window, right clickto open the pop-up menu and select “Optimize database”.
- Depending on the database system, a message either appears, stating that a database optimisation for the database system is not support or asking for confirmation that an optimisation should really be started.
- Depending on the system and on the database, this process can take several hours to complete and will affect the performance of your system.
- In the second case, confirm the prompt with “Yes” if you want to start the optimization immediately or reject it with “No” if you want to perform the optimisation later.

3.5.5 Manage data

How:

- On selection of the element “Database” in the projects window and “Manage data...” in the pop-up menu

Brief description:

- Deletes certain data (e.g. devices selected for deletion along with their measurement values) permanently from the database and by doing so improves performance by optimising the database.

Steps:

- Select the entry “Database” in the projects window, right click to open the pop-up menu and select “Manage data...”.
- The following deletion options are available:

  Tip for selecting devices in the assistant: By pressing the <Ctrl> key, the mouse can be used to select more than one device at a time. With the <Shift> key an area can be selected.

  - “Delete devices”
    Enables the deletion of devices and their measurement values from the database. Via the button “All deleted from...” in the assistant, all devices are preselected, which have the status “marked as deleted” (see “Delete device”).
    If other devices and their measurement values should be deleted from the database, then these are selected with the mouse.
  - “Delete all values from all devices from a given time range”
    Enables deletion of all measurement values within a time range. The time range should be selected in the assistant, within which all measurements for all devices in the database are to be removed.
  - “Delete all values from the selected devices from a given time range”
    Enables the device-based deletion of all measurement values within a time range. The corresponding devices should be selected via the assistant and then the time range should be set.
  - “Delete all values from selected devices and types from a given time range”
    Enables device-based deletion of certain measurement values within a time range. The corresponding devices should be selected via the assistant and then measurement values to be deleted and the time range should be set.
  - “Delete too long data”
    Enables the deletion of data that is too long. The time tolerance range for data deletion should be defined in the assistant. All data outside this tolerance range will be deleted from the database. This means that data with widely separated start and end points can be deleted. Select the desired option and follow the instructionsvia the “Next” button.

3.5.6 Properties

How:

- Right-click to select a device in the projects window.
- Using the menu item Windows --> Properties (Properties window).

Brief description:

- Presentation of additional information on the device (device type, name, description, connection ...)

Steps:

- Select a device in the projects window and right-click to open the pop-up menu. Select the menu time “Properties”.

3.5.7 Deleting device

How:

- Right-click to select a device in the projects window.
- Select a device in the project window and choose the menu item “Edit --> Delete”.

Brief description:

- If the selected device is under the tree”By device type”, it will be marked in the database as deleted (see “Manage data”).
- If the device (link) is below a tree created by the user, then the link to the device is deleted. The actual device remains in the group “By device type”!

Steps:

- Select a device under the “By device type” tree right-clicking on it in the project window and select “Delete device” in the pop-up menu.
- If the following prompt is confirmed with “Yes”, then the device will be marked as deleted in the database:
  - The device will no longer appear in the overview.
  - However, the device and the cumulative data remain in the database.
  - The device and its measurement values are to be removed from the database, then the device should be selected via “Delete device” and deleted via “Manage data”.

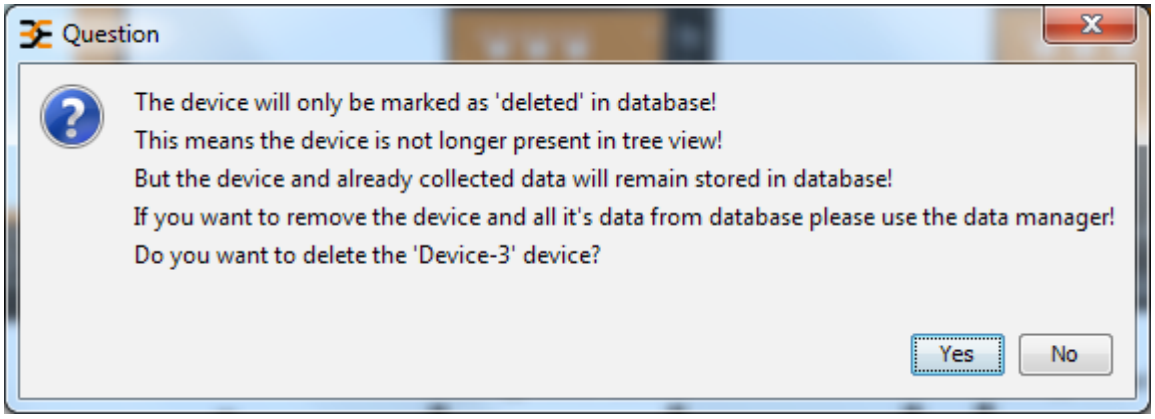

Fig.: The device is marked in the database as deleted.

- If in the project window, a device (link)is selected below a user-created tree and deleted via the pop-up menu, then after the prompt only the deletion of the link occurs. The actual device is retained (below the node “By device type)”!

3.5.8 Takeover device

How:

- Right-click to select a device in the projects window.

Brief description:

- Assignment of responsibility for the selected device from a service running in the background to the local ecoExplorer go application (see “Transfer device”). After acceptance, the local ecoExplorer go application is again responsible for the device – the background service hands over responsibiltiy for the device to the appliation (for reading measurement data, for example).
- If the application/a service is not the device owner, it cannot use all device functionalities. All automatic processes that also run under the ecoExplorer go service are owner-independent:
- Online data entry, automatic read-out and time synchronisation.

Steps:

- Select a device in the projects window by right-clicking it andselect “Takeover device” in the pop-up menu.

3.5.9 Transfer device

How:

- Right-click to select a device in the projects window.

Brief description:

- Assignment of the selected device running on a background service (see “ecoExplorer go Service / Device menu list”). After assignment, this service is again responsible for the device - the background service hands over responsibility for the device to the application (for reading measurement data, for example) (see “Takeover device”).
- Attention:
  If the application/a service is not the device owner, it cannot use all device functionalities. All automatic processes that also run under the ecoExplorer go service are owner-independent:
  Online data entry, automatic read-out and time synchronisation. Note that you can no longer use these functionalities, if you surrender responsibility for the device!

Steps:

- Select a device in the projects window by right-clicking it and select “Assign device” in the pop-up menu. Read the following warning prompt and confirm it.

3.5.10 Editing graph axes

How:

- For display of a graph via the corresponding buttons in the toolbar in Graph window.

Brief description:

- “Edit bottum axis”: Sets the visible time interval on the x axis.
- “Edit left axis”: Sets the amplitude spectrum display using a minimum and a maximum value.
- “Edit right axis”: Sets the right axis using a minimum and a maximum value (only with two different measurement value types).

Steps:

- Create a graph (Creating graph).
- Select the corresponding buttons in the graph window toolbar to edit the axes and set the axis values.

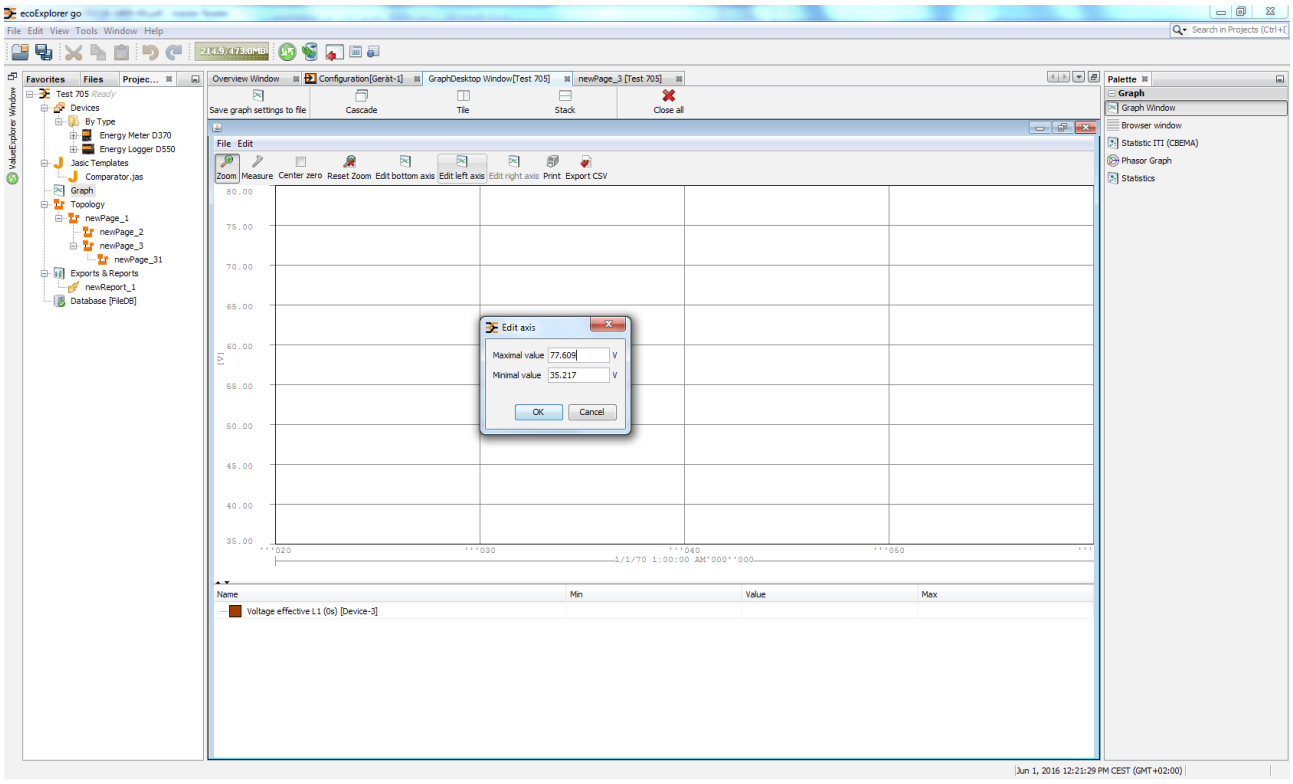

Fig.: Editing the axis

3.5.11 Exporting graphs as CSV values

How:

- When displaying a graph via the button “Export CSV” in Grap hs window.

Brief description:

- Enables export of the measurement values required for the graph display in a CSV file, which is readable by other programs.

Steps:

- Create a graph (Create graphs).
- Use the “Export CSV” and assign a file name to the export file. Confirm the dialogue with “Save” or “OK”.

NOTE: If several graphs are displayed in the diagram, all graphed values are exported to a CSV file. To export values of only graph, the CSV export function in the pop-up menu of the legend for the required graph (see Changing graph properties).

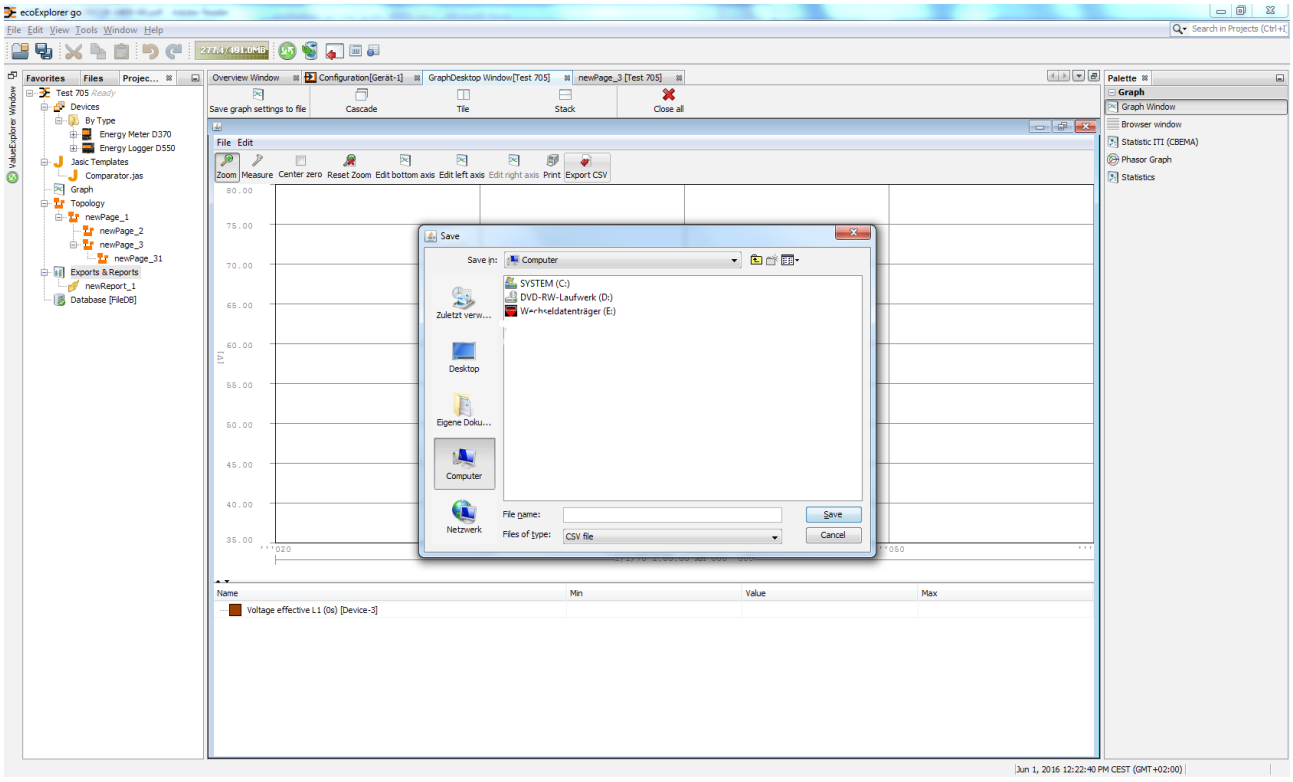

Fig.: Exporting graph values in a CSV file

3.5.12 Changing graph properties

How:

- By right-clicking on the respective graph legend to show a graph in the graph window.

Brief description:

- This function changes various graph and diagram properties
- Enables the saving of graphed values from the selected graphs to a CSV file.

Steps:

- Create a graph (Creating graphs).
- Select a graph in the legend and right-click to open the pop-up menu.
- Select one of the following graph functions.

Graph properties:

- “Change colour”
  The graph colour is changed via a colour selection dialogue.
- “Toggle visibility”
  This shows or hides the selected graph.
- “Move forward” / “Move back”
  This moves the selected graph into the foreground or background.
- “Remove”
  This removes the selected graph out of a diagram.
- “Adjust time”
  Enables the graph display to be time-shifted (from nanoseconds to days) via a slider.
- “Painting method”
  This provides of a selection of graph types (e.g. pie, line, cubic, differential, bar chart).
- “Toggle Min/Max”
  Enables Min/Max values to be shown/concealed.
- “Reset graph”
  This reloads the selected graph in the diagram.
- “Average”
  The values of the selected graph are displayed via the selected average (e.g. hourly average).
- “Export data to CSV file”
  This facilitates exporting the graphed values to a CSV file.

3.5.13 Saving graph settings in file

How:

- By selecting the “Graphs” node in the Graphs window using the “Save graph settings to a file” button in the toolbar.

Brief description:

- Saves the currently selected graph with its window position toa file. This can be opened again under the

"Graphs" node in the project window (Create graphs, Graphs window).

- Also supports graph display based on historical values in the time period previous day, last week, last month

Steps:

- Create a graph by dragging a value or a value group into the graph window (Create graphs).
- Select the "Save graph settings to a file" button from the toolbar, then assign a configuration name.
  - If the graph has been created with online values, then the listed time periods do not have any function.
  - If the graph is created from historical values, then a graph configuration can be created with a preset time period via the selection of time periods.
    - "Do not reload values when opened"
      Creates a graph setting with the data currently displayed in the graph.
    - "Reload with the data of the last day"
      Creates a graph setting with the yesterday's data.
    - "Reload with the data of the last week"
      Creates a graph setting with the last week's data.
    - "Reload with the data of the last month"
      Creates a graph setting with the last month's data.
- Confirm with "OK". The saved graph setting appears under the "Graphs" node in the projects window and can be opened directly.

If the graph setting is created from historical data and if a time period has been selected, when the graph setting is called up, the graph below the "Graphs" node with the corresponding data is generated.

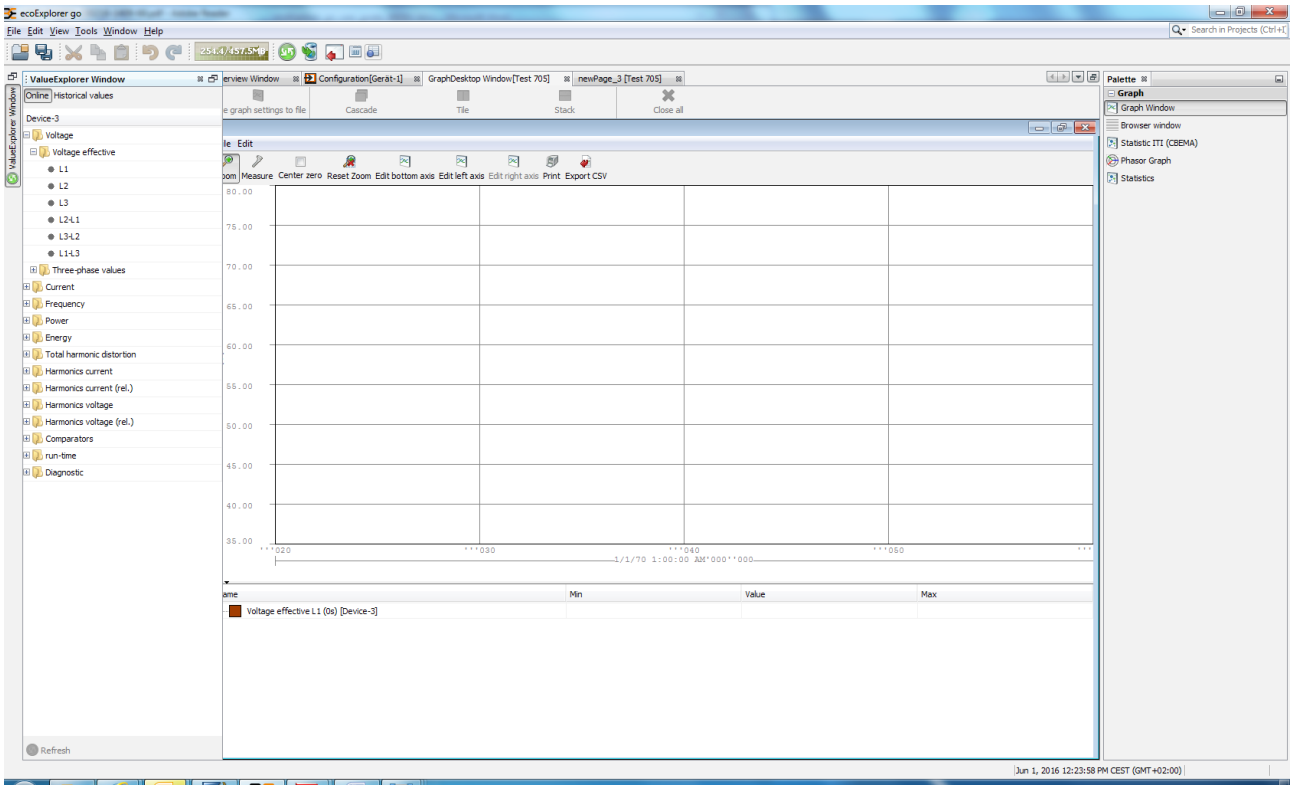

Fig.: Value tree and graph window

3.5.14 Printing and saving graphs

How:

- When displaying a graph via the “Print” button in the graphs window.

Brief description:

- Opens the “Print Graph” window with a print preview of the graph. The preview is saved an printed via the corresponding icons above the display.

Steps:

- Create a graph (Create graphs).
- Use the “Print” button and change over to the newly opened “Print Graph” window.
- Print and save the PDF display with the respective icons above.

3.5.15 Creating graphs

How:

- By selecting the Graphs node in the projects window and dragging at least one measurement value from the Value Explorer into the graph window.
- Selection of at least one measurement value in the value tree window and selecting the menu item “Show in graph” by right-clicking in the pop-up menu.

Brief description:

- Displays selected current and historic measurement values in a diagram Displaying graphs, Graph windows).

Steps:

- Select the “Graphs” node in the project window.
- Via the menu “Windows --> Value type(s)”, open the Value tree window and choose in the menu between online and historical values.

  NOTE: It is necessary to read out the device to display historical values!
- Using the plus sign or arrow symbols, open a branch in the Value tree window and follow it until the desired measurement values appear.
- Highlight a subordinate value group (e.g. effective voltage) or at least one measurement value and drag this to the graph window with the mouse button held down.

3.5.16 Measuring graphs

How:

- When displaying a graph via the “Measure” button in the Graphs window.

Brief description:

- Measurement of the time and amplitude spectrum differences in a graph.

Steps:

- Create a graph (Creating graphs).
- To calculate an area, select the “Measure” button and select an area by holding down the left mouse button and dragging the mouse, for example, from the upper left to the lower right.
- This displays the time and amplitude spectrum differences within the selected area.
- Select “Zoom” to enlarge the graph, if this is desired.

3.5.17 Zeroing graphs

How:

- When displaying a graph via the “Center zero” button in the graphs window.

Brief description:

- Alignment of the amplitude spectrum centre with a centred zero baseline within the graphs.

Steps:

- Create a graph (Creating graphs).
- Select the “Center zero” button to zero graph.

3.5.18 Zooming graphs

How:

- When displaying a graph via the “Zoom” button in the Graphs window.

Brief description:

- This function zooms in /zooms out on a selected section of the graph.

Steps:

- Create a graph (Creating graphs).
- To enlarge the selected area, select the “Zoom” button and highlight an area by holding down the left mouse button and dragging the mouse from the upper left to the lower right.
- To reset the zoom level, proceed as explained above but drag the mouse from the lower right to the upper left or click the “Reset zoom” button.

3.5.19 Resetting graph zoom

How:

- When displaying a graph via the “Reset zoom” button in Grap hs window.

Brief description:

- Shrinks zoomed area of graph to original size.

Steps:

- Create a graph (Creating graphs) and zoom in on the graph (see Zooming graphs).
- Zoom out again from the graph via the “Reset zoom” button or by selecting an area in the graph from the bottom right to top left.

3.5.20 Configuration

How:

- Right-click to select a device in the Projects window.
- When a device is selected in the projects window and then the “Configure” button in the overview window.

Brief description:

- Opens the configuration window for the device.

Steps:

- Select a suitable device in the project window.
- Start the configuration window via the “Configure” window in the overview window (see configuration of devices, for example Energy Analyser D550 - Configuration).
- Set the required device settings and save these with the “Transmit” button. The settings will then be transferred to the device.

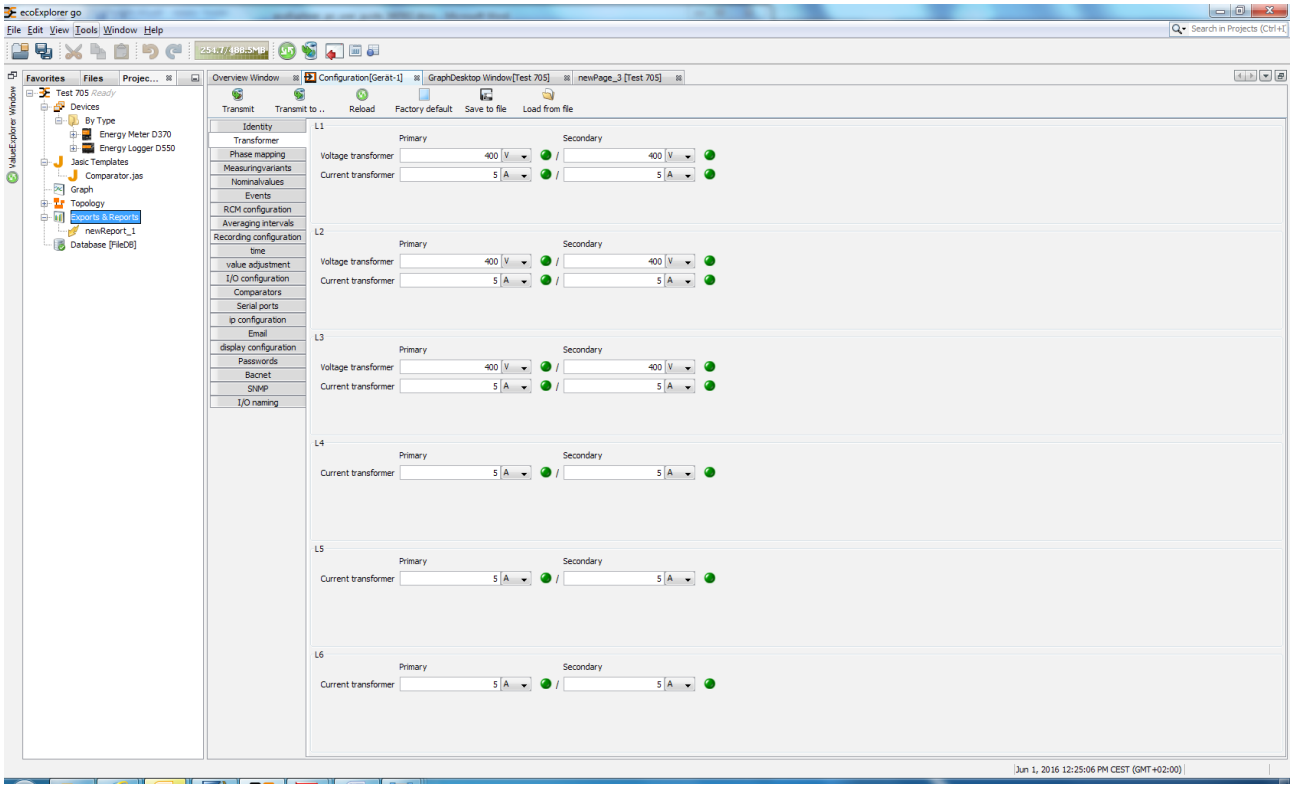

Fig.: Configuration window

3.5.21 Copying / inserting

How:

- Right-click to select a device in the Projects window.
- Via the menu “Edit --> Copy” or “Edit --> Paste”

Brief description:

- Copies the device selected in the projects window to the clipboard, for example, or inserts in from the clipboard.

Steps:

- Example: Copy device to a new node
- Select a device in the projects window and right-click to open the pop-up menu. Select the menu time “Copy”.
- Create a new tree (see “Creating customized tree”).
- Select this tree and right-click to open the pop-up menu. Select the menu time “Paste”.

3.5.22 Creating customized tree

How:

- By selecting the “Devices” node in the Projects window.

Brief description:

- To make a project display clearer, other nodes can be generated under the “Devices” level.
- Previously created devices can be dragged to the new tree with the mouse or be saved under the new node with the functions “Copy” and “Paste”. In the process, a link is established to the created device. If the origiinal device - presented in the “By device type” node - deleted, the device and also the created link will be removed. If only the link is to be deleted, this should be selected and deleted.

  CAUTION: If the devices under the “By device type” node are deleted, the device will be removed from the project and data may be lost. In contrast, links can be deleted without any risk of data loss!

Steps:

- Select the “Devices” node in the projects window and right-click to open the pop-up menu.
- Start the wizard via the menu item “Create customized tree” and assign it a unique name.
- After confirmation via the “OK” button, a new tree appears under the “Devices” node.
- Set a link to a device by dragging a device with the mouse from the “By device type” node into the new tree. The device and a link to it will now be displayed in the tree.

3.5.23 Adding a new device

How:

- Menu item “ File / New File”.
- Right-click to select a device group in the Projects window.
- With the selection of a device group in the project window using the “Add new device” button in the overview window.

Brief description:

- For adding a new device to the current project.

Steps:

- Select the type of device, listed under the device category, and confirm the selection with “Next”.
- Configure the connection and parameters for the type of device. Depending on the type of connection, the Connection test button can be used to perform a connection test.
- The device appears under the Devices node in the project window when the wizard closes.

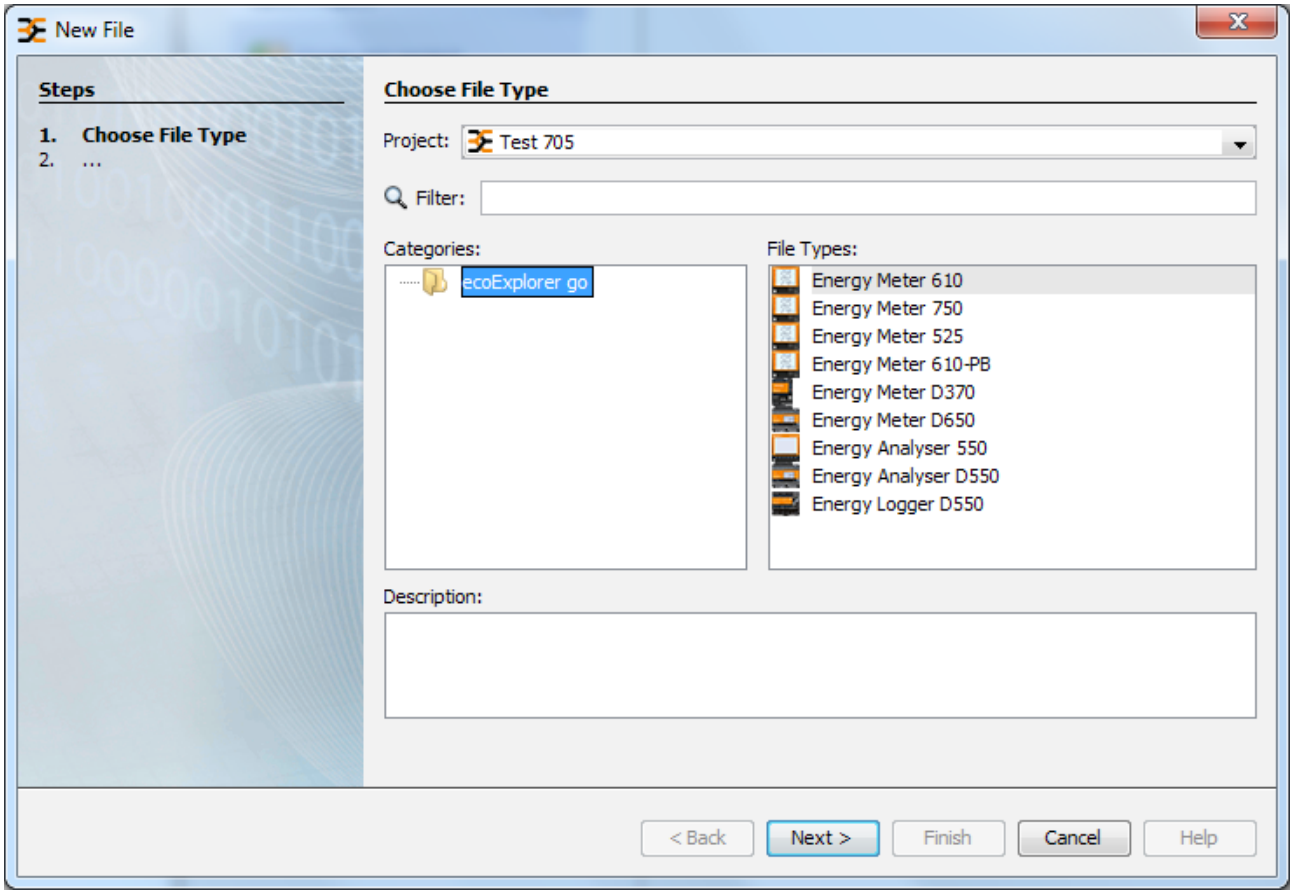

Fig.: Adding a new device to a project

3.5.24 Palette - Browser window

How:

- By selecting the “Graphs” node in the Projects window and the menu for the Palette window display.

Brief description:

- Creates an empty browser window in the graphs window which can show events, harmonics or sequences from the value tree window.

Steps:

- Select the “Graphs” node in the projects window.
- Using the menu item “Window --> Palette”, open the palette window.
- Drag the “Browser window” symbol by pressing the mousekey to the Graphs window. An empty window appears.
- Open the Value tree window for a device and click the “Historical values” button (also see “Download memory”)
- Open the “Harmonics” or “Events” node and drag a subgroup over the window. The measurement values are presented in tabulated form.
- The graphic display is generated by double-clicking the respective entry. Alternatively, the switch “Show in graph” can be set, which generates a graphic display of the selected table entry below the value table.

3.5.25 Palette - Graph window

How:

- By selecting the “Graphs” node in the Projects window and the Palette window display.

Brief description:

- Creates an empty graph window, which can be populated with measurement values from the value tree window.

Steps:

- Select the “Graphs” node in the projects window.
- Using the menu item “Window --> Palette”, open the palette window.
- Drag the “Graph window” symbol, while holding down the mousekey to the Graphs window. An empty graph window appears.
- Via the menu item “Window/Value type(s)”, open the value tree window and drag a measurement value or a measurement value group (such as “Effective voltage”) over the empty graph window. The measurement values will now be displayed there (see for example”Creating graphs”, “Changing graph properties”.)

  NOTE: If the device has been read out (see “Download memory”), additional historical values can be displayed (“Historical values” button in the Value tree window).

3.5.26 Palette - ITI statistics (CBEMA)

The ITIC or CBEMA curve (Computer Business Equipment Manufacturers Association) describes the maximum voltage deviation in relation to the event duration that an electronic device has to be able to tolerate. The curve defines permitted tolerances for evaluation of events, thus enabling interpretation of any malfunctions and can be used as evaluation benchmark.

A point in the diagram represents the voltage deviations presented on the Y-axis (voltage outages, voltage drops or overvoltages) linked with the duration presented on the X-axis, thus describing the event. These values should be within the permitted range of the CBEMA curve.

How:

- By selecting the “Graphs” node in the Projects window and the Palette window display.

Brief description:

- Creates a CBEMA in the graphs window without measurement value assignment.

Steps:

- Select the “Graphs” node in the projects window.
- Using the menu item “Window --> Palette”, open the palette window.
- Drag the “ITIC (CBEMA)statistics” symbol while holding the mousekey down to the Graphs window. A CBEMA diagram appears.
- Drag a read-out device from the project window (see “Download memory”), a Energy Analyser D550, for example, over the respective area of the diagram.
- Saved events will then appear in the diagram as points.

Interpretation of the display: Events within the coloured areas are outside the tolerance range. Overvoltage (red zone) can lead to a defect, undervoltage (yellow zone) to a temporary outage of the device.

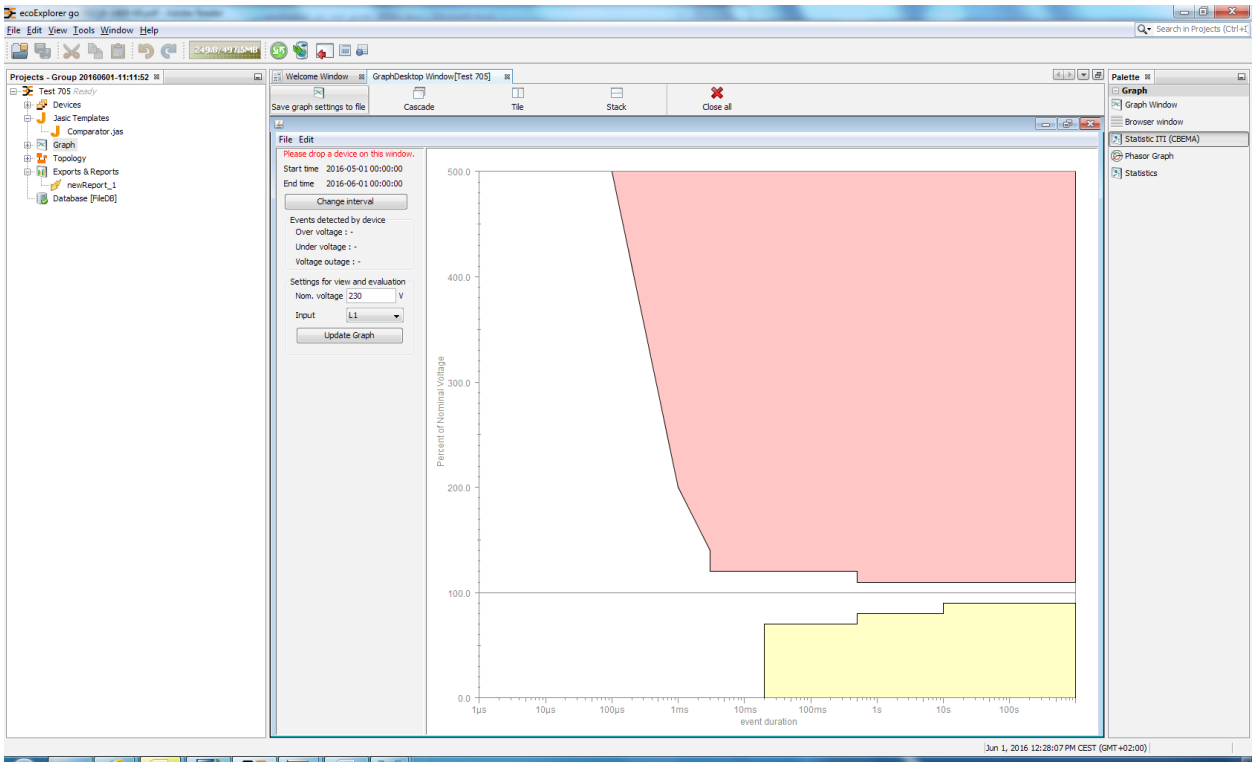

Fig.: Areas of the ITIC (CBEMA) curve

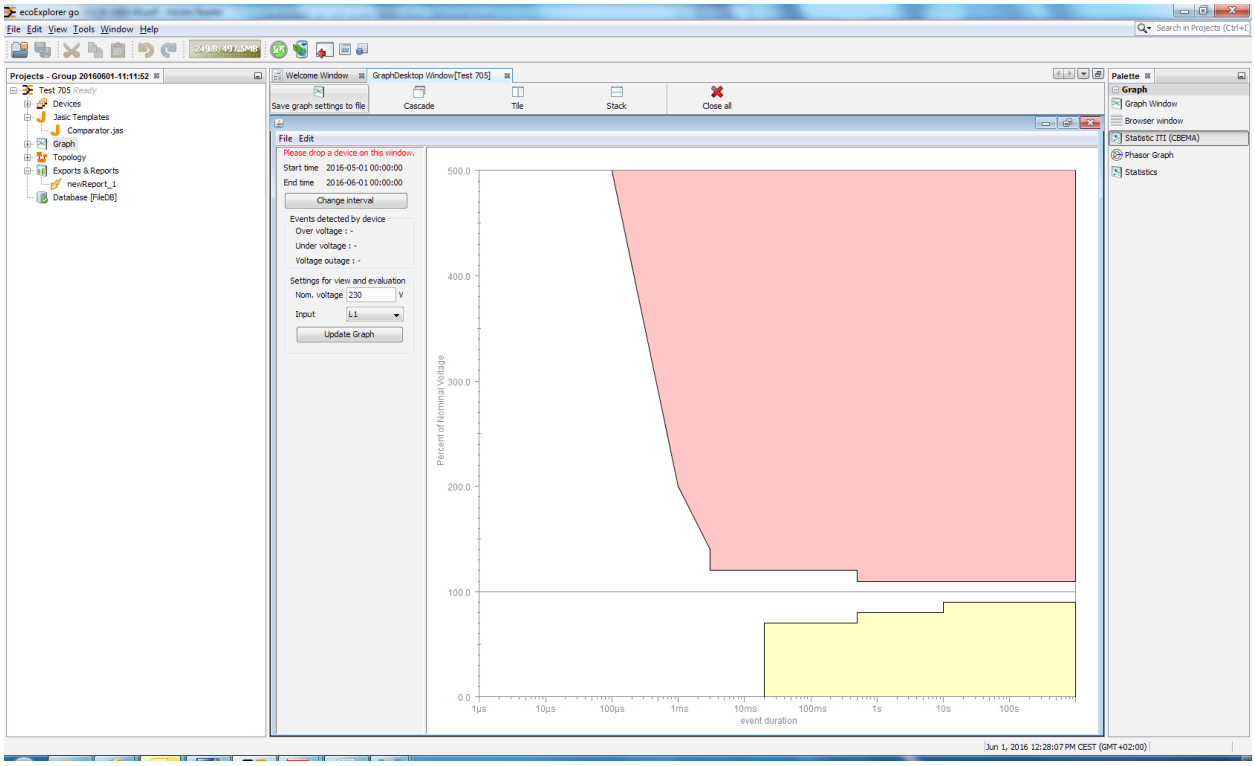

Fig.: Example of ITIC (CBEMA) curve

3.5.27 Palette - Statistics

How:

- By selecting the “Graphs” node in the Projects window and the Palette window display.

Brief description:

- Creates an empty statistics window in the graphs window, which can be populated with historical values.

Steps:

- Select the “Graphs” node in the projects window.
- Using the menu item “Window --> Palette”, open the palette window.
- Drag the “Statistics” symbol by pressing the mousekey to the Graphs window. An empty diagram appears.
- Click the “Historical data” button in the value tree window and open a value-specific tree (e.g. voltage).
- Drag a historical data group over the diagram. The values are then displayed and can be varied in the window via the statistics properties.

3.5.28 Palette - Phasor graph

How:

- By selecting the “Graphs” node in the Projects window and the Palette window display.

Brief description:

- Creates an empty phasor diagram in the graphs window, which can be linked with a device.

Steps:

- Select the “Graphs” node in the projects window.
- Using the menu item “Window --> Palette”, open the palette window.
- Drag the “Phasor graph” symbol while holding down the mousekey to the Graphs window. An empty diagram appears.
- Drag a linked device from the projects window to the diagram the phasor diagram for the respective device will appear.

3.5.29 Generating a report

How:

- By selecting one of the report nodes under “Reports” in the Projects window by clicking the “Execute” button in the Report overview window.
- With a right-click on a selected report node in the projects window.

Brief description:

- Creates report with contents in accordance with selected report node.

Steps:

- Select a report class under the “Reports” node in the projects window (e.g. “Report in accordance with DIN 50160”).
- Using the “Execute” button in the report navigation window, open the “Create a report” wizard and follow its instructions.
- The created report will be shown in a preview window. Using the buttons in the window bar, the report can for example be printed, saved or reviewed.

3.5.30 Generating and printing connection test report

How:

- By selecting a device group in the Projects window and selecting at least one device in the Overview window via the “Print report” button.
- Tip: By pressing the <Ctrl> key or the <Shift> key, the mouse can be used to select more than one device at a time in the overview window for inclusion in the report.

Brief description:

- Generates a report for the selected devices with the most important parameters (serial number, firmware version, connection type, address ...).

Steps:

- Select a device group in the projects window (e.g. “By device type” group).
- Select at least one device in the overview window (menu window/overview) and perform a connection test via the “Connection test” button in the overview window.
- Create a report with the “Print report” button.
- Complete the customer/tester details and confirm with “OK”.
- You can print out the report by clicking the printer icon in the toolbar above the report. Select a suitable printer and start printing with “OK”.
- You can save the report by clicking the save icon in the toolbar. Define the storage location, assign the report a name and confirm with “OK”.

  NOTE: Without a previous successful connection test, the report will be provide you with all values. If you come across the term “Unknown”, the connection test was either unsuccessful or nothing was done before the report was called up. In the second case, close the report again, repeat the connection test and regenerate the report. Values should be displayed for all devices whose connection test was successful.

3.5.31 Schedule-controlled generation of reports

How:

- By selecting a saved report configuration (Save report) under report class in the Projects window and clicking the “Schedule” button in the report overview window.
- With a right-click on a saved report configuration in the projects window.

Brief description:

- Via a schedule, enables automatic execution of a saved report configuration in the background and subsequent saving of the result quantity.

Steps:

- Under the Reports node in the projects window, select a previously saved report configuration from (Save report).
- By clicking the “Schedule” button in the report navigation window, open the schedule selection.
- Select a saved schedule or create a new schedule and confirm the selection with “Next”.
- Select the desired export settings with:
  - Define the directory in which the export file is to be saved via the “...” button.
  - Select a file type (PDF, ODT, HTML or XLS).
- The report is automatically generated according to the schedule and the export file is saved in the selected directory.

3.5.32 Saving report

How:

- By selecting one of the report nodes under “Reports” in the Projects window by clicking the “Save” button in the Report overview window.
- With a right-click on a selected report node in the projects window.

Brief description:

- Saves a report configuration displayed under the selected report node in the projects window.
- The saved report configuration can be manually started by clicking the “Execute” button or automatically started via a schedule.

Steps:

- Select a report node under the “Reports” node in the projects window (e.g. “Report in accordance with DIN 50 160”).
- Using the “Save” button in the report navigation window, open the “Create report” wizard and follow its instructions.
- The report configuration is created under the corresponding node in the projects window.
- After the report configuration has been selected in the projects window, this can be executed, edited, assigned a schedule or deleted via the corresponding buttons in the Report overview window.

3.5.33 Resetting measurement values

How:

- By selecting a device in the Projects window by right-clicking in the pop-up menu under “Reset values”.
- By right-clicking the “Reset values” button in the overview window when selecting a device in the projects window.

Brief description:

- Depending on the selection, enables resetting of minima, maxima, active energy, apparent energy, reactive energy and historical data

Steps:

- Select a device in the projects window by right-clicking it and select the item “Reset value” in the pop-up menu. Alternatively, after selecting a device, you can also click the corresponding button in the overview window.
- Then make a selection of values to be deleted in the “Reset values” window and confirm this selection.
- The selected values will then be deleted on the device.

3.5.34 Sorting elements in a user-defined tree

How:

- By selecting a user-defined tree in the projects window by right-clicking the “Sort…” pop-up menu.

Brief description:

- Enables device links within a user-defined tree to be sorted.

Steps:

- If no user-defined tree is available in the projects window, this must be created (see “Creating new tree”).
- Select a user-created tree in the projects window and change the order of the elements below the tree by right-clicking the “Sort...” pop-up menu.
- Via the corresponding submenu entries, opt for a specific or alphabetical order
  - alphabetical order
  - Sorts the elements below the tree alphabetically
  - specific order
  - Enables definition of an individual order. Via a dialogue, devices can be selected and move up or down a list.

3.5.35 Download memory

How:

- Right-click to select a device in the Projects window.
- By selecting a device in the projects window and then clicking the “Download memory” button in the overview window.
- By selecting a device group in the project window and selecting at least one device in the Overview window with the “Download memory” button.

Brief description:

- Depending on the type of device (device memory), the measurement data is loaded from the device memory to ecoExplorer go. The imported measurement values are to found, for example, in the value tree window under “Historical data”.

Steps:

- Select a suitable device (device with internal memory) in the projects window.
- Start the measurement value transmission from the device using the “Download memory” button in the navigation window.
- This starts the transmission. A status bar shows the progress of the transmission. It is still possible to work with ecoExplorer go during transmission.

3.5.36 Add topology page

How:

- By selecting the Topology node in the Projects window via the right mousekey.

Brief description:

- Visualisation of a topology structure with devices and measurement values.

Steps:

- Select the “Topology” node in the projects window.
- Select “Add new topology page” by right-clicking on “Topology” in the pop-up menu.
- Assign the new topology page a name. It appears as a node under “Topology”.
- Create an individual topology with the devices and values (see Adding topology, Topology window).

3.5.37 Editing topology page

How:

- By selecting a newly created topology page in the Projects window by double-clicking the “Edit mode” button in the topology window.

Brief description:

- Enables a topology page to be edited.

Steps:

- Double-click a previously created and saved topology page in the projects window (see “Topology window”, “Adding topology”).
- Click the “Edit mode” button in the topology window.
- Edit the displayed elements or create new ones (see “Adding topology”).
- Save the change(s) via the “Save” button. If the window is closed after an unsaved change has been made to the topology page, a prompt on saving the changes appears.
- Afterwards quit edit mode with the “View mode” button.

3.5.38 Changing topology page backgrounds

How:

- By clicking the “Change background” or “Delete background” buttons within a topology window in edit mode.

Brief description:

- Enables a background image to be defined or deleted for an existing topology page.

Steps:

- Via the projects window, create a new topology page (see “Add topology page”) or selected an existing page in the projects window by double-clicking (see “Topology window”, “Adding topology”).
- Click the “Edit mode” button in the topology window.
- To upload a background image click the “Change background “ button and via the following selection dialogue select the background image created in an external program (for example in JPG, PNG, GIF or BMP formats).
- If the selected file format is supported, it will be displayed in the topology window as the background image. Then position the devices or measurement values, as required, in the topology window.
- A background image is deleted in edit mode via the “Delete background” button.

3.5.39 Deleting topology page

How:

- By selecting an existing topology page in the projects window and by right-clicking “Delete topology page” in the pop-up menu.

Brief description:

- Enables a saved topology page to be deleted.

Steps:

- Right-click a saved topology page and select “Delete topology page” in the pop-up menu that appears.
- Confirm the prompt in relation to the desired deletion with “OK”. This deletes the selected topology page from the project.

3.5.40 Renaming topology page

How:

- By selecting an existing topology page in the projects window and by right-clicking “Rename topology page” in the pop-up menu.

Brief description:

- Enables a saved topology page to be renamed.

Steps:

- Right-click a saved topology page and select “Rename topology page” in the pop-up menu that appears.
- Assign a new name and confirm with “OK”.
- The saved topology page then appears in the projects window with a new name.

3.5.41 Adding and configuring topology elements

How:

- Adding elements: By editing (edit mode) an existing topology page via the palette window, for example
- Configuring elements: By right-clicking elements on an existing topology page and selecting the appropriate function in the pop-up menu.

Brief description:

- Enables topology elements to be added and then configured.

Steps:

- Double-click a previously created and saved topology page in the projects window (see “Topology window”, “Adding topology”).
- Click the “Edit mode” button in the topology window.
- If the palette window is not visible, click the menu item “Window --> Palette” to open it.
- Set some topology elements. In this regard, see Adding topology.
  - Drag the element “device” from the palette window and drop it in the topology window area. Then select a device in the projects window and drag this with the mouse and drop it on the newly created device element. The device is shown with several measurement values. Configure the element (configure device element).

    NOTE: Device elements can also be directed inserted into an editable topology page by dragging a device from the projects window.
  - Drag the element “online values” from the palette window and drop it in the topology window area. Then selected an online value from the value tree window for a device and drag this over the newly created element. The selected measurement value is then displayed.

    NOTE: Online elements can also be directed inserted into an editable topology page by dragging a device from the value tree window.
  - Drag the element “links”, “text” and “image” one after another and drop them in the topology window area.
    - Device: Enables display of a device with associated measurement values
    - Links: Enables other topology pages, external files and URL pages to be linked.
    - Online values: Enables display of online measurement values.
    - Text: Enables input of individual texts.
    - Image: Enables individual images to be placed, which can be changed in accordance with a measurement value size.
- Configure the individual elements by right-clicking the respective elements and the relevant pop-up menu items and then save the changed topology page by clicking the “Save” button.
- Configuring devices element
- Configuring link element
- Configuring online values element
- Configuring text element
- Configuring image element

Configuring “link” topology element

- Double-click a previously created and saved topology page in the projects window via the “Topology” node (see “Add topology page”, “Editing topology page”).
- If the palette window is not visible, open it via the “Window --> Palette” menu.
- Drag the “Link” element from the palette window and drop it in the topology window area.
- Open the flyout menu by right clicking desired element and select the menu item “Title”.
  - Enter your individual display in the text box. Select the desired font via “Select font parameters” and via “Select font colour”. Define the background colour and frame colour/thickness via the respective buttons.
- Select the desired link type via the list and confirm the selection with “OK”.
  - “Open linked Topology Page”
    Create a link to a previously existing, saved topology page. To do this, select the desired topology page from the second list.
  - “Open external File”
    Creates a link to an existing external file. To do this, open the file selection box via the “...” button and select the desired file, which is to be opened by clicking the element.
  - “Browse URL”
    Creates a link to a URL address. To do this, assign the desired URL address plus protocol (e.g. “http://”, “ftp://”).
  - “Execute File”
    Creates a link to an executable file (e.g. a batch/script or EXE file).
    If required, you can enter transfer parameters for the executable file via the free input box.
- Determine via the items “To front” or “To back” in the flyout menu, the visible order of the elements (see “Configuring topology element “Device””)
- An element can be removed from the topology page via “Remove link” in the flyout menu for the element.

Configuring topology element “device”

- Select a device in the projects window and drag it to the open topology window.
- Open the flyout menu by right clicking desired element (device) and select the desired function:
  - “To front”, “To back”
    If two elements are superimposed or overlap, then the visible sequence can be changed via these settings.
  - “Remove values from display”
    The device element is connected with the display of several measurement values. Via this menu item, the measurement values to be displayed can be determined via a dialog box. Select the undesired measurement values and remove these from the element with the “Remove values” button and then confirm with “OK”. The measurement value display for the device is then updated on the topology page.
  - “Remove all values from display”
    Removes the measurement value display associated with the device element. Only the device then appears on the topology page as element.
    - “Copy list of displayed values”, “Insert valuesfrom the copied list”
      Enables copying of the displayed value types for a device and the use of these in the value display of another device.
      Example:
      Via “Delete values from display”, delete all displayed values except for “Effective voltage L1 and L2”

from the device element A.
Copy the list with the menu item “Copy list of displayed values” in the flyout menu. Create a new device element B (see Adding topology) and delete all associated measurement value displays for this element via “Delete all values from display”. Via the menu item “Insert values from the copied list”, insert the measurement values previously copied from device element A in device element B.

- “Remove device”
  Deletes the device element from the topology page.
- “Activate automatic scaling (all devices)”, “Switch off scaling (all devices)”
  The measurement devices for all devices are automatically scaled by ecoExplorer go via their units. If scaling is deactivated, the measurement value display will be determined by the device.
- “Edit scaling (all devices)”
  The group of work and power values are individually adjustable in the scaling. For other values, a selection is made between “No scaling” or “Automatic scaling”.
- “Edit size”
  Enables change of display size of the device element by entering pixel width and height. Enables display to be scaled via the element corners (see Adding topology)

Configuring topology element “image”

- Double-click a previously created and saved topology page in the projects window via the “Topology” node (see “Add topology page”, “Editing topology page”).
- If the palette window is not visible, open it via the “Window --> Palette” menu.
- Drag the “Image” element from the palette window and drop it in the topology window area.
- Open the flyout menu by by right mouseclicking desired element and select the menu item “Configure”.
  NOTE: Any changes to the configuration are immediately effective, i.e. their effects can be viewed in the background without having to first quit the configuration dialog.
- Select the corresponding device and the desired measurement value for the image.
- Add an image in PNG or JPG format via the “Add image” button. The selected image then appears in the Images pane. A value ranage initialized with - to + appears under the image. The upper and lower limit of the selected value is defined via the value range; these limits control the display of the associated image, i.e. if the selected measurement value is within the value range, then precisely this image is displayed. Via a click with the right mousekey on the image, a configuration window for the boundary values of the image is opened, by means of which these can be adjusted. An error image is displayed next to the selection boxes for the device and value type. This can be modified via the corresponding button below or provided again on the system. Default image with red cross on white background is reset. The error image is displayed if an invalid boundary value configuration series is present, no access to device is possible or the selected value type is no longer available.
- Invalid image boundary value configurations: If the value ranges of various images overlap, depending on the current value status, no clear assessment can be made about the image display in the topology. Furthermore, gaps between the individual limit value ranges are not permissible. Further errors can result from the use of open barriers at the bottom (-) or top (+). Only if there are gaps between the boundary value ranges can all 3 different elements be used with open interval at the same time, otherwise only a maximum of 2 of them (in this case the 3rd element closes the gaps). Two equal elements with open interval (even if the close interval boundary is the same) remain unpermissible. Every invalid state is acknowledged with an error message at the bottom of the configuration window and it is not possible to save this configuration.
- It should be noted that any changes to the configuration are immediately effective, i.e. their effects can be viewed in the background. However, invalid configurations cannot be permanently saved, as in this

case the Finish button is concealed and only way to quit the configuration window is via the reset button or corrections must be made previously.

- Add another image via the “Add image” button. The value range of this image is then initialized with minus infinity (-) to plus infinity (+). As the value range of both images overlap, an error message appears and saving is not possible.
- Then configure the value range of the loaded images via the right mousekey. Click the corresponding image and select the item “Bounds Config” in the flyout menu. Set the corresponding value range via the input fields for the upper and lower boundary. If no specific boundary is entered, this input is read as “infinity” (). The image value ranges may not overlap and may not have gaps! The images are automatically sorted in rising order from the lower boundary value. It thus does not play a role in which order you insert the images. If no errors are present, the configuration dialog can be saved via “Exit”. The “Revert and Exit” button enables the changes to be reset.
- Example:
  - Select a device and set the measurement value to “Effective power L1”.
  - Add an image via the “Add image” button (the value range is from “-” to “+”)..
  - Add another image (the value range is from “-” to “+”)..
  - The configuration indicates an error as the value ranges overlap.
  - Set the value range in the flyout menu via item “Boun ds Config” by right clicking the corresponding image (image 1). Set the upper limit to a sensible value (x1).
  - Proceed as above to configure the value range for the second image. Set the lower limit to the valuex1 (see above, upper boundary of Image 1).
  - If the measurement value size now changes the value range, then the image also changes. The change is directly visible in the topology window.
  - Quit the configuration dialog with “Exit”.
- The image to be shown in the event of an error (e.g. “Connection to device lost” or “Measurement value no longer available”) can be edited via the “Select Error Image” button.
- By clicking the image element, determine with the items “forward” or “back” in the flyout menu, the visible order of the elements (see “Configuring device topology element”).

An element can be removed from the topology page via “Delete element” in the flyout menu for the element.

Configuring topology element “Online value”

- Using the menu item “Window --> Value type(s)”, open the value tree window.
- Select a device in the project window. The online values in the value tree window then show the measurement values for this device.
- Open the desired measurement value type in the node structure for the online values (e.g. “Effective voltage”).
  - With the left mousekey or alternatively with <Ctrl> or <Shift>, select several of these and also drag it/them with the left mousekey to the topology window.
- Open the flyout menu by right clicking desired element (measurement value) and select the desired function:
  - “To front”, “To back”
    If two elements are superimposed or overlap, then the visible sequence can be changed via these settings.
  - “Title”

Opens a dialog for element configuration with settings for frame, title, background and text colour, font, number of decimal places and enables the configuration of a colour change when the set boundary value is exceeded/undershot.

- "Remove value"
  Deletes the selected element.
- "Activate automatic scaling (all devices)", "Switch off scaling (all devices)"
  The measurement devices for all devices are automatically scaled by ecoExplorer go via their units. If scaling is deactivated, the measurement value display will be determined by the device.
- "Edit scaling (all devices)"
  The group of work and power values are individually adjustable in the scaling. For other values, a selection is made between "No scaling" and "Automatic scaling".

Configuring topology element "Static text"

- Double-click a previously created and saved topology page in the projects window via the "Topology" node (see "Creating topology page", "Editing topology page").
- If the palette window is not visible, open it via the "Window --> Palette" menu.
- Drag the "Text" element from the palette window and drop it in the topology window area.
- Open the flyout menu by right clicking desired element and select the menu item "Title".
- Enter your individual text in the text box. Select the desired font via "Select font parameters" and via "Select colour" and confirm the configuration with "OK".
- Determine via the items "To front" or "To back" in the flyout menu, the visible order of the elements (see "Configuring topology element "Device"").
- An element can be removed from the topology page via "Remove text" in the flyout menu for the element.

3.5.42 Configuring connection

How:

- By right-clicking a device in the projects window.
- By selecting a device in the projects window and then clicking the "Configure connection" button in the overview window.
- By selecting a device group in the projects window and then selecting at least one device in then navigation window via the "Configure connection" button.

Brief description:

- Enables configuration of the device connection (see "Creating new device").

Steps:

- Select a device in the projects window by right-clicking it and select "Configure connection" in the pop-up menu. Select a connection type and complete the remaining entries (such as device address).
- As a precaution, perform a connection test via the "Connection test" button. If the connection is successful, a dialogue with additional device information will be displayed.

3.5.43 Connection test

How:

- By right-clicking a device in the projects window.
- By selecting a device in the project window via the “Connection test” button in the overview window.
- By selecting a device group in the projects window and then selecting at least one device in the overview window via the “
- Connection test” button.

Brief description:

- Attempts to establish a connection with the selected device(s).

Steps:

- Select a suitable device or a device group in the projects window.
- When selecting a project group, select at least 1 device in the overview window. Start the device connection test via the “Connection test” button in the overview window.
- An attempt will be made to establish a connection to the device. A window will inform you whether a connection wasestablished.

3.5.44 Creating directories in the user-defined tree

How:

- By selecting an existing tree in the projects window by right-clicking in the pop-up menu under “Create directory”.

Brief description:

- Enables the creation of additional sub-directories in a tree created by the user.

Steps:

- If no user-defined tree is available in the projects window, this must be created (see “Creating customized tree”).
- Select a tree created by the user in the projects window and create a sub-directory by right clicking the pop-up menu and selecting “Create folder”.
- Assign a name to the sub-directory and confirm with “OK”.
- A new entry then appears in the projects window below the tree created by the user. By sliding a device from the “By device type” group to the sub-directory, a link to this device is created to this device.

3.5.45 Phasor diagram

How:

- By selecting a device in the projects window and by right-clicking “Show phasor graph” in the pop-up menu.
- In the palette window, by selecting the “Graphs” node in the projects window.

Brief description:

- Shows the phase angle and the rotary field direction of the selected device in a phasor diagram.
- The rotary field usually rotates to the “right”.

Steps:

- Select a device in the projects window by right-clicking it and select “Show phasor graph” in the pop-up menu.
- Or select the Graphs node in the projects window. Open the palette window (menu item “Windows/Palette”) and drag the “phasor graph” icon into the graphs window. Drag a device from the projects window to the empty phasor diagram.

3.5.46 Displaying overview window

How:

- By selecting the “By type” node, a device class or a device in the projects window - either by double-clicking or via the right-mousekey and the item “Show overview” in the pop-up menu.

Brief description:

- Opens the overview window and shows additional information in this:
- Overview window for the “By device type” node: List of all integrated devices with the following information: Device name, type, description, connection type with status, last synchronised value and read-out schedule.
- Overview window for a device class: List of all devices, which belong to the same class, with the following information: Device name, type, description, connection type with status, last synchronised value and read-out schedule.
- Device overview window: Presentation of specific information for a certain device e.g. serial number, firmware version, hardware revision, connection, address, selection of energy values, min/max values etc.

Steps:

- In the projects window, either select:
  - the “By type” node:
  - a device group node or
  - an individual device.
- Double click with the right mousekey the selected entry or alternatively open the pop-up menu via the right mousekey and then click “Show overview”. The overview window is opened.

3.5.47 Configure time synchronisation

How:

- By selecting a device in the projects window and right-clicking “Configure time synchronisation” in the pop-up menu.
- By selecting a device group in the projects window and at least one device in the overview window, and then right-clicking “Configure time synchronisation” in the pop-up menu.
  By pressing the <Ctrl> key or the <Shift> key, the mouse can be used to select more than one device at a time in the overview window.

Brief description:

- Enables synchronisation of the device time with the PC time.

Steps:

- Select a device group in the project window.
- Select at least one device in the overview window.
- Right-click the mouse and select the item “Configure time synchronisation” in the pop-up menu.
- If a schedule does not yet exist, this can be configured by selecting “Add schedule” (see Schedules).
- Select a schedule and confirm the time setting with “OK”.

4 Devices

4.1 Energy Meter D370

4.1.1 Connection to computer

Example 1:

The Energy Meter D370 has an RS485 interface and the PC has an RS232 interface. An interface converter is required.

Example 2:

The Energy Meter D370 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: Energy Analyser D550, Energy Analyser 550.

4.1.2 Adding device

Integrating Energy Meter D370 in ecoExplorer go

- The Energy Meter D370 must be connected to the PC via a gateway (device type) or via an interface converter (Example of connection).
  Create a new Energy Meter D370 in ecoExplorer go and define the connection type (First steps, Adding new device).

Connection types

Ethernet gateway (e.g. for the devices connected to the RS485)

A gateway is required to be able to connect the Energy Meter D370 via Ethernet to the PC and to be able to configure it and read it with ecoExplorer go.

- The Energy Meter D370 has an RS485 interface.
- The gateway must have both an RS485 and an Ethernet interface (e.g. a Energy Analyser D550 with the appropriate options).
- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one Energy Meter D370 can be connected to the gateway, the device address set in the Energy Meter D370 must also be set under the connection settings (see Fig. Configuring the connection).
- If no connection could be established to the Energy Meter D370, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter D370, the number of attempted connections will be limited by the number set under max. no. of attempts.
- The connection protocol must be set via the Modbus protocol. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter D370.

Modbus RTU (RS485/RS232)

An interface converter is required to be able to connect the Energy Meter D370 to the PCs RS232 interface and to be able to configure it and read it with ecoExplorer go.

- The Energy Meter D370 has an RS485 interface.
- An interface converter from RS485 (Energy Meter D370) to RS232 (PC) is required.
- Adapt the PCs RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- Baud rate; Is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Meter D370.
- Because more than one Energy Meter D370 can be connected to the interface converter, the device address set in the Energy Meter D370 must also be set under the connection settings.
- If no connection could be established to the Energy Meter D370, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter D370, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter D370.

4.1.3 Configuration

4.1.3.1 Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

4.1.3.2 Transformer

Voltage transformers

- The voltage measurement inputs are designed for the measurement of low voltages in which rated voltages (L-N/PE) of up to 300 V against earth can occur.
- Voltage transformers are necessary in networks with higher rated voltages.
- Outer voltage L-L must be input for the primary voltage.
- Set the transformer requirements for the current measurement inputs.

Current transformers

- Currents up to 5 A can be measured directly. Observe the installation guide when doing this.
- Transformers are used when measuring currents greater than 5 A.
- Set the transformer requirements for the current measurement input.

4.1.3.3 Phase mapping

The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

4.1.3.4 Nominal values

- The rated frequency applies for all 3 measurement channels.
- Select the mains frequency in accordance with the available mains supply.

4.1.3.5 Averaging intervals

- The applied exponential messaging method reaches at least 95 % of the measurement value once the reporting time has lapsed.
- A reporting time of 15 minutes is set ex works.

4.1.3.6 Comparators

- 2 comparator groups, each with 3 comparators (A,B,C), are provided for the monitoring of threshold values.
- The results of the comparators can be linked by AND or OR operators and the result inverted if desired.

4.1.3.7 Serial interface

An interface converter is required in order to establish a direct connection between the PC (RS232 interface) and the Energy Meter D370 (RS485 interface). The Energy Meter D370 can only function as a Modbus slave.

As more than one Energy Meter D370 can be connected to an interface converter, each Energy Meter D370 must be set with its own device address.

Note that the device address 0 is reserved for servicing. Two rotary switches on the device are used to set the device address.

- RS485 in the Modus Modbus slave
- Baud rate selection from 9600 bps, 19200 bps, 38400 bps, 115200 bps and auto detect.
- The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Analyser D550. The Energy Meter D370 is set in the factory to the automatic baud rate recognition feature, “auto detect”.
- If a fixed baud rate is selected in the Energy Meter D370, it must also be programmed in the remote station (PC, Energy Analyser D550). The auto detect setting in the Energy Meter D370 attempts to establish the baud rate in the remote station with a maximum of 8 attempts.

4.1.3.8 Naming of the inputs

- Enables naming of inputs and outputs.
- The respective inputs/appoints can be assigned names by entering a name in the corresponding box.

4.1.3.9 Setting device address

- Two rotary switches on the device are used to set the device address from 1 to 99.
- When using more than one Energy Meter D370, for example with an interface converter, each device must be set with its own address.

4.1.4 Modbus functions

Modbus functions supported by Energy Meter D370:

- 03 Read Holding Registers
- 04 Read Input Registers
- 06 Preset Single Register
- 16 Preset Multiple Registers

4.2 Energy Meter 610

4.2.1 Connection to computer

Example 1:

The Energy Meter 610 and the PC have an RS232 interface.

Example 2:

The Energy Meter 610 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: Energy Analyser D550, Energy Analyser 550.

Example 3:

The Energy Meter 610 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: Energy Analyser D550, Energy Analyser 550.

4.2.2 Adding device

Integrating Energy Meter 610 in ecoExplorer go

- Create a new Energy Meter 610 in ecoExplorer go and define the appropriate type of connection for your device (First steps, Adding new device).

Connection types

Ethernet gateway (e.g. for the devices connected to the RS485)

A gateway is required to be able to connect the Energy Meter 610 via Ethernet to the PC and to be able to configure it and read it with ecoExplorer go.

- The Energy Meter 610 has an RS485 interface.
- The gateway must have both an RS485 and an Ethernet interface (e.g. a Energy Analyser D550 with the appropriate options).
- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one Energy Meter 610 can be connected to the gateway, the device address set in the Energy Meter D370 must also be set under the connection settings (see Fig. Configuring the connection).
- If no connection could be established to the Energy Meter 610, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter 610, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- The connection protocol must be set via the Modbus protocol. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter 610.

Modbus RTU (RS485/RS232)

- Using an RS485 connection, a direct connection can be established over an interface converter between

the Energy Meter D650 and the PCs RS232 interface (Connection).

RS232-RS232 connection

- The Energy Meter 610 has an RS232 interface.
- Adapt the PCs RS232 interface (e.g. COM1) to be used as the interface.
- Baud rate; the baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Meter 610.
- Device address: set the set Energy Meter 610 device address.
- If no connection could be established to the Energy Meter 610, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter 610, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter 610.

RS232-RS485 connection

- The Energy Meter D370 has an RS485 interface.
- An interface converter from RS485 (Energy Meter 610) to RS232 (PC) is required.
- Adapt the PCs RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- Baud rate; the baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Meter D370.
- Because more than one Energy Meter 610 can be connected to the interface converter, the device address set in the Energy Meter 610 must also be set under the connection settings.
- If no connection could be established to the Energy Meter 610, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter 610, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter 610.

4.2.3 Configuration

4.2.3.1 Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

4.2.3.2 Transformers

Voltage transformers

- The Energy Meter 610 voltage measurement inputs are designed for the measurement of low voltages in which rated voltages (L-N/PE) of up to 300 V against earth can occur.
- Voltage transformers are necessary in networks with higher rated voltages.
- The converter requirements for each voltage input must be determined separately.

Current transformers

- Currents up to 5 A can be measured directly. Observe the installation guide when doing this.
- Transformers are used when measuring currents greater than 5 A.
- Set the current converter requirements for the current measurement input.

4.2.3.3 Phase mapping

The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

4.2.3.4 Measuring variants

Set the device’s connection variant for the voltage and current measurements (operating manual).

4.2.3.5 Nominal values

- All 4 of the measurement channels are activated via the rated frequency. Select the mains frequency in accordance with the available grid supply.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent).
- The rated current of the transformer at the supply is required in order to calculate the K factor.
- The relevant voltage indicates whether a measurement is to be made between the outer conductor L-L or between outer conductor L and neutral conductor N.
- The relevant voltage is required for the calculation of harmonics, events and flicker.

- For Energy Analyser D550 and Energy Meter 610 devices with the firmware small Rel. 2.x, the relevant voltage is not adjustable and is always L-N.
- In the 3-conductor network (e.g. mean voltage) the relevant voltage relates to a calculated star point.

4.2.3.6 Averaging intervals

The applied exponential messaging method reaches at least 95 % of the measurement value once the reporting time has run its course.

A reporting time of 10 minutes is set ex works.

4.2.3.7 Recording configuration

- Up to 16 records can be configured when configuring recording.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are
- derived from the measurement values in the measurement timeframe.
- The mean value measurement timeframe is established by the time set under “Time basis”.
- Measurement values are saved once the time set under “Time base” has lapsed (Calculation of required storage capacity).

Setting up / editing a recording configuration

- An individual recording instance can be set up using the “New “ or “Edit” buttons.
- Measurement values are selected in the recording window using the “Add values” button.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- The selected measurement values can be described in more detail via the option “Mean (arithmetical)”, “Mean (RMS)”, “Minimum”, “Maximum”, “Sample” and “With value change”.
- Mean (arithmetical)
- The arithmetical mean is the ratio of the sum and the number of all 200 ms measurement values: x(arithm.) = (x1+x2+x3...) / n
- Mean (rms)
- This value describes a quadratic mean (potential mean) with: x (rms) = root ((x12+x22+x32+..) / n)
- Minimum / Maximum
- When these buttons are selected, the means of the minimum and/or maximum values are recorded.
- Sample
- Sample describes the recording of the measurement value within the defined time duration. The time baseline defines the time intervals at which the recording is made.

In contrast to the arithmetical mean, the quadratic mean is of increasing importance when the measurement values vary greatly cyclically. Outliers in the measurement values thus have a greater significance. With a value like voltage, it is a good idea to take this more into account than for a power value. Using the “Delete values” button, selected measurement values can be deleted.

EN 50160 and EN 61000-2-4 presettings selection aid

- Via the EN 50160 and EN 61000-2-4 buttons, recording configurations can be predefined.
- If the device does not support measurement as per EN 50160, a prompt appears.

4.2.3.8 Time

- The Energy Meter 610 has a clock with a battery backup.
- The fault in the clock’s quartz is aligned with room temperature during production so that the clock only deviates by +-1 minute/month.
- The clock is programmed ex works for local time.
- During configuration, the clock can be aligned to UTC time in the connected PC.

4.2.3.9 Time zone

All time information with regard to measurement values, events and transients relate to UTC time (Coordinated Universal Time). ecoExplorer go converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time - time offset from Central European Winter Time relative to UTC time.
- Summer time - time offset from Central European Summer Time relative to UTC time.
- Start of daylight saving time - start of daylight saving time.
- End of daylight saving time - end of daylight saving time.

4.2.3.10 Inputs

The Energy Meter 610 has two digital outputs and an input used to measure temperature. Both digital inputs can be used as digital inputs and as input pulse meters.

A pulse value can be assigned to every pulse input.

Various temperature sensors can be connected to the input used to measure temperature:

- PT100 - temperature range -55...+175 °C
- PT1000 - temperature range -40...+300 °C
- KTY83 - temperature range -99...+500 °C
- KTY84 - temperature range -99...+500 °C

4.2.3.11 Digital outputs

The Energy Meter 610 has two digital outputs. Both of these digital outputs can be programmed as a pulse output (S0 output) or as a comparator group output.

Each digital output can be programmed as a NC or NO contact.

4.2.3.12 Comparator

- 2 comparator groups, each with 4 comparators (A,B,C,D), are provided for the monitoring of threshold values.
- The results of the comparators can be AND or OR linked and the result inverted if desired.
- The overall linked result for the comparator group 1 can be allocated to the digital output 1 and the overall linked result for the comparator group 2 can be allocated to the digital output 2.

4.2.3.13 Serial ports

- Device ID
- The device ID (device address) is required for Modbus communication and for the Profibus.
- Each device has its own address within the bus.
- RS485
- Modbus setting: Modbus slave
- Baudrate selection from 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps and 921600 bps
- The baudrate is to be selected uniformly in grid.
- RS232
- Modbus settings: Modbus slave and SLIP
- Baud rate selection from 9600 bps, 19200 bps, 38400 bps, 57600 bps and 115200 bps
- Profibus (version P)

NOTE: Additional Profibus settings are made under Fieldbus profiles.

4.2.3.14 Fieldbus profiles

Fieldbus profiles hold a list of values which can be read or written by a PLC over the Profibus.

- Using ecoExplorer go, 16 fieldbus profiles can be configured.
- The Energy Meter 610 is pre-programmed ex works with 4 fieldbus profiles.
- Using the Edit button, the preconfigured fieldbus profiles can be retrospectively changed.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the Delete values button, selected measurement values can be deleted.
- The measurement value sequence can be determined with the position buttons.

4.2.3.15 Naming of inputs

- Enables naming of inputs and outputs.
- The respective inputs/appoints can be assigned names by entering a name in the corresponding box.

4.3 Energy Analyser D550

4.3.1 Connections to computer

Example 1 (RS232-RS485 connection):

The PC has an RS232 interface and the Energy Analyser D550 an RS485 interface. An interface converter is required.

Example 2 (direct Ethernet connection):

The PC and the Energy Analyser D550 have an Ethernet interface. Because there is a direct connection, a “twisted” patch cable must be used.

Example 3 (Ethernet connection):

The PC and the Energy Analyser D550 have an Ethernet interface. The connection is established in a network via a switch or a hub.

Example 4 (BACnet gateway connection):

The Energy Analyser D550 is used as a BACnet gateway with which to connect RS485 devices (e.g. Energy Meter D370). The Energy Analyser D550 is the Modbus master (RS485) and the Energy Meter D370 the Modbus slave, whereby the BACnet shows the Energy Meter D370 as the Energy Analyser D550 virtual device. A Jasic program queries the measurement values for the connected devices and provides the values to the BACnet.

Example 5 (Modbus gateway connection):

The Energy Analyser D550 is used as a gateway with which to connect RS485 devices (e.g. Energy Meter D370). The Energy Analyser D550 is the Modbus master (RS485) and the Energy Meter D370 the Modbus slave, whereby the baud rate to be set for both devices must concur. A Jasic program queries the measurement values for the connected Energy Meter D370 and makes them available for further processing.

4.3.2 Adding device

Integrating Energy Analyser D550 in ecoExplorer go

- Create a new Energy Analyser D550 in ecoExplorer go and define the appropriate type of connection for your device (First steps, Adding new device).
  - Ethernet interface (option) with the connection types TCP/IP and Modbus via Ethernet
  - RS485 interface with the connection type Modbus RTU (RS485)

Connection types

- TCP/IP connection
- A “twisted” patch cable is required in order to establish adirect connection between a PC and a Energy Analyser D550 via the Ethernet interface. A normal patch cable is used when establishing a connection in a network (a hub/switch is present).
- The Energy Analyser D550 address can be pulled via DHCP from a server or a fixed address set directly in the Energy Analyser D550.

- The address can be input as an address or as a name.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Modbus RTU (RS485/RS232)
- An interface converter is required to be able to connect the Energy Analyser D550 to the PCs RS232 interface and to be able to configure it and read it with ecoExplorer go.
- An interface converter from RS485 (Energy Analyser D550) to RS232 (PC) is required.
- Adapt the PCs RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Analyser D550.
- As more than one Energy Analyser D550 can be connected to the interface converter, the device address set in the Energy Analyser D550 must also be set in the interface converter.
- If it is not possible to establish a connection with the Energy Analyser D550, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Analyser D550, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- With online measurements, ecoExplorer go will repeatedly attempt to establish a connection to the Energy Analyser D550.
- Ethernet gateway (e.g. for the devices connected to the RS485)
- A gateway is required to be able to connect the Energy Meter D370 via Ethernet to the PC and to be able to configure it and read it with ecoExplorer go. A Energy Analyser D550 can be used to establish this gateway function (Connection example 5).
- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one device (e.g. Energy Meter D370) can be connected to the gateway, the device address set in the Energy Meter D370 must also be set under the connection settings (see Fig. Configuring the connection).
- If no connection could be established to the Energy Meter D370, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter D370, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- The connection protocol must be set via the Modbus protocol.
- TCP/IP packets are used when connecting via Modbus TCP.
- The TCP port 502 is reserved for Modbus TCP.
- When measuring online, the ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter D370.
- Secured TCP
- A connection between a PC and a Energy Analyser D550 via TCP/IP connection with secured access data.
- The Energy Analyser D550 address can be dragged via DHCP from a server or a fixed address set directly in the Energy Analyser D550.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Enter your access data (username, password) for a secured connection.

4.3.3 Introduction

4.3.3.1 Data memory

- The Energy Analyser D550 has a flash memory of 128 MByte.
- Of this, approx. 112 MByte are available to the user as data memory.
- Homepage add-ons or files loaded to the Energy Analyser D550 via FTP reduce the available data memory.

  In its delivery condition, with the factory default data memory configuration settings, the Energy Meter 750 can save the following quantities of data:

Estimated memory capacity for records

- Measured value, mean value, minimum value and maximum value each requires 4 bytes of memory.
- A dataset without measurement values requires 24 bytes of memory.
- A dataset with one measurement value requires the following per record: 24 bytes + 4 bytes = 28 bytes.
- A dataset with one mean value requires the following per record: 24 bytes + 4 bytes = 28 bytes.
- A dataset for a mean value with minimum and maximum values requires the following per record: 24 bytes + 4 bytes + 4 bytes + 4 bytes = 36 bytes.

Example: Measurement value records for the voltage in L1.

Time basis = 60 seconds.

Dataset = 24 bytes + 4 bytes measurement value, i.e.: Dataset = 28 bytes

Required memory per day (86400 seconds): Per day, 86400 / 60 = 1440 datasets are saved.

1440 datasets x 28 bytes = 40320 bytes of memory required per day.

Required memory per month: 40320 bytes x 31 days = 1249.92 kB required memory per month.

Required memory per year: 1249.92 kB x 12 months = approx. 15 MB required memory per year.

4.3.3.2 Error message

- The Energy Analyser D550 display shows the error message “Error CF”.
- Cause
  The calibration data cannot be read from the memory without error.
- Remedy
  Send the device to the manufacturer forinspection and testing.

4.3.3.3 Jasic

- 7 Jasic programs can be executed simultaneously in the Energy Analyser D550.
- 128 kByte of memory is available for each program.
- Jasic programs are easily created with the graphic programming integrated into ecoExplorer go.

4.3.3.4 Parameter list

- The parameter list is a list of addresses for settings that can be directly implemented on Energy Analyser D550.
- The parameter list forms part of the installation instructions.

If the Energy Analyser D550 is in “Programming mode” you can edit the values in the parameter list with numeric 1 and 2 keys (see Manual).

4.3.3.5 Configuration file init.jas

- init.jas is a text file that is saved in the directory/sys/config/init.jas of the Energy Analyser D550.
- init.jas contains the configuration data for the Energy Analyser D550.
- Part of init.jas is overwritten by ecoExplorer go.
- init.jas does not contain any configuration data for the EMAX program (option).
- init.jas does not contain any configuration data for recordings.

4.3.4 Measurement

4.3.4.1 Measurement values

- A measurement value (in the Energy Analyser D550) is an effective value generated over a 200 ms period (measurement window).
- A measurement window has 10 periods in the 50 Hz network and 12 periods in the 60 Hz network.
- A measurement window has a starting point and an end point.
- There are approx. 2 ns between the starting point and end point.
- The precision of the starting and end points depends on the precision of the internal clock. (Typically +-1 minute/month)
- Comparing and aligning the time in the device with that of a time server is recommended in order to improve the internal clock’s precision (time).

4.3.4.2 Full wave effective values

- A full wave effective value is a measurement value that corresponds with the formation of a full wave over a measurement period.
- For full wave effective values, measurement results are generated every 20 ms (50 Hz) or every 16.7 Hz (60 Hz).
- Full wave effective values can be used in Jasic programs.
- Calculated full wave effective values
  - Voltage, UL1-N, UL2-N, UL3-N, UL4-N

- Current, IL1, IL2, IL3, IL4
- Effective power, PL1, PL2, PL3, PL4
- Fundamental-wave reactive power Q0L1, Q0L2, Q0L3, Q0L4

The fundamental wave-reactive power compensation has a measurement error of as much as 0.2 % due to a constant phase shift of 1.5 ° and a ripple of 0.1 %.

- Processing time (calculation)
  - Typically 5 ms
  - Maximum 10 ms

  Processing time variables: Number and runtime of Jasic programs; homepage accesses.
- Transmission to the interfaces
  - Typical latency period 1 ms
  - maximum 7 ms
- Calculation of the full wave effective values

4.3.4.3 Fixed frequency

A frequency in the range 40...70 Hz can be selected for grid analysis.

Modbus address: 10248; type: float; number range: 0, 40...70 Hz

- Selectable in ecoExplorer go:
  - 50 Hz fixed frequency
  - Measurement values are calculated on the basis of 10 periods (200 ms measurement window).
  - 60 Hz fixed frequency
  - Measurement values are calculated on the basis of 12 periods (200 ms measurement window).
  - 0 automatic frequency determination
  - Frequency range: 40...70 Hz
  - Measurement values can be formed from the number of periods that best reflect a 200 ms measurement window.

NOTE: If a fixed frequency of e.g. 50 Hz or 60 Hz is selected, currents can be measured even if a measurement voltage has not been applied.
Other fixed frequencies in the range 40...70 Hz can only be set via the Modbus address.
The network frequency can also be calculatedand for example displayed by ecoExplorer go only if automatic frequency determination has been selected. Otherwise, only the selected fixed frequency will be displayed as the network frequency.

4.3.4.4 Flagging

- The identification of unreliable measurement values is called flagging.
- During voltage drops or increases or during an interruption, the measuring process can provide unreliable values for other variables (e.g. frequency measurement). It indicates that an extrapolated value can be unreliable.
- The Energy Analyser D550 applies the flagging concept in accordance with DIN EN 61000-4-30.

4.3.4.5 Deleting consumption meters

- Consumption meters can be deleted in the Modbus address list or in a Jasic program.
- The Energy Analyser D550 uses the following consumption meters:
  - Effective and apparent consumption meters
  - Reactive consumption meters

The addresses used to reset the consumption meters and themin./max values can be found in the Modbus address list and parameter list.

4.3.4.6 Recording

You can define your own values to be used when recording. These values are saved in the device (e.g. Energy Analyser D550) (recording configuration).

- Only numeric values can be recorded.
- Records can be read out by ecoExplorer go and saved in the database.
- Records can be used in the device's homepage (e.g. Energy Analyser D550).

The following recording methods are available:

- Mean values
  Mean values provided from the measurement values in a time window which can be selected, with the time window's start and end times. The corresponding min./max. values can also be recorded.
- Measurement values
  Record measurement values with the corresponding start and end times.
- Associated measurement values
  Measurement values with the corresponding end time and with the end time of the last measurement value as the start time.
  Advantage: The graphic representation shows no gaps.

NOTE: The selected recording method applies for all of the value names set up in the icon.

Connections:

- Update
  Input of update starts the calculation of the min., max. and mean values from the saved measurement

values in the measurement buffer.

- Reset
  Reset deletes the measurement buffer content.
- Save
  Entering save saves the pending measurement values (e.g. burner period) in the corresponding measurement value buffer.
- “Value name”
  At least one value name must be set up (e.g. burner period).

NOTE: It is necessary to at least link the save input and a “value input”.

Defining recording in Jasic

Double-clicking on the Jasic recording module (Jasic start) defines the recording method with a value name.

- Select the recording type.
- Use the Add button to assign a name to the measurement value.
- Define the value unit by double-clicking on the respective field under value unit.

4.3.4.7 Energy Analyser D550D - Residual current monitoring (RCM)

Monitoring residual current by measuring residual current in electric systems is a precaution used in preventative maintenance. Insulation faults caused by fault currents can be recognised early using residual current monitors (RCM) as specified in DIN EN 62020 (VDE 0663).

- Residual current monitoring is not a substitute for the recurring inspections to be carried out in accordance with DIN VDE 0105!
- Alternating currents and pulsing direct currents are monitored in accordance with EN 62020:1998+A1:2005.

Application

Protection and monitoring of systems in which fault currents form, e.g. as a result of:

- Dust deposits or moisture,
- Porous cables and wires,
- Capacitive fault currents,
- Insulation faults.

Measuring current in the Energy Meter 750

Measurement range:

- Current measuring input I1...I3: via transformer ../5A or ../1A (0.001...7.5 A AC)
- Current measuring input I4: via residual transformer ../30mA (0.03...30 mA AC)

NOTE: Direct current cannot be monitored.
In no way does measuring in this way relieve the user from the obligation to carry out recurring inspections of permanently installed electrical systems in accordance with DIN VDE 0105-100.

4.3.5 Configuration

4.3.5.1 Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

4.3.5.2 Transformers

Voltage transformers

- The Energy Analyser D550 voltage measurement inputs are designed for the measurement of low voltages in which rated voltages (L-N/PE) of up to 300 V against earth can occur.
- Voltage transformers are necessary in grids with higher rated voltages.
- The converter requirements for each voltage input must be determined separately.

Current transformers

- Currents up to 5 A can be measured directly. Observe the installation guide when doing this.
- Transformers are used when measuring currents greater than 5 A.
- Set the current converter requirements for the current measurement input.

4.3.5.3 Phase mapping

- The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

4.3.5.4 Measuring variants

Set the device’s connection variant for the voltage and current measurements (operating manual).

4.3.5.5 Nominal values

- All 4 of the measurement channels are activated via the rated frequency. Select the mains frequency in accordance with the available grid supply.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent).
- The rated current of the transformer at the supply is required in order to calculate the K factor.
- The relevant voltage indicates whether a measurement is to be made between the
  - outer conductor L-L or between
  - outer conductor L and neutral conductor N.
- The relevant voltage is required for the calculation of harmonics, events and flicker.

- For Energy Analyser D550 and Energy Meter 610 devices with the firmware small Rel. 2.x, the relevant voltage is not adjustable and is always L-N.
- In the 3-conductor network (e.g. mean voltage) the relevant voltage relates to a calculated star point.

4.3.5.6 Events

- An event occurs if threshold values set for the current and the voltage are violated.
- An event has a mean value, a minimum or maximum value, a start time and an end time.
- The ecoExplorer go event browser can display recorded events.
- Threshold values are set per measurement channel (L1...L4) for excess voltage, undervoltage and overcurrent as a percentage of the nominal values.
- Threshold values can be switched off by switching the Manual/Off button to Off.

4.3.5.7 Event recording

- Effective values recorded in the Energy Analyser D550 describe the trend of full wave effective values.
- Effective value recording can be started by an event or by a Jasic program.
- Various recording modes can be selected to record effective values triggered by an event.
  - Only the value in which the event was found.
  - Only voltage and current in the phase in which the event was found.
  - All of the inputs of the value in which the event was found.
  - All of the values in all the inputs
- The length of the effective value record is determined by the number of full wave effective values up to the beginning of the event (pre-run) and by the number of full wave effective values after the beginning of the event (after-run).
  - Pre-run setting range: 64...8192 full waves (up to firmware rel. 1.1: 64...6144 full waves)
  - After-run setting range: 64...8192 full waves (up to firmware rel. 1.1: 64...6144 full waves)

4.3.5.8 Transients

- Transients are fast voltage changes.
- The Energy Analyser D550 recognises transients if they are longer than 50 µs, although it only monitors the four voltage measurement inputs.
- There are two independent criteria by which transients are recognised.
  - Absolute: If a sampled value exceeds the set threshold, a transient is recognised.
    - Available settings:
    - Off - transient monitoring has been switched off
    - Automatic - the threshold value is calculated automatically and comes to 110 % of the current 200 ms effective value.

  - Manual - the transient monitoring uses the set threshold values.
- Fast increase: If the difference between two neighbouring sampled points exceeds the set threshold, a transient is recognised.
  - Available settings:
  - Off - transient monitoring has been switched off.
  - Automatic - the threshold value is calculated automatically and comes to 0.2175 times the current 200 ms effective value.
  - Manual - the transient monitoring uses the set threshold values.
- If a transient has been recognised, the threshold value increases by 20 V, both in automatic and in manual mode. This automatic increase of the threshold value switches off within 10 minutes.
- If a transient has been recognised, the wave form will be saved to a transient record.
- If a further transient is recognised within the next 60 seconds, it will be recorded with 512 points.

4.3.5.9 Transient recording

- If a transient has occurred, the wave shape can be saved in a transient record with an adjustable number of sampled points before and after the transient.
- The time between two sample points is always 50 µs.
- You can choose between the following measurement channels for recording in the transient record:
- The phase voltage will be recorded with the transient.
- The phase voltage and current will be recorded with the transient.
- All currents will be recorded.
- All voltages and all currents will be recorded.

Record length

- The number of sample points to be saved before the transient occurred:
  - Pre-run setting range: 64...8192 points (up to firmware rel. 1.1: 64..6144 points)
  - After-run setting range: 64...8192 points (up to firmware rel. 1.1: 64..6144 points)

4.3.5.10 Averaging intervals

- Parameterisation of the floating average (previous name for trailing value indicator) for the individual measurement values.
- The measurement values of the mean values are marked in the device display with an overline.
- The values can also be used for operators or comparators (Jasic).
- The adjustment range of the reporting times of the selected group (L1-L4) is 10, 15, 30, 60 seconds and 5, 8, 10, 15 minutes.
- The settings of different reporting intervals for each individual phase are made on the device.

4.3.5.11 Recording configuration

Recording configuration

- Up to 16 records can be configured when configuring recording.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are derived from the measurement values in the measurement timeframe.
- The mean value measurement timeframe is established by the time set under “Time basis”.
- Measurement values are saved once the time set under “Time basis” has run its course (Calculating required memory capacity).

Setting up / editing a recording configuration

- An individual recording instance can be set up using the New or Edit buttons.
- Measurement values are selected in the recording window using the Add values button.
- To do so drag the desired measurement value (measurement value group) over the value field. The measurement values are adopted and displayed.
- The selected measurement values can be described in more detail via the option “Mean (arithmetical)”, “Mean (RMS)”, “Minimum”, “Maximum”, “Sample” and “With value change”.
  - Mean (arithmetical)
    The arithmetical mean is the ratio of the sum and the number of all 200 ms measurement values:
    x(arithm.) = (x1+x2+x3...) / n
  - Mean (rms)
    This value describes a quadratic mean (potential mean) with: x (rms) = root ((x12+x22+x32+..) / n)
  - Minimum / Maximum
    When these buttons are selected, the means of the minimum and/or maximum values are recorded.
  - Sample
    Sample describes the recording of the measurement value within the defined time duration. The time baseline defines the time intervals at which the recording is made.
- With value change
  If the measurement value is changed, the 200 ms measurement value is recorded. This setting is useful for, for example, the monitoring of digital inputs and outputs (not with high frequency signals) or of the temperature input.

In contrast to the arithmetical mean, the quadratic mean is of increasing importance when the measurement values vary greatly cyclically. Outliers in the measurement values thus have a greater significance. With a value like voltage, it is a good idea to take this more into account than for a power value.

- Using the Delete values button, selected measurement values can be deleted.

EN 50160 and EN 61000-2-4 presettings selection aid

- Via the EN 50160 and EN 61000-2-4 buttons, recording configurations can be predefined.
- If the device does not support measurement as per EN 50160, a prompt appears.

Calculation of the required memory capacity

With the default programming for recordings a data memory of approx. 11 MByte p.a. will be occupied.

Recording 1

- 23 values, 900 seconds
- (4+4+4) x 23 + 24 = 300 Bytes per dataset
- A dataset is written into the memory every 900 seconds.
- This means that the required annual memory capacity is =>96 datasets per day, => 35040 datasets p.a., => 10.512 MByte p.a.

Recording 2

- 12 values, 3600 seconds
- 4 x 12 + 24 = 72 Bytes per dataset
- A dataset is written into the memory once an hour.
- This means that the required annual memory capacity is => 24 datasets per day, => 8760 datasets p.a., => 630.72 kByte p.a.

4.3.5.12 Memory configuration

- The Energy Analyser D550 has a storage capacity of approx. 112 MByte.
- The data memory has been partitioned as follows ex works:
  - 40 % for user-defined recording.
  - 22.5 % for the recording of transients.
  - 22.5 % for the recording of full wave effective values.
  - 10 % for the recording of events.
  - 5 % for the recording of flags (flagging).

4.3.5.13 Time

The Energy Analyser D550 has a clock with a battery backup. The fault in the clock's quartz is aligned with room temperature during production so that the clock only deviates by +-1 minute/month. If transient records and event records are to be compared with other measurement records, it is recommended that the time indicated by the Energy Analyser D550 be compared and aligned with that in a time server. For this purpose, the Energy Analyser D550 requires the Ethernet interface (option). The network time protocol (NTP) is used for synchronisation.

- Mode
  Off - synchronisation of the clock with an external time server is switched off.
  Lists - The Energy Analyser D550 is waiting for time information from a time server.
  Active - The Energy Analyser D550 automatically requests time information from an NTP server every 64 seconds.
- NTP server - this is where the time server's address is input.

Time setting

- During configuration, the clock can be aligned to UTC time in the connected PC.

4.3.5.14 Time zone

All time information with regard to measurement values, events and transients relate to UTC time (Coordinated Universal Time). ecoExplorer go converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time - time offset from Central European
- Winter Time relative to UTC time.
- Summer time - time offset from Central European
- Summer Time relative to UTC time.
- Start of daylight saving time - start of daylight saving time.
- End of daylight saving time - end of daylight saving time.

4.3.5.15 Inputs

The Energy Analyser D550 has two digital outputs and an input used to measure temperature. Both digital inputs can be used as digital inputs and as input pulse meters.

- A pulse value can be assigned to every pulse input.
- Various temperature sensors can be connected to the input used to measure temperature:
  - PT100 - temperature range -55...+175 °C
  - PT1000 - temperature range -40...+300 °C
  - KTY83 - temperature range -99...+500 °C
  - KTY84 - temperature range -99...+500 °C

4.3.5.16 Digital outputs

The Energy Analyser D550 has two digital outputs. Both of these digital outputs can be programmed for event messages or as a pulse output (S0 output).

- Each digital output can be programmed as a NC or NO contact.
- One or more events can be allocated to an output if it is programmed for event updates.
- The event output activates if a selected event occurs.

4.3.5.17 Serial outputs

- Device ID
  The device ID (device address) is required for Modbus communication and for the Profibus.
- RS485
  Setting the Modbus selection between Modbus master, Modbus slave, transparent gateway and BACnet IP. Baud rate selection from 9600 bps, 19200 bps, 38400 bps, 76800 bps, 115200 bps and 921600 bps
- RS232
  Setting the Modbus selection between Modbus slave, debug protocol and SLIP
- Baudrate selection of 9600 bps, 19200 bps, 38400 bps, 57600 bps, 76800 bps, 115200 bps
- Profibus (option)

NOTE: Additional Profibus settings are made under Fieldbus profiles.

4.3.5.18 Fieldbus profiles

Fieldbus profiles hold a list of values which can be read or written by a PLC via the Profibus (see Profibus profiles).

- Using ecoExplorer go, 16 fieldbus profiles can be configured.
- In the Energy Analyser D550, with firmware from 1.095, 4 fieldbus profiles are preconfigured ex works.
- Using the “Edit” button, the preconfigured fieldbus profiles can be retrospectively changed.
  - Clicking the “Add values” button opens an selection of measurement values or measurement value groups.
  - Drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
  - Using the Delete values button, selected measurement values can be deleted.
  - The measurement value sequence can be determined with the position buttons.

4.3.5.19 IP configuration

- For devices with the Ethernet option, it is necessary to set at least the IP address and the subnet mask.
- In the Energy Analyser D550, it is possible to choose between the options fixed IP address, BootP and DHCP mode.
- Fixed IP address
  All settings are undertaken by the user.
- BootP
  BootP allows for the fully automatic integration of a Energy Analyser D550 into an existing network.
- DHCP mode
  When started, the Energy Analyser D550 pulls all of its settings from the DHCP server.

IMPORTANT: Any settings should only be made after these have been discussed with the administrator.

4.3.5.20 Naming of inputs

- Enables naming of inputs and outputs.
- The respective inputs/appoints can be assigned names by entering a name in the corresponding box.

4.3.6 Serial interfaces

4.3.6.1 Ethernet

Ethernet: Introduction

To be able to operate the Energy Analyser D550 in the Ethernet, the Energy Analyser D550 requires an Ethernet address. There are three options here:

- Fixed IP address
  In networks without a DHCP server, the network address must be set directly in the Energy Analyser D550.
- BootP
  BootP allows for the fully automatic integration of a Energy Analyser D550 into an existing network.
- However, BootP is an older protocol and does not provide the scope of functions provided by DHCP.
- DHCP mode
  DHCP allows for the fully automatic integration of a Energy Analyser D550 into an existing network without additional configuration.
  When started, the Energy Analyser D550 automatically draws the IP address, the network screen and the gateway from the DHCP server.

The respective settings can be programmed into the Energy Analyser D550 under the parameter address 205.

- 0 = fixed IP
- 1 = BootP
- 2 = DHCP

Ethernet: Fixed IP address

In networks without a DHCP server, the network address must be set directly in the Energy Analyser D550. To do this, the following settings must be carried out:

1. Set up the Energy Analyser D550 for a fixed IP address.
2. Set the desired IP address, IP screen and IP gateway.

Put the Energy Analyser D550 into programming mode as explained in the operating manual and, using the keys 1 and 2, input the following addresses:

Address:
300 = xxx --- --- --- (IP address)
301 = --- xxx --- --- (IP address)
302 = --- --- xxx --- (IP address)
303 = --- --- --- xxx (IP address)
304 = xxx --- --- --- (IP screen)
305 = --- xxx --- --- (IP screen)
306 = --- --- xxx --- (IP screen)
307 = --- --- --- xxx (IP screen)
310 = xxx --- --- --- (IP gateway)

311 = --- xxx --- --- (IP gateway)
312 = --- --- xxx --- (IP gateway)
313 = --- --- --- xxx (IP gateway)

Ethernet: Ports
Devices equipped with the Ethernet option can use the following ports:

- UDP
- TFTP 1201
- Modbus/TCP 502
- DHCP 68
- NTP 123
- BaCnet 47808
- Nameservice 1200
- TCP
- HTTP 80 (can be edited in the ini.jas)
- FTP command port 21, (data port 1024, 1025, 1026, 1027)
- Modbus/TCP 502 (4 ports)
- Modbus RTU via Ethernet 8000 (1 port)

4.3.6.2 Modbus

Modbus address list
A list of the measurement values available in the device with the corresponding addresses and formats can be found on the CD/DVD provided with ecoExplorer go.

Modbus status
The Modbus functions, “Write Modbus” and “Read Modbus”, provided in the programming language Jasic deliver status messages. These can be written to a Log file or displayed directly in the Debug log.

Modbus status messages

- 0 (there are no faults)
- -1 (request submitted incorrectly)
  There is a serious fault. This should not occur in the graphic programming.
- -2 (CRC fault)
  Checksum fault
- -3 (device does not respond)
  The device is not connected. The baud rate does not match up.
- -4 (device in Modbus slave mode)
  For the Modbus functions, Write Modbus and Read Modbus in theprogramming language Jasic, the Energy Analyser D550 RS485 interface must be switched to Modbus master.
- 1(Illegal Function)
  The function code received in the query is not an allowable action for the slave. If a Poll Program Com-

plete command was issued, this code indicates that no program function preceded it.

- 2 (Illegal Data Adress)
  The data address received in the query is not an allowable address for the slave.
- 3 (Illegal Data Value)
  A value contained in the query data field is not an allowable value for the slave.
- 4 (Slave Device Failure)
  An unrecoverable error occurred while the slave was attempting to perform the requested action.
- 5 (Acknowledge)
  The slave has accepted the request and is processing it, but a long duration of time will be required to do so. This response is returned to prevent a timeout error from occurring in the master.
  The master can next issue a Poll Program Complete message to determine if processing is completed.
- 6 (Slave Device Busy)
  The slave is engaged in processing a long–duration program command. The master should retransmit the message later when the slave is free.
- 7 (Negative Acknowledge)
  The slave cannot perform the program function received in the query. This code is returned for an unsuccessful programming request using function code 13 or 14 decimal. The master should request diagnostic or error information from the slave.
- 8 (Memory Parity Error)
  The slave attempted to read extended memory, but detected a parity error in the memory. The master can retry the request, but service may be required on the slave device.

Modbus functions

Energy Analyser D550 supports the following Modbus functions as master:

- 01 Read Coil Status
  Reads the ON/OFF status of discrete outputs (0X references, coils) in the slave. Broadcast is not supported.
- 02 Read Input Status
  Reads the ON/OFF status of discrete inputs (0X references) in the slave. Broadcast is not supported.
- 03 Read Holding Registers
  Reads the binary contents of holding registers (4X references) in the slave.
- 04 Read Input Registers
  Reads the binary contents of input registers (3X references) in the slave.
- 05 Force Single Coil
  Forces a single coil (0X references) to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.
- 06 Preset Single Register
  Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.
- 15 (0F Hex) Force Multiple Coils
  Forces each coil (0X references) in a sequence of coils to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.
- 16 (10Hex) Preset Multiple Registers
  Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.
- 23 (17Hex) Read/Write 4X Registers
  Performs a combination of one read and one write operation in a single Modbus transaction. The function

can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

Energy Analyser D550 supports the following Modbus functions as slave:

- 03 Read Holding Registers
  Reads the binary contents of holding registers (4X references) in the slave.
- 04 Read Input Registers
  Reads the binary contents of input registers (3X references) in the slave.
- 06 Preset Single Register
  Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.
- 16 (10Hex) Preset Multiple Registers
  Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.
- 23 (17Hex) Read/Write 4X Registers
  Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

4.3.7 Security

4.3.7.1 File permissions

- Read and write permissions are identical and depend on the login (FTP).
- Read permissions for data files and logs can be configured.
- ADMINISTRATORS can write and delete.

4.3.7.2 Directory permissions

Directories created by the system cannot be deleted.

- /
  This can be read by GUESTS and written and deleted by the SYSTEM.
- /data
  This and the subdirectories can be read by the USER and written and deleted by the SYSTEM.
- /sys
  This and the subdirectories can be read by the USER and written and deleted by ADMIN.
- /basic
  This and the subdirectories can be read by the USER and written and deleted by USER.
- /http
  This and the subdirectories can be read by the GUEST and written and deleted by USER.

4.3.7.3 Encryption

Directories created by the system cannot be deleted.

- Files between ecoExplorer go and the Energy Analyser D550 can be encrypted for transmission.
- Files can be AES encrypted.
- AES stands for Advanced Encryption Standard. AES is a symmetrical encryption technology.

4.3.7.4 Authentification procedure

- The Energy Analyser D550 can use the CRAM-MD5 authentication procedure when connecting to ecoExplorer go.
- With this process, the password is not transferred in plain text.
- The process is explained in the RFC2195.

4.3.7.5 Password

- FTP password (admin)
  - Allows access to all of the values listed in the Modbus address listed in the device.
  - Allows access to all of the Jasic programs in the device.
  - Allows the device's homepage to be updated.
  - Factory default setting
  - Username: admin
  - Password: tbd
  - Password forgotten -

- FTP password (user)
  - Allows access to all of the values listed in the Modbus address listed in the device.
  - Allows access to all of the Jasic programs in the device.
  - Allows the device's homepage to be updated.
  - Factory default setting
    - Username: user
    - Password: tbd
  - Password forgotten - Using ecoExplorer go, establish a secure connection to the device and log in as admin.

- FTP password (guest)
  - Allows access to all of the values listed in the Modbus address listed in the device.
  - Allows access to all of the Jasic programs in the device.
  - Allows the device's homepage to be updated.
  - Factory default setting

  - Username: guest
  - Password: tbd
- Password forgotten -

- Homepage password
  - The homepage password (Modbus address 502) provides administrator rights for the device homepage.
  - The homepage password enables loading and starting Jasic programs on the device homepage.
  - Password mode (Modbus address 501). The Energy Analyser D550 uses three different password modes to access the homepage:
    - 0 - The homepage password is not requested at all. (Factory default setting)
    - 2 - The ability to change the configuration and to display measurement values requires the password to be entered once.
    - 128 - Every change in the configuration requires that the password be entered again.
  - The factory default setting for the homepage password is 0.
  - The homepage password has 4 digits.
  - The homepage password is requested every time the homepage is opened.
  - The homepage password is requested again after 5 minutes of inactivity.
  - Password forgotten - Using ecoExplorer go, establish a secure connection to the device and log in as admin.

- Display password
  - To make it difficult for program files to be changed accidentally on the device, the Energy Analyser D550 can be programmed with a 4-digit display password (Modbus address 500).
  - The factory default setting does not request a display password.
  - A forgotten display password can only be deleted using ecoExplorer go together with the FTP password.
  - The display password has 4 digits.
  - The display password can be input directly in the Energy Analyser D550.
  - Password forgotten - Using ecoExplorer go, establish a secure connection to the device and log in as admin.

- ecoExplorer go and FTP programs
  - The FTP password is required.
  - The FTP password is required in order to transfer files between ecoExplorer go and the device via Modbus TCP.
  - The FTP password is required in order to transfer files between ecoExplorer go and the device via Modbus RTU over Ethernet.

- Modbus TCP, Modbus RTU
  - No password protection is provided for, in order to enable retrieving measurement values (Modbus address list) using the Modbus RTU protocol.
  - The FTP password is required in order to transfer files between ecoExplorer go and the device via Modbus TCP.

- The FTP password is required in order to transfer files between ecoExplorer go and the device via Modbus RTU over Ethernet.

4.4 Energy Analyser 550

4.4.1 Connection to computer

Example 1 (RS232-RS485 connection):

The PC has an RS232 interface and the Energy Analyser 550 an RS485 interface. An interface converter is required.

Example 2 (direct Ethernet connection):

The PC and the Energy Analyser 550 have an Ethernet interface. Because there is a direct connection, a “twisted” patch cable must be used.

Example 3 (Ethernet connection):

The PC and the Energy Analyser 550 have an Ethernet interface. The connection is established in a network via a switch or a hub.

Example 4 (BACnet gateway connection):

The Energy Analyser 550 is used as a BACnet gateway with which to connect RS485 devices (e.g. Energy Meter D370). The Energy Analyser 550 is the Modbus master (RS485) and the Energy Meter D370 the Modbus slave, whereby the BACnet shows the Energy Meter D370 as the Energy Analyser 550 virtual device. A Jasic program queries the measurement values for the connected devices and provides the values to the BACnet.

Example 5 (Modbus gateway connection):

The Energy Analyser 550 is used as a gateway with which to connect RS485 devices (e.g. Energy Meter D370). The Energy Analyser 550 is the Modbus master (RS485) and the Energy Meter D370 the Modbus slave, whereby the baud rate to be set for both devices must be the same. A Jasic program queries the measurement values for the connected Energy Meter D370 and makes them available for further processing.

4.4.2 Adding device

Integrating Energy Analyser 550 in ecoExplorer go

- Create a new Energy Analyser 550 in ecoExplorer go and define the appropriate type of connection for your device (First steps, Adding new device).
  - Ethernet interface (option) with the connection types TCP/IP and Modbus via Ethernet
  - RS485 interface with the connection type Modbus RTU (RS485)

Connection types

- TCP/IP connection
- A “twisted” patch cable is required in order to establish a direct connection between a PC and a Energy Analyser 550 via the Ethernet interface. A normal patch cable is used when establishing a connection in a network (a hub/switch is present).
- The Energy Analyser 550 address can be pulled via DHCP from a server or a fixed address set directly in the Energy Analyser 550.

- The address can be input as an address or as a name.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Modbus RTU (RS485/RS232)
- An interface converter is required to be able to connect the Energy Analyser 550 to the PCs RS232 interface and to be able to configure it and read it with ecoExplorer go.
- An interface converter from RS485 (Energy Analyser 550) to RS232 (PC) is required.
- Adapt the PCs RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the Energy Analyser 550.
- Because more than one Energy Analyser 550 can be connected to the interface converter, the device address set in the Energy Analyser 550 must also be set in the interface converter.
- If no connection could be established to the Energy Analyser 550, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Analyser 550, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- With online measurements, ecoExplorer go will repeatedly attempt to establish a connection to the Energy Analyser 550.

Ethernet gateway (e.g. for the devices connected to the RS485)

A gateway is required to be able to connect the Energy Meter D370 via Ethernet to the PC and to be able to configure it and read it with ecoExplorer go. A Energy Analyser D550 can be used to establish this gateway function (Connection example 5).

- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one device (e.g. Energy Meter D370) can be connected to the gateway, the device address set in the Energy Meter D370 must also be set under the connection settings (see Fig. Configuring the connection).
- If no connection could be established to the Energy Meter D370, an attempt will be repeated following the set Timeout.
- When attempting to read data from the Energy Meter D370, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- The connection protocol must be set via the Modbus protocol. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- When measuring online, ecoExplorer go will repeatedly attempt to establish a connection to the Energy Meter D370.

Secured TCP

- A connection between a PC and a Energy Analyser 550 via TCP/IP connection with secured access data.
- The Energy Analyser 550 address can be dragged via DHCP from a server or a fixed address set directly in the Energy Analyser 550.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Enter your access data (username, password) for a secured connection.

4.4.3 Measurement

The Energy Analyser 550 has 4 measurement channels used to measure the current (I1..I4) and 4 measurement channels used to measure the voltage (V1..V4 against Vref). Measured voltage and measured current for the measurement channels 1-4 must derive from the same network.

- Baseline measurement
- The baseline measurement uses the measurement channels 1-3.
- Use the measurement channels 1-3 in three-phase systems.
- Supporting measurement
- The supporting measurement only uses measurement channel 4.
- Use measurement channel 4 when measuring in single-phase systems or in three-phase systems with symmetrical loads.
- The frequency setting and the setting for the relevant voltage are pulled automatically from the baseline measurement settings.

4.4.3.1 Half wave effective values

- A half wave effective value is a measurement value that corresponds with the formation of a full wave over a measurement period.
- For half wave effective values, measurement results are generated every 10 ms (50 Hz) or every 8.3 Hz (60 Hz).
- Half wave effective values CANNOT be used in Jasic programs.
- Calculated full wave effective values
- Voltage, UL1-N, UL2-N, UL3-N, UL4-N
- Current, IL1, IL2, IL3, IL4
- Calculation of the half wave effective values.

4.4.3.2 Base frequency

The Energy Analyser 550 operates in networks with base frequencies from 15 to 440 Hz.

If a fixed base frequency of 50 Hz or 60 Hz has been set in the Energy Analyser 550, then the voltage quality will be measured in accordance with EN 61000-4-30 Class A, and flicker calculated in accordance with EN 61000-4-15.

If automatic frequency recognition has been selected, voltage quality will be measured in accordance with EN 61000-4-30 Class S (as there is no synchronisation of the 10 minute measurement windows), and no flicker is calculated in accordance with EN 61000-4-15.

4.4.3.3 Jasic

- 7 Jasic programs can be executed simultaneously in the Energy Analyser 550.
- 128 kByte of memory is available for each program.
- Jasic programs are easily created with the graphic programming integrated into ecoExplorer go.

4.4.3.4 Relevant voltage

In three-phase systems, measurements can be carried out between the outer conductors and between the outer conductors and the star point.

The relevant voltage indicates whether a measurement is to be made between the outer conductors (mesh voltage) L-L or between the outer conductors and the star point (star voltage) L-N

Establishing the relevant voltage is required in order to calculate transients, events and flicker

4.4.3.5 Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

4.4.3.6 Transformers

Voltage measurement

- Three-phase, 4-conductor networks with earthed neutral line
- Rated voltages (L-N/PE) to a maximum of 417 V
- Rated voltages (L-N/PE) to a maximum of 277 V in accordance with UL
- Three-phase, 3-conductor networks, not earthed
- Rated voltages (L-L) to a maximum of 480 V
- Voltage transformers are necessary in networks with higher rated voltages

Voltage transformers

- The converter requirements for the main measurement and secondary measurement must be determined separately.
- Select the 400/400 V setting when measuring without a voltage converter.

Current measurement

- The Energy Analyser 550 can measure currents up to 5 A directly.
- Observe the installation guide when doing this.
- Transformers are used when measuring currents greater than 5 A.

Current transformers

- The converter requirements for the main measurement and secondary measurement must be determined separately.
- Select the 5/5 A setting when measuring currents directly.

4.4.3.7 Phase mapping

The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

4.4.3.8 Connection variants

Set the device's connection variant for the voltage and current measurements (operating manual).

4.4.3.9 Nominal values

- The measurement channels are addressed via the rated frequency. Select the mains frequency in accordance with the existing mains.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent), harmonics and flickers will require the nominal values as reference.
- The rated current of the transformer at the supply is required in order to calculate the K factor.
- The relevant voltage indicates whether a measurement is to be made between the outer conductor L-L or between outer conductor L and neutral conductor N.
- The relevant voltage is required for the calculation of harmonics, events and flicker.
- The relevant voltage can be set for Energy Analyser 550 devices. For Energy Analyser D550 and Energy Meter 610 devices with the firmware small Rel. 2.x, the relevant voltage is not adjustable and is always L-N.
- In the 3-conductor network (e.g. mean voltage) the relevant voltage relates to a calculated star point.

4.4.3.10 Ripple control signal

The ripple control voltage is a voltage measured with a carrier frequency established by the user. Only frequencies below 3 kHz are taken into account.

Events

- An event occurs if threshold values set for the current and the voltage are violated.
- An event has a mean value, a minimum or maximum value, a start time and an end time.
- The ecoExplorer go event browser can display recorded events.

- The threshold values are set for excess voltage, undervoltage, voltage interruption and overcurrent as a percentage of the nominal values.
- Threshold values can be switched off by switching the Manual/Off button to Off.

4.4.3.11 Event recording

- Effective values recorded in the Energy Analyser 550 describe the change in half wave effective values.
- Effective value recording can be started by an event.
- Various recording modes can be selected to record effective values triggered by an event.
  - Only the value in which the event was found.
  - Only voltage and current in the phase in which the event was found.
  - All of the inputs of the value in which the event was found.
  - All of the values in all of the inputs
- The length of the effective value record is determined by the number of half wave effective values up to the beginning of the event (pre-run) and by the number of half wave effective values after the beginning of the event (after-run).

4.4.3.12 Transients

- Transients are fast voltage changes.
- The Energy Analyser 550 recognises transients if they are longer than 50µs, although it only monitors voltage measurement inputs.
- There are three independent criteria by which transients are recognised.
  - Absolute: If a sampled value exceeds the set threshold, a transient is recognised.
    - Available settings:
    - Off - transient monitoring has been switched off
    - Automatic - the threshold value is calculated automatically and comes to 110 % of the current 200 ms effective value.
    - Manual - the transient monitoring uses the set threshold values.
- Fast increase: If the difference between two neighbouring sampled points exceeds the set threshold, a transient is recognised.
  - Available settings:
  - Off - transient monitoring has been switched off.
  - Automatic - the threshold value is calculated automatically and comes to 0.2175 times the current 200 ms effective value.
  - Manual - the transient monitoring uses the set threshold values.
- Envelope: If a set threshold value has been exceeded, a transient is recognised.
  - Available settings:
  - Off - transient monitoring has been switched off.
  - Automatic - the threshold value is calculated automatically.
  - Manual - the transient monitoring uses the set threshold values.
- If a transient has been recognised, the threshold value increases by 20 V, both in automatic and in manual mode.

This automatic increase of the threshold value switches off within 10 minutes.

- If a transient has been recognised, the wave form will be saved to a transient record.
- If a further transient is recognised within the next 60 seconds, it will be recorded with 512 points.

4.4.3.13 Transients recording

- If a transient has occurred, the wave shape can be saved in a transient record with an adjustable number of sampled points before and after the transient.
- The distance between two sample points is always 50µs.
- You can choose between the following measurement channels for recording in the transient record:
- The phase voltage will be recorded with the transient.
- The phase voltage and current will be recorded with the transient.
- All voltages will be recorded.
- All voltages and all currents will be recorded.

Record length
The number of sample points to be saved before the transient occurred.

4.4.3.14 Averaging intervals

- Parameterisation of the floating average (previous name for trailing value indicator) for the individual measurement values.
- The measurement values of the mean values are marked in the device display with an overline.
- The values can also be used for operators or comparators (Jasic).
- The adjustment range of the reporting times of the selected group (L1-L4) is 10, 15, 30, 60 seconds and 5, 8, 10, 15 minutes.
- The settings of different reporting intervals for each individual phase are made on the device.
- If different reporting intervals have been set via the device within a L1-L4, then after the configuration has been read in, the corresponding group box is marked in red. A reselection of the reporting time followed by transfer, resets the group (L1-L4) to the selected value.

4.4.3.15 Recording configuration

- Default profiles can be loaded or up to 16 records configured in recording configuration.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are derived from the measurement values in the measurement timeframe.

- The mean value measurement timeframe is established by the time set under “Time basis”.
- Measurement values are saved once the time set under “Time basis” has run its course (Data memory capacity calculation using Energy Analyser D550 as example).

Setting up / editing a recording configuration

- An individual recording instance can be set up using the New or Edit buttons.
- Measurement values are selected in the recording window using the Add values button.
- To do so drag the desired measurement value (measurement value group) over the value field. The measurement values are adopted and displayed.
- The selected measurement values can be described in more detail via the option “Mean (arithmetical)”, “Mean (RMS)”, “Minimum”, “Maximum”, “Sample” and “With value change”.
  - Mean (arithmetical)
    The arithmetical mean is the ratio of the sum and the number of all 200 ms measurement values:
    x(arithm.) = (x1+x2+x3...) / n
  - Mean (rms)
    This value describes a quadratic mean (potential mean) with: x (rms) = root ((x12+x22+x32+..) / n)
  - Minimum / Maximum
    When these buttons are selected, the means of the minimum and/or maximum values are recorded.
  - Sample
    Sample describes the recording of the measurement value within the defined time duration. The time baseline defines the time intervals at which the recording is made.
- With value change
  If the measurement value is changed, the 200 ms measurement value is recorded. This setting is useful for, for example, the monitoring of digital inputs and outputs (not with high frequency signals) or of the temperature input.

In contrast to the arithmetical mean, the quadratic mean is of increasing importance when the measurement values vary greatly cyclically. Outliers in the measurement values thus have a greater significance. With a value like voltage, it is a good idea to take this more into account than for a power value.

- Using the Delete values button, selected measurement values can be deleted.

EN 50160 and EN 61000-2-4 presettings selection aid

- Via the EN 50160 and EN 61000-2-4 buttons, predefined recording settings can be made.
- If the device does not support measurement as per EN 50160, a prompt is issued.

4.4.3.16 Memory configuration

Configuring data memory

- The Energy Analyser 550 has a storage capacity of approx. 256 Mbyte.
- The data memory has been partitioned as follows ex works:
  - 40 % for user-defined recording.
  - 22.5 % for the recording of transients.
  - 22.5 % for the recording of full wave effective values.

- 10 % for the recording of events.
- 5 % for the recording of flags (flagging).

4.4.3.17 Time

The Energy Analyser 550 has a clock with a battery backup. The fault in the clock's quartz is aligned with room temperature during production so that the clock only deviates by +-1 minute/month. If transient records and event records are to be compared with other measurement records, it is recommended that the time indicated by the Energy Analyser 550 be compared and aligned with that in a time server via an Ethernet connection. For synchronisation, the Network Time Protocol (NTP) is used.

- Mode
  Off - synchronisation of the clock with an external time server is switched off.
  Lists - The Energy Analyser 550 is waiting for time information from a time server.
  Active - The Energy Analyser 550 automatically requests time information from an NTP server every 64 seconds.
- NTP server - this is where the time server's address is input.

Time setting

- The time can be reset during configuration by adopting the UTC time from the connected PC.

4.4.3.18 Time zone

All time information with regard to measurement values, events and transients relate to UTC time (Coordinated Universal Time). ecoExplorer go converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time - time offset from Central European Winter Time relative to UTC time.
- Summer time - time offset from Central European Summer Time relative to UTC time.
- Start of daylight saving time - start of daylight saving time.
- End of daylight saving time - end of daylight saving time.

4.4.3.19 Inputs

The Energy Analyser 550 has eight digital inputs. These inputs can be used as digital inputs and as input pulse meters

- A pulse value can be assigned to every pulse input.

4.4.3.20 Digital outputs

The Energy Analyser 550 has five digital outputs. Both of these digital outputs can be programmed for event messages or as a pulse output (S0 output).

- Each digital output can be programmed as a NC or NO contact.
- One or more events can be allocated to an output if it is programmed for event updates.
- The event output activates if a selected event occurs.

4.4.3.21 Serial outputs

- Device ID
  The device ID (device address) is required for Modbus communication and for the Profibus.
- RS485
  Setting the Modbus selection between Modbus master (gateway), Modbus slave or Profibus Baudrate selection of 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps and 921600 bps
- Profibus
  Additional Profibus settings are performed under fieldbus profiles.

4.4.3.22 Fieldbus profiles

Fieldbus profiles hold a list of values which can be read or written by a PLC over the Profibus.

- Using ecoExplorer go, 16 fieldbus profiles can be configured.
- The Energy Analyser 550 is pre-programmed in the factory with 4 fieldbus profiles.
- Profiles can be created or changed using the Edit button.
  - To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
  - Using the Delete values button, selected measurement values can be deleted.
  - The measurement value sequence can be determined with the position buttons.

4.4.3.23 IP configuration

- For devices with Ethernet, it is necessary to set at least the IP address and the subnet mask.
- In the Energy Analyser 550, it is possible to choose between the options fixed IP address, BootP and DHCP mode.
- Fixed IP address
  All settings are undertaken by the user.
- BootP
  BootP allows for the fully automatic integration of a Energy Analyser 550 into an existing network.

- DHCP mode
  When started, the Energy Analyser 550 obtains all its settings from the DHCP server.

IMPORTANT: Setting should only be undertaken after these have been discussed with the administrator.

4.4.3.24 Naming of inputs

- Enables naming of inputs and outputs.
- The respective inputs/outputs can be assigned names by entering a name in the corresponding box.

4.4.4 Interfaces

4.4.4.1 Modbus

Modbus address list

A list of the measurement values available in the devie with the corresponding addresses and formats can be found on the CD/DVD provided with ecoExplorer go.

Further information at:

Energy Analyser D550 - Modbus

Energy Analyser 550 – Ethernet

Ethernet: Introduction

To be able to operate the Energy Analyser 550 in the Ethernet, the Energy Analyser 550 requires an Ethernet address. There are three options here:

- Fixed IP address
- In networks without a DHCP server, the network address must be set directly in the Energy Analyser 550.
- BootP
- BootP allows for the fully automatic integration of a Energy Analyser 550 into an existing network.
- However, BootP is an older protocol and does not provide the scope of functions provided by DHCP.
- DHCP mode
- DHCP allows for the fully automatic integration of a
- Energy Analyser 550 into an existing network without additional configuration.
- When started, the Energy Analyser 550 automatically draws the IP address, the network screen and the gateway from the DHCP server.
- For more information, refer to the Energy Analyser 550 guide!

Ethernet: Fixed IP address

In networks without a DHCP server, the network address must be set directly in the Energy Analyser 550. To do this, the following settings must be carried out:

1. Set up the Energy Analyser 550 for a fixed IP address.

2. Set the desired IP address, IP screen and IP gateway.

Put the Energy Analyser 550 into parameterisation mode as explained in the operating manual and set the Ethernet address under Communication.

Ethernet: Ports

Devices equipped with the Ethernet option can use the following ports:

- UDP
- TFTP 1201
- Modbus/TCP 502
- DHCP 68
- NTP 123
- BaCnet 47808
- Nameservice 1200
- TCP
- HTTP 80 (can be edited in the ini.jas)
- FTP command port 21, (data port 1024,
- 1025, 1026, 1027)
- Modbus/TCP 502 (4 ports)
- Modbus RTU via Ethernet 8000 (1 port)

4.4.4.2 Profibus

Profibus profiles

A Profibus profile contains the data to be exchanged between an Energy Meter and a PLC. A Profibus profile can:

- Retrieve measurement values from the Energy Meter,
- Set the digital outputs in the Energy Meter and
- Query the status of the digital inputs in the Energy Meter.

Each Profibus profile can hold a maximum of 127 bytes of data. If more data has to be transferred, simply create additional Profibus profiles.

- Every Profibus profile has a profile number. The profile number is sent by the PLC to the Energy Meter.
- Using ecoExplorer go, 16 Profibus profiles (profile numbers 0...15) can be edited.
- Additional Profibus profiles (profile numbers 16...255) can be created using Jasic programs.
- Four Profibus profiles are preconfigured ex works.

www.weidmueller.com

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 16
32758 Detmold
Germany
Phone +49 (0) 5231 14-0
Fax +49 (0) 5231 14-292083
info@weidmueller.com
www.weidmueller.com

Order number:
2008050000/03/02-2018