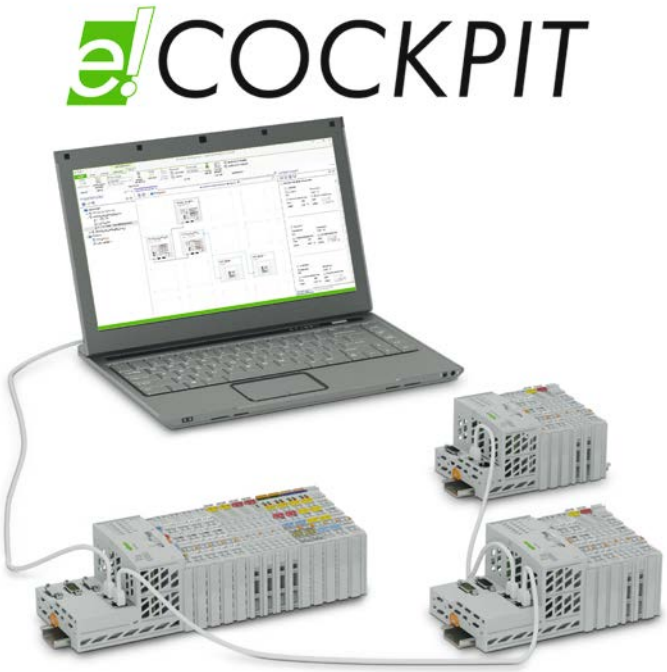
WAGO-Software

Manual



2759-0101

e!COCKPIT

Version 1.3.0

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

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1 Notes about this Documentation

Note

Always retain this documentation!
This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

Note

Note about working with this documentation!
Please read the “Overview” section, it is an introduction to the software and provides a general description of functions. The following sections describe program installation and launch. Next, familiarize yourself with the ***e!****COCKPIT* graphical user interface. The subsequent sections contain operating instructions for using the software.

Information

Additional Information:
Documentation on the software and libraries, as well as the Quick Start Guide can be found in the Windows start menu at WAGO Software > ***e!****COCKPIT*.

1.1 Scope of Validity

This documentation applies to the “***e!****COCKPIT*” software version 1.3.1.

Overview of versions

Table 1: Scope of Validity – Versions

Release	Software version	Document version
1	1.0.0	1.0.0
1 (Patch 1)	1.0.1	1.0.0
2	1.1.0	1.0.1
2 (Patch 1)	1.1.1	1.0.1
3	1.2.100	1.1.0
4	1.3.0	1.2.0
4 (Patch 1)	1.3.1	1.3.0

1.2 Copyright

1.3 Symbols

DANGER

Personal Injury!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

DANGER

Personal Injury Caused by Electric Current!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Personal Injury!
Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Personal Injury!
Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Damage to Property!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

Note

Important Note!
Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

Information

Additional Information:
Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.4 Number Notation

Table 2: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.5 Font Conventions

Table 3: Font Conventions

Font Type	Indicates
italic	Names of paths and data files are marked in italic-type. e.g.: *C:\Program Files\WAGO Software*
Menu	Menu items are marked in bold letters. e.g.: **Save**
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: **File** > **New**
Input	Designation of input or optional fields are marked in bold letters, e.g.: **Start of measurement range**
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under **Start of measurement range**.
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: **[Input]**
[Key]	Keys are marked with bold letters in square brackets. e.g.: **[F5]**

2 Important Notes

This section describes the legal principles and system requirements for using the software in compliance with intended purpose, underlying provisions and stated specifications.

2.1 Legal Bases

2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

2.1.2 Personnel Qualification

Any steps related to the use of WAGO software may only be performed by qualified employees with sufficient knowledge of handling the respective PC system used.

Steps in which files are created or changed on the PC system may only be performed by qualified employees with sufficient knowledge in the administration of the PC system used in addition to the aforementioned.

Steps in which the behavior of the PC system in a network is changed may only be performed by qualified employees with sufficient knowledge in the administration of the network used in addition to the aforementioned.

2.2 Safety Advice (Precautions)

Note

Use up-to-date security software!
Secure operation of the PC system can be at risk as a result of malware such a viruses and Trojans, as well as related threats such as denial-of-service attacks. Therefore, make sure that the latest security software and definitions are always installed on the PC system.

Information

Disable or uninstall software that is no longer required!
The vulnerability of a PC system against malware and related threats increases with the number of installed or active software components (applications and services). Therefore, uninstall or disable software components that are not needed for the purpose at hand.

Note

Check the runtime system if access problems occur!
To access devices from ***e!****COCKPIT*, ***e!****RUNTIME* must be set in your device as the runtime system. In the event of access problems, check the device settings with your tool (hardware dependent) or from the Web-based management system.

Note

Adjust the screen resolution if necessary!
The CODESYS programming environment in ***e!****COCKPIT* is optimized for a screen resolution of 96 DPI. If editors are displayed out of focus, you may be using a different resolution. To adjust the resolution:

1. Right-click on the desktop.
2. Click **Customize**.
3. Click **Display**.
4. Select **“100%.”**

3 Overview

e!*COCKPIT* is an integrated development environment with seamless data retention for all automation tasks:

- **Hardware configuration and parameterization**

Hardware component configuration is an essential element of automation applications. All devices are configured so that the controller software produces optimum results during runtime. Controllers, fieldbus couplers/controllers, modules, input and output devices, as well as their communication relations can be configured.

Integrated configurators assist with device and network configuration using standard operating procedures: For example, it is possible to arrange devices in the project via Drag & Drop, use Copy & Paste to quickly multiply individual devices or entire network branches, or set parameter values for multiple devices simultaneously.

Besides the organization of devices in a tree structure, ***e!****COCKPIT* also enables the graphical display of a network topology – in the Network view – as a display form. This makes it possible to monitor complex interrelationships between devices and their current statuses. The network topology is likewise used for configuring different communication protocols. ***e!****COCKPIT* simplifies connecting controllers to fieldbuses.

Fieldbus-specific device description files (e.g., EDS), device drivers and libraries allow systems from other suppliers to be integrated into the topology along with WAGO devices. As such, the software has information on device specifications, i.e., device data or supported functions.

- **Programming with integrated *e!RUNTIME***

e!*COCKPIT* integrates the ***e!****RUNTIME* programming software that is based on CODESYS 3. This enables software development in the standard IEC 61131-3 programming languages: Structured text (ST), ladder diagram (LD), function block diagram (FBD), instruction list (IL), sequential function chart (SFC) and “Continuous Function Chart” (CFC). For flexibility, all programming languages can be combined with one another. Created programs can be checked easily via simulations on the development PC. Existing programs can be reused and further developed.

- **Visualization (operation and monitoring)**

e!*COCKPIT* uses Drag & Drop to streamline user interfaces for the operation and visualization of a plant. The integrated visualization editor offers direct access to the program's variables in order to simulate the human machine interface (HMI) and PLC program on the PC.
Using Unicode and the latest standards, such as HTML 5 or CSS, also prevents dependency on particular languages and target systems.

- **Diagnostics for target-oriented development and commissioning**

Whether in the office for development or at the machine for commissioning: Knowing the current, detailed status of the automation network is vital in order to obtain, audit and enable rapid fault localization and debugging. ***e!****COCKPIT* offers powerful diagnostic options for this purpose: Error messages are displayed immediately. Through the structured wiring test function, erroneous wiring can be systematically identified.

- **Other useful functions**

e!*COCKPIT* comes with an extensive range of IEC libraries. The software also offers several convenience functions, such as automatic updates, context-sensitive menus or user-defined workspaces.

Note

References to the *e!RUNTIME* programming environment!
Setting options in ***e!****COCKPIT* resulting from the integrated *e!RUNTIME* and CODESYS programming environment are described in the online help feature. Opening the online help in ***e!****COCKPIT* will also display the CODESYS documentation in the tree view next to the ***e!****COCKPIT* documentation. Individual setting windows or names within the CODESYS documentation may differ from how they are shown in ***e!****COCKPIT*.

4 Requirements

4.1 System Requirements

Minimum System Requirements

Table 4: Minimum System Requirements

Components	Requirements
Operating System	Windows 7/8
Memory	4 GB
Free hard disk storage	6 GB
Processor	Dualcore CPU
Screen resolution	1,366 x 768 Pixel

Recommended System Requirements

Table 5: Recommended System Requirements

Components	Requirements
Operating System	Windows 7/8 x64
Memory	8 GB
Free hard disk storage	10 GB
Processor	Quadcore CPU
Screen resolution	1,920 x 1,080 Pixel

4.2 Licenses

e!*COCKPIT* software is protected by licensing mechanisms.

For productive, unlimited software usage, a license is required.

The software can also be used fully without a license key for 30 days. This trial period only includes the days of actual use. When loading the software, a prompt appears with the number of days remaining. Access without a license key is not possible after the trial period.

Depending on the type of software license, an Internet connection may be required for activation. Please refer to your license certificate for the corresponding information.

Following license models are offered:

Workstation license:
- 2 license keys for 2 PCs (e.g. PC and laptop)

Multi-user license
- 10/15/20 license keys for 10/15/20 PCs

Site license
- 1 license key; installations on an unlimited number of PCs at one company location

Buyout license
- 1 license key; allows installation on an unlimited number of PCs within a company at every site in this country. In addition, the software shall be used in the company's products that contain WAGO's automation components and thus form a functional unit (e.g. machines with integrated PC).

Starter kit license
- 1 license key for one PC; sale only in conjunction with hardware

Note

Only use the license key according to license conditions!
Do not use your license key outside the limits of your license model, otherwise you will be breaking the license agreement, which may have legal consequences.

Activating a license key is described in section “Starting”.

In addition to the software, certain extensions are subject to license protection (see Section “Enabling Licensed Add-ons”).

5 Installation

e!*COCKPIT* software is installed from a setup file. This contains a CODESYS programming environment, the .NET Framework and communication drivers for WAGO 750 Series devices. The device description files (Device Type Packages) for WAGO 750 Series devices are also automatically imported.

1. Open the *e!COCKPIT Website*.

2. To receive a download link for the ***e!****COCKPIT* software, click the **[Registration]** link and complete the form.

3. Download the software.

4. Start the installation process by double-clicking the setup file and follow the steps described in the Installation Wizard:

   - Select the installation language.
   - Accept the license agreement.
   - Select the target directory for installation.

5. Click **[Install]** to start the installation.

If an older version is already installed, a dialog appears in which you can choose to accept already installed devices.

6. Click **[Finish]** to complete installation.

6 Starting

1. Launch ***e!****COCKPIT* via **Start > Programs > “WAGO Software” > *“e!COCKPIT”*** or via the link on your desktop.

A start screen will be displayed while the software is loaded.

If you have already purchased and activated a license, the lower area of this screen will display the name under which your ***e!****COCKPIT* application is registered.

If you have not yet acquired a license, you can see the remaining time on the start screen.

Figure 1: Display of the Start Screen during Loading

This also opens a dialog via which you can purchase/activate a license (see the following section).

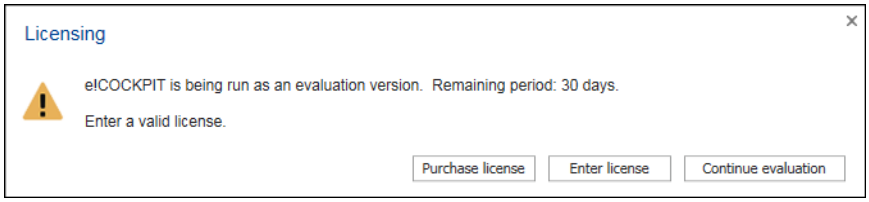


Figure 2: Display of the License Status

2. To test ***e!****COCKPIT* without entering a license key, click **[Continue evaluation]**.

6.1 Purchasing a License

1. If you wish to purchase a license, click **[Purchase license]** after launching the software.

You will be taken to a Website where you can place the order (Online catalogue/ eShop).

6.2 Activating the License

When purchasing the software via WAGO Kontakttechnik GmbH & Co. KG, the license key will be sent to you by email or phone.

1. To enter a purchased license key and activate the license, click **[Enter license]**.

Note

Pay attention to exact spelling!
Depending on your selected license, an Internet connection may be required for entering and activating the license. Licenses that do not require an Internet connection for activation require the entry of the customer name.
Ensure that you enter your customer name exactly as it is written in the email that you received when purchasing the software.

2. Enter your license key and, if necessary, your customer name in the dialog.

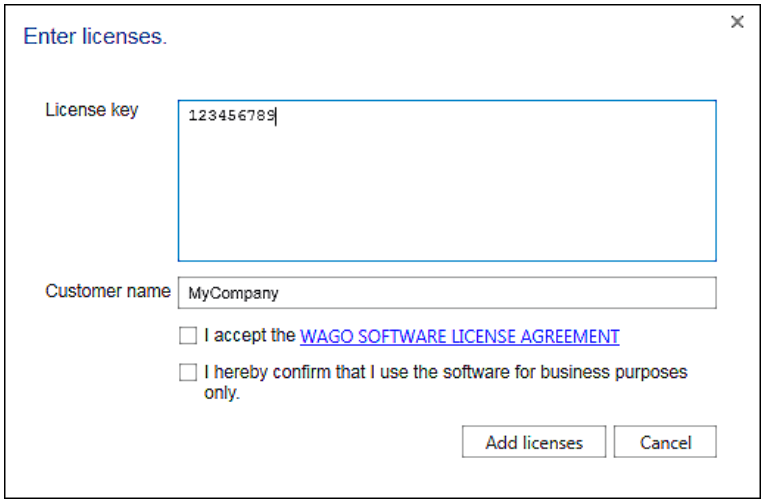


Figure 3: Entering the License Key

3. Accept the license conditions and confirm that you are a commercial user.

4. To activate the license, click **[Add licenses]**.

If the software has already been launched, open this dialog in the Backstage view: “Licensing” page, **[License Manager]**, **[Enter licenses]**.

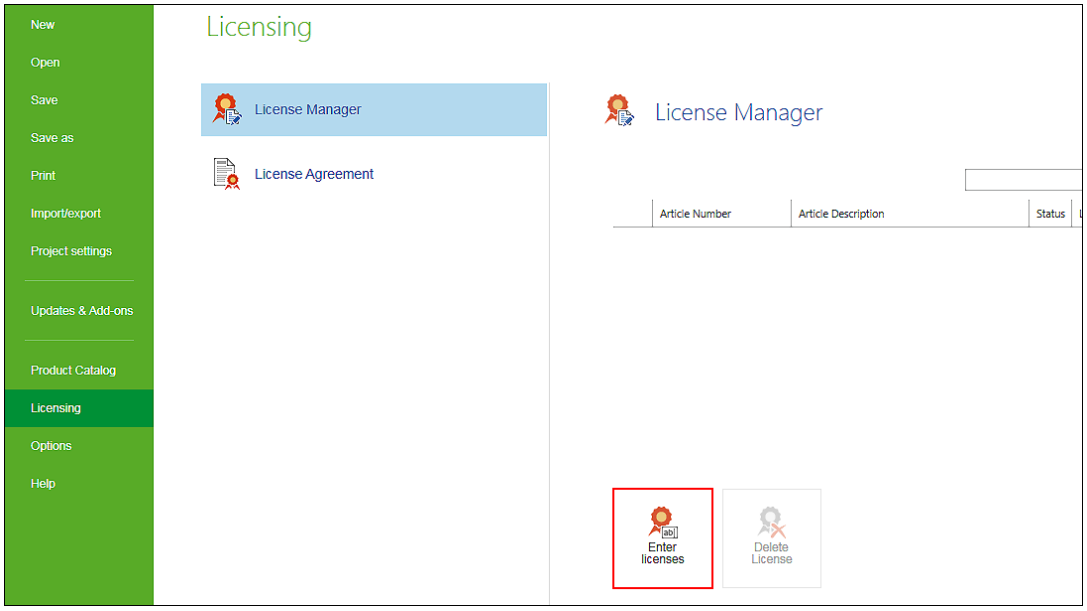


Figure 4: Entering Licenses

This creates the license and is displayed in the license manager.

Note

Open an Internet connection to activate licenses!
Ensure that an Internet connection is established before you enter a license. The Internet connection is required for checking the validity of a license and for activation.
The license is also checked and activated if you tick the “Check for update and license information when starting ***e!****COCKPIT*” checkbox in Backstage view, “Help” > **[Update]**.

6.3 Activating Automatic Updates

After the program is launched, the “Automatic updates” dialog is displayed.

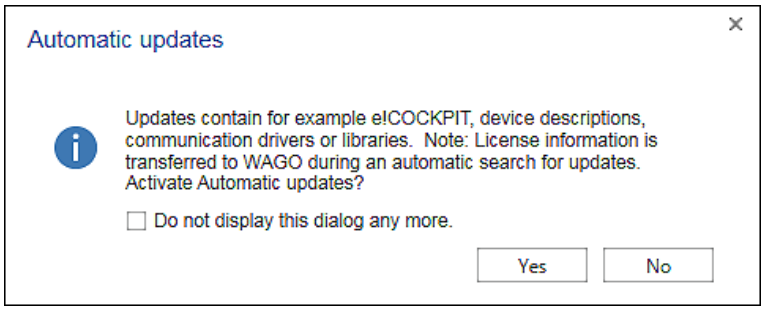


Figure 5: Activating Automatic Updates

1. To automatically search for updates when the program launches, click **[Yes]**.

If you choose **[No]**, you can enable the Update function later: In the Backstage view (“FILE” tab) “Updates & Add-ons” page, tick the “Check for update and license information when starting ***e!****COCKPIT*” checkbox (Internet connection required on starting the program).

The update process compares your license information with the records of WAGO Kontakttechnik GmbH & Co. KG.

For additional information on performing updates, see the Section “Operating” > “Setting and Managing” > “Performing Updates”.

7 Graphical User Interface

The graphical user interface consists of three views:

- **Start View**
  For launching the program and using templates.

- **Main View**
  For configuring, parameterization and programming devices.

- **Backstage View**
  For setting general options and file handling settings.

These views are described in the following sections. Start view is shown first when the software is launched.

7.1 Start View (Projects and Templates)

Start view enables you to create new projects or use existing templates. If projects were previously created, the most recently used projects can be accessed quickly from this page.

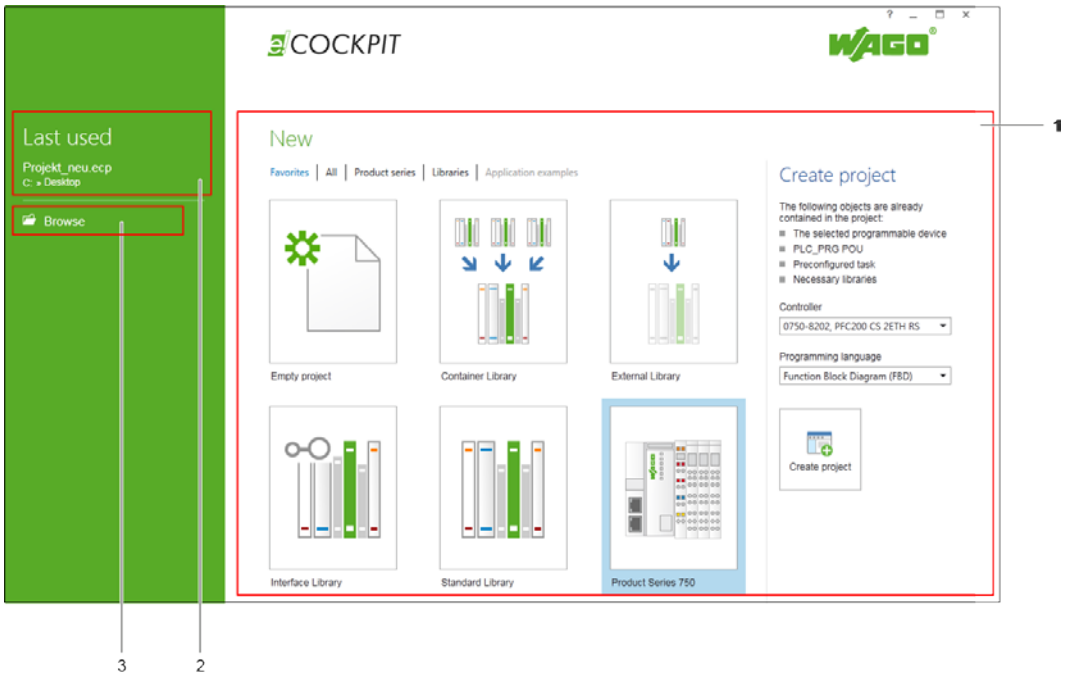


Figure 6: Start View

Table 6: Key for Figure “Start View”

No.	Description
1	**New** Displays templates that can be used for new projects
2	**Last used** Displays previous projects with the relevant path
3	**Browse** Switches to Backstage view, e.g., to open projects from other sources

7.2 Main View (Configuring, Parameterization, Programming)

The main view is divided into a quick access ribbon, menu ribbon, workspace and status bar. The dockable panels enable the workspace to be adjusted to suit the application.

The panels within the main view can be adjusted to create a suitable layout for the relevant task (e.g., creating networks, device configuration or programming). Besides fixed areas offering basic functions, other panels can be arranged as dockable windows depending on the project's needs.

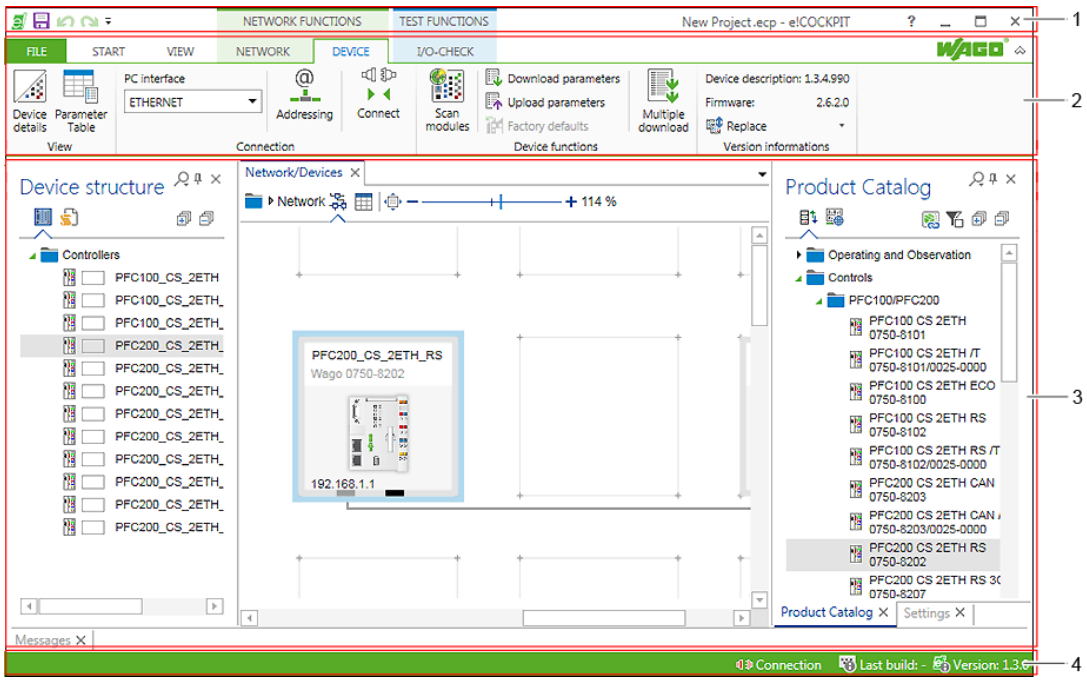


Figure 7: Main View

Table 7: Key for Figure “Main View”

No.	Description
1	Quick access toolbar
2	Menu ribbon
3	Workspace
4	Status Bar

7.2.1 Quick Access Toolbar

The quick access toolbar is located in the upper area of the window.
The quick access toolbar is a toolbar that is independent of the currently selected tab and is always visible, making it ideal for frequently used commands.

Figure 8: Quick Access Toolbar (Standard View)

It contains the following buttons by default:

Table 8: Buttons on the Quick Access Toolbar

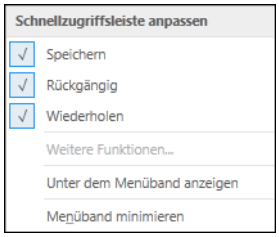
Symbol	Function	Description	
	Save	Saves the project	
	Undo	Undoes the last action	
	Repeat	Repeats the last action	
	Customize	Opens the menu for customizing the quick access toolbar  Figure 9: Customizing the Quick Access Toolbar	
		Save	Adds or removes the **[Save]** button (Save project) to or from the quick access toolbar
		Undo	Undoes the last action
		Repeat	Repeats the last action
		Additional Functions...	Currently not available
		Display Above/Below Menu Ribbon	Displays the quick access toolbar above/below the menu ribbon
		Minimize Menu Ribbon	Minimizes/maximizes the menu ribbon.
?	**Display *e!COCKPIT* Help**	Opens the ***e!****COCKPIT* online help The CODESYS help function is displayed in the tree structure underneath the ***e!****COCKPIT* help	
–	**Minimize**	Minimizes the window	
☐	**Maximize**	Maximizes the window	
✕	**Close**	Closes ***e!****COCKPIT* (Alt + F4)	

Table 8: Buttons on the Quick Access Toolbar

Symbol	Function	Description
⌃	**Minimize Menu Ribbon**	Displays only the tab names in the menu ribbon. The menu ribbon opens if a tab is clicked. It is then minimized afterward.*
⌄	**Extend Menu Ribbon**	Displays the menu ribbon permanently*

* Toggling between a Minimized or Extended ribbon is also possible by double-clicking a tab name.

7.2.2 Menu Ribbon

Tabs are arranged under the quick access toolbar. Selecting a tab opens the particular tab ribbon with relevant command buttons based on task and group.

Relevant tabs are displayed according to the workspace. For example, the “PROGRAM” and “DEBUG” tabs are only displayed in the “Programming” workspace.

The buttons on the tabs are context-sensitive, i.e., only the functions that can actually be used at the moment are displayed and activated.
Functions that cannot be executed within the relevant context are shown in gray.

The individual tabs are described below.

7.2.2.1 “START” Tab

The “START” tab contains buttons for general project editing and setting the user interface.

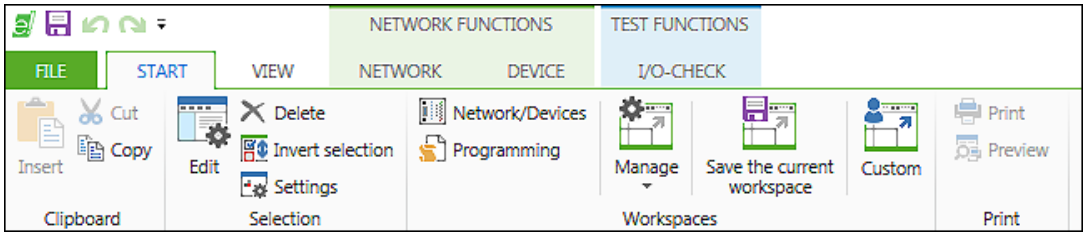


Figure 10: Menu Ribbon (Standard View)

Table 9: “START” Tab Operating Elements

Symbol	Function	Description
“Clipboard” Group		
	**Insert**	Inserts copied project element Only active if the previously copied or cut element can be inserted at the currently selected position
	**Cut**	Cut project element
	**Copy**	Copy project element

Table 9: “START” Tab Operating Elements

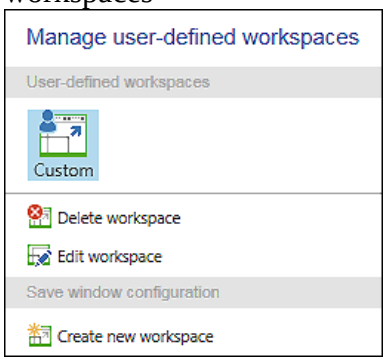
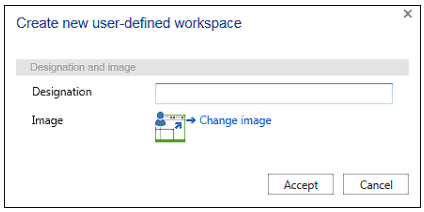
Symbol	Function	Description
“Edit” Group		
	**Edit**	Opens one or several project elements for editing Double-clicking a project element triggers the same function. “Network/Devices” Workspace: Moves to the Device Detail view of the selected device and displays the “Settings” panel to edit device parameters. “Programming” Workspace: Depending on the selection in the Program Structure, displays the CODESYS program, project information or library managers
	**Delete**	Deletes one or several project elements “Network/Devices” workspace: Removes the selected devices from the project “Programming” Workspace: Depending on the selection in the Program Structure, deletes the CODESYS program, project information or library managers
	**Invert Selection**	Inverts the devices/elements selection
	**Settings**	Opens the “Settings” panel for the selected object (device, program etc.), see Section “Workspace” > “Panels” > “Settings”
“Workspaces” Group		
	**Network/Devices**	Displays the preconfigured “Network/Devices” workspace (see Section “Network/Devices workspace”)
	**Programming**	Displays the preconfigured “Programming” workspace (see Section “Programming workspace”)
	**Manage**	Opens a context menu for managing workspaces  Figure 11: Managing workspaces

Table 9: “START” Tab Operating Elements

Symbol	Function	Description	
		User-defined workspaces	
		 **<Workspace>**	Selects the relevant workspace that is targeted for deletion or editing
		 **[Delete workspace]**	Deletes the selected workspace The button of the user-defined workspace is removed from the menu ribbon
		[Edit workspace]	Used for customizing the workspace name and icon
		Save window configuration	
		 **[Create new workspace]**	Opens a dialog for creating a new workspace from the current window constellation  Figure 12: Creating a New Workspace
			Designation Field for entering the workspace name
			[Change image] opens an Explorer window for selecting a pictogram (JPG, PNG or BMP).
			[Accept] accepts the name and pictogram of the new workspace as a button in the menu ribbon.
			[Cancel] closes the dialog without saving the workspace.
	**Save the current workspace**	Saves the changed workspace	
	**<Workspace>**	Opens the user-defined workspace (see Section “User-Defined Workspaces”)	
“Print” Group			
	**Print**	Prints the content of the active editor in the “Programming” workspace (available in the “Programming” workspace)	
	**Preview**	Creates a print preview of the content for the active editor (available in the “Programming” workspace)	

Note

Restore standard workspaces!
If one of the three predefined workspaces has been changed, you can restore it via **[Options]** > [**Standard workspaces]** > **[Reset standard workspaces]** in the “FILE” tab.

7.2.2.2 “VIEW” Tab

The “VIEW” tab enables you to display or close workspaces and panels.

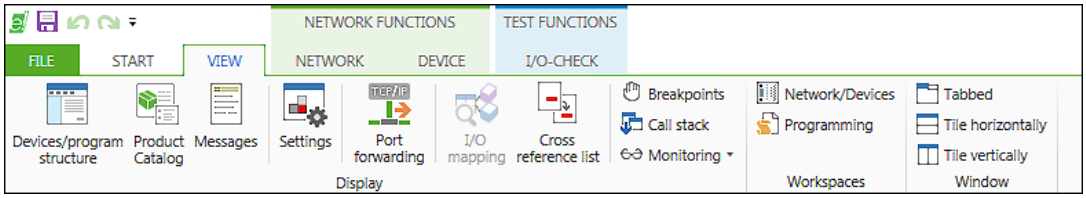


Figure 13: “VIEW” Tab

The “VIEW” tab contains the following operating elements.

Table 10: “VIEW” Tab Operating Elements

Symbol	Function	Description
“Display” Group		
	**Devices/Program structure**	Opens the “Device Structure” or “Program Structure” depending on which workspace is opened (see Section “Panels” > “Device Structure” or “Program Structure”)
	**Product Catalog**	Opens the “Product Catalog” panel (see Section “Workspaces” > “Product Catalog”)
	**Messages**	Opens the message list (see Section “Panels” > “Message Bar and Message Window”)
	**Settings**	Opens the “Settings” panel (see Section > “Panels” > “Settings”)
	**Port forwarding**	Opens the “Port forwarding” panel (see Section > “Panels” > “Port Forwarding”)
	**I/O Mapping**	Opens the mapping for inputs and outputs under Device Detail view (see Section > “Device Detail View” > “I/O Mapping”).
	**Cross reference list**	Opens the cross reference list with the references of a variable in the project (see Section “Programming Workspace” > “Cross Reference List”)
	**Breakpoints**	Opens the Breakpoints list (see Section “Programming” > “Breakpoints” workspace)
	**Call stack**	Opens the call stack (see Section “Programming” > “Call Stack” workspace)

Table 10: “VIEW” Tab Operating Elements

Symbol	Function	Description
	**Monitoring**	Opens a selection field with the commands “ Monitoring 1, 2, 3, 4” or “View all forced values”, which display the corresponding watch list “View all forced values” is a special view of all currently forced values. It enables “Program Organization Units” (POUs − program organization units of type program, function or function block) and a user-defined list of expressions/variables to be monitored.
“Workspaces” Group		
	**Network/Devices**	Displays the preconfigured “Network/Devices” workspace (see Section “Network/Devices workspace”)
	**Programming**	Displays the preconfigured “Programming” workspace (see Section “Programming workspace”)
“Window” Group		
	**Tabbed**	Arranges the windows of the main view in individual tabs
	**Tile horizontally**	Arranges the windows of the main view vertically (tiled horizontally)
	**Tile vertically**	Arranges the windows of the main view horizontally (tiled vertically)

7.2.2.3 “NETWORK” Tab

The “NETWORK” tab contains functions that specifically relate to the display and scanning of devices in the network. The tab is displayed in the “Network/Devices” workspace.

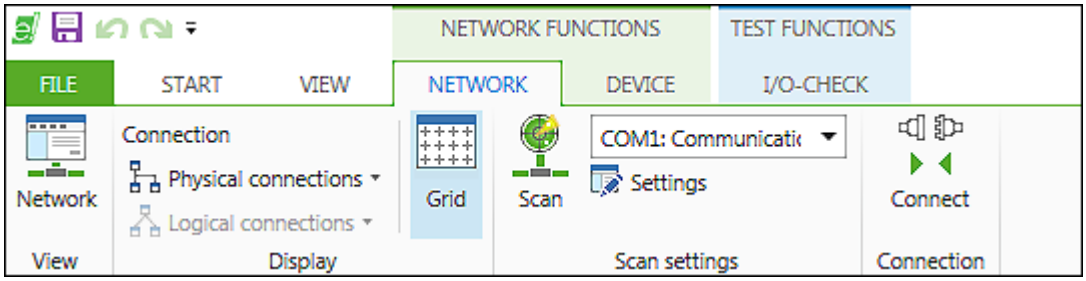


Figure 14: “NETWORK” Tab

The “NETWORK” tab contains the following operating elements:

Table 11: “NETWORK” Tab Operating Elements

Symbol	Function	Description
“View” Group		
	**Network**	Opens the Network view
“Display” Group		
	**Physical connections**	Filters the displayed physical connections arranged according to ETHERNET, CANopen or PROFIBUS
	**Logical connections**	Filters the displayed logical connections according to PROFINET, MODBUS, EtherCAT, Data Server (CODESYS) or network variables (CODESYS)
	**Grid**	Shows or hides the grid in the Network view
“Scan Settings” Group		
	**Scan**	Starts the scan operation via the selected PC interface
	**Interface**	Selects the interface used for the scan (e.g., COM1, ETHERNET)
	**Settings**	Opens the Settings dialog for the selected interface

Table 11: “NETWORK” Tab Operating Elements

Symbol	Function	Description
“Connection” Group		
	**Connect**	Opens an online connection to one or several selected devices. The CODESYS application is connected with the target system. An ongoing online simulation is closed. The status of the button depends on the devices selected: “Connect” if no device is connected, “Disconnect” if all selected devices are connected. If the selected devices have different connection states, all devices are disconnected on the first click and connected with a second click. Connection requirements: - error-free program compilation - correctly configured communication device settings Connection to the selected device (login) is performed for all applications.
	**Disconnect**	Disconnects the development and target systems (controller or simulated device) and returns to offline mode

7.2.2.4 “DEVICE” Tab

The “DEVICE” tab configures devices.
The tab is displayed in the “Network/Devices” workspace.

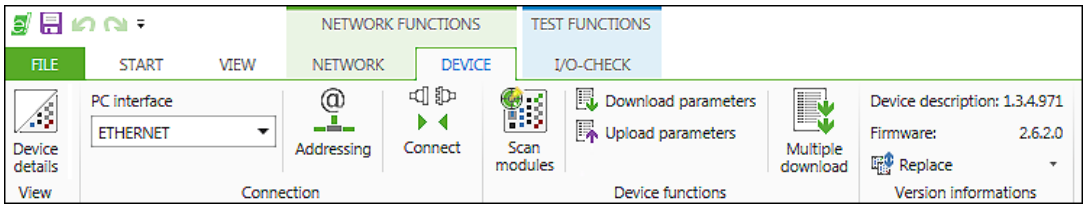


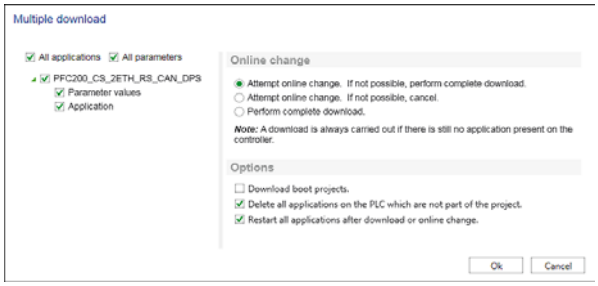
Figure 15: “DEVICE” Tab

The “DEVICE” tab contains the following operating elements.

Table 12: “DEVICE” Tab Operating Elements

Symbol	Function	Description
“View” Group		
	**Device details**	Opens the Device Detail view
“Connection” Group		
	**PC interface**	Selects the communication interface to be used for the selected device and displays it
	**Addressing**	Sets the address for the selected device and the relevant interface, such as the IP address
	**Connect**	Opens an online connection to one or several selected devices. The CODESYS application is connected with the target system. An ongoing online simulation is closed. The status of the button depends on the devices selected: “Connect” if no device is connected, “Disconnect” if all selected devices are connected. If the selected devices have different connection states, all devices are disconnected on the first click and connected with a second click. Connection requirements: - error-free program compilation - correctly configured communication device settings The connection to the selected device (login) is performed for all applications.
	**Disconnect**	Disconnects the development system and target systems (controller or simulated device) and returns to offline mode
“Device Functions” Group		
	**Scan modules**	Identifies and displays any modules present

Table 12: “DEVICE” Tab Operating Elements

Symbol	Function	Description
	**Download parameters**	Opens a connection to the selected device and downloads parameters to it
	**Upload parameters**	Opens a connection to the device, reads device parameters and displays them in the software
	**Multiple download**	Opens a dialog with a list of all project applications and parameters These can be selected and the selected device(s) can be loaded.  Figure 16: “Multiple download” Dialog Project devices, applications and parameters that can be selected via checkboxes are displayed in the left-hand area. **“All applications”** selects all applications of the project. **“All parameters”** selects all of the project parameters. In the right-hand area, the CODESYS options are listed that refer to the changes, online change and (renewed) download of the application (see CODESYS Online Help, “Multiple download”). **[OK]** loads the selected applications and parameters to the selected devices. **[Cancel]** closes the dialog.
“Version information” Group		
Device description: 1.3.4.971 Firmware: 2.6.2.0		Displays the device description and firmware version of the selected device
	**Replace**	Opens a dialog to replace the device description of the selected device The selection is enabled if exactly one device is selected.
	**Replace all**	Opens a dialog to update the device descriptions of all devices used in the project to the latest version The selection is enabled if exactly one device is selected.

The “DEVICE” tab may show additional functions, depending on the selected device. The contents of device-specific tab groups are described in the relevant device documentation.

7.2.2.5 “PROGRAM” Tab

The “PROGRAM” tab contains functions for programming and loading the application onto a device. Actions of this tab always refer to active applications, i.e., applications that are connected or simulated online.

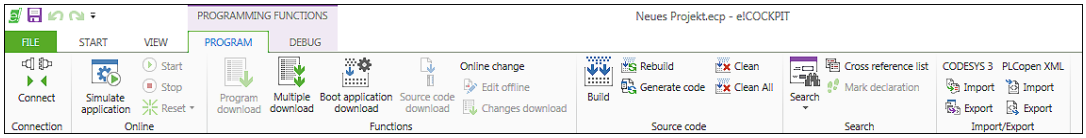


Figure 17: “PROGRAM” Tab

The “PROGRAM” tab contains the following operating elements:

Table 13: “PROGRAM” Tab Operating Elements

Button		Description
“Connection” Group		
	**Connect**	Opens an online connection to one or several selected devices. The CODESYS application is connected with the target system. An ongoing online simulation is closed. The status of the button depends on the devices selected: “Connect” if no device is connected, “Disconnect” if all selected devices are connected. If the selected devices have different connection states, all devices are disconnected on the first click and connected with a second click. Connection requirements: - program compiled error-free - correctly configured communication device settings Connection to the selected device (login) is performed for all applications.
	**Disconnect**	Disconnects the development and target systems (controller or simulated device) and returns to offline mode
“Online” Group		
	**Simulate application**	Can be selected if there is no online connection Starts Simulation mode The mode starts and debugs an application on a simulated target device in order to test the online behavior of an application in advance without requiring the actual device. No communication settings are required for the simulated device. When a function is called for the first time, a prompt asks whether the application is to be created or loaded.
	**Close simulation**	Closes the simulation mode; the simulation is also closed if the **[Connect]** button is clicked.

Table 13: “PROGRAM” Tab Operating Elements

Button		Description
	Start	Starts the application on the controller or in the simulation
	Stop	Stops the application on the controller or in the simulation
Reset	**Reset**	All Reset commands cause a restart in online mode. The set breakpoints in the project are deactivated. **Reset (warm):** Resets all variables of the active program to their initial and default values apart from the retentive variables (Retain, Persistent). Behavior is the same as switching the controller off and on while the program is running (e.g., in the event of a power failure). **Reset (cold):** The same as the “Reset warm” command, but also resets the retentive variables of the active application to their initialization values and default values (behavior is same as the start of the program currently loaded onto the controller). **Reset (original):** Resets the values of all variables of the active application to their initialization values and deletes the program on the controller.
“Functions” Group		
	Program download	Builds and compiles the active application in online mode, i.e., a syntax check is executed, application code is generated and then downloaded to the controller The compilation log is created in the project directory. All variables are reinitialized apart from the persistent variables.

Table 13: “PROGRAM” Tab Operating Elements

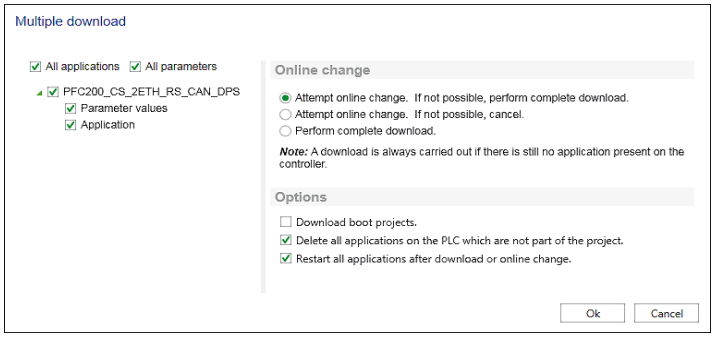
Button		Description
	**Multiple download**	Opens a dialog with a list of all project applications and parameters These can be selected and the selected device(s) can be loaded.  Figure 18: Multiple Download Project devices, applications and parameters that can be selected via checkboxes are displayed in the left-hand area. **“All applications”** selects all applications of the project. **“All parameters”** selects all of the project parameters. In the right-hand area, the standard CODESYS options are listed that refer to the changes, online change and (renewed) download of the application (see CODESYS Online Help, “Multiple Download”). **[OK]** loads the selected applications and parameters to the selected devices. **[Cancel]** closes the dialog.
	**Boot application download**	Saves the boot application under the name <Application_name>.app on the target device. This automatically begins when the controller is started. If the controller is in offline mode, the current application is first stored as a boot application in the project directory in order to download it later to a target system.
	**Source code download**	Downloads the current project as an “archive.prj” archive file to the currently connected controller.
	**Edit offline**	Enables the editing of a currently connected application The changes can be downloaded later to the controller via “Download Changes.”
	**Changes download**	Compiles changes to the active application carried out offline and downloads them to the controller

Table 13: “PROGRAM” Tab Operating Elements

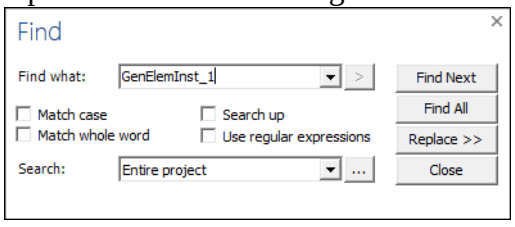
Button		Description
“Source code” Group		
	**Build**	Checks the source code of the active application for errors
	**Rebuild**	Checks the source code again
	**Generate Code**	Compiles the source code of the active application. The code is not loaded onto the PLC.
	**Clean**	This cleans the compiler information for the currently active application on the development system. The compiler information was created the last time the application was downloaded to the target system and saved in a “*.compileinfo” file on the development system.
		 **Note** **For online change after cleaning, reload the application!** Reload the program to the controller after cleaning if you wish to use Online Change, otherwise it is not possible to execute Online Change.
	**Clean All**	Deletes the compilation information for all applications. This was created the last time the applications were downloaded to the target systems and saved in a “*.compileinfo” file. After cleaning, an online change is no longer possible for the affected application. In this case, the program must be completely reloaded onto the controllers. Internal information on persistent variables is also deleted, so this must be re-installed after a download.
	**Syntax check project library**	Checks the syntax of the created library The button is visible if a library template was selected in the Start or Backstage view. The library is compiled in the Backstage view > **[Import/Export]** > **[IEC library]**.
“Search” Group		
	**Search**	Opens the “Search” dialog  Figure 19: “Search” Dialog
		Find what: Searches for the expression entered or selected from the drop-down list

Table 13: “PROGRAM” Tab Operating Elements

Button		Description	
		Match case	Distinguishes between upper/lower case
		Search up	When selected, searches for previous occurrences of the expression
		Match whole word	When selected, searches for an exact term without additional characters
		Use regular expressions	When selected, allows the use of syntax rules for evaluating the expression, e.g., characters “*,” “+” or “?”
		[Find Next]	Searches for the next expression
		[Find All]	Shows all occurrences of the expression in the message window Double-clicking on this entry enables you to move in the editor to the appropriate position
		[Replace >>]	Opens a “Replace” dialog This dialog contains the following additional options: **[Replace]** replaces the next instance of the expression with the expression entered in the “Replace with” field. **[Replace All]** replaces all occurrences of the expression searched for.
		Search:	Selects the location to be searched: - Active editor - All opened editors - Entire project **[…]** opens a dialog with the additional option to search in objects and store this search as a search scheme.
		[Close]	Closes the “Search” dialog.
Search		**Opens the quick access list for the search.**	
		Search	Opens the “Search” dialog (Ctrl + F)
		Replace	Opens the “Replace” dialog (Ctrl + H)
		Next	Shows the next occurrence of the search expression (F3)
		Next (selection)	Displays the next occurrence of the search expression (Ctrl + F3) selected in the editor
		Search previous	Displays the previous occurrence of the search expression (Shift + F3)

Table 13: “PROGRAM” Tab Operating Elements

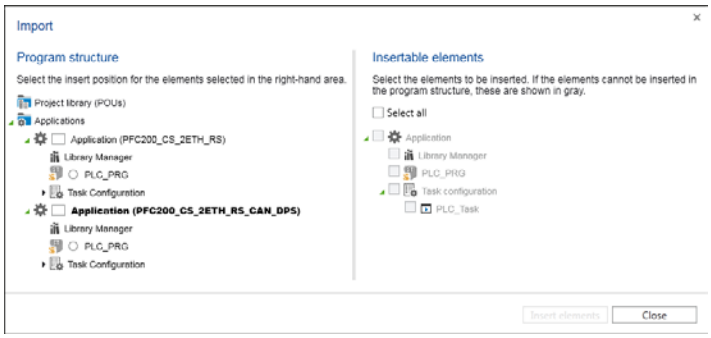
Button		Description	
		Search previous (selection)	Displays the previous occurrence of the search expression (Ctrl + Shift + F3) selected in the editor
	**Cross reference list**	Opens the cross reference list with the references of a variable in the project (see Section “Programming Workspace” > “Cross Reference List”)	
	**Mark declaration**	“Source text navigation”; jumps to the relevant definition/declaration of the identifier that the cursor is positioned on. Function block, program or variable is opened in the appropriate editor. If the definition is located in a “compiled” library, the corresponding function block is opened in the Library Manager.	
“Import/Export” Group			
CODESYS 3			
	**Import**	Opens a browser window to select the CODESYS 3 program elements to be imported After selecting the required *.export file, a dialog appears where you select the insert position in the program structure and the elements to be inserted.  Figure 20: Importing Program Elements **[Insert Elements]** imports program elements from an export file *.export. **[Close]** closes the dialog. No file is imported.	

Table 13: “PROGRAM” Tab Operating Elements

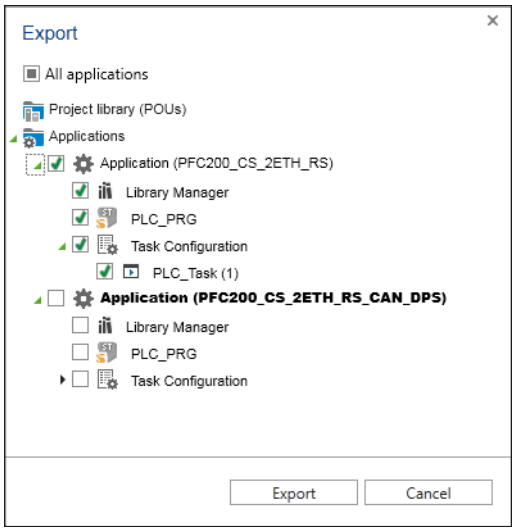
Button		Description
	**Export**	Opens a dialog window for exporting CODESYS 3 program elements to an export file  Figure 21: Exporting Program Elements **[Export]** exports selected CODESYS 3 program elements to an *.export file. **[Cancel]** closes the dialog. An export file is not created.

Table 13: “PROGRAM” Tab Operating Elements

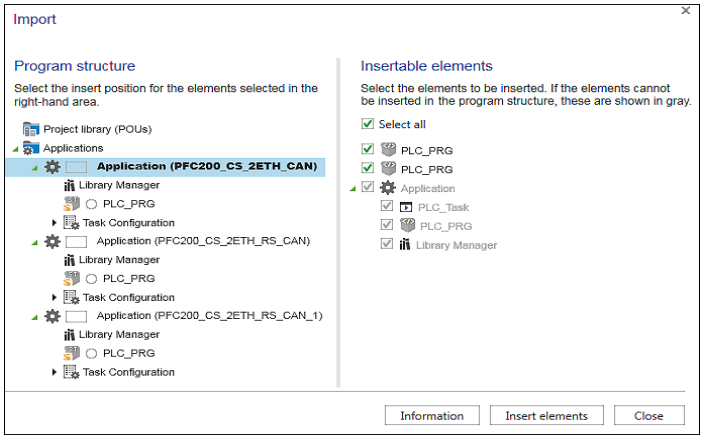
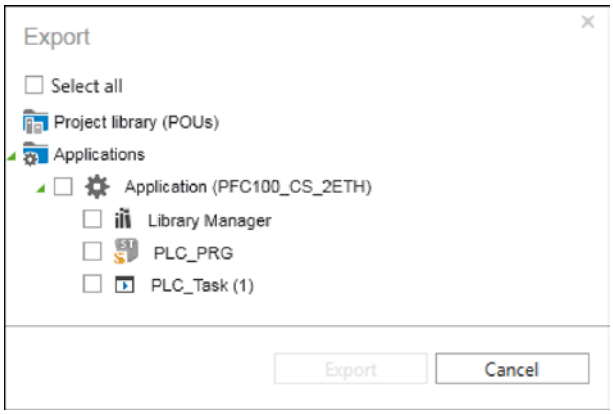
Button		Description
PLCopen XML		
	**Import**	Opens a browser window to select an XML file that can contain project components or entire projects After selecting the required project, a dialog appears where you select the insert position in the program structure and the elements to be inserted.  Figure 22: Importing PLCopenXML **[Information]** displays information on the import file. **[Insert elements]** imports an XML file in PLCopen notation. This standard format is particularly used for exchanging project data between different development systems based on IEC 61131-3. The file elements are inserted in the program structure. **[Close]** closes the dialog. No file is imported.

Table 13: “PROGRAM” Tab Operating Elements

Button		Description
	Export	Opens a dialog window for exporting project sections or entire projects  Figure 23: Exporting PLCopenXML **[Export]** exports selected objects of the program structure in an XML file according to the PLCopen standard. **[Cancel]** closes the dialog. An export file is not created.

7.2.2.6 “DEBUG” Tab

The “DEBUG” tab contains functions for executing and checking the source code.

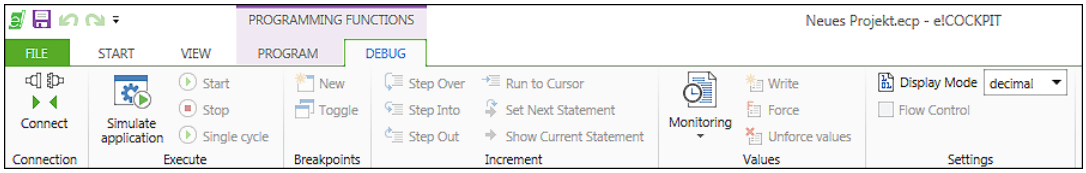


Figure 24: “DEBUG” Tab

The “DEBUG” tab contains the following operating elements:

Table 14: “DEBUG” Operating Elements

Button		Description
“Connection” Group		
	**Connect**	Opens an online connection to one or several selected devices. The CODESYS application is connected with the target system. An ongoing online simulation is closed. The status of the button depends on the devices selected: “Connect” if no device is connected, “Disconnect” if all selected devices are connected. If the selected devices have different connection states, all devices are disconnected on the first click and connected with a second click. Connection requirements: - error-free program compilation - correctly configured communication device settings Connection to the selected device (login) is performed for all applications.
	**Disconnect**	Disconnects the development and target systems (controller or simulated device) and returns to offline mode
“Execute” Group		
	**Simulate application**	Can be selected if there is no online connection; starts Simulation mode. The mode starts and debugs an application on a simulated target device in order to test the online behavior of an application in advance without requiring the actual device. No communication settings are required for the simulated device. When a function is called for the first time, a prompt asks whether the application is to be created or loaded.

Table 14: “DEBUG” Operating Elements

Button		Description
	**Close simulation**	Closes the simulation mode; the simulation is also closed if the **[Connect]** button is clicked.
	Start	Starts the application on the controller or in the simulation
	Stop	Stops the application on the controller or in the simulation
	Single cycle	Performs one cycle of the active application
“Breakpoints” Group		
	**New**	Sets a breakpoint at the current position within the active code editor (see Section “Programming Workspace” > “Breakpoints”)
	**Toggle**	Toggles between the active and inactive state of a breakpoint. This also causes the setting of a new breakpoint (if not yet set at the current breakpoint position). Active breakpoints are deactivated after online mode is closed or after logging in again (see Section “Programming Workspace > “Breakpoints”).
“Increment” Group		
	**Step Over**	Executes a program in online mode in defined steps, e.g., for debugging. With instructions on one level, this corresponds to “stepping” with the “Step Into” command (see next command). When a function block call is reached, the entire function block is performed in a single step. A complete action is processed in a sequential function chart.
	**Single Into**	Executes a program in online mode in defined steps, e.g., for debugging. A single step is performed. If necessary, the program switches to another program organization unit (POU). If the current position is a function call or function block call, the program stops in front of the first instruction of the called function block. In all other situations, the command has the same function as the “Step Over” command. Possible stop positions during step-by-step processing depend on the type of editor. The current position is highlighted in yellow.

Table 14: “DEBUG” Operating Elements

Button		Description
	**Step Out**	Steps a program backward In the case of a nested program code, the backward step is made through the calls. This causes a return to the start of the program if the program does not contain any calls. It also causes a return to the calling instruction if the program had jumped previously to a called function block.
	**Run to Cursor**	Runs the program from the current position to a temporarily definable position For this the cursor is placed at the required stop position before performing the command.
	**Set Next Statement**	Sets the statement to be executed next; to do this, the cursor is placed in this instruction before executing the command.
	**Show Current Statement**	This returns the cursor in online mode to the current execution position if the stepwise processing had moved the cursor to another position in the user interface.
“Values” Group		
	**Monitoring**	Opens a selection field with the commands “Monitoring 1, 2, 3, 4” or “View all forced values”, which display the relevant watch list. “View all forced values” is a special view of all currently forced values. It enables program organization units (POUs − program organization units of type program, function or function block) and a user-defined list of expressions/variables to be monitored.
	**Write**	Sets the corresponding variable in the controller at the start of the next cycle once to the value defined for it in the programming software. The command is applied to all variables of the active application that are prepared for writing.
	**Force**	If the controller is connected (online), the Force Values command causes one or several expressions/variables of the active application to be set permanently to defined values, i.e., they are not overwritten while the program is running. This command is available in online mode. **[F7]**
	**Unforced values**	Removes the forcing of all variables of the active application in online mode. Forcing is also removed by disconnecting the controller from the programming system. The variables are then assigned their current value from the controller.

Table 14: “DEBUG” Operating Elements

Button		Description
“Settings” Group		
	**Display Mode**	Sets the number format of variable values. The following can be selected: decimal, hexadecimal, binary.
☐	**Flow Control**	Switches the flow control in online mode on or off for the language editors ST, FBD, LD, IL and CFC; an activated flow control enables program processing to be followed in the editor window. Current variables, and thus the results of function calls and operations in the current cycle, are highlighted at the relevant processing position and time. The flow control functions in all currently visible sections of the currently opened editor window. Values cannot be written or forced in the flow control. This can only be performed in the declaration section.
		Note **Function increases run time!** Activating the flow control increases the application runtime.

⚠ WARNING

Be aware of dangers resulting from writing or forcing values!
Abnormally changing a value in an application running on the controller may cause undesired behavior of the controlled system.
Evaluate any possible dangers resulting from writing or forcing variable values and take appropriate safety precautions. Depending on the system controlled, there is a risk of damage to the system and equipment or danger to people.

7.2.2.7 “I/O CHECK” Tab

This tab enables a systematic input/output test to be performed. It verifies that a controller is wired correctly. Both individual modules and entire nodes can be tested. The “I/O CHECK” tab is displayed if a device is selected or the Device Detail view of a device is opened. If several devices are selected, the “I/O CHECK” tab is hidden.

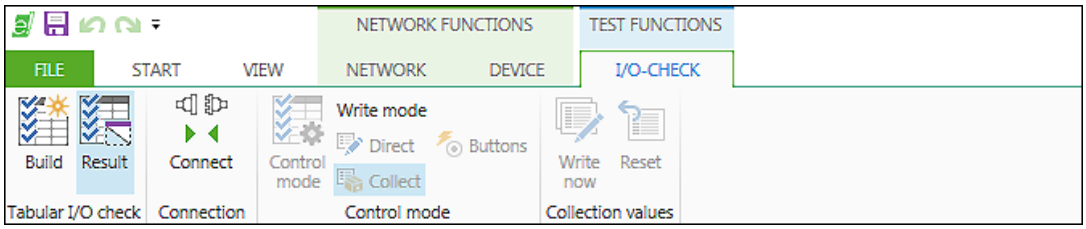


Figure 25: “I/O CHECK” Tab

The “I/O CHECK” tab contains the following operating elements: Active functions are highlighted in blue.

Table 15: “I/O CHECK” Tab Operating Elements

Symbol	Function	Description
“Tabular I/O check” Group		
	**Build**	Tests the connection (systematic hardware function test)
	**Result**	Switches the view of the “Status” and “Test Result” columns on/off
“Connection” Group		
	**Connect**	Opens an online connection to one or several selected devices. The CODESYS application is connected with the target system. An ongoing online simulation is closed. The status of the button depends on the devices selected: “Connect” if no device is connected, “Disconnect” if all selected devices are connected. If the selected devices have different connection states, all devices are disconnected on the first click and connected with a second click. Connection requirements: - error-free program compilation - correctly configured communication device settings Connection to the selected device (login) is performed for all applications.
	**Disconnect**	Disconnects the development and target systems (controller or simulated device) and returns to offline mode

Table 15: “I/O CHECK” Tab Operating Elements

Symbol	Function	Description
“Control mode” Group		
	**Control mode**	Activates/deactivates the Control mode: Enables the modules for changes (write). If the control mode is not active and there is an online connection to the device, the monitor mode is automatically activated, i.e., actual values of the I/O module are displayed (read only).
	**Direct**	Activates/deactivates the mode for direct writing to the I/O module
	**Collect (Number of prepared changes)**	Writes prepared changes (marked with an asterisk) to the module
	**Buttons**	Activates/deactivates the push-button mode for digital inputs/outputs
“Collection values” Group		
This tab group is displayed if the “Collect” mode is active (blue background).		
	**Write Now**	Write collected values to the module. Changed values are indicated with an asterisk.
	**Reset**	Reset collected values. Changed values are indicated with an asterisk.

Besides this systematic input/output test, a simple test can also be performed for digital input/digital output modules via the Device Detail view (see Section “Workspace” > … > “Device Detail view”).

7.2.2.8 Other Tabs

Depending on the devices used, other tabs may be displayed that have specific content relating to the particular device driver. The setting options can be found in the relevant product documentation of the device.

7.2.3 Workspace

The workspace consists of the window area underneath the menu ribbon. This is divided into the main workspace and panels that can be arranged freely; these elements can be shown or hidden via the “VIEW” tab to suit the particular application or specific operation. Panels are used to display and/or edit project data or other data.

e!*COCKPIT* offers two predefined workspaces that are already adapted for typical applications such as network and device configuration, parameterization and programming. The appearance of the user interface changes according to the workspace selected.

User-defined workspaces can be created in addition to the predefined workspaces. The position and size of selected views, tabs and panels are saved here to customize the workspace. These settings are stored separately for each Windows user.

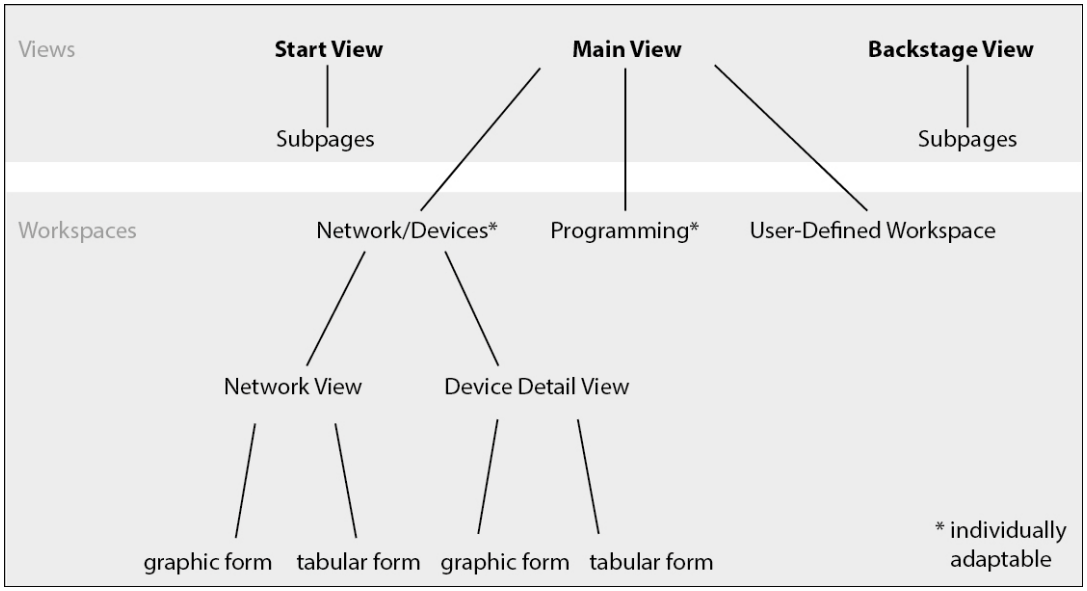


Figure 26: Views and Workspaces

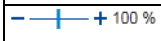
After opening a newly created project in ***e!****COCKPIT*, the standard view shows the “Device Structure” panel on the left, the Network view in the middle and “Product Catalog” and “Settings” panels on the right.

The configuration, parameterization and programming are performed in the central window area.

7.2.3.1 General Operating Elements

The main workspace and panels have the following operating elements (some of these functions depend on the panel):

Table 16: General Operating Elements

Symbol	Function	Description
	**Search** 	Shows or hides the search field. (free text search, no wildcards necessary) The search field is permanently displayed in some panels.
	**Dock**	Hides the panel; Panel appears as a tab on the right of the window or at bottom left.
	Close	Closes the panel
	**Zoom**	Increases/decreases magnification of the view (Zoom) (Network/Device Detail view)
	**Adjust**	Adjusts the view to the optimum size or to the window (Network/Device Detail view)
	**Expand**	Opens all elements of the tree structure
	**Collapse**	Closes all elements of the tree structure

7.2.3.2 General Status Display for Connections

A device's connection status is shown as a four-section status display in operating fields and workspaces.

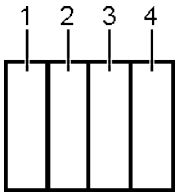


Figure 27: General Status Display for Connections

Table 17: Key for Figure “General Status Display for Connections”

Item	Explanation
1	Connection status
2	PLC status
3	Status of the internal bus (e.g., internal data bus, 750 Series)
4	Fieldbus status

The status information is likewise displayed in the status bar. Information on the last program compilation is also displayed here. The following table provides an overview of the different symbols:

Table 18: General Status Display for Connections

Symbol in Status Bar	Symbol in Workspace	State	Description
Connection			
		**Not connected**	The selected device is not connected.
		**Connected**	The selected device is connected.
		**Limited Connection**	The selected device has a limited connection. This means that the application on the controller is different than the application in the project within ***e!****COCKPIT*.
		**Control Mode Active**	The Control mode is active. Write access to modules is possible. No online connection to the device.
		**Simulation Mode Active**	The Simulation mode is active.
Program Compilation (Build)			
	-	**Build successful**	The compilation of the program was successful. Date and time of the last compilation are displayed.
	-	**Build not successful**	Program compilation of the program not successful. Date and time of the last compilation are displayed.
	-	**No information**	No information available. Possible reasons: Several devices are selected, or a non-programmable device was selected or no project compiled.
PLC			
		**Stop**	The controller is not running (PLC stopped).
		**Running**	The controller is running.
		**Error**	Error is present. Note the error messages in the message window.
Internal Bus			
		**Not running**	No communication via the internal bus.
		**Running**	Internal bus ready for communication.
		**Error**	Error is present. Note the error messages in the message window.
Fieldbus			
		**Not running**	No communication via fieldbus.
		**Running**	Fieldbus ready for communication.

Table 18: General Status Display for Connections

Symbol in Status Bar	Symbol in Workspace	State	Description
		**Error**	Error is present. Note the error messages in the message window.

If a device is connected online, connection status is also displayed in a pop-up display as soon as the mouse is placed over the device. The status information is displayed both for fieldbus couplers/controllers as well as for connected modules.

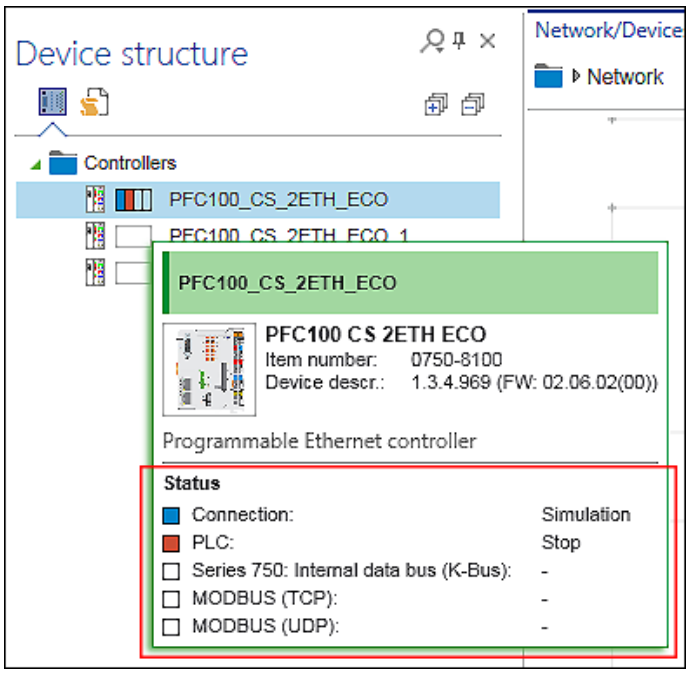


Figure 28: Status Display for Devices (Online)

7.2.3.3 “Network/Devices” Workspace

The “Network/Devices” workspace is used to configure and parameterize the network and devices. The workspace contains the following operating elements:

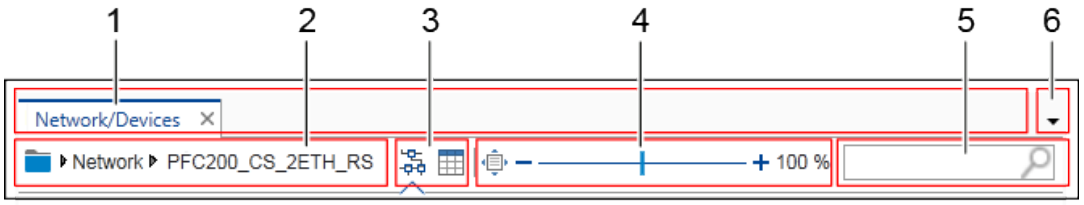


Figure 29: “Network/Devices” Workspace

Table 19: Elements of the Network View

No.	Description
1	**Tab** “Network/Devices” tab and other tabs, for example, open configurators.
2	**Breadcrumb Navigation** The path of the view which is currently displayed. The path can be used for navigation by clicking on an entry. Clicking **Network** for example returns the display from Device Detail view to Network view.
3	**Graphic/Table Toggle Button** Button is used for toggling between graphical and tabular view.
	 The graphical view is suitable for adding and configuring devices and networks.
	 The tabular view is primarily designed to provide a better overview during a network or device scan and for comparing configured and found devices.
4	**Zoom Function** Zoom adjuster that can be clicked and moved to enlarge or decrease the view. “+” or “-” are the buttons that adjust the view in 10 % steps.
	 The button adjusts the view to the current window.
5	**Search field** Free text search, no wildcards are necessary.
6	**Active Tabs** Shows active tabs in a selection list.

7.2.3.3.1 Network View

Network view displays configured network connections between devices. It contains the following elements:

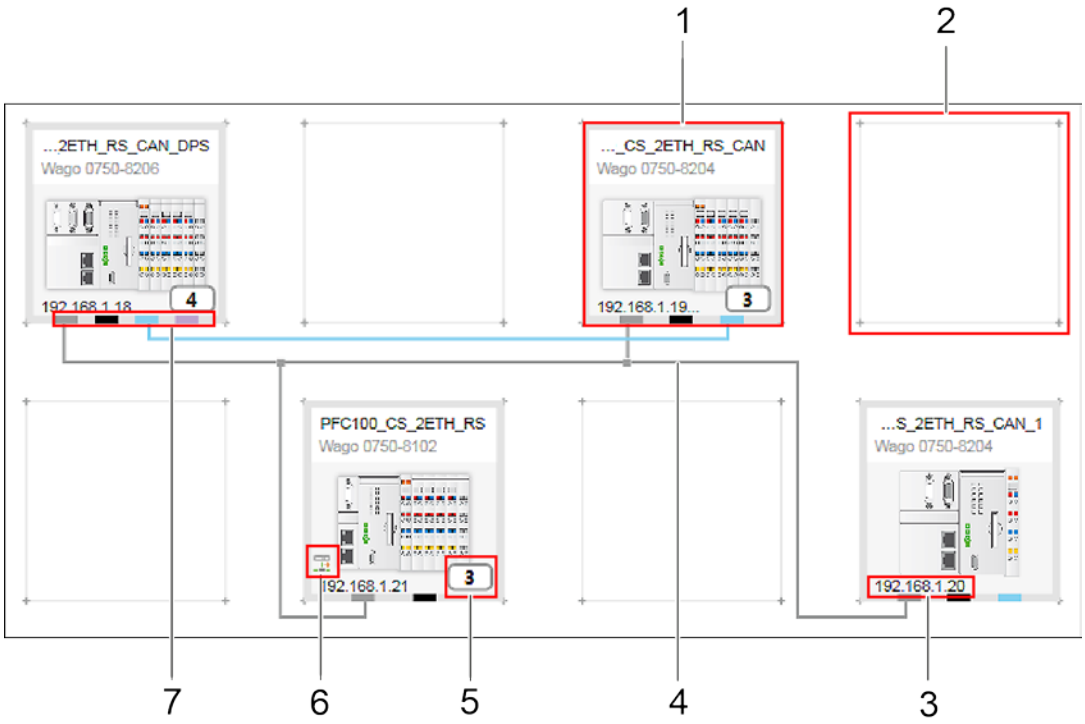


Figure 30: Network View

Table 20: Key for Figure “Network View”

No.	Description
1	**Tile –** Displays the configured device To change a name, click the displayed device name to enter a new name.
2	**Device Location –** Empty tile as location for devices.
3	**Address –** Displays the IP address or the fieldbus address of the device
4	**Network/Bus Connections –** Physical/logical connections between devices are displayed as horizontal/vertical lines Colors are uniquely assigned to a particular network/bus type.
5	**Number of Modules –** Displays the number of modules connected with this head station that are inserted in the Device Detail view via the product catalog or by “Scan modules”
6	**Port Forwarding** – Indicates that port forwarding has been configured for this controller and is active
7	**Connectors –** The interfaces via which connections to other devices can be configured

7.2.3.3.1.1 Tiles

The Network view's workspace is divided into tiles. Tiles are placeholders for devices that are added from the Product Catalog. The device's status is indicated by its frame:

Table 21: Device Status

Frame Color	Description
Gray	Standard frame of an included device
Light Blue	Device has been selected/highlighted.
Green	The device is connected online.
Purple	The device has a limited connection (controller application is different to the project application in ***e!****COCKPIT*).
Orange	Control mode ("I/O-CHECK" tab) is active.
Blue	Simulation mode is active ("PROGRAM"/"DEBUG" tab).

The device name and item number are displayed at the top of the tile.

The device's status — with regard to the connection, PLC, internal bus and fieldbus — is indicated by a four-section status display in the top right corner of the tile. The individual symbols are explained in the Section "Workspace" > "General Status Display for Connections".

The IP address of the device is shown in the lower area of the tile. The fieldbus interface is displayed for devices which do not have an ETHERNET interface. Three points behind the address indicate that the device has several addresses.

Right-clicking the tile displays the context menu's different buttons:

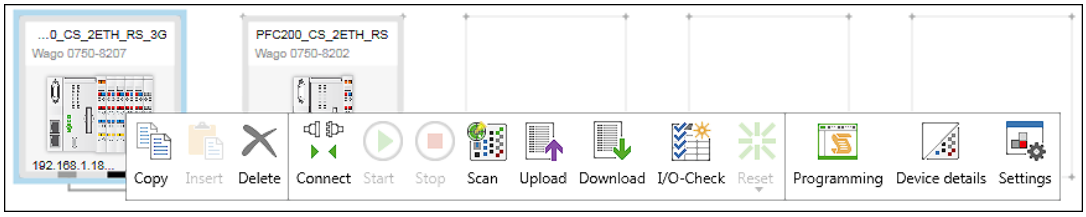


Figure 31: Context Menu of a Device

Table 22: Context Menu of a Device

Symbol	Function	Description
	**Copy**	Copies selected devices
	**Insert**	Inserts copied devices
	**Delete**	Deletes the selected device from the Network view. When deleting the device, the associated program elements are also deleted.

Table 22: Context Menu of a Device

Symbol	Function	Description
	**Connect**	Opens an online connection to one or several selected devices
	**Disconnect**	Removes the connection between the development and target systems (controller or simulated device) and returns to offline mode
	**Start**	Starts the application on the controller or in the simulation
	**Stop**	Stops the application on the controller or in the simulation
	**Scan**	Scans the node for the presence of modules and displays results in a list
	**Upload**	Reads parameters from the selected device
	**Download**	Writes parameters to the selected device
	**I/O-Check**	Opens the “I/O CHECK” tab (see Section “I/O CHECK Tab”)
 Reset	**Reset**	All Reset commands cause a restart in online mode. The set breakpoints in the project are deactivated. **Reset (warm):** Resets all variables of the active program to their initial and default values apart from the retentive variables (Retain, Persistent). Behavior is the same as switching the controller off and on while the program is running (e.g., in the event of a power failure). **Reset (cold):** The same as the “Reset warm” command, but also resets the retentive variables of the active application to their initialization values and default values (behavior is same as the start of the program currently loaded onto the controller). **Reset (original):** Resets the values of all variables of the active application to their initialization values and deletes the program on the controller.
	**Programming**	Opens the “Programming” workspace (see Section “’Programming’ workspace”)
	**Device details**	Opens the Device Detail view and displays the I/O mapping
	**Settings**	Displays device settings in the corresponding panel (see Section “Panels” > “Settings”)

7.2.3.3.1.2 Connectors

Each device supports specific interfaces for communicating with other devices. The interfaces are shown as connection points (connectors) in different colors on the edge of a tile:

Figure 32: Color Coding of Connectors

Table 23: Color Coding of Connectors

Connector Color	Description
Gray	Connector for ETHERNET/MODBUS connections and connections via activated port forwarding
Black	Connector for serial connections/COM interfaces
Blue	Connector for CANopen connections
Purple	Connector for PROFIBUS connections

Hovering the mouse over a connector displays additional information, such as interface type, the device's IP address or connections to other devices, if present.

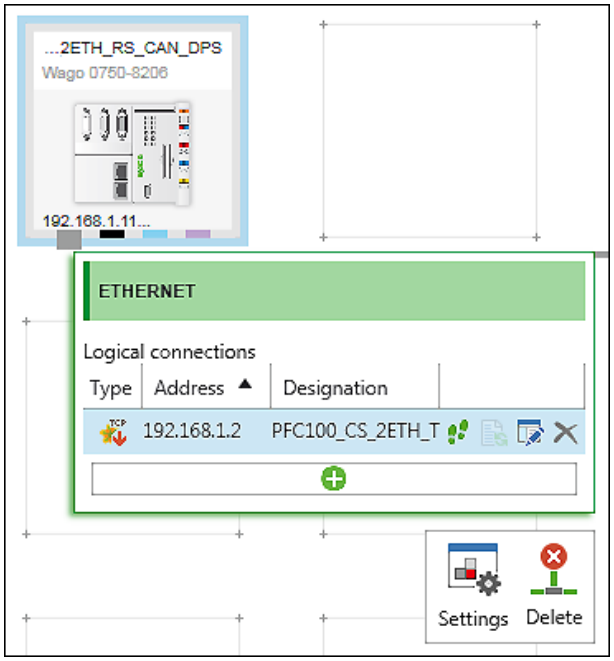


Figure 33: Context Menu of a Connector

Table 24: Operating Elements in the Context Menu of a Connector

Symbol	Description
	Pictogram for the type of logical connection
	Selects the connected device and centers the view
	Updates the configuration The button is available when the configuration of connected devices has been changed. Example: The configuration of a master device is adapted to the configuration of the connected slave. This is indicated by a warning symbol next to the interface: 
	Opens the connection settings (see Section “Fieldbus-Specific Configurators”).
	Removes the logical connection
	Displays device settings in the corresponding panel (see Section “Panels” > “Settings”)
	Deletes all connections for this interface to any number of devices

7.2.3.3.1.3 Network/Bus Connections

The devices can be interconnected in Network view. Connectors are dragged with the mouse between two similar device connectors. The color of a connection is the same as the relevant connector color (see previous Section).

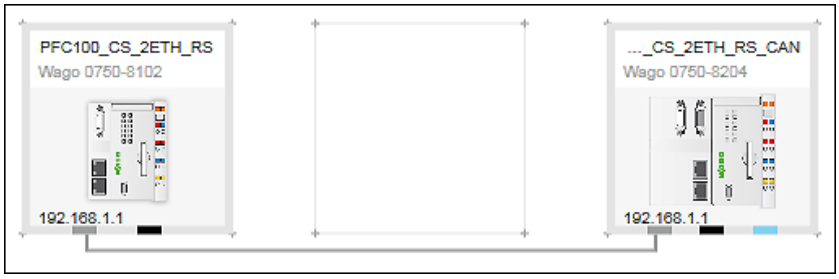


Figure 34: Connection between Two Devices

Connections are either physical or logical connections.

Physical connections correspond to cables between devices that are compatible with their hardware, i.e., their terminations. The direction in which connection lines are dragged with the mouse is not important to physical connections.

Logical connections are only possible where physically connected devices can exchange information with the appropriate protocols. Logical connections are dragged over an already displayed physical connection.

Unlike physical connections, the direction in which devices are connected is relevant for logical connections as the displayed options (e.g., “Modbus TCP master”) refer to the source device.

Example: When selecting “Modbus TCP Master” the source device becomes the master, the target device becomes the slave for the new connection.

With connections via CANopen and PROFIBUS, the physical connection is the same as the logical connection. Only one connection line must be dragged between the devices. Whether it is a master or slave device depends solely on the configuration of the device concerned.

To control data exchange, each logical connection can be further configured via the buttons in the context menu of the connector (see previous Section).

If the cursor is moved to a connection line, the protocol for the connection is displayed.

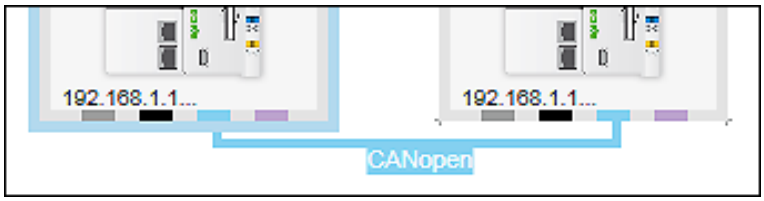


Figure 35: Display of Protocol Used; here, “CANopen”

If a project controller is connected with an off-network device that is only connected to the controller by port forwarding, “Port Forwarding” is displayed for this connection instead of the protocol name.

7.2.3.3.2 Fieldbus-Specific Configurators

Fieldbus-specific configurators are used to configure MODBUS, CANopen and PROFIBUS connections. These are accessed via the context menu of a connector and displayed in the main workspace.

The connected devices, as well as the device type, are displayed in the upper area.

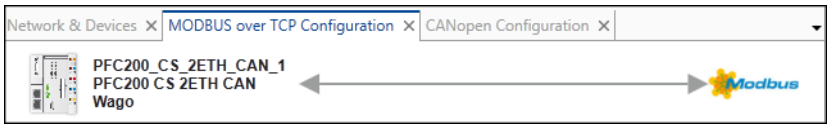


Figure 36: Fieldbus-Specific Configurators

The lower area is structured according to the specific fieldbus, see the following Section.

7.2.3.3.2.1 MODBUS Configurator

e!*COCKPIT* integrates two MODBUS configurators for configuring the connection between MODBUS master and MODBUS slave.

The data points/variables to be exchanged in a real master-slave connection is set in the master configurator.

The slave configurator sets which data points/variables are available for **all** masters.

MODBUS Master Configurator

The settings are made in two tabs.

The “MODBUS Master-Variables” tab configures data exchange between the master and slave. The left-hand column here displays the variables used by the slave. The right-hand column displays the variables available on the master.

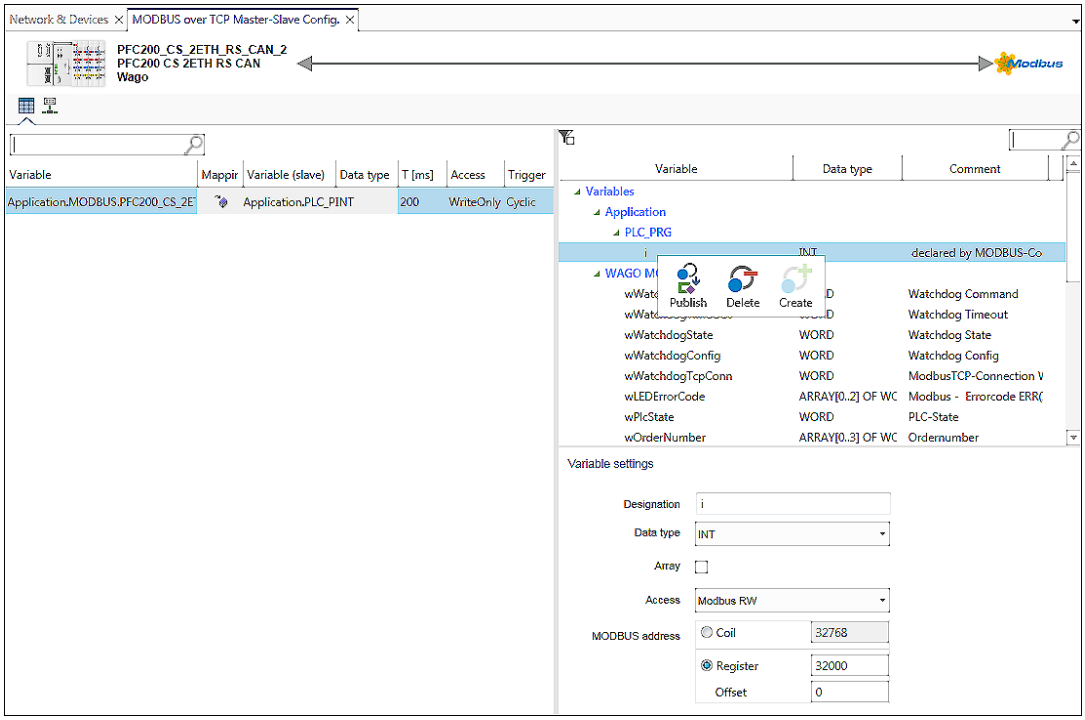


Figure 37: “MODBUS Master Variables” Tab

Table 25: Key for Figure “MODBUS Master Variables” Tab

Parameters	Description
Variables (Slave, left-hand column)	
Variable	Variable name and path on the slave Variants are normally either manual or automatic. Automatic: A variable is created according to the variable path on the master. Manual: The variable is entered by the user. This can be an existing variable or one created by CODESYS.
Mapping	Existing (arrow symbol) variables and variables generated by CODESYS (asterisk)
Variable (slave)	Variable name and path on the master
T [ms]	Cycle time when accessing the variables
Access	Read and write access
Trigger	Triggering of access. Selection depends on the access setting. Read: Cyclic Write: Cyclic/on value change
Variables (Master, right-hand column)	
Variable	Name of variable
Data type	Variable data type
Comment	Comment of the variable
Variable settings	
Designation	Name of variable
Data type	Variable data type
Array	Change data type to array (to read or write access several MODBUS tabs at once). The size of the variables is set via the number of elements in the array.
Access	Access via MODBUS (RO/RW)
MODBUS address	MODBUS address of the variable

Context menu of the slave variables (left-hand column):

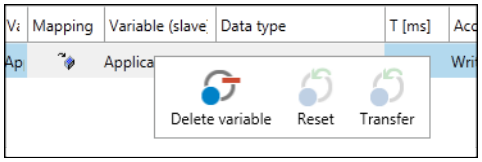


Figure 38: Slave Variables Context Menu

Table 26: Key to Figure “Slave Variables Context Menu”

Symbol	Function	Description
	**Delete variable**	Delete variable of slave
	**Reset**	Reset variable to “automatic value”
	**Transfer**	Accept value of the cell for all selected rows (T [ms], trigger, access)

Context menu of the master variables (right-hand column):

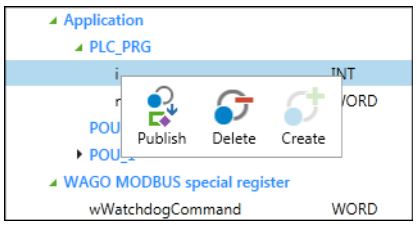


Figure 39: Master Variables Context Menu

Table 27: Key to Figure “Master Variables Context Menu”

Symbol	Function	Description
	**Publish**	Publish variable via MODBUS and make it available in the slave
	**Delete**	Delete variable of master
	**Create**	Create new variable on the master

In the “Connection Settings” tab, all general settings for the MODBUS connection are performed, such as the response timeout of requests and request intervals. Settings for “TCP Keepalive” specifically apply to MODBUS/TCP connections; “Type Of Service (IP)” applies to MODBUS-UDP and TCP connections.

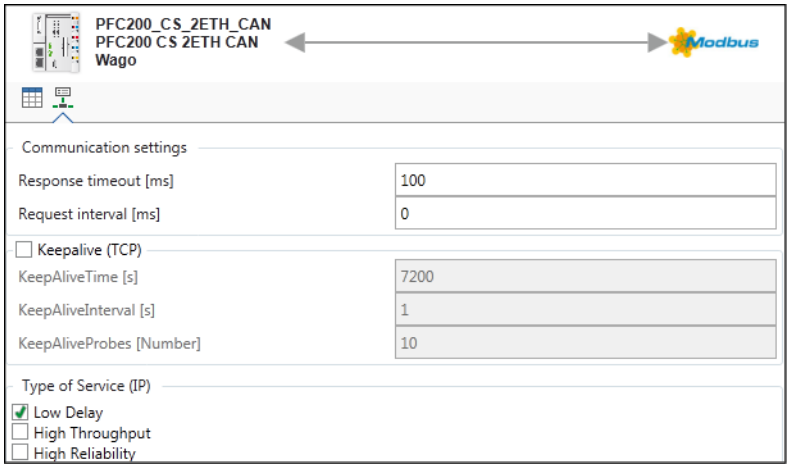


Figure 40: “Connection Settings” Tab

Table 28: Key to “Connection Settings” Tab

Parameter	**Description**
Communication Settings	
Response timeout [ms]	Wait time in ms until a request is repeated
Request interval [ms]	Time in ms between two successive requests
Keepalive (TCP)	
KeepAliveTime [s]	The time span in seconds (once) between the last data packet and the first KeepAlive packet (probe)
KeepAliveInterval [s]	Interval in seconds between two successive Keepalive packets (Probes)
KeepAliveProbes [Number]	Number of Keepalive packets until the connection is considered lost/removed
Type of Service (IP)	
Low Delay	Sets the “Low Delay” attribute in the IP header
High Throughput	Sets the “High Throughput” attribute in the IP header
High Reliability	Sets the “High Reliability” attribute in the IP header

MODBUS Slave Configurator

The MODBUS Slave Configurator is used to configure the MODBUS-accessible variables.

The left-hand column contains a tabular overview of all variables published via MODBUS. The variables present in the slave application are mapped in the right-hand column.

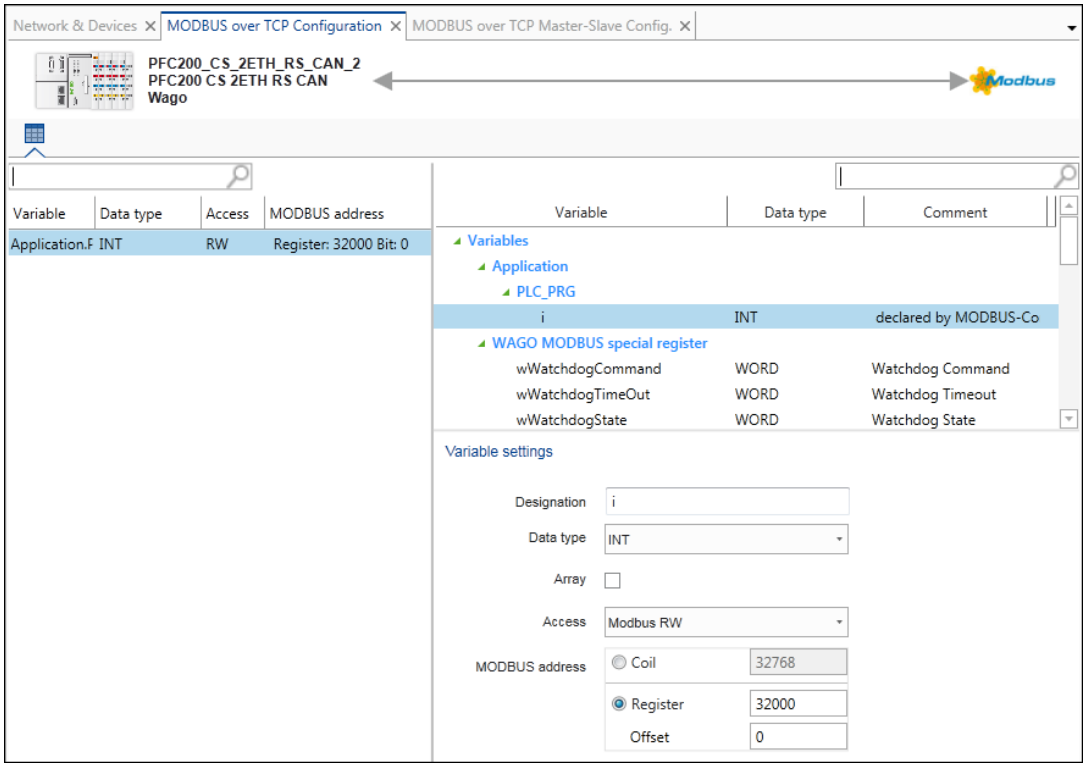


Figure 41: MODBUS Slave Configurator

The function of the right-hand column is identical to the function in the MODBUS master configurator. A variable can be deleted in the left-hand column, otherwise the column is only for informational purposes.

7.2.3.3.2.2 CANopen Configurator

“CANopen Remote Device” Tab

This tab sets the parameters in order to configure the sending and receiving of messages of other CANopen devices, such as the cyclic polling or monitoring of devices.

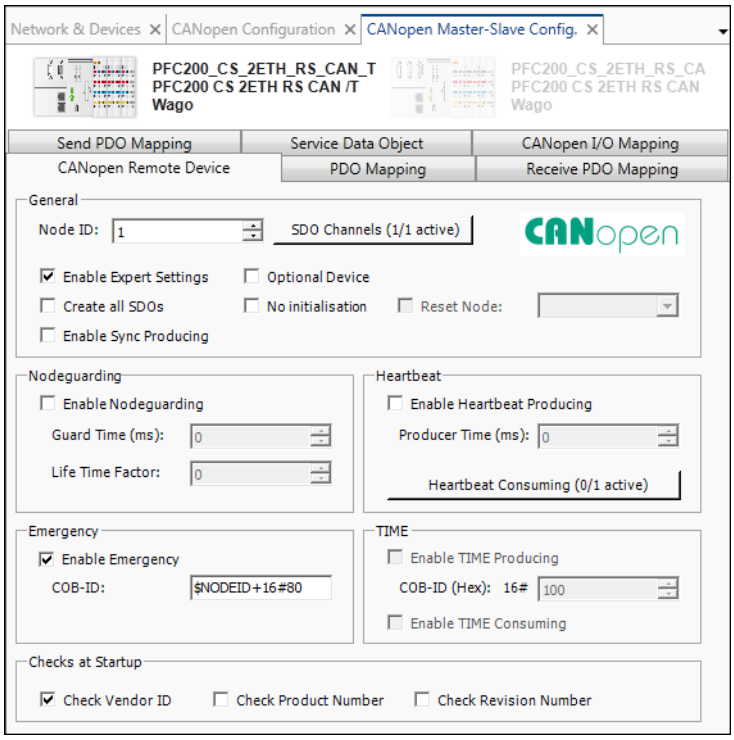


Figure 42: “CANopen Remote Device” Tab (view with “Expert Settings” checkbox enabled)

Table 29: Key for Figure “CANopen Remote Device Tab”

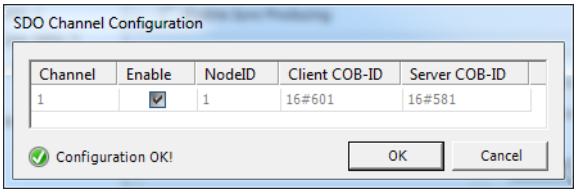
Parameter	Description
General	
Node ID	Selects the node ID or station address (1 … 126) that the PFC uses to communicate with the slave in the CAN network.
[SDO Channels]	Opens the “SDO Channel Configuration” window for configuring the service data objects (SDO). With some devices, this can be used to configure the communication parameters for the SDO transfer.  Figure 43: SD Channel Configuration
	Column / **Description**: **Channel** – Channel number **Activate** – Activate channel **NodeID** – Additional node ID for SDO transfers (e.g., a channel for communication with the master and a channel for the communication with another slave) **Client COB-ID** – Resulting “Communication Object ID” of the client **Server COB-ID** – Resulting “Communication Object ID” of the server
Enable Expert Settings	When enabled, the following expert functions described are displayed
Generate all SDOs	When enabled, SDOs are generated for all objects from the EDS file In addition, the corresponding options must be activated. If writing nodeguarding objects is required, the checkbox for the “Nodeguarding” option must be enabled. When disabled, SDOs are only generated for the objects with default values that deviate from the EDS file.
Enable Sync Producing	When enabled, synchronization messages are generated for synchronizing the process images between devices via this slave.
Optional Device	When enabled, the CAN network is also “OPERATIONAL” (ready for communication via PDOs), if the device is not available.

Table 29: Key for Figure “CANopen Remote Device Tab”

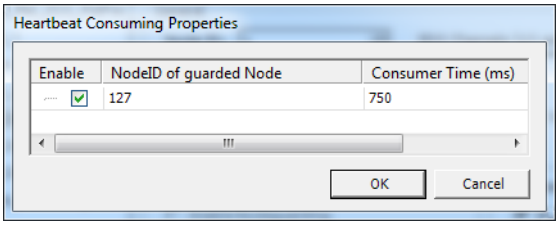
Parameter	Description
No Initialization	When enabled, no parameterization of the slave is performed by the master.
Reset Node	When enabled, the slave is reset by the PFC before the configuration is sent to the slave.
Nodeguarding	
Enable Nodeguarding	When enabled, the slave monitors the PFC for possible interruptions during fieldbus communication.
Guard Time (ms)	Selects the interval in which the PFC expects “Confirmation” from the slave.
Life Time Factor	Sets the multiplication value for the “Guard Time.” If the time resulting from “Guard Time” x “Life Time Factor” (“Node Life Time”) has elapsed, the slave is switched to the predefined state.
Heartbeat	
Enable Heartbeat Production	When enabled, the CAN device produces heartbeats at the ms intervals entered at “Producer Time.”
Producer Time (ms)	
[Heartbeat Consuming]	Opens the “Heartbeat Consuming Properties” dialog.  Figure 44: Heartbeat Consuming Properties When enabled, the CAN device monitors the “Heartbeat” of the device selected by Node ID. The Master Heartbeat is entered automatically as standard. Either “Heartbeat” or “Nodeguarding” can be used for monitoring.
Emergency	
Enable Emergency	When enabled, the slave sends error and status messages (Emergency messages). When disabled, the SDO 0x1014 is not transferred to the slave. The standard setting of the slave therefore continues to be valid.
COB-ID	CAN identifier, preset: Node-ID + 0x80

Table 29: Key for Figure “CANopen Remote Device Tab”

Parameter	Description
TIME	
Enable TIME Production	When enabled, the slave sends “Time” messages for synchronizing network devices.
COB-ID (Hex)	CAN identifier, preset: Node-ID + 0x80
Enable TIME Consumption	The slave receives “Time” messages.
Checks at Startup	
Check Vendor ID	Manufacturer ID of the CAN device
Check Product Number	Product number of the CAN device
Check Revision Number	Revision number of the CAN device

“PDO Mapping” Tab

Process data objects (PDO) transport data. These are divided into send and receive objects (TPDO and RPDO). This tab displays and performs the mapping between process data objects (PDO).

The receive PDO is selected in the left-hand area, and the send PDO (from the point of view of the controller) in the right-hand area.

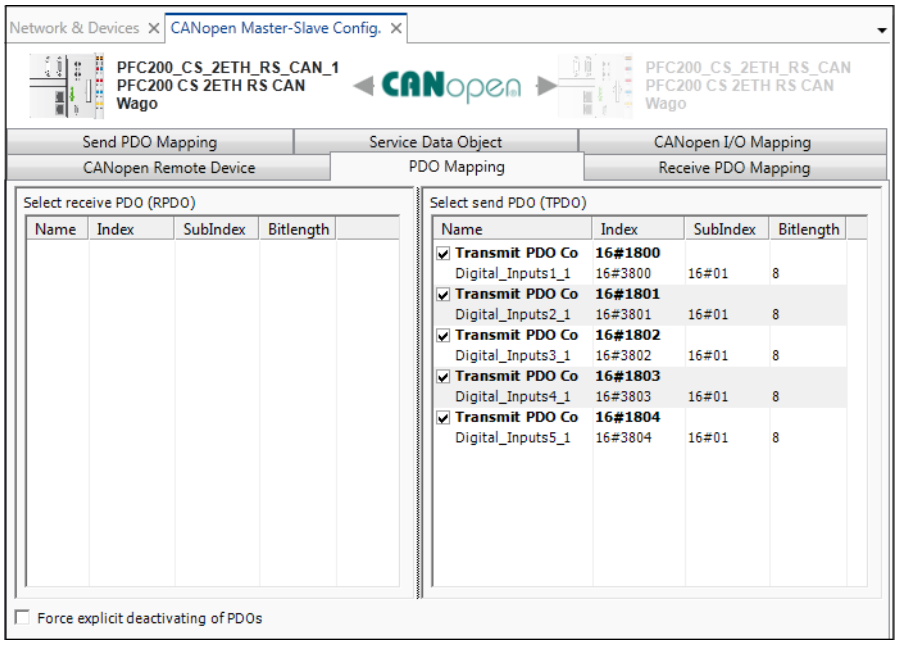


Figure 45: “PDO Mapping Tab”

Table 30: Key for Figure “PDO Mapping Tab”

Column	Description
Name	Name of PDO
Index	Index of PDO
SubIndex	Subindex of PDO
Bit length	Bit length of the PDO
Force explicit deactivating of PDOs	When enabled, the displayed PDOs are no longer used for communication.

“Receive PDO Mapping”/“Send PDO Mapping” Tab

These tabs are displayed if the “Expert Settings” option is enabled in the “CANopen Remote Device” tab.

They display the receive and send PDOs.

“Service Data Object” Tab

This tab displays the Service Data Objects (SDO). Additional SDOs can also be created for parameterization. SDOs transfer parameters to the device configuration.

On initialization of the CAN bus, the set values will be transmitted to the slaves as SDOs.

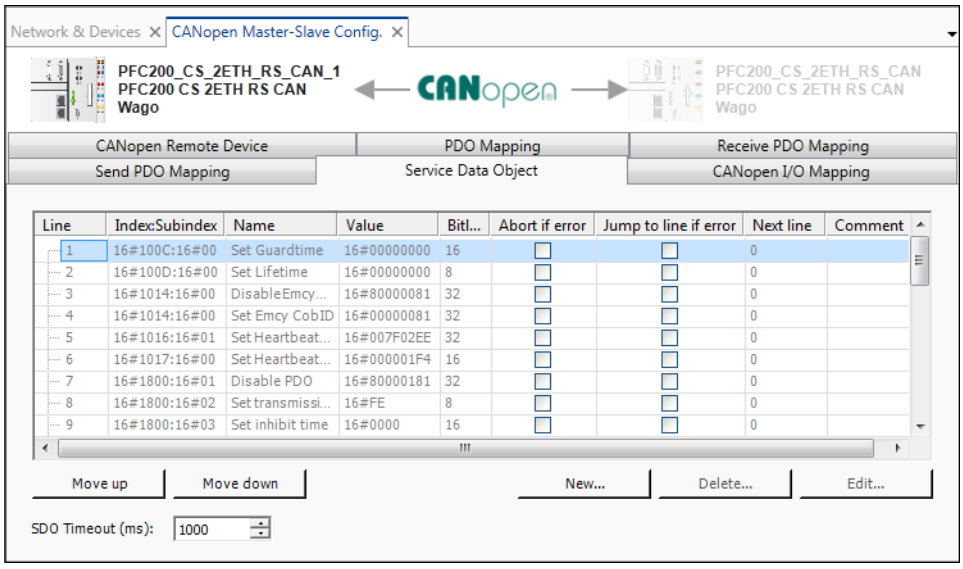


Figure 46: “Service Data Object Tab”

Table 31: Key to Figure “Service Data Object Tab”

Column	Description
Line	Line number
Index:Subindex	Index and subindex of the SDO
Name	Name of the service data object
Value	Value of the service data object

Table 31: Key to Figure “Service Data Object Tab”

Column	Description
Bit length	Bit length of the service data object
Abort if error	Not used
Jump to line if error	Not used
Next line	Not used
Comment	Displays the comment Can be changed by selecting and overwriting the cell
[Move up]	Moves the entry up
[Move down]	Moves the entry down
[New…]	Opens a dialog window for adding an existing service data object from the list Additional new service data objects can be created or selected service data objects changed in the lower area. Adding/changing is performed by double-clicking an entry or via the **[OK]** button.

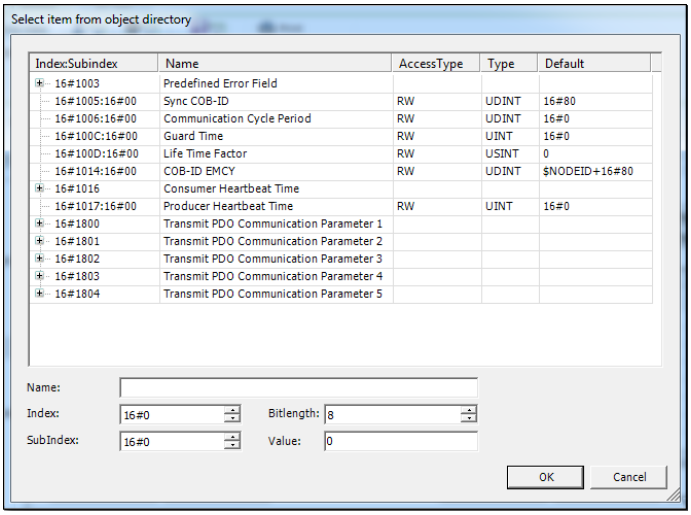


Figure 47: Adding Service Data Objects

Parameters	Description
Index:Subindex	Index and subindex of the SDO
Name	Name of SDO
Access Type	Displays which objects can be changed (RW)
Data type	Data type of the SDO
Default	Value from the EDS file

[Delete…]	Deletes one or several selected service data objects
[Edit…]	Opens a dialog for editing a selected service data object
SDO Timeout (ms)	Not used

“CANopen I/O Mapping” Tab

The tab displays the mapping of CODESYS IEC objects to CAN variables.

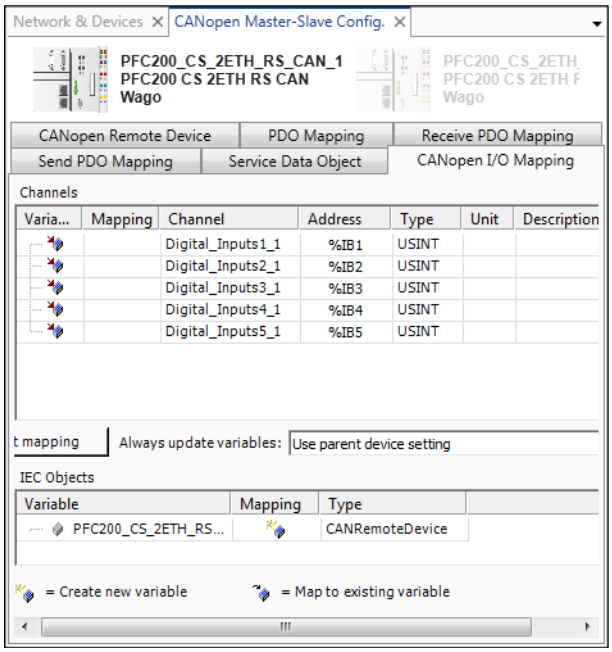


Figure 48: “CANopen I/O Mapping” Tab

Table 32: Key to Figure “CANopen I/O Mapping” Tab

Column/Button	Description
Variable	Project variable
Mapping	Displays which variable is new and which variable already exists:
	The variable is not yet available, is newly created and can then be used in the entire project.
	Uses an already existing variable for mapping
Channel	Channel name
Address	Variable address
Type	Variable data type
Unit	Unit of the variable
Description	Variable description

Configuring the CANopen Slave:

The Configurator is opened after a slave is selected using the appropriate button in the “Settings” panel.

General Configuration

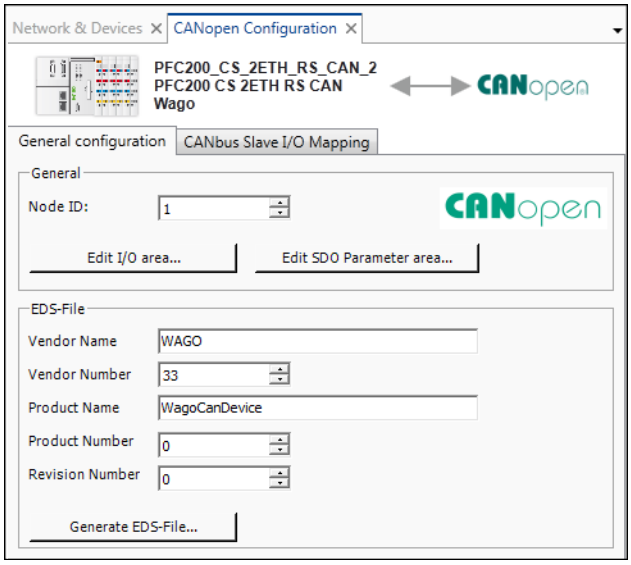


Figure 49: CANopen Slave Configuration

Table 33: General Configuration

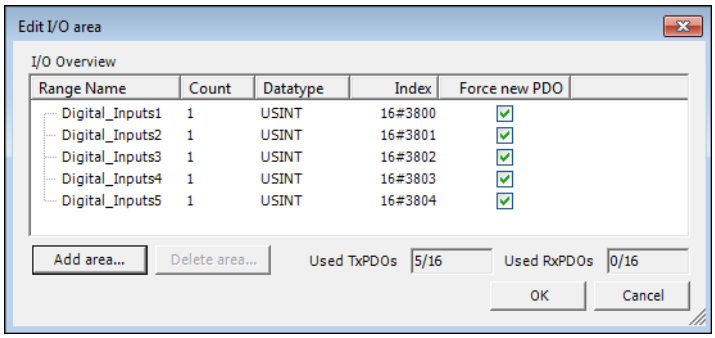
Parameter	Description
General	
Node ID	Selects the node ID or station address (1 … 126) that the PFC uses to communicate with the slave in the CAN network.
[Edit I/O area…]	Opens the dialog for creating I/O areas or process data objects and the corresponding object directory indices (slaves). The possible number and size of the I/O areas depends on the number of unused PDOs. The actual number of **Used TxPDOs** and **Used RxPDOs** is displayed below the table (max. 16 PDOs).  Figure 50: Edit I/O Area

Table 33: General Configuration

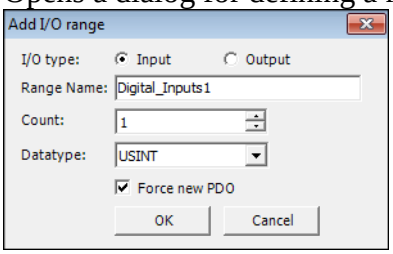
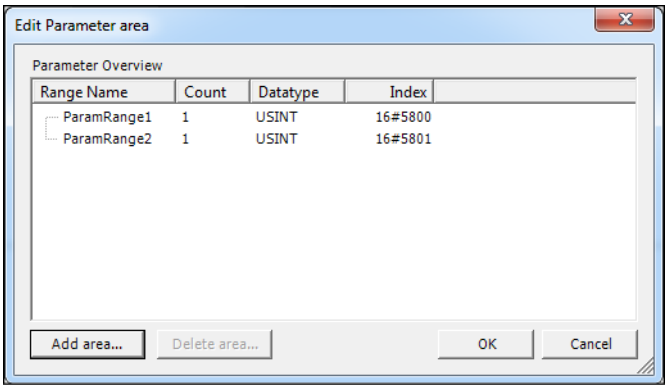
Parameter	Description	
	Range Name	Displays the unique name of the range This is automatically entered but can be changed.
	Count	Displays the number of inputs/outputs. The possible values depend on the data type and the actual number of PDOs.
	Datatype	Displays the data type of the process data object: USINT, UINT, UDINT, ULINT, SINT, INT, DINT, LINT, REAL, LREAL
	Index	Displays the index in the object dictionary of the slave that is assigned to the new object
	Force new PDO	If this option is enabled (default), each new I/O area is mapped to a new PDO — even if the existing PDO mapping is not yet full. Otherwise, the actual PDO mapping is completely filled in before a new PDO is created.
	[Add area…]	Opens a dialog for defining a range  Figure 51: Add I/O Range
	[Delete area…]	Deletes ranges and associated data (e.g., mapping variables, PDOs, PDO mapping) of the selected entries
	Used TxPDOs/Used RxPDOs	Displays the current number or receive/send process data objects The possible number and size of the I/O areas depends on the number of unused PDOs.

Table 33: General Configuration

Parameter	Description	
	[OK]	Activates the new I/O range and displays it in the I/O overview table Input/output channels and mapping variables are created. In the device's object dictionary, each I/O range receives its own index (output range: 0x3000 … 0x30FF, input range: 0x3800 … 0x38FF) and each individual input/output within the input range of a subindex. When an I/O range is created, PDOs are automatically created (RxPDOs start with 0x1400, TxPDOs with 0x1800). If the “Force New PDO” option is enabled (see above), the inputs/outputs are automatically mapped sequentially to these new PDOs.
	[Cancel]	Closes the dialog and discards any changes
[Edit SDO Parameter area…]	Opens a dialog for creating configuration data objects The description of the dialog is the same as that of “**[Edit I/O area…]**.”  Figure 52: Edit Parameter Range	
EDS File		
Vendor Name	Name of the device manufacturer	
Vendor Number	Number of the device manufacturer	
Product Name	Name of the product	
Product Number	Number of the product	
Revision Number	Revision number of the product	
[Generate EDS File...]	This function enables an EDS file to be generated from the slave configuration.	

CANbus Slave I/O Mapping

The window displays the I/O mapping of the slave side.

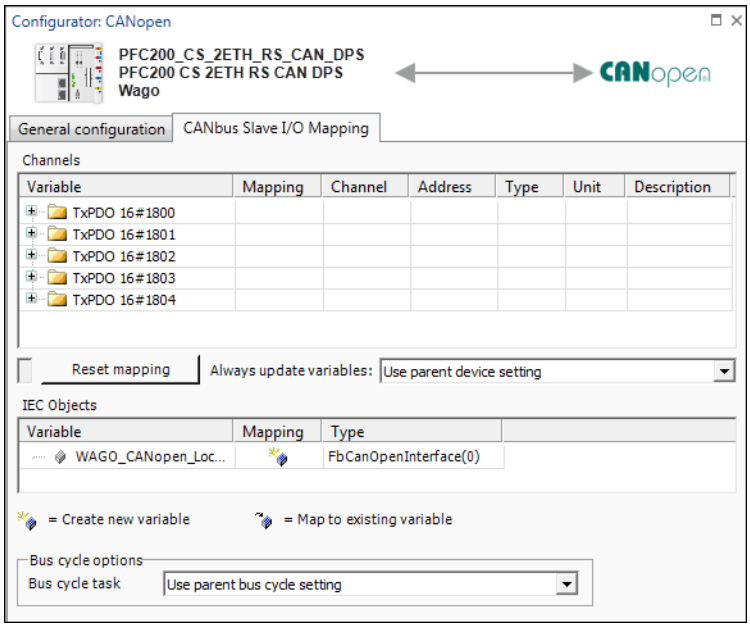


Figure 53: CANbus Slave I/O Mapping

Table 34: CANbus I/O Mapping

Column/Button	Description
Variable	Project variable
Mapping	Displays which variable is new and which variable already exists:
	The variable is not yet available, is newly created and can then be used in the entire project.
	Uses a pre-existing variable for mapping.
Type	Variable data type

Configuring the CANopen Master

The CANopen master configurator opens when the master device is selected and the appropriate button in the “Settings” panel is clicked. It contains two tabs: “CANopen Manager” and “CANopen I/O Mapping.”

CANopen Manager

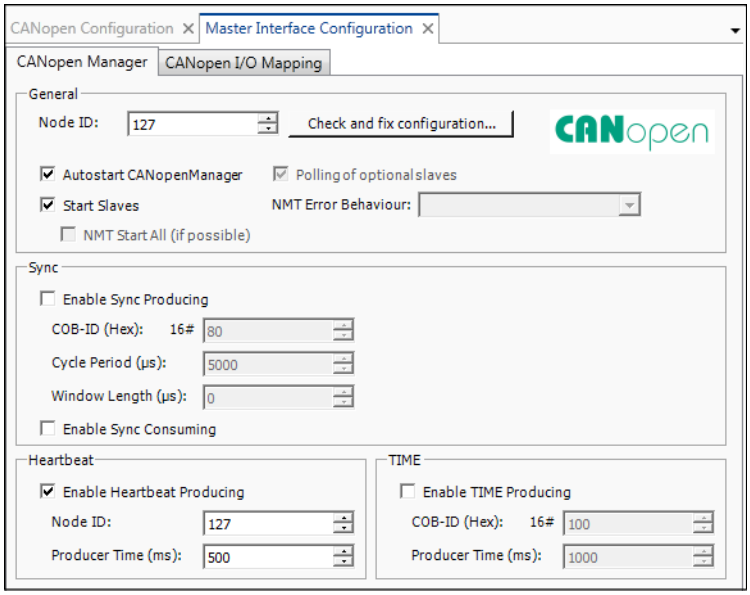


Figure 54: CANopen Manager

Table 35: CANopen Remote Device

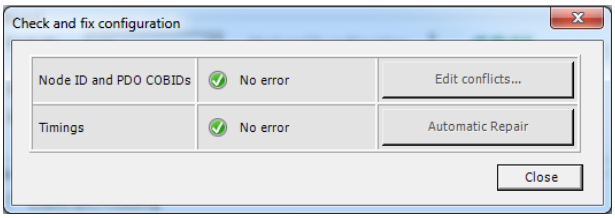
Parameter	Description
General	
Node ID	Selects the node ID or station address (1 … 126) that the PFC uses to communicate with the slave in the CAN network
[Check and fix configuration…]	Opens a dialog for editing conflicts and for automatic repair  Figure 55: Check and Fix Configuration
Autostart CANopenManager	When enabled, starts the CANopen Manager automatically (OPERATIONAL) as soon as all obligatory slaves are ready. Otherwise, the CANopen Manager must be started by the application using the “CiA405 NMT” function block.

Table 35: CANopen Remote Device

Parameter	Description
Start Slaves	When enabled, the CANopen Manager is responsible for starting the slaves. Otherwise the slaves must be started by the application using the “CiA405 NMT” function block.
Polling of optional slaves	When enabled, a slave that does not return a response during the boot sequence is polled regularly by the CANopen Manager until it returns a response. This option is currently enabled by default.
NMT Error Behavior	The NMT error behavior is not currently configurable.
NMT Start All (if possible)	The “NMT Start All” option cannot be selected at present.
Sync	
Enable Sync Production	When enabled, (disabled by default), the CANopen Manager transmits synchronization telegrams
	Note **Observe note on “Sync Production!”** If “Sync Production” is enabled in the CANopen Manager, this function is disabled for all other bus stations.
	The following settings are available:
COB-ID (Hex)	CAN ID of the SYNC telegram Possible value range: [1, 2047]
Cycle Period (µs)	Interval length (in microseconds) after which the synchronization telegram is sent
Window Length (µs)	Not configurable
Enable Sync Consumption	When enabled, (disabled by default), the receipt of synchronization telegrams of other devices by the CANopen Manager is displayed
Heartbeat	
Enable Heartbeat Production	When enabled, the CAN device produces heartbeats at the ms intervals entered at “Producer Time.”
Node-ID	Unique identification (1 … 127) of the Heartbeat producer on the bus.
Producer Time (ms)	ms intervals in which heartbeats are sent

Table 35: CANopen Remote Device

Parameter	Description
TIME	
Enable TIME Production	When enabled, the slave sends a time stamp
COB-ID (Hex)	“Communication Object Identifier” which identifies the message's time stamp Default values: [0, 2047], default 100
Producer Time (ms)	Interval in milliseconds in which the time stamp is sent This value must be a multiple of the task cycle time.

CANopen I/O Mapping:

The window displays the master's I/O mapping.

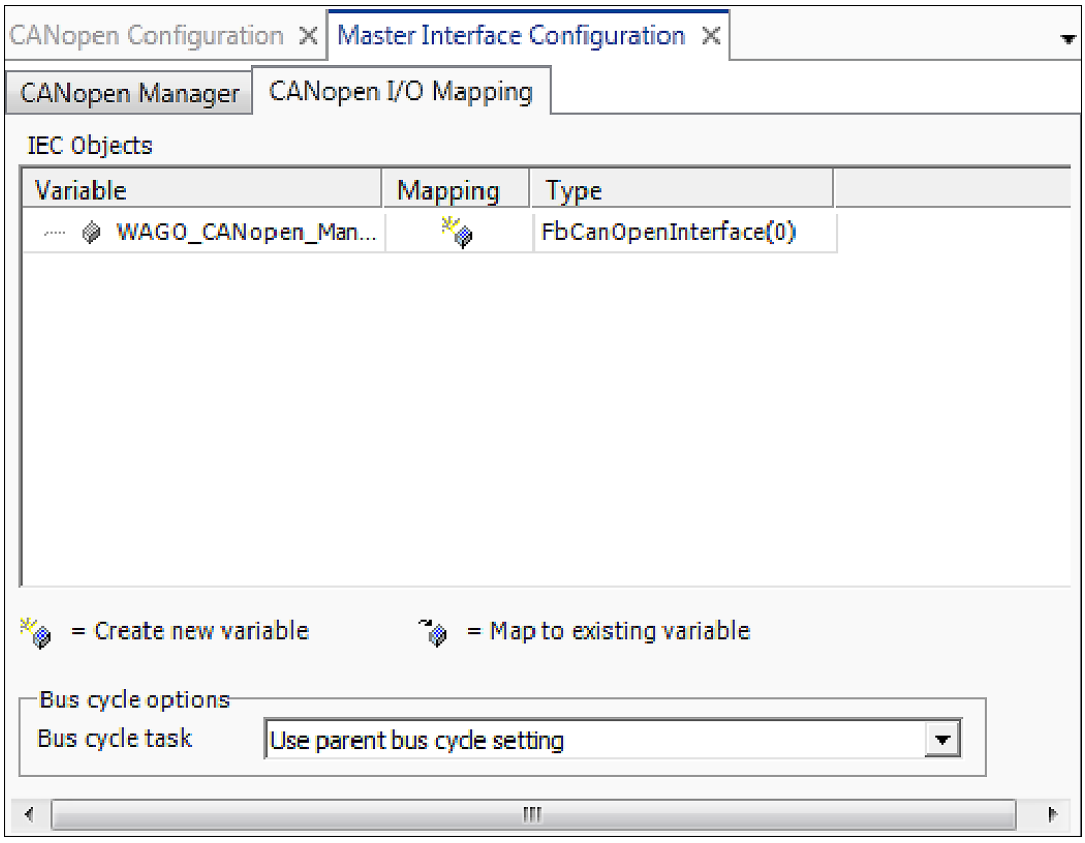


Figure 56: CANopen I/O Mapping

7.2.3.3.2.3 PROFIBUS Configurator

The PROFIBUS Slave Configurator creates data points for communication between the IEC program and PROFIBUS. The following functions are provided:

- Creation of data points
- Deletion of data points
- Mapping of data points to existing application variables (CODESYS configuration user interface)
- Creation of data points as new CODESYS variables (CODESYS configuration user interface); these can be addressed directly in the program editor.
- Export of the configuration in the form of a device description file (*.gsd or *.gsg).

The configuration user interface consists of two main areas: “Data Points” tab and “I/O-Mapping” tab, which are arranged beneath the device images.

The “Data Points” tab lists defined data points and creates or deletes new ones. The data points are shown in tabular form. Each column represents a property of the data point. After a data point is created, properties (interdependent) can be changed. The individual table cells serve as entry or selection windows.

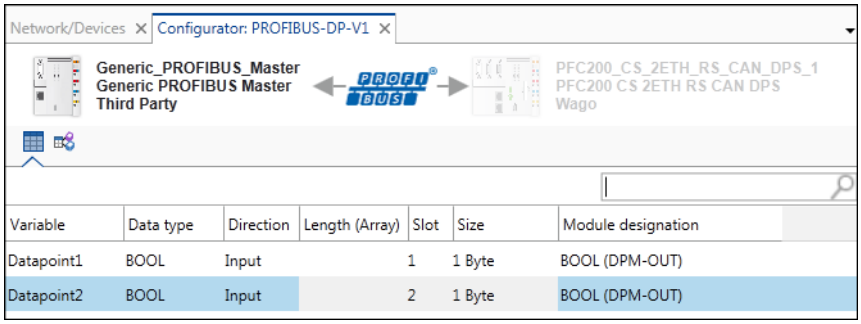


Figure 57: PROFIBUS Connection Configurator

Table 36: PROFIBUS Connection Configurator

Parameter	Description
Variable	Displays the data point name The name is always identical to the name of the application variable
Data type	Displays the data type of the data point, as well as the application variable The following data types are supported: • BOOL • BYTE • WORD • DWORD • SINT • INT • DINT • USINT • UINT • UDINT • REAL • ARRAY OF BOOL • ARRAY OF BYTE • ARRAY OF WORD • ARRAY OF DWORD • ARRAY OF SINT • ARRAY OF INT • ARRAY OF DINT • ARRAY OF USINT • ARRAY OF UINT • ARRAY OF UDINT • ARRAY OF REAL
Direction	Indicates whether it is input data or output data
Length (Array)	Displays the number of elements With simple data types (no arrays), the value is always set to 1. With arrays, the value can be changed.
Slot	Displays the slot's number Each data point is automatically assigned a slot. This cannot be changed. The data of a slot is always transmitted in a PROFIBUS telegram. This guarantees the consistency of the transferred data.
Size	Displays the size of the data point in bytes
Module designation	Displays the module name Each data point can be assigned a module name. If a user-defined name is not assigned, the name is generated from the data type and the number of elements. This is automatically updated with changes. A default name is also generated for deleted module names.

Right-clicking inside the table opens the context menu for adding (**New**), removing (**Delete**) or rearranging (**Up** / **Down**) data points. These commands are

also provided in the menu ribbon. The menu ribbon also provides commands for creating and duplicating several data points.

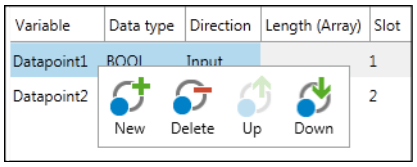


Figure 58: Context Menu of a Data Point

The lower area of the PROFIBUS Configurator displays a gray status line. Clicking the text of the status line toggles between two views: “Used” and “Remaining.” The first view shows the slots, input bytes and output bytes already used. The second view shows the remaining bytes.

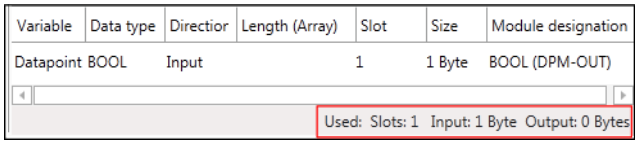


Figure 59: Information in the Status Line of the PROFIBUS Configurator

The “I/O Mapping” tab performs mapping to the variables (if required).

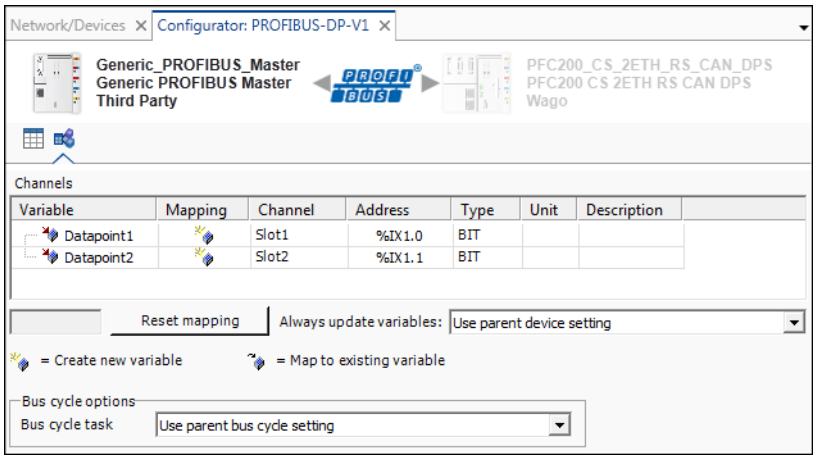


Figure 60: PROFIBUS Connection Configurator

Table 37: PROFIBUS Configurator

Parameter	Description
Variable	Displays the name of the assigned or created variable. This name is visible in the IEC program.
Mapping	Displays which variable is new and which variable already exists:
	 The variable is not yet available, is newly created and can then be used in the entire project.  Uses an already existing variable for mapping
Channel	Displays the data point's name
Address	Displays the data point's IEC address
Type	Displays the variable's data type
Unit	Not used in this context
Description	Displays the description
[Reset mapping]	Deletes all mapping to existing variables
Always update variables	Defines whether the I/O variables are updated in the bus cycle task. The default value is defined in the device description. **Use parent device settings** Updates the settings according to the settings of the parent device **Activated 1 (use bus cycle task if not used in a task)** Updates the I/O variables in the bus cycle task if they are used in no other task **Activated 2 (always in the bus cycle task)** Updates all variables in each cycle of the bus cycle task, regardless of whether they are used or whether they are mapped to an input or output channel

7.2.3.3.3 Device Detail View

The Device Detail view is opened by double-clicking a device in the Network view. The Device Detail view is designed for each specific product series. It adds modules to a head station (via Drag & Drop from the Product Catalog), for simple cable tests on digital input/output modules (lamp test by clicking LEDs), as well as an entry point for configuring displayed devices.

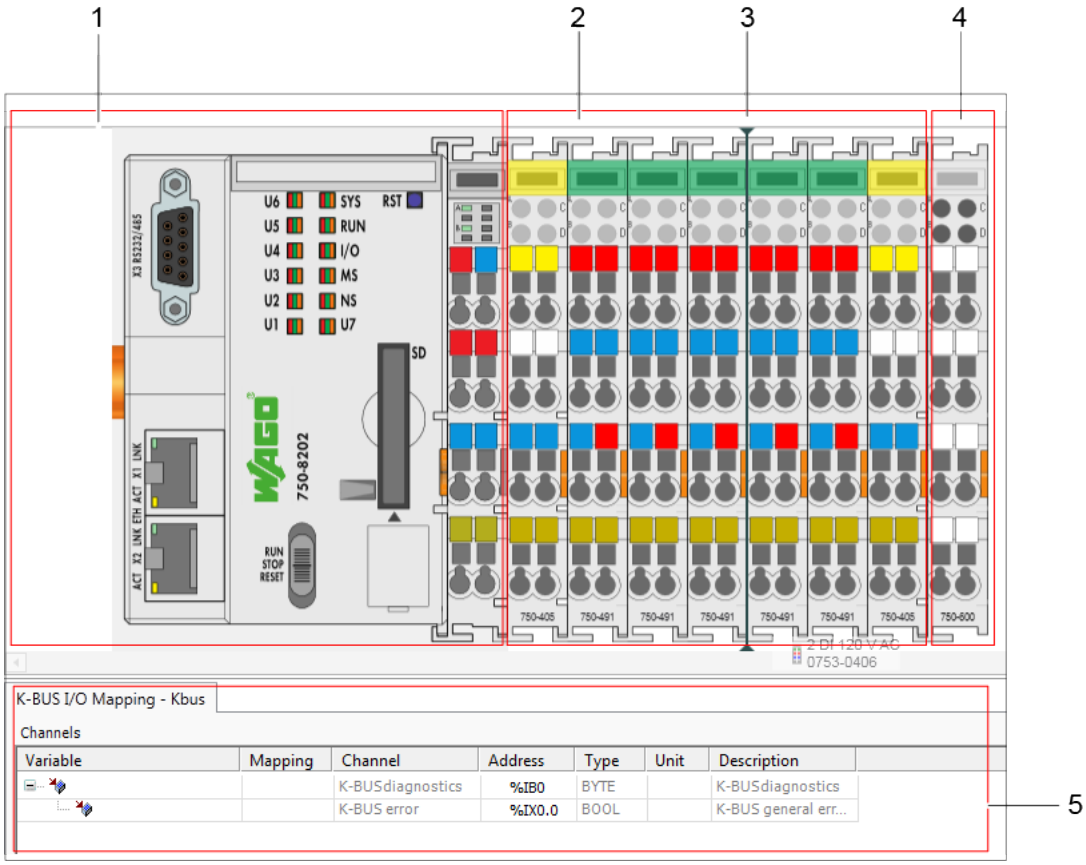


Figure 61: Device View (Example: Fieldbus Controller with Connected Modules)

Table 38: Elements of the Device View

No.	Description
1	**Head Station/Controller** Detailed view of a head station/controller in the project
2	**Arranged Modules** Detailed view of arranged modules To check the wiring, the LEDs of digital input/output modules can be switched on and off with a mouse click (if the device is connected online and control mode is active).
3	**Positioning Line for Modules** Position where new modules are added. Displayed if a module is dragged to the Device Detail view with the mouse.
4	**End Module** Display of the end module that terminates a node. End modules cannot be removed.
5	**I/O Mapping** Mapping and assignment of input, output, and memory addresses of the controller to project variables that are used by the application. The I/O mapping is displayed in the Device Detail view and can be opened or closed via arrow buttons. Alternatively, the Mapping view can be opened or closed via the menu ribbon, “VIEW” tab, **[I/O Mapping]** button.

Right-clicking a device displays the different buttons of the context menu:

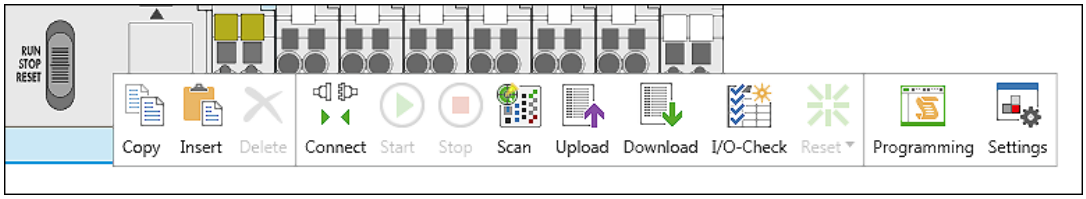


Figure 62: I/O Module Context Menu

Table 39: Context Menu of a Device

Symbol	Function	Description
	Copy	Copies selected modules
	Insert	Inserts copied modules
	Delete	Deletes selected modules from the node
	Connect	Opens an online connection to the node
	Disconnect	Removes the connection between the development and target systems
	Start	Starts the application on the controller or in the simulation
	Stop	Stops the application on the controller or in the simulation
	Scan	Scans the node for the presence of modules and displays results in a list
	Upload	Reads parameters from the displayed devices
	Download	Writes parameters to the displayed device
	I/O-Check	Opens the “I/O CHECK” tab (see Section “I/O CHECK Tab”)
Reset	**Reset**	Causes a reboot in online mode (for additional information, see Section “Tiles”)
	Programming	Opens the “Programming” workspace (see Section “'Programming' workspace”)
	Settings	Displays device settings in the corresponding panel (see Section “Panels” > “Settings”)

The I/O mapping is displayed below the Device Detail view.

7.2.3.3.3.1 I/O Mapping

I/O mapping is the assignment of input, output, and memory addresses of the controller to project variables that are used by the application.

The display refers to the selected I/O module in the Device Detail view. If several I/O modules are selected, the I/O mapping of the last selected I/O module is displayed.

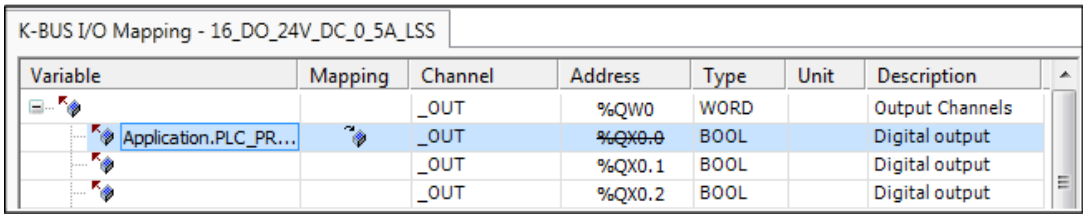


Figure 63: I/O Mapping

Table 40: I/O Mapping

Column	Value (example)	Description
Variable	“Input01”	Input field for the name of the variable to be used for mapping the channel in the CODESYS application. Double-clicking the input field displays the **[…]** button for opening the Input Assistant.
Mapping	 	Symbol which displays a new or existing variable. The variable is not yet available, is newly created and can then be used in the entire project. Uses an already existing variable for mapping
Channel	“Input channel 1”	Displays the symbolic name of the channel.
Address	“%IB3”	Displays the address of the channel in the following format: %<Memory area><Data type><Number(s)> Memory area: I Input/input memory area Q Output/output memory area M Marker memory area Data type: X Single bit None Single bit B Byte (8 Bit) W Word (16 Bit) D Double word (32 Bit)

Table 40: I/O Mapping

Column	**Value (example)**	**Description**
		For additional information on I/O mapping and addressing, see the CODESYS Online Help, “I/O Mapping.”
Type	“BYTE”	Displays the channel data type The table cell remains empty if non-IEC data types are involved.
Unit	“ms”	Displays the unit of the parameter value
Description	“Process data input channel 1”	Writes the parameter Edit the entry by double-clicking the entry field

7.2.3.4 “Programming” Workspace

The “Programming” workspace is similar to the CODESYS 3.0 programming environment.

Different editors are displayed in the middle of the workspace, and are opened by double-clicking on objects in the Project Structure or via the “Edit” button in the menu ribbon. The tab carries the name of the selected object.

The “Programming” workspace also contains its own panels, which can be used for programming (breakpoints, call stack, cross reference list).

7.2.3.4.1 Program Editor

The program editor is displayed in a tab if a program (e.g., PLC_PRG) is double-clicked in the Project Structure or the “Edit” button of the menu ribbon is clicked. For additional information, see the CODESYS online help.

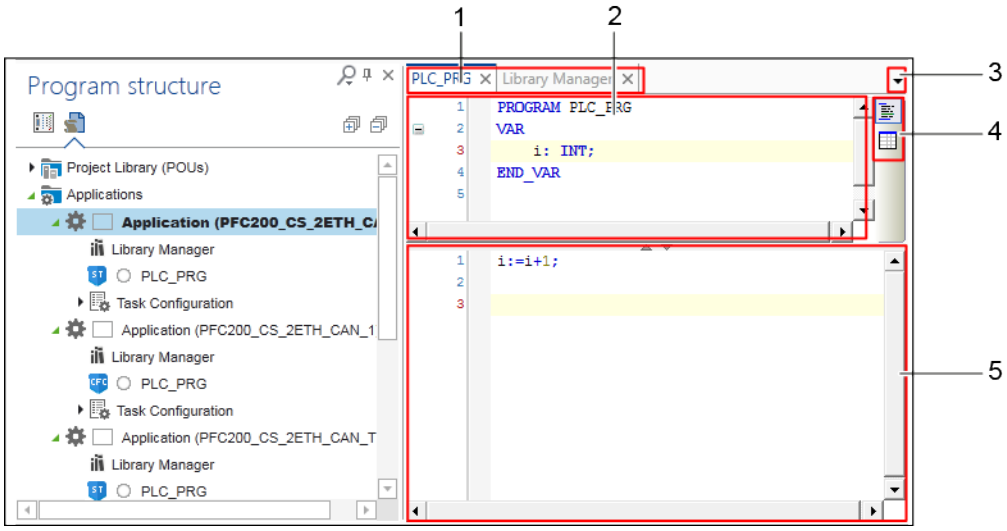


Figure 64: Elements of the Program Editor

Table 41: Elements of the Program Editor

No.	Description
1	**Tabs** Program editors, library managers, visualizations are displayed based on the selection in the Program Structure (double-clicking). Right-clicking a tab opens a context menu that contains the following functions: “Close,” “Close all windows apart from this one,” “Undock/Dock”, “New horizontal/vertical tab group” and “Move to the next/previous tab group”.
2	**Declaration Editor** This area normally appears above the program code. It contains the program name, the scope of validity and variable declarations (see CODESYS online help: “Options, Declaration Editor”).
3	**Active Tabs** Shows active tabs in a selection list.
4	**Text/Table Toggle Button** Toggles between textual and tabular view (see CODESYS online help: “Options, Declaration Editor”)
	 Textual View
	 Tabular View
5	**Language Editor** The program code appears here when using language editors such as for “Structured Text” (ST) or “Continuous Function Chart” (CFC).

7.2.3.4.2 Library Manager

Libraries contain collections of reusable objects such as functions, function blocks or variables that are incorporated into projects. The contents of these libraries can be used here without any new declaration. The library manager is used to manage the libraries of a project.

The following libraries are supported:

- **User-Related Libraries**, which contain ready-to-use software solutions for manufacturing, building and process automation
- **Function-Related Libraries**, which contain technology functions and simple applications, such as for opening a communication connection
- **WAGO and CODESYS System Libraries** which enable complete system access

Note

Only use system libraries from WAGO!
In order to use functions adapted to WAGO devices, only use WAGO's proprietary system libraries. You can recognize these libraries by the prefix “Wago” in the library name.

Information

Additional Information
Further notes on the libraries are provided in the manual “Libraries for ***e!****COCKPIT* (Overview and Migration Instructions)”.
The manual provides an overview of libraries that can be used in ***e!****COCKPIT*. It also provides instructions on importing software projects created in the WAGO-I/O-*PRO*, CODESYS-2 or CODESYS-3 programming environments. The appendix of this manual provides an overview of corresponding functions in libraries for WAGO-I/O-*PRO* and ***e!****COCKPIT*.
Additional information on converting CODESYS 2 and CODESYS 3 projects is provided in the CODESYS online help: (“Converting”).

Note

Permanently install libraries!
Note that all libraries must be incorporated permanently. If you simply replace the library files in your local library directory, the libraries are not available in ***e!****COCKPIT*. They must be installed from the repository.

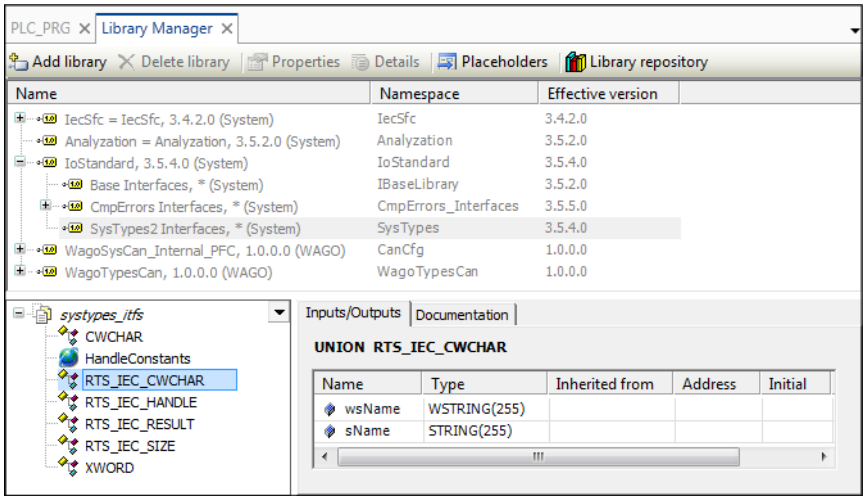


Figure 65: Library Manager

Table 42: Library Manager

Button	Description
[Add library]	Opens a dialog for library selection. The library manager adds to the project a reference to the library already installed in the repository.
[Delete library]	Deletes the reference to the selected library
[Properties]	Displays general properties of the selected library
[Details]	Displays details of the selected library
[Placeholders]	Displays placeholders used and adds target system-independent libraries. Depending on the device, the appropriate library is used; the standard library is used if no devices are available.
[Library repository]	Allows the addition and deletion of libraries from the Library Repository Libraries are permanently installed in ***e!****COCKPIT*.

7.2.3.4.3 Task Configuration

A task is a temporal sequence and control unit in an IEC program. It is defined by name, priority, type and a start condition. Either temporal conditions or an internal or external event can be defined for starting the task.

If a device is added to a project, a task configuration with a main task is automatically added for this device in the Program Structure (see the following Section). This calls one or several POUs. Call sequence is defined by the combination of priority and condition.

Time monitoring for each task can also be configured (watchdog). The setting options depend on the target system.

The task configuration is opened by double-clicking the appropriate entry in the Program Structure. The “Properties” tab shows the basic settings, such as maximum values for tasks and watchdog parameters.

The “Monitor” tab displays the status and current statistics for cycle times in online mode.

For additional information, see CODESYS online help: “Task Configuration Editor > Dialog, Properties.”

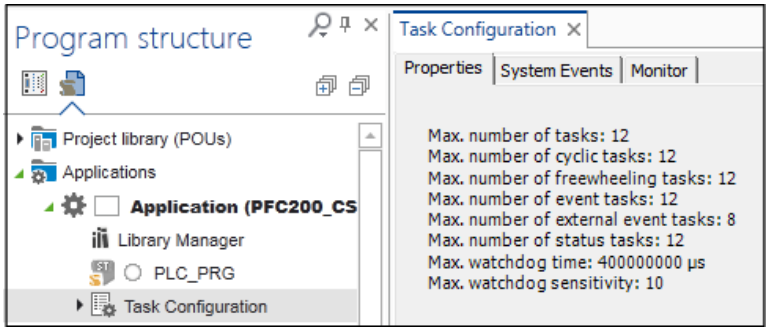


Figure 66: Task Configuration

7.2.3.4.4 “PLC_Task” Main Task

Configured tasks are displayed below the task configuration in the Program Structure. A “PLC_Task” main task is automatically created first for each task configuration. Tasks can be edited or deleted. The number behind the task indicates how many program calls are associated with the task. The task can be double-clicked to change the name. Other tasks can be extended by right-clicking them in the task configuration and choosing **[Add New Element]** > **Task** in the context menu.

For additional information, see CODESYS online help: “Task Configuration Editor > Configuration Dialog.”

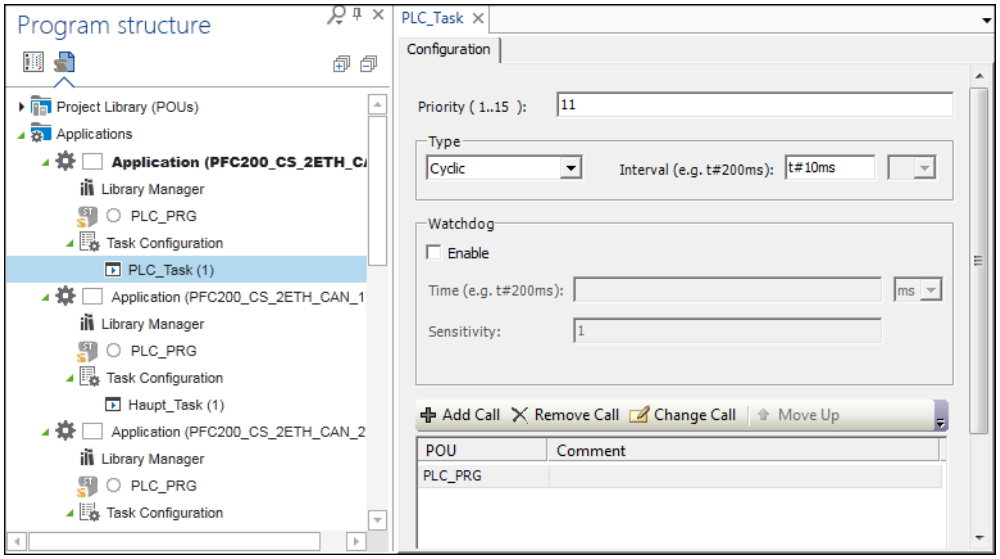


Figure 67: “PLC_Task” Main Task

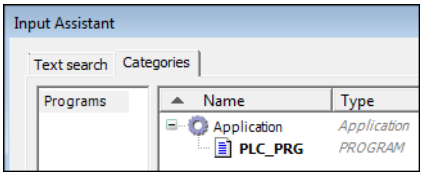
Table 43: “PLC_Task” Main Task

Parameter	Description
Priority (1...15)	Indicates the task priority on a scale between 1 to 15 1 = highest priority 15 = lowest priority
	Note **Task priority can affect the runtime behavior of the controller!** Note that a set task priority in the critical range (1 .. 3) can considerably affect the runtime behavior of the controller.
“Cyclic” Type	Defines the time after which the task will be restarted. The cycle time (e.g., “200”) corresponds to the task cycle time entered in the “Interval” field in milliseconds “ms” or microseconds “µs.”

Table 43: “PLC_Task” Main Task

Parameter	Description
	Note **Observe requirements for other bus systems!** When entering the task cycle time, consider system requirements. For example, in CAN bus systems, this must fit the currently set baud rate and the number of frames used on the bus. To prevent the loss of CAN frames, also enter multiples of the task cycle time for Heartbeat, Nodeguarding and Sync.
“Event” Type	Starts the processing of the task as soon as a rising edge occurs on the variable defined in the “Event” text field The **[…]** button opens the Input Assistant with a list of all available global variables.
	Note **Use at least on a cyclic task for inputs!** If the event that controls a task comes from an input, there must be at least one task that is not event-triggered. Otherwise the inputs and outputs are never updated and the event-controlled task is never started.
“External” Type	Starts task processing as soon as the event defined in the “Event” field occurs (events dependent on the target system)
“Freewheeling” Type	Begins task processing at the start of the program and restarts automatically in a continuous loop at the end of the task (no defined cycle time)
“Status” Type	Starts task processing if the variable of the “Event” field has the value TRUE
Watchdog	Defines watchdog parameters for a task. Depending on the device used and definitions in the respective device description, setting options (upper/lower limits, default values, units, etc.) may be different than the settings shown. The watchdog can be switched off for specific cycles.

Table 43: “PLC_Task” Main Task

Parameter	Description
Enable	If this option is activated, the watchdog is active. The task ends with an error status if the entered cycle time incl. set tolerance (sensitivity) is exceeded. **Several successive timeouts:** A sensitivity of 0 or 1 generates the exception error in cycle 1, a sensitivity of 2 to n generates the exception error in cycle 2 to n. **With Single Timeout:** Exception error if the cycle time of the current cycle is longer than (time * sensitivity) Example: Cycle time 10 ms and sensitivity 5 →Exception error as soon as the task (once) is longer than 50 ms. If this option is deactivated, the watchdog is deactivated. There is no task watchdog.
[Add call]	Opens a dialog for adding a program or POU call The dialog can likewise be opened in the Program Structure (right-click on a task > **Program Call**).  Figure 68: Selecting a Program via the Input Assistant For additional information, see CODESYS online help: “Program Call”
[Remove Call]	Removes the selected program call
[Change Call]	Opens the Input Assistant for selecting another program or POU
[Move up]	Moves the selected program or POU up by one position in the processing sequence
[Move down]	Moves the selected program or POU down by one position in the processing sequence
[Open POU]	Opens the selected program in the programming editor

7.2.3.4.5 Breakpoints

Breakpoints are used for debugging an application program. Breakpoints enable the program to be stopped at a defined position or executed in defined steps.

The breakpoint list is displayed in a window. This is opened via the menu ribbon, “VIEW” tab, **[Breakpoints]** button.

The “DEBUG” tab enables breakpoints to be set at the actual position in the Programming Editor (**[New]** button). It is also possible to toggle between the active and inactive state of a breakpoint (**[Toggle]** button).

Program symbols:

- Breakpoint active
- Breakpoint inactive
- Stop at the breakpoint in online mode

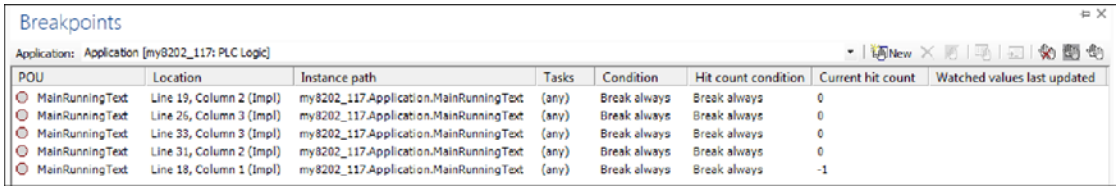


Figure 69: Breakpoints

Further information on creating and editing breakpoints can be found in CODESYS online help: (“Breakpoints”).

7.2.3.4.6 Call Stack

During the step-by-step execution of a program, this always shows the currently reached position in the call stack with a complete call path.

The “Call Stack” panel is opened as a panel via the “View” tab of the menu ribbon.

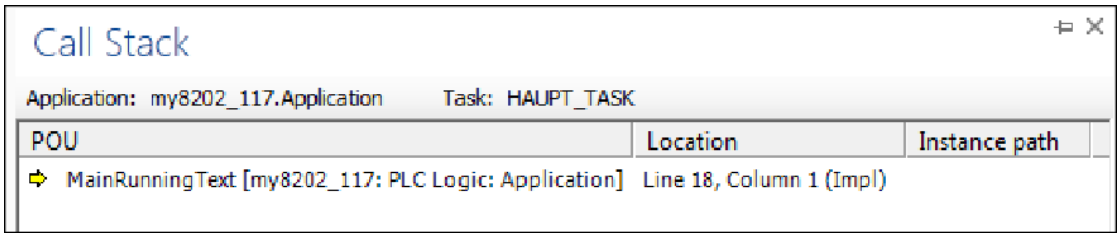


Figure 70: Call Stack

Further information on creating and editing call stacks can be found in the CODESYS online help: (“Call Stack”).

7.2.3.4.7 Cross Reference List

The cross reference list shows all occurrences of a variable in the project or the active editor.

The “Cross Reference List” panel is opened as a panel via the “View” tab of the menu ribbon.

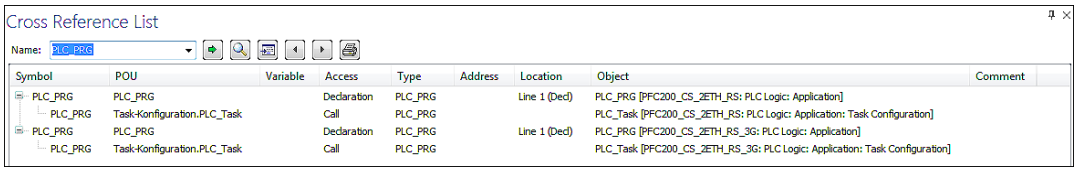


Figure 71: Cross Reference List

Further information on creating and editing cross reference lists can be found in CODESYS online help: (“Cross Reference List”).

7.2.3.5 User-Defined Workspaces

e!COCKPIT's graphical user interface can be configured as needed. Predefined workspaces are provided for two main tasks in a window layout ("Network/Devices" and "Programming").

These workspaces can be customized with user-defined settings, additional panels, window divisions, etc. and saved as a user-defined workspace. Use the **[Manage]** button within the "START" tab for this. After saving, a new button is displayed in the "START" tab through which the new workspace can be accessed.

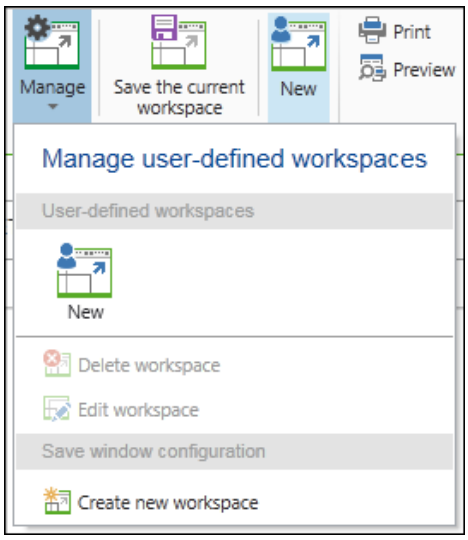


Figure 72: Creating and Managing User-Defined Workspaces

The information for user-defined workspaces is stored for each user in the local Windows properties.

If the default "Network/Devices" or "Programming" workspaces were changed and overwritten with **[Save the current workspace]**, the default settings can be restored at any time in the Backstage view, **[Options]** > **[Standard workspaces]** > **[Reset standard workspaces]**.

7.2.3.6 Panels

The workspace in ***e!****COCKPIT* consists of different windows; within these windows, the panels can be arranged as required.

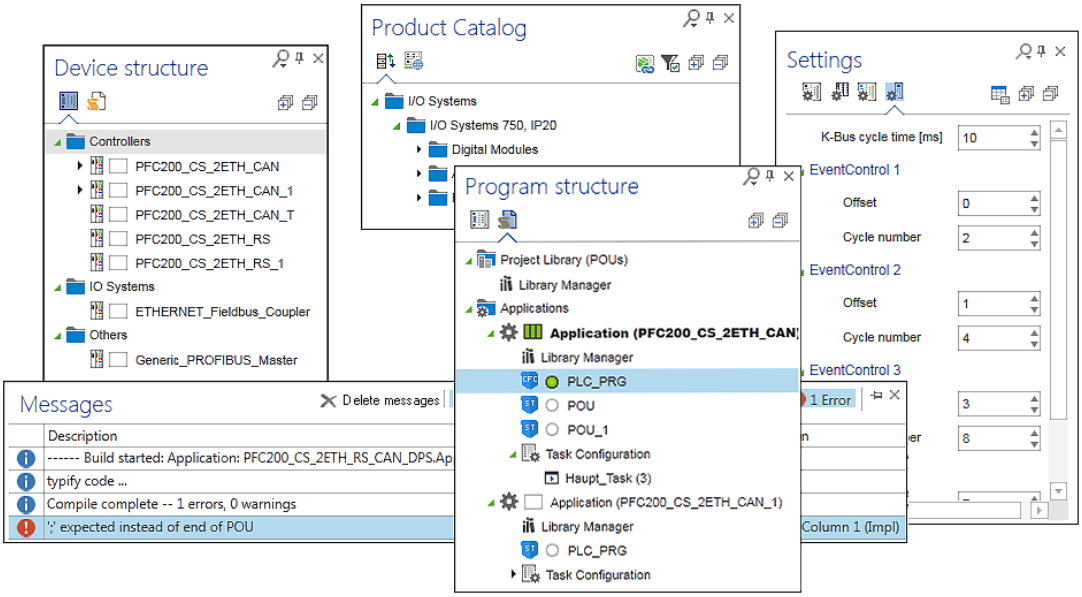


Figure 73: Panels

The “Network/Devices” workspace displays the “Device Structure,” “Product Catalog” and “Settings” panels by default. The “Programming” workspace displays the “Program Structure” panel. This and other panels, such as “Port Forwarding”, “Messages” or the panels related to programming such as “Cross Reference Lists,” can be displayed via the “VIEW” tab.

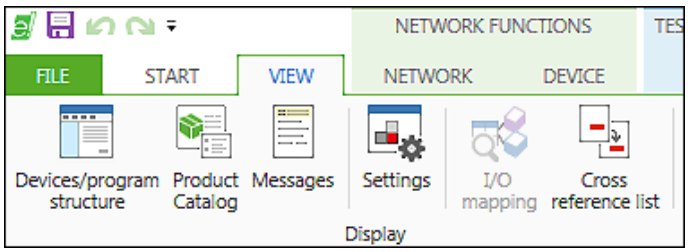


Figure 74: Displaying Panels

Panels can be docked, floated and grouped.

The selection panel synchronizes the selection in other windows or areas of the workspace. The commands and functions of individual tabs depend on the particular elements selected in the panels.

7.2.3.6.1 Device Structure

The Device Structure panel is used for display and providing navigation between the different devices integrated in a project. The panel is part of the “Network/Devices” workspace and is opened via the **[Network/Devices]** button in the “VIEW” tab.

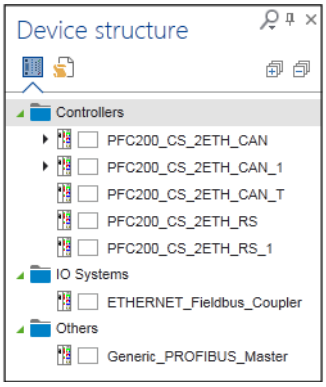


Figure 75: “Device Structure” Panel

The devices are organized in groups that are based on product segments of a Product Catalog, e.g., “Controllers,” or “I/O Systems.”

Device types are represented with different pictograms. A four-section display behind the device pictogram indicates a device’s status for the connection, PLC, internal bus and fieldbus (see Section “Workspaces” > “General Status Display for Connections”). This is followed by the device name based on the device description file. The name can be double-clicked in order to change it.

It is possible to toggle between Device Structure and Program Structure by clicking the tabs in the panel.

Other functions can be accessed via the context menu of a device. These functions are explained in the Section “Tiles.”

7.2.3.6.2 Program Structure

The “Program Structure” is used for display and providing navigation between the different devices integrated in a project. The panel is part of the “Programming” workspace and is opened via the **[Programming]** button in the “VIEW” tab.

The program elements are displayed by device group (“**Application ([Device Name])**”).

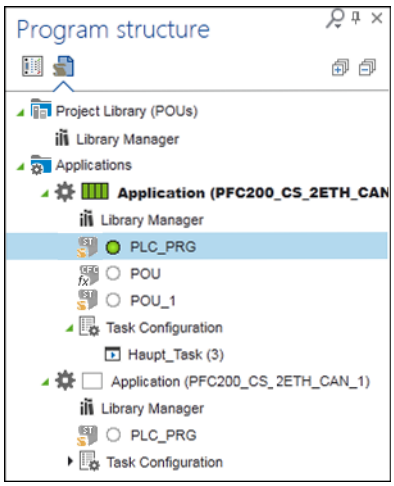


Figure 76: “Program Structure” Panel

A four-section status display provided in front of each application indicates the status with regard to connection, PLC, internal bus and fieldbus (see Section “General Status Display for Connections”).

Another symbol indicates whether it is a program, a function or a function block.

Figure 77: Symbols in the Program Structure

Table 44: Legend for Figure “Symbols in the Program Structure”

No.	Description
1	Display the programming language of the program according to IEC 61131-3: Structured text (ST), ladder diagram (LD), function block diagram (FBD), instruction list (IL), sequential function chart (SFC) and “continuous function chart” (CFC).
2	program
	Function
	Function block

A running program is indicated by a green circle icon displayed in front of it. Possible error states (such as compiler errors) are indicated with a red underline just as they are in CODESYS. Programs excluded from compiling are indicated in gray.

Right-clicking an element in the list opens a context menu that contains additional functions.

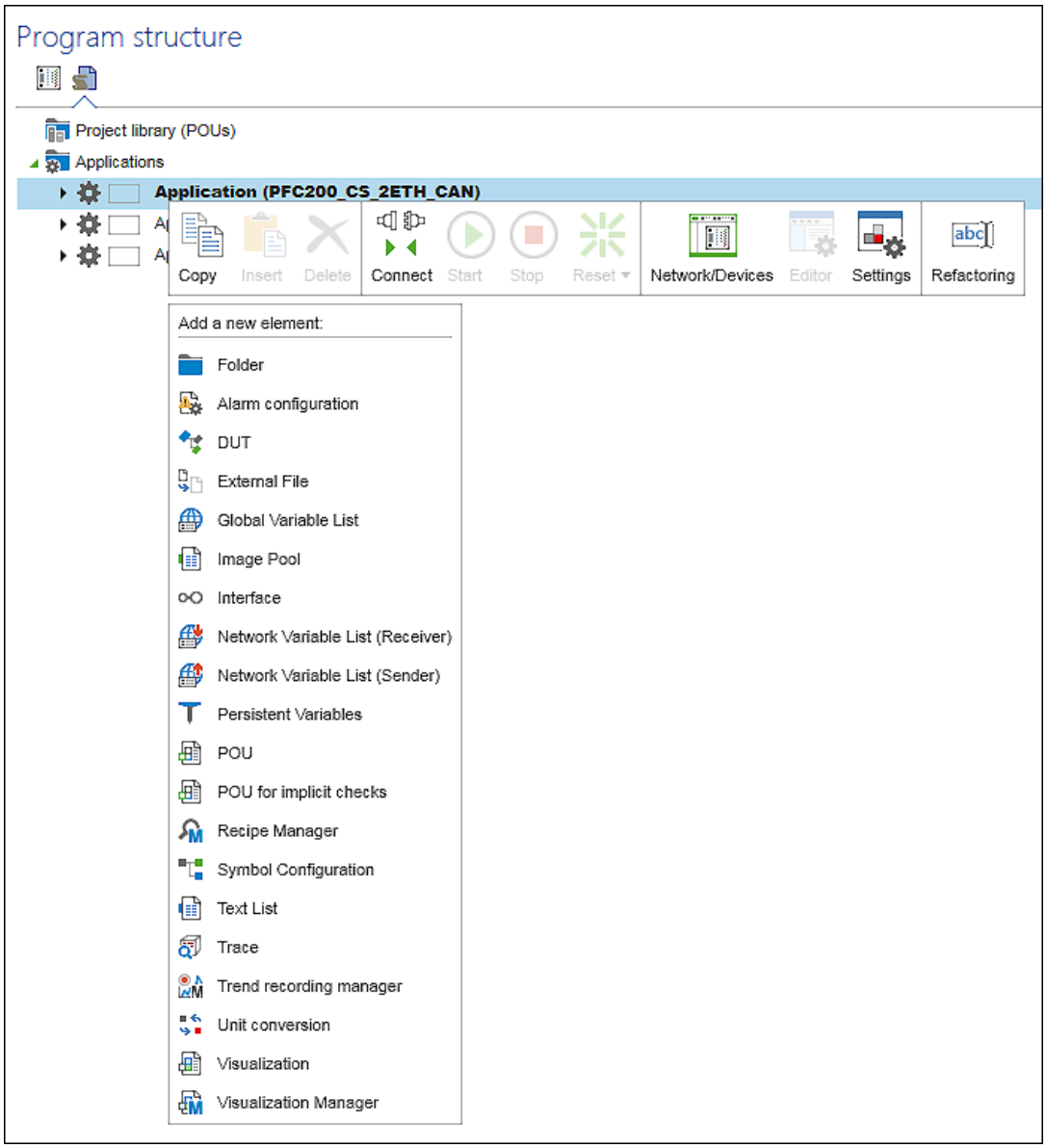


Figure 78: Context Menu of an Application

Table 45: Context Menu of an Application

Symbol	Function	Description
	**Copy**	Copies the selected element
	**Insert**	Inserts the copied element
	**Delete**	Deletes the selected element from the Program Structure
	**Connect**	Opens an online connection to one or several selected applications
	**Disconnect**	Removes the connection between the development and target systems (controller or simulated device) and returns to offline mode
	**Start**	Starts the application on the controller or in the simulation
	**Stop**	Stops the application on the controller or in the simulation
	**Reset**	Causes a reboot in online mode (for additional information, see Section “Tiles”)
	**Network/ Devices**	Opens the “Network/Devices” workspace (see Section ”Network/Devices Workspace”)
	**Editor**	Opens the programming editor for entering program code
	**Settings**	Opens a dialog in which program properties can be edited (see CODESYS online help: “Properties, General”)
	**Refactoring**	Opens the “Refactoring” dialog to rename the object if permitted for the object (see CODESYS online help, Index “Refactoring”)

Depending on the element that is right-clicked, other CODESYS elements can be appended to the structure, e.g., other program organization units (POUs), visualizations or variable lists. For additional information, see the CODESYS online help: “Adding Objects.”

7.2.3.6.3 Product Catalog

The Product Catalog displays all devices that are available in the system and have device drivers that are installed (Backstage view > **[Product Catalog]** > **[Import device]**). The devices can be sorted by product segment and protocol type.

Note

If the Network view is activated, only controllers are visible – not modules!
If Network view is active, no modules are shown in the Product Catalog. These are only displayed when Device Detail view is active. No internal WAGO modules (e.g., the internal bus) or end modules are shown.

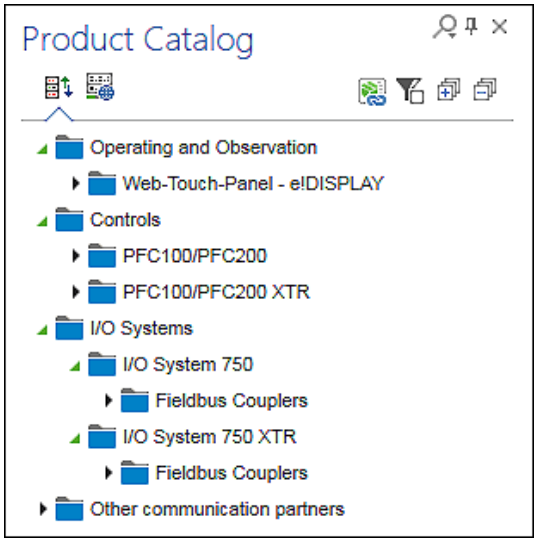
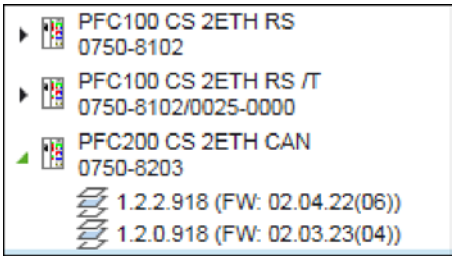


Figure 79: “Product Catalog” Panel

Table 46: Buttons of the “Product Catalog” Panel

Button		Description
	[Sort by product segment]	Displays the products by segment: • Operation and monitoring • Controllers • I/O systems • Accessories • Modules • Basic network functions • Other communication partners
	[Sort by communication protocol]	Sorts the devices by protocol type, such as: • MODBUS • PROFIBUS • CANopen • Serial interface
	[Move to the product catalog management]	Moves to the “Product Catalog” page of the Backstage view for incorporating new devices (**[Import device]** button)

Table 46: Buttons of the “Product Catalog” Panel

Button		Description
	[Display the available versions]	Displays in the tree structure all available device type versions of a device. This function can be switched on/off for each tab in the Product Catalog.  Figure 80: Displaying Available Versions
	[Expand]	Opens all elements of the tree structure (up to device level)
	[Collapse]	Closes all elements of the tree structure
	[Add Devices]	Opens a context menu for adding several devices to the Network or Device Detail view

Functions of the Product Catalog:

- To add a device to a project, individual devices are dragged from the Product Catalog and dropped onto a tile in the Network view.

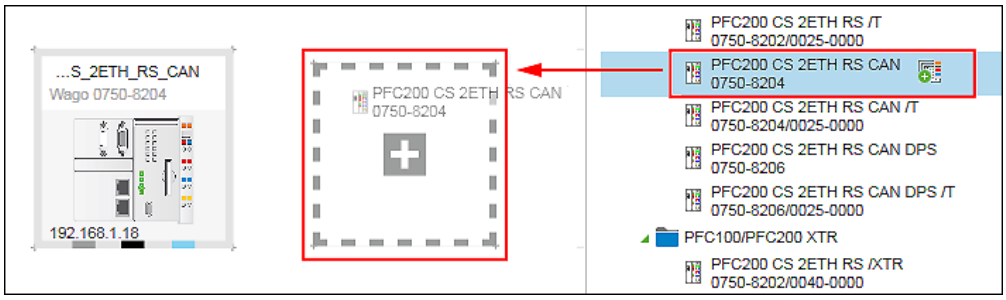


Figure 81: Dragging Devices to the Network View

- Hovering the mouse over a device will display a tooltip showing the product view, device name, type, order number of the device.

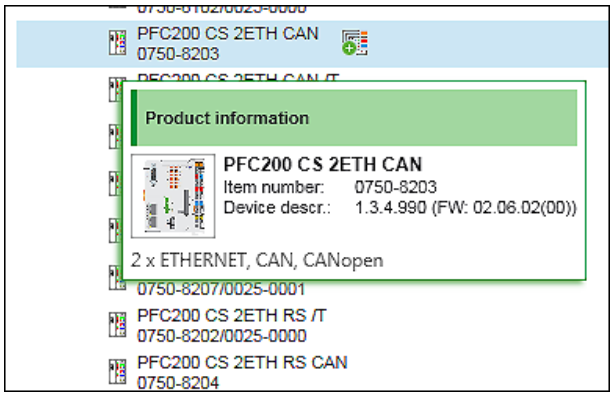


Figure 82: Displaying Product Information

- The “Add” symbol is also displayed.

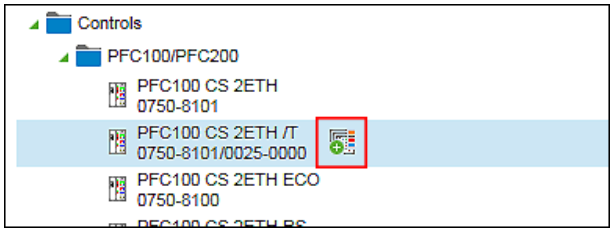


Figure 83: Adding Devices to a Project

Clicking the symbol opens a context menu via which up to 250 devices can be added simultaneously.

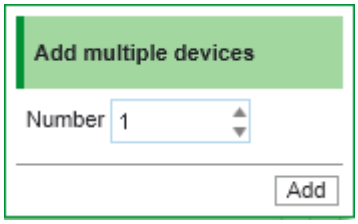


Figure 83: Dialog for Inserting Several Devices

[Add] or **[Enter]** adds the entered number of devices and closes the dialog.

Pressing **[Tab]** moves the focus to the button with the “Add” symbol.

Pressing **[Esc]** or clicking outside of the dialog window to close it.

If several devices are inserted, the last added device is selected.

7.2.3.6.4 Settings

Device parameters are selected in the “Settings” panel. The parameters can be entered within defined limits. Entries in the “Settings” panel depend on the device selection and are based on the relevant device description of the selected device.

Complex modules or devices with more extensive settings, e.g., those involving CANopen or PROFIBUS parameters, can be set using integrated configurators. The configurators are opened from this panel via the relevant buttons. The setting options for these device configurators, as well as an explanation of individual parameters, can be found in the manual of the respective device.

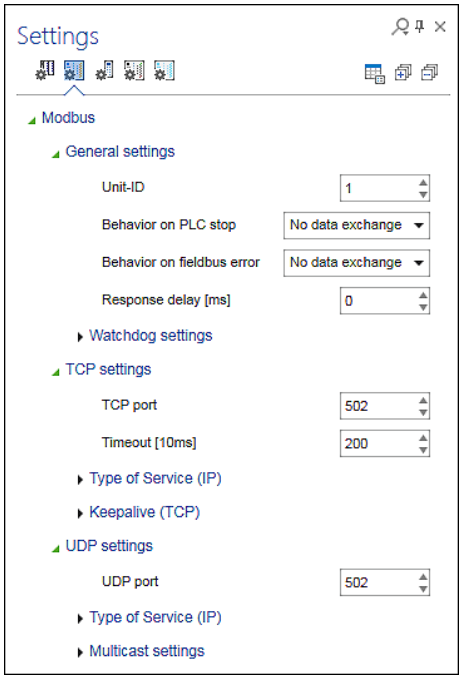


Figure 84: “Settings” Panel with the Button to a Device Configurator (CANopen)

If a head station is selected in Device Detail view or a device in Network view, the “Settings” panel also serves as an entry point for opening network configurators for MODBUS, CANopen and PROFIBUS connections. Network configurators are described in Section “Fieldbus-Specific Configurators”.

Other PLC settings can be made in the “PLC Settings” tab.

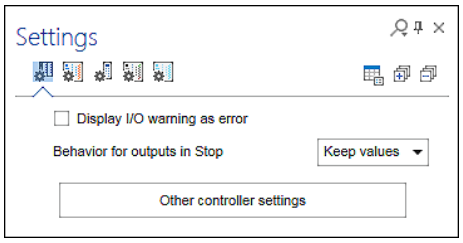


Figure 85: Additional PLC Settings

7.2.3.6.5 Port Forwarding

A controller can be configured as a router in the “Port Forwarding” panel. Devices can use this router to connect to the network, even if they are physically in a different subnetwork.

Note

Observe the Application Note for the Controller Configuration!
In order to use a controller as a router and to use it in ***e!****COCKPIT* for port forwarding, you must first make corresponding settings in the controller. For WAGO controllers based on Linux, these settings are described in application note A500840. You can find this application note in the download area of our websitehttp://www.wago.com.

The “Port Forwarding” panel is opened via the corresponding button in the “VIEW” tab. The panel is opened as an additional tab in addition to the “Product Catalog” and “Settings” panels.

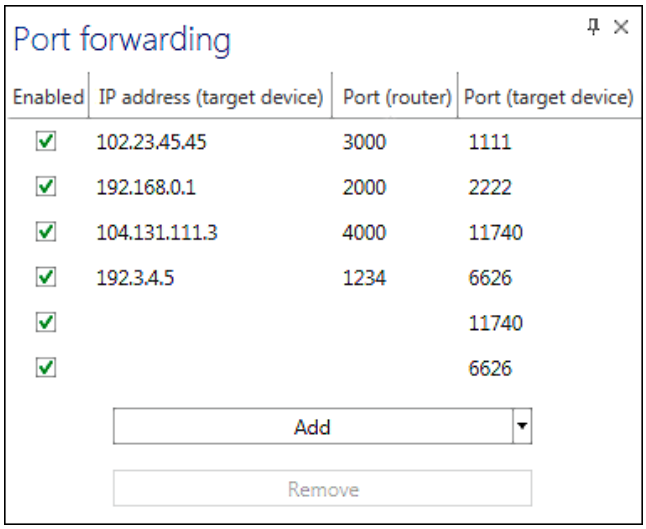


Figure 86: “Port Forwarding” Panel

If the port forwarding function is supported for the selected device, the following settings can be made in the panel:

Table 47: Port Forwarding

Column	Description	
Enabled	☑	Port forwarding activated The device can be used as router for other devices.
	☐	Port forwarding deactivated
IP address (target device)	IP address of the off-network device to be connected	
Port (router)	Port of the controller acting as router and for which port forwarding is activated	
Port (target device)	Port of the off-network device to be connected	

Additional port forwarding configurations can be set up via the **[Add]** button:

Table 48: Setting Up New Port Forwarding Configurations

Add Options	**Description**
Individual port forwarding	Creates two new lines with pre-allocated values for using WAGO devices: • Port 11740 (CODESYS port) • Port 6626 (WAGO connection)
***e!COCKPIT*-specific port forwarding**	Creates a new line with no pre-allocation

Information about port forwarding is saved in the project.

7.2.3.6.6 Message Bar and Message Window

e!COCKPIT features a message bar below the menu ribbon that displays any warnings, messages or errors during configuration, programming or validation.

Figure 87: Message Bar

Table 49: Message Bar Elements

No.	Description
1	Message type “Errors”
2	Name of the affected element, e.g., the program “PLC_PRG”
3	Short message description
4	Button for opening the message window
5	Button for closing the message window

Error messages can refer, for example, to validations of the Device Detail or Network view. CODESYS error messages, configuration errors (incompatible I/O module), compiler errors, warnings, etc. can be displayed. The test is performed continuously.

The complete message list is displayed in a message window. This is opened via the **[Display Message Window]** button of the yellow message bar or alternatively via the menu ribbon, “VIEW” tab, **[Messages]** button.

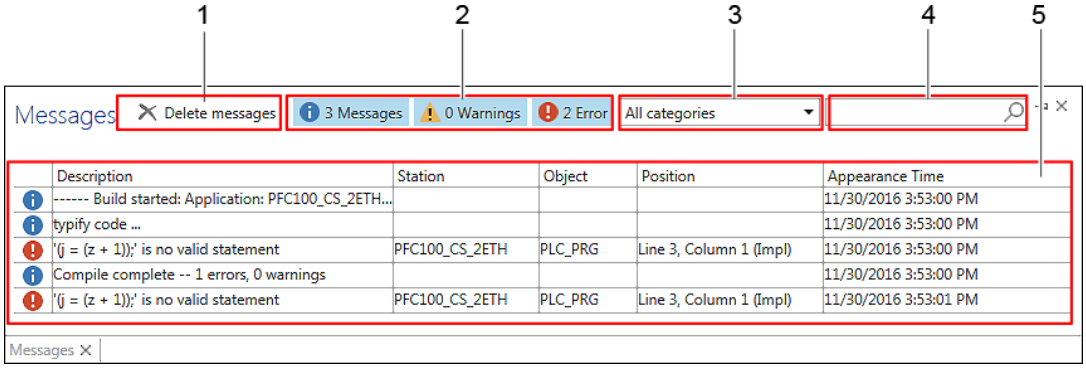


Figure 88: Message Window

Table 50: Elements of the Message Window

No.	Description
1	**[Delete messages]** removes all messages from the list.
2	Filter by message types “Messages”, “Warnings” and “Errors” Click the filter to enable (blue background) and click again to disable.
3	Filters for message categories: By selecting a message category (e.g., “Compile”), the list of displayed messages is limited to this category.
4	Search box: Search and filter by any text in the message window Entering a character enables the search function for all columns and displays the hits highlighted in yellow. Lines without hits are hidden.
5	Description: Description of the message
	Station: Name of the station to which the message is assigned, e.g., a head station (consisting of coupler/controller with connected modules)
	Object: Name of the project element
	Position: Line in the source code
	Message time: Date and time when the message was crated The list is sorted from old (top) to new (bottom). When opening the message window, the newest message is displayed first.

7.2.3.6.7 Other Panels

Besides the panels described, other device-specific panels may appear that are not included in this description.
The contents of these tabs result from the particular device description file (DTP) used.

The “Call stack,” “Breakpoints” and “Cross reference list” panels are described in greater detail in the context of programming, see Section “Programming Workspace”.

7.2.3.6.8 Status Bar

The status bar displays all related connection information of the device currently selected with regard to the connection, PLC, internal bus, fieldbus, last build and e!COCKPIT version with which the project was last saved.

Figure 89: Status Bar

This information applies to one device. No status is displayed if several devices are selected. However, the connection status is displayed in the status bar if several applications of the same device with the same connection properties are selected.

The individual symbols are explained in the Section “Workspace” > “General Status Display for Connections”.

7.3 Backstage View (Files and Settings)

The project file itself, as well as other general basic settings of ***e!****COCKPIT*, are handled and managed via Backstage View, keeping these tasks separate from the processing of actual project content.

The buttons of the navigation bar in the left-hand window display the relevant pages in the right-hand window area or in a separate dialog. The individual pages are described in the following sections.

Open the Backstage view from the Start view via **[Other Projects]** or via the “FILE” tab of the main view.

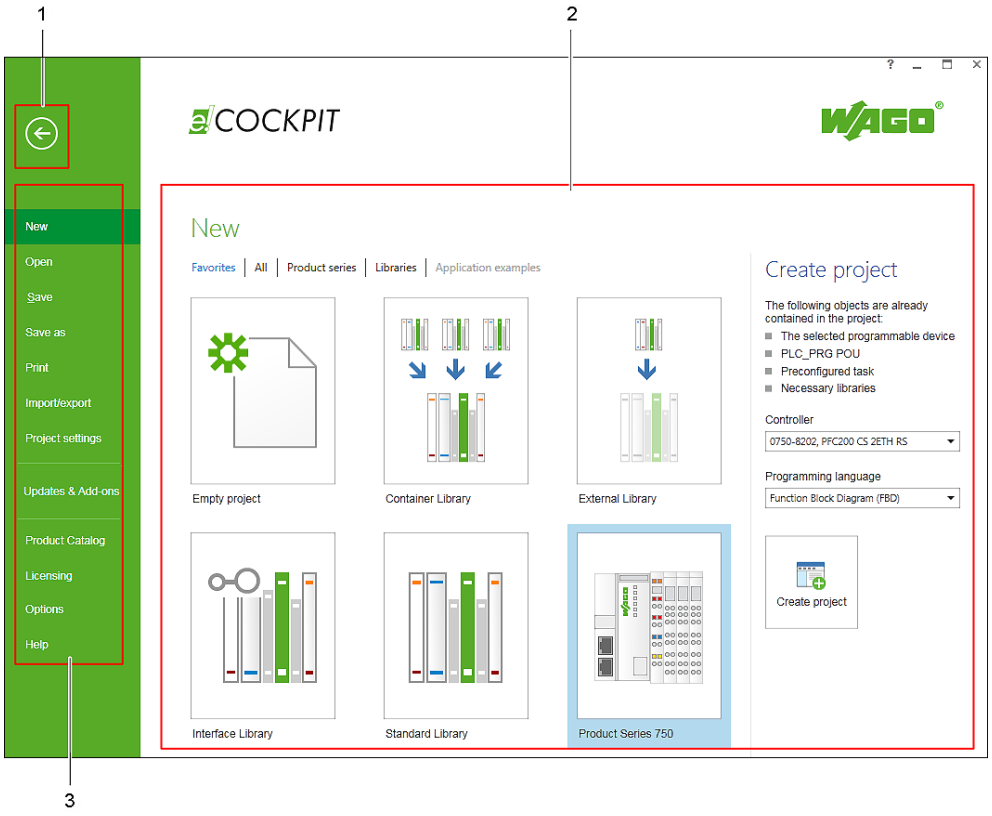


Figure 90: Backstage View

Table 51: Legend for Figure Backstage View

No.	Description
1	**Back** Returns to the previous view
2	**Pages** Shows the content for handling and managing files, as well as basic settings for ***e!****COCKPIT* (see following Section)
3	**Navigation Bar** Navigates via buttons to different pages that open in the right-hand window area

7.3.1 “New” Page

The “New” page creates a new project. Project templates provide special presets for creating a project.

The templates are displayed in groups in the form of tiles in the “Favorites”, “All”, “Product series”, “Libraries“ and “Application examples” tabs.

Moving the mouse over a tile will display a pin symbol. Click the pin to transfer the corresponding template to the “Favorites” tab. Clicking again will remove the favorite again from this tab.

Some templates in the right-hand window offer additional setting options, such as for creating a project with the “Product Series 750” template. This template creates a project with a fieldbus controller and an initial application. Create the project by clicking the **[Create Project]** button. The projects of templates that do not require any additional settings are created immediately when these templates are clicked.

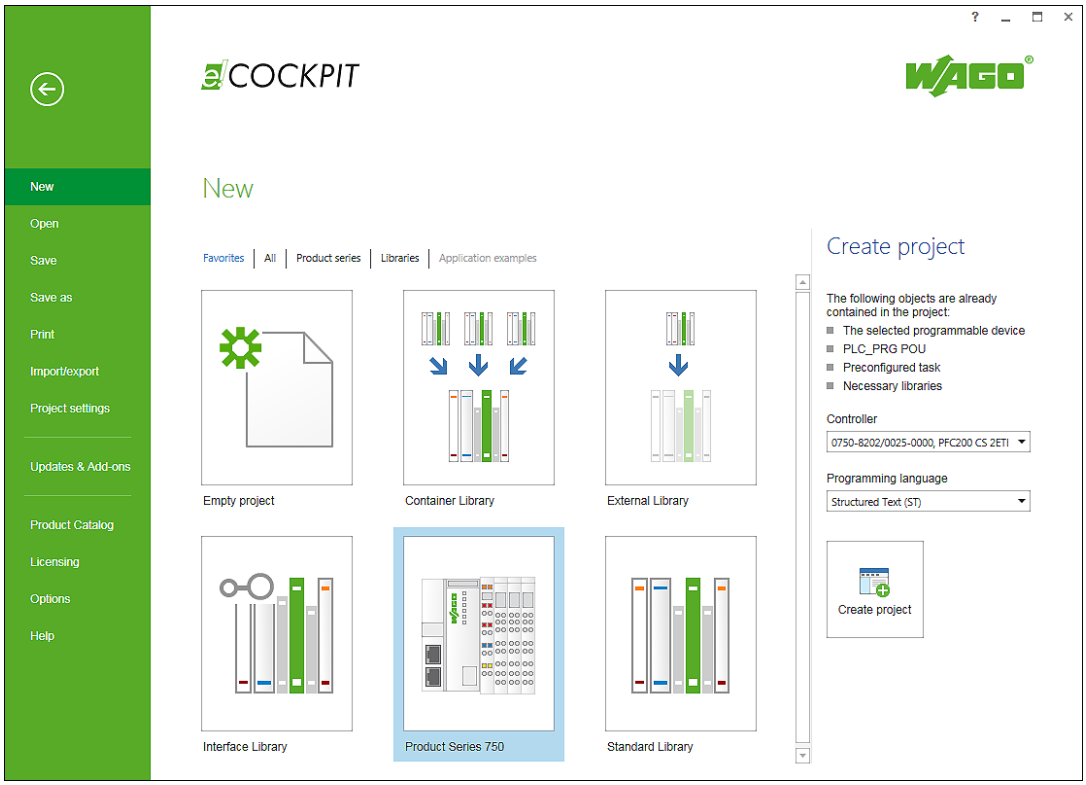


Figure 91: Backstage View, “New” Page

7.3.2 “Open” Page

The “Open” page finds and opens documents.

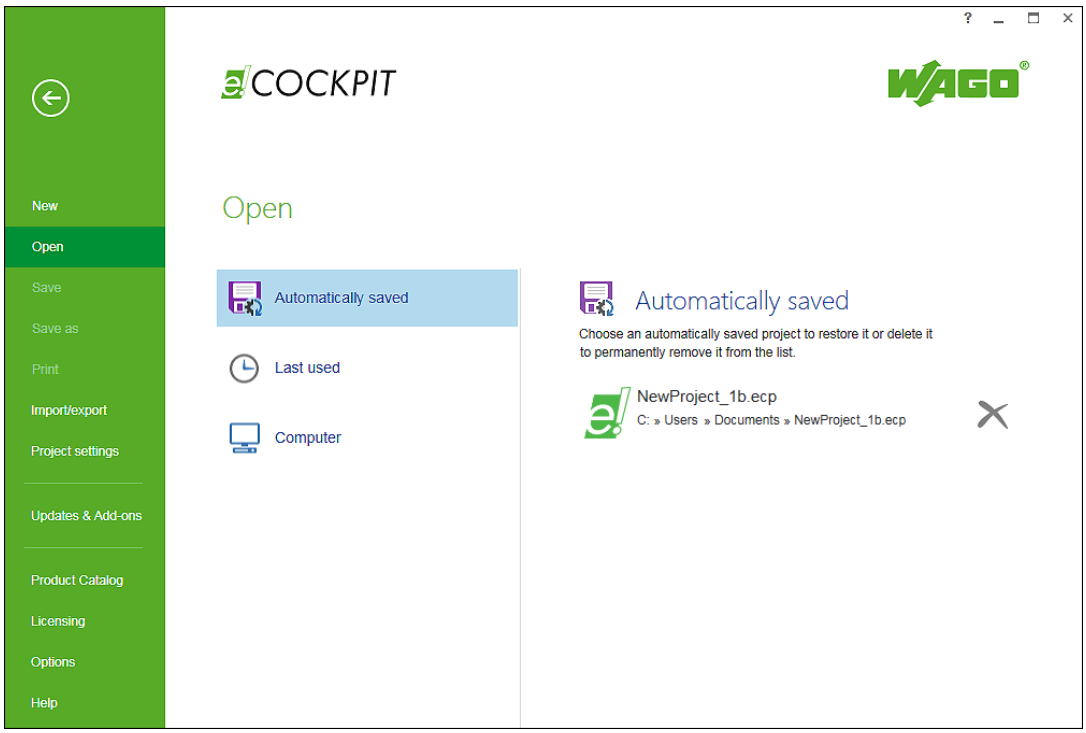


Figure 92: Backstage View, “Open” Page

Table 52: Backstage View Operating Elements, “Open” Page

Button	Description
[Automatically saved]	Displays (if present) automatically saved projects Besides manual saving (“Save”/“Save as” page), the project is also saved automatically by default every 10 minutes. The activation/deactivation of the automatic saving and setting of the save interval are made on the “Options” page.
[Last used]	Displays the last projects used Hovering the mouse over one of these projects will cause a gray pin to appear on the right. Clicking the pin will permanently identify the corresponding project in the list as a favorite.
[Computer]	Shows the last folder selected on the PC. **[Browse]** opens files in other locations.

7.3.3 “Save” and “Save As” Page

“Save” stores the project under the currently used file name and memory location. The “Save as” page selects either the last folder used or another location via **[Browse]**.

See “Options” for automatic saving of projects.

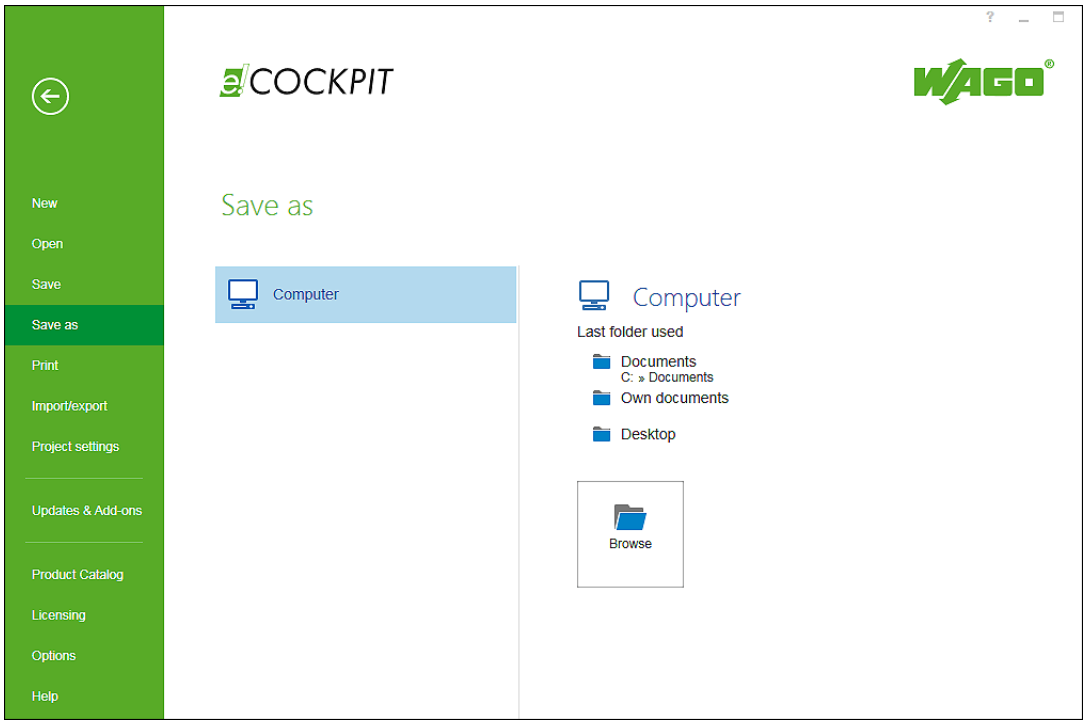


Figure 93: Backstage View, “Save As” Page

7.3.4 “Print” Page

The “Print” page generates a print version of the entire project content or selected objects.

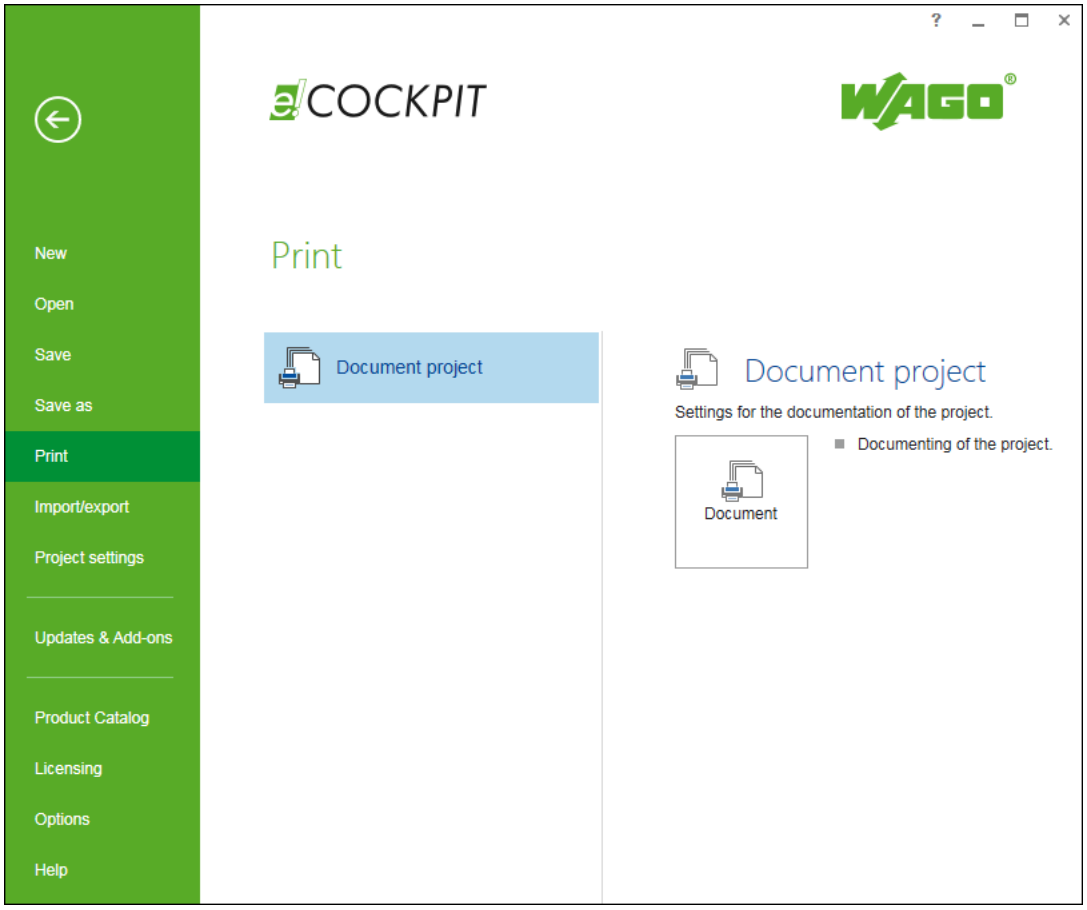


Figure 94: Backstage View, “Print” Page

Table 53: Backstage View Operating Elements, “Print” Page

Button	Description
[Document project]	Opens a dialog for selecting contents of the current project that can be combined and printed

7.3.5 “Import/Export” Page

The “Import/Export” page enables projects from CODESYS 2 and 3 to be imported, as well as ***e!****COCKPIT* archives generated and opened.

Functions are provided for compiling and saving libraries (**[IEC library]** button) if a library is selected on the “New” page as a project template.

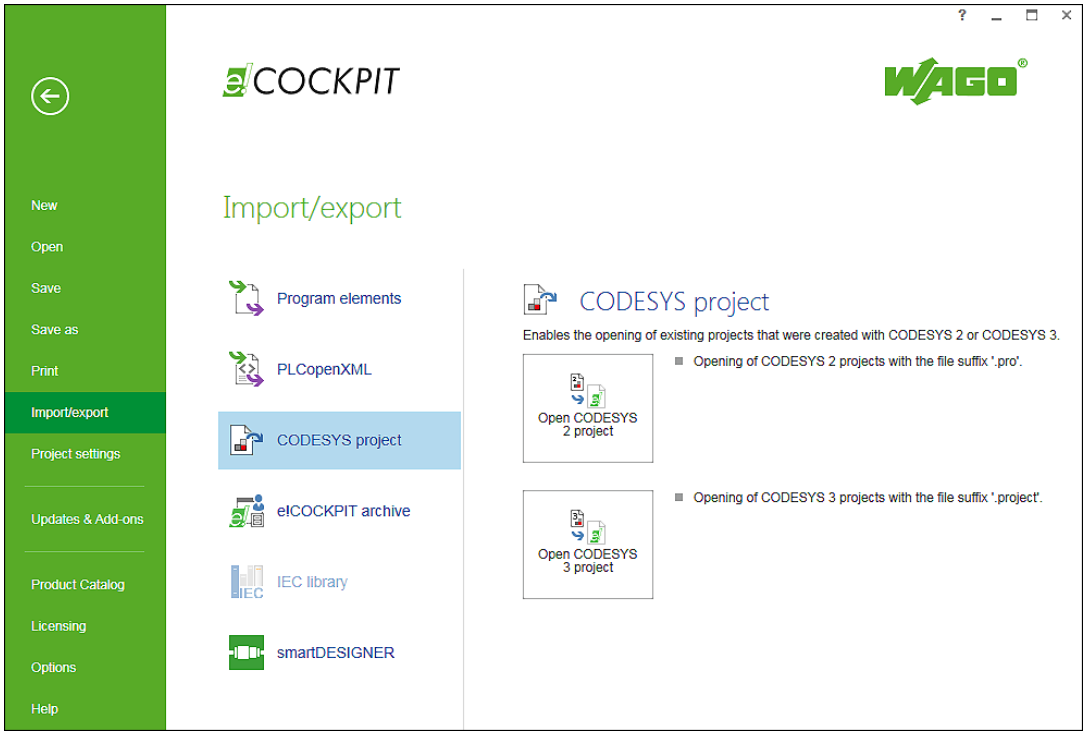


Figure 95: Backstage View, “Import/Export” Page

Table 54: Backstage View Operating Elements, “Import/Export” Page

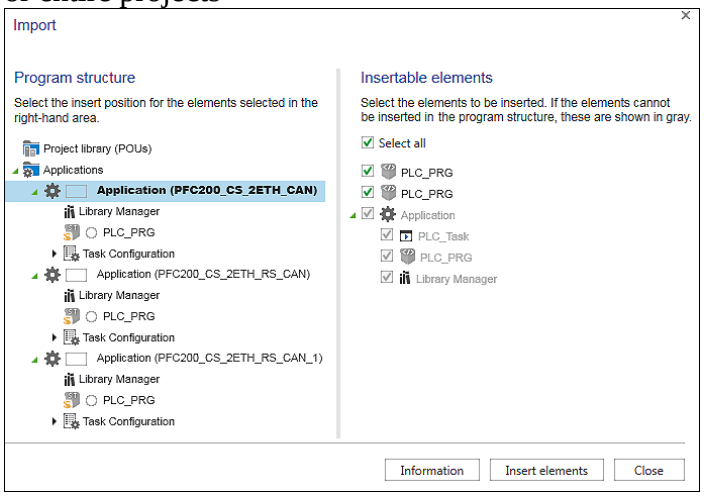
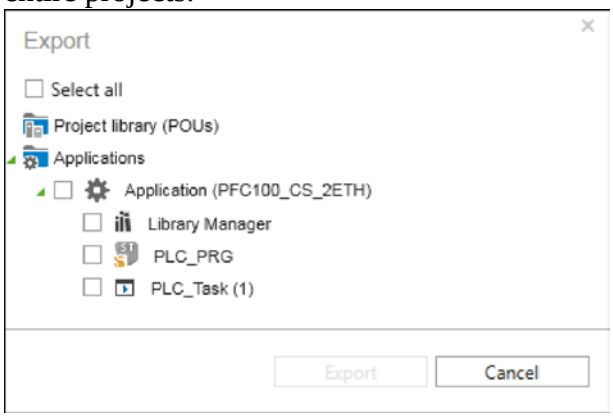
Button	Description
Program elements	
Import	Imports program elements of an export file
Export	Save program elements in an export
PLCopenXML	
[Import]	Opens a dialog window for importing project sections or entire projects  Figure 96: Importing PLCopenXML **[Show additional information]** displays information on the import file. **[Insert elements]** imports an XML file in “PLCopen” format. This format is specially used to exchange project data between different development systems based on IEC 61131-3. The file elements are inserted in the program structure. **[Close]** closes the dialog. No file is imported.
[Export]	Opens a dialog window for exporting project sections or entire projects.  Figure 97: Exporting PLCopenXML **[Export]** exports selected objects of the program structure in an XML file in the PLCopen format. **[Cancel]** closes the dialog. An export file is not created.

Table 54: Backstage View Operating Elements, “Import/Export” Page

Button	Description
CODESYS project	
[Open CODESYS 2 project]	Imports CODESYS 2 projects (file suffix “.pro”)
	 **Note** **Install CODESYS 2 for project import!** The CODESYS 3 programming environment is integrated into ***e!****COCKPIT*. However, to import or export a CODESYS 2 project, you also need to install CODESYS 2 on your PC – otherwise, an error message will be displayed and project import will not be possible.
[Open CODESYS 3 project]	Imports CODESYS 3 projects (file suffix “.project”)
***e!COCKPIT* archive**	
[Save archive]	Saves the current project on the controller as an archive file. The archive combines project-related files so that they can be forwarded to third parties. An archive combines all the files contained and referenced in the currently opened project into a central “*.projectarchive” archive file.
[Open archive]	Opens a project present on the controller as an archive file
IEC library	
[Compile and save]	Compiles and saves the library with the file suffix “compiled-library”
[Save in library repository]	Saves the library in the system repository
***smart*DESIGNER**	
[Import]	**[Import]** loads all devices and modules of a project saved as a new project in ***e!****COCKPIT* from ***smart****DESIGNER* via CAE export.
[Export]	**[Export]** saves all devices and modules in a file that can be read in from ***smart***DESIGNER via the CAE import and further processed. The **[Export]** button is inactive if a project is not present or a library project is selected.

7.3.6 “Project Settings” Page

The “Project Settings” page is used to view and modify CODESYS-specific project settings. For additional information, see the CODESYS Help.

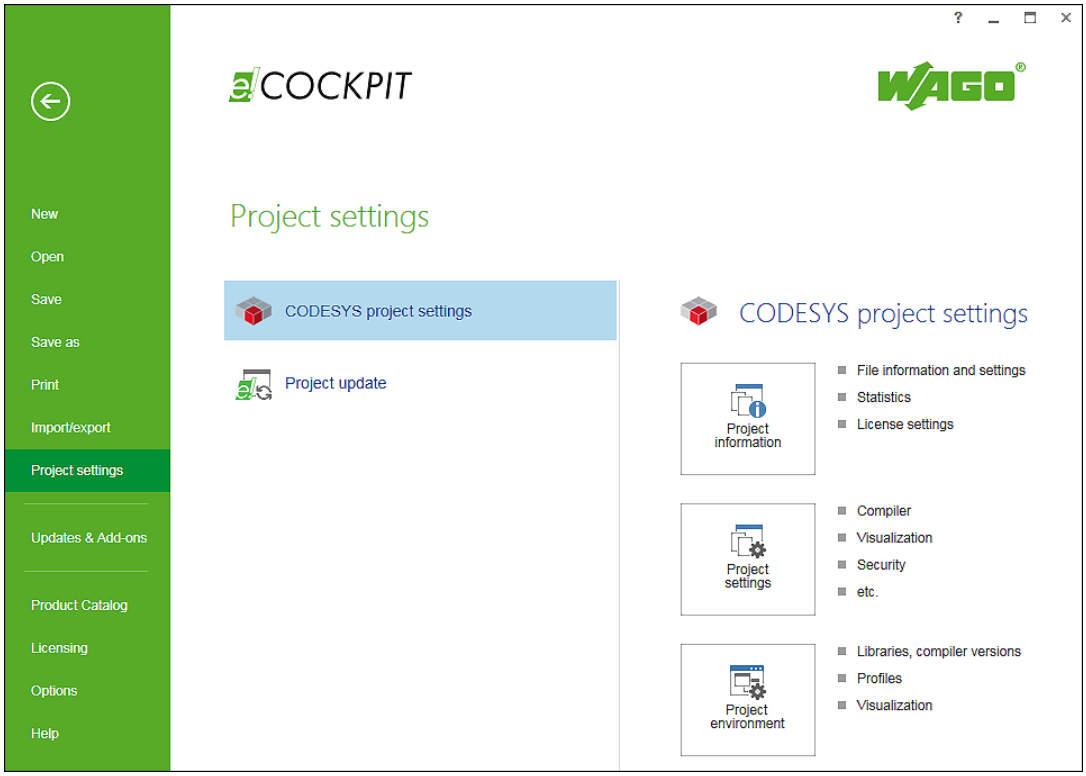


Figure 98: Backstage View, “Project Settings” Page

Table 55: Backstage View Operating Elements, “Project Settings” Page

Button	Description
CODESYS project settings	
[Project information]	Opens the “Project Information” dialog to view or enter file information/settings, statistics and license settings (see CODESYS online help: “File, Project information”)
[Project settings]	Opens the “Project Settings” dialog for setting tasks such as compiler options and visualization. Also opens a dialog for security settings including project encryption, user and access rights administration, version handling and page settings for printing. The availability of individual categories partly depends on the installation scope (see CODESYS online help: “File, Project settings”).
[Project environment]	Opens the “Project Settings” dialog for managing versions of embedded libraries, compilers, devices, visualization profiles and styles (see CODESYS online help: “File, Project environment”)

Table 55: Backstage View Operating Elements, “Project Settings” Page

Button	Description
Project update	
[Project update]	Checks if new compilers, visualization profiles and device descriptions are available for the current project If newer versions are available, they can be updated or retained. **[Update]** – Performs a project conversion using locally available, more up-to-date compilers, visualization profiles and device descriptions **[Retain]** – Retains all versions of the project used However, when the project is opened again, .it is still checked for current data. **[Retain and do not ask again for this project]** – Retains all versions of the project used When the project is opened again, it is no longer checked for newer versions. To continuously check for new versions, select **[Update]**.

7.3.7 “Updates & Add-ons” Page

The “Updates & Add-ons” page displays (can be filtered by “Updates” / “New” / “Installed”) all available updates, service packs, add-ons and sample projects. Any required licenses for individual packages, e.g., UML add-ons, are displayed in the “Required Licenses” column.

Service packs may contain the following packages: WAGO-I/O-*CHECK* updates, communication drivers, device descriptions, firmware, IEC libraries and documentation.

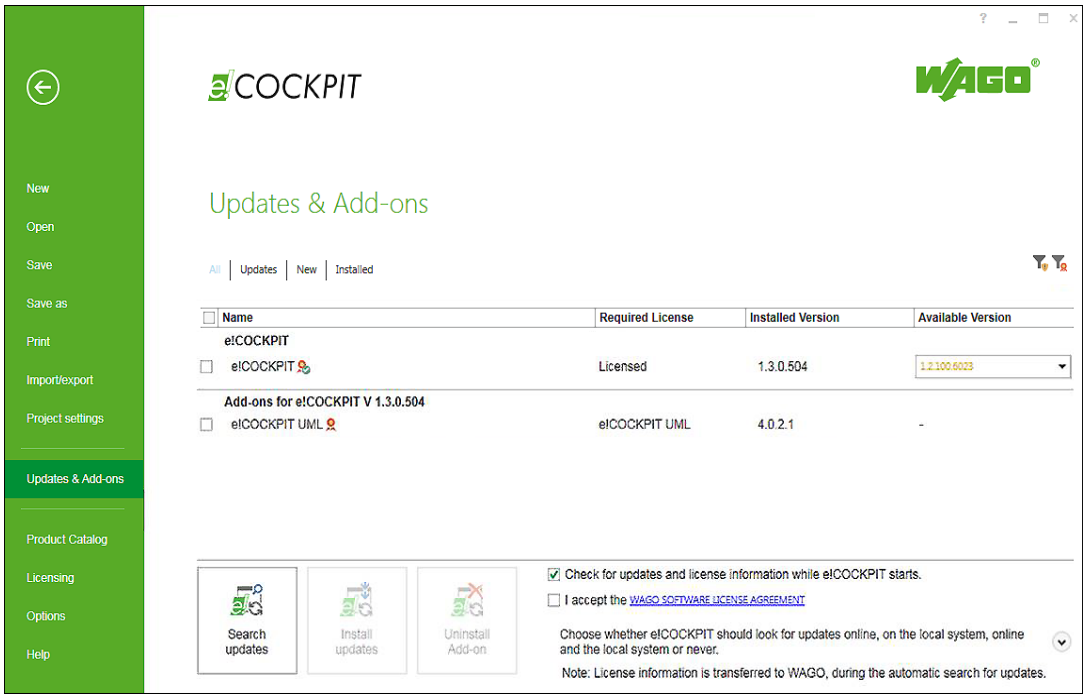


Figure 99: Backstage View, “Updates & Add-ons“ Page

Table 56: Backstage View Operating Elements, “Updates & Add-ons“ Page

Button	Description
	Filters the display by security-related updates
	Filters the display by updates that require a license
[Search Updates]	Searches locally and/or online by available updates (based on the setting on the right side)
[Install Updates]	Installs selected components **The license agreements must be accepted to install updates.**
[Uninstall Add-ons]	Uninstalls selected add-ons
Check for updates and license information on starting *e!COCKPIT*.	Checks for and displays available updates at program start
I accept the WAGO SOFTWARE LICENSE AGREEMENT	Synchronizes license information when installing updates

Table 56: Backstage View Operating Elements, “Updates & Add-ons“ Page

Button	Description
Here you can choose whether *e!COCKPIT* shall look online, locally, online and locally or never for online updates.	Search for updates online, locally or both online and locally. Enter path for local updates.

7.3.8 “Product Catalog” Page

The “Product Catalog” page adds and deletes devices, as well as manages installed device description files.
When opening a project, the system automatically checks if new versions of device description files for integrated devices in the ***e!COCKPIT*** product catalog.

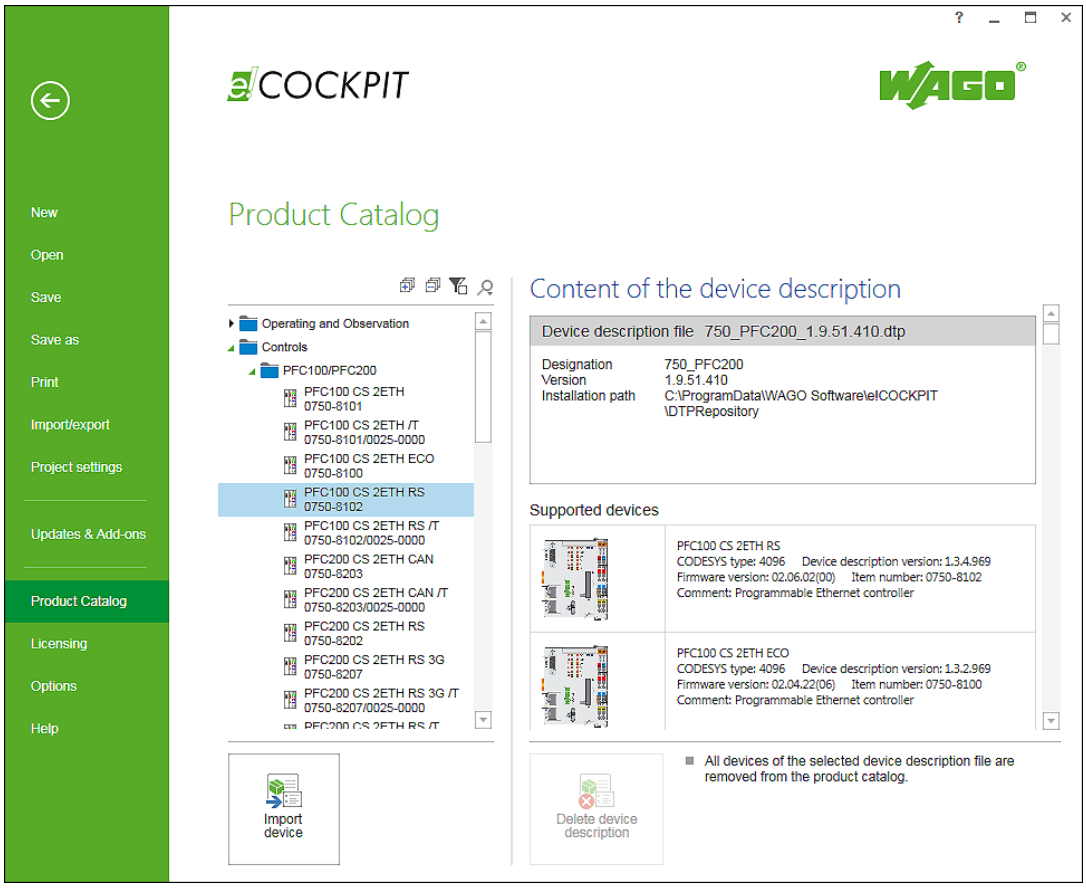


Figure 100: Backstage View, “Product Catalog” Page

The Product Catalog content is shown on the left-hand side of the page (see also Section “Panels” > “Product Catalog”).
When a device is selected, the name, version and path of the installed device description file are shown on the right-hand page (“Content of the device description”).
The lower area lists all devices that belong to this description file and version (“Supported Devices”).

Table 57: Backstage View Operating Elements, “Product Catalog” Page

Symbol/Function	Description
[Import devices]	Imports a device description file. A window opens to select the description files. Type “dtp” device descriptions cannot be imported. They are automatically updated via Updates.

Table 57: Backstage View Operating Elements, “Product Catalog” Page

Symbol/Function	Description
[Delete device description]	Deletes the device description file for the device selected in the Product Catalog, as well as for all devices listed under “Supported devices” using the same device description Type “dtp” device descriptions are permanently installed and cannot be deleted.

7.3.9 “Licensing” Page

The “Licensing” page displays information on licenses used for the software itself and for certain extensions.

Licenses can be entered and activated on this page but can also be deleted and therefore reactivated. The reactivation makes it possible to reuse the license on another PC.

The table displays the license with item number/description, status, license key, serial number, customer name, MAC address, hardware ID as well as some other detailed information.

The “Status” column indicates whether a license is linked or already activated:

Table 58: License Status

Status	Description
Linked	The license has been transferred to a device and has been linked to it. An Internet connection is required to activate the license in the following.
Activated	The information on license use was transferred to WAGO Kontakttechnik GmbH & Co. KG. Depending on license model, an activated license is linked to one or several devices (see License models, Section “Licenses”).

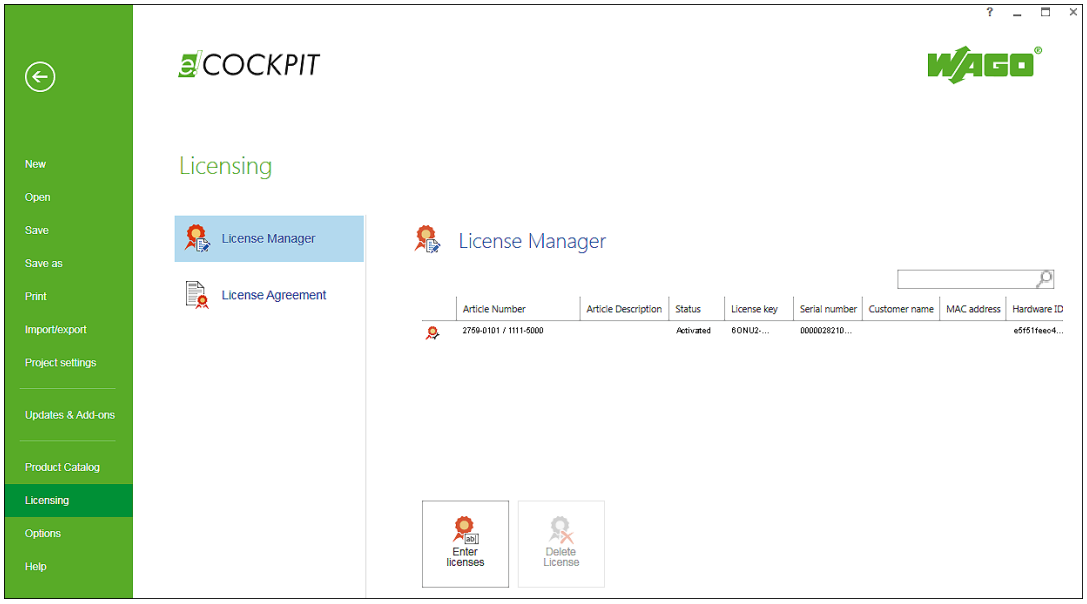
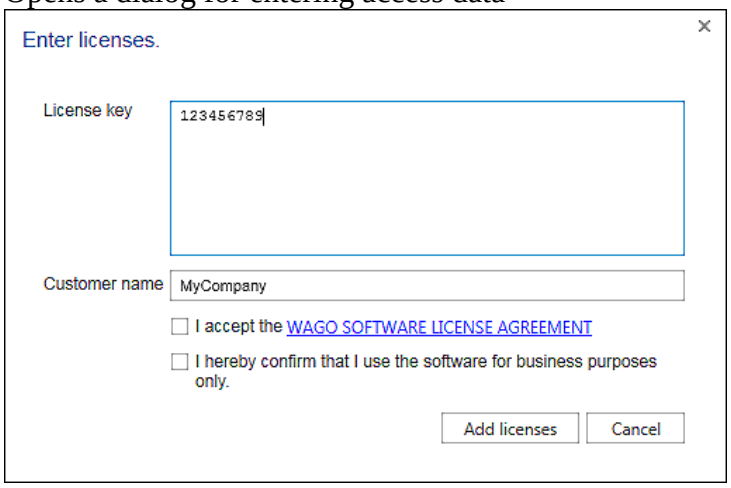


Figure 101: Backstage View, “Licensing” Page

Table 59: Backstage View Operating Elements, “Licensing” Page

Button	Description
License Manager	
[Enter licenses]	Opens a dialog for entering access data  Figure 102: Entering the License Key **[Add license(s)]** adds the license and displays it(them) in the license manager. **[Cancel]** closes the dialog without saving the license.
[Delete license]	Deletes the selected license, for example to use it on a different PC Alternatively a license can be deleted via the context menu or via the **[Del]** button.
License Agreement	
Displays the software license agreement	

7.3.10 “Options” Page

The “Options” page contains general settings such as language selection or resetting of the workspaces, as well as CODESYS-specific settings. For additional information, open CODESYS Help.

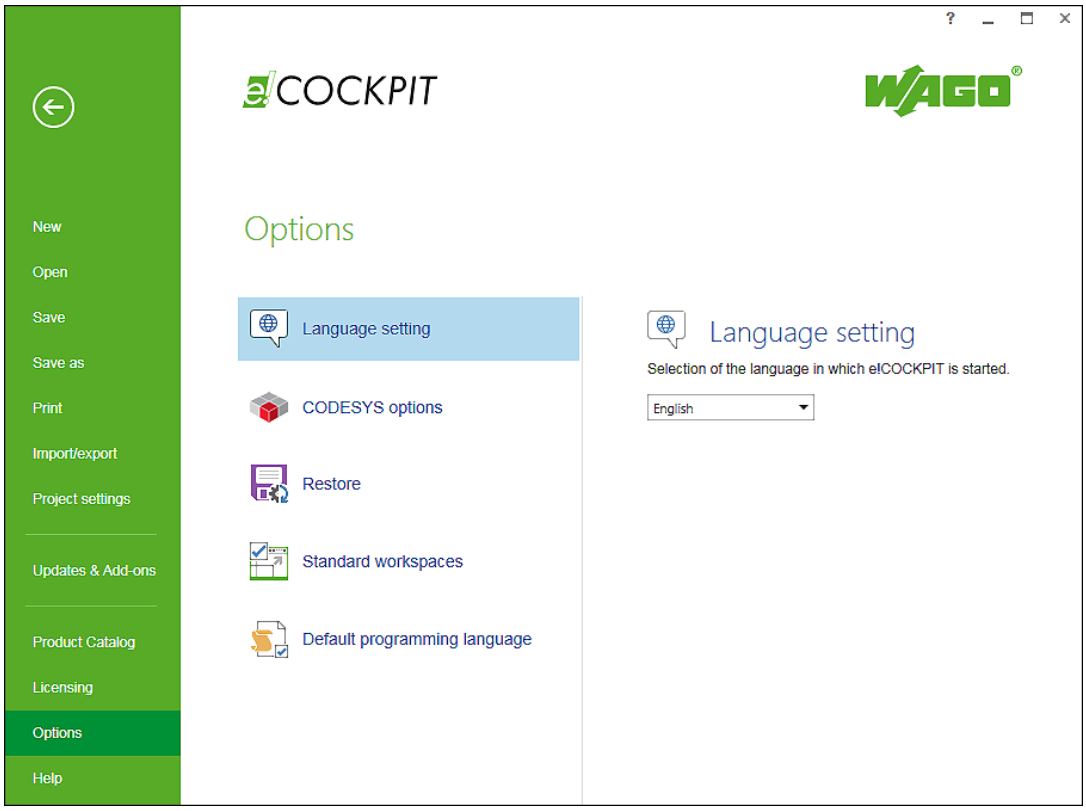


Figure 103: Backstage View, “Options” Page

Table 60: Backstage View Operating Elements, “Options” Page

Button	Description
[Language setting]	Sets the language in which ***e!****COCKPIT* is started (German, English) The setting is activated when the software is restarted.
[CODESYS options]	**[Options]** opens a window with general options that control the appearance of the CODESYS user interfaces embedded in ***e!****COCKPIT* (see CODESYS online help: “Options dialog”). **[Library/visualization elements/visualization styles repository]** opens library repositories, visualization elements and styles that are installed and used in CODESYS projects. The repositories stored there are installed from the specified location permanently in ***e!****COCKPIT*. When changing to other libraries, for example, these must not be replaced in the local system folder but must be imported from the repository in ***e!****COCKPIT* and installed.

Table 60: Backstage View Operating Elements, “Options” Page

Button	Description
[Restore]	**[Restore]** saves the current project at regular intervals if changes were carried out. The save interval can be set in minutes (default activated, 10 min).
[Standard workspaces]	**[Reset standard workspaces]** resets changes to the “Network/Devices” and “Programming” standard workspaces back to the installation settings.
[Default programming language]	**[Default programming language]** opens a selection field to set the default programming language. This affects how new projects are created and when adding objects in an existing project. A POU object (PLC_PRG) is automatically generated in the default programming language. The programming language is retained after a reboot and saved separately for each Windows user. If this setting remains unchanged, “Structured text (ST)” is used. If a template is used to create a project on the “New” page of the Backstage view, the programming language can also be set there. However, the setting only applies to the template. The following objects of a newly created project are generated again with the default programming language.

7.3.11 “Help” Page

The “Help” page contains product and license information, links, product web pages and support addresses.

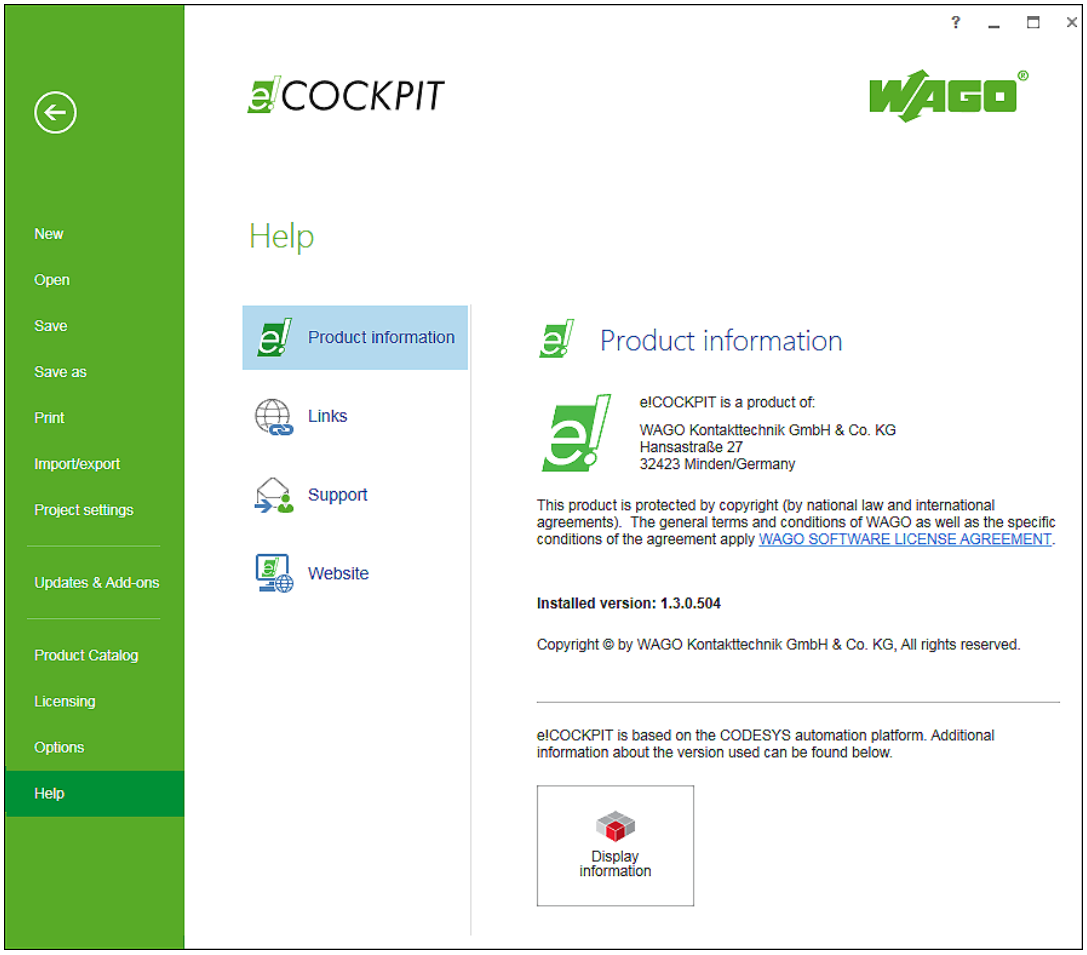


Figure 104: Backstage View, “Help” Page

Table 61: Backstage View Operating Elements, “Help” Page

Button	Description
[Product information]	Displays the ***e!****COCKPIT* version. **[SOFTWARE LICENSE AGREEMENT]** shows ***e!****COCKPIT* conditions of use. **[Display information]** shows the integrated CODESYS version.
[Links]	Contains links to further documentation regarding the ***e!****COCKPIT* software, device descriptions, firmware repositories and sample projects

Table 61: Backstage View Operating Elements, “Help” Page

Button	Description
[Support]	Displays Support contact information Clicking the displayed email address causes a locally installed mail client (if present) to open an email window. Clicking the **[Generate Email with Log Files]** attaches all *e!COCKPIT* log files to your email. Click the **[Save log files]** button to create and save a log file.
[Website]	Displays the link to the *e!COCKPIT* software website This provides you with general information and additional links.

8 Operating

This section describes software operation through its stages and typical workflows.

8.1 Working with the User Interface

In this section, familiarize yourself first of all with the general settings of the user interface and the interaction between the workspaces and panels.

8.1.1 Using Online Help

The online help feature in ***e!**COCKPIT* contains the description of the ***e!**COCKPIT* user interface (1) and help for the integrated CODESYS 3.5.(2) software.

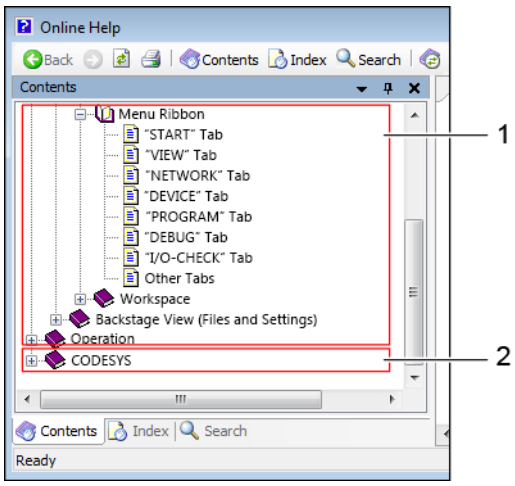


Figure 105: Using Online Help

Please note that some settings, windows, etc. in CODESYS online help may be named differently and that the workflows described may differ slightly from those in ***e!**COCKPIT*.

If you have installed add-ons, the respective descriptions are automatically integrated in the online help. The descriptions are available in the “Add-ons” folder, “[name of the add-on]” subfolder.

8.1.1.1 Calling Up Online Help

The ***e!**COCKPIT* online help function is context-sensitive so that the help pages displayed relate directly to a currently active panel, a parameter or a function block.

- To display all sections of the Online Help, click **[?]** at the top right of the window.
- To display the online help of a selected/active panel, window or element of the user interface, press the **[F1]** key.

- Help information on devices are provided in DTP files which are installed during the device installation. You can access the device help files via the Windows Start menu > All Programs > WAGO Software > ***e!****COCKPIT* > Device Help Files

- Press **[F1]** if you are in a program editor and require help on elements from libraries.

- In the Library Manager, context-sensitive information on selected elements of WAGO libraries is displayed in the “Documentation” tab. In the Library Manager click a library and an element (e.g., a module) in order to display more information.

Besides online help providing general information on entire windows or dialogs, tooltips are provided for individual buttons.

- To open a tooltip containing a short description of the button function, hover the mouse over a button.

8.1.1.2 Search

Users can perform searches in the online help function to narrow down the results displayed.

1. Click the **[Search]** button in the online help window.

2. Enter a search term in the text field.

3. Start the search by pressing the **[Enter]** key or by using the **[Search]** button.

8.1.2 Using Panels

8.1.2.1 Opening and Closing Panels

The workspace in ***e!****COCKPIT* consists of different windows; within these windows, the panels can be arranged as required.

1. Open the “VIEW” tab.

2. Click the appropriate button to display the Device Structure, Program Structure, Product Catalog, Messages or Settings panels. The “Settings” panel can be selected as soon as a project contains a device.

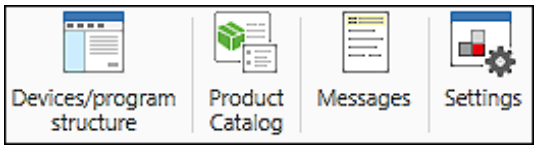


Figure 106: Displaying Panels

3. To close a panel, click the ‘x’ on the panel itself.

Figure 107: Closing a Panel

8.1.2.2 Docking, Floating and Grouping Panels

To change the layout of the panels:

1. Click the title bar of the appropriate panel.

2. Hold down the mouse button and drag the panel to the required position.

   The panel appears as a transparent blue object. Potential destinations are shown for the panel.

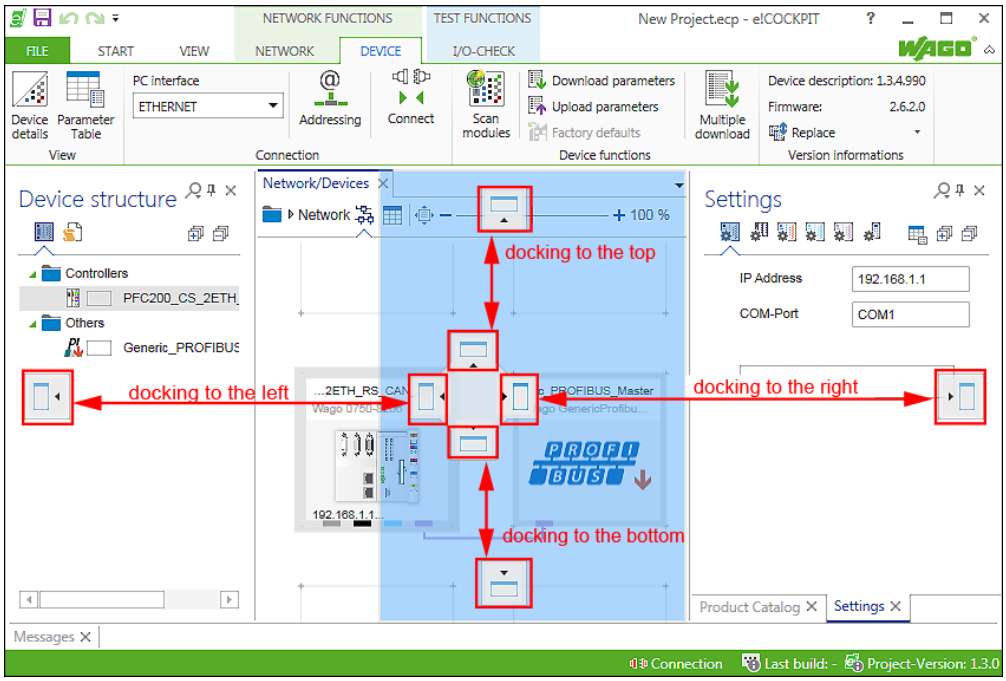


Figure 108: Docking Panels

3. **Docking:**
To dock the panel at this position, release the mouse button precisely on the appropriate location icon.

Floating:
To float the panel on the workspace, release the mouse button at any other position.

Grouping:
Drag the panel over, underneath or between other panels so that a cross appears. Release the mouse button on the appropriate side of the cross to connect it with the desired panel.

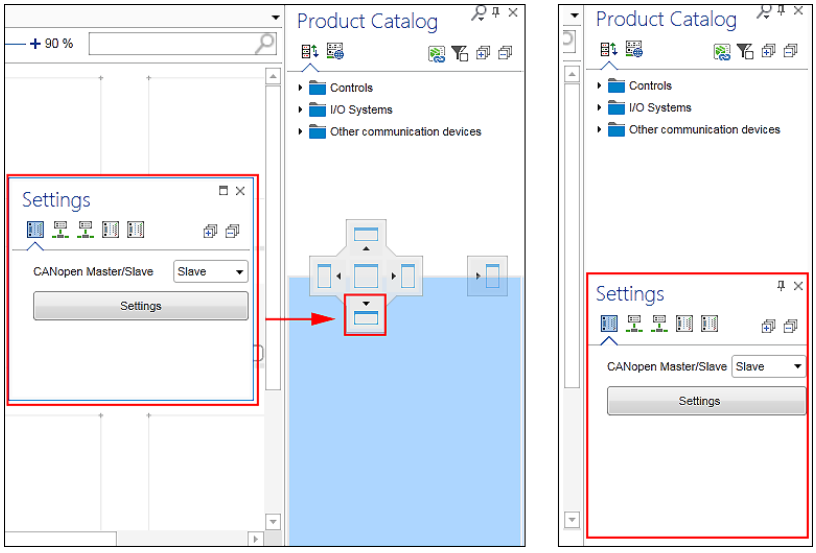


Figure 109: Grouping Panels

To separate panels from each other, drag the particular panel to another area.

8.1.2.3 Docking and Floating the Main View

The tabs of the main view cannot be docked, however they can be floated on the workspace.

1. Click the tab of the main view, hold down the mouse button and drag the view to another position.

2. To centrally dock the main view again, move the view to the docking point at the center of the workspace and release the mouse button.

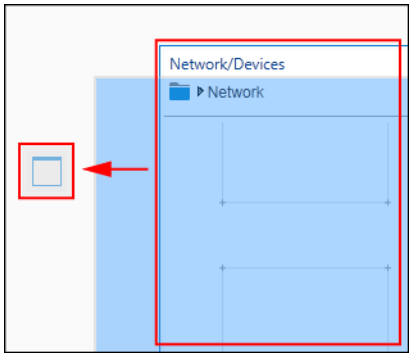


Figure 110: Docking and Floating the Main View

8.1.2.4 Using Multiple Selection

e!COCKPIT supports the multiple selection of elements in order, for example, to move several devices to the Network view or to easily change the settings of multiple devices.

You can always jointly select those elements that belong to the same class. For this reason, I/O modules and head stations cannot be selected together.

Some functions/buttons are deactivated if they cannot be applied to multiple elements simultaneously.

Selecting Multiple Elements with [Ctrl] + Mouse:

1. Click the elements to be selected while holding the Control key **[Ctrl]** down.

The selection appears in blue.

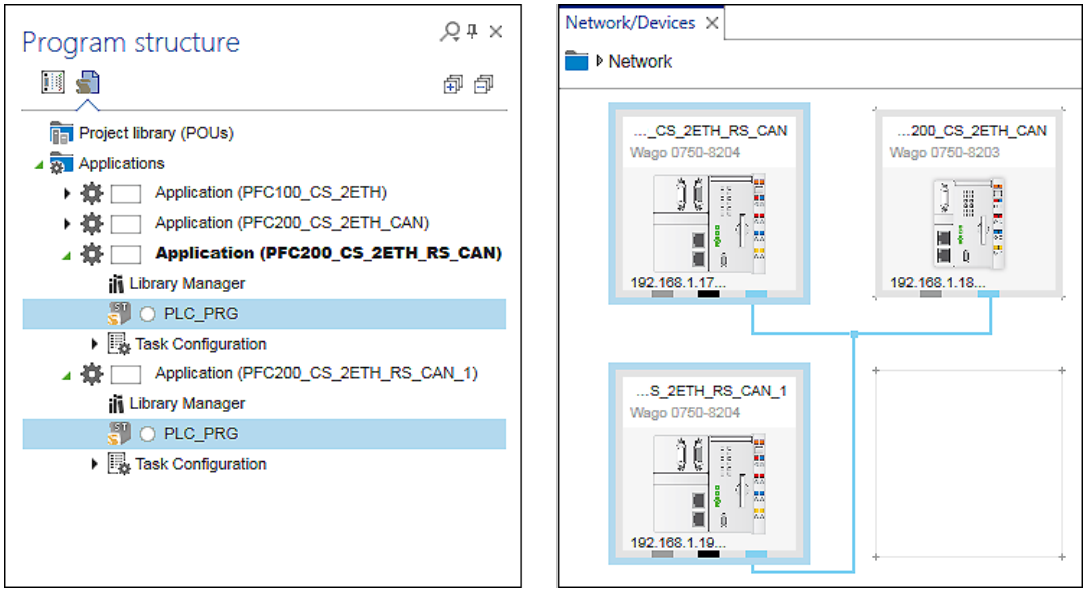


Figure 111: Multiple Selection in Tree Structures or Network View

Selecting Multiple Contiguous Elements with [Shift] + Mouse:

1. To select a contiguous series of elements, select the first element with the mouse and click the last element while holding down the **[Shift]** key.

This selection is also only possible for elements of the same class. Other devices are skipped.

In Network view, click the first and last device to be selected from left to right and from top to bottom with the **[Shift]** key pressed to add the entire group of devices to the selection. This selection will also include devices that are not visible in the current view on the Network view workspace.

Selecting Elements with Frames (Network View):

1. Click the mouse and drag a frame around or across the device to be selected.

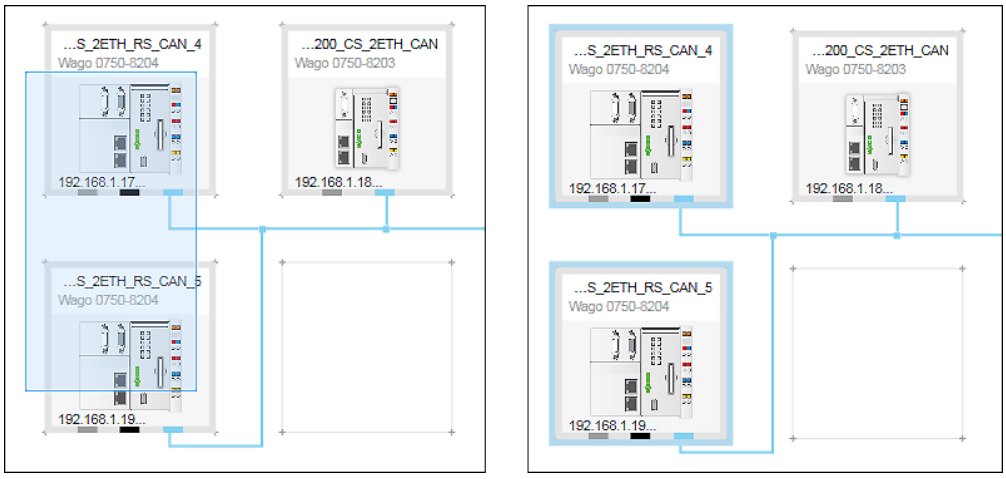


Figure 112: Multiple Selection with Frames

The devices touched by the frame are selected.

2. Move the selected devices to free tiles.

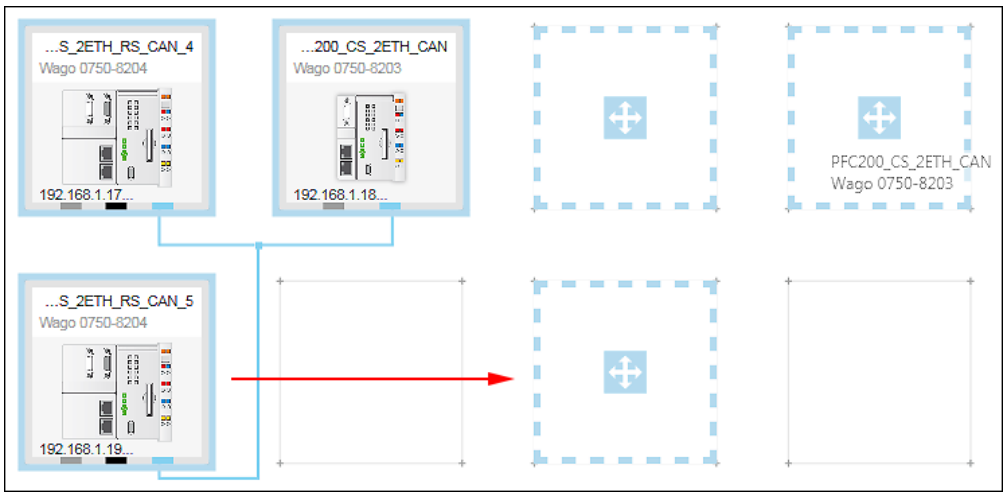


Figure 113: Moving Multiple Selection

Deselecting Individual Elements with the [Ctrl] Key:

1. In order to deselect individual elements from a selection, click them while pressing the **[Ctrl]** key.

Canceling the Entire Selection:

1. To deactivate the entire selection, press the **[Esc]** key.

Invert Selection:

1. To invert the selection click the [**Invert selection]** button in the “START” tab of the menu ribbon.

8.1.3 Using Workspaces

e!COCKPIT's graphical user interface can be configured as needed. Predefined workspaces are provided for two main tasks in a window layout.

The predefined workspaces are provided in the “START” tab or the “VIEW” tab via the menu ribbon. The appropriate window layout is displayed in the workspace after selecting a workspace.

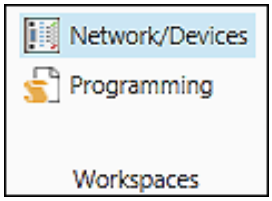


Figure 114: Predefined Workspaces

8.1.3.1 Opening the “Network/Devices” Workspace

1. To open the workspace for configuring the network and setting device parameters, click the **[Network/Devices]** button in the “START” or “VIEW” tab.

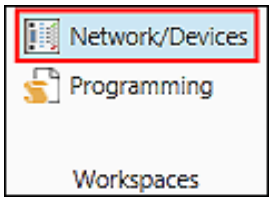


Figure 115: Opening the “Network/Devices” Workspace

Alternatively, click the **[Network/Devices]** button in the Program Structure.

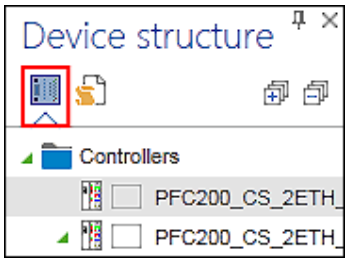


Figure 116: Opening the “Network/Devices” Workspace

The **[Network/Devices]** button accesses two workspaces: the Network view and the Device Detail view. Network view is displayed first by default. If the Device Detail view is displayed, click **Network** in the Breadcrumb Navigation.

Figure 117: Opening Network View

The “NETWORK” tab provides functions for configuring the network.

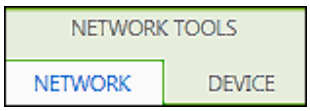


Figure 118: “NETWORK” Tab

2. Move to Device Detail view to display a single selected device. To do this, double-click the device in the Network view.

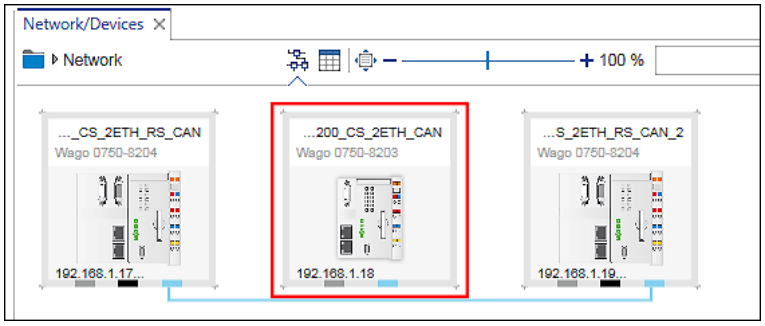


Figure 119: Opening Device Detail View via Network View

Alternatively, click **[Device details]** in the “DEVICE” tab or in the context menu of device.

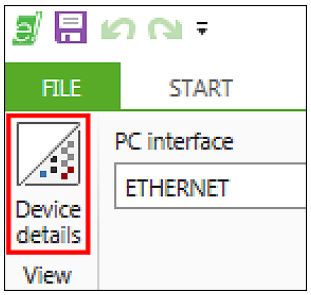


Figure 120: Opening Device Detail View via the “DEVICE” Tab

You can also open the Device Detail view by double-clicking a device in the Device Structure.

The particular device is displayed.

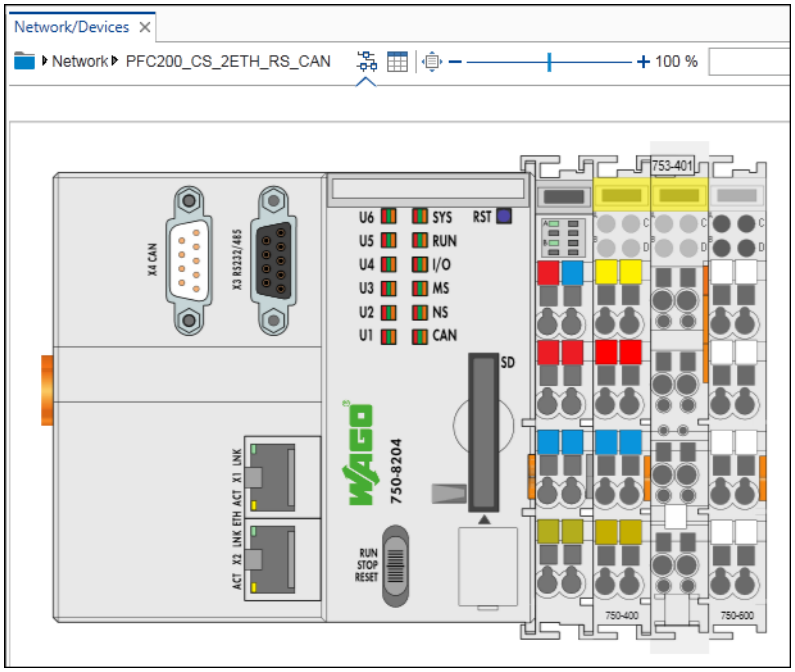


Figure 121: Opening Device Detail View

The “DEVICE” tab in the menu ribbon displays functions for configuring the device.

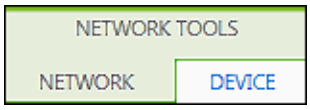


Figure 122: “DEVICE” Tab

3. Click “Network” in the Breadcrumb navigation to return to Network view.

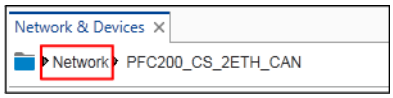


Figure 123: Use the Breadcrumb navigation to move to the Network view

Alternatively, click the **[Network]** button in the “NETWORK” tab.

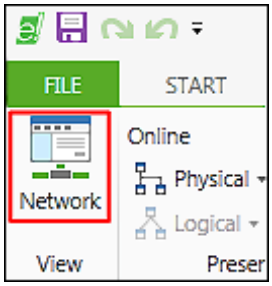


Figure 124: Use the “NETWORK” tab to move to the Network view

Moving between Network view and Device Detail view is possible by double-clicking the entries of the Device Structure:

4. To open Network view, providing an overview of all controllers, double-click “Controllers.”

5. Double-click the required device to open the Device Detail view.

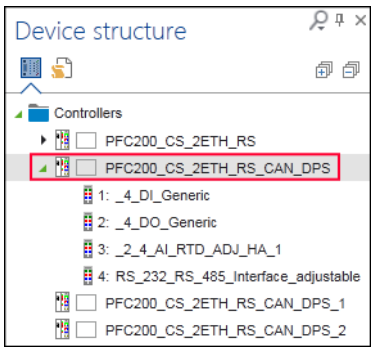


Figure 125: Moving between Network View and Device Detail View

You can choose between a graphical or tabular display both in Network view and in Device Detail view.

6. Click the appropriate button in order to move to the graphical or tabular view.

Figure 126: Toggling between Graphical and Tabular View

8.1.3.2 Opening the “Programming” Workspace

1. To open the “Programming” workspace for programming the controller, click the **[Programming]** button in the “START” or “VIEW” tab.

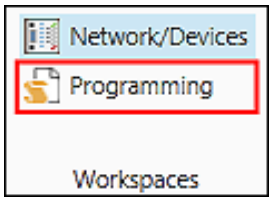


Figure 127: Opening the “Programming” Workspace

Alternatively, click the **[Programming]** button in the Device Structure or in the context menu of device.

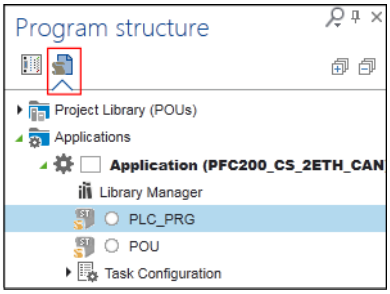


Figure 128: Opening the “Programming” Workspace

The “Programming” workspace is displayed.

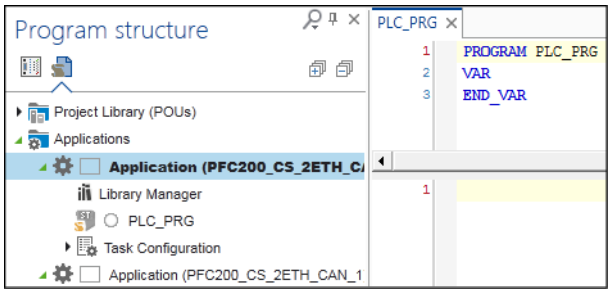


Figure 129: Opening the “Programming” Workspace

This opens the “PROGRAM” and “DEBUG” tabs in the ribbon, which contain additional functions for programming and debugging.

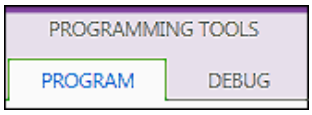


Figure 130: Opening the “PROGRAM” and “DEBUG” Tabs

8.1.3.3 Using User-Defined Workspaces

You can save and manage your own window layouts in the “Workspaces” group in the “START” tab. A saved workspace is stored as a user-defined button in the menu ribbon. You can restore modified default workspaces at any time.
The information for user-defined workspaces is stored for each user in the local Windows properties.

8.1.3.3.1 Creating a Workspace

1. Open the “START” tab.
2. Click **[Manage]** in the “Workspaces” group.
3. Click **[Create new workspace]**.
4. Assign a name for the workspace.
   If required, select any pictogram of your choice (JPG, PNG or BMP) for the button via **[Change image]**. The image is automatically scaled to a size of 32 x 32 pixels.

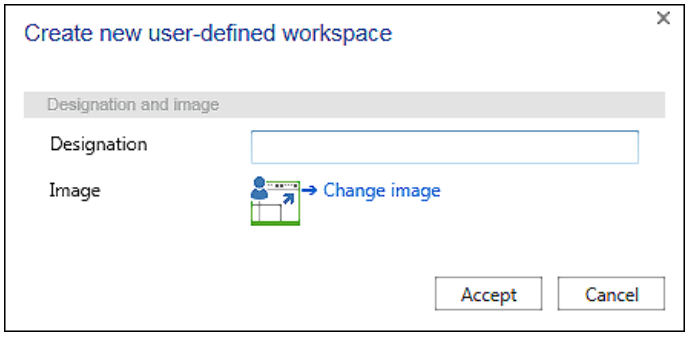


Figure 131: Creating a New Workspace

5. To save the workspace, confirm your setting with **[Accept]**.

6. The new button is displayed in the menu ribbon.

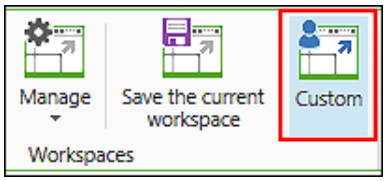


Figure 132: New Button in the Menu Ribbon

The active workspace is displayed on a blue background.

8.1.3.3.2 Editing a Workspace

Changing Name and Image:

1. Click **[Manage]** in the “Workspaces” group of the “START” tab.

2. Select the workspace to be edited under “User-Defined Workspaces.”

3. Click **[Edit workspace]**.

4. Change the name and/or image of the workspace.

5. Save the changes by clicking **[Accept]**.

Changing the Window Layout:

1. To make future modifications to the window layout, create the layout first: Rearrange the panels or open others.

2. Click the **[Save the current workspace]** button in the “START” tab.

The previously created workspace is overwritten with the new settings.

Please note that changes are only possible within one application area, i.e., the “Network/Devices” workspace cannot be changed to a “Programming” workspace. Changes refer only to panels and their visibility, position and size.

8.1.3.3.3 Deleting a Workspace

1. Click **[Manage]** in the “Workspaces” group of the “START” tab.
2. Select the workspace to be deleted under “User-Defined Workspaces.”
3. Click **[Delete workspace]**.

8.1.3.3.4 Restoring a Workspace

The two predefined standard workspaces “Network/Devices,” and “Programming” can be changed with user-defined settings. To restore the default settings:

1. Move to Backstage view (“FILE” tab).
2. Select “Options.”
3. Click **[Standard workspaces]**.
4. Click **[Reset standard workspaces]**.

8.1.4 Using Key Combinations

Use key combinations to quickly access frequently required functions.

- To enter key combinations, press the keys stated in the following list. Keys to be pressed simultaneously are marked with a plus sign (+).

8.1.4.1 General

Table 62: General Key Combinations

Function	Key Combination
Save	**[Ctrl] + [S]**
Select All	**[Ctrl] + [A]**
Print	**[Ctrl] + [P]**
Remove Multiple Selections	**[Esc]**
Open Input Assistant	**[F2]**

8.1.4.2 “START” Tab

Table 63: Key Combinations, “START” Tab

Function	Key Combination
Copy	**[Ctrl] + [C]**
Cut	**[Ctrl] + [X]**
Paste	**[Ctrl] + [V]**
Edit	**[Ctrl] + [E]**
Delete	**[Del]**

8.1.4.3 “PROGRAM” Tab

Table 64: Key Combinations, “PROGRAM” Tab

Function	Key Combination
Search	**[Ctrl] + [F]**
Replace	**[Ctrl] + [H]**
Next	**[F3]**
Next (selection)	**[Ctrl] + [F3]**
Previous Search	**[Shift] + [F3]**
Previous Search (selection)	**[Ctrl] + Shift + [F3]**
Build	**[F11]**
Connect	**[Alt] + [F8]**
Disconnect	**[Ctrl] + [F8]**

8.1.4.4 “DEBUG” Tab

Table 65: Key Combinations, “DEBUG” Tab

Function	Key Combination
Start	**[F5]**
Stop	**[Shift] + [F8]**
Single cycle	**[Ctrl] + [F5]**
Toggle	**[F9]**
Step Over	**[F10]**
Single Step	**[F8]**
Step Out	**[Shift] + [F10]**
Write Values	**[Ctrl] + [F7]**
Force Values	**[F7]**
Unforce Values	**[Alt] + [F7]**

8.2 Using Projects

A project contains configured networks, as well as their entered devices and programming.

8.2.1 Creating a New Project

1. Launch ***e!****COCKPIT*.
2. Select a template in the Start view, e.g., “Empty Project”.

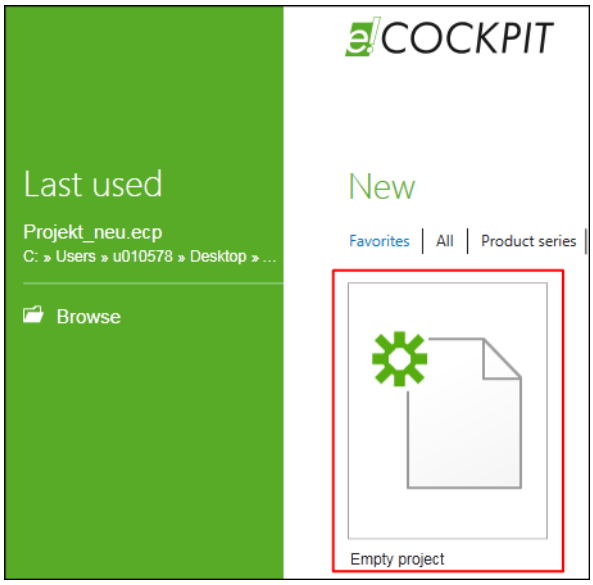


Figure 133: Selecting a Template

This creates a project. The main view is opened.

Information

Additional Information

The “Empty Project” template can be used, for example, for online configuration in multi-controller projects.
The “750 Product Series” template can be used, for example, for offline configuration in single-controller projects.

8.2.2 Opening an Existing Project

1. Launch *e!COCKPIT*.

Recently edited projects are displayed in the Start view under “Last used”.

2. To open a project, click one of the displayed project entries.

   Alternatively click **[Browse]** to open projects of other sources (**[Open]** button) via the Start view.

Information

Dock the position of the project file!
To keep frequently used projects in the “Last used” list and place them at the top of the list, click the gray pin symbol behind project name. The pin is shown in green.

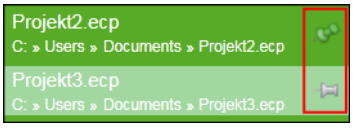


Figure 134: Docking the Position of the Project File

Click the pin again to float the project once more from the position. The pin is then shown in gray.

8.2.2.1 Opening a Project with Obsolete Libraries

If a project is opened which uses libraries that are no longer available in this form and cannot be loaded, this is indicated in a dialog window.

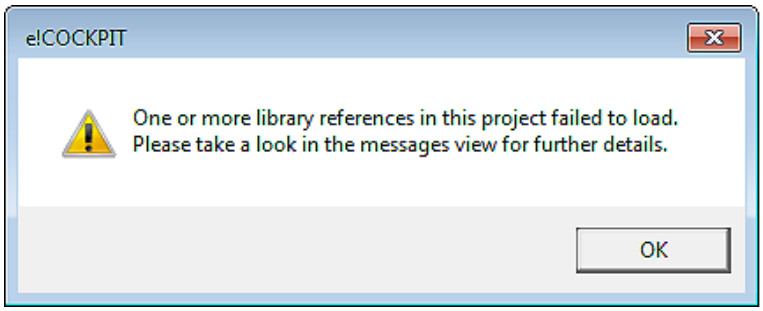


Figure 135: Notification of Unloaded Libraries

The missing library references are updated automatically in the further project update process.

1. Confirm the replacing of old with new libraries with the **[OK]** button.

As your *e!COCKPIT* version uses a newer programming environment, the “Project environment” library opens. Different tabs are shown depending on the complexity of your project.

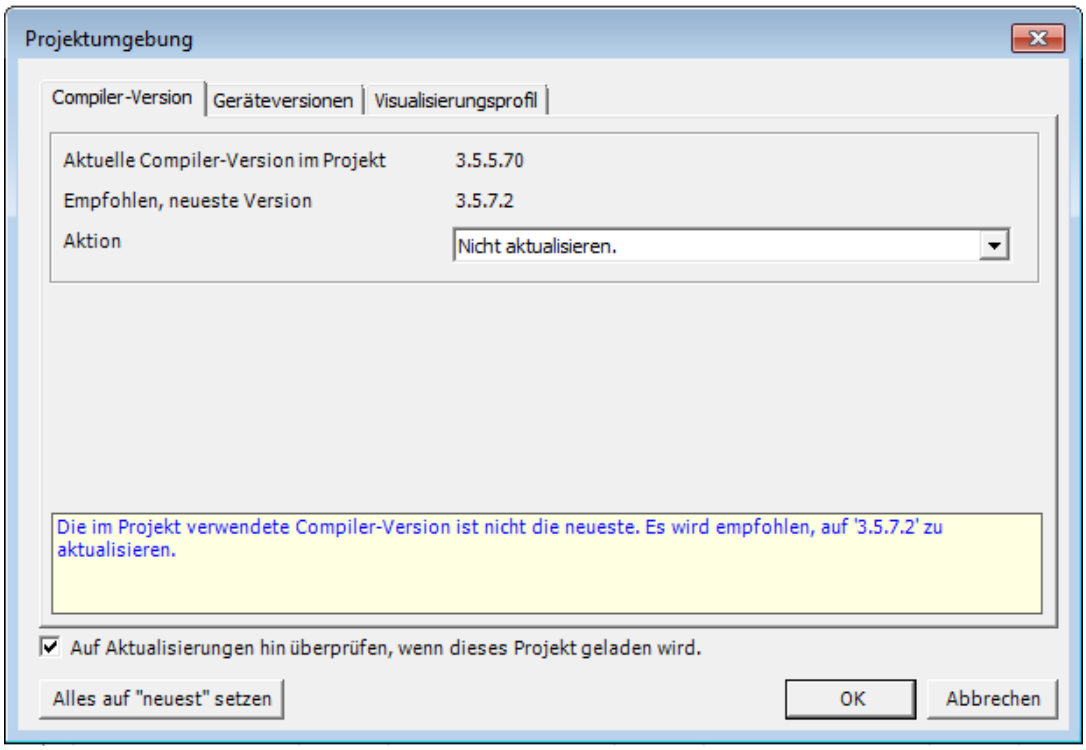


Figure 136: Programming Environment

2. Click the **[Set all to newest]** button in the “Compiler version” tab.

3. Confirm the changing of the project environment in the popup window and in the “Project environment” dialog with **[OK]**.

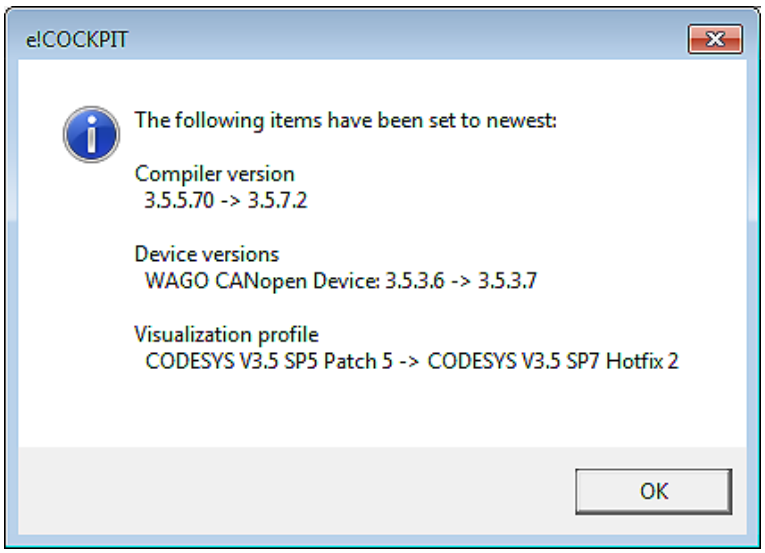


Figure 137: Successful Replacing of the Project Environment

8.2.2.2 Opening the Project with an Obsolete Device Description

When opening a project containing devices for which new device descriptions are available, this is shown in a dialog window.

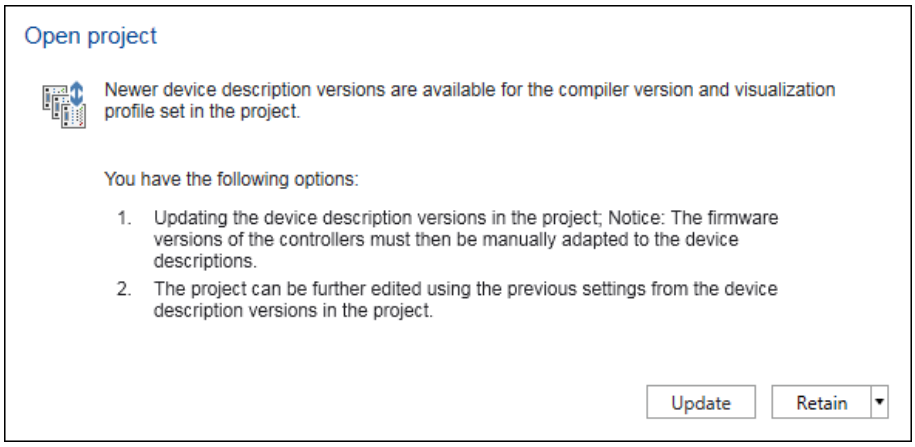


Figure 138: Replacing the Device Description

Note

New device descriptions may require a firmware update!
New device descriptions may require an update of the firmware of your device. Update your firmware to continue using the device in your project.

4. To close the dialog without updating the device descriptions, click the [**Retain**] or [**Retain and no longer ask for this project**] button and you will not receive any further messages.

   To update the displayed device descriptions click the **[Update]** button.

5. Then adapt the compiler version and the visualization profile to the new device description (see Section “Adjusting the Compiler/Visualization Profile“).

Other device descriptions already used in the project must then also be adapted to the compiler/visualization profile setting.

8.2.2.3 Opening Project with Obsolete Project Settings

If an ***e!****COCKPIT* project is opened which was created either with an older ***e!****COCKPIT* version or with modified project settings (compiler version/visualization profile), this is displayed in a dialog window.

1. Click **[Update]** to load the new project settings and thus also the corresponding new device descriptions.

The dialog is closed.

Note

New device descriptions may require a firmware update!
New device descriptions may require an update of the firmware of your device. Update your firmware to continue using the device in your project.

2. Click **[Retain]** to continue working with the older project settings.

8.2.3 Saving a Project

1. Create your project.
2. Open the Backstage view by clicking the “FILE” tab.
3. To save the project, click **[Save]** or **[Save as]**.
4. Select a location. Click [**Desktop]**, [**Own Documents]** or choose another memory location via [**Browse]**.
5. Enter the file name and click **[Save]**.

8.2.3.1 Saving Projects Automatically

Projects are saved automatically every 10 minutes if changes are carried out. Proceed as follows to activate/deactivate this function or change the save interval:

1. Open Backstage view.
2. Click **[Options]** in the navigation bar.
3. Click **[Restore]**.
4. To activate the function tick “Restore − Save information”.
   To deactivate the function, untick the option.
5. To change the save interval, enter the corresponding number of minutes in the input field.

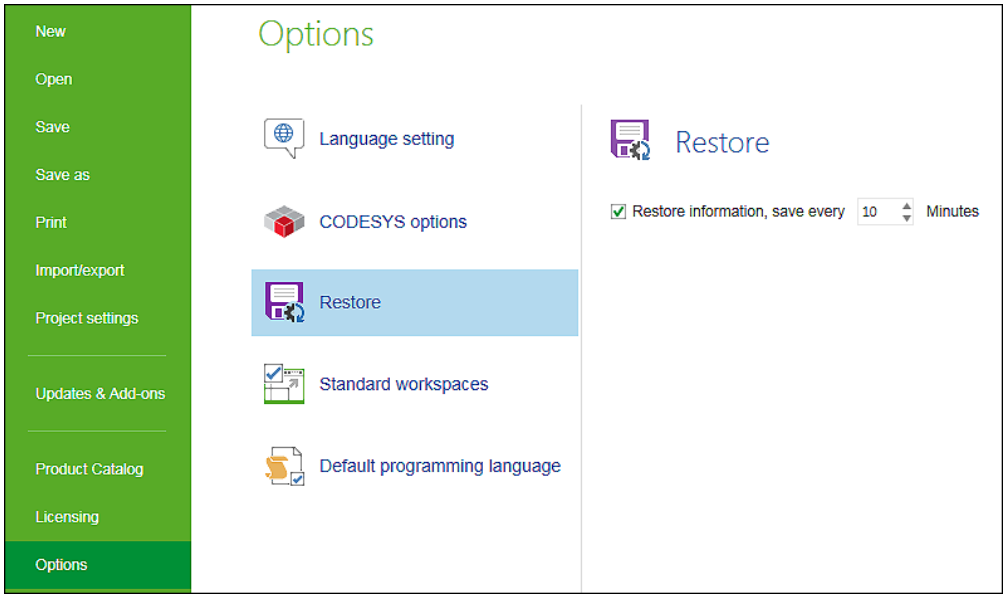


Figure 139: Saving a Project Automatically

8.2.3.2 Restoring Projects after a Software/Hardware Crash

A dialog opens when the software is restarted after a software/hardware crash. You are notified of any restored project files.

1. Click **[Yes]** to display the project files.

The “Open” page of the Backstage view is opened. This page lists all projects that can be restored (in descending order by modification date).

If several instances of ***e!****COCKPIT* were opened before the crash, the projects of all instances are offered for restoring.

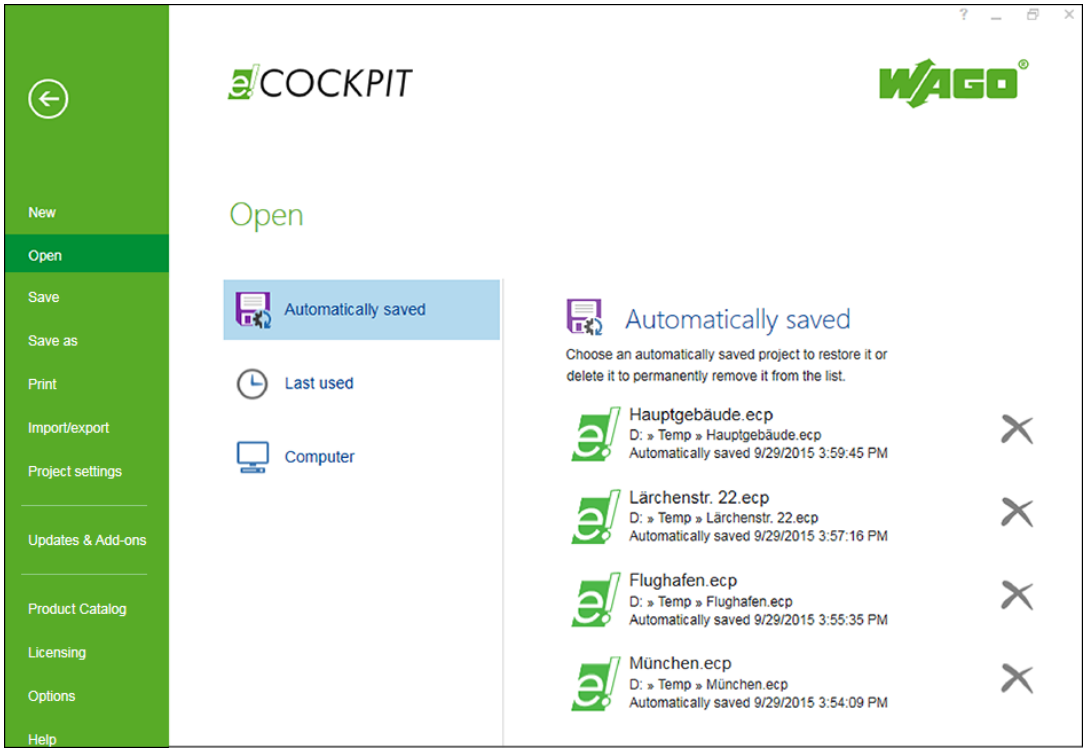


Figure 140: Automatically Saved Projects on the “Open” Page

2. Delete any restored projects that are not required by clicking the cross next to the corresponding file.

3. Double-click one of the displayed files to open it.

Another dialog will open. You are asked whether you wish to open the restored file or the original document. The restoration of the original file discards the restoration file.

4. Select accordingly **[Move to restoration view]** or **[Open original document]**.

5. To save the project click the “FILE” tab and then **[Save]**.

8.3 Configuration and Parameterization

8.3.1 Offline Configuration

In offline configuration mode, you configure the devices and network first without connecting to real devices. The configuration is saved and transferred at a later time.

8.3.1.1 Adding Devices in the Project

If there are imported devices in the Product Catalog (see Section “Setting and Managing” >...> “Importing Devices”), they can be used as follows:

- To add devices to a project, drag the individual devices (in this example, a PFC200) from the Product Catalog and drop them onto a free tile in Network view.
  To place devices on a free tile automatically, double-click the device name.

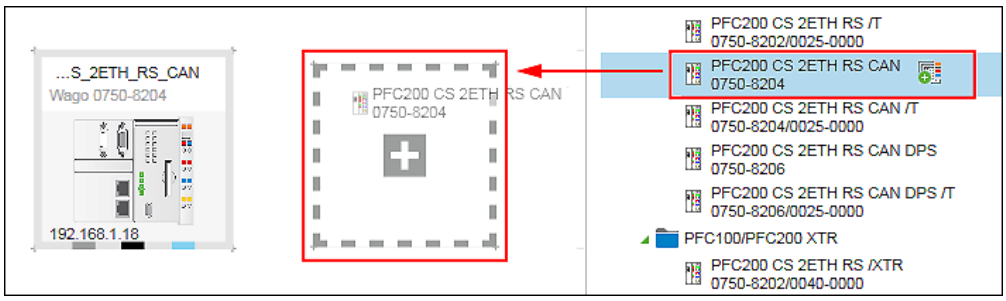


Figure 141: Dragging Devices to the Network View

- To insert a device several times click the Add symbol next to the device name. In the opened window enter the number of devices you wish to insert and click **[Add]**.

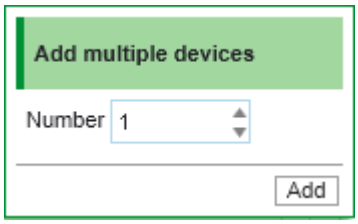


Figure 142: Adding Several Identical Devices

- Open the Device Detail view by double-clicking an appropriate tile. Drag the modules from the product catalog to any position after the head station.

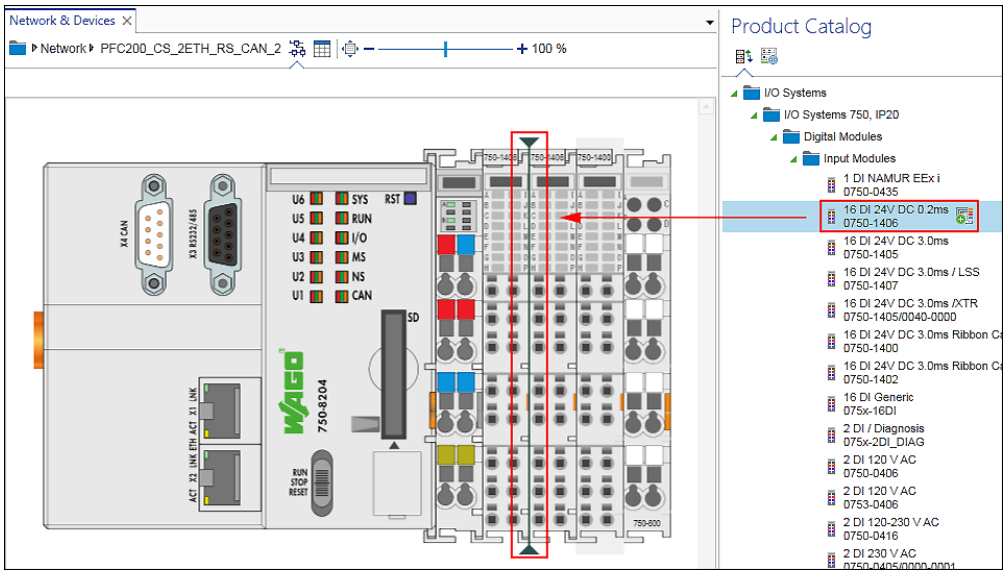


Figure 143: Adding Modules

This will display a **[+]** next to the mouse pointer. Positioning lines between existing modules indicate at what point the module will be placed when you release the mouse button.
Alternatively, the module can also be added by double-clicking it from the Product Catalog behind the currently selected module or at the last location.

The Device detail view only allows the configuration of one head station with connected modules.

8.3.2 Online Configuration

In online configuration mode, you are physically connected to your devices in the network via ***e!****COCKPIT*. The configuration can be transferred directly.
Click the **[Connect]** button to connect to available devices directly or perform a network scan first.

8.3.2.1 Scanning the Network and Devices

To display devices present in the network, scan the network first:

1. Click **[Network/Devices]** in the device/program structure.

2. Open the “NETWORK” tab.

3. If the Network view does not appear in the workspace, click the **[Network]** button in the menu ribbon.

4. First check the communication settings by selecting from the selection field in the “Scan Settings” group the medium in which the search will be performed, such as ETHERNET.

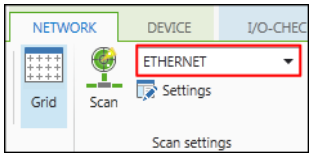


Figure 144: Selecting the Medium for Scanning

5. Click **[Settings]** to make other settings.

6. For instance, restrict the scan range for the ETHERNET settings.

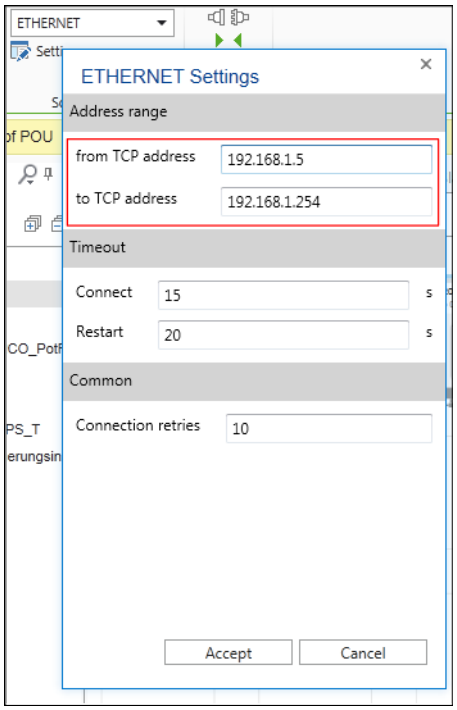


Figure 145: Restricting the Scan Range

7. Click **[Accept]**.

8. To search for devices within the specified range, click the **[Scan]** button in the menu ribbon.

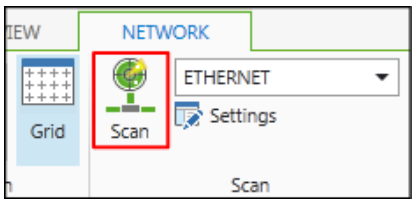


Figure 146: Starting the Scan Operation

After the scan has finished, the search results of the configuration are displayed:

- Green: Configured and scanned device match.
- Red: Configured and scanned device are different.
- Blue: New device detected (if the device cannot be selected, this is an unknown device).

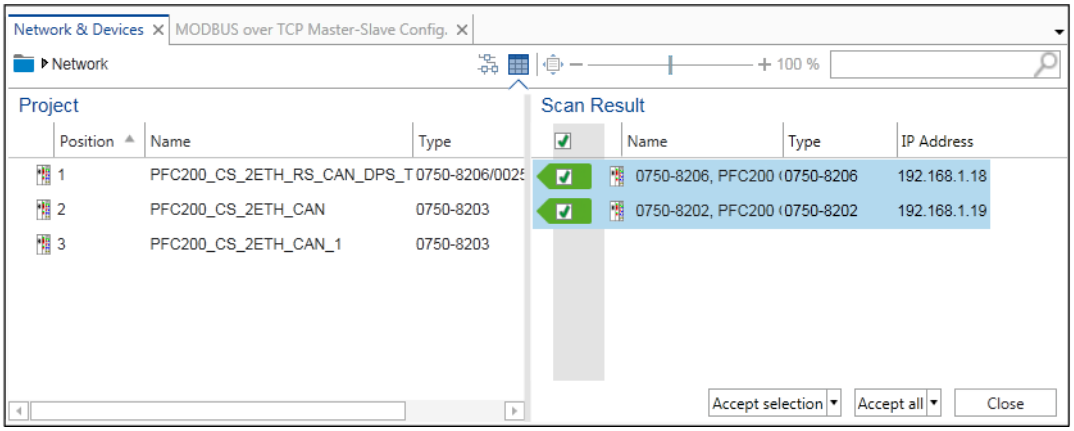


Figure 147: Displaying a Scan Result

A red exclamation mark on a device indicates that it is not in the Product Catalog. In this case import the corresponding device description file for this device by importing it ("FILE" tab > **[Product Catalog]** > **[Import device]**).
Please note that "dtp" file types are always permanently installed and cannot be imported. Use, for example, "eds" type device description files.

9. Use the mouse to select the devices you wish to transfer to your project and click **[Accept selection]**.
   Click **[Accept all]** to transfer all devices.

Note

Scan head stations and modules separately or together!
In this example first select only the head stations to be accepted. Scan modules separately (point 13). Here you can scan the head stations including the connected modules by clicking **[Accept selection (incl. Modules)]**.

It is recommended that you make any name changes in this overview or in the tabular network view as IP address, device type, etc. are displayed here clearly in list form.

10. With the mouse, select a device in the "Configuration" list. Click the device again and change the device name.

11. To switch from the scan results back to the graphical view (Network view), click the symbol for the graphical Network view.

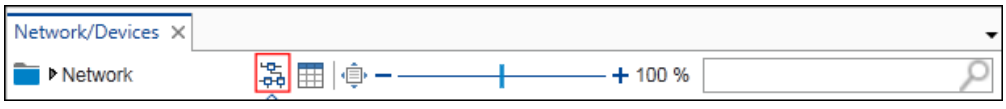


Figure 148: Opening Graphical Network View

12. To identify the modules of the scanned head station, double-click the device to enter Device Detail view.

13. Click **[Scan modules]** in the open "DEVICE" tab.

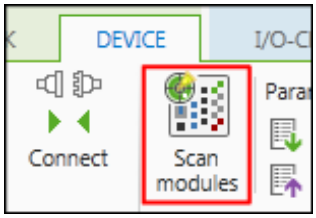


Figure 149: Scanning Modules

If the device is not connected, it is first automatically connected. The modules are then detected. The workspace shows the configuration and scan results. In the right-hand area, all modules which are connected with the device and which have their device description files loaded in ***e!****COCKPIT* are displayed.

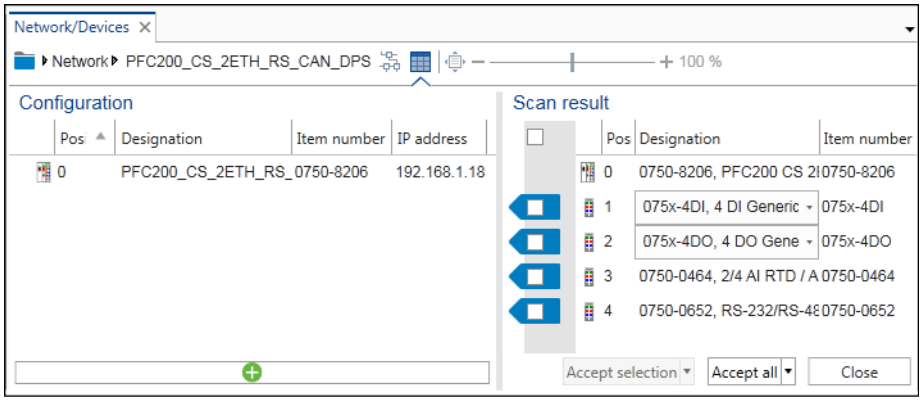


Figure 150: Displaying Scanned Modules

A device description file can represent several modules if these have the same process data structure. A detected module may also be represented by several device description files. For this reason, there can be selection boxes for certain modules.

14. Select the used module in the selection box.

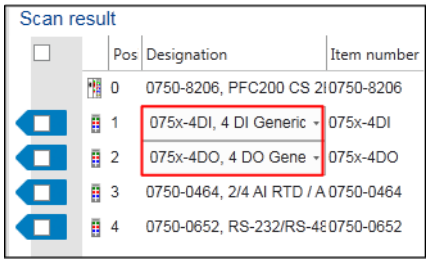


Figure 151: Selecting Modules

If there are several modules with the same scan result, the “Use for all suitable modules” checkbox is displayed in the selection field. Activate this checkbox to accept the selection for all suitable modules at the same time. The corresponding modules are marked for the transfer.

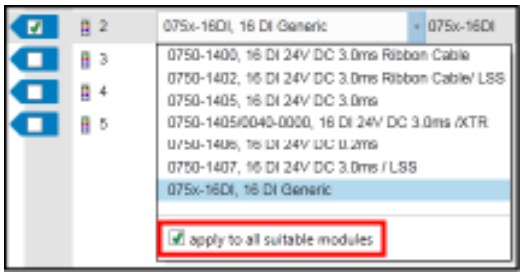


Figure 152: Accepting Modules with the Same Scan Result Together

15. Tick the checkboxes in front of the modules that you wish to add to your project and click **[Accept selection]**.
To transfer all modules, click **[Accept all]**.

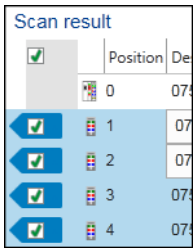


Figure 153: Applying Modules

The Device Detail view appears. You see the head station with the scanned modules.

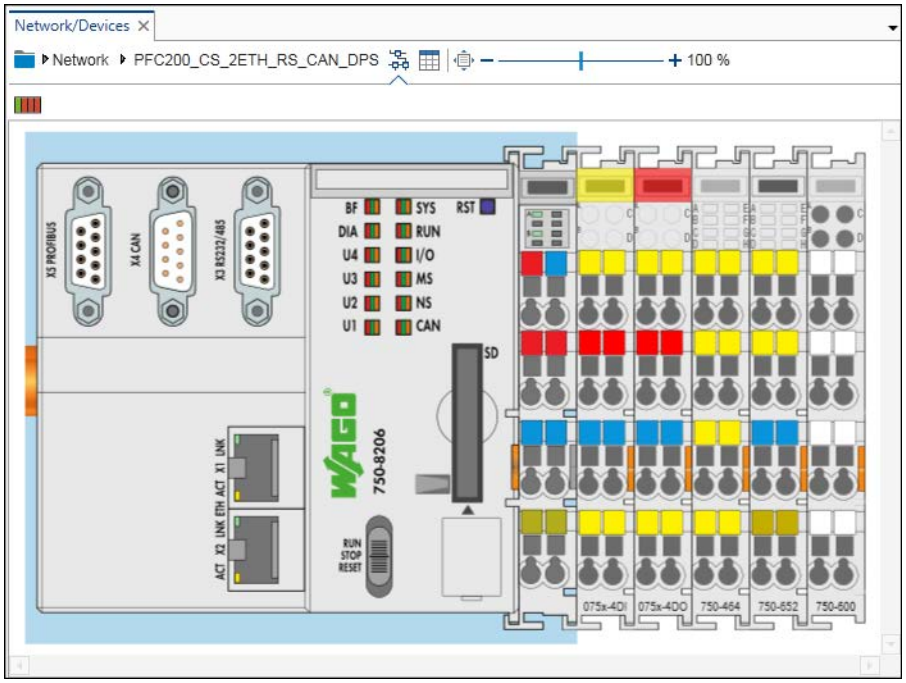


Figure 154: Displaying Scanned Modules

Information

Additional Information

The number of modules detected is displayed in the Network view at the bottom of the device image.

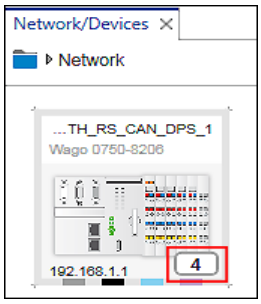


Figure 155: Display of Applied Modules

8.3.2.2 Scanning the Modules of Several Devices

If you have scanned several devices (head stations), you can scan arranged modules for these devices together.

1. Open the Network view.
2. Use the mouse to select several devices.
3. Right-click one of these devices and click **[Scan]** button in the context menu.

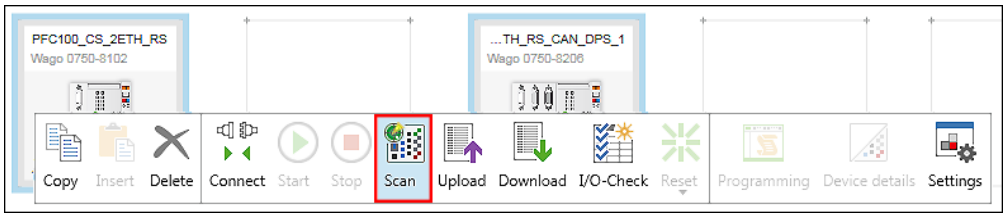


Figure 156: Scanning for Modules of Several Devices

e!COCKPIT scans the modules of the devices and shows these in the “Scan result” dialog.

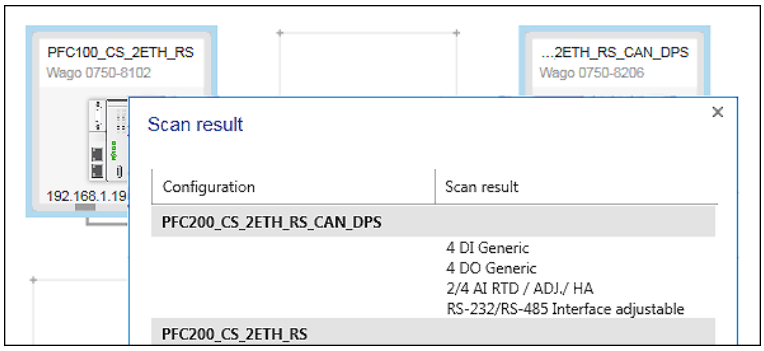


Figure 157: Displaying the Scan Report

4. Click **[Accept]** to add the displayed modules to the project.

8.3.2.3 Connecting and Disconnecting Devices

There are several ways to connect and disconnect devices.
This function can also always be executed simultaneously for multiple devices (multiple selection).

1 Right-click the device to which you wish establish a connection and click **[Connect]** in the context menu.

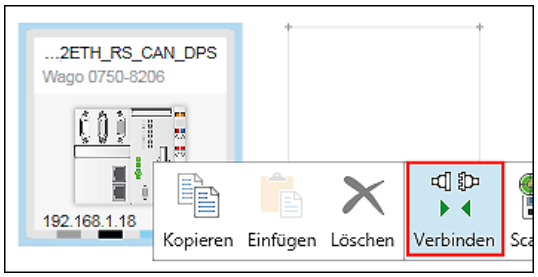


Figure 158: Connecting Devices (Network View)

Alternatively perform the connection via the context menu of the device in the Device Structure.

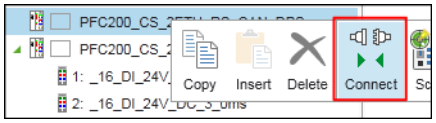


Figure 159: Connecting Devices (Device Structure)

The “Connect” function is also integrated in the menu ribbon. You can find the corresponding button in the “NETWORK”, “DEVICE”, “I/O CHECK”, “PROGRAM” and “DEBUG” tabs.

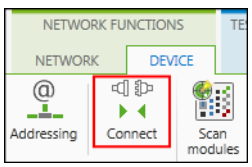


Figure 160: Connecting Devices (Menu Ribbon)

Information

Additional Information
The **[Connect]** button is active if at least one of the selected devices has all the necessary information for opening a connection (e.g., an interface via which the connection can be made).

5. Click the **[Connect]** button.

The connection to the device or the devices is established. An automatic login is carried out in ***e!****RUNTIME*. The **[Connect]** button changes to a **[Disconnect]** button.
If two or more devices have different states (connected/restricted connection/not connected), these devices are disconnected on the first click of the button and are all connected with the second click.

If parameters were changed, this is displayed in a dialog.

6. If the displayed parameters are to be downloaded to the device, confirm this with **[OK]**.

7. If the connection of the selected devices is to be removed, click the **[Disconnect]** button.

The status of the button changes back to “Connect.”

With each connection establishment ***e!****COCKPIT* checks whether the compiler version and the visualization profile of device and device description match.
If these match, the connection with the device is established.
If they do not match or if a version of the device cannot be determined, this is displayed in a dialog window.

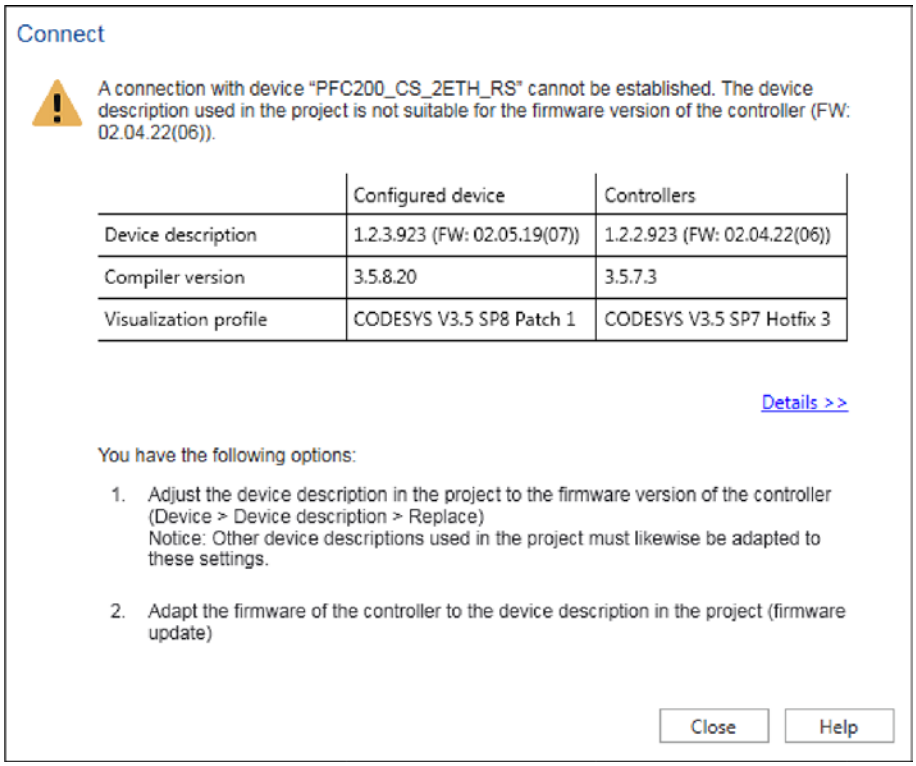


Figure 161: Establish connection

In this case, the connection cannot be established.

8. Click **[OK]** to close the dialog.

9. Now adapt either the device description in the project to the firmware version of the controller (see Section "Replacing Device Type Versions/Device Descriptions") or adapt the firmware of the controller to the device description in the project by performing a firmware update for the device or devices.

8.3.3 Replacing a Device

You can replace devices that you use in your project. The new device must be the same type as the device to be replaced, i.e., you can only replace a head station for another head station or a module for another module.

1. To replace the device, click the new device in the product catalog and drag & drop on the tile or line of the device to be replaced.

You can replace head stations both in the graphic and tabular network view.

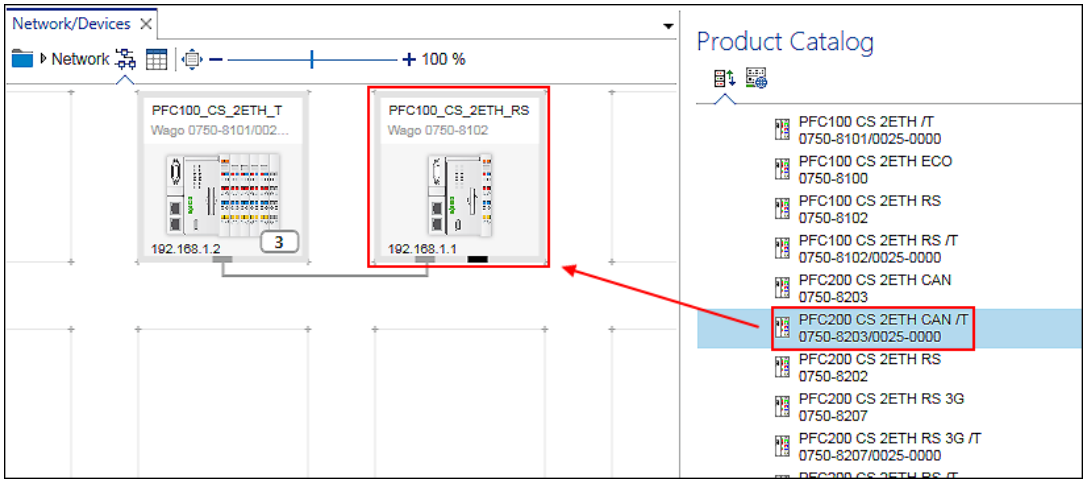


Figure 162: Device Replace in the Graphic Network View

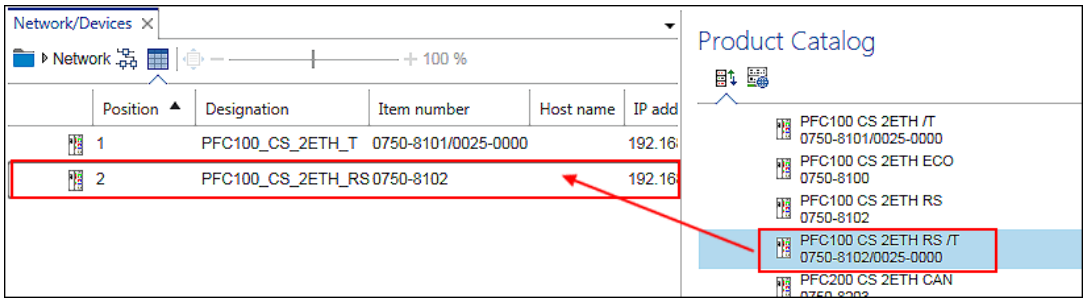


Figure 163: Device Replace in the Tabular Network View

2. To replace modules, switch to a head station in the Device Detail view.

3. Open the tabular view.

4. Click the new I/O module or module in the product catalog and drag & drop on the device to be replaced.

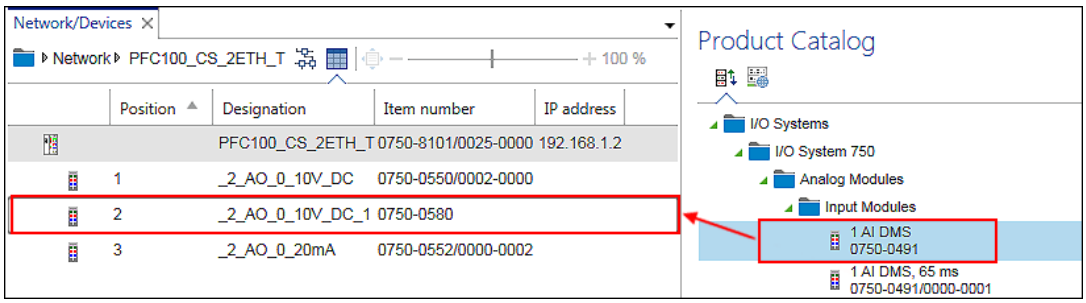


Figure 164: Device Replace in the Tabular Device Detail View

You are again prompted in a dialog that data is lost when replacing devices since the device may change fundamentally. What data (e.g., programming elements, modules, parameters, etc.) are lost or retained depends on the respective device.

Connections to other devices are always lost when replacing head stations. Modules are retained if the new head station supports them.

When replacing modules, no data is retained since neither has programming elements or other submodules. Gateways that may have submodules are an exception. When switching to another gateway, submodules are retained.

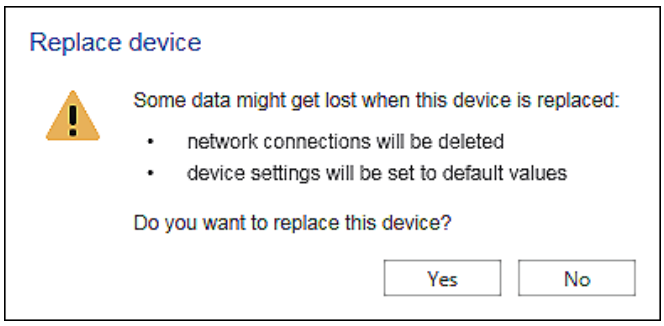


Figure 165: “Device Replace” Dialog

5. Confirm that you want to actually replace the device and click **[Yes]**.

The configured device is replaced by the new device.

8.3.4 Parameterizing Devices

1. In the workspace of the Network/Device Detail view or in the device structure right-click the device to be parameterized.

2. Click the **[Settings]** button in the context menu.

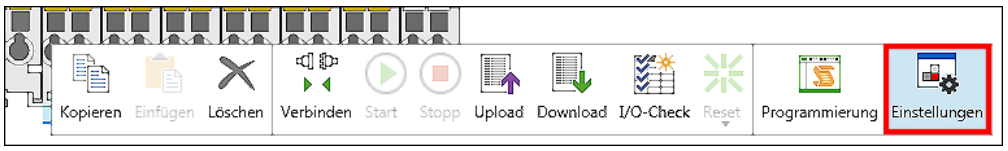


Figure 166: Opening the “Settings” Panel (here: Device Detail View)

The **[Settings]** button is also provided in the menu ribbon in the “VIEW” tab.

The “Settings” panel is displayed (see following Section).

8.3.4.1 Parameterizing Devices via the “Settings” Panel

Tabs, entry screens and selection fields in the panel depend on the particular device. Displayed setting options depend on the content of the particular device description file.

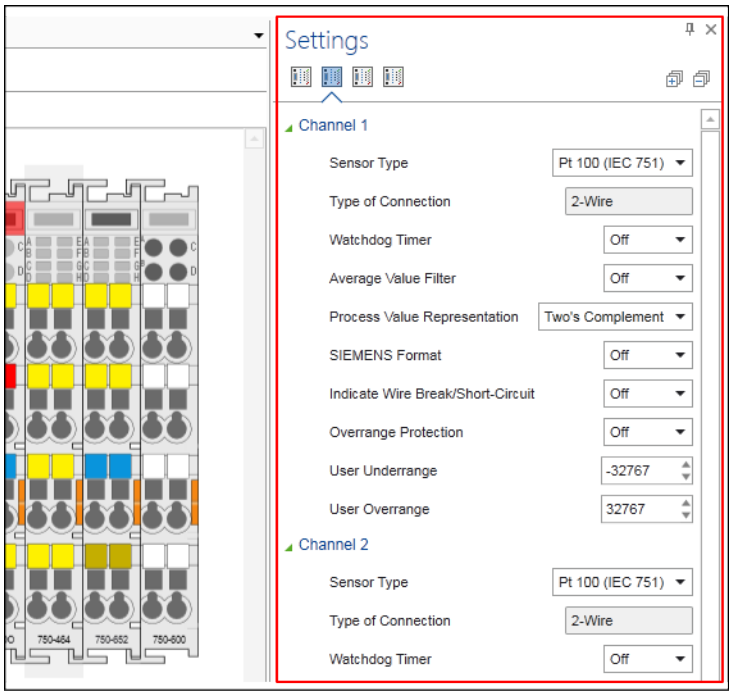


Figure 40: Opening the “Settings” Panel

1. Move between different tabs which contain settings groups by clicking the appropriate tab.

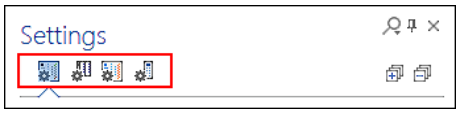


Figure 167: “Settings” Panel (Tab Navigation)

2. Tabs can contain subgroups. Open these by clicking the black arrow symbol.

The group is extended and marked with a green arrow symbol.

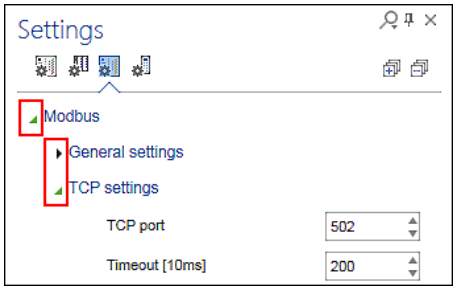


Figure 168: “Settings” Panel (Groups in Tabs)

3. Close the subgroups by clicking on the green arrow symbol.

4. Change the parameters and settings via the specific selection and entry options.

Information

Additional Information
The possible parameters, values and effects of parameter changes are described in the manual of the particular device.

8.3.4.2 Connecting Off-Network Devices (Port Forwarding)

If you want to use devices that are in a different network than the rest of the devices in your project, you can connect the off-network devices to your network via port forwarding or routing. In this case, the project controllers serve as router for the off-network devices.

Note

Observe the Application Note for the Controller Configuration!
In order to use a controller as a router and to use it in *e!COCKPIT* for port forwarding, you must first make corresponding settings in the controller. For WAGO controllers based on Linux, these settings are described in application note A500840. You can find this application note in the download area of our websitehttp://www.wago.com.

Setting Up Controller as Router

1. Select the controller to be used as router for the off-network device.
2. Open the “VIEW” tab.
3. Click the **[Port forwarding]** button.

The “Port forwarding” panel opens.

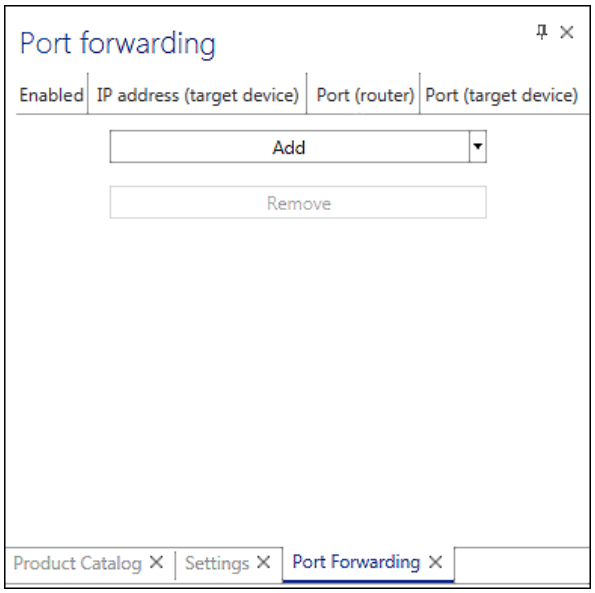


Figure 169: “Port Forwarding” Panel

Not all controllers support the port forwarding / routing function.
If it is not possible to make any entries in the panel, select a different controller.

4. Click the **[Add]** button.

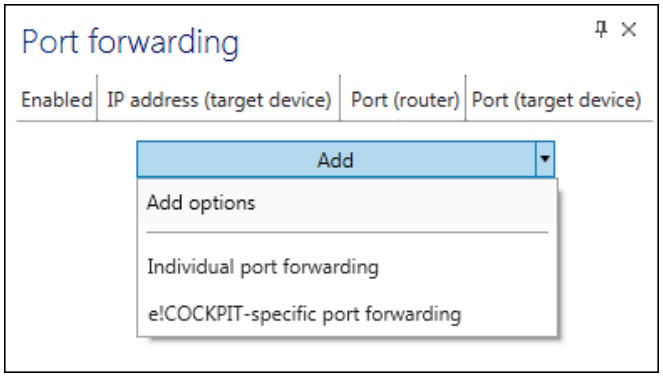


Figure 170: Adding Port Forwarding

5. Select **Individual port forwarding** to create a new line without pre-allocated values. “Individual port forwarding” is especially suited for off-network devices that, e,g., do not use any standard ports.

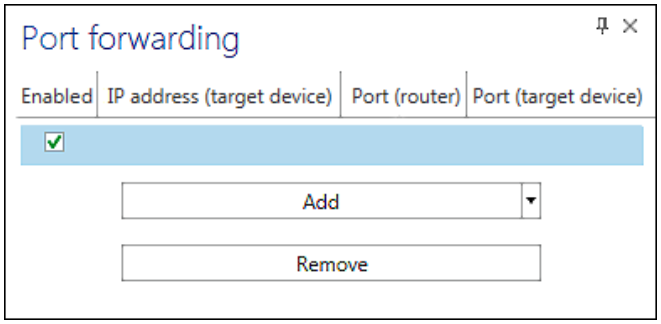


Figure 171: Adding Individual Port Forwarding

- In the newly created line, highlighted in blue, click the “IP address (target device)” field and enter the IP address of the off-network device to be connected.
  Here, ensure a syntactically valid IP address format, e.g., 192.168.1.15. Also, be sure to use an existing IP address.

- Click the “Port (router)” field and enter the port number of the controller selected to act as router.

- Click the “Port (target device)” field and enter the port number of the off-network device to be connected.

Select ***e!COCKPIT*-specific port forwarding** when the off-network device is a WAGO device. In this case, two lines are pre-allocated with default values: Port 6626 for WAGO connections and Port 11740 for CODESYS connections.
You can change these values as needed.

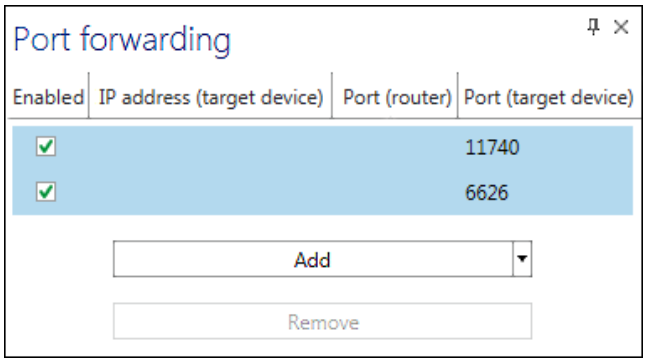


Figure 172: Adding *e!COCKPIT*-Specific Port Forwarding

Proceed as described above:

- Click the “IP address (target device)” field in both lines and enter the IP address of the off-network device to be connected.
- Click the “Port (router)” field and enter the port number of the controller selected to act as router.

Connecting Off-Network Device

1. Select the off-network device in the product catalog or the network view.
2. Right-click on the device and select **[Connect]**.
3. The connection is established via the previously configured routing controller.

Deactivate or Delete Controller Acting as Router

- To deactivate a controller's router function, delete the corresponding checkmark in the “Enabled” column in the “Port forwarding” panel.
- To delete one or more port forwarding connections, select the corresponding line(s) and click the **[Remove]** button.

8.3.4.3 Using Device-Specific Configurators

Simple modules can be parameterized via the “Settings” panel. Devices with more complex setting options, such as I/O modules that have mailbox functions, are assigned parameters in their own configurators. The configurators are opened from this panel via the relevant “Settings” buttons.

1. Click the device to be configured.
2. Click the appropriate button in the “Settings” panel to assign additional parameters.

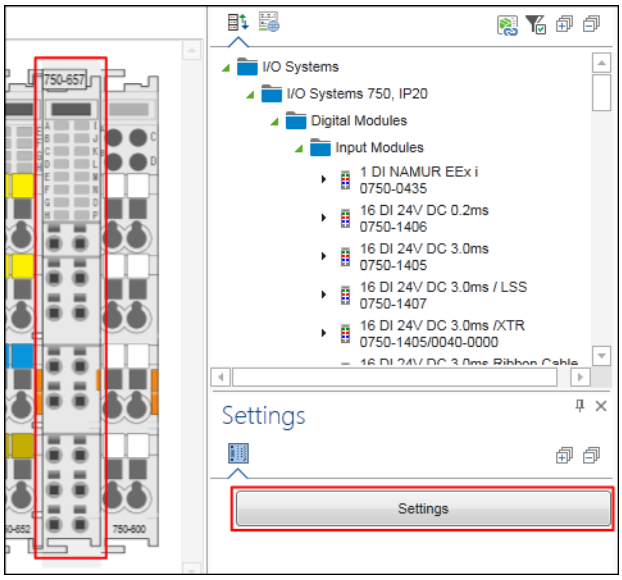


Figure 173: Opening Device-Specific Configurators

Information

Additional Information

The possible parameters, values and effects of parameter changes are described in the manual of the particular device.

8.3.4.4 Uploading and Downloading Parameters

1. Right-click the device with the set parameters and click the **[Download]** button in the context menu.

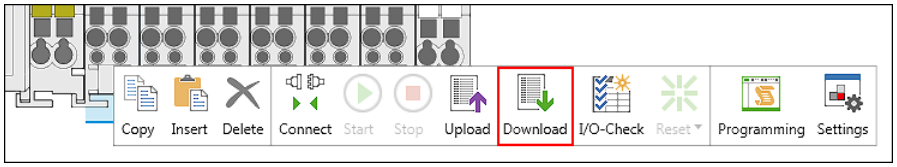


Figure 174: Writing Parameters to the Device

The parameters are transferred to the device.

2. To read parameters from the selected device with the set parameters, click the **[Upload]** button in the context menu of the device.

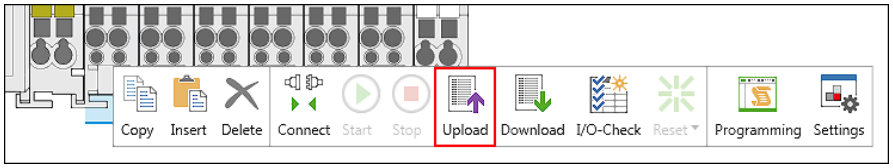


Figure 175: Reading Parameters from the Device

The parameters are loaded from the device to the software and displayed in the “Settings” panel.

The **[Upload]** and **[Download]** buttons are accessed via the context menu of a device in the Device Structure or via the corresponding buttons in the “DEVICE” tab of the menu ribbon.

8.3.5 Configuring Networks

Besides the parameterization of individual devices you can also design complete networks via ***e!****COCKPIT*. Choose devices from the Product Catalog, assign roles (master/slave), drag connections between the connectors of the devices with the mouse and select communication protocols and communication parameters.

8.3.5.1 Creating a Simple MODBUS Network

1. Select two devices from the Product Catalog and drag them with the mouse into the Network view.

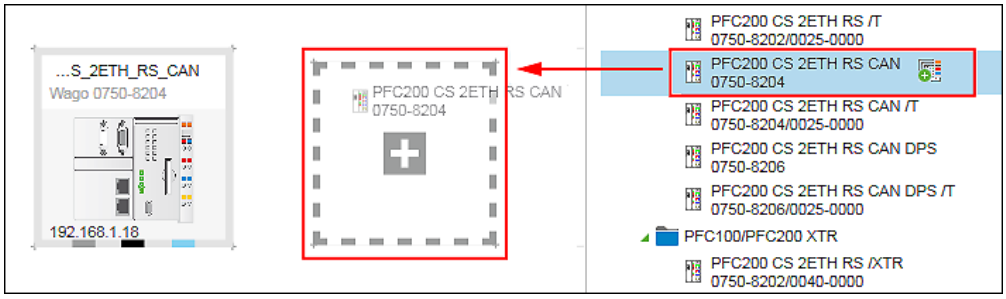


Figure 176: Dragging Devices to the Network View

2. To change the settings or parameters of the devices added, click the respective device, open the “Settings” panel in the context menu and make your changes there.

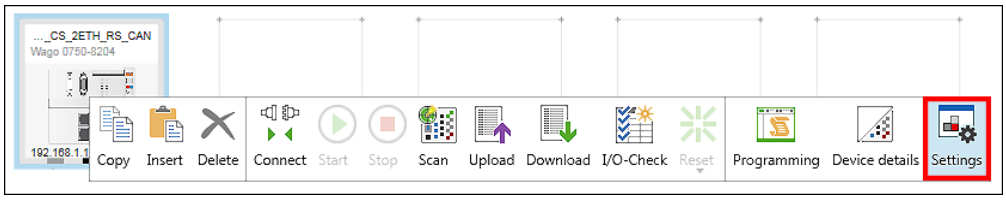


Figure 177: Opening the “Settings” Panel

3. Now connect the devices. Click the gray connector (ETHERNET/MODBUS) for one of the devices in the Network view and hold down the mouse button.

4. To connect the devices to each other, drag the connection line to the same type connector of the second device. Release the mouse button as soon as a green plus sign appears.

   The line initially symbolizes the physical ETHERNET connection.

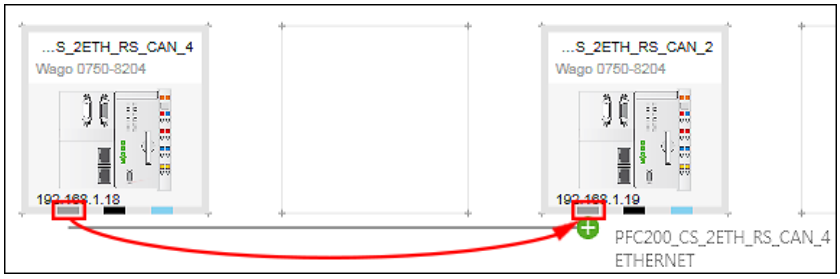


Figure 178: Establishing Network Connections

5. Click a device connector to open the interface.

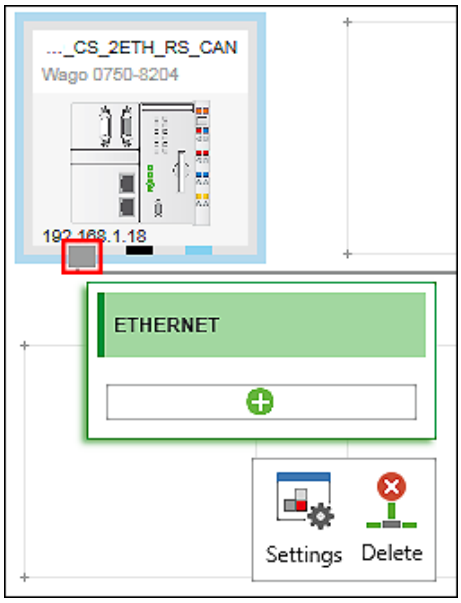


Figure 179: Opening the Interface

6. Click the green plus sign.

Possible connections are displayed for each device. The selection depends on the device used.

7. Select the required connection. In this example, select “MODBUS via (TCP) Master”. You have thus defined the role and protocol used for this connection of the first device (role: client/master, protocol: MODBUS TCP).

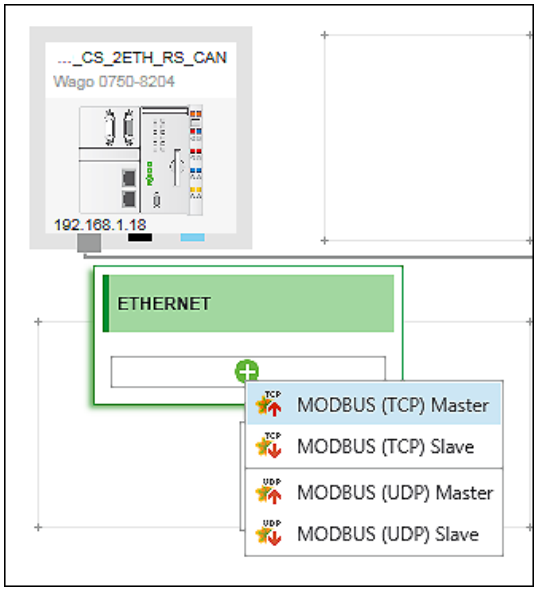


Figure 180: Selecting a Connection

8. A broken line is displayed. Similar to the first line, drag this to the connector of the partner device to establish a logical connection for the existing physical connection.

You have also defined the role and protocol of the second device for this logical connection (role: slave/server, protocol: MODBUS TCP).

The connection to the partner device(s) is displayed.

9. Move the mouse over the logical connection in the list, so that other buttons are visible.

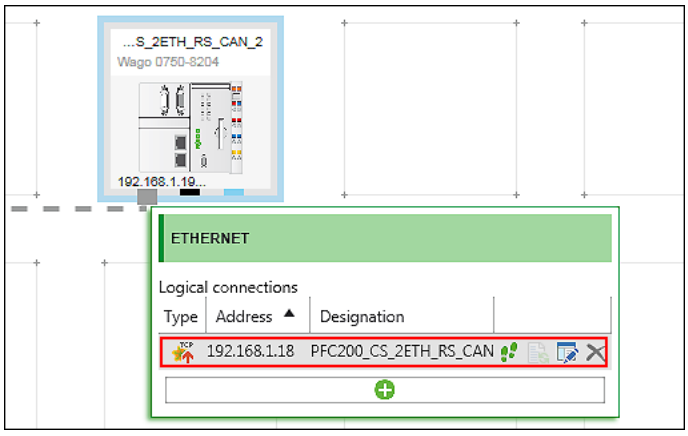


Figure 181: Displaying Devices That Are Logically Connected

10. Click the button to open the connection settings.

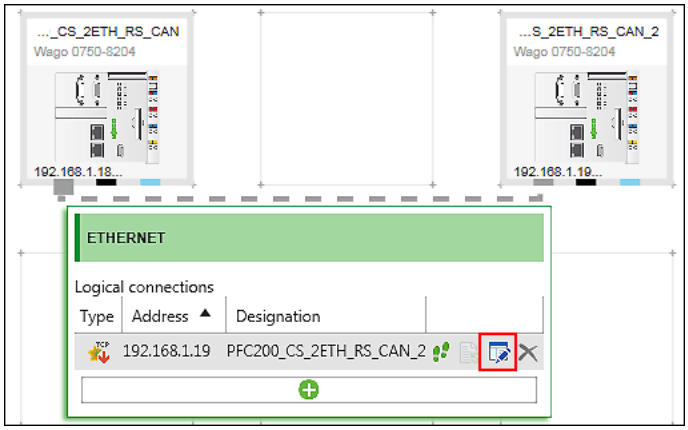


Figure 182: Opening Connection Settings or MODBUS Slave Configurator

The MODBUS Configurator opens matching the role of the device in this connection. In this example, the connection configurator for the MODBUS slave/server is opened (open the configurator for the MODBUS master/client in the same way as for the first configured device).

Use the MODBUS Configurator to define which variables of the slave (server) are available on the master (client).

The figure below shows the MODBUS Configurator for the slave. No variables for communication between master and slave have been defined yet.

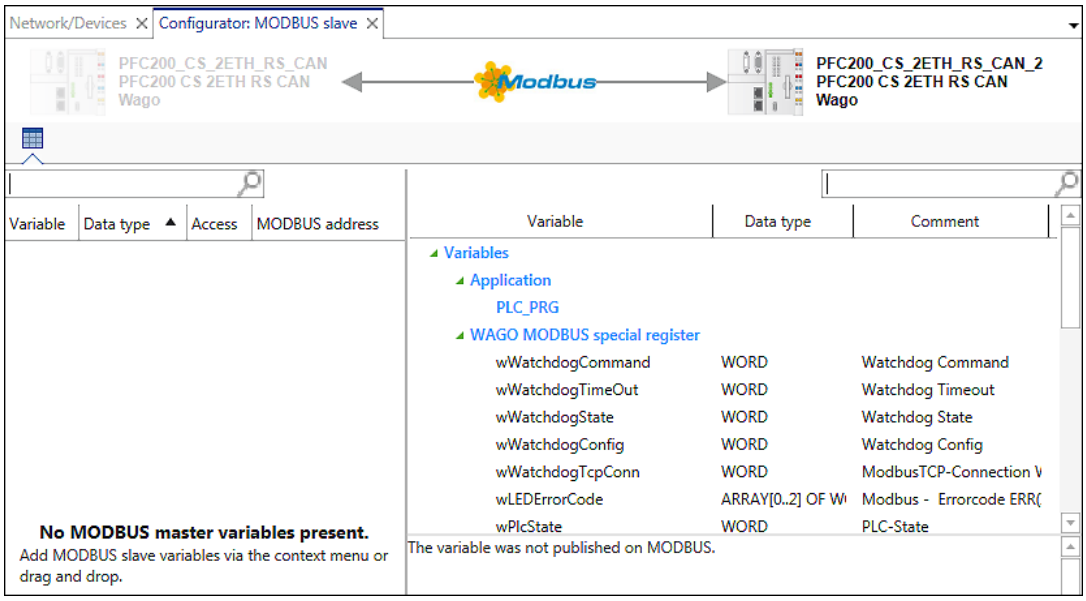


Figure 183: Variable Configuration MODBUS, View for the Master (Client)

The configurator is divided into two columns:

The variables on the master are displayed on the left. The variables available on the slave and used in the slave application are displayed on the right. The tree displays them in a hierarchical view according to the program structure.

Create variables:

1. Right-click “PLC_PRG.”

The context menu opens.

2. Click the button to add a data point to create a variable in your program “PLC_PRG.”

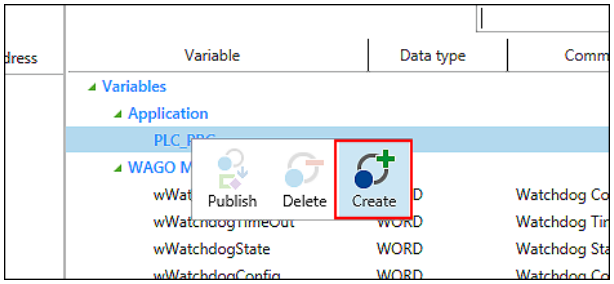


Figure 184: Creating New Variables on the Slave

Click the new variable to display the settings for MODBUS access to the new variable “newVAR” in the bottom half of the Slave view (“Variable Settings”).

3. Enter settings in this area if you want configure access to this variable via MODBUS (Description, Data Type, Array, Access, MODBUS Address).

The variable is created in the Slave application.

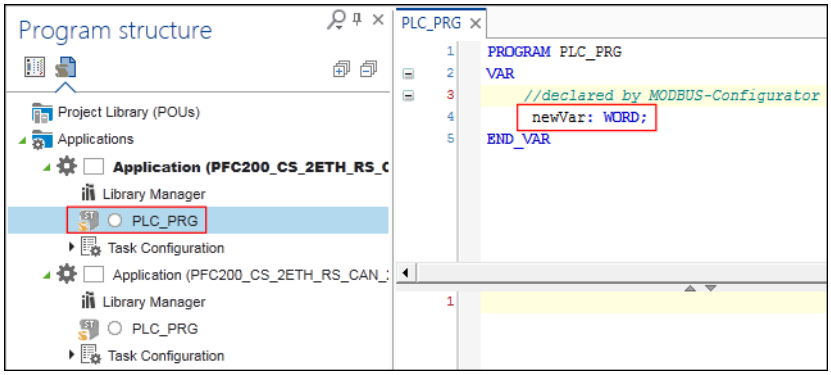


Figure 185: New Variable in the Slave Application

A variable is created in the master/client application by default (corresponding to the path (namespace) in the slave application). The variable is available on the master directly.

4. Click the master connector in the Network view.

5. Open the master configurator by clicking the button to open the connection settings.

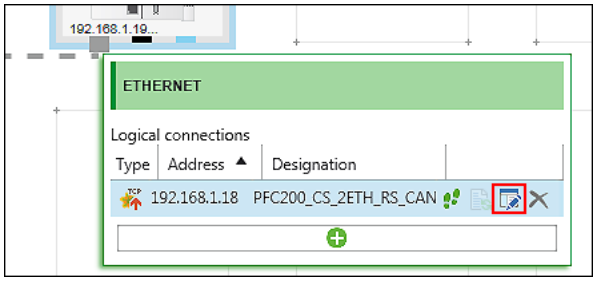


Figure 186: MODBUS Connection Settings

The MODBUS Configurator for the master opens. The variable created on the master (1), the variable on the slave (2), the cycle time for updating the variables via MODBUS (3) and MODBUS access to the variables (4) are displayed.

ReadOnly (RO): Master reads
WriteOnly (WO): Master writes
ReadWrite (RW): Master reads and writes

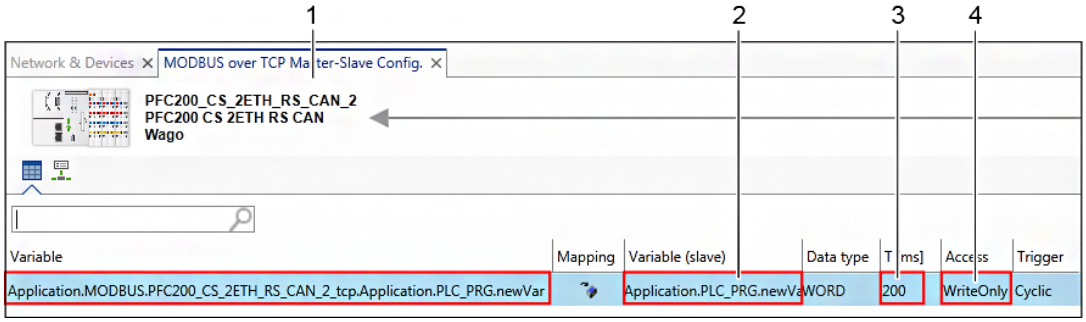


Figure 187: New Variable on the Master

Open the “Programming” workspace and open the main program of the master.

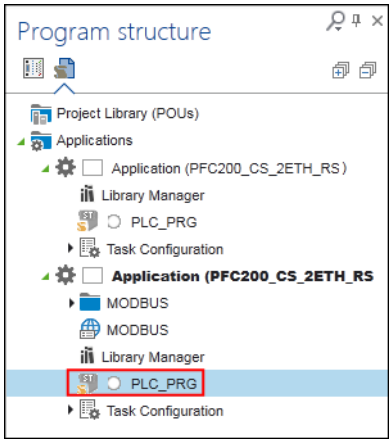


Figure 188: Opening the Main Program of the Master

In the master application, access to the “newVar” variable as shown in the following figure. Tip: Press the **[F2]** key to open the Input Assistant for easy variable selection.

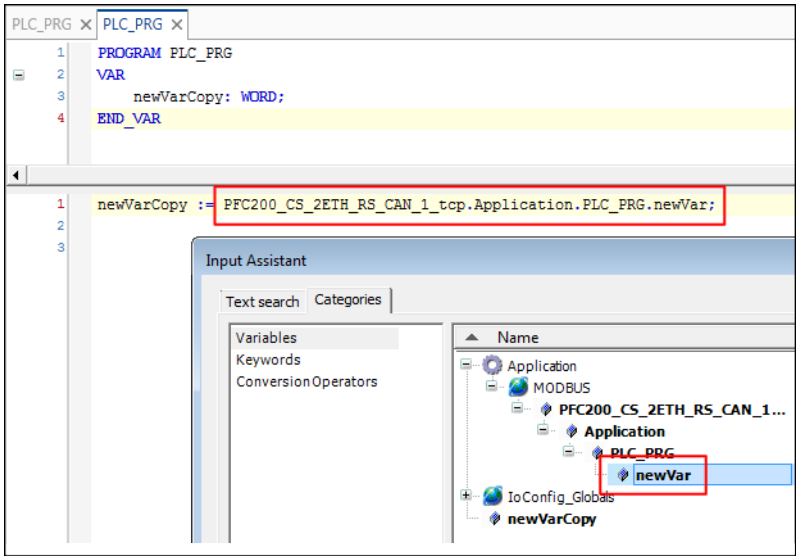


Figure 189: Accessing the “newVar” Variable in the Master Application

In this way, a variable (“newVar”) has been declared in the slave application, made accessible via MODBUS and read in the master application.

8.3.5.2 Creating a Simple CANopen Network

In the following description you connect two CANopen devices and create data points for joint communication.

1. Select two devices from the Product Catalog (e.g., 750-8204) and drag them with the mouse into the Network view.

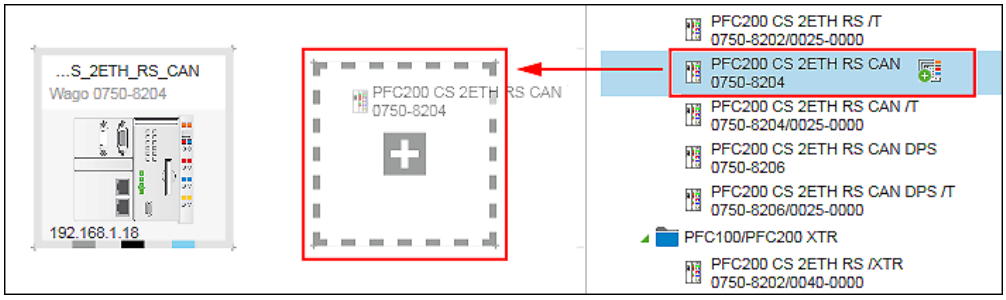


Figure 190: Dragging Devices to the Network View

2. Select the first device and click the “DEVICE” tab in the menu ribbon.

3. Click the **[Addressing]** button.

4. Enter the IP address of the device in the entry field and click **[Ok]**.

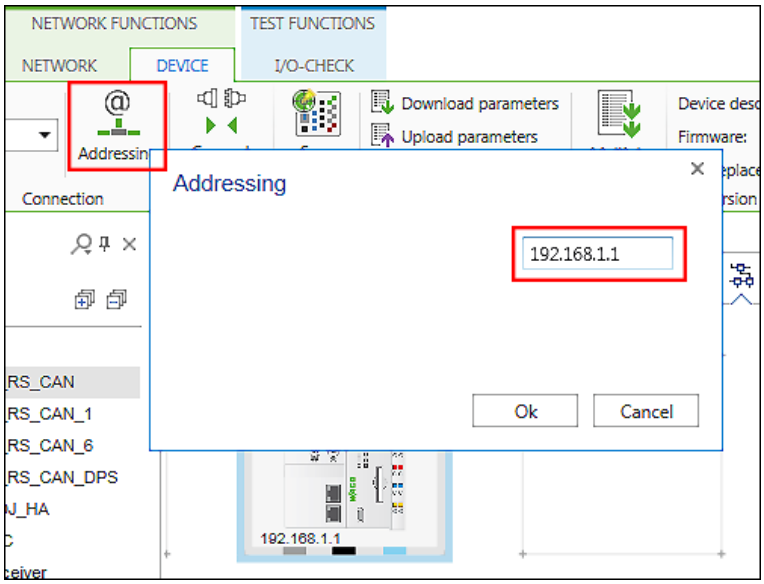


Figure 191: Assigning an IP Address

5. Proceed in the same way with the second device. The IP addresses of both devices must be different.

6. Open the “Settings” panel by right-clicking the first device and clicking the **[Settings]** button in the context menu.

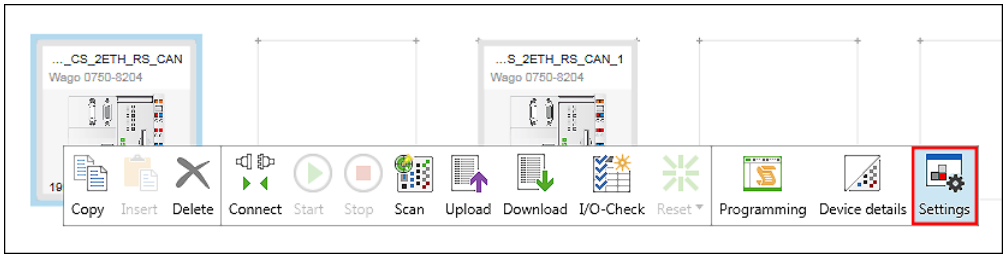


Figure 192: Opening the “Settings” Panel

7. Assign the master role to the first device by selecting “Master” in the drop-down menu.

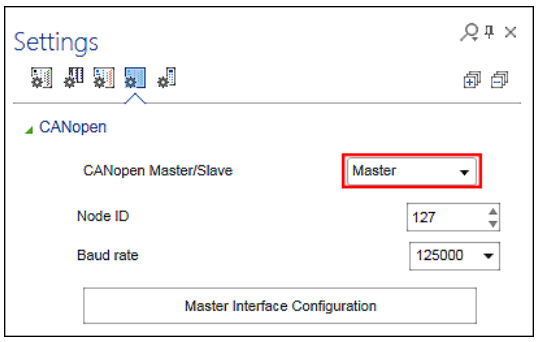


Figure 193: Assigning the Role of the Device

8. Configure the second device (if not preset) in the same way, however, as a slave.

9. Create a logical connection between the devices by dragging a connection from the CANopen connector of the master to the CANopen connector of the slave.

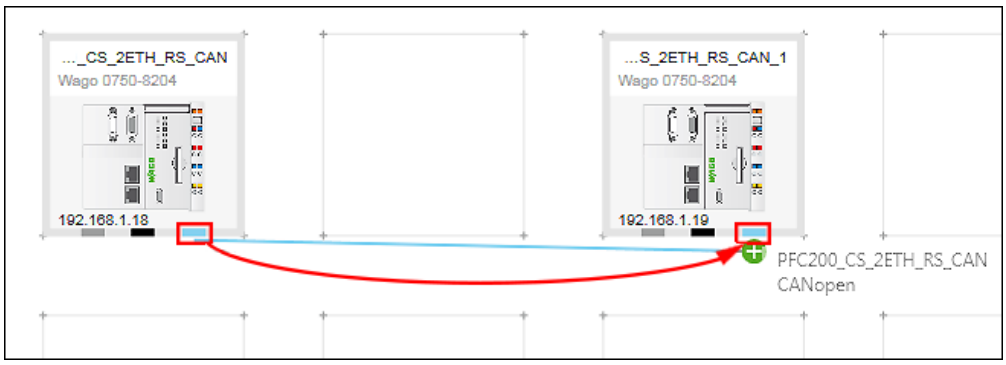


Figure 194: Creating a Connection between CANopen Devices

Preparing the Slave:

10. Select the CANopen slave with the mouse.

11. Change if required the “Node ID” (e.g., “1”) and the baud rate (e.g., 250000) in the “Settings” panel.
Note that “Node IDs” within a CANopen network must always be different.

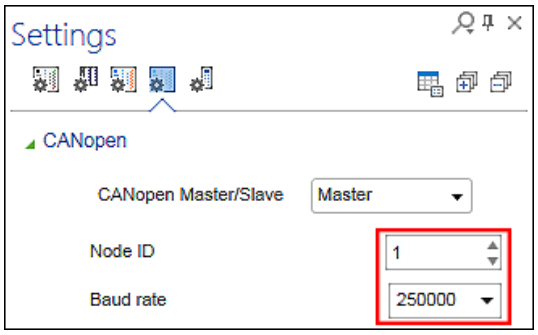


Figure 195: Adapting “Node ID” and Baud Rate

Create a data point for the slave (UINT):

12. To display the logical connection to the master click the CANopen connector of the slave and then the button for opening the connection settings.

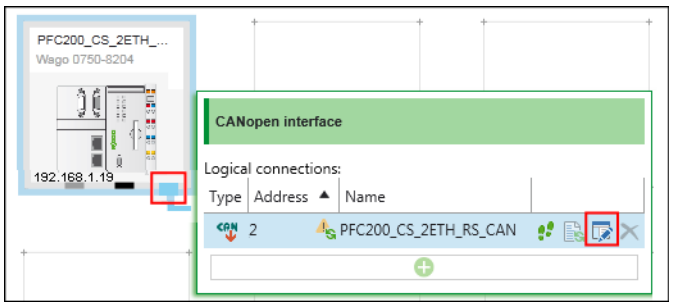


Figure 196: Opening the CANopen Connection Configurator

The CANopen connection configurator for the slave is opened.

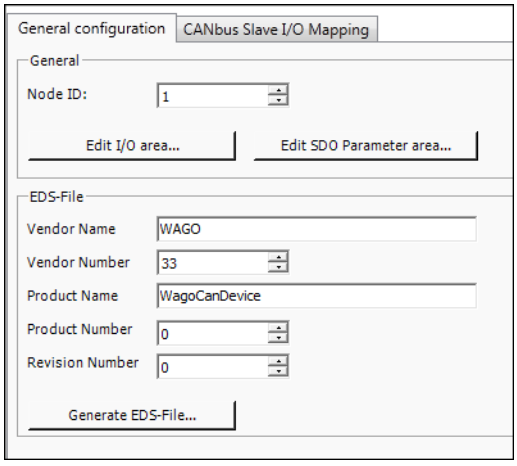


Figure 197: CANopen Connection Configurator (Slave)

13. To add a data point, click first the **[Edit I/O area…]** button in the “General Configuration” tab.

14. Click the **[Add area…]** button in the following dialog.

15. Enter the I/O type, name, number and data type of your data point and confirm via **[OK]**.
Create several data types if required.

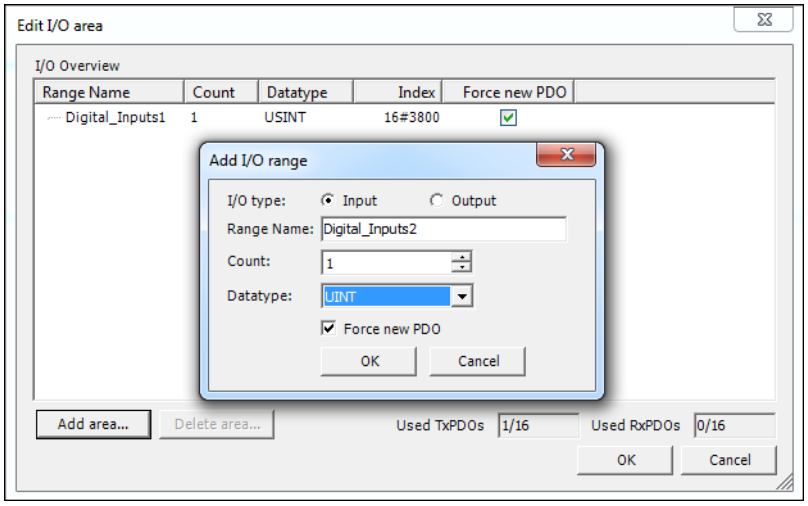


Figure 198: Adding a Data Point

16. Move to the “CANbus Slave I/O Mapping” tab.

The created data points and your channels within the I/O range are displayed here (if the display is incomplete, close the dialog and reopen it.).

Preparing the Master:

17. Select the CANopen master with the mouse.

18. Change the “Node ID” (e.g., “2”) and the baud rate (e.g., 250000) in the “Settings” panel.
Note that “Node IDs” within a CANopen network must always be different.

The configuration of the slave was changed. This is indicated as a warning symbol (yellow triangle with an exclamation mark). The configuration must be updated in order for all created slave data points to be available in the master.

19. To do this click the connector of the master and click the button for updating the configuration.

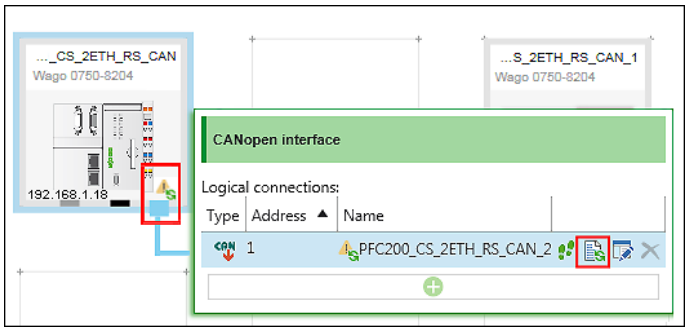


Figure 199: Updating the Configuration

20. In the “Choose Update Behavior” dialog activate the “Create New” checkbox.

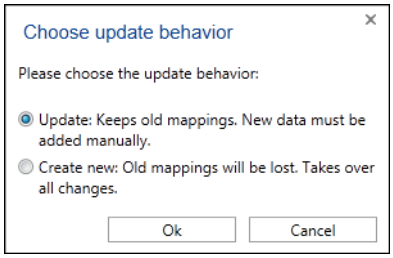


Figure 200: Choosing the Update Behavior

The configuration is updated. The warning symbol disappears.

21. Open the CANopen connection configurator for the master. To do this click the connector of the CANopen master and click the button for opening the connection settings.

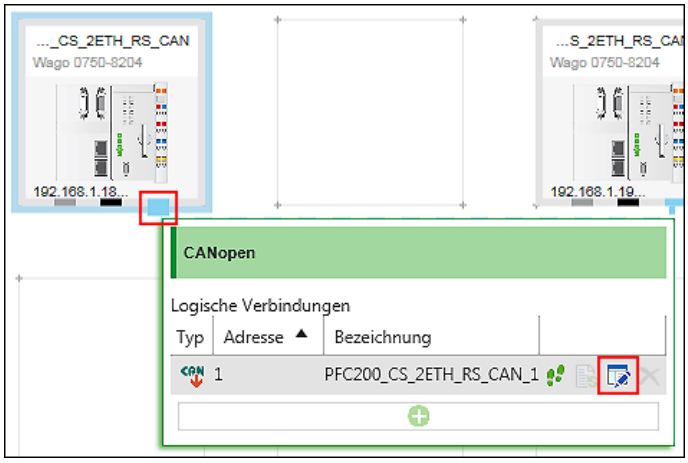


Figure 201: Opening the CANopen Connection Configurator

The CANopen connection configurator for the master is opened.

22. Open the “CANopen I/O Mapping” tab.

23. Assign variables to the channels created in the slave by clicking on the appropriate variable field and entering a variable.

    Alternatively, use the Input Assistant by clicking the **[…]** button.

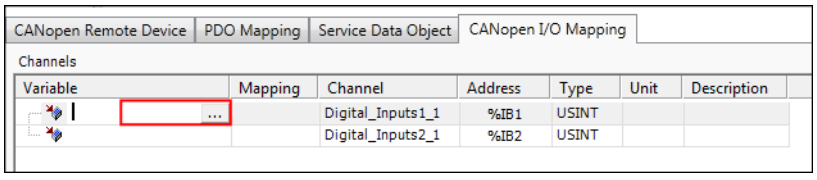


Figure 202: Entering Variables

The configuration is then complete. The variables can be used in ***e!RUNTIME*** programs of both devices.

8.3.5.3 Creating a Simple PROFIBUS Network

To create a PROFIBUS network, you need at least one PROFIBUS master and one slave. The PROFIBUS slave function is provided with a PFC200 (order number 750-8206). The configuration of the PROFIBUS slave requires a connection to a generic PROFIBUS master.

1. Place the generic PROFIBUS master and the PROFIBUS slave in the Network view.

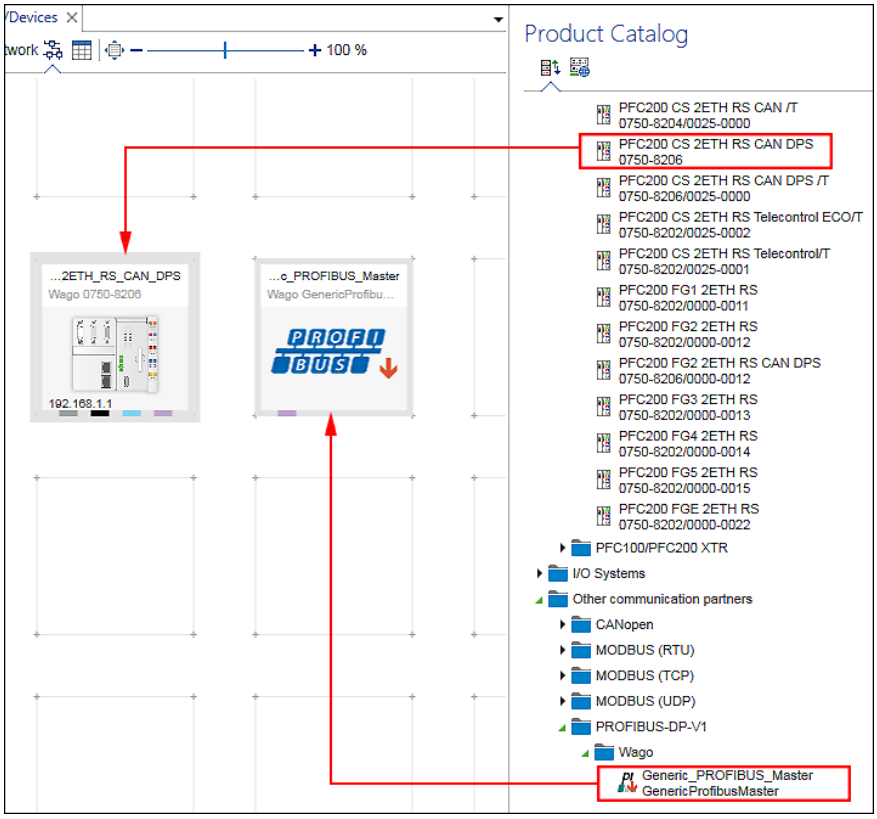


Figure 203: Placing the PROFIBUS Master and Slave in the Network View

2. Create a connection between both devices by connecting up the PROFIBUS connectors (purple) with each other.

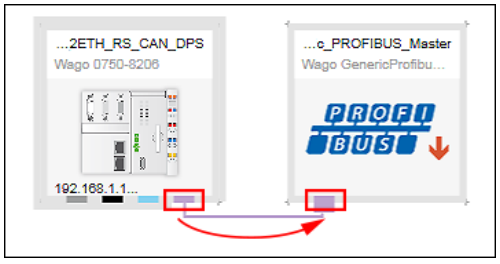


Figure 204: Connecting PROFIBUS Devices

In a PROFIBUS network, each device is assigned a unique address. The PROFIBUS address is set in the “Settings” panel.

3. If the “Settings” panel is not yet opened, open it by right-clicking the slave device and clicking the **[Settings]** button.

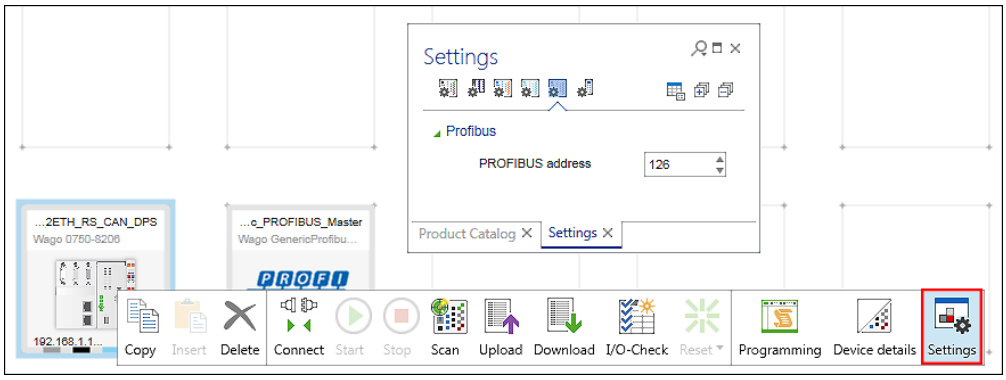


Figure 205: Opening the “Settings” Panel

4. Click the tab in the “Settings” panel in which the PROFIBUS address is set.

5. Enter a unique address in the “PROFIBUS Address” entry field.

The communication in the PROFIBUS network is performed using data points. These are set in the configurator of the PROFIBUS connection for the PROFIBUS slave.

6. Open the configuration interface (PROFIBUS interface) via the context menu of the PROFIBUS connector.

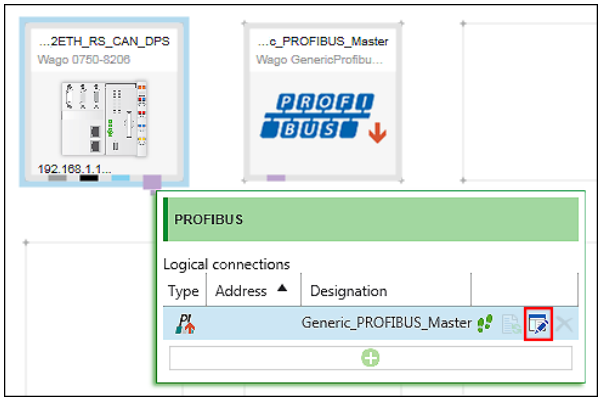


Figure 206: Opening the Configurator of the PROFIBUS Connection

The user interface of the configurator is opened.

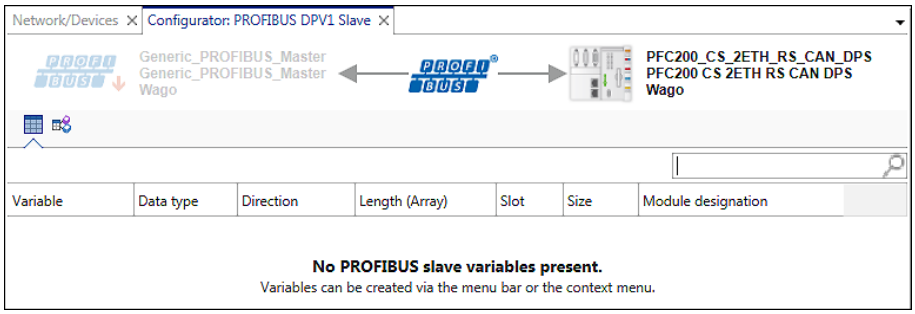


Figure 207: PROFIBUS Connection Configurator

The configuration user interface consists of two main areas, the “Variables” tab and “I/O Mapping” tab, which are arranged beneath the device images.

In the “Variables” tab, defined variables are listed and new ones are created. The “I/O Mapping” tab is used to perform (if required) the mapping to the variables.

7. Create a data point via the context menu in the “Variables” tab or by clicking the appropriate **[New]** button in the menu ribbon “Configurator: PROFIBUS-DP-V1.”

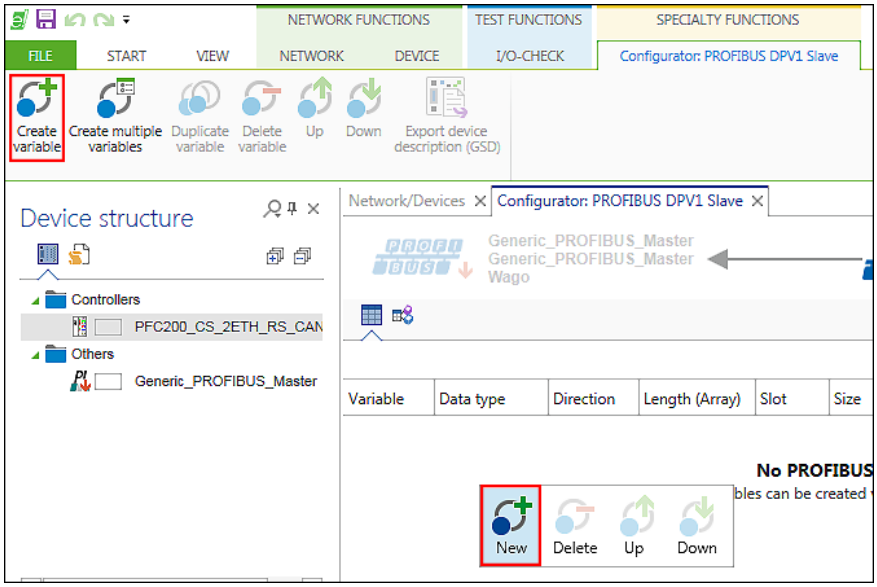


Figure 208: Creating a New Variable

The variable is created. The “Name”, “Data type,” “Direction,” Slot,” “Size” and “Module Designation” are provided with default values. These values are assigned for each new variable created.

Create additional variables and adjust the values as required.

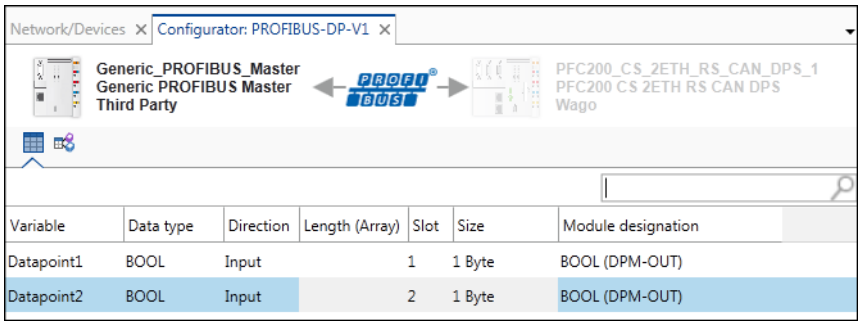


Figure 209: Configured Variables

To create multiple variables at once or to duplicate existing data points, use the corresponding **[Create Multiple Variables]** or **[Duplicate Variable]** buttons in the menu ribbon. In both cases these open a dialog in which multiple values can be set for the newly created variables.

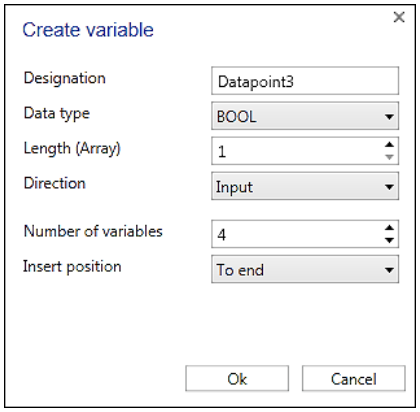


Figure 210: Creating Multiple Variables

Information

Place variables at any location!
If you have not selected a variable from the list, the new variable is placed at the last position. If you have selected one or multiple variables, the new variable is placed behind the last selected variable. This enables you to insert the new variable at any position.

You can delete the variable if required in the same way (context menu of the corresponding variable or **[Delete Variable]** button in the menu ribbon).

After a variable name is assigned, an application variable with the same name (global variable list) is created automatically in the background. You can use this variable in your IEC program.

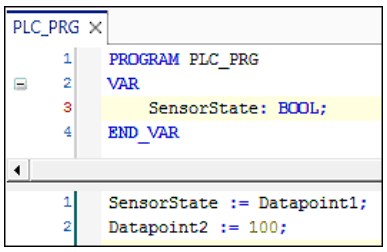


Figure 211: Using Created Variables

8. If you have already created application variables and wish to map them to data points, click the “I/O Mapping” tab to open the corresponding configuration user interface.

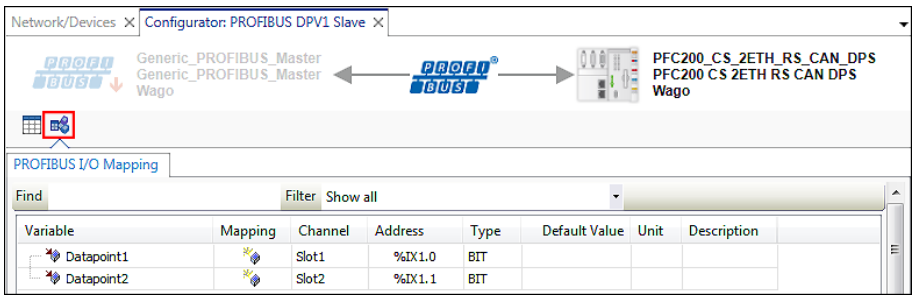


Figure 212: Opening the “I/O Mapping” Tab

There are two ways of mapping a data point to an existing application variable:

9. Double-click the corresponding variable name and enter the name of the existing application variable manually.

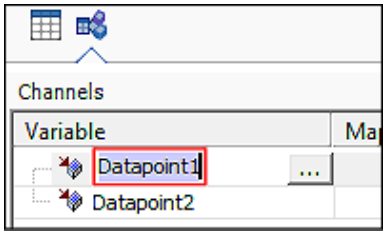


Figure 213: Manual Entry of the Application Variable

10. Or click the **[…]** button to open the Input Assistant.

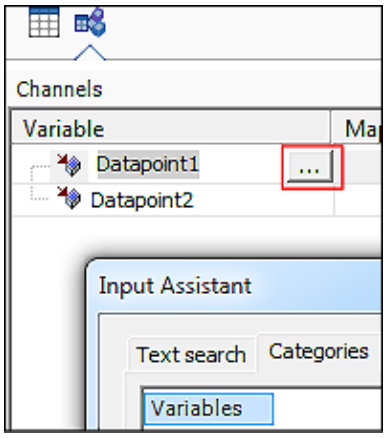


Figure 214: Entering Application Variables via the Input Assistant

11. In the Input Assistant select the application variable and confirm with **[OK]**.

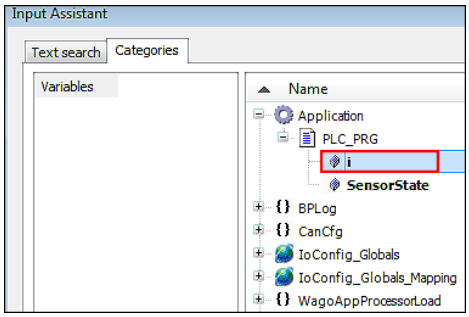


Figure 215: Selecting a Variable

The mapping is performed.

Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
Application.PLC_PRG.i		Slot1	~~%IX1.0~~	BIT			
Application.PLC_PRG.SensorState		Slot2	~~%IX1.1~~	BIT			

Figure 216: Mapping Completed

After the variables are created and optional mapping, you can save the configuration in the form of a device description file.

12. To do this, click the **[Export device description (GSD)]** button.

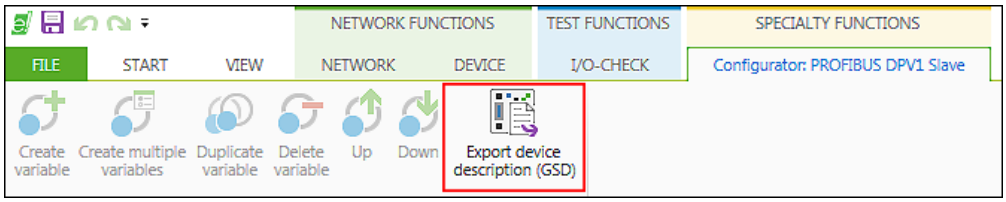


Figure 217: Saving the Device Description File

The “Save As” dialog for entering a file name is opened.

13. Enter a name and confirm with the **[OK]** button.

Two files are saved. The two files contain identical configurations. Only the description language of the parameters is different. The file with the suffix “*.gsg” contains German text. The file with the suffix “*.gsd” contains English text.

The exported device description can be imported by other engineering tools.

8.4 Testing

8.4.1 Performing an Input/Output Test for Digital Input/Output Modules

To verify the wiring of digital input/output modules, switch an LED on or off with ***e!****COCKPIT*.

The input/output test requires the device to be connected online and Control mode to be active (“I/O-CHECK” tab).

1. Open the Device Detail view.
2. Click the LED of the relevant module.

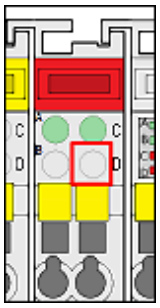


Figure 218: Switching an LED On/Off with the Mouse

3. Verify if the device’s LED mirrors its on-screen behavior in ***e!****COCKPIT*.

If this is the case, the module is connected correctly.

The display is reset as soon as the Device Detail view is closed.

8.4.2 Performing a Systematic Input/Output Test (I/O CHECK)

Check for correct wiring of your node using the systematic input/output test. You can test both individual modules and entire nodes.

Testing Individual Modules:

1. Open the Device Detail view.

2.Click a module.

3. Click the **[Build]** button in the “IO-CHECK” tab of the menu ribbon.

A tab is opened in the workspace, in which the selected module is displayed.

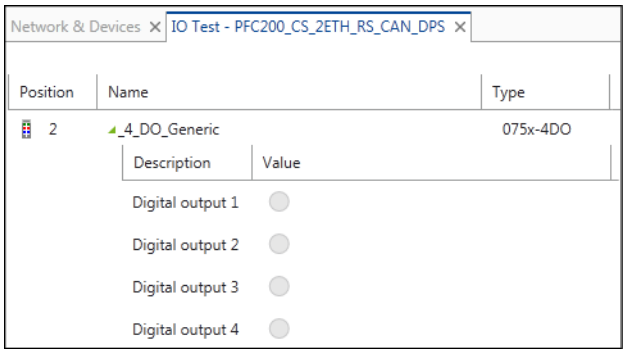


Figure 219: Display of an I/O Module for the Input/Output Test

4. To add additional modules to this test, repeat steps 1–3.

Testing an Entire Node:

1. Open the Network view.
2. Click a device.
3. Click the **[Build]** button in the “IO-CHECK” tab of the menu ribbon.

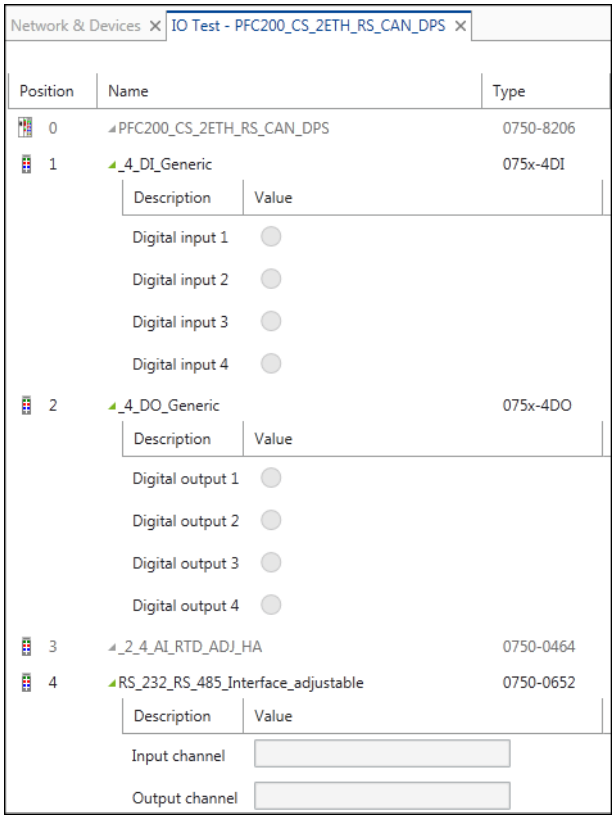


Figure 220: Display of a Node for the Input/Output Test

An overview of input/output channels of the corresponding modules is displayed in both cases.

4. Click the **[Connect]** button in the menu ribbon.

The monitoring function is active first. The current values are displayed. If required, the “Result” column can be switched on/off via the button of the same name in the menu ribbon.

5. Compare the displayed values with your hardware, e.g., whether the green LED is actually lit and for each entry click either **[Ok]** or **[Error]**.

Figure 221: Performing a Test

Depending on your entry, the status is shown in the “Result” column.

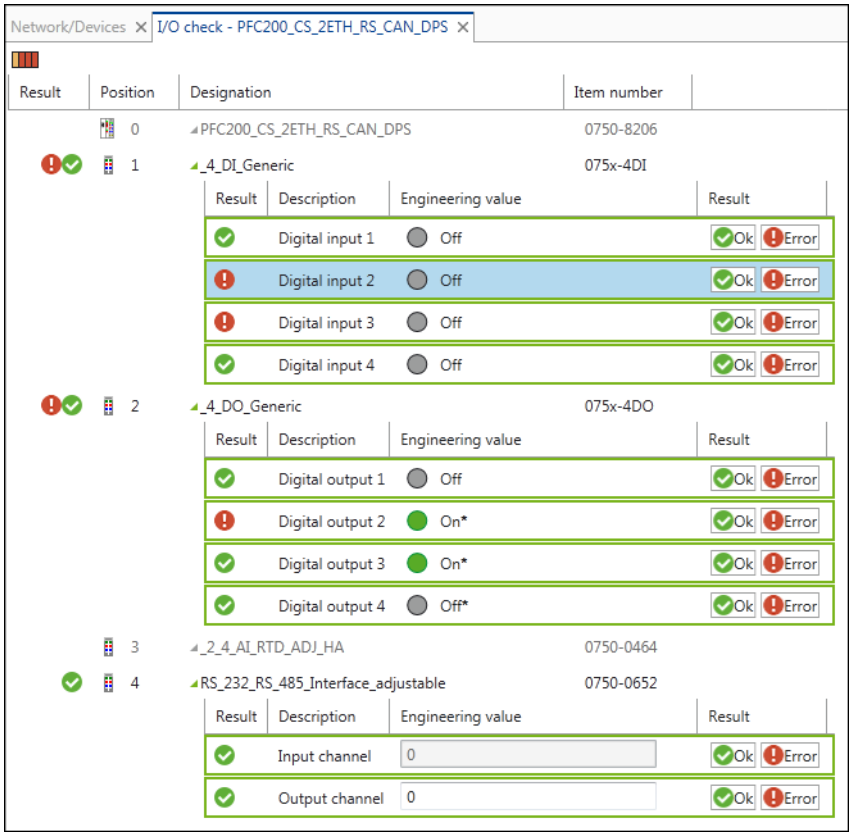


Figure 222: Status Display for Inputs and Outputs

Besides value monitoring, you can also write or read them.

6. Switch to control mode by clicking **[Control mode]** in the menu ribbon.

Change the individual values. For this use, the slide adjuster and entry fields for analog output terminals; for digital output terminals click, the LED symbol.

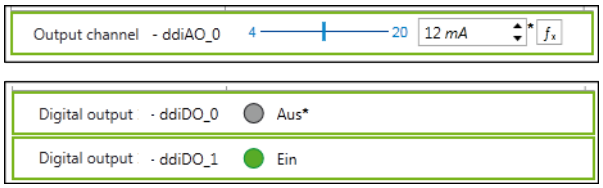


Figure 223: Changing Analog and Digital Values

Changed values are indicated with an asterisk (*) and the number of prepared changes shown as a number in the menu ribbon (here: 3) if “Collect” is active (blue background).

7. To load all changed values to the I/O module click the **[Write now]** button in the menu ribbon. The write operation is performed once.

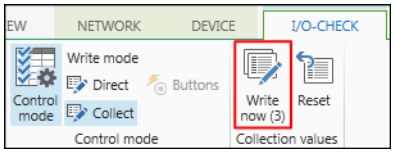


Figure 224: Write Collection Values

If the **[Direct]** button is clicked, the values are continuously written as they are entered.

8.5 Programming

e!*RUNTIME* is integrated in ***e!****COCKPIT* user interface. This is the 3S hardware-independent CODESYS IEC 61131-3 programming system (version 3.5). ***e!****COCKPIT* can assign elements for program development to (fieldbus controllers), thus enabling for example the implementation of fieldbus and I/O configurations, visualizations, motion control and other tasks.

1. Open the “Programming” workspace.

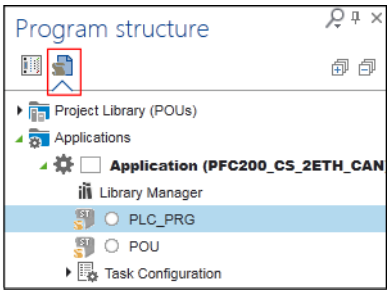


Figure 225: Opening the “Programming” Workspace

A CODESYS application with a library manager, “PLC_PRG” program and a task configuration is created for each head station incorporated. Other applications can be created on the same level or below.

A “project library” is created for POUs, which applies to all applications.

You can incorporate additional CODESYS elements via the context menu in the Program Structure, such as additional POUs, files, variable lists or visualizations (see CODESYS online help, “Adding an Object”).

Right-click the project library and choose **[Copy]** to copy, for example the entire content of this directory, to a directory of an appropriate project application. Copying and inserting is also possible between different instances of ***e!****COCKPIT*.

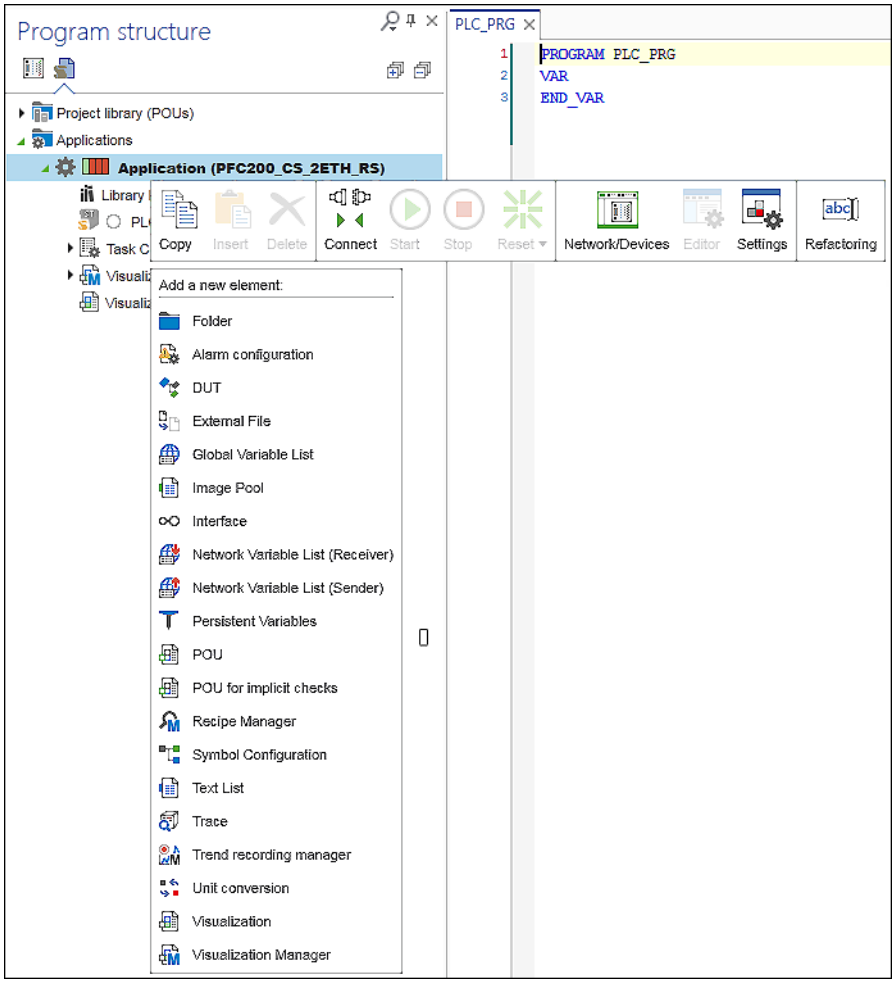


Figure 226: Context Menu in the Program Structure

“POUs” are program organization units/objects that form a controller program. When you create a POU, the workspace is adapted accordingly. Depending on the selected programming language, other tabs are added to the menu ribbon and new panels are shown (e.g., “Tools”).

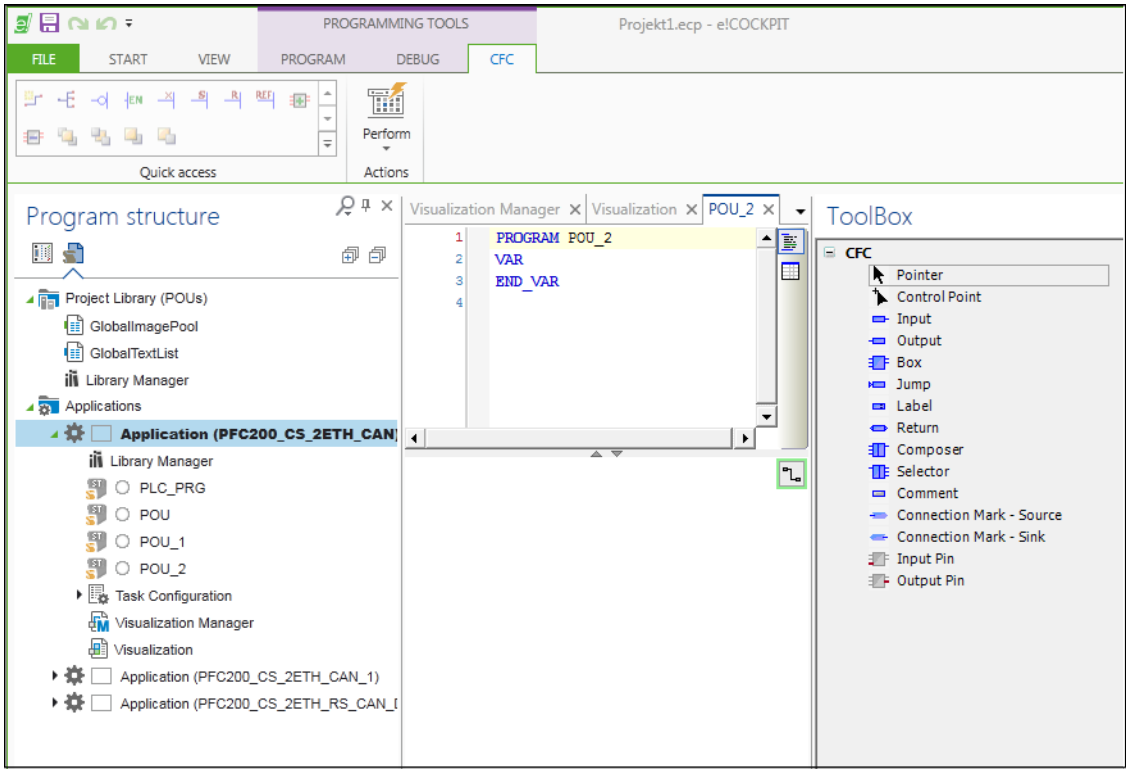


Figure 227: Adding a POU

The use of individual panels is described in the CODESYS online help.

The context menu of an application also enables you to copy, insert or delete the appropriate application, connect the device, start and stop the application, open the programming editor or view/change the settings of the application.

8.5.1 Creating Libraries

1. Select a library template in the Start or Backstage view.

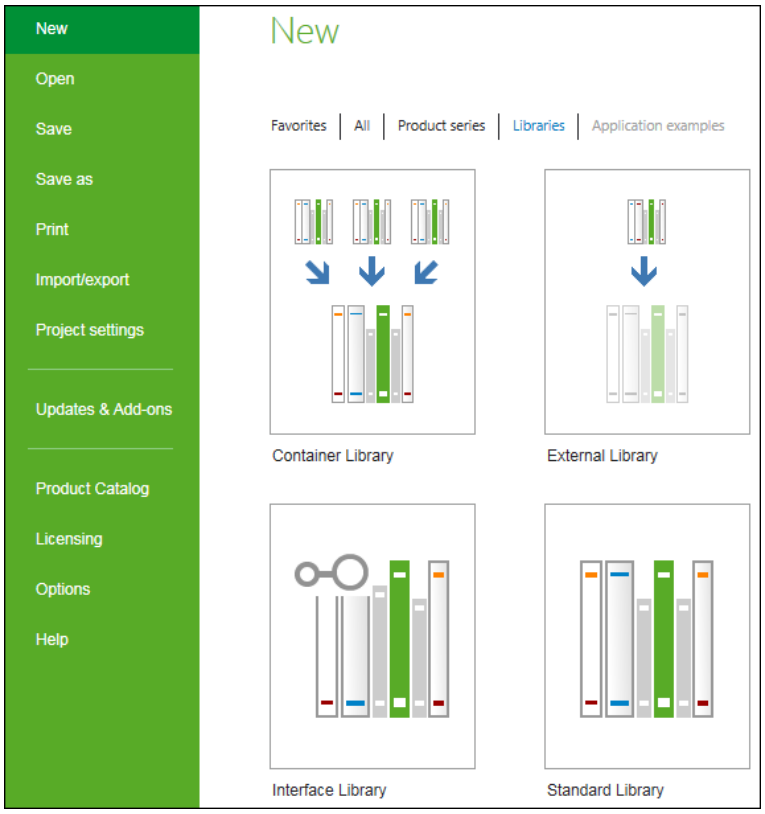


Figure 228: Selecting a Template for Libraries

The main view is opened.

2. Open the “Programming” workspace.

3. Create your library.

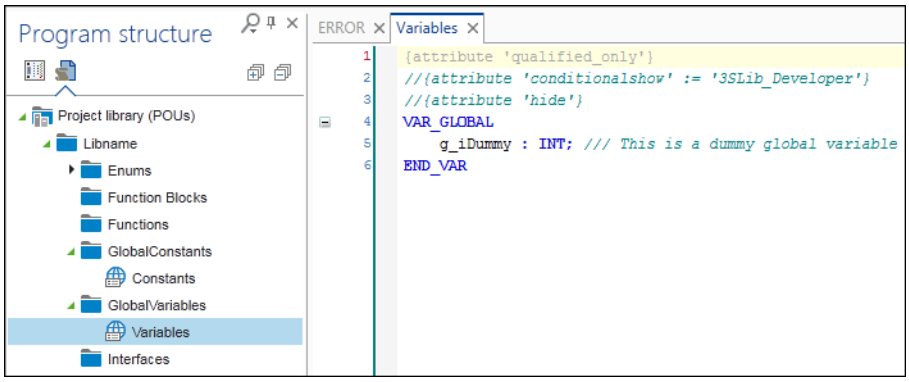


Figure 229: Creating a Library

4. To check the created library, click the **[Syntax check project library]** button in the “PROGRAM” tab of the menu ribbon.

This checks the written library according to IEC 61131-3.

5. After a successful check move to the Backstage view (“FILE” tab).

6. Click **[Import/Export]**.

7. Click the **[IEC library]** button.

8. Saving and installing a library:

   - To save the library as a compiled library with the “compiled-library” suffix, click **[Compile and save]**.
   - To save the library in the system repository, click **[Save in library repository]**.

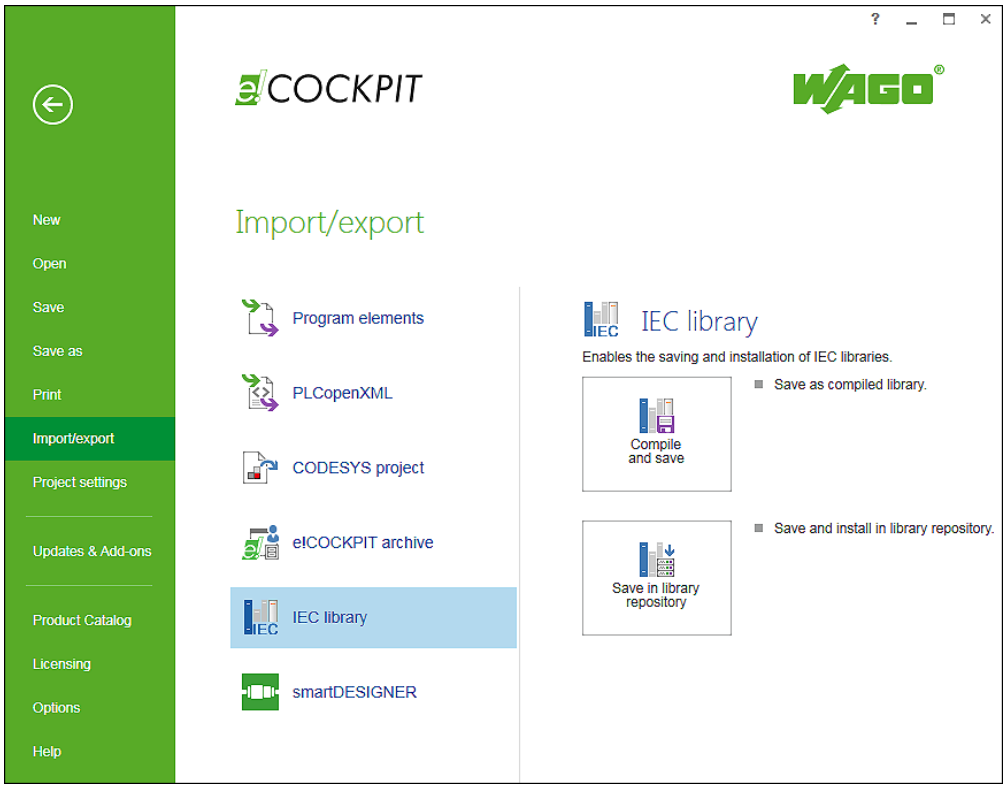


Figure 230: Saving and Installing a Library

8.5.2 Adding Libraries

Libraries contain collections of reusable objects such as functions, function blocks or variables that are incorporated into projects. The contents of these libraries can be used here without any new declaration. The library manager is used to manage the libraries in a project. This displays both application-related and function-related libraries as well as CODESYS and WAGO system libraries.

WAGO system libraries are already supplied. Add libraries that are not present as follows.

1. Open the “Programming” workspace.

2. Right-click the “Project Library (POUs)” entry and click **Library Manager** in the context menu.

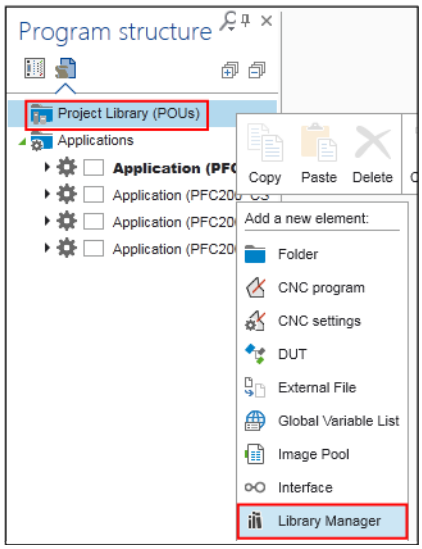


Figure 231: Adding the Library Manager

3. Click **[Add]** in the dialog.

The library manager is opened in the workspace.

4. To add a new library that has not been installed on the system, click **[Add library]**.

5. Select the relevant library in the dialog.

6. Confirm your selection with **[OK]**.

The library manager incorporates a reference to a pre-installed library into the project.

To add a library that is not yet installed on the local system, click the **[Library repository]** button to install it.

To add target-system neutral libraries, use the **[Placeholders]** button instead. Depending on the device used and its device description, the appropriate library is

used. Alternatively, the standard library is used if no device is present, so that the program can be compiled error-free.

Note

Install libraries in *e!COCKPIT*!
Note that all libraries must be incorporated permanently. If you simply replace the library files in your local library directory, the libraries are not available in *e!COCKPIT*. They must be installed from the repository.

8.5.3 Creating Programs

The “PLC_PRG” main program is created automatically. You can create additional programs.

1. Right-click the corresponding application and select **[POU]** in the context menu.

2. In the dialog assign a name and select the type and the implementation language per IEC 61131-3.

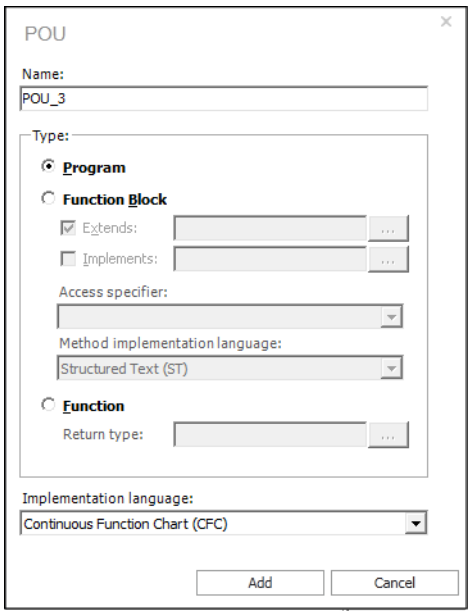


Figure 232: Creating a Program

The programs are automatically assigned to a task. If the task was deleted, you can create this again by right-clicking the application and selecting **[Task Configuration]** in the context menu.

3. To assign a program to the task, click the created task and add a **Program call**.

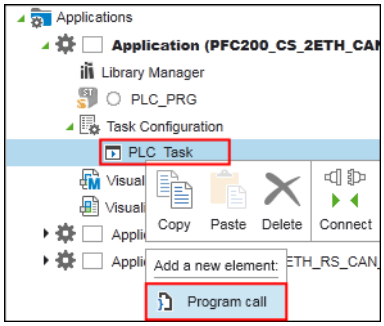


Figure 233: Adding a Program Call

A “Program call” dialog is opened.

4. In the “POU to Call” field, enter the program name.

   Alternatively, use the Input Assistant by clicking the **[…]** button, select the program in the new window and confirm with **[OK]**.

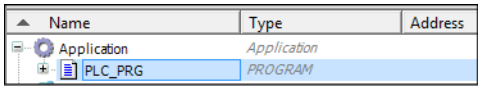


Figure 234: Entering the Program Name via the Input Assistant

The program name is entered in the “Program call” dialog.

5. To add the program call, click the **[Add]** button.

6. To open and edit the added program double-click the program in the Project Structure.

   Depending on the implementation language you have selected under point 2, the corresponding programming editor is displayed.

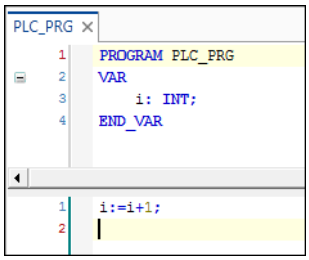


Figure 235: Programming Editor (in this example: Structured Text (ST))

7. Write your program according to IEC 61131-3.

8.5.4 Performing I/O Mapping

By I/O mapping is meant the mapping and assignment of input, output, and memory addresses of the controller to project variables that are used by the application. The I/O mapping is displayed in the Device Detail view below the device image.

1. Open the Device Detail view.
2. Select the I/O module with the mouse.
3. Click the “Variables” column in the corresponding fields and enter the variables/data points.

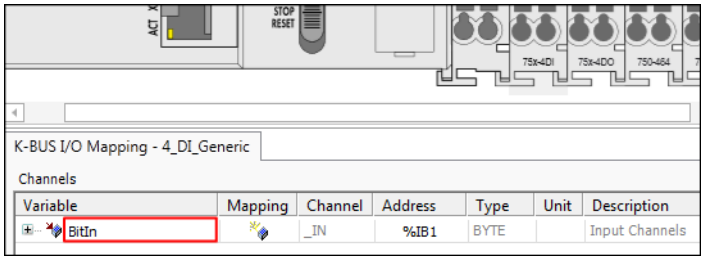


Figure 236: Entering Variables/Data Points

The variable or data point is created and is available in the entire project.

You can use the Input Assistant to assign variables that are already known in the project.

4. To do this, double-click a field.
5. To open the Input Assistant, click the **[…]** button.

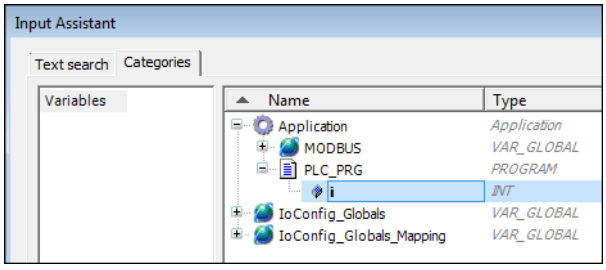


Figure 237: Entering Variables/Data Points via the Input Assistant

6. Select the corresponding variable or the data point and confirm with **[OK]**.

The mapping is accepted for the project.

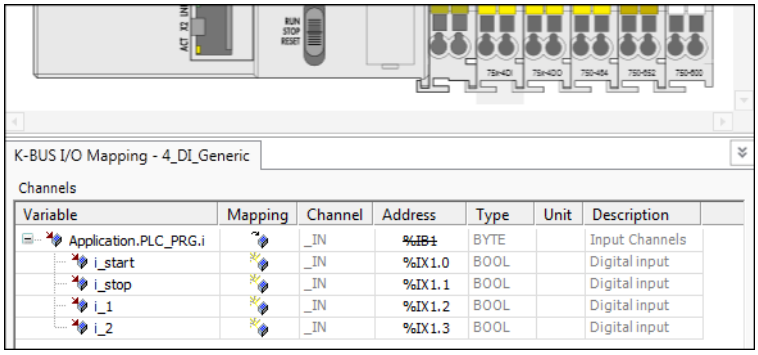


Figure 238: I/O Mapping

8.5.5 Compiling and Validating an Application

1. To compile the program click the **[Build]** button in the “PROGRAM” tab of the menu ribbon.

   The program is compiled and a message bar shows the errors.

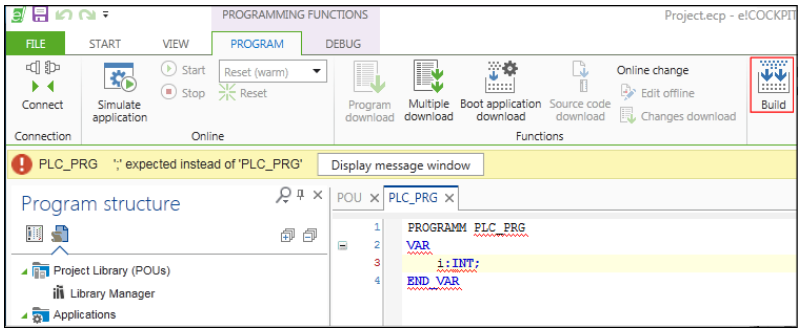


Figure 239: Compiling an Application

2. To display details of the validation, click **[Display message window**]. Alternatively, open the message window via the **[Messages]** button at the bottom left of the workspace or via the **[Messages]** button in the “View” tab.

First, all messages are displayed: The “Messages”, “Warnings” and “Errors” message types are active (blue background) and the selected message category includes “All categories”.

3. To filter the view, click the respective message type(s), for example, to display only warnings and errors.

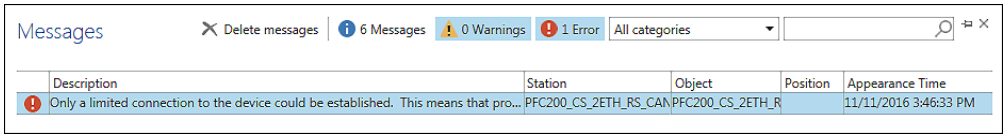


Figure 240: Message Window

4. To limit the search results further, select a message category and enter a search term.

Information

Additional Information:
Message categories are generated dynamically depending on software use and extensions included. Not all message categories shown in this documentation have to be available to you.

5. Click an entry in the message window list to jump directly to the error location.

6. To clean the list, click the **[Delete messages]** button.

8.5.6 Excluding Programs for Compiling

If you wish to connect and compile an application, you can exclude individual programs that must not be compiled.

1. Right-click in the Program Structure the program that must not be compiled, e.g., “PLC_PRG.”
2. Click **Settings** in the context menu.
3. In the dialog click the “Build” tab and activate the “Exclude from compiling” check box.

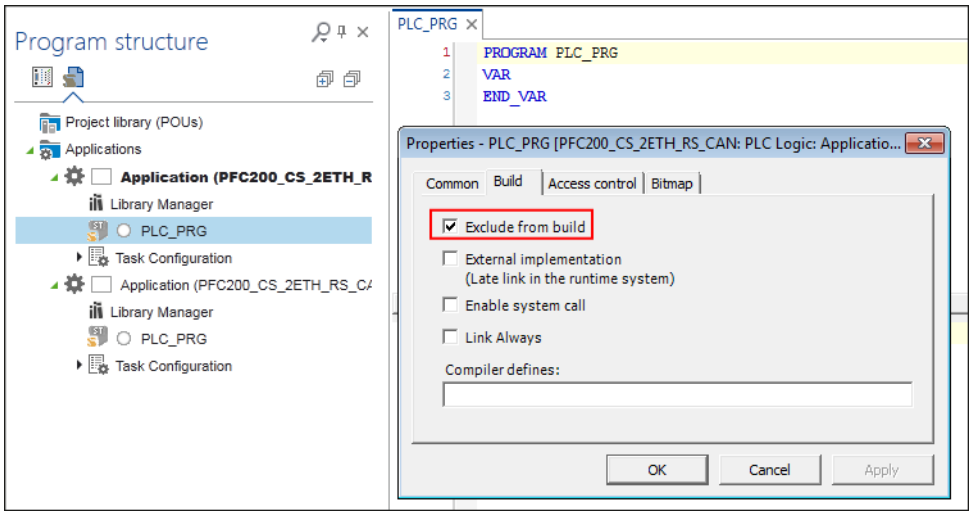


Figure 241: Excluding the Program from Compiling

4. Click **[OK]** to confirm.

The program is displayed in gray and in italics.

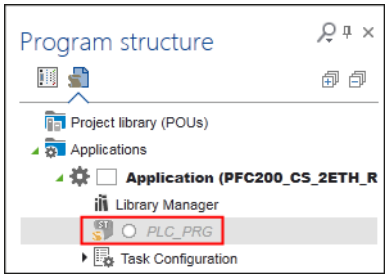


Figure 242: Program Excluded from Compiling

8.5.7 Debugging an Application

The debug function examines programming errors. This requires a connection to the device.

1. Move to the “DEBUG” tab in the menu ribbon.
2. To start the debug process, click **[Start]**.
3. To create a watch window, click the **[Monitoring]** button in the menu ribbon and select one of the five entries.

This will open the “Watch” panel.

4. Double-click the “Expression” field and then the **[…]** button displayed there for the Input Assistant.
5. Select the value or values to be monitored.

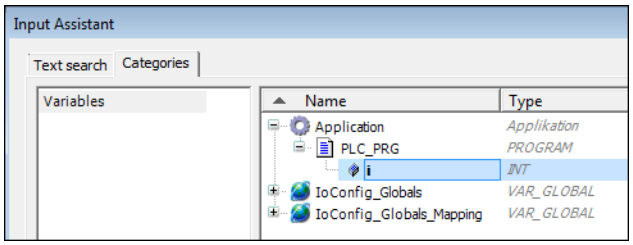


Figure 243: Selecting Values for Monitoring

6. Transfer the value or values by clicking **[OK]**.

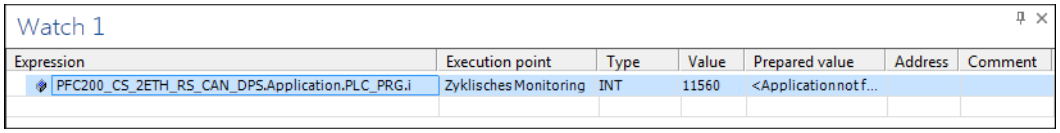


Figure 244: Watch List

7. Click the **[New]** button in the “Breakpoints” group to add breakpoints.

Breakpoints can be set at specific positions in the program to stop execution. Specific conditions can be defined for the stop (see CODESYS online help, “Breakpoints”).

8. Then click **[Toggle]** to activate the breakpoint.

Step-by-step processing via **Single Step** (menu ribbon, “DEBUG” tab) enables the program to be run in controlled steps. The particular variable values can be examined at each stop. A **Call stack** (menu ribbon, “VIEW” tab) can be displayed to determine the current position.

The flow control can be activated to track previous sections of the application program. Unlike standard monitoring, which only displays the value of a variable between two cycles, the flow control supplies the value for each processing step precisely at the time of processing.

8.5.8 Simulating an Application

Simulation mode enables you to debug and test the behavior of an application without connecting to a real target system. No communication settings are required for the simulation.

1. Open the “PROGRAM” tab in the menu ribbon.

2. Click **[Simulate application]**.

The button in the menu ribbon changes to **[Close simulation]**. In the status bar, the status display in front of the corresponding device and in the tooltip of the device (“Program structure” panel) the connection is shown in blue. Also in the Network view the tile of the corresponding device is outlined in blue.

3. Use the commands of the “DEBUG” tab to test the application.

8.5.9 Creating Visualizations

e!*COCKPIT* integrates the visualization functions of CODESYS. These enable the use of predefined visualization elements and commands for simulating, controlling and monitoring machine and plant systems.

A web server connection (CODESYS-Web-Visu) also enables a visualization to be operated with a web browser or displayed on an external device/display (CODESYS-HMI).

Note

Ensure compatibility with web browsers!
The view of the web visualization has been tested and optimized for the following web browsers:

- Firefox 30.0
- Chrome 34.0, 35.0
- Internet Explorer 11
- Opera 12.17
- Android 4.0
- Safari iPad2

Note

If the connection establishment fails, reduce the number of visualization tabs!
If many tabs containing the visualizations are opened in the programming workspace, it may not be possible to make a connection to a device. Use the “Close all windows apart from this one” function in the context menu of the tab to retain only the current tab and close all the others. Try again to connect the application.

Note

Use trend visualization for online devices!
You can visualize the graphical history of variable values over a longer time. If using such trending, make sure to use them for online devices only.
Trend visualization is not supported in simulation mode.

Note

“Web Browser” and “ActiveX Element” visualization elements are not supported!
Various control and visualization elements can be integrated in the Web visualization. If using the “Web Browser” or “ActiveX Element” visualization elements, the elements are displayed, but the visualization and function on the Website are not supported.

Note

Note browser compatibility for integrated graphics!
If integrating graphics in your Web visualization, please note that the “wmf” file format (Windows Metafile) as a Microsoft-specific format is not supported by all browsers. Instead, integrate graphics in e.g., “jpg”, “png” or “svg” format.

1. First open the “Programming” workspace.

2. Add a visualization by right-clicking an application and selecting **[Visualization]** as a new element.

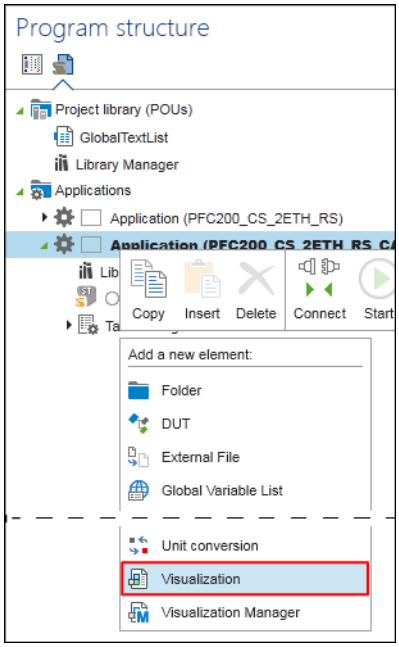


Figure 245: Adding a Visualization

The visualization editor is opened in the workspace.
This will display the “ToolBox” and “Properties” panels.

3. Use the elements from the “ToolBox” panel, such as the bar display, by placing them in the visualization editor via drag and drop.

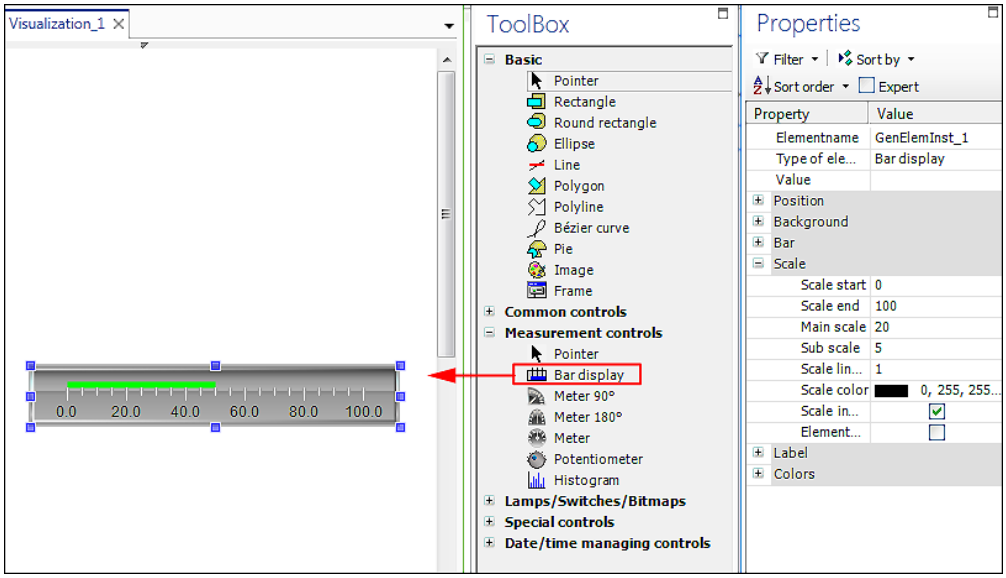


Figure 246: Creating a Visualization

Assign a value to the display:

4. Click the “Value” field and press **[F2]** to open the Input Assistant.

5. Via the Input Assistant select a value which will be used for the visualization. This example uses the value “i” from the “PLC_PRG.”

The value is accepted:

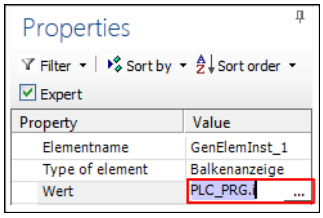


Figure 247: Assigning a Value

6. In the “DEBUG” tab of the menu ribbon, click **[Simulate application]**.

7. To start the visualization click **[Start]**.

This will start the visualization.

8.5.10 Connecting

To perform online actions such as a program download, program execution etc. for this application, connect the application with the target system.

1. **“Network/Devices” Workspace:** In the context menu of a device or via the menu ribbon (e.g., “DEVICE”, “NETWORK” tabs) click **[Connect]**. The device is switched to online mode. All applications of the device are active/connected online.

   “**Programming” workspace:** In the context menu of one or several selected applications or in the menu ribbon (“PROGRAM”, “DEBUG” tabs) click **[Connect]**. The selected applications of one or several devices are active/connected online.

2. If an application was not previously stored on the controller, a prompt will ask whether an application should be created or downloaded. Confirm this with **[Yes]**.

8.5.11 Downloading Applications to the Device

1. To download the selected application to the controller, click **[Program Download]** in the “PROGRAM” menu ribbon.

   To load multiple applications/parameters on the device and set other options (e.g., Online Change), click **[Multiple download]** in the “PROGRAM” menu ribbon.

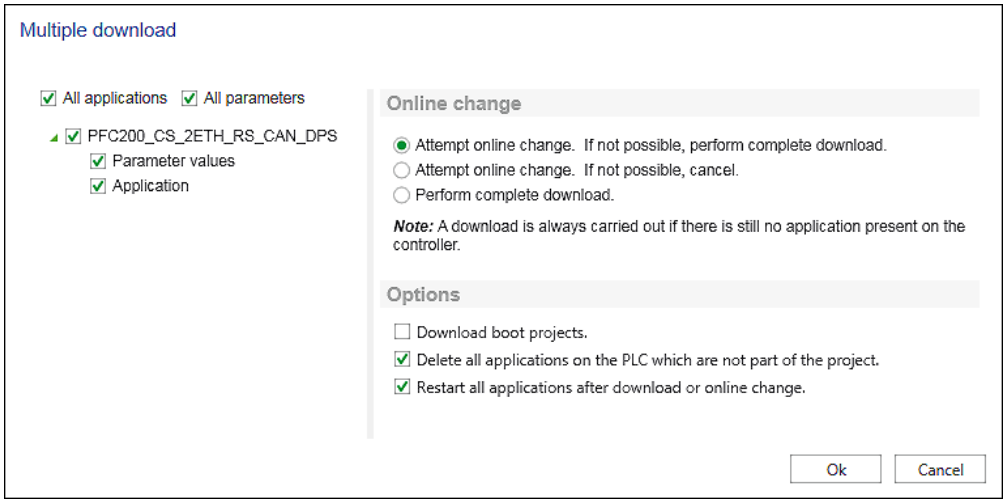


Figure 248: Multiple Download

2. All devices with associated applications and parameters are preselected by default. Use the mouse to untick components that are not to be loaded as required.

8.5.12 Importing CODESYS 2 and CODESYS 3 Projects

To load projects that you have created in CODESYS 2 (file suffix ".pro") or CODESYS 3 (file suffix ".project"):

Note

Install CODESYS 2 for project import!
The CODESYS 3 programming environment is integrated into ***e!COCKPIT***. However, to import or export a CODESYS 2 project, you also need to install CODESYS 2 on your PC – otherwise, an error message will be displayed and project import will not be possible.

1. Open Backstage view ("FILE" tab).
2. Click the **[Import/Export]** buttons and then **[CODESYS project]**.

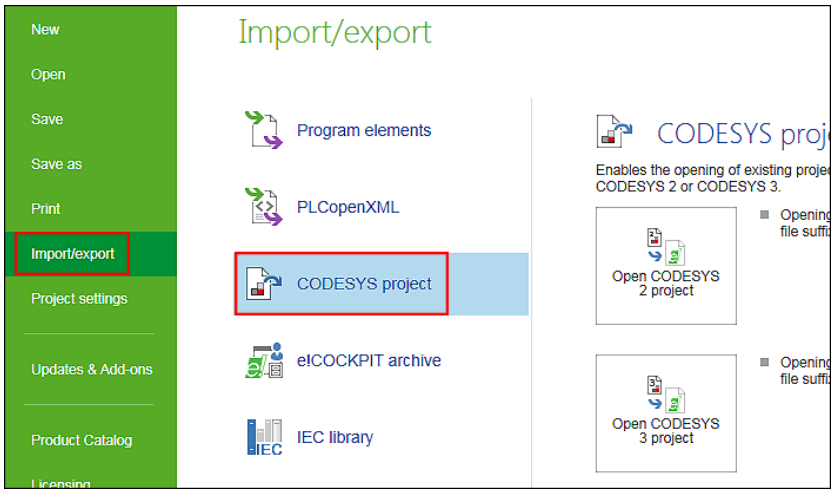


Figure 249: Loading a CODESYS Project

3. Click **[Open CODESYS 2 project]** or **[Open CODESYS 3 project]**.
4. Select the project file and click **[Open]**.

This starts the project import.

e!RUNTIME uses new libraries which have different names and content to the libraries of previous CODESYS projects.

5. If the following window is displayed for converting a library reference, first select the following setting: "Ignore the device. All application specific objects will not be available in the new project."

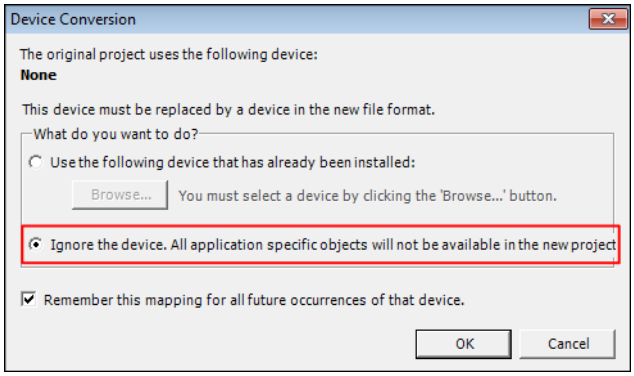


Figure 250: Converting a Library Reference

The window is displayed for each new library not found. You require a new version for these libraries.

6. Click **[OK]**.

This allows you to only load programs and devices first of all. You can update new libraries later.

Information

Additional Information
Further information on the libraries are provided in the manual “Libraries for ***e!***COCKPIT* (Overview and Migration Instructions)”.

The manual provides an overview of libraries which can be used in ***e!***COCKPIT*. Instructions are provided for migrating software projects which were created in the WAGO-I/O-*PRO*, CODESYS 2 or CODESYS 3 programming environments. The appendix of this manual provides an overview of corresponding functions in libraries for WAGO-I/O-*PRO* and ***e!***COCKPIT*.

Further instructions on converting between CODESYS 2 and CODESYS 3 projects are provided in the CODESYS online help (“Converting”).

If a device of the imported project is unknown, a suggestion list of available and compatible devices is displayed.

Note

Applications may be discarded when using compatible devices!
If the compatible device does not support all existing applications, a warning message will be shown before you replace the device.
Unsupported applications are discarded.

Select a corresponding device.

7. To accept the device click **[Replace device]**.

The main view is opened after the CODESYS project is loaded.

8. Open the “Programming” workspace.

Load the “Standard.lib” library first:

9. Double-click the library manager of the imported application.

10. Click **[Add library]** and select the “Standard” library.

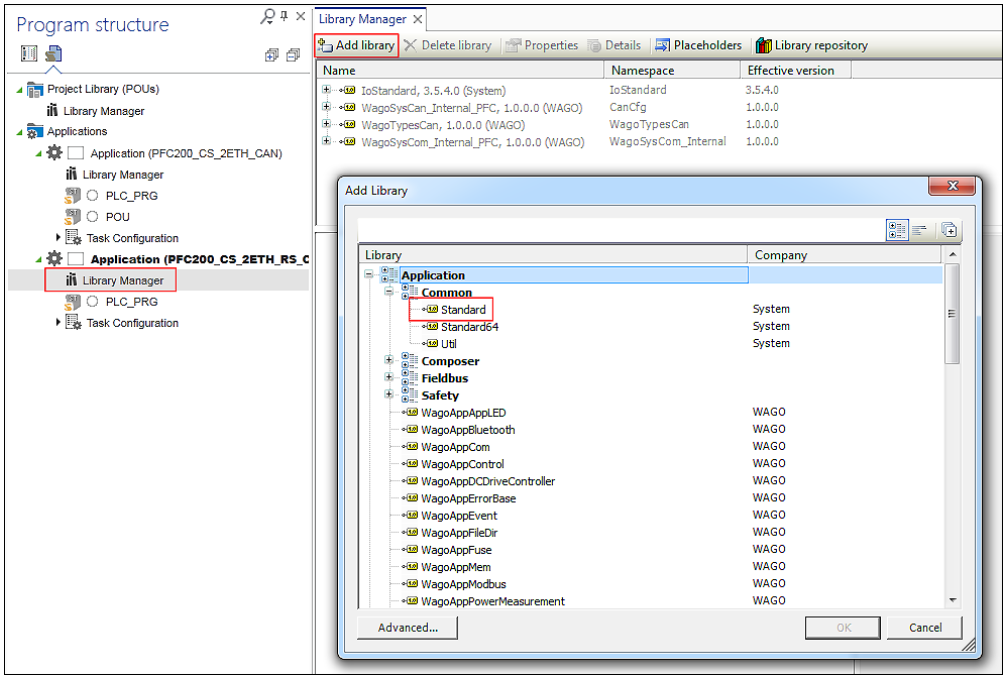


Figure 251: Adding a Library

11. Open your program/s and click **[Build]** in the “PROGRAM” tab.

12. If the message bar is opened, click **[Display message window]**.

13. Adjust your program according to the messages.

14. Load missing libraries (see point 5) via the library manager. Both libraries for your devices are available at http://www.wago.com.

8.5.13 Importing/Exporting Program Elements

Elements of the Program view can be exported and reimported in newly created projects. Depending on the application the standard XML format or the PLCopen XML format can be used for exchanging with other development systems.

The relevant **[Export]/[Import]** and **[Export PLCopenXML]/[Import PLCopenXML]** buttons are shown in the menu ribbon (“PROGRAM” tab). Alternatively, you can access the export/import functions via Backstage view, “Import/Export” page > **[Program Elements]**.

Exporting

1. Click the **[Export]** or **[Export PLCopenXML]** button.

The “Export” dialog window is opened and the Program Structure is displayed.

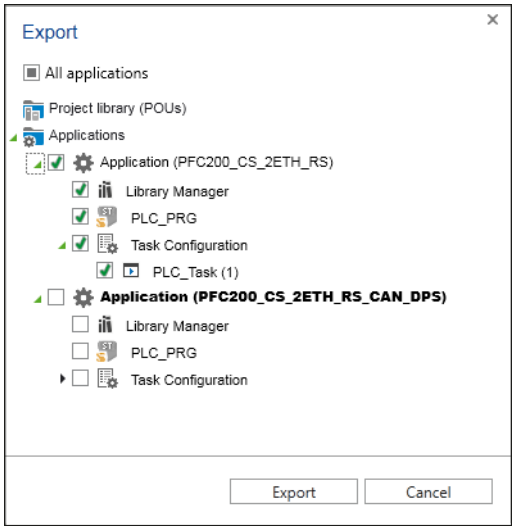


Figure 252: Exporting Program Elements

2. Tick the elements to be exported.
3. Click **[Export]**.
4. Select the memory location in the file selection dialog and enter a file name.
5. Export the program elements by clicking **[OK]**.

An export file is saved.

Importing

1. Click the **[Import]** and **[Import PLCopenXML]** button.

This opens a file selection dialog box.

2. Select the file to be imported and click **[Open]**.

The “Import” dialog is displayed.

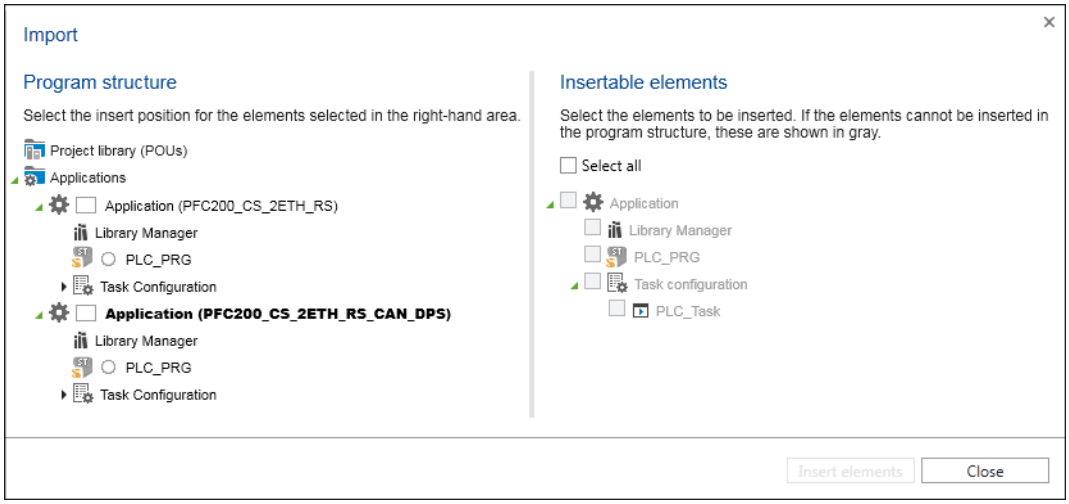


Figure 253: Importing Program Elements

The Program Structure is displayed in the left-hand area of the dialog. This is used to select the position where the imported elements are inserted.

The content of the import file is displayed in the right-hand area. The content is context-sensitive according to the selection in the Program Structure. If the content to be imported cannot be inserted at the current position in the Program Structure, the relevant objects are grayed out.

3. To insert the selected objects at the selected insert position click **[Insert Elements]**.

The dialog does not close automatically. You can select a succession of elements and insert them at different positions. Multiple selection is also possible. This only allows the simultaneous selection of objects of the same class (e.g., programs). The selected objects are inserted at several positions at the same time.

4. Click **[Close]** to finish the import.

8.5.14 Adjusting the Compiler/Visualization Profile

If device versions are used in a project which have unsuitable compiler and visualization profiles, this may cause problems with the parameter download and connection. ***e!****COCKPIT* detects this and issues warning messages as popups in the message bar. To ensure trouble-free connection and subsequent use, the compiler and visualization profile should be matched up.

Warning messages may occur in the following cases:

- You open a project that was created with different software versions and for which the compiler/visualization profiles do not match.
- You add devices to a project which contain a compiler/visualization profile that does not match the project settings.
- When replacing device descriptions, you choose versions with compiler/visualization profiles that do not match the project settings.
- You establish a connection (with parameter download) to a device with a compiler/visualization profile that does not match the project settings.
- You change the compiler/visualization profile of the project so that this no longer matches the configured devices.

Adjust the profiles as follows:

1. Open Backstage View (“File” tab).
2. Click **[Project Settings]**.
3. Click **[CODESYS Project Settings]** > **[Project Settings]**.
4. In the dialog, select the entry “Compiler Options” to select a different compiler version, or “Visualization Profile” to change the visualization profile.
5. Click **[OK]** to apply the changes and close the dialog.

e!*COCKPIT* checks whether the new compiler version set and the visualization profile are compatible with the devices configured in the project. The versions are displayed in a dialog window.

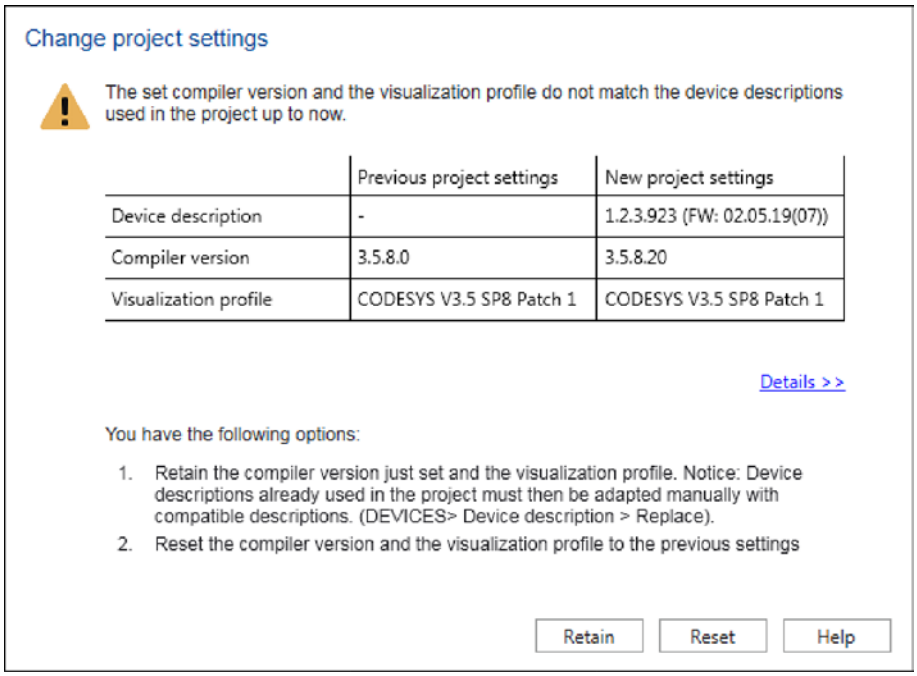


Figure 254: Changing project settings

6. Click **[Reset]** to cancel the dialog and re-enter the previously set compiler version and visualization profile in the project regardless of any incompatibility.

   Click **[Retain]** to apply the new project settings displayed.

However, in this case you must adapt the device description file according to the project settings:

7. First select the appropriate device in Network or Device Detail View.

8. Open the “DEVICES” tab.

9. Click **[Version]** in the “Device description” area.

10. In the selection field select a compatible device description (see Section “Replacing Device Type Versions/Device Descriptions”).

8.6 Setting and Managing

8.6.1 Documenting and Printing a Project

Overviews of all components contained in a project can be printed for project documentation.

1. Open Backstage view.
2. Click **[Print]**.
3. Click **[Document project…]** and **[Document]**.

A dialog will open, which displays the project components. Components which are printed are indicated with a green tick.

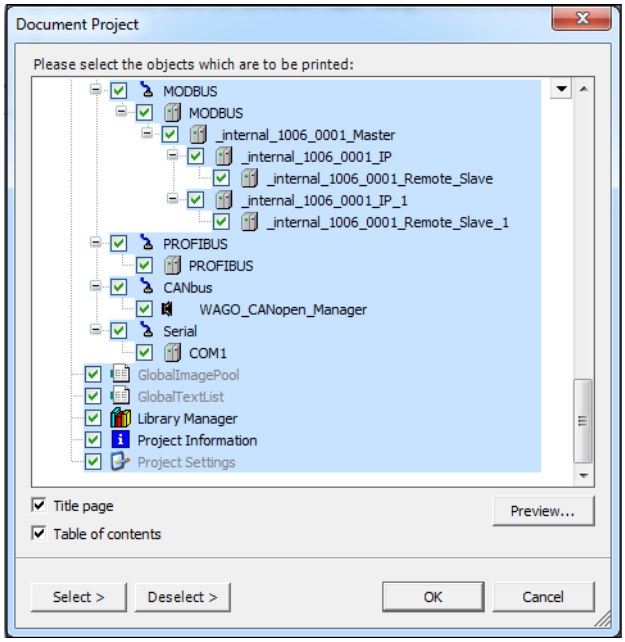


Figure 255: Documenting a Project

4. Untick components that are not to be printed as required.
5. Tick the appropriate checkboxes to create a **Title Page** or **Table of contents**.
6. Click **[OK]** to print the project.

An additional print function is provided for active editors in the “Programming” workspace.

1. Open the “Programming” workspace.
2. Open an element by clicking it in the Program Structure, such as a “PLC_PRG” program.
3. Move to the “START” tab.

4. Click **[Print]**.

The content of the active editor is printed.

8.6.2 Managing Devices

To operate devices in ***e!****COCKPIT*, drivers containing device-specific description files are imported and interpreted by ***e!****COCKPIT*. These files contain information such as, device properties, interfaces and supported protocols.

The following device description files are supported:

- "Electronic Data Sheet" (EDS) for CANopen devices
- "Device Configuration File" (DCF)

Device manufacturers provide these description files for their devices.

A device description file can apply to several similar devices. It is also possible to install several versions and use these in the same or different projects.

Devices and installed device description files are managed on the "Product Catalog" page of Backstage view.

1. To move to the Product Catalog management in the Backstage view, click the corresponding button the Product Catalog panel.
   Alternatively click the "FILE" tab and the **[Product Catalog]** button.

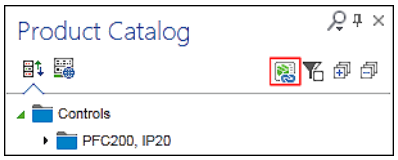


Figure 256: Moving to the Product Catalog Management

8.6.2.1 Importing Devices

When ***e!****COCKPIT* is installed, description files ("dtp") are also installed for standard WAGO devices so they can be displayed and used directly in the Product Catalog.

If you require WAGO or other devices, proceed as follows to import the description files for these devices on the "Product Catalog" page in the Backstage view:

1. Click the **[Import device]** button.

2. In the "Open" dialog, select a "eds" or "dfc" type device description.

3. Click **[Open]**.

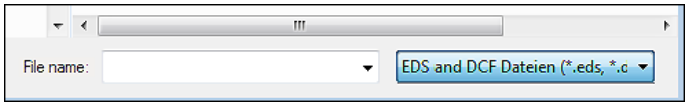


Figure 257: Selecting a Device Description

This will import the description files. The devices are available in the Product Catalog.

If you add devices to a project, the latest device description of the device which matches the compiler version currently set in the project and the visualization profile is always used.

If no suitable device description version is found, the newest device description is inserted and a dialog appears showing the versions.

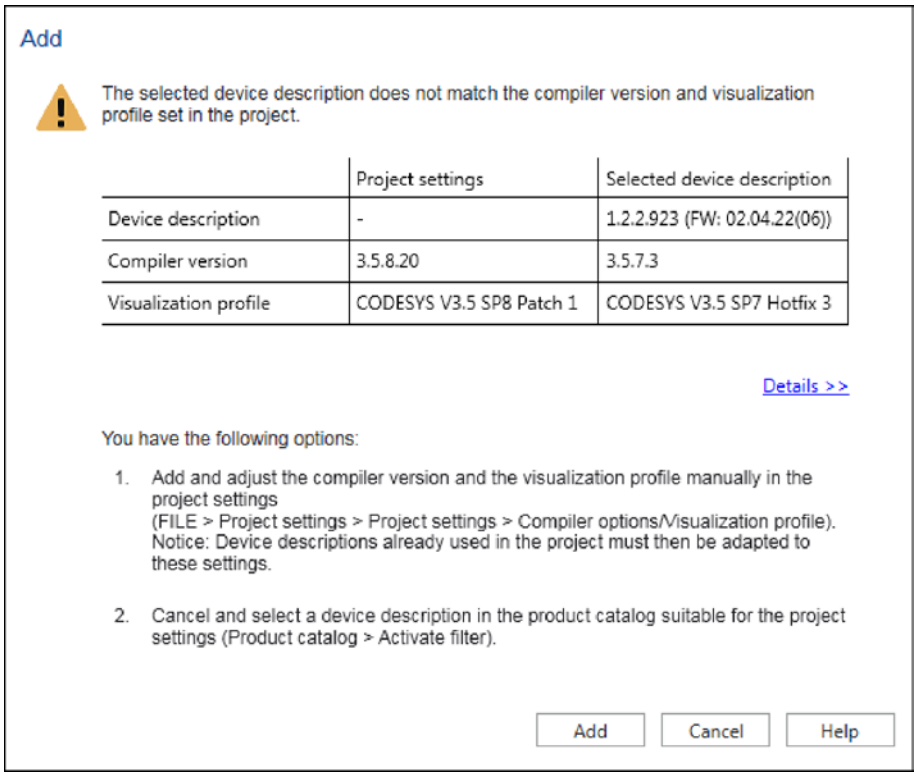


Figure 258: Add devices

4. To add the device to the project in this case regardless of any incompatibility, click **[Add]**.

You can then adapt the compiler version and visualization profile manually via the project settings (see Section “Adjusting the Compiler/Visualization Profile“). Device descriptions already used in the project must likewise be adapted to these settings.

5. Click **[Cancel]** to close the dialog without adding devices.

If you have canceled the dialog, you can then select suitable device descriptions for the project settings via the Product Catalog:

6. To do this tick the filter function **Display Available Versions** in the Product Catalog so that a green tick is shown. Compatible versions are displayed in the tree structure below the relevant device.

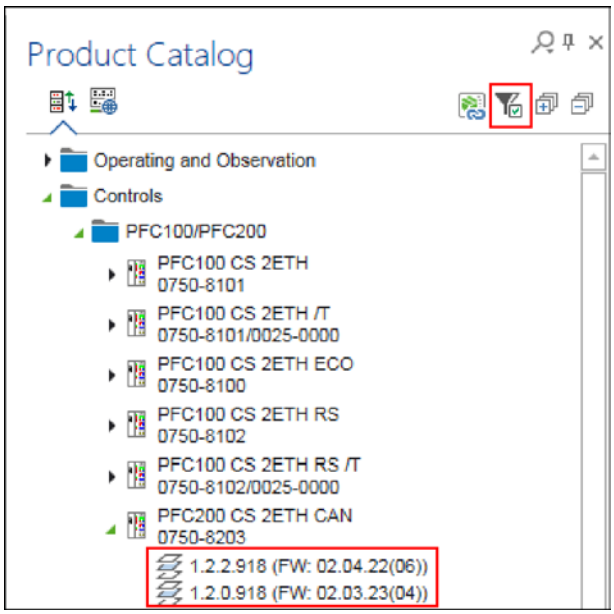


Figure 259: Displaying Available Versions in the Product Catalog

7. If you click one of the displayed device description versions, precisely this version is inserted in the project.

Always the latest device description is used if the filter function is not ticked and the device is inserted from the Product Catalog by drag & drop or by double-clicking.

When adding devices by network scanning, the scanned devices are automatically accepted in the project in the matching versions.

8.6.2.2 Deleting Devices

Please note that when deleting a device description file for a particular device, it may be required for several similar devices. You may therefore be removing several devices from your project.

1. In the “Product Catalog” page in Backstage view select the device that you wish to remove.

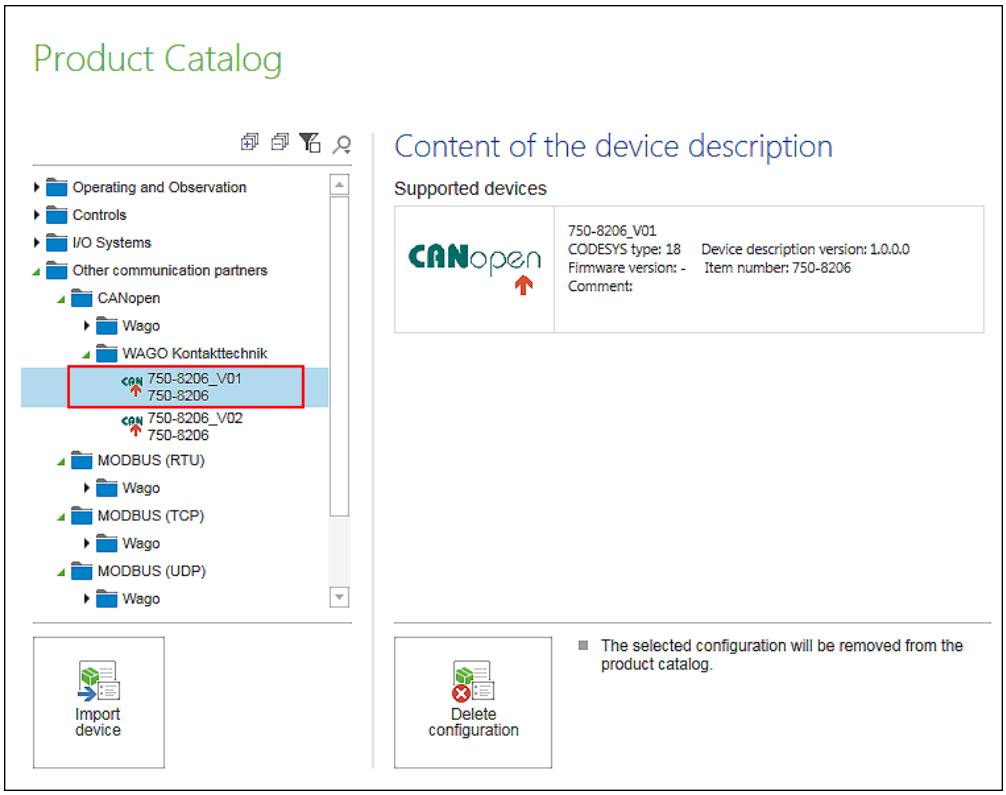


Figure 260: Selecting a Device

Information on the relevant device description file and a list of devices that belong to this description file and version are displayed on the right. Please note that “dtp” type device descriptions are permanently installed and cannot be removed.

2. Click the **[Delete device description]** or **[Delete configuration]** button.

The “Included Devices” area highlights in yellow the devices related to this device description file that will also be deleted.

3. Click **[Ok]** to actually delete the device types.

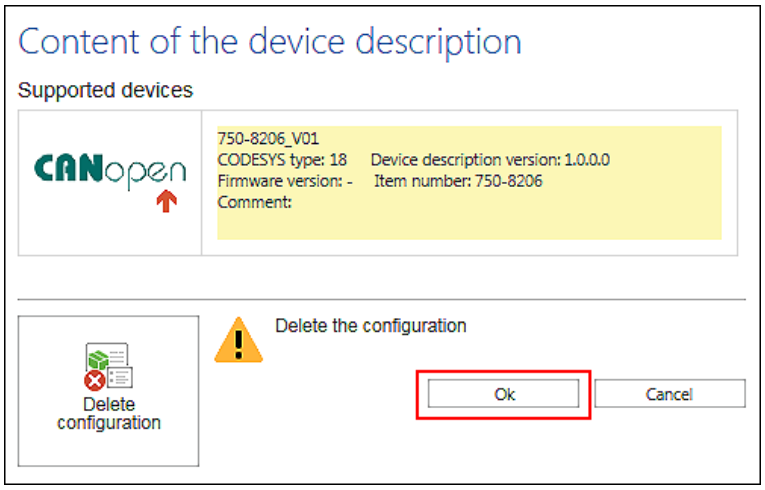


Figure 261: Deleting a Device Type or Configuration

4. If the currently opened project contains devices that are affected by this deletion, save and close the project before deletion and repeat the step.

8.6.2.3 Displaying Device Type Versions/Device Descriptions of a Device

A device may be present in several device type versions, i.e, may be represented in different versions of device description files. Any of these versions can be used in a project. Versions of device descriptions are displayed on the “Product Catalog” page in the Backstage view and in the Product Catalog.

1. To display **the currently used** device description for a device, first select the device in the Network or Device Detail view.

The “DEVICE” tab in the menu ribbon displays the device description version of the selected device.

The version of the device description used is also displayed in the tooltip of the device if you move the mouse over the device.

If it is a controller, the firmware version is also displayed.

2. To display **all available** versions of a device, first select a device or module in the Network or Device Detail view.

3. Click the **[Version]** button in the “DEVICE” tab in the menu ribbon.

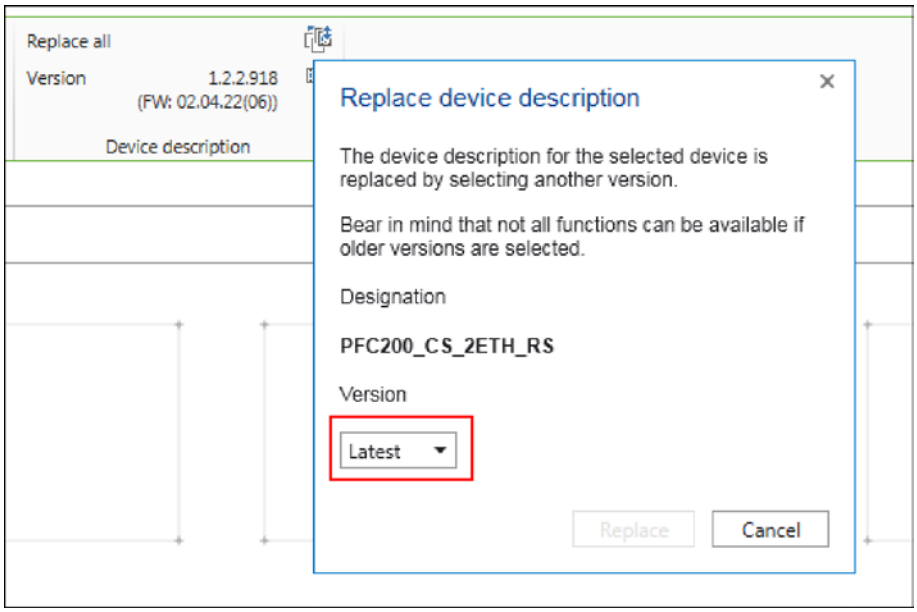


Figure 262: Displaying Device Type Versions/Device Descriptions

All available device description versions are displayed in the selected dialog.

8.6.2.4 Showing Device Type Versions/Device Descriptions of Several Devices

1. To display the available versions of several or all devices, enable the **Display the Available Versions** in the Product Catalog so that a green tick is displayed.
   This activation does not apply to all tabs of the Product Catalog, therefore switch the function on or off according to the tab.

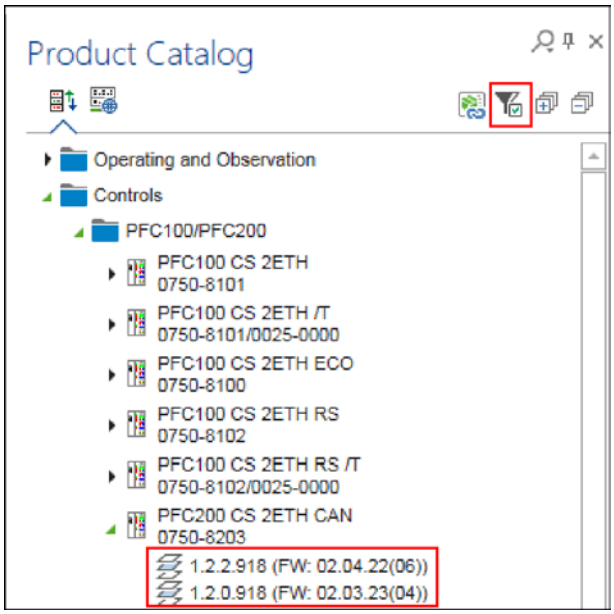


Figure 263: Displaying Available Versions

Other levels are displayed with the available device type versions and firmware versions (for controllers) in the tree structure of the Product Catalog.

When using the Search function, only the versions of devices are displayed that are present in the Search result.

8.6.2.5 Replacing Device Type Versions/Device Descriptions

Devices are integrated in ***e!****COCKPIT* via device descriptions. Every device description has a version. Different versions can be installed for a device, although versions can also be replaced by others. When returning to a previous version, a check for any functional restrictions is made via the DTP description. Incompatible versions are not displayed. Replacing is not possible if the device is connected online.

1. Double-click the required version of the device description to operate the used device in this version, for example, to maintain compatibility with other devices.

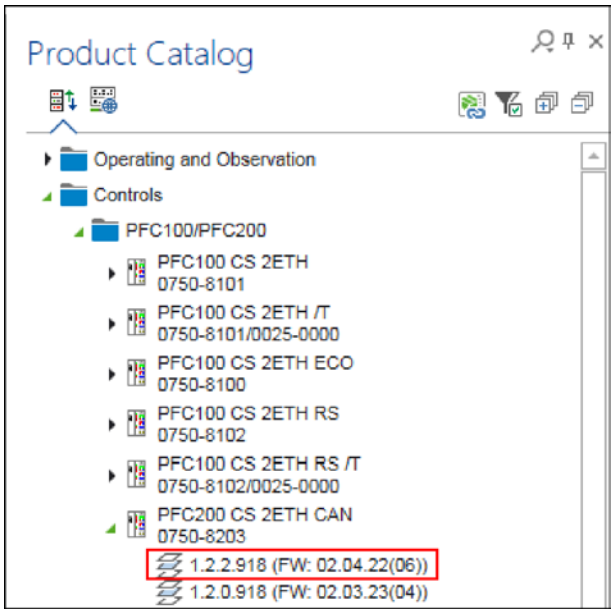


Figure 264: Replacing Device Type Versions/Device Descriptions

Alternatively, select a device in the Network or Device Detail view and then click the **[Version]** button.

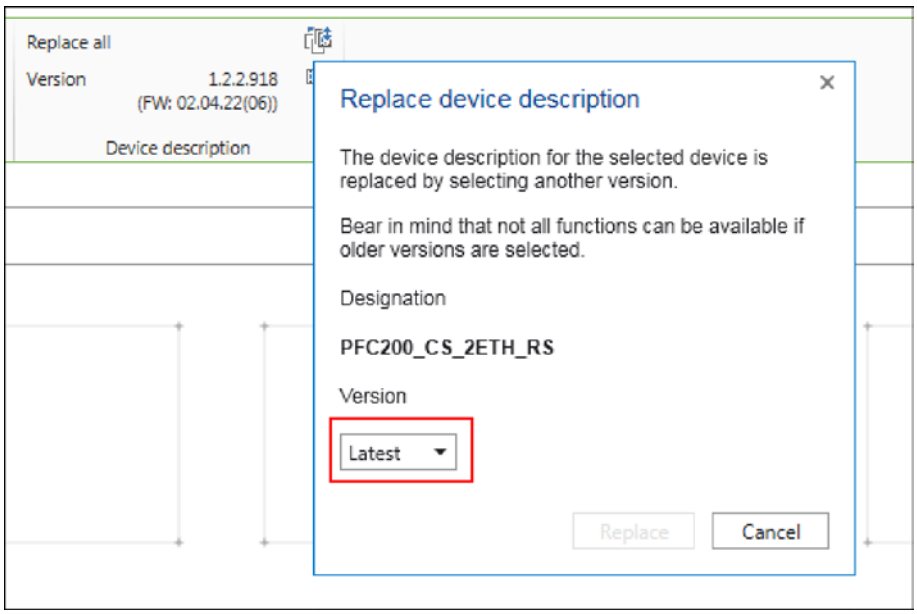


Figure 265: Replacing Device Type Versions/Device Descriptions

2. In the selection field, choose the required version and click **[Replace]**.

If the selected device description does not match the compiler version and visualization profile set in the project, this is indicated in a dialog.

The device description versions, the compiler version and the visualization profile within the current project are displayed with those of the selected device description.

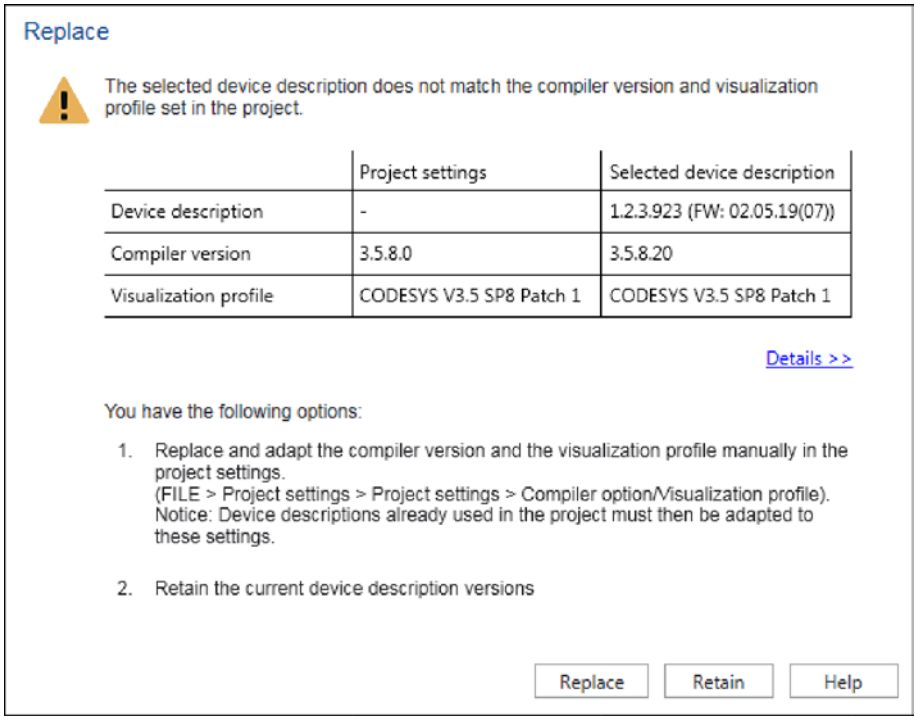


Figure 266: Replacing a Device Description

3. Click **[Retain]** if you wish to retain the previous device description version.

4. Click **[Replace]** if you wish to use the selected device description version regardless of any incompatibility. In this case you should then manually adapt the compiler version and the visualization profile in the project settings to the new device description (see Section “Adjusting the Compiler/Visualization Profile”).

Other device descriptions already used in the project must then also be adapted to the compiler/visualization profile setting.

5. If you do not wish to update one device description but the device descriptions of all devices used in the project, click the **[Replace all]** button.

A dialog will open.

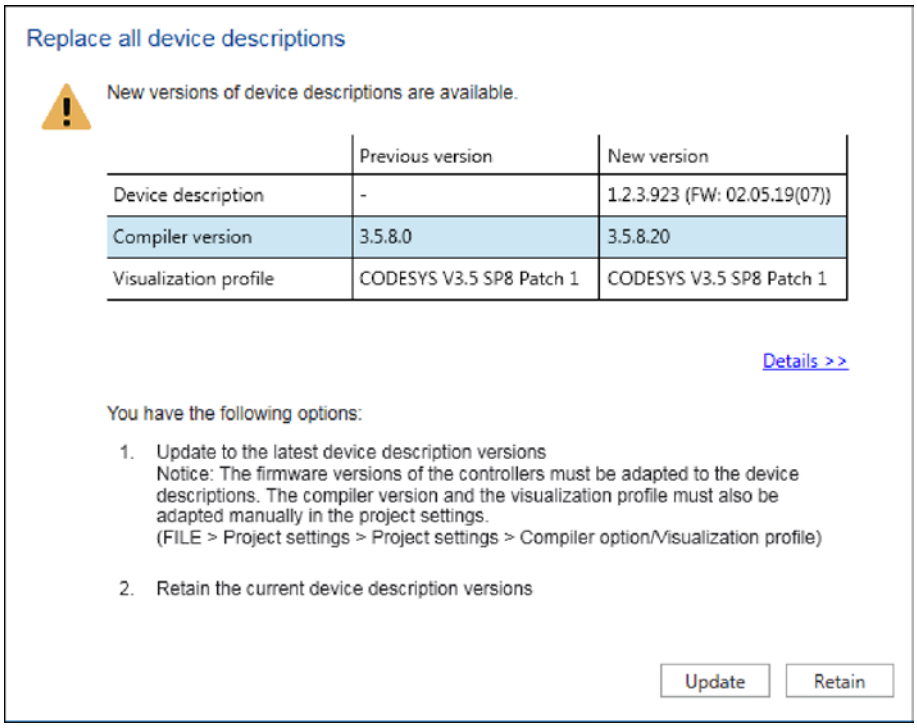


Figure 267: Replacing All Device Descriptions

6. Click **[Update]**.

The device descriptions of all devices used in the project are automatically set to the latest version.

8.6.3 Performing Updates

The search for software updates can be manual and automatic. These contain updates for *e!COCKPIT* itself, service packs and add-ons.

Note

Automatic restart after update!
Updates are activated after the next restart. If you are installing ***e!****COCKPIT* updates or Add-ons, the software is restarted automatically.

Searching for updates manually

1. Open Backstage view (“FILE” tab).

2. Click **[Updates & Add-ons]** in the navigation bar.

The right-hand page shows information on installed components.

3. To search for updates manually, click the **[Search for Updates]** button.

New updates and add-ons are displayed.

4. Use the “All,” “Updates,” “New” or “Installed” tabs to modify the display as required.

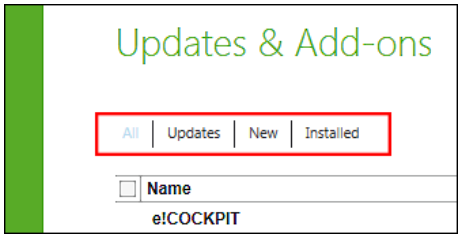


Figure 268: Modify Display as Required

5. As required, use additional filters for security-related updates and updates that require licenses by clicking the respective icon.

Figure 269: Filter by Security-related or License-based Updates

Choose to search for online, local or both online and local updates. For a local search, specify the respective folder.

6. To start the search, click the **[Check for Updates]** button.

The updates found are displayed.

7. If required, exclude the individual updates by clicking on the relevant checkboxes and deactivating these updates.

The update installation process checks your license information with WAGO Kontakttechnik GmbH & Co. KG.

8. Agree to this check by activating the “I accept the WAGO SOFTWARE LICENSE AGREEMENT” checkbox.

9. To update all the selected components click **[Install updates]**.

e!*COCKPIT* performs a restart during installation. The installed components are then displayed with the respective version numbers on the “Updates & Add-ons” page.

Searching for updates automatically

10. Tick the “Check for updates and license information on starting ***e!****COCKPIT*” checkbox (Internet connection required during program start).

8.6.3.1 Enabling Licensed Add-ons

If you have installed a licensed add-on, you can use it for 30 days without a license key. This trial period only includes the days of actual use. The remaining time of use is displayed when launching *e!COCKPIT*. Once the trial period has elapsed, you can no longer use the add-ons without a license key.

You can identify licensed components by a corresponding icon after the name.

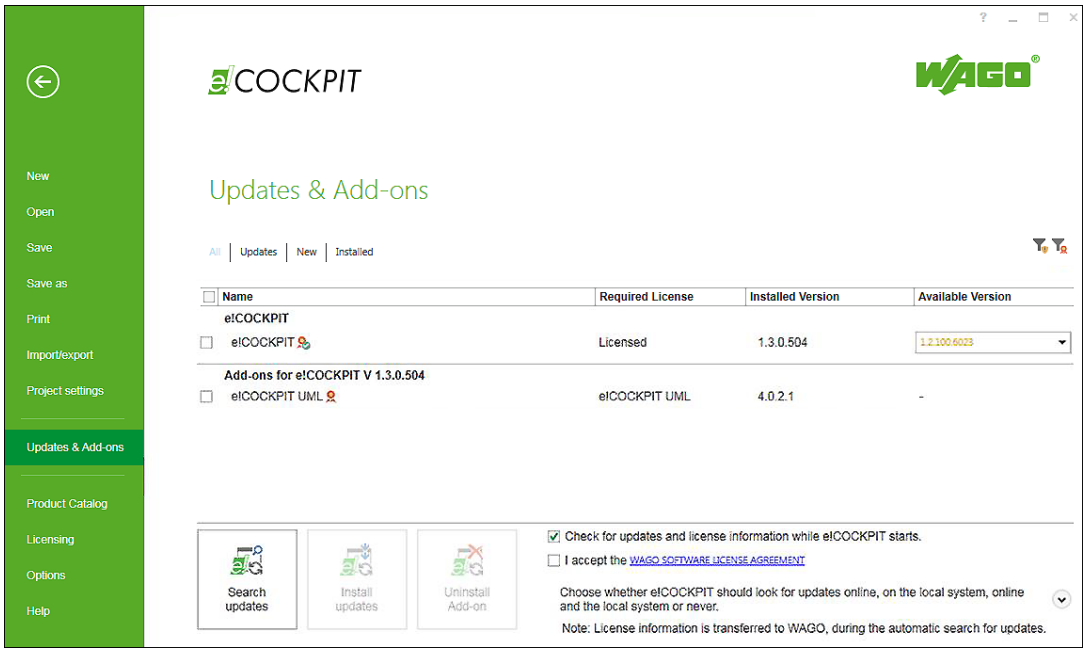


Figure 270: Enabling Licensed Add-ons

The “Required License” column includes the license name, e.g., “*e!COCKPIT* UML”. You need this information to purchase the license from WAGO Kontakttechnik GmbH & Co. KG (see Section “Purchasing a License”).

During the trial period, a dialog displays the remaining time of use of the add-on when launching *e!COCKPIT*.

11. Click **[Purchase License]** in the dialog.

12. Continue as described in the Section “Activating the License”.

Alternatively, you can also enter the license information via the License Manager.

13. Opening the “Licensing” page in the Backstage view.

14. Click **[License Manager]** and then click the **[Enter License]** button.

15. Continue as described in the Section “Activating the License”.

Once completed, the license is displayed in the License Manager. The add-on is licensed and can be used unrestricted.

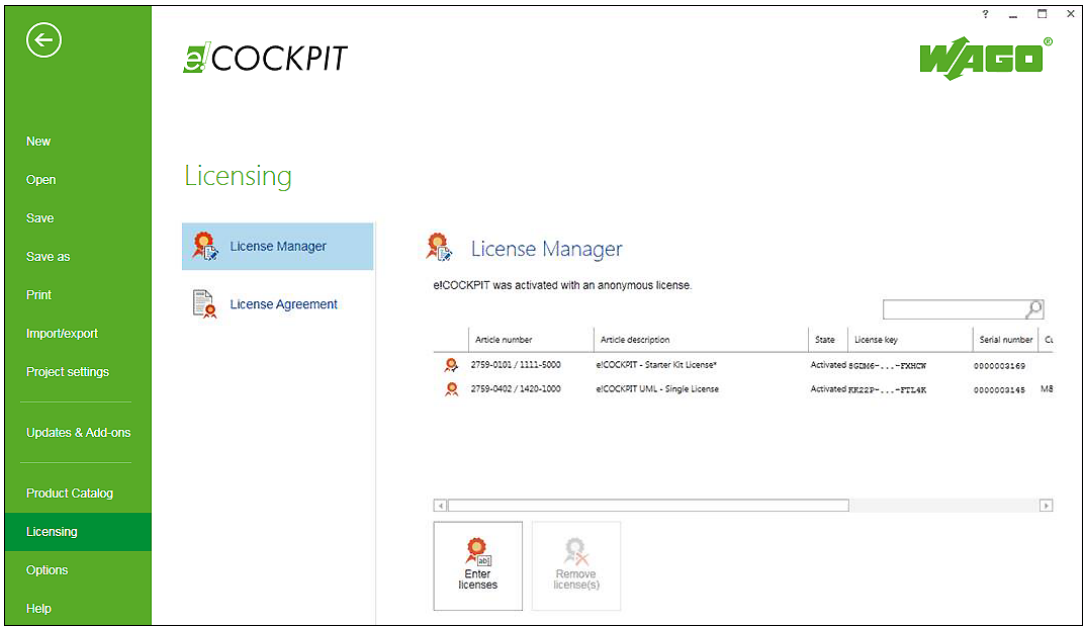


Figure 271: Display of the Activated License on the “Licensing” Page

The activated licenses are also displayed on the “Updates & Add-ons” page. “Licensed” appears in the “Required License” column and the respective icon after the license name.

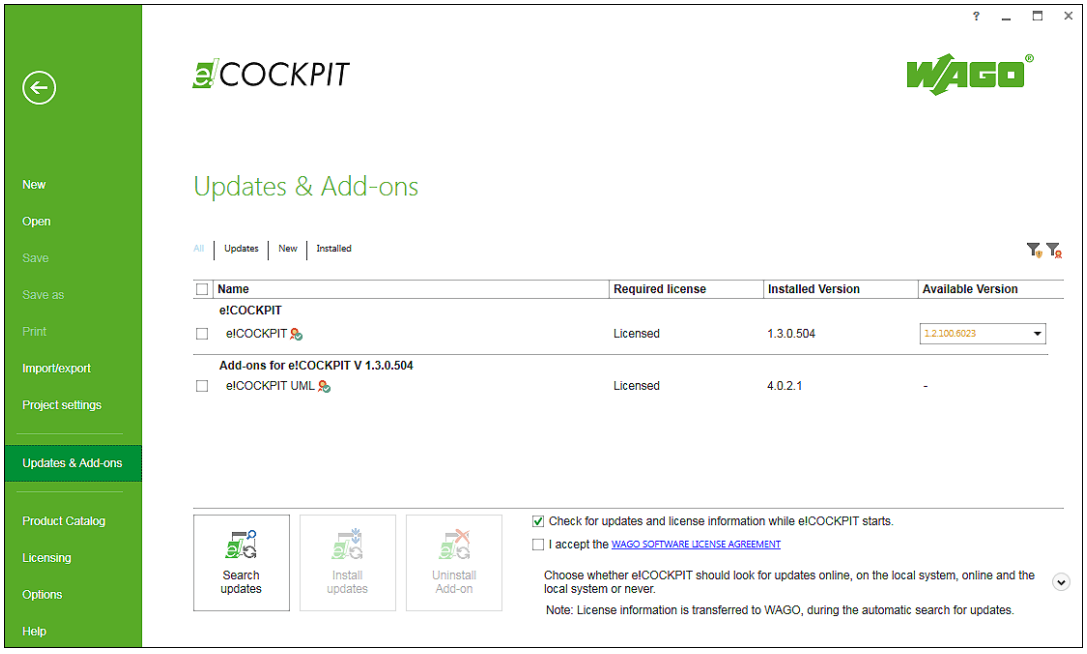


Figure 272: Display of the Activated License on the “Updates & Add-ons” Page

The description of add-ons is displayed in the online help, see Section “Using the Online Help”.

8.6.4 Archiving

Saves the current project with all its associated data, such as devices used, device descriptions, libraries on the controller as an archive file. The archive combines project-related files so that they can be forwarded to third parties. An archive combines all the files contained and referenced in the currently opened project into a central “*.eca” archive file. The “Archive” function can be selected when a project is active.

8.6.4.1 Creating an Archive

1. Open Backstage view (“FILE” tab).
2. Click **[Import/Export]**.
3. Click **[*e!COCKPIT* archive]**.
4. Click the **[Save archive]** button.

A dialog will open, which displays the elements of the currently opened project. The archiving always includes all devices and applications. Libraries can be excluded from archiving by unticking the checkbox for the appropriate library.

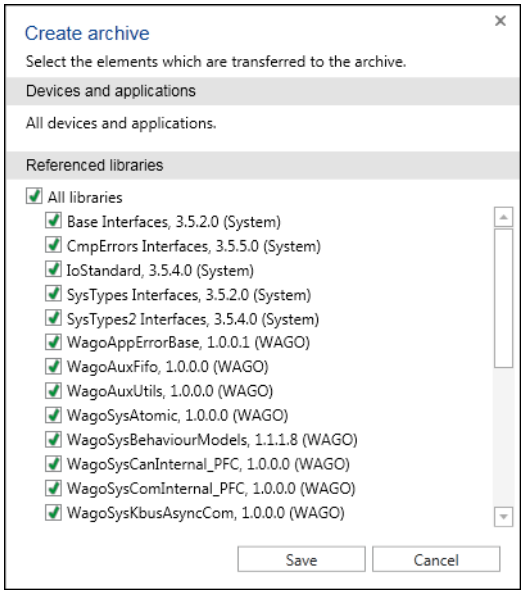


Figure 273: Saving Archives

5. Click **[Save]**.
6. Select a location for the archive.
7. Click **[Save]** to finish the archiving.

8.6.4.2 Opening an Existing Archive

1. Open Backstage view (“FILE” tab).
2. Click **[Import/Export]**.
3. Click **[e!COCKPIT archive]**.
4. Click the **[Open archive]** button.
5. Select a saved “.eca” archive file.
6. Click **[Open]**.

The archive file is extracted. Libraries are installed and loaded. The project is opened.

8.6.5 Deinstalling

Back up your project files before deinstalling in case you wish to reinstall ***e!****COCKPIT* in future. For this use the archive function (see Section “Operation” > “Setting and Managing” > “Archiving”).

1. Call up the Control Panel.
2. Click **[Uninstall Programs]** (such as with Windows 7).
3. Select “WAGO ***e!****COCKPIT*”.
4. Click **[Uninstall]**.

The software with all integrated components is removed from your PC. Separately installed CODESYS versions are not affected by this.

8.7 Interfaces

8.7.1 *smart*DESIGNER

The ***smart***DESIGNER from WAGO Kontakttechnik GmbH & Co. KG is an online configurator which enables terminal blocks, I/O modules, multi-terminal connectors, PCB terminal blocks and W*INSTA*® cables to be designed and projects to be validated. Labels can be created and printed for the components used. The graphical display of components on a DIN rail is the same as in ***e!****COCKPIT*. The ***smart***DESIGNER can also be used to generate mounting plans, parts lists and 3D views. The tool features several CAE interfaces including EPLAN, a system for designing electrical installations. This interface supports export/import to/from ***e!****COCKPIT*, so that modifications made in one system can be transferred to the other.

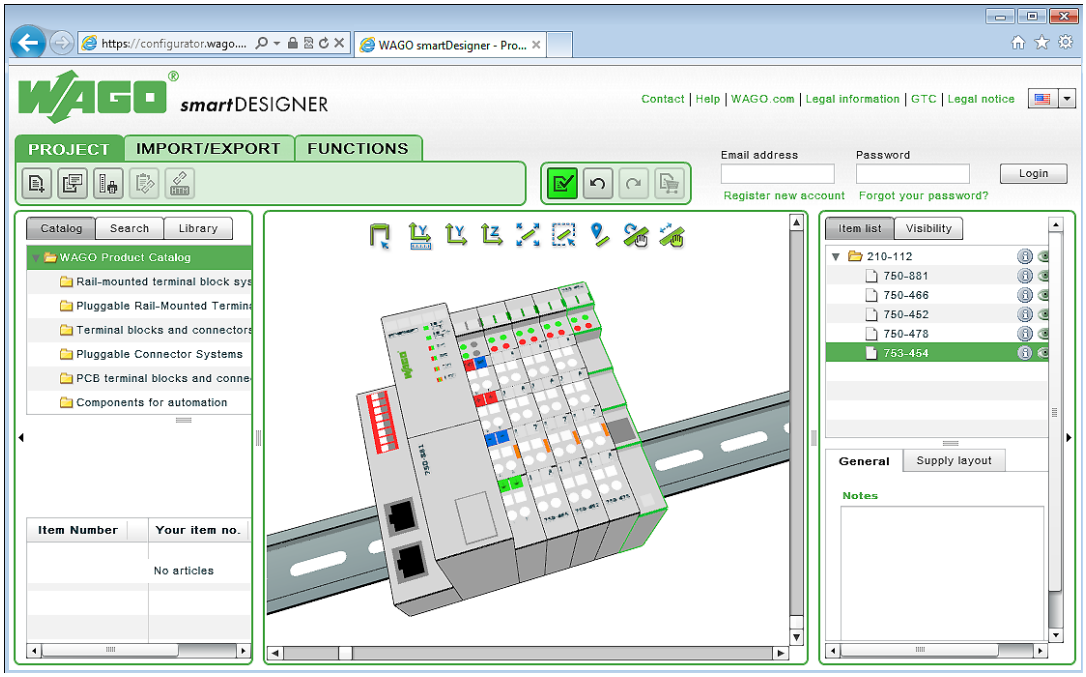


Figure 274: WAGO ***smart***DESIGNER

8.7.1.1 Importing a Project from *smart*DESIGNER

1. To import projects created with ***smart***DESIGNER, click **[Import/Export]** in the Backstage view.
2. Click **[*smart*DESIGNER]**.
3. Click **[Import]**.
4. Select a valid file (CAE file, *.xml) from the dialog that opens.

The content of the file is opened as a new project. Network view is opened automatically.

If a project was opened and modified beforehand, you will be asked to save it.

The “Import” dialog is opened. This contains all imported (green) and unimported (red) devices.

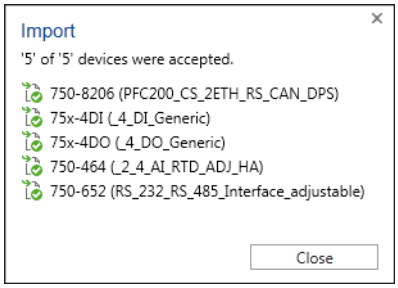


Figure 275: Overview of the Imported Devices

8.7.1.2 Exporting a Project for *smart*DESIGNER

1. To export projects you wish to open in ***smart***DESIGNER, click **[Import/Export]** in Backstage view.
2. Click **[*smart*DESIGNER]**.
3. Click **[Export]**.

Select a valid file in the dialog.

All devices with modules are created in the export file.

The Backstage view stays open.

A warning message appears if the project contains a device for which a DTP is not installed. If this is a coupler, the modules are exported on a DIN rail without this coupler.

A warning message also appears if the project contains a device that does not have a valid order number, as this is possibly a generic item.

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