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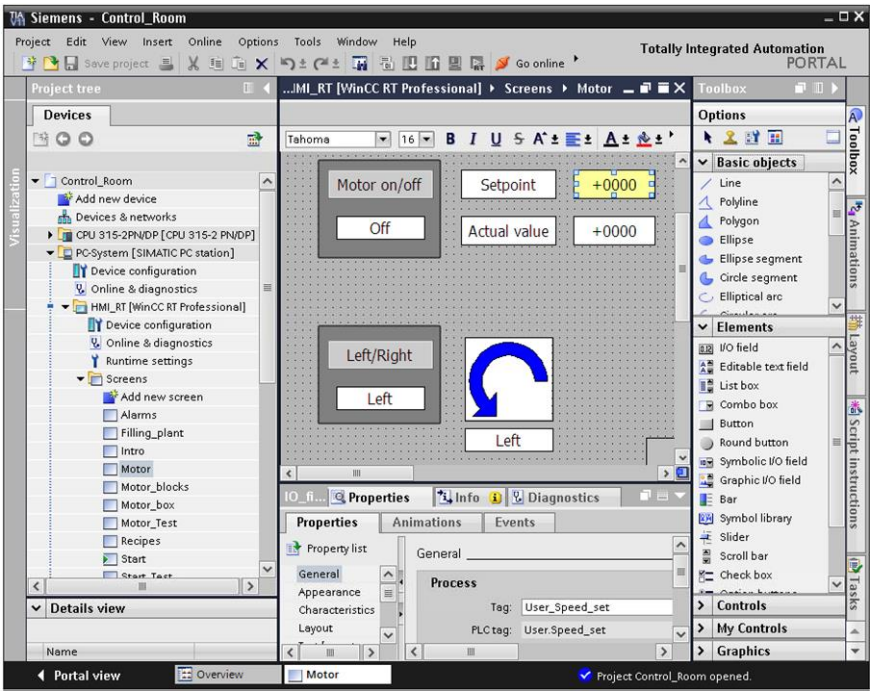
Configuration of basic Objects

2. Configuration user interace of the engineering system

TIA Portal V11

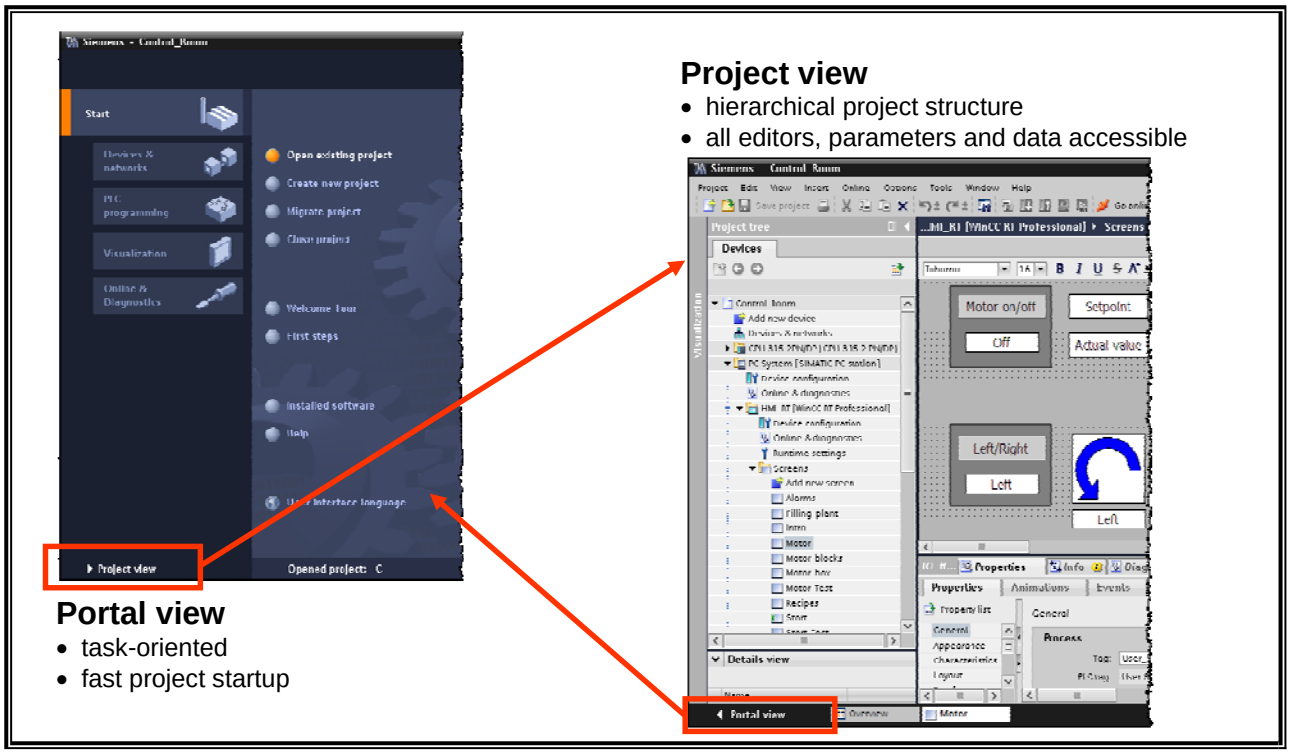


This chapter introduces and explains the structure of the engineering interface.

Participants will get to know the views (windows), task cards (Toolbox and Properties windows) and the most important editors. They will gain an overview of working with the engineering user interface and the options for making settings in it.

2.1. Components of the configuration interface

2.1.1. Views



The TIA Portal framework manages the project (a database) for all components and project data of an automation solution.

It provides two views between which users can change at any time.
Following software installation, the TIA Portal engineering user interface opens with the basic setting → Portal view, Start portal

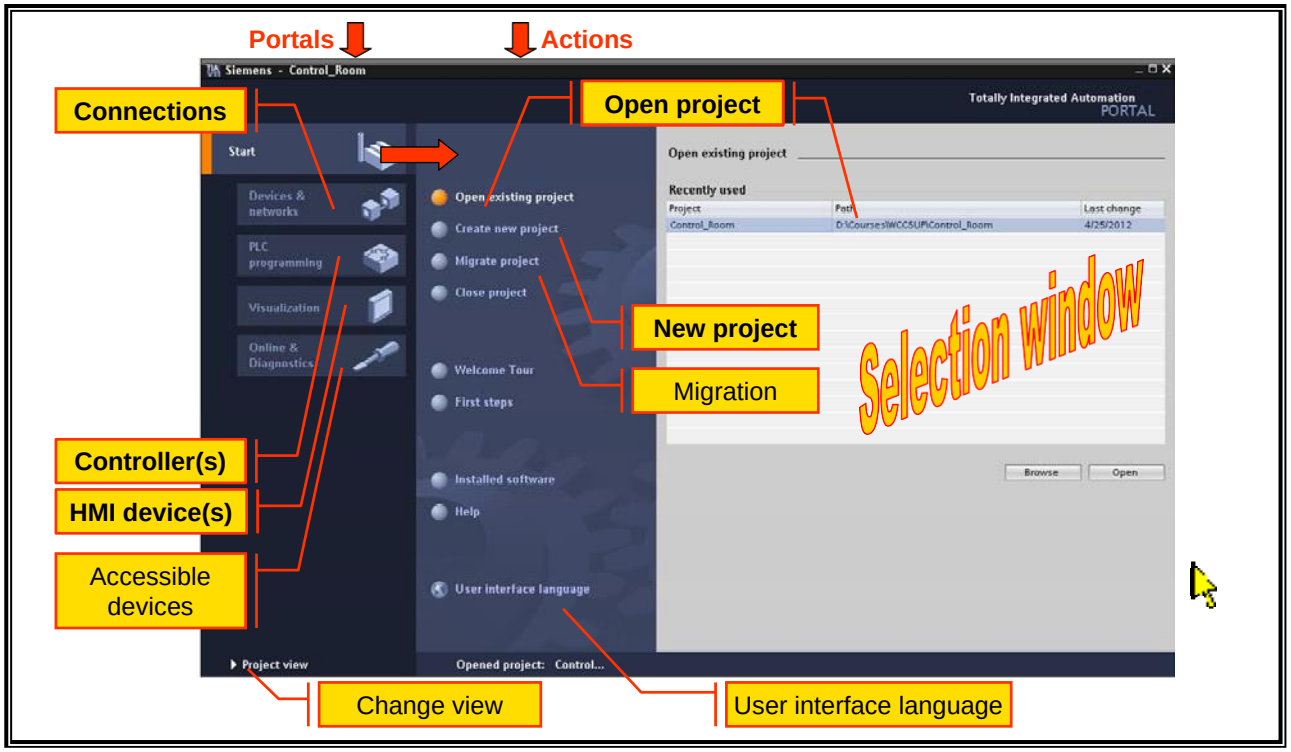
Portal view

- Task-oriented mode of working
- Fast project startup with user guidance

Project view

- Hierarchic structure of the project
- All editors, parameters and data are in one view
- The necessary editors open according to the task in hand

2.1.1.1. Portal view



Layout of the portal view

- Portals (left) for the various tasks
- Actions (central area) for the portal selected on the left
- Selection window (right) for the selected action

Portals

Access to devices, components and their connections.

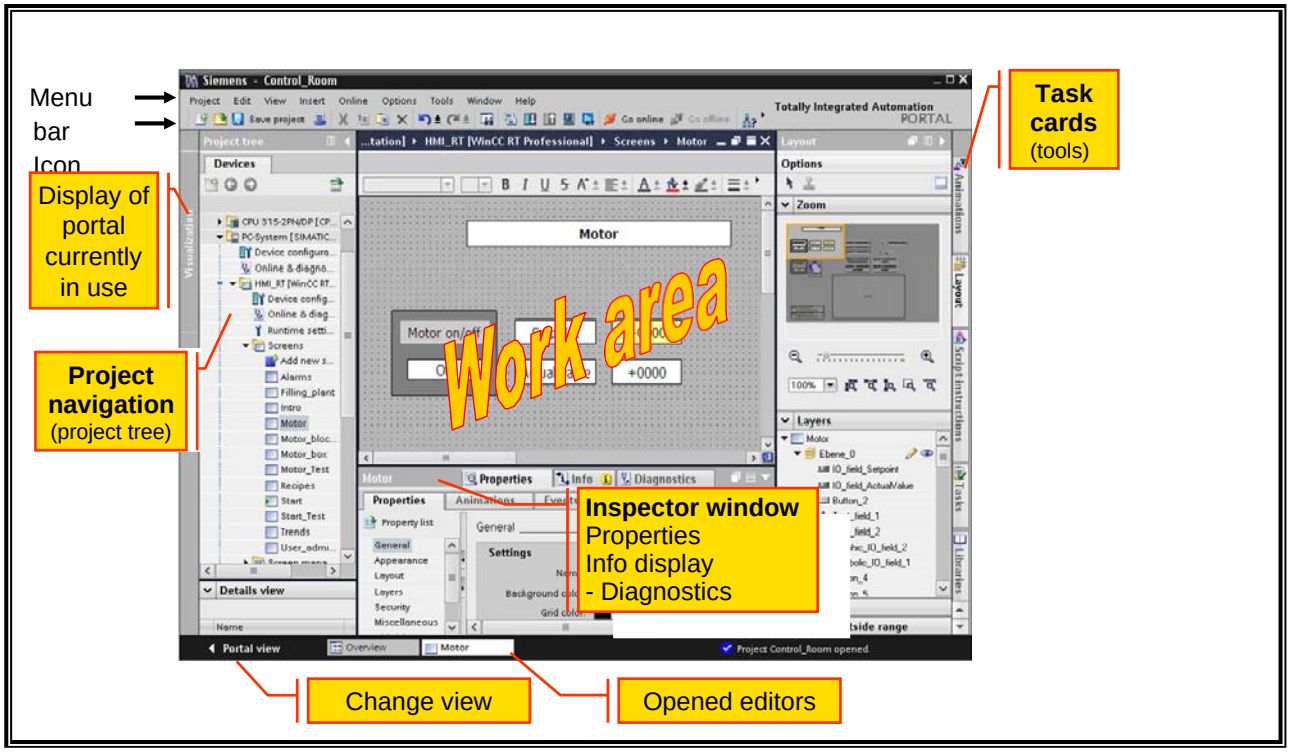
Actions

Depending on the selected portal, actions are available here that can be executed in the selected portal. Context-sensitive help is available in every portal.

Selection window

The selection window is available in all portals. The content of the window adapts to the currently selected portal and action.

2.1.1.2. Project view



Project tree

The project tree is the central control point for the automation solution. All components and editors available in a project appear in the Project tree and can be opened there. Each editor is assigned a symbol with which the objects belonging to it can be identified.

Only elements supported by the selected HMI device are displayed in the Project tree.

Work area

The central configuration area in which the objects of the HMI device can be edited using the active editor.

Several editors can be opened simultaneously. If more than one editor is open at one time, these are displayed as tabs at the bottom.

Task cards

These provide tools for configuration/programming. The content of the task cards depends on the open editor and the selected object displayed in the work area.

If a screen is open, configuration objects, templates for animation, layout tools and libraries, for example, are available.
If a CPU is opened as the device, the hardware catalog, for example, is available as a task card.
If a program block is opened, a task card with instructions is available.

Inspector window

Additional information on a selected object or on executed actions is displayed in the Inspector window.

The available properties of the selected objects can also be edited here (for example properties of screens, screen objects, tags).

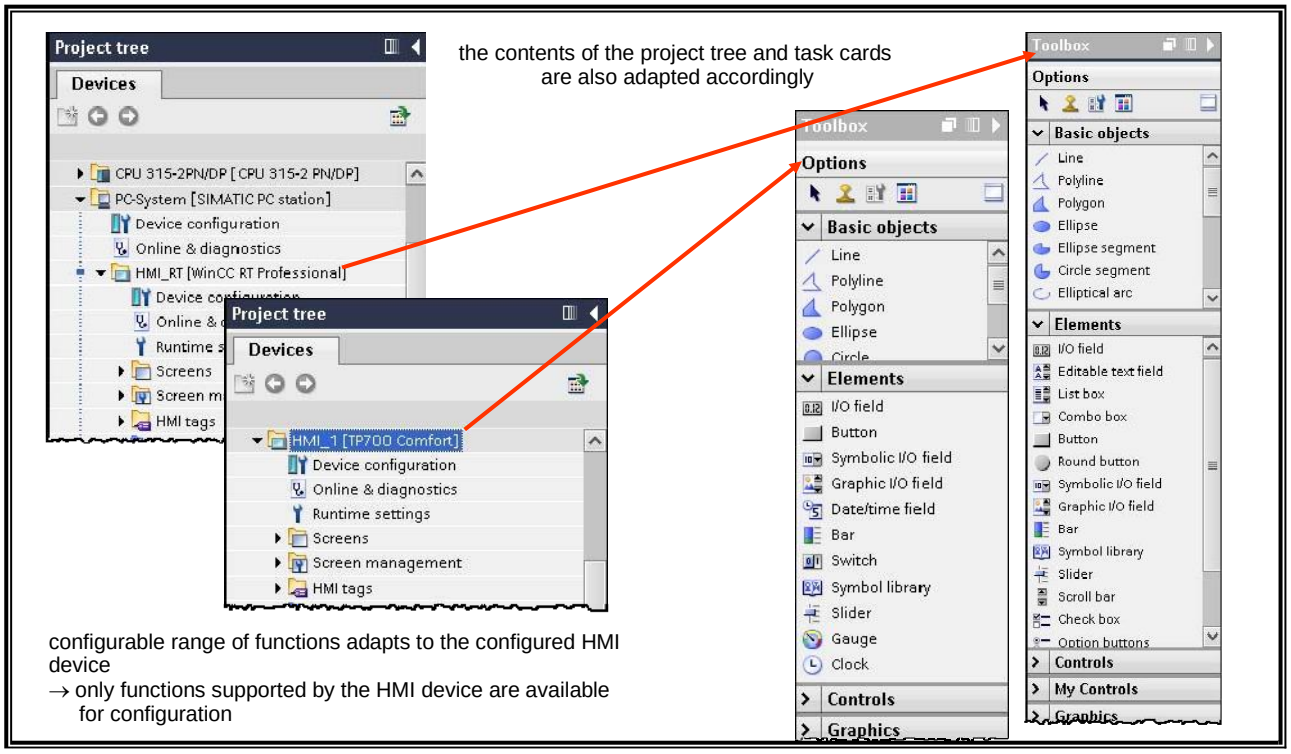
The Inspector window displays all system messages from the engineering, for example those resulting from generating a project.

On completion of generation, this window should always be checked for any errors and warnings.
Menu call: > *View* > *Inspector window*

Details view

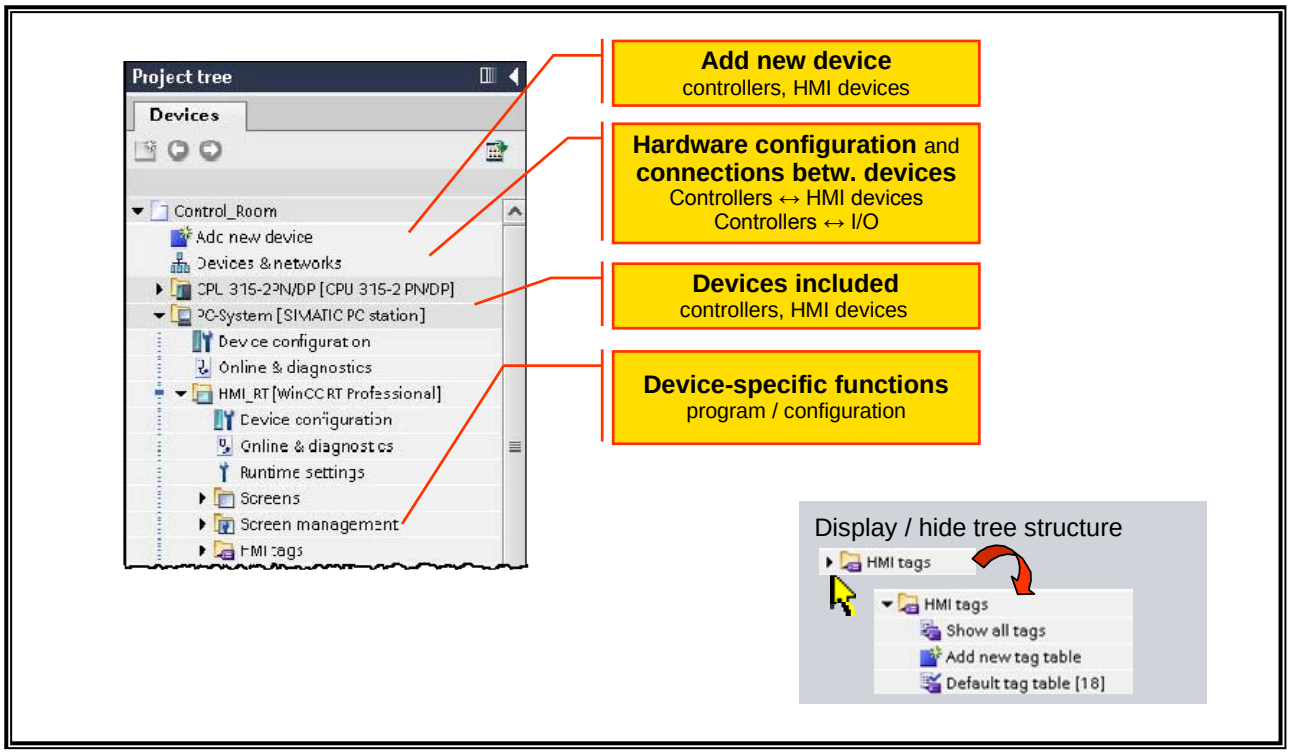
There is a help window in the Details view. Here, the elements of the configuration editor selected in the project window are displayed. These can be used in the active editor of the work area (by dragging them to the work area). This allows fast access to the required objects (for example tags).

2.1.2. Project view → Project tree and task cards



In terms of the range of functions, the contents of the project tree and the task cards adapt themselves during configuration to the HMI device currently being used. A different range of functionality is available in the task cards depending on the HMI device.

This means that only functions supported by the selected HMI device can be configured.



Project tree

The Project tree provides access to all components and project data. All components and editors available in a project appear in the Project tree and can be opened there. Each editor is assigned a symbol with which the objects belonging to it can be identified.

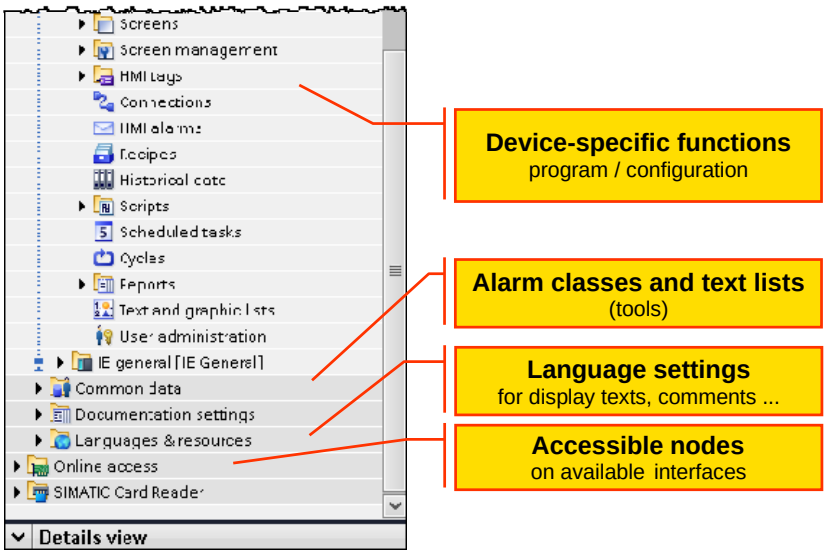
Only elements supported by the selected HMI device are displayed in the Project tree.

The following actions are available:

- adding configurable or programmable components (controllers, HMI devices etc.)
- editing existing components
- querying and modifying properties of existing components
- diagnosing accessible components

Showing or hiding a section of the tree structure

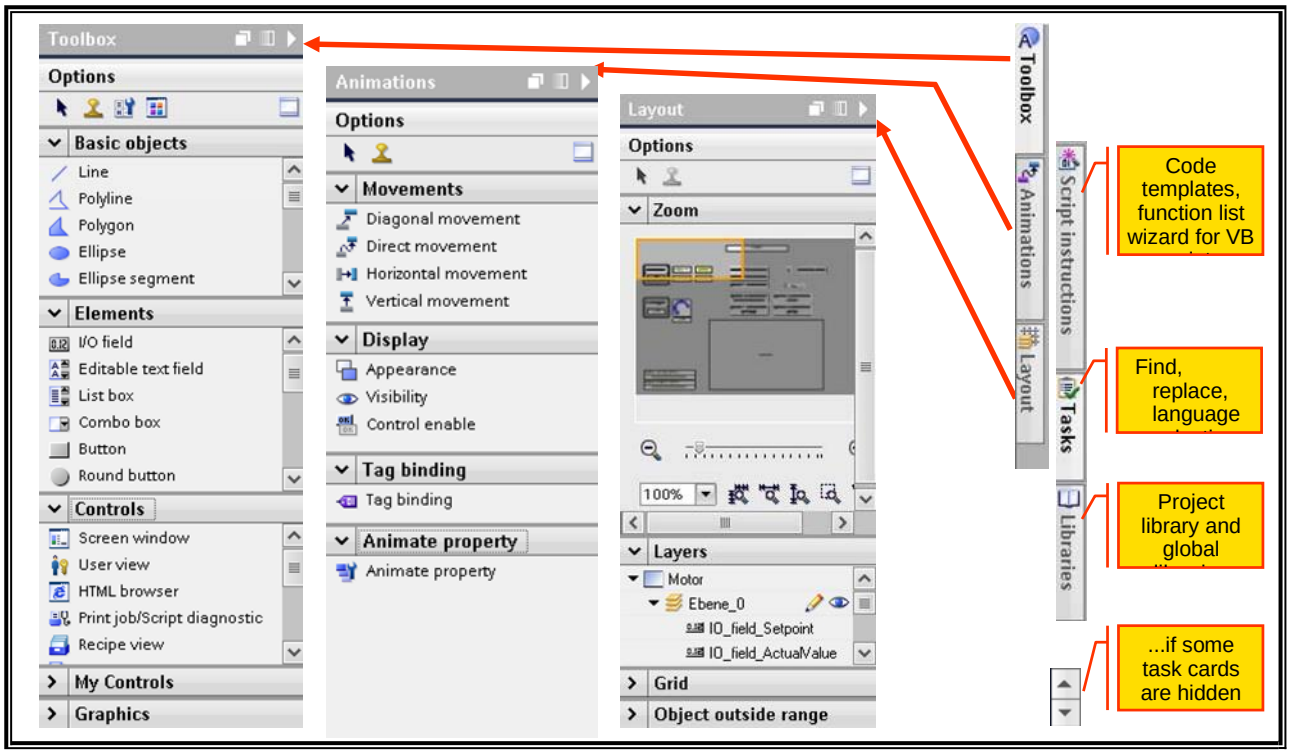
An underlying structure is indicated by the black triangle ▸. By clicking on the triangle, the underlying structure level can be shown ▸→▾ or hidden again ▾→▸



Project tree continued

The Project tree provides the following functions in the lower area:

- editing existing components
- querying and modifying properties of existing components
- diagnosing accessible components



Task cards

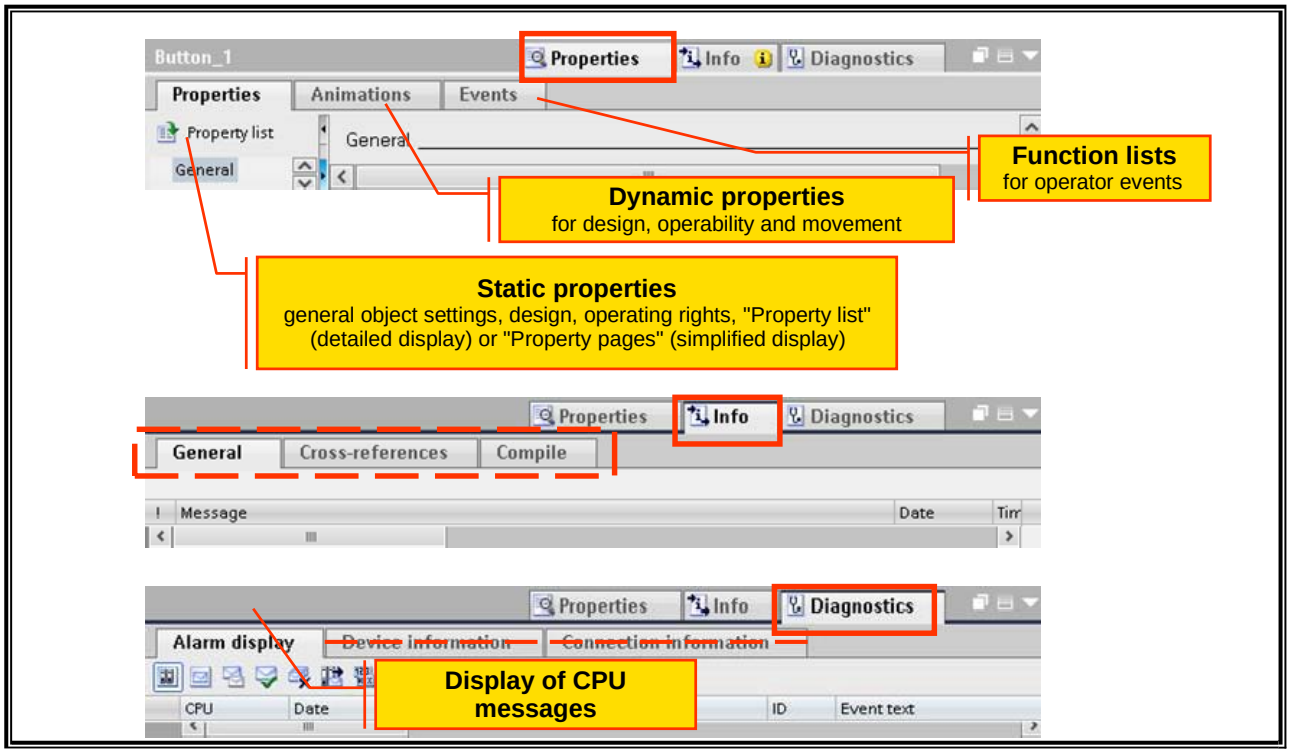
Depending on the opened editor, suitable task cards (additional windows) are available at the right-hand edge of the screen.

Which task cards are available depends on the products that have been installed and the currently active editor. If they cannot all be seen, the task card bar can be moved to the bottom right in the framework using the cursor buttons.

- in the Screen editor
  - **Toolbox**
    Configurable screen objects (graphics, display and operator control objects) in different panes (basic objects, elements, controls, optional customized controls, graphics)
  - **Animations**
    Templates for dynamization of screen objects in different panes (movements, display, tag binding for dynamization)

    The "Animations" task card is not available in WinCC Basic.
  - **Layout**
    Tools for adapting the presentation in the editor (zoom, level assignment, grid alignment, objects outside the area)
- in the Screen and Script editors
  - **Instructions**
    Code templates and function list wizard for script programming (VBS as well as C scripts with WinCC Professional)
- in all editors
  - **Tasks**
    Classic editor functions (find/replace, language selection for a project language)
  - **Libraries**
    Management of the local project library and global libraries

2.1.3. Project view → Inspector window



The Inspector window is divided into three information areas with a maximum of three underlying areas each
→ can be selected by clicking on the tabs

"Properties" area

In this area, the properties of one or more objects selected in the work area are adapted.

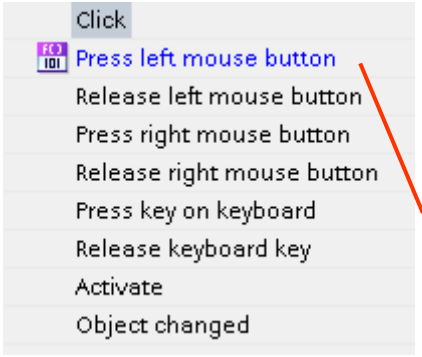
The contents of the area depend on the type of object. Each object has the "Properties" area. On the other hand, "Animations" and "Events" do not exist with all objects.

Properties

Object settings and static properties are specified during configuration and assigned to the objects. The static properties always have a default value.

Animations

These are implemented by tag binding, i.e. the current value of the tag during Runtime of the configuration modifies the appearance and behavior of the object.



Events

System and user functions can be configured according to object events, and are carried out when such events occur (e.g. calling a screen by clicking on a button).

Event contains function(s)

If the properties display is switched over to the display of the "Properties list", all properties of an object are shown in detail.

In the properties list, you can create dynamizations with tags or local C and VB scripts for the individual object properties (for example changing the background color of an object dynamically).

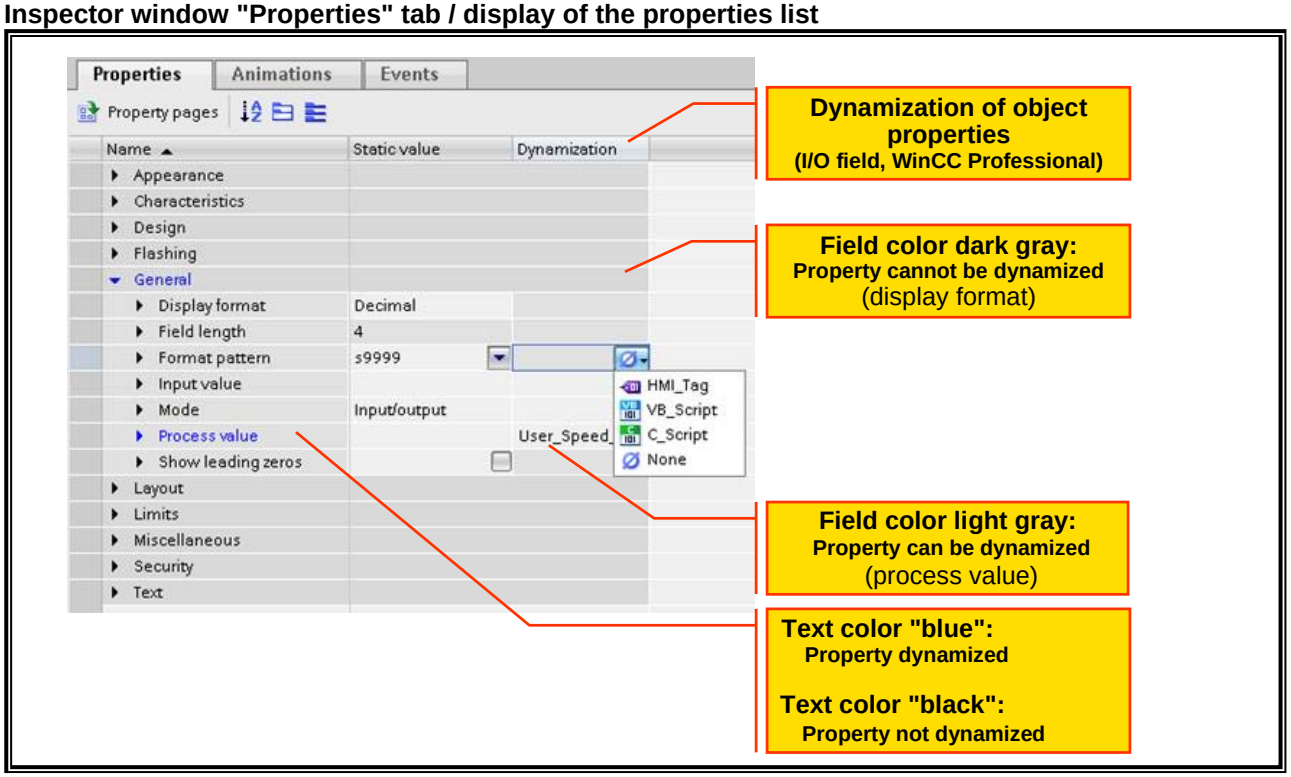
In the "Dynamic value" column, you can make the object property dependent on a tag, a C script or a VB script.

Whether or not an object property can be dynamized, is shown in the properties list based on the background color of the boxes in the "Dynamization" column:

Light gray: Can be made dynamic
Dark gray Cannot be made dynamic

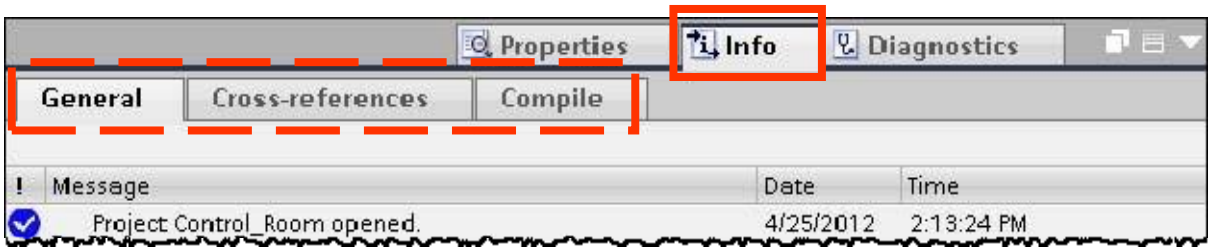
Object properties that have already been dynamized are shown in the properties list of the object as blue text (for example Process value).

Inspector window "Properties" tab / display of the properties list



"Info" area

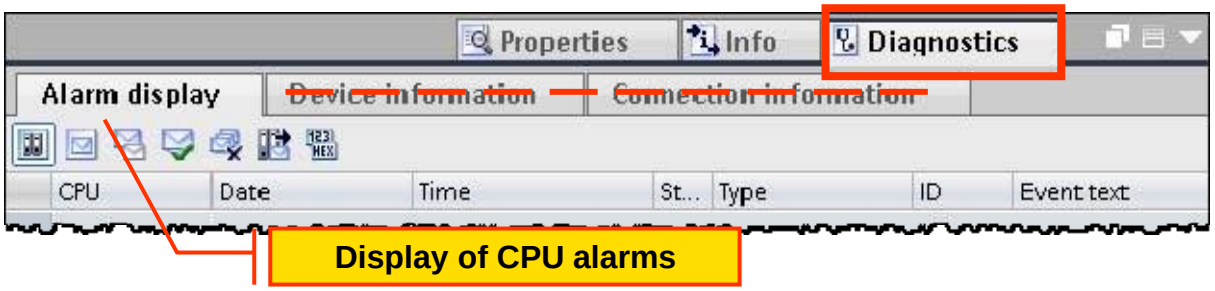
Here you select the output area of the engineering.



"General" tab → general status output
"Cross-references" tab → display of the current locations at which the selected object is used
"Compile" tab → status display of compilation progress

"Diagnostics" area

Here, the output area for diagnostics information is opened.



"Alarm display" tab → display of current CPU alarms (for example Alarm_S)
"Device information" tab and
"Connection information" tab → only relevant for CPUs and similar components

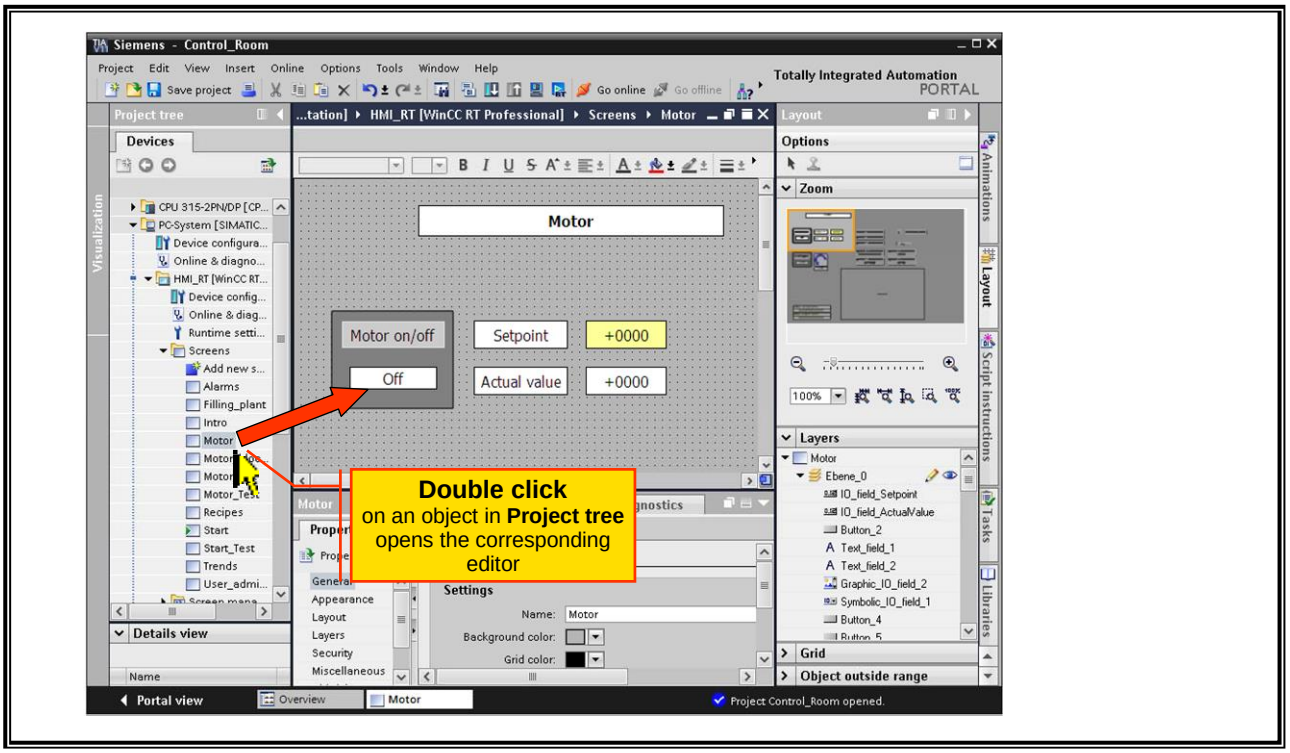
2.2. The WinCC editors

In the TIA Portal, there is a special editor for each configuration task. WinCC differentiates between two different types of editor:

- The graphic editor (e.g. Screen editor, Connection editor)
- The table editor (e.g. Tag editor)

There is no restriction to the number of opened editors.
However, the overview of the opened editors in the framework deteriorates the more editors are open and each editor not in use takes up main memory on the PG/PC. It is therefore advisable to close unused editors again.

2.2.1. Opening an editor



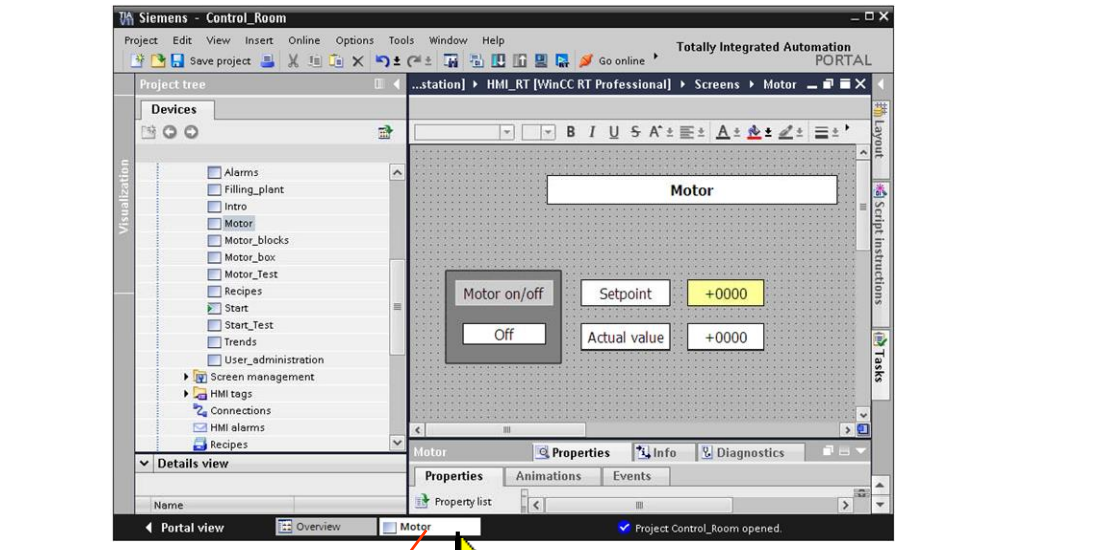
Click once

This selects the editor and lists underlying/contained objects in the "Details view" of the selected editor if these can be used for dragging during configuration (for example to drag a tag to a screen).

Double-click

Opens the editor

2.2.2. Working with the editors



- **Change editor by clicking on the tab**
- **No limit to the number of simultaneously open editors**

WinCC has a special editor for each configuration task. The currently opened editors are displayed along the bottom edge of the framework.

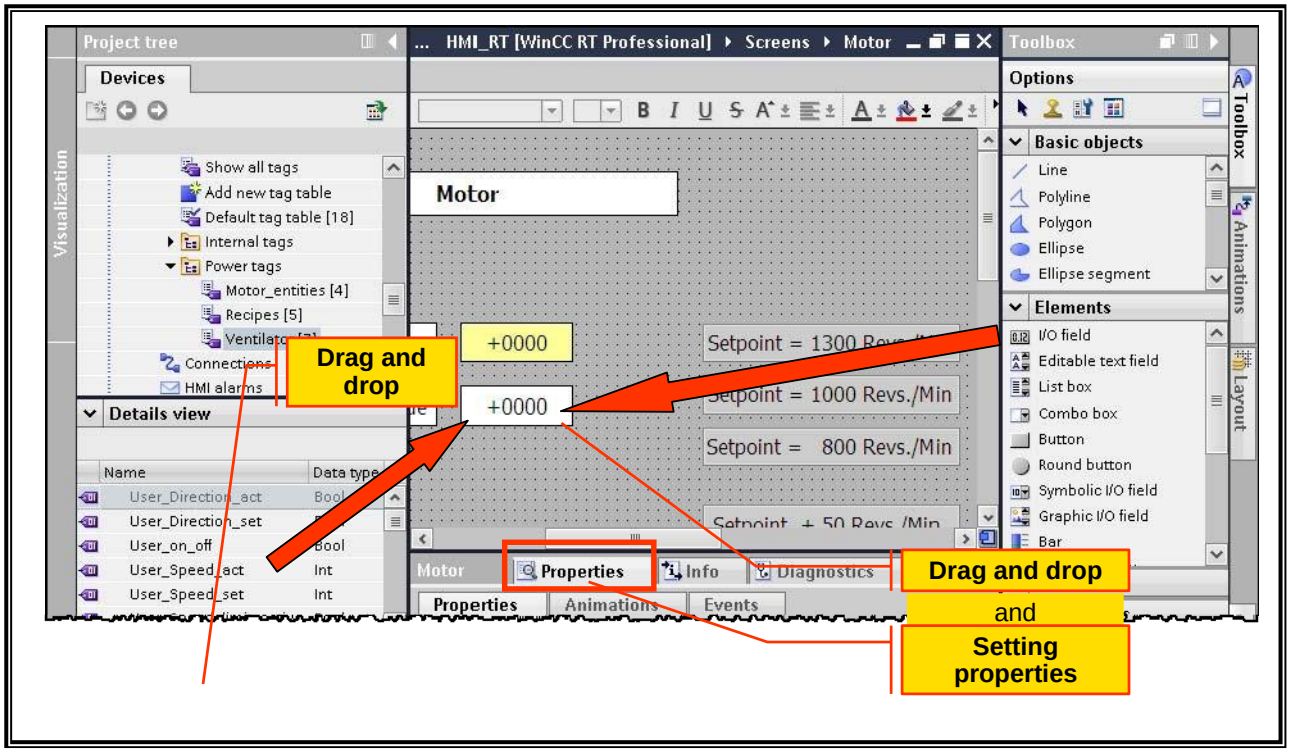
A distinction is made between graphic editors (Screen editor) and table editors (e.g. Tag editor).

Tooltips of WinCC

The tooltips appear automatically if the mouse pointer is allowed to hover for a couple of seconds on a function or an object and the function or object is ***not*** *clicked*. Since there are editors that cannot receive an individually configured name, this display is quite useful when several editors with the same name are open at the same time from different HMI devices.

Disabling this quick information is not currently possible.

2.2.3. Screen editor



The screen editor offers comprehensive options for quick and efficient screen configuration. To create process screens, you have powerful functions available in the "Toolbox" task card that support screen creation and the reuse of configured screens and screen objects.

The Screen editor also provides the following functions:

- Creation of connected screen objects using drag & drop
  - For example configuring an I/O field with process connection:
    Drag the tag from the Details view to the active screen.
  - For example configuring screen selection:
    Drag the screen from the project tree or Details view to the active screen.

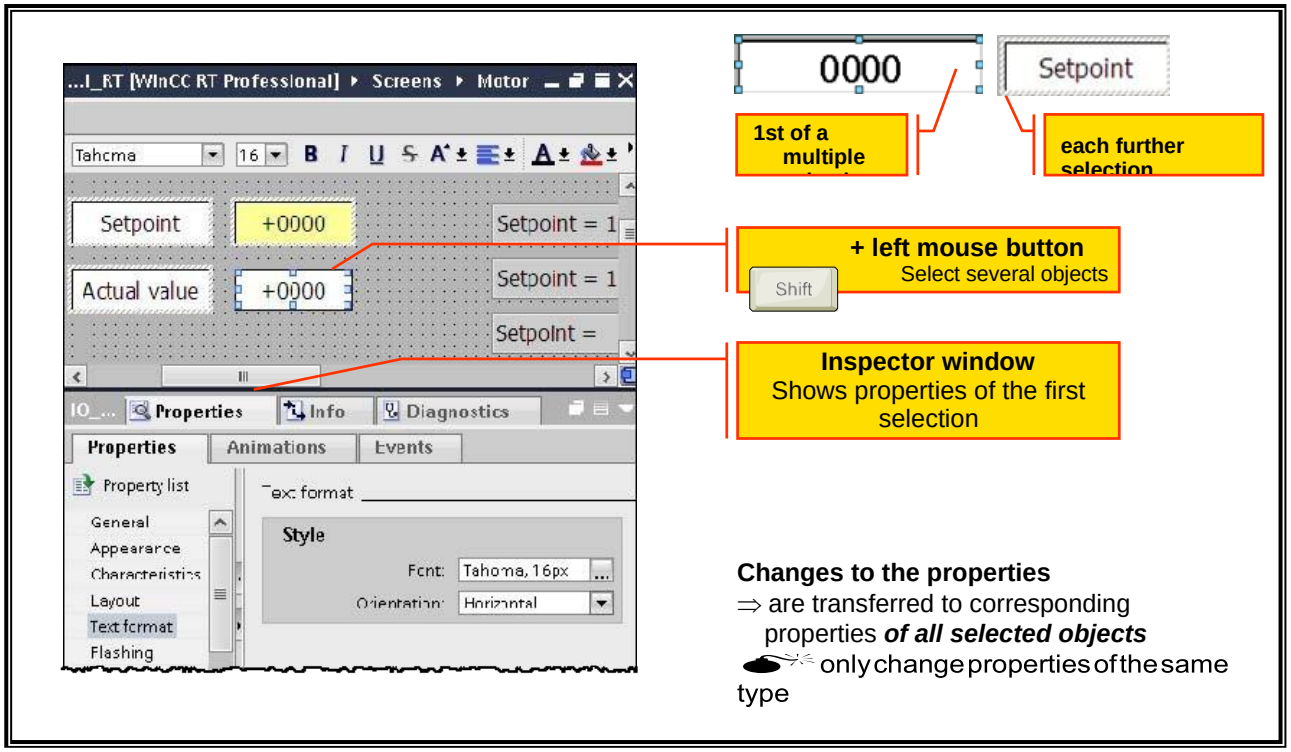
    Since the current screen name becomes the name of the button, the screen should already have its correct name at this point.
- Graphic configuration of paths of movement, for automatically moving screen objects across the screen in Runtime according to the process value
- Level technology with up to 32 levels per screen
- Tools for aligning, rotating or flipping objects

Task cards

Objects can be added to screens from the panes of the "Toolbox" task card by dragging or double-clicking. The selection of objects depends on the HMI device currently being configured.

From the panes of the "Animations" task card, the available dynamizations can be added to a screen object by dragging or double-clicking.

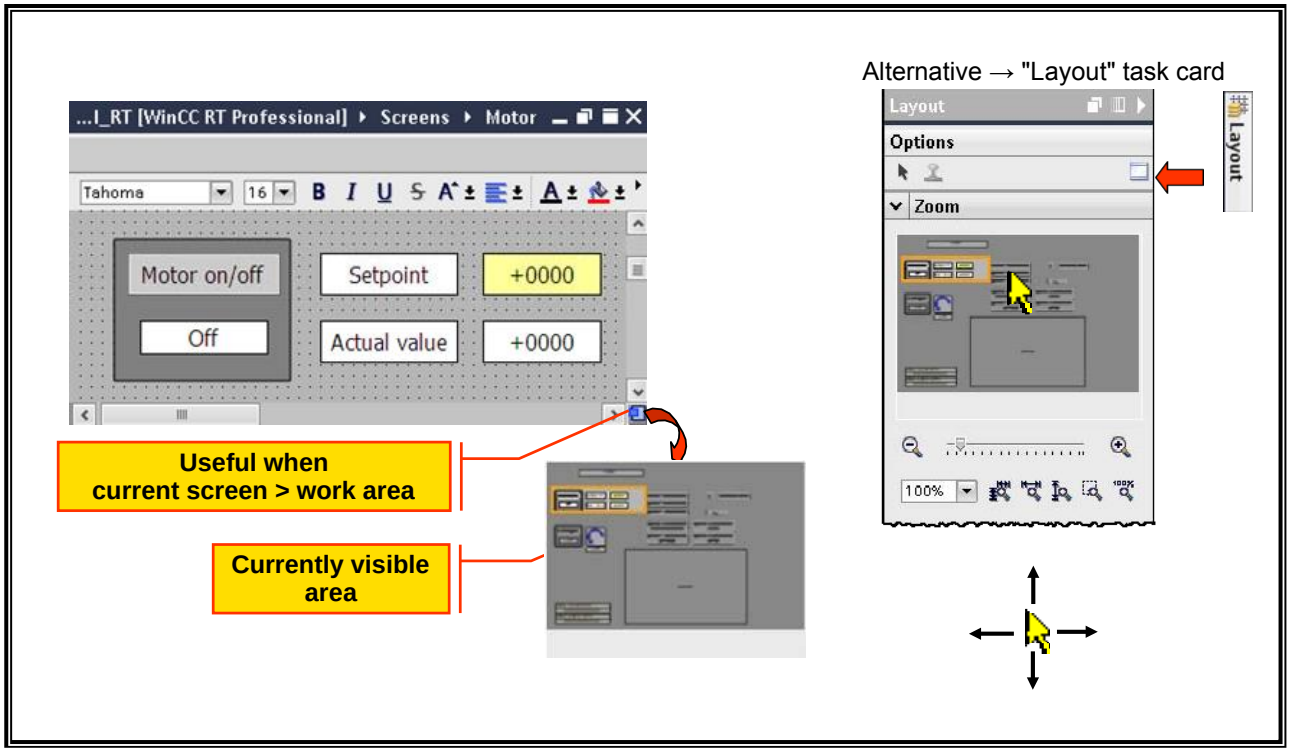
2.2.3.1. Multiple selection and properties in the Inspector window



Several objects can be selected simultaneously using **<Shift> + left mouse button**. The first selected object is identified by the object limit points, and all others by a hatched line.

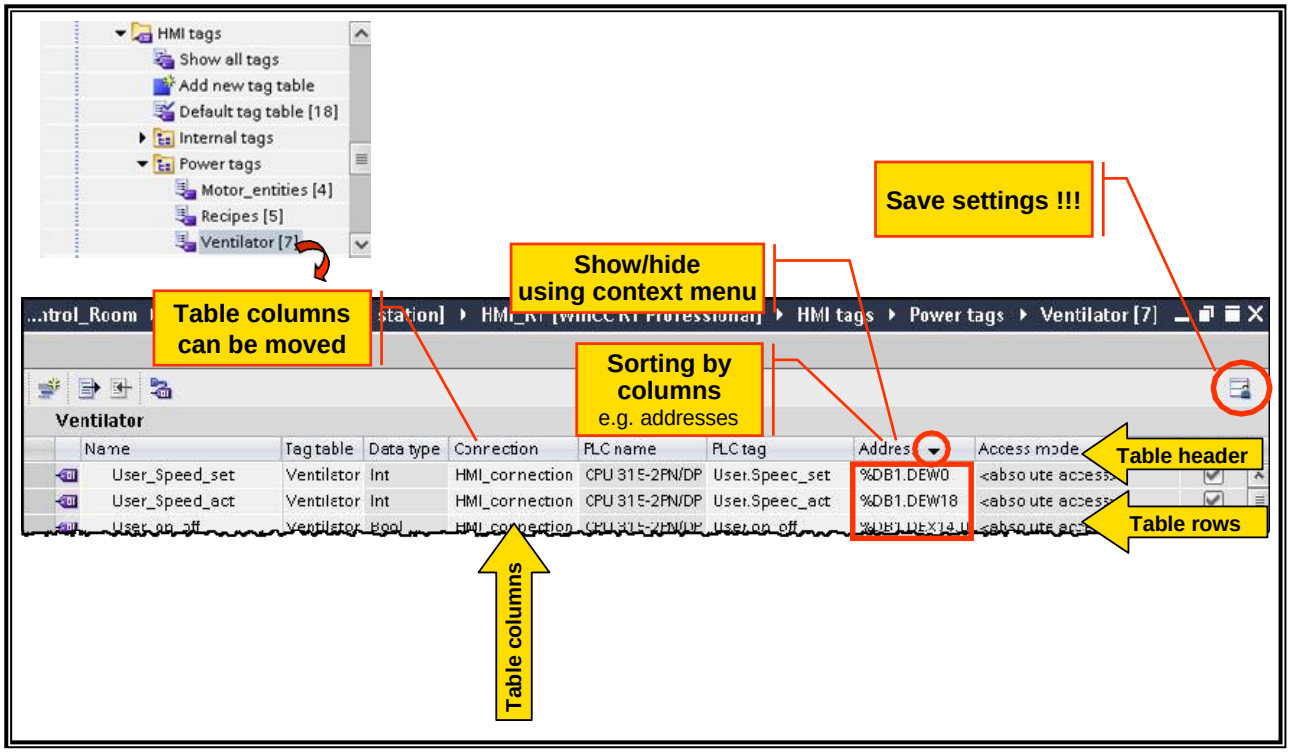
Several objects can also be selected simultaneously using the lasso function **<press and hold left mouse button, move over screen and release>**.

2.2.3.2. Panning tool or "Layout" task card



The panning tool or the "Layout" task card provides a miniature overview of the complete screen. The visible section (with an orange border) can also be moved to display a different area within the work area.

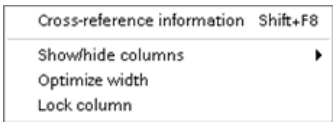
2.2.4. Table editor



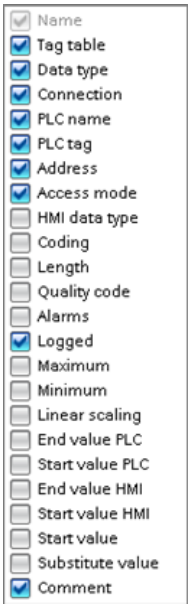
The table editor provides useful support for fast and efficient configuration of table objects such as tags.

2.2.4.1. Design of a table editor

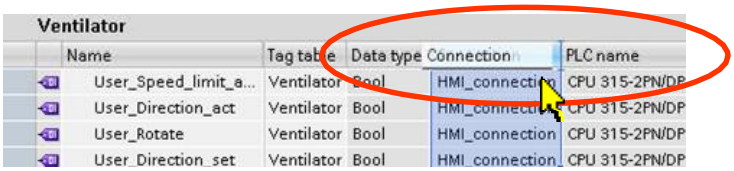
- **Number of table columns** can be configured
  → right mouse click on the table header opens the column overview
  ☑ column ON, ☐ column OFF



Column overview

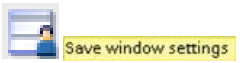


- **Order of columns** of the tables can be configured
  → left mouse - click on relevant column title - hold -
  → move mouse left/right - release



- Tables can be **sorted**
  → left mouse click on relevant column title
  sorts ascending/descending acc. to this column

Sorting indicator



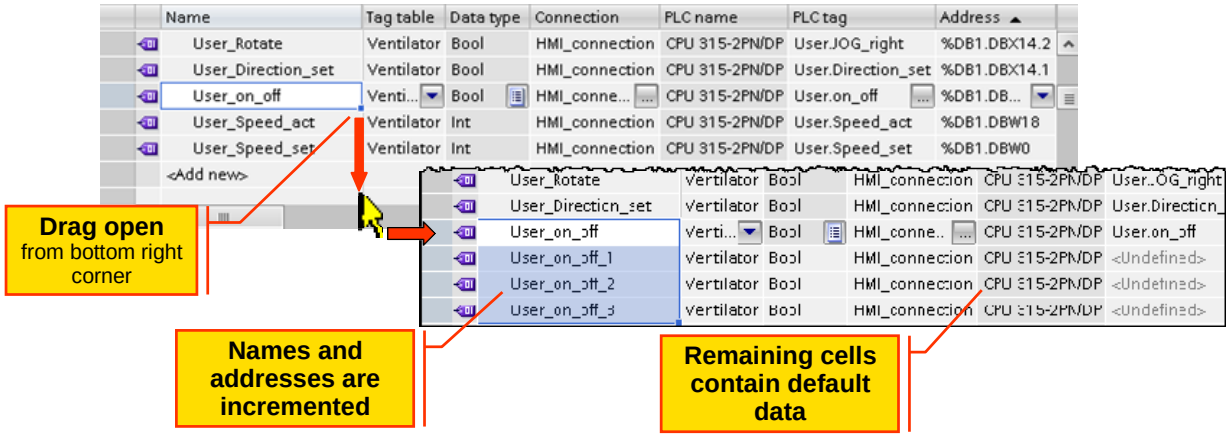
The display columns, their sequence, and sorting of their contents in each table can be individually configured.

The individual arrangement can be saved (in the Windows user profile) using the "Save window settings" button (at the top right in the editor). Otherwise the adapted setting is lost again when you close the editor.

2.2.4.2. Input help for the Table editor: creating new rows

- **only name and address**
  → select name cell
- **all cell entries**
  → select entire row !!!

→ left mouse click - click on the bottom corner
→ hold down the mouse button - pull down
→ release



A larger number of similar tags can be created within the table by "dragging rows". To do this, the left mouse button must be held down and then the lower right-hand corner of the selected area must be dragged down into the empty area in the table.

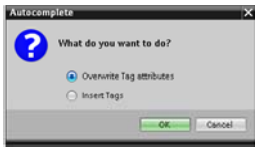
When the entries are created automatically, the tag names with indices and the memory area according to the selected data type are incremented. Depending on the selection, all other cells are reset to the default new entry (selection of name cell) or adopted in their entirety (selection of the complete row).

Selecting a row

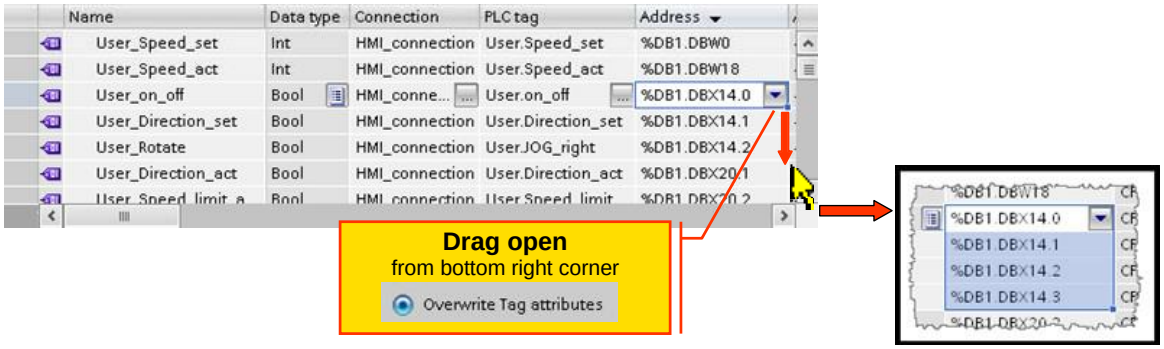
Clicking on the  symbol at the start of a row selects the entire row.

2.2.4.3. Input help for the Table editor: customizing cell properties

- **Transferring content** (with addresses = address calculation depending on data type)
  → select relevant cell
  → left mouse button - click on bottom right corner
  → hold down the mouse button - drag down or up - release



- **Multiple selection**
  → select several rows or cells (Shift / Ctrl)
  → change properties of the same type in the properties window



Transferring contents

You can also use the auto fill function to transfer the contents of a cell to the cells above or below it in the table, and therefore to the corresponding tags.

If the prompt

is answered with "Overwrite...", the content of these cells is overwritten.

Selecting a row

Clicking on the  symbol at the start of a row selects the entire row.

Multiple selection (several rows)

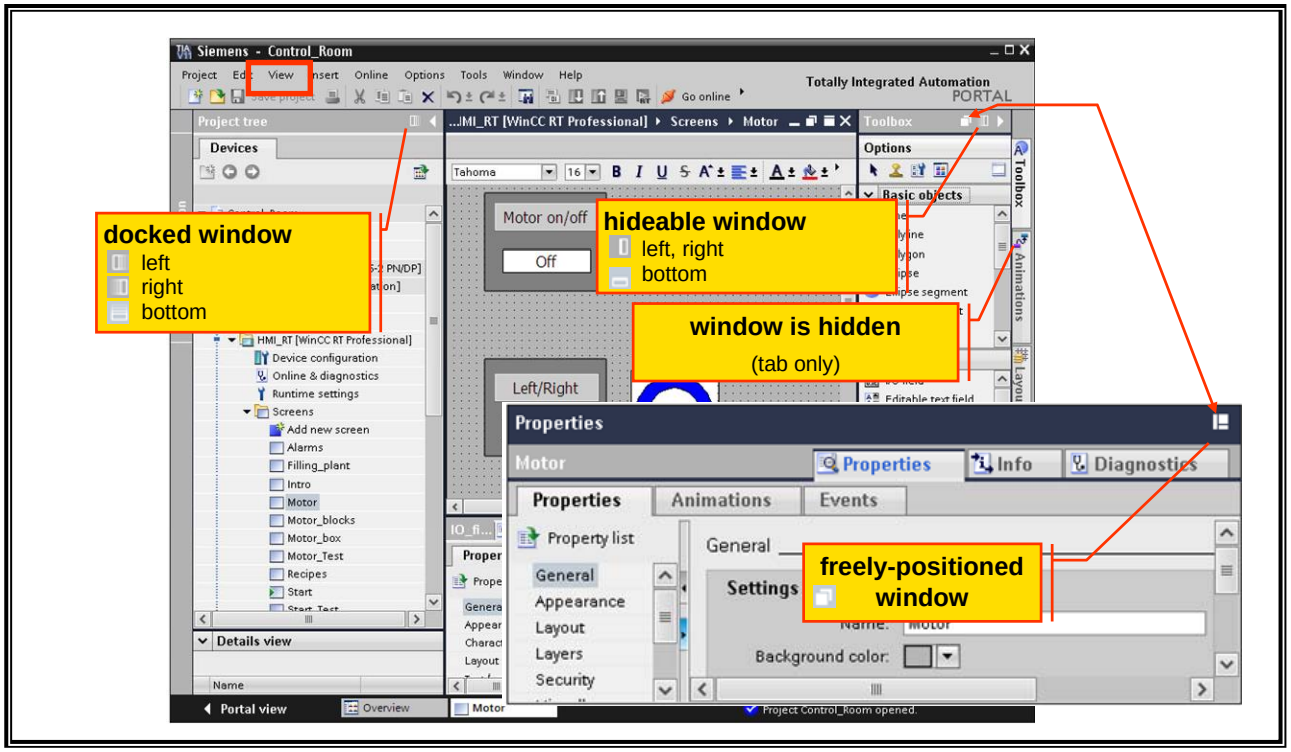
To do this, the rows or cells of the table entries must be selected in the table.

Several rows can be selected simultaneously as an area using **<Shift> + left mouse button**. Further rows can be added to the selected area using **<Ctrl> + left mouse button**.

The properties of the first selected row are displayed in the properties of the Inspector window.

By changing a property, all selected table entries can now be assigned a matching property in one action in the Inspector window.

2.3. Individual design of the user interface

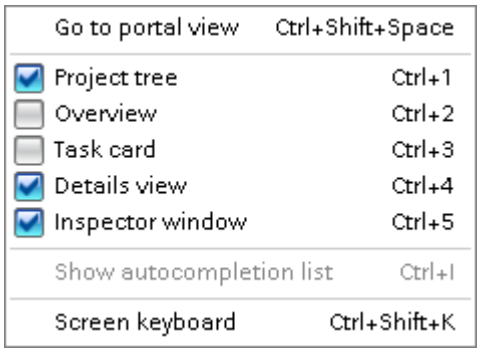


The positions and characteristics of windows can be configured individually. You can hide windows that are seldom required and enlarge the surface of the work area.

The current configuration of the engineering user interface is saved in the user profile of Windows. On saving the project, the positions and characteristics of windows are automatically saved with it.

→ View menu

Using the "View" menu function or assigned hotkeys, the windows listed below can be opened or closed or reduced in size.

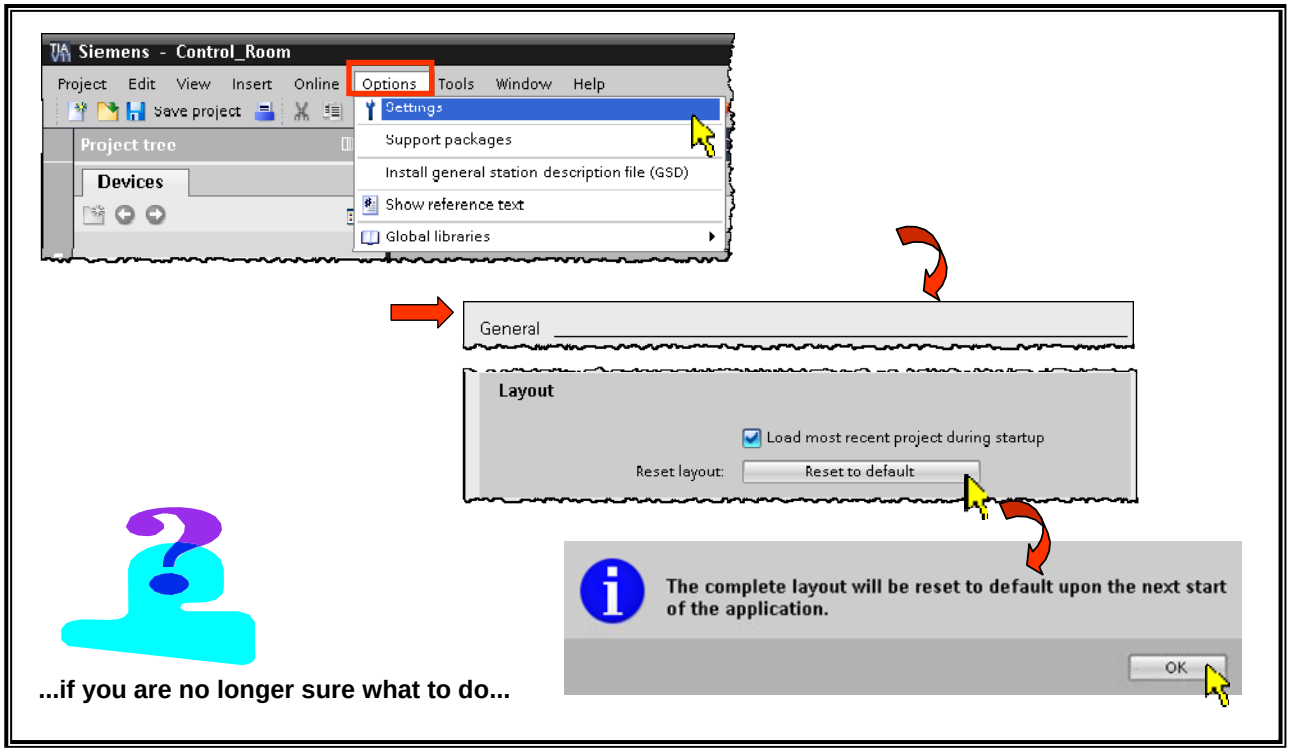


Window layout options

- docked window
  - fixed location and fixed size on user interface
  - position possible at left, bottom or right outside the work area
  - always open, reduces work area
- hideable window
  - hidden at edge of user interface
  - position possible at left, bottom or right, superimposed on work area when open
  - default status = window closed, and tab displayed at edge of the user interface
  - mouse click on the tab opens the window
  - closed automatically the next time there is a click outside the window area
- freely-positioned window
  - can be positioned anywhere on the user interface
  - permanently covers the user interface area underneath it

Clicking the functions  in the window title bar **changes** between the **mode** freely positioned, docked and hidden.
Hidden windows are **opened** by clicking on the tab and **closed** again by clicking outside the window area.

2.3.1.1. Reset user interface to defaults

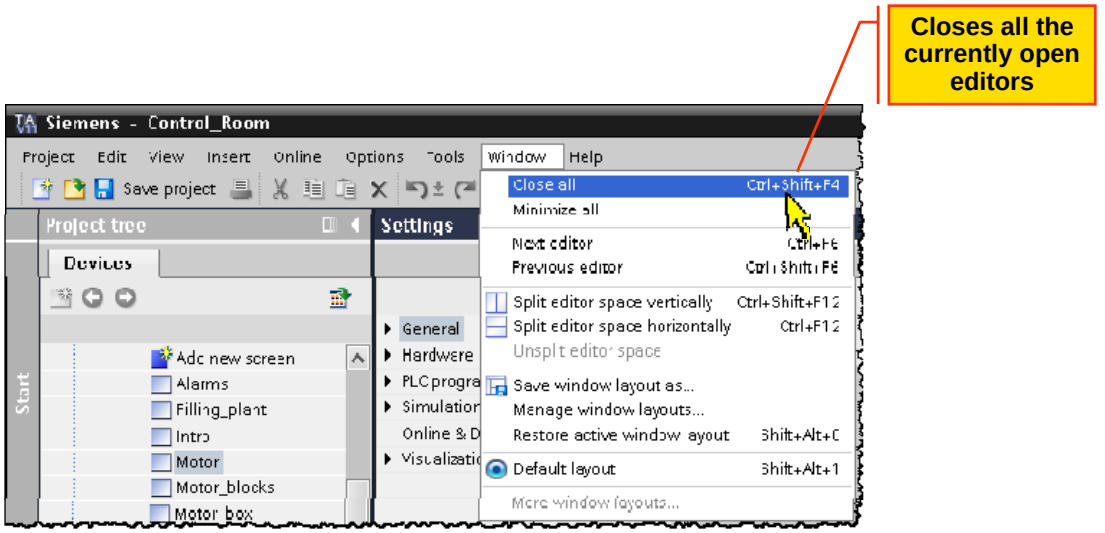


The next time the TIA portal is started, the window layout is then reset.

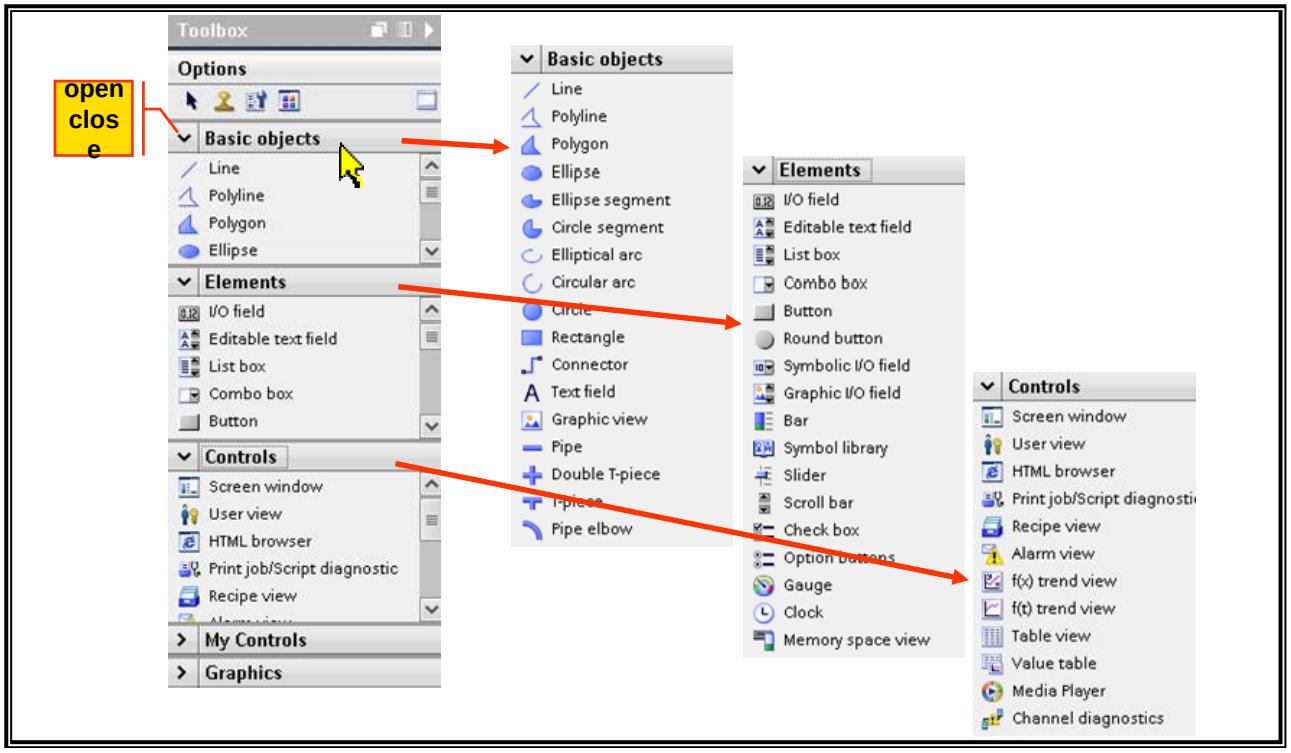
- Framework full screen
- Project tree docked left
  Details view opened
- Task cards docked right
- Inspector window docked at bottom

2.4. Extras

2.4.1. Closing all windows



2.4.2. "Toolbox" task card - Basic objects, Elements and Controls

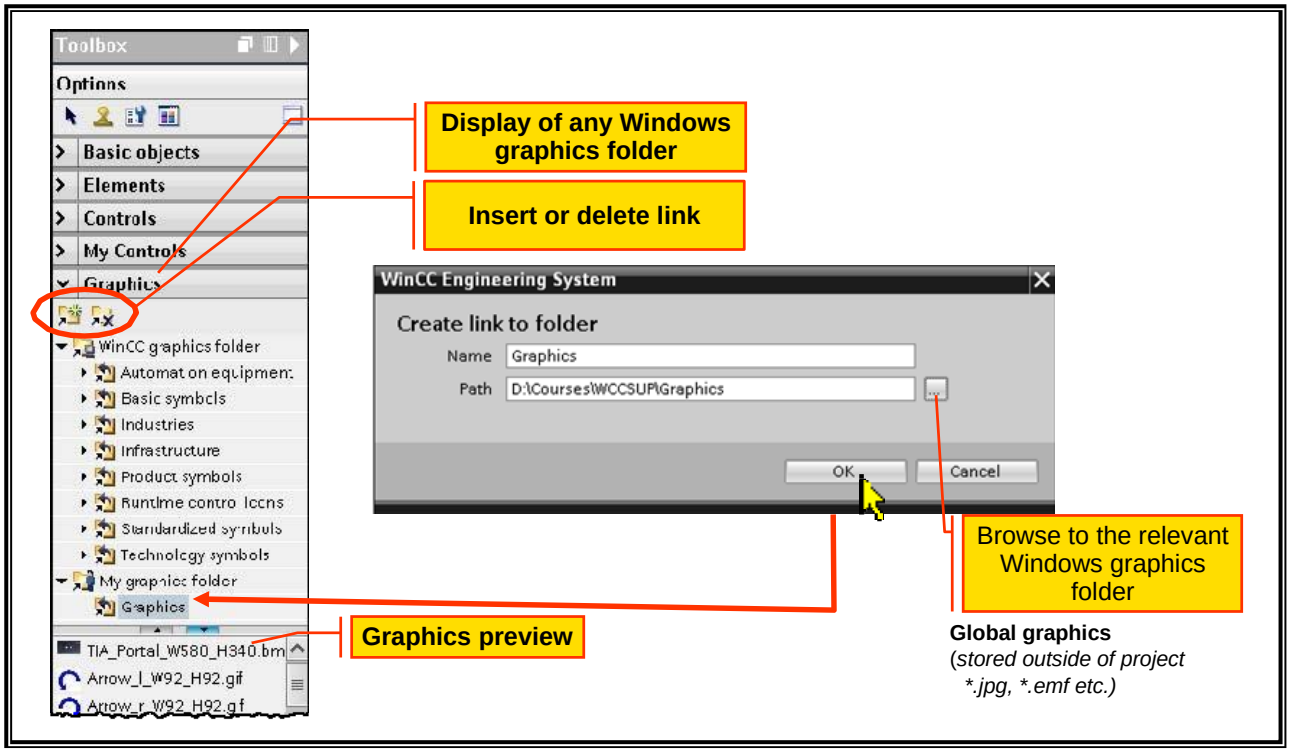


The "Toolbox" task card contains all objects that can be configured in screens. The content of the areas vary depending on the configured target device.

- **Basic objects**
  Basic objects include graphic objects (for example line, circle or graphic view) and the text box.
- **Elements**
  This includes the basic operator control elements (for example I/O field or button) and enhanced display elements (for example the symbol library).
- **Controls**
  These objects have an enhanced range of functions.

For PC-based HMI devices, it is also possible for users to program their own active X controls.

2.4.3. "Toolbox" task card - Graphics



Graphics from any directory are displayed in the preview window and can be used directly for configuring with drag & drop.

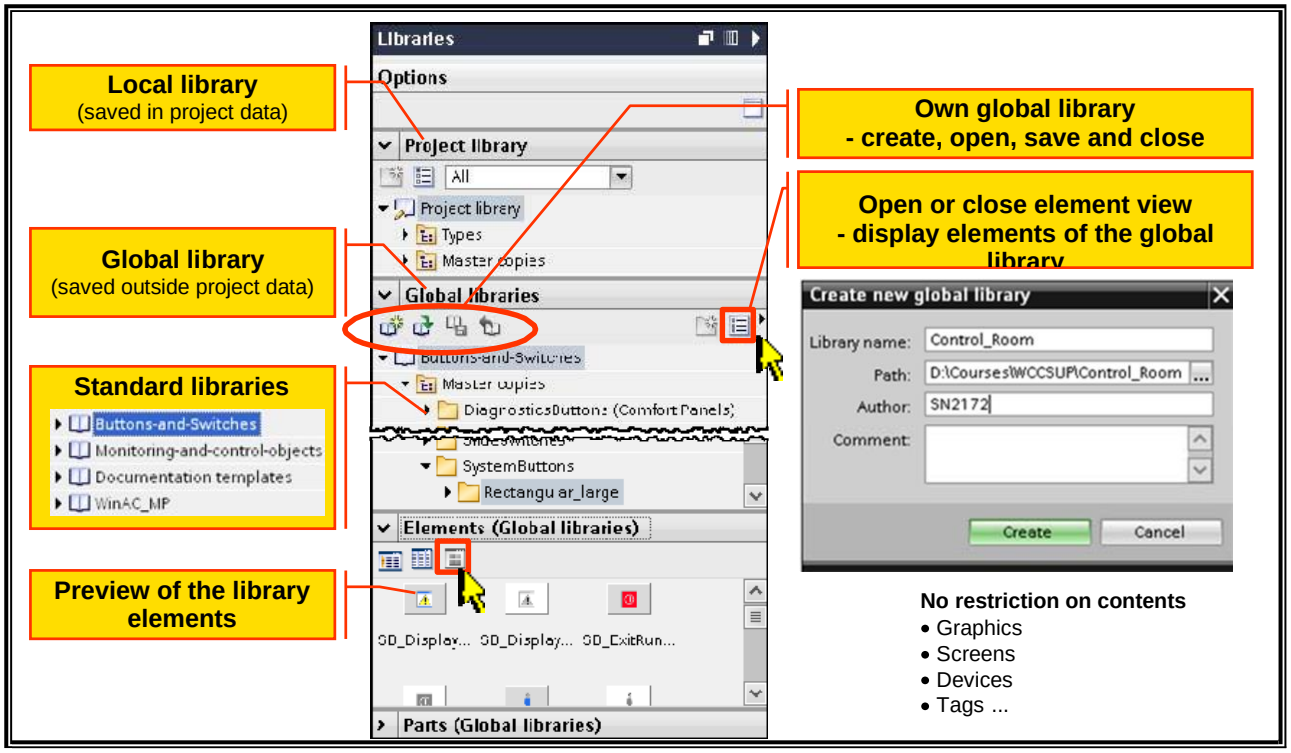
Standard graphics ship with WinCC. These are not organized in libraries, but rather they are stored as pixel- or vector-oriented graphics directly in the Windows file system.
These graphics are sorted to some extent by their depth of color and they are displayed automatically in the "Toolbox" task card under the "Graphics" pane for selection during configuration.

Any graphics collection can be opened as graphics directories, be inserting a new folder link (or using the shortcut menu: right mouse button in the gray directory area).

Supported graphics formats

- *.bmp
- *.tif
- *.png
- *.ico
- *.emf
- *.wmf
- *.gif
- *.jpg
- *.jpeg

2.4.4. "Libraries" task card



A library can contain all WinCC objects, for example an entire HMI device, screens, display and operator control objects including tags and functions, graphics, tags, alarms, text and graphics lists, faceplates and structures.

WinCC distinguishes between global and project-related libraries.

The required library is opened from the "Libraries" task card and the "Project library" or "Global libraries" pane.

Project library

A project library always exists for each project. The project library is stored together with the project data and is available only in that project.

"Types" folder

In this project library folder, objects are saved that can be used as instances. These include, for example user data types (structure types) and faceplates. The user data types are used to create tags of the data type "user data type" (structures).
These objects are then stored in the project library and are also edited there. In the screen, for example, when using faceplates, there is only one reference to the central object. If such central objects are modified, all the locations at which the object is used in the project are updated.

Although a global library can contain a Types folder, if this used in the project, it is copied to the project library and only referenced there.

"Master copies" folder

This folder can contain any objects that can be used when required as copies in the project.

Global libraries

A global library is saved as a separate file with the extension *.al11 in the specified directory. A global library is available for all projects that can access this directory.
Various global libraries ship with WinCC, for example "Buttons-and-Switches" and "Monitoring-and-control objects".

A project can access multiple global libraries. A global library may be used concurrently in multiple projects.

Customized global libraries can be generated. A global library is opened or created using the buttons or the shortcut menu (right mouse button) in the "Global libraries" pane.

If a library object is used in a project, the object and all referenced objects are copied into the WinCC project. After it has been copied, the object no longer has a connection to the global library. This means that changes to objects in the libraries do not affect library objects already copied to projects.

You can only use the objects in the "DiagnosticsButtons" folder on Comfort Panels.
The objects with the name "Switch" in the object name or in the corresponding folder name cannot be used in Runtime Professional.

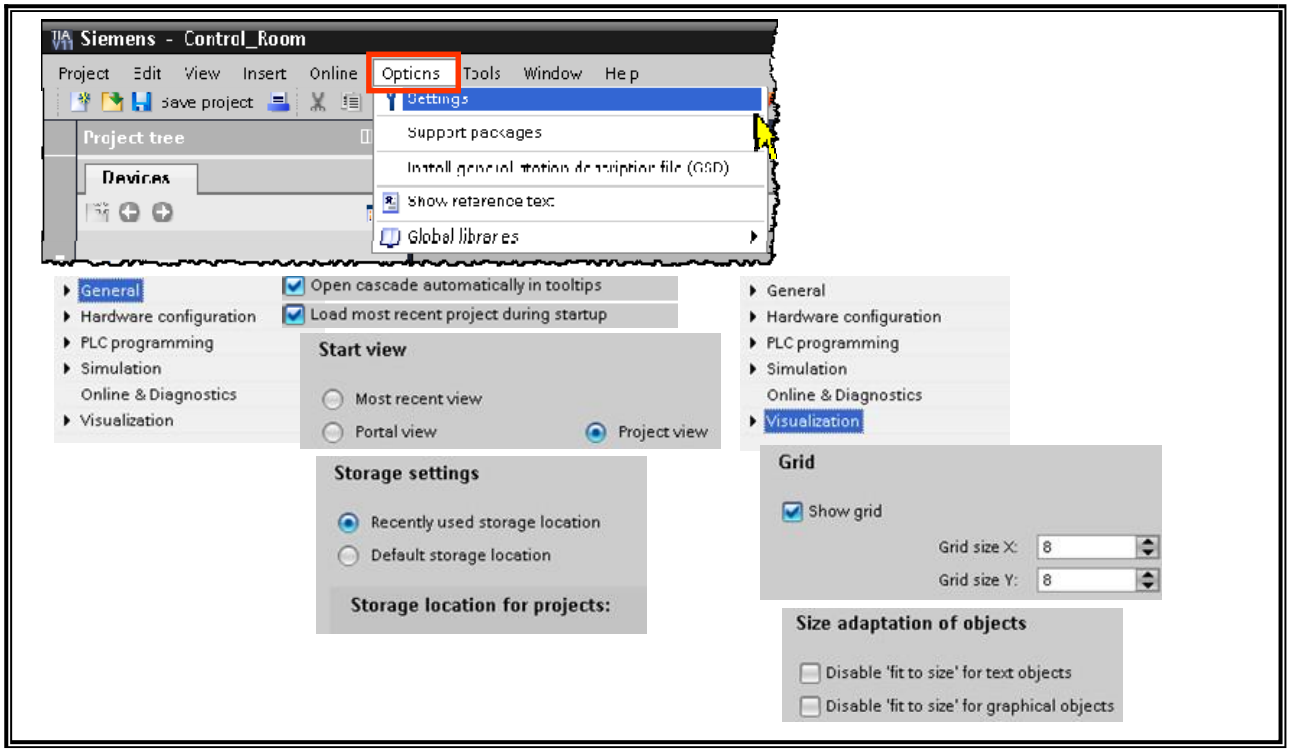
Elements

List (and possibly also a miniature preview) of the library objects of the selected library folder.

Elements

In this pane, you can display the contents of the library elements.

2.4.5. The most important engineering settings



The engineering settings are called in the main menu with:

> Options > Settings

The settings are saved and used again the next time WinCC is started.