User Guide – May 2025

User's Guide for i-CHoose. (Revision 100)

REPRODUCTION

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1 Introduction

i-CHoose allows you to create custom integrated manifolds (HIC), compact directional valves assemblies (CDV) and also compact power module (CPM) projects from the early design stages all the way through pricing and quoting your customers. This innovative software allows you to integrate, simplify, and cut costs in your hydraulic systems using Bosch Rexroth components.

The integrated product selector and configurator allows users to determine the price of individual components or of a complete project assembly. You can then generate a quote directly from i-CHoose. With embedded component-based 3D models, you can easily insert and layout elements on a block or connect modules to create compact valve or power module assemblies, with dimensions, and weight estimations.

This 3D layout will then be used to assist engineers in designing Bosch Rexroth systems, or to show customers a visual and dimensional estimation of what their assembled project would look like upon completion.

1.1 Document Content

The main goal of the i-CHoose software is to make it possible to select and configure elements that are part of a custom manifold (HIC), a compact directional valve (CDV) or a compact power module (CPM) assembly.

In this *i-CHoose User's Guide*, we have included all the instructions on how to use the software in order to draft the schematic, configure components and layout the assembly to obtain a unique Bosch Rexroth solution. This content has been organized so that all sections are sorted to follow a logical order.

However, this document covers neither the technical aspects of the components, manifold systems, compact directional valves nor compact power modules. For more information, refer to the Bosch Rexroth documentation or the Bosch Rexroth website: http://www.boschrexroth.com/

This *i-CHoose User's Guide* contains the following chapters:

Chapter	Contents
1	Introduction
2	Getting Started – The Interfaces
3	Building a First Project
4	Documentation

2 Getting Started – The Interfaces

2.1 Welcome Screen

Once the application is open, the user is prompted with the i-CHoose Welcome Screen. This welcome screen is intended to ease the access to recent projects, existing projects or to create new projects.

The welcome screen contains the following major sections:

1. The “Recent Projects” List: Contains the list of the most recently opened projects;
2. The “Open Project” Button: Is used to search for and open an existing project;
3. The “New Project” List: This section contains the buttons used to create a new project according to the available i-CHoose project types:
    - HIC
    - CDV
    - CPM

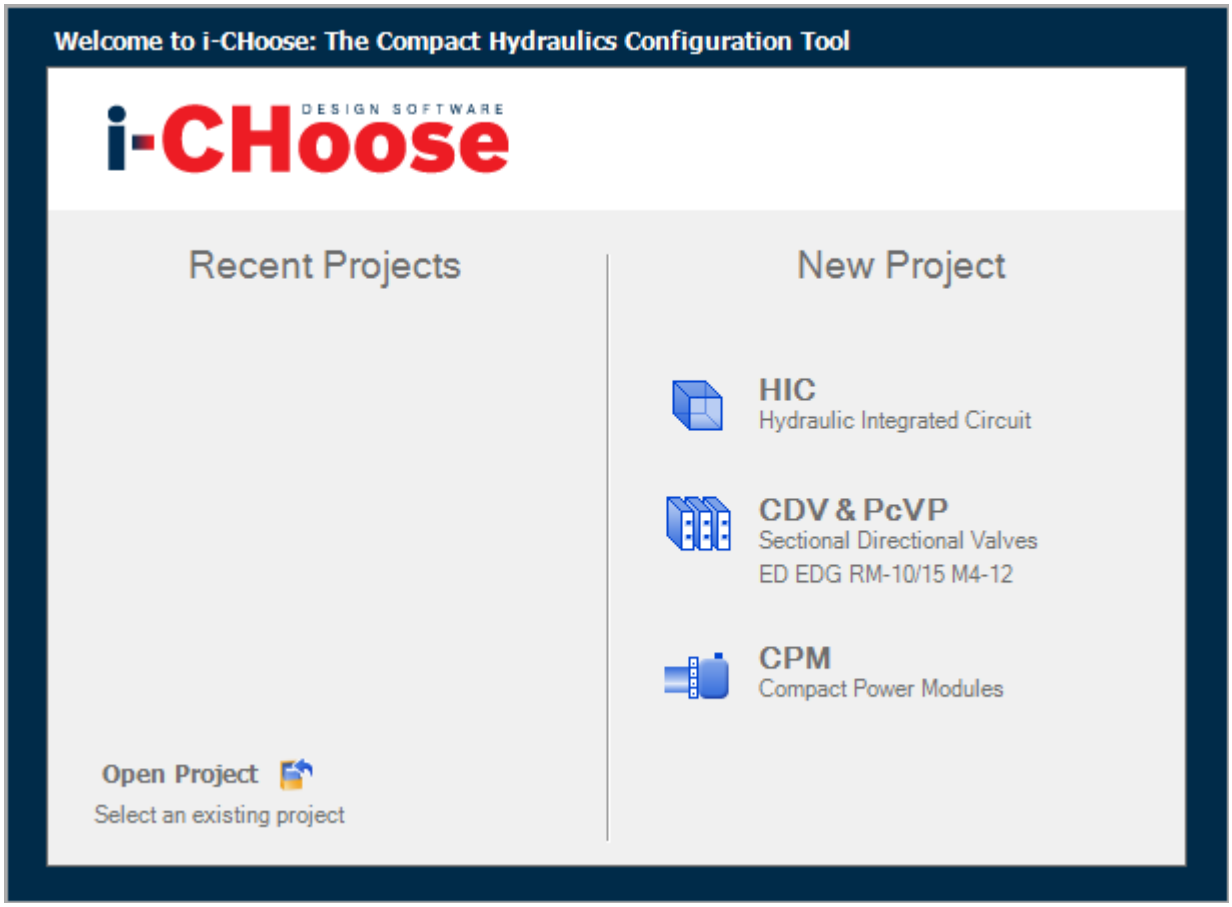


Figure 2-1: i-CHoose Welcome Screen

2.2 Main Interface

The main interface contains multiple elements that will change depending on the section of the software that is currently in use. Therefore, the main interface is designed in a way which facilitates access to the various sections of the software. i-CHoose interfaces are based on standard Windows interfaces and include additional items specifically designed for this application.

The main interface contains the following major sections:

1. The application header: Contains the menus and toolbars;
2. The "Project Explorer" window: Allows the user to switch between interfaces;
3. The main display: This section will change depending on the selection made in the "Project Explorer";
4. The "Library Explorer" window: Allows the user to access the application components that can be used in the hydraulic circuit. This interface changes depending on the main display in use. The libraries of the main interfaces will be covered in more detail later;
5. The "Messages" window: Lists all the errors/warnings that occurred during the manifold design process.

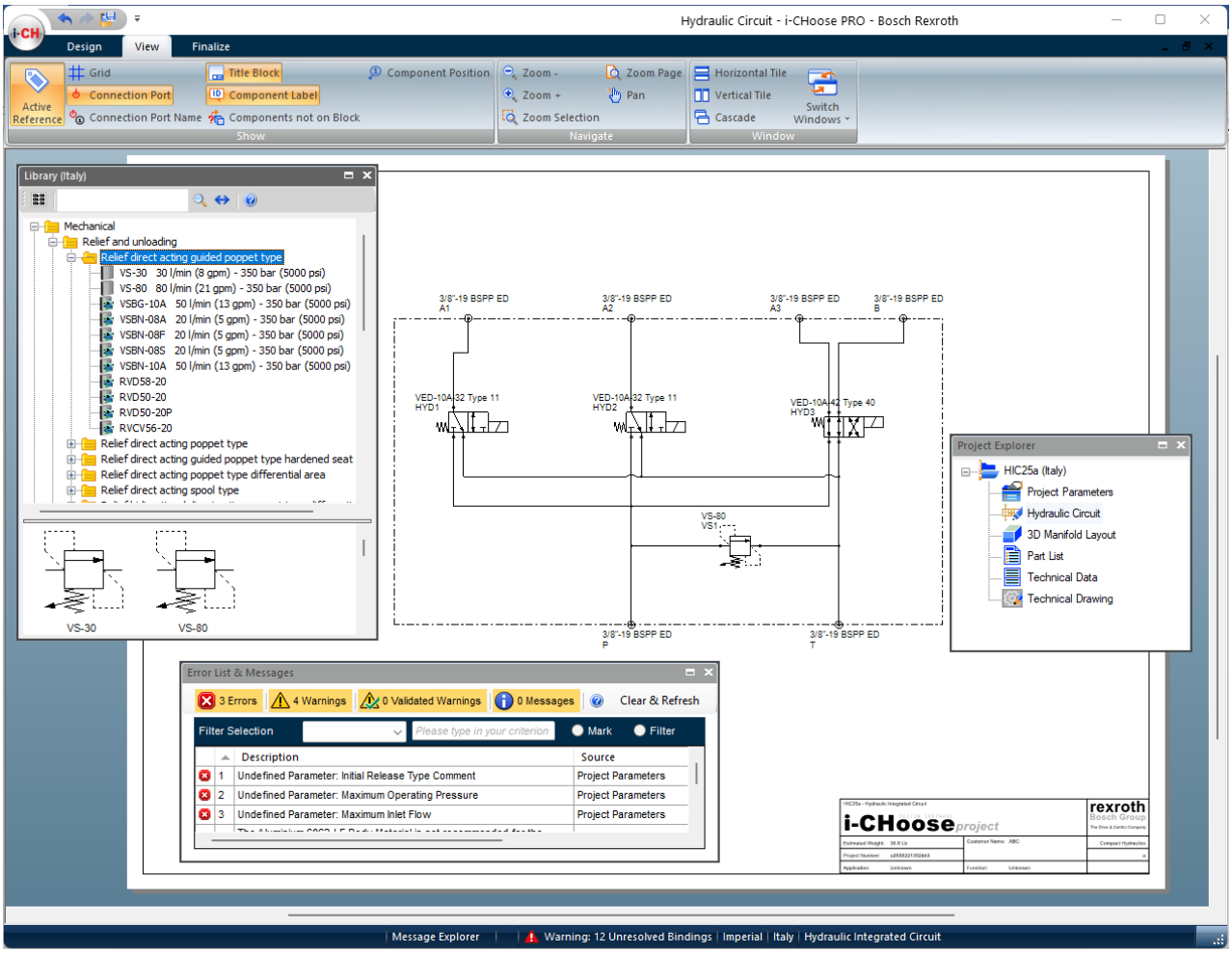


Figure 2-2: i-CHoose Interfaces

The header is based on a standard Windows interface (Ribbon Bar). This section of the application holds the various menus / toolbars needed to access the main software features and tools.

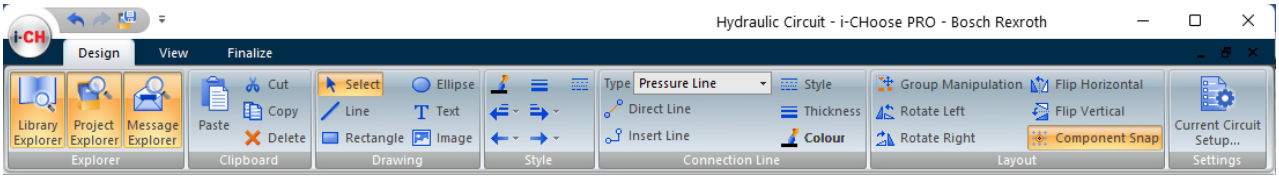


Figure 2-3: Application Header (Design)

2.2.1 Menu (i-CHoose)

The menu found in i-CHoose works just like any other standard Windows application (Ribbon Bar).

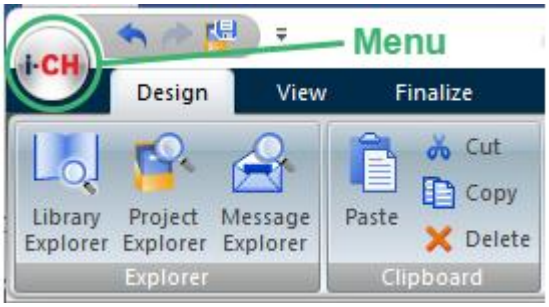
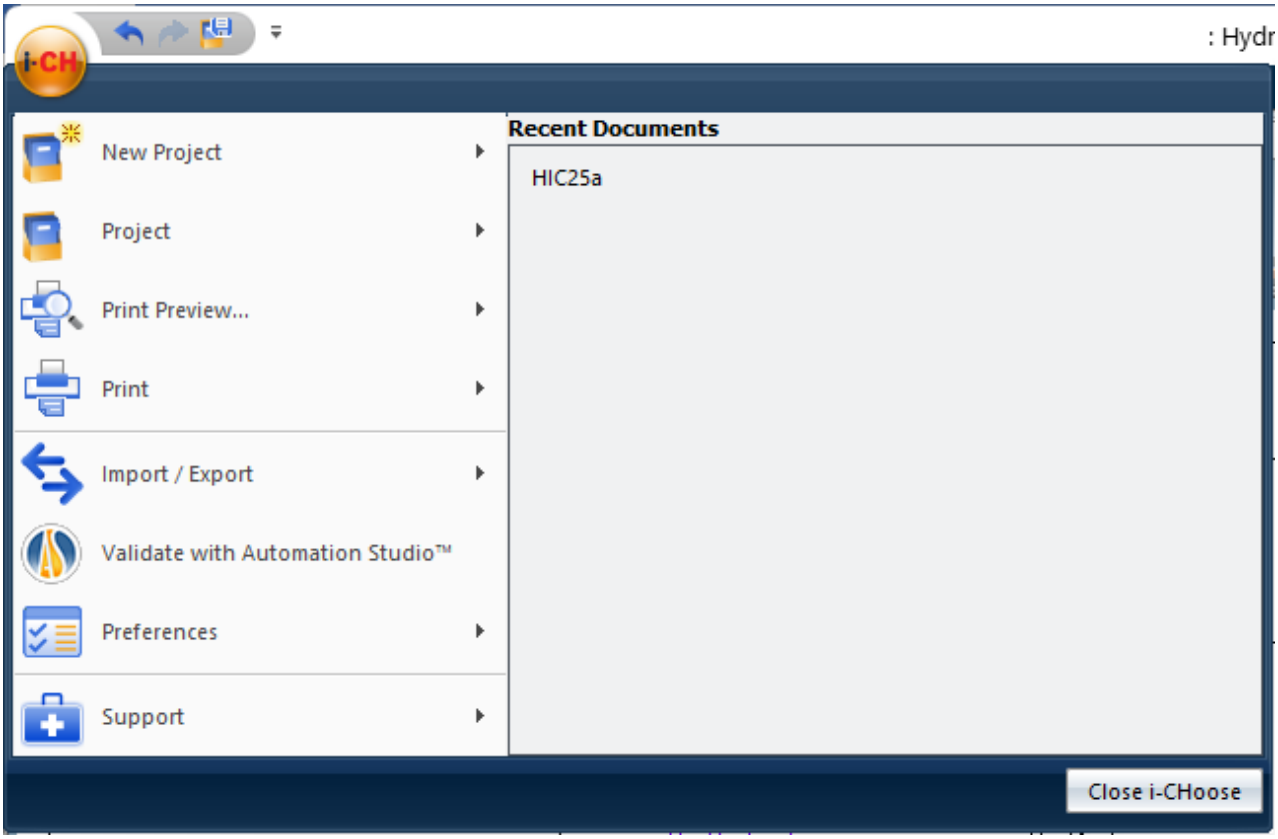


Figure 2-4: i-CH→ i-CHoose Menu

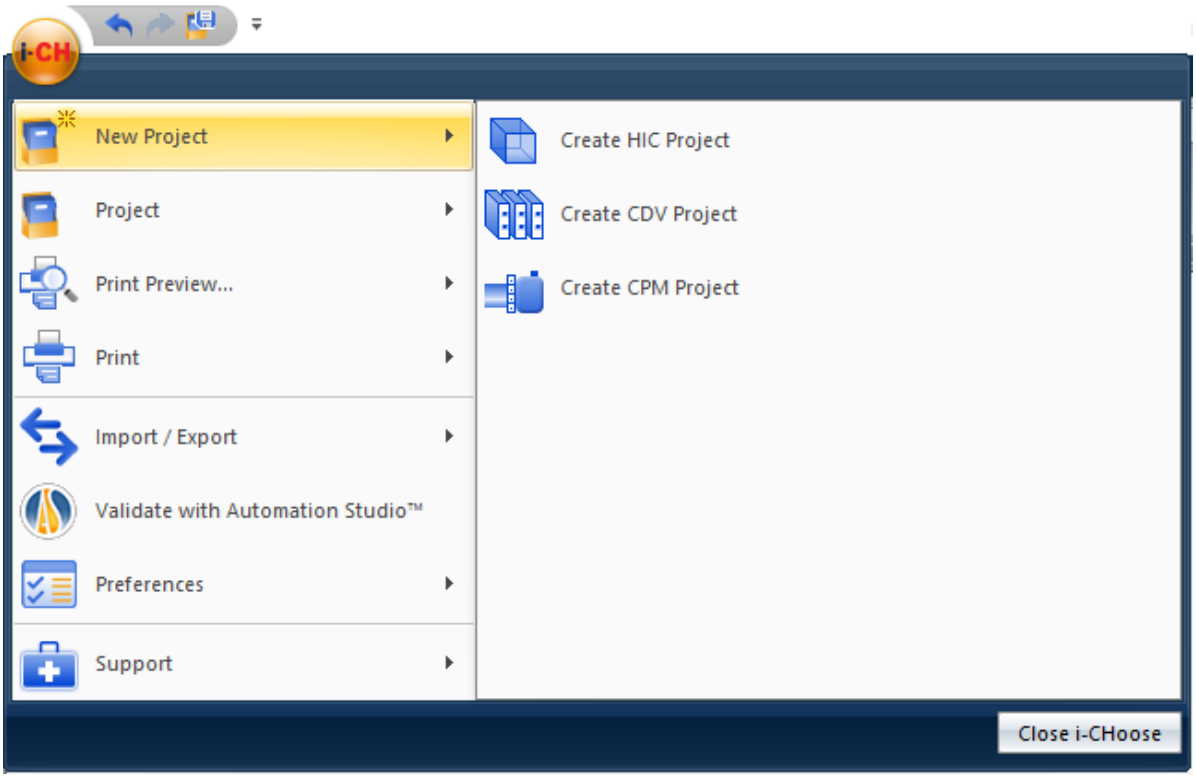
2.2.1.1 Content of the Menu

The menu contents are:

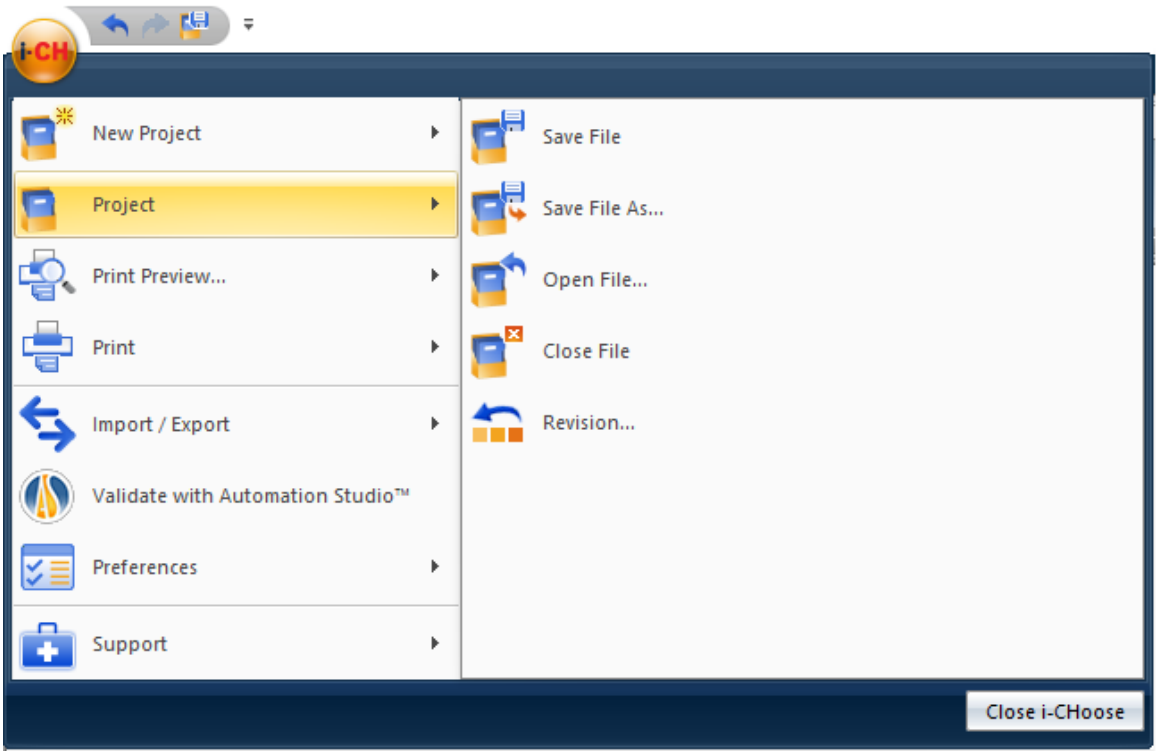
1. Nothing Selected → Recent Documents



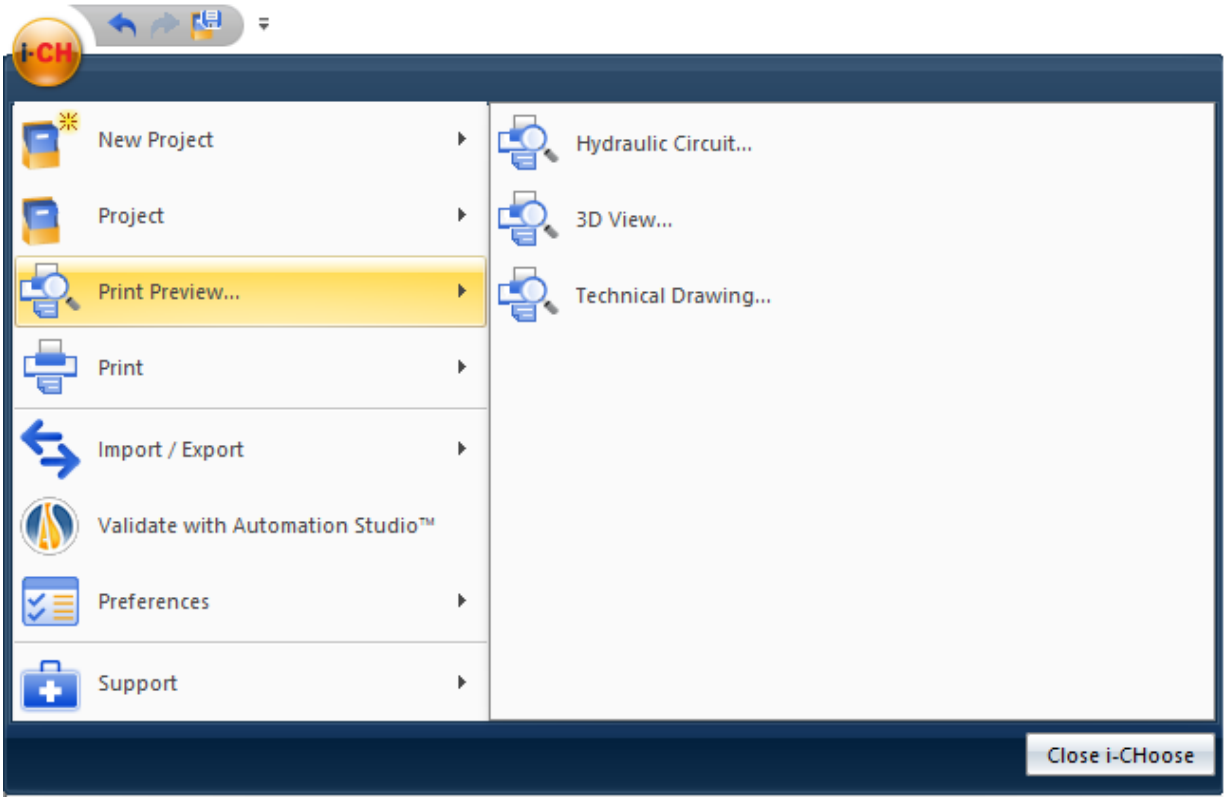
2. New Project



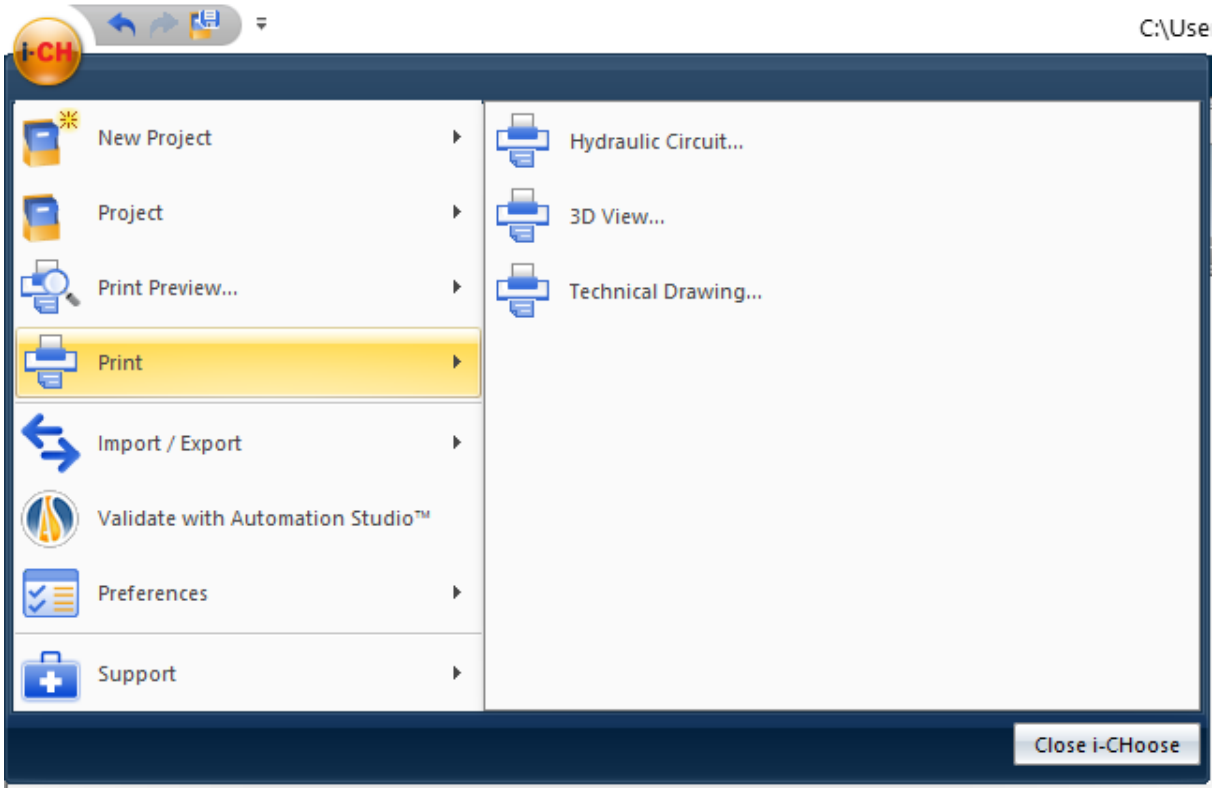
3. Project



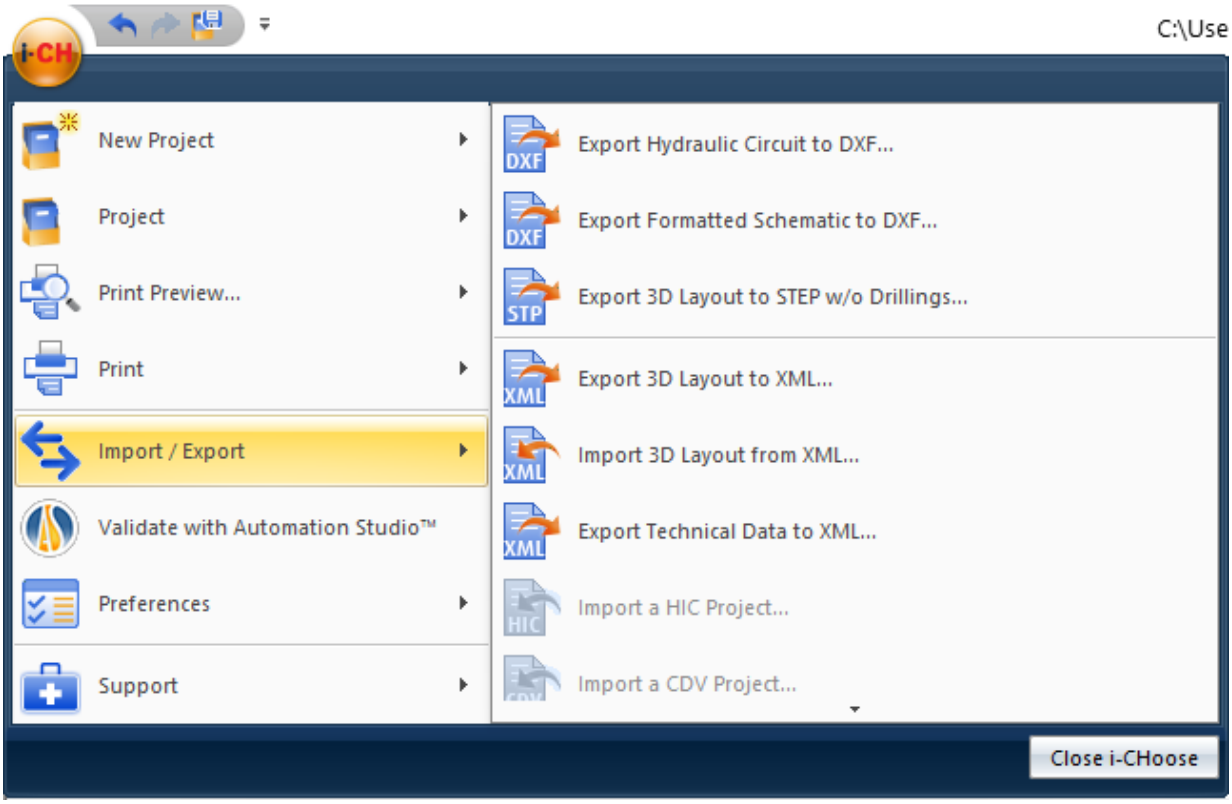
4. Print Preview



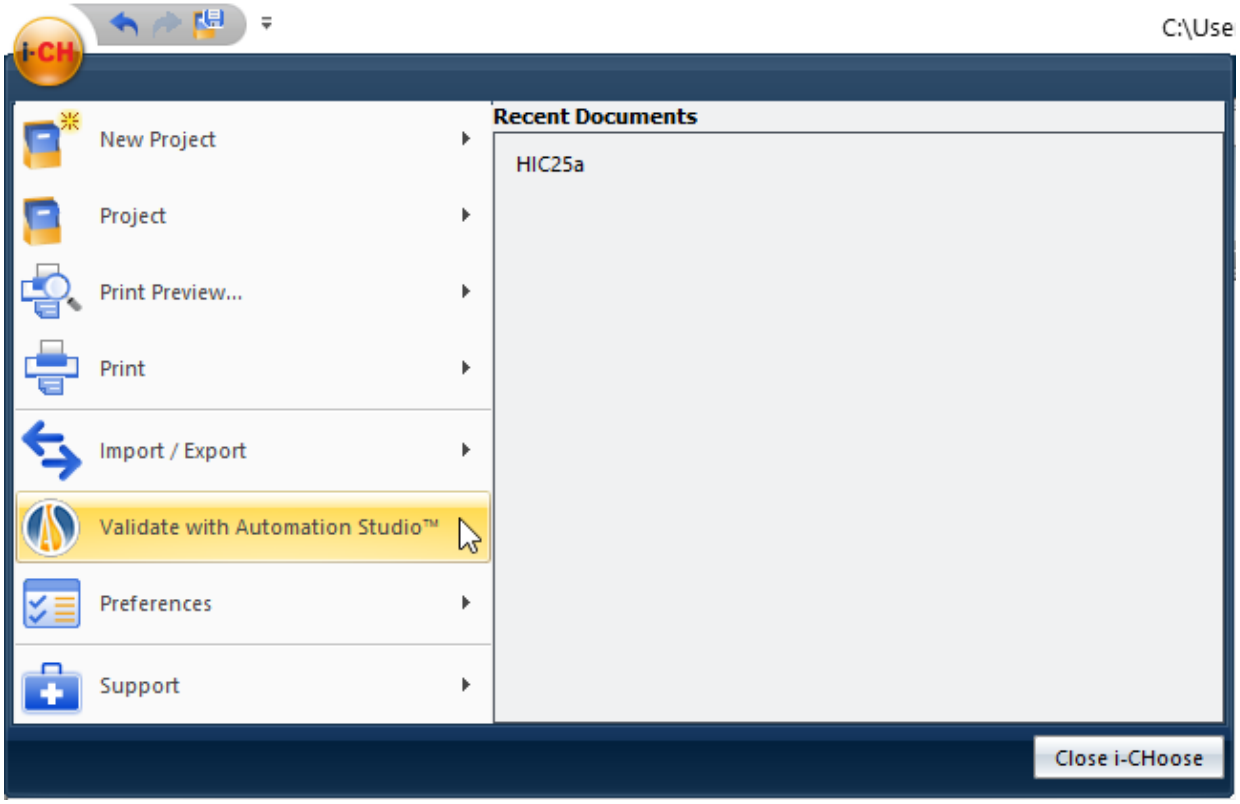
5. Print



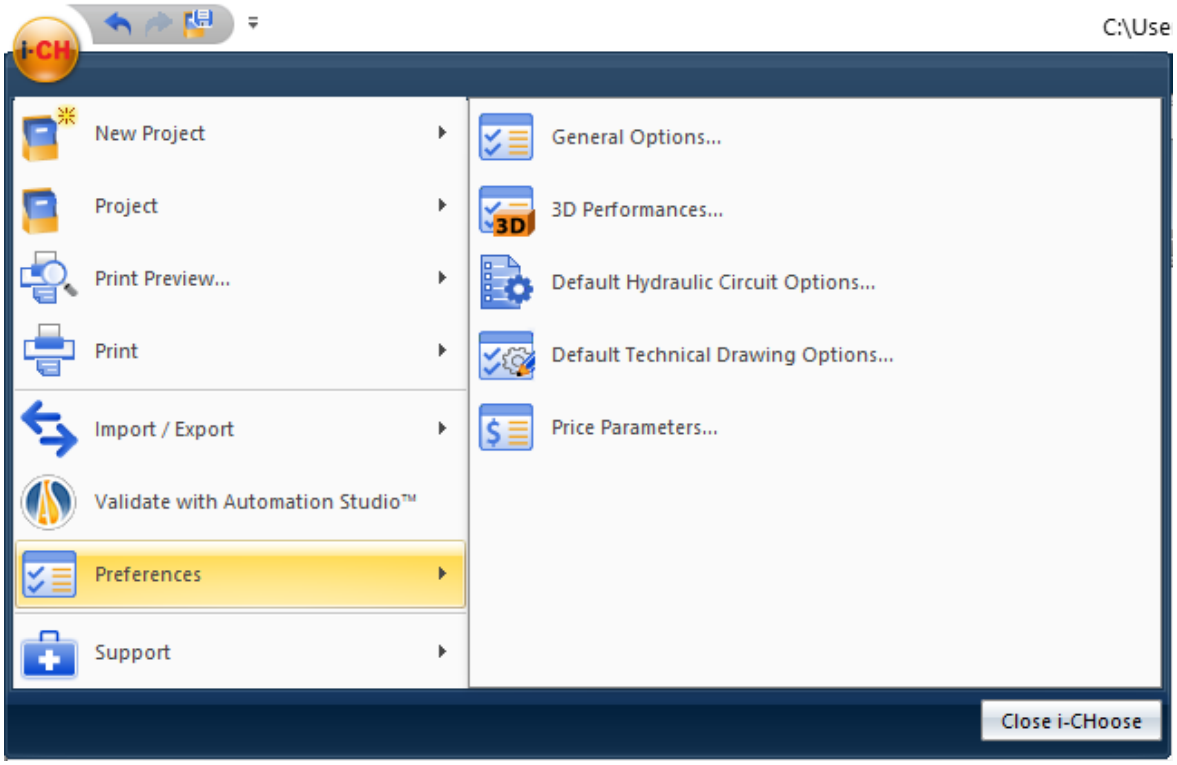
6. Import / Export



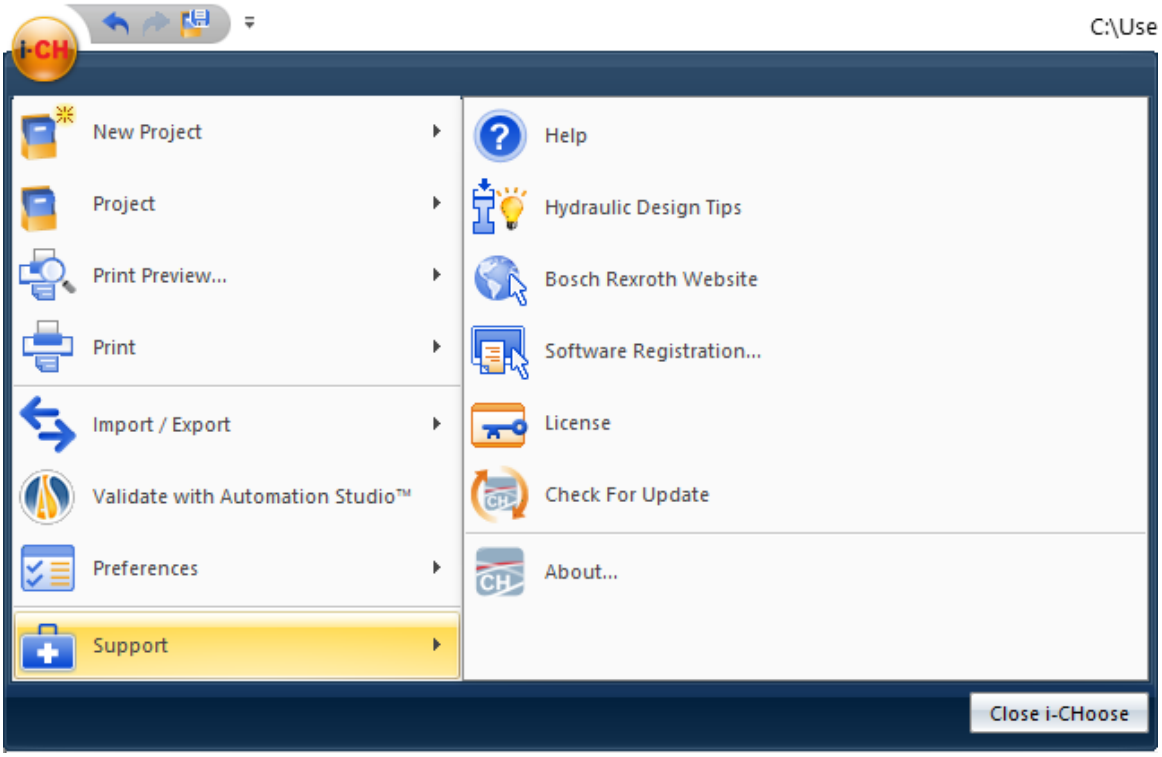
7. Validate with Automation Studio™



8. Preferences



9. Support



2.2.1.2 Design Toolbar

2.2.1.2.1 Hydraulic Circuit (Schematic)

The “Design” toolbar is used to quickly access the explorer, clipboard, drawing, connection line, layout and settings groups:

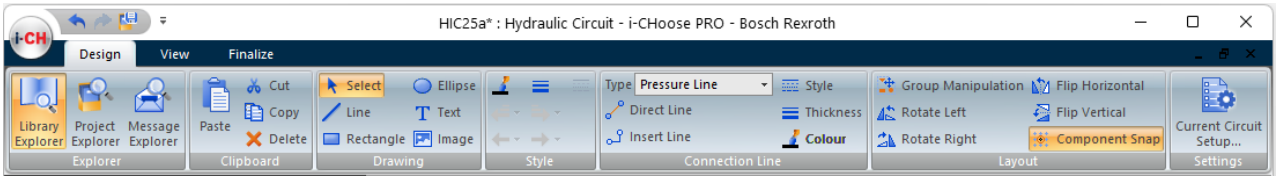


Figure 2-5: Design Toolbar (Hydraulic Circuit)

Explorer Group:

Button	Description	Function
	Library Explorer	Opens/Closes the Library window
	Project Explorer	Opens/Closes the Project Explorer window
	Message Explorer	Opens/Closes the Error List & Messages window

Clipboard Group:

Button	Description	Function
	Paste	Pastes the content of the clipboard
	Cut	Cuts the selection
	Copy	Copies the selection to the clipboard
	Delete	Deletes the selected items

Drawing Group:

Button	Description	Function
	Select	Returns the mouse pointer to the normal mode when creating graphical elements.
	Line	Inserts a line
	Rectangle	Inserts a rectangle
	Ellipse	Inserts an ellipse
	Text	Inserts text
	Image	Inserts an image
	Style	Modifies the line style of a graphical element
	Thickness	Modifies the thickness of a graphical element
	Color	Modifies the color of a graphical element

Connection Line Group:

Button	Description	Function
Pressure Line	Line Type	Modifies the selected lines' types or the default line type if no line is selected.
	Direct Line	Transforms an orthogonal connection line into a straight line between two connection points
	Insert Line	Inserts a connection line
	Line Style	Modifies the selected lines' style
	Line Color	Modifies the selected lines' color
	Line Thickness	Modifies the selected lines' thickness

Layout Group:

Button	Description	Function
	Group Manipulation	Rotates the selection (group) to the right
	Rotate Left	Rotates the active component 90 degrees left
	Rotate Right	Rotates the active component 90 degrees right
	Flip Horizontal	Flips the active component over a vertical axis
	Flip Vertical	Flips the active component over a horizontal axis
	Component Snap	Snaps the component to the grid

Settings Group:

Button	Description	Function
	Current Circuit Setup…	Opens the "Current Hydraulic Circuit Options" dialog

2.2.1.2.2 3D Layout

Some features are specific to the *3D Layout*:

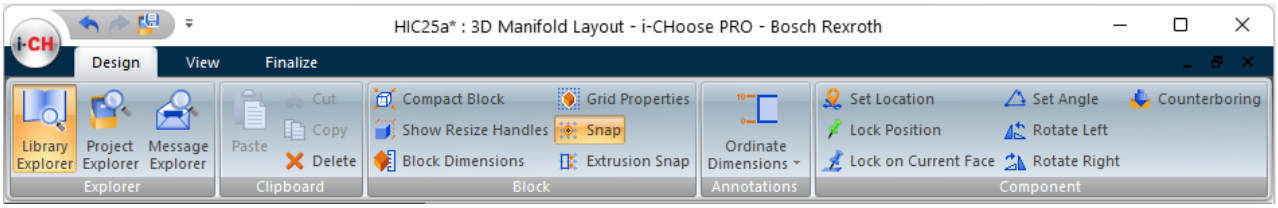


Figure 2-6: Design Toolbar (3D Layout)

Block Group (HIC Only):

Button	Description	Function
	Compact Block	Shrinks the block manifold dimensions to its minimum without moving any components
	Show Resize Handles	Displays the resize handles which are used to resize the block manifold by dragging its edges while in "flat" mode in the 3D layout display
	Block Dimensions	Opens the dialog that is used to manually define the block dimensions
	Grid Properties	Defines the grid spacing

Button	Description	Function
	Component Snap	Snaps the component to the grid

Dimensions Group:

Button	Description	Function
	Create Dimension	Draws dimensions: linear or ordinate

Component Group:

Button	Description	Function
	Component Location*	Define the component location
	Lock Component Position*	Locks a component in its current position (HIC Project)
	Restrict Component to Surface*	Locks a component to the current manifold face (HIC Project)
	Set Angle*	Defines the component angle
	Rotate Left	Rotates the active component 90 degrees left
	Rotate Right	Rotates the active component 90 degrees right
	Counterboring*	Define the counterbore parameters

* HIC Only

2.2.1.3 View Toolbar

2.2.1.3.1 Hydraulic Circuit (Schematic)

The "View" toolbar is used to quickly access the various visualization functions:

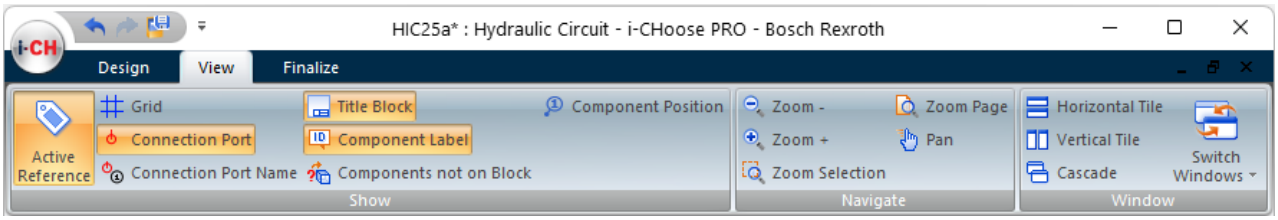


Figure 2-7: View Toolbar

Show Group:

Button	Description	Function
	Grid	Displays/Hides the grid
	Connection Port	Displays/Hides the connection port
	Connection Port Name	Displays/Hides the connection port name
	Reference	Displays/Hides the component references
	Title Block	Displays/Hides the title block
	Component Label	Displays/Hides the component labels
	Component Position	Displays/Hides the item position
	Components not on block*	Highlights/Unhighlights the components that are not yet positioned on the block

* HIC Only

Navigate Group:

Button	Description	Function
	Zoom Out	Zooms out of the design by 25%
	Zoom In	Zooms into the design by 25%
	Zoom Selection	Zooms into a specific selection
	Zoom Page	Zooms in order to display the whole page on the screen
	Pan	Pans the schematic (Moves the page)

Window Group:

Button	Description	Function
	Horizontal Tile	Arranges the windows in a horizontal tile layout
	Vertical Tile	Arranges the windows in a vertical tile layout
	Cascade	Arranges the windows in a cascade layout
	Switch Windows	Switch the active window

2.2.1.3.2 3D Layout

Some features are specific to the *3D Layout*:

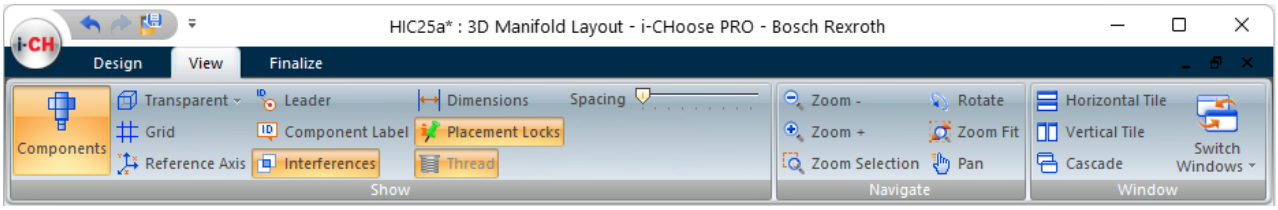


Figure 2-8: View Toolbar (3D Layout)

Show Group:

Button	Description	Function
	Components*	Displays/Hides the components in the 3D layout view
	Transparency	Displays the block in one of the 3 following states: Opaque, Transparent or Invisible. (Opaque view by default)
	Grid*	Displays/Hides the grid
	Reference Axis*	Displays/Hides the reference axis
	Leader	Displays/Hides the satellite owner
	Component Label	Displays the component IDs
	Interferences*	Displays/Hides the interferences
	Dimensions*	Displays/Hides the dimensions
	Placement Locks*	Displays/Hides the placement locks
	Thread	Displays/Hides the cavity threads
	Spacing	Adds and increases the spacing between 3D Objects

* HIC Only

Navigate Group:

Button	Description	Function
	Rotate	Used to rotate the block in the layout display

2.2.1.4 Finalize Toolbar

The "Finalize" toolbar is used to quickly access the various functions available in the "Edit/View" menu:

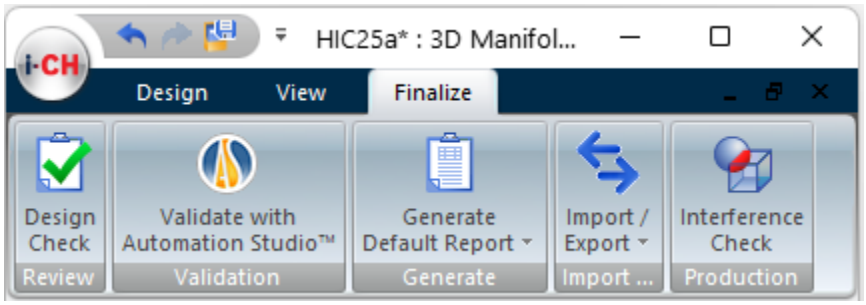


Figure 2-9: Finalize Toolbar

Review Group:

Button	Description	Function
	Design Check	Verifies the configuration rules

Validation Group:

Button	Description	Function
	Validate with Automation Studio™	Exports the schematic into an Automation Studio compatible format in order to simulate and validate it.

Generate Group:

Button	Description	Function
	Generate Report(s)	Generates the assembly report depending on the user rights (Sales Manager, Distributor or OEM)

Import/Export Group:

Button	Description	Function
	Import/Export	Exports the document in the selected format or opens the imported compatible format

Production Group:

Button	Description	Function
	Interference Check	Verifies all the 3D object interferences

2.2.2 Project Explorer

The "Project Explorer" lists all the opened projects and is used to select the interface that will appear in the main display area. The user has the choice between six interfaces. These interfaces are:

Project Type	Choice	Impact
HIC CDV CPM	Project Parameters	Takes the user to the "Project Parameters" page in the main display.
	Hydraulic Circuit	Takes the user to the "Hydraulic Circuit" page in the main display.
	3D Layout	Takes the user to the "Isometric Layout" page view in the main display.
	Part List	Takes the user to the "Part List" page in the main display.
	Technical Data (HIC only)	Takes the user to the "Technical Data" page in the main display.
	Technical Drawing	Takes the user to the "Technical Drawing Layout" page in the main display

The project explorer window is opened and closed with the "Project Explorer" button  located in the "Design" toolbar.

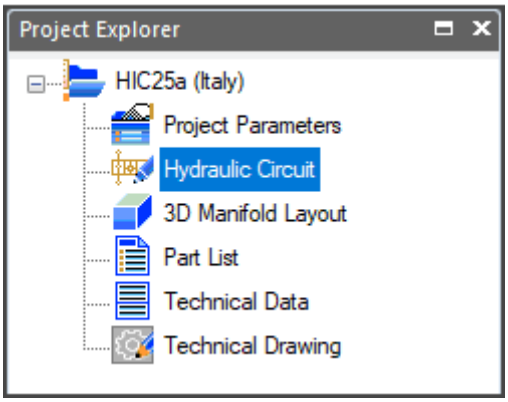


Figure 2-10: Project Explorer (HIC Example)

2.2.2.1 Multiple Projects Management

When several projects are opened during the same work session, they will all be listed in the "Project Explorer" window. It is then possible to copy and paste components from the "Hydraulic Circuit" interface of a project to another one (As long as the project types are the same, HIC/HIC; CDV/CDV, etc, …).

It is also possible to use the tiled or cascade functions in the "Window" menu to display one or more projects at a time.

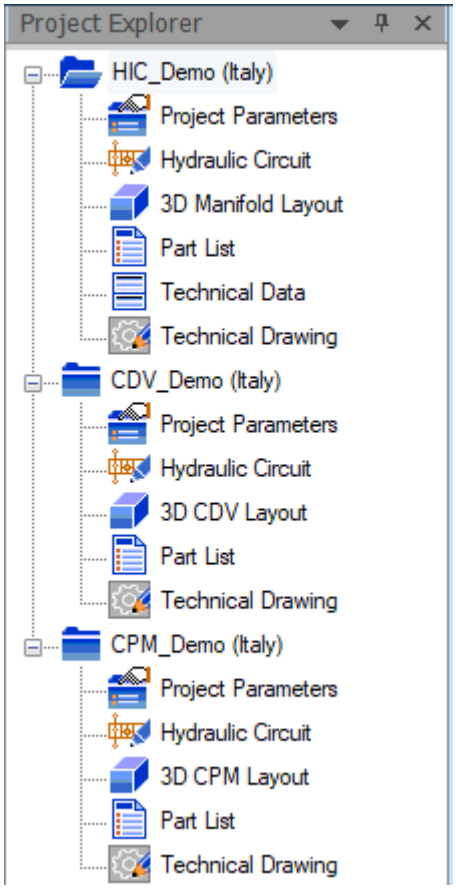


Figure 2-11: One of each project type listed in the Project Explorer

2.2.2.2 Project Explorer Contextual Menu

In the “Project Explorer” window, right-click on a project name to access its contextual menu.

The “Project Explorer” contextual menu is used to:

1. Save the current project;
2. Close the current project;
3. Rename the current project;
4. Access the “Revision History” dialog box.

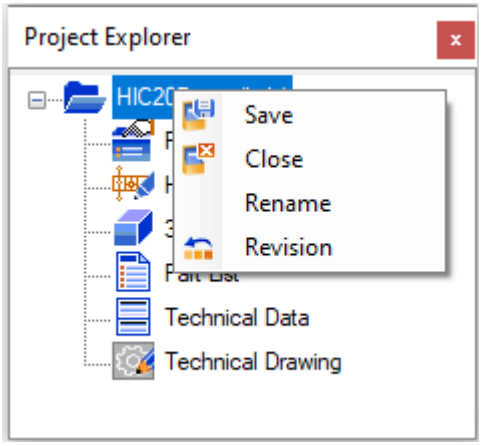


Figure 2-12: Project Explorer Contextual Menu

2.2.3 Main display

The main display will change with respect to the interface selection that has been made. As discussed previously, the main display will have six interfaces:

1. Project Parameters;
2. Hydraulic Circuit;
3. 3D Manifold Layout (HIC) or 3D CDV Layout (CDV) or 3D CPM Layout (CPM);
4. Part List
5. Technical Data (HIC Only)
6. Technical Drawing.

2.2.4 Warning Messages

Errors and Warning messages are displayed to inform the user that some rules have not been respected during the design phases. These messages could appear while working in all six interfaces (document types).

An indication that a message is pending appears in the status bar at the bottom of the application window.

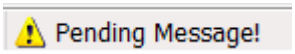


Figure 2-13: Pending Message in the Status Bar

To make the warning disappear from the status bar, open the "Error List & Messages" window. There are two ways to open it:

1. Click on the warning message directly in the status bar;
2. Click on the "Message Explorer" button in the "Explorer" group of the toolbar. This will open the "Error List & Messages" window if it was closed or close it if it was opened.

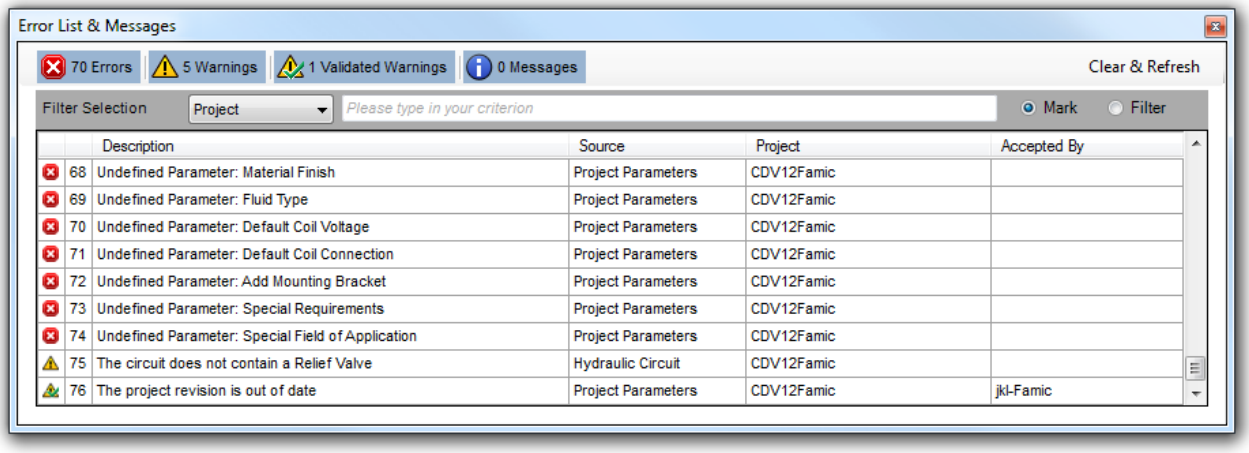


Figure 2-14: Errors/Warnings in the Error List & Messages Window

The "Error List & Messages" window lists all the errors, warnings and messages that have been displayed in the current work session. To clear the messages, click on the "Clear & Refresh" button located on the top-right of the window.

2.3 Working with Project Files

2.3.1 Creating a New File

To create a new file:

3. Select the “New Project” command from the “i-CHoose” menu;
4. Select the project type (HIC, CDV or CPM).

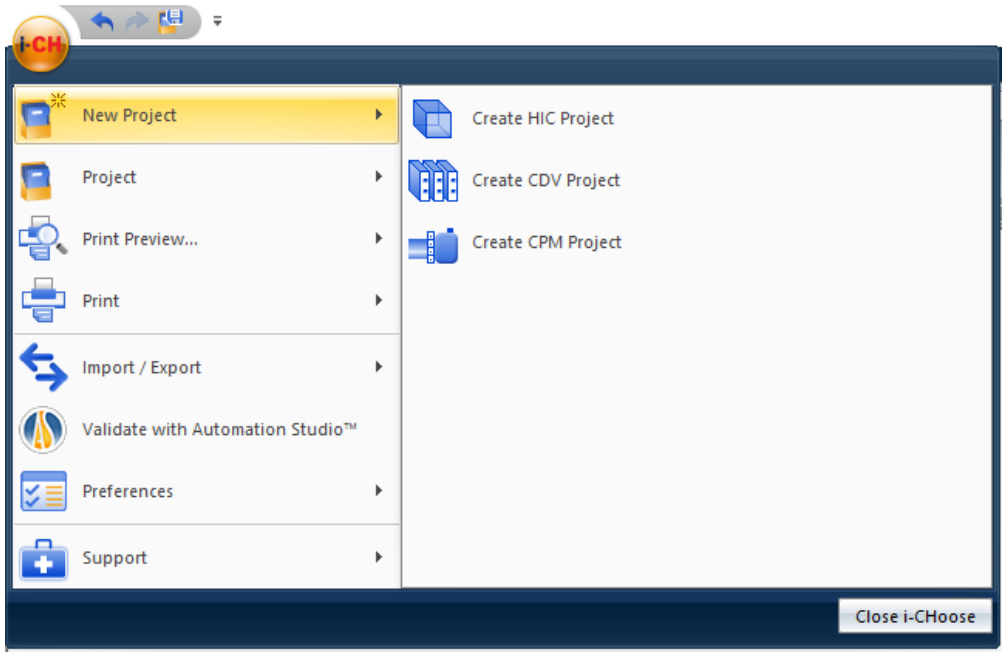


Figure 2-15: “New Project” Menu

This will create a new project that appears in the “Project Explorer”. When a project is created it will have a default name. It can be renamed at any time.

Users can also click on the desired project type button from the “New Project” section of the “Welcome Screen” to create a new project file.

2.3.2 Opening a File

To open a file:

1. Select the “Open File” command in the “i-CHoose / Project” menu;

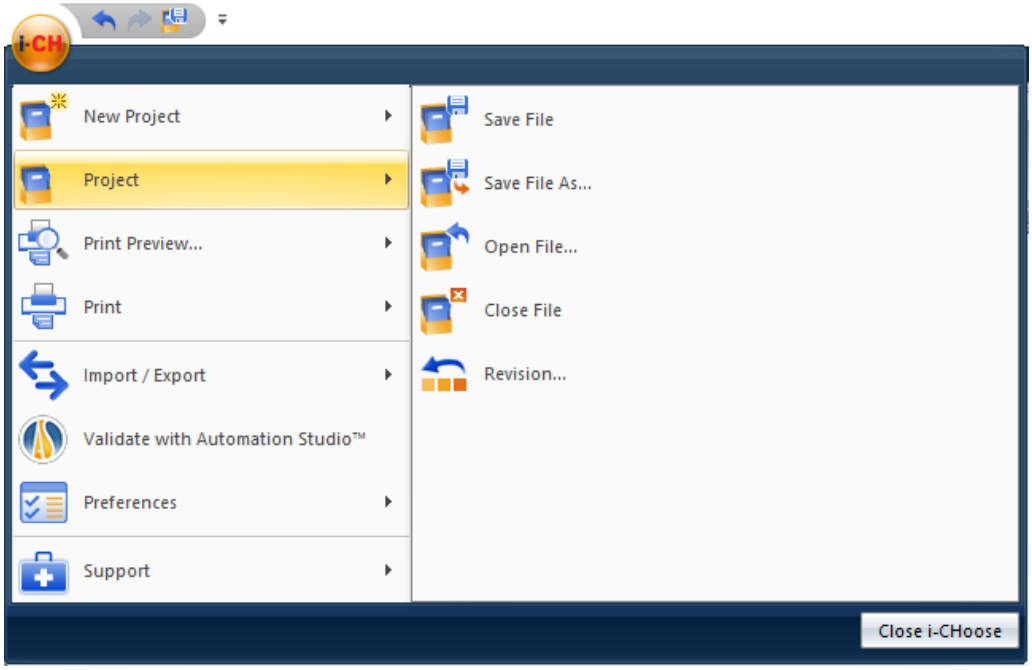


Figure 2-16: Project / Open File Menu

A standard Windows browser for file opening appears.

2. Use the browser to find the desired file with the extension .ch3d or .chTemplate, which are respectively the i-CHoose project and i-CHoose template format and select it;

3. Click on the “Open” button.

The project opens and appears in the “Project Explorer”. All saved information is retrieved and all interfaces, options and information are updated accordingly.

Users can also click on the “Open Project” button from the bottom section of the “Welcome Screen” to open an existing project file.

Notes:

The symbols and underlying configuration features do not update automatically when a project is loaded. That is, the symbol and configuration are specific to a project. If there is any doubt that the symbol or features have been updated, the user should re-insert the component into the project. The symbols and configuration features are part of the component database. The revision level of the component database can be found in the “About” dialog box under the “Help” menu.

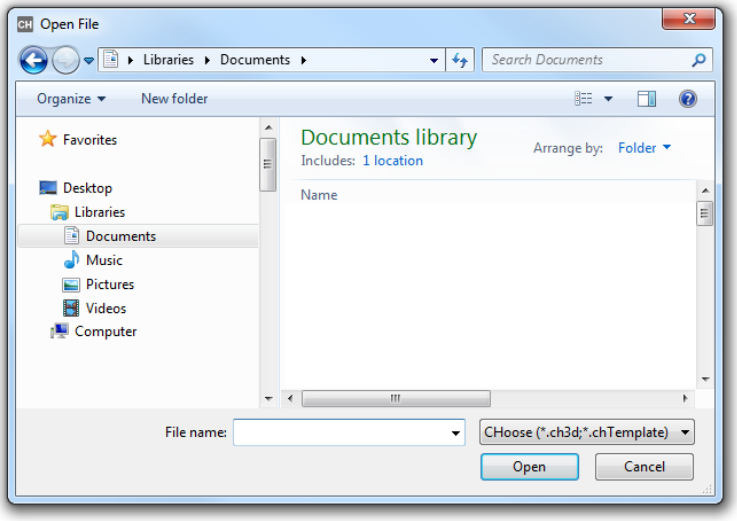


Figure 2-17: File Opening Browser

2.3.3 Saving a File

Three options are available to save a project:

1. Select the “Save File” command from the “i-CHoose / Project” menu;

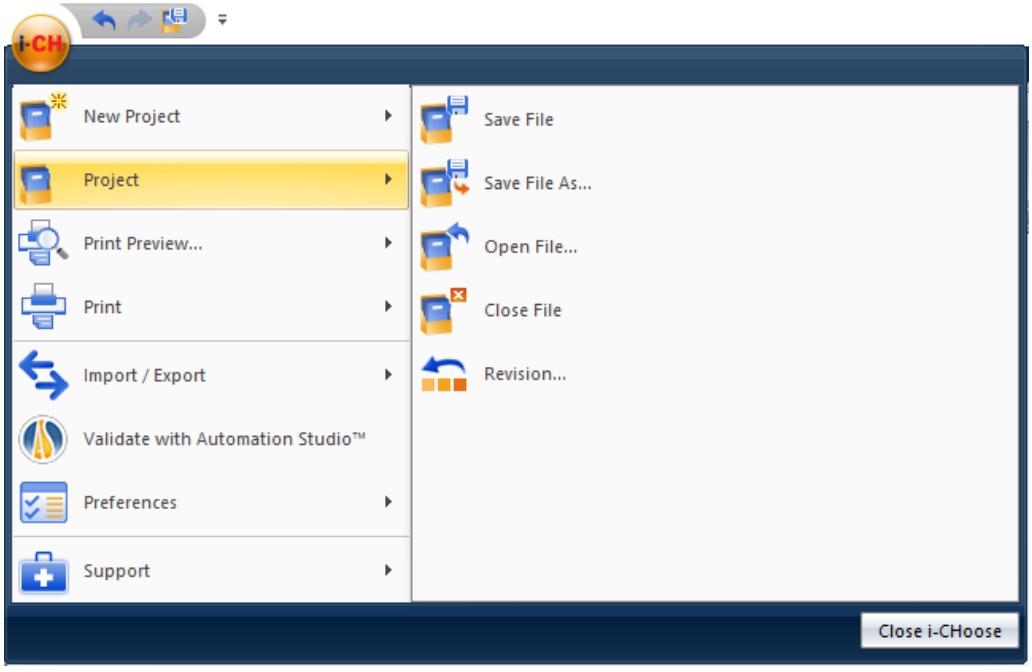


Figure 2-18: Project / Save File Menu

Or

1. Click on the “Save File” button in the “Quick Access” toolbar;

Or

1. Use the “Save” command from the contextual menu in the “Project Explorer” (right-click on the project name);

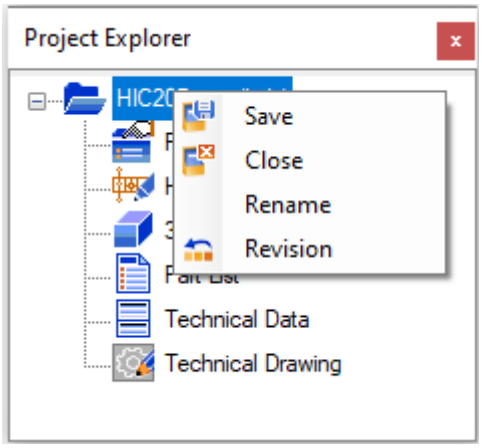


Figure 2-19: Contextual Menu

If the file has not been previously saved, the browser window opens. If the file has been previously saved, the application will overwrite the last saved file version.

2. Select the folder where the file will be saved;
3. Type the name of the file in the "File Name" field;
4. Click on the "Save" button.

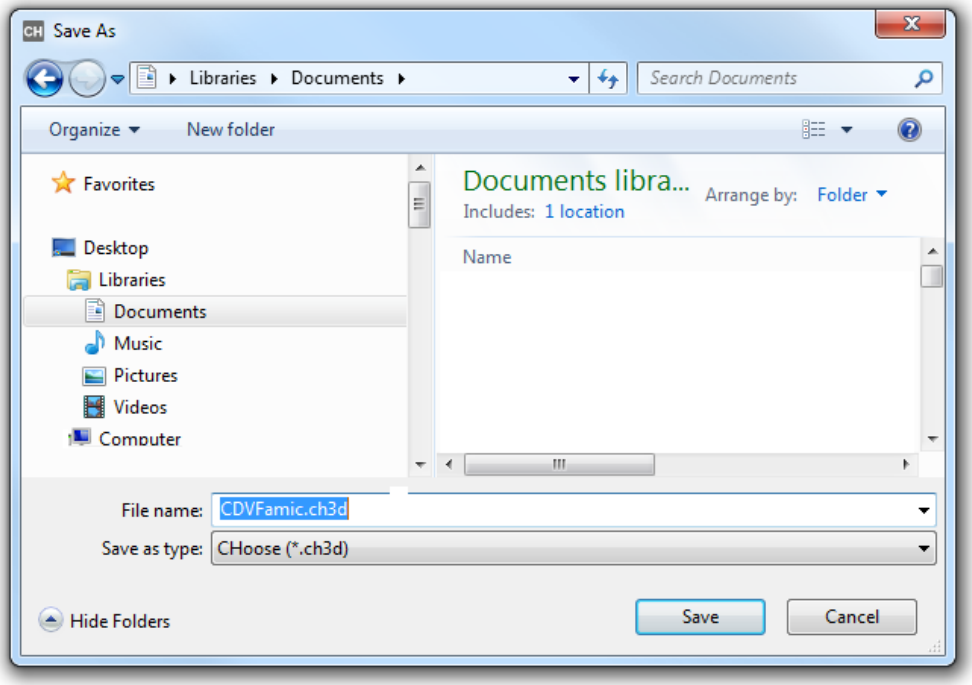


Figure 2-20: File Saving Browser

Note: To help in the design process, the software provides methods to build project templates. The user can save a project as a template file and re-use it later. (Example: Fan Drive Application.**chTemplate**)

These templates can be used to start new projects.

2.3.4 Saving a File As…

Using the "Save As…" command is the same as using the "Save" function for the first time. It is mostly used to save the file with a different name or to create a backup.

Note: If you rename the file in Windows Explorer, the project name will be modified in i-CHoose. The project name and file name are linked.

2.3.5 Printing the Current Configuration

The manifold configuration can be printed at any time during the design process. Whether in the "Hydraulic Circuit" or in the "3D Layout" interface, the user has the option to choose what to send to the printer.

To print the current project configuration:

1. Select the "i-CHoose" menu → "Print" → "Hydraulic Circuit", "3D View" or "Technical Drawing";

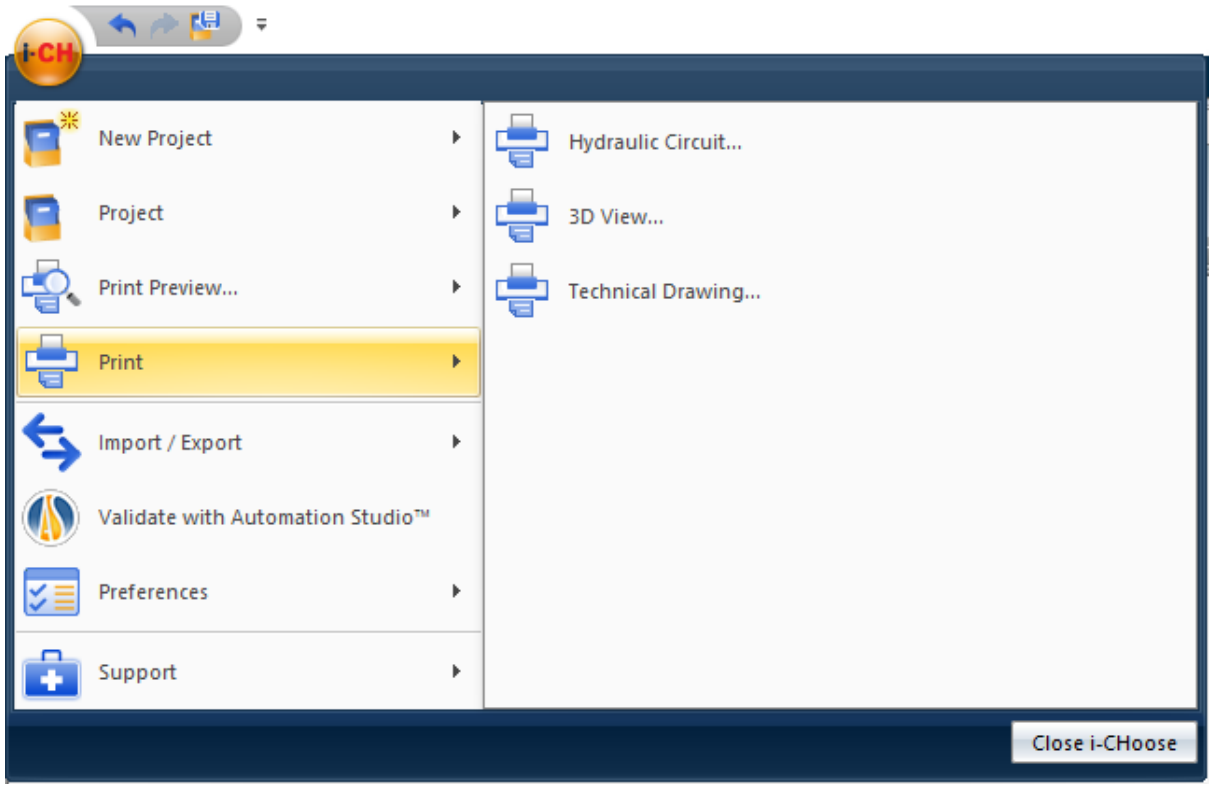


Figure 2-21: Print Menu

2. Select the options that pertain to the printer set-up and print location in the dialog box;
3. Click on OK;
4. The chosen interface will be sent to the printer.

2.3.6 Previewing the Printing of the Current Configuration

To preview the current manifold configuration:

1. Select the "i-CHoose" menu" → "Print Preview" → "Hydraulic Circuit", "3D Layout" or "Technical Drawing";

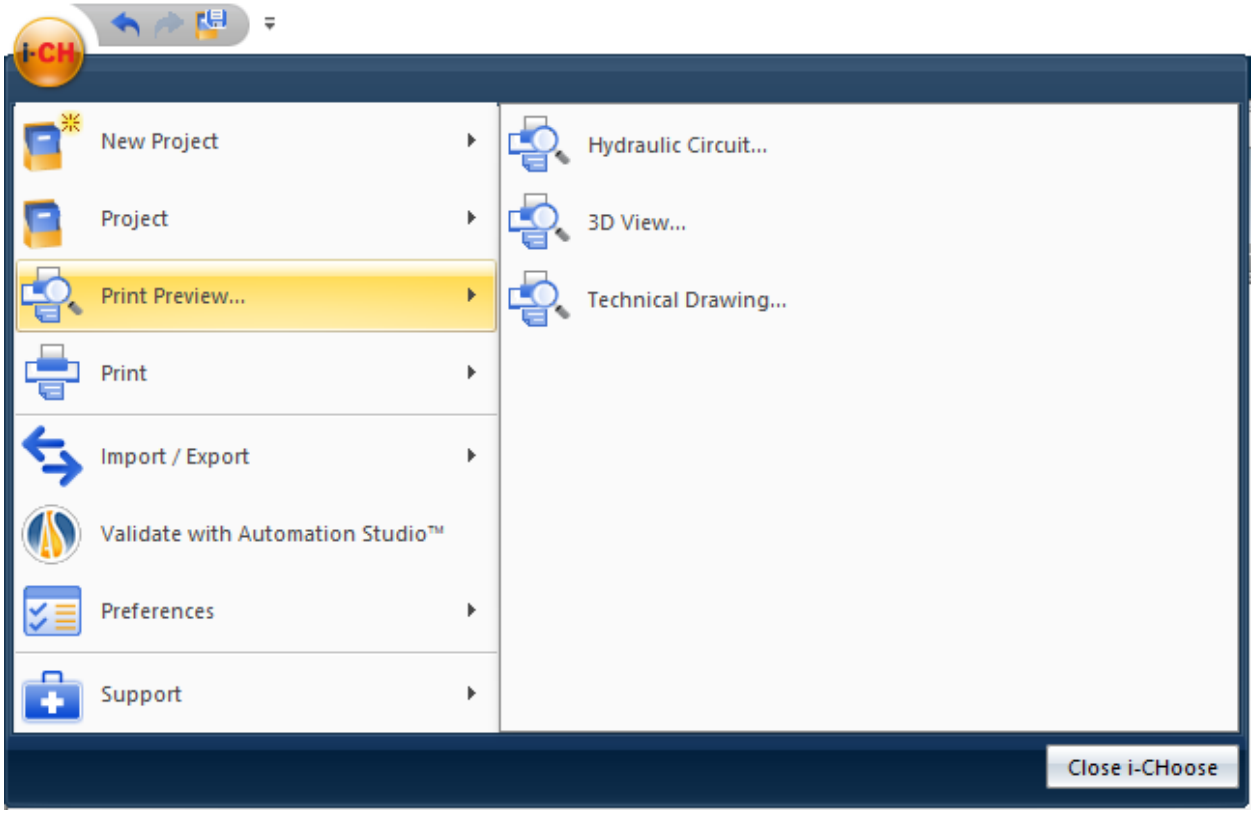


Figure 2-22: Print Preview Menu

2. Select the options that pertain to the printer set-up and location in the print dialog;
3. Click on OK;
4. The current configuration will be displayed on the screen in a “Print Preview” window;

2.3.7 Importing and Exporting

2.3.7.1 Exporting to DXF or to STEP

To export a diagram to a DXF or STEP file format:

1. Select the “i-CHoose” menu → “Import/Export” → “Export to DXF” or “Export to STEP” command;

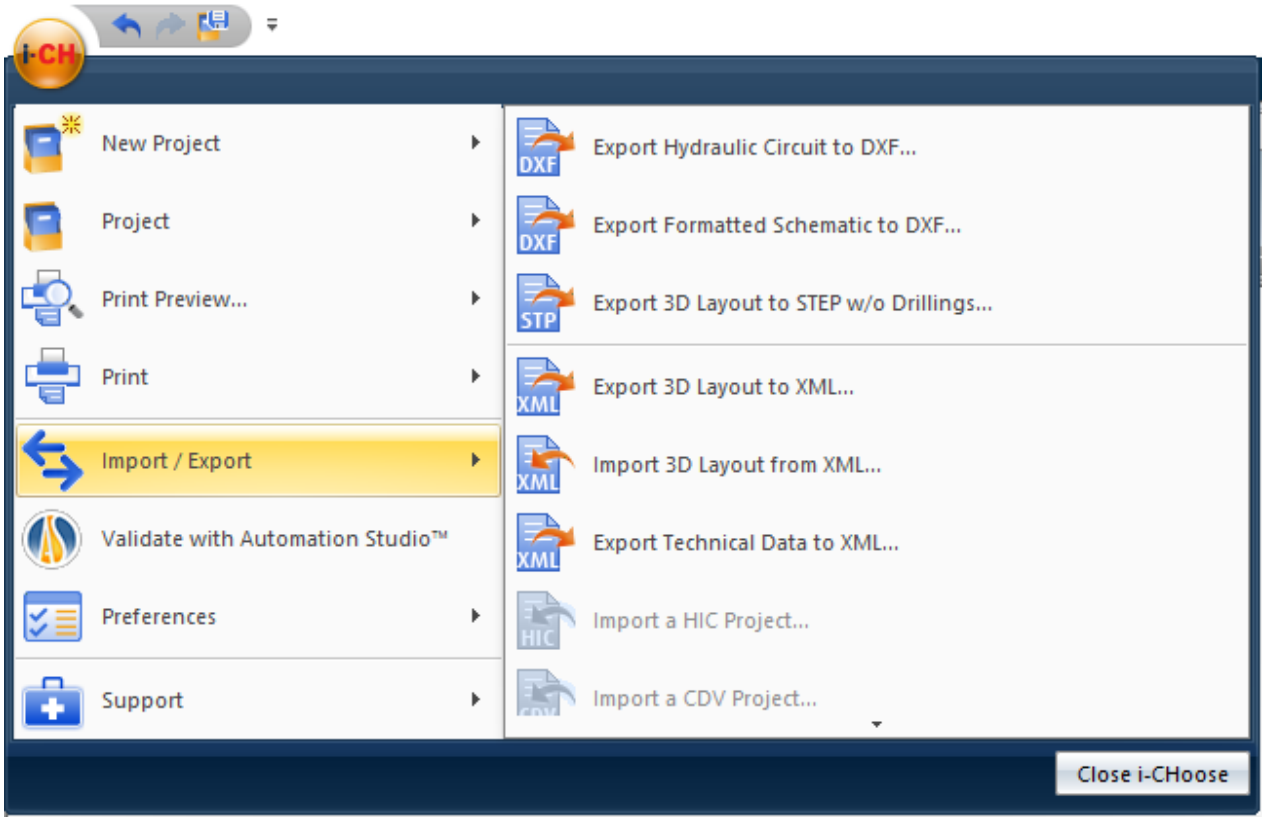


Figure 2-23: Import / Export Menu

A "Save As…" dialog box opens.

2. Select the desired folder to save to;
3. Click on the "Save" button.

Note: The .dxf format used is compatible with AutoCAD® 2000 and later revisions.

2.3.7.2 Exporting 3D Layout to XML

To export the component 3D position information into an XML file:

1. Select the "i-CHoose" menu → "Import/Export" → "Export 3D Layout to XML" command;

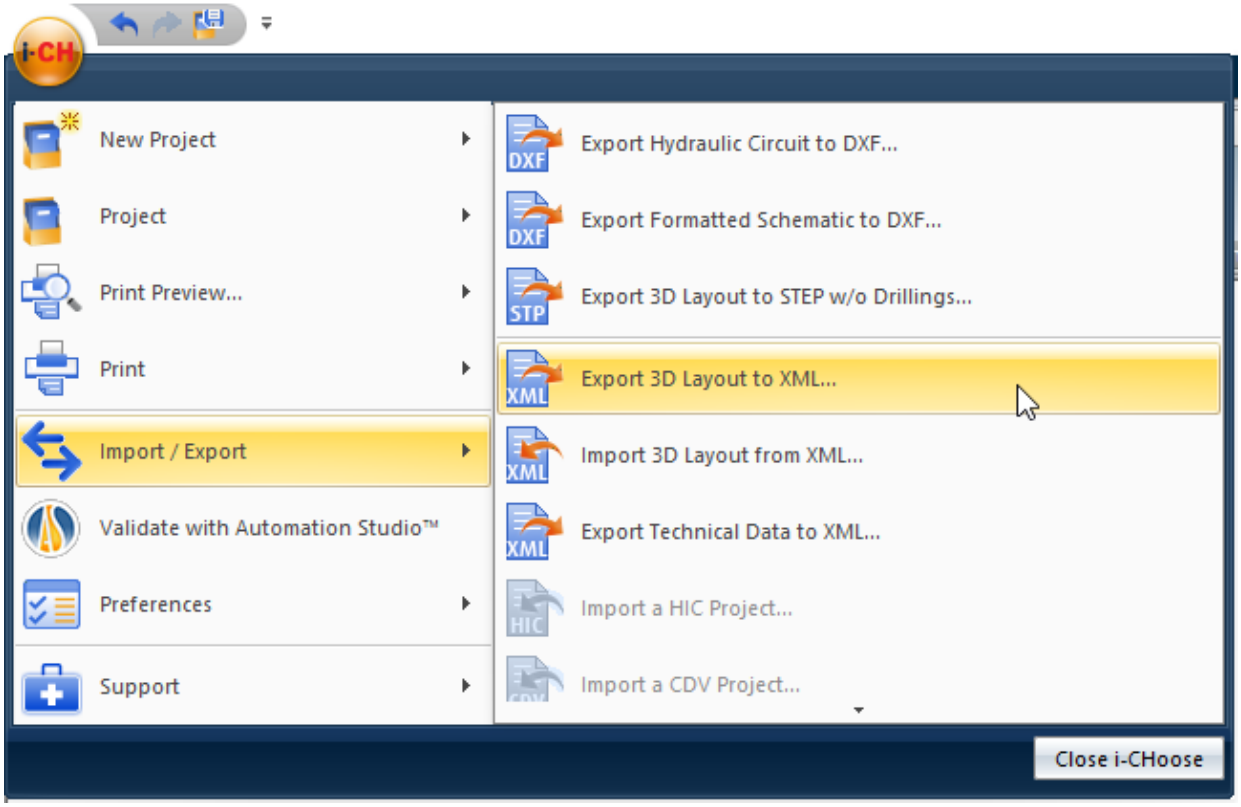


Figure 2-24: Export 3D Layout to XML Menu

A "Save As" dialog box opens.

2. Select the folder to save to;
3. Click on the "Save" button.

Note: All the components are exported to the XML file, even if they are not inserted on the manifold block.

2.3.7.3 Importing from XML 3D

To import the components' 3D positions in the current project from an XML file:

1. The selected manifold project must use the components listed in the XML file you want to import.
2. Select the "i-CHoose" menu → "Import/Export" → "Import 3D Layout from XML" command;

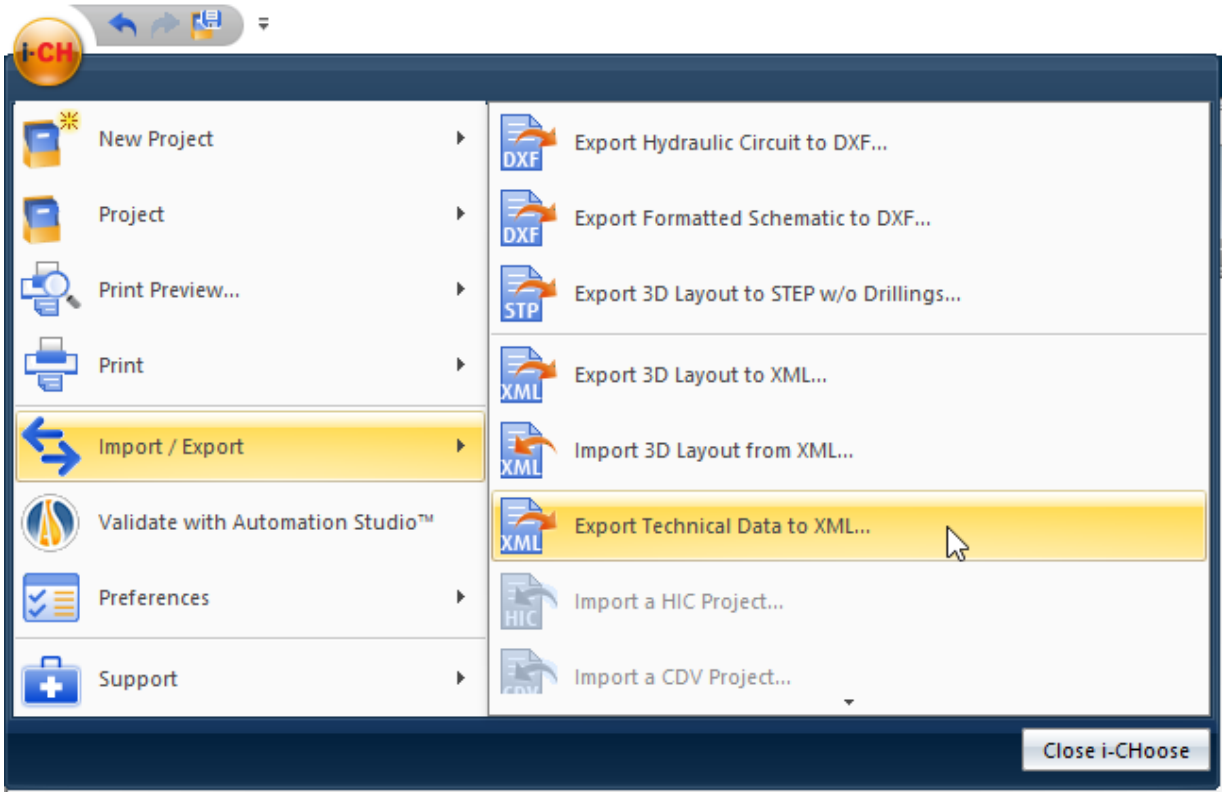


Figure 2-25: File Menu (Import 3D Layout from XML)

An "Open" dialog box appears.

3. Select the .xml file to import;
4. Click on the "Open" button.

Note: The positions of the components listed in the XML file will be automatically updated in i-CHoose. The manifold layout views will be refreshed accordingly.

2.3.7.4 Importing a HIC project in a CDV Project (CDV or CPM Project Only)

It is possible to import a HIC block into a CDV or CPM Project. To do this, select the "i-CHoose" → "Import / Export" → "Import a HIC Project…" command. The user may then select the .ch3d file to import

2.3.7.5 Importing a CDV project in a CPM Project (CPM Project Only)

It is possible to import a CDV assembly into a CPM Project. To do this, select the "i-CHoose" → "Import / Export" → "Import a CDV Project…" command. The user may then select the .ch3d file to import

2.3.7.6 Exporting to Automation Studio

To export to Automation Studio:

1. Select the "i-CHoose" menu → "Validate with Automation Studio™" command;

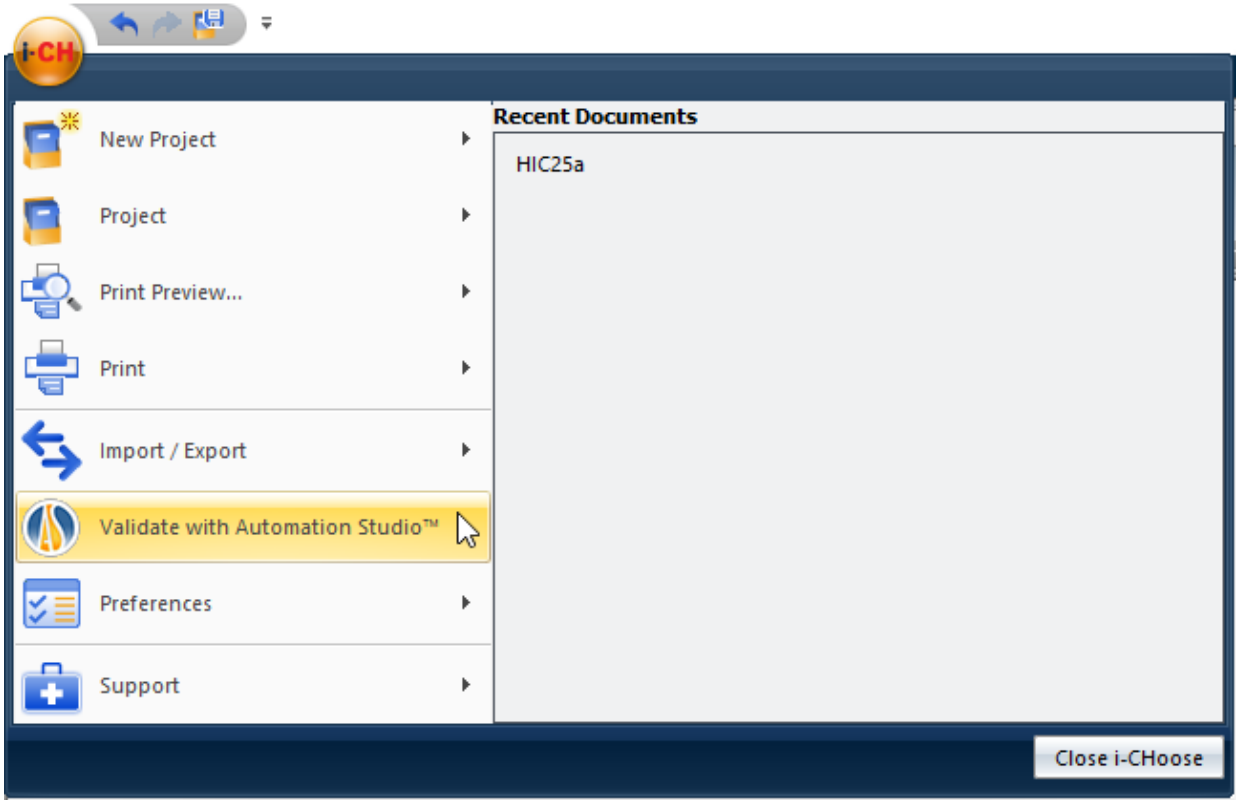


Figure 2-26: "Validate with Automation Studio" Menu

Figure 2-27: "Validate with Automation Studio" Dialog

A "Save As…" dialog box opens.

2. Select the desired folder to save to;
3. Click on the "Save" button.

Note: The .chx format used is compatible with Automation Studio version 6.0 and higher.

2.4 Software and files updates

You can check if new software releases or databases are available by using the "Support / Check for Update" Menu (an Internet connection is required for this feature to work properly).

The software update check can generate 3 cases:

- The update server is not responding

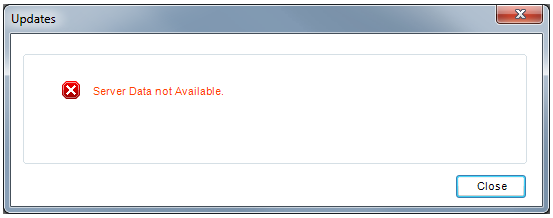


Figure 2-28: Data Server Not Available

- The update server does not have new versions

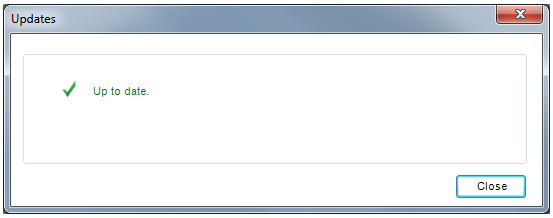


Figure 2-29: Software is Up-to-date

- The update server has an available update

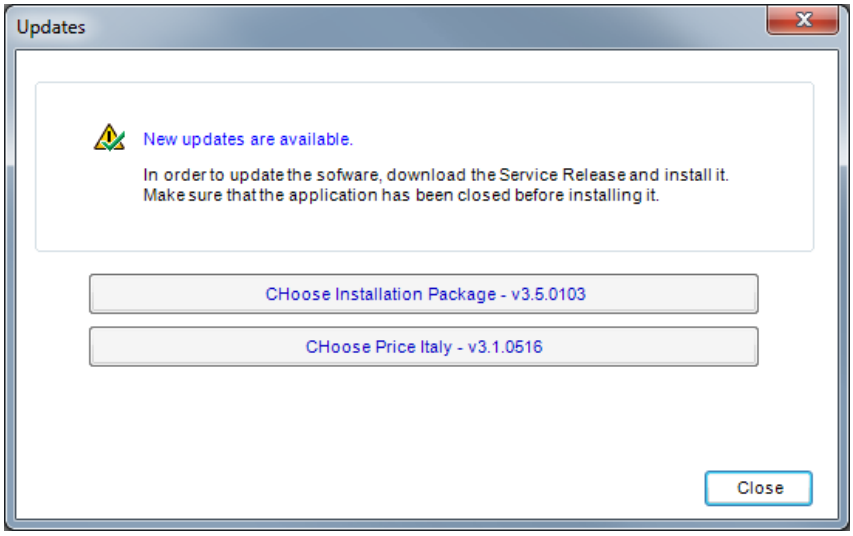


Figure 2-30: Software Updates are Available

You can click on the "i-CHoose Installation Package – v3.X.X.XXXX" button or the "i-CHoose Price – vX.X.XXXX" button when available; otherwise the window can only be closed. This action launches the current browser with the Bosch Rexroth server address. The user can then download the latest version and install it on their computer (The **i-CHoose application must be closed prior to the update operation**).

3 Building a First Project

3.1 Creating a Manifold Project (HIC)

When you begin a new project, you will start on the “Project Parameters” page where specific technical parameters can be set as default values that will carry throughout all component selections. You may also choose to start on the Hydraulic Circuit page where you can quickly and easily create your circuit using the drag-and-drop feature. After designing the circuit, you can move on to the “3D Layout” page where you will specify the locations of the valves, ports and mounting holes, and define the maximum envelope dimensions. There is also a “Part List” that can be used to quickly review the bill of materials and manifold costs at any point throughout the design process. When the manifold design and layout is complete, the software has a built-in design check that will provide a variety of detailed errors and warnings for issues such as incomplete product specifications, errors in component size, pressure or flow setting, etc. You can then create the “Technical Drawing” where you can summarize all of the manifold assembly details by laying down on a single or multiple page(s) the schematic, the BOM and some of the 3D views which can be fully customized.

When you are ready to see the final draft of your project, you can generate a report. The report contains information from all parts of the project; customer or distributor information, technical parameters, the circuit schematic, the manifold layout, the bill of materials, warnings, and the revision history.

3.1.1 Project Parameters Interface

The first step in creating a new manifold design is to describe the project and its technical parameters. The project parameters interface is designed for this specific purpose. It allows the user to define the basic information needed to build a Bosch Rexroth custom manifold. This information can be general, commercial or technical. The interface is divided in four sections.

1. Project Information
2. Customer Information
3. Commercial Information
4. Technical Information

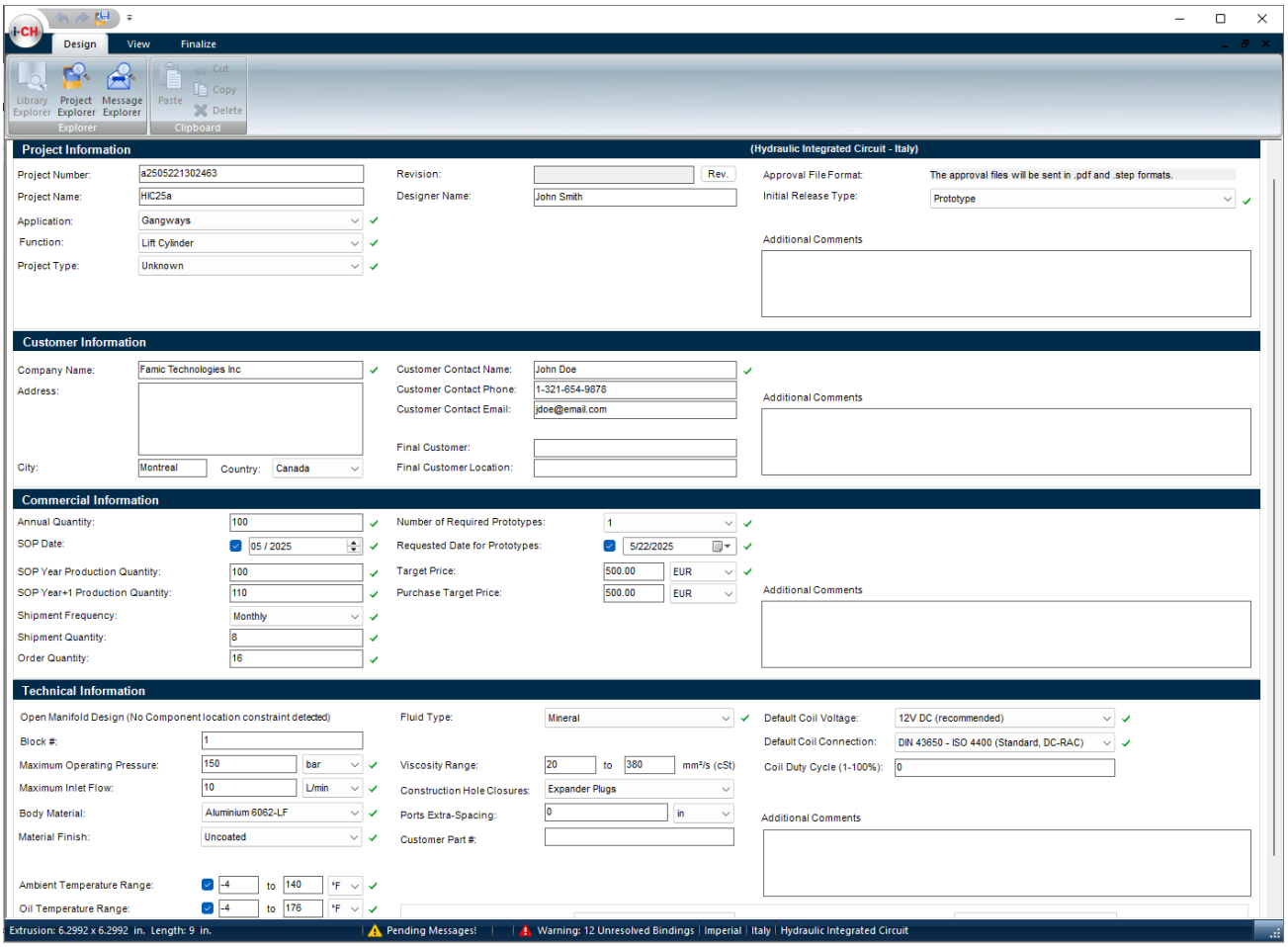


Figure 3-1: Project Parameters Interface for Manifold Projects

3.1.1.1 Accessing the Project Parameters Interface

To access the Project Parameters interface:

1. Open the “Project Explorer”;
2. In the desired project, click on the “Project Parameters” branch.

3.1.1.2 Project / Customer / Commercial Information

These sections are used for information purposes only. They will appear on the report and can be consulted at any time while using the software but this information has no impact on the choices offered to the user during the design process.

Some parameters are mandatory to generate a valid report. A “Check” sign, located to the right of a parameter, means it is mandatory. By default, the sign color is orange .

If the parameter has been set, the sign becomes green .

3.1.1.3 Technical Project Parameters

Technical project parameters are used as references while the user is designing the system. Therefore, the choices made / entered in this section of the interface will have an impact on the design process.

3.1.1.4 Selecting Default Values

Default values are selected so that they will appear by default in the component properties interface. If a selection is made and a situation occurs where it does not exist in the component options, the first available option will be selected by default. The fields for which a default value can be set are:

1. Coil Voltage;
2. Coil Termination.

Note: Default values can be overwritten during the configuration process.

3.1.2 Hydraulic Circuit Interface

The Hydraulic Circuit interface is used to design the actual hydraulic circuit that will later be used to create the Bosch Rexroth custom manifold. The interface is split into two major areas:

1. The part library;
2. The diagram editor.

3.1.2.1 Accessing the Main Design Interface

To access the main circuit design interface:

1. Click on the "Project Explorer" 

button in the "Design" toolbar;
2. In the desired project, click on the "Hydraulic Circuit" branch.

The main display will show the circuit design interface.

3.1.2.2 Part Library

The "Library Explorer" is the main tool for selecting components and building circuits. To access the "Library Explorer":

1. Click on the "Library Explorer" 

button in the "Design" toolbar;
2. Browse the various categories using the + sign and by selecting various categories in the library.

Or

Use the search engine to find the component you want.

Components and their description / model code appear in the component viewer / selector window.

Note: The contents of the library will change depending on the selected interface and the project type currently in use.

3.1.2.2.1 Search Field

The search field allows the user to search through the library for a specific model code or part of a model code. When the search is launched from anywhere in the library, the search engine will close the search loop by restarting from the beginning.

3.1.2.2.2 Library Explorer

The “Library Explorer” is a navigational tool. It allows the user to:

- View different component categories;
- Expand / Contract component categories.

3.1.2.2.3 Component Selector

The component selector allows the user to:

- Visualize the component symbols;
- Visualize the component description. If selected in the subfolder, the complete component description is shown;
- The component selector allows the user to drag and drop a component onto the design area. (See the *Working with Components* chapter)

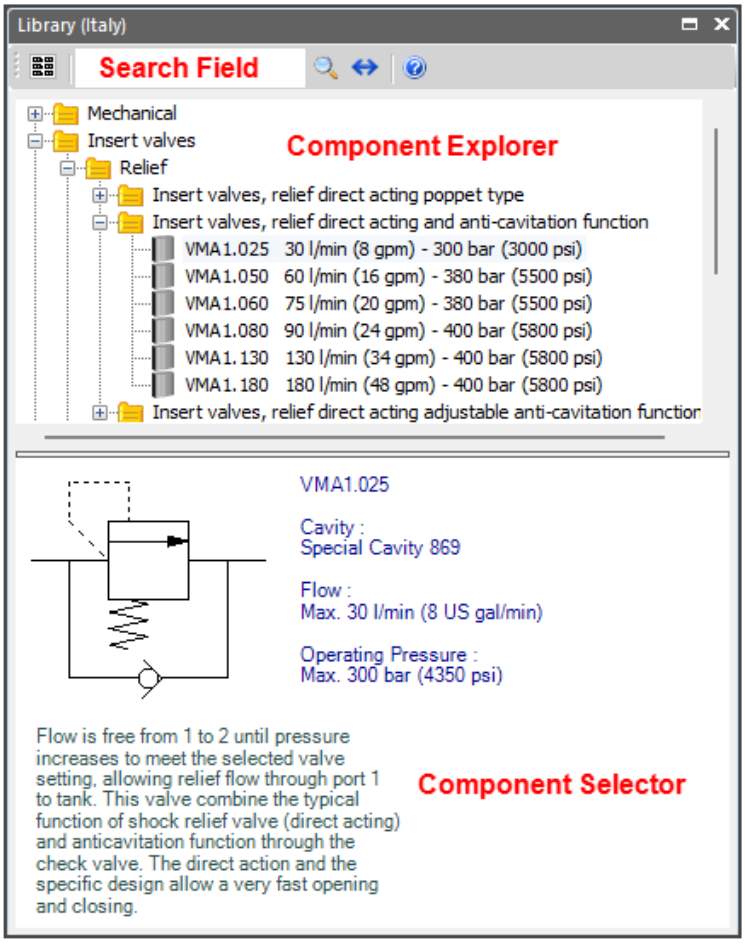


Figure 3-2: Library

3.1.2.2.4 Equivalent Products

With HydraForce and Bosch components available in the library, two products may serve the same function. The preferred product is indicated and displayed first in search results.

If a product is no longer available in the library but has an equivalent, the equivalent product is indicated.

Product equivalences can be viewed by opening the corresponding window using the highlighted command in the library.

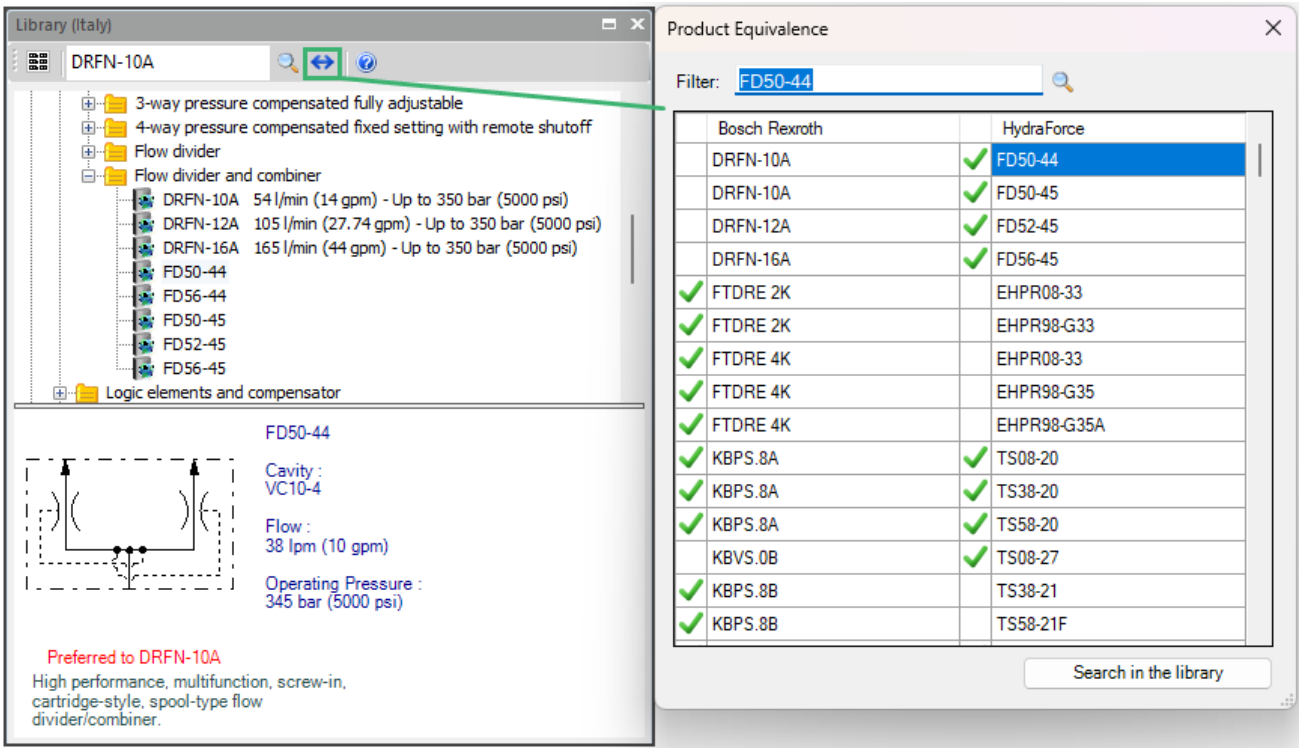


Figure 3-3: Product Equivalence in the Library

3.1.2.3 Diagram Editor

The diagram editor is the main part of the software. This interface is used for designing the symbolic view of the manifold design. It is composed of the following elements:

- Drawing area;
- Drawing tools;
- CAD elements.

Briefly, it allows the user to:

- View the drawing area;
- Activate the grid function;
- Insert a Title Block;
- Zoom in, zoom out and pan the drawing area;
- Browse, select libraries and view components;
- Insert components onto the drawing area;
- Move, copy, cut, rotate and paste components on the drawing area;
- Connect components;
- Access specific component properties dialogs.

3.1.2.3.1 Drawing Area

The drawing area is a white section onto which it is possible to design the desired system. Many tools and drawings aids are available while in this interface, primarily:

- Page setup;
- Grid function;
- Zoom function.

3.1.2.3.2 Default Page Setup

The "Default Page Setup" dialog box can be accessed through the "i-CHoose" menu → "Default Hydraulic Circuit Options" → "Default Page Setup". It is used to specify the default page format for every new diagram.

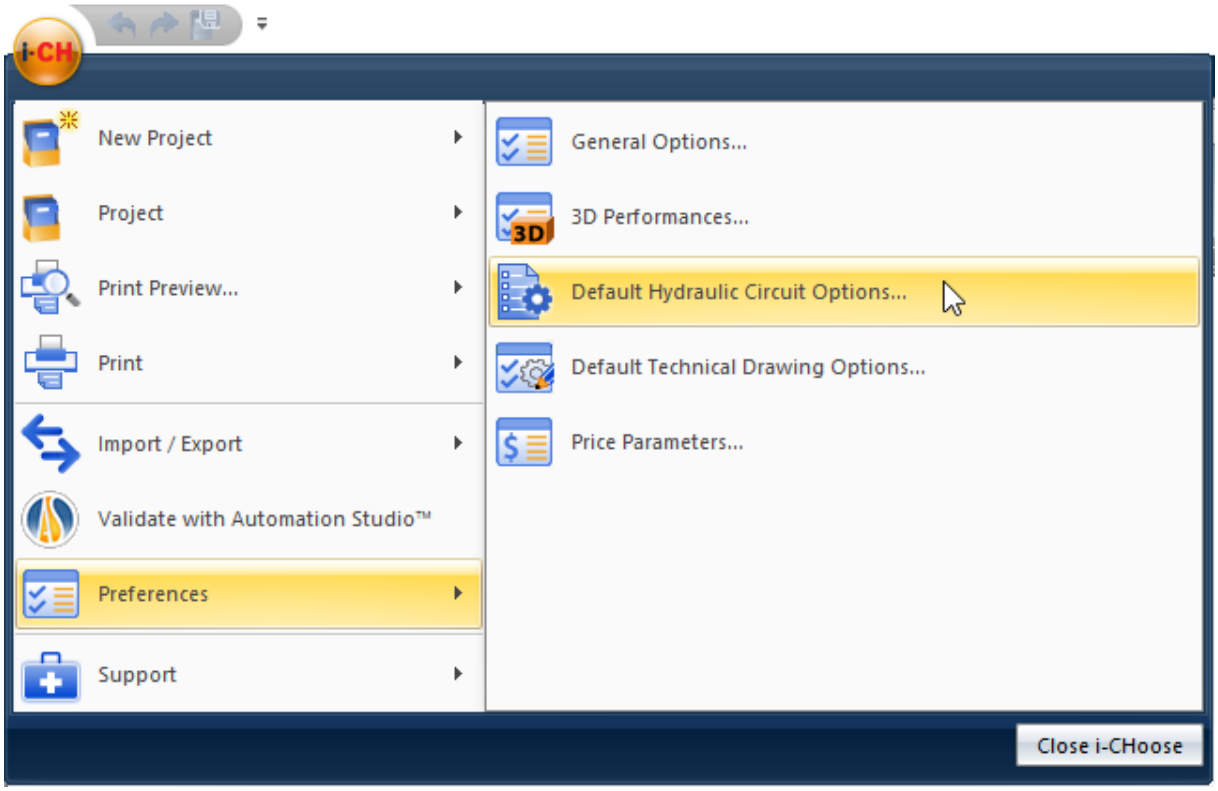


Figure 3-4: "Default Hydraulic Circuit Options" Menu

The "Default Hydraulic Circuit Options" dialog box allows the user to select the default diagram size, orientation and units.

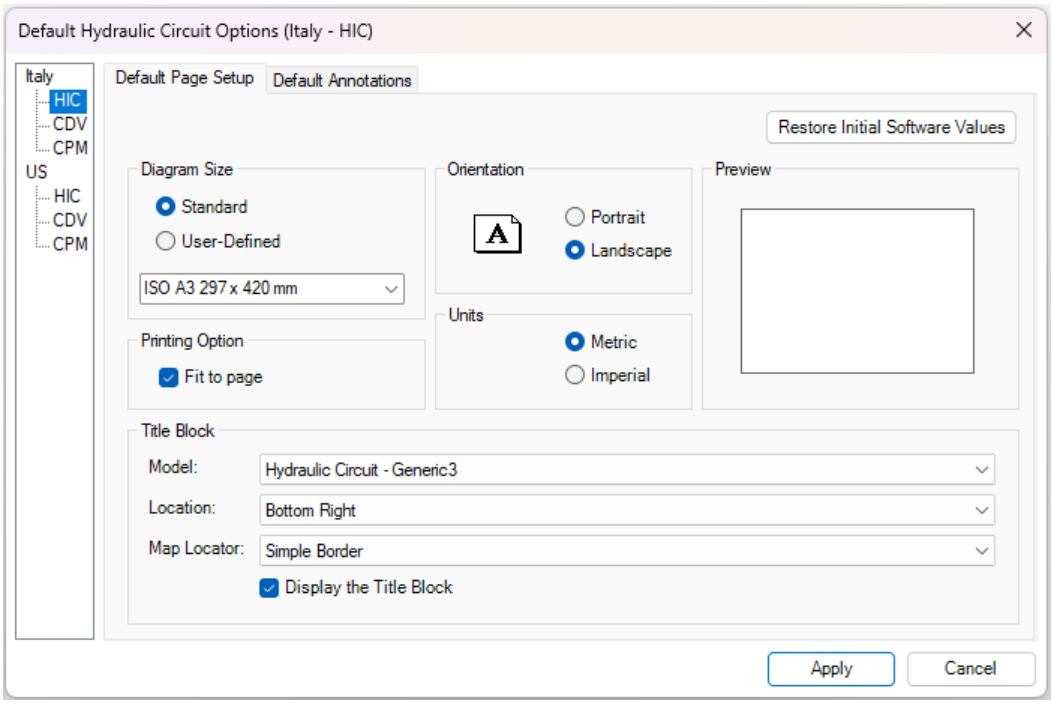


Figure 3-5: Hydraulic Circuit – Default Page Setup Dialog Box

3.1.2.3.3 Current Page Setup

The "Current Page Setup" is used to specify the dimensions of the diagram that is currently in use. It can be accessed:

- Through the "Design" menu → "Settings" group → "Current Circuit Setup…";

Figure 3-6: Current Page Setup menu

The "Current Page Setup" dialog box allows the user to select the current diagram size, orientation, and units.

Note: These settings overwrite the ones specified in the "Default Page Setup".

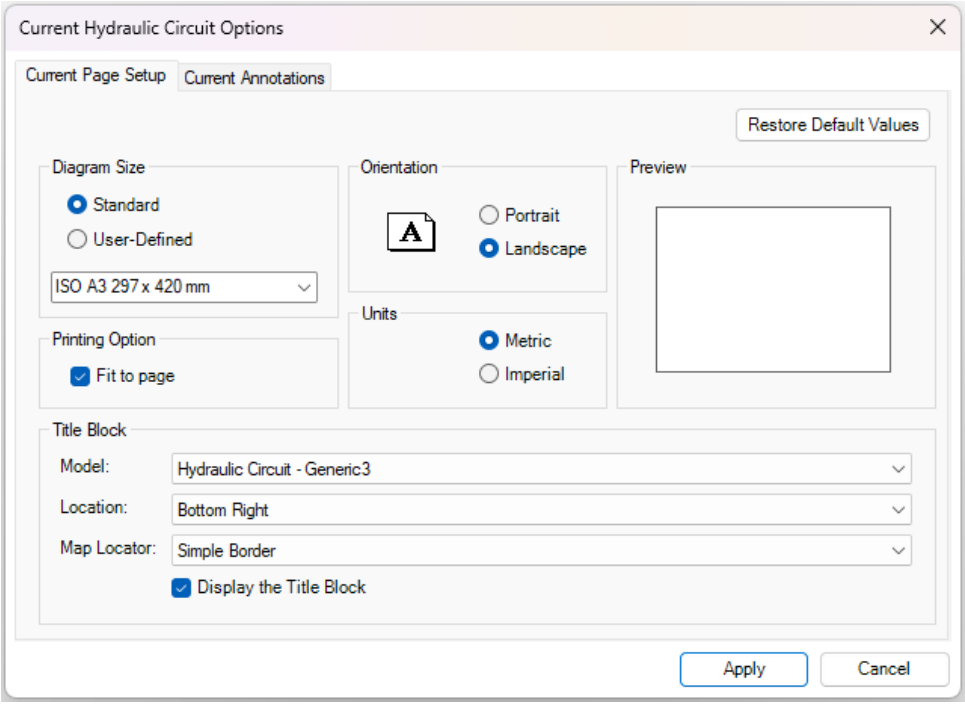


Figure 3-7: Current Page Setup Dialog Box

3.1.2.3.4 Grid Function

The grid is a series of perpendicular lines allowing the user to see the horizontal and vertical alignment of components. This function allows the user to align components to improve the clarity of the hydraulic circuit. To activate the grid:

- Activate the "Grid" button in the "View" toolbar.

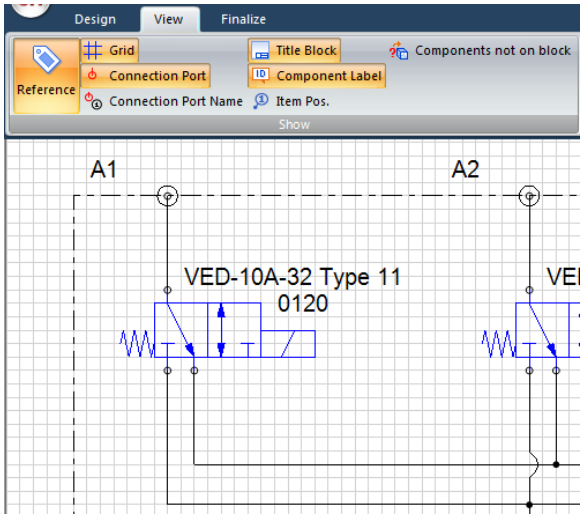


Figure 3-8: Activated Grid Drawing Area

3.1.2.3.5 Component Snap

Component snap is used to keep all of the component connectors on a grid point. It is recommended to keep the snap mode active at all times to ensure the alignment of the components when placed on the drawing area.

To activate the function, activate the "Component Snap" button in the View toolbar.

3.1.2.3.6 Zoom Functions

The zoom functions are used to change the view of the drawing page. There are many zoom tools that can be used:

- The zoom-in tool:

1. Click on the “Zoom in”  button in the “View” toolbar to zoom into the drawing;

OR

2. Click on CTRL with +;

OR

3. Scroll with the mouse button.

- The zoom-out tool:

1. Click on the “Zoom out”  button in the “View” toolbar to zoom out of the drawing;

OR

2. Click on CTRL with -;

OR

3. Scroll with the mouse button.

- The zoom box tool:

1. Click on the “Zoom Selection”  button in the “View” toolbar to make it active;
2. Make a box on the drawing space around the area you wish to zoom into.

- The zoom-page tool:

1. Click on the “Zoom Page”  button in the “View” toolbar;
2. The grid and the component symbols are zoomed-out or in so that all of the components on the drawing area are visible.

- The pan tool:

1. Click on the “Pan”  button in the “View” toolbar;
2. The mouse pointer takes the shape of a hand;
3. Move the drawing area and all of the components on it by clicking and dragging the hand on the drawing area;
4. De-select the tool by clicking on the icon again.

OR

5. Use the left mouse button and “Shift”, “Space Bar” key or the middle mousse button for the pan tool.

3.1.2.4 Working with Components

The first step in designing a system is to select and position components on the drawing area. This section details the following items:

1. Dragging and dropping components onto the drawing area;
2. Component representation on the drawing area;
3. Selecting, deleting, copying, cutting, and pasting components;
4. Rotating and moving components;

5. Accessing the component properties dialog box;
6. Accessing a component's contextual menu.

3.1.2.4.1 Dragging and Dropping Components on the Drawing Area

Once the desired component has been found in the component library, the user needs to follow these steps to insert it onto the drawing area:

1. Select the image of the component in the bottom part of the library;
2. Click and drag the component to the desired location on the drawing area;

   An image of the component is dragged along with the mouse pointer.

   If the component cannot be dropped at the position of the mouse pointer, the cursor changes to a prohibited symbol (circle with oblique bar). 
3. Release the mouse button.

   If the position is valid, the component stays in place and a purple rectangle (boundary box) with handle points surrounding the component is visible.

   The component appears in red. This means that it is not completely configured.

   The component ports appear in red until they get connected to other ports.

   Component labels (satellites) appear beside the symbol. The "Displayed Information" dialog box is used to choose what to display on the schematic.

3.1.2.4.2 Selecting – Single Component

To select a component:

1. Click on the component. A selected component is enclosed in a purple boundary box.

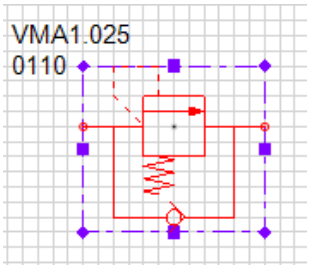


Figure 3-9: Selected Component on the Drawing Area

3.1.2.4.3 Selecting – Window Selection

To select multiple components using the selection window:

1. Click and drag a rectangle on the drawing area while not in a tool mode (pan, zoom, line, etc.).

Everything that is inside the selection box is then selected.

Once multiple component selections are made, components can be:

- Moved;

- Copied;
- Deleted.

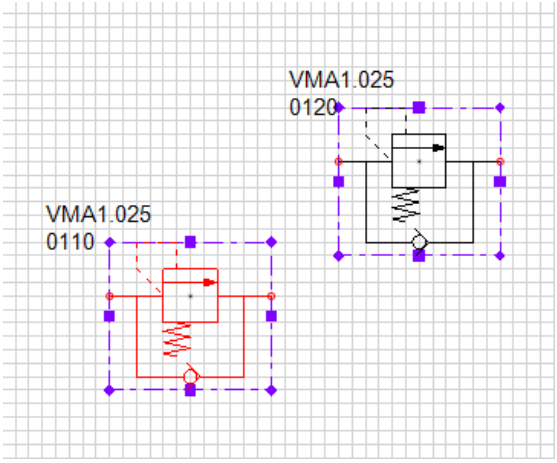


Figure 3-10: Multiple Components Selection on the Drawing Area

3.1.2.4.4 Deleting

To delete a component:

1. Select the component or group of components;
2. Click on the "Delete" button in the "Design" toolbar;

   Or

3. Press the DEL key;

   Or

4. Open the contextual menu and select the "Delete" command.

All links created from the component stay in place (see the linking components section).

3.1.2.4.5 Copying

To copy a component:

1. Select the component or group of components;
2. Click on the "Copy" button in the "Design" toolbar;

   Or

3. Press the CTRL+C keys;

   Or

4. Open the context menu and select the "Copy" command.

The component and all its attributes (properties, orientation, etc.) are sent to the clipboard.

3.1.2.4.6 Cutting

To cut a component:

1. Select the component or group of components;
2. Click on the "Cut" button in the "Design" toolbar;

Or

3. Press the CTRL+X keys;

Or

4. Open the context menu and select the “Cut” command;

The component and all of its attributes (properties, orientation, etc.) are sent to the clipboard. The component is removed from the drawing area.

3.1.2.4.7 Pasting

To paste a component:

1. Click on the drawing area at the location where you want to paste the component;
2. Click on the “Paste”  button in the “Design” toolbar;

Or

3. Press the CTRL+V keys;

Or

4. Open the contextual menu and select the “Paste” command.

Note: A component can only be pasted if it exists in the clipboard.

3.1.2.4.8 Rapid Copy/Paste

To accelerate the Copy/Paste function, press the CTRL key while moving a component. This will automatically copy the component to the new position.

The mouse pointer changes to  when the CTRL key is used.

3.1.2.4.9 Rotating

To rotate a component:

1. Select a component;
2. Use the clockwise  rotation command in the “Design” toolbar;

Or

3. Use the counterclockwise  rotation command in the “Design” toolbar;

Or

4. Press on the CTRL+H rotation right shortcut keys on the keyboard;

Or

5. Press on the CTRL+L rotation left shortcut keys on the keyboard;

Or

6. Select the “Rotate Right” command from the contextual menu;

Or

7. Select the “Rotate Left” command from the contextual menu.

The rotation of a component will rotate the symbol but not the satellite texts associated to it.

3.1.2.4.10 Flipping

To flip a component:

1. Select a component;
2. Use the “Flip Horizontal”  command in the “Design” toolbar;

Or

3. Use the “Flip Vertical”  command in the “Design” toolbar;

Or

4. Press on the CTRL+T keys on the keyboard (Horizontal);

Or

5. Press on the CTRL+R keys on the keyboard (Vertical);

Or

6. Select the “Flip Horizontal” command from the contextual menu;

Or

7. Select the “Flip Vertical” command from the contextual menu.

Flipping a component will flip the symbol but not the satellite texts associated to it.

3.1.2.4.11 Moving

To move a component:

1. Drag and drop the component to a new position;

Or

2. Select the component and move it using the arrow keys.

The same rules apply if a component is dragged from the “Library”.

If links are attached to the component, the links remain attached when moving it.

3.1.2.5 Context Menus

To access contextual menus, right-click with the mouse in one of the following situations:

1. Mouse pointer is on a hydraulic circuit component:

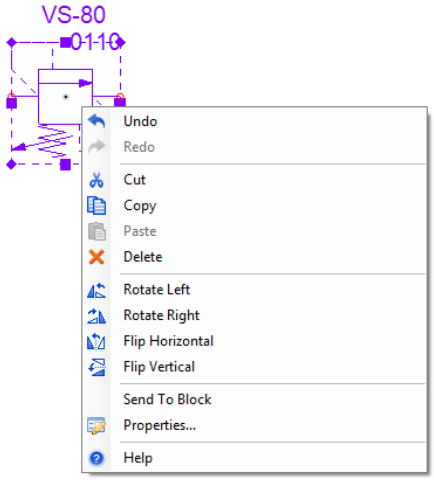


Figure 3-11: Component Context Menu

2. Mouse pointer is on an empty section of the hydraulic circuit area

Figure 3-12: Empty Circuit Context Menu

3.1.2.6 Viewing Component Properties

To view component properties:

3. Double-click on the component;
4. Select the “Properties” command from the contextual menu of the selected item.

See the “Component Properties” section of this manual for more details.

3.1.2.7 Working with Graphical Elements

Inserting a graphical element on the drawing area is similar to the insertion of a component. This action is done through the use of a drawing tool. Graphical elements can be stretched, copied, rotated, deleted and moved.

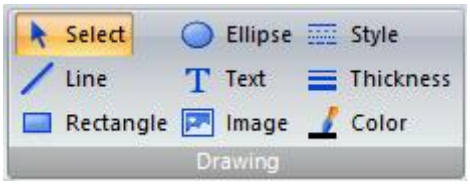


Figure 3-13: Design-Drawing toolbar

3.1.2.7.1 Inserting a Line, a Rectangle, and an Ellipse

To avoid redundancy in the drawing function descriptions, only one graphical object’s drawing procedure is described below.

To insert an ellipse:

1. Select the “Ellipse”  button in the “Design” toolbar;
2. Left-click on the diagram without releasing it and drag the cursor away;
3. While dragging, the shape of the object appears and changes with the mouse movements;
4. Release the mouse button when the object has reached the desired dimensions;

   The graphical object is displayed on the diagram.
5. Repeat steps 1 to 4 for any other graphical object to insert it onto the diagram.

3.1.2.7.2 Inserting a Text Box and a Picture

To avoid redundancy, the following function description starts from the release of the left-click in the previous section.

To insert a text box:

1. Repeat steps 1 to 4 of the previous procedure and ensure that the “Insert Text”  tool is selected in the “Design” toolbar;
2. In the entry box, type-in the text to include on the diagram.

To insert a picture:

1. Repeat steps 1 to 4 of the previous procedure and ensure that the “Insert Image” tool is selected in the “Design” toolbar;

   The “Open” dialog box pops up.

2. Select the image you wish to insert onto the diagram;

   Accepted formats are .JPG, .GIF, .PNG and .BMP.

3. Click on Open;

   The image appears on the diagram.

3.1.2.7.3 Modifying Text Attributes

To modify the text attributes:

1. Double-click on the text to modify or select the “Properties” from its contextual menu;

   The “Font” dialog box for the text appears.

2. Change the font of the text. Choices appearing in the list reflect the installed Windows fonts;
3. Change the font style. The available styles are Windows standard: Bold, Italic and Bold Italic;
4. Change the font size;
5. Add text effects: Strikeout or Underline;
6. Change the font color;
7. Change the font script;

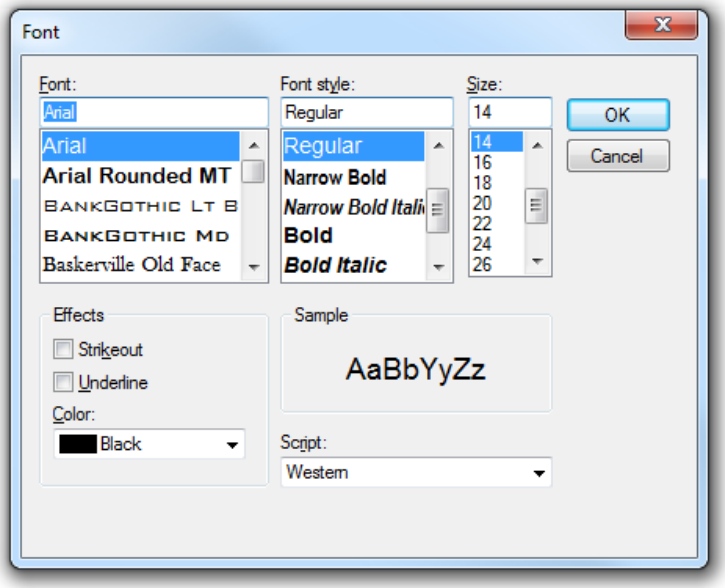


Figure 3-14: Text Attributes Dialog Box

The color selection is done through the “Color” dialog box:

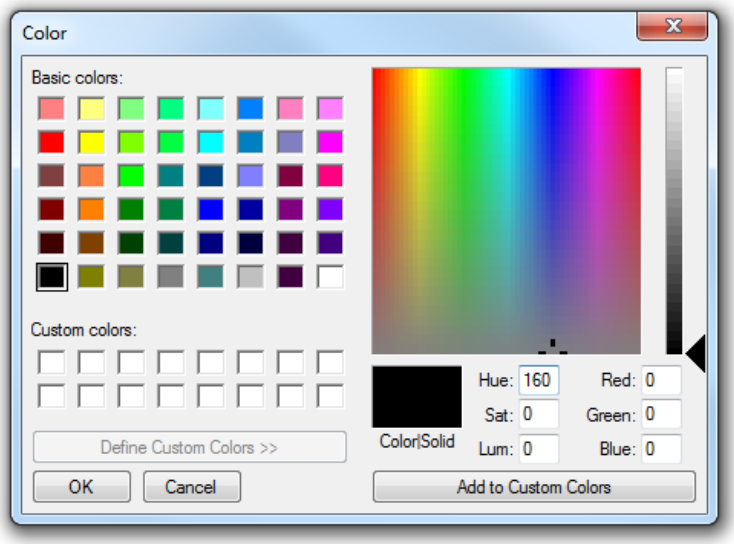


Figure 3-15: Color Picker

3.1.2.7.4 Modifying Graphical Element Attributes

To change the outline of a graphical element:

1. Select the element;
2. Using the following buttons in the “Design” toolbar, define the line attributes of the element:

Figure 3-16: Graphical Element Attributes

The selection of colors is done through the use of a Windows standard color selector.

The selection of the line type is done via a drop-down list.

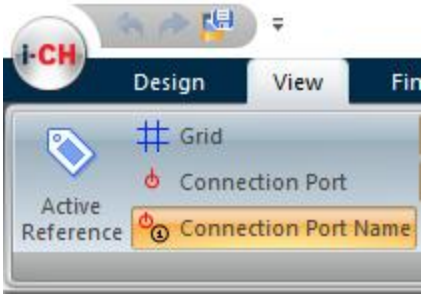
The selection of the line thickness is done via a drop-down list.

Note: The color and thickness tools can be used to modify the valve symbols as well.

3.1.2.8 Displaying Connection Port Names

To display the port names of the components:

1. Select the “View” toolbar → “View Connection Port Names”;



The port numbers will appear in a bubble. They cannot be moved or modified.

2. To display a different port number, use the text tool to create a custom ID.

3.1.2.9 Displaying Connection Ports

To display the ports (small circles) on the components:

1. Select the "View" toolbar → "View Connection Ports".

The ports will appear or disappear depending on their current state.

3.1.3 Component Properties

The "Component Properties" dialog box can contain four branches that are used to:

- Component Configuration:
  - View the component description;
  - Select the component type;
  - View the component technical properties (ex: "Flow" and "Operating Pressure")
  - View the component symbol;
  - Select specific options for the component;
  - View the current component "Model Code" (P/N);
  - View the "Material Number";
  - View the coil information (if applicable)
  - View the component cavity name;
- Displayed Information:
  - Select some component information to be displayed on the hydraulic circuit page;
  - Add a comment;
  - Edit the component label.

- Catalog Information:
  - View additional information on the component;
  - View the component PDF catalog file.

To access the "Component Properties" dialog box:

1. Double-click on the component;
   Or
2. Select the "Properties" command from its contextual menu.

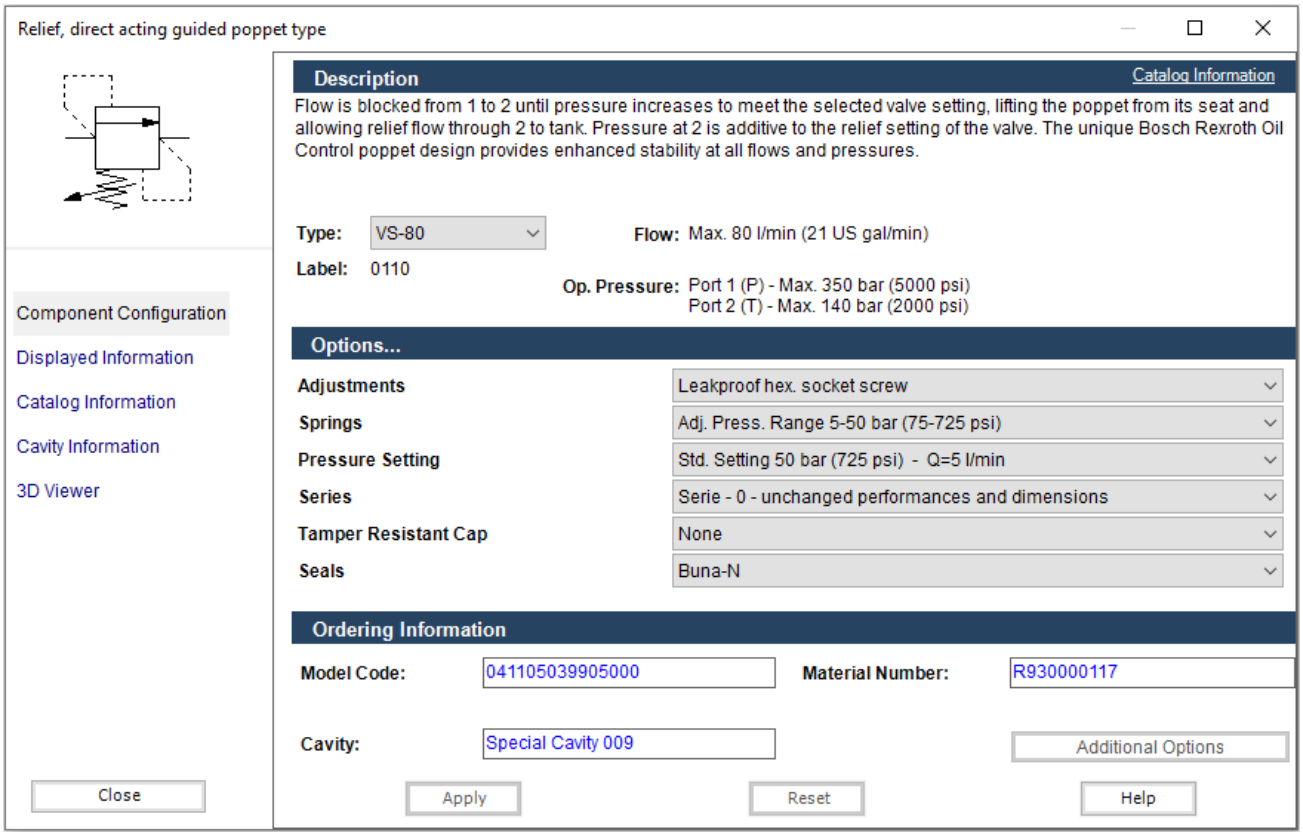


Figure-3-17: Component Properties Dialog

3.1.3.1 Selecting a Component Model

Component model selection is the first step in the configuration of a component. Select the expected component model from this drop-down list field. This will update the component option fields as well as the "Model Code" number.

3.1.3.1.1 Configuring the Component Model Code

To configure the model code, select the desired options in each of the drop-down lists. Each component is defined as per the component specific attributes.

Selection menus are dynamic, meaning that the contents of the drop-down lists will be consequential to the previous choices.

If a default value for certain options has been defined in the "Project Properties" interface (seal, coil, termination), the drop-down lists will default to that value. However, these default values can be overwritten. Otherwise, the default value is a blank value which will normally be represented by "None" or "?".

If a modification is made in an option field and it impacts another field, the second field is then automatically updated.

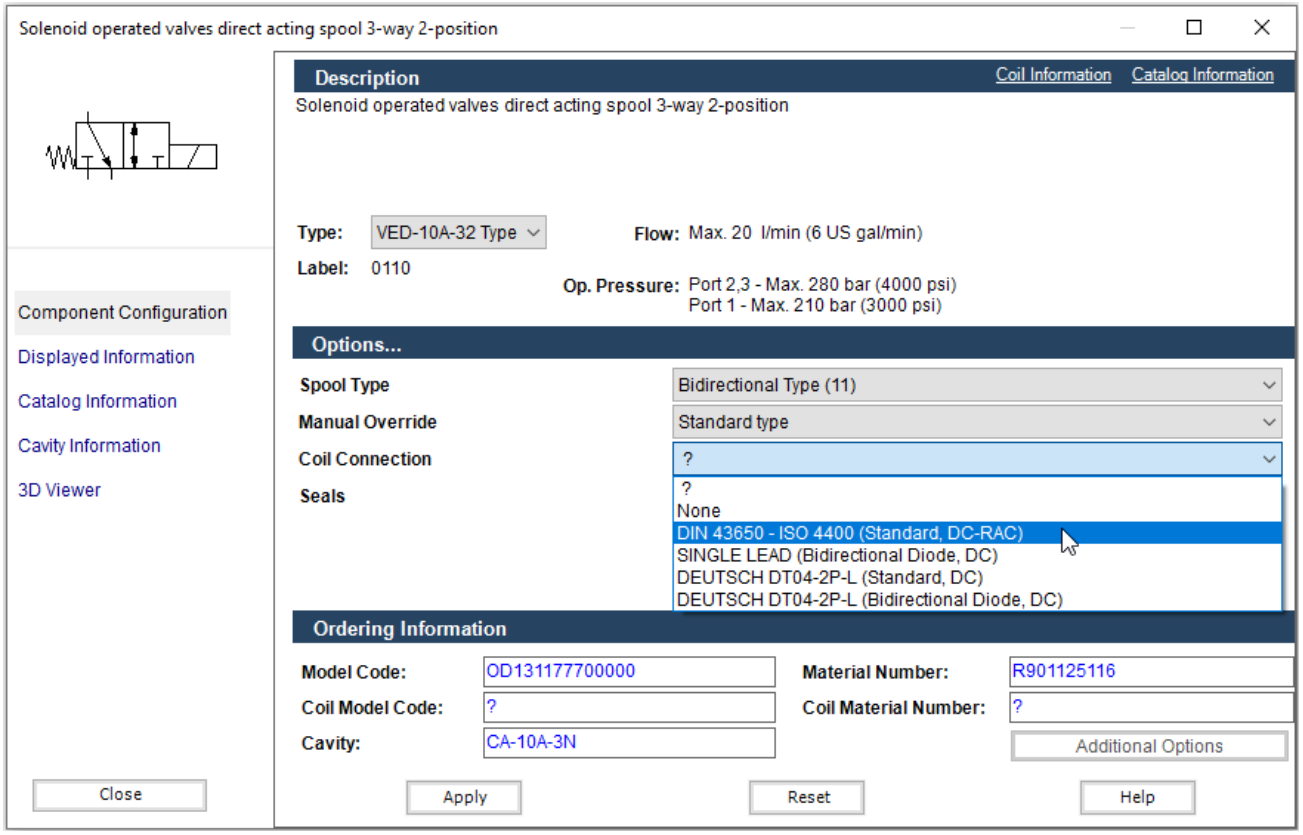


Figure 3-18: Component Properties Dialog Box – Component Configuration

3.1.3.1.2 Incomplete Component Model Codes – Component Display

Components appear in red on the "hydraulic circuit" page when their "Component Properties" dialog has not been opened or if they have an incomplete model code due to a field that has been left blank in the component options.

Furthermore, even if the user fills in all component option fields in the "Project Parameters" interface and a default model code is available for a component, that component will still appear in red as long as the user has not opened the "Component Properties" dialog box and clicked on the "Apply" button.

The default color can be changed in the "Preferences/Options" i-CHoose menu.

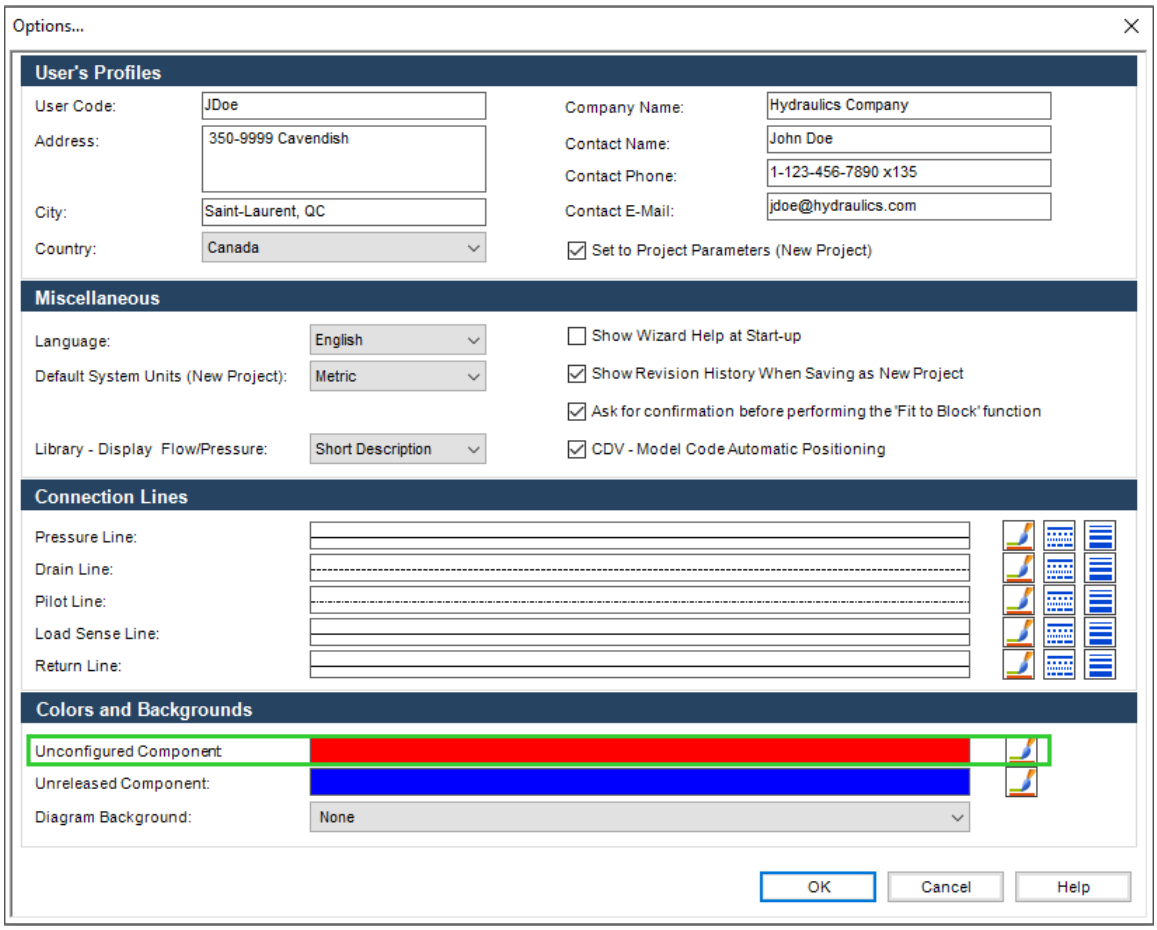


Figure 3-19: Incomplete Component Color – Options Dialog

3.1.3.1.3 Incomplete Component Material Number – Component Display

Components that have an incomplete material number appear in blue on the “hydraulic circuit” page.

3.1.3.2 Options Having an Impact on Component Symbol

Some options selected in the drop-down lists will have an impact on the symbol that represents the component on the schematic.

When one of these options is selected in the lists and the “Apply” button is clicked, the component symbol is automatically updated on the schematic to reflect these changes.

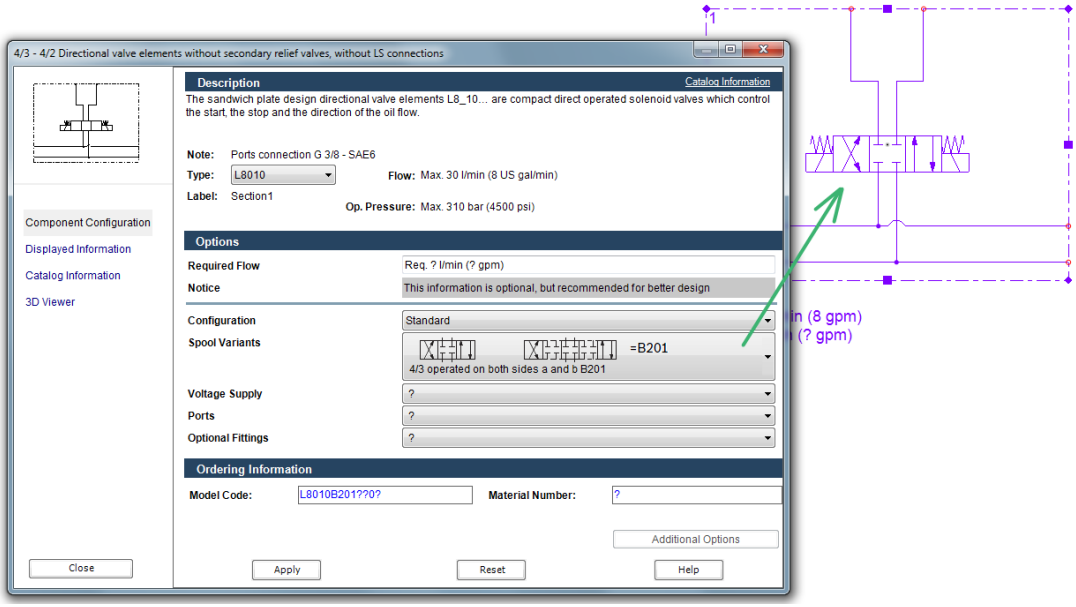


Figure 3-20: Component Symbol Selection – Configuration Window

3.1.3.3 Component Identifier (ID) – Automatic Numbering

The component "Identifier" is unique to each component on the drawing area. The software will automatically produce an ID for each component inserted on the diagram.

> Note: There is no check for "Component ID" uniqueness. The "Component Label" can be edited in the "Displayed Information" dialog box, but not the "Component ID". The "Component ID" is a sequential number and will always take the value of a free number or increment to the next available one.

A "Port Size" property is automatically added to the component and updated after changes are made in the "Component Configuration" dialog. The property is automatically positioned under the Component Id.

3.1.3.4 Cavity Information

For each component, a cavity is associated. Furthermore, the corresponding cavity will appear in the "Component Properties" → "Component Configuration" dialog box.

3.1.3.5 Displayed Information

The information listed in this dialog box is displayed on the diagram, but only if the box to the left of the field is checked. Standard information is displayed and positioned beside the symbol. The text displayed on the diagram can be moved but will always keep its position relative to the component if the component is moved. In other words, if the component is moved, the text boxes (satellites) move accordingly.

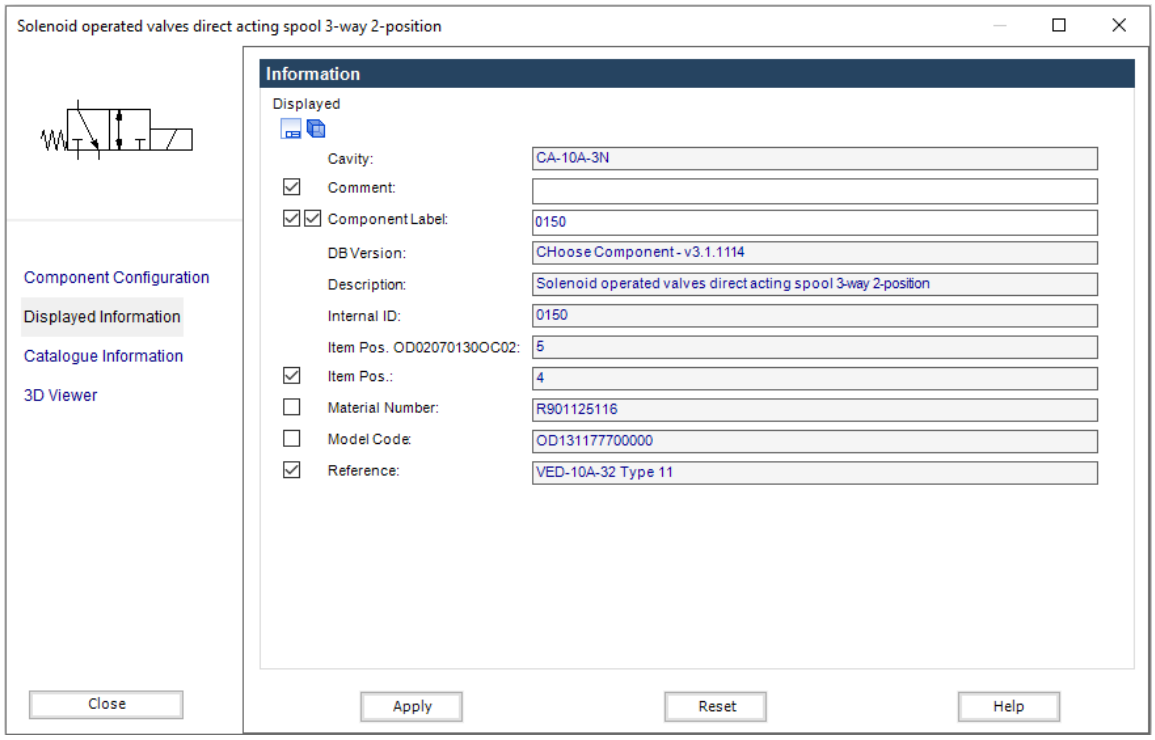


Figure 3-21: Component Properties Dialog Box – Displayed Information

3.1.3.6 Catalog Information

This section will bring up the PDF catalog page for the current component model.

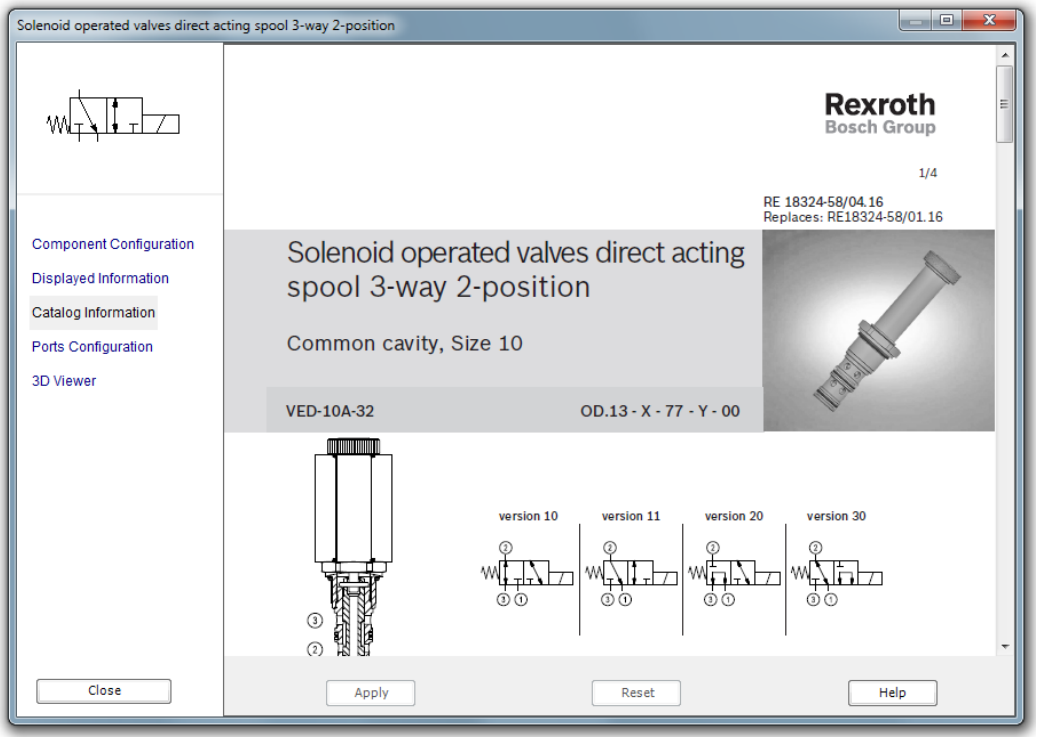


Figure 3-22: Component PDF Data Sheet

3.1.4 Creating a Design

3.1.4.1 Connecting Components

To connect components:

1. Click on one of the symbol's connection ports to define the starting point. The connection ports appear in red when a component is inserted onto the drawing area and is still not connected;

The mouse pointer takes the shape of a cross.

2. Each click, other than on another connection port, defines a new elbow in the link;
3. Click on another port to create a connection. The link is established between the two components;

Or

4. Double-click where there is no connection port on the diagram. The link will end at the point where the double-click occurred and the link will have a connection port at its end.

The mouse pointer reverts to its initial shape once the link is completed, as described in steps 3 and 4.

3.1.4.1.1 Modifying a Connection Line (Link)

To modify the shape of a link:

1. Select the link that will be modified;

The link is highlighted in the selection color and handles are displayed along it.

2. Click and hold the mouse button on one of the link handles;

The mouse cursor takes one of the following shapes depending on the selected handle , or .

3. Drag the cursor to modify the link path;

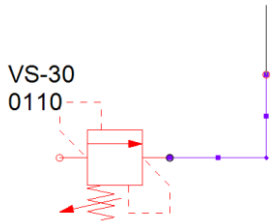


Figure 3-23: Modifying the Shape of a Link

4. Release the mouse button.

The link is modified.

The mouse pointer reverts to its initial shape.

3.1.4.1.2 Select Path (Highlight Path)

The "Highlight Path" feature, accessible via the context menu by right-clicking on a connection line, allows you to select all interconnected connection lines.

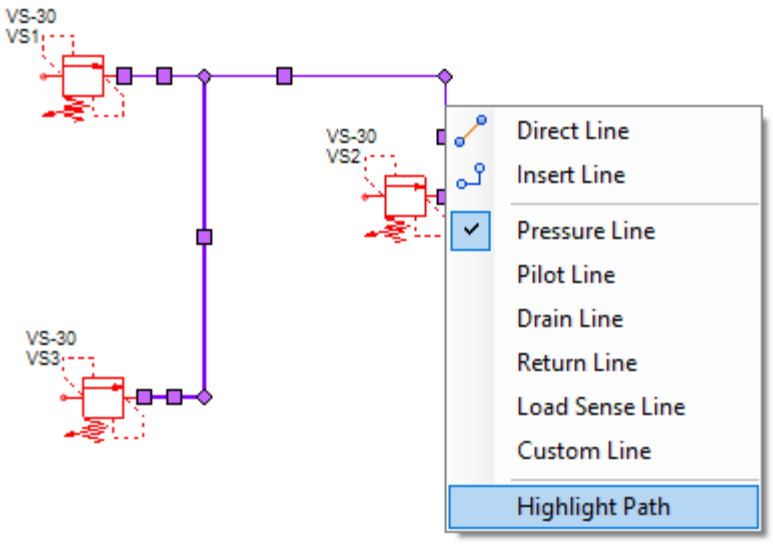


Figure 3-24: Highlight Path

3.1.4.1.3 Link Crossing Jump and Connection

When two links cross each other without connecting, a line jump will appear on one of the two lines. Two links that connect to each other will do so with a connection point (black dot).

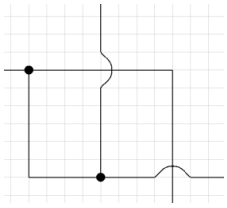


Figure 3-25: Line Jump and Line Connection

3.1.4.1.4 Configuring a Connection Line

3.1.4.1.4.1 Configuring the Default Appearance of a Connection Line

The default appearance of each line can be changed in the “Preferences/Options” of the application. See the “Preferences/Options” Chapter.

The possible line types are:

Line type	Default Appearance (Example)
Pressure	Solid Black Line
Pilot	Short Dashed Black Line
Drain	Short Dashed Black Line
Return	Long Dashed Black Line
Load sense	Long Dashed Black Line
Custom	Solid Black Line

The custom line is a special case; its default appearance can be modified from the toolbar. The first time the application is launched, its default value will be the same as the pressure line. The custom line keeps the last configured changes.

The other line types can be modified as well. In this case, information will be added to the name of the type to indicate that the default value has been modified. Example: Pressure Line (Modified)

3.1.4.1.4.2 Modifying a Connection Line from the Toolbar

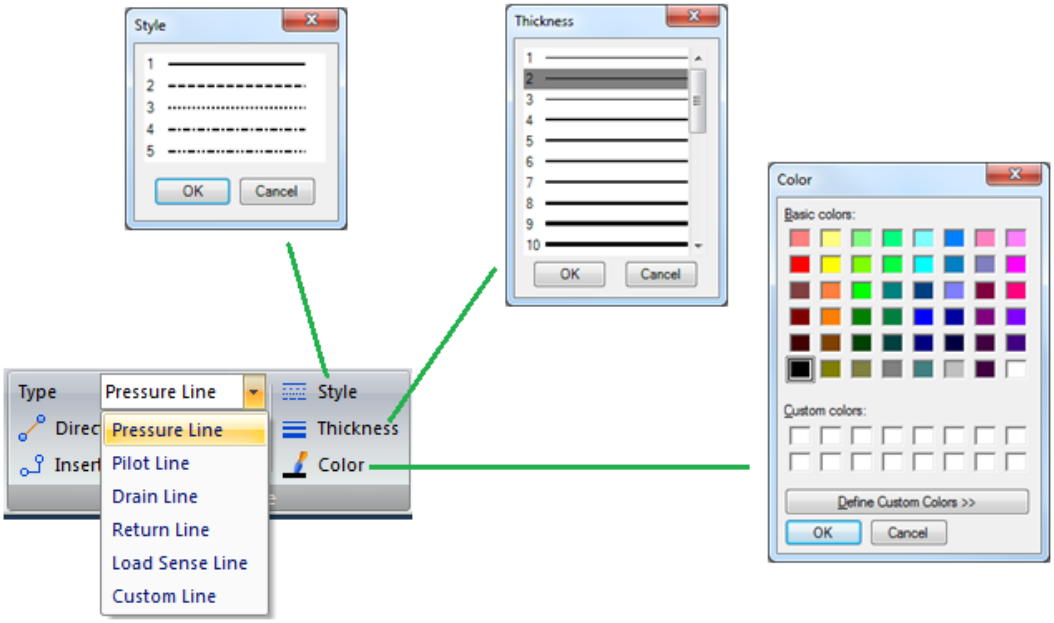


Figure 3-26: Modifying a Connection Line

3.1.4.1.4.3 Connection Line Modification Behavior

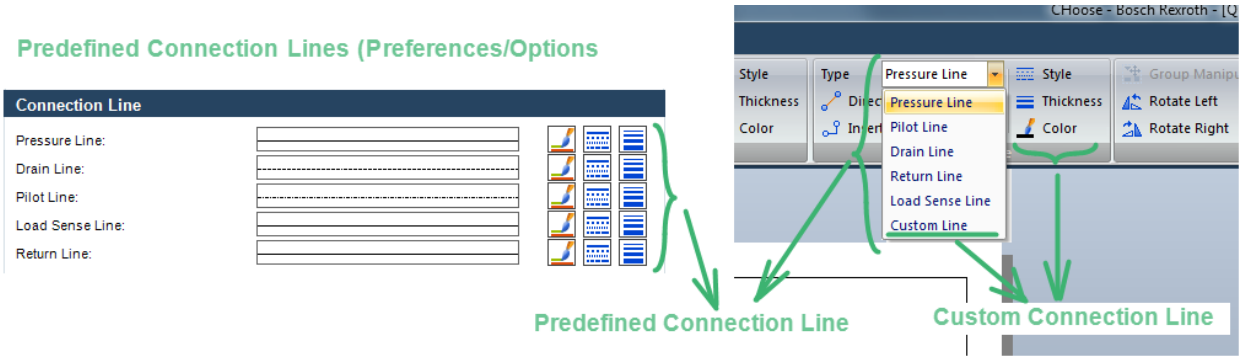


Figure 3-27: Predefined vs Custom Connection Line

The users can choose among predefined and custom connection lines when they draw the schematic.

Predefined connection Lines

The "usual" connection lines are predefined in the "Options" dialog (Preferences menu):

- *Pressure Line*
- *Drain Line*
- *Pilot Line*
- *Load Sense Line*
- *Return Line*

Custom Connection Line

The user can use a specific configuration (Color, Style and Thickness) using a “Custom Line”. In this case, they can change the color, the style and the thickness from the toolbar.

3.1.4.1.4.4 Use Case 1: Select the Connection Line Type before drawing it (No connection line selected on the schematic)

If no connection line is selected on the schematic, the drop-down list displays the current connection type (which will be used for each new connection line). The user can change the current line type by selecting a different type in the list.

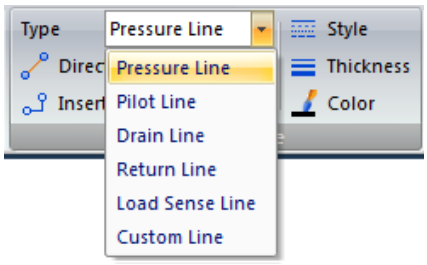


Figure 3-28: Predefined Connection Line

The three buttons used to modify the color, style and thickness are enabled. If one of these predefined values is modified (and different), a text appears near the line type in the drop-down list.

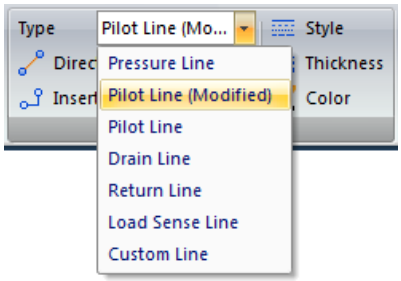


Figure 3-29: Modified Predefined Connection Line

If a predefined type is selected in the drop-down list, and if the color, style or thickness is modified with the same value, the predefined type is still selected.

The values selected in the drop-down list will be used for each new connection line drawn on the schematic.

3.1.4.1.4.5 Use Case 2: Modify an existing Connection Line Type on the schematic

If one or more connection lines are selected, the type field displays the type of the selected connections. If there are different connection types in the selection, the type field will be empty.

If one or more connection lines are selected, the user can change the type of the selected connections by selecting a different value.

If one or more connection lines are selected, the user can change the color, style and thickness.

If a predefined type is selected in the drop-down list, and if the color, style or thickness is modified with the same value, the predefined type is still selected.

3.1.4.1.4.6 Use Case 3: Behavior when a project is open

When a project is opened, it uses the “Predefined values” of the user to draw the predefined connection lines.

Example: If a project is created on computer1 using some black predefined pressure lines, the color of the connection lines will be black. If the project is open on another computer2 with red predefined pressure line, the connection lines will be displayed in red.

3.1.4.1.4.7 Configuring a Connection Line from the Contextual Menu

As different line types exist in the hydraulic circuit design, it is possible for the user to select the different line types from the line contextual menu (right click on the line). This will allow the user to represent the lines differently on the schematic.

This line type change only modifies the selected connection lines.

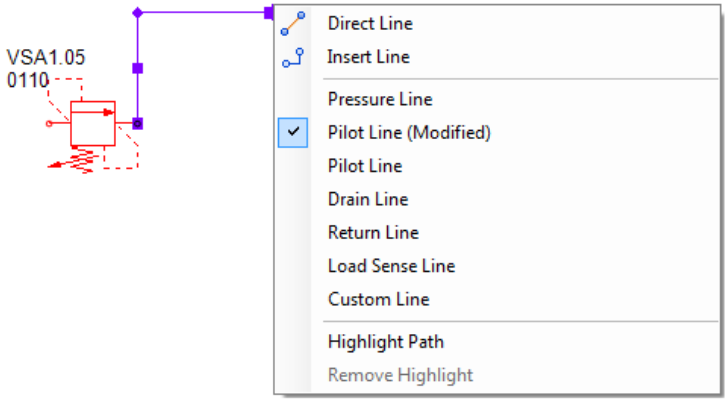


Figure 3-30: Selecting Line Type

3.1.4.2 Creating a System Boundary

The “System Boundary”, or manifold border, is used to define the limits of the manifold in a circuit diagram.

To create a manifold border:

1. Select the “System Boundary” component from the “Library”;
2. Drag and drop the “System Boundary” anywhere onto the drawing area;
3. Using the handles, stretch the border to the desired size, encompassing all components that are included on the manifold block.

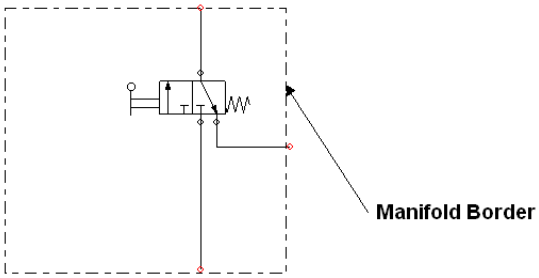


Figure 3-31: Manifold Border

3.1.4.3 Adding Ports to the Manifold

The manifold ports are components used to define the connections that will appear on the manifold once it has been completely designed.

To insert a port:

1. Select the “Connection Port” component from the “Library”;
2. Click and drag the port onto the drawing area;
3. Double click on the “Connection Port” or select “Properties” from its contextual menu.
4. In the “Component Configuration” branch, enter the “Component Options”.

Note: Each “Port” inserted on the hydraulic circuit diagram will appear in the “Manifold Library” used in the 3D manifold layout interface.

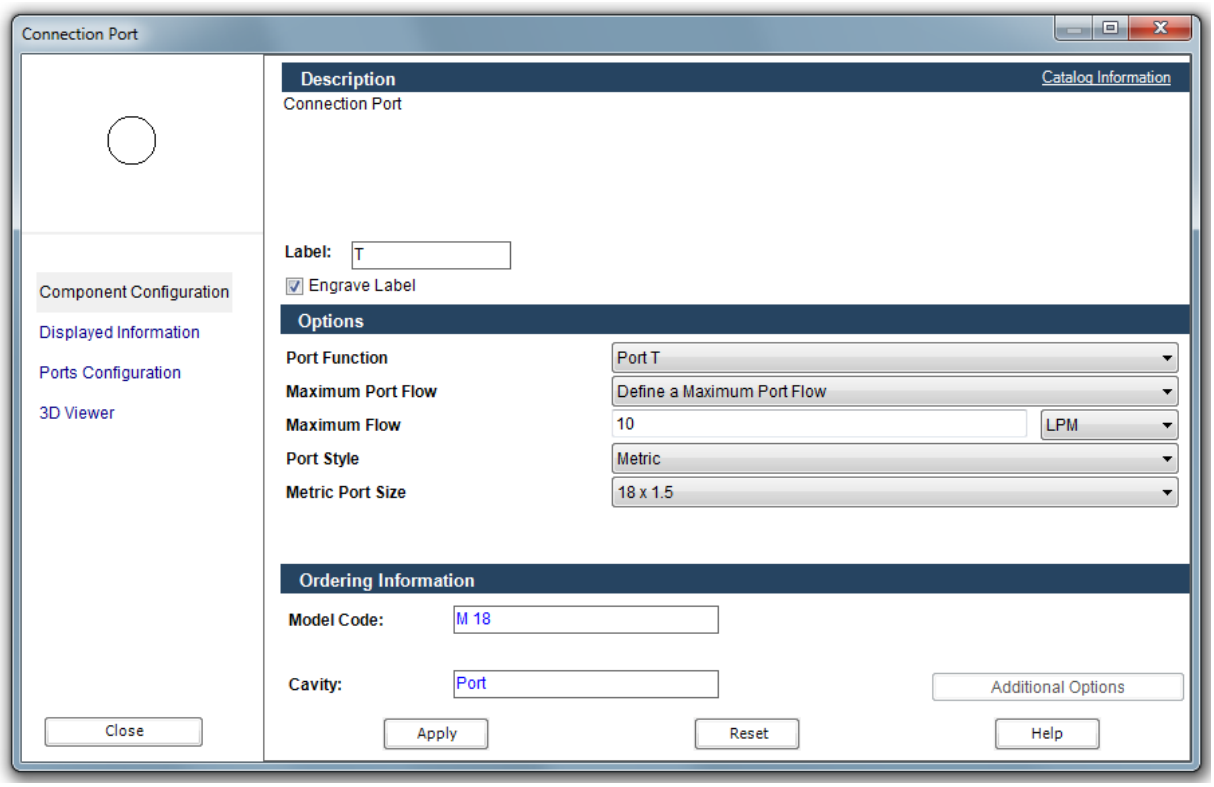


Figure 3-32: Connection Port Component Properties

3.1.5 Manifold Layout Interface

The manifold layout interface is used to physically position the components on the manifold block faces. The component representations shown in the interfaces are realistic. The component sizes and shapes are represented as envelopes that need to be taken into consideration when positioned.

The interface contains two major parts:

1. The “Manifold Library”;
2. The “Manifold Layout” editor;

The “3D Manifold Layout” interface is an isometric view of the manifold block. It can be rotated to view each of its faces.

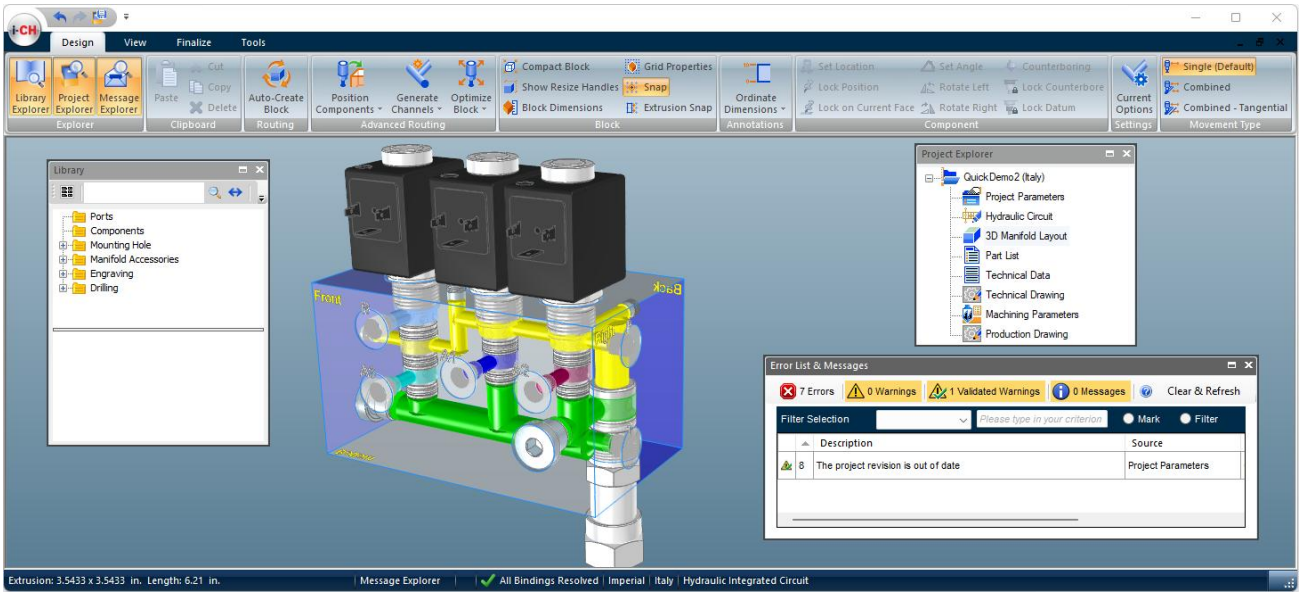


Figure 3-33: 3D Manifold Layout Interface

3.1.5.1 Manifold Layout Library

The “Manifold Library” uses the same interface as the “Hydraulic Circuit Library”. Differences lie in the components that populate the library. Three major component categories are included in this library:

1. Manifold Ports;
2. Components;
3. Mounting Holes;

The “Manifold Library” is automatically populated with components that have been inserted on the “Hydraulic Circuit” page.

3.1.5.1.1 Manifold Ports

The manifold ports are the same “Connection Ports” that have been inserted and configured in the “Hydraulic Circuit” interface. In the “Library”, they are identified by the same identifier that is defined in the “Hydraulic Circuit” interface.

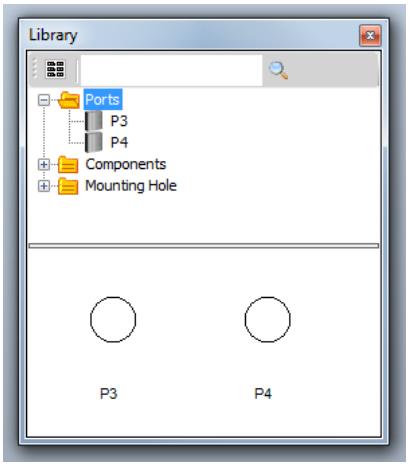


Figure 3-34: Manifold Layout Library

3.1.5.1.2 Manifold Components

Components found in the “Components” section of the “Manifold Library” are taken directly from the “Hydraulic Circuit” interface. Their identifiers are the same as the ones defined in the “Hydraulic Circuit” interface.

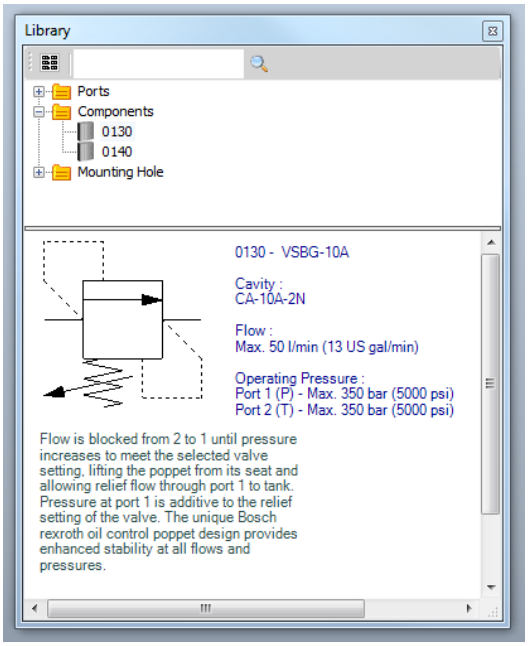


Figure 3-35: Component in the Manifold Layout Library

3.1.5.1.3 Mounting Holes

Mounting holes do not appear in the “Hydraulic Circuit” interface. Only one component appears in the manifold library. That component can be inserted onto the manifold block as many times as required.

3.1.5.2 Manifold Layout Editors

The 3D manifold layout editors are used to position the various components on the manifold block. They are required to define the physical parameters of the manifold.

3.1.5.2.1 Manifold Layout Editor – Inserting Ports

The insertion of “Ports” is the same as the insertion of other components in the “Hydraulic Circuit” interface. The component can be dragged and dropped from the “Manifold Library” onto one of the manifold surfaces. The positioning and manipulation of components and satellite texts follow the same rules as for the hydraulic circuit interface. The size and identifier that are defined for the “Port” automatically appear beside it.

3.1.5.2.2 Manifold Layout Editor – Deleting Ports

Deleting “Ports” is done in one of the two following ways:

1. Select the “Port” and press the “Delete” key;
2. Select the “Delete” command from the component contextual menu.

The deleted port will return to the “Manifold Library” and be available for re-insertion.

3.1.5.2.3 Manifold Layout Editor – Managing Ports

If a port is deleted in the hydraulic circuit interface, the corresponding port is also deleted in the manifold layout editors.

If a port’s ID is changed in the hydraulic circuit interface, the corresponding port is renamed in the manifold layout interfaces.

A port cannot be pasted/copied in the manifold layout editors.

3.1.5.2.4 Manifold Layout Editor – Inserting Components

The insertion of components in the “Manifold Layout” editors is done in the same way as in the “Hydraulic Circuit” interface. To insert a component, drag and drop it onto one of the manifold faces. The component can only be dropped if it is on one of the manifold faces.

3.1.5.2.5 Manifold Layout Editor – Component Management

If a component is deleted from the hydraulic circuit interface, the corresponding component is also deleted from the manifold layout editors.

If a component label is changed in the hydraulic circuit interface, the corresponding component is renamed in the manifold layout interfaces.

A component cannot be pasted/copied in the manifold layout editors.

3.1.5.2.6 Manifold Layout Editor – Inserting Mounting Holes

The “Mounting Hole” component is only available in the “3D Manifold Layout” library .

The insertion is done in the same way as for the other ports and components. The “Component Properties” dialog box is then used for proper configuration.

To access the “Component Properties” dialog box, double-click on the “Mounting Hole”.

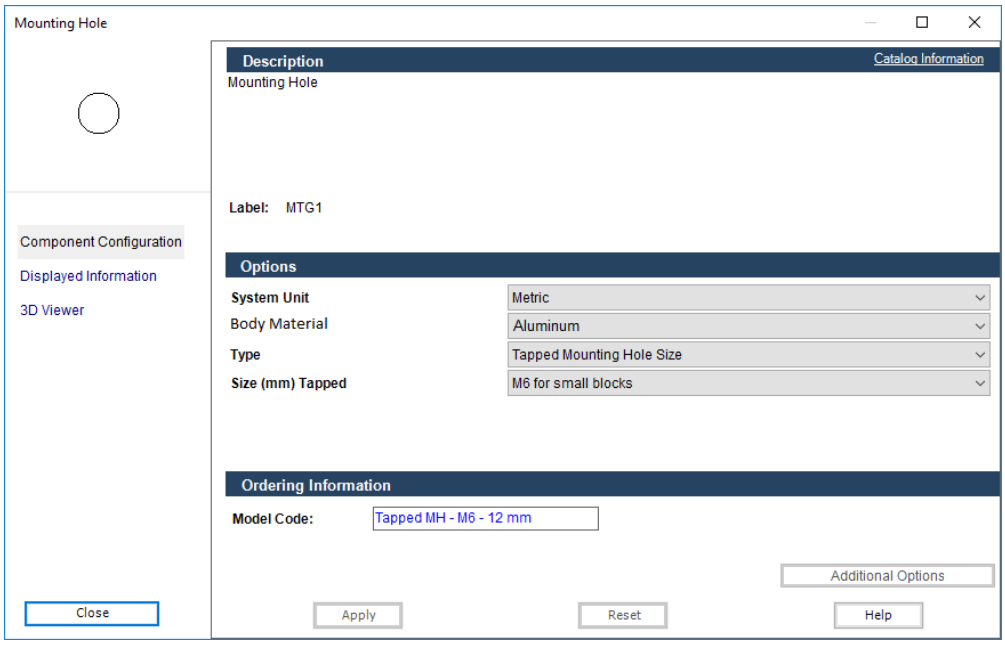


Figure 3-36: Mounting Hole Component Properties Dialog Box

3.1.6 Manifold Manipulations

3.1.6.1 Faces Labels

Each block face has a stamped label name (Front, Back, Top, Bottom, Left or Right)

3.1.6.2 Zoom

The user can zoom in and out by using the mouse scroll or the zoom functions in the “View” toolbar.

If the mouse wheel is used, the zoom is focalized on the center of the mouse.

3.1.6.3 Pan

The user can use the panning function in the “View” toolbar to move the view in any direction.

The other method is to click and drag the mouse while holding the spacebar on the keyboard.

When the “Pan” mode is activated, the cursor changes with the following image:

3.1.6.4 Rotate

The user may rotate the 3D view by using the wheel button in the 3D view and moving the mouse around.

Another method is to click and drag the mouse while holding the shift key on the keyboard.

The “Rotate Block” tool in the “Design” toolbar can also be used to rotate the manifold block.

When the “Rotate Block” mode is activated, the cursor changes with the following image:

When using the “Rotate Block”, a click and drag action on the manifold will then rotate the view.

The ESC key cancels the “Rotate Block” mode, and return to the “Select” mode.

3.1.7 Manifold View

The 3D manifold view may be configured in several ways. This section describes how to activate the following views:

- Transparency;
- Components;
- Component Label;
- Leader;
- Interferences;
- Reference Axis;
- Manifold Grid.
- Dimensions;
- Placement Locks.

3.1.7.1 Transparency

The *3D Manifold Layout* interface may be configured to be visualized in a solid/opaque view, a transparent view or an invisible view (Only displays components).

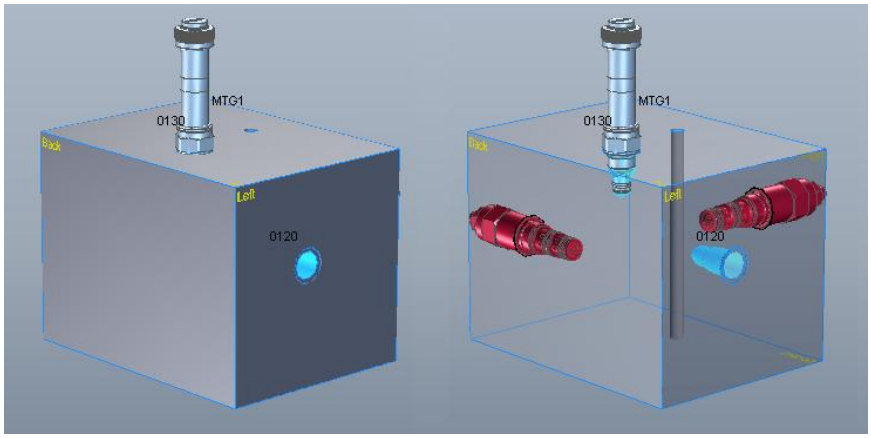


Figure 3-37: Transparent vs. Solid Views

Change the transparency setting by clicking on the Transparency drop-down list in the "View" toolbar.

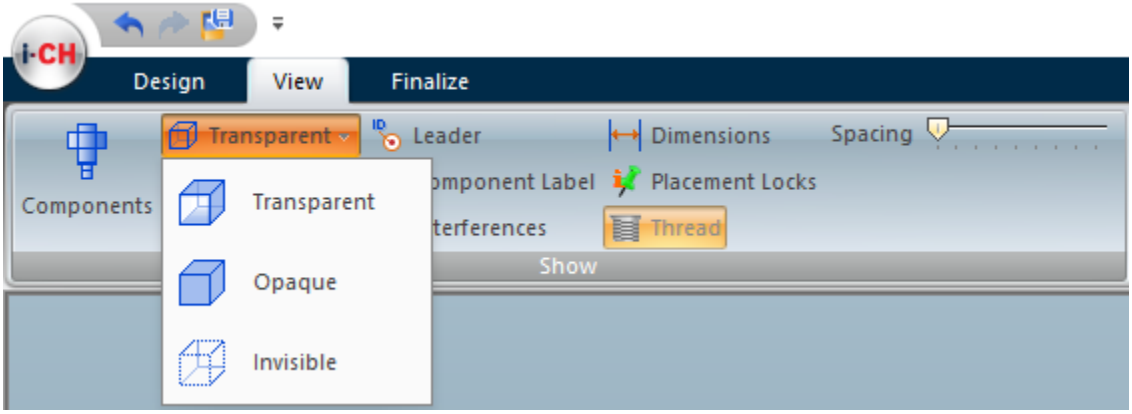


Figure 3-38: Transparency Options

3.1.7.2 View Components

The *3D Manifold Layout* interface may be configured to display only the cavity portion of the components. By default, the complete components are displayed.

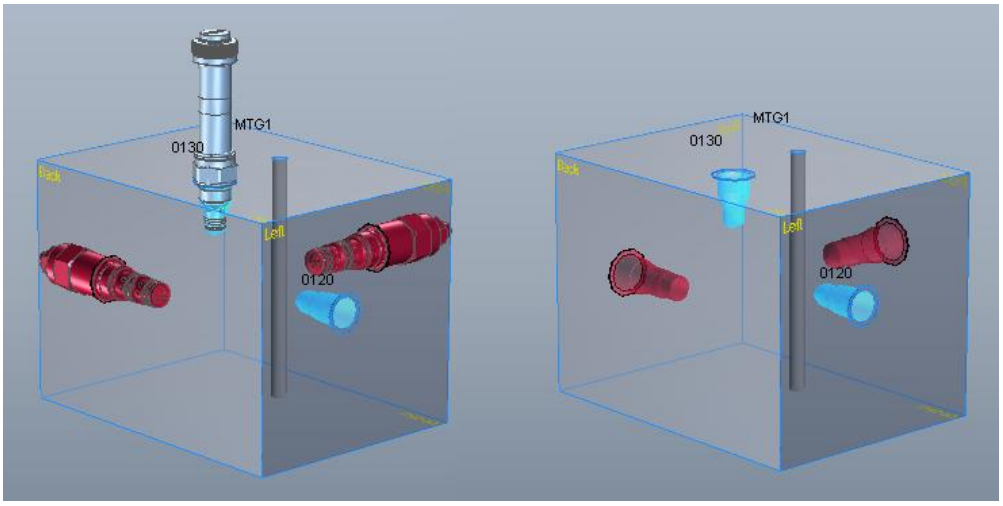


Figure 3-39: View of the Complete Components vs. the Cavities Only

Change the “Components” setting by clicking on the “Components” button in the “View” toolbar.

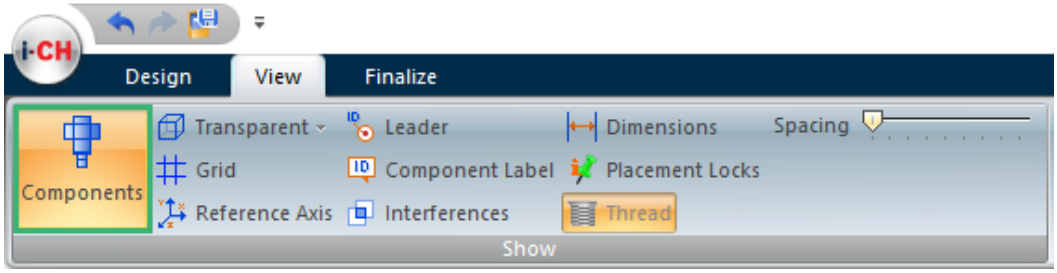


Figure 3-40: View Cavities Only Option

3.1.7.3 View Component Label

The *3D Manifold Layout* interface may be configured to display/hide the component labels. By default, the component labels are displayed.

Change the “Component Label” setting by clicking on the “Component Label” button in the “View” toolbar.

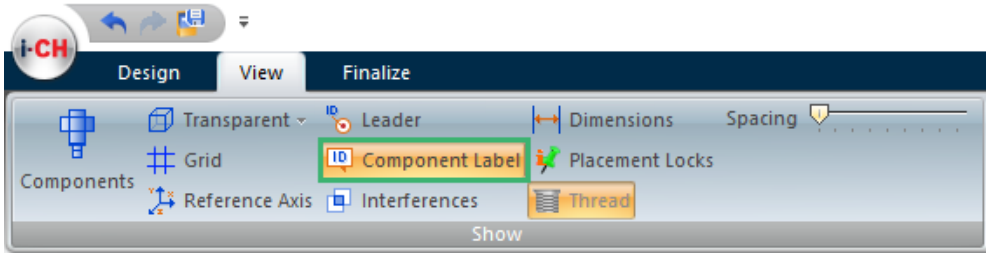


Figure 3-41: View Components Label Option

It is possible to configure the identifier font by double-clicking on each of them. The identifiers can also be moved around by selecting and dragging them.

3.1.7.4 View Satellite Owner

The *3D Manifold Layout* interface may be configured to display/hide a line going from the components to their identifiers. By default, the line is not displayed. This is useful to easily figure out which identifier goes with each component.

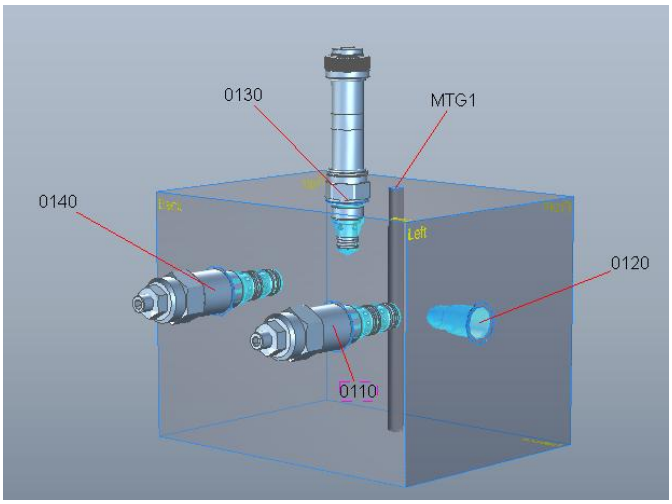


Figure 3-42: Lines Showing the Owners of the IDs

To display/hide the lines, select the “Leader” command in the “View” menu.

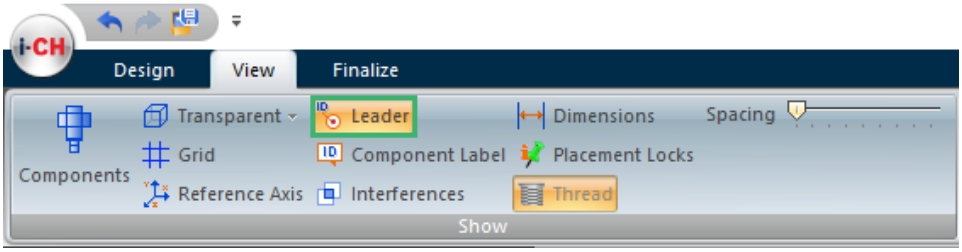


Figure 3-43: View Leader Option

Note: The reference lines will follow the corresponding IDs when they are moved.

3.1.7.5 View Interferences

The *3D Manifold Layout* interface may be configured to display/hide the physical cavity interferences in red. By default, the interferences are displayed.

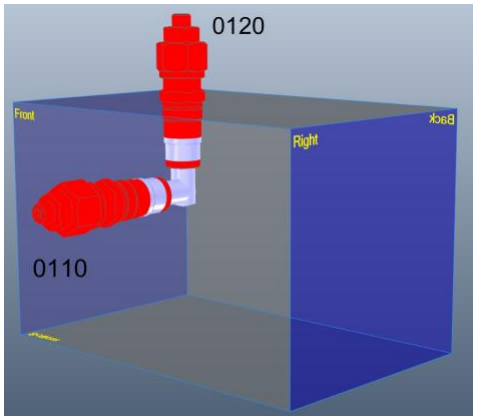


Figure 3-44: Component Interference

Change the “View Interferences” setting by clicking the “View Interferences” command in the “View” menu.

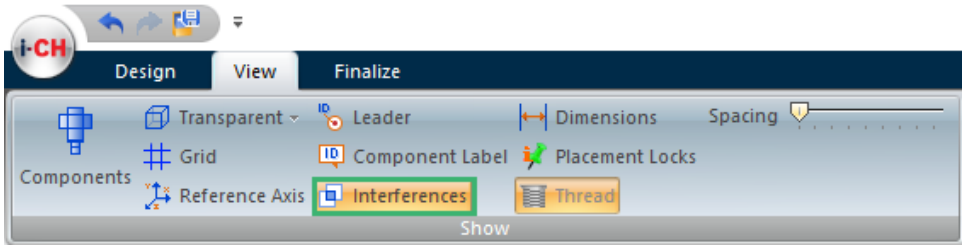


Figure 3-45: View Interferences Option

3.1.7.6 View Reference Axis

The 3D manifold interface may be configured to display/hide the XYZ axis at the (0, 0, 0) coordinate.

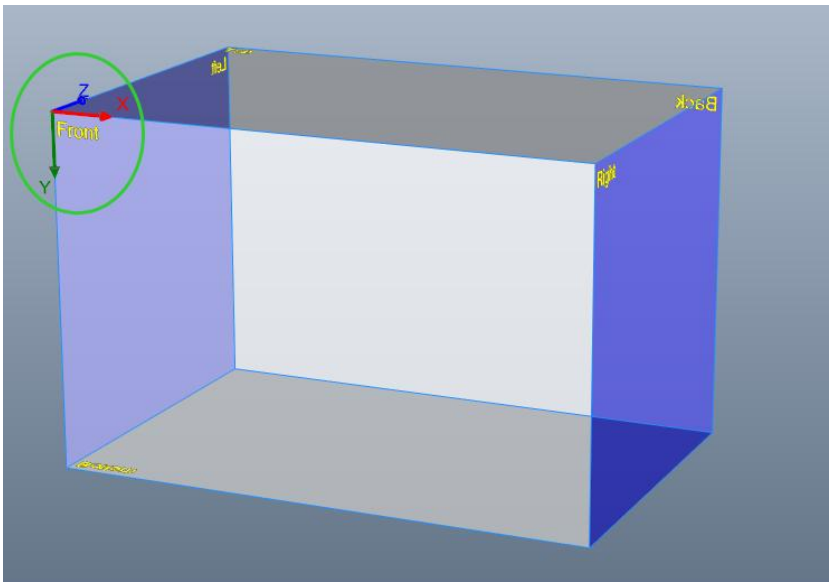


Figure 3-46: Reference Axis

There are two ways to display/hide the reference axis:

3. By selecting the “View Reference Axis” command in the “View” menu;

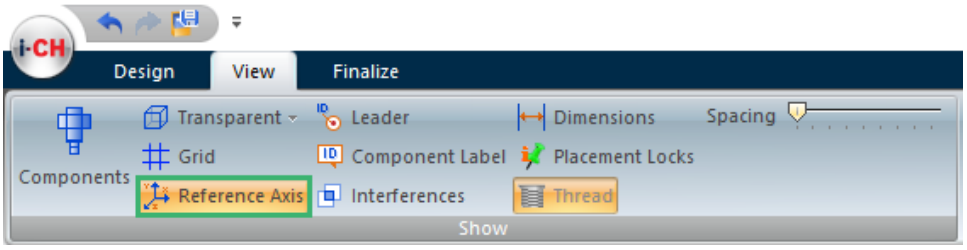


Figure 3-47: View Reference Axis

4. By right-clicking on one of the manifold faces and selecting “Display Reference Axis” in the contextual menu.

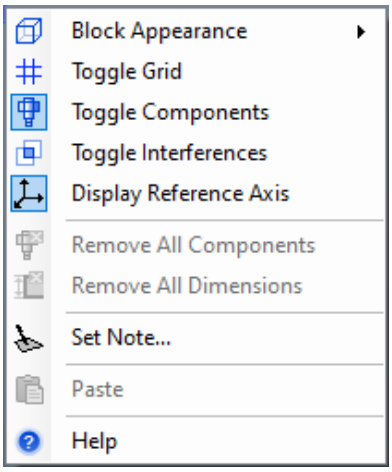


Figure 3-48: Display Reference Axis in the Contextual Menu

3.1.7.7 Manifold Grid

The grid properties can be configured for the 3D manifold interface. The unit defined when the project was created is used.

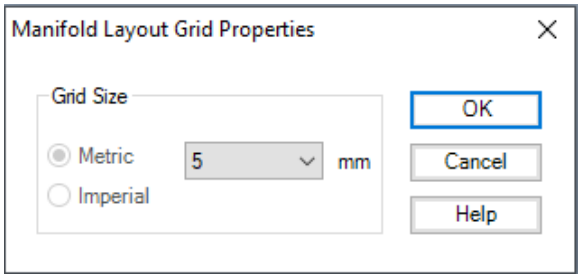


Figure 3-49: Manifold Layout Grid Properties Dialog Box

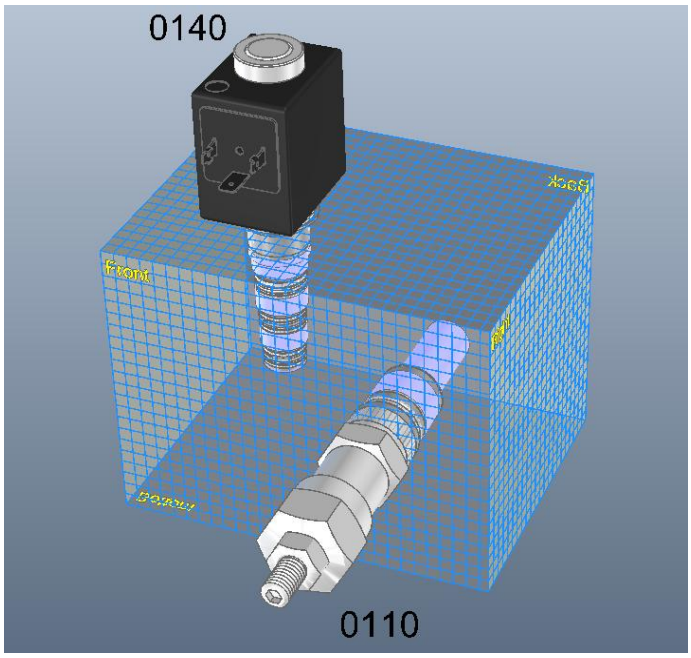


Figure 3-50: Manifold Layout Grid

To open the “Manifold Grid Properties” dialog box, select it in the “Design” menu→ “Block” group.

Figure 3-51: Manifold Grid Properties Command

Notes: Do not forget to activate the “View Grid” option in the “Preferences” menu to see the grid lines.

3.1.7.8 Flat View

In the 3D interface you have the “Flat” view. To rapidly go to a “Flat” view, double-click on the desired face.

To see the isometric view after activating the flat view, simply rotate the manifold by pressing on the wheel button and moving the mouse in the main display.

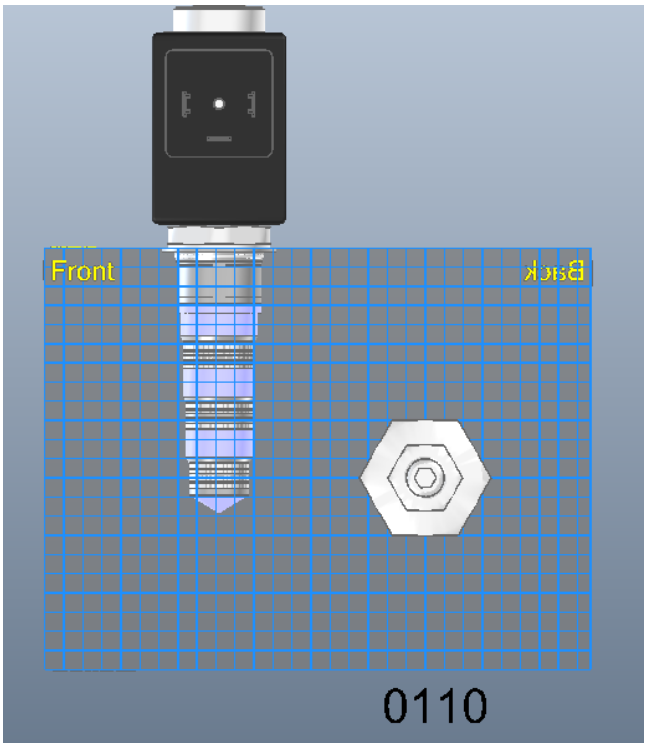


Figure 3-52: 3D Front Face in Flat View

3.1.8 Manifold Component Configuration

Once a component has been inserted onto a manifold face, the user can modify various parameters to their exact specifications. The following configurations can be applied:

- Set Custom Component Dimension;
- Set Component Location;
- Rotate and Move Components;
- Lock Component Position;

- Restrict Component to Surface;
- Counterboring;

The description of how to assign notes to a manifold face is also at the end of this section.

3.1.8.1 Set Custom Cartridge Dimension

It is possible to position “Custom” cartridges on the manifold block. Custom cartridges have unknown dimensions and shapes that need to be specified. To do this:

1. Insert the custom cartridge from the library onto one of the manifold faces;
2. Right click on it and select “Set Dimensions…” from the contextual menu;

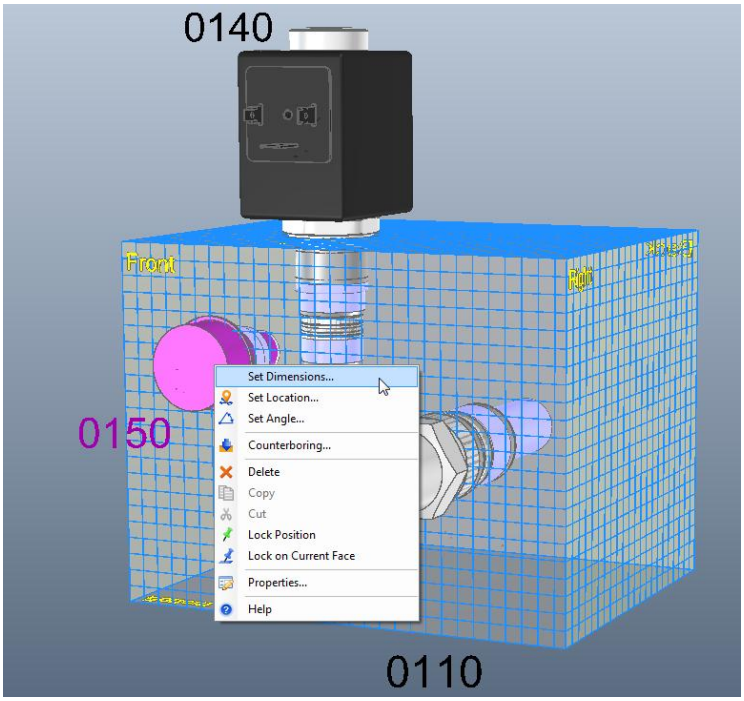


Figure 3-53: 3D Set Dimensions from its Contextual Menu

3. Select the envelope shape in the dialog box;
4. Enter the dimensions of the component.

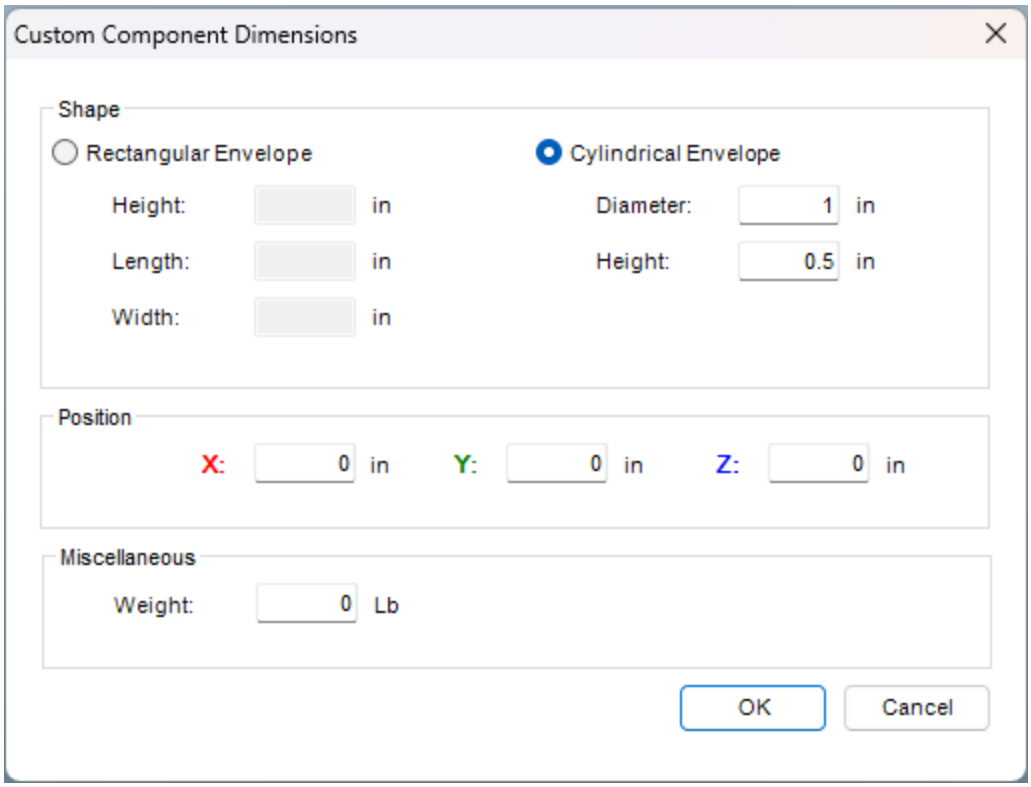


Figure 3-54: Custom Component Envelop Dimensions

Note: Cavity envelope shapes and sizes will be used to signal interferences with other cavities or the manifold edges.

3.1.8.2 Set Component Location

Components can be moved in three different ways:

1. By selecting a component and dragging it with the mouse on any of the manifold faces;

   Note: The movement is restricted to one face if more than one component is selected at a time.

2. By selecting a component and using the keyboard arrows to move it. The component movement is restricted to its current face. This works only in the "flat" view;
3. By right clicking on the component and selecting "Set Location" in its contextual menu.

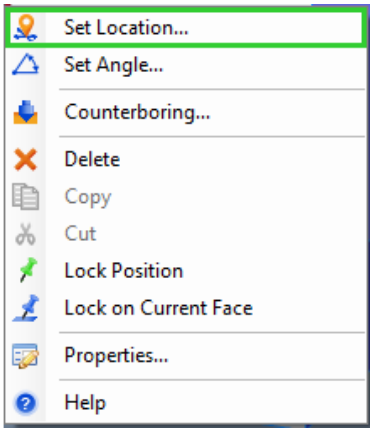
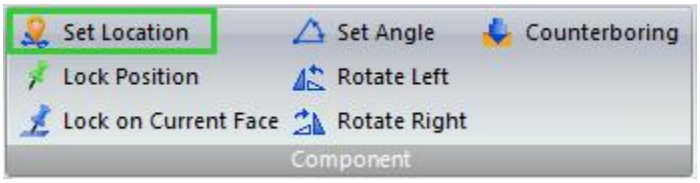


Figure 3-55: Set Location Command

- *From the "Design" toolbar*



Then enter the X, Y, Z position coordinates in the dialog box that opens. These coordinates are relative to the origin point shown by the reference axis. (See *View Reference Axis* section for more details)

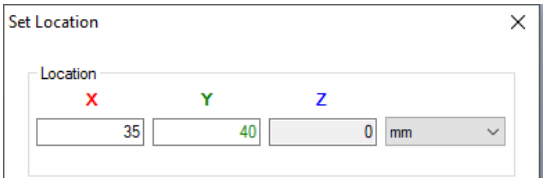


Figure 3-56: Set Location X, Y, Z Fields

Note: The coordinates must be on the same face where the component is currently located. This is the reason why there is one coordinate that cannot be edited.

3.1.8.3 Rotate a Component

Components and accessories can be rotated so that the user can optimize the manifold block space. To do this:

1. Right click on the component to select it and display its contextual menu.
2. Select the "Set Angle" command;

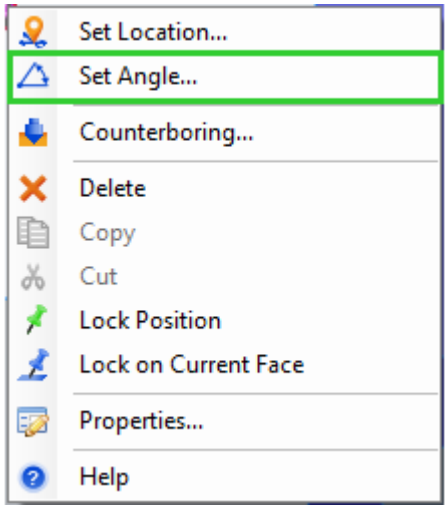


Figure 3-57: Set Angle Command

3. Type in the desired angle in the "Component Angle" dialog box;

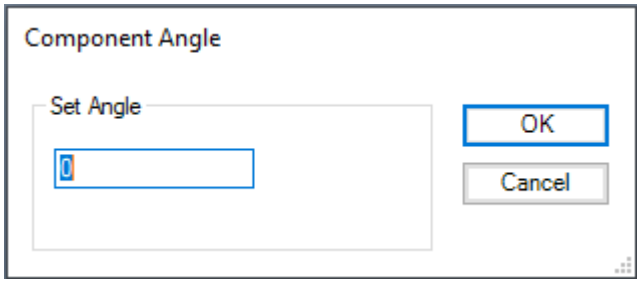


Figure 3-58: Component Angle Dialog Box

4. Click on "OK".

The manifold layout views are immediately refreshed to display the new angle of the modified component.

The "Rotate Left" and "Rotate Right" tools in the "Design" toolbar can also be used to quickly rotate the selected component by 45 or 90 degrees counter-clockwise or clockwise. The angle used depends on the selected component.

3.1.8.4 Lock Component Position

If a component position is a constraint for the block manifold design, the user can lock the component position so that it cannot be moved or displaced afterward.

There are three ways to lock the position of a component on the manifold:

1. By using the "Lock Position"  button in the "Design" toolbar;
2. By right clicking on a component and selecting "Lock Position" in the contextual menu;

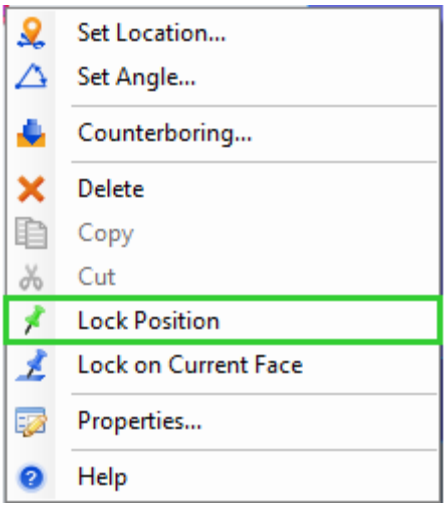


Figure 3-59: Lock Position Command

3. By right clicking on a component and selecting “Set Location” in the contextual menu.

Then select the “Lock Location” radio button in the “Constraint” area of the “Set Location” dialog box.

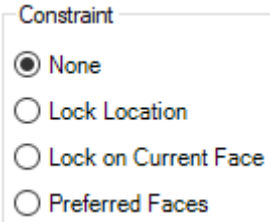


Figure 3-60: Lock Location Radio Button

Note: To unlock the component position, select the “None” radio button in the “Constraint” area of the “Set Location” dialog box.

A green pin  is displayed over the component in the manifold views to indicate that it cannot be relocated.

3.1.8.5 Restrict Component to Surface

If a component position is restricted to a face of the block manifold design, the user can restrict the component position so that it cannot be moved outside of the selected face.

There are several ways to restrict the position of a component on the manifold:

1. By using the “Lock on Current Face”  tool in the “Design” toolbar;
2. By right-clicking on a component and selecting “Lock on Current Face” in the contextual menu.

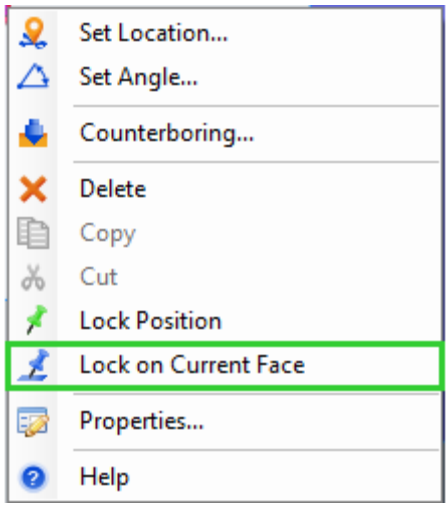


Figure 3-61: Lock on Current Face Command

3. By right clicking on a component and selecting “Set Location” in the contextual menu.

   Then select the “Lock on Current Face” radio button to activate the constraint.

The “Preferred Faces” choice is only used for documentation purposes. The software will not restrict the component location in this case. To do this, select the “Preferred Faces” radio button instead. Then add the preferred faces to the list going from 1st to 6th.

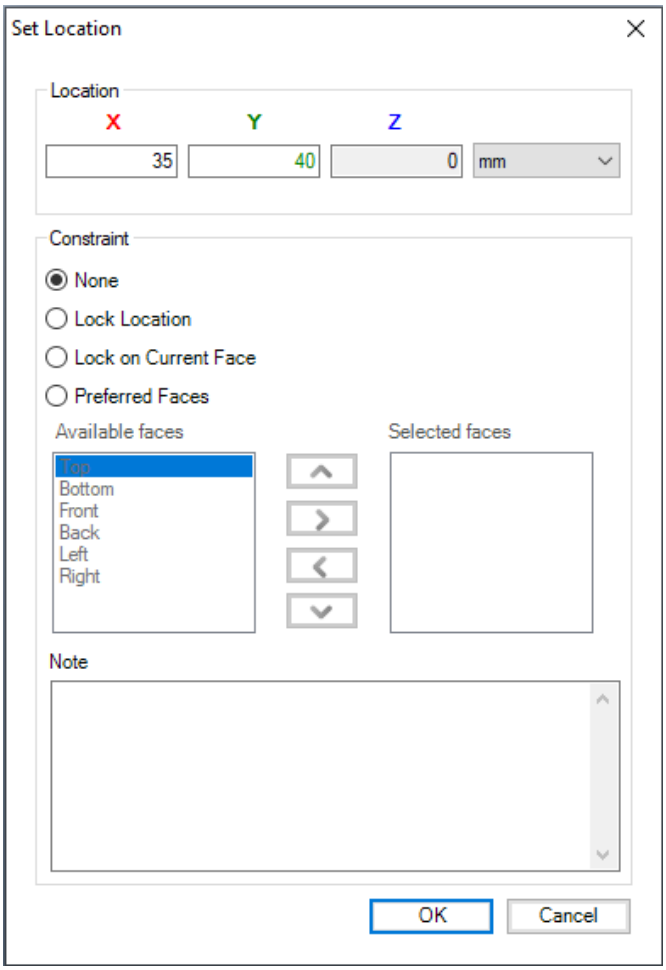


Figure 3-62: Preferred Faces Defined in Set Location Dialog Box

A blue pin  is displayed over the component in the manifold views to indicate that it is restricted to the current face.

A yellow pin  is displayed over the component to indicate that it is restricted to several faces.

3.1.8.6 Counterboring

After being placed on an orthogonal projection or on one of the isometric view faces, a valve can be sunk into a counterbore. To create a counterbore:

1. Right-click on a component in a manifold layout interface;
2. Select “Counterboring” in its contextual menu;

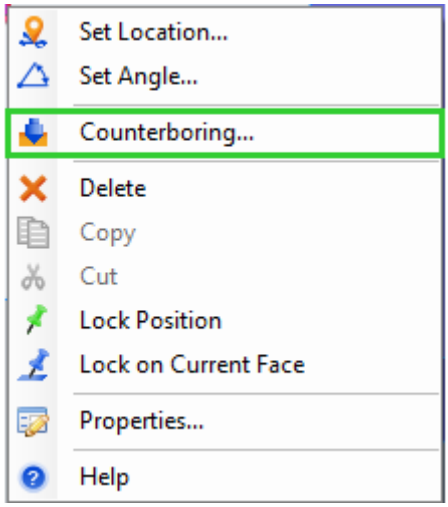


Figure 3-63: Counterboring Command in the Contextual Menu

3. Configure the depth and the diameter of the desired counterbore for this component.

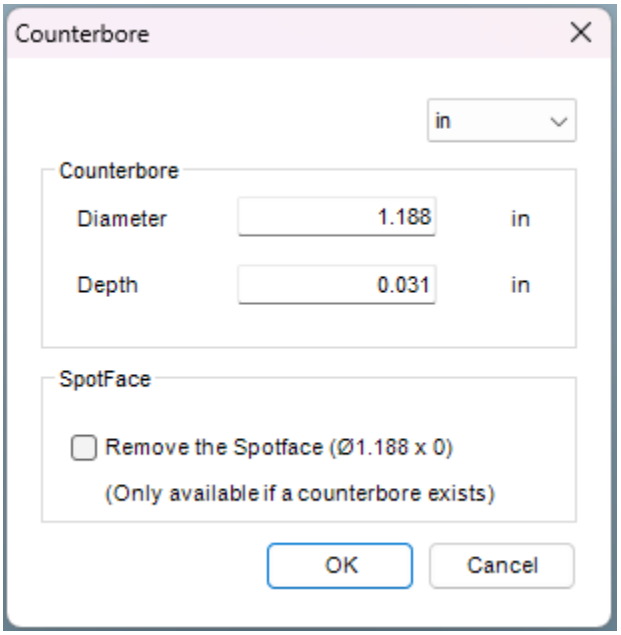


Figure 3-64: Counterbore Dialog Box

3.1.8.7 Reversing a Component

Some components are bi-directional and symmetric. The flow can travel in 2 directions. In this case, the designer can reverse the component in order to simplify the routing solution. Port 1 will become Port 2 and vice versa.

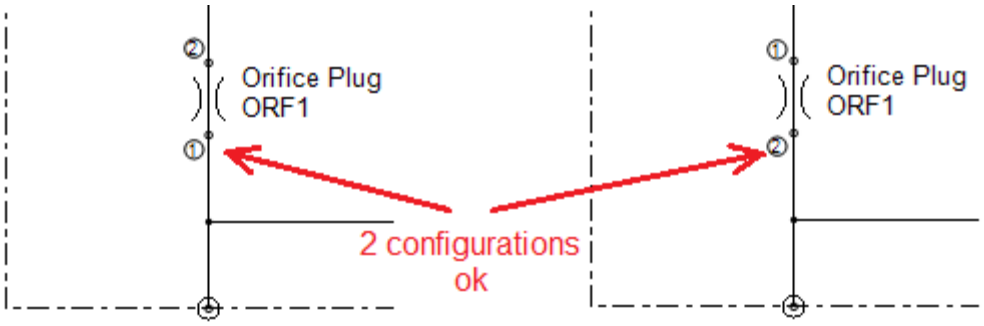


Figure 3-65: Reversible Components

1. Right click on the component in the schematic or on the 3d layout and select “Flip Reversible Component” from the contextual menu;

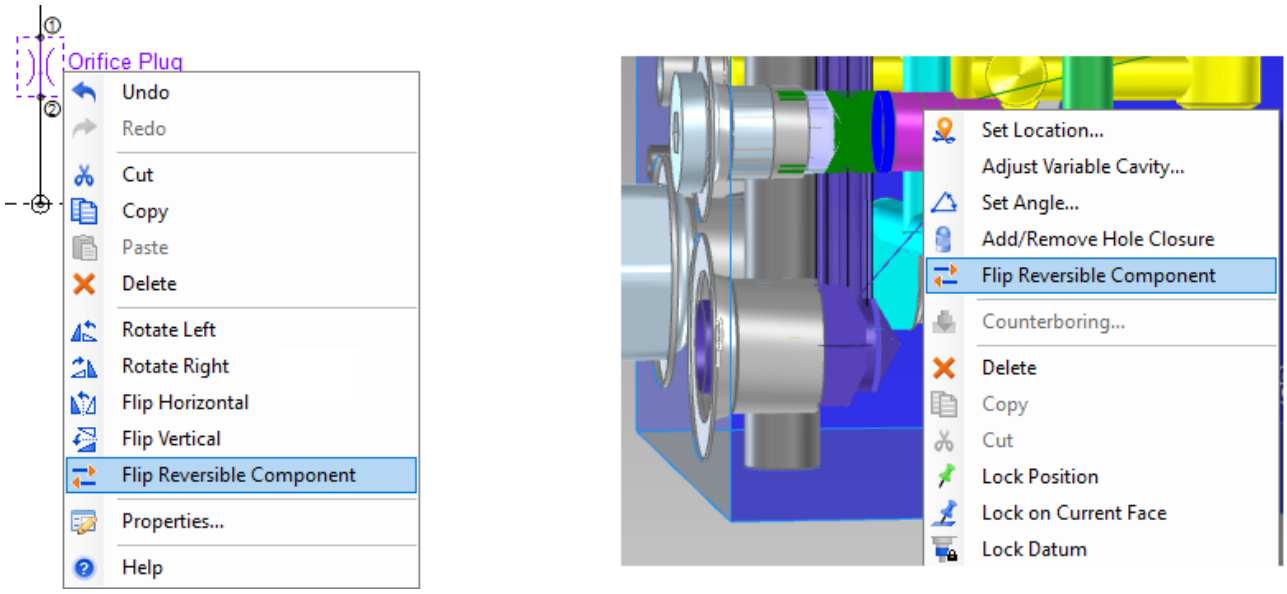


Figure 3-66: Flip Reversible Component Option

3.1.8.8 Assigning Notes to the Manifold Faces

Notes can be added to each face of the manifold block. To create a note:

2. Right click on the faces where you want to add the note;
3. Select “Set Note” in the contextual menu;

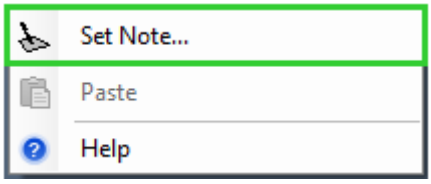


Figure 3-67: Set Note Command in the Manifold Face Contextual Menu

4. Type in the note;

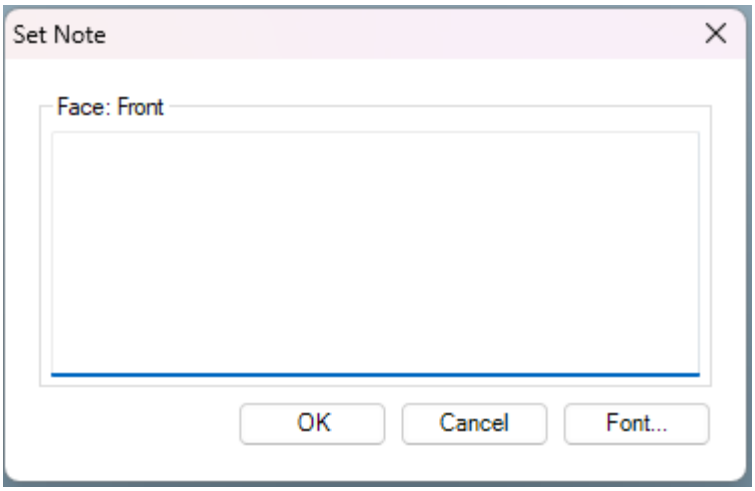


Figure 3-68: Set Note Dialog Box

5. Configure the desired text font by clicking on the “Font” button.

A note is now displayed below the face in the “flat” view.

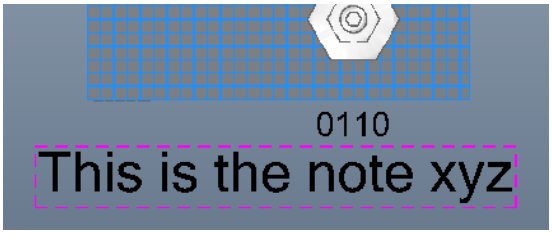


Figure 3-69: Note Added to the Manifold Front Face

3.1.9 Manifold Dimensioning

When a new project is created, the manifold has predefined dimensions. You can read the current extrusion size and the length in the status bar.

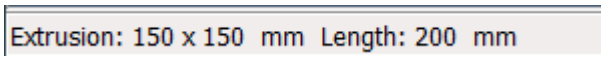


Figure 3-70: Extrusion Size and Length in the Status Bar

There are three ways to modify the block manifold size:

- By dragging face edges;
- By using the “Dimensions” dialog box;
- With automatic shrinking.

3.1.9.1 Resizing by Dragging the Edges

Modification to the manifold dimensions can be done by dragging the edges. Depending on the dragged edge, the dimension change will be done on the length or the extrusion. To do this:

1. On the 3D Manifold Layout document, double-click on a face to display it in “Flat mode”.
2. Activate the resizing mode by clicking on the “Show Resize Handles” tool  in the “Design” toolbar.

Selection boxes with handles will appear on the manifold layout interface;

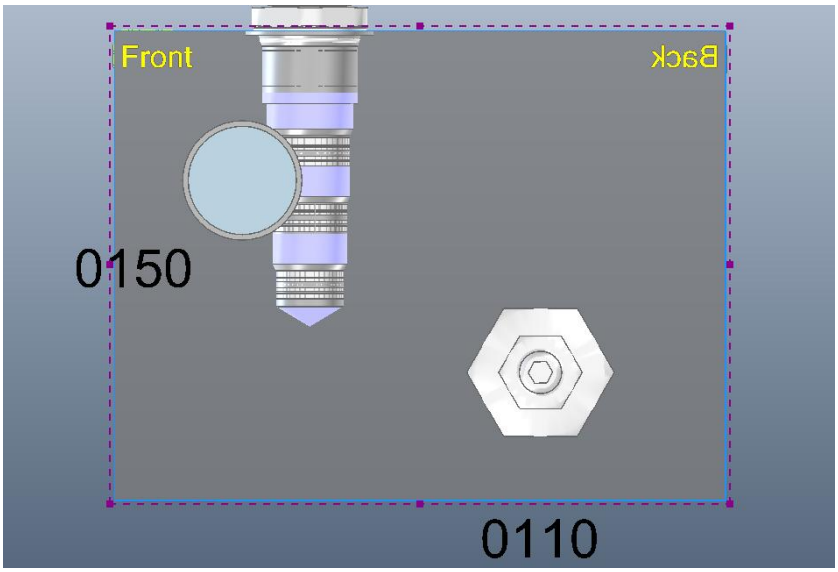


Figure 3-71: The Manifold Layout Interface in Resizing Mode

3. Grab one of the handles, which are the little squares on the selection lines around the faces, and drag it with the mouse.
4. Repeat the dragging of the edges until you obtain the desired size.

Notes: When dragging a manifold edge, the extrusion will increase or decrease to the next standard size.

3.1.9.2 Resizing through the Dimensions Dialog Box

The manifold dimensions can be modified from the “Dimensions” dialog box by selecting the “Design” menu → “Block Dimensions…”.

Figure 3-72: Set Manifold Dimensions…

This opens the “Manifold Dimensions” dialog box that can be used to precisely resize the extrusion and the length of the manifold block.

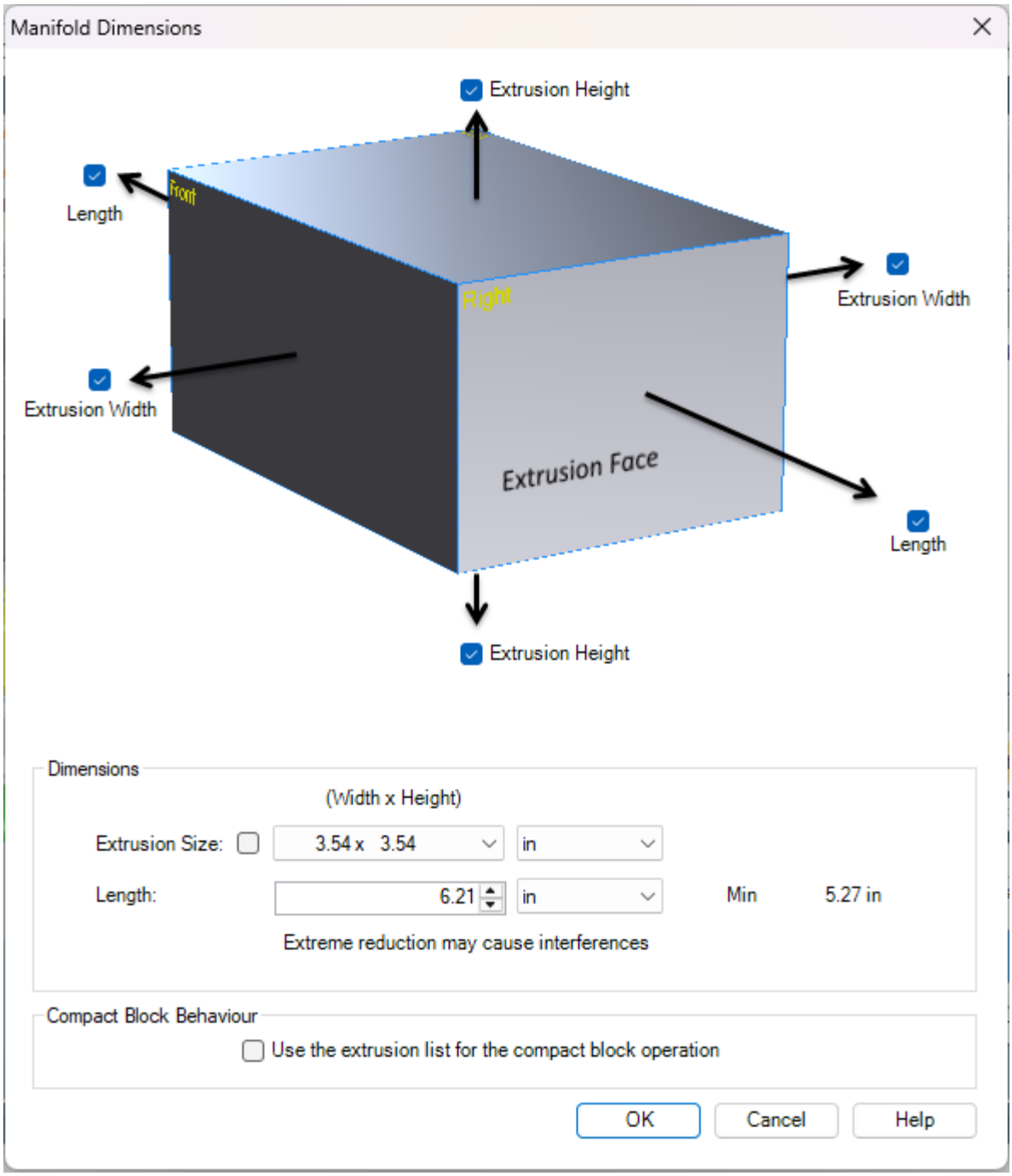


Figure 3-73: The "Manifold Dimensions" Dialog Box

To resize the extrusion:

1. Select the desired "Extrusion Size" from the predefined list;
2. Select the direction in which resizing should be done by checking the corresponding boxes;

If two opposed extrusion checkboxes are selected, then resizing is done symmetrically in the two directions. Otherwise, it will only be done in the checked direction.

If two opposite directions are unchecked, the "Extrusion Size" drop-down list will only display options using the current dimension for this side.

Note: The available extrusion sizes in the drop-down list depend on the component envelopes inserted on the manifold block.

To change the manifold length:

3. Enter the desired value in the “Length” field;
4. Select the direction in which resizing should be done by checking the corresponding “Length” boxes;

If both extrusion checkboxes are selected, then resizing is done symmetrically in the two directions. Otherwise, it will only be done in the checked direction.

Note: The minimum length permitted, displayed at the right of the “Length” field, depends on the component envelopes inserted on the manifold block.

3.1.9.3 Automatic Block Compaction

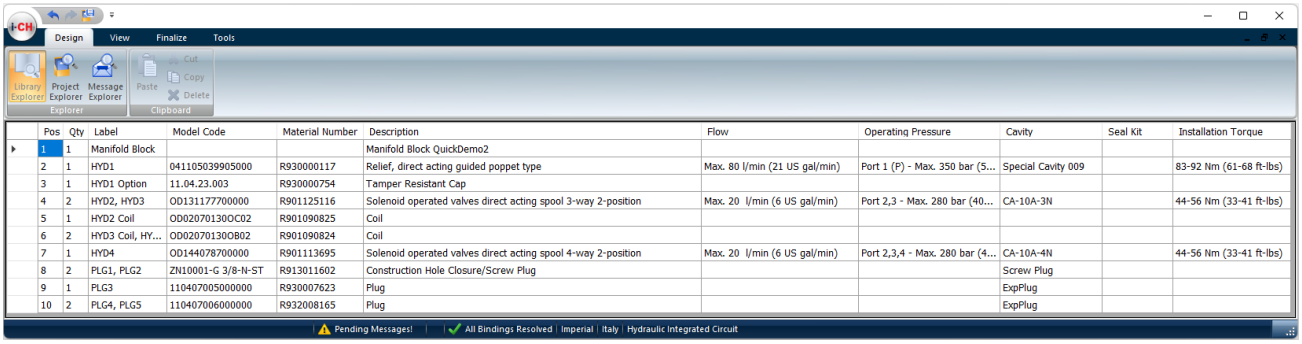
The “Compact Block” function automatically finds the minimum extrusion size and length by closing each manifold face until cavity envelope interferences are detected.

To automatically compact the manifold dimensions, click on the “Compact Block” tool in the “Design” tab → “Block” group. 

3.1.10 Parts List Interface

The part list interface is a simple BOM of the current design. It displays the information of the components that have been inserted and configured in the hydraulic circuit interface.

This list can be copied and pasted into any Microsoft compatible spreadsheet application.



Pos	Qty	Label	Model Code	Material Number	Description	Flow	Operating Pressure	Cavity	Seal Kit	Installation Torque
1	1	Manifold Block			Manifold Block QuickDemo2					
2	1	HYD1	041105039905000	R930000117	Relief, direct acting guided poppet type	Max. 80 l/min (21 US gal/min)	Port 1 (P) - Max. 350 bar (5...	Special Cavity 009		83-92 Nm (61-68 ft-lbs)
3	1	HYD1 Option	11.04.23.003	R930000754	Tamper Resistant Cap					
4	2	HYD2, HYD3	OD131177700000	R901125116	Solenoid operated valves direct acting spool 3-way 2-position	Max. 20 l/min (6 US gal/min)	Port 2,3 - Max. 280 bar (40...	CA-10A-3N		44-56 Nm (33-41 ft-lbs)
5	1	HYD2 Coil	OD020701300C02	R901090825	Coil					
6	2	HYD3 Coil, HY...	OD020701300B02	R901090824	Coil					
7	1	HYD4	OD144078700000	R901113695	Solenoid operated valves direct acting spool 4-way 2-position	Max. 20 l/min (6 US gal/min)	Port 2,3,4 - Max. 280 bar (4...	CA-10A-4N		44-56 Nm (33-41 ft-lbs)
8	2	PLG1, PLG2	ZN10001-G 3/8-N-ST	R913011602	Construction Hole Closure/Screw Plug			Screw Plug		
9	1	PLG3	110407005000000	R930007623	Plug			ExpPlug		
10	2	PLG4, PLG5	110407006000000	R932008165	Plug			ExpPlug		

Figure 3-74: Parts List Interface

All of the information found in the part list interface is defined in the “Component Properties” dialog box.

3.1.11 Technical Data Interface

The technical data interface is a summary table of the project and component parameters. The table is divided into multiple sections:

- TECHNICAL DATA
- ELECTRICAL CHARACTERISTICS COIL

The technical data section displays information from the project parameters.

The electrical characteristics coil section displays the information of the components containing coils that have been inserted and configured in the hydraulic circuit interface. The same coils are grouped in one table section. If there are other different coils, new ELECTRICAL CHARACTERISTICS COIL tables are added.

This whole table contains the following columns:

- Parameter Name
- Value
- Button to Override the Value (Only visible in PRO version)
- Button to Display the data in the Technical Drawing (Only visible in PRO version)

A blank row makes it possible to input other parameters (Only in PRO version).

A blank row makes it possible to input other parameters in the electrical area (Only in PRO version).

This table can later be reused from the library as an element on the technical drawing.

All the original values are displayed on the gray background and cannot be modified.

TECHNICAL DATA

	Max. Pressure	210 Bar		
	Max. Flow	20 LPM		
	Ports P3-P4-Acc	7/16 - 20 UNF		
	Ports P1-P2	3/4 - 16 UNF		
	Manifold Material	Aluminium		
	Surface Treatment	Uncoated		
	Fluid	Mineral-based or synthetic oil lubricating properties at viscosities of 20 to 380 mm²/s (cSt)		
	Fluid Temperature Range	-30°C to +100°C (-22°F/+212°F)		
	Recommended Filtration	ISO 4406 19/17/14		
	Internal Leakage	See catalog pages valves (Part3 RE 9005-03)		
	Sealing Material	NBR		
*				

ELECTRICAL CHARACTERISTICS COIL

	Connection	DIN 43650 - ISO 4400		
	Voltage V	12 V ±10%		
	Coil Protection	IP54 / IP67		
	Circuit	Standard		
	Coil Insulation Class	180°C (356°F)		
	Ambient Temperature Range	-30/+60°C (-22/+140°F)		
	Current A	Cold coil 1.7 A - Hot coil 1.2 A		
	Power W	20 W		
	Resistance R at 20°-25° Ohm	7.2 Ohm		
*				

Figure 3-75: Technical Data Interface

In the PRO version, icons beside each parameter entry are used to override the values or to display the parameters on the Technical Drawing. If a value is overridden, the background of the text is white.

3.2 Creating a Compact Directional Valve Project (CDV)

The principle is similar to that of a HIC project. See the “Creating a Manifold Project” chapter for the complete detailed information.

However, some specific cases apply for a CDV project. These differences are described hereafter.

3.2.1 Project Parameters Interface

The only differences compared to a HIC project concerns the mounting bracket and spacer options.

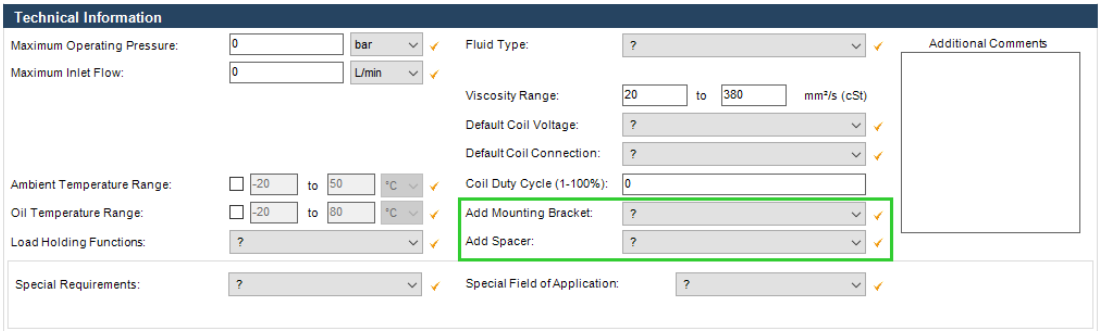


Figure 3-76: Mounting Brackets

3.2.2 Creating a Hydraulic Circuit

The behavior is the same as for a HIC project except for the 3D interface. (See “Creating a Hydraulic Circuit” for HIC project).

For a CDV project, the components are automatically placed on the 3D view. No manipulation is allowed except for some items such as accessories, coil rotation, etc...

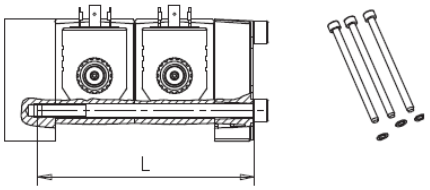
The properties dialog opens by double-clicking on the element.

3.2.2.1 Accessories and fixation elements

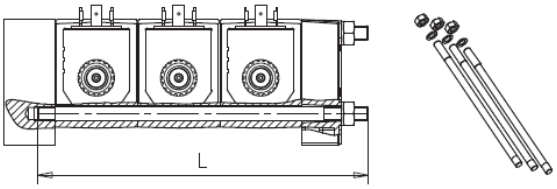
The following accessories are automatically placed on the 3D view and will be listed in the report too.

- ***Assembly of directional elements***

  For 1 or 2 elements, the assembly kit is composed of 3 screws and 3 washers.

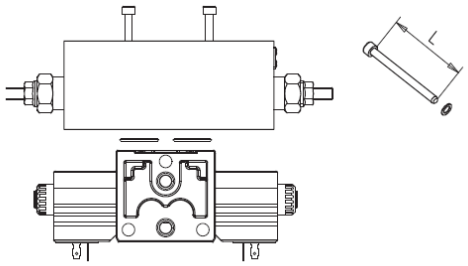


  For 3 or more elements, the assembly kit is composed of 3 tie-rods, 3 washers and 3 nuts.



- ***Assembly of flangeable elements***

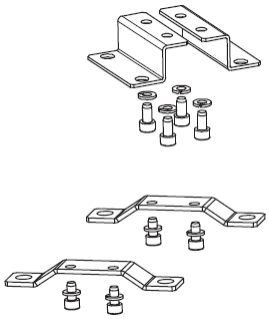
  The assembly kit is composed of 4 screws and 4 washers.



- ***Fitting of mounting brackets***

  The kit is composed of 2 brackets, 4 screws and 4 washers.

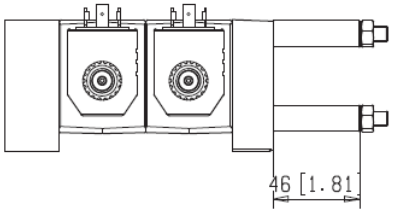
The Mounting Brackets are not automatically added to the assembly. To add Mounting Brackets to the project, select them in the Project Parameters page.



- ***Kit for spacer between elements***

The spacers are fitted in order to install longer tie-rods for the future insertion of an extra directional element.

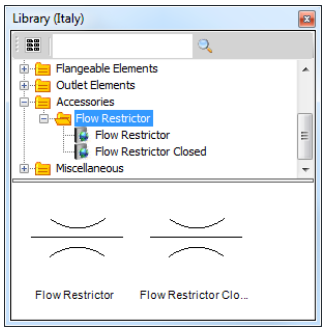
The spacer is not automatically added to the assembly. The user has to open the properties dialog of the screw and then, select “Spacer”. The spacer will appear on the 3D view and in the report.

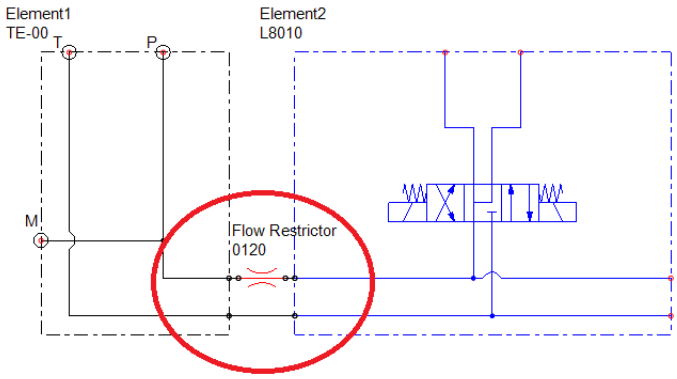


- ***Flow restrictors***

The flow restrictors are placed in a port between elements (for example). Additionally, they can be used to close a port.

These components are available in the library and must be inserted in the hydraulic circuit page as shown in the following example:





3.2.3 CDV Layout Interfaces

The CDV layout interface is used to visualize the components. The component representations shown in the interfaces are realistic.

This is the 3D CDV Layout interface.

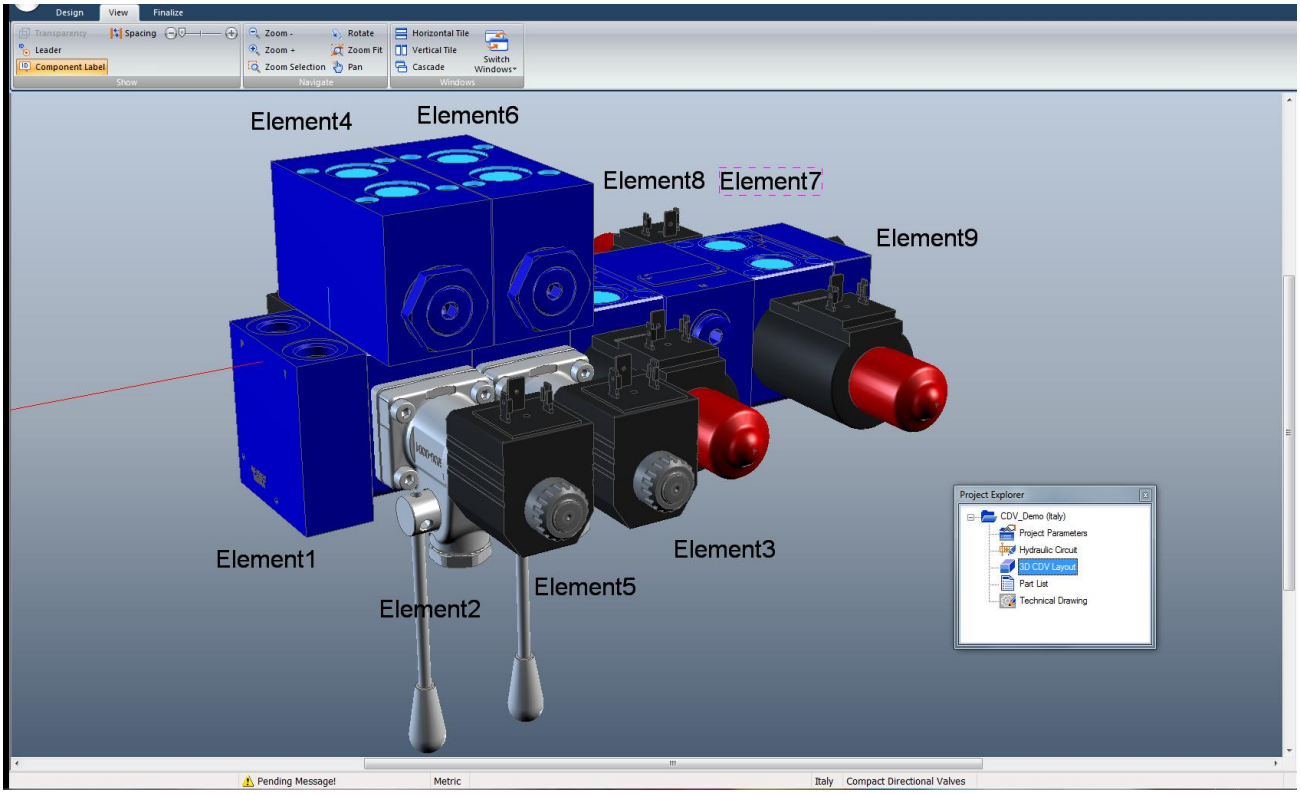


Figure 3-77: 3D CDV Layout Interface

3.2.4 CDV Layout Manipulations

The following functionalities are available for the 3D CDV Layout interface.

3.2.4.1 Zoom

The user can zoom in and out by using the mouse scroll or the zoom functions in the “View” toolbar.

If the mouse is used, the zoom is focalized on the center of the mouse.

3.2.4.2 Pan

The user can use the panning function from the View toolbar to move the whole view in any direction.

The other method is to move the mouse while holding the spacebar on the keyboard.

When the “Pan” mode is activated, the cursor changes to the following image:

3.2.4.3 Rotate

The user may rotate the 3D view by using the wheel button in the 3D view and moving the mouse around.

Another method is to move the mouse while holding the shift key on the keyboard.

The “Rotate Block” tool in the “Design” toolbar can also be used to rotate the manifold block.

When the “Rotate Block” mode is activated, the cursor changes to the following image:

When using the “Rotate Block”, a click and drag action on the manifold will then rotate the view.

The ESC key cancels the “Rotate Block” mode, and return to the “Select” mode.

3.2.4.4 Explode

The user may separate (explode) all the elements by holding the ctrl + shift key on the keyboard and using the mouse scroll wheel.

The user may separate all the elements by moving the following cursor in the toolbar  .

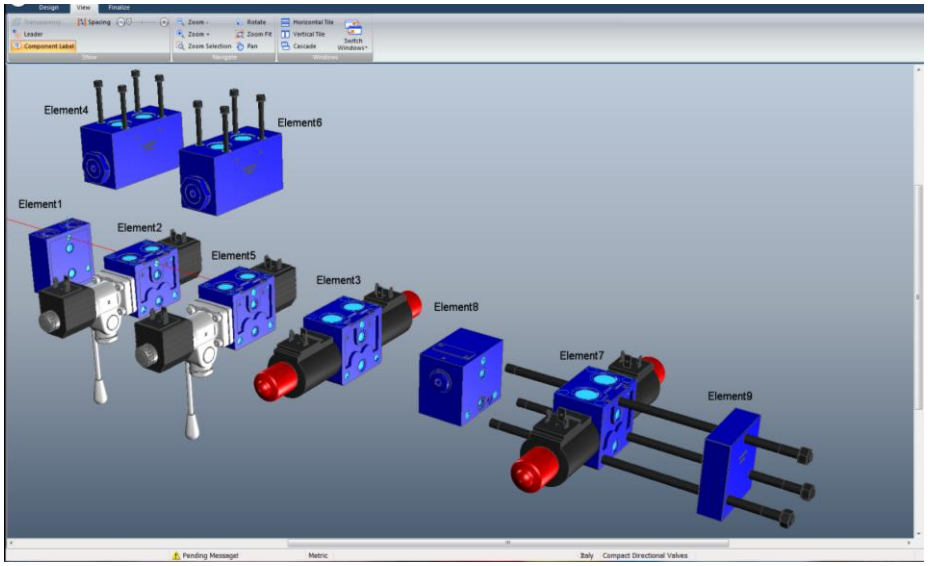


Figure 3-78: 3D CDV Exploded View

3.2.5 Insert a HIC Manifold in a CDV Project

You can insert a HIC manifold into a CDV Project. Use the “Import a HIC Project” command available in the “i-CHoose – Import / Export” menu. An “open file” dialog opens where the HIC project can be selected. The HIC schematic will be inserted onto the schematic as a group of components

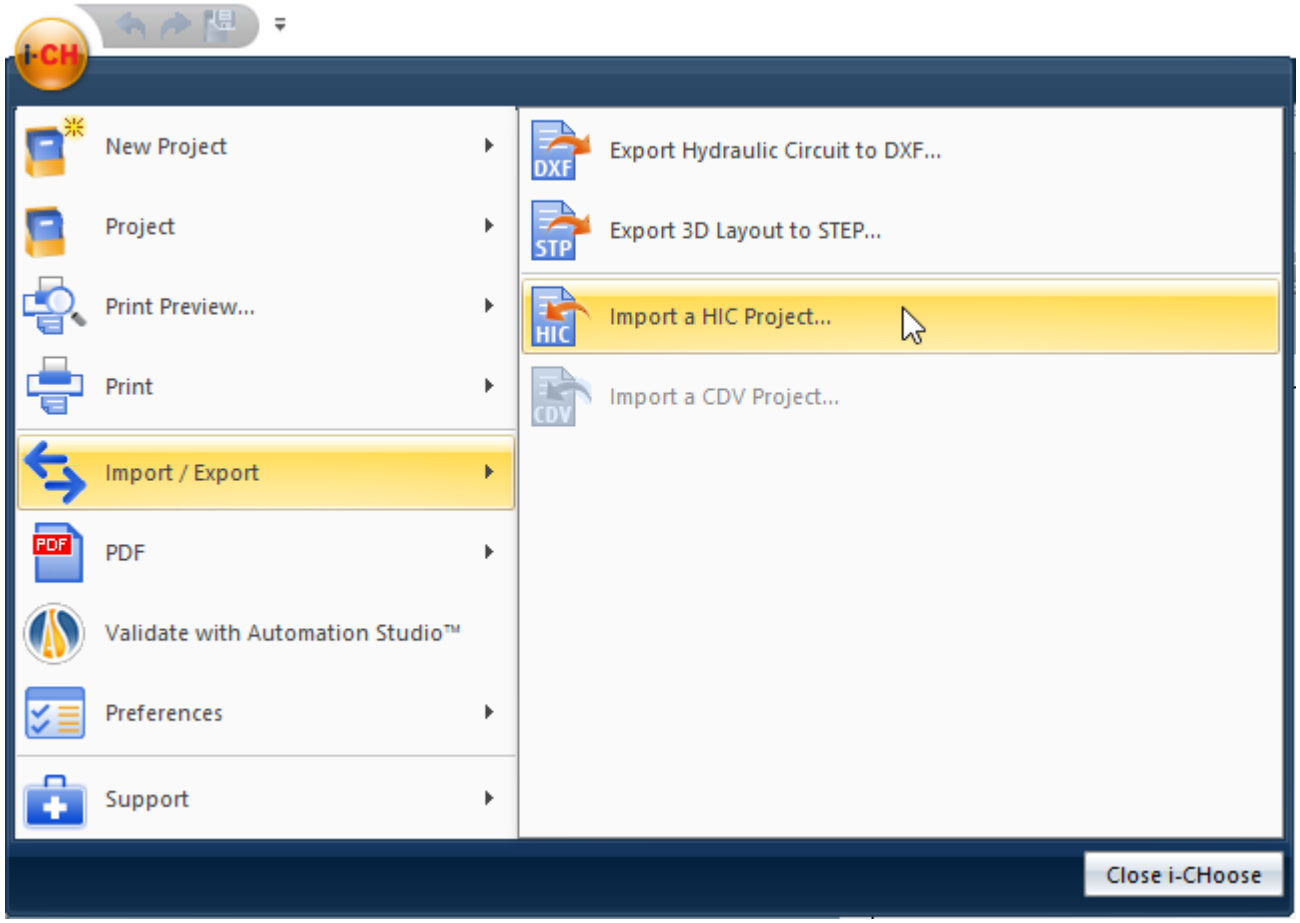


Figure 3-79: Insert a HIC in a CDV Project

Note: The HIC project must be compatible with a CDV project. For example, the external connections of the manifold must have compatibles flanges. Contact Bosch Rexroth for more details.

3.3 Creating a Compact Power Module Project (CPM)

The principle is similar to that of a CDV project. See the “Creating a Compact Directional Valve Project” chapter for the complete and detailed information.

However, some specific cases apply to a CPM project. These differences are described hereafter.

3.3.1 Project Parameters Interface

The main differences when compared to an HIC project are listed below:

- Relief Valve Pressure Setting (Mandatory)
- Operating Pressure
- Motor Type (Mandatory)
- Required Flow (Mandatory)
- Motor Power (Mandatory)
  - Help button: To get motor power theoretical calculations
- Mounting Position (Mandatory)
- Useable Tank Capacity (Mandatory)
  - Help button: To get information in order to calculate tank capacity
- Add Mounting Bracket (Mandatory)
- Max Overall Dimensions
  - Help button: To get information in order to specify the maximum acceptable overall dimensions
- Ambient Type (Mandatory).

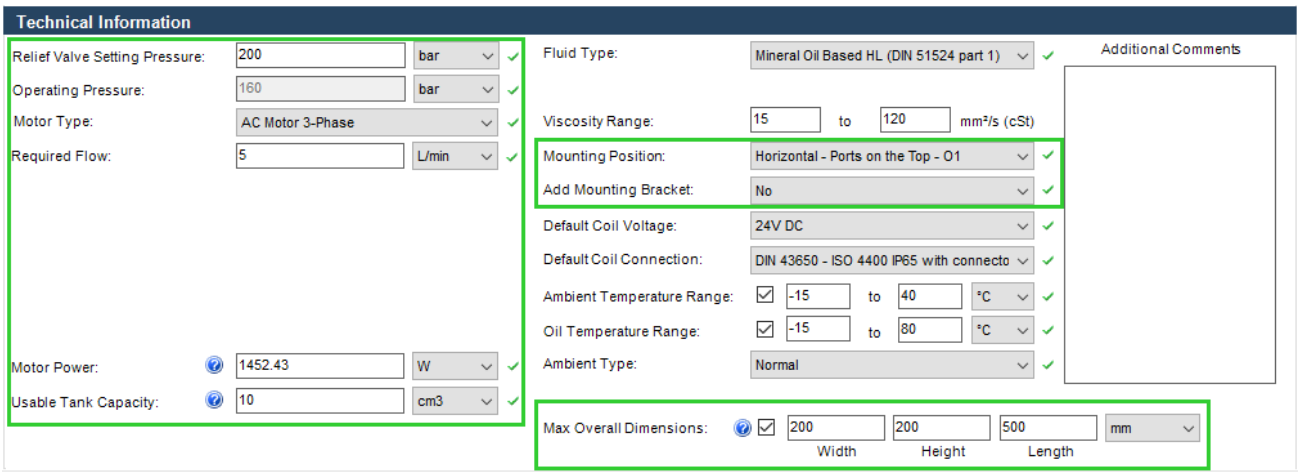


Figure 3-80: Technical Information

3.3.2 Creating a Hydraulic Circuit

The behavior is the same as for a CDV project. (See “Creating a Hydraulic Circuit” for CDV project).

For a CPM project, the components are automatically placed on the 3D view. No manipulation is possible except for some items such as accessories, coil rotation, etc...

The properties dialog opens by double-clicking on the element.

3.3.2.1 Library Specificities

The library in a CPM project includes more features than the library available for an HIC or a CDV project.

In a CPM project, the library automatically highlights the compatible central manifolds based on the “Project Information”, such as the “Application” and the “Function” selected to guide the user in its selection.

Additionally, the library contains “Main Realizable Diagrams” which are predefined/preconfigured central manifolds from which the user can start.

A mouse-over a central manifold pops-up a larger preview.

Another particularity is the central manifold itself, which is in fact a complete power module assembly containing the central manifold in the upper section and the motor, the pumps, the tank and the pipes in the lower section.

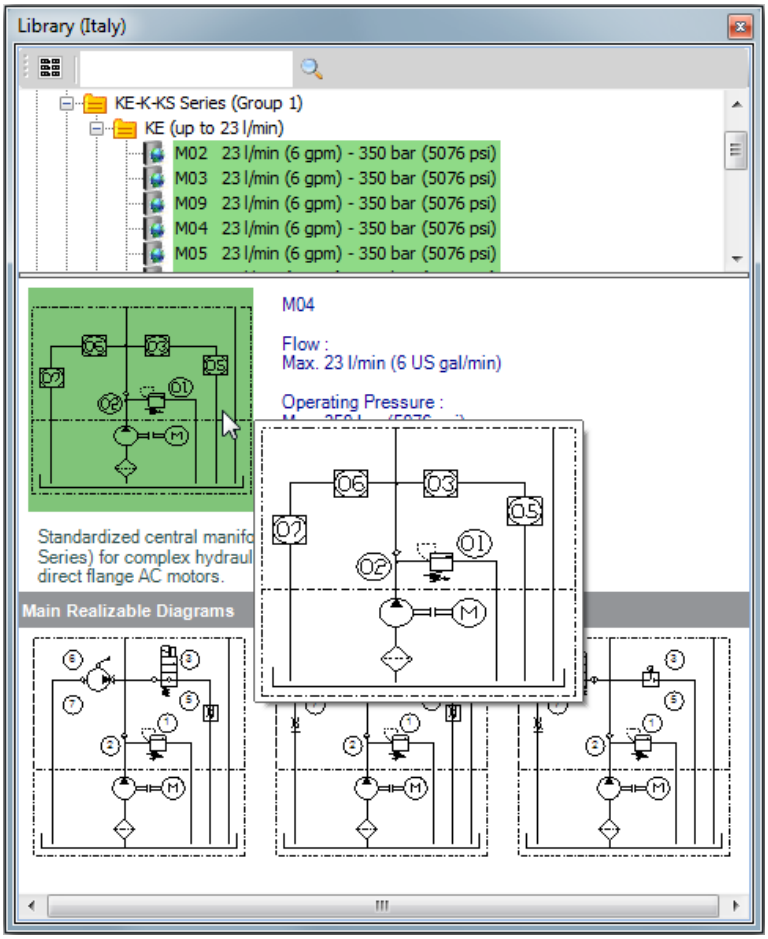


Figure 3-81: Library Specificities

3.3.2.2 CPM Configuration

The starting point of a CPM project remains the completion of the “Project Parameters” document like in an HIC or a CDV project. However, in a CPM project, some information in the “Project Parameters” document is used to guide and facilitate the central manifold selection. Additionally, once the central manifold is brought into the “Hydraulic Circuit” from the library for the first time, some of the technical parameters are transferred into the current central manifold. For these reasons, starting from the “Project Parameters” document is much more important in a CPM project.

The next step is to select a central manifold from the library and drag and drop it onto the “Hydraulic Circuit” document. This is the core of a CPM project. In fact, as previously stated, the central manifold is a complete power module representation.

The configuration process starts after the central manifold is placed on the schematic. Double-clicking on the central manifold opens the configuration window which contains all the elements of the power module.

The configuration window lists all the elements of the power module in a logical order to complete the configuration process. It starts with general parameters (relief valve setting pressure, required flow, mounting position, etc.) which are usually transferred from the “Project Parameters” document, then the motor, the pump, the junction element, the central manifold built-in valves … all the way down to the pipes.

The configuration process is loaded with design rules, element compatibility and automatic element selection which make the configuration easy and errorless every time.

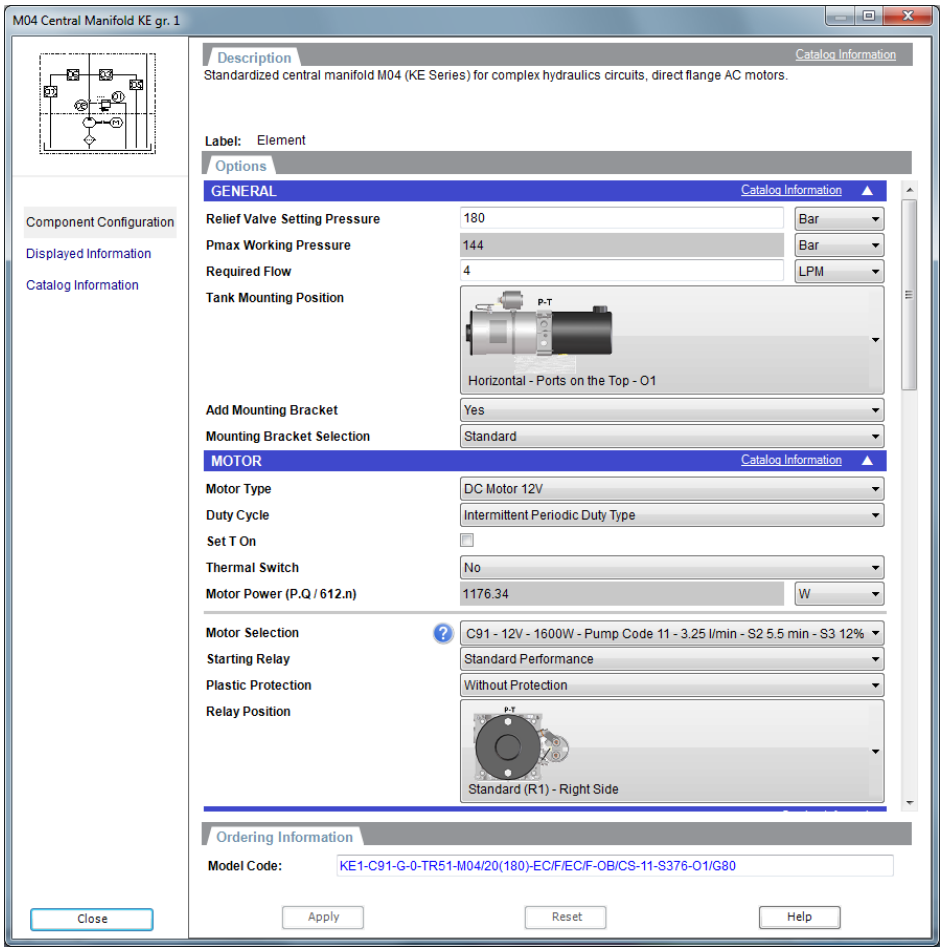


Figure 3-82: Configuration Window

3.3.2.3 Modular Stackable Elements

Like in a CDV project, stackable modular elements can be added to the central manifold hydraulic circuit to complete the system. However, these elements have interfaces which determine whether or not they are compatible with each other. If they are compatible, they are automatically shown in the 3D Layout in the correct physical location and will also be listed in the report.

3.3.2.4 Accessories

Accessories like the isolator, pressure gauge or switch and plug can be inserted on any compatible port on the schematic. If they are compatible, they are automatically shown in the 3D Layout in the correct physical location and will also be listed in the report.

3.3.2.5 Fixation Elements

Like in a CDV project, all the bolts, the screws and the assembly kits are automatically shown in the 3D Layout in the correct physical location and will also be listed in the report.

3.3.3 CPM Layout Interfaces

The CPM layout interface is used to visualize the components. The component representations shown in the interface are realistic.

Following is the *3D CPM Layout* interface.

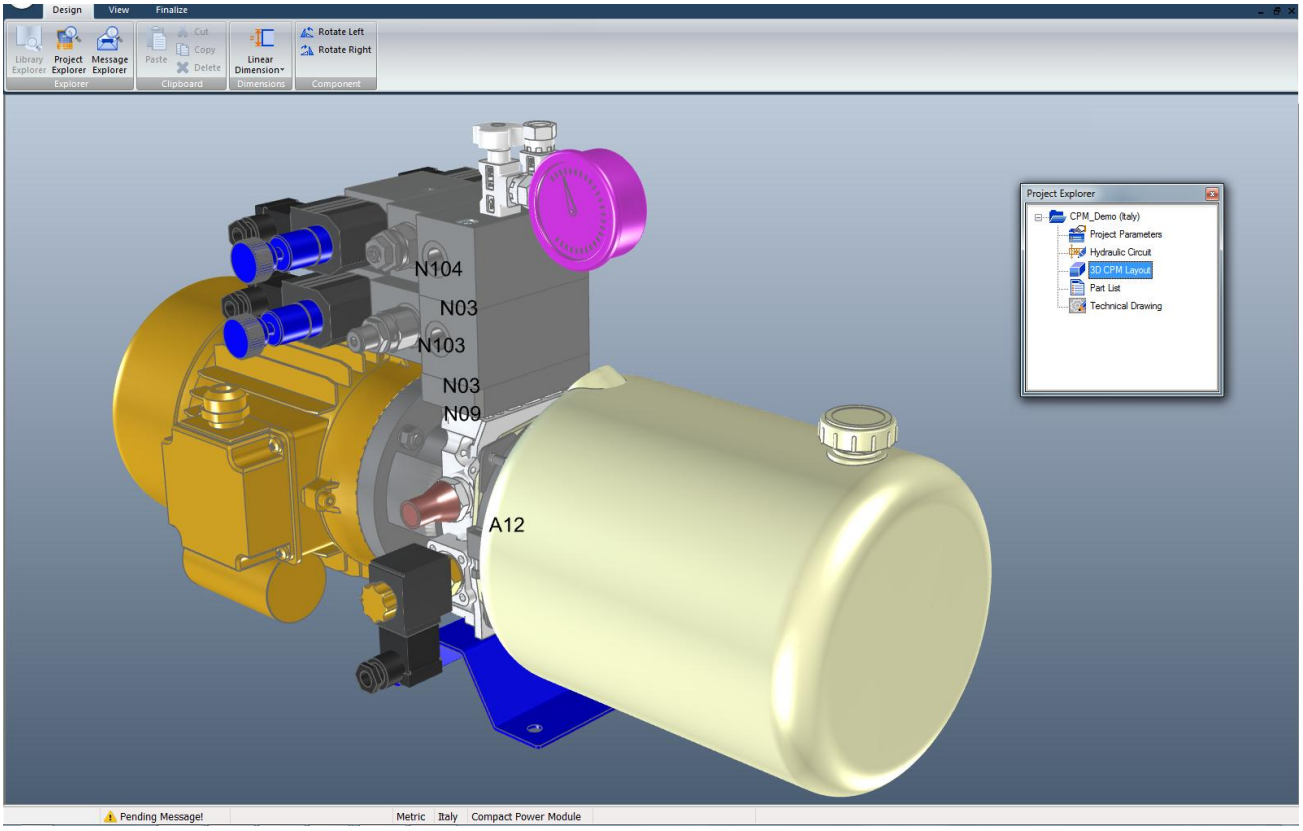


Figure 3-83: 3D CPM Layout Interface

3.3.4 CPM Layout Manipulations

The features in the CPM 3D Layout document are the same as in a CDV project.

3.3.4.1 Transparency

The user can make an element transparent to view the internal arrangement by right-clicking on the element and by selecting “Set Transparent” from the contextual menu.

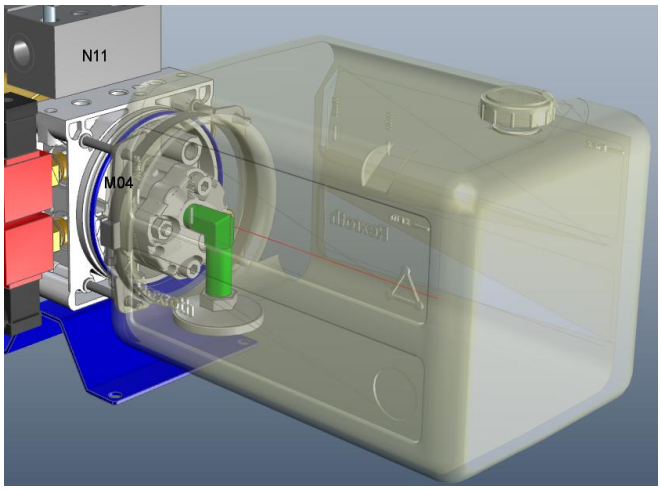


Figure 3-84: CPM Transparent Element

3.3.5 Insert a HIC Manifold in a CPM Project

You can insert a HIC manifold in a CPM Project. Use the “Import a HIC Project” command available in the “i-CHoose – Import / Export” menu. An “open file” dialog opens where the HIC project can be selected. The HIC schematic will be inserted on the schematic, as a group of components

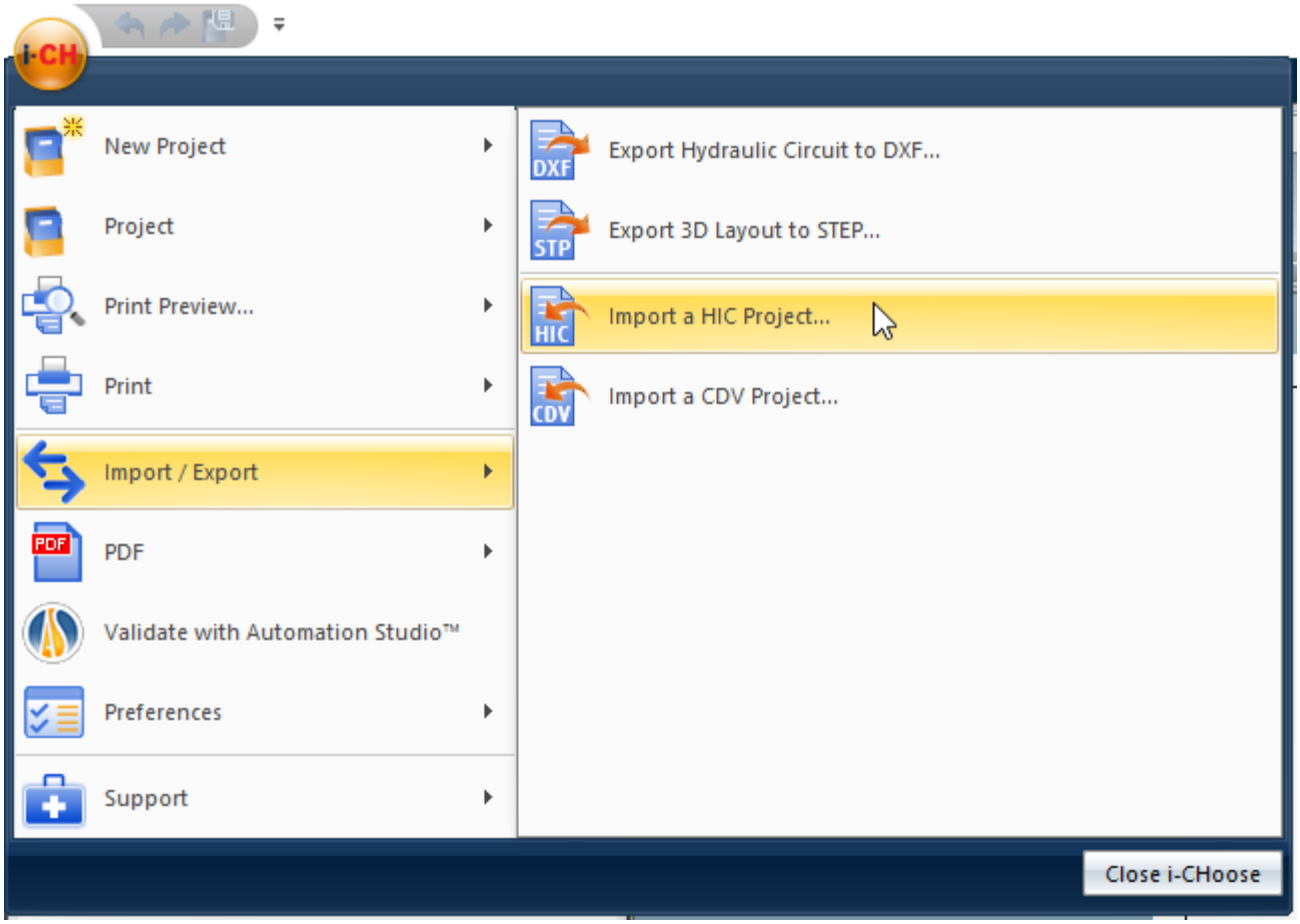


Figure 3-85: Insert a HIC in a CPM Project

Note: The HIC project must be compatible with a CPM project. For example, the external connections of the manifold must have compatibles flanges. Contact Bosch Rexroth for more details.

3.3.6 Insert a CDV Assembly in a CPM Project

You can insert a CVD assembly in a CPM Project. Use the “Import a CDV Project” command available in the “i-CHoose – Import / Export” menu. An “open file” dialog opens, so the user selects the CDV project. The CDV schematic will be inserted on the schematic as a group of components

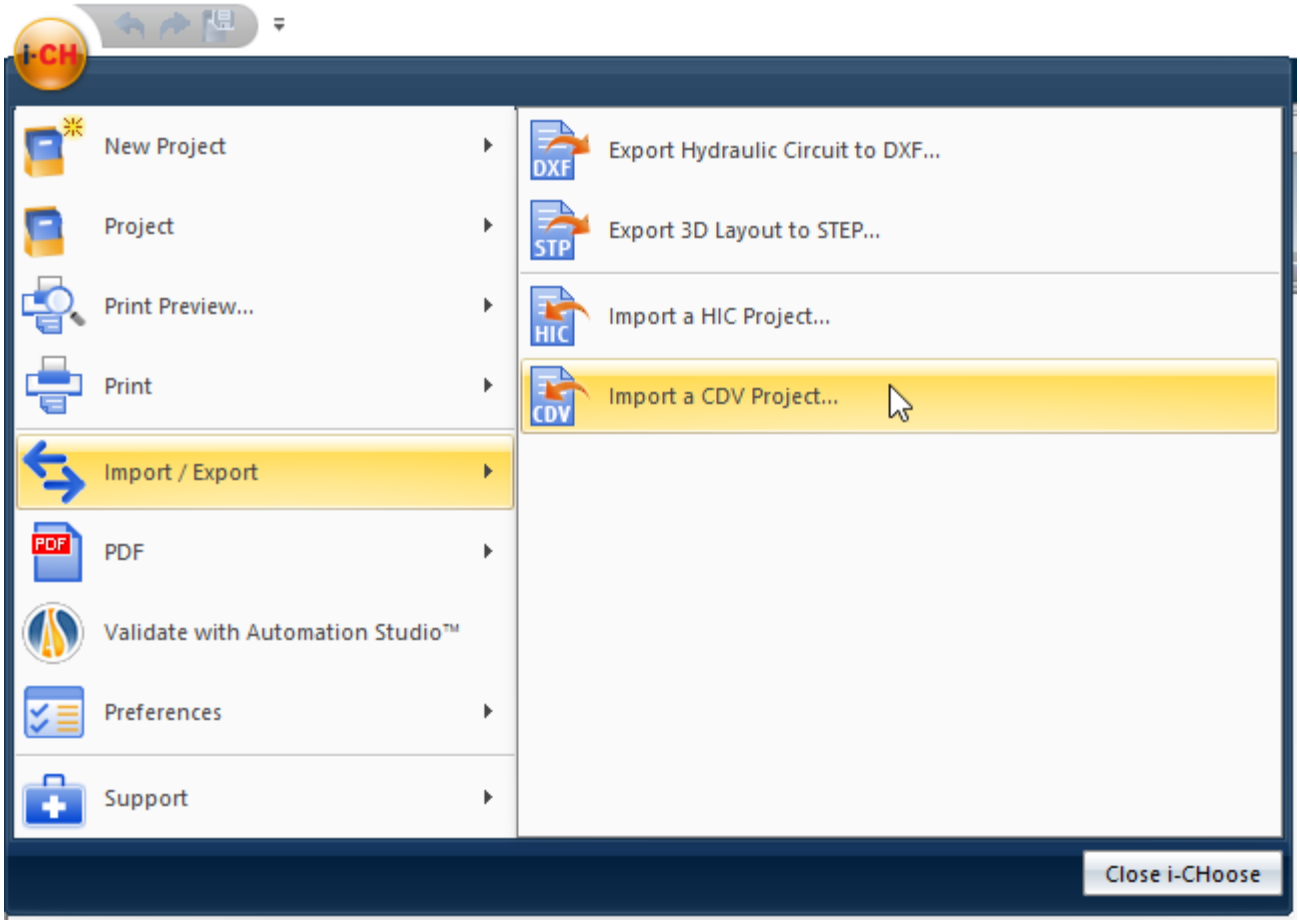


Figure 3-86: Insert a CDV in a CPM Project

Note: The CDV project must be compatible with a CPM project. For example, the CDV assembly must contain the compatible adaptor plate. Contact Bosch Rexroth for more details.

3.4 Revision History

The “Revision History” dialog box is used to track the changes made to the manifold design project.

In this section we will:

1. Describe how to access the “Revision History” dialog box;
2. List the available fields;
3. Create and view revisions.

3.4.1 Accessing the Revision History

There are several ways to access this dialog box:

1. Through the “Revision” command in the “i-CHoose - Project” menu;

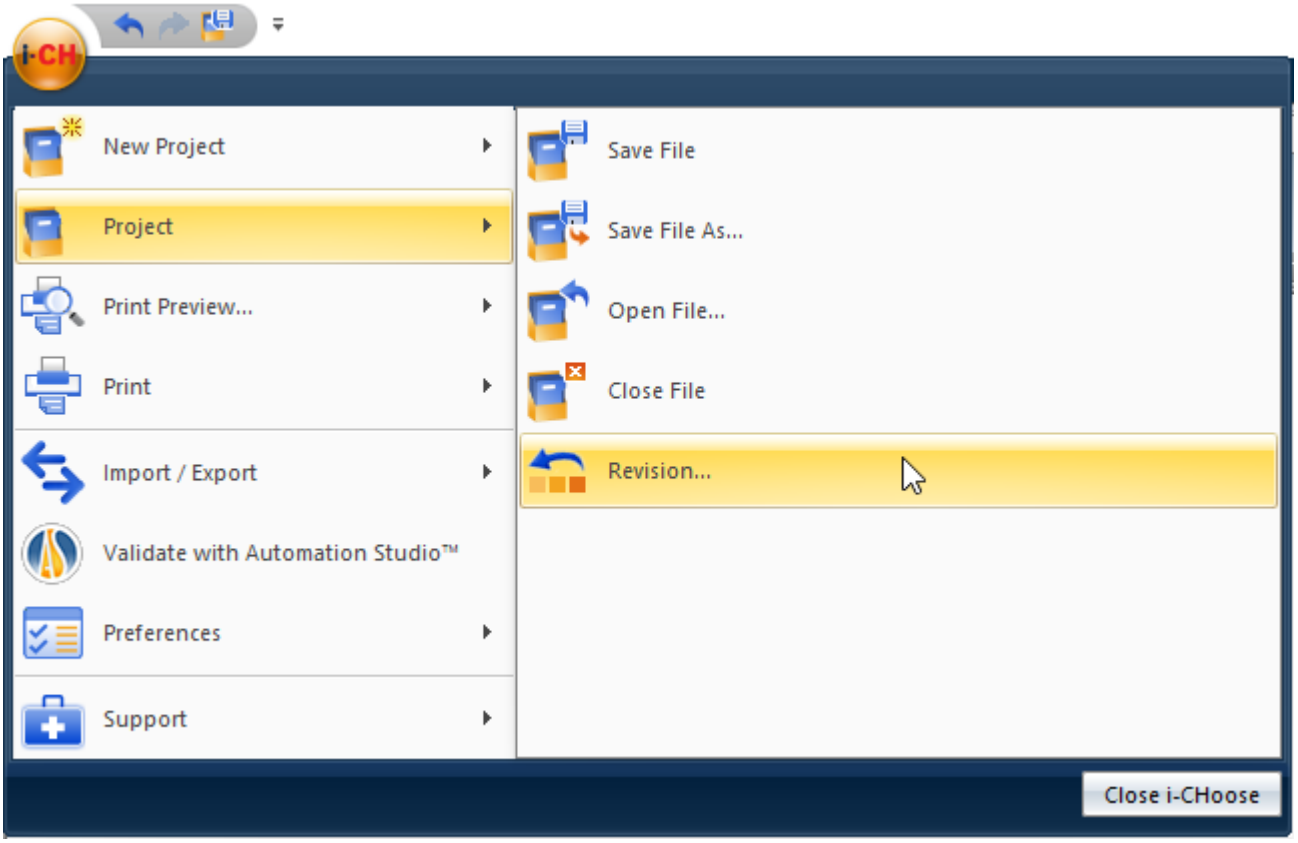


Figure 3-87: Revision in the File Menu

2. By right clicking on the project name in the “Project Explorer” window and selecting “Revision” in the contextual menu;

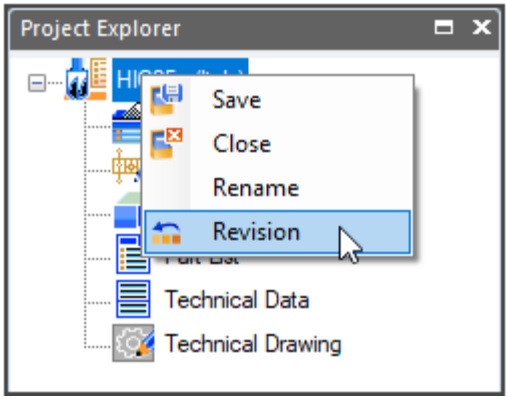


Figure 3-88: Revision in the Project Explorer Context Menu

3. By clicking on the "Revision" button in the "Project Parameters" interface;

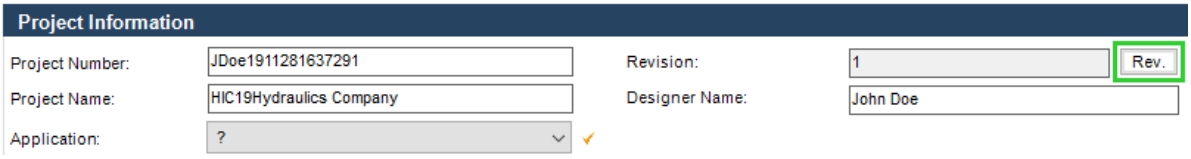


Figure 3-89: Revision Button in the Project Parameters Interface

4. When the project has a revision history and is saved as a new project, the "Revision History" dialog box will automatically open if the "Show Revision History When Saving as New Project" box is checked in the "i-CHoose - Preferences" → "Options" dialog box.

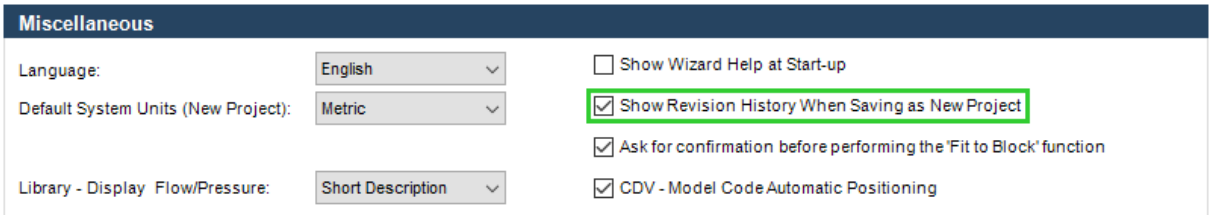


Figure 3-90: Check the Revision History Checkbox in the Options

3.4.2 Revision History Dialog Box

The "Revision History" dialog box is there to provide a means to describe and document the various changes and evolutions made to the project. It contains the following:

- Revision selection list: Will display all of the revisions that have been created and documented. A user needs to select the revision to see its description and comments. This field begins at 0 (no revision) and is automatically incremented by 1 each time there is a new revision.
- Revision comment field: Open field that allows the user to input the information for a specific revision.
- Revised by field (Mandatory): Open field that allows the user to input the information for a specific revision.
- Date field: This field is automatically filled with the current date when the reviser writes or modifies his name.
- Verified by field: Open field that allows the user to input the information for a specific revision.

- Date field: This field is automatically filled with the current date when the user writes or modifies his name.
- Approved by field: Open field that allows the user to input the information for a specific revision.
- Date field: This field is automatically filled with the current date when the approver writes or modifies his name.
- Create new revision button: Allows the user to create a new revision. This button increments the revision number by one. It can only be used when someone puts their name in the "Revised by" field.

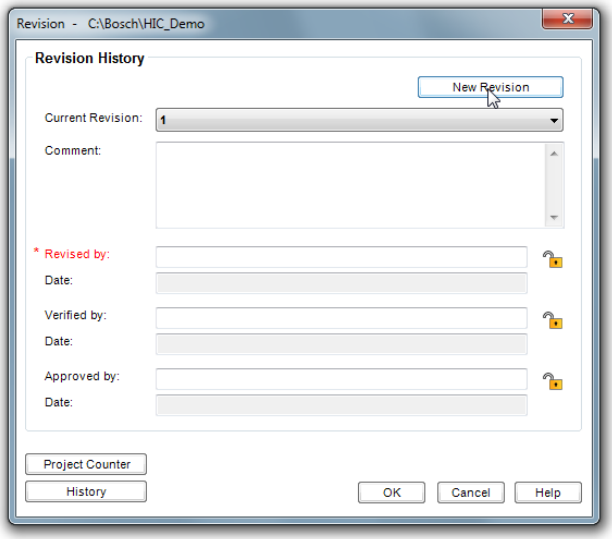


Figure 3-91: Revision History Dialog Box

3.4.3 Revision History Interface – Creating Revisions

3.4.3.1 Revision History Interface – Creating a Revision

At the beginning, no revision is created. All the fields are grayed out.

To create a new revision, the user must click on the "New Revision" button. A new revision number appears in the revision list.

This will be considered the identifier of the new revision. Then, all of the information needed for the revision must be entered in the corresponding fields of the new revision.

The "Revised by" field must be filled (Mandatory) to be able to validate the revision (OK) or to create a new revision (New Revision).

When a new revision is created, the older revisions can no longer be modified.

The CANCEL button cancels all the modifications

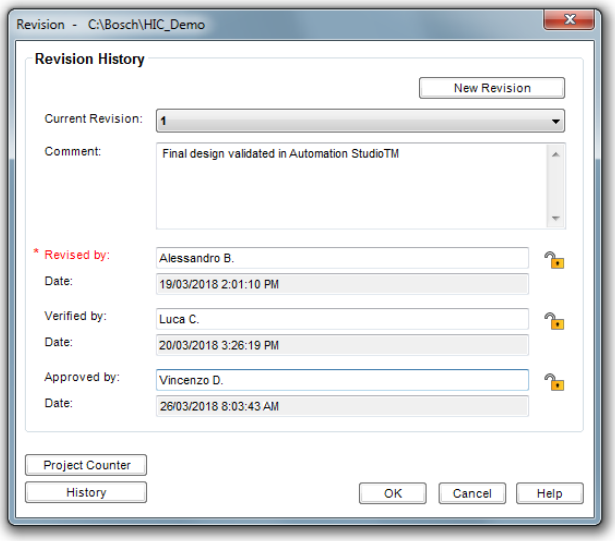


Figure 3-92: Creation of a New Revision

3.4.3.2 Locking some fields for a revision

The user can “lock” some fields using a button to the right of the field. Once a field is locked, it can no longer be modified (After hitting OK).

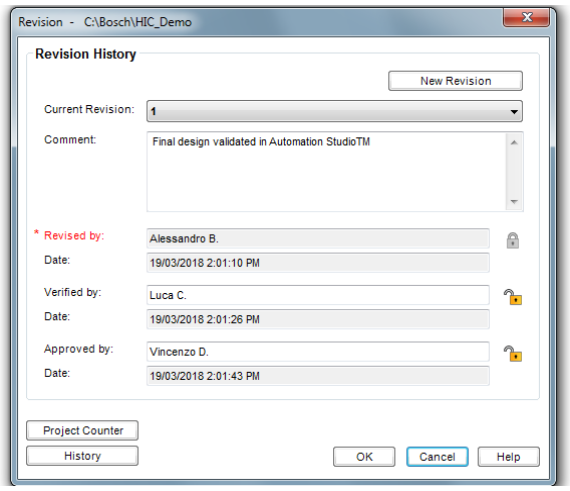


Figure 3-93: Creation of a New Revision

3.4.3.3 Revision History Interface – Viewing a Revision

To view a revision and its description:

1. Select the correct revision number from the “Revision” drop-down list.

3.4.3.4 Revision History Interface – Modifying a Revision

Only the last active revision is available for modification. The previous revisions are locked and can only be viewed.

By default, the Revision History dialog shows the last revision. The user can modify the fields as desired and confirm with the OK button.

3.4.3.5 Revision History Interface – Clearing the revision history

When saving a project with a different name (File/Save As…), and if the project already has a revision, the user is prompted with a message asking whether or not to modify the revision history (If the "Check the Revision History" is checked in the "options" dialog in the Preferences/Options menu.)

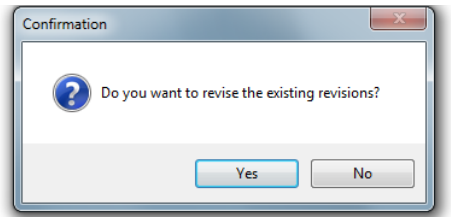


Figure 3-94: Revision History Confirmation

Yes → the revision dialog opens and a "Clear" button is visible on the bottom-left. The user can modify or clear all the existing revisions. The project is then saved.

No → the project is saved without displaying the revision dialog.

Figure 3-95: Clear Revision History

3.5 Price Parameters

This dialog is used to specify and adjust various price parameters:

- the price list selection
- the discount schedule for the reports

It is only available to certain users.

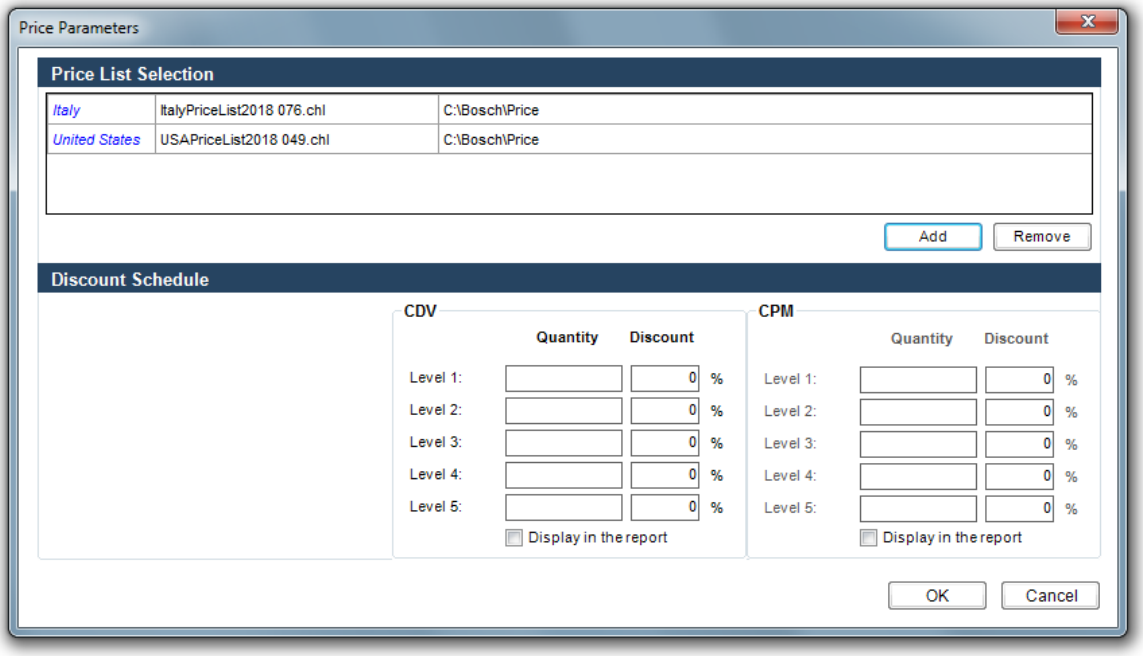


Figure 3-96: Price Parameters Dialog

3.5.1 Price List Selection

This section allows the user to specify the price list that will be used to calculate the prices (if available). For more information, please contact Bosch Rexroth.

3.5.2 Discount Schedule (CDV, CPM Only)

The discount schedule section allows the user to specify up to five quantity breaks and their associated discount percentage.

If a Quantity field is left empty, the discount for that line will not be used or displayed in the report.

The discount field is used to calculate the unit price for the corresponding quantity break (see figure below).

Discount Schedule

#	Manifold Quantity	Price
1	1-10	€450,47
2	11-100	€405,42
3	101-500	€382,90
4	501-1000	€360,37
5	1001 + up	€337,85

Figure 3-97: Discount Schedule Section in the Report

3.6 Software Options

Software options are used to customize some of the application's global parameters.

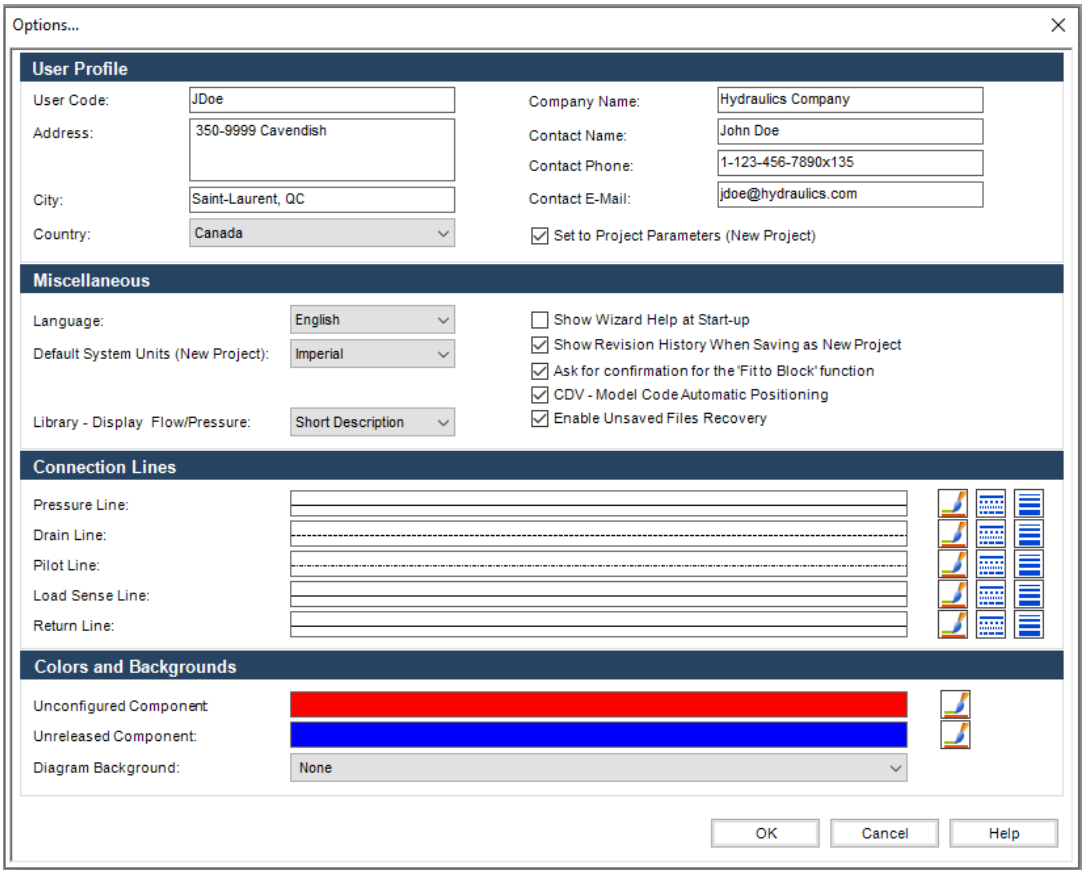


Figure 3-98: Software Options

The options include:

1. User Profile:
    - User Code (provided by Bosch Rexroth - used to automatically generate the project number)
    - User's company name
    - User's address
    - User's city
    - User's country
    - User's contact name
    - User's phone
    - User's e-mail
    - "Copy to Project Parameters" checkbox: Automatically copy a part of the user profile to the project parameters of a new project.

2. Miscellaneous:
    - Language. The change will take effect after restarting the application
    - Default unit system (Imperial or Metric). This option will specify the units that will be used in the next project that will be created. It will not be possible to change the unit system of a project after its creation
    - Library – The pressure/flow can be added near the component reference in the library. Indicate the format of the data to display.
    - Prompt for a Wizard Help when the application Starts-up
    - Show Revision History when saving as a new project
    - Prompt for confirmation of the “Fit to Block” function. If checked, a confirmation dialog will be displayed each time the user clicks the ‘Resize to Fit’ button in the Manifold Layout
    - CDV – Model Code Automatic Positioning – Automatically groups the model codes of connected CDV elements
    - Enable Unsaved Files Recovery – When i-CHoose closes unexpectedly, prompts the user to recover unsaved files.

3. Connection Lines:
    - Default Pressure Line Configuration;
    - Default Drain Line Configuration
    - Default Pilot Line Configuration
    - Default Load Sense Line Configuration
    - Default Return Line Configuration

4. Colors & Background options:
    - Unconfigured Component Color
    - Not Released Component Color
    - Diagram Background

5. HydSel (Pro Version Only):
    - HydSel Database – Path to the HydSel Database. The buttons marked “…” are used to browse for the file. The checkbox enables/disables the HydSel file. If the path is incorrect or if it is impossible to read the HydSel database, the textbox background is red.
    - UDF Root Folder – Path to the UDF root folder. The buttons marked “…” are used to browse for the folder. The checkbox enables/disables the UDF folder. If the path is incorrect, the textbox background is red.

3.7 3D Options

The i-CHoose application relies heavily on the graphics card in order to render the 3D views. Thus, for large blocks with a lot of components, the responsiveness in the 3D views can decrease considerably depending on the graphics card's capabilities.

This dialog is used to adjust the quality of the 3D views depending on the graphics card's capabilities:

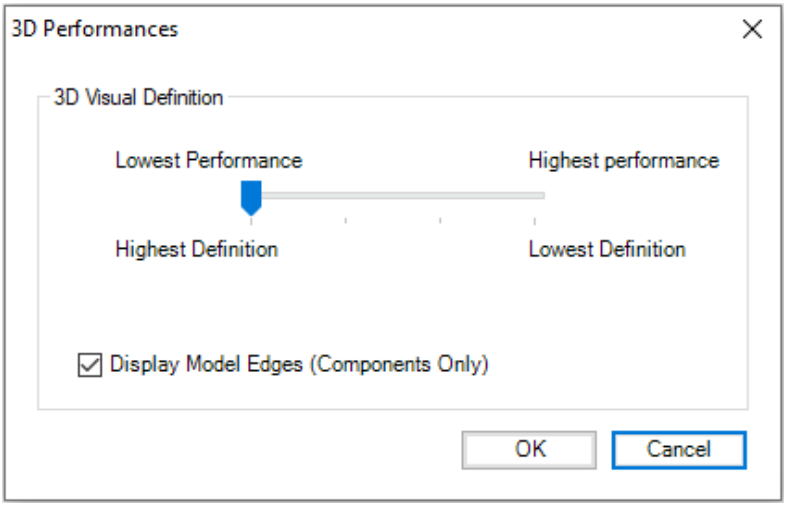


Figure 3-99: 3D Options Dialog

The 3D visual definition section is used to adjust the quality of the components and cavities in the 3D representation.

The highest definition setting is recommended for computers with a good graphics card.

The highest performance option is recommended for computers with an older graphics card. However, the visual representation of the components could be degraded.

3.8 Dimensioning Tool

Dimensions can be added on the *3D Layout* interface in all project types. Dimensions are created from predefined anchor points or user-defined anchor points.

Dimensioning can be done in two different styles: linear or ordinate. Dimensioning styles can be selected from the "Design" tab → "Annotations" group → "Dimensions" → "Linear Dimension" or "Ordinate Dimension". A third option ("Default Dimension Options") is used to modify the default font of the dimensions. (See "Annotation Options" chapter)

3.8.1 Linear Dimension

Create a linear dimension by clicking on the "Linear Dimension" ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process begins by clicking on the first desired anchor point and moving the mouse. A line attached to the mouse pointer is automatically drawn. Clicking on the destination anchor point creates the dimension. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, the dimension is finalized by clicking one last time in order to fix the dimension layout and finish the dimensioning process.

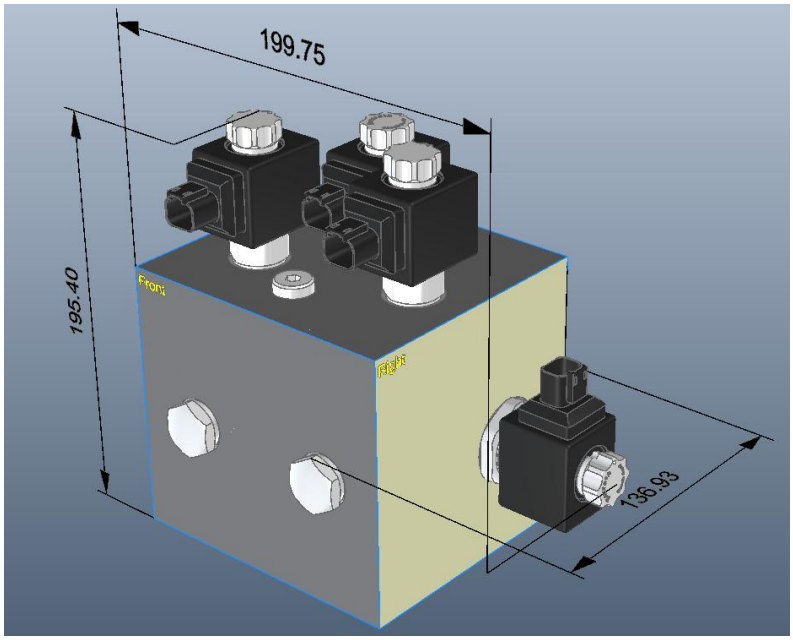


Figure 3-100: Linear Dimensions

3.8.2 Ordinate Dimension

Create an ordinate dimension by clicking on the "Ordinate Dimension" ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process begins by clicking on the desired anchor point. This automatically creates the dimension from the origin, shown as the red dot on each view. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, the dimension is finalized by clicking one last time in order to fix the dimension layout and finish the dimensioning process. Notice that the "0" dimension is created at the same time.

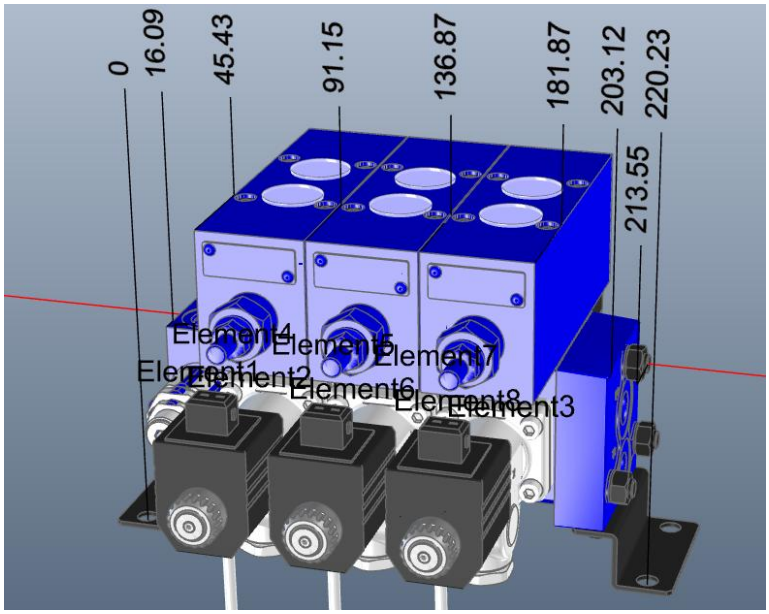


Figure 3-101: Ordinate Dimensions

The dimensioning text can be placed in the middle, on one side or on the other side.

To remove a dimension, click on the text or the arrows to select it, and then use the delete key or the ribbon bar button.

See the “Dimensions (Annotations)” section for more details about dimension related features.

3.9 Title Block

To select the default title block for the “Hydraulic Circuit” or “Technical Drawing” document of new projects, go to “i-CHoose menu” → “Preferences” → “Default Hydraulic Circuit Options” or “Default Technical Drawing Options” → Default Page Setup”.

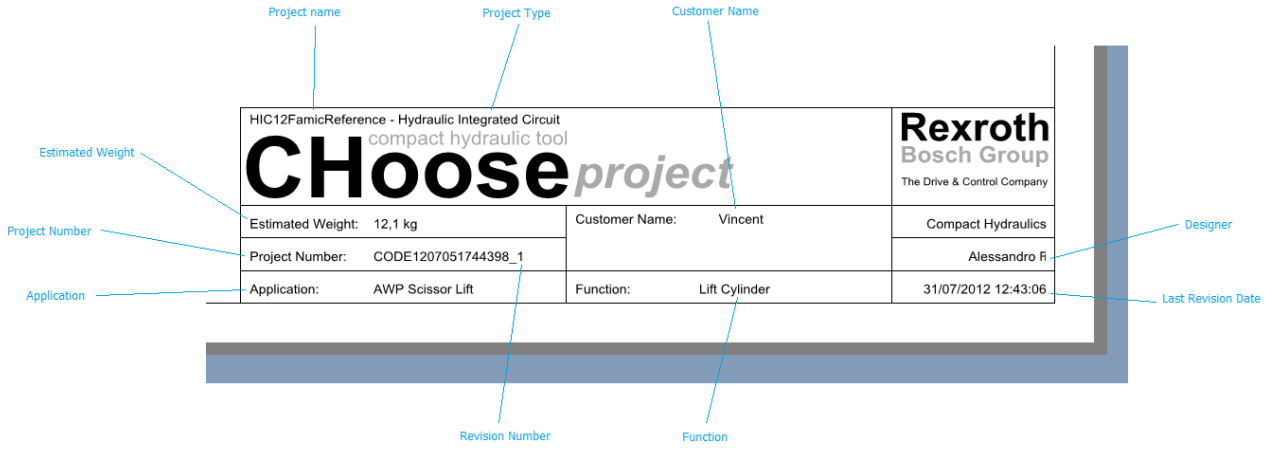


Figure 3-102: Title Block (Example)

To override the title block of the current “Hydraulic Circuit” or “Technical Drawing” document, click on the ribbon bar “Design” → “Current Circuit Setup” → “Current Page Setup” → “Title Block” section.

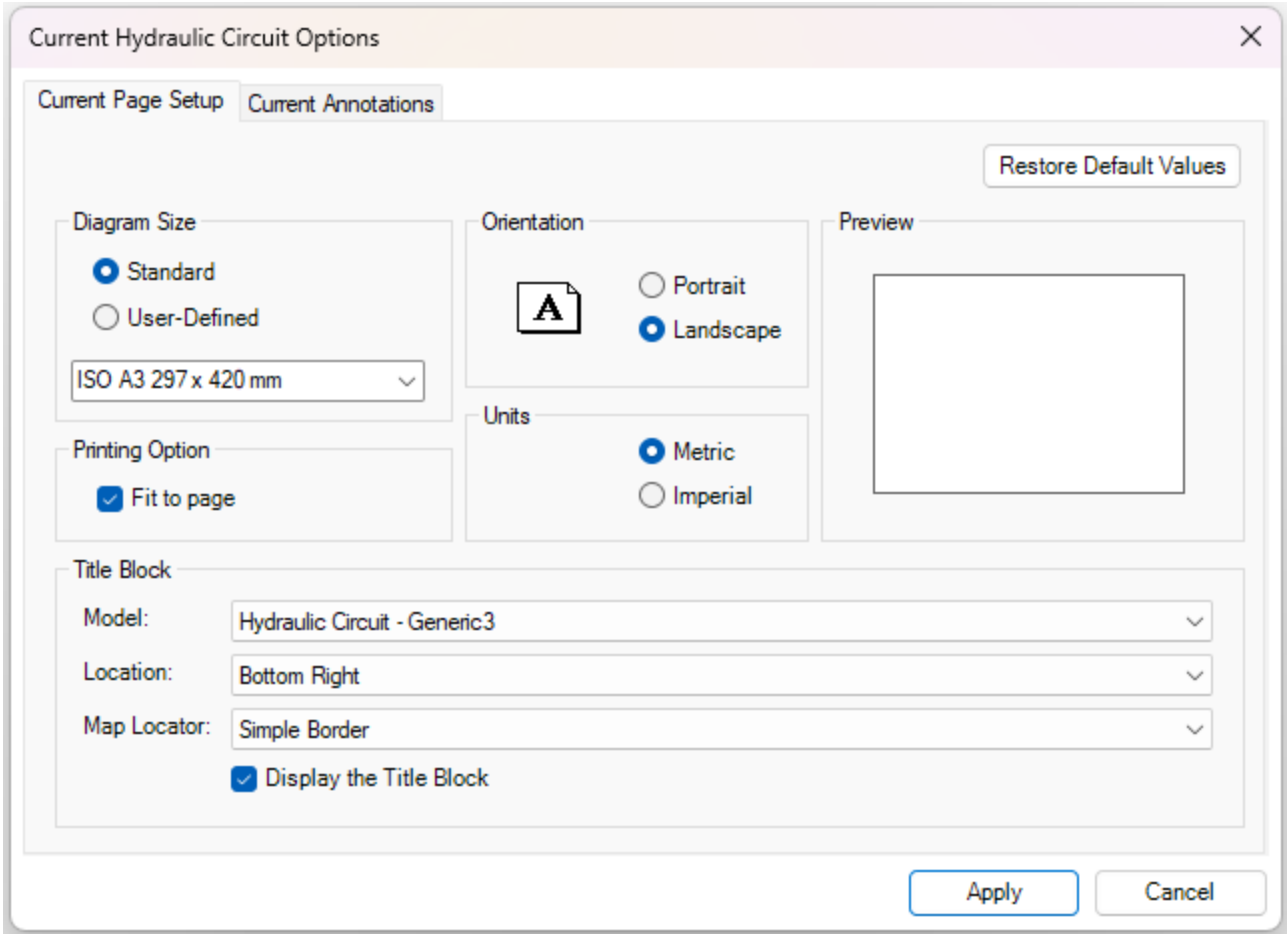


Figure 3-103: Current Circuit Setup Dialog

To override the title block of the current "Technical Drawing" document, click on the ribbon bar "Design" → "Current Drawing Setup" → "Current Page Setup" → "Title Block" section.

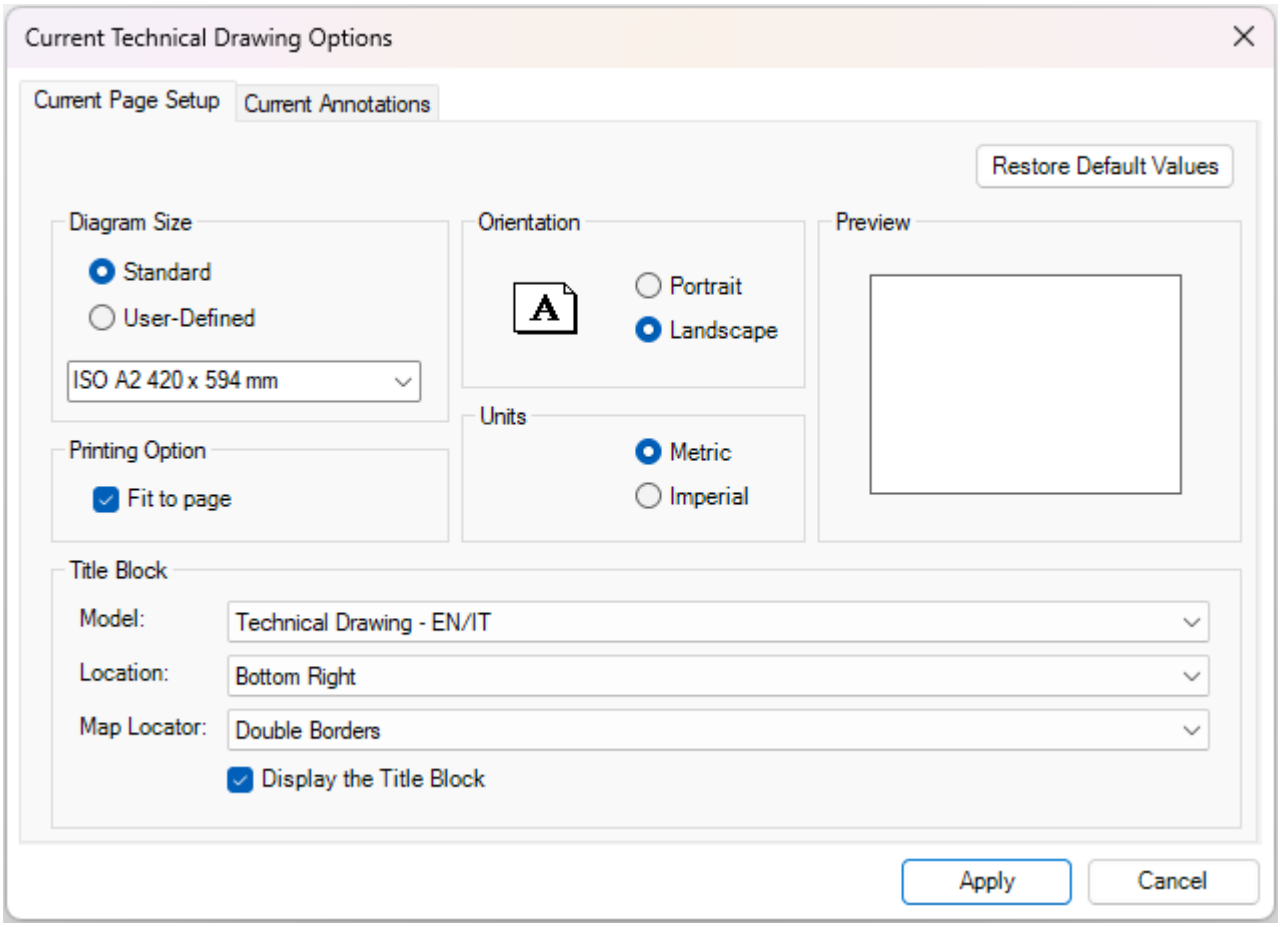


Figure 3-104: Current Drawing Setup Dialog

To display or hide the title block on the current project, click on the ribbon bar "View" → "Show" → "Title Block"

The title block's dynamic content is extracted from the project itself or from within the program:

- Project name: the « project » name in the Project Parameters interface
- Project type: HIC, CDV or CPM (concatenated with the project name)
- Project number: the « Project Number » in the Project Parameters interface
- Revision Number: concatenated to the Project number if there is a revision
- Application: the « Application » in the Project Parameters interface
- Function: the « Function » in the Project Parameters interface
- Customer Name: the « Customer Name » in the Project Parameters interface
- Estimated Weight (in pounds or kilograms): calculated from the individual weights of the elements within the project
- Designer Name: the « Designer Name » in the Project Parameters interface

In PRO mode only (Engineers) - In order to fill the undefined parameter fields, the user double-clicks on the Title Block (A dialog opens and contains 3 columns).

- Parameter: The name of the parameter

- Value: The value of the parameter which could be extracted from a property of the project. In this case, the field is gray and read only. Otherwise, it is blank and read/write.

- Overridden: Checkbox available only for predefined values. If checked, the “Value” field becomes read/write and can be overwritten.

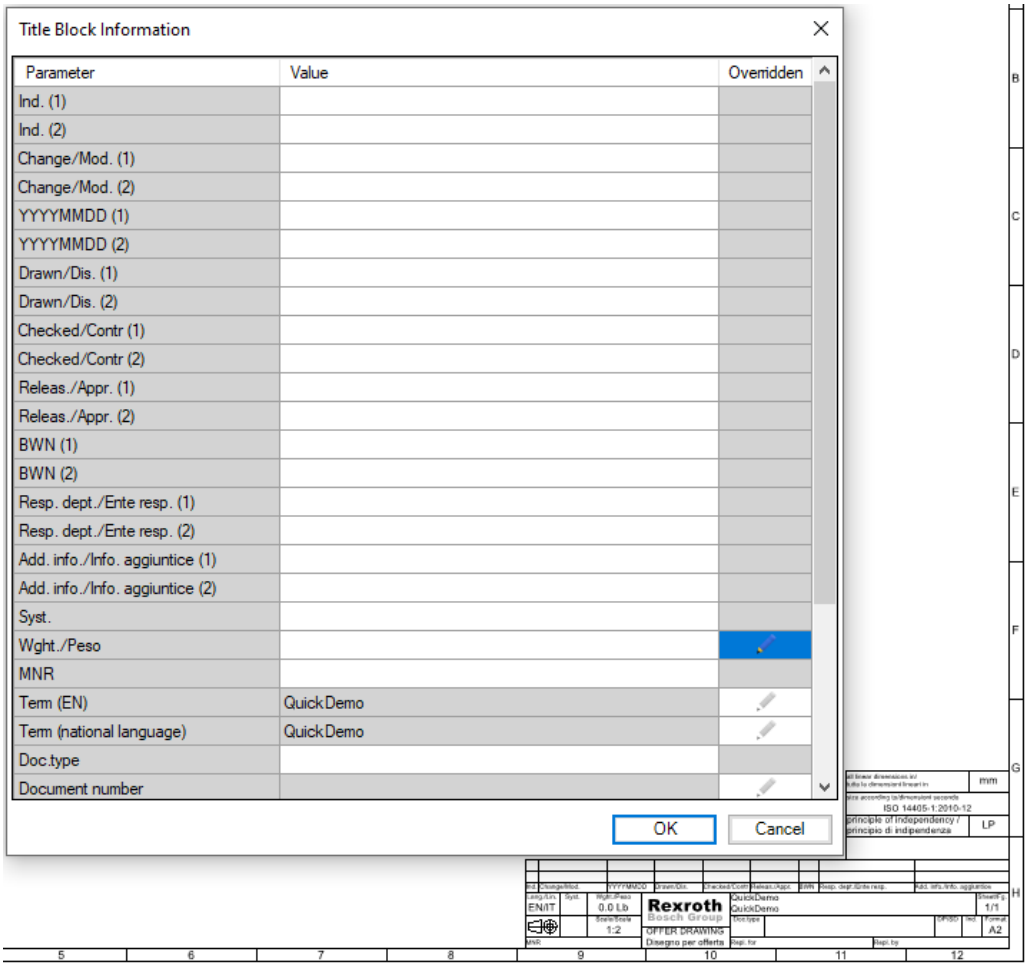
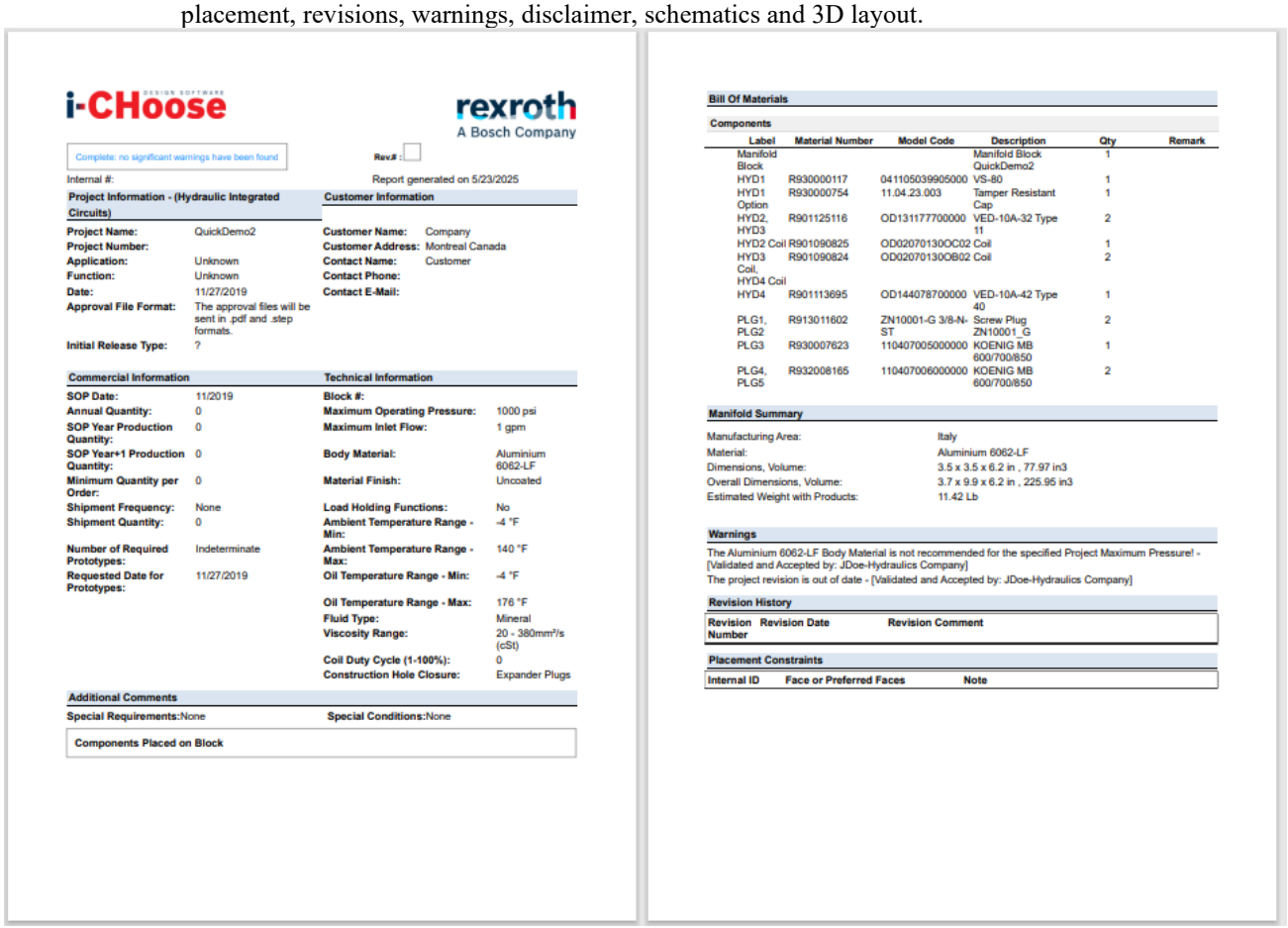


Figure 3-105: Title Block Information – Editing Mode

4 Documentation

4.1 Introduction

The report is the main objective of the i-CHoose application. It summarizes all of the information required to build the hydraulic system. It includes: the project information, component list, placement, revisions, warnings, disclaimer, schematics and 3D layout.



i-CHoose DESIGN SOFTWARE

rexroth
A Bosch Company

Complete: no significant warnings have been found

Rev.# :

Internal #:

Report generated on 5/23/2025

Project Information - (Hydraulic Integrated Circuits)

Project Name:	QuickDemo2
Project Number:	
Application:	Unknown
Function:	Unknown
Date:	11/27/2019
Approval File Format:	The approval files will be sent in .pdf and .step formats.
Initial Release Type:	?

Customer Information

Customer Name:	Company
Customer Address:	Montreal Canada
Contact Name:	Customer
Contact Phone:	
Contact E-Mail:	

Commercial Information

SOP Date:	11/2019
Annual Quantity:	0
SOP Year Production Quantity:	0
SOP Year+1 Production Quantity:	0
Minimum Quantity per Order:	0
Shipment Frequency:	None
Shipment Quantity:	0
Number of Required Prototypes:	Indeterminate
Requested Date for Prototypes:	11/27/2019

Technical Information

Block #:	
Maximum Operating Pressure:	1000 psi
Maximum Inlet Flow:	1 gpm
Body Material:	Aluminium 6062-LF
Material Finish:	Uncoated
Load Holding Functions:	No
Ambient Temperature Range - Min:	-4 °F
Ambient Temperature Range - Max:	140 °F
Oil Temperature Range - Min:	-4 °F
Oil Temperature Range - Max:	176 °F
Fluid Type:	Mineral
Viscosity Range:	20 - 380mm²/s (cSt)
Coil Duty Cycle (1-100%):	0
Construction Hole Closure:	Expander Plugs

Additional Comments

Special Requirements: None

Special Conditions: None

Components Placed on Block

Bill Of Materials

Components

Label	Material Number	Model Code	Description	Qty	Remark
Manifold Block			Manifold Block QuickDemo2	1	
HYD1	R930000117	041105039905000	VS-80	1	
HYD1 Option	R930000754	11.04.23.003	Tamper Resistant Cap	1	
HYD2, HYD3	R901125116	OD131777700000	VED-10A-32 Type 11	2	
HYD2 Coil	R901090825	OD02070130OC02	Coil	1	
HYD3 Coil, HYD4 Coil	R901090824	OD02070130OB02	Coil	2	
HYD4	R901113695	OD144078700000	VED-10A-42 Type 40	1	
PLG1, PLG2	R913011602	ZN10001-G 3/8-N-ST	Screw Plug ZN10001_G	2	
PLG3	R930007623	110407005000000	KOENIG MB 600/700/850	1	
PLG4, PLG5	R932008165	110407006000000	KOENIG MB 600/700/850	2	

Manifold Summary

Manufacturing Area:	Italy
Material:	Aluminium 6062-LF
Dimensions, Volume:	3.5 x 3.5 x 6.2 in , 77.97 in3
Overall Dimensions, Volume:	3.7 x 9.9 x 6.2 in , 225.95 in3
Estimated Weight with Products:	11.42 Lb

Warnings

The Aluminium 6062-LF Body Material is not recommended for the specified Project Maximum Pressure! - [Validated and Accepted by: JDoe-Hydraulics Company]

The project revision is out of date - [Validated and Accepted by: JDoe-Hydraulics Company]

Revision History

Revision Number	Revision Date	Revision Comment

Placement Constraints

Internal ID	Face or Preferred Faces	Note

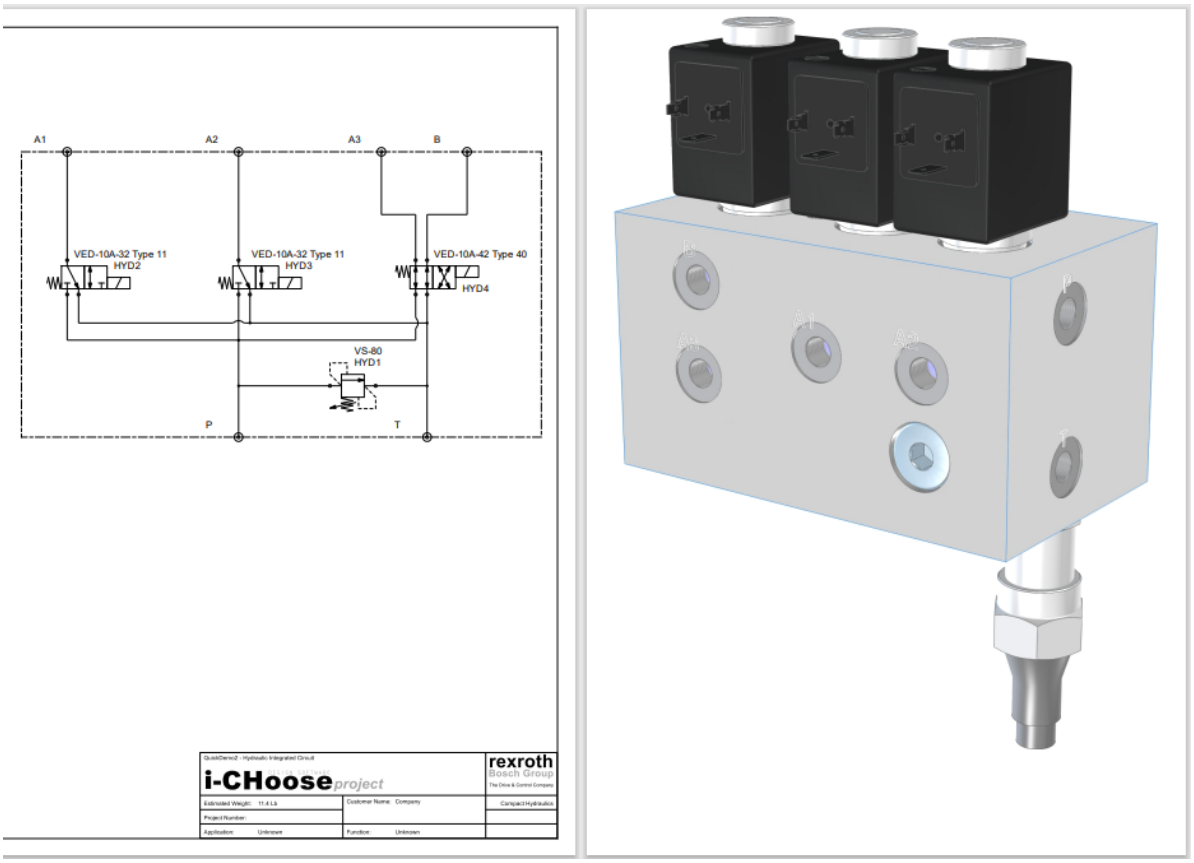


Figure 4-1: Report (Partial)

4.2 Part List (BOM)

The *Part List* interface is a simple bill of material (BOM) of the current hydraulic system.

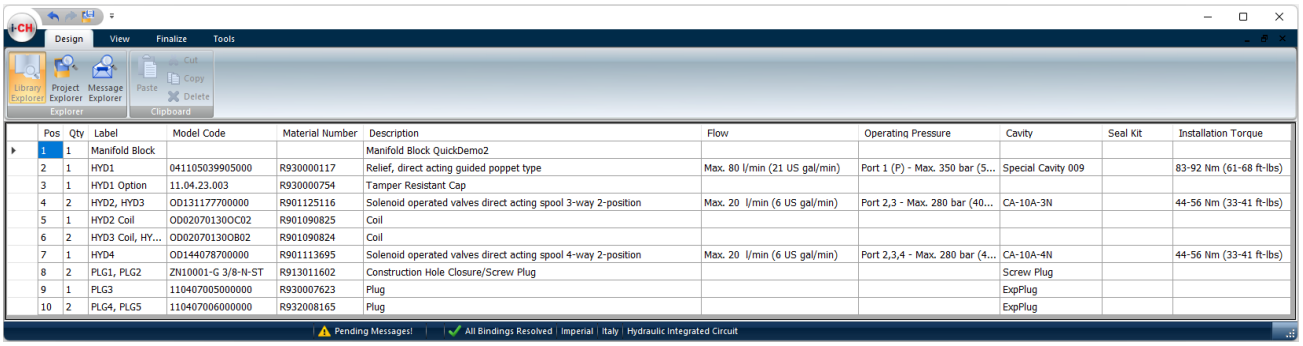
Items that appear in the list are:

- All components/elements found in the hydraulic circuit
- Components/elements not present on the hydraulic circuit such as mounting holes, fittings, bolts, tie-rods, nuts, washers …

Row height and column width can be adjusted using the separators in-between the rows or the separators between the column headers.

Information in the table can be sorted alphabetically by column by double-clicking on the desired column header.

Table content can be copied and pasted into a spreadsheet application (like MS Excel)



	Pos	Qty	Label	Model Code	Material Number	Description	Flow	Operating Pressure	Cavity	Seal Kit	Installation Torque
▸	1	1	Manifold Block			Manifold Block QuickDemo2					
	2	1	HYD1	041105039905000	R930000117	Relief, direct acting guided poppet type	Max. 80 l/min (21 US gal/min)	Port 1 (P) - Max. 350 bar (5...	Special Cavity 009		83-92 Nm (61-68 ft-lbs)
	3	1	HYD1 Option	11.04.23.003	R930000754	Tamper Resistant Cap					
	4	2	HYD2, HYD3	OD131177700000	R901125116	Solenoid operated valves direct acting spool 3-way 2-position	Max. 20 l/min (6 US gal/min)	Port 2,3 - Max. 280 bar (40...	CA-10A-3N		44-56 Nm (33-41 ft-lbs)
	5	1	HYD2 Coil	OD02070130OC02	R901090825	Coil					
	6	2	HYD3 Coil, HY...	OD02070130OB02	R901090824	Coil					
	7	1	HYD4	OD144078700000	R901113695	Solenoid operated valves direct acting spool 4-way 2-position	Max. 20 l/min (6 US gal/min)	Port 2,3,4 - Max. 280 bar (4...	CA-10A-4N		44-56 Nm (33-41 ft-lbs)
	8	2	PLG1, PLG2	ZN10001-G 3/8-N-ST	R913011602	Construction Hole Closure/Screw Plug			Screw Plug		
	9	1	PLG3	110407005000000	R930007623	Plug			ExpPlug		
	10	2	PLG4, PLG5	110407006000000	R932008165	Plug			ExpPlug		

Figure 4-2: Part List Interface

4.3 Technical Drawing

The Technical Drawing interface is used to create a specific layout with multiple views of the assembled project on a page with an optional title block and map locator.

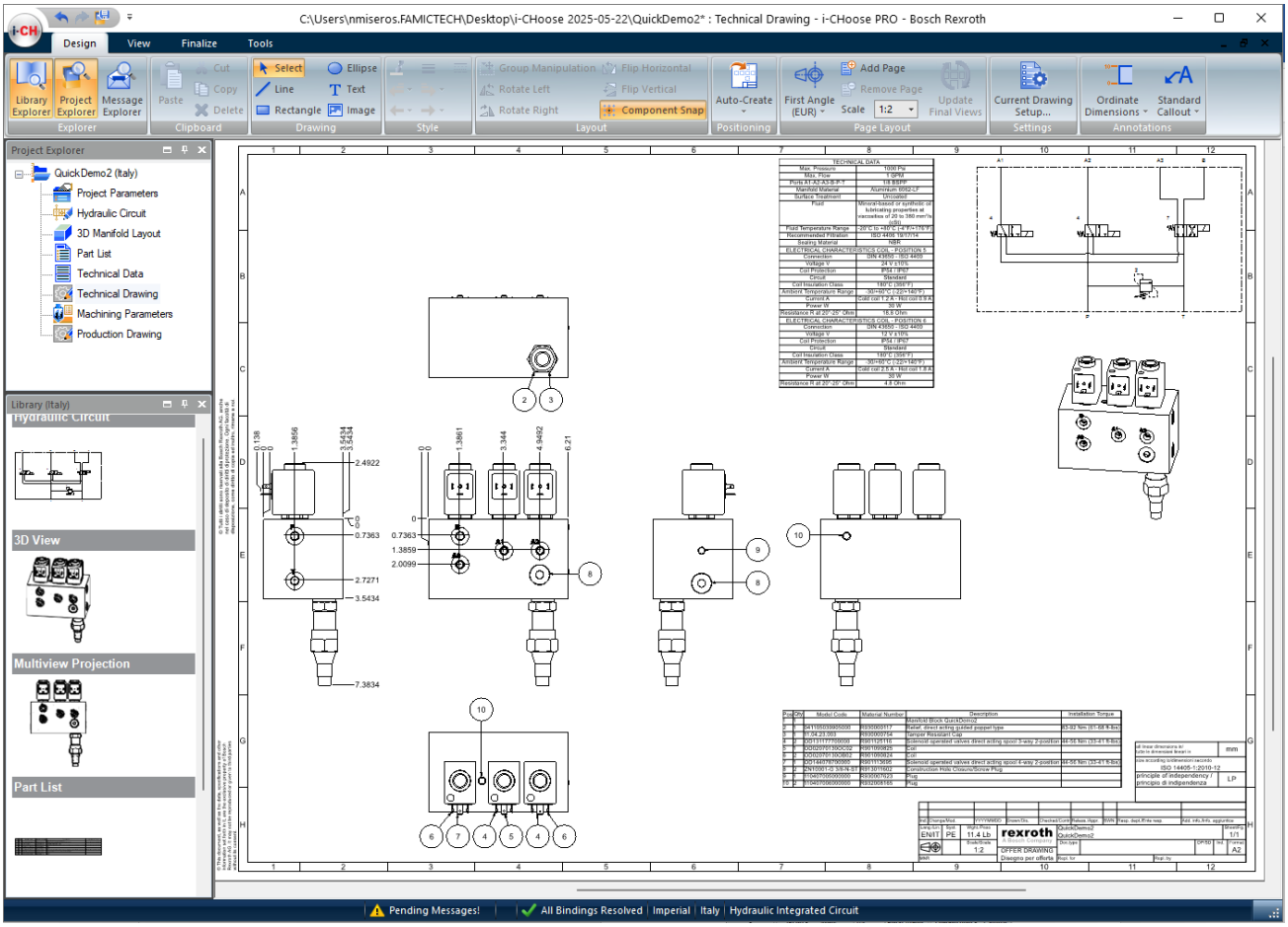


Figure 4-3: Technical Drawing

Elements from different documents within the project are listed in the library: the hydraulic circuit schematic, the 3D view, the multiview projection (6 faces of the block), the part list, the technical data and the Ordering Code (CPM projects only).

Elements can be manually dragged & dropped from the library onto the Technical Drawing page. While manipulating the views, guidance boxes are displayed in order to easily layout the desired view and avoid representation errors.

The orthogonal views can be positioned automatically by clicking on the “Auto Create” button from the “Design”→ “Positioning” group. This will create all 6 projections and position them appropriately on the page according to the drawing setup options.

4.3.1 Positioning the Technical Drawing Elements

The *Technical Drawing* interface requires specific design features which are available under the "Design" tab →"Page Layout" group.

Figure 4-4: Technical Drawing Tools

4.3.1.1 Automatic Positioning

Using the "Auto-Create" command, a single click completes all the operations required to create a technical drawing. The user can simply click on the "Auto-Create" icon in the "Design" tab → "Positioning" group → 

This will automatically position the technical drawing elements, including the ballooning of the block components and a complete dimensioning of the block. The automatic view positioning and annotation commands (Dimensioning and Ballooning) can also be launched separately through the drop-down list beneath the "Auto-Create" command. The system will position all the elements on the page taking into account various parameters such as page margins, projection configuration, elements to insert, etc.

The auto-positioning options for the current project can be configured by clicking on the "Current Drawing Setup" icon in the "Design" tab → "Settings" group →  .

Note: The layout of the views (6 or 3 views, L or ⌐, etc.) depends on the manufacturing site. Once positioned, the current Projection Angle defines only the faces.

4.3.1.2 Manual Positioning

Individual drawing elements are displayed as images in the library. These vector graphics can be taken from the library and dropped onto the page. Each vector image can be resized by using the handles, except for the orthogonal views which are managed by the selected scale factor in the *Design* tab → *Page Layout* group → *Scale* drop-down list.

The orthogonal views are positioned according to particular layout rules: first or third angle projection, scale, alignment, etc...

4.3.1.2.1 Selecting the Projection Angle

Existing drawing standards (ASME, BS, ISO…) suggest that the multiview drawings can be laid out following two different projection angles, First and Third.

4.3.1.2.2 Default Projection vs Region

Upon the project creation, the projection angle is set by default according to the selected region (Italy, USA, China…).

Default Projection Angle vs Region:

Australia	Third Angle Projection (US)
Brazil	First Angle Projection (Euro)

Canada	Third Angle Projection (US)
China	First Angle Projection (Euro)
Germany	First Angle Projection (Euro)
India	First Angle Projection (Euro)
Italy	First Angle Projection (Euro)
Japan	Third Angle Projection (US)
Korea	First Angle Projection (Euro)
US	Third Angle Projection (US)

These are used as the reference for selecting the correct default template for the corresponding project type, as follows:

Examples of the layout of views for the First Angle (Euro) Projection: 

Multiview – 6 Views (HIC)			
	Bottom		
Right	Front	Left	Back
	Top		

Multiview – 3 Views (CDV, CPM)	
Right	Front
	Top

Examples of the layout of views for the Third Angle (US) Projection: 

Multiview – 6 Views (HIC)			
	Top		
Left	Front	Right	Back
	Bottom		

Multiview – 3 Views (CDV, CPM)	
Top	
Front	Right

4.3.1.2.3 Modifying Projection Angle

The projection angle can be changed by clicking on the split button and selecting another type (First Angle Projection - Europe and the Third Angle Projection - US). The Projection Type button is located in the *Design* tab → *Page Layout* group.

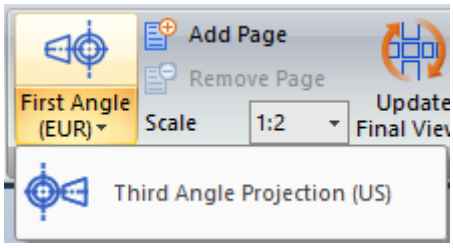


Figure 4-5: Design Tab → Projection Angle Selection

4.3.1.2.4 Technical Drawing Library

The library contains all the available elements for the Technical Drawing.

- Hydraulic Circuit
- 3D View
- Multiview Projections
- Part List
- Technical Data
- Ordering Code (CPM project only)

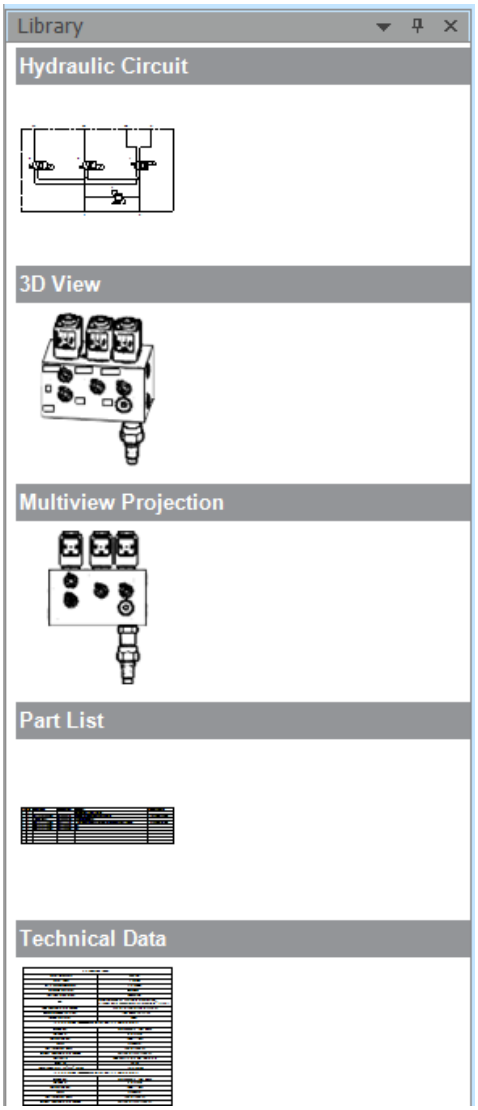


Figure 4-6: Library – Technical Drawing

4.3.1.2.5 Scaling (Orthogonal Views)

To modify the scale, select the desired ratio from the scale drop-down list located in *Design* tab → *Page Layout* group → *Scale* drop-down list. The size of the existing views already on the page are automatically adjusted to the selected scale. Newly inserted views will use the same scale ratio.

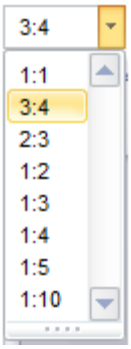


Figure 4-7: View Scale Drop-Down List

As a reminder, the only way to modify the size of the orthogonal views is via this drop-down list. All of the other graphical elements can be resized using the resize handles.

Note: A scale of 1:1 implies that the object has been drawn to true size. Therefore, a scale of 1:2 implies that the object has been reduced to half its size on the drawing.

4.3.1.2.6 Orthogonal View Alignment

Alignment lines are shown when a view is moved on the page in order to easily align it with the other views that are already on the technical drawing.

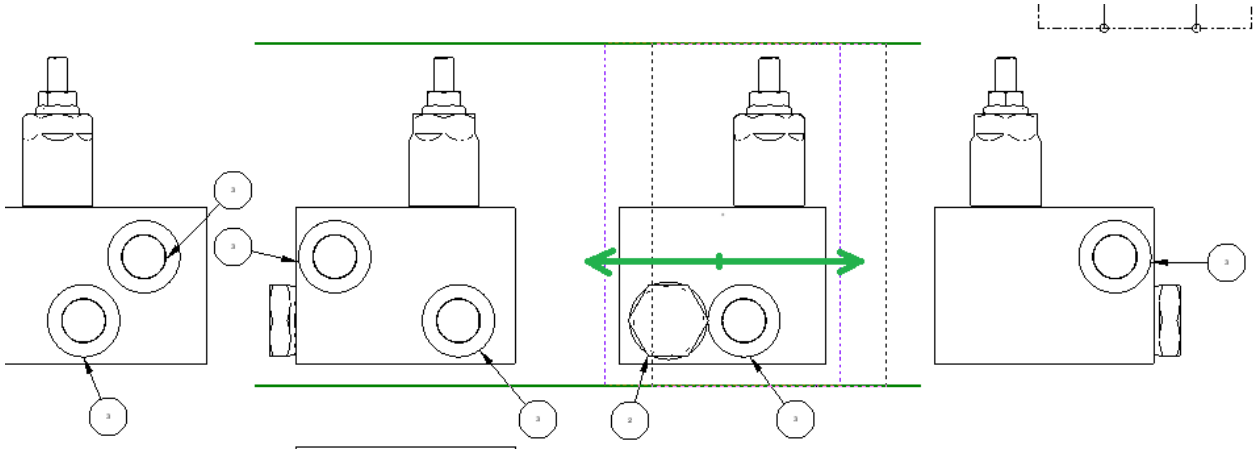


Figure 4-8: Moving View Alignment Lines

4.3.1.2.7 Moving Orthogonal Views

The available destination positions appear when a view is moved in a direction other than the alignment axis. The view can only be moved (dropped) to the proposed areas. The same mechanism is used when the view is inserted from the *Library*.

When the view is dropped on the destination location, it is automatically updated and is positioned in the correct orientation.

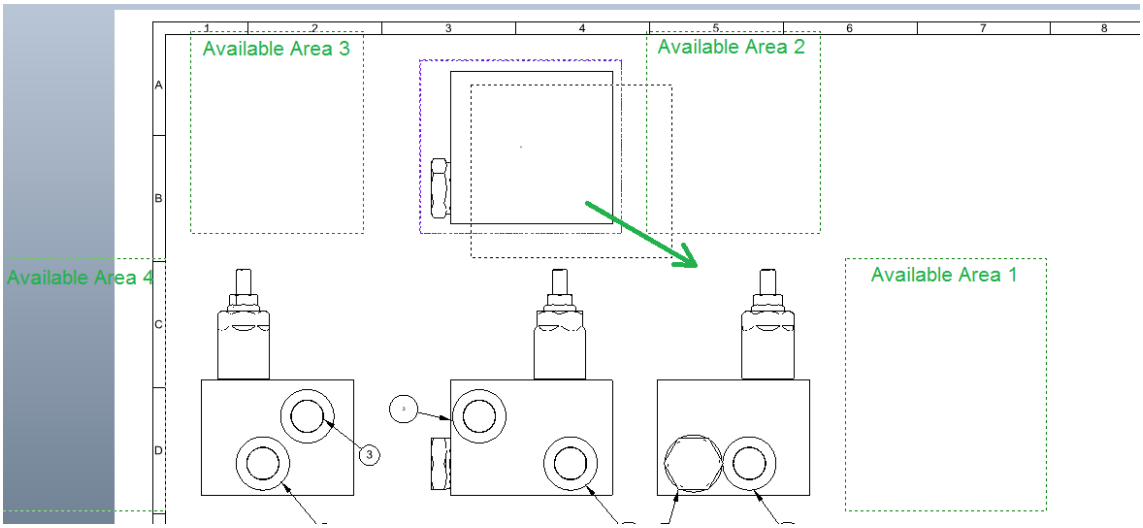


Figure 4-9: Moving View – Available Areas

4.3.1.2.8 Using the Current 3D Layout Orientation

Regarding the 3D view element, the “Update All Views” command in the contextual menu regenerates the 3D view while keeping the same orientation (Not the one on the 3D Layout). If the user wants to regenerate the view corresponding to the 3D layout, they must use the “Use the Current 3D Layout Orientation” command available in the contextual menu (See below).

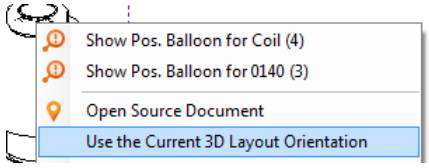


Figure 4-10: Current 3D Layout Orientation

4.3.1.2.9 Changing a View (Multiview Projections)

Each view can be switched with another one using the contextual menu of the Multiview projection.

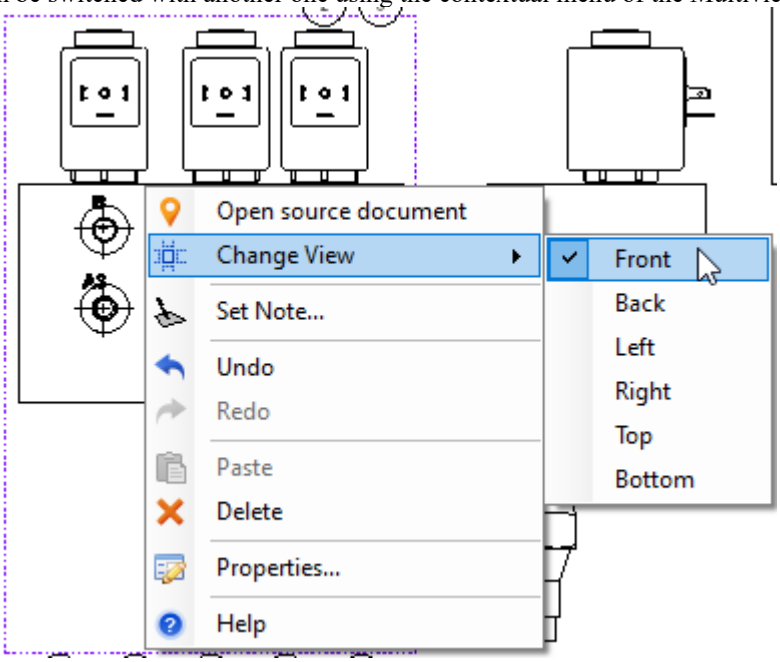


Figure 4-11: View Change

Once the view is changed, all the adjacent views are recalculated consequently.

4.3.1.2.10 Opening the Source Document

The “Open Source Document” command in the contextual menu gives the focus to the source document of the element (Schematic, 3D Layout, Part List ...)

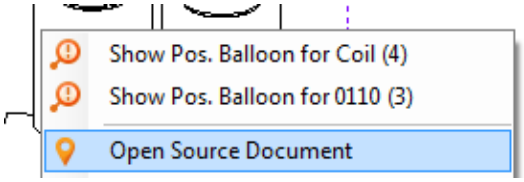


Figure 4-12: Source Document Link

4.3.1.2.11 Managing Pages

Other pages can be created in order to insert the orthogonal views, 3D view, schematic, technical data and the part list.

Adding Page

Multiple pages can be added by clicking on the "Add Page" button in the *Design* tab → Page Layout group.

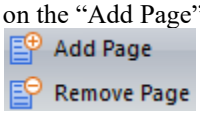


Figure 4-13: Add/Remove Page

The new pages of the *Technical Drawing* are displayed one after another with an associated page number.

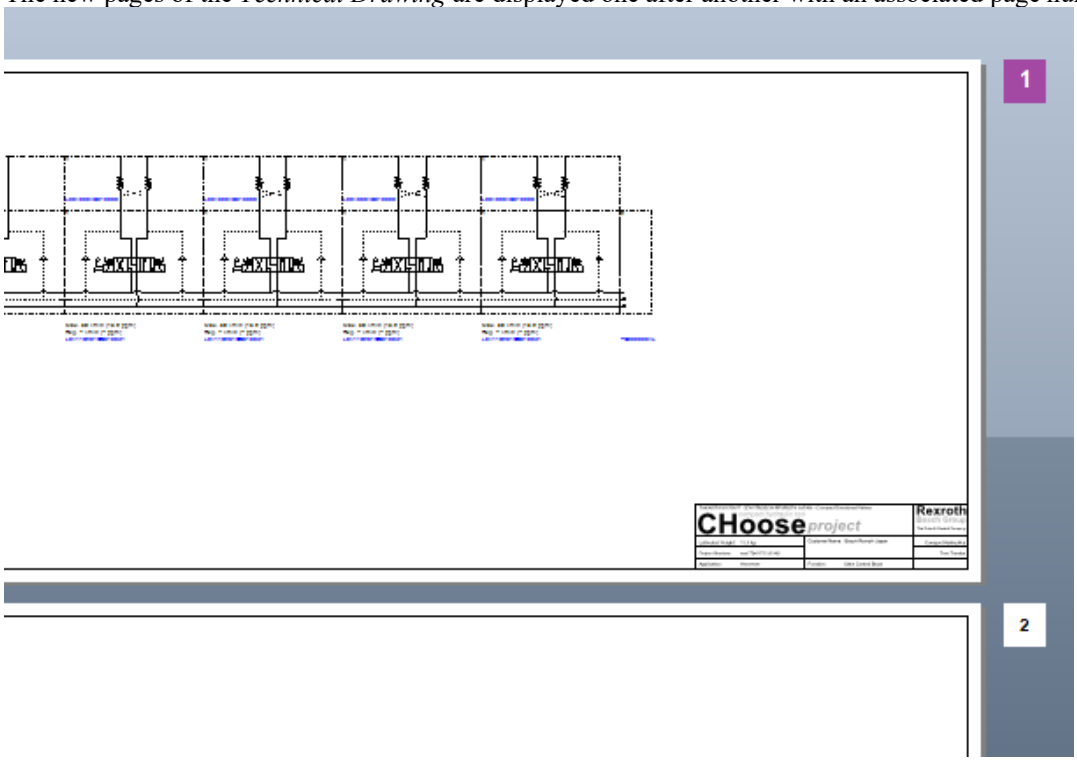


Figure 4-14: Multi-page Number

Each page is not considered to be stand-alone, which means that a view of the projection can only be displayed on one page. Duplications are not allowed.

Select Page

The page is automatically selected once a click has been done on a page (including the content). The page number located in the top/right corner of the active page is highlighted.

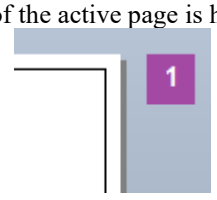


Figure 4-15: Active Page Indicator

Select a page by clicking anywhere on the page or on the page number.

If there are several pages, the "Zoom Page" button and other similar commands in the ribbon bar will affect the selected page.

Note: At least one page remains selected at all times. In other words, it is not possible to have no page selected.

Delete Page(s)

Selected pages can be removed by clicking on the “Remove Page” button in the *Design* tab → *Page Layout* group.

Similarly, using the right-click on a page opens the contextual menu which contains a command to remove the page.

4.3.2 Updating Views

4.3.2.1 Schematic or Layout Changes

If modifications are made in the project (new component, new option, schematic, 3D layout, BOM, etc…) the multiview elements are not automatically updated in order to prevent the application from slowing down.

If some components have been modified, then a warning icon is overlaid on the elements to indicate that they need to be updated.

(*) Some visual modifications, such as diagram grid, 3D rotation, component spacing, panning the diagram/image, are not taken into consideration. In these cases, no warning is triggered.

An icon in the top right corner of a view indicates that the view is not up-to-date.

Outdated views can be updated by clicking on the "Update Draft Views" button in the *Design* tab → *Page Layout* group or using the contextual menu → "Update All Views (Draft)"

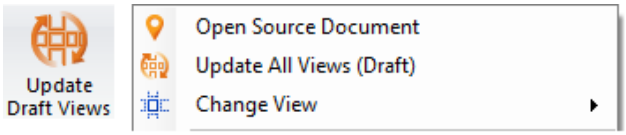


Figure 4-16: Update (Draft) Ribbon and Contextual Menu

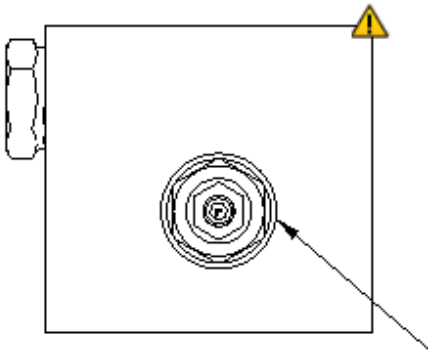


Figure 4-17: Outdated View Needing an Update

4.3.2.2 Technical Drawing Quality

In order to optimize the process of positioning the graphical elements and reduce lag, a draft quality is used for manual or automatic placement of the orthogonal or isometric views. Draft views are not finalized and some elements may have missing edge or internal lines.

To refine the graphical aspect and finalize the technical drawing, an extra step is required to generate the "Final" version with all lines, shapes and outlines.

All draft views can be updated to final views by clicking on the "Update Final Views" button in the *Design* tab → *Page Layout* group or using the contextual menu → "Update All Views (Final)".

Note: The "Update Final Views" icon is available only if all "Draft" views are updated. Additionally, once the views are updated to "Final", the "Update Final Views" icon is grayed-out.

A message appears after clicking on "Update Final Views" button:

Figure 4-18: Update (Final) Ribbon and Contextual Menu

4.3.3 Adding Information

Dimensions, balloons, supplemental texts, notes or CAD objects (line, rectangle, circle …) can be added to the page. For more information related to adding text, notes or CAD objects, please refer to the "Working with Graphical Elements" chapter under "Hydraulic Circuit" Interface section.

4.3.3.1 Dimensions (Annotations)

Dimensions can be added to the technical drawing (multiview). Dimensions are created from predefined anchor points or user-defined anchor points.

4.3.3.1.1 Dimension and Label Visibility

Dimensions and labels can be shown or hidden from the "View" tab → "Show" group.

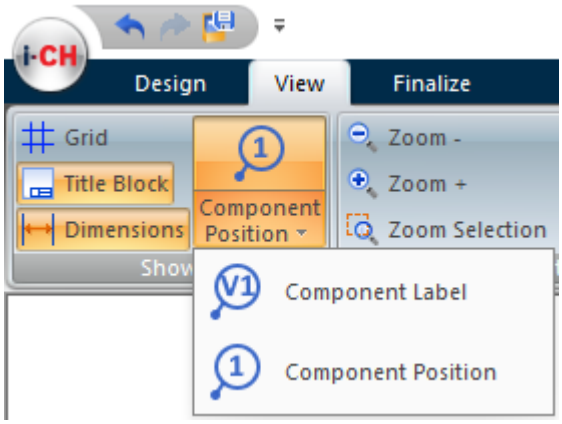


Figure 4-19: Show or Hide Commands

Note: The *Dimensions* button is also used by the *3D Layout* but is independent, i.e. the dimensions can be displayed on the *Technical Drawing* or/and the *3D Layout* independently.

4.3.3.1.2 Creating Dimensions

Automatic dimensioning can be done by clicking on the "Dimensions" command  located in the drop-down list under the "Auto-Create" command.

Manual dimensioning can be done following two different styles: linear or ordinate. Dimensioning styles can be selected from the "Design" tab → "Annotations" → "Linear Dimensions" or "Ordinate Dimensions".

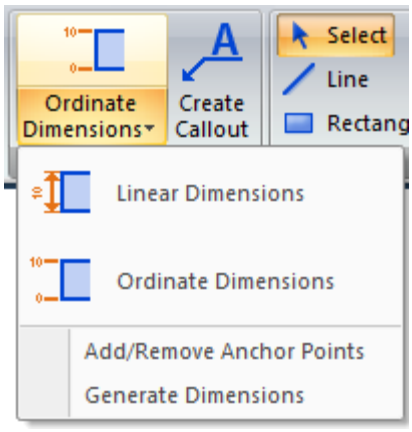


Figure 4-20: Dimension Style and Options Menu

Linear Dimension

Create a linear dimension by clicking on the "Linear Dimension" ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process is started by clicking on the first desired anchor point and moving the mouse. A line will be drawn between the mouse pointer and the first anchor point. Clicking on a second anchor point will then create the dimension. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, click once more to fix the dimension layout and finish the dimensioning process.

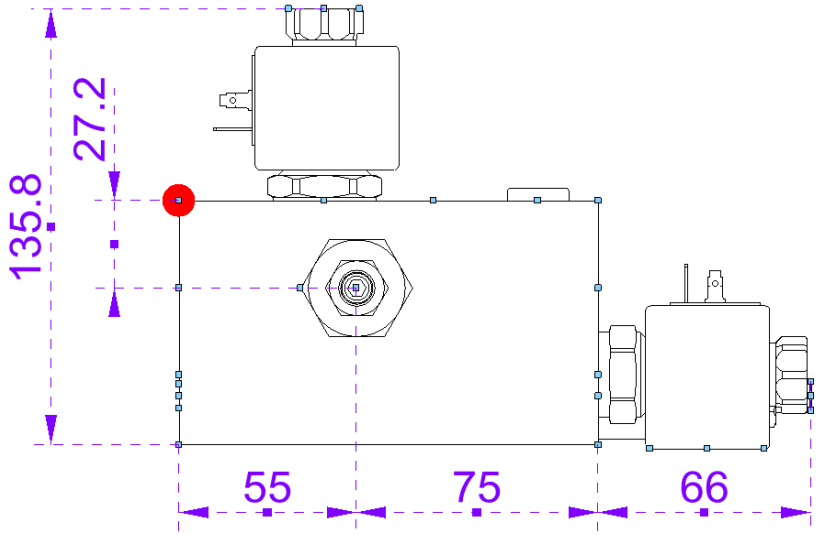


Figure 4-21: Linear Dimensions

Ordinate Dimension

Create an ordinate dimension by clicking on the "Ordinate Dimension" ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process is started by clicking on the desired anchor point. This automatically creates the dimension from the origin, displayed as a red dot on each view. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, click once more to fix the dimension layout and finish the dimensioning process. Notice that the "0" dimension is created at the same time.

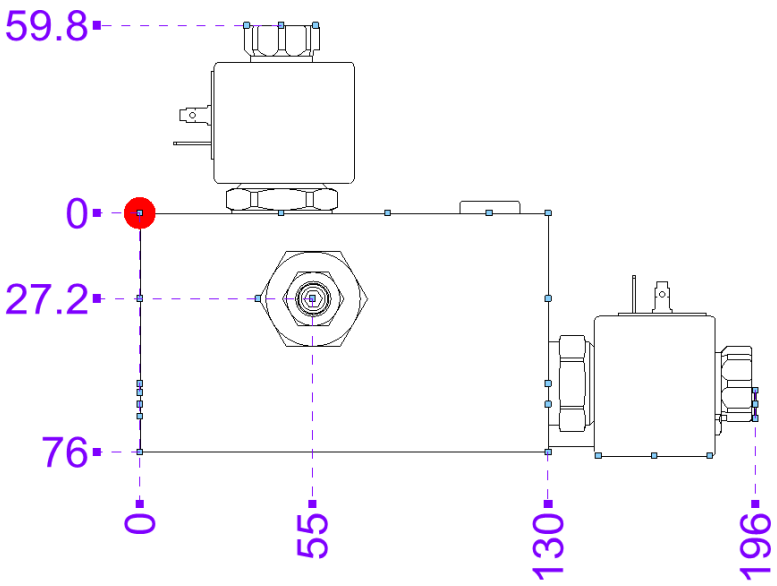


Figure 4-22: Ordinate Dimensions

4.3.3.1.3 Modifying Dimensions

Modify the dimension text position by clicking on the text and moving the text to a new location. The text can be placed in the middle, or on either side of the dimension lines.

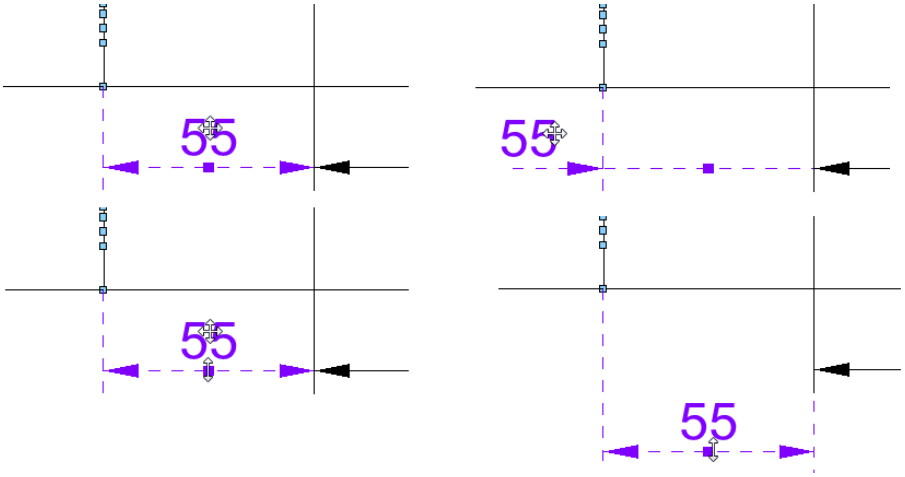


Figure 4-23: Modified Dimensions

Modify the leader lengths or the dimension's distance from the object by clicking on the handle grip shown on the dimension arrow(s) and then drag the dimension to a new location.

Delete a dimension by clicking on the dimension text or the arrows. Once selected, press the DELETE key or use the ribbon bar button located in the "Design" tab → "Clipboard" group.

4.3.3.1.4 Creating Anchor Points

Additional anchor points can be created to define specific dimensions.

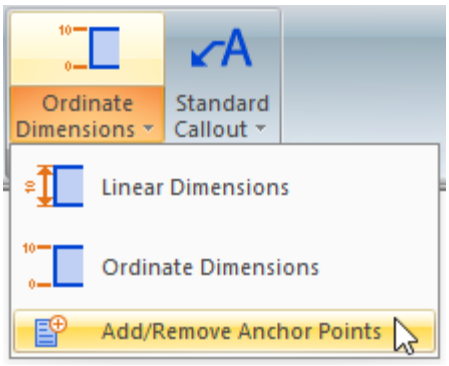


Figure 4-24: Add/Remove Anchor Points Menu

Create an anchor point by clicking on the "Add/Remove Anchor Points" ribbon bar button. Once activated, predefined anchor points appear in gray on the views. Add an anchor point by clicking on an existing line at the desired location. The new user-defined anchor point appears in bright green.

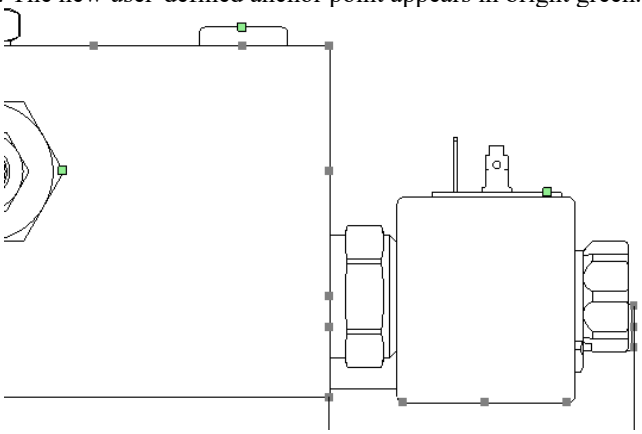


Figure 4-25: Creating User-defined Anchor Points

Delete a user-defined anchor point by clicking on an existing user-defined anchor point.

Note: Predefined anchor points cannot be deleted. The esc key exits this mode. Once deactivated, all the anchor points return to the same color (blue).

4.3.3.2 Balloons (Item Position - Annotations)

A technical drawing contains the list of all the components (part list). Each component has a unique index (Item Position). These indexes are displayed in the technical drawing layout as a reference in the bill of materials (BOM) for each part in the project.

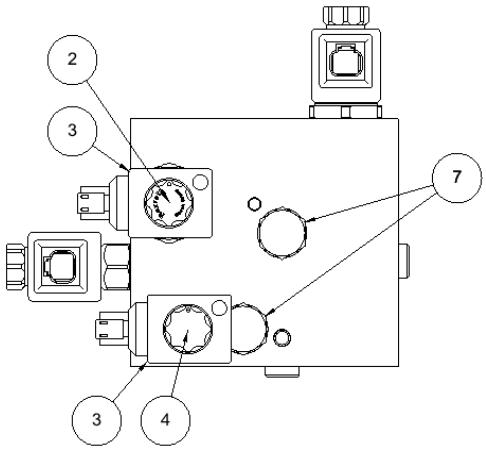


Figure 4-26: Reference Balloons

4.3.3.2.1 Visibility

Balloons can be shown or hidden from the “View” tab → “Show” group → “Item Pos.”.

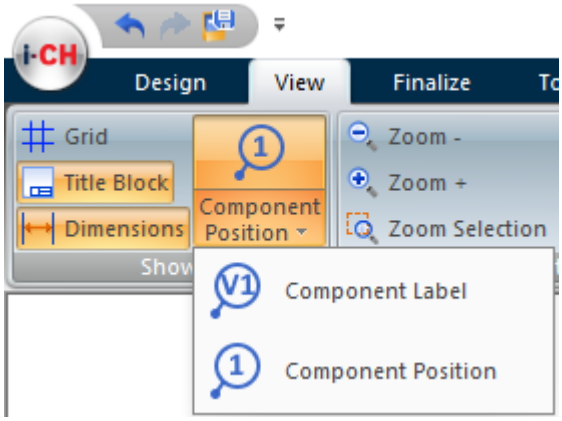


Figure 4-27: Show or Hide Balloons

By default, the balloons are visible on the *Technical Drawing*.

Note: The “Component Position” of each component is displayed in a circle. A leader line is attached to the surface of the component. The size of the circle (or shape) is adapted to the paper size.

4.3.3.2.2 Creating Balloons

Balloons are automatically created for each component. Additionally, they are all automatically positioned.

For HIC projects, balloons are positioned on the different multiview projections.

The automatic balloon positioning can be relaunched through the “Dimensions” command  located in the drop-down list under the “Auto-Create” command.

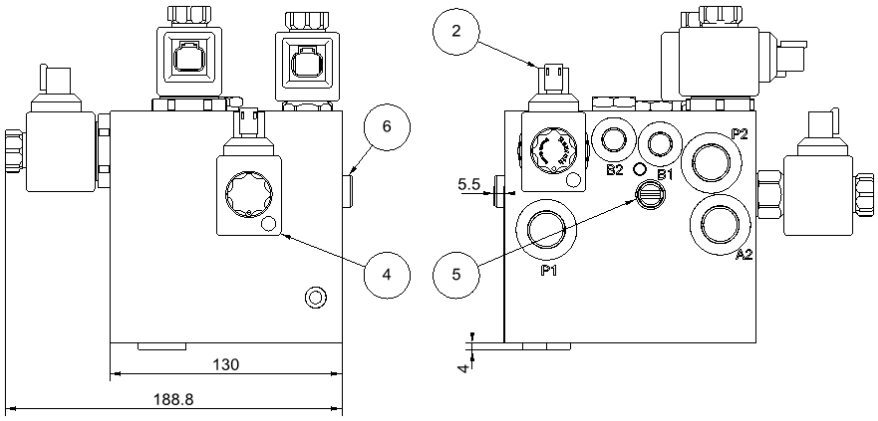


Figure 4-28: Reference Balloons on Multiple Views

Balloons are only positioned around views containing visible components.

For CDV and CPM projects, balloons are positioned in the 3D view.

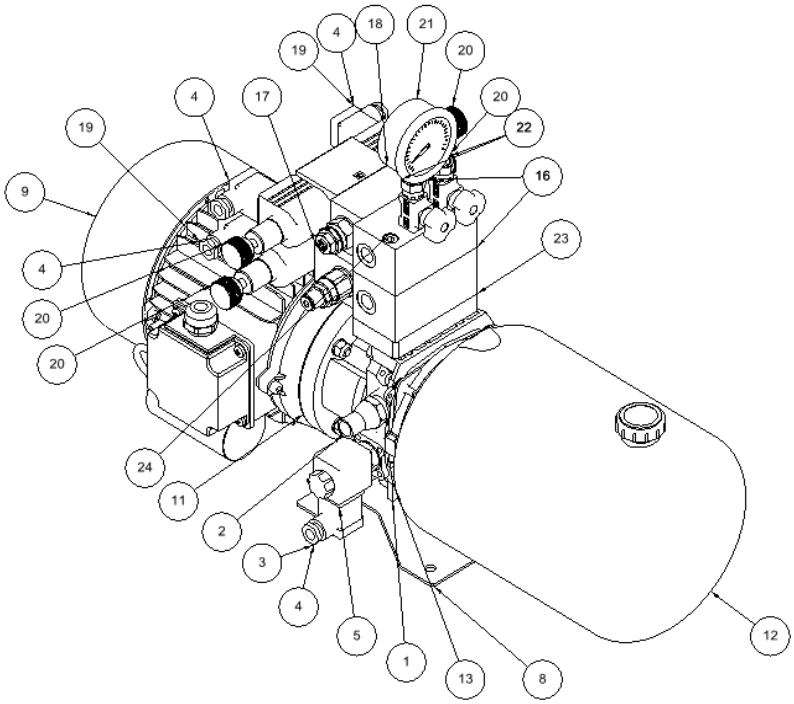


Figure 4-29: Reference Balloons on 3D View (CPM)

4.3.3.2.3 Modifying Balloons

Modify the balloon position by clicking on the balloon and moving it to a new location.

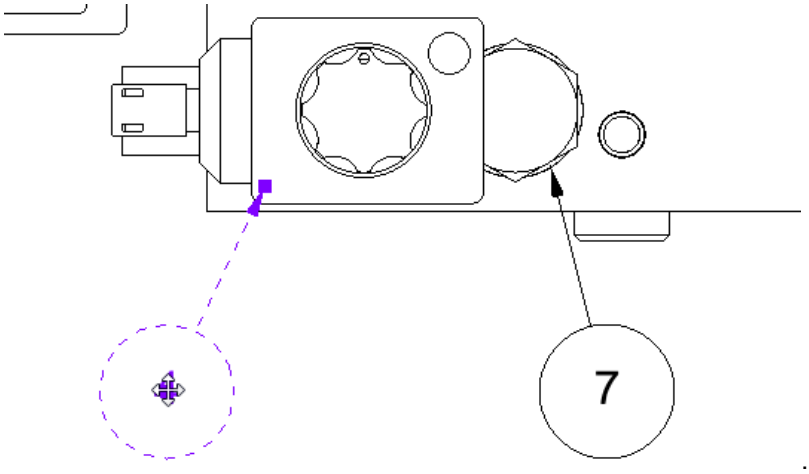


Figure 4-30: Moving a Balloon

Modify the balloon leader, pointing arrow position, by clicking on the arrow tip and dragging it on the same object, from the same or another view. Note that it cannot be located outside the object.

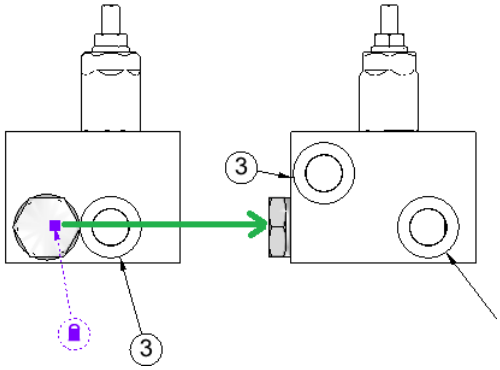


Figure 4-31: Moving a Balloon to another View

Balloon font size can be modified by double-clicking on it or using the contextual menu. The “Font” dialog opens.

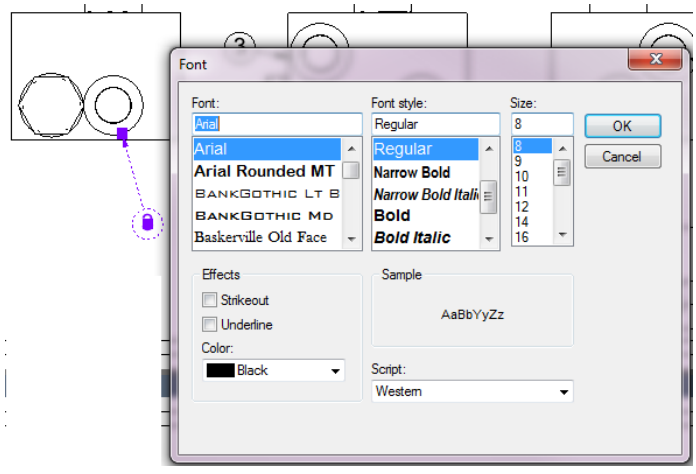


Figure 4-32: Changing Balloon Font Size

Show or hide a balloon using the contextual menu available from the component or from the balloon circle:

1. If the balloon is shown: it can be hidden from its contextual menu → “Hide Item (Pos.) Balloon”

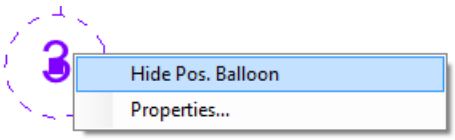


Figure 4-33: Hiding a Balloon

2. If the balloon is hidden: it can be shown from its contextual menu → "Show Part List Item (Pos.) for *xyz*"

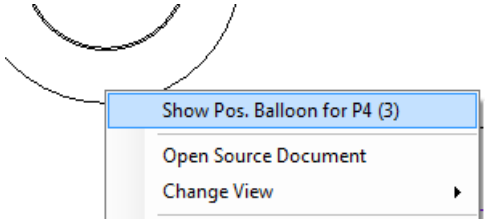


Figure 4-34: Showing a Balloon

3. Balloons can be moved to another view by right-clicking on the component in another view and selecting "Show Item Pos. Balloon..." The balloon corresponding to the clicked component appears linked to the object, and is removed from the previous location.

Note: Only one balloon can be displayed for each object (component block, valve, coil, connector etc.). A balloon can be shown on one view at a time - if a balloon is shown on a view, it will be removed from the other views.

Some components have sub-components. In this case, the contextual menu gives the information on all the sub-components.

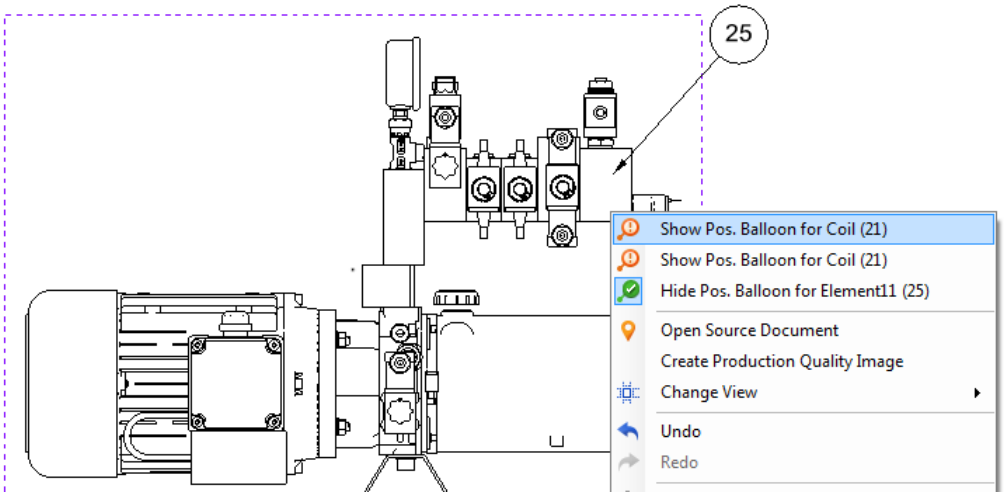


Figure 4-35: Showing a Sub-component Balloon

4.3.3.2.4 Balloon Check

Open the contextual menu from a blank space on the page in order to check if all the balloons have been placed on the page(s).

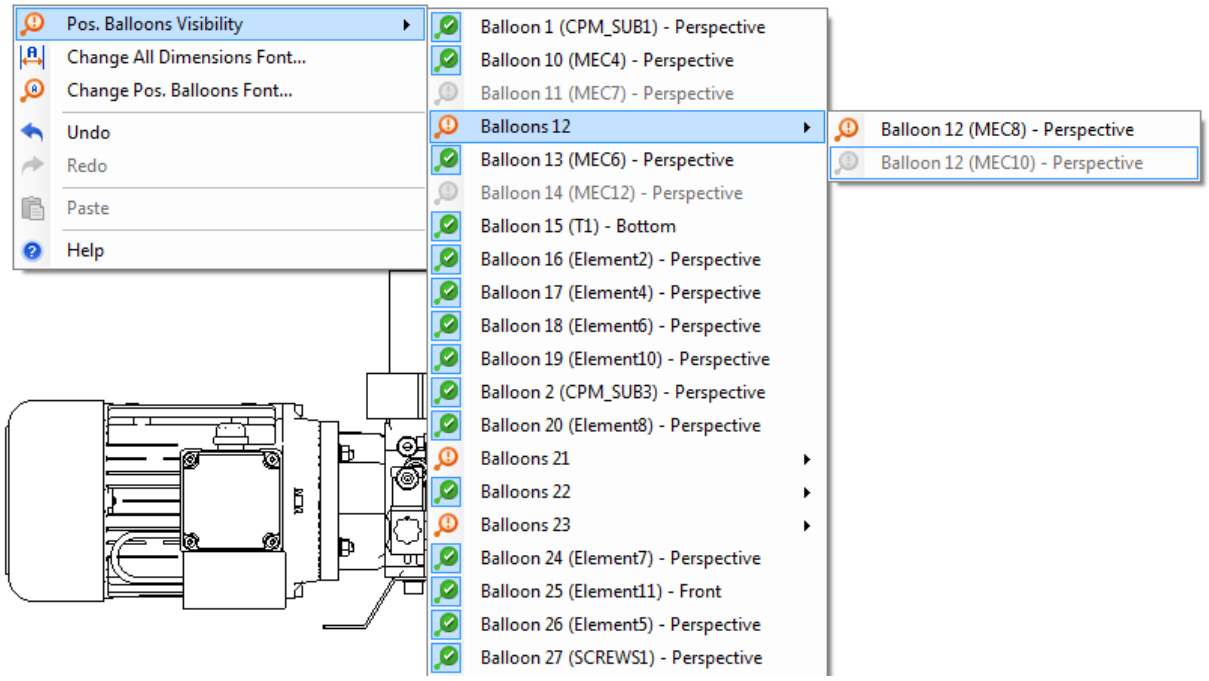


Figure 4-36: Checking Balloons Status

Green icon: the balloon is already on the page.

Orange icon: the balloon is not on the page but a compatible view is available on a page.

Grey icon: the balloon is not on the page and no compatible view is available on the page. The name of the missing view is displayed.

Clicking on an orange balloon will position it somewhere else on a view.

Clicking on a green balloon will hide it.

4.3.3.3 Dimensions and Balloons Options

A contextual menu is available from an empty surface of the page and can be used to change the Font of the Dimensions, the Item (Pos.) balloons and the Callouts.

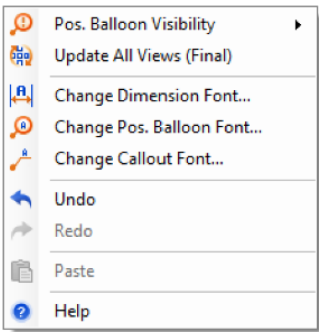


Figure 4-37: Changing Dimension, Callout or Balloon Font

4.4 Production Drawing

The Production Drawing interface is used to create a 2D layout with the production views of the assembled project on a page with an optional title block and map locator. This document is only available in the PRO Version of i-CHoose.

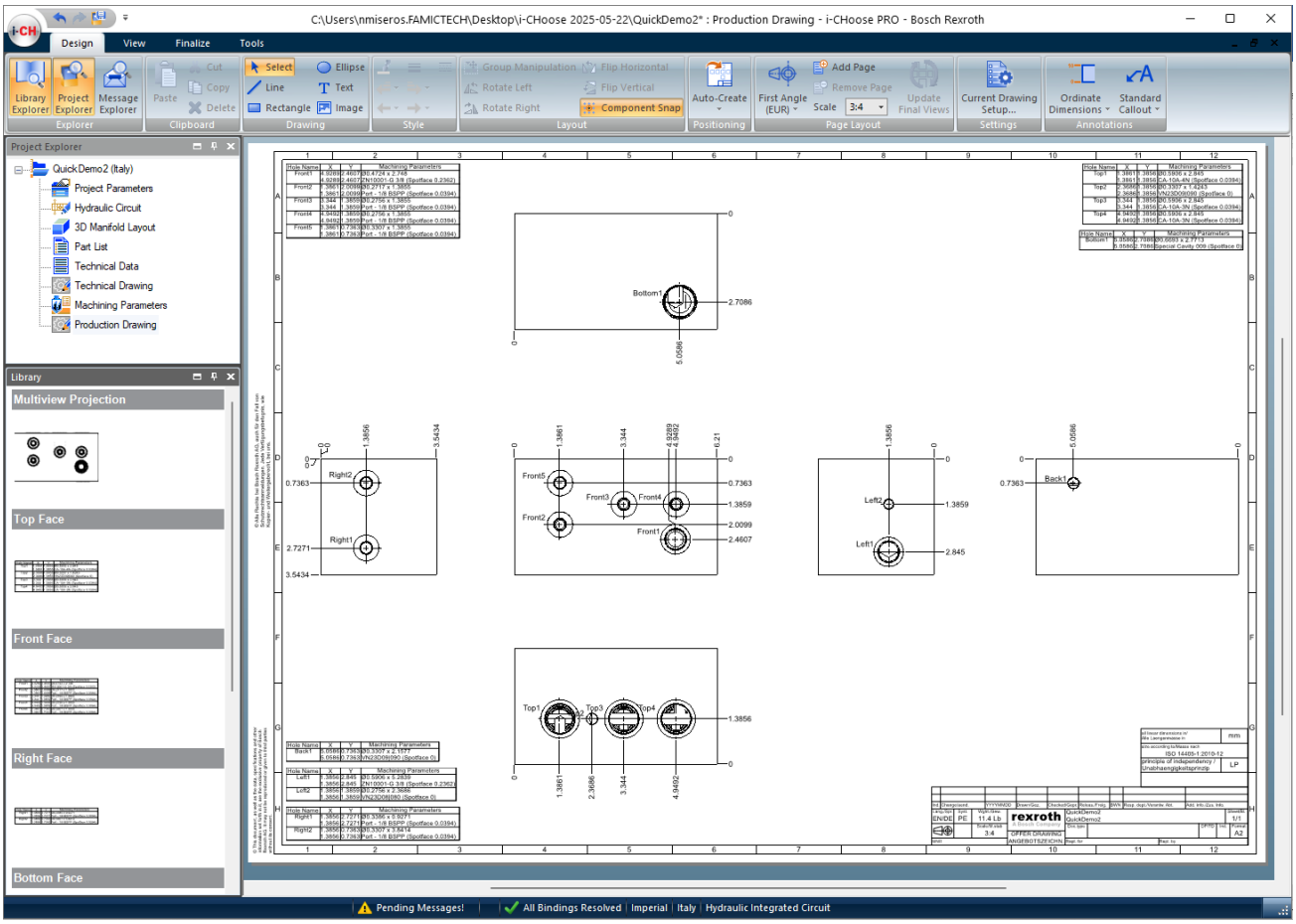


Figure 4-38: Production Drawing

The “Multiview” production views from the 3D Layout are available in the library.

The “Multiview” views can be manually dragged & dropped from the library to the Production Drawing page. The inserted view depends on where it is dropped on the production drawing.

The orthogonal views can be positioned automatically by clicking on the “Auto-Create” button from the “Design”→ “Positioning” group. This will create all 6 projections and position them appropriately on the page.

4.4.1 Positioning the Production Drawing Elements

The *Production Drawing* interface requires specific design features which are available under “Design” tab →“Page Layout” group.

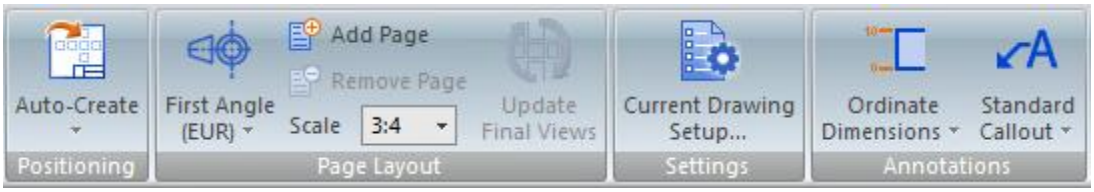


Figure 4-39: Production Drawing Tools

4.4.1.1 Automatic Positioning

Using the "Auto-Create" command, a single click completes all the operations required to create a production drawing. The user can simply click on the "Auto-Create" icon in the "Design" tab → "Positioning" group → 

This will automatically position the production drawing elements, including the drilling identifiers and locations and the drill lists for each face of the block. The automatic positioning commands for views, dimensions and drilling identifiers can also be launched separately through the drop-down list beneath the "Auto-Create" command. The system will position all the elements on the page taking into account various parameters such as page margins, projection configuration, elements to insert, etc.

The auto-positioning options for the current project can be configured by clicking on the "Current Drawing Setup" icon in the "Design" tab → "Settings" group →  .

4.4.1.2 Manual Positioning

Individual drawing elements are displayed as images in the library. These vector graphics can be taken from the library and dropped onto the page. Each vector image can be resized by using the handles, except for the orthogonal views which are managed by the selected scale factor in the *Design* tab → *Page Layout* group → *Scale* drop-down list.

The orthogonal views are positioned according to particular layout rules: first or third angle projection, scale, alignment, etc...

4.4.1.2.1 Selecting the Projection Angle

According to various drawing standards (ASME, BS, ISO, …), multi-view drawings can be laid out following one of two different projection angles, First and Third.

The projection angle can be changed by clicking on the split button and selecting the other type (First Angle Projection - Europe and Third Angle Projection - US). The Projection Type button is located in the *Design* tab → *Page Layout* group.

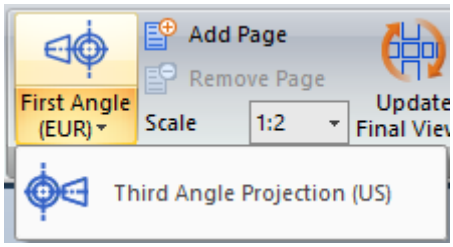


Figure 4-40: Design Tab → Projection Angle Selection

4.4.1.2.2 Production Drawing Library

The library contains the multiview projection and the drill list tables for each face of the manifold:

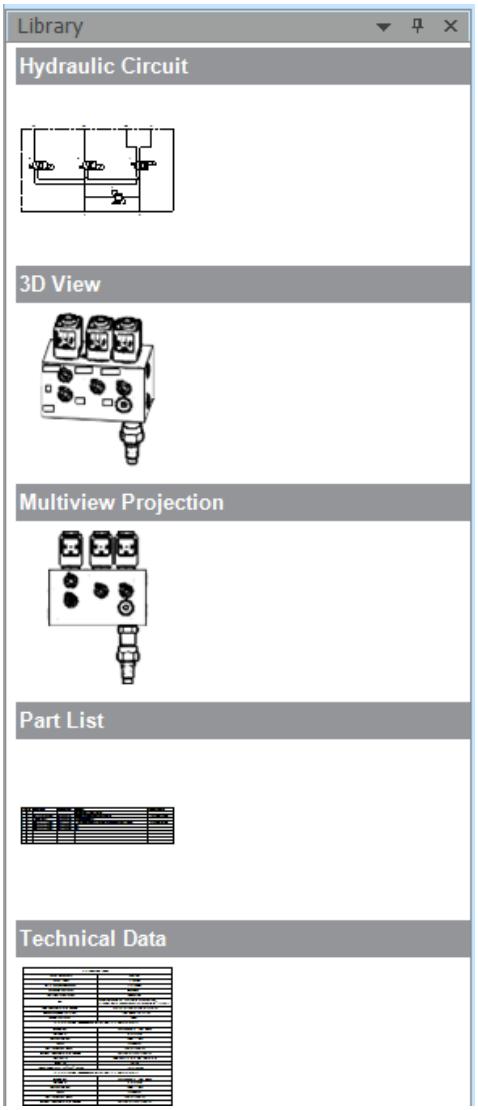


Figure 4-41: Library – Production Drawing

4.4.1.2.3 Scaling (Orthogonal Views)

To change the scale, select desired ratio from the scale list box located in *Design* tab → *Page Layout* group → *Scale* drop-down list. The size of existing views already on the page automatically changes to adjust to the selected scale. Newly inserted views will use the same scale ratio.

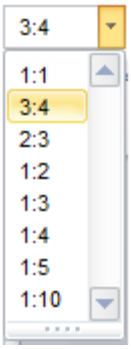


Figure 4-42: View Scale Drop-Down List

The only way to change the size of the orthogonal views is via the scale setting in this list box. All the other graphical elements can be resized by using the handle selection.

Note: A scale of 1:1 implies that the object has been drawn to true size. Therefore, a scale of 1:2 implies that the object has been reduced to half its size on the drawing.

4.4.1.2.4 Orthogonal View Alignment

Alignment lines are shown when a view is moved on the page in order to easily align it with the other views that are already on the production drawing.

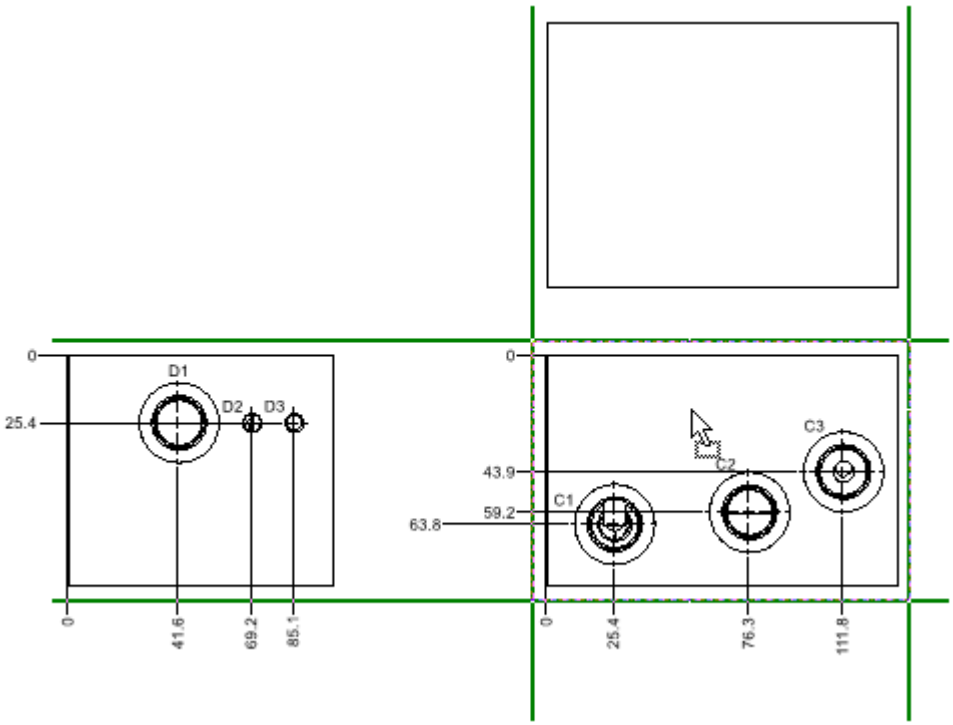


Figure 4-43: Moving View Alignment Lines

4.4.1.2.5 Moving Orthogonal Views

When a view is moved in a direction other than the alignment axis, the available destination positions appear. The view can only be moved (dropped) in the proposed areas. These destinations are also displayed.

When the view is dropped in the destination location, it is automatically updated and is positioned in the correct orientation.

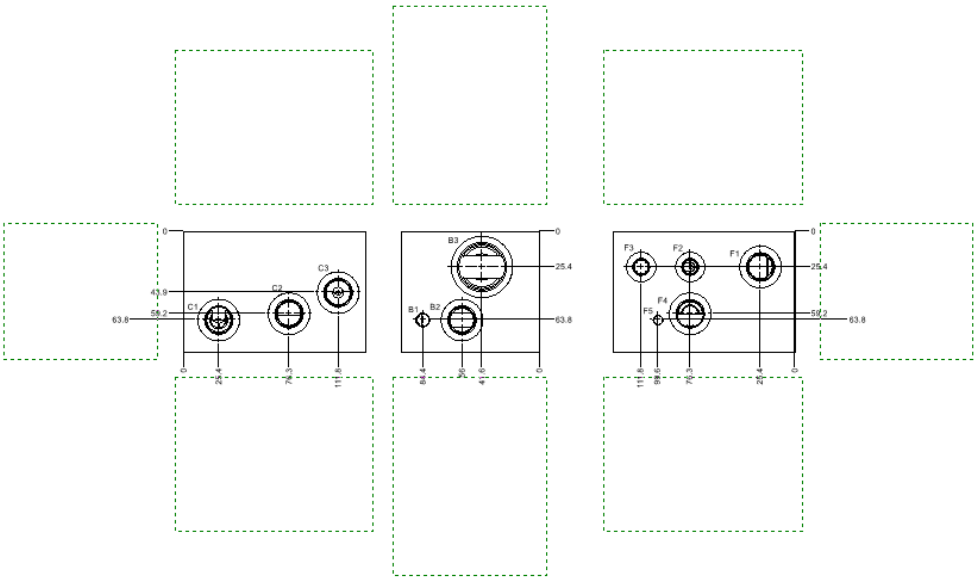


Figure 4-44: Moving View – Available Areas

4.4.1.2.6 Changing a View (Multiview Projections)

Each view can be switched with another one using the contextual menu of the Multiview projection.

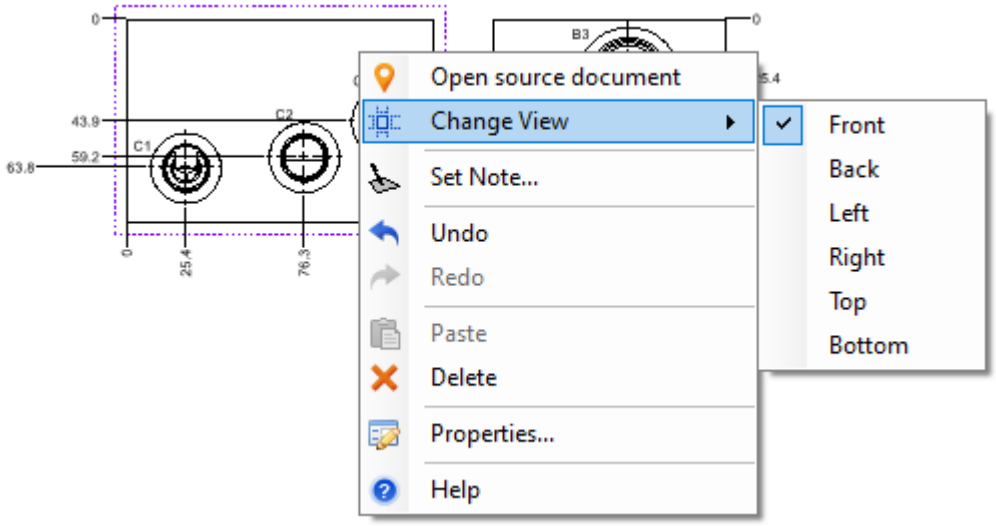


Figure 4-45: View Change

Once the view is changed, all the adjacent projections are updated according to their positions relative to the new view.

4.4.1.2.7 Opening the Source Document

The “Open Source Document” command in the contextual menu will open the project on the source of the element (Views, Drill list…)

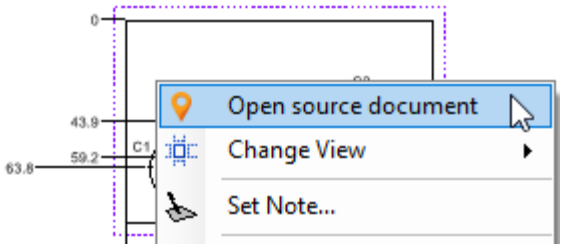


Figure 4-46: Source Document Link

4.4.2 Updating Views

4.4.2.1 Schematic or Layout Changes

If modifications are made in the project (new component, new option, schematic, 3D layout, BOM, etc…) the multiview elements are not automatically updated in order to prevent the application from slowing down.

If some components have been modified, then a warning icon is overlaid on the elements to indicate that they need to be updated.

(*) Some visual modifications, such as diagram grid, 3D rotation, component spacing, panning the diagram/image, are not taken into consideration. In these cases, no warning is triggered.

An icon in the top right corner of a view indicates that the view is not up-to-date.

Outdated views can be updated by clicking on the "Update Draft Views" button in the *Design* tab → *Page Layout* group or using the contextual menu → "Update All Views (Draft)"

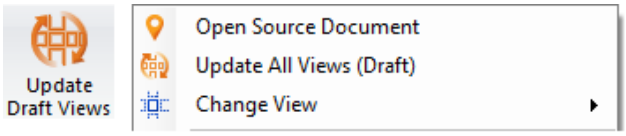


Figure 4-47: Update (Draft) Ribbon and Contextual Menu

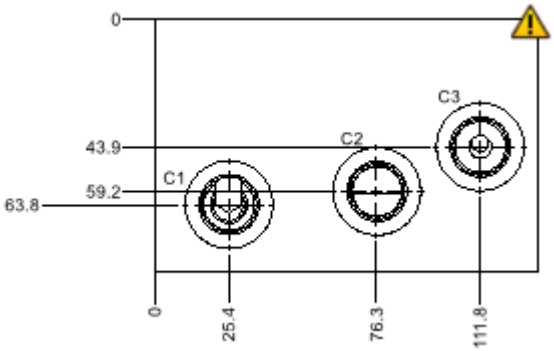


Figure 4-48: Outdated View Needing an Update

4.4.2.2 Production Drawing Quality

In order to optimize the process of positioning the graphical elements and reduce lag, a draft quality is used for manual or automatic placement of the orthogonal or isometric views. Draft views are not finalized and some elements may have missing edges or internal lines.

To refine the graphical aspect and finalize the technical drawing, an extra step is required to generate the "Final" version with all lines, shapes and outlines.

All draft views can be updated to final views by clicking on the "Update Final Views" button from the Design tab → Page Layout group or using the contextual menu → "Update All Views (Final)".

Note: The "Update Final Views" icon is available only if all "Draft" views are updated. Additionally, once the views are updated to "Final", the icon "Update Final Views" is grayed-out.

A message appears after clicking on "Update Final Views" button:

Figure 4-49: Update (Final) Ribbon and Contextual Menu

4.4.3 Adding Information

Dimensions, balloons, supplemental texts, notes or CAD objects (line, rectangle, circle …) can be added to the page. For more information related to adding text, notes or CAD objects, please refer to the "Working with Graphical Elements" chapter under "Hydraulic Circuit" Interface section.

4.4.3.1 Dimensions (Annotations)

Dimensions can be added to the production drawing. Dimensions are created from predefined anchor points or user-defined anchor points.

4.4.3.1.1 Dimension Visibility

Dimensions can be shown or hidden from the "View" tab → "Show" group → "Dimensions".

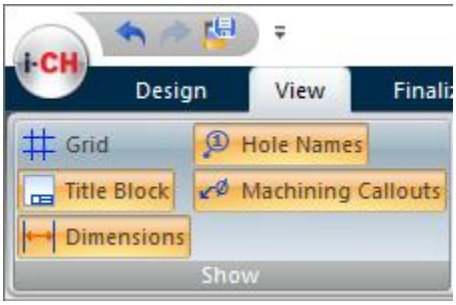


Figure 4-50: Show or Hide Dimensions

Note: The button is also used by the *3D Layout* but is independent, i.e. the dimensions can be displayed on the *Production Drawing* or/and the *3D Layout* independently.

4.4.3.1.2 Creating Dimensions

Automatic dimensioning can be done by clicking on the "Dimensions" command  located in the drop-down list under the "Auto-Create" command.

Manual dimensioning can be done following two different styles: linear or ordinate. Dimensioning styles can be selected from the “Design” tab → “Annotations” → “Linear Dimensions” or “Ordinate Dimensions”.

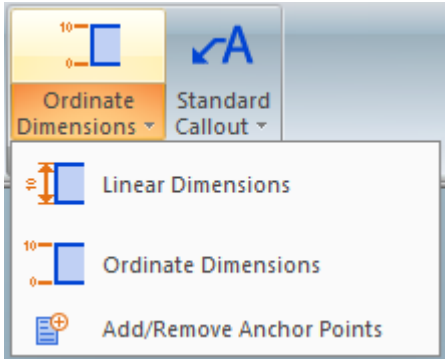


Figure 4-51: Dimension Style and Options Menu

Linear Dimension

Create a linear dimension by clicking on the “Linear Dimension” ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process is started by clicking on the first desired anchor point and moving the mouse. A line will be drawn between the mouse pointer and the first anchor point. Clicking on a second anchor point will then create the dimension. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, click once more to fix the dimension layout and finish the dimensioning process.

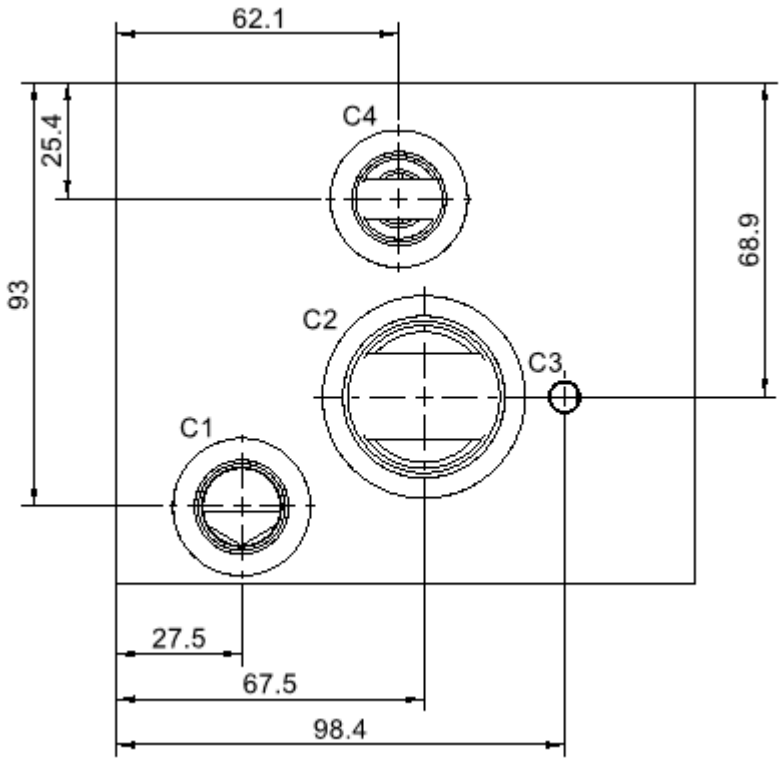


Figure 4-52: Linear Dimensions

Ordinate Dimension

Create an ordinate dimension by clicking on the “Ordinate Dimension” ribbon bar button. Once activated, anchor points (colored squares) appear on the views. The dimensioning process is started by clicking on the desired anchor point. This automatically creates the dimension from the origin, displayed as a red dot on each

view. Move the mouse to position and orient the dimension text. Once the dimension text is positioned correctly and in the right orientation, click once more to fix the dimension layout and finish the dimensioning process. Notice that the "0" dimension is created at the same time.

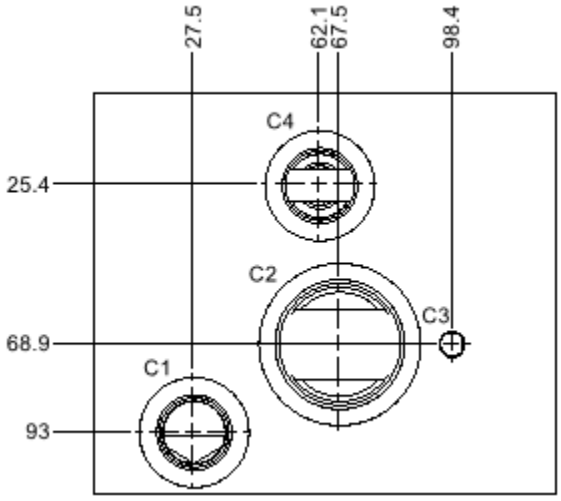


Figure 4-53: Ordinate Dimensions

4.4.3.1.3 Modifying Dimensions

Modify the dimension text position by clicking on the text and moving the text to a new location. The text can be placed in the middle, or on either side of the dimension lines.

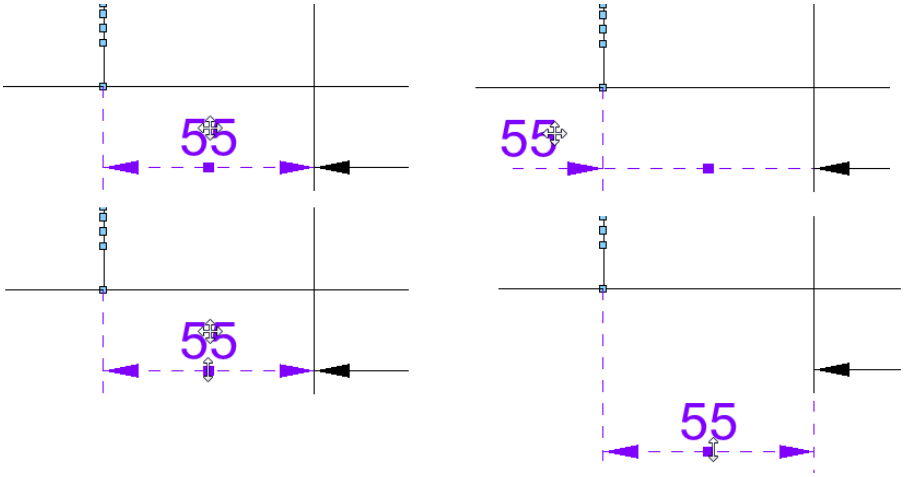


Figure 4-54: Modified Dimensions

Modify the leader lengths or the dimension's distance from the object by clicking on the handle grip shown on the dimension arrow(s) and then drag the dimension to a new location.

Delete a dimension by clicking on the dimension text or the arrows. Once selected, press the DELETE key or use the ribbon bar button located in the "Design" tab → "Clipboard" group.

4.4.3.1.4 Creating Anchor Points

Additional anchor points can be created to define specific dimensions.

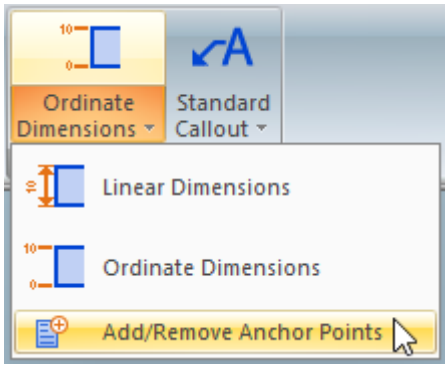


Figure 4-55: Add/Remove Anchor Points Menu

Create an anchor point by clicking on “Add/Remove Anchor Points” the ribbon bar button. Once activated, the predefined anchor points appear in gray on the views. Add an anchor point by clicking on an existing line at the desired location. The newly created user-defined anchor point appears in purple as it is still selected. Previously created anchor points appear in bright green.

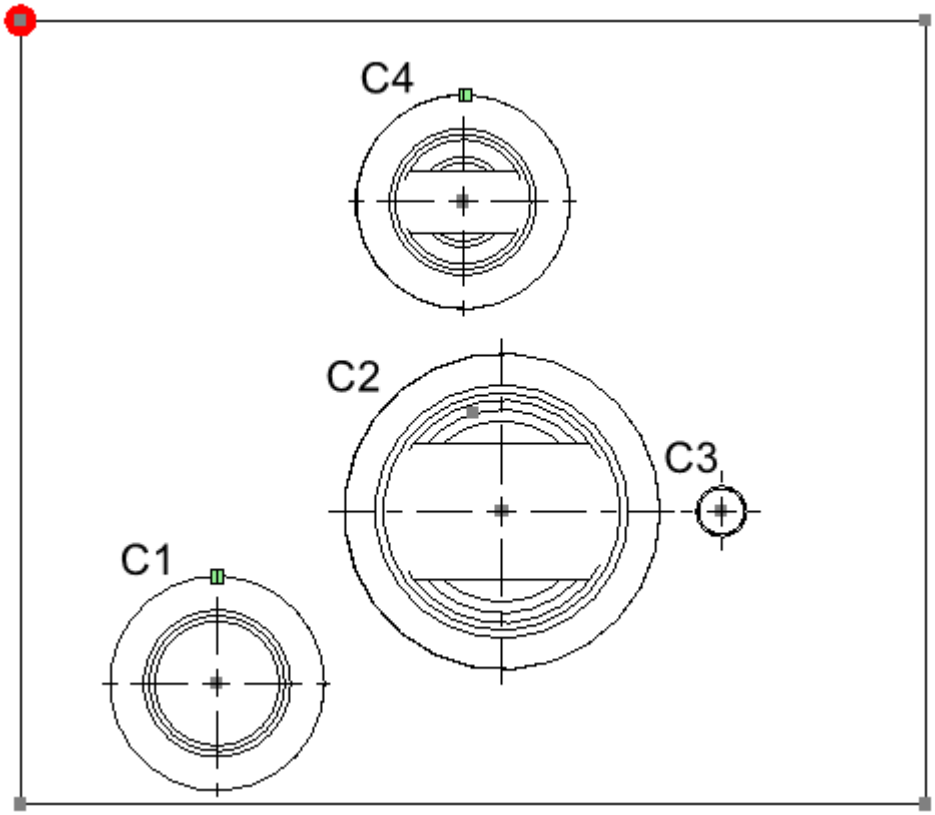


Figure 4-56: Creating User-defined Anchor Points

Delete a user-defined anchor point by clicking on an existing user-defined anchor point.

Note: Predefined anchor points cannot be deleted. The esc key exits this mode. Once deactivated, all the anchor points return to the same color (blue).

4.5 Generating the report

To generate the report:

1. Click on the “Generate Default Report”  tool in the “Finalize” toolbar or
2. Select one of the options in the drop-down list (available depending on the key configuration).

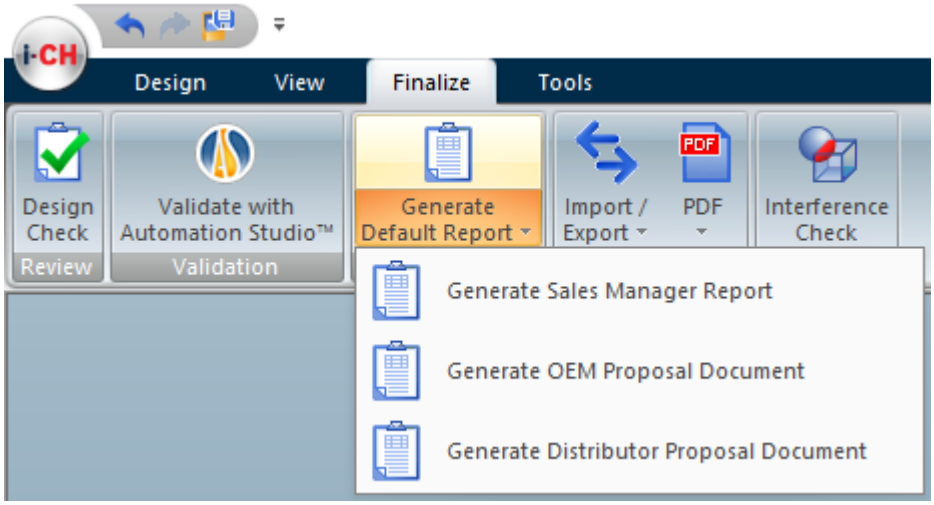


Figure 4-57: File Menu (Generate Report)

The report is created in PDF format on the local computer and can be saved under a different name/location.

4.5.1 Options and Warnings before generating a report

Before the report can be generated, a dialog opens and allows the user to:

- Select the output language. The recommended value is indicated
- Select a specific output directory or the default one
- Select a specific company logo or the default one
- Include the catalogue files (pdf) in the report directory
- Read the warnings regarding the project

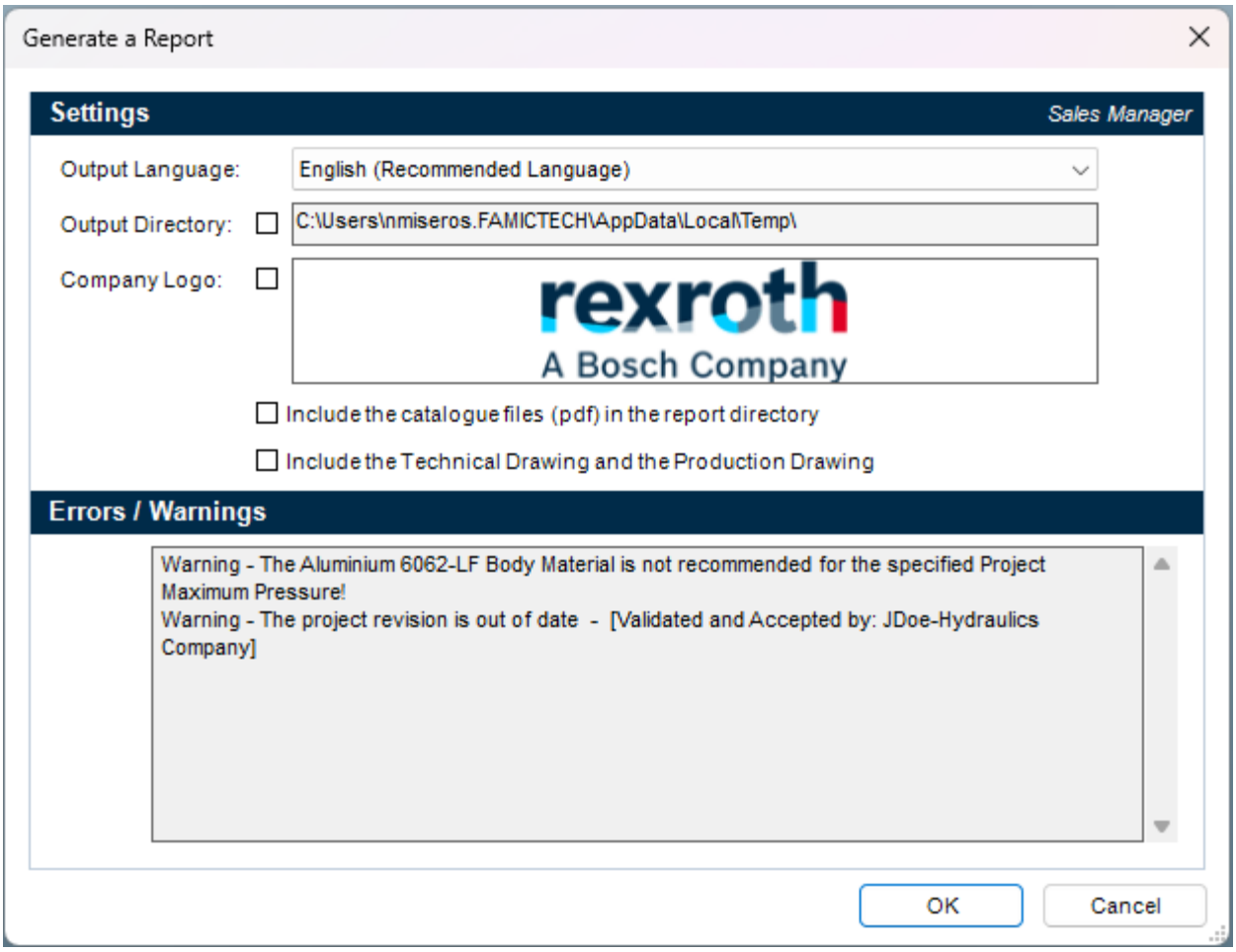


Figure 4-58: Report Error/Warning Dialog

The report output language list contains all the languages available in i-CHoose. The user can choose among all the available languages.

When the "Specific Output Directory" is selected, all the report files are saved in a unique directory. The name of the directory is: Project Name + date + _integer (if needed)

4.5.2 Saving the report

When the report is generated, click on the PDF viewer "File" menu and use the "Save As…" command. This is a standard Windows function.

4.5.3 Printing

When the report is generated and opened in a PDF viewer application, click on the "File" menu and use the "Print" command. This is a standard Windows function.

4.5.4 Report Contents

The report contents will vary depending on the design. For a standard report, the following information is included:

- Company Logo, project status and revision

- Project information sheet (Project, customer, commercial, technical information)
- Bill of Materials (BOM)
- Project Summary
- Price range and discount information (CDV and CPM only)
- Warnings and Errors
- Revision history
- Placement constraints
- Hydraulic Circuit (Diagram)
- 3D Layout
- Technical Drawing
- Terms and Conditions of sales