HMI Template for WinCC Unified

WinCC Unified V17 for Wire Processing

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Table of contents

1 Preface

Purpose of the manual

This document contains information about the HMI Template developed for WinCC Unified projects of machine builders in the area of metal forming and especially for wire processing applications.

Core content

The following core features are covered in this document:

- Customizable navigation concept
- Title and Status bar
- Three navigation levels
- Customizable color concept

Required basic knowledge

Basic knowledge in the area of JavaScript is required to understand the explanations of this documentation but it is not necessary to adapt the template.

Validity

This document is valid for the following components of WinCC Unified

- Unified Comfort Panels in Full HD, HD and IPC resolutions

2 Introduction

2.1 Description

We offer a modifiable HMI project for WinCC Unified V17. This project intents to provide a starting point on the development of an HMI interface without investing programming effort on non-built-in, but important, basic and navigation functions.

2.2 Function principle

Download the template project matching your hardware and adapt the text list to fit your navigation necessities according to the respective machine.

Advantages:

- Show / Hidden function of the second and third navigation level are automatized
- Go-to-previous-screen (Back Button) option is already included
- Change screen by screen ID option is already included
- The use of text lists allows a multilingual (German/English) implementation

2.3 Scope of delivery

A downloadable WinCC Unified V17 project with a customizable multilingual navigation concept for Full HD, HD and IPC resolutions.

3 Navigation Concept

3.1 Overview

The navigation concept represents the backbone of the HMI Template. It allows the user to navigate between different screens based on 3 navigation levels, which will be described in detailed. An important recurrent terminology is “*ScreenID*”, with which we assign a unique identificatory number to organize and access the screens.

The navigation is based on a *ScreenID* logic which is assigned following an ascending order according to its position on each navigation level. A Fourth Navigation level with one digit is already included in the concept, but not available on the current version, hence it should always be predefined to a value of “1”.

Table 3-1 – Screen ID

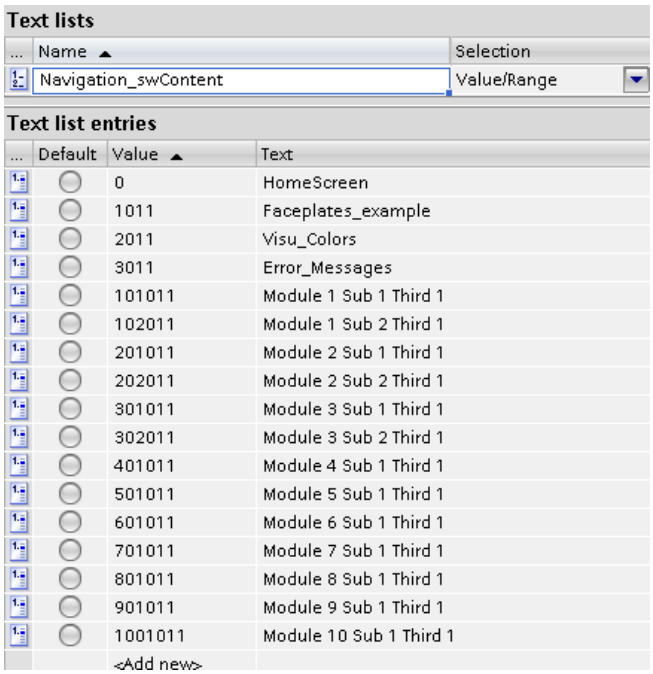
Main Navigation	Sub Navigation	Third Navigation	Fourth Navigation
00 - 10	01 - 10	01 - 10	1

The complete list of *ScreenID* must be specified on the “*Navigation_swContent”* text list in all languages. As seen on Figure 3-1, in case of a single digit position, a leading cero needs to be added; two digits are required for each of the three first navigation levels.

The ScreenID with value “0” is reserved for the Welcome Screen, once the runtime is started it is not accessible. It should be used as an introduction to the HMI Interface and a point of reference in case the device suffered an unexpected reboot or restart.

The text assigned to each *ScreenID* must correspond to the actual name of the Screen intended to access.

Figure 3-1 – Screen ID navigation text list



An overview of the three navigation levels is shown on Figure 3-2. Each one is a Faceplate. They are implemented with up to 11 elements which are linked to different text lists. This allows an uncomplicated adaption of their shown text content and visibility.

In case of an empty text list for the value, the button will not be displayed. If no button is filled with text, the complete navigation level will be automatically hidden from the screen.

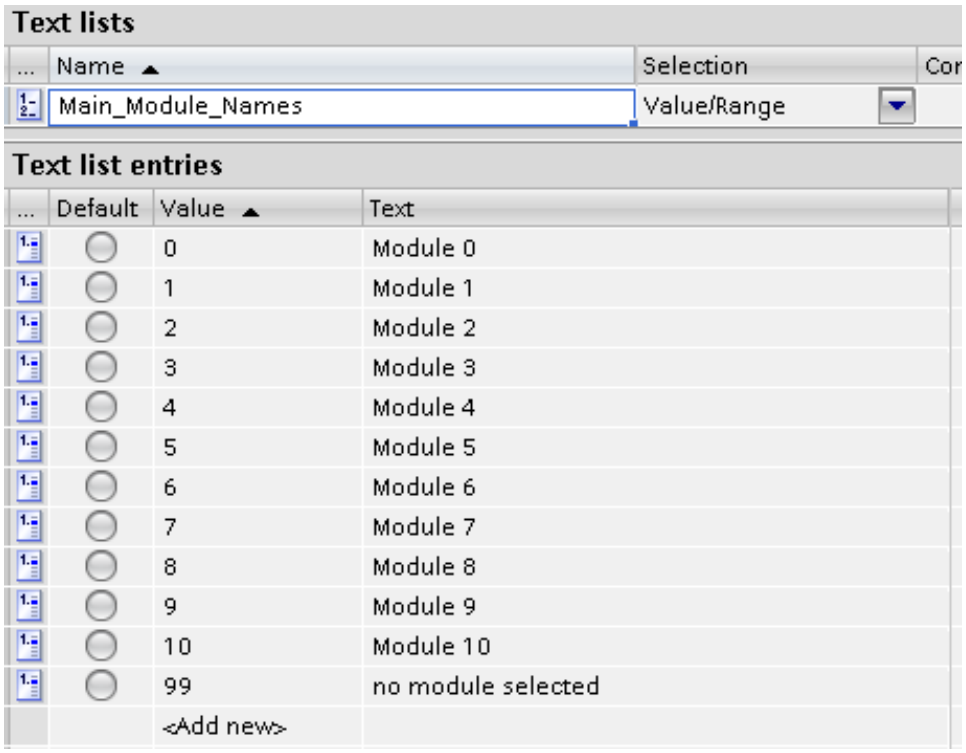
Figure 3-2 – Navigation levels overview

3.2 Main Navigation Level

The first level navigation is shown once its Burger Button on the title bar has been pressed and will be hidden if a button or another region outside the navigation is selected.

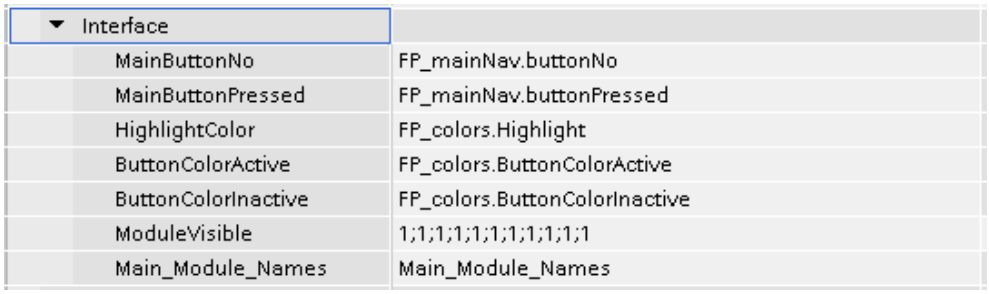
The corresponding text list is shown on Figure 3-3. The predetermined text will be displayed on the respective button. The Module 0 is intended to function as the machine overview of the HMI Interface. This is the only navigation level which starts with value of “0”, so there are 11 modules predefined.

Figure 3-3 – Main Navigation text list



The following Figure 3-4 relates to the Faceplate Interface under Properties/Miscellaneous. The value of *ModuleVisible* from left to right match the buttons from top to button and defines the visible status of each one. If a button is required to be hidden, change its value to “0”.

Figure 3-4 – Main navigation faceplate properties



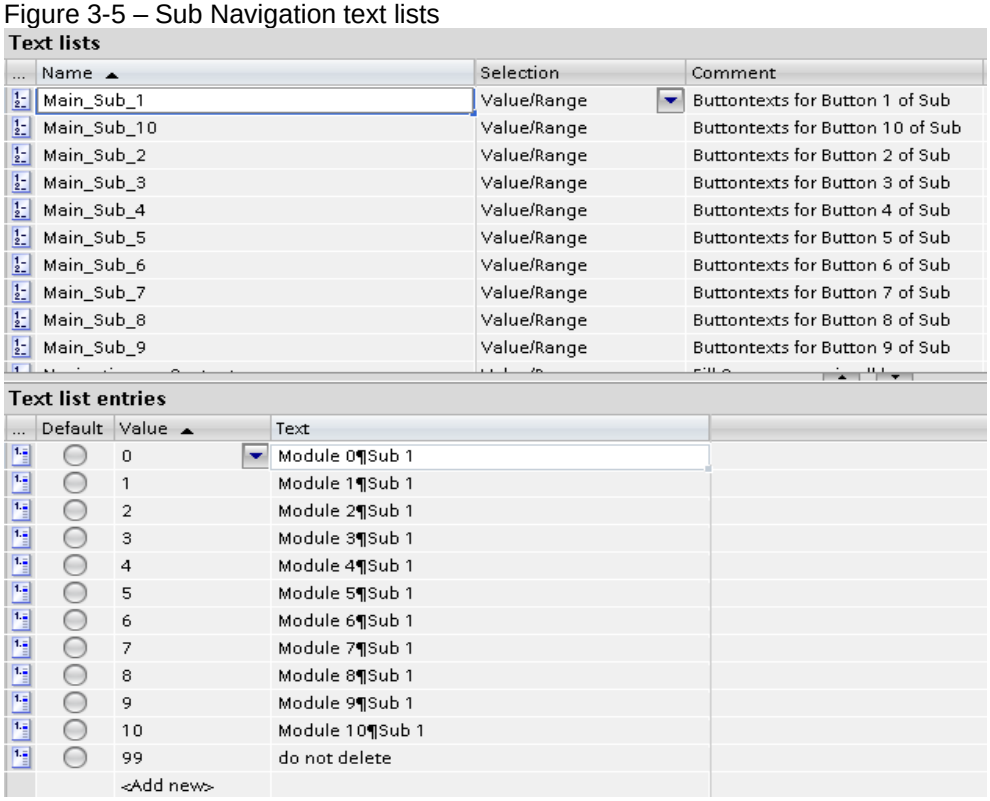
3.3 Sub Navigation Level

The second level navigation is located at the bottom of the screen and includes the home button on the left and the back button on the right side, together with up to 10 elements. These text lists are shown in Figure 3-5. Each list corresponds to a button position from 1 to 10, while each value inside of the list is linked to the position on the Main Navigation level.

Hence the list “*Main_Sub_1*” assembles the collection of texts for the first element on the Sub Navigation level, where Value “0” corresponds to the first element on the Main Navigation level, value “1” to the second and so on.

A total of 10 text lists with values from 0 to 10 apiece are included in the project.

Figure 3-5 – Sub Navigation text lists



Text lists

...	Name	Selection	Comment
	Main_Sub_1	Value/Range	Buttontexts for Button 1 of Sub
	Main_Sub_10	Value/Range	Buttontexts for Button 10 of Sub
	Main_Sub_2	Value/Range	Buttontexts for Button 2 of Sub
	Main_Sub_3	Value/Range	Buttontexts for Button 3 of Sub
	Main_Sub_4	Value/Range	Buttontexts for Button 4 of Sub
	Main_Sub_5	Value/Range	Buttontexts for Button 5 of Sub
	Main_Sub_6	Value/Range	Buttontexts for Button 6 of Sub
	Main_Sub_7	Value/Range	Buttontexts for Button 7 of Sub
	Main_Sub_8	Value/Range	Buttontexts for Button 8 of Sub
	Main_Sub_9	Value/Range	Buttontexts for Button 9 of Sub

Text list entries

...	Default	Value	Text
		0	Module 0¶Sub 1
		1	Module 1¶Sub 1
		2	Module 2¶Sub 1
		3	Module 3¶Sub 1
		4	Module 4¶Sub 1
		5	Module 5¶Sub 1
		6	Module 6¶Sub 1
		7	Module 7¶Sub 1
		8	Module 8¶Sub 1
		9	Module 9¶Sub 1
		10	Module 10¶Sub 1
		99	do not delete
		<Add new>	

The following Figure 3-6 relates to the faceplate interface under properties/miscellaneous. In this case, there is no need to edit any value.

Figure 3-6 – Sub Navigation faceplate propertiesAdmi

Interface	
MainButtonNo	FP_mainNav.buttonNo
SubButtonNo	FP_subNav.buttonNo
SubButtonPressed	FP_subNav.buttonPressed
BackButton	BackButton
HomeButton	HomeButton
NumbersOfBackPossible	ScreenIndex
HighlightColor	FP_colors.Highlight
ButtonColorActive	FP_colors.ButtonColorActive
ButtonColorInactive	FP_colors.ButtonColorInactive
textlist_Main_Sub_1	Main_Sub_1
textlist_Main_Sub_2	Main_Sub_2
textlist_Main_Sub_3	Main_Sub_3
textlist_Main_Sub_4	Main_Sub_4
textlist_Main_Sub_5	Main_Sub_5
textlist_Main_Sub_6	Main_Sub_6
textlist_Main_Sub_7	Main_Sub_7
textlist_Main_Sub_8	Main_Sub_8
textlist_Main_Sub_9	Main_Sub_9
textlist_Main_Sub_10	Main_Sub_10

3.4 Third Navigation Level

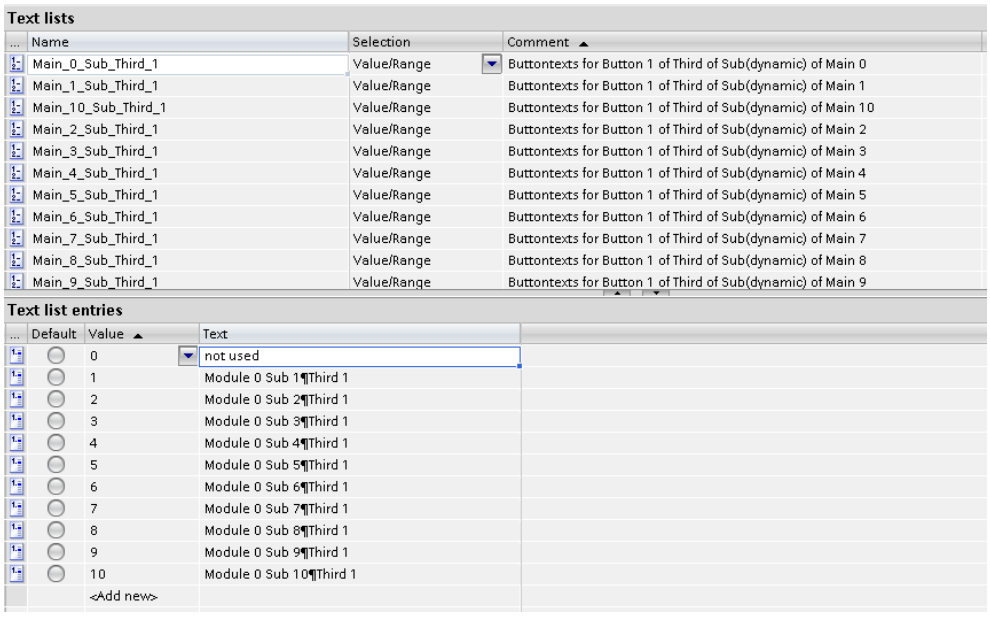
The deepest navigation level is located at the left side of the screen and will only be displayed if any of the corresponding buttons has a text assigned on its text list. Otherwise, it will be automatically hidden, saving engineering time for deciding when to show / hide its window.

On Figure 3-7 you can see, there are 11 text lists matching the main navigation level buttons from 0 to 10, for the first element of the Third Navigation level. Each value from 1 to 10 relates to the respective element on the second level navigation for the corresponding module of first level navigation. A value of “0” is included in each list, although it is not being used.

Hence the text list “*Main_0_Sub_Third_1*” assembles the collection of texts for the first element of the third level navigation while the first element on the main level navigation is active. The value indicates the respective button of the sub level navigation, so the value “1” indicates that the first element on the sub level navigation is active, the value “2” that the second element and so on.

A total of 110 text lists with values from 0 to 11 apiece are included in the project. One is for the modules of the main level navigation. The next 10 text lists are for the respective buttons of the sub level navigation. In the end, there are 100 text lists for the respective buttons of the third level navigation, so 10 text list for each sub level navigation.

Figure 3-7 – Third Navigation text lists



Eleven different *ThirdNavigation* screens are included in the Screen Layout folder, which match the elements of the first level navigation. They are all already linked to their respective text lists and therefore no change is required on the values shown in Figure 3-8.

Figure 3-8 – Third Navigation faceplates properties

Interface	
SubButtonNo	FP_subNav.buttonNo
ThirdButtonNo	FP_thirdNav.buttonNo
ThirdButtonPressed	FP_thirdNav.buttonPressed
HighlightColor	FP_colors.Highlight
ButtonColorActive	FP_colors.ButtonColorActive
ButtonColorInactive	FP_colors.ButtonColorInactive
textlist_Sub_Third_1	Main_0_Sub_Third_1
textlist_Sub_Third_2	Main_0_Sub_Third_2
textlist_Sub_Third_3	Main_0_Sub_Third_3
textlist_Sub_Third_4	Main_0_Sub_Third_4
textlist_Sub_Third_5	Main_0_Sub_Third_5
textlist_Sub_Third_6	Main_0_Sub_Third_6
textlist_Sub_Third_7	Main_0_Sub_Third_7
textlist_Sub_Third_8	Main_0_Sub_Third_8
textlist_Sub_Third_9	Main_0_Sub_Third_9
textlist_Sub_Third_10	Main_0_Sub_Third_10

4 Header Concept

4.1 Description

The Header is composed of two elements, as seen on Figure 4-1. The upper part is the title bar and the lower one is the status bar. Since every project may require extensive modifications to the header elements, on this version the header is not built as a faceplate but of single unified elements. Faceplates are modified in a different environment, so it is faster to let the changes be done directly on the screen window. Furthermore, faceplates are used for repetitive elements and not for those who often needs to be modified.

Figure 4-1 – Header overview

The title bar consists of the Siemens logo, as a placeholder for the machine builder's logo with a *Go-to-Home-Screen* function, an editable text for the HMI Interface project name, date and time on DD/MM/YYYY format and the burger button for main navigation. Additionally, the actual selected module is shown beside the button

The status bar is made of a predefined set of Pop-Up buttons, starting from left to right as Mode/State, Parameter Set, User and Settings. The last element is an alarm indicator with a configurable *Go-to-ScreenID* function which is intended to display the number of active alarms and open the alarms page.

4.2 Operation of Status Bar

The first predefined Pop-Up element is "Mode/State", which includes the Operating Mode and the Machine State status. The Machine State is linked to a color indicator at the left side of the status bar and is predefined with the values of:

- Undefined – No Color
- Production – Green
- Holding – Yellow
- Aborting – Orange

The Machine State status has a Pop-Up in Pop-Up function which displays an overview of the different processes that can be running according to OMAC standard.

The second predefined Pop-Up element is "Parameter Set" which is also part of the HMI Template Suite Wizard and available as default element.

The third predefined Pop-Up element is "User", where the current logged in user is shown and a Logout button is displayed. It is not possible to change users directly from the HMI Interface project

The fourth predefined Pop-Up element is "Settings", here it is possible to change the operating language between the configured languages, set the Display Brightness and Stop the Runtime through another Pop-Up in Pop-Up button.

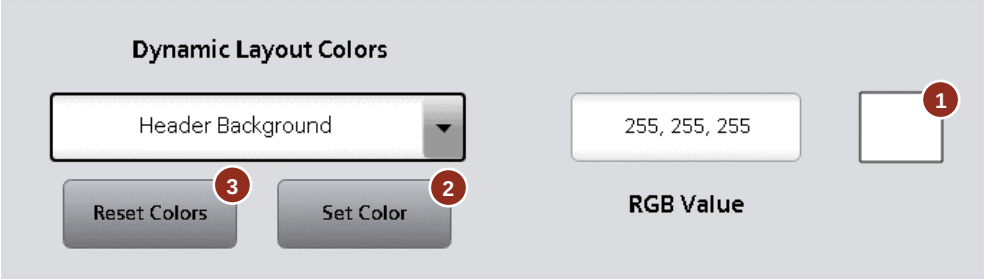
5 Color Concept

5.1 Color Change function

To provide a higher user adaptability, a change color function has been developed and implemented to certain elements of the HMI Template. This functionality is realized as Faceplate and can be adapted via the HMI Template runtime, so the user can see all changes live on the screen. Later on all adjustments can be permanently transferred to the project, so that this is only relevant for engineering or commissioning.

As seen on Figure 5-1, a drop-down menu allows you to select between actual 14 independent elements. On the right side the color can be defined based on its RGB value, which will be display on the square indicator (1). Once the desired color has been defined, the Set Color button (2) must be pressed and thus assigns the respective color to the element. In order to go back to the default colors, the Reset Colors (3) button will return all 14 elements to their initial values.

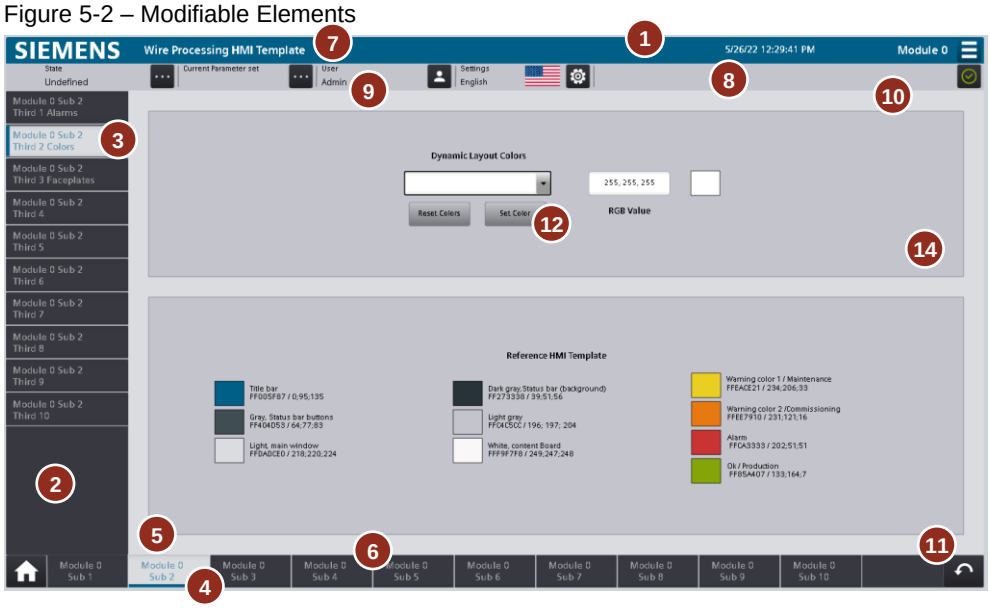
Figure 5-1 – Dynamic Colors



An overview of all the modifiable elements can be seen on Figure 5-2 and are also shown in the following list:

1. Header Background
2. Button Color Inactive
3. Button Color Active
4. Line Color Active
5. Font Color Active
6. Font Color Inactive
7. Header Font Color
8. Statusbar Background
9. Statusbar Font Color
10. Screen Background
11. Home Back Button Background
12. Screen Button Color Inactive
13. Screen Button Color Active
14. Screen Region Background

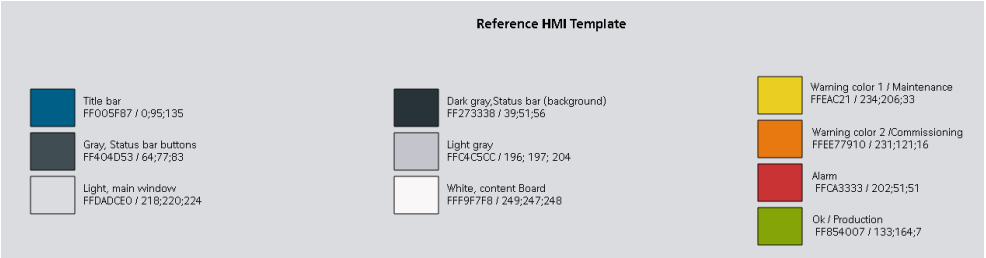
Figure 5-2 – Modifiable Elements



5.2 Layout color reference

On the same screen of the change color function, a reference color layout is implemented. This overview shows what is currently being used for the HMI Template and is intended to serve as basis. As seen on Figure 5-3, the reference gives information on the intended use as well as their hexadecimal and RGB color values.

Figure 5-3 – Reference HMI Colors



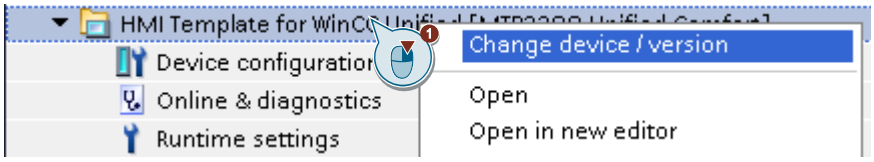
6 Steps to create a new project

6.1 Device and resolution definition

First, it is very important to decide if the intended project will be displayed on a Full HD (1920x1080) or HD (1366x768) display resolution and afterwards the correct HMI template must be used. At the moment, the HMI Template project is provided in Full HD, HD and IPC resolutions.

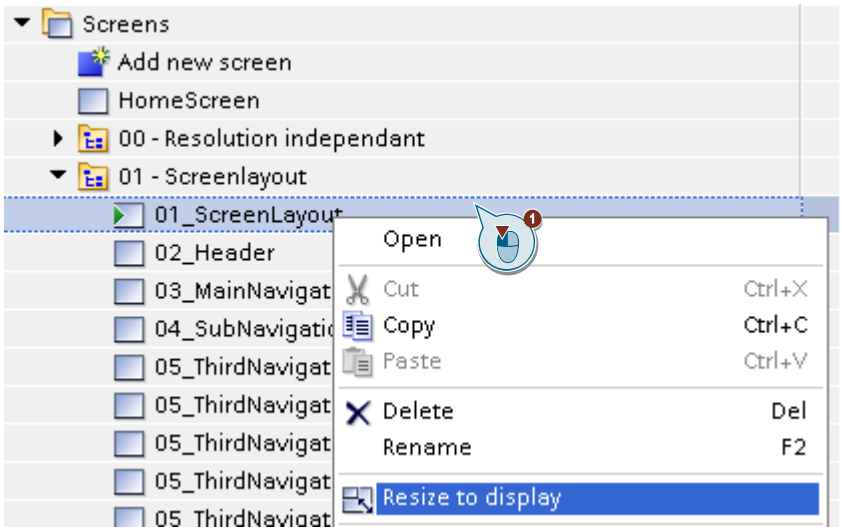
Once the correct project has been initialized, proceed to change the device according to your hardware requirements. On the Project Tree, do a right click to the project device and select “Change Device” as seen on Figure 6-1.

Figure 6-1 – Change device resolution



Once the device has been changed proceed to the screen named “01_ScreenLayout” which is located inside of the Screen folder and verify that the borders of the new screen still match the limits of the given windows. In case, they have been modified perform a “Resize to Display” only on this screen. As seen on Figure 6-2, right click to the “01_ScreenLayout” screen and execute the described function.

Figure 6-2 – Resize screen



Unfortunately, if the layout had to be modified the screen “02_Header” may also need some modifications. This cannot be performed through “Resize to display” and will be needed to be done manually. The expected header width and height values can be found on the “01_ScreenLayout” screen at the “02_Header” window.

Just adjust the screen size values and adapt each of the elements to fit the new size.

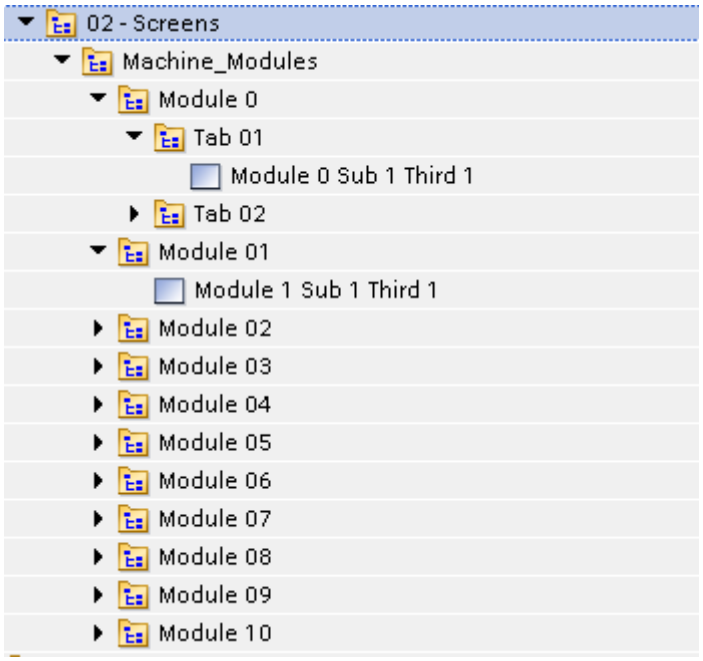
6.2 Selection of active navigation levels

Once the sizing of the screens has been finished, it is important to define how many buttons will be shown on each of the navigation levels and how they should be named. See section 3.2 Main Navigation Level for more details.

6.3 Adding new screens

New screens can be added under the project tree folder “02 – Screens”, as seen on Figure 6-3. There are already some empty screens for example ordered in modules from 0 to 10. These screens can be deleted, and new ones can be added, or just modify the existing ones by changing the names and, in case it is necessary, perform a “Resize to Display” before adding any elements.

Figure 6-3 – Screens drop down folder overview

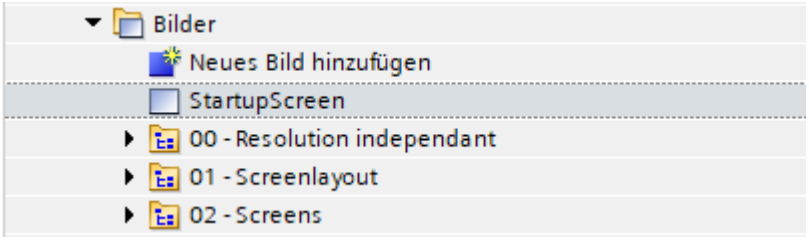


For the screens to be accessed, they must be linked to their respective ScreenID on the “*Navigation_swContent”* text list in all languages, predefined are German and English. See section Navigation Concept for more details.

6.4 Defining startup screen

As predefined startup screen, the template offers a welcome image showing the wire processing technology. This first feature is thought to be used as one-time access only to provide initial information to the panel user. The screen cannot be re-called through the back button and does not contain the sub navigation menu. It can be found under the Image folder as “StartupScreen”.

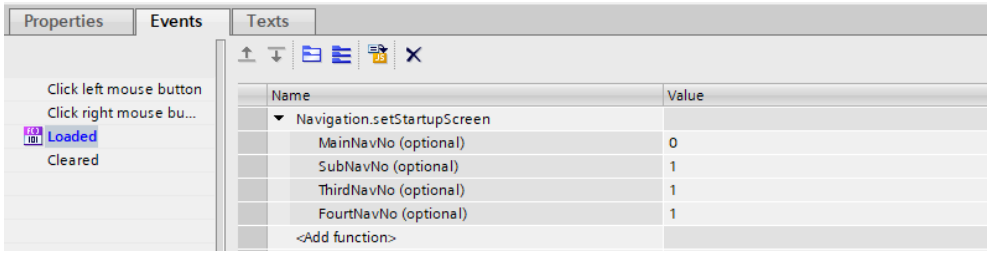
Figure 6-4 – Startup Screen



A different screen can be selected as startup window. In order to include it in the back button functionality, it must be part of the navigation levels and defined in the “Navigation_swContent” text list with its corresponding Screen ID.

On the selected new startup screen, move into events and select “Loaded”, there add the function “Navigation.setStartupScreen” and provide the corresponding location based on each navigation index.

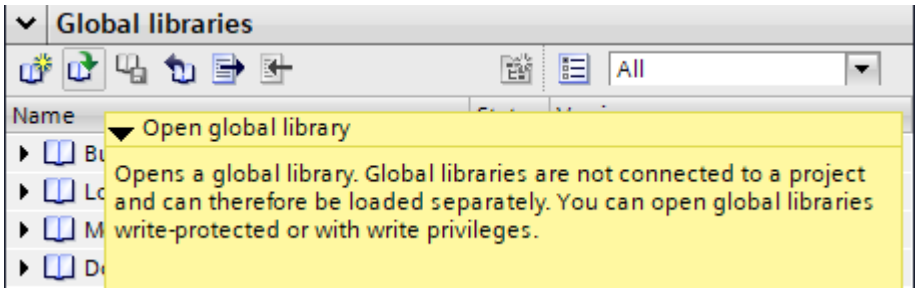
Figure 6-5 – Screen selected for Module 0 Sub 1 Third 1



6.5 Updating existing project

In order to update an existing project, the function of libraries is used. A “Siemens TIA Portal V17 Library” file is provided and must be open in the project to be updated. The libraries menu can be found on the right-side window panel in the engineering view.

Figure 6-6 – Open global library in project to be updated



On the current TIA Portal Version faceplates and graphic elements have a version function, which allows to compare them with the current project status and decide which to update. HMI Screens do not have such functionality yet. Therefore, it is important to compare the screen before copying it into the project, since the old version will be replaced.

7 Connection to the Machine Template for S7-1500

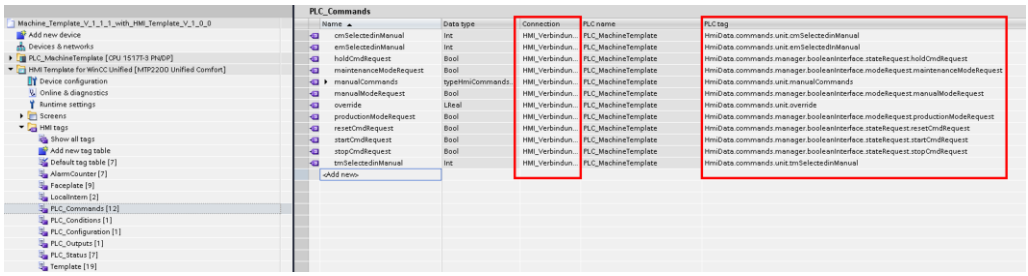
The HMI Template is published in two variants, on the one hand standalone and on the other hand in a project with the PLC Machine Template for S7-1500. This chapter describes how the HMI Template is linked to the PLC project and how the PLC Template is visualized and operated.

7.1 Handshake to the PLC

In the following, the linking of the HMI Template with the PLC project is described.

After the HMI connection between PLC and HMI panel has been established, the HMI tags are linked, see Figure 7-1. These are linked to the corresponding variables of DB HmiData.

Figure 7-1 – HMITag mapping

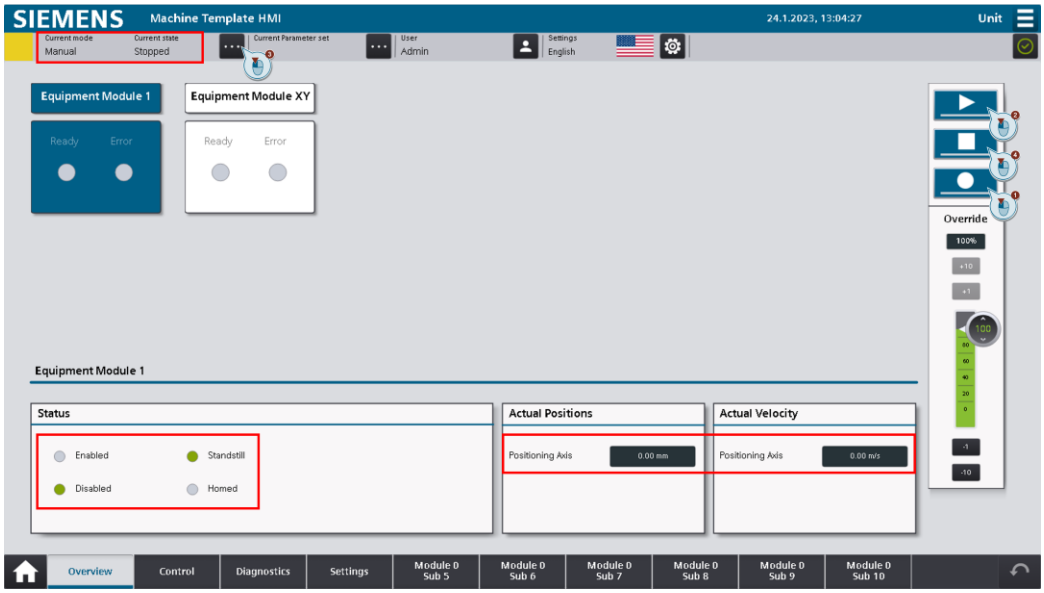


7.2 Control of the Machine Template via HMI

In addition to the actual HMI Template, four screens are included in the HMI project. These screens show an overview screen and a control screen each for the Unit and for the first Equipment Module.

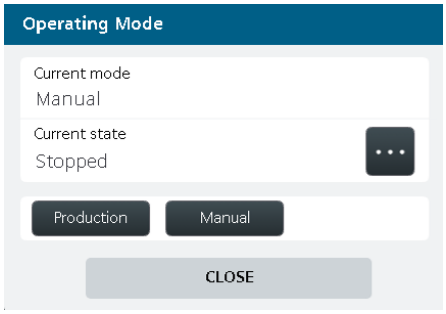
If the PLC project has been loaded into the real machine or the S7-PLCSIM Advanced instance, the machine starts in the operating mode *Manual* and the state *Stopped*. On the overview page of the unit, the machine can be controlled via the three buttons start, stop, reset on the right side, see Figure 7-2.

Figure 7-2 – Overview screen for Unit



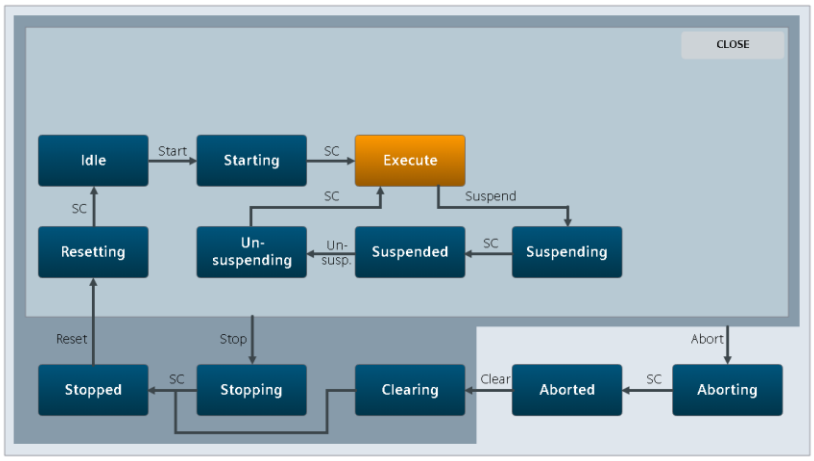
The operating mode and the corresponding state can be monitored in the left corner of the status bar. First, the *reset* button is pressed to bring the machine into the *Idle* state via the state *Resetting*. In the second step the button *start* can be pressed and the state changes to *Execute*. By clicking on the button right to the current state, the popup for the operating modes opens, see figure 7-3. In this pop up the operating mode can be changed to *Production* or *Manual* when the machine is in the state *Stopped*.

Figure 7-3 – Operating mode



By clicking on the button with the three dots the state model opens and the current state can be monitored by the marking in orange, see figure 7-4.

Figure 7-4 – State model

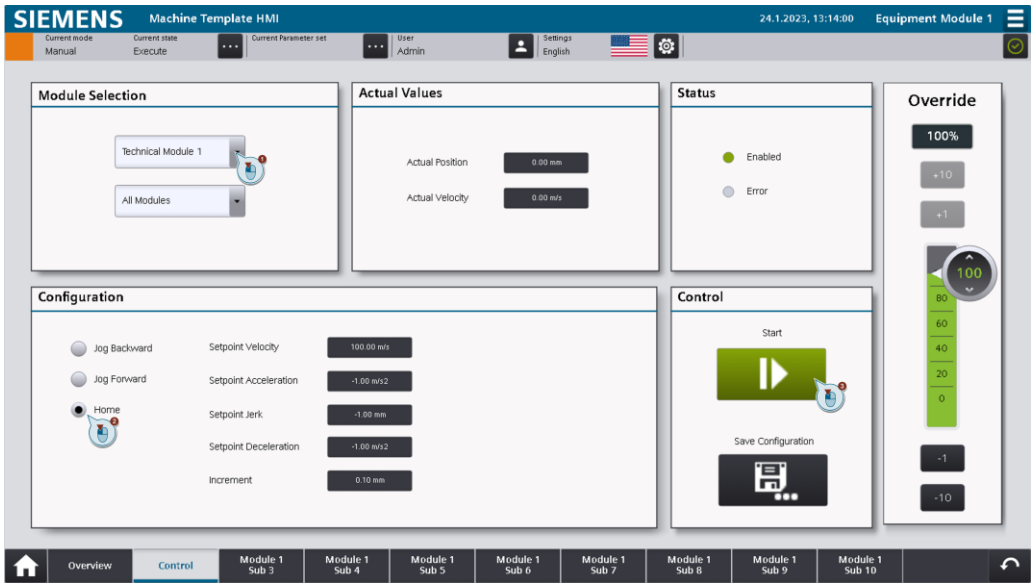


When the operating mode *Manual* and the state *Execute* is active, the machine can be *homed* or *jogged*. Therefore, the operator has to switch to the screen of the respective Equipment Module. This can either be done by clicking long on the marked Equipment Module in figure 7-2 or by using the first navigation level and clicking on the burger button on the right upper corner. Within the Equipment Module 1 the operator has to use the screen *Control* in the second navigation level, see figure 7-5.

Here, first the Technical Module that is to be controlled, has to be selected. Afterwards it has to be defined via the radio buttons whether the module is to be jogged forward, backward or homed. By clicking *start* the jogging or homing is executed.

When the homing is done for each axis of the machine, the machine is ready to be operated in production mode. Therefore, the operator goes back to the overview screen of the Unit in figure 7-2.

Figure 7-5 – State model



Now in the field Status it can be seen that the Equipment Modules are homed. To be ready to change the operating mode to *Production* the operator has to click on the stop button. Now the state changes to *Stopped* and the operating mode can be changed, see figure 7-3.

By clicking on reset and afterwards start, the state changes first to *Idle* and afterwards to *Execute*. In the currently active operating mode *Production* the movement of the Equipment Modules can be monitored by the field *Actual position* and *Actual velocity* in figure 7-2.

8 Appendix

8.1 Service and support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, application examples and videos – all information is accessible with just a few mouse clicks:

support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts.

Please send queries to Technical Support via Web form:

siemens.com/SupportRequest

SITRAIN – Digital Industry Academy

We support you with our globally available training courses for industry with practical experience, innovative learning methods and a concept that’s tailored to the customer’s specific needs.

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:

siemens.com/sitrain

Service offer

Our range of services includes the following:

- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information on our range of services in the service catalog web page:

support.industry.siemens.com/cs/sc

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for iOS and Android:

support.industry.siemens.com/cs/ww/en/sc/2067

8.2 Industry Mall

The Siemens Industry Mall is the platform on which the entire siemens Industry product portfolio is accessible. From the selection of products to the order and the delivery tracking, the Industry Mall enables the complete purchasing processing – directly and independently of time and location:
mall.industry.siemens.com

8.3 Related literature

Table 8-1

	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Download page of this entry https://support.industry.siemens.com/cs/ww/en/view/109804620
\3\	HMI design with the HMI Template Suite https://support.industry.siemens.com/cs/ww/en/view/91174767

8.4 Change documentation

Table 8-2

Version	Date	Modifications
V1.0	12/2022	First version