

SIEMENS

SIMATIC HMI

Getting Started Basic Panels




Getting Started

<u>Welcome</u>	1
<u>Creating a project</u>	2
<u>Configuring Screens</u>	3
<u>Configuring alarms</u>	4
<u>Configuring recipes</u>	5
<u>Configuring screen changes</u>	6
<u>Finishing the project</u>	7
<u>Transferring and using a project</u>	8

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.
NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Proper use of Siemens products

Note the following:

 WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

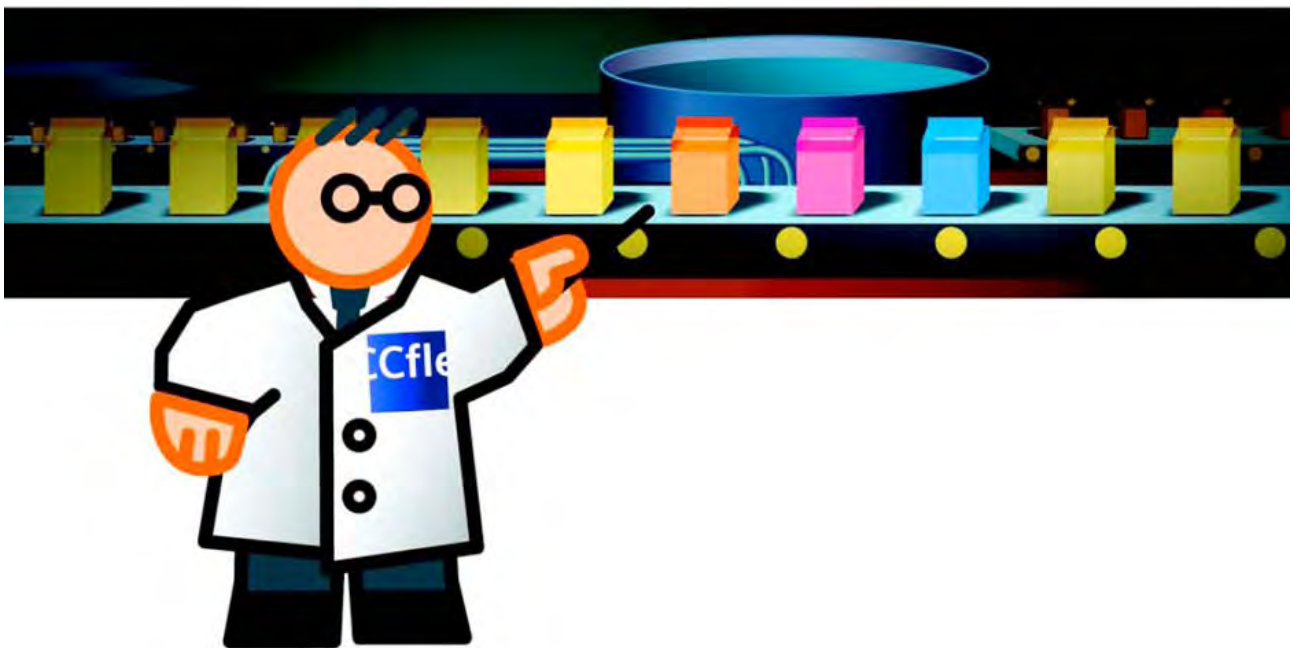
Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	Welcome.....	4
2	Creating a project	6
2.1	Projects in WinCC flexible.....	7
2.2	Creating a project.....	7
2.3	The new project.....	11
3	Configuring Screens	20
3.1	Function of the screens.....	21
3.2	Configuring fill level displays.....	22
4	Configuring alarms.....	28
4.1	Alarms in project	29
4.2	Configuring discrete alarms	30
4.3	Configuring analog alarms	33
4.4	Configuring an alarm view	36
5	Configuring recipes.....	38
5.1	Function of the recipes.....	39
5.2	Configuring a new recipe	40
5.3	Configuring a Recipe view	44
6	Configuring screen changes	46
6.1	Creating a Selection screen.....	47
6.2	Configuring screen change with function keys	49
6.3	Configuring screen change with buttons.....	51
7	Finishing the project.....	56
7.1	Consistency check and simulation.....	57
7.2	Running the consistency check	58
7.3	Simulation in Runtime	59
8	Transferring and using a project	64
8.1	Overview	65
8.2	Requirements.....	66
8.3	Check connection parameters	68
8.4	Transfer the project to the HMI device.....	69
8.5	Using project with S7 controller	71

Welcome



Welcome to WinCC flexible "Getting Started - First Time Users."

Using an example of a fruit juice mixing system, this manual will illustrate how easy it is to create the user interface for an HMI device using WinCC flexible.

The fruit juice mixing system produces juice, nectar and beverage drinks in the flavors orange, apple and tropical. The necessary ingredients are available in four supply tanks.

The ingredients are mixed in mixing tanks and then filled.

The fruit juice mixing system operator can perform the following tasks:

- Control the fill level in the supply tanks
- Monitor the status of the supply line valves
- Enter and transfer mixture ratios

In order that the operator can perform these tasks, the user interface of the HMI device must be "configured." The configuration steps necessary to do this are explained in the "Getting Started - First Time Users manual":

- Creating a project (Page 6)
- Configuring Screens (Page 20)
- Configure alarms (Page 28)
- to configure recipes (Page 38)
- Configure screen changes (Page 46)
- Finishing the project (Page 56)
- Transferring and using a project (Page 64) (optional)



"Configuring" relates to the creation and configuration of the user interface for an HMI device.

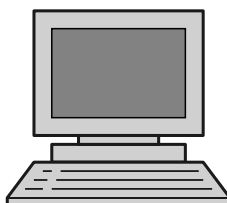
Requirements

The "CD_1" folder of the enclosed WinCC flexible DVD contains programs that will allow you to carry out these configuration steps by yourself. In addition, install the WinCC flexible edition "Compact", "Standard" or "Advanced" on your configuration computer.

The following components are used for the example in this "Getting Started - First Time Users" manual:



KTP600 Basic DP



PC

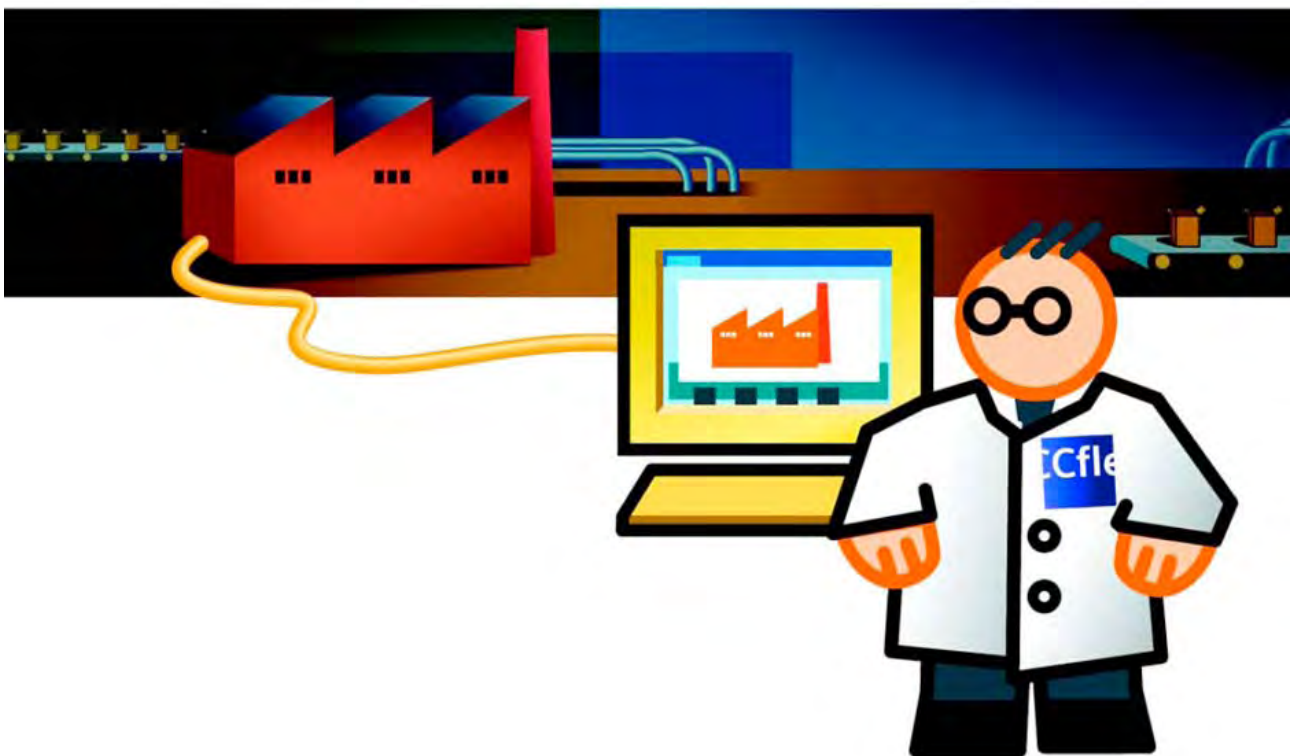


Product DVD
WinCC flexible 2008 SP1

Only the configuration computer is required for the configuration steps mentioned.

Creating a project

2



2.1 Projects in WinCC flexible

A project brings together all the information of a configured user interface. The project forms the basis of the configuration.

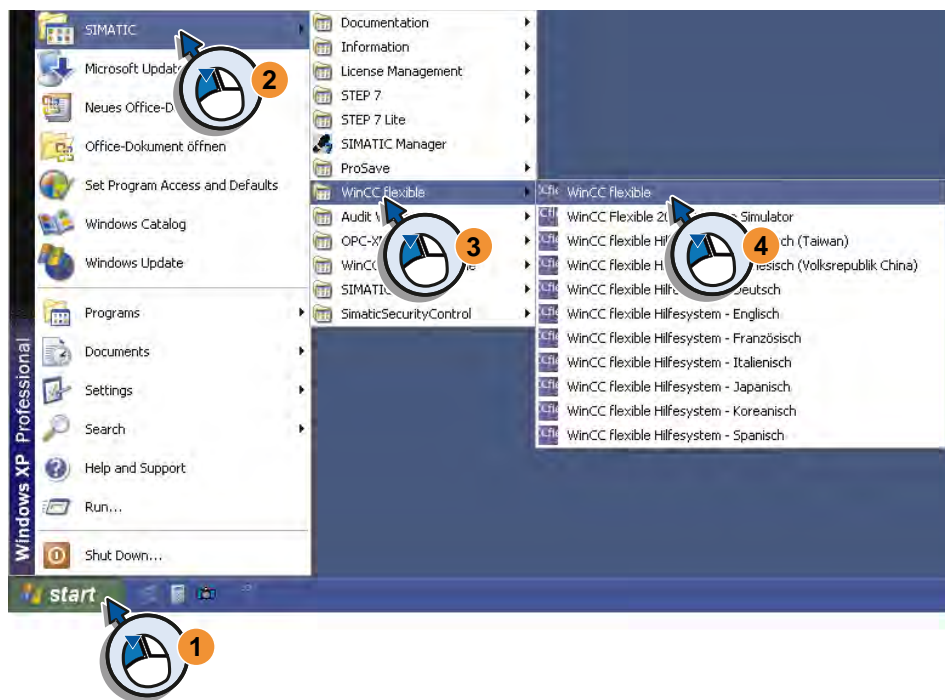
Create and configure all the objects in the project which are necessary to operate and monitor the fruit juice mixing system, for example:

- Screens, to depict and operate the fruit juice mixing system.
- Tags, to transfer data between the HMI device and fruit juice mixing system.
- Alarms, to indicate the operating status of the fruit juice mixing system on the HMI device.

2.2 Creating a project

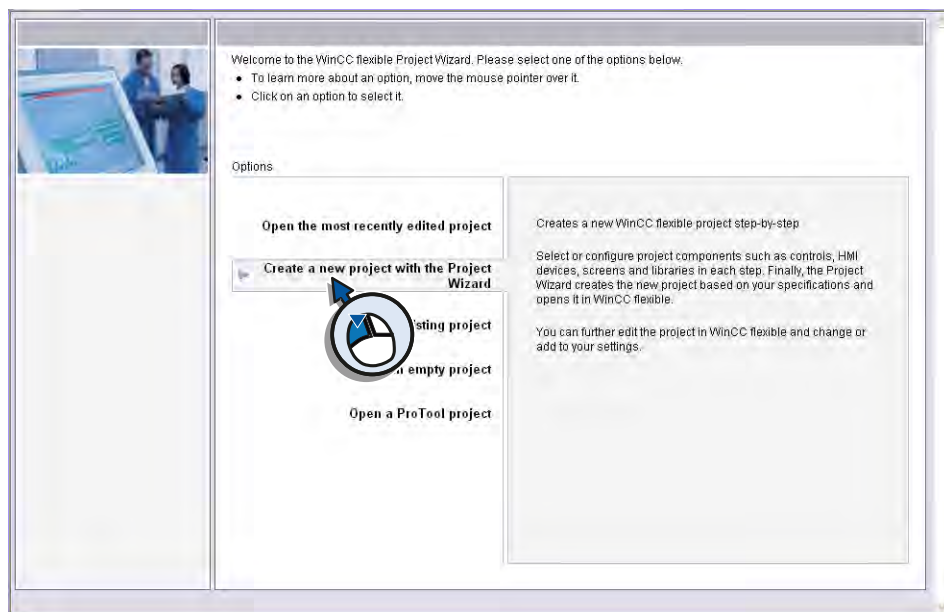
The Project Wizard

1. Start WinCC flexible.

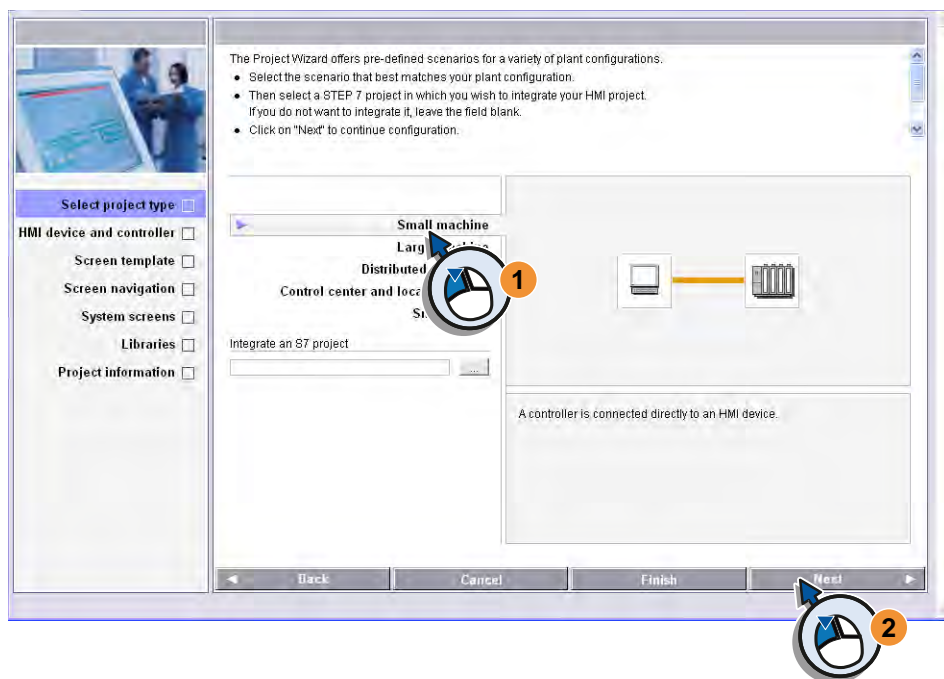


The WinCC flexible project wizard opens. The project wizard provides supports when creating a project by guiding users step-by-step through the configuration settings. The project wizard has various scenarios for frequently required configurations. Complete the configuration settings for your project by selecting the scenarios provided.

2. Create a new project.

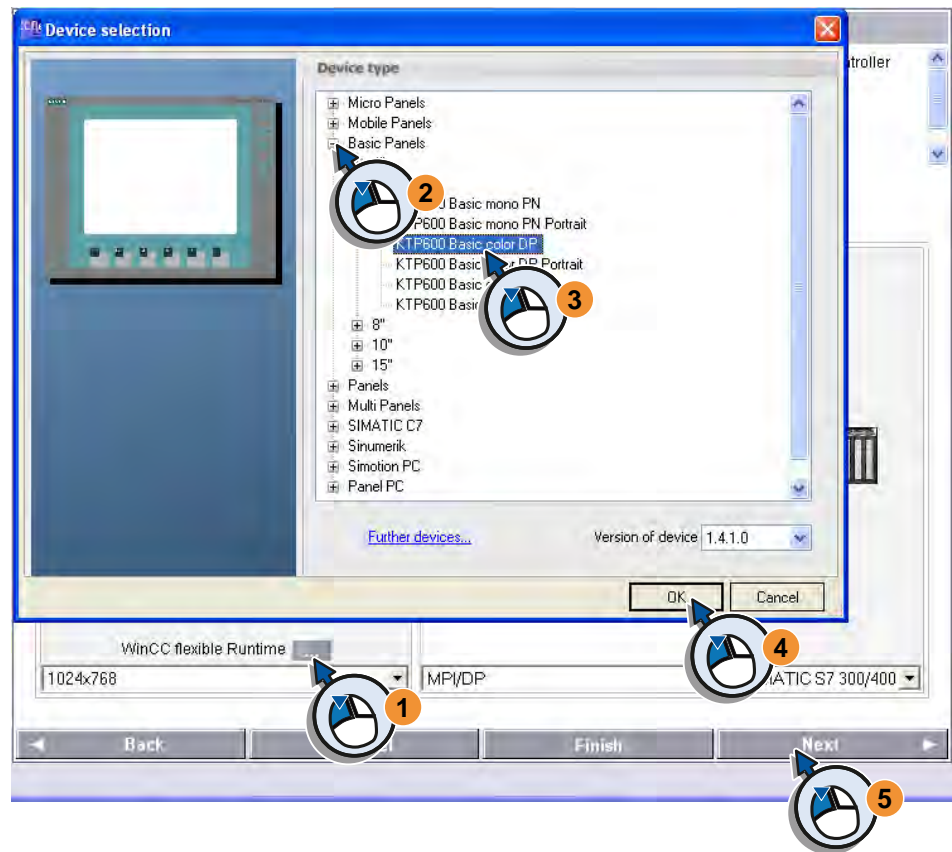


3. To operate the fruit juice mixing system, only *one* HMI device and *one* control unit are needed. Select the scenario "Small machine" and accept the selection with "Next".



4. Configure the scenario.

- Select your HMI device and enter the version of the HMI device. The information on device type and version are available on the back of your HMI device.
- Accept the default setting "IF1 B" as connection for the "Getting Started" project.
- Use the predefined "SIMATIC S7 300/400" as PLC.
- Accept the settings with "Next".



5. Click on "Next" to apply the standard settings provided on the next page "Screen template."
6. Click on "Next" to apply the standard settings provided on the next page "Screen navigation."
7. Click on "Next" to apply the standard settings provided on the next page "System screens."

8. Click on "Next" to apply the standard settings provided on the next page "Libraries."
9. Now enter the information on the project and create the project with "Finish".

Small machine

Enter information about the project to help you to later identify it in WinCC flexible.

- Enter comments here.
- Press "Finish" to generate the project with your settings.

Project name

KTP600_Mixing

Project author

bt

Create

1.2

Comments

Project for operating the fruitjuice mixing station

Back Cancel Finish Next



This "Getting Started" shows the principles of configuration using the "KTP600 Basic" HMI device as an example. You can apply the same configuration process to other HMI devices. Some steps in the configuration sequence may be different for a given HMI device. Additional information is available in manual for your HMI device and in the WinCC flexible online help.

2.3 The new project

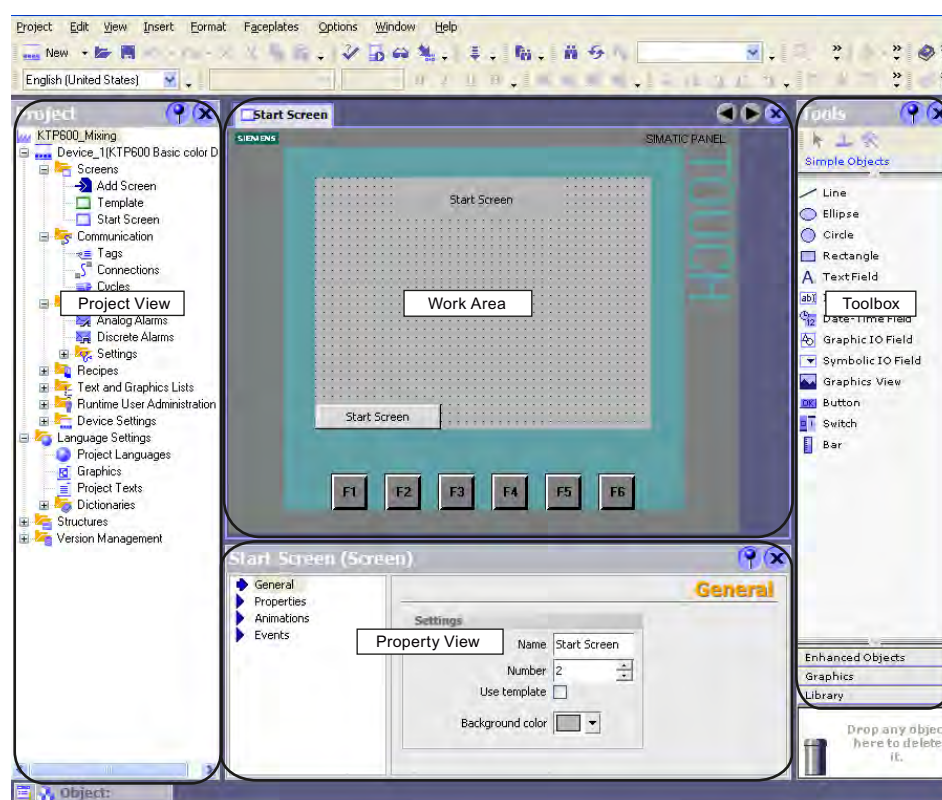
Introduction

You have created the project with the project wizard.

In this section you will be introduced to the WinCC flexible software interface.

The WinCC flexible interface

The project wizard creates the new project according to the information specified and opens it in WinCC flexible.



On the left you see the **Project View** with its tree structure. In this window, you have access to the project properties and the device settings of the HMI device. The tree structure includes all elements of the project. You open all elements, such as configurable objects and available editors, from this window. The number of available elements depends on the range of functions offered by the HMI device.

The HMI device is shown in the central **Work Area**. You edit all configurable objects of the project in the work area. All windows of WinCC flexible are arranged around the work area. With the exception of the work area, you can size, move, pin or hide all windows. You show hidden windows using the "View" menu.

The **Property View** is used to edit object properties, such as size or color of screen objects. The configurable properties may differ with the object. The property view is only available in specific editors.

The **Toolbox** on the right includes objects, graphics and other elements required for the configuration. The window is divided into several areas:

- "Simple objects" includes preconfigured objects, such as I/O field, button, graphics and text field.
- "Advanced objects" includes objects with extended functionality, such as alarm windows.
- Graphics includes a collection of images to create screens and objects.
- The library area offers access to objects you have created yourself as well as external objects, such as your own collection of graphics or objects from other projects.

The new project

The project wizard has automatically created some objects you can configure in the Project view:

- Screens
- Connections

Screens

The "Template" screen is available under "Screens" in the project tree.

The "Start screen" of the HMI device is automatically opened in the work area to the right of the tree structure. You will see two overlapping alarm windows in the display of the HMI device. The gray shading of the Alarm Window indicates that this alarm window is inserted in the "Template" screen. The Error Alarm Window and the System Alarm window are required for later operation of the HMI device on the fruit juice mixing system.



The error alarm window shows pending faults in the plant.

The system alarm window shows configured alarms for the operating states in the plant.

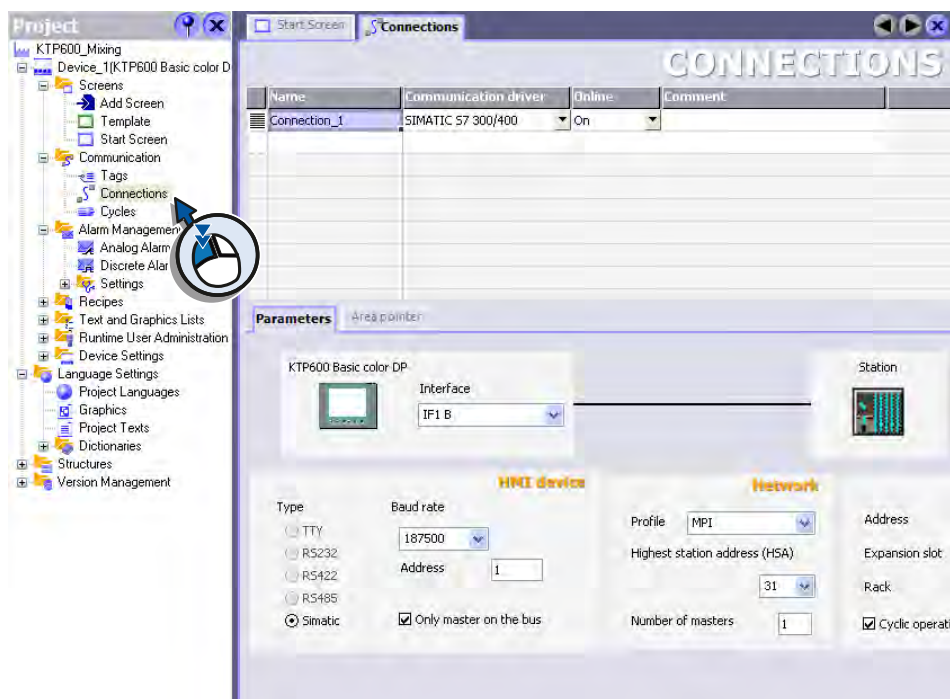
An alarm indicator directs your attention to pending alarms or those requiring acknowledgment.

The total number of alarms is displayed under the "Caution" symbol in the alarm indicator.



Connections

With the scenario configured in the project wizard you have already defined the "Connections" between HMI device and PLC:



Customizing the template

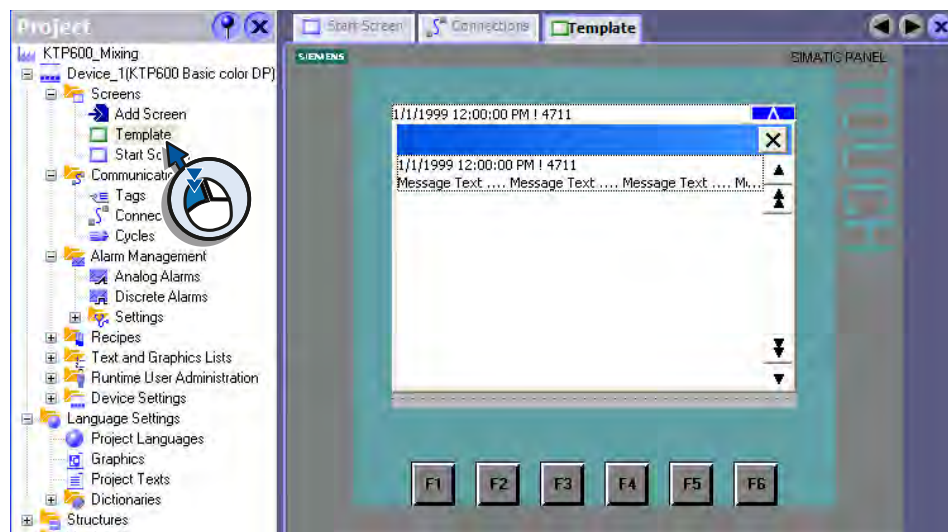
Objects inserted in the "Template" are those which should appear in every screen, such as the previously mentioned alarm windows. A screen consists of 32 layers. The top layer, "Layer 0", is the standard view of the screen. Objects, such as alarm windows, that are to be visible in standard view, will be added below the top layer.

Because the alarm windows are to appear only when a message occurs while the fruit juice mixing machine is in operation, you can suppress the permanent display of the alarm windows during configuration. To do this, deactivate the level in which the alarm windows are inserted.

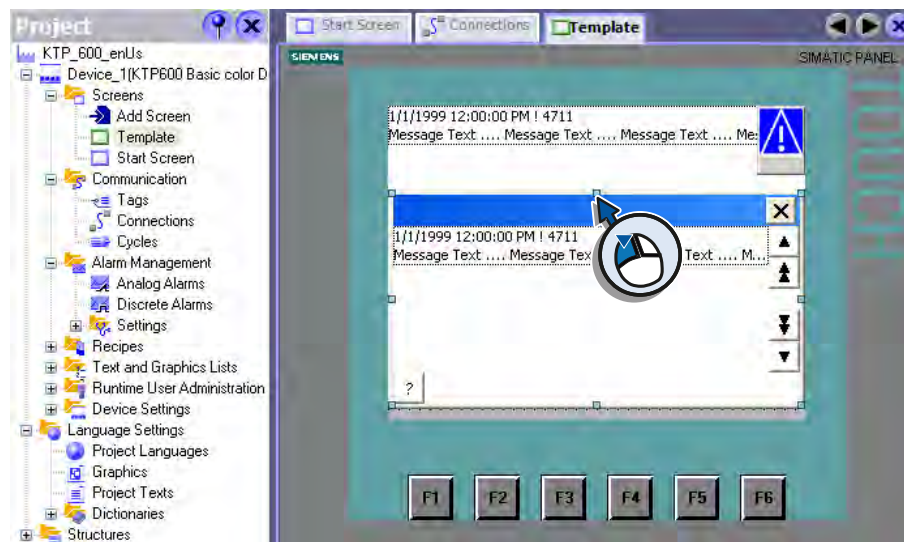


Under "Options > Settings" you can hide all template objects independent of the levels. The objects will then no longer be displayed on the screens during configuration. All objects included in the template will be reported in the project documentation.

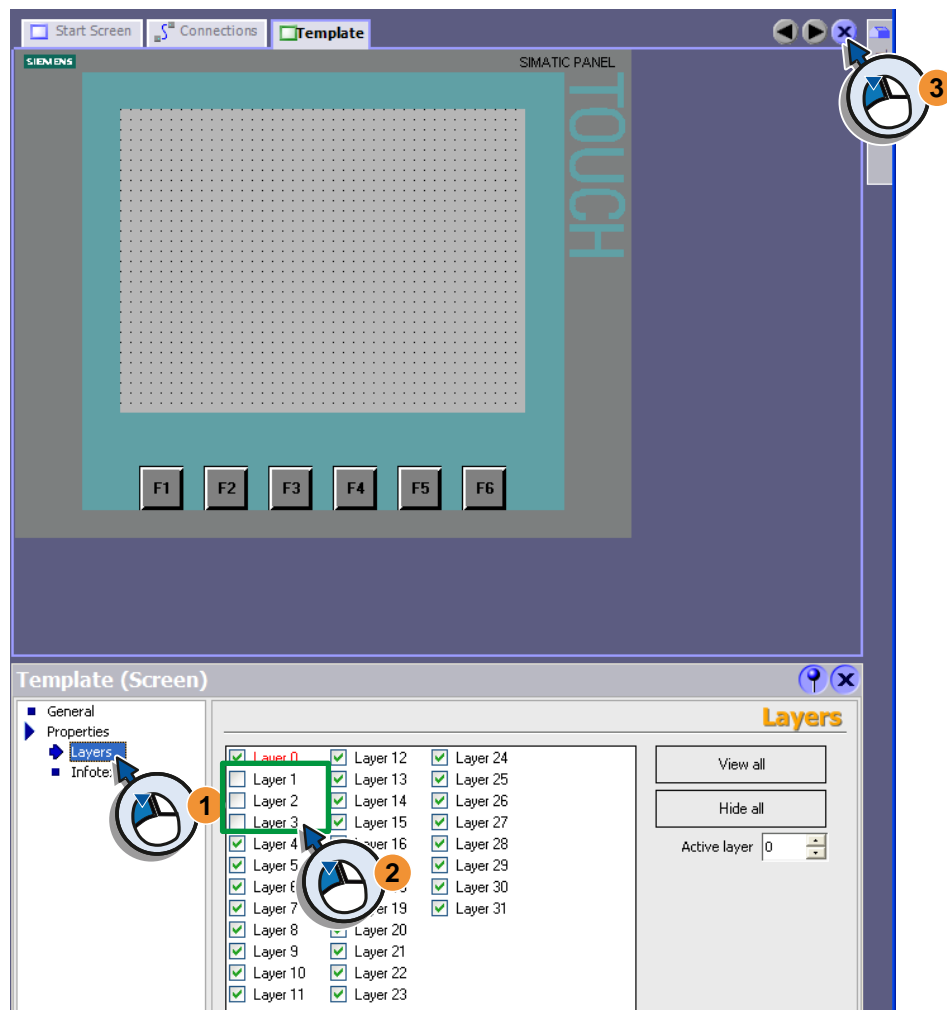
1. Open the "Template" screen with a double click:



2. Minimize the window so that you will be able to see the alarm indicator below:



3. Hide the layers with the alarm windows (1, 2) and close the template (3).



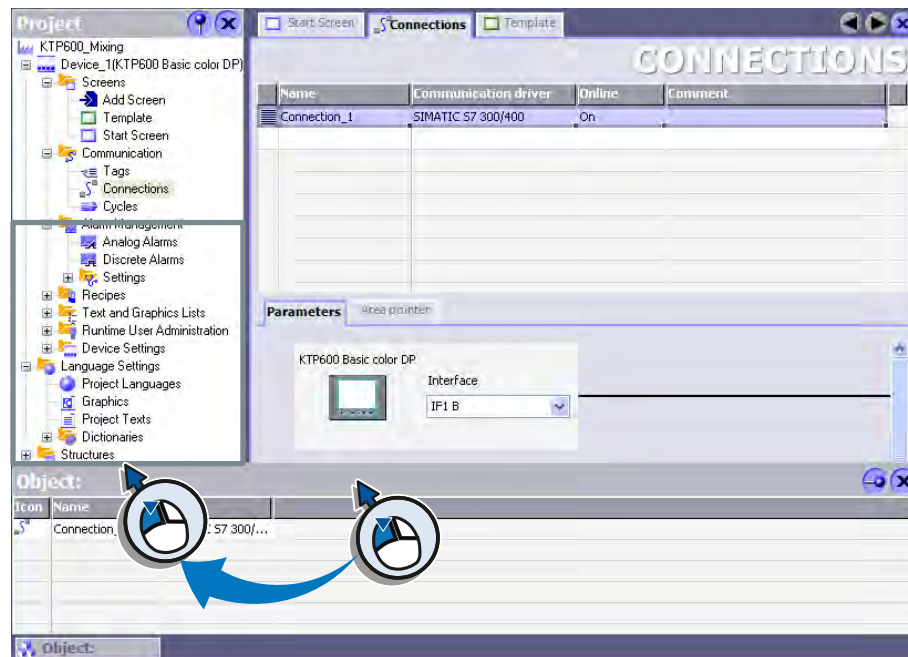
Setting up the workbench area

The WinCC flexible Workbench consists of individual windows which can be arranged as required around the work area. The following section describes how to "dock" the Object view in the Project view.

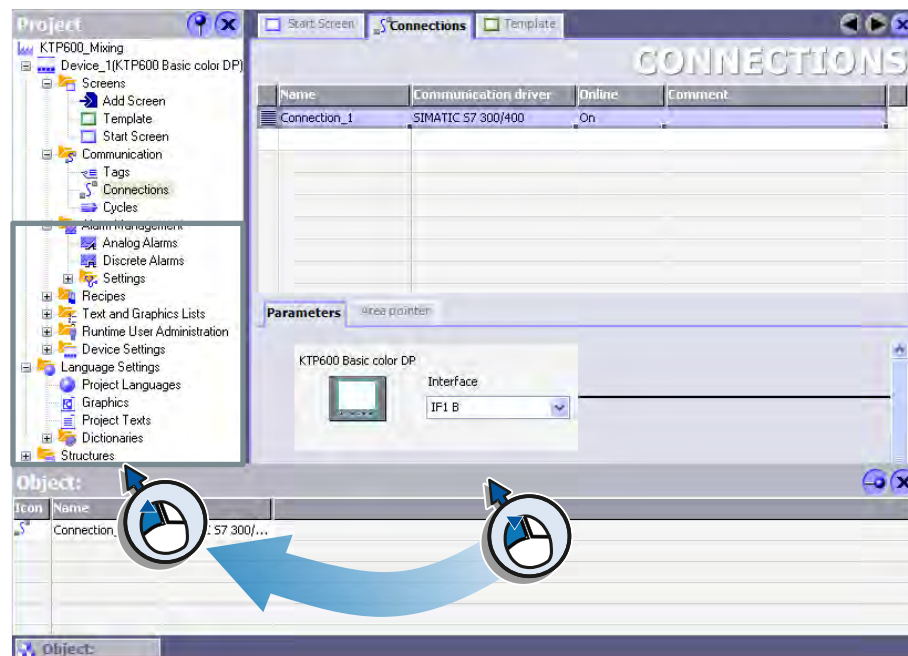


"Docking" refers to the integration of a window into the WinCC flexible workbench. You can automatically hide docked frames in order to increase your workspace.

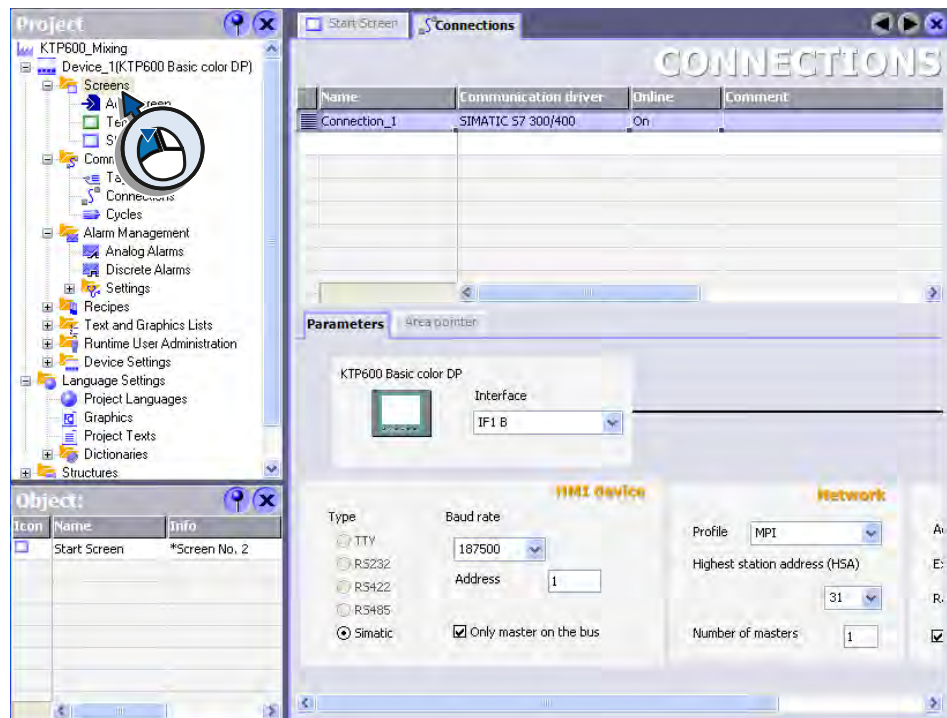
1. Unhide the Object view (1) and configure the view so that it is not automatically hidden (2):



2. Move the Object view into the Project view and dock the frame as soon as the gray frame has adapted to the Project view:

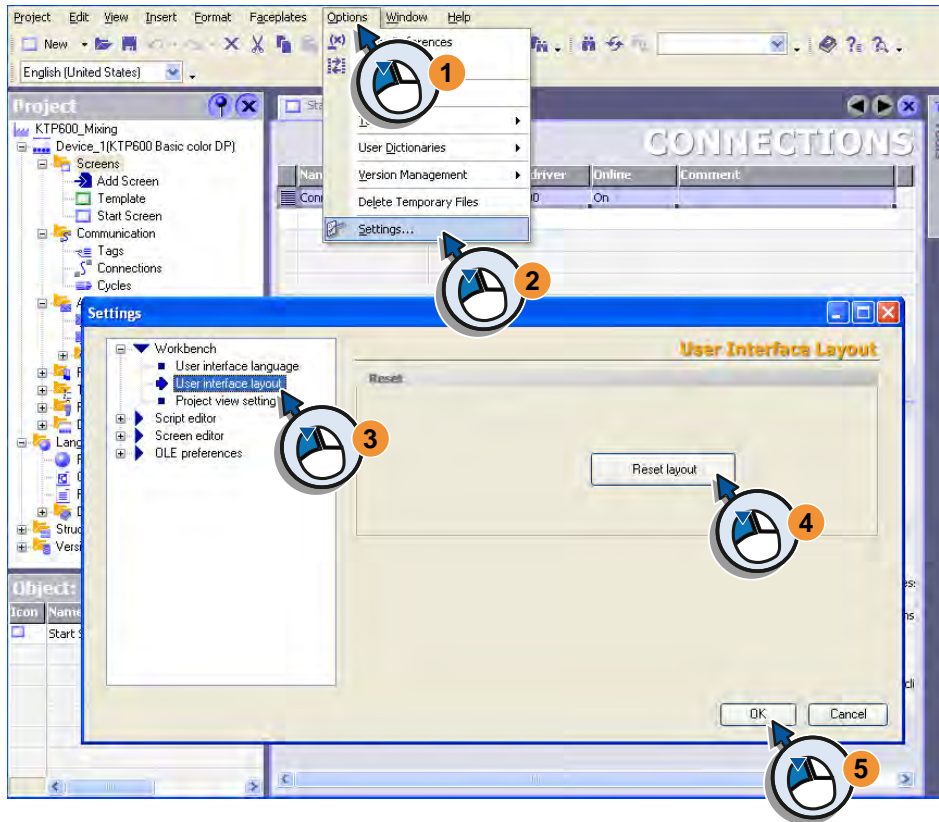


- The Object view contains the contents of the area selected in the Project view, such as Screens:



Resetting window arrangement

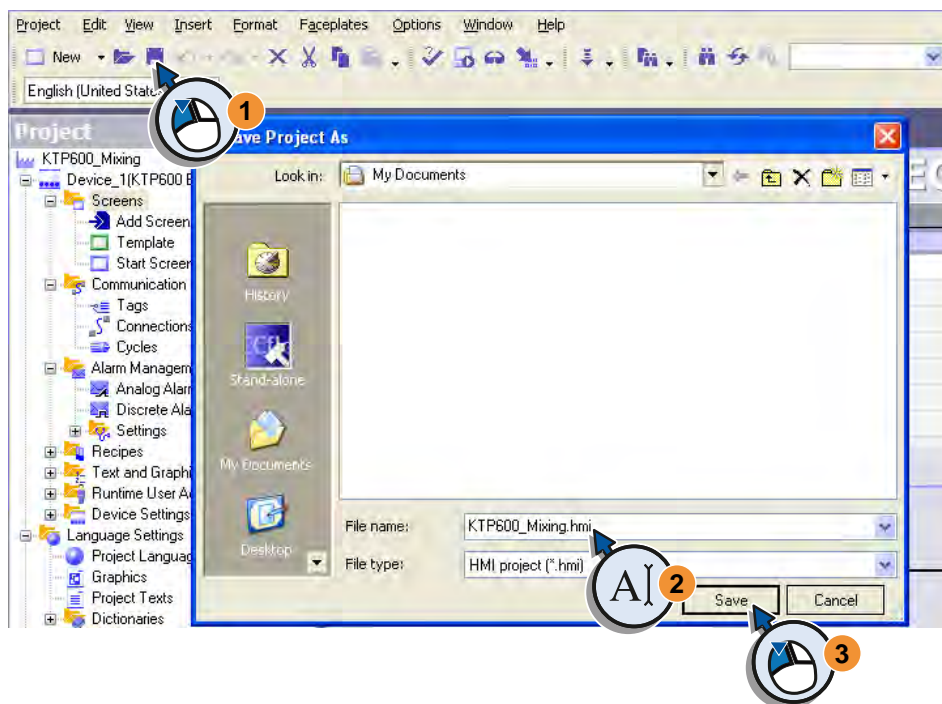
Docking the window in the desired position does take some practicing. For this reason, the arrangement of the windows can be reset to their original setting at any time:



Interrupting configuration

You can stop configuration at any time and continue later.

- If you want to interrupt configuration, save the project (1).
- Select a suitable storage location and save the project with a self-explanatory name (2, 3):

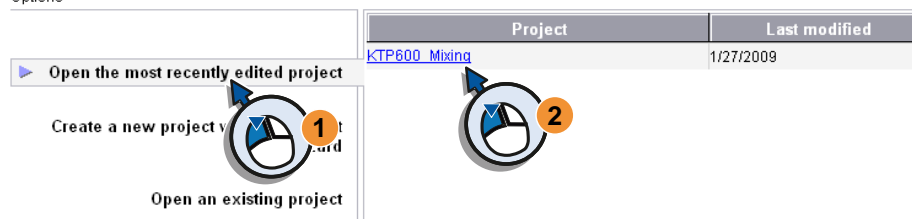


The next time WinCC is started, the project is displayed in the project wizard:

Welcome to the WinCC flexible Project Wizard. Please select one of the options below.

- To learn more about an option, move the mouse pointer over it.
- Click on an option to select it.

Options



Configuring Screens



3.1 Function of the screens

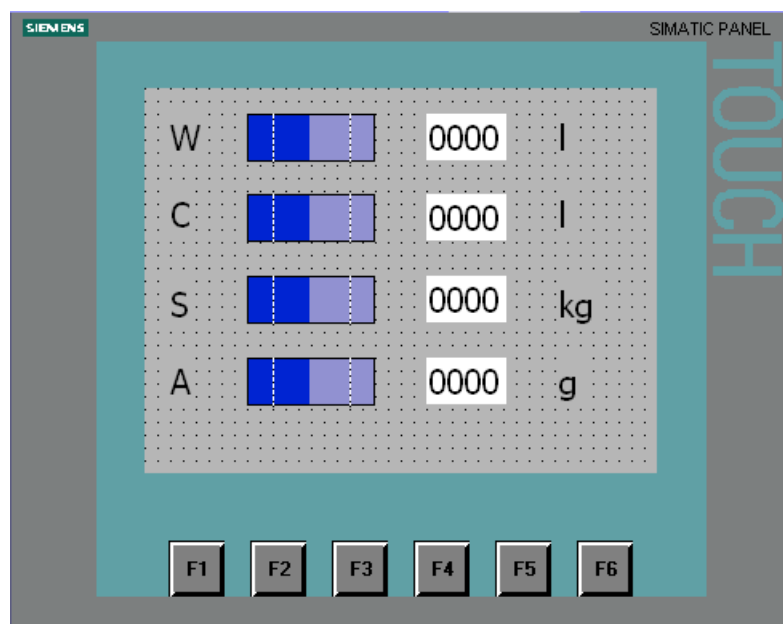
A user interface consists of several related screens. Screens enable you to operate and monitor a plant and are the main elements of the project.

Screens are displayed on the HMI device and consist of configurable objects:

- Operable objects, such as alarm windows, IO fields or buttons.
- Objects to display values, such as trend view and bars.
- Informative objects for the description of objects or screens, such as text fields or graphic fields.

You can drag-and-drop these objects from the toolbox directly into a screen.

The figure below shows the fill level indicator as an example for our project:



The user interface of the fruit juice mixing system is comprised of four screens. The operator uses the fill level indicator to monitor the fill levels of the storage tanks.

The following section explains the configuration of the fill level indicators for water, concentrated juice, sugar and flavoring. The fill levels should be indicated on the HMI device both graphically and numerically.

3.2 Configuring fill level displays

Configuring fill level displays

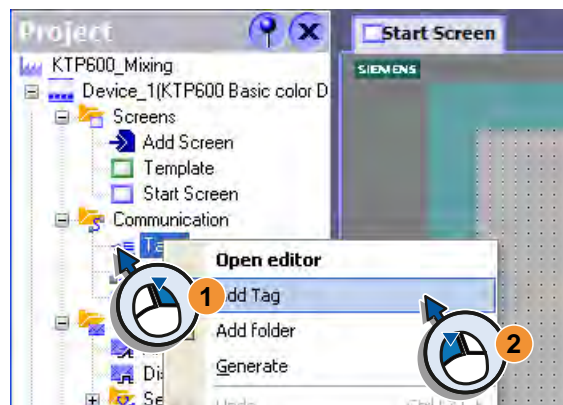
The following objects are required to configure the fill level displays:

- Tags to store the fill levels
- Output fields for displaying fill levels in numeric form
- Bar graphs for displaying fill levels graphically
- Text fields for labeling

The following steps will show you how to configure these objects.

Creating fill level tags

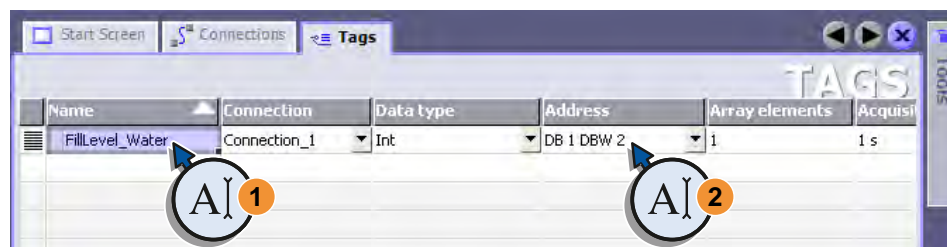
1. Create a tag called "FillLevel_Water" which stores the fill level of the water:



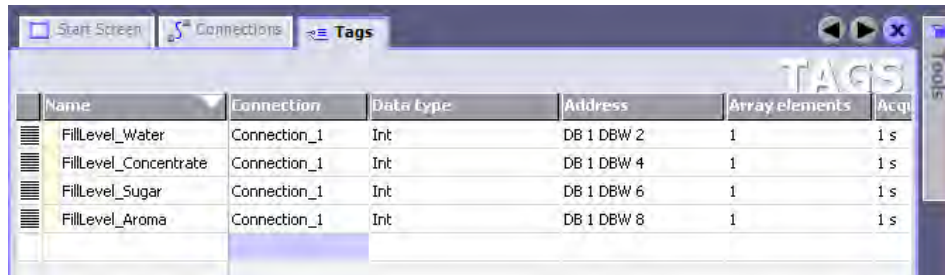
2. Configure the tag:

- Enter the name "FillLevel_Water".
- The connection "Connection_1" has already been entered.
- Set the data type "Int" for integer because decimal numbers are used for the fill levels.
- Set the storage area in the PLC that contains the current value of the tag.

Make sure that "Name" and "Address" match with the associated process tag in the S7 control program. Information on process tags are available in the WinCC flexible online help.



3. In the same way, create the tags "FillLevel_Concentrate", "FillLevel_Sugar" and "FillLevel_Aroma":



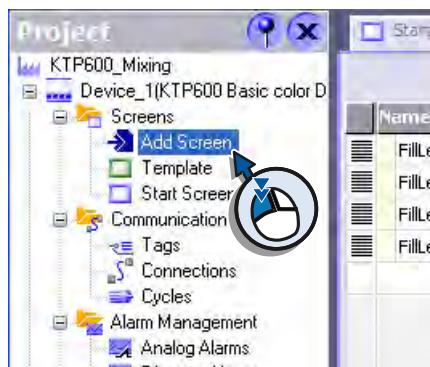
Name	Connection	Data type	Address	Array elements	Acq
FillLevel_Water	Connection_1	Int	DB 1 DBW 2	1	1 s
FillLevel_Concentrate	Connection_1	Int	DB 1 DBW 4	1	1 s
FillLevel_Sugar	Connection_1	Int	DB 1 DBW 6	1	1 s
FillLevel_Aroma	Connection_1	Int	DB 1 DBW 8	1	1 s



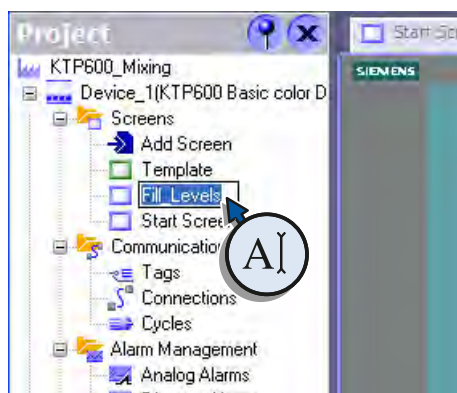
The process tags of the PLC will store the tank fill levels which are determined by measuring transmitters. If the configured tags have been configured to match the associated process tags, then the data in the PLC and HMI device will be compared by the set connection.

Creating a new screen to show fill levels

1. Create a new screen:

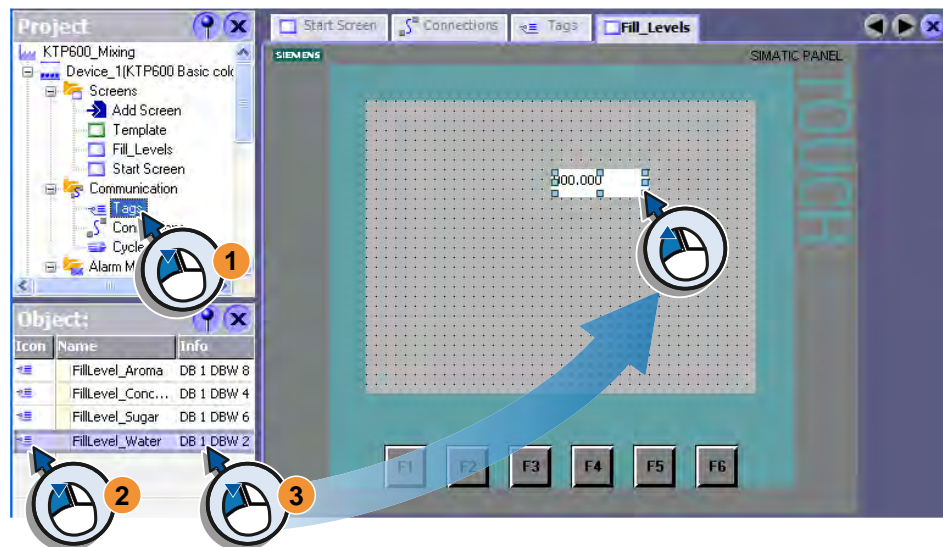


2. Use "FillLevels" as the new names:

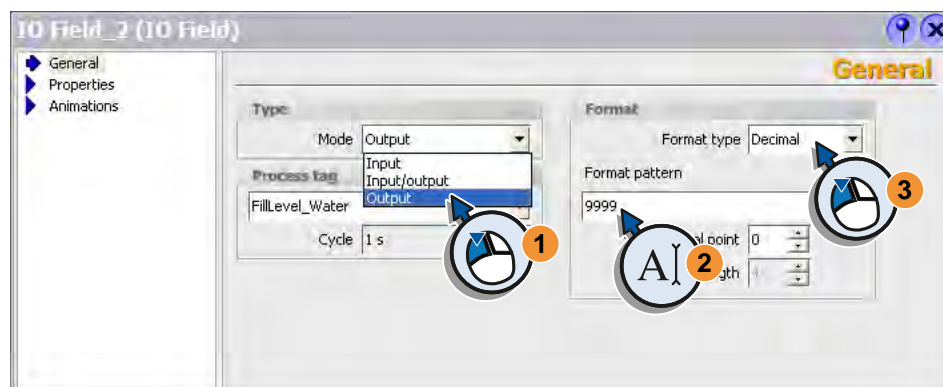


Creating an output field for numeric fill level display

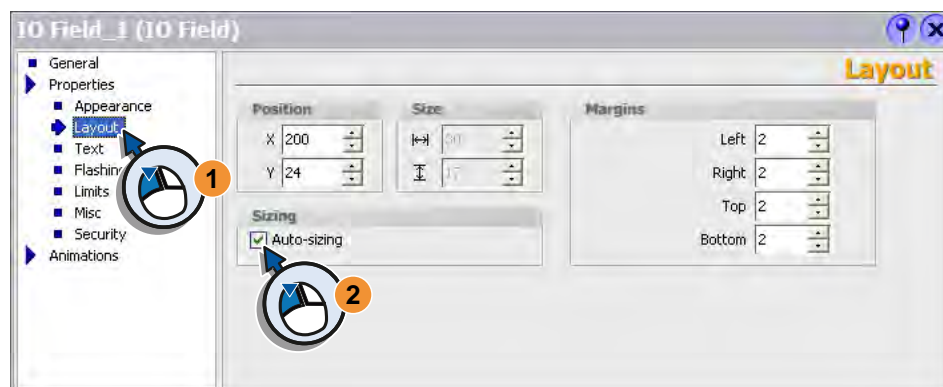
1. Insert an IO field in the screen in which the water fill level can be displayed:



2. Configure the output format of the IO field in the Properties view:



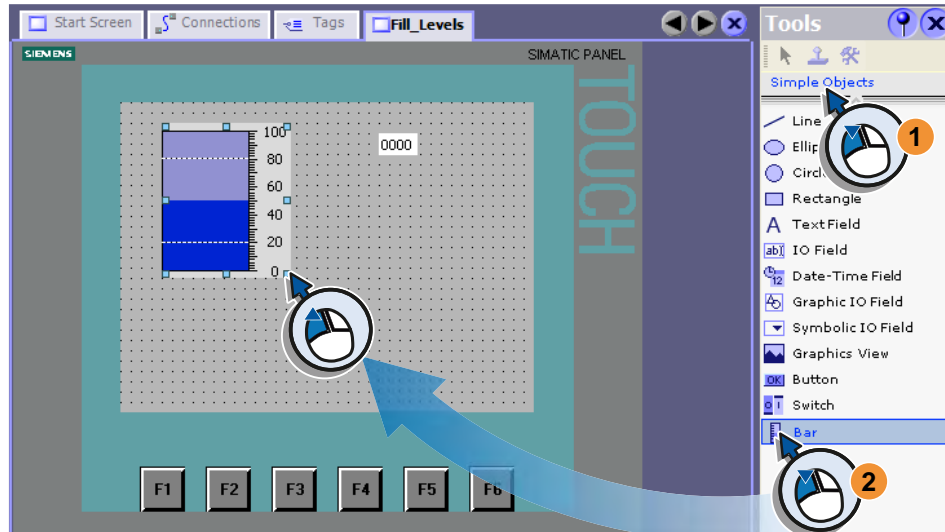
3. Resize the IO field:



If you drag a tag from the Object view to the screen using drag-and-drop, an input/output field (IO field) will be created automatically which is connected to the tag.

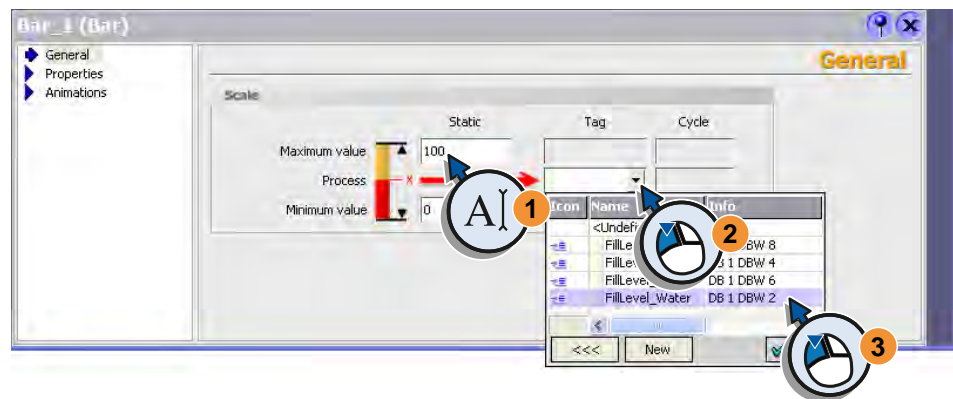
Creating a bar graph for displaying the fill level graphically

1. Insert a bar in the screen:

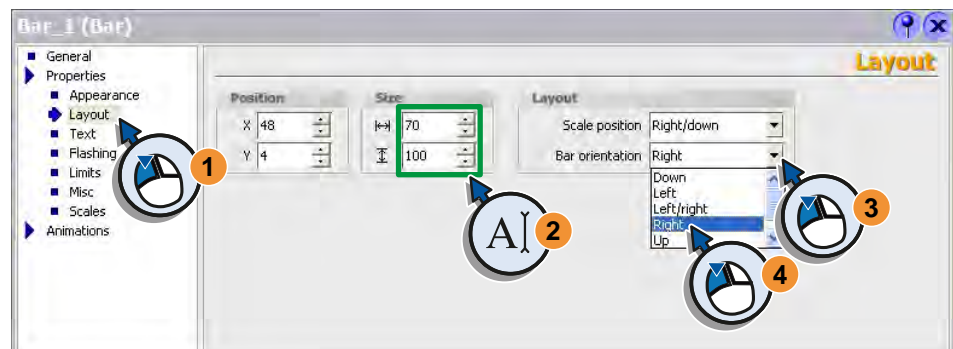


2. Configure the bar graph in the Properties view:

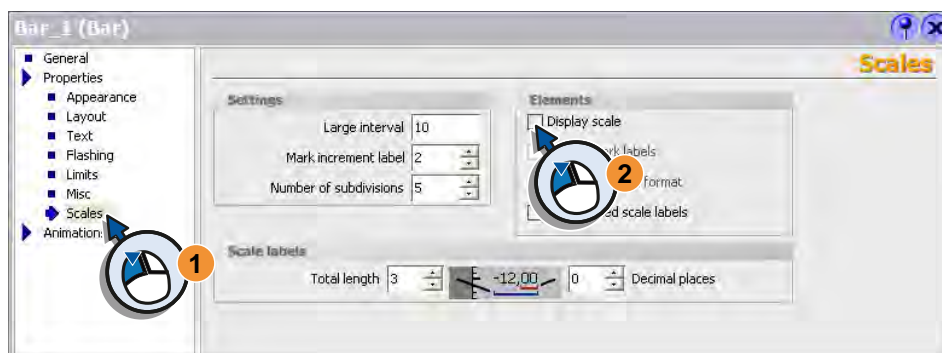
- Enter the volume of the tank (1) and select the "FillLevel_Water" tag (2, 3).



- Adapt the size (2) and align the bar to the right (3, 4):

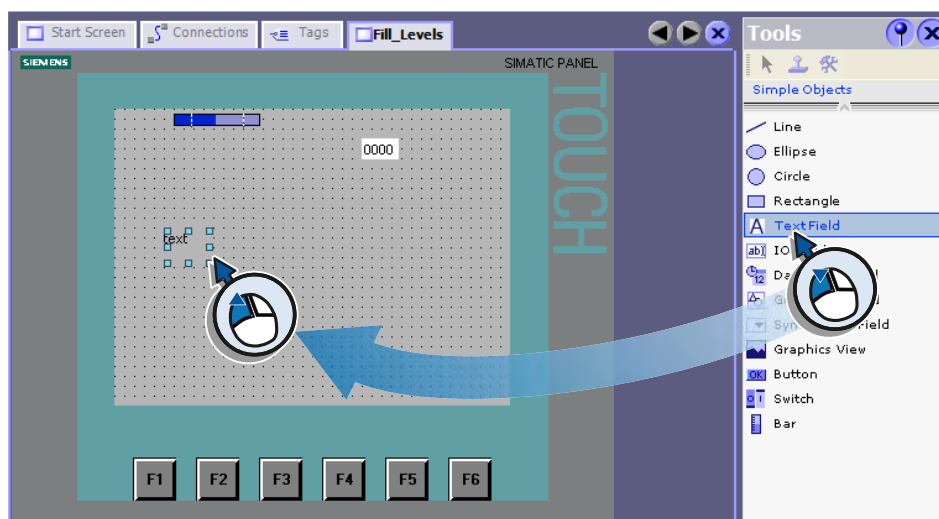


- Deactivate the scale indicator:

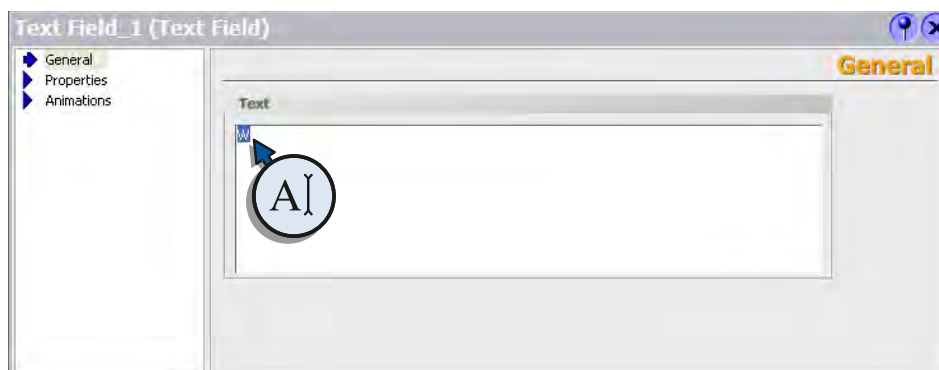


Creating a text field to label the fill level display

1. Insert a text field in the screen:



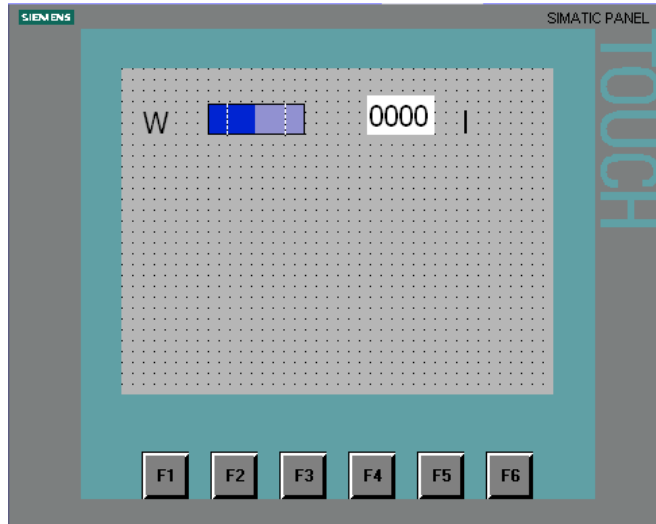
2. Enter a "W" for water in the Properties view:



3. In the same way, create another text field labeled "l" for liters.

Arranging the text fields, bar graphs and output field.

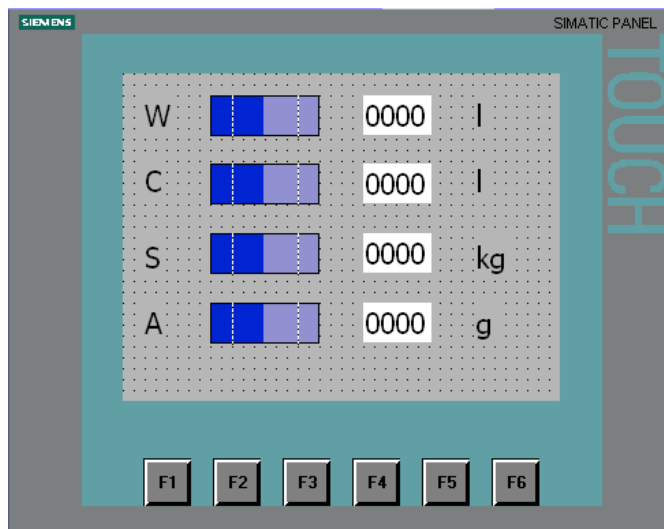
1. Position the two text fields, bar graphs and IO field in the display using the cursor keys:



2. Match the size of text and display of the configured objects to your display.
With the TP1500 Basic you will reserve a part of the screen area for buttons.

Adding the fill level displays for juice, sugar and flavoring

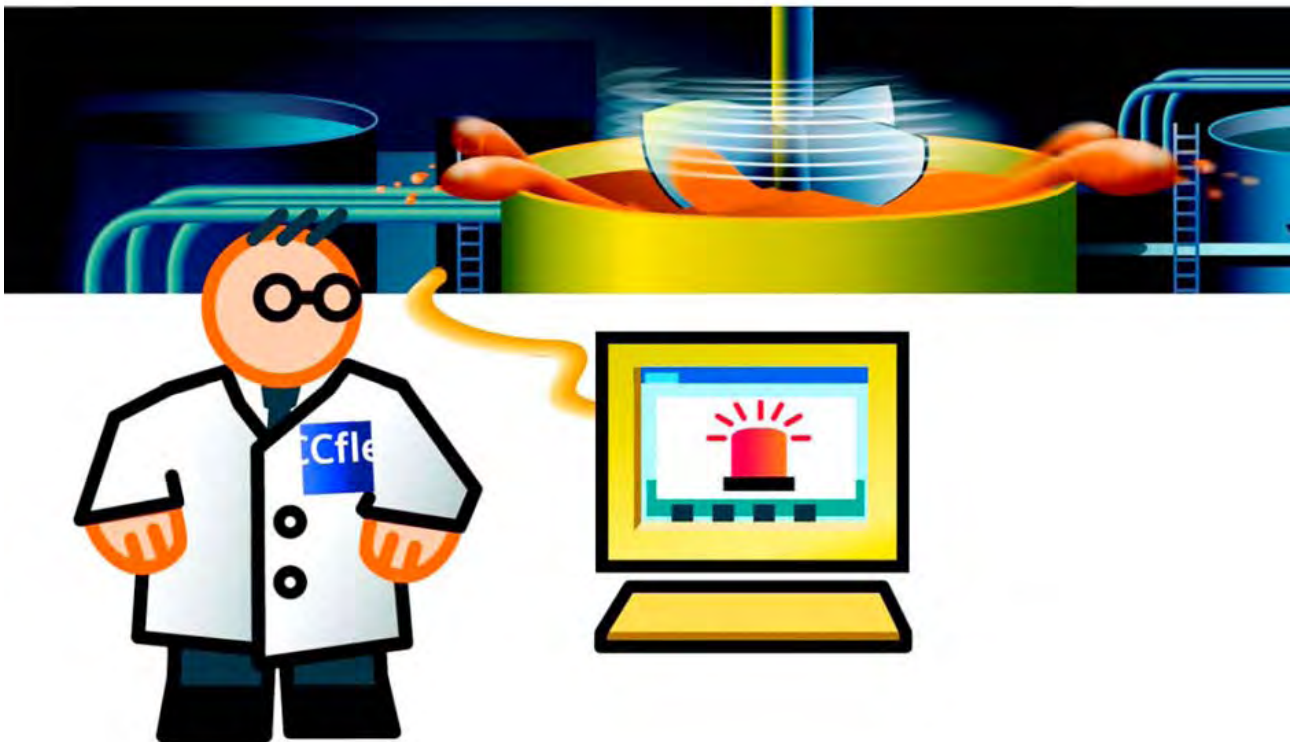
1. In the same way, create the fill level displays for juice, sugar and flavoring:



You multiply the elements of the fill level display quickly with copy and paste. "Copy&Paste" saves time when creating objects. Make sure that the correct tags are interconnected with the IO fields.

The fill level display is configured. When the system is running, the operator can read the current fill levels of the tanks on the HMI device.

Configuring alarms



4.1 Alarms in project

Alarms indicate events or operating states which occur or prevail in the fruit juice mixing system. Alarms can be used, for example, for diagnostics purposes when clearing faults.

Alarms are differentiated as follows:

- **Discrete alarms** indicate changes of status in the fruit juice mixing system and are triggered by the controller. They indicate, for example, whether a valve is open or closed.
- **Analog alarms** indicate a value has moved outside the limits of the permitted range.

An analog alarm is triggered, for example, when the speed of a motor drops below a specific value.

An alarm view makes it possible for operators to get information about the operating status of a plant.

4.2 Configuring discrete alarms

Introduction

Each tank in the fruit juice mixing system is equipped with an inlet valve. The following section explains how to configure an alarm display in which the states (open or closed) of the inlet valves for water, juice, sugar and flavoring are shown.

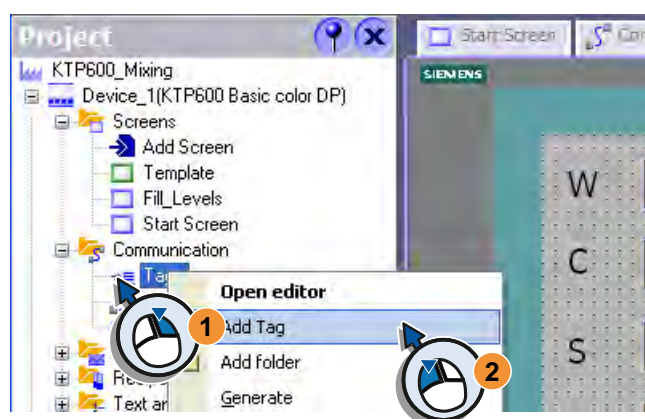
When a valve opens or closes during operation, the corresponding discrete alarm is triggered.

Creating tags to store the states

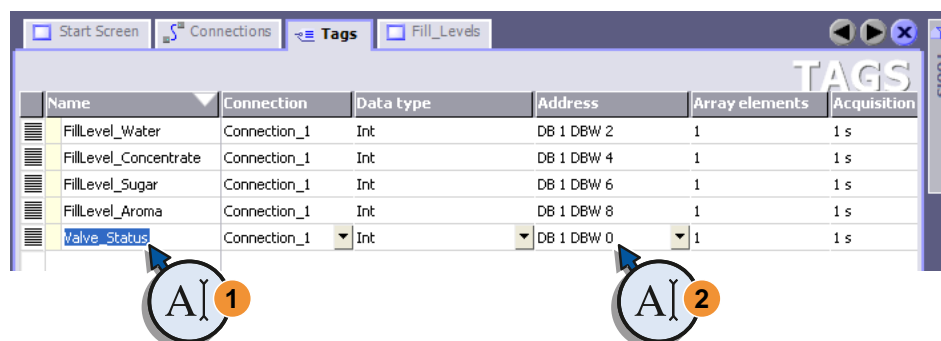
The states of the valves are stored in the "Valve_Status" tags. Each status is assigned a bit in the tag.

- Water valve: Bit 0 and Bit 1
- Juice valve: Bit 2 and Bit 3
- Sugar valve: Bit 4 and Bit 5
- Flavoring valve: Bit 6 and Bit 7

1. Create the "Valve_Status" tag:

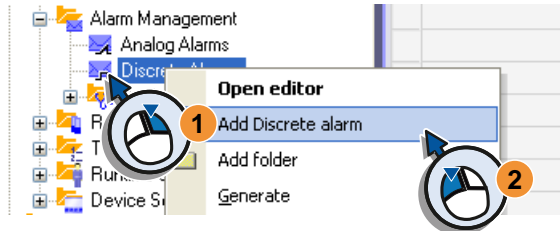


2. Configure the tag:



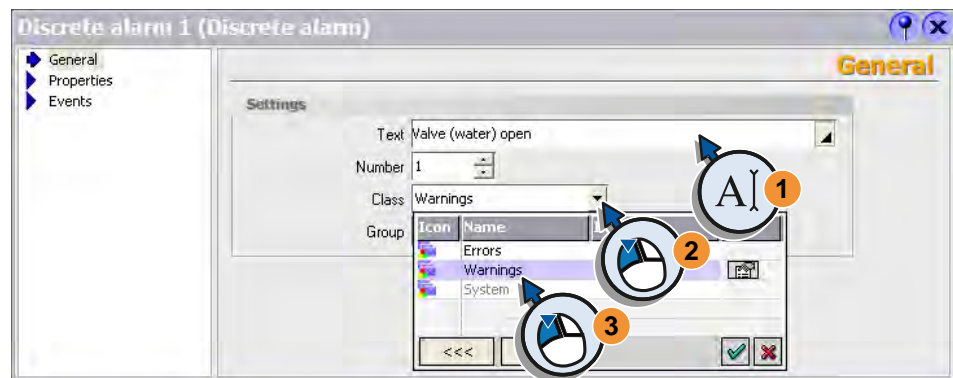
Creating alarms for status display

1. Create a new discrete message:

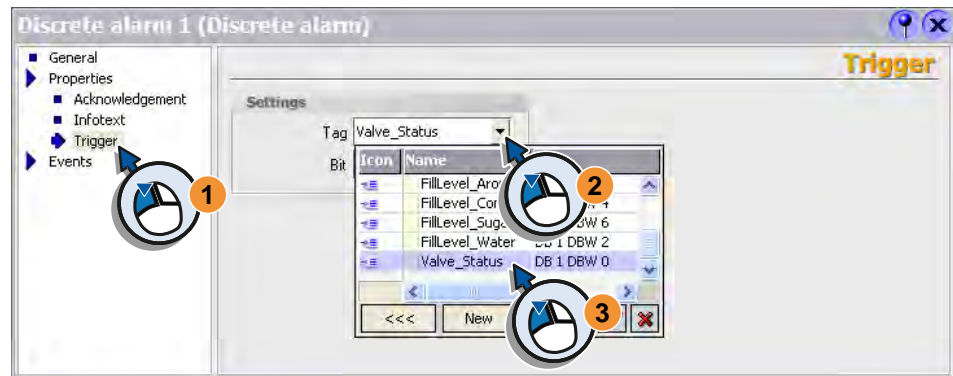


2. Create the discrete alarm in the Properties view:

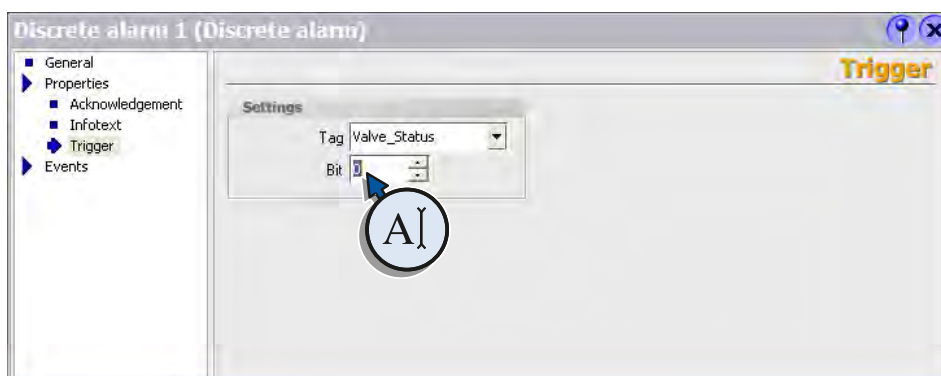
- Enter "Valve (water) open" (1) and select the alarm class "Warnings" (2, 3):



- Select the tag in which the status of the valve is stored.



- Select the bit number which represents the "open" status:



When the water tank valve opens, the discrete alarm "Valve (water) open" is triggered.

3. In the same way, configure the discrete alarm "Valve (water) closed" which represents the "closed" status.
4. Configure the discrete alarms for the "juice", "sugar" and "flavoring" valves in the same way:

Text	Number	Class	Trigger Tag	Trigger bit
Valve (water) open	1	Warnings	Valve_Status	0
Valve (water) close	2	Warnings	Valve_Status	1
Valve (concentrate) open	3	Warnings	Valve_Status	2
Valve (concentrate) close	4	Warnings	Valve_Status	3
Valve (sugar) open	5	Warnings	Valve_Status	4
Valve (sugar) close	6	Warnings	Valve_Status	5
Valve (aroma) open	7	Warnings	Valve_Status	6
Valve (aroma) close	8	Warnings	Valve_Status	7



Add a second discrete alarm by double-clicking the next empty line. The settings of the first discrete alarm will be adapted. The alarm number and bit number are automatically incremented. Now adjust the text.

4.3 Configuring analog alarms

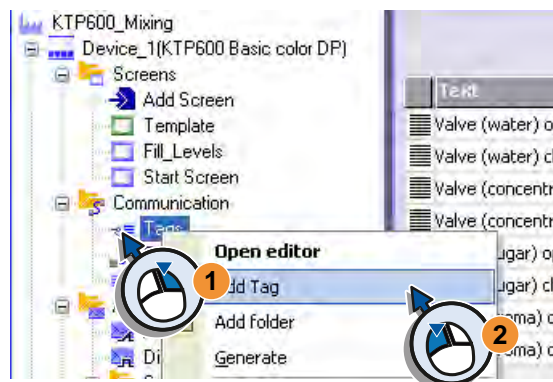
Introduction

The fruit juice mixing system's mixing tank is equipped with a mixer whose speed must be monitored. When the speed moves outside the upper or lower limit value, the corresponding alarm should appear on the HMI device.

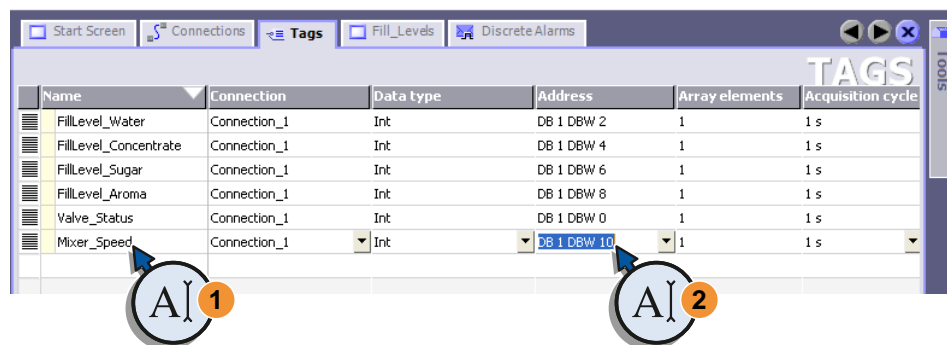
Creating the tag to store the speed

The speed of the mixer is stored in the "Mixer_Speed" tag.

1. Create the "Mixer_Speed" tag:



2. Configure the tag:



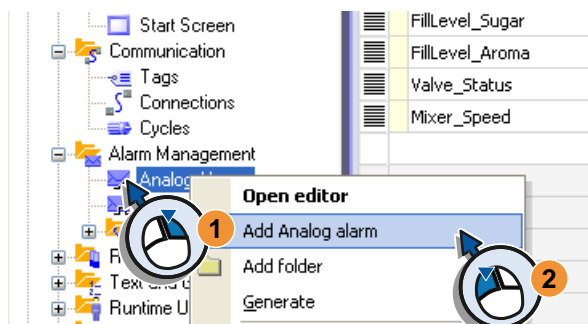
3. In the Property view, select the "Cyclic continuous" mode under "General".



Cyclic updates of tags add to system load. Use cyclic updates only within the scope of the system limits (WinCC Information System > Performance > System Limitations).

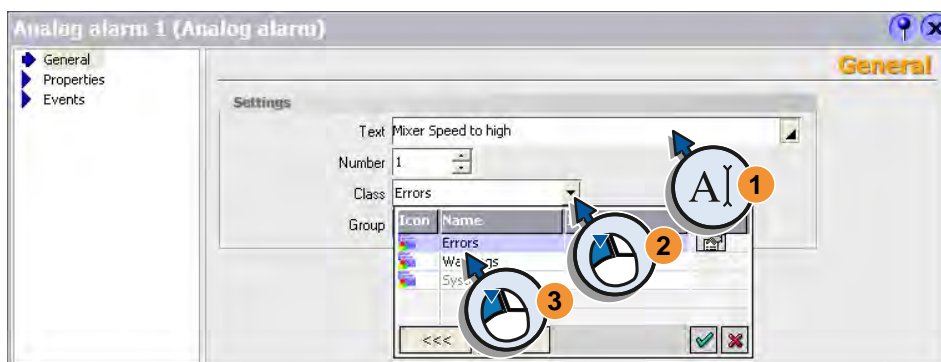
Creating alarms for speed monitoring

1. Create a new analog alarm:

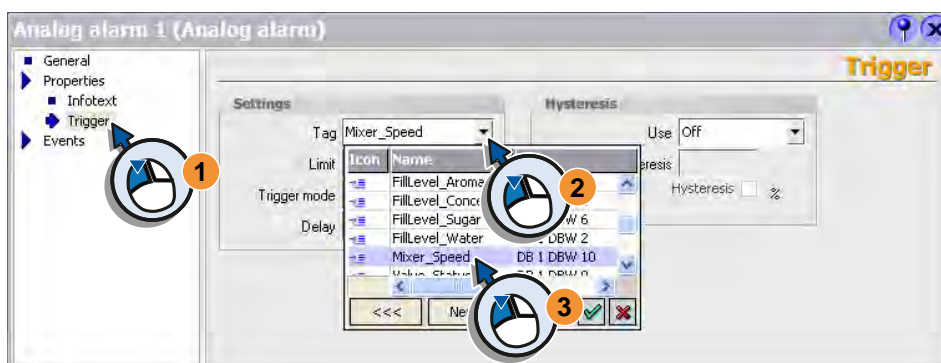


2. Configure the analog alarm in the Properties view:

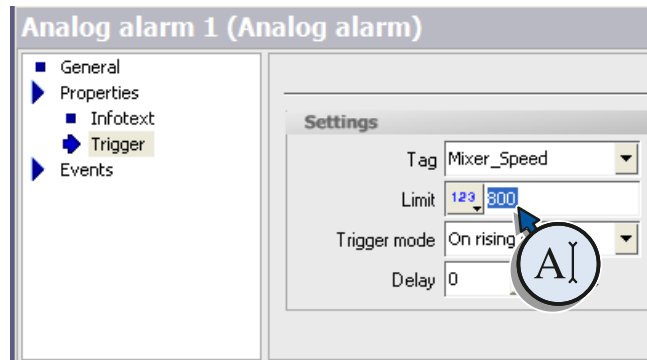
- Enter "Mixer Speed too high" (1) as the alarm text and select the alarm class "Errors" (2, 3):



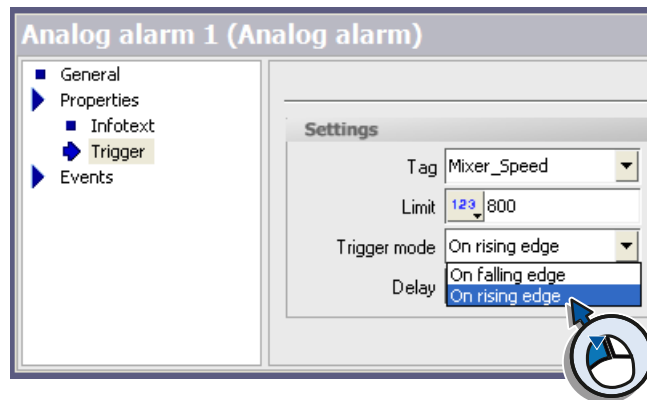
- The speed of the mixer is to be stored in the "Mixer_Speed" tag. Select the tag "Mixer_Speed".



- Enter "800" as the maximum valid speed:



- Select "On rising edge":



3. Similarly, configure the "Mixer speed too low" alarm. The alarm should be triggered if the speed drops below 400 (at "falling edge").



The settings from the first analog alarm are transferred to the second analog alarm settings by double-clicking in the empty line. You will only have to adapt the settings. The alarm number is automatically incremented.

Alarms of the "Errors" alarm class must be acknowledged by the operator.

4.4 Configuring an alarm view

Introduction

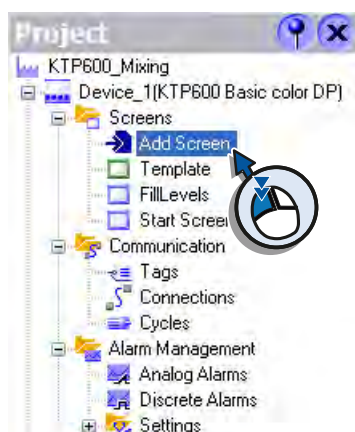
Error alarm windows inform operators about irregularities during operation of the plant. Error alarm windows are available in the template for this project so that they will be displayed in each screen in case of an error.

The alarm view shows all the error alarms and warning alarms which have occurred to date.

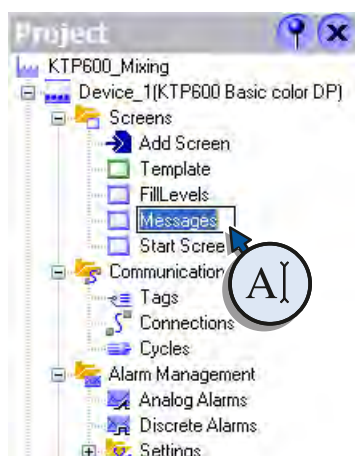
The following steps will show you how to configure an alarm view.

Creating an Alarm View

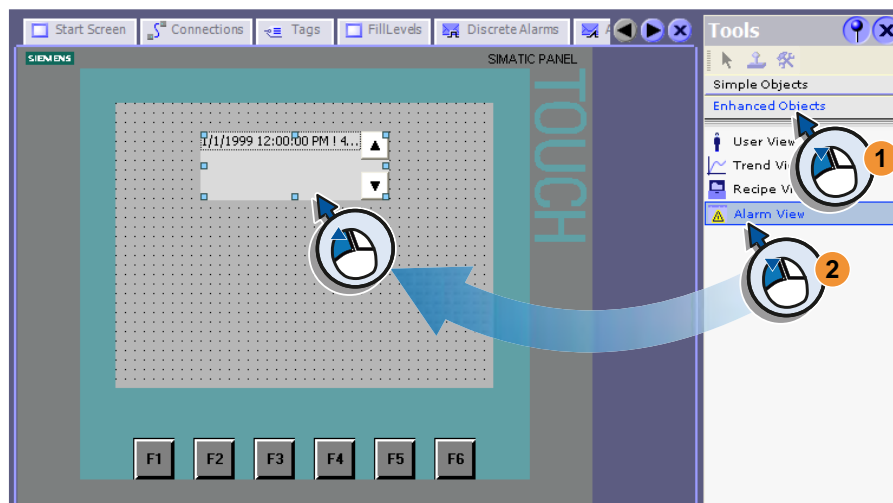
1. Create a new screen:



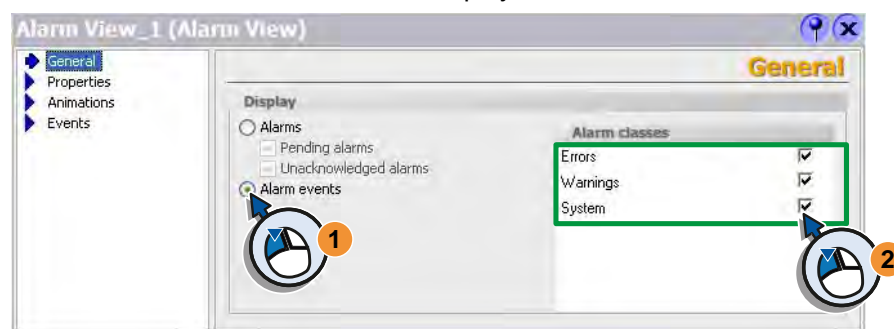
2. Use "Messages" as the new names:



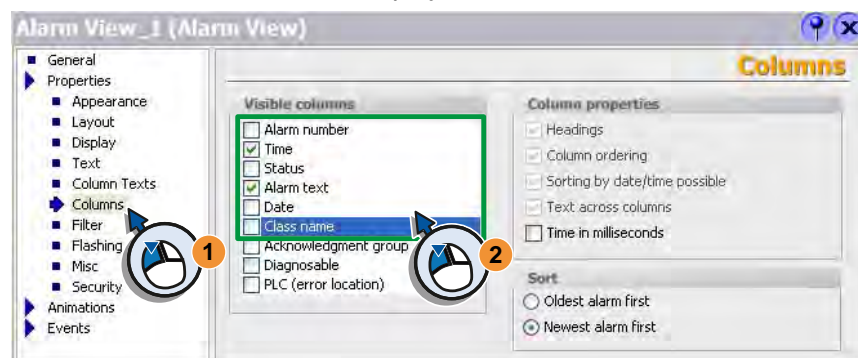
3. Drag the alarm view into the display:



4. Adjust the size of the alarm view screen on your display.
When using a TP1500 Basic leave an area free for buttons.
5. Configure the alarm view in the Properties view:
 - Select the alarm classes which are displayed in the alarm view:



- Make the necessary selections so that the last incoming message is displayed in the first line and the alarm text is displayed with the time:

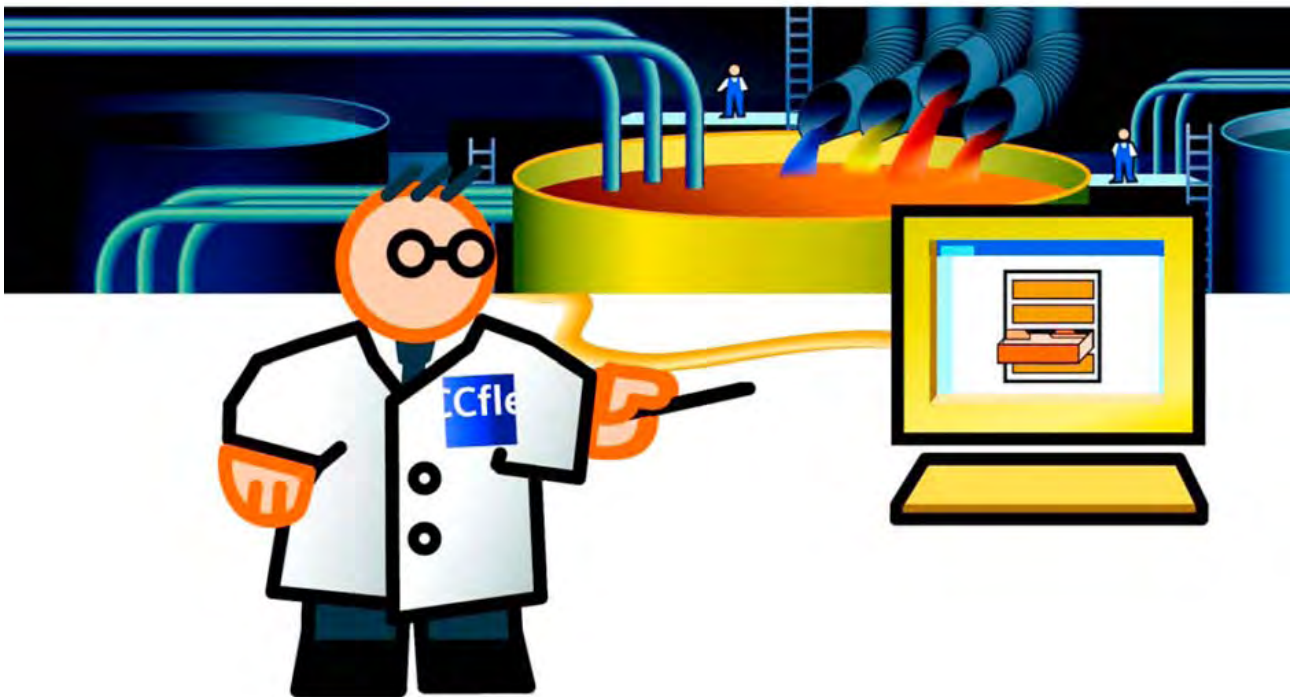


When the system is in operation, the status of the water, juice, sugar and flavoring tanks appear on the screen "FillLevels".

The operating states of the valves for water, juice, sugar and flavoring are listed in the alarm view.

Deviations in mixer speed are shown as error alarms with time in a separate error alarm window and recorded in the alarm view.

Configuring recipes



5.1 Function of the recipes

A recipe contains a combination of related production data, such as mixing ratios. A mixing ratio can be transferred from the HMI device to the fruit juice mixing system in a single working step in order, for example, to switch production from orange juice to orange nectar.

The fruit juice mixing system can produce drinks with "orange", "apple" and "tropical" flavors. A recipe is created for each flavor. The ingredients required for each flavor are defined in the recipes.

In turn, each recipe contains three recipe data records in which the mixing ratios for "juice", "nectar" and "beverage" are stored.



Recipes collect production parameters in parameter records that are easy to use.

Recipes enable the fruit juice production to be switched to other mixing ratios or flavors in the simplest of ways.

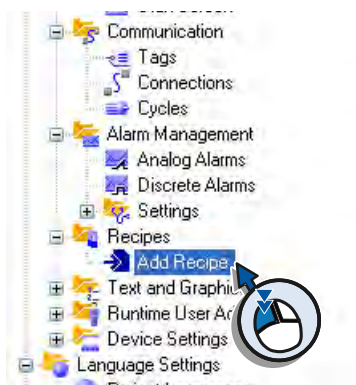
5.2 Configuring a new recipe

Introduction

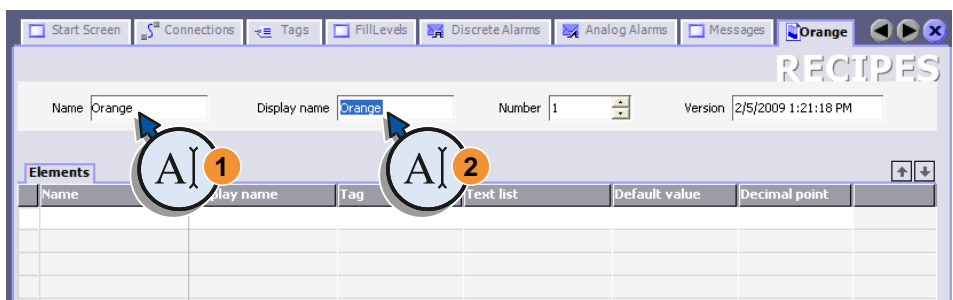
The following section explains how to create the "Orange" recipe together with the associated mixing ratios for juice, nectar and beverage.

Creating a recipe for the "Orange" flavor

1. Create a new recipe:



2. Enter the name and view name for the recipe:



Creating tags for the quantities of the ingredients

Four tags are required in order to transfer the mixing ratios to the fruit juice mixing system. Each tag contains the quantity of one of the ingredients.

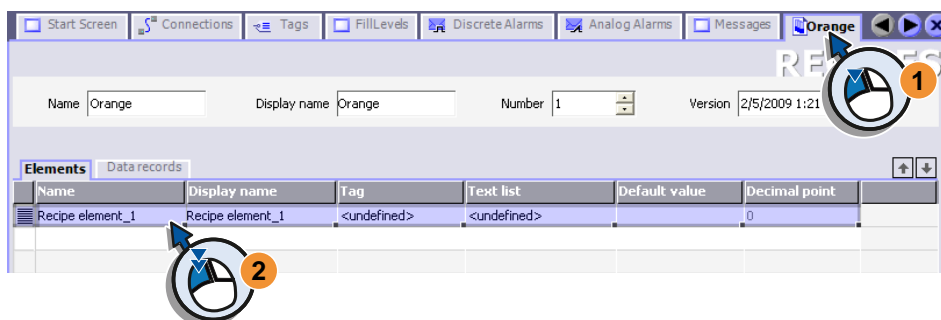
1. Create the tags "Litre_Water", "Litre_Concentrate", "Kilo_Sugar" and "Gram_Aroma" with the following settings:

Name	Connection	Data type	Address	Array elements	Acquisition cycle
FillLevel_Aroma	Connection_1	Int	DB 1 DBW 2	1	1 s
FillLevel_Concentrate	Connection_1	Int	DB 1 DBW 8	1	1 s
FillLevel_Sugar	Connection_1	Int	DB 1 DBW 6	1	1 s
FillLevel_Water	Connection_1	Int	DB 1 DBW 4	1	1 s
Mixer_Speed	Connection_1	Int	DB 1 DBW 0	1	1 s
Valve_Status	Connection_1	Int	DB 1 DBW 10	1	1 s
Litre_Water	Connection_1	Int	DB 1 DBW 12	1	1 s
Litre_Concentrate	Connection_1	Int	DB 1 DBW 14	1	1 s
Kilo_Sugar	Connection_1	Int	DB 1 DBW 16	1	1 s
Gram_Aroma	Connection_1	Int	DB 1 DBW 18	1	1 s

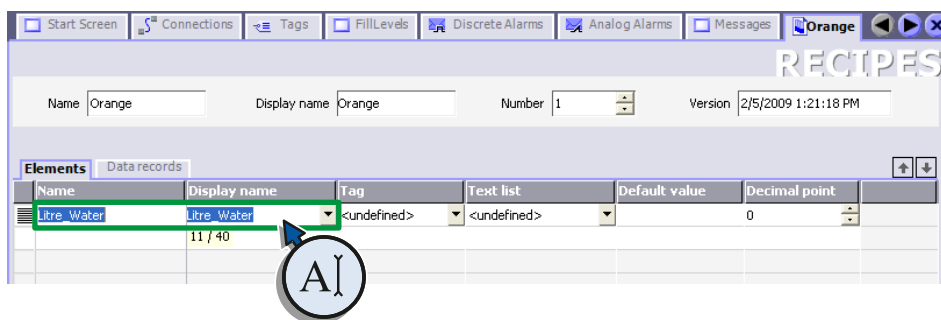
Creating recipe elements for the ingredients

One recipe element is required for each ingredient, in this case water, juice, sugar and flavoring.

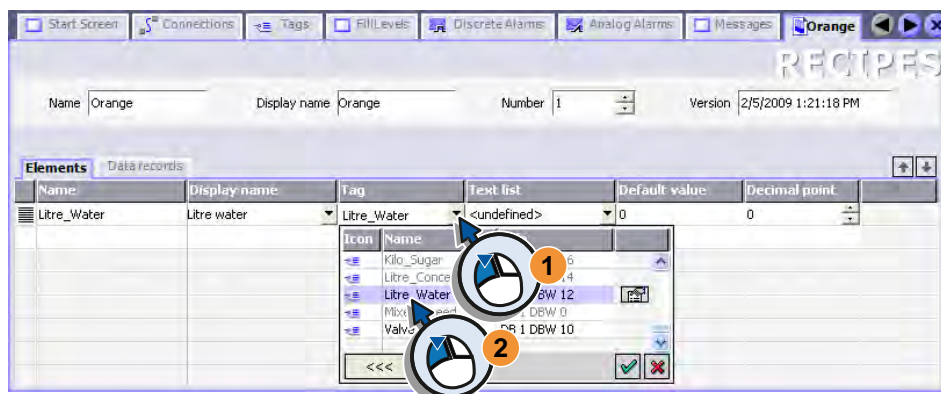
1. Create a new recipe element "Litre_Water":



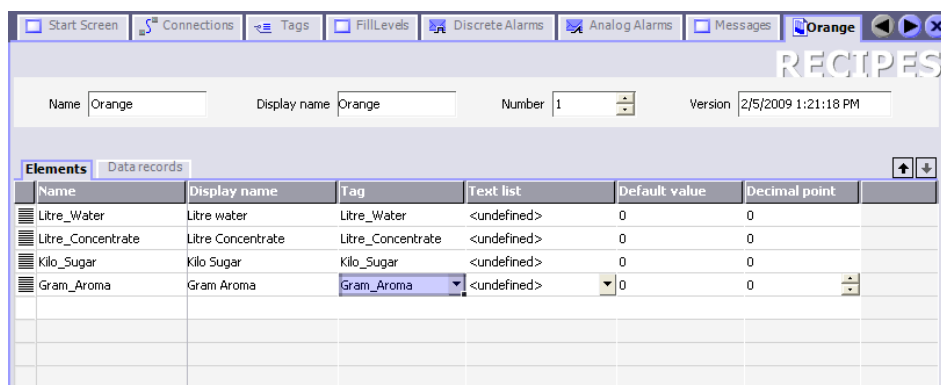
2. Enter the name and view name for the recipe element:



- Link the recipe element with the "Litre_Water" tag:



- In the same way, create the recipe elements "Litre_Concentrate", "Kilo_Sugar" and "Gram_Aroma":



Entering mixing ratios

A specific quantity of the ingredients is required for each individual drink "juice", "nectar" and "beverage." The mixing ratios are stored in the recipe data records.



The mixing ratios can also be entered in external programs, such as MS Excel, and imported on the HMI device.

An example for such a file is available on the WinCC flexible DVD in the "CD_3\Documents\Language\Getting Started" folder. For additional information, refer to the documentation for WinCC flexible.

1. Create a new recipe data record called "Beverage":

Name	Display name	Number	Litre_Water	Litre_Concentrate	Kilo_Sugar	Gram_Aroma
Recipe data record_1	1_1	1	0	0	0	0

2. Enter the name, view name and number:

Name	Display name	Number	Litre_Water	Litre_Concentrate	Kilo_Sugar	Gram_Aroma
Beverage	Beverage	1	0	0	0	0

3. Enter the quantities of the ingredients:

Name	Display name	Number	Litre_Water	Litre_Concentrate	Kilo_Sugar	Gram_Aroma	Comment
Beverage	Beverage	1	70	30	45	300	

4. In the same way, create the recipe data records for "Nectar" and "Juice":

Name	Display name	Number	Litre_Water	Litre_Concentrate	Kilo_Sugar	Gram_Aroma	Comment
Beverage	Beverage	1	70	30	45	300	
Nectar	Nectar	2	50	50	10	300	
Juice	Juice	3	5	95	3	100	

5.3 Configuring a Recipe view

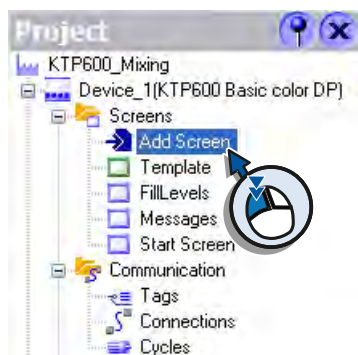
Introduction

The operator is to change and manage the recipes on the HMI device during operation. This step requires a recipe display that offers the following commands:

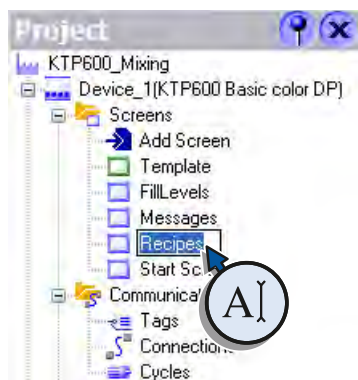
- Create recipe data record
- Save recipe data record
- Delete recipe data record
- Transfer recipe data record to fruit juice mixing system
- Read recipe data record from fruit juice mixing system

To do this, a Recipe view is inserted:

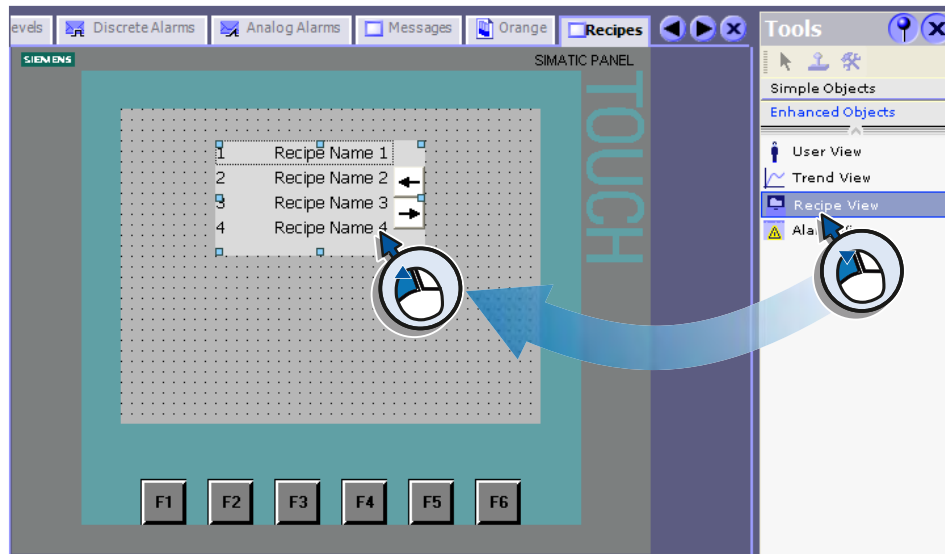
1. Create a new screen:



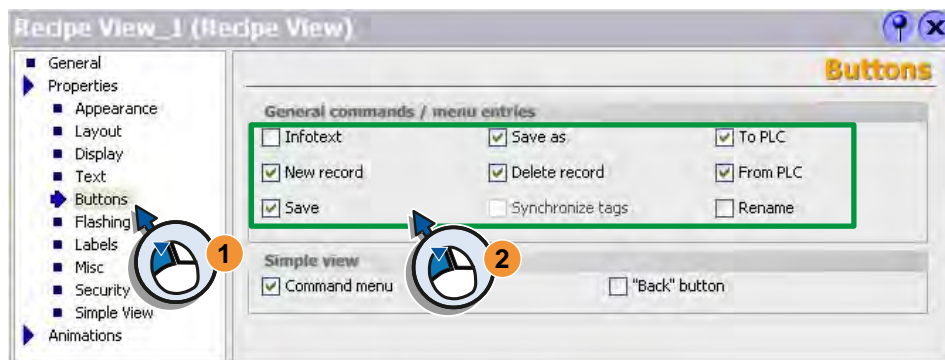
2. Use "Recipes" as the new names:



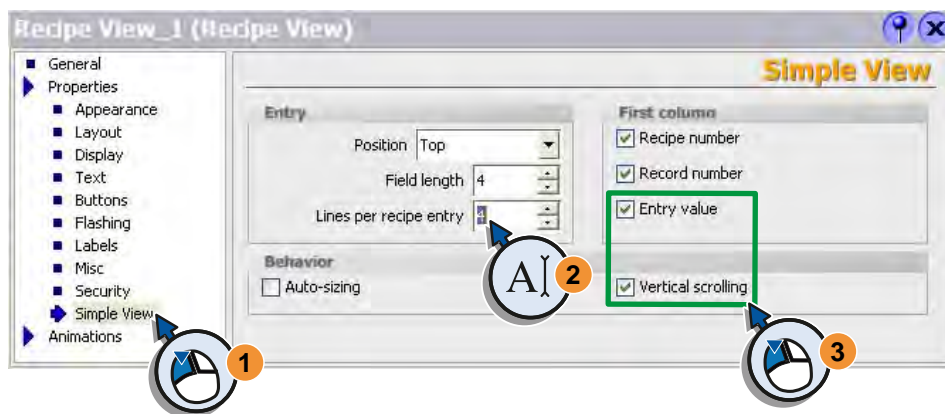
3. Drag the Recipe view into the display:



4. Enable the functions in the Property view that should be available in the Recipe view.



5. Then define the following view settings:



Configuring screen changes



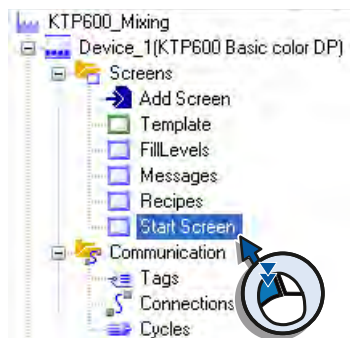
6.1 Creating a Selection screen

The Selection screen shows the operator which key must be used to switch to a specific screen on the HMI device and back to the Selection screen. The operator is guided to create the Selection screen and linking the screen change.

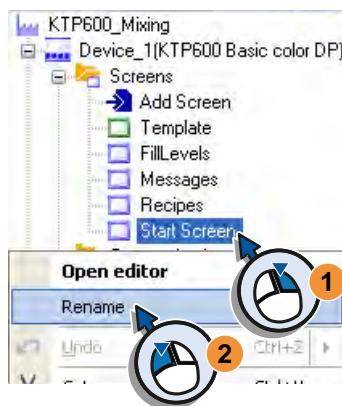
The screen changes are assigned to the function keys <F1> to <F4> on the HMI device in our example. The <F5> key should be used to switch off the HMI device.

Procedure

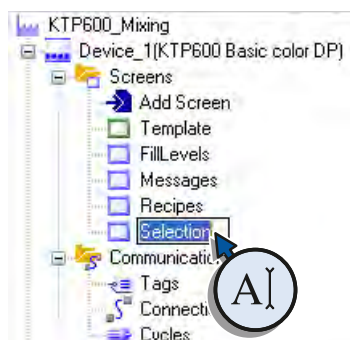
1. Open the "Start Screen" screen:



2. Rename the "Start Screen" screen:



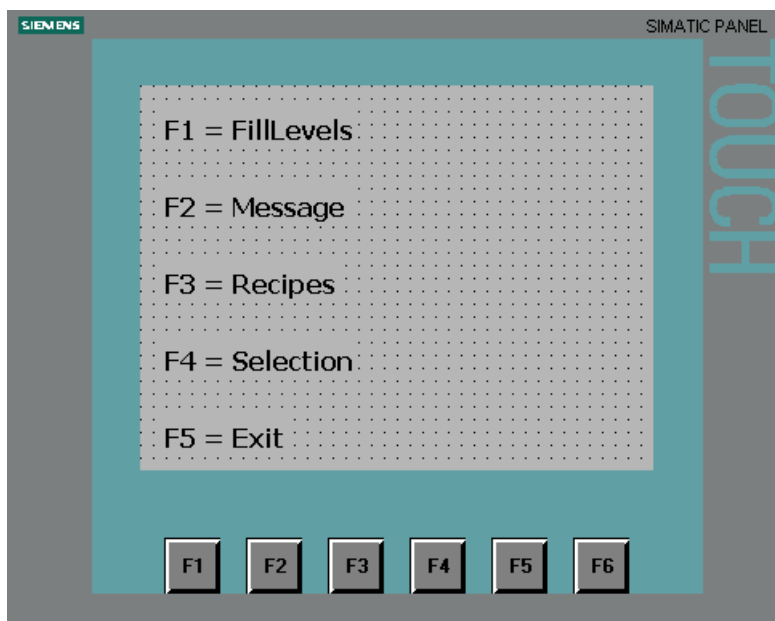
3. Use "Selection" as the new names:



4. Delete the following objects in the screen:
 - the text field with the screen name "Start screen"
 - the button with the text "Start screen"

5. Create five text fields with the following content:

- "F1 = Fill level"
- "F2 = Alarms"
- "F3 = Recipes"
- "F4 = Choices"
- "F5 = Exit"



6. Define the start screen in the "Device Settings" of the Project view:

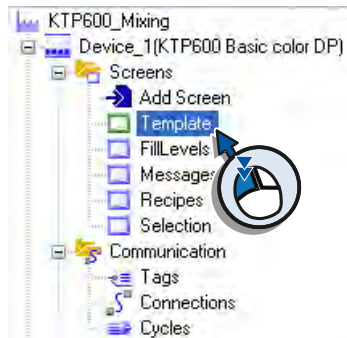
- The start screen will always be displayed first when you start the HMI device. Because the "Start screen" created with the Project wizard was adapted, the "Selection" screen has already been entered as start screen.



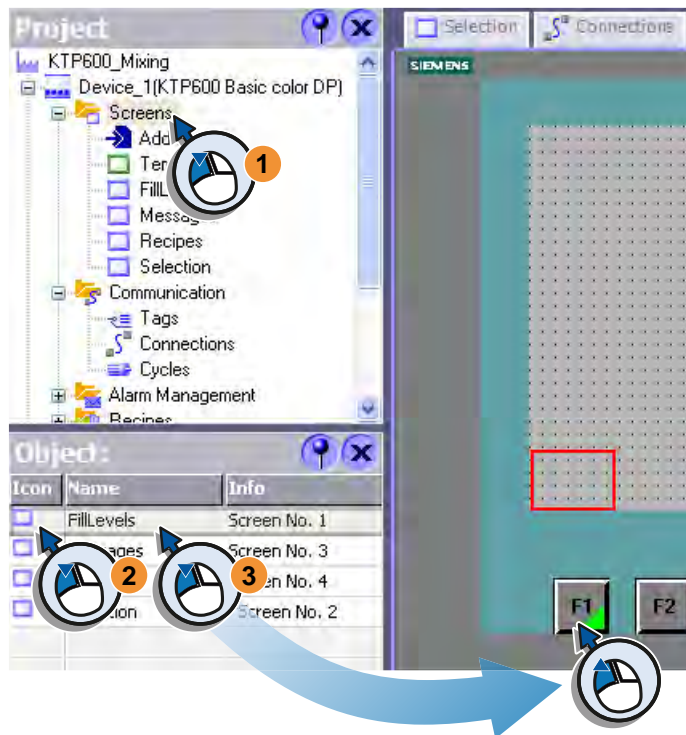
6.2 Configuring screen change with function keys

Configuring global screen change with function keys

1. Open the template:



2. Assign the change to "FillLevels" to function key <F1>:



On pressing the <F1> function key on the HMI device during operation, the screen with the fill levels appears in the display.

3. Assign the change to "Messages", "Recipes" and "Selection" on the function keys <F2>, <F3> and <F4>.

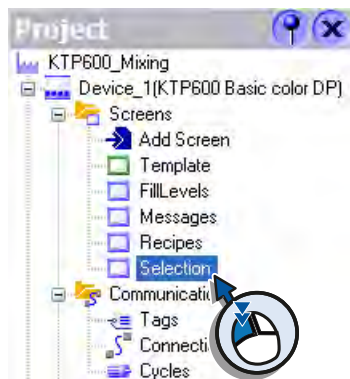


Function keys configured in the Template will have a global effect. The same function will be triggered in each screen with the same key. You can also configure the functions of the keys individually in the respective screen.

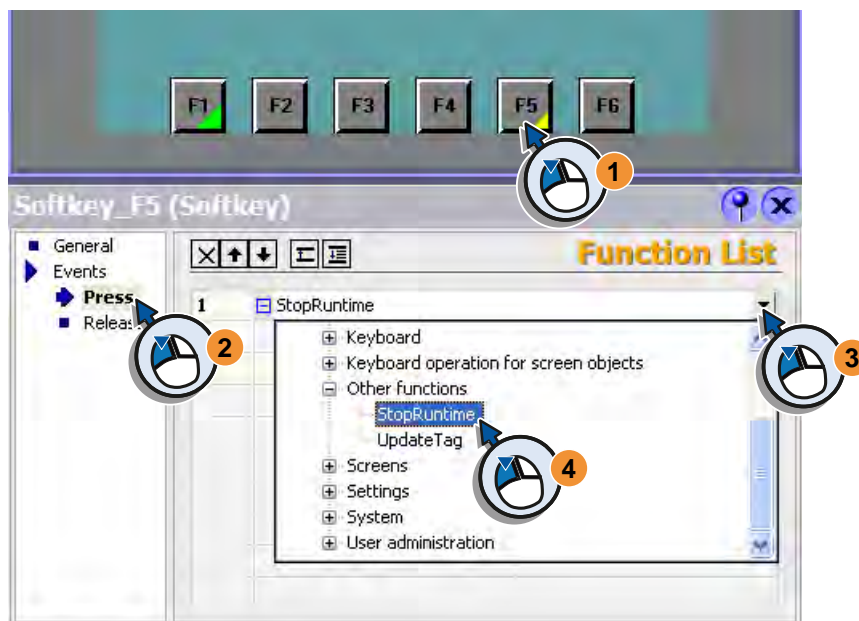
Configuring deactivation of the HMI device

The finished project represents the user interface of the HMI device. The user interface will be started and displayed automatically when you turn on the HMI device.

1. Open the "Selection" screen:



2. Assign the "StopRuntime" system function to the <F5> key:



3. Save the project with "Project" > "Save" in a directory of your choice for the settings to become effective.



*Project names including the .hmi extension may not exceed a length of 120 characters.
The path name including the .hmi extension may not exceed a length of 218 characters.*

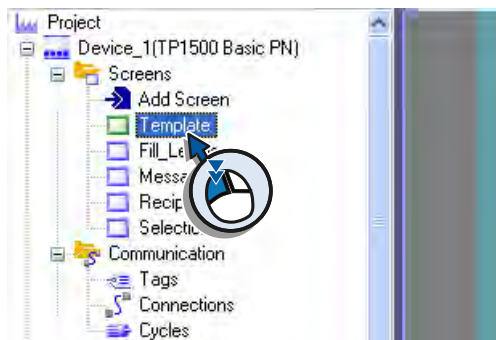
6.3 Configuring screen change with buttons

Introduction

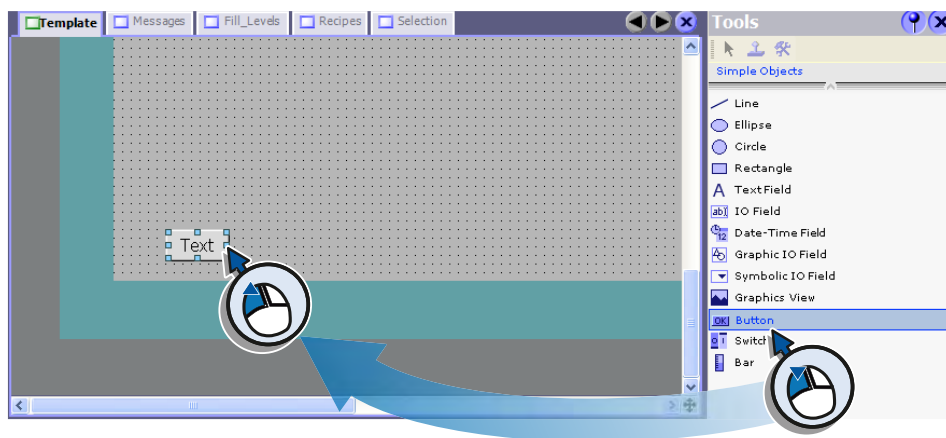
There are no function keys on the TP1500 Basic. You configure buttons in the Template that will trigger the screen change. These buttons are displayed in all screens and have a global effect.

Configuring global screen change with buttons

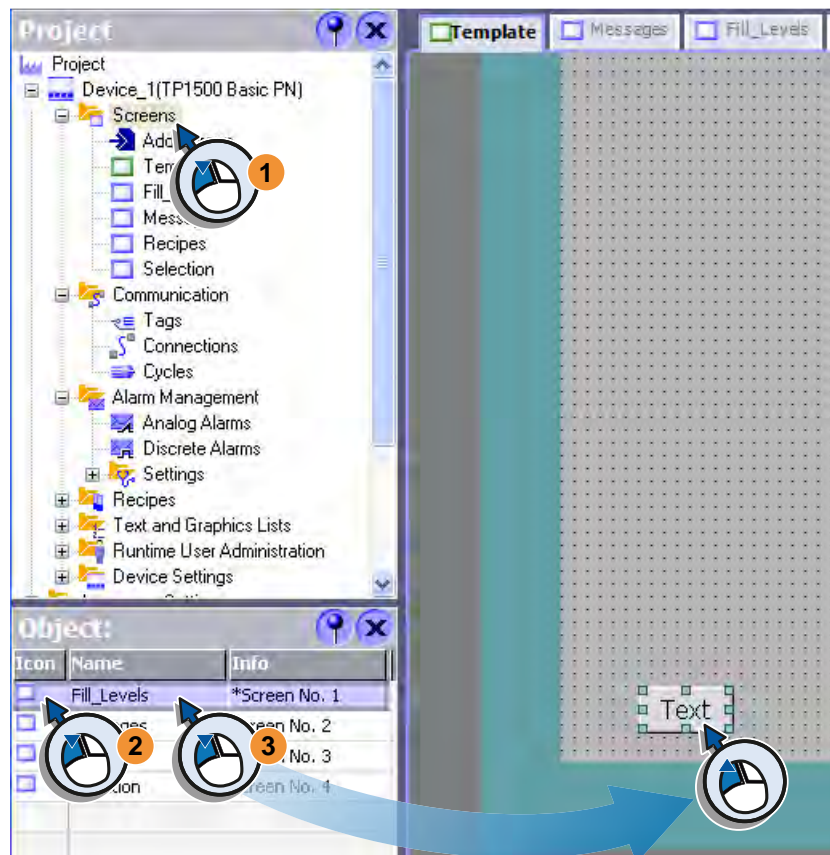
1. Open the template:



2. Insert a button into the screen.

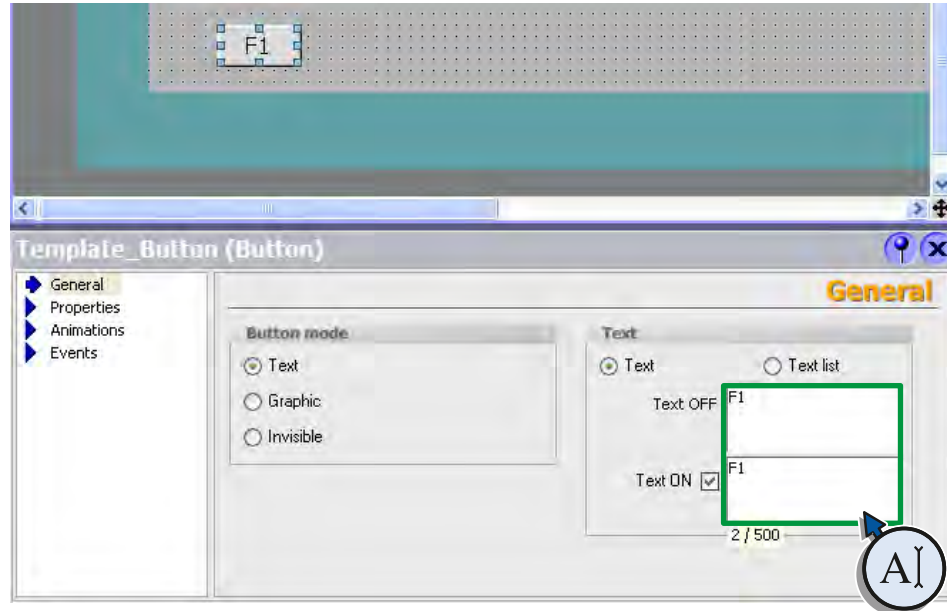


3. Assign the change to the "FillLevels" screen to the button:



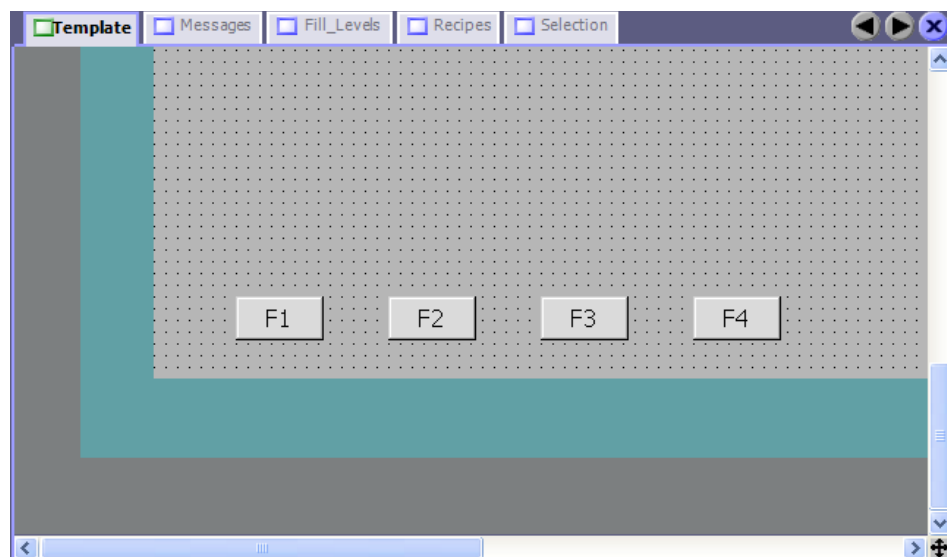
4. Type in the button name "F1".

On pressing the "F1" button on the HMI device during operation, the screen with the fill levels appears in the display.



5. Configure the following buttons with screen changes:

Labeling	Screen change to
F2	"Messages"
F3	"Recipes"
F4	"Selection"

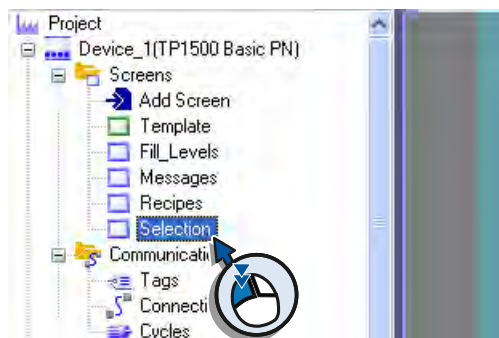


Buttons configured in the Template will have a global effect. The same function will be triggered in each screen with the same button.

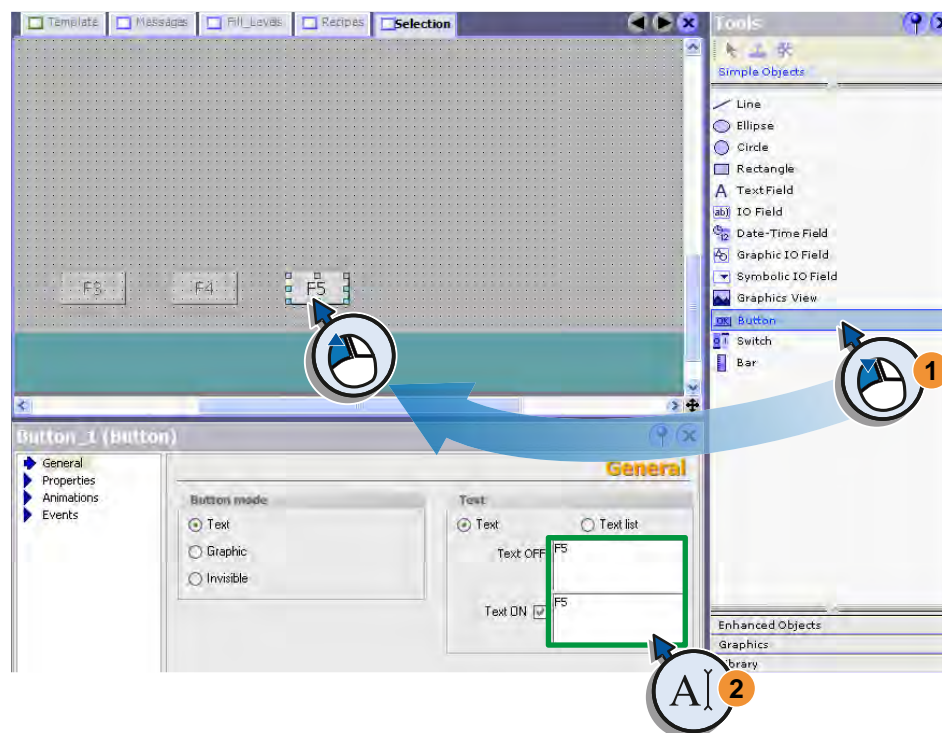
Configuring deactivation of the HMI device

The finished project represents the user interface of the HMI device. The user interface will be started and displayed automatically in Runtime when you turn on the HMI device.

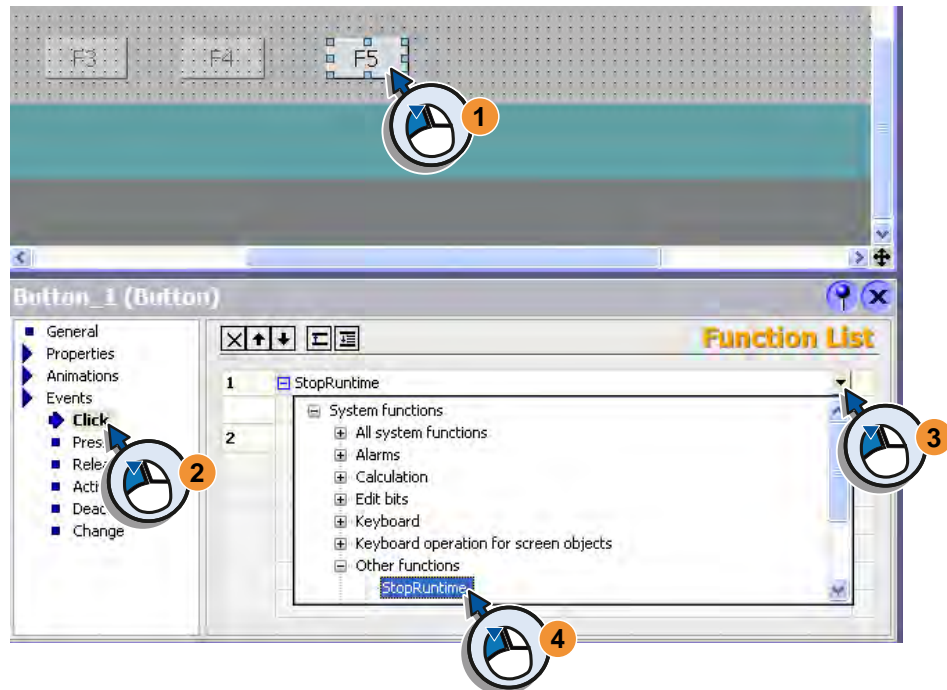
1. Open the "Selection" screen:



2. Configure a button and name it "F5".



3. Assign the "StopRuntime" system function on the "Press" event of the button:



4. Save the project so that the settings take effect.

Finishing the project



7.1 Consistency check and simulation

Your inputs will be checked during configuration. The tag of the "Byte" data type can have a value between 0 and 255. Input will be rejected if you attempt to enter a value greater than 255. Incomplete configurations, such as an IO field without assigned tag, will not be checked at input. Such errors will be detected by the consistency check during compilation and listed in the Output window.

If WinCCflexible was installed with the Simulation/Runtime component, you can simulate the project with the Runtime Simulator. The Simulator changes the values of the configured tags. Selection of the tags and the change of values takes place via a simulation table. This enables you to check the functions and processes of the configuration without connection to a PLC.



The program only simulates the tags in the configuration if no PLC is connected.

If a PLC is connected, then the Simulator will change the values of the respective process tags in the S7 program. The configuration is simulated together with the PLC. This means you can check to see if the values are transmitted correctly between process and project tags.

7.2 Running the consistency check

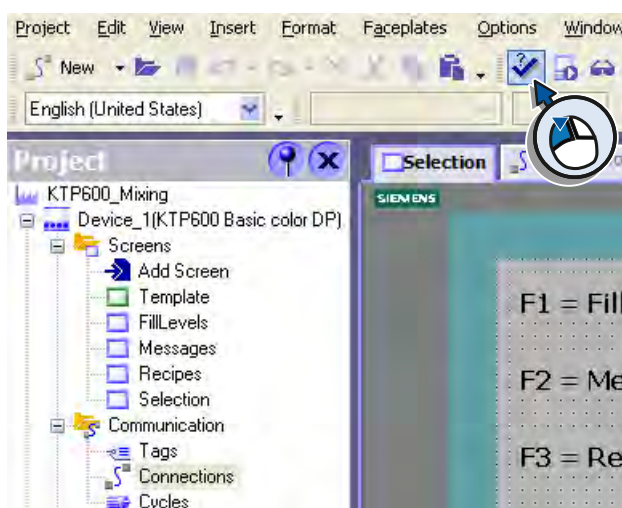
Introduction

You have just created your first project. Before the configuration is concluded, the project can be tested and simulated using the migration consistency check function and the simulator provided by WinCC.

Check project for consistency

The consistency check determines missing links, violation of value ranges and incorrect settings.

1. You start the consistency check by compiling the project once again:
 - This function is available under "Project > Compiler > Compile".



The result of the consistency check appears in the Output view:



If there no errors or warnings have occurred during compilation, the project can be simulated.

If an error has occurred, you can jump directly from the context menu to the error location in the project by double-clicking the error entry in the output window.

7.3 Simulation in Runtime

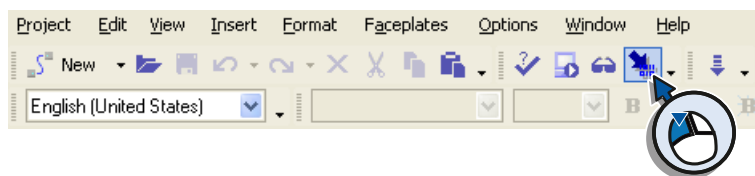
Introduction

The simulation function helps you to find logical configuration errors, such as incorrect limit values.

The following sections explain how to simulate the fill level indicator and alarms for the valve states.

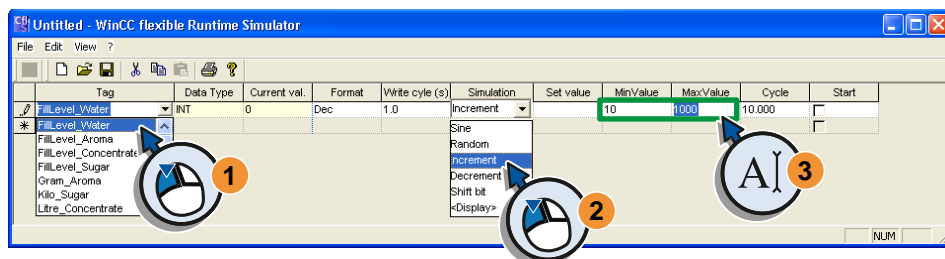
Creating a simulation table

1. Start the simulator:



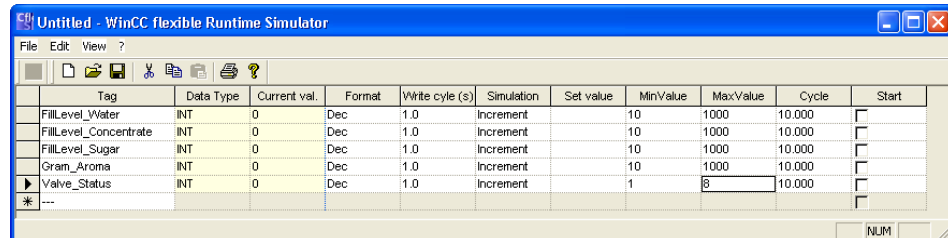
The Simulator and the simulation table will be displayed.

2. Select the "FillLevel_Water" tag in the simulation table and enter the simulation values:



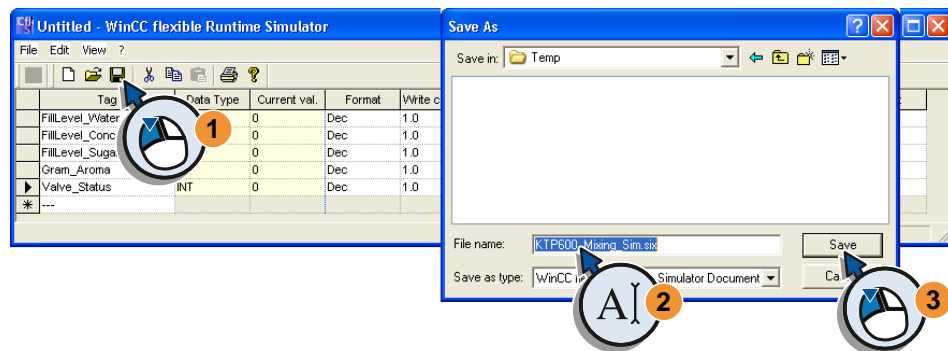
The WinCC flexible Runtime Simulator is controlled via the displayed simulation table. You select configured tags in the "Tag" column and enter them consecutively in the lines of the table. The properties of the tags are shown in the columns "Data Type" and "Current val." with yellow shading. The entries in the white columns are the simulator settings and control the simulation process.

3. Complete the simulation table with the tags "FillLevel_Concentrate", "FillLevel_Sugar", "FillLevel_Aroma" and "Valve_Status":



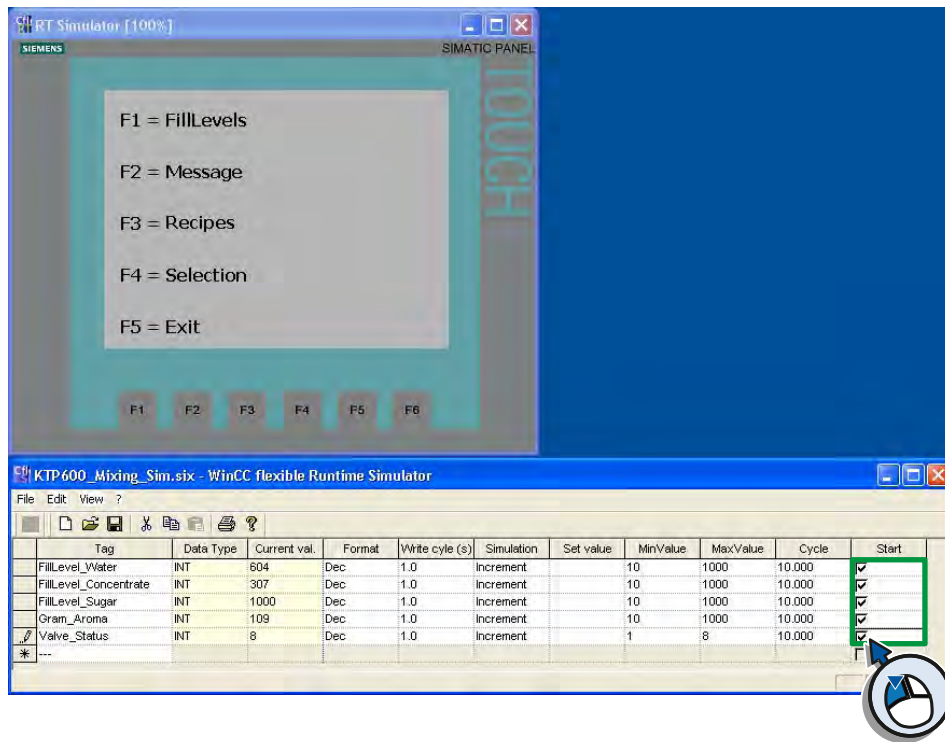
Tag	Data Type	Current val.	Format	Write cycle (s)	Simulation	Set value	MinValue	MaxValue	Cycle	Start
FillLevel_Water	INT	0	Dec	1.0	Increment	10	10	1000	10.000	<input type="checkbox"/>
FillLevel_Concentrate	INT	0	Dec	1.0	Increment	10	10	1000	10.000	<input type="checkbox"/>
FillLevel_Sugar	INT	0	Dec	1.0	Increment	10	10	1000	10.000	<input type="checkbox"/>
Gram_Aroma	INT	0	Dec	1.0	Increment	10	10	1000	10.000	<input type="checkbox"/>
Valve_Status	INT	0	Dec	1.0	Increment	1	1	8	10.000	<input type="checkbox"/>

4. Save the simulation table



Simulating the project

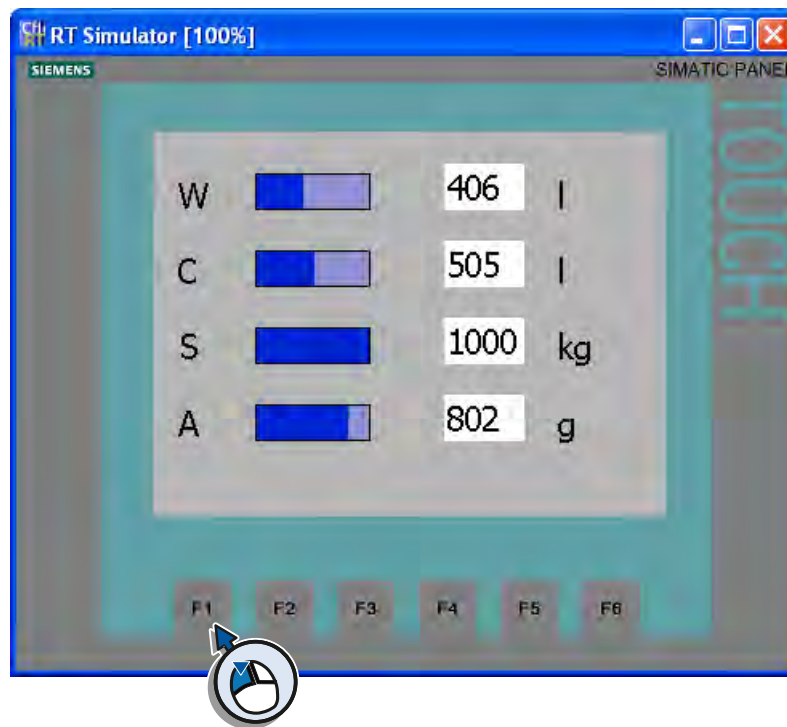
1. Start the simulation:



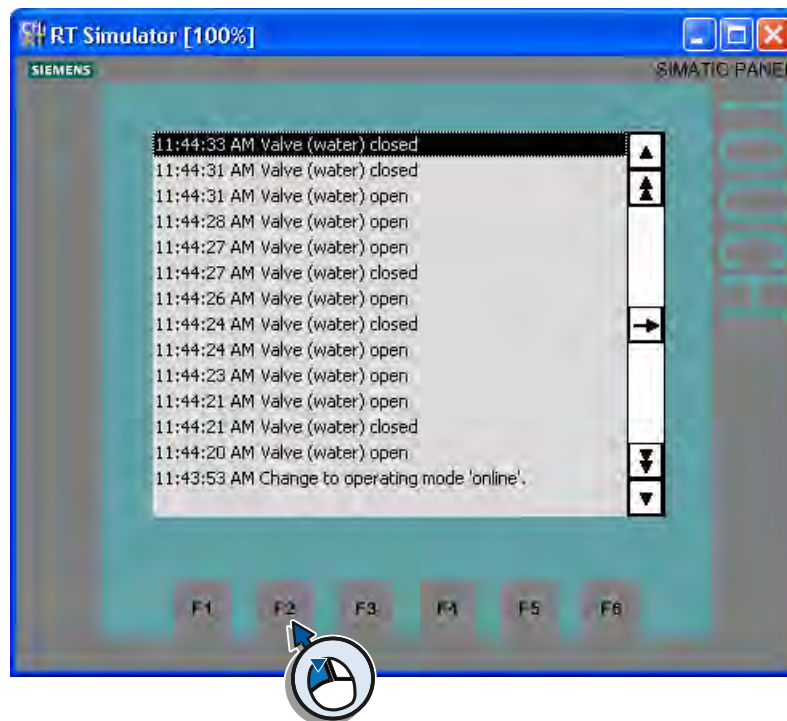
If you activate the "Start" option of a tag, you will start the simulation of this tag. The Simulator alters the value of the tag according to the selected setting.

For a reliable function test, you should select the settings of the Simulator so that they correspond to the function of the tag. Tags whose values depend on each other can be simulated together.

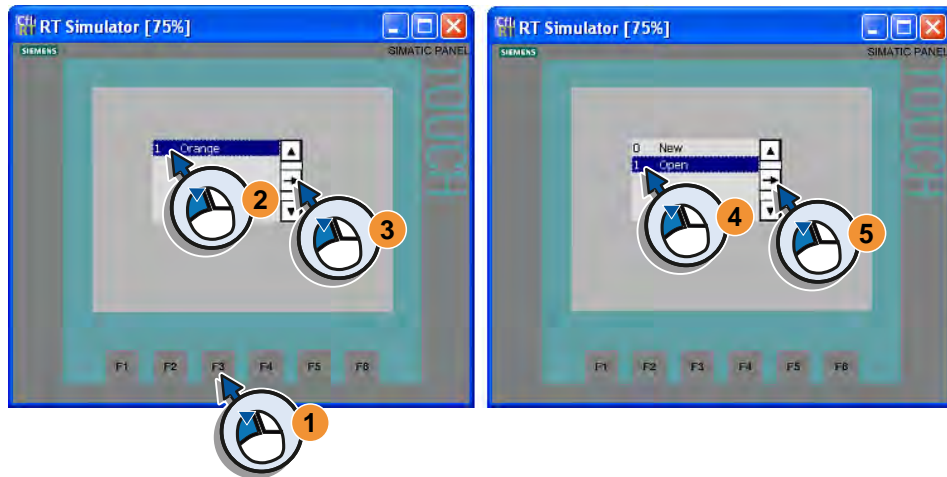
2. Change to the "FillLevels" screen and observe how the fill levels change:



3. Change to the "Messages" screen and observe how the alarms on the valve status are triggered:



4. Change to the "Recipes" screen and open any recipe data record:



You can operate the device representation in the simulator window. Acknowledge the pending error alarm with the corresponding function of the alarm window in the display of the HMI device.

Transferring and using a project



8.1 Overview

You have created the graphical user interface for your HMI device in the project. You have created tags to read out process values from the PLC or to transfer them to the PLC.

The following requirements must be met to use the project on the HMI device:

1. The HMI device is connected to an matching power supply.
2. Your configuration PC comes equipped with a matching interface adapter and is connected with your HMI device.

If these conditions are met, the following steps will be executed:

- Check connection parameters
- Transfer the project to the HMI device
- Operating a project on the HMI device

These requirements and steps apply even if the project was created for a different HMI device instead of an KTP600 Basic.

If you have access to a SIMATIC S7-300/400 PLC, you can upload a prepared S7 program to the PLC to actively simulate your project on the HMI device together with the PLC.

8.2 Requirements

Power supply

The HMI device is connected to an matching power supply.

The HMI device is designed for power supply through a SIMATIC PLC. The power supply must meet the following requirements:

- Use only 24 VDC power supply units with safe electrical isolation in accordance with IEC 60364-4-41 or HD 384.04.41 (VDE 0100, Part 410), for example, in accordance with the PELV standard.
- The supply voltage must be within the specified voltage range for your HMI device. The power consumption may not exceed the value specified for your HMI device. Otherwise, malfunction at the HMI device cannot be ruled out. The information is available in the operating instructions or on the rating plate on the back of the HMI device.
- For non-isolated design: Connect the "GND" connection from the 24 V power supply output to equipotential bonding for a uniform reference potential. You should always select a central point of termination.
- Only qualified personnel may connect and commission the HMI device according to the operating instructions.

Connection with the configuration PC

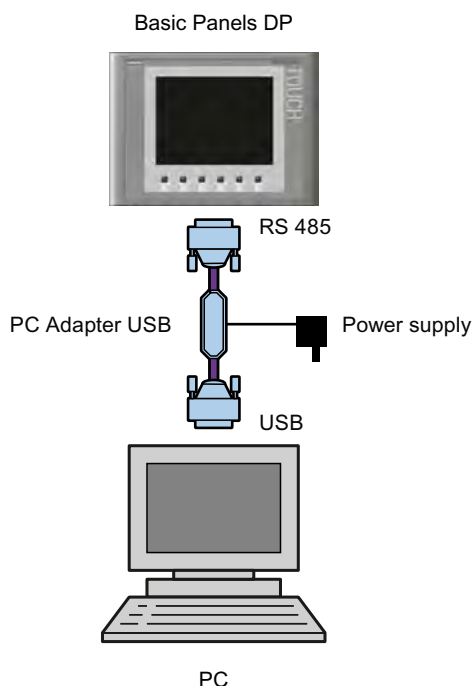
Your PC has to be equipped with the matching interface to connect the configuration PC with the HMI device.

The connection requires an MPI interface card installed in the PC or an external adapter. If an MPI interface card is installed in your PC, you will be able to connect the HMI device using the matching MPI cable.

The following external adapters are available at <http://mall.automation.siemens.com>:

- Serial USB/PPI cable, order number 6ES7 901-3DB30-0XA0
 - Serial PC/PPI cable, order number: 6ES7 901-3CB30-0XA0
 - MPI "PC Adapter USB", order number: 6ES7972-0CB20-0XA0
- Matching power supply, order number 6ES7972-0CA00-0XA0

In this "Getting Started" we are using the "PC Adapter USB".



The "PC Adapter USB" has its own power supply and you connect it to the configuration PC using the supplied USB cable. If the associated software is installed on the PC, the adapter will be detected automatically and offers a flexible MPI interface for connection of control and HMI devices.

We have used the "PROFIBUS" MPI/DP interface in this project. This interface was set in your project under "Connections" as "Connection_1".

Additional information on transfer is available in the operating instructions of the Basic Panels in the Internet (<http://support.automation.siemens.com/WW/view/en/31032678>) and the WinCC flexible online help.



Connect PN devices of the Basic Panels via Ethernet with the configuration PC.

You save and restore data, transfer a project or update the operating system via MPI.

You cannot update the operating system with "Reset factory settings" via MPI.

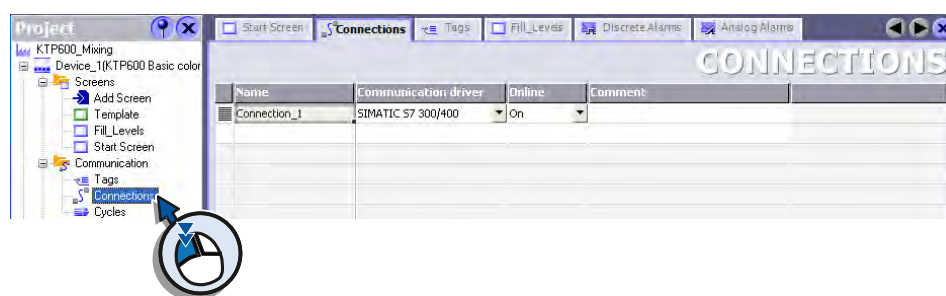
8.3 Check connection parameters

The connection parameters define the data connection between HMI device and configuration PC. A successful transfer is only possible if the following settings are correct:

- The settings configured under "Connections" in the project match the transfer settings of the HMI device.
- The USB/PPI adapter was configured as active MPI interface to the HMI device. The settings match the settings in the project.

Checking the connection parameters in the project

1. Open the "Connections" editor:

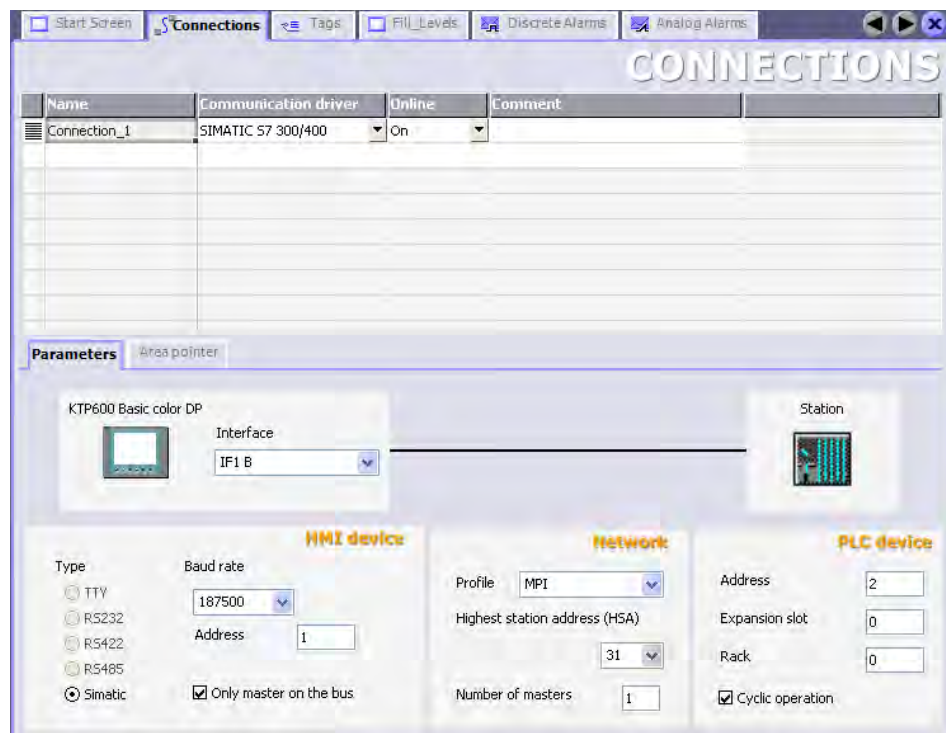


2. Check the settings you have made when creating the project with the Project wizard.

The following addresses must be set:

- HMI device: 1
- PLC: 2

The PLC and HMI device communicate with each other via an MPI network.



Checking the connection parameters of the adapter

The parameter settings of the adapter are available in the Windows Control Panel of your configuration PC.

1. Open the Windows Control Panel.
2. Open the settings for the PG/PC interface with "Set PG/PC Interface".
3. Check to see if the "PC Adapter USB" was set as interface for the configured MPI network.
4. Check to make sure that the settings of the adapter under "Properties/MPI" match the configured settings.

If the settings of the adapter do not match the settings in the project, then the adapter cannot transfer the project.

Checking the connection parameters at the HMI device

The transfer settings of the HMI device must match the settings in the project for the HMI device to receive the project data.

1. Switch on the power supply of the HMI device.
The HMI device starts. The Loader is displayed.
2. Open the Control Panel by pressing the "Control Panel" button of the Loader.
3. Press the "Transfer" button to open the "Transfer Settings" dialog.
4. Activate the MPI/PROFIBUS channel in the "Transfer" window and open the advanced settings with the "Advanced" button. Make sure that the settings in the "Advanced" window match the settings in the project.

8.4 Transfer the project to the HMI device

After having checked the connection parameters, transfer the project data to the HMI device.

Preparation

You will have to set the HMI device to transfer mode so that it can receive the transmitted data.

1. Switch on the power supply of the HMI device.
The HMI device starts. The Loader is displayed.
2. Select the entry "Transfer" in the Loader to switch the HMI device into transfer mode for data transmission.

The HMI device switches to transfer mode. The dialog window displays the message "Connecting to host ...".

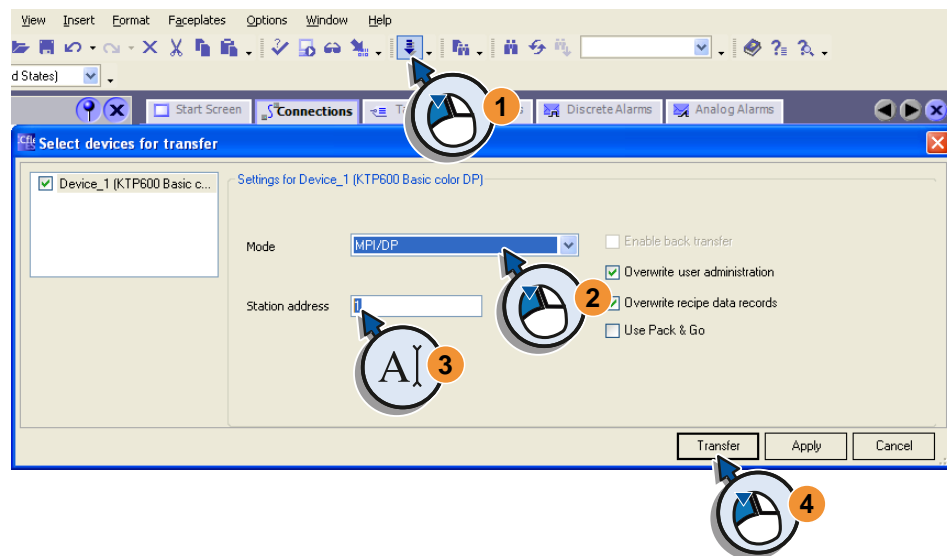
Transfer

Transmit the project data to your HMI device:

1. Start the transfer (1) in WinCC flexible.

You can also start the transfer via the "Project > Transfer > Transfer settings" menu.

2. Check the displayed settings for the transfer (2, 3) and start the transfer to your HMI device (4):



3. Track the displayed transfer steps in WinCC flexible and on your HMI device.



When the project is transferred to the HMI device, a consistency check is automatically performed. If the project still includes errors, then the transfer will be interrupted with a corresponding error message.

If the project you want to transfer is greater than the internal memory of the device, then the project will not be transferred completely and you will see a message to that effect.

Using a project on the HMI device

The HMI will restart automatically after successful transfer. Wait until the start process is complete and the Loader is displayed. The HMI device will start your project after a few seconds.

You can now call up and observe the screens of your project on the HMI device or check the functions of the Recipe view. Because the configured tags are not altered, the displays will be static and no messages will be created.

To operate the HMI device in a very realistic manner, the device has to be connected to an active S7 controller.

8.5 Using project with S7 controller

You have successfully transferred and tested the project on your HMI device.

The following paragraphs will describe the relationship between the HMI device and the controller.

The following requirements must be met to use the configured HMI device on an S7 controller:

- The configured HMI device is connected to a functioning, isolated S7 300/400 controller.
- An S7 program matching the project was transferred via the interface adapter to your controller.
- The values of the process tags of the S7 program will alter to match the project.

The function of the S7 controller

In reality, the PLC processes a program that controls the processes in a machine or plant via control values. The control values correspond to the states of the individual parts of the plant; they are detected with tags that were defined accordingly as part of data blocks in the program. If the data blocks include tags that match the tags created in the project regarding function and addressing, then the values detected there will be compared to the process and project tags. Entries on the HMI device change the values of linked tags and will trigger the reactions of the controller. Process values are transferred in configured tags and displayed in the project.

You need an S7 controller ready for operation to operate the project on the HMI device. The S7 controller must be isolated, which means the controller has to meet the following requirements:

- There may be no connections between controller and real plant or parts of the plant.
- The controller may not be located in the vicinity of components that carry dangerous electrical voltages.

All you need is a laboratory setting on a DIN rail, consisting of a SIMATIC S7-300/400 CPU with matching power supply. Your HMI device has to be connected to the power supply of the controller and has to be connected to the CPU with an MPI or PROFIBUS bus cable. Information on this setup is provided in the operating instructions of the S7 components.

WARNING

Risk of injuries when touching components carrying line voltage!

S7-300/400 modules are classified as open equipment. The danger of components carrying live voltage is given once the power supply is connected to the mains.

S7 modules have to be installed by trained personnel according to the respective operating instructions on a grounded DIN rail. The mains connection has to be touch-protected according to applicable standards.

S7 modules may only be installed in housings, control cabinets or electrical equipment rooms. Access must be key or tool controlled and limited to instructed and trained personnel.

The S7 program

A matching control program has been prepared for your "Getting Started" configuration. It simulates the function of the configured fruit juice mixing plant in the connected S7 controller. The cyclic change of the values in the process tags triggers the configured alarms and the display of the fill levels will vary. You can now operate the project on the HMI device.

The control program "S7_Mixing" is available in the "CD_3\Documents\[Language]Getting Started" folder on your data carrier or the WinCC flexible DVD.

STEP 7 and the installed "PC Adapter USB" is required to transfer the control program to the S7 controller. Information on this step is available in the S7 online help or the S7 Programming Manual.

1. Start STEP 7 on the configuration computer and run the control program "S7_Mixing".
2. Transfer the control program to the S7 control.



WARNING

Danger of unexpected movement or function of plant parts!

The "Getting Started" S7 program does not include any safety functions. When using the program in the PLC of a real plant or machine, you may trigger functions involuntarily and endanger persons in the close vicinity.

Do not transfer the "Getting Started" S7 program to the PLC of a real plant or machine. The PLC used for the "Getting Started" may not be connected to a functioning plant or its parts. The "Getting Started" S7 program was intended solely for use as part of this tutorial on a separate SIMATIC S7 controller.

Using the project

1. Start the power supply of the S7-CPU and the HMI device and wait until the start process has been completed.
2. If the S7 program and your project were transferred successfully, you can operate the configuration on the HMI device, observe the change in fill levels and track the status messages in the alarm window.

Result

- By transferring the project to the HMI device you have successfully carried out the tasks in "Getting Started - First-Time Users" and created a runnable project.
- You have become familiar with the basic use of your project by connecting the HMI device with the controller. You are now able to reproduce all steps of the simulation with an HMI device and PLC.