

Learn-/Training Document

Siemens Automation Cooperates with Education (SCE) | As of Version V9 SP1

PA Module P02-01 SIMATIC PCS 7 – HMI generation

siemens.com/sce



Matching SCE Trainer Packages for this Learn-/Training Document

- SIMATIC PCS 7 Software Package V9.0 (set of 3) Order No.: 6ES7650-0XX58-0YS5
- SIMATIC PCS 7 Software Package V9.0 (set of 6) Order No.: 6ES7650-0XX58-2YS5
- SIMATIC PCS 7 Software Upgrade Packages (set of 3) Order No.: 6ES7650-0XX58-0YE5 (V8.x→ V9.0)
- SIMIT Simulation Platform with Dongle V10 (contains SIMIT S & CTE, FLOWNET, CONTEC libraries) 2500 simulation tags Order No.: 6DL8913-0AK00-0AS5
- Upgrade SIMIT Simulation Platform V10 (contains SIMIT S & CTE, FLOWNET, CONTEC libraries) from V8.x/V9.x Order No.: 6DL8913-0AK00-0AS6
- Demo Version SIMIT Simulation Platform V10
 Download
- SIMATIC PCS 7 AS RTX Box (PROFIBUS) only in combination with ET 200M for RTX Order No.: 6ES7654-0UE23-0XS1
- ET 200M for RTX Box (PROFIBUS) only in combination with PCS 7 AS RTX Box Order No.: 6ES7153-2BA10-4AB1

Note that these trainer packages are replaced with successor packages when necessary. An overview of the currently available SCE packages is available at: <u>siemens.com/sce/tp</u>

Continued training

For regional Siemens SCE continued training, get in touch with your regional SCE contact siemens.com/sce/contact

Additional information regarding SCE

siemens.com/sce

Information regarding use

The SCE Learn-/Training Document for the integrated automation solution Totally Integrated Automation (TIA) was prepared for the program "Siemens Automation Cooperates with Education (SCE)" specifically for training purposes for public educational facilities and R&D institutions. Siemens does not guarantee the contents.

This document is to be used only for initial training on Siemens products/systems, which means it can be copied in whole or part and given to those being trained for use within the scope of their training. Circulation or copying this Learn-/Training Document and sharing its content is permitted within public training and advanced training facilities for training purposes.

Exceptions require written consent from the Siemens. Send all related requests to <u>scesupportfinder.i-ia@siemens.com</u>.

Offenders will be held liable. All rights including translation are reserved, particularly if a patent is granted or a utility model or design is registered.

Use for industrial customer courses is explicitly not permitted. We do not consent to commercial use of the Learn-/Training Document.

We wish to thank the TU Dresden, particularly Prof. Dr.-Ing. Leon Urbas and the Michael Dziallas Engineering Corporation and all other involved persons for their support during the preparation of this Learn-/Training Document.

Table of contents

1	Goa	Goal						
2	Pre	Prerequisite5						
3	Rec	Required hardware and software6						
4 Theory								
	4.1	Theory in brief	7					
	4.2	Objectives of process control	8					
	4.3	Concepts of representation	8					
	4.4	Representation techniques	10					
	4.5	HMI generation in PCS 7	13					
	4.6	References						
5	Tas		15					
6	Pla	nning	15					
7	Lea	Irning objective	15					
8	Stru	uctured step-by-step instructions	16					
	8.1	Faceplates in the plant hierarchy	16					
	8.2	Creating block icons	19					
	8.3	Compiling and downloading objects	22					
	8.4	Configuring WinCC	27					
	8.5	Editing the faceplate for the multipurpose plant	37					
	8.6	Configuring the picture change	44					
	8.7	Editing the faceplate for T1_educt_tanks	49					
	8.8	Linking of picture elements with PLC tags	55					
	8.9	Saving in the project library	59					
	8.10	Adapting the orientation of the faceplates	61					
	8.11	Testing the faceplates	67					
	8.12	Checklist – step-by-step instruction	76					
9	Exe	ercises	77					
	9.1	Tasks	77					
	9.2	Checklist – exercise	80					
1() Add	ditional information	81					

HMI generation

1 Goal

After working through this module, the students can design and implement a graphical user interface for efficient process control. They will also become familiar with the objectives of process control. They understand the basic concepts of representation and various representation techniques. This will enable the students to generate a usable and effective graphical user interface in **PSC 7**.

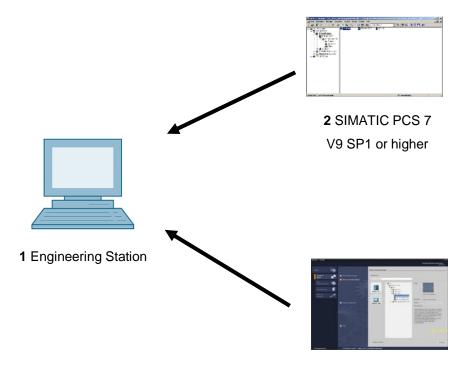
2 Prerequisite

This chapter builds on chapter 'Functional safety'. To implement this chapter, you can use an existing project from the previous chapter or the archived project 'p01-08-exercise-r1905-en.zip' provided by SCE. The download of the project(s) is stored on the SCE Internet for the respective module.

The (optional) simulation for the SIMIT program can be retrieved from the file 'p01-04-plantsimv10-r1905-en.simarc'. It can be run in demo mode.

3 Required hardware and software

- 1 Engineering station: Requirements include hardware and operating system (for further information, see Readme on the PCS 7 installation DVD)
- 2 SIMATIC PCS 7 software V9 SP1 or higher
 - Installed program packages (contained in SIMATIC PCS 7 Software Trainer Package):
 - Engineering \rightarrow PCS 7 Engineering
 - Engineering \rightarrow BATCH Engineering
 - Runtime \rightarrow Single Station \rightarrow OS Single Station
 - Runtime \rightarrow Single Station \rightarrow BATCH Single Station
 - Options \rightarrow SIMATIC Logon
 - Options \rightarrow S7-PLCSIM V5.4 SP8
- 3 Demo Version SIMIT Simulation Platform V10



3 SIMIT V10 or higher

4 Theory

4.1 Theory in brief

A modern process control system such as *PCS* **7** provides operating personnel various screenbased windows to the process via which all process control tasks can be completed. Due to the large amount of information from the technical process that the operator must take in and process, it is useful to structure the information. In addition, certain rules for navigation and representation must be adhered in order to produce an easy-to-operate interface to the technical process that effectively supports operators in carrying out their various process control tasks.

PCS 7 supports the design process of process pictures for operator control and monitoring in multiple ways. First, for many of the elementary blocks and individual control functions used in basic automation, operating icons and operator panels are defined that enable project-wide uniform interaction with similar technical equipment. Second, the plant hierarchy can be used to conveniently structure the information display.

This structure allows a large number of elements of the operating system that would have to be implemented manually in other systems to be generated automatically and error-free in a single generation run. Two essential tasks remain for designing process pictures. The first is the representing of static process structures (tanks, pipes, etc.) for better orientation. The second is the inserting of elements for navigation along process streams on a plant hierarchy level.

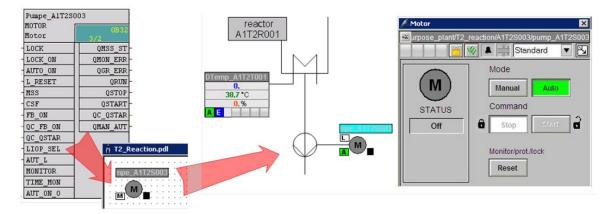


Figure 1: From the individual drive function to the faceplate

The generation run creates block icons for all operable blocks of a hierarchical level. These icons then only have to be positioned and enhanced with static elements in order to obtain a complete faceplate (see Figure 1).

4.2 Objectives of process control

The task of an operator in a process plant is to operate this plant for the intended purpose in an economical and environmentally compatible manner. This task is called process control. They must ensure a consistently high product quality and amount (yield) and keep the amount of waste as low as possible, while at the same time compensating for disturbance factors such as varying properties of raw material, plant malfunctions or fluctuating throughput. The operator must see to it that the availability and service life of the plant is maximized. Furthermore, the operator must ensure that emission limits are observed and energy and material consumption is minimized [1].

To attain these goals, an operator must always be able to monitor the plant, diagnose problems and intervene in the running process to solve them. An operator station in the control room serves as the operator's work station. This operator station has all the displays and possibilities of intervention that an operator needs to perform his work. The control system provides the operator a user interface that he can use to carry out his tasks according to his abilities, skills and requirements [1].

4.3 Concepts of representation

The representation of data and information on the graphical user interface has a decisive influence on the performance of the operator. For this reason, it has to be matched to the operator's abilities, skills and requirements. The following questions must therefore be answered in turn:

- 4. For whom and for what purpose does the representation serve?
- 5. What is to be represented?
- 6. How is it to be represented?

These questions depend on the plant that is being planned and, therefore, have to be answered for the respective project. However, the following aspects always have to be considered:

Organization of the information and data to be represented

The information and data to be represented has to be organized suitably for the representation. For this, it is necessary to specify how the existing elements are structured and arranged, how they relate to each other and how the representations can be navigated between. Accordingly, the total amount of information and data to be represented must be specified (quantitative aspect). And, the information and data that is to be visualized simultaneously and together must be specified (qualitative aspect).

Here, the ratio of what is new (information, dynamic picture components) to what is known (data, static picture components) must be decided. The aim is the maximize the proportion of information but to provide enough data to allow accurate and appropriate interpretation of the information.

The result is a distribution of information and data among the various faceplates. How the operator goes from one faceplate to another must then also be defined (*navigation*).

Density

Depending on the user interface, only a limited area is available for simultaneous representation of data and information. To ensure that the information and data remains legible and distinguishable in all operating situations, only a certain percentage of this area is to be occupied with characters. This percentage is referred to as the *density* of the representation.

The recommended density depends on the type of characters and display elements as well as on the necessary structuring of these elements. Thus, it depends on the representation technique used. For example, the density of a process flow diagram should be no more than 50%; for a message page, on the other hand, it may be up to 80% [1].

Coding

Coding is used to specify how certain information is represented. Information can be coded by color, shape, form, extension, direction (angle), position and dynamics (flashing). A uniform coding facilitates the intake and evaluation of information by the operator.

An effective coding is characterized by the fact that it is clear, distinguishable and consistent with existing conventions. That is why the color green should never be used for a STOP signal. If, for example, a red flashing signal is used instead as a coding for STOP, this coding should be used consistently for the entire user interface. Also, it is necessary to avoid reuse of this coding for other information in order to rule out confusion. In addition, an effective coding should be obvious so that it is easy to learn and remember for the operator.

Conspicuousness

A central function of the user interface is to direct the operator's attention to important information. Because a faceplate generally displays a variety of information, it is advisable to design this information with varying conspicuousness corresponding to its relevance and priority. The more conspicuous the information is represented, the sooner it will be spotted. In addition, the operator can recognize the information that requires the most attention at the moment based on its conspicuousness. Table 1 shows the stepping up of conspicuousness using a few examples.

 $^{\prime}$

	Increas	ing consp	icuousnes	s of	
\wedge					
$\langle \varsigma \rangle$	Combination of means				Application
of visualization	Contrast	Color	Flashing	Acoustical signal	
visu	high	Х	х	х	Alarm
	high	х	х	-	Change of state (requiring acknowledgement)
conspicuousness	high	Х	-	-	Change of state (not requiring acknowledgement)
idsu	high	Х	-	-	Curves
	high	-	-	-	Text of message line, explanatory texts
Increasing	medium	-	-	-	selctable and operator-controllable object (keys)
	low	-	-	-	currently not selctable and operator- controllable object

Table 1: Application of stepped conspicuousness according to [1]

Consistency

Often, a particular piece of information appears in several representations at the same time. In this case it is important that this information be represented **consistently** throughout the user interface. This means the information has the identical appearance in all representations and behaves identically. The same terms and symbols must always be used. The operating sequence should always be the same. Likewise, it is recommended that the timing and content of the system response to operator inputs be similar.

4.4 Representation techniques

Basic structure of the display area

The display area should always be structured the same for all representation modes. This facilitates the orientation, information intake and, thus, process control for operator. The basic structure recommended for this according to VDI 3699 [1] is shown in Figure 2. A message line in which the latest messages are displayed as group messages is located at the top. Below it is an overview field in which the available representations (for example, process pictures in **PCS 7**) are listed. There is the option to open any representation from here. The working area occupies the largest part of the display area. The currently selected visualization is displayed here.

The bottom area contains the key field for activating general functions. In the working area, windows with supplementary information (such as different views of *PCS* 7 blocks) can be opened in addition. All areas except the working area are reserved and are always displayed.

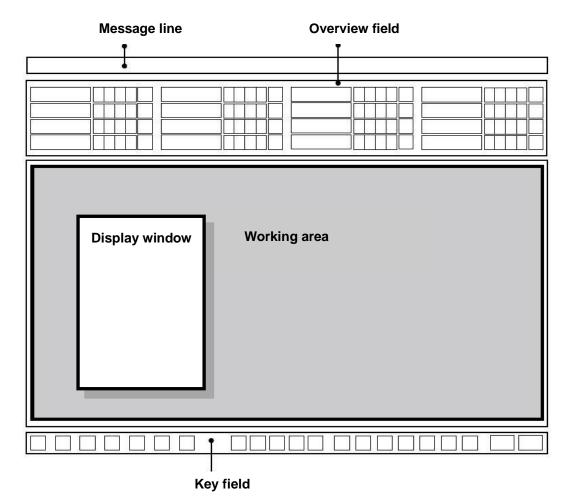


Figure 2: Basic structure of a display area

Flow diagrams

A flow diagram is a "schematic representation of components including their connection through (flow) lines to show relationships in a control plant and in control engineering" [1]. It represents the plant structure in a simplified manner and provides information about the paths of material, energy and signal flows between the different plant units. With the aid of flow diagrams, process-and control-related information is represented and interventions in the process are made possible.

Flow diagrams consist of static and dynamic elements. The static picture elements are represented by the *root screen*. This root screen contains the dynamic picture elements that are continuously updated.

The static root screen provides the context for the dynamic picture elements, which means it indicates the meaning of the represented objects and their relationship to each other. The root screen represents all data that remains unchanged during the display. It contains, for example, the picture background, the headings and labels as well as the plant units and the devices (if their representation is not supposed to change).

The dynamic picture elements provide the information for process control. **Display elements** display changes, time variations and relationships of the process values. Thus, they reflect the state of the plant, control system or process. **Selection and operator control elements** allow the operator to perform operator interventions for process control. In addition, there is often the option to display additional information such as function diagrams or trends in the flow diagram as a window.

Flow diagrams are subdivided as follows:

- Control flow diagrams represent only components of the control system such as loop controllers, actuators and controllers as symbols. They are connected to each other with signal flow lines.
- Process flow diagrams graphically represent plant units in a simplified way using symbols. Here, three different kinds are differentiated:
 - A basic flow diagram represents plants, plant sections or plant units in the form of rectangles. They are connected to each other with flow lines for materials, energy or energy sources.
 - A *process flow diagram* represents processes using (simplified) graphic symbols.
 The symbols represent the corresponding plant units and are connected to each other with flow lines.
 - A *piping & instrumentation flow diagram* (P&I diagram) represents the technical equipment of the plant using graphic symbols. In addition, process tags, control blocks and actuators are represented. The symbols are connected to each other by lines for pipes and signal paths.

In *PCS 7*, flow diagrams are referred to as *process pictures*. Various process pictures will be created for the configured plant within the scope of the step-by-step instructions.

4.5 HMI generation in PCS 7

PCS 7 has an extensive operator control and monitoring system that consists of the following subsystems [2]:

- A graphic system for displaying process information and for operator process control.
- A *curve system* for representation and analysis of time series of stored process values.
- A message system for diagnosing the process.
- A log system for documenting the process.
- An *archive system* for storing and keeping process values, messages and logs.

In this chapter, the graphic system of *PCS* **7** is introduced. The alarm system will be described in the subsequent chapter 'Alarm Engineering'.

The graphic system represents the plant in a plant overview. It displays process pictures in the working area of the user interface, provides elements for operator process and system control and indicates alarm states. The corresponding user interface is generated on the operator station (OS) of the system. The OS is thus the central station for operator control and monitoring of a *PCS 7* plant [2].

Configuration of the user interface in PCS 7

The selected plant hierarchy of the project is the basis for the organization of the user interface. The created plants and subunits are represented in the user interface through corresponding process pictures. Picture names and directory names of the plant hierarchy are applied automatically. In process mode, the available process pictures are represented in the overview area corresponding to the plant hierarchy.

The process pictures of a project are first created at the corresponding location in the plant hierarchy and assigned to an OS. The OS is then compiled. The process pictures can then be configured in the *Graphics Designer* of the *WinCC Explorer*. The *Graphics Designer* is an editor where static and dynamic picture elements can be inserted, arranged and interconnected.

Configuration of the process pictures in PCS 7

Operator control and monitoring-capable technological blocks from *PCS* **7** libraries already have corresponding graphic representations, so-called *block icons*. When the process pictures are configured, the block icons are inserted automatically in the corresponding picture. Block icons represent the most important information about the represented block as an overview in the process picture.

Various pre-configured *faceplates* can be opened as a window in the working area via the block icons. Faceplates are dynamic picture elements that are connected to the parameters of the represented block and are updated automatically. They allow extensive operator control and monitoring of the associated technological block for the operator. Depending on the block type, different *views* exist for the associated faceplates. These views enable access to parameters for very specific tasks. For example, in addition to the standard view there often also is a parameter view for assigning parameters, an alarm view for diagnostics or a limit view for setting operational limits of the setpoint. The views offered depend on the represented technological block.

The **Graphics Designer** provides additional dynamic standard objects and inserts them manually. These objects can be interconnected directly with the I/Os of the blocks in the CFCs and SFCs and thus realize the desired dynamic behavior. Examples of standard objects are input and output fields for entering and displaying values, status indicators for displaying binary states of an object as well as bars for the relative representation of values.

In addition, the *Graphics Designer* provides various libraries with pre-assembled graphic elements such as pipes or valves that can be used to create the static root screen. Alternatively, there is the option to also create and use your own graphics.

In the step-by-step instructions below, additional characteristics and capabilities of the *Graphics Designer* will be presented. Several other important *WinCC* tools are also presented.

4.6 References

- [1] VDI 3699 (Edition 2014-01): Process control using display screens.
- SIEMENS (2017-10): Process Control System PCS 7: OS Process Control (V9.0 SP1).
 A5E39221482-AB. (<u>support.industry.siemens.com/cs/ww/en/view/109754981</u>)

5 Task

In this task, a few presets are made in *SIMATIC Manager* followed by creation of the operator station (OS).

An overview picture of the multi-purpose plant and one-unit picture each for the educt tank, reactor and product tank are to be created. A solution for a tank for each plant unit will be created first.

6 Planning

To start, the target system on which the OS is to run must be defined. In these instructions, this is the same computer on which the engineering is performed. But it does not have to be. The following specification will be made:

- Type of network connection: TCP/IP
- Network connection used: PLCSIM.TCPIP.1
- Number of monitors: 1
- Resolution of monitors: 1920x1080

The CFCs and SFCs created previously in the preceding projects are a basis for overview and unit pictures. Once these are automatically generated by PCS 7, they only have to be arranged on the faceplates.

The static elements that are created when implementing these instructions are another basis.

Because several very similar plant units exist, it makes sense to use the project library of WinCC and to simplify the engineering in this way. This will be demonstrated using the example of an educt tank.

7 Learning objective

In this chapter, students learn the following:

- Generation of the operator station (OS) in SIMATIC Manager
- The WinCC configuration environment
- Creation of pictures with the Graphics Designer

8 Structured step-by-step instructions

8.1 Faceplates in the plant hierarchy

 To start, you are to change the object properties of your picture of the A1_multipurpose_plant level. (→ A1_multipurpose_plant → Picture(2) → Object Properties)

SIMATIC Manager - [SCE_PC57_MP	(Plant View) C:\F	Program Files (x86)\SIEMENS\STE	P7\S7Proj\SCE	_PC57\SCEMP]	
😪 File Edit Insert PLC View Option	is Window Help					_ 8 ×
] D 😅 🎛 🛲 🌡 🖻 💼 📩	© <u>₽</u> <u>₽</u> <u>₽</u>	🕮 🏛 🖻	< No Filter >	• 7	1 🐮 🎯 🖷 🗖	🔳 🕴
SCE_PCS7_MP SCE_PCS7_Pri Shared Declarations M1_multipurpose_plant G A1_multipurpose_plant G A1_multipurpose_plant G A1_multipurpose_plant G A1_multipurpose_plant G educt_tank B001 G educt_tank B002 G educt_tank B002 G T2_reaction G T2_reactor R001 G reactor R001 G reactor R002 G T3_product_tank B001 G educt_tank B001 G e	i T1_educt_tanks	in T2_reaction A1H002 ↑ Picture(2) - - - - - - - - - -	Copen Object Cut Copy Paste Delete Access Protection Print Plant Hierarchy SIMATIC BATCH Rename Object Properties		rinsing :_Product01	
Displays properties of the selected object for	editing.					11.

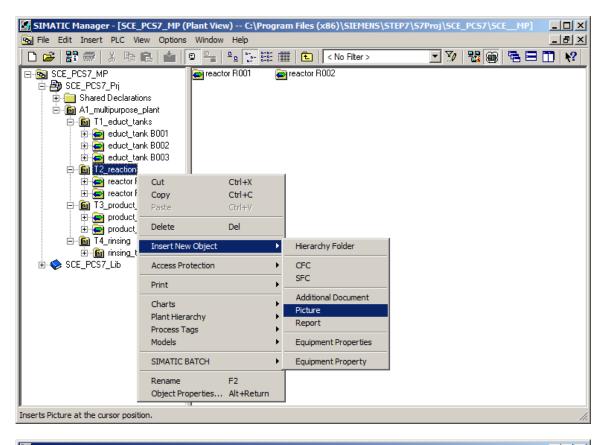
2. Enter "A1_multipurpose_plant" as the name. (\rightarrow General \rightarrow Name \rightarrow A1_multipurpose_plant)

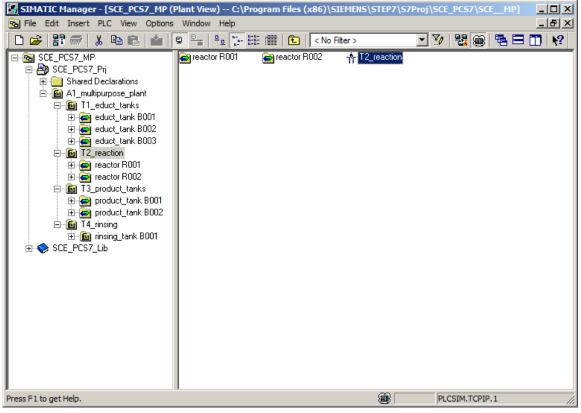
Properties - WinCC-Pict	ture: Picture(2)	x
General Block icons		
Name:	A1_multipurpose_plant	
Path:	SCE_PCS7_Prj\OS(1)\GraCS\Picture(2).Pdl	
Plant path:	SCE_PCS7_Prj\A1_multipurpose_plant	
Storage location of the project:	C:\Program Files (x86)\SIEMENS\STEP7\S7Proj \SCE_PCS7\SCEPrj	
Author:		
Created:		
Last changed on:		
OS Multiuser engineering:	deactivated	
Comment:	×	
ОК Арр	ly Cancel	

Derive the block icons from the plant hierarchy. (→ Block icons → Derive the block icons from the plant hierarchy → OK)

Properties - WinCC-Picture: Picture(2)	X
General Block icons	
Derive the block icons from the plant hierarchy.	
OK Apply Cancel	

Insert a picture in the T2 level by right-clicking and selecting "Insert New Object". Name this
as shown below. (→ Insert New Object → Picture → Object Properties → Name)





5. In the same way, create two new faceplates for units T3 and T4, rename the picture in unit T1 appropriately and delete the pictures from the three educt tanks folders.

8.2 Creating block icons

 The block icons must then be created or updated. (→ A1_multipurpose_plant → Plant Hierarchy → Create/Update Block Icons)

SIMATIC Manager - [SCE_PCS]		:\Program Fi	es (x86)\SIEMENS\STEP7\S	7Proj\SCE_PCS7\SC	E_MP] _OX
			No Filter >		1 to
SCE_PCS7_MP SCE_PCS7_Pri ScE_PCS7_Pri Shared Declarations Shared Declarations	Mathematical Sector	A1H		an ks 🔞 T4_rin sing 🏘 SFC_Produc	ŧ01
G G T1_educt_tanks G G educt_tank B G educt_tank B G educt_tank B	Сору С	Ctrl+X Ctrl+C Etrl+V			
□ · · · · · · · · · · · · · · · · · · ·	Delete D Insert New Object Access Protection	el			
⊕ 📻 product_tank ⊕ 📻 product_tank ⊡ 💼 T4_rinsing	Print Charts	, ,			
⊡- <u>G</u> ininsing_tank E ⊡-� SCE_PCS7_Lib	Plant Hierarchy Process Tags Models) 	Settings Check Consistency Open Check Log		
	SIMATIC BATCH	•	Create/Update Block Icons		
	Rename F Object Properties A	2 Alt+Return	Open Block Icons Log Change AS Assignment Change OS Assignment Cancel Assignment		
			Create/update diagnostic scre Display Diagnostic Screens Log Advanced Diagnostics Setting Configured Objects	,	
			Update in the Multiproject Clear Shortcut		
Creates/updates block icons in the sele	cted pictures.				

In the window that opens, set 'Chart' under "...name components of the HID" and the included lower-level hierarchy levels to '1'. Confirm with "OK". (→ Name components of the HID: Chart → Lower hierarchy levels included → 1 → OK)

Create/Update Block Icons							
Block icons will be created or updated for the following pictures:							
 A1_multipurpose_plant\A1_multipurpose_plant A1_multipurpose_plant\T1_educt_tanks\T1_educt_tanks A1_multipurpose_plant\T2_reaction\T2_reaction A1_multipurpose_plant\T3_product_tanks\T3_product_tanks A1_multipurpose_plant\T4_rinsing\T4_rinsing 							
The object name TAG is made up of the following components of the HID:							
Chart 💌							
Lower hierarchy levels included:							
Lower hierarchy levels included:							
Lower hierarchy levels included:							
Zoom block icons							

3. Next, the creation and update of the block icons takes place.

Plant Hierarchy - Create/Update Block Icons	
Updating pictures	
SCE_PCS7_Prj\OS\WinCC Appl.\OS(1)	
	Cancel

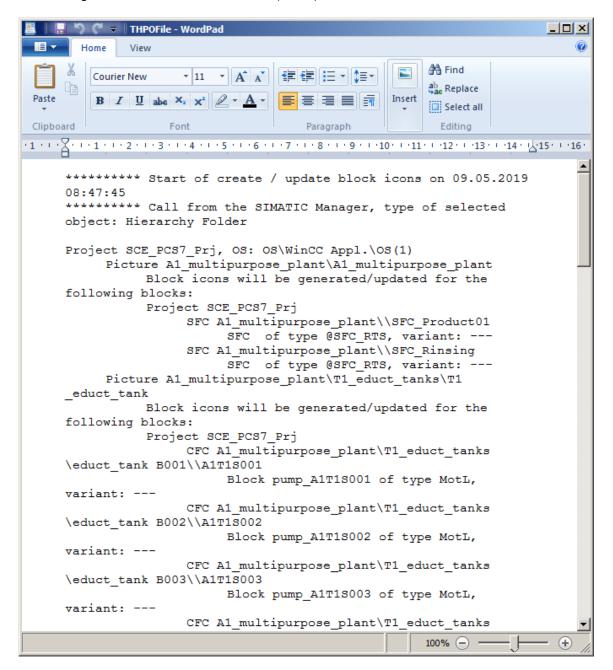
4. If the computer name in the WinCC project does not match the local computer name, you will receive the following message, which you confirm with 'Yes'.

s7omwin	x	×
<u>^</u>	The configured server is not available. Do you want to open the project with the local computer as server?	
	Yes No	

5. After the creation and update of block icons is complete, have the log displayed. (\rightarrow Yes)

Create/Update Block Icons (3283:5053)						
To ensure possible automatic corrections to the WinCC picture interconnections, you must subsequently compile the associated operator stations before making changes to the name components of the associated process variables (HID, chart names,). Do you want to view the function log now?						
<u>Y</u> e:	<u>N</u> o					

6. The log shows that no errors occurred. ($\rightarrow \checkmark$)



8.3 Compiling and downloading objects

1. You can now start compiling the OS from the component view. (\rightarrow OS \rightarrow PLC \rightarrow Compile and Download Objects...)

	ger - [SCE_PCS7_M rt PLC View Opti			n Files (x86)\SIEMENS\S	5TEP7\57Proj\SCE_PC	57\5CE
 D 🛩 🎛 🐖			b-b- b-b- b-b- b-b- b-b- b-b- b-b- b-b	< No Filter >	• y % 📾	
	S7_Prj	Configuration	📳 WinCC Appl.	¦≣ ≓IE General		
🗄 📄 Sh	Open Object	Ctrl+Alt+O				
i i • ♦ SCE_P	Cut Copy Paste	Ctrl+X Ctrl+C ⊂trl+∀				
	Delete	Del				
	PLC	•	Download	Ctrl+L		
	Access Protection	•	Configure Compile and Down	Ctrl+K oad Objects		
	Print	•	Compare			
	SIMATIC BATCH	•			I	
	Rename Object Properties	F2 . Alt+Return				
Compiles/downloads t	he objects to be selec	cted under the high	highted objects.			

2. Before starting, check the settings for compiling the OS. (\rightarrow OS(1) \rightarrow Edit...)

Compile and Download Objects				
Selection table:				
Objects	Status	Operating mode	Compile	Download
⊡- <u>@</u> 0S			V	
Dun Configuration	undefined		I	
- WinCC Appl.			4	
Connections	undefined		 Image: A state of the state of	
OS(1)			 Image: A set of the set of the	
Settings for compilation/download Update	a Mode Sir		ct objects	Deselect All
Upon opening Dupon				DescicutAir
Compile only	ł			Check project
Devices connected to an enterprise network or directly to the against unauthorized access, e.g. by use of firewalls and network For more information about industrial security, please visit: http://www.siemens.com/industrialsecurity	e internet must be a work segmentation	appropriately protected		
Start Close				Help

3. Leave the assignment of areas to operator stations unchanged. (\rightarrow Next)

Hierarchy	Area	OS Assignment	Comment
A1_multipurpose_plant	A1_multipurpose_plant	OS\WinCC Appl.\OS(1)	Multipurpose plant for training
.1			

In the next dialog step, the network connection is checked. (→ S7 Program(1) → right-click
 → Select Network Connection...)

perator stations and areas:	S7 programs and network connections:
∃ 🗹 🅐 OS(1)	S7 program 🛆 Connections Subnet Subnet type WinCC unit Address S
🔤 🖬 A1_multipurpose_plant	S7 Program(1) 1 Ethernet(1) Ind. Eth. Industrial 08.00.06.01.00.00
	Select Network Connections
ote: All areas are selected because the op	tion 'Clear/Reset' is active Connection

5. TCP/IP should be set as the WinCC unit. (WinCC unit \rightarrow TCP/IP \rightarrow OK)

50	Select Network Connection									
	S7 prograr	n: S7 Program(1)							
	Subnet	Subnet type	WinCC unit	Address	Station no.	Segment no.	Rack no.	Slot no.	Send/rece	
	Eth	Ind. Eth.	Industrial Etherr 💌	08.00.06.01.00.00			0	3		
			Industrial Ethernet Industrial Ethernet (I TCP/IP	D						
			ТСРИР							
	•								F	
	OK						Cance		Help	

6. Now go to the next dialog step. (\rightarrow Next)

Settings: Compile 0S							×
Select the network connections for the							
Operator stations and areas:	S7 programs and	d network connect	ions:				
🖃 ··· 🗹 🥐 OS(1)	S7 program	△ Connections	Subnet	Subnet type	WinCC unit	Address	Station
🗹 🖻 A1_multipurpose_plant	🗊 S7 Program	(1) 1	Ethernet(1)	Ind. Eth.	TCP/IP	192.168.0.1	
N	<u> </u>						
Note: All areas are selected because the option	Clear/Reset is a	ctive				Connect	tion
< Back Next >							lala
< DACK NEXT >						Cancel H	lelp

7. In the last setting window, apply the values shown below. $(\rightarrow Apply)$

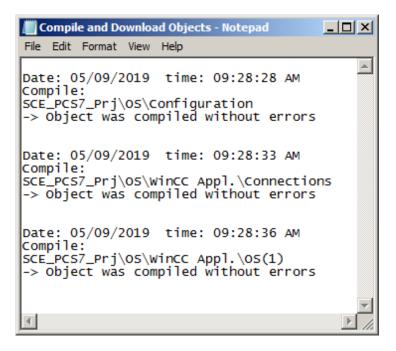
Data ☑ Tags and messages	Futher options Minimum acquisition cycle of the archive tags: 1 second	
SFC Visualization	With interconnection partner (SFC option)	
Diagnostics	Compression Settings	
✓ Picture Tree Scope	Create server data	
🖲 Entire OS 🛛 🗹 With	memory reset	
🔿 Changes		
lote: OS has not yet been compiled	vith the setting for AS-OS Engineering V9.0.	
anguage settings		
	STEP 7 multiproject. This has an impact on the u want to start the wizard for the language settings? Yes	

 Because the operator station (OS) is being started on the engineering system (ES) for this plant, select only Compile here and not Download. After the compilation is started, confirm the warning with 'Yes'. (→ Start → Yes)

🚟 Compile and Download Objects				_ 🗆 🗙
Selection table:				
Objects	Status	Operating mode	Compile	Download
⊡- <u>©</u> OS				
Du Configuration	undefined			
- WinCC Appl.			×	
Connections	undefined			
S(1)				
Settings for compilation/download Update			ect objects	n 1
Edit Test Status Operating		gle Object All	Select All	Deselect All
Compile only IV Do not load if compilation error is detected				Check project
Devices connected to an enterprise network or directly to the against unauthorized access, e.g. by use of firewalls and netw For more information about industrial security, please visit: http://www.siemens.com/industrialsecurity				
Start Close				Help

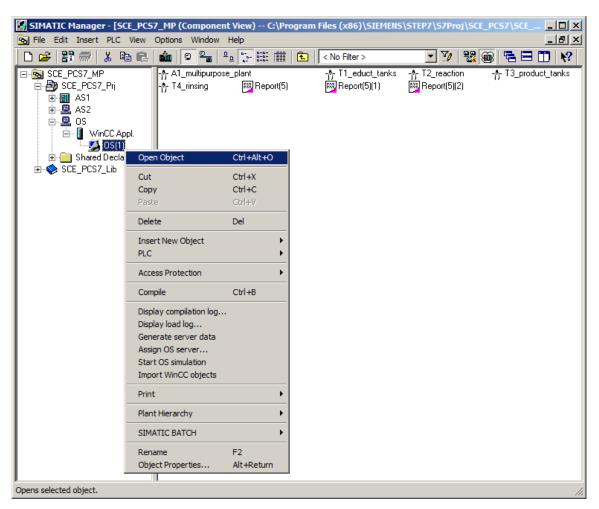
Compile and download objects (3280:822)							
If you want to download changes online, please make sure that the prerequisites have been met (e.g. correct settings selected, no previous complete compilation fro the OS). A complete download is only possible if the PLCs are no in RUN.							
	Do you want to continue?						
(Ye:	s No						

9. The log that is now displayed shows no errors. (\rightarrow \boxtimes)



8.4 Configuring WinCC

1. After the compilation, the operator station can be opened (\rightarrow OS(1) \rightarrow Open Object)



2. If the computer name in the WinCC project does not match the local computer name, you will receive the following message, which you confirm with 'Yes'.

s7omwin>	c .	×
<u> </u>	The configured server is not available. Do you want to open the project with the local computer as server?	
	Yes No	

3. You should then change the name of the computer. ($\rightarrow \square$ Computer $\rightarrow \square$ server computer \rightarrow Properties)

A WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_	_Prj\wincproj\05(1)\05(1).mcp	
<u> </u>		
□≥ ■> Х==□ 出Ч≥器		
⊡ OS(1)	Name	Туре
	PCS7ES	Server
Tag Management	Cut Copy	
	Paste	
	Delete	
Tag Logging	Properties	
🖓 😳 Global Script		
Text Library		
Text Distributor		
Time synchronization		
Horn		
Lifebeat Monitoring		
OS Project Editor		
Component List Editor		
— 器 SFC		
Web Navigator	•	۱.
OS(1)\Computer\	1 object(s) selected	Licensed mode //

 If the computer name is the same as the local computer name, no changes need be made. If the computer name does not match, it has to be set with the 'Use Local Computer Name' button. Exit the window with "OK". (→ Use Local Computer Name → OK)

Computer properties	Computer properties
General Startup Parameters Graphics Runtime Runtime	General Startup Parameters Graphics Runtime Runtime
Computer Name: PCS7ES	Computer Name: PCS70SCLIENT3
Use Local Computer Name	Use Local Computer Name
Computer Type:	Computer Type:
C Server	Server WinCC Client
C WINC LIPT	• WINDE GIERA
Server List:	Server List:
OK Cancel Help	OK Cancel Help

5. The change of the computer name is applied only after the restart. This means you have to close WinCC after changes to the computer name. (\rightarrow OK \rightarrow File \rightarrow Exit \rightarrow Exit)

The name of the computer 'PCS7OSCLIENT3' has changed. The change becomes effective only after you restart WinCC.	
OK	
WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PC57\SCE_Prj\wincproj\05(1)\05(1).mcp File Edit View Tools Help	1×
] Diew Ctrl+N [注意] [2] [2] [2] [2] [2] [2] [2] [2] [2] [2	
Den Ctrl+O Name Type	
Close Server	
Activate	
Print Project Documentation	
Preview Project Documentation	
Set Up Project Documentation	
Recent File	
Exit	
- P Text Distributor	
- 👸 User Administrator	
Cross-Reference Exit WinCC Explorer	
User Archive This closes the WinCC Explorer.	
Time synchronization	
Horn Close project when exiting	1
Picture Tree	
S Project Editor	
Component List Editor Exit Cancel	
움 SFC	
Web Navioator	1.1
Exits the application; asks whether the documents should be saved. I object(s) selected Licensed mode	Ŀ

6. You can re-open the WinCC project from SIMATIC Manager.

SIMATIC Manager - [SCE_PC			ogram Files (x86)\SIEMENS	\STEP7\S7Proj\SCE	_PCS7\SCE X
D 😅 🎛 🛲 X 🖻 🖻	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<u>D</u> <u>b-</u> <u>b-b-</u> <u>iiii</u>		🗾 🏹 器 (🗑 🖻 🗖 📢
CE_PCS7_MP CE_PCS7_Pr CF_PCS7_Pr CF_PCS_Pr CF_PCS_Pr CF_PCS_Pr CF_PCS_Pr CF_P	-^ A1_multipurpose -^r T4_rinsing	e_plant		-∱-T2_reaction ■Report(5)(2)	-∱ T3_product_tanks
⊕	pen Object	Ctrl+Alt+O			
Cu	ut opy	Ctrl+X Ctrl+C			
	aste	Ctrl+V			
De	elete	Del			
Ins	sert New Object	+			
PL	.C	•			
Ac	ccess Protection	+			
Co	ompile	Ctrl+B			
Dis Ge As Sta	splay compilation log splay load log enerate server data ssign OS server art OS simulation sport WinCC objects				
Pri	int	•			
Pla	ant Hierarchy	•			
SI	MATIC BATCH	×			
	ename bject Properties	F2 Alt+Return			
Opens selected object.					

7. To set the network configuration, open Tag Management. (\rightarrow Tag Management \rightarrow Open)

& WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_	Prj\wincproj\05(1)\05(1).mcp		_ 🗆 🗵
<u> </u>			
□≥ ■ > X ==================================			
⊡ <mark>]</mark> } OS(1)	Name	Type	
Tag Management			
Text and graphic Properties			
Tag Logging			
Report Designer			
😳 😳 Global Script			
Text Library			
Text Distributor			
🦷 🙀 User Administrator	No objects exist		
Cross-Reference	No objects exist		
User Archive			
····· D Time synchronization			
		i li	
* OS Project Editor			
Component List Editor		11	
		212	
OS(1)\Tag Management\	Process objects: 45 / License: Unlimited	License	d mode //,

8. You can change the system parameters here. To do so, you must select the system parameters in the SIMATIC S7 Protocol Suite under TCP/IP. (\rightarrow SIMATIC S7 Protocol Suite \rightarrow TCP/IP \rightarrow System parameters)

	« 📔 💓	Tags [TCP/IP]			Find		<mark>۰ ج</mark>
III Tag Management		Name	Comment	Data type	Length	Format adaptation	
🕀 🍟 Internal tags	1	A1_multipurpose_plant/SFC_Product01.BA		Binary Tag	1		_
SIMATIC S7 Protocol Suite	2	A1_multipurpose_plant/SFC_Product01.BA_		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
MPI	3	A1_multipurpose_plant/SFC_Product01.BA_		Text tag 8-bit character set	32		
PROFIBUS	4	A1_multipurpose_plant/SFC_Product01.CUS		Unsigned 8-bit value	1	ByteToUnsignedByte	
Industrial Ethernet	5	A1_multipurpose_plant/SFC_Product01.DIS		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
Slot PLC	6	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
	7	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
₩ S7 💕 New Connection	8	A1_multipurpose_plant/SFC_Product01.Eve		Signed 32-bit value	4	LongToSignedDword	
	9	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
Copy	10	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
Named Paste	11	A1_multipurpose_plant/SFC_Product01.HEL		Unsigned 8-bit value	1	ByteToUnsignedByte	
	12	A1_multipurpose_plant/SFC_Product01.LI_6		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
Export	13	A1_multipurpose_plant/SFC_Product01.MS		Binary Tag	1		
Structure tags	14	A1_multipurpose_plant/SFC_Product01.MS		Binary Tag	1		
⊕-Ŷ\$ @AssetCo II System parameters	15	A1_multipurpose_plant/SFC_Product01.OC		Binary Tag	1		
	16	A1_multipurpose_plant/SFC_Product01.OP_		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
@AssetInfoExportControlStruct	17	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
@AssetInfoExportControlStructCyclic	18	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
@Enum_Operating State	19	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
⊕ 🔧 @Maintenance	20	A1_multipurpose_plant/SFC_Product01.STE		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
E 🕂 @ResetControlStruct	21	A1_multipurpose_plant/SFC_Rinsing.BA_EN		Binary Tag	1		
+ 4 S7\$Program(1)/@SFC_RTS	22	A1_multipurpose_plant/SFC_Rinsing.BA_ID		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
I → A ST\$Program(1)/CPU_RT		A1_multipurpose_plant/SFC_Rinsing.BA_NA		Text tag 8-bit character set	32		
E-4 S7\$Program(1)/Intlk02	24	A1_multipurpose_plant/SFC_Rinsing.CUSEC		Unsigned 8-bit value	1	ByteToUnsignedByte	
		A1_multipurpose_plant/SFC_Rinsing.DIS_S		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
E - 4 S7\$Program(1)/06 BEGIN		A1_multipurpose_plant/SFC_Rinsing.EventF		Unsigned 32-bit value	4	DwordToUnsignedDwor	- 1000
		A1_multipurpose_plant/SFC_Rinsing.EventF		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
S7\$Program(1)/PIDConL		A1_multipurpose_plant/SFC_Rinsing.EventS		Signed 32-bit value	4	LongToSignedDword	
±-≪\$ S7\$Program(1)/VivL		A1_multipurpose_plant/SFC_Rinsing.EventT		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
i		A1_multipurpose_plant/SFC_Rinsing.EventT		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
Tag Management		A1_multipurpose_plant/SFC_Rinsing.HELDS		Unsigned 8-bit value	1	ByteToUnsignedByte	
Alarm logging		A1_multipurpose_plant/SFC_Rinsing.LI_ERF		Unsigned 32-bit value	4	DwordToUnsignedDwor	d
		A1_multipurpose_plant/SFC_Rinsing.MSG_L		Binary Tag	1	, , , , , , , , , , , , , , , , , , ,	
Tag Logging		A1_multipurpose_plant/SFC_Rinsing.MSG_S		Binary Tag	1		
, [] (0) (1) (0) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	35	A1_multipurpose_plant/SFC_Rinsing.OCCU		Binary Tag	1		

 In the 'Unit' tab, set PLCSIM.TCPIP.1 as the logical device name. (→ Unit → Logical device name: PLCSIM.TCPIP.1 → OK)

Systemparameter - TCP/IP	X
SIMATIC S7 Unit	
Logischen Gerätenamen auswählen	
CP-Typ / Busprofil: TCP/IP	
Logischer Gerätename: PLCSIM.TCPIP.1	
Automatisch einstellen CP-TCPIP CP_H1_1: CP_L2_1: CP1623.RFC1006.1 MPI	
Auftragsbearbeitung PLCSIM.TCPIP.1 PLCSIM.TCPIP_internal.1 Schreiben mit Priorität Realtek RTL8168C(P)/8111C(P)-F Realtek RTL8168C(P)/8111C(P)-F	
Realtek RTL8168C(P)/8111C(P)-F Geben Sie einen neuen Geräten gewünschte Gerät aus der Liste. TS Adapter IE	
OK Abbrechen Hilfe	

10. Close Tag Management. (\rightarrow File \rightarrow Exit)

Set Up Project Documentation	« 🃦	Tags [TCP/IP]			Find	م	
Preview Project Documentation		Name	Comment	Data type	Length	Format adaptation	
Print Project Documentation	1	A1 multipurpose plant/SFC Product01.BA		Binary Tag	1		
	2	A1 multipurpose plant/SFC Product01.BA		Unsigned 32-bit value	4	DwordToUnsignedDword	
Exit	3	A1_multipurpose_plant/SFC_Product01.BA_		Text tag 8-bit character set	32		
	4	A1_multipurpose_plant/SFC_Product01.CUS		Unsigned 8-bit value	1	ByteToUnsignedByte	
Industrial Ethernet		A1_multipurpose_plant/SFC_Product01.DIS		Unsigned 32-bit value	4	DwordToUnsignedDword	
Slot PLC	6	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDword	
	7	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDword	
	8	A1_multipurpose_plant/SFC_Product01.Eve		Signed 32-bit value	4	LongToSignedDword	
	9	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDword	
PROFIBUS (II)	10	A1_multipurpose_plant/SFC_Product01.Eve		Unsigned 32-bit value	4	DwordToUnsignedDword	
Industrial Ethernet (II)	11	A1_multipurpose_plant/SFC_Product01.HEL		Unsigned 8-bit value	1	ByteToUnsignedByte	
Named Connections		A1_multipurpose_plant/SFC_Product01.LI_		Unsigned 32-bit value	4	DwordToUnsignedDword	
Soft PLC	13	A1_multipurpose_plant/SFC_Product01.MS		Binary Tag	1		
🗄 🧟 Structure tags	14	A1_multipurpose_plant/SFC_Product01.MS		Binary Tag	1		
🕀 🔧 @AssetControlStruct	15	A1_multipurpose_plant/SFC_Product01.0C0		Binary Tag	1		
🕀 🔧 @AssetControlStructCyclic	16	A1_multipurpose_plant/SFC_Product01.OP		Unsigned 32-bit value	4	DwordToUnsignedDword	
🗉 🏤 @AssetInfoExportControlStruct	17	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDword	
	18	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDword	
	19	A1_multipurpose_plant/SFC_Product01.SFC		Unsigned 32-bit value	4	DwordToUnsignedDword	
🗉 🔧 @Maintenance	20	A1_multipurpose_plant/SFC_Product01.STE		Unsigned 32-bit value	4	DwordToUnsignedDword	
@ResetControlStruct	21	A1_multipurpose_plant/SFC_Rinsing.BA_EN		Binary Tag	1		
E - K S7\$Program(1)/@SFC RTS	22	A1_multipurpose_plant/SFC_Rinsing.BA_ID		Unsigned 32-bit value	4	DwordToUnsignedDword	
	23	A1_multipurpose_plant/SFC_Rinsing.BA_NA		Text tag 8-bit character set	32		
	24	A1_multipurpose_plant/SFC_Rinsing.CUSEC		Unsigned 8-bit value	1	ByteToUnsignedByte	
E S7\$Program(1)/MotL	25	A1_multipurpose_plant/SFC_Rinsing.DIS_S		Unsigned 32-bit value	4	DwordToUnsignedDword	
E Systrogram(1)/OB_BEGIN	26	A1_multipurpose_plant/SFC_Rinsing.EventF		Unsigned 32-bit value	4	DwordToUnsignedDword	
E-4 S7\$Program(1)/PIDConL	27	A1_multipurpose_plant/SFC_Rinsing.EventF		Unsigned 32-bit value	4	DwordToUnsignedDword	
	28	A1_multipurpose_plant/SFC_Rinsing.EventS		Signed 32-bit value	4	LongToSignedDword	
±•t\$ S7\$Program(1)/vivL	29	A1_multipurpose_plant/SFC_Rinsing.EventT		Unsigned 32-bit value	4	DwordToUnsignedDword	
Tag Management	30	A1_multipurpose_plant/SFC_Rinsing.EventT		Unsigned 32-bit value	4	DwordToUnsignedDword	
Tag Management	31	A1_multipurpose_plant/SFC_Rinsing.HELDS		Unsigned 8-bit value	1	ByteToUnsignedByte	
🖌 Alarm logging		A1_multipurpose_plant/SFC_Rinsing.LI_ERF		Unsigned 32-bit value	4	DwordToUnsignedDword	
	33	A1_multipurpose_plant/SFC_Rinsing.MSG_I		Binary Tag	1		
Tag Logging		A1_multipurpose_plant/SFC_Rinsing.MSG_		Binary Tag	1		
	35	A1_multipurpose_plant/SFC_Rinsing.OCCU		Binary Tag	1		-

11. Open the Picture Tree Manager. (\rightarrow Picture Tree Manager \rightarrow Open)

Ѧ WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_	Prj\wincproj\05(1)\05(1).mcp	_ 🗆 🗵
Eile Edit View Tools Help		
□> ■> Х直直 出出之診謬(()		
⊡ OS(1)	Name	Туре
Tag Management		
Graphics Designer		
- 🔛 Text and graphics lists		
Alarm Logging		
Tag Logging		
] 😃 Global Script		
Text Library		
🙀 User Administrator	No objects exist	
🛐 Cross-Reference	No objects exist	
Redundancy		
		_
Lifebeat Mor Open		de la compañía de la
Component List Editor		
		10.00
Web Navigator		
OS(1)\Picture Tree\	Process objects: 45 / License: Unlimited	Licensed mode //.

12. The order in which the pictures will be called later is specified in the Picture Tree Manager.

Picture Tree - WinCC Configuration Studio											<u>_ ×</u>
<u>F</u> ile <u>E</u> dit <u>V</u> iew Too <u>l</u> s Options <u>H</u> elp											
Picture Tree «	۸	Avai	lable pictures [Picture	hierarc	Find		۶ -	1	Properties	- Available picture	*
🖃 擦 Picture hierarchy		Use	Picture Name	Containe	r name	Display name		Ξ	Selection		
A1_multipurpose_plant	1		A1_multipurpose_plant.Pdl	A1_multi	purpose_plant				Object type	Available picture	
A1_multipurpose_plant/T1_educt_tanks	2	_							Object name	A1_multipurpose_plant.Pdl	
A1 multipurpose plant/T2 reaction	3							Ξ	General		
A1_multipurpose_plant/T3_product_tanks	4								Use	V	
A1_multipurpose_plant/T4_rinsing	5								Picture Name	A1_multipurpose_plant.Pdl	
	6									A1_multipurpose_plant	
	7								Display name		
	8								Translation		
	9								Text ID	604	
	10								Name (DEU)	A1_multipurpose_plant	
	11								Name (ENU)	A1_multipurpose_plant	
	12								Name (ESP)	A1_multipurpose_plant	
	13								Name (FRA)	A1_multipurpose_plant	
	14								Name (ITA)	A1_multipurpose_plant	
	15										
	16										
	17										
	18						_				
	10						_				
	20	-									
	20	-					_				
		-									
Tag Management	22	-									
Alarm logging	23	-									
Authoritogging	24	-									
Tag Logging	25						_				
	26										
III ₩ III ● <mark>☆</mark> 🖽 ×	27 ∣∢	4 F FI	Available pictures								
Ready NUM			0	German (Ger	many)		Tal	ble:	1 Available pictur	e 100 % 🕞 — 🖓 —	-+ .:

13. Keep and save the structure and close the editor. (\rightarrow File \rightarrow Save \rightarrow \times Close)

in P	cture Tree - WinCC Configuration Studio										_ 🗆 ×
Eile	<u>E</u> dit <u>V</u> iew Too <u>l</u> s Options <u>H</u> elp										
	Save		Avai	ilable pictures [Picture	hierarc Find		ہ م	1	Properties - A	vailable picture	*
	Project Documentation Group Display - Setup		Use	Picture Name	Container name	Display name	-	Ξ	Selection		-
		1		A1_multipurpose_plant.Pdl	A1_multipurpose_plant				Object type A	vailable picture	
	Project Documentation Group Display - Preview	2								1_multipurpose_plant.Pdl	
	Print Project Documentation Group Display	3							General		
		4							Use 😨	1	
	Set Up Project Documentation	5							Picture Name A	1_multipurpose_plant.Pdl	
	Preview Project Documentation	6								1_multipurpose_plant	
	Print Project Documentation	7							Display name		
nGe	- inter of each of the internation	8							Translation		
	Exit	9								04	
		10								1_multipurpose_plant	
		10								1_multipurpose_plant	
										1_multipurpose_plant	
		12								1_multipurpose_plant	
		13							Name (ITA) A	1_multipurpose_plant	
		14									
		15									
		16									
		17					_				
		18									
		19									
		20									
		21									
	Tag Management	22									
11		23									
	Alarm logging	24									
-		25									
	Tag Logging	26									
	🏢 🍏 🎹 🐠 😓 👻	27					-				
	III W W W H 22 Y	14 4		Available pictures			• //				
Rea	dy NUM			(German (Germany)		Tal	ble:	1 Available picture	100 % 🕞 💎 🖓	-+ .:

14. Then open the OS Project Editor. (\rightarrow OS Project Editor \rightarrow Open)

& WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_	Prj\wincproj\0S(1)\0S(1).mcp	<u>_ ×</u>
<u> </u>		
□≫ ■ > X ==□ 出品於錄		
□ OS(1)	Name	Туре
Tag Management		
A Graphics Designer		
Text and graphics lists		
Tag Logging		
Global Script		
Text Library		
	No objects exist	
User Archive		
Time synchronization		
		$\leq 1/2 = -1$
Lifebeat Monitoring		estas - I
* OS Project Editor		221 N
Component List E Open		
一 去 SFC Properties		
💮 Web Navigator		
OS(1)\OS Project Editor\	0 object(s)	Licensed mode //

15. The motor configuration and the screen resolution can be selected under 'Layout' in the OS Project Editor. In addition, there are settings for the message display, the visible areas, the window arrangement in the Runtime window and other basic settings. Set the desired layout, the number of area keys and the monitor configuration. (→ Select layout → Select monitor configuration → 'Detail...' button → Number of Areas Horizontal / Vertical: 2 → OK)

🎌 OS Project Editor	? ×
🔁 Layout 🔹 🕅 🌋 Message Configuration 📗 Message Display 🛛	👷 Area 🏾 🖻 Runtime Window 🔹 🎦 Basic Data 🔹 🖀 General 💧
Current Layout: SIMATIC Standard 1920*1200	
Available Layouts:	Layout Description:
Picture Name	SIMATIC Standard-Layout for screen resolution of 1920*1080
SIMATIC Standard 1024*768	
SIMATIC Standard 1152 864	
SIMATIC Standard 1600*1200	Number of area keys: 24
SIMATIC Standard 1680*1050	Number of server keys:
SIMATIC Standard 1920*1080 SIMATIC Standard 1920*1200	
SIMATIC Standard 2560*1600	
	Runtime help available
	Display
	C User name
- Manier and in unline	
Monitor configuration	
	OK Cancel Apply
Layout Configuration	Cayout Configuration
Number of configured areas: 1 Suggestion	Number of configured areas: 1 Suggestion
Number of configured servers: 1 Preview	Number of configured servers: 1 Preview
Number of Areas:	Number of Areas:
Horizontal: 4 2 — 11	Horizontal: 2 ÷ 2 1 11
Vertical: 6 2 1 6	Vertical: 2 2 6
Number of Servers:	Number of Servers:
Horizontal:	Horizontal:
Vertical:	Vertical:
OK Cancel	OK Cancel

For unrestricted use in educational / R&D institutions. $\textcircled{\mbox{\sc b}}$ Siemens 2020. All rights reserved.

16. Exit the dialog with 'OK'. (\rightarrow OK)

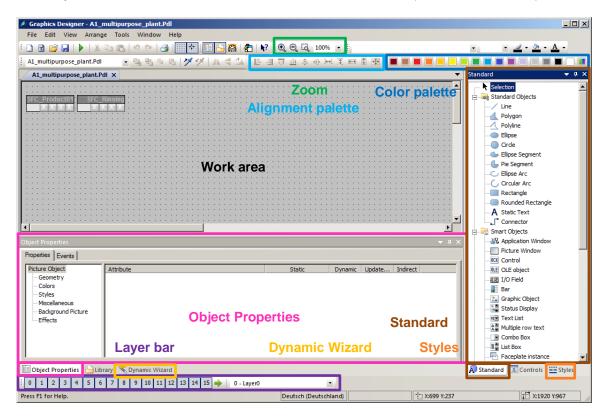
🎌 05 Project Editor	<u>? ×</u>
Layout • Message Configuration Message Display	🙀 Area 🛛 🔁 Runtime Window 🛛 🎒 Basic Data 🗍 😭 General 🗎
Current Layout: SIMATIC Standard 1920*1200	
Available Layouts:	Layout Description:
Picture Name SIMATIC Standard 1024*768 SIMATIC Standard 1152*864	SIMATIC Standard-Layout for screen resolution of 1920*1080
SIMATIC Standard 1280*1024 SIMATIC Standard 1600*1200 SIMATIC Standard 1680*1050 SIMATIC Standard 1920*1080	Number of area keys:
SIMATIC Standard 1920*1200	Overview extended configuration: Detail Runtime help available
Project Con	figuration
Monitor configuration	Configuring the runtime system
	Copies picture files
	OK Cancel Apply

8.5 Editing the faceplate for the multipurpose plant

 The faceplates are created in the Graphics Designer. The best way to open individual screens is to double-click on the name in the right window. (→ Graphics Designer → A1_multipurpose_plant)

🛦 WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_Prj\wincproj\05(1)\05(1).mcp						
Ele Edit View Iools Help						
□ > ■ > X 道 直 出 5 芬 謎 🏢	會 ?					
⊡ OS(1)	Name	Туре	Last Change			
Computer	Å @ScreenSettings.PDL	Process picture	2/18/2017 12:13:24 AM			
Tag Management	Å @ServersStates.PDL	Process picture	2/18/2017 12:13:24 AM			
	A @SIGNAL_Test.PDL	Process picture	2/18/2017 12:13:24 AM			
···· A Graphics Designer	Å @simatic_batchos.pdl	Process picture	11/17/2017 8:59:20 AM			
Text and graphics lists	Å @TemplateAPLV7.PDL	Process picture	11/16/2017 10:35:22 AM			
	🙏 @TemplateAPLV8.PDL	Process picture	11/16/2017 10:36:02 AM			
Tag Logging	👌 @TemplateBasisLibraryV8.pdl	Process picture	11/24/2017 2:18:56 PM			
	👌 @TemplateLM.pdl	Process picture	11/13/2017 1:39:08 PM			
Global Script	👌 @Template_Batch_APL.pdl	Process picture	11/17/2017 8:59:22 AM			
	Å @Test001.PDL	Process picture	2/18/2017 12:13:24 AM			
Text Library	👌 @Time7SEG.pdl	Process picture	2/18/2017 12:13:24 AM			
Text Distributor	👌 @TopAlarmNew.pdl	Process picture	5/7/2019 11:27:36 AM			
😳 🉀 User Administrator	A @TRG_APL_TrendCurve.PDL	Process picture	11/16/2017 10:36:06 AM			
- Tage Cross-Reference	A @TRG_APL_TrendCurve_FullScreen.PDL	Process picture	11/21/2017 10:45:30 AM			
Redundancy	👌 @TRG_Default.Pdl	Process picture	2/18/2017 12:13:24 AM			
User Archive	👌 @TRG_Standard.Pdl	Process picture	2/18/2017 12:13:24 AM			
	👌 @UserAdmin.pdl	Process picture	2/18/2017 12:13:24 AM			
	👌 @WarningLevel.PDL	Process picture	2/18/2017 12:13:24 AM			
	👌 @WarningServer.PDL	Process picture	2/18/2017 12:13:24 AM			
	👌 @WarningTopfield.PDL	Process picture	2/18/2017 12:13:24 AM			
Lifebeat Monitoring	A @Welcome.PDL	Process picture	2/18/2017 12:13:24 AM			
	A1_multipurpose_plant.Pdl	Process picture	5/7/2019 10:53:13 AM			
Component List Editor	A T1_educt_tanks.Pdl	Process picture	5/7/2019 10:53:15 AM			
	A T2_reaction.Pdl	Process picture	5/7/2019 10:53:16 AM			
	A T3_product_tanks.Pdl	Process picture	5/7/2019 10:53:17 AM			
	A T4_rinsing.Pdl	Process picture	5/7/2019 10:53:18 AM			
OS(1)\Graphics Designer\	1 object(s) select	ed	Licensed mode			

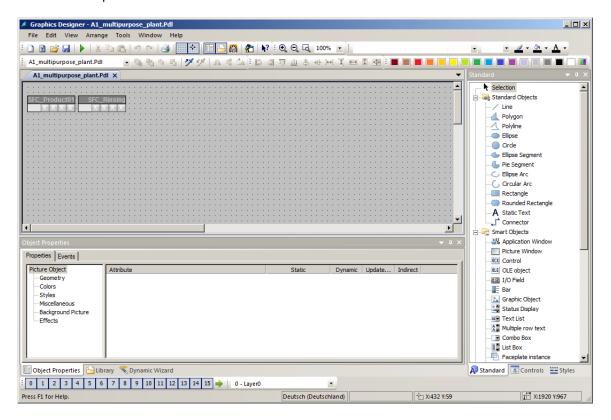
2. The Graphics Designer provides a wide range of functions for creating process pictures. They can be hidden or shown in the menu with View/Toolbars. (\rightarrow View \rightarrow Toolbars)



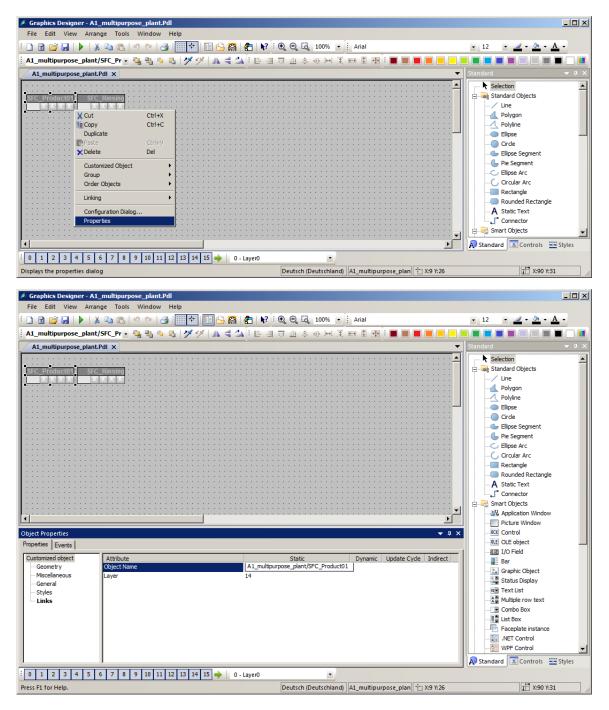
These toolbars have the following functions:

- Standard palette: Contains icons and buttons to execute frequently used commands quickly.
- Color palette: Allows the assignment of colors to selected objects (one of 16 standard colors or a user-defined color).
- **Zoom palette**: Sets the zoom factor (in percent) for the active window.
- Styles: Changes the appearance of a selected object. Depending on the object, the line/border type, the line/border weight, the line end styles or the fill pattern can be changed.
- Standard: Contains the standard objects (polygon, ellipse, rectangle, etc.), smart objects (OLE control, OLE element, I/O field etc.) and Windows objects (button, check box etc.).
- Dynamic Wizard: Provides numerous frequently used functions. These can be created with the help of a dialog that guides and assists the user.
- Layer palette: Selects which of the 32 levels (level 0 to 31) is visible. Level 0 is selected by default.
- Alignment palette: Allows you to change the absolute position of one or more objects and the position of selected objects relative to each other or to standardize the height and width of several objects.
- Object properties: Allows you to view and change all properties of the selected object.

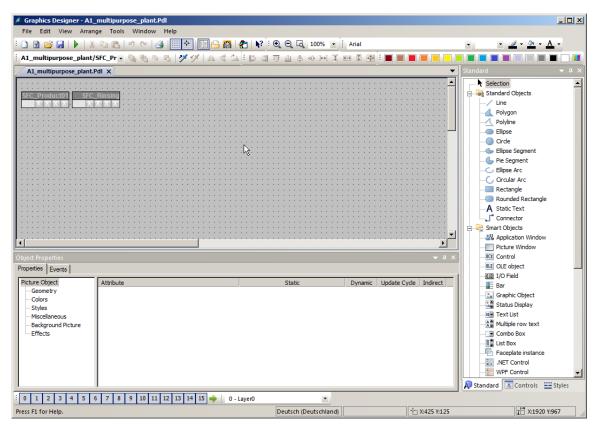
- Object palette: Shows you which object is currently selected and offers different options for manipulation.
- 3. By creating faceplates, the pictures already contain block icons, which can be positioned within the pictures as desired.



 4. The name displayed in the faceplate can be specified in the properties of the block icons. Otherwise, a very long name that includes the path is displayed. Leave the name unchanged.
 (→ Properties → Object Name → A1_multipurpose_plant/SFC_Product01)



5. Now, you change the background color of the picture to white. To do so, left click in the background of the picture with activated Object Properties toolbar. The properties of the picture object open.



 Each object as well as the picture itself has numerous properties that can be changed statically or dynamically (for example, connected to process tags). The background color will be edited here. (→ Picture Object → Colors → Background Color → Edit)

bject Properties				▼ 単:
Properties Events				
Picture Object	Attribute	Static	Dynamic	Update Cycle Indirect
Geometry	Background Color		Q	
Colors	Fill Pattern Color	Edit	ý –	
- Styles	Grid Color		Ť	
Background Picture				
Effects				

Color Selection			×
🜖 Colors 📗 Palet	te		
┣╾┼╾┼╾┼╾			
	┢╼┟═┟═┤		
		•	
		-	
Red		- 255	
Green —		255	
Blue		- 255	
	HTML code:	FFFFFF	
		ОК	Abbrechen

7. Select white as the color (255 255 255). (white \rightarrow OK)

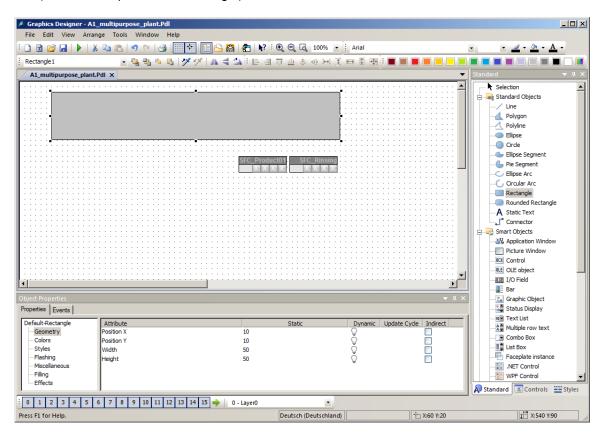
 For the change of the background color to become effective, the global color scheme must be deactivated. (→ Picture Object → Effects → Global Color Scheme → No)

bject Properties				▼ ‡
operties Events				
icture Object	Attribute		Static Dynamic	Update Cycle Indirect
Geometry Colors Styles Miscellaneous Background Picture Effects	Global Color Scheme	No	Ç	

9. Now, change the picture geometry so that it can be displayed completely in the work area (1920x847) at the screen resolution configured in section 8.4 (1920x1080). (→ Picture Object → Geometry → Picture Width: 1920 → Picture Height: 847)

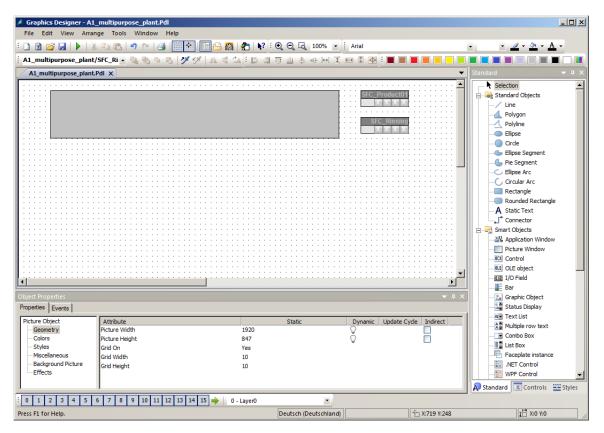
Object Properties				▼ ₽ 2	×
Properties Events					
Picture Object	Attribute	Static	Dynamic	Update Cycle Indirect	
Geometry	Picture Width	1920	, Q		
···· Colors	Picture Height	847	Q		
Styles	Grid On	Yes			
Miscellaneous	Grid Width	10			1
Background Picture Effects	Grid Height	10			I

10. Next, in the Standard palette, click on Rectangle and draw a large rectangle in the picture.



 $(\rightarrow$ Standard palette \rightarrow Rectangle)

11. Arrange the icons for the SFCs as shown below next to the rectangle you just drew.



8.6 Configuring the picture change

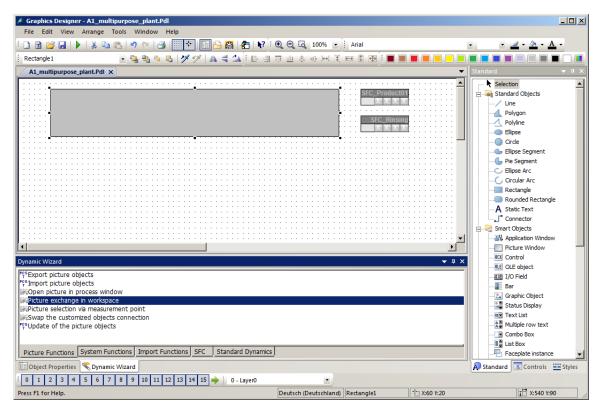
1. If the Dynamic-Wizard is not yet displayed, open the selection for the toolbars. (\rightarrow View \rightarrow Toolbars \rightarrow Dynamic Wizard)

	ner - A1_multipurpose_pla	_								
File Edit Vie	w Arrange Tools Windo	w	Help	_						
i 🗋 🖬 💕 💻	Toolbars •	~	Alignment Palette	者 📢 E	ର୍ ପ୍ 🗹	100% -	Arial		-	• 🔟 • 🦄 • <u>A</u> •
A1 multipu	Full Screen	~	Layer Palette		णि में के र	n 1+1 ∓	😐 1 🕂 i 🔳 🔳			
A1_multip		~	Color Palette			_			Stan	
AI_MUIUp	Grid	~	Object Palette					•	1 I	
	Zoom	~	Font Palette				CEC Desiduation	; : : : : : : : : 🏛		Selection
	Layers	~	Standard Palette				X X X X			Standard Objects
	Language	~	Status Bar							Polygon
	Update references F5	~	Zoom Palette				SFC_Rinsing			- A Polyline
				-			XXXX			Ellipse
			Output Window							Cirde
			Symbol library							Ellipse Segment
			SVG library							🌜 Pie Segment
		~	Controls							
			Dynamic Wizard							Circular Arc
			Object properties							Rectangle Rounded Rectangle
			Process Pictures							A Static Text
		~	Standard							Connector
		~	Styles					💻		Smart Objects
			Tags					Þ		Application Window
Object Properties								▲ ∄ ×		Picture Window
Properties Events	1		Reset							OCX Control
Picture Object	Attribute				Static		Dynamic Update C	vde Indirect		OLE Object
Geometry	Picture Width			1920	Statuc					0.12 I/O Field
Colors	Picture Height			847			٥̈́	Ē I		Bar
Styles	Grid On			Yes			•			
Miscellaneous	Grid Width			10						Status Display
Background Pie	cture Grid Height			10						- Text List
Enceta										
] (A) s	Standard 📧 Controls 🔛 Styles
0 1 2 3	4 5 6 7 8 9 10	11	12 13 14 15 🔶 0 -	- Layer0		•				
Displays the Dynam	nic Wizard				Deutsch (De	utschland)		T:: 526 Y:6		1 X:0 Y:0

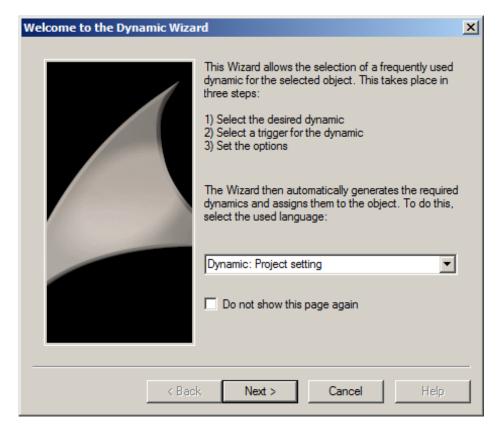
For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved.

p02-01-hmi-generation-v9-tud-0719-en.docx

If the toolbar for the Dynamic Wizard is displayed, double-click the 'Picture change in working area' function in the Picture Functions to open it. In order for this function to be applied to the rectangle you have just created, it must be selected first.
 (→ Picture Functions → Picture change in working area)



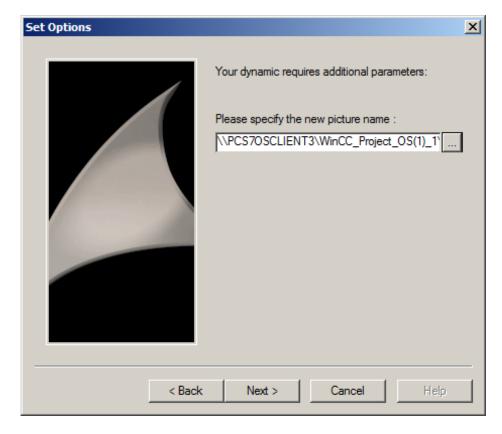
3. Read the explanation and click 'Next'. (\rightarrow Next)



4. Select 'Mouse click' as the trigger. (\rightarrow Mouse click \rightarrow Next)

Select Trigger	×
You have selected a dynamic that requires a trigger.	
Please select a trigger: Left mouse key Mouse click Right mouse key	
Trigger options	
< Back Next > Cancel Help	

5. Now select the picture that is to be changed to. $(\rightarrow \dots)$



6. In the Picture Browser, select 'T1_educt_tanks.Pdl'. (\rightarrow T1_educt_tanks.Pdl \rightarrow OK)

Picture Browser		? ×
🕅 📴 📴		
Hierarchy:		
PCS7OSCLIENT3	File Name * ^hr @Welcome.PDL ^hr A1_multipurpose_plant.Pdl ^hr T1_educt_tanks.Pdl ^hr T2_reaction.Pdl ^hr T3_product_tanks.Pdl ^hr T4_rinsing.Pdl	
	OK Cancel	Help

7. The name of the picture was applied and you confirm with 'Next'. (\rightarrow Next)

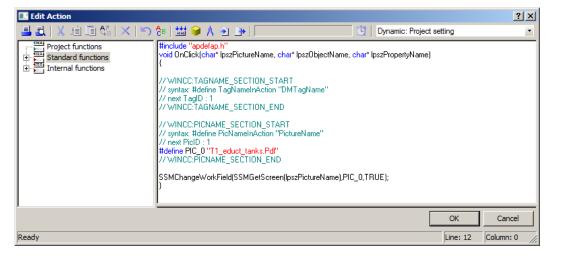
Set Options		×
	Your dynamic requires additional parameters: Please specify the new picture name : T1_educt_tanks.Pdl	
< Back	Next > Cancel Heip	3

8. The wizard is closed with 'Finish'. (\rightarrow Finish)

Finished!	×
The Wizard will generate the following: The current picture: A1_multipurpose_plant.Pdl is exchanged with the picture T1_educt_tanks.Pdl by activating the trigger Mouse click on the object Rectangle 1	
Do not show this page again	
< Back Finish Cancel Help	

 If you would like to view the result, you will find the mouse and the mouse click under 'Events'. With a double-click on the f icon, you can then view the created C script. (→ Object Properties → Events → Mouse → Mouse click f → OK)

Object Properties					•	ąχ
Properties Events						
Rectangle Mouse Keyboard Focus Miscellaneous Property Topics	Execute on Mouse Click Press Left Release Left Press Right Release Right	Action				
Object Properties 🤻	Dynamic Wizard					



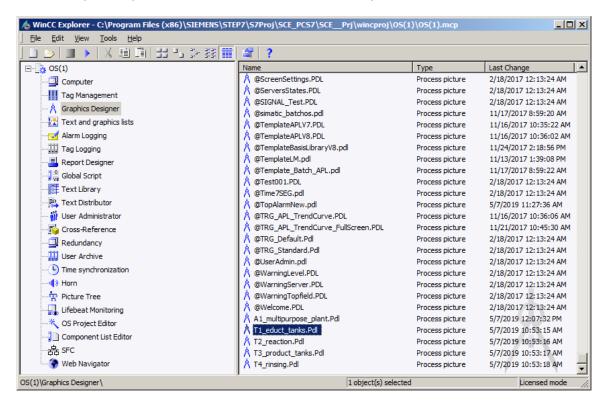
For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved. p02-01-hmi-generation-v9-tud-0719-en.docx

Using static texts, rectangles and the Dynamic Wizard, design your picture as shown here.
 Be sure that the language in the 'View' menu corresponds to the desired target language.
 Here: English (United States). (→ View → Language → English)

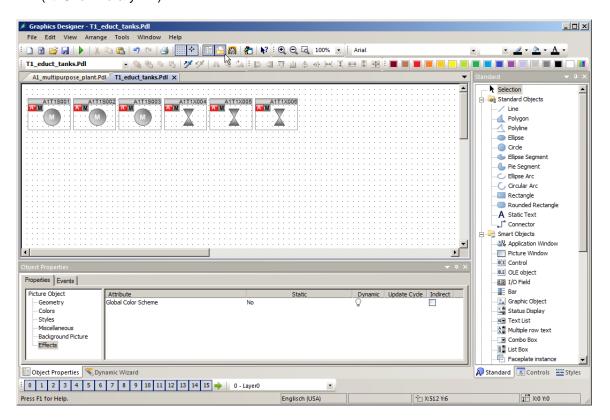
A1_multipurpose_plant.Pdl ×	
A1_multipurpose_plant	· · · · · · · · · · · · · · · · · · ·
T1_educt_tanks A1T1B001 A1T1B002 A1T1B003	Recipes SFC_Product01
T2_reaction A1T2R001 A1T2R002	
T3_product_tanks A1T3B001 A1T3B002	
T4_rinsing A1T4B001	
Image: A state of the state	· · · · · · · · · · · · · · · · · · ·

8.7 Editing the faceplate for T1_educt_tanks

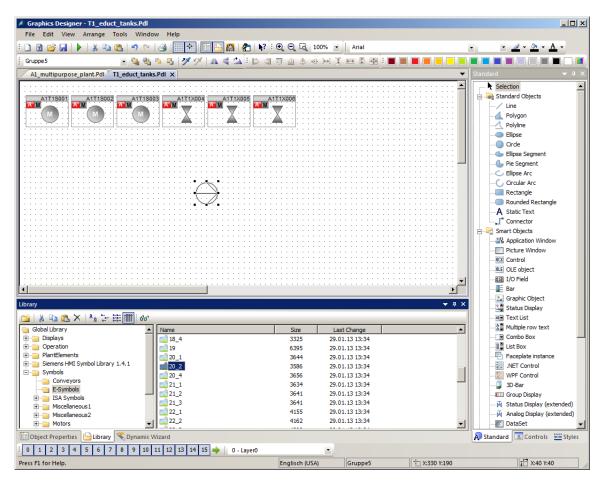
1. Next, open the picture 'T1_educt_tanks' from WinCC Explorer.



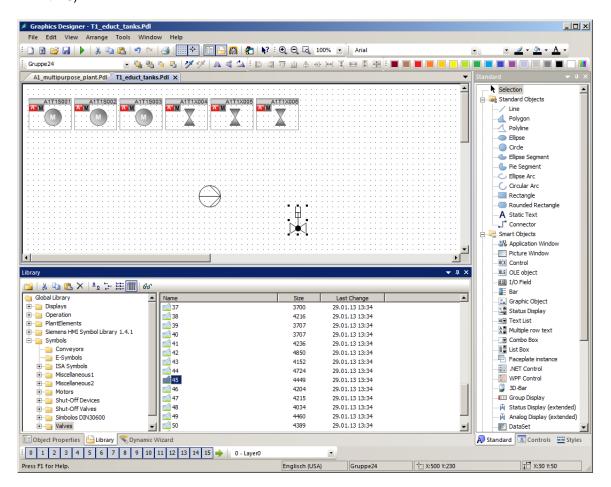
After you have changed the background color to white and the size to 1920x847, as you did previously for the picture of the multipurpose plant, open the library.
 (→ Show library □)



3. First, drag a symbol for the pump from the library to the work picture. (\rightarrow Global Library \rightarrow Symbols \rightarrow E-Symbols \rightarrow 20_2)



4. Now also drag a valve symbol to the work picture. (\rightarrow Global Library \rightarrow Symbols \rightarrow Valves \rightarrow 45)



The static symbols can be changed in their orientation by using the button Rotate. (→ Rotate object (→))

႔ Graphics Designer	r - T1_educt_tanks.Pdl		_
File Edit View	Arrange Tools Window Help		
🗄 🗅 🖻 💕 🔙 🕨	🕨 🙏 🗈 📇 🤊 🗠 🎒 🔠 🔛 🔛	🛛 🎇 🦹 📢 🔍 🔍 🗔 100% 🔹 🕅 Arial	• • <u>2</u> • <u>3</u> • <u>A</u> •
Gruppe5	- 👊 🗞 💁 💆 🏏 🕢	╡ 🚮 : [= 킠 ㅠ 프 ㅎ 아 ↦ 포 프 표 표	
A1_multipurpose_I	plant.Pdl T1_educt_tanks.Pdl ×	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	▼ Standard ▼
			Selection
A1T1S001	A1T1S002 A1T1S003 A1T1X004	A1T1X005 A1T1X006	🗄 🗔 🔂 Standard Objects
	· (M) · · · · · (M) · · · · · X · · · · · ·	: 🗶 : : : : : : 🗶 : : : : : : : : : :	Polygon
		· · · · · · · · · · · · · · · · · · ·	
			Circle
			Ellipse Segment
			Rectangle
			A Static Text
			Connector
			Smart Objects
			Application Window
			Picture Window
			OLE object
			😳 😳 💭 😳 Status Display
•			Text List
			A A A A A A A A A A A A A A A A A A A
			→ · · · · · · · · · · · · · · · · · · ·
Properties Events			Ist Box Faceplate instance
Group	Execute on Action		
Mouse	Mouse Click		WPF Control
Keyboard Focus	Press Left Release Left		
Miscellaneous	Press Right		IIII Group Display
Property Topics	Press Left Release Left Press Right Release Right		
. Objects	····· //		Analog Display (extende
I			DataSet
Object Properties	Library Vynamic Wizard		Restandard Controls
	5 6 7 8 9 10 11 12 13 14 15 →	0 - Layer0	
		Englisch (USA) Gruppe5	1 X:330 Y:190
Rotates an object by 90	v uegrees.	Engliser (OSA) Gruppes	L A.30 1.150

 After you have inserted additional lines and text fields as shown here, place a rectangle for representation of the tank and select its properties. (→ Rectangle → Properties)

Graphics Designer - T1_educt_tanks.Pdl				
File Edit View Arrange Tools Window Help				
: 🗅 🖻 💕 🛃 🕨 🛝 👒 🙈 🔊 🗠 🦪 🔠 📆 💷 🖴 🎇 🥐 😢	€ 🖸 🗔 100% 🔹	Arial		• • <u>⊿</u> • <u>A</u> •
Rectangle 1				
	n m t a an ar F			
A1_multipurpose_plant.Pdl T1_educt_tanks.Pdl X				Standard 🗸 🗘 X
			📤	Selection
	1X006			E Standard Objects
	7			Line
				Polygon
				Ellipse
				Circle
				Ellipse Segment
I				
••••••••••••••••••••••••••••••••••••••				
LSA+_A1T1L001				Circular Arc
•••••••••••••••••••••••••••••••••••••••				
······································				A Static Text
educt tank B001				Connector
			🖵	🖃 🖳 Smart Objects
X Cut Ctrl+X				
Ctrl+C				Picture Window
Ctrl+v				ULE OLE object
X Delete Del				
Customized Object				Bar
Customized Object				Graphic Object
Order Objects				Status Display
				Text List
Linking				Multiple row text
Configuration Dialog				Combo Box
Properties				
······································				
•				Standard Controls
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 🛶 0 - Layer0	•			
Displays the properties dialog	Englisch (USA)	Rectangle1	1: X:225 Y:170	X:70 Y:120

7. To change the color, deactivate the global color scheme once again. (\rightarrow Properties \rightarrow Effects \rightarrow Global Color Scheme \rightarrow No)

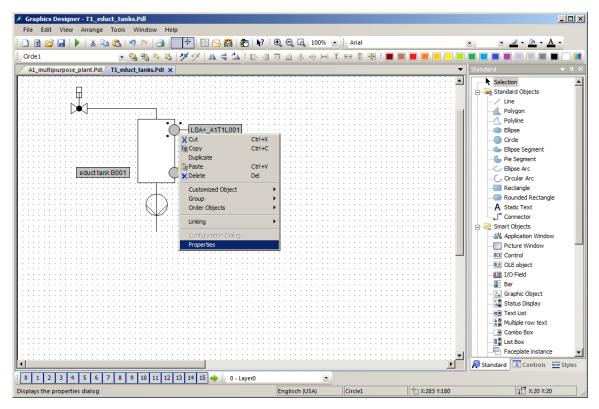
Object Properties				▼ ₽ ×
Properties Events				
Rectangle	Attribute	Static	Dynamic	Update Cycle Indirect
Geometry	Global Shadow	Yes	Q	
Colors	Global Color Scheme	No	Q	
···· Styles ···· Flashing	Object Transparency	0	Ŷ	
Miscellaneous				
Filling				
Effects				

8. Now change the background color to white. (\rightarrow Properties \rightarrow Colors \rightarrow Background Color)

Object Properties					•	ąх
Properties Events						
Rectangle Geometry Styles Flashing Miscellaneous Filling Effects	Attribute Border Color Border Background Color Background Color Fill Pattern Color	Static	Dynamic	Update Cycle	Indirect	

8.8 Linking of picture elements with PLC tags

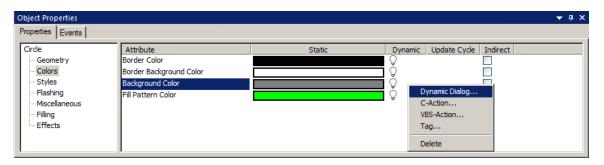
 Next, you are to configure a display of the digital level sensors. For this, drag two circles into the picture as shown here. Then, select properties of the top circle. (→ Circle → Properties)



2. To have the color displayed dynamically, deactivate the global color scheme. (\rightarrow Properties \rightarrow Effects \rightarrow Global Color Scheme \rightarrow No)

Object Properties				▼ ₽ ×
Properties Events				
Circle	Attribute	Static	Dynamic Update C	Cycle Indirect
Geometry	Global Shadow	Yes	Q	
Colors	Global Color Scheme	No	Q	
Styles Flashing Miscellaneous Filling Effects	Object Transparency	0	¢	

3. Select the background color with the right mouse button and then select the dynamic dialog in order to implement a dynamic display. (\rightarrow Properties \rightarrow Colors \rightarrow Background Color \rightarrow right-click in Dynamic column $\bigcirc \rightarrow$ Dynamic Dialog)



In the next dialog, first select Boolean as the data type. Then, change the color for Yes/TRUE 4. to green. Finally, select and expression 'Tag' for the dynamization. (\rightarrow Data Type: Boolean \rightarrow

•••

Yes/TRUE \rightarrow \rightarrow \rightarrow \rightarrow Tag)	
Value Range	Value Range
Used Language: Dynamic: Project setting Event Name: Expression/Formula: Check Result Of The Expression/Formula: Valid range Back Valid range Back C Analog Solean Solean Bit Direct Add	Used Language: Dynamic: Project setting Event Name: Expression/Formula: Valid range Back Yes / TRUE No / FALSE
C Do not evaluate tag status Evaluate tag status Evaluate quality code Valid range Back	C Do not evaluate tag status Evaluate tag status Evaluate quality code Valid range Back
OK Cancel	OK Cancel

For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved.

5. For the tags, select 'STEP 7 Symbol Server' as the data source. There, for the symbols, input I70.0 for the 'level monitoring educt_tank B001 operating point H'. (→ Data source → STEP 7 Symbol Server → A1.T1.A1T1L001.LSA+.SA+ / E70.0 / level monitoring educt tank B001 operating point H → OK)

Tags - Project: C:\Program Files (x86)\SIEMENS\STEP7	S7Proj\SCE_PCS7\SCEPrj\wi	ncproj\05(1	l)\05(1).m	icp ?X			
1 3 13 III 3	P 7 Symbol Server						
Filter: Data source:	CC Tags						
STEP 7 Symbol Server	Name	Data Type	Address	Comment			
S7 Program(1), SCE_PCS7_Prj//AS1//CPU 414-3 DP	a1.A1H001.HS+START	BOOL	I 0.0	Main power switc			
🗄 🖶 Symbols	a1.A1H002.HS+OFF	BOOL	I 0.1	emergency switc			
	a1.A1H003.HS+LOC	BOOL	I 0.2	locla operation m			
S7 Program(2), SCE_PCS7_Prj//AS2//WinLC RTX	a1.T1.A1T1L001.LSA+.SA+	BOOL	I 70.0	level monitoring			
	a1.T1.A1T1L001.LSASA-	BOOL	I 70.1	level monitoring			
	a1.T1.A1T1L002.LSA+.SA+	BOOL	I 70.2	level monitoring			
	a1.T1.A1T1L002.LSASA-	BOOL	I 70.3	level monitoring			
	a1.T1.A1T1L003.LSA+.SA+	BOOL	I 70.4	level monitoring			
	a1.T1.A1T1L003.LSASA-	BOOL	I 70.5	level monitoring			
	A1.T1.A1T1S001.SO+.O+	BOOL	I 1.0	pump outlet edu			
	A1.T1.A1T1S001.SV.C	BOOL	Q 3.0	pump outlet edu			
	A1.T1.A1T1S002.SO+.O+	BOOL	I 1.1	pump outlet edu			
	a1.T1.A1T1S002.SV.C	BOOL	Q 3.1	pump outlet edu			
	A1.T1.A1T1S003.SO+.O+	BOOL	I 1.2	pump outlet edu			
	A 1 TI A 1T 16002 EV C	POOL	0 21	numa autlat adu			
		OK	Ca	ancel Help			
				11.			

Note:

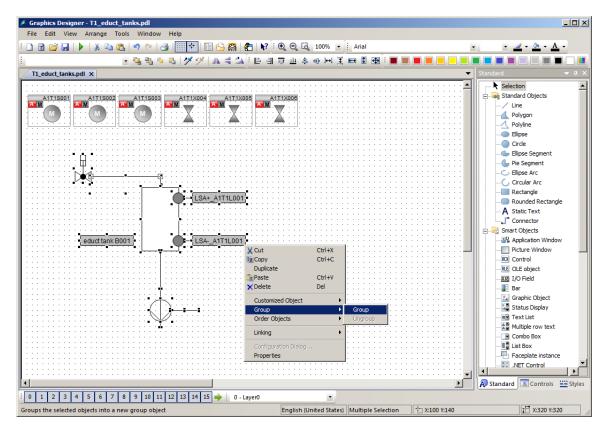
 If you are using the AS1/S7-400, select the symbols under S7 Program(1). If you are using the AS2/RTX Box, however, you must select the symbols under S7 Program(2). 6. Now, check the settings in the Dynamic Dialog. (\rightarrow Check \rightarrow Close \rightarrow OK)

Value Range			? ×
Used Language:	Dynamic: P	roject setting	•
Event Name:	Tag		2
Expression/Formula: 'S7\$Program(1)/A1\$ Result Of The Express Valid range Yes / TRUE No / FALSE	T 1\$A 1T 1L00 1\$LSA + sion/Formula: Back	\$SA+'	 Check Data Type: Analog Boolean Bit Direct Add Remove
 Do not evaluate to C Evaluate tag statu C Evaluate quality of 	JS		
Val	id range	Back	
		ОК	Cancel
Everything OK		2	٢
No error occurred	!		

Close

8.9 Saving in the project library

 The steps presented above will also be performed for the sensor 'A1.T1.A1T1L001.LSA-.SA-/ I70.1 / level monitoring educt_tank B001 operating point L'. Then, the elements shown here will then be selected together and grouped. Leave enough space for a valve to be placed on the line between the tank and pump. Also take into account the function line on the pump (→ A1.T1.A1T1L001.LSA-.SA- / I70.1 / level monitoring educt_tank B001 operating point L → Group → Group)



2. The group is then copied. (\rightarrow Copy)

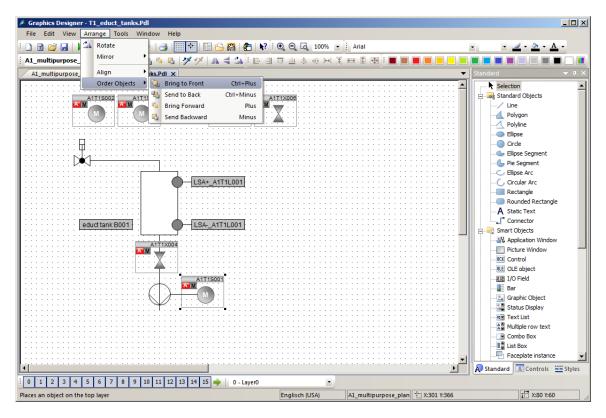
Graphics Designer - T1_educt_tanks.pdl	
File Edit View Arrange Tools Window Help	
: 🗋 🖻 🚰 🛃 🕨 片 😹 🛍 🛍 🥙 🗠 🚑 🧱 👬 🔢 🔂 🏭 🚰 🐶 : ગ 🖓 🛃 Arial	• 12 • <u>2</u> • <u>3</u> • <u>A</u> •
Group1 - 電電 - 電子ググ A	
T1 educt tanks.pdl X	▼ Standard ▼ # ×
ATTISOO1 A ATTISOO2 A ATTISOO3 A ATTISOO3 A ATTISOO3 A ATTISOO5 ATTISOO5	Standard Objects
	Polygon
	Polyline
	Ellipse
	Circle
•	: Ellipse Segment
	Pie Segment
	: Ellipse Arc
	· Circular Arc
LSA+ A1T1L001	Rectangle
	. Rounded Rectangle
	. A Static Text
	Connector
	: Smart Objects
educt tank B001LSA_A1T1L001	
X Cut Ctrl+X	Picture Window
The second secon	Control
Duplicate	: OLE object
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	: I/O Field
X Delete Del	Bar
Customized Object	Status Display
Ground Courter Court	· Status Display
Order Objects	A Multiple row text
Linking	Combo Box
	List Box
Configuration Dialog	Faceplate instance
Properties	.NET Control
	📕 🔍 Standard 📧 Controls 🚟 Styles
- 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 🌩 0 - Layer0 💌	
Copies the selected data and transfers it to the Clipboard. English (United States) Group1 🗄 X:100 Y:140	X:320 Y:320

3. Now, open the library and paste the group in the project library. Name the template 'educt_tank_V1_0'. ($\rightarrow \stackrel{\frown}{\longrightarrow} \rightarrow$ Project Library \rightarrow Paste)

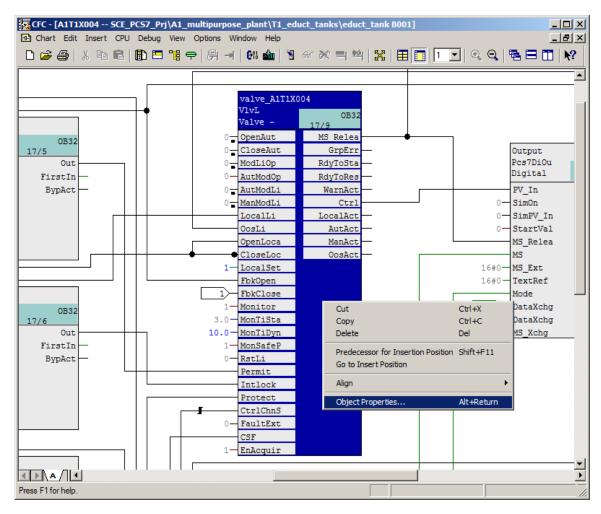
Library				→ ‡ X
📸 🐰 🗈 🏝 🗙 🐁 🖫 🏢 🎸 -				
Clobal Library	Name	Size	Last Change	
Project Library				
	View •			
	Paste			
	Import New Folder			
]			
Liberer				→ ‡ X
Library				▼ # ×
		C.	1.1.0	
Global Library Project Library	Name educt_tank_V1_0	Size 17526	Last Change 07.05.19 14:53	
		1/525	07.00.15 11.00	
	J			

8.10 Adapting the orientation of the faceplates

 Next, in the picture 'T1_educt_tank.Pdl', you will position the faceplates for the valve 'A1T1X004' and for the pump 'A1T1S001' as shown here. It is recommended that the symbols within the layer be brought to the front so they cannot be covered up by other drawing elements. (→ Arrange → Order Objects → Bring to Front).



2. The orientation of the dynamic valve faceplates is not yet correct. At runtime, the faceplates are animated in such a way that they are perpendicular to the run of the pipe in closed state and are rotated parallel with the run of the pipe in open state. However, a change of the orientation can only take place via the CFC of the respective valve. To rotate a valve, first open the associated CFC and then the object properties of the valve block. (→ SIMATIC Manager → Plant View → A1T1X004 → VlvL → Object Properties).



3. Now, in the 'Create block icon' field, enter a "2". This rotates the icons by 90 degrees. (\rightarrow Create block icon \rightarrow 2 \rightarrow OK)

Properties - Block A1	1X004\valve_A1T1X004	1			×
General I/Os					
Type: Name:	VivL valve_A1T1X004		Block group:		
Comment:	Valve - Large				
Inputs:	84		OCM po	ossible	
Internal identifier:	FB1899			OCM	
Instance DB:	DB132		E O	reate block icon:	
Name (header):	VlvL		2		-
Family:	Drives		1		
Author:	AdvLib90		I_ M	IES-relevant	
To be inserted in OB/ta	sks:		- Special prop	erties	
✓ OB100 [Warm restance]	art]			Messages eadback enabled	
ОК		Print		Cancel	Help

 After you have made the changes for all valves that are located on a vertical pipe, compile the changes. (→ SCE_PCS7_Prj → PLC → Compile and Download Objects → OS(1) → Edit)

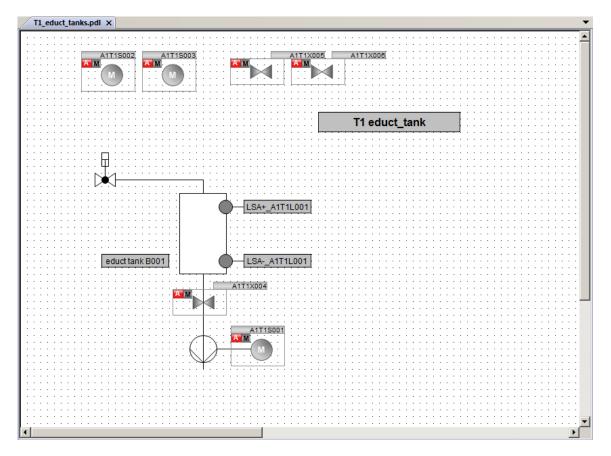
Compile and Download Objects						
Selection table:						
Objects	Status	Operating mode	Compile			
□-==_B SCE_PCS7_Prj			V			
⊟-∰ AS1			V			
🛄 Hardware	undefined		✓			
□- CPU 414-3 DP			×.			
Blocks						
Charts	undefined		✓			
Connections	undefined		✓			
<u>₽</u> OS			V			
🛄 Configuration	undefined		✓			
□- WinCC Appl.			×.			
Connections	undefined		✓			
🛃 OS(1)			✓			
Settings for compilation/download ——— Update		log Selec	t objects			
Edit Test Uppen Development	Mode Sin		elect All Deselect All			
Compile only			Check project			
Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit: http://www.siemens.com/industrialsecurity						
Start Close			Help			

5. In the last dialog of the settings, select 'Changes' as the scope and start compiling the OS.

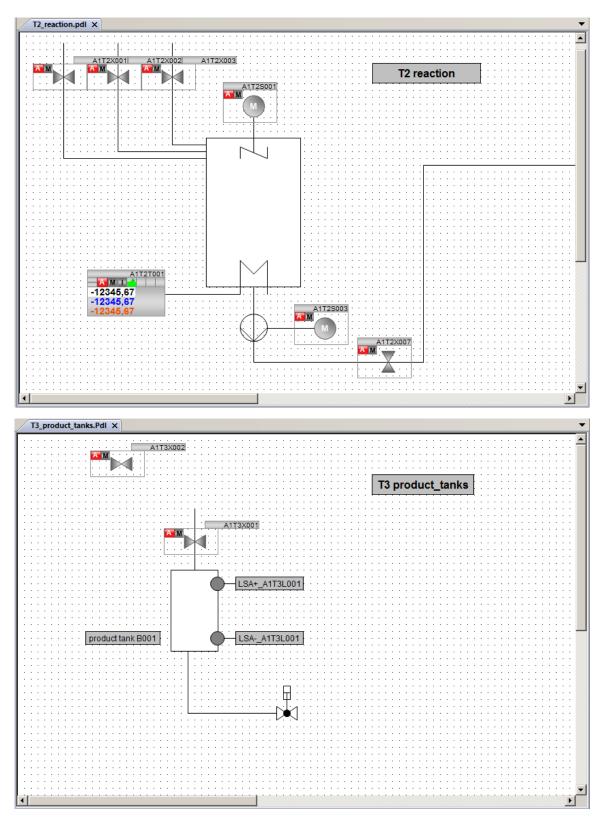
 $(\rightarrow \text{Scope} \rightarrow \text{Changes} \rightarrow \text{Apply} \rightarrow \text{Start})$

ettings: Compile 05		×
Select the data you want to com	ile and the scope of the compilation.	
Data	Further options Minimum acquisition cycle of the archive tags: 1 second	
SFC Visualization	With interconnection partner (SFC option)	
Diagnostics	Compression Settings	
Picture Tree Scope	Create server data	
C Entire OS 🗌 With Changes	memory reset	
	STEP 7 multiproject. This has an impact on the u want to start the wizard for the language settings? Yes	
< Back	Apply	Cancel Help

 In WinCC, the symbol of the valve for which you made the change shown is now rotated by default. Insert a static text 'T1 educt_tank' to facilitate orientation during operation. The result is shown below.



7. Just as for the picture 'T1_educt_tank', a tank/reactor will now be created in the pictures for the product tanks and reactors. You can orient yourself to the two figures below for this. In addition, create a template for the library from the one reactor as well as from the product tank.



For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved.

8.11 Testing the faceplates

 To test the HMI with SIMIT and PCLSIM, you must download the charts to PLCSIM as you already know. You must also start the plant simulation in SIMIT. Set the CPU to RUN-P mode.

S7-PLCSIM1 AS1\CPU 414-3 DP	
File Edit View Insert PLC Execute Tools Window Help	
📄 🗅 😂 🖶 🔄 PLCSIM(TCP/IP) 💽 🕺 🖻 💼 🧧 🎛 –🚧 💦 🎦 🎦	1 〒 12 12 12 12 12 12 13 13 13 13 13 13 13 13 13 13 13 13 13
□ □ 1 +1 □ =0	
\$	
SF RUN-P IB 1 Bits V QB 3 Bits V	
DC RUN 76543210 76543210	
Press F1 to get Help.	CPU/CP: MPI=2 DP=2 IP=192.1

 In the WinCC Explorer, you need to determine if activation on the ES is permitted in the properties of the OS. (→ Properties → Allow activation on ES)

http://www.common.com/www.common.com/www	IEMENS\STEP7\S7Proj\SC	E_PCS7\SCEPrj\wii	ncproj\05(1	l)\05(1).mcp	<u>_ 0 ×</u>
<u>File Edit View Tools Help</u>					
	> ≋ ≣ ≧ ?				
	Project Properti				×
Tag Management			1		10.1
Graphics Designer	Operating	g Mode	Ι	User Interface a	and Design
Text and graphics lists	General	Update Cyc	les	Shortcuts	Options
Alarm Logging					
Tag Logging		Additional pro	oject optio	ons	
Text Library			-		
User Administrator	🛛 🔽 Allow activa	ation on ES			
Cross-Reference			_		
Redundancy	Help availab	ole in Runtime			
User Archive					
Time synchronization	Color conve	rsion when printi	ing messa	ages	
Picture Tree	Export text f	iles as Unicode			
	—				
	🗖 Multiuser er	igineering			Resources
Component List Editor				-	
一					
Press F1 for Help.	C scripts with la	nguage setting "	'Dynamic'	" in Runtime:	
		inguage county	2,1131110		
	Operating syste	em language for i	non-Unic	ode programs	▼
	-				
	This option allo	ws you to acces	s the Onl	line Help in runtin	ne.
				-	
			ОК	Abbrecher	n

For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved.

3. Then, activate OS Runtime (\rightarrow Activate)

WinCC Explorer - C:\Program Files (x86)\SIEMENS\STEP7\S7Proj\SCE_PCS7\SCE_	_Prj\wincproj\0S(1)\0S(1).mcp	
∫ <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>T</u> ools <u>H</u> elp		
] □ ≥ ■ 🔪 ※ 埴 궼 出 님 ≥ 錄 🧱 畲 ?		
E- Cos(1) K	Name	Туре
Computer	Computer	Computer
Tag Management	Tag Management	Tag Management
Graphics Designer	A Graphics Designer	Editor
Text and graphics lists	Text and graphics lists	Editor
	Alarm Logging	Editor
	Tag Logging	Editor
Tag Logging	Report Designer	Editor Editor
Report Designer	Global Script	Editor
	Text Library	Editor
Text Library	W User Administrator	Editor
Text Distributor	Cross-Reference	Editor
User Administrator	Redundancy	Editor
Cross-Reference	User Archive	Editor
	© Time synchronization	Editor
	Horn	Editor
User Archive	The Picture Tree	Editor
Time synchronization	Lifebeat Monitoring	Editor
	* OS Project Editor	Editor
Picture Tree	Component List Editor	Editor
	器SFC	Editor
OS Project Editor	😯 Web Navigator	Editor
Component List Editor		
		2.5
Web Navigator	•	
Activates the project.	22 object(s)	Licensed mode //

 First, open the plant overview by clicking on the area key 'A1_multipurpose_plant' in the overview area. (→ A1_multipurpose_plant)

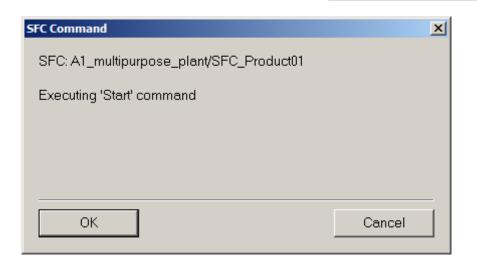
🗎 🖉 📃										3	07.05.2019 16:30:39
	A1_multipur	oose_plan	t	30	Û					Û	SIEMENS
					Ū.					0	
	97 🛅		۷ 🎵	1			•	s h	5	 9 0	*

5. The picture 'A1_multipurpose_plant' with an overview of all areas of the plant and the sequential function charts (SFC) is now shown.

		5/9/2019 3:42:18 PM
A1_multipurpose_plant		
A1_multipurpose_plant Teducit_tanks		
► 🕈 🖿 🖿 🗶 💵 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	× .

 By clicking on the block icon of the sequential function chart, an SFC can be opened and operated. (→ SFC_Product01 → Start → OK)

		🔺 A1_multipurpose	_plant/SFC_Product01			×
A1_multipurpose_plant		SFC for produce of pr		a 🛱 🔁		*
						N
T1_educt_tanks	Recipes	Idle			Т	•
A1T1B001 A1T1B002 A1T1B003	STC Product01	MANUAL] 8
	SFC_Rinsing	MANUAL	Start Hold	Resume	Command output	
T2 reaction		AUTO 📉	Abort 😽 🗸 Complete	Stop	Cyclic operation	
		8 5	Restart 🖍 Reset		Time monitoring	
A1T2R001 A1T2R002		🔽 Synchronize	Sequence properties	Start condition		Ð
T3_product_tanks		_	START]	_	•
		E	ductB00 educt tank B00	EductB00	educt tank B00	
T4_rinsing			[L0]	L0]		
A1T4B001		He	heating reactor	EductB00	educt tank B00	
			то	L0]		
		REPERUN /	Wait waiting for par	Stir	stir for min 10 s	•



For unrestricted use in educational / R&D institutions. © Siemens 2020. All rights reserved. p02-01-hmi-generation-v9-tud-0719-en.docx

Learn-/Training Document | PA Module P02-01, Edition 02/2020 | Digital Industries, FA

	A1_multipurpose_plant/SFC_Product01						
A1_multipurpose_plant		SFC for produce of p			🙀 🛱 🔁	*	
						<u> </u>	
T1_educt_tanks	Recipes	Run	RUN			T	
A1T1B001 A1T1B002 A1T1B003	SfC_Product01	MANUAL					
	SFC_Rinsing	MANUAL	Start	Hold	Resume	Command output	
T2 reaction		AUTO 🗙	Abort 🗸	 Complete 	Stop	Cyclic operation	
		8 5	Restart 🖌 🖌	 Reset 		Time monitoring	
A1T2R001 A1T2R002		Synchronize	Sequence	properties	Start condition	<u></u>	
T3_product_tanks		=	~	START		_	
T4 rinsing		▶	EductB00 edu	t tank B00	EductB00	educt tank B00	
		ŀ		ing reactor	EductB00	educt tank B00	
				ing for par	L0 Stir	stir for min 10 s	

 You get to the lower level layers either by opening the Picture Tree Navigator or by selecting the picture change you created. (→ arrow to the right of the A1_multipurpose_plant U → T1_educt_tank)

A1_multipurpose_plant	
	Ū. Į.
Imultipurpose_plar Imultipurpose_plar T1_educt_tanks Imultipurpose_plar T2_reaction Imultipurpose_plar T3_product_tanks Imultipurpose_plar T4_rinsing Imultipurpose_plar	Recipes SFC_Product01 SFC_Rinsing
T2_reaction A1T2R001 A1T2R002	
T3_product_tanks	
T4_rinsing A1T4B001	

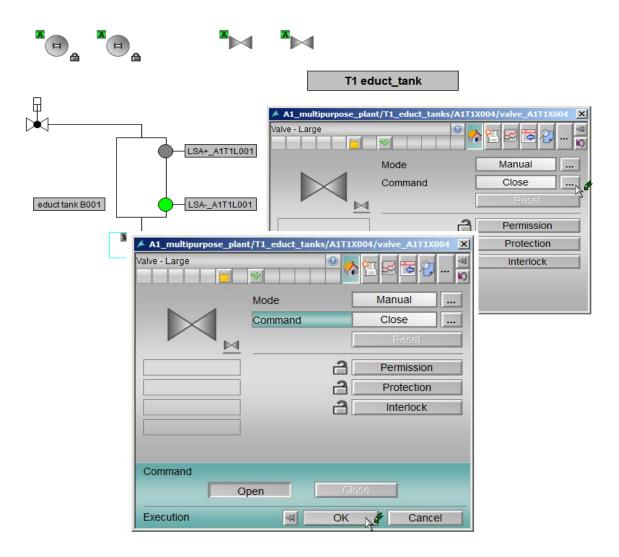
 The educt tank screen shows the faceplates for the valves and pumps of this layer are shown. The faceplates allow the operating mode change and the operation of the valves and pumps.

			3	5/7/2019 4:42:38 PM
A1_multipurpose_plant	\bigcirc		J.	SIEMENS
	J.			
	* * *	 		· · · · · · · · · · · · · · · · · · ·

9. In order to operate a valve, you must put it into 'Manual' mode. $(\rightarrow Valve \rightarrow Mode \longrightarrow Anual \rightarrow OK)$

📕 A1_multipurpose_plan	nt/T3_product_tank	s/A1T	3X001/v	alve_A1T3	ко 💌
Valve - Large	<u></u>	© 🥐		1 2 2	
	Mode		Auto	matic	
	Command	[Cl	ose	
				Resei	
		8	Pe	rmission	
		1	Pr	otection	
		3	lr	nterlock	
Mode					
Automatic	Manual	-		Local	-1
Out of service	Manuar			(20)000	_
Execution		ОК	A	Cance	:

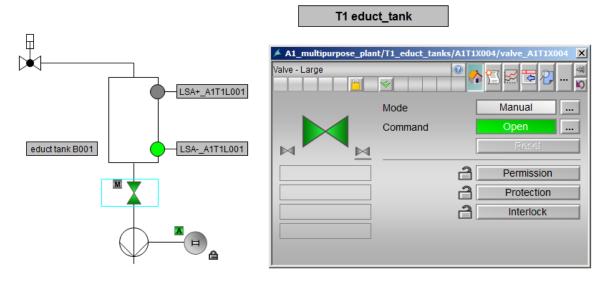
10. You can then operate the valve. (Click the command button \square next to 'Close', select 'Open' and confirm your selection with 'OK'. ($\rightarrow \square \rightarrow$ Open \rightarrow OK)



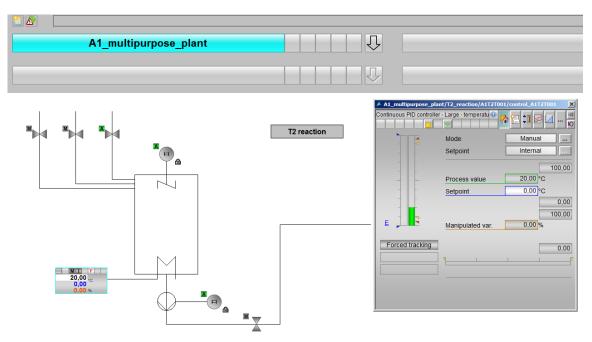
Note:

If one of the lock symbols is still locked a, the valve cannot be opened. Only if all three interlock types are released a can the block be fully operated again.

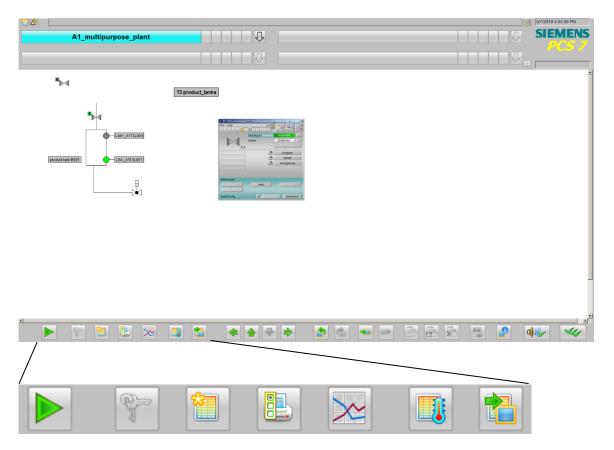
11. The open valve position is signaled through the rotation and the green coloring of the faceplate.



In addition to the faceplates for valves and pumps, the operator screen 'T2_Reaction' has a faceplate for the PID controller via which operator control and monitoring is possible.
 (→ A1_multipurpose_plant → T2_Reaction → Temperature control)



13. You close runtime by pressing the 'Key set change' button 🕨 in the control bar at the bottom.



14. Then, select 'Exit runtime' 🙆 and 'Deactivate'.

					5/7/2019 4:52:57 PM
A1_multipurpose_plant	Û			Û	SIEMENS
	Û			Û	
¥					· 🗠 📔
M T3 product_tanks	8				
-					
USAA173L001					
product tank B001					
· 🖌 🕅 🔛	1	\$	<u>X X X X X X X X X X X X X X X X X X X </u>	۲	
	-	¢¢	25/25	1	
				/	
		A			
	6		1		
		M			
*		×			
		Ċ			
Exit Runtime		\mathbf{U}			
Are you sure to deactivate the r	untime se	ssion?			
If you agree push the "Deactivat	te" button				
Deactivate	С	ancel			
2					

8.12 Checklist – step-by-step instruction

The following checklist helps students to independently check whether all steps of the step-bystep instruction have been carefully completed and enables them to successfully complete the module on their own.

No.	Description	Checked
1	All 5 faceplates created	
2	Block icons created successfully	
3	Objects successfully compiled and downloaded	
4	WinCC configured	
5	Faceplate for multipurpose plant with all 4 units and SFCs edited and configured	
6	Picture change configured for all 4 units	
7	Faceplate for T1_educt tank with tank A1T1B001 edited and configured	
8	Faceplate for T2_reaction with reactor A1T2R001 edited and configured	
9	Faceplate for T3_product tank with tank A1T3B001 edited and configured	
10	Project library contains template for educt tank, reactor and product tank	
11	Valves are all correctly oriented	
12	Faceplates successfully tested	
13	Project successfully archived	

Table 2: Checklist for step-by-step instructions

9 Exercises

In the exercises, you apply what you learned in the theory section and in the step-by-step instructions. The existing multiproject from the step-by-step instructions (p02-01-project-r1905en.zip) is used and expanded for this. The download of the project is stored as zip file "Projects" on the SCE Internet for the respective module.

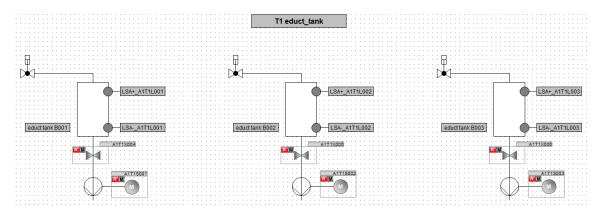
In the step-by-step instructions, only one element of the T1_educt_tank, T2_Reaction and T3_product_tank levels of the plant hierarchy were implemented. The objective of the exercise is to complete the pictures of the individual levels, or to create the pictures of the missing levels.

Then, you also design a picture for the T4_rinsing level.

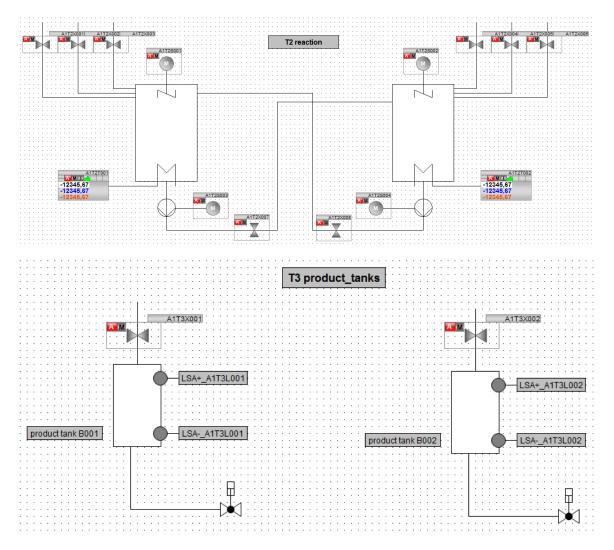
9.1 Tasks

The tasks below are based on the step-by-step instructions. The corresponding steps of the instructions can be used to assist with each task. Regarding the arrangement, the rules VDI3699 [1] must be observed.

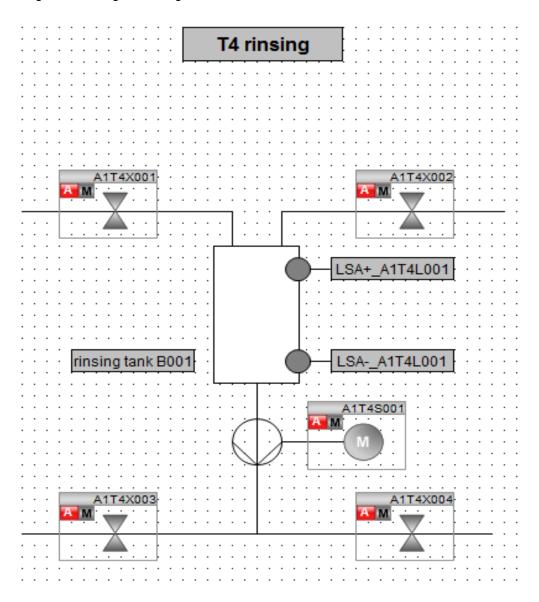
 Complete the picture of the 'T1_educt_tanks' level by adding the missing tanks A1T1B002 and A1T1B003. Use the template from the library for this so that the representations will be consistent. Adapt the labeling of the tank and of the binary sensors. Remember to adapt the tags for the visualization of the binary sensors. The valves and motors are already created and only have to be placed. Note, however, that it may be necessary to rotate the valves again.



2. You now also complete the pictures of the T2_reaction and T3_product_tank levels with the missing elements (tanks or reactors). Use the P&I diagram as a guide so that all valves, motors and controllers are positioned correctly. Ensure the correct rotation of the valves.



3. Finally, design the faceplate for the 'T4_rinsing' level. Adapt the background for this similar to the step-by-step instructions. Create a picture title and a tank based on the educt and product tanks. Link the tags of the binary sensors and arrange the valves and the motor using the P&I diagram as a guide.



9.2 Checklist – exercise

The following checklist helps students to independently check whether all steps of the exercise have been carefully completed and enables them to successfully complete the module on their own.

No.	Description	Checked
1	Tanks A1T1B002 and A1T2B003 inserted and configured in faceplate T1_educt_tanks	
2	Reactor A1T2R002 inserted and configured in faceplate T2_reaction	
3	Tank A1T3B002 inserted and configured in faceplate T3_product_tanks	
4	Faceplate for T4_product tank edited and configured	
5	(optional) New faceplates successfully tested	
6	Project successfully archived	

Table 3: Checklist for exercises

10 Additional information

More information for further practice and consolidation is available as orientation, for example: Getting Started, videos, tutorials, apps, manuals, programming guidelines and trial software/ firmware, under the following link:

siemens.com/sce/pcs7

Preview "Additional information"

Getting Started, Videos, Tutorials, Apps, Manuals, Trial-SW/Firmware

- SIMATIC PCS 7 Overview
- SIMATIC PCS 7 Videos
- > Getting Started
- > Application Examples
- > Download Software/Firmware
- SIMATIC PCS 7 Website
- SIMATIC S7-400 Website

Further Information

Siemens Automation Cooperates with Education siemens.com/sce

Siemens SIMATIC PCS 7 siemens.com/pcs7

SCE Learn-/Training Documents siemens.com/sce/documents

SCE Trainer Packages siemens.com/sce/tp

SCE Contact Partners siemens.com/sce/contact

Digital Enterprise siemens.com/digital-enterprise

Industrie 4.0 siemens.com/future-of-manufacturing

Totally Integrated Automation (TIA) siemens.com/tia

TIA Portal siemens.com/tia-portal

SIMATIC Controller siemens.com/controller

SIMATIC Technical Documentation siemens.com/simatic-docu

Industry Online Support support.industry.siemens.com

Product catalogue and online ordering system Industry Mall **mall.industry.siemens.com**

Siemens Digital Industries, FA P.O. Box 4848 90026 Nuremberg Germany

Subject to change and errors © Siemens 2020

siemens.com/sce