

SCE Training Curriculum

Siemens Automation Cooperates with Education | 05/2017

TIA Portal Module 042-201 WinCC Advanced with TP700 Comfort and SIMATIC S7-1500



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Matching SCE trainer packages for these training curriculums

SIMATIC HMI Panels and WinCC Advanced Software

- SIMATIC HMI TP700 COMFORT PANEL
- Order no.: 6AV2133-4AF00-0AA0
- SIMATIC HMI TP1500 COMFORT PANEL Order no.: 6AV2133-4BF00-0AA0
- SIMATIC HMI WinCC Advanced V14 SP1 Classroom license for 6 users Order no.: 6AV2102-0AA04-0AS5
- SIMATIC HMI WinCC Advanced V14 SP1 Upgrade license for 6 users Order no.: 6AV2102-4AA04-0AS5
- SIMATIC HMI WinCC Advanced V14 SP1 Student license for 20 users Order no.: 6AV2102-0AA04-0AS7

SIMATIC Controllers

- SIMATIC ET 200SP Open Controller CPU 1515SP PC F and HMI RT SW Order no.: 6ES7677-2FA41-4AB1
- SIMATIC ET 200SP Distributed Controller CPU 1512SP F-1 PN Safety Order no.: 6ES7512-1SK00-4AB2
- SIMATIC CPU 1516F PN/DP Safety Order no.: 6ES7516-3FN00-4AB2
- SIMATIC S7 CPU 1516-3 PN/DP Order no.: 6ES7516-3AN00-4AB3
- SIMATIC CPU 1512C PN with Software and PM 1507 Order no.: 6ES7512-1CK00-4AB1
- SIMATIC CPU 1512C PN with Software, PM 1507 and CP 1542-5 (PROFIBUS) Order no.: 6ES7512-1CK00-4AB2
- SIMATIC CPU 1512C PN with Software Order no.: 6ES7512-1CK00-4AB6
- SIMATIC CPU 1512C PN with Software and CP 1542-5 (PROFIBUS) Order no.: 6ES7512-1CK00-4AB7

SIMATIC STEP 7 Software for Training

- SIMATIC STEP 7 Professional V14 SP1 Single license Order no.: 6ES7822-1AA04-4YA5
- SIMATIC STEP 7 Professional V14 SP1- Classroom license (up to 6 users) Order no.: 6ES7822-1BA04-4YA5
- SIMATIC STEP 7 Professional V14 SP1 Upgrade license (up to 6 users) Order no.: 6ES7822-1AA04-4YE5
- SIMATIC STEP 7 Professional V14 SP1 Student license (up to 20 users) Order no.: 6ES7822-1AC04-4YA5

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PROCESS VISUALIZATION WITH THE SIMATIC HMI PANEL TP700 COMFORT AND WINCC ADVANCED

1 Goal

In this chapter, you will become acquainted with the basics of process visualization and the use of a SIMATIC HMI Panel TP700 Comfort together with the SIMATIC S7-1500 and the TIA Portal programming tool.

The module explains the configuring of a SIMATIC HMI Panel TP700 Comfort, the creating of the connection to the SIMATIC S7-1500 and the read and write access to CPU data from the SIMATIC HMI Panel TP700 Comfort.

The SIMATIC S7 controllers listed in Chapter 3 can be used.

2 Prerequisite

This chapter builds on the chapter "Global data blocks with SIMATIC S7 CPU 1516F-3 PN/DP". You can use the following project for this chapter, for example: "SCE_EN_032-600_Globale_Data_Blocks_R1508.zap13".

3 Required hardware and software

- 1 Engineering station: requirements include hardware and operating system (for additional information, see Readme on the TIA Portal Installation DVDs)
- 2 SIMATIC STEP 7 Professional software in TIA Portal as of V13
- 3 WinCC Advanced software in TIA Portal as of V13
- SIMATIC S7-1500/S7-1200/S7-300 controller, e.g. CPU 1516F-3 PN/DP –
 Firmware as of V1.6 with memory card and 16DI/16DO and 2AI/1AO
 Note: The digital inputs and analog inputs and outputs should be fed out to a panel.
- 5 SIMATIC HMI Panel TP700 Comfort
- 6 Ethernet connection between engineering station and controller and between controller and TP700 Comfort control panel



5 SIMATIC HMI Panel TP700 Comfort

4 Theory

4.1 Process visualization

Production processes are becoming more and more complex and greater demands are being placed on the functionality of machinery and plants. For this reason, the operator needs a high-performance tool to control and monitor production plants. An HMI (Human Machine Interface) system represents the interface between the human being (operator) and the process (machine/plant). The controller has the actual control over the process. There is therefore an interface between the operator and WinCC (on the HMI panel) and an interface between WinCC and the controller.

SIMATIC HMI Comfort Panels and WinCC undertake the following tasks:

· Representing processes with a clear screen structure

The process is represented on the HMI device. If, for example, a state changes in the process, the display is updated on the HMI device. The process can be represented clearly structured on multiple screens.

Operating processes

The operator can operate the process using the graphical user interface. The operator can, for example, enter a setpoint for the controller or start a motor.

Outputting alarms

If critical process states occur in the process, an alarm is triggered automatically; for example, when a specified limit is exceeded.

· Logging process values and alarms

The HMI system can log alarms and process values. You can document the process history in this way. As a result, you still have access to older production data even at a later time.

Documenting process values and alarms

The HMI system can print out alarms and process values as reports. For example, you can output the production data at the end of a shift.

· Managing process parameters and machine parameters in recipes

The HMI system can store parameters for processes and machines in recipes. You can transfer these parameters, for example, from the HMI device to the controller in a single step in order to change production to another product type.

User management

Certain rights can be granted to the devices and the possible operator inputs can be limited for certain users.

4.2 SIMATIC HMI Panel TP700 Comfort

4.2.1 Device description

The SIMATIC HMI Comfort Panels product line includes touch panels (operated by a touch screen), key panels (operated by a keyboard) and key & touch panels (operated by a keyboard and touch screen).

The SIMATIC HMI Comfort Panels cover all requirements described in Chapter 3.1. The following is also optionally possible:

- Support for operation through help texts
- User-specific expansion of functionality through VBScript
- Microsoft Excel/Word/PDF Viewer for displaying documents
- Remote access to the user interface of the Comfort Panel via Ethernet from the web browser of another HMI device or any PC through the WinCC/Sm@rtServer option
- Recording of operations in an audit trail with electronic signature through the WinCC/Audit option
- Uninterruptible power supply (UPS) with USB support

This document explains these HMI devices using the TP700 Comfort as an example.



Figure 1: TP700 Comfort

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The WinCC Advanced V13 (TIA Portal V13) software is required for configuration and programming. This software is included in the product package of the SCE Trainer Packet "SIMATIC HMI TP700 COMFORT PANEL"!

Notes:

Because all devices in this series have similar functions, it would also be possible to work through the chapters of this document with a different device version in this series.

WinCC Advanced Runtime Simulation can also be used to represent the TP700 Touch Panel on the PC (included in the product package of the SCE Trainer Package SIMATIC HMI TP700 COMFORT PANEL).

Front view of the TP700 Comfort



3 Touchscreen display

Rear view of the TP700 Comfort



Rating plate
 Slots for SD memory cards

Interfaces of the TP700 Comfort



- (1) Connection for power supply
- (2) Connection for equipotential bonding (ground)
- ③ PROFIBUS (Sub-D RS422/485)
- ④ 2x USB type A
- (5) PROFINET (LAN), 10/100 Mbit, 2 ports
- 6 Audio Line IN/OUT
- (7) USB type Mini-B

4.2.2 Memory concept

The HMI devices can use the following types memory:

- Internal memory
- System memory card
- Memory card
- USB mass storage connected to the USB port

Internal memory

The following data is stored here:

- Operating system
- Project file
- License keys
- User management
- Recipes

Note: Cyclic write access is not permitted for the internal memory because this reduces the life expectancy of the internal memory and thus the service life of the HMI device. You should preferably use external memory cards, such as the SIMATIC HMI Memory Card, if possible, in order to prolong the service life of the HMI device for the storage of data records and for logs.

Memory card

The following data is stored here:

- Logs
- Backups
- Recipes

You can use commercially available memory cards in "SD(IO / HC)" or "MMC" format as the memory card. For reasons of data consistency, use of a SIMATIC HMI Memory Card as the memory card is recommended.

System memory card

The system memory card is part of the service concept of the HMI devices and helps to reduce downtimes.

When you activate the service concept, all data is transferred from the internal memory of the HMI device to the system memory card. In this way, if the HMI device fails, the system memory card can simply be inserted into the replacement device.

Only the SIMATIC HMI Memory Card with 2 GB or more memory is permitted as the system memory card. Other memory cards are not recognized by the HMI device as a system memory card.

Slots for memory card and system memory card



- (1) Slot for memory card in "SD(IO / HC)" or "MMC" format
- (2) Slot for system memory card
- ③ Locking slide

4.2.3 Settings on the Touch Panel TP700 Comfort/Start Center

A few important settings must be made directly on the Touch Panel TP700 Comfort.

The Touch Panel TP700 runs on the Windows CE operating system and can be operated, like all touch panels, directly on the screen. For better operation, you should use a touch pen or connect a mouse to the panel's USB port.

After the panel starts, the desktop containing the standard icons and the **'Start Center'** window appear. The version of the images present on the panel is also displayed in this window.

Buttons in the Start Center:

Transfer: The data transfer becomes activate (Connecting to host ...) and the panel waits for the configuration data to download from WinCC Advanced to the PC.

Start: Runtime is started and the process visualization appears on the panel. The panel is often set up so that the start occurs automatically after a few seconds.

Settings: The Windows CE settings dialog opens. Settings for the panel can be made here.

Taskbar: The Start bar of Windows CE opens.

 \rightarrow Select \rightarrow "Settings" in the "Start Center" directly after switching on the voltage supply and the start of the panel.

SIEMENS		SIMATIC HMI
Wy secure mode Computer secure mode Image: Secure mode image: Secure mode<	Start Center V13.0.1.8 Transfer Start Start E Settings Taskbar	TOUCH
Start Start Center V13.0.1.8		Q 02:55 Ø 🖊

Note: The selection of "Settings" must occur fast enough, and before the automatic "Start" of Runtime.

4.2.4 Setting the date and time



 \rightarrow Set the date, current time and time zone. \rightarrow Close and confirm the dialog with "OK".

Date/Time Properties	ок 🗙
Date/Time	4
▲ Mai 2009 ► M D M D F S S	Current Time 09:47:40
27 28 29 30 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	Time Zone (GMT+01:00) Amsterdam, Berlin, Bern, Ro
18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7	Daylight savings time currently in effect Apply

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4.2.5 Setting transfer properties and assigning the IP address



→ Select "Automatic". The transfer will then be started from the WinCC Advanced software.
 → Select Ethernet "PN/IE" as the transfer channel. Press the "Properties..." button → to set the IP address on the panel and to make or check the network settings.



Notes:

To set the MPI or PROFIBUS address on the panel, select the MPI or PROFIBUS interface and then press the Properties button to make or check the bus settings.

The settings in the Transfer Settings window have nothing to do with the connection settings in the project. This means, for example, that data can be transferred between the TP700 panel and WinCC Advanced using the Ethernet interface, and communication between the panel and the SIMATIC S7 controller can take place via the PROFIBUS interface.

In our example, data is transferred between the TP700 panel and WinCC Advanced and communication takes place between the panel and the SIMATIC S7 controller via the Ethernet interface.

→ Double-click the Ethernet interface PN_X^1 in the network settings to select it.



→ In the "IP Address" tab, select the "Specify an IP address" option and set the IP address and subnet mask. → Close and confirm the dialog with "OK".



 \rightarrow Click x to close the network settings.



 \rightarrow Click "OK" to accept the transfer settings.

Transfer	Settings		ок	\times		
General	Directories		43			
Transfer Off Man Auto	ual omatic					
Transfer channel						
MPI PROFIB USB dev	US vice	•	Properties			

4.2.6 Calibrating the touch panel and rebooting

 \rightarrow Select the \bigcirc

ne **OP** icon in order to open the basic settings of the touch panel.

File View	I									N? ×
	×			9	*	Õ		ļŶ		
Certificates	Date/Time	Display	InputPanel	Internet Options	Keyboard	Mouse	Network and Dial-up Co	Network ID	OP	
P	Ì	RROF!	P	SCR		۷		5	€f	
Password	Printer	PROFINET	Regional Settings	ScreenSaver	Service & Commissio	System	Transfer	UPS	Volume & Sounds	
WinCC Intern										

 \rightarrow Select the "Touch" tab \rightarrow Start the calibration there with "Recalibrate".



→ Follow the instructions on the touch panel and press on the center of the target as accurately as possible.

Carefully press and briefly hold stylus on the center of the target. Repeat as the target moves around the screen. \rightarrow To conclude the calibration operation, tap on the touch display of the panel again.



 \rightarrow Now select the "Reboot" option in the "Device" tab.



 \rightarrow Press the "Reboot" button.



4.3 WinCC Advanced V13 programming software (TIA Portal V13)

The WinCC Advanced V13 software (TIA Portal V13) is the programming tool for the following visualization systems:

- WinCC Runtime Advanced for PC-based single-user systems with licenses for 128, 512, 2k, 4k as well as 8k Power Tags (tags with a process interface)
- SIMATIC Comfort Panels
- SIMATIC Mobile Panels
- SIMATIC Multi Panels
- SIMATIC Panels of predecessor generations (Series 70, 170, 270)
- SIMATIC Basic Panels

With WinCC Advanced V13 you have the following functions for creating HMI (Human Machine Interface) systems:

- Configuration and parameter assignment of the hardware
- Specification of communication and creation of a connection to a PLC
- Creation and design of screens with hierarchical structure
- Creation of internal and external variables
- Creation of alarms and alarm views
- Creation of logs and display of logs in the form of trends and tables
- Creation of recipes and recipe views
- Creation and printing of reports
- Creation of user-defined functions with Visual Basic Scripting
- Testing, commissioning and servicing with operational/diagnostic functions
- Remote operation via the optional WinCC Smart Server
- Recording of operations in an audit trail with electronic signature through the WinCC/Audit option
- Documentation

Support is provided for all functions through detailed online help.

4.3.1 Project

To implement a solution for an automation and visualization task, you create a project in the TIA Portal. A project in the TIA Portal contains the configuration data for the configuration and networking of devices as well as the programs and the configuration of the visualization.

4.3.2 Hardware configuration

The *hardware configuration* contains the configuration of the devices consisting of the automation system hardware, the intelligent field devices and the visualization hardware, e.g. panels as HMI (Human Machine Interface) systems. The configuration of the networks specifies the communication between the various hardware components. The individual hardware components are inserted in the hardware configuration from catalogs.

The hardware of automation systems comprises controllers (CPUs) with signal modules for input and output signals (SMs) and communication and interface modules (CP, IM). Other power supply modules (PS) and power modules (PM) are also available for supplying the modules with energy.

The signal modules and intelligent field devices connect the input and output data of the process to be automated and visualized to the automation system.



The visualization, in turn, accesses the data in the automation system.

Figure 2: Example of hardware configuration with centralized and distributed structures and process visualization

The hardware configuration enables the downloading of automation and visualization solutions to the automation system and access to the connected signal modules by the controller.

4.3.3 Schedule the hardware

Before you can configure the hardware, you must plan it (hardware planning). In general, you begin by selecting which controllers are needed and how many. Next you select the communication modules and signal modules. The selection of signal modules is based on the number and type of inputs and outputs needed. As the final step, a power supply that ensures that the necessary power is supplied must be selected for each controller or field device.

The functionality required and the ambient conditions are of vital importance for planning the hardware configuration. For example, the temperature range in the application area sometimes limits the devices available for selection. Fail-safe operation might be another requirement, for example.

The <u>TIA Selection Tool</u> (automation technology \rightarrow select TIA Selection Tool and follow the instructions) provides you support.

Notes:

- TIA Selection Tool requires Java.
- Online research: If more than one manual is available, you should look for the description "Device Manual", "Product Manual" or simply "Manual" (as opposed to "Function Manual", "List Manual", "System Manual", etc.) in order to find the device specifications.

Figure 2 (see above) shows an automation structure that contains both centralized and distributed structures.

Centralized and distributed uses are also possible for the visualization. Panels are often used for distributed local operation. These can communication with the controller via Ethernet, WLAN or fieldbus. For centralized operation and monitoring, PCs can also be used. They are usually connected to the controller via Ethernet.

The <u>TIA Selection Tool</u> (automation technology \rightarrow select TIA Selection Tool and follow the instructions, requires Java) also supports you when selecting the panels.

4.3.4 Planning the screen structure

After selection of a device for the visualization, the screen structure must be planned. For this purpose, you should collect, group and structure the information to be displayed. A screen structure, such as shown by way of example in Figure 3, should be derived from this. The point of entry into the screen structure is always guaranteed by a so-called root screen.



Figure 3: Example of the screen structure

The screen structure should be chosen to optimally support navigation by the user through the information distributed among the screens for operation and monitoring of the process.

The following questions can aid you in this: Which mental model of the process should be observed for the information display? Which data belong together? Which data belong in which order? Which data belong to which actions/processes? Is there cross-action data and the like? Which data are key data, which are supplementary data?

4.3.5 Planning of the screen structure

Every individual screen must be planned. For the information display, its use by people must also be considered. It is helpful here to observe design principles such as the law of proximity, law of similarity and law of symmetry. The following rules of thumb derived from the design principles can also aid in structuring screens:

- \rightarrow Form groups of data blocks
- → Uniform division of the overall screen into work information, status or system information and controller information
- → Observe the average distribution of attention on the screen as a function of reading direction.
- → Use alignment as a design principle (align numbers, column headings same as column content)
- → Make effective use of a maximum of 30 40% of the available space: place as little information as possible and as much as necessary
- → Use codings sparingly (for example, color, bold text, brightness, shape, outline, pattern, flashing)
- → Subdivide numbers: Subdivide numbers with more than 4 digits in groups of 2, 3 or 4 (for example, 66 234)
- \rightarrow Select numbers preferentially when listing objects, properties, etc.
- \rightarrow Use and position designations uniformly, use short words if possible

4.3.6 Basic settings for WinCC Advanced in the TIA Portal

Users can specify their own default settings for certain settings in the TIA Portal. The path to the settings for the visualization is shown here.



 \rightarrow In the project view, select the \rightarrow "Options" menu and then \rightarrow "Settings".

 \rightarrow Under \rightarrow "Visualization" in "Settings", select the desired default settings for the appearance of the user interface.

Settings		_∎≣×
General Hardware configuration HLC programming STEP 7 Safety Simulation Online & diagnostics PLC alarms Visualization Keyboard shortcuts	Visualization Screens General Show templates in screens Use same font for all languages Colors	
	Screen background:	•
	Settings editor Snap to lines Snap to grid None	
	Grid	~
	🖳 Properties 🛛 🗓 Info 🛛 🗓 Diagnostics	

Note: Keep the default settings for the visualization here.

4.3.7 Resetting the SIMATIC HMI Panel TP700 Comfort and setting the IP address

The SIMATIC HMI Panel TP700 Comfort can be reset directly in the TIA Portal. A new IP address can also be assigned to the panel here.

To do so, select the Totally Integrated Automation Portal, which is opened here with a doubleclick.

(\rightarrow TIA Portal V13)



 \rightarrow Then, select \rightarrow "Online & Diagnostics" and open \rightarrow "Project View".



→ In the project tree, select the network adapter of your computer under → "Online access". If you click → "Update accessible devices" here, you will see the IP address (if previously set) or the MAC address (if IP address not yet assigned) of the connected SIMATIC HMI Comfort Panel → Select → "Online & Diagnostics" here.



 \rightarrow To reset the panel, select the \rightarrow "Reset to factory settings" function and click \rightarrow "Reset".

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Pr	oject Edit View Insert Online Options 🖥 🎦 🗔 Save project 进 🐰 🗐 🗊 🗙 📉	Too ± (24	s Window	Help 🚹 🖳 🙀 🚿 Go onlin	e 💅 Go offline	<u>k</u> ? 🖪 🖪 🗶 😑		Tota	ally Integ	grated Autor	nation PORTAL	
	Project tree			Intel(R) Ethernet	Connection I2		92.168.0.10		[192.168	3.0.10] -	- # = X	
Online & Diagnostics	Devices Image: Devices Image: Devices Image: Devices Intel(R) Ethernet Connection I217-LM Image: Devices Image: Devices		 Diagnostics Functions Assign IF Assign n <u>Reset to</u> 	s P address name <u>factory settings</u>	Reset to factory	y settings MAC addr IP addr PROFINET device na	ess: 28 -63 ess: 192 . 1 me: panel	-36 -55 -11 68 . 0 . 1 Reset Reset	8 - 19 0			Online tools 👘 Tasks 📑 Libraries
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	> Details view		٤								>	
	Portal view Overview	🞖 Or	line & dia					Scanning for	devices co	ompleted for in	1t	

Note: For resetting to factory settings, "Runtime" should not yet be started in the panel and the "Start Center" should be displayed.

 \rightarrow Confirm the prompt asking if you really want to reset the module with \rightarrow "Yes".

Online & diagnostics (0241:000019)							
Do you really want to reset the module?							
	Yes No						

→ Before you can assign the IP address, you must wait until the panel has finished resetting. Afterwards, you must select → "Update accessible devices" and → "Online & diagnostics" of your panel again. To assign the IP address, select the → "Assign IP address" function here. Enter the following IP address here, for example: → IP address: 192.168.0.10 → Subnet mask 255.255.255.0. Click → "Assign IP address" and this new address will be assigned to your SIMATIC HMI Panel TP700 Comfort.

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Project Edit View Insert Online Options Tools	Window Help Totally Integrated Aut	omation
📑 🎦 🗔 Save project 进 🐰 🏥 🏛 🗙 🏷 ± (~ ±	🖥 🛄 🚰 🖳 💋 Goonline 🖉 Gooffline 🕌 🌆 🕼 🥻 🛨 🛄	PORTAL
Project tree 🔲 🖣	Ethernet Connection I217-LM + Accessible device [28-63-36-55-18-19] + Accessible device [28-63-36-55-18-19]	_ 🖬 🖬 🗙 🖪
Devices		0
Image: Solution of the second of the sec	Diagnostics General Functions Assign IP address Assign IP address Assign name Reset to factory settings MAC address: 28 -63 -36 -55 -18 -19 Accessible devices	nline tools () Tasks
C Adapter [MP] Calification [Coal] Calif	IP address: 192.168.0 .10 Subnet mask: 255.255.255.0 Use router Router address: 0.0	Libraries
	Assign IP address	~
	Assign a device address to the module	
	General Cross-references Compile	
	! Message Go to ? Date Time	
	Scanning for devices on interface Intel(R) Ethernet Connection I217-LM was started. 5/28/2016 1:35:48 AM	^
	Scanning for devices completed for interface Intel(R) Ethernet Connection I217-LM. Found Size Size Size Size Size Size Size S	
> Details view	Scanning for devices on interface intell(k) Ethemet Connection 1217-LM was started.	>
Portal view Derview Overview Overview	& dia î) Scanning for devices completed fo	r int

→ If the IP address was not successfully assigned, you will receive a message in the → "Info" window under → "General".

	🖳 Properties	🔄 In	fo 📱 Di	agnostics			
General Cross-references Compile							
Show all messages							
! Message	Go to	?	Date	Time			
😢 🔻 The IP address could not be assigned.		?	5/28/2016	1:41:32 AM	^		
O The function could not be executed.			5/28/2016	1:41:32 AM	_		
					*		
<					>		

Note: The IP address of the SIMATIC HMI Panel TP700 Comfort can also be set using the Windows CE operating system of the panel.

4.3.8 WinCC user interface

Project tree	Menu bar and buttons	Work area	Tools	
7/6 Siemens - D:00 TIA_Portal\042.201_WinC	C_Advanced_TP700_CPU1516F042_201_WinCC_Advanced_TP700_CPU151	6F		_ □ X
Project Edit View Insert Online Option Project tree Image: Comparison of the series of t	s Toms Window Help) ± (# ± 1 1 1 1 1 1 2 1 2 2 4 2 Goonline 2 Gooffline 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	Comfort] > Screens > Overview Sorti	ng Station _ I = X Toolbox Options	PORTAL
Image: Section of the section of t	SIEMENS SIMATIC HMI Speed Motor Magazine Plastic System -B4 -B5 -B4 -B4 -B5 -B4 -B4 -B5 -B4 -B4 -B5 -B4 -B		12/31/2000 Basic obje Basic obje A A A A -87 Elements Basic obje Controls Plastik/ Elements Basic obje Controls Plastik/ Controls Controls 	Toolbox Pg Animations Backgrout Adjinstructions Adjinstructions Image: Comparison of the state of the s
Details view		Properties window		

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4.3.9 Project tree

The project tree window is the central control point for project editing. All components and all available editors of a project are displayed in a tree structure in the project window and can be opened there.

Each editor is assigned a symbol that enables you to identify the associated objects. Only elements supported by the selected HMI device are displayed in the project window.

You can access the HMI device settings in the project window.



4.3.10 Details view

The details view displays the contents or additional information on the objects selected in the project tree.

~	Details view			
	Name	Number		
	Different jobs	10		^
	Magazine Plastic	3		=
	Overview Sorting Station	1		
	Project information	6		
	SIMATIC PLC system diagn	5		
	Speed Motor	2		
<	C	^	>	~

4.3.11 Menu bar and buttons

In the menus and toolbars, you will find frequently used functions you need to configure your HMI device. If a corresponding editor is active, editor-specific menu commands and toolbars are displayed.

If you point to a command with the mouse, a corresponding tooltip is provided for each function.

Ma Siemens - D:00_TIA_Portal/042 201_WinCC_Advanced_TP700_CPU1516F\042 201_WinCC_Advanced_TP700_CPU1516F	_ _ _ ×
Project Edit View Insert Online Options Tools Window Help	Totally Integrated Automation
📑 💁 🔜 Save project 🚇 🐰 🗐 🏗 🗙 🍤 🛨 (주 🛨 🖥 🔃 🖺 🖉 🕼 🖉 Go online 🖉 Go offine 🏭 🖫 🔚 🗶 🚽 📋	PORTAL

4.3.12 Work area

You edit the objects of the project in the work area. All other WinCC elements are arranged around the working area.

In the work area, you edit the project data either in tabular form (for example, tags), or graphically (for example, process screens).

A toolbar is located in the upper part of the work area. Here, you can select, for example, the font, font color and functions such as rotate, align, etc.



4.3.13 Tools

The Tools window contains a selection of objects is provided that you can insert into your screens, such as graphic objects and operator controls. In addition, the Tools window contains graphics with preassembled graphic objects and collections of faceplates.

Objects are moved to the working area via "drag and drop".

Toolbox 📑 💷 🕨	
Options	A
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III 🔽 🗾 🗵	tions
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	Tas
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Navigation	-

4.3.14 Properties window

In the properties window, you edit the properties of the objects selected in the work area (e.g. the color of screen objects). The window is available only in certain editors.

The properties of the selected object are displayed arranged by category in the properties window. As soon as you exit an input field, the value changes take effect. If you enter an invalid value, it is highlighted in color. The tool tip gives you information about the valid value range, for example.

In addition, animations (e.g. change of color at a signal state change in the PLC) and events (e.g. change of screen when a button is released) are configured for a selected object in the properties window.

Overview Sorting Station [Screen]	Seroperties	🗓 Info 追 🗓 Diagnostics	
Properties Animatio	ns Events Texts			
📑 Property list	General			
General Layers	Pattern		Tooltip	
4	Background color: 255, 255, 255 V Grid color: 0, 0, 0			~
	Number: 1	■		~

4.3.15 Other tabs

Settings for the work area such as the level selection and grid functions can be made in the layout window.

Animations, instructions, tasks and libraries of the select object can be selected using additional tabs.

Layout		
Options		A
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■ Overview Sorti		
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HmiScr		B
Graphic		Itio
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⇒ Laver 2		
≝ Layer 3		#
≝ Layer 4	•	5
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✓ Grid		1
Layout mode		*
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O Snap to grid		tru
O shap to gird		<u></u>
None		suc
Grid		
Show grid		
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5 Task

In this chapter, process visualization will be added to the program from chapter "SCE_EN_032-600_Global_Data_Blocks". This will enable you to better monitor the process flow and operate the process more effectively.

6 PlanningProcess visualization

A Touch Panel TP700 Comfort is to be used for the process visualization.

The programming device, a SIMATIC S7-1500 controller and the Touch Panel TP700 Comfort are interconnected via the **Ethernet interface**.

The basic configuration is to be performed using the wizard in the TIA Portal V13. All **system** screens are to be created in the process.

In an overview screen "**Overview of sorting station**", the process will be represented by the conveyor and sensors. Conveyor speed and the count of plastic workpieces will also be displayed here.

In this screen, it is also to be possible to select the operating mode, start and stop in automatic mode and reset the counter.

The actual speed of the motor will be graphically displayed in another screen titled **"Motor Speed".** The setpoint speed can also be specified here.

The "Plastic Magazine" will be created in a first step.

An alarm line, date/time and the plant states "Emergency Stop ok/triggered", "Main switch ON/OFF" and "Automatic started/stopped" are to be displayed in the **header** of all screens.

The **footer** contains a button that can be used to return to the start screen and a button to exit Runtime.

The alarm system is also to be configured.

System events are to be displayed on the panel and the CPU and limit violations of the motor speed and the main switch monitored.

The alarms will be displayed in the alarm line of the header and shown automatically in alarm windows when errors/warnings occur.

Remote control of the Touch Panel TP700 Comfort is activated via the web server.

6.1 Program description for the sorting station with speed control and speed monitoring of the motor

The "MOTOR_AUTO" [FB1] function block controls a conveyor in automatic mode.

The Memory_automatic_start_stop is latched with the Start_command but only if the reset conditions are not present.

The Memory_automatic_start_stop is to be reset if a Stop_command is pending or safety shutoff is active or automatic mode is not activated from the visualization.

The Conveyor_motor_automatic_mode output is activated when Memory_automatic_start_stop is set, the enable conditions are met and Memory_conveyor_start_stop is set.

To save energy, the conveyor should only run when a part is present. For this reason, the Memory_conveyor_start_stop is set when Sensor_chute_occupied signals a part and reset when Sensor_end_of_conveyor produces a negative edge or safety shutoff is active or automatic mode is not activated (manual mode).

Because the Sensor_end_of_conveyor is not able to be mounted directly at the end of the conveyor, signal stretching of the Sensor_end_of_conveyor signal is programmed.

The magazine for plastic holds only five parts. For this reason, the parts will be counted at the end of the conveyor. When the magazine contains five parts, automatic mode is to be stopped. After the magazine has been emptied, automatic mode will be restarted with the Start_command once the counter has been reset from the visualization.

The **speed setting** is made at an input of the "SPEED_MOTORCONTROL" [FC10] function in revolutions per minute (range: +/- 50 rpm).

First, the function first checks for correct entry of the speed setpoint in the range +/- 50 rpm.

If the speed setpoint is outside the range +/- 50 rpm, the value 0 will be output at the speed manipulated value output. The return value of the function (Ret_Val) will be assigned the value TRUE (1).

If the speed setting is within the range +/- 50 rpm, this value will first be normalized to the range 0...1 and then scaled to +/- 27648 with data type 16-bit integer (Int) for output as the speed manipulated value at the analog output.

In the "SPEED_MOTORMONITORING" [FC11] function, the actual value will be made available to B8 as an analog value and queried at an input of the "SPEED_MOTORMONITORING" [FC11] function.

The actual speed value will be scaled to revolutions per minute (range: +/- 50 rpm) and made available at an output.

The following four limits can be specified for the block inputs in order to monitor them in the function:

Speed > SPEED_MOTOR_monitoring_error_max

Speed > SPEED_MOTOR_monitoring_warning_max

Speed < SPEED_MOTOR_monitoring_warning_min

Speed < SPEED_MOTOR_monitoring_error_min

If a high or low limit is violated, the value TRUE (1) is assigned to the corresponding output bit.

If a fault is present, the protective tripping of the "MOTOR_AUTO" [FB1] function block is to be tripped.

The speed setpoint and the actual speed value as well as the positive and negative error and warning limits are created in the data block "SPEED_MOTOR" [DB2], as are the error and warning bits.

The setpoint and actual value of the counter for the plastic parts will be specified and displayed in the global data block "MAGAZINE_PLASTIC" [DB3]. These values are interconnected with the "MOTOR_AUTO" [FB1] function block using an input for the setpoint setting and an output for the actual value display.
6.2 Technology diagram

Here, you see the technology diagram of the plant for the task.



Figure 4: Technology diagram

Schalter der Sortieranlage Switches of sorting station	Automatikbetrieb Automatic mode -P5 gestartel/started	Handbetrieb / Manual mode -S3 Tippbetrieb -M1 vorwärts/ Manual -M1 forwards
-Q0 Hauptschalter/Main switch	-S1 Start/start	-S4 Tippbetrieb -M1 rückwärts/ Manual -M1 backwards
-A1 NOTHALT/Emergency stop	-S2 Stopp/stop	-S6 Zylinder -M4 ausfahren/ cylinder -M4 extend -S5 Zvlinder -M4 einfahren/ -S5 Zvlinder -M4 einfahren/
-P2 Handimanual -P3 Auto/auto		-S5 Zylinder -M4 extend -S5 Zylinder -M4 einfah cylinder -M4 retrac

Figure 5: Control panel

6.3 Reference list

DI	Туре	Identifier	Function	NC/NO
I 0.0	BOOL	-A1	Return signal emergency stop OK	NC
I 0.1	BOOL	-K0	Main switch "ON"	NO
I 0.2	BOOL	-S0	Mode selector manual (0)/ automatic (1)	Manual = 0 Auto = 1
I 0.3	BOOL	-S1	Pushbutton "Automatic Start"	NO
10.4	BOOL	-S2	Pushbutton "Automatic Stop"	NC
I 0.5	BOOL	-B1	Sensor cylinder -M4 retracted	NO
l 1.0	BOOL	-B4	Sensor part at slide	NO
I 1.3	BOOL	-B7	Sensor part at end of conveyor	NO
IW64	BOOL	-B8	Sensor actual value speed of the motor +/-10V corresponds to +/- 50 rpm	

The following signals are required as global operands for this task.

DO	Туре	Identifier	Function	
Q 0.2	BOOL	-Q3	Conveyor motor M1 variable speed	
QW 64	BOOL	-U1	Manipulated value speed of the motor in two directions +/-10V corresponds to +/-50 rpm	

Legend for reference list

- DI Digital input DO Digital output
- AI Analog input AO Analog output

0

Output

- I Input
- NC Normally Closed
- NO NO Normally Open

7 Structured step-by-step instructions

You can find instructions on how to carry out planning below. If you already have a good understanding of everything, it will be sufficient to focus on the numbered steps. Otherwise, follow the individual instructions in the steps below.

7.1 Retrieving an existing project

→ Before you can expand the "SCE_EN_032-600_Global_Data_Blocks_R1508.zap13" project from chapter "SCE_EN_032-600_Global_Data_Blocks", you must retrieve this project from the archive. To retrieve an existing project that has been archived, you must select the relevant archive with → Project → Retrieve in the project view. Confirm your selection with "Open".

₩§ 9	Sieme	ens					
Pro	ect	Edit	View	Insert	Online	Optior	ıs
	New Open. Migrat	 te proje	ect			Ctrl+O)
	Close					Ctrl+W	
	Save Save a	as			Ctrl+	Ctrl+S Shift+S	•
	Delete Archiv	e proje /e	ct			Ctrl+E	
Tard Reader/USB memory Memory card file							
	Upgra	de					
	D:11d D:110 D:100. D:100_ D:100_ D:100_	e042 2 42 20 \032- _TIA_P _TIA_P 32-30	201_Win 1_WinC 600_G ortal\HM ortal\TIA 00_IEC_	hCC_Adv C_Advan lobale_D II_1500\I _Proje\ Zeiten_Z	anced_TI iced_TP7(atenbaus HMI_150 TIA_Proje aehler M	P70 00 teine 0 ct_3 it P	

 $(\rightarrow \text{Project} \rightarrow \text{Retrieve} \rightarrow \text{Select a .zap archive } \dots \rightarrow \text{Open})$

→ The next step is to select the target directory where the retrieved project will be stored. Confirm your selection with "OK".

(\rightarrow Target directory ... \rightarrow OK)

→ Save the opened project under the name 042-201_WinCC_Advanced_TP700_CPU 1516F.

 $(\rightarrow \text{Project} \rightarrow \text{Save as} \dots \rightarrow 042\text{-}201_\text{WinCC} \text{Advanced} \text{TP700} \text{CPU} 1516F \rightarrow \text{Save})$



7.2 Adding a SIMATIC HMI Panel TP700 Comfort

→ To create a new panel in the project, go to the portal view. In the portal, select the menu command → "Devices & networks" and → "Add new device".



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→ Now, select the device version as follows: → "HMI" → "SIMATIC Comfort Panel" → "7" Display" → "TP700 Comfort" and the correct order number of your panel, here, for example, → 6AV2 124-0GC01-0AX0

Controllers	HMI SIMATIC Basic Panel SIMATIC Panel SIMATIC Comfort Panel GIVE Comfort Panel GIVE GIVE Display	Device:	
	 ▼ → Display ▼ → 7" Display ▼ → 7" Display ▼ → TP700 Comfort ■ 6AV2 124-0GC01-0AX0 		TP700 Comfort
	TP700 Comfort Portrait	Article no.:	6AV2 124-0GC01-0AX0
HMI	 TP700 Comfort Outdoor TP700 Comfort Outdoor Por 	Version:	13.0.1.0 ▼
	Figure KP700 Comfort Figure KP700	Description: 7.0" TFT displa Touch screen; PROFINET/Indu	y, 800 x 480 pixels, 16M colors; 1 x MPI/PROFIBUS DP, 1 x strial Ethernet interface with MRP
PC systems	 ▶ a 19 "Display ▶ a 22" Display ▶ a 22" Display ▶ SIMATIC Multi Panel 	and RI/IRI sup slot;3 x USB	port (2 Ports); 2 x Multimedia card
	 Image: Simarce Handranet Image: Simarce Handranet Simarce Handranet Sima		
Drives			

→ Enter "Panel TP700 Comfort" as the device name and \rightarrow select the check box \checkmark "Start device wizard". Click the \land Add button here.



7.3 HMI wizard for the TP700 Comfort Panel

The TIA Portal now creates the desired panel and automatically starts the HMI wizard for the TP700 Comfort Panel This helps in specifying a few basic settings for the panel.

→ A prompt for the PLC connections appears first. Choose your previously configured CPU 1516F as the communication partner.

CPU1516F CPU 1516F-3 PN/DP				
Browse				
Name	CPU type			
None				
CPU1516F	CPU 1516F			
1				
	 Image: A start of the start of	×		

→ In order to connect your panel to the CPU, select the "Ethernet" interface.→ Confirm your selection by clicking "______"

HMI Device Wizard: TP700	Comfort PLC connections Configure the PLC connection(s).
PLC connections Screen layout Alarms Screens System screens Buttons	Communication driver: SIMARIC \$7 1500 Interface: ETHERNET Panel TP700 Comfort TP700 Comfort CPU1516F Browse
Save settings	<< <u>B</u> ack <u>Next>></u> <u>E</u> inish <u>C</u> ancel

→ Under "Screen layout" you can change the default background color of your panel. → Select the IPage header" check box with screen title IDate/time" and IDate.→ Confirm your selection by clicking "<u>Next>></u>".

HMI Device Wizard: TP700 Co	Screen layout Select the screen objects to b	e displayed.
PLC connections		
Screen layout 🥚	Screen	Preview
Alarms 🥥	Resolution 800 × 480 pix 💌	SEMENS Root screen arms
Screens 🥥	Background color	
System screens 🥥	✓ Header	
Buttons 🥥	Screen title Novienting field	
	Date/time	
	Logo Browse	
Save settings	<< <u>B</u> ack	lext>> <u>F</u> inish <u>C</u> ancel

→ In the "Alarms" section, you can specify the alarms that are to be displayed in a window. Select all 3 alarm types IVI (with the option "Top alarm line" for unacknowledged alarms) → Confirm your selection by clicking "Next>>>".

HMI Device Wizard: TP700 C	comfort	×
	Alarms Configure the alarm setting:	s.
PLC connections		
Screen layout 🥥	Alarms	Preview
Alarms 🥚	Unacknowledged alarms	SECRETS Root screen and and and and and and and and and an
Screens 🥥	Alarm Window Alarm line top	No. Time Date
System screens 🥥	Alarm line bottom	ALI
Buttons 🥥	Active system events	
Save settings	C Back	Next >> Einish Cancel
Save settings	N Dack	<u>Emisii</u> <u>Cancer</u>

→ The "Screen navigation" section shows the screen structure with the screen names of the last created project, in which the start screen is the first screen shown on the left.
 → By clicking a screen name, you can easily assign a new name → By clicking +, you can insert new pictures in the hierarchy →By clicking " Delete screen ", you can delete selected screens.



→ Use this method to create the screen structure shown below with the corresponding screen names. → Confirm your selection by clicking "<u>Next>></u>".

HMI Device Wizard: TP700	Comfort			×
	Screen navigation Add	new screens by clicking this	button: 🛨	
	📑 Add screen 🖳 Delete scree	en 📝 Rename 🗖 Delete	all screens	
PLC connections	2			
Screen layout	2			
Alarms 🤇	2			
Screens 🤇	•			
System screens		Г	• • L_	
Buttons		+ 💼 🗕	Speed Motor	
		Overview Sorting Station	• • •	
			Magazine	
			Hestic	
Save settings		<< <u>B</u> ack <u>N</u> ext	Einish Can	icel

→ In the "System screens" section, you can select previously preset views for system functions and automatically insert them. →Enable all system screens with Select all"
 → Confirm your selection by clicking "Next>>>".

HMI Device Wizard: TP700	Comfort			×
	System screens	t the system screens.		
PLC connections Screen layout Alarms				SIMATIC PLC Status/Force System diagnostics view Project information
Screens System screens Buttons	Overview Sorting Station	System screens	1 N	System settings User administration
	Select all			System information Operating modes Language switching Control Panel Stop Runtime
Save settings		<< <u>B</u> ack Ne	<u>ext</u> >> <u>F</u>	inish <u>C</u> ancel

→ In the "System buttons" section, you will find the four freely selectable buttons for Exit
 (Runtime), Log on , Language and Start screen . You can place these buttons on the provided button areas "Left", "Bottom" or "Right" using drag-and-drop.

System buttons	Preview
	SIEMENS Overview Sorting Station uses
Exit Log on Language Start Closes runtime. screen	
	Button area
	Reset all

→ Enable only the "Button area" I Bottom". → Insert the button for the "Start screen" on the left and the button for Runtime "Exit" on the right. → Confirm your selection by clicking "<u>Einish</u>"

THMI Device Wizard: TP700	Buttons Add buttons with drag-and-dro buttons.	op or by clicking on available system
PLC connections		
Screen layout	System buttons	Preview
Alarms 🤇		SECURING Overview Sorting Station
Screens 🤇	Log on Language	
System screens		
Buttons 🤇		
		Button area
		Reset all
Save settings	<< Back	ext>>> <u>Finish</u> <u>C</u> ancel

7.4 Device configuration of the TP700 Comfort Panel

→ The TIA Portal now switches automatically to the project view and displays the start screen of our visualization there.

M Siemens - D:00_TIA_Portal\042 201_WinCC_Advanced_TP700_CPU1516F\042 201_WinCC_Advanced_TP700_CPU1516F	_ _ ×
Project Edit View Insert Online Options Tools Window Help 登 💁 💭 Save project 昌 🐰 道 道 🗙 答之 《主 智 민 🖸 里 區 🥔 Go online 🖉 Go offline 👬 匪 澤 😤 📃 🗓	Totally Integrated Automation PORTAL
Project tree II < J TP700 CPU1516F > Panel TP700 Comfort [TP700 Comfort] > Screens > Overview Sorting	Station 💶 🖬 🖬 🗙 Toolbox 📑 💷 🕨
Devices	Options
	L 11 + 31 12 + 13 L 2 13 11 - 1
5 T1 042 201 WinCC Advanced TP700 CPU1	A V Basic objects
Add new device	SIM 📝 📥 📑
a Devices & networks	
S ▼ [m CPU1516F [CPU 1516F3 PN/DP]	
Device configuration	
Solution Contraction Contracti	
Bergram blocks	Elements
Extended ourse files	<u> </u>
SIMAIIC HMI	
▶ G PLC data types	1
Watch and force tables	
Speed Motor Magazine Plastic System screens	
Traces	✓ Controls
Program info	::::::::::::::::: 🔄 📷 🍋 📲
Igi Device proxy data	
Taut live	📰 🛄 其 👔
Panel TP700 Comfort [TP700 Comfé	🔁 🖾 🔁 📷
Common data Welcome to Panel 1P/00 Comfort (1P/0	O Comfort)!
Commentation settings	
Cip Languages & resources	,
Gonine access	
Card Reader/USB memory	
A Properties T Info U Di	agnostics
General 1 Cross-references Compile	es
Show all messages	
! Path Description Go to ?	Errors Warnings .
> Details view	> Graphics
Portal view Overview Overview Overview	Project 042 201 WinCC Advanced TPZ

→ In order to configure our panel, select "Panel TP700 Comfort" in the project tree and double-click it to open its "Device configuration".

Via	Siemens - D:\00_TIA_Portal\042 201_WinCC_
Pr	oject Edit View Insert Online Options
	Project tree
	Devices
	🖆 🔲 🖸 🖸
	042 201_WinCC_Advanced_TP700_CPU1
iza	📑 Add new device
	n Devices & networks
	CPU1516F [CPU 1516F-3 PN/DP]
	🔻 🛅 Panel TP700 Comfort [TP700 Comfc
	Device configuration
	Online & diagnostics
	🍸 Runtime settings
	Screens
	Screen management
	🕨 🔁 HMI tags

7.4.1 Setting the IP address

- \rightarrow Double-click the Ethernet interface of the panel in the Device view.
- → In the → "Properties" under General, open the → "PROFINET interface [X1]" menu command and select the → "Ethernet addresses" entry there.
- \rightarrow Set the IP address 192.168.0.10 under IP protocol.

042 201_WinCC_Advanced_TP70	0_CPU1516F Panel TP700 Comfort [TP700 Comfort]	∎∎×
	🚝 Topology view 👗 Network view 🛐 Device	e view
Ranel TP700 Comfort		
HMI		Device data
< =	> 100%	~
Panel TP700 Comfort.IE_CP_1 [PR	OFINET Interface] Properties Info Diagnostics	
General IO tags System	n constants Texts	
General		^
	Ethernet addresses	<u> </u>
General	Interface networked with	
Ethernet addresses		_
Operating mode	Subnet: PN/IE_1	
 Advanced options Diagnostics addresses 	Add new subnet	
Diagnostics addresses	IP protocol Set IP address in the project IP address: 192.168.010 Subnet mask: 255.255.255.0 Use router Router address: 0.0.0 P address is set directly at the device	

Note: The subnet mask was previously set in the settings of the CPU 1516F and is applied automatically to the panel.

→ To obtain an overview of the assigned addresses within a project, you can click the → " "" icon in the →"Network view". If you click → "... Connections, the "HMI connection" between the CPU and panel that you previously created in the wizard will be displayed.

042 201_WinCC_Advanced_	TP700_CPU1516F Devices & networks	_ = = ×
I	📱 Topology view 🛛 🛔 Network view 📗	Device view
Network	iMI connection 💌 🔡 🖽 🔍 🛨	
CPU1516F CPU 1516F	Panel TP70 TP700 Comf	Network data
192.168.1.1 PN/IE_1: 192.168.0.1 2	PN/IE_1: 192.168.0.10	~
< 11	> 100%	

7.5 Compiling the CPU and panel and saving the project

 \rightarrow To compile all blocks, click the "CPU_1516F" folder and select the $\boxed{100}$ icon for compiling in the menu. To compile the panel, click the "Panel TP700 Comfort" folder and select the

icon for compiling in the menu. You can save your project by clicking the

🔜 Save project button in the menu.

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\rightarrow CPU_1516F \rightarrow \square \rightarrow Panel 1P700 Comfort \rightarrow \square \rightarrow \square set project	(→ CPU_1516F → ៉ → Panel TP700 Comfort → ៉ → 🖥	Save project
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🕨 🔚 HMI tags				Power Supplies					
2 Connections				Field devices					
MII alarms			~	Other field devices					
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Text and graphic lists	 MPI/DP Interface [X2] 								
📢 User administration	Information	Name: Panel TP700 Comfort							
Common data		Device/application type: TP700 Comfort							
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Languages & resources		Change deviceiversion							
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Details view		<	>	Information					
Portal view Overview	Overview So Devices 8	ne	Project 042 2	201 WinCC Advanced TP7					

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→ The 'Info' area then indicates whether compiling was successful or whether warnings or errors occurred.

	🖳 Properties 🚺 Info	o 追 🗓 Dia	gnostics	
General (1) Cross-reference	s Compile			
😢 🛕 🕕 Show all messages	-			
Compiling completed (errors: 0; warni	ngs:0)			
! Path	Description	Go to	? Error	rs War
🚹 🔻 Panel TP700 Comfort	Time stamp: 28.05.2016 16:11 - 505400 bytes used of '	1258. 🦰	0	0
 Hardware configuration 		~		
0	Software compilation started.	~		
0	Number of tags: 1	~		
0	Software compilation completed (device version: 13.0.1.0)). 🏲		
S	Compiling completed (errors: 0; warnings: 0)			
<	III			>

7.6 Configuring the graphic display

→ After successful compilation, you want to lay out the first screen for the visualization. To do this, first open the \rightarrow "Overview of sorting system" screen by double-clicking it.



→ Many objects such as the screen change buttons were already created by the wizard. The text filed in the center of the screen is to be removed by right-clicking it and selecting → "Delete" in the displayed dialog.

TP700_CPU1516F •	Panel TP700	Comfort [TP700 Comfo	rt] 🕨 Screens 🕨 Over	view Sorting Statio	n _∎∎>	Tool	box	. .	〕▶
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→ From Tools, select → "Graphic display" \square under → "Basic objects". The mouse pointer changes so that you can now draw an area for displaying a graphic in the work area.

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→ You can double-click the graphic display area to have its properties displayed. Select the → "Create graphic from file" icon \rightarrow in the \rightarrow "General" sub-item.

,1_WinCC_Advanced_TP700	_CPU1516F Panel TP	700 Comfor	t [TP700 Co	mfort	i] 🕨 Screen	s • Overview Sorting Station	_ # # X
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	🖄 eate new graphic from file 🔄						Apply

Note: There are four sub-items for the properties of the objects.

- Properties for static settings of the object.
- Animation for dynamic settings of the object.
- Events if actions are to be triggered from objects.
- Texts for the multilingual display within an object.

→ In the displayed dialog, select the "Foerderband_Conveyor.bmp" file in the "SCE_EN_042-201_Screens" folder and click → "Open"



Note: You can draw the graphics used in this document yourself and save them in *.bmp format or download them from <u>www.siemens.en/sce/S7-1500</u> in the "SCE_EN_042-201 WinCC Advanced with TP700 and S7-1500" under "SCE_EN_042-201_Screens".

 \rightarrow Select the "Foerderband_Conveyor.bmp" graphic for the display and click \rightarrow "Apply".



Note: The generated graphic is stored in the "Languages & Resources" path under "Project graphics".

→ Position the graphic with the mouse in such a way that the positions and sizes shown below are entered → under "Layout" → in the properties. Select the → "Fit graphic to object size" option to adapt the size.



7.7 Displaying a process value in an IO field

→ You first want to insert a display of the actual value of the current speed below the conveyor motor. To do this, select the → "Program blocks" of the → "CPU_1516F" and the → "SPEED_MOTOR[DB2]" data block there. Then drag the → "Actual speed value" tag from the → "Detail view" to our "Overview of sorting station" screen.

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	MOTOR_SPEEDCONTROL [FC10]	-B4 -B5 metal -B7	<u> </u>				
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→ The connection to the tag in the PLC has already been created in the "Properties" of the IO field under "General", "Process". The "Display format" is set to "Decimal". Now, all you have to do is change the "Format pattern" to → "s999.99" and the "Type" of the field to → "Output".

		000.00	-81 75%	•				
I/O field_1 [I/O field]			🖳 Properti	es 🚺 Info 💶 🗓 Diag	nostics 🗖 🗖 🗖 🤜 🗸			
Properties Animations Events Texts								
Property list	General							
General Appearance	Process			Format				
Characteristics	Tag:	SPEED_MOTOR_Spee	d_Actual_Value 🔳	Display format:	Decimal 🔻			
Layout	PLC tag:	SPEED_MOTOR.Spee	ed_Actual_Value 🛛 🥕	Decimal places:	0			
Elashing	Address:		Real	Field length:	6 🜲			
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		Input/output						
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Note: The format pattern s999.99 means that the display will include three places in front of the decimal point two places after the decimal point and a sign.

 $\rightarrow\,$ In the "Properties" under "Appearance", we change the "Color" of the "Background" to $\rightarrow\,$ "Blue".

I/O field_1 [I/O fi	ield]	🔍 Pr	roperties 🚺 Info 🔒 📱 Diagnostics	
Properties	Animations Events Texts			
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 \rightarrow Under "Text format" in "Properties", change the "Horizontal" setting of "Alignment" to \rightarrow "Right".

I/O field_1 [I/O f	ield]					🖳 Properties	🗓 Info 🔒 🗓 Diagnostics	∎∎▼
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Miscellaneous				Vortical	Top			
Security				vertical:	Тор			

 \rightarrow Under "Layout" in the "Properties", change \rightarrow "Position & Size" as illustrated here so that the IO field will be displayed below the conveyor motor.

I/O field_1 [I/O f	O field_1 [I/O field]						🔍 P	ropertie	s 1	Info 🧯	🕽 🗓 Diag	nostics	∎ = ▼	
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Text format	-													
Flashing	•	Fit to	size											
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Style/Designs		E FI	t object to co	ontents										
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→ For the description, use drag-and-drop to insert a → "Text field" A before and after the IO field from → "Basic objects" in "Tools". Type → "Actual speed value" and → "rpm" there.

TI	P700_CPU1516F ▸ P	anel TP700 Comfort [T	P700 Comfort] 🕨 So	reens 🕨 Ov	erview Sorting S	itation 🗕 🗖	■×	Toolbo	ox 🔳	
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→ Next, select the three objects → IO field → text field "Actual speed value" → and text field "rpm" in that order and then click on the → "Align selected objects on top" function in the toolbar of the work area. Save your project by clicking Save project.

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Ru	itsche/Slide		Förd	erband/Convey	or				Plastik/ plastic	
		M1	<i>.</i>	Text		M4	-B2			
Speed	l actual valu	ie <u>00</u> 0	.0C rpm				-B1		_	~
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7.8 Visualizing binary signals with animated rectangles

→ For the visualization of the sensors, you want to start with sensor "-B4" at the slide. To allow you to draw and position the rectangle better, first change the zoom factor to \rightarrow "300%".



→ Next, use "drag-and-drop" to move a rectangle from \rightarrow "Basic objects" in Tools to the position of sensor "-B4".



→ Draw the correctly sized and positioned rectangle with the mouse or set the → "Position & Size" under "Layout" in "Properties" as shown here. The sensor will then be displayed below the designation "-B4".

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Style/Designs Miscellaneous	Y: 152 🗘 15 🗘	Y: 0 ♥ %	

→ In "Properties" under "Appearance", change the "Color" of the "Background" to \rightarrow "Gray" and the "Width" of the "Border" to \rightarrow "0".

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Miscellaneous	•		Fili pattern:			Style: Solid	
						Color: 0, 0, 0	•

 $\rightarrow~$ Now change to the "Animation" tab and select "Display" and click

 \rightarrow "Add new animation" $\stackrel{\bullet}{\blacksquare}$.

Rectangle_1 [Rectangle]		🖻 Properties 🚺 Info 🔒 🗓 Diagnostics 👘	•
Properties Animations	Events Texts		
Overview	Animation types		
👻 🖹 Display	Display		
Add new animation	- Appearance	📑 🎤 Dynamize colors and flashing	
Movements	visibility	💣 🎮 Make visibility dynamic	
	-		

 $\rightarrow~$ In the displayed dialog, select \rightarrow "Appearance" and click \rightarrow "OK".

Add animation	×
Select the animation you want to add.	
Appearance Visibility	
	OK Cancel

 $\rightarrow~$ To establish the connection to the global tag in the CPU, select \rightarrow "PLC tags" under $\rightarrow~$ "CPU_1516F" and below that

the \rightarrow "Tag_table_sorting_station". Next, drag the "-B4" tag from the \rightarrow "Detail view" to the "Name" field for the "Tag".

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Project Edit View Insert Online Options Tools	Window Help		Totally Integrated Automation
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💥 Default tag table [54]	Properties Animations	Events Texts	
Tag table_sorting station [30]		Appearance	A 🖄 🕒 📑
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	Add new animation	Name: -84	. O Range
Name Details Data type Comment	Movements	Address:	O Multiple bits ■
			Single bit
-B4 %I1.0 🖃 Bool 🔳 sensor part at		Range A Background color Border color	Flashing
-B5 %I1.1 Bool sensor metal		<add new=""></add>	> Controls
R6 %11 2 Rool sensor part in *			✓ > Graphics
Portal view Overview Overview	view So 📩 Devices & ne		The project 042 201_WinCC_Advanced

→ In the "Appearance" of the "Display", add an area with the value \rightarrow "1" (signal state "High") and change the "Background color" to \rightarrow "Green".

Rectangle_1 [Rectangle]	🖾 Properties 🛛 🗓 Info 😮 🗓 Diagnostics 🚽 💷	-
Properties Animations	Events Texts	
	Appearance	
Overview	Ταφ	
- 🐑 Display		
Add new animation	Name: -84 🔳 💽 Range	
- Appearance	Address: O Multiple bits	
▶ Z Movements	◯ Single bit 0 🖨	
-	Range 🔺 Background color Border color Flashing	
	1 v 0,255,0 v 0,0,0 v No	
	<add new=""></add>	
	More colors	

As shown in the previous steps, create a display for each of the following sensors:

- \rightarrow "-B1", \rightarrow "-B2", \rightarrow "-B5", \rightarrow "-B6" and \rightarrow "-B7".
- → Also insert an additional binary display below the motor M1 and connect it to the global tag \rightarrow "-B3". For the description, insert a text field \rightarrow "-B3 Motor active" in front of it.

Advanced_TP700_CPU15	16F 🔸 Panel TP700 Comfort [TP700 Comfort] 🔸 Screens 🔸 Overview Sorting Station 👘 🗖 🖬 🕇
IT ▼ B	Ⅰ U ⊱ A*±≣± <u>A</u> ±
	-B6
-B4	H -B5 Metall/
	i metai
Rutsche/Slide	Förderband/Conveyor
	M1 -B2
-B3 Motor active	M4
	Text
Speed actual value	-000.00 rpm -B1
<	125%
Rectangle_7 [Rectangle]	🖳 Properties 🚺 Info 🚺 🖳 Diagnostics 👘 💷 🤊
Properties Animations	Events Texts
	Appearance
Overview	Тад
Display	Name: #3
Add new animation	Address
Appearance	AUUESS:
Appearance Movements	Single bit
Appearance Movements	Single bit
- <u>Appearance</u> ► <u>∠</u> [™] Movements	Range Background color Border color Flashing 1 0.255.0 0.00 No

7.9 Symbol library

 \rightarrow In order to show that the conveyor is being controlled, use drag-and-drop to move the

"Symbol library" object from \rightarrow "Elements" in Tools onto the conveyor.

CPU1516F > Panel TI	P700 Comfort [TP	700 Comfort] 🕨	Screens 🕨 Overview Sorting	Station 🗕 🖬 🗮 🗙	Toolbox	
					Options	A
17 💌	BIUSA	`±≣± <u>A</u> ± <u>⊀</u>	<u>≥ ± ∠ ±</u> ≡ ± − ± <u>∎</u> ± <u>∆</u> ±	Ш±臣±印± 💎 🕻	🕨 🚨 🖬 🛽	
					✓ Basic obj	ects
			-B6		$\angle \Delta$	
-84	-B5		Metall/	-B7		
					Α 🔝	natio
Rutsche/Slide	Fö	rderband/Conveyor	x/y: 446,130 w/h:120.120	Plast plast ≡	✓ Elements	s
	<u>+</u>				51.0	
Do Matan a dia	M1		-B2		🔝 °5	ayo
-B3 Motor active		Text	M4			
Speed actual value	+000.00 rpm	T CAL	-В1		Symb	ol library
				• • • • • • • • • • • • • • • • • • • •	$\mathbf{v} \mathbf{i}$	Inst
<		>	100%]	ructi

→ The symbol library contains a number of simple and more complex graphic elements. Under "General" in "Properties", select the "Category" → "Arrow". Select an arrow pointing in the opposing direction here → \leftarrow .



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→ Under "Appearance" in "Properties", change the "Style" of the arrow to \rightarrow "Solid" and the "Color" of the "Foreground" to \rightarrow "Green".

ced_TP700_CPU151	6F 🕨 Panel TP700 Comfort [TP70	0 Comfort] > Screens	Overview Sorting Station	_∎≣×
	■ B I U S A*± E± A±	&± <u>∠</u> ± ≣± −± !	■± 💁 ± Щ ± 🗄 ± 🔰 ± 🛷 1	t <u>⊴ ±</u> ⊑
	-B4 -B5	Metall/ metal	-87	
Rutsche/Slide	Förderband/Co	nveyor		Plastik/ plastic ≡
-B3 Motor acti	ve Text	-B2	2	~
		> 100%		
Symbol library_1 [Sym	ibol library]	Services Properties	🛛 🖺 Info 🗓 🖺 🖞 Diagnostic	s
Properties Anin	nations Events Texts			
Property list	Appearance			
General Appearance	Background	Sty	le	
Layout	Foreground color:	0, 255, 0 🔻	Background: Tran	isparent 💌
Flashing	Background color:	192, 192, 192 🔻	Fill style: Soli	d 🔻
Miscellaneous				
Security				

→ Now change to the "Animation" tab and select "Display" and click → "Add new animation" $\stackrel{\bullet}{\blacksquare}$.

Symbol library_1 [Symbol librar	/]	🖻 Properties 🚺 Info 🔋 📱 Diagnostics	7 8 ▼
Properties Animations	Events Texts		
	Animation types		
Overview			
• In Tag connections	Display		
💌 🖭 Display	- Appearance	📑 🥕 Dynamize colors and flashing	
Add new animation	Control enable	Animate enabled state	
Z Movements	Visibility	📑 🎘 Make visibility dynamic	

 $\rightarrow~$ In the displayed dialog, select \rightarrow "Visibility" and click \rightarrow "OK".

Add animation	×
Select the animation you want t	o add.
Appearance Control enable	
	OK Cancel

→ To establish the connection to the global tag in the CPU, select → "PLC tags" under → "CPU_1516F" and below that → "Tag_table_sorting_station". Next, drag the "-Q3" tag from the → "Detail view" to inside the "Tag" field. In addition, select → "Single bit" as the type of evaluation.



→ Next, duplicate the arrow from the symbol library with all its properties using \rightarrow ^[1] "Copy" and ^[2] "Paste".



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7.10 Connections and HMI tags

→ Before you download the configuration to the TP700 Comfort Panel, you should check the connection to the CPU 1516F. To do so, double-click → "Connections" in → "Panel TP700 Comfort" to select it. In the displayed view, you can check the IP addresses and the connection settings. It is important that the check box for Selected.

礽	Siemens - D:\00_TIA_Portal\042 201_WinCC_Ad	vanced_TP700_CPU1516F	042 201_WinCC_Advanc	ed_TP700_CPU1516F					_ 🗆 X	ŝ
Pro	oject Edit View Insert Online Options 1 F 🎦 🔒 Save project 블 💥 🗎 🗎 🗙 🏹 🛨	Tools Window Help C ⁴ ± 🖥 🛄 🗊 🖳 🙀	💋 Go online 💋 Go offli	ne 👬 🖪 🖪 🗶 🚍 🛄			Totally Integrated Au	itomation PORT	TAL	
	Project tree	042 201_WinCC_Advar	nced_TP700_CPU1516	F 🕨 Panel TP700 Comfort [1	[P700 Comfort] 🕨	Connections		_ •	\times (
	Devices									j
		Connections to S7 PLCs in	n Devices & Networks					E	3 3	ł
		Connections							- K	1
	▼ 1 042 201 WinCC Advanced TP700 Cl 🔨	Name	Communication driver	HMI time synchronization mode	Station	Partner	Node	Online		4
zat	💣 Add new device	HMI_Connection_1	SIMATIC S7 1500	None	 S71500/ET200MP s 	CPU1516F	CPU 1516F-3 PN/DP.			1
la	Devices & networks	<add new=""></add>		h					it	ł
Vist	▶ 1 CPU1516F [CPU 1516F-3 PN/DP]								ari	
	 Panel TP700 Comfort [TP700 Co. 								es	l
	Device configuration	<							>	1
	Online & diagnostics	Parameter Area	pointer							
_	🍸 Runtime settings		ponter							
	Screens	TD700 Comfort					C1-1		<u></u>	
	Screen management	TP700 Comfort					Stati	on		
	HMI tags	Interfac	e:					-		
	2 Connections	ETHERN	VET 💌							
	HMI alarms								-	
	Recipes							8 U	-	
	Historical data									
	< III >	HMI device				PLC				
	✓ Details view	Address: 1	92.168.0.10			A	ddress: 192, 168, 0	. 1		
		Access points				Accoss pag	countrel.			
		Access points [54	- Cheme			Access pa.				
	Name							_	×	
	m:HMI_connection_1				🖳 Prop	erties 🚺 Info	Diagnostics			l
	Portal view Overview	Overview So 🔒 Devices	& ne 🍡 Connections			😪 The pro	oject 042 201_WinCC_Adva	inced		

Note: If access protection has been activated for the CPU 1516F, the access password for the panel can also be entered here.

→ To access the HMI tags, you must double-click the → "Default tag table" in the → "HMI tags" folder in → "Panel TP700 Comfort" to open it. All tags created by drag-and-drop have been entered here.



 \rightarrow In the default tag table, you can check which tags in the CPU 1516F will be accessed. You can also made additional settings.

The "Acquisition cycle" of our tags is to be accelerated from 1 second to 100 milliseconds here. To do so, click the \rightarrow selection field and select a new acquisition cycle \rightarrow "100 ms" by double-clicking it.

04	42 20	1_WinCC_A	dvanced_TP700_CPU1	516F 🕨 P	anel TP700	Comfort [TF	700 Comfort] 🕨 HN	∕II tags → Default tag table [10]			- 6	i ≣ X	ĸ
									🖳 HMI ta	ags	👆 System	tags	1
1	۹ 🖻	• 🗄 🚼											
	Def	ault tag tabl	le										
	1	Name 🔺		Data type	Connection	PLC name	PLC tag	Address Access mode	Acquisition cycle Logged Source com	ment			
	-00	-B1		Bool	🗉 HMI_Co 🗔	CPU1516F	"-B1"	symbolic access>	1 s 🔳 📄 sensor cylir	nder - M	4 retracted (no)	
		-B2		Bool	HMI_Conne.	CPU1516F	"-B2"	<symbolic access=""></symbolic>					
		-83		Bool	HMI_Conne.	CPU1516F	"-B3"	<symbolic access=""></symbolic>	Panel TP700 Comfort [TP			i i	or
	-00	-B4		Bool	HMI_Conne.	CPU1516F	"-B4"	<symbolic access=""></symbolic>	Cycles Cycles	Na	ame		
	-	-85		Bool	HMI_Conne.	CPU1516F	"-B5"	<symbolic access=""></symbolic>			None	~	
	-	-B6		Bool	HMI_Conne.	CPU1516F	"-B6"	<symbolic access=""></symbolic>		Ċ	100 ms		
	-	-87		Bool	HMI_Conne.	CPU1516F	"-B7"	<symbolic access=""></symbolic>		- Ċ	500 ms	=	
		-Q3		Bool	HMI_Conne.	CPU1516F	"-Q3"	<symbolic access=""></symbolic>		1 CD	1 s		
		SPEED_MO	TOR_Speed_Actual_Value	Real	HMI_Conne.	CPU1516F	SPEED_MOTOR.Speed_	<symbolic access=""></symbolic>		e)	2 s	i i	n.
	<	<add new=""></add>								Ċ	5 s		
	<									Ċ	10 s	7	>
	D '							-		Ċ	1 min	- 7	-
	Discr	rete alarms	Analog alarms	Logging t	tags					Ċ	5 min		
	1	D	Alarm text	AI	larm class	Trigger tag	Trigge Trigger address	Acknowledg Ackn HMI acknowl		Ċ	10 min	~	
		<add new=""></add>							<	<	Ⅲ >		
									📑 Ac	dd new	✓ ×		

→ You can make the settings of other tags using the "Autocomplete" function by selecting the lower right corner of the first entry with the mouse and dragging over the other entries.

Acquisitio	n cycle	Logged
1 s		
1 s		
1 s		
1 s		
1 s		
1 s		
1 s		
1 s		

Autocom	plete		×
?	What do y	ou want to do?	
	💿 Overw	rite Tag attributes	
	🔘 Insert	new Tags	
			OK Cancel
Acquisiti	on cycle		
100 ms			

7.11 Downloading the CPU and panel

→ Before the project is downloaded to the CPU and the panel, compile the CPU and panel again and save the project.

 $(\rightarrow CPU_1516F \rightarrow \square \rightarrow Panel TP700 Comfort \rightarrow \square \rightarrow \square Save project)$

→ After successful compilation, the complete controller with the created program including the hardware configuration can be downloaded, as described in the previous modules.



→ To download the visualization to the panel, proceed in a similar way. Select the \rightarrow "Panel TP700 Comfort [TP700 Comfort]" folder and click the icon



 \rightarrow III "Download to device".

→ The manager for configuring the connection properties (extended download) opens. First, the interface must be correctly selected. This happens in three steps.

 \rightarrow Type of the PG/PC interface \rightarrow PN/IE

 \rightarrow PG/PC interface \rightarrow here, for example: Intel(R) Ethernet Connection I217-LM

 \rightarrow Connection to interface/subnet \rightarrow "PN/IE_1"

The \rightarrow "Show all compatible devices" check box must then be selected. The search for devices in the network is started by clicking the \rightarrow <u>Start search</u> button.

Extended download t	o device					×
	Configured access nod	es of "Panel TP700 (Comfort"			
	Device	Device type	Slot	Туре	Address	Subnet
	Panel TP700 Comfort	TP700 Comfort		Ethernet	192.168.0.10	
	Panel TP700 Comfort	PROFINET Interface	5 X1	PN/IE	192.168.0.10	PN/IE_1
	Panel TP700 Comfort	MPI/DP Interface	7 X2	MPI	1	
	HMI_RT_1			S7USB		
	Τv	pe of the PG/PC inter	face:	PN/IE		-
		PG/PC inter	face:	Intel(R) Et	hernet Connection I217-	LM 🛡 🖲 🔍
	Conne	ection to interface/su	bnet:	PN/IE_1		
		1st gate	eway:			
			Ĩ			
	Compatible devices in	target subnet:			🛃 Show all compat	ible devices
	Device	Device type	Туре		Address	Target device
101			PN/IE		Access address	
Flash LED						
						Start soarch
						Diansealch
Online status information:						Start search
Display only error me	552005					
	ssages					
					Loa	d <u>C</u> ancel

→ If your panel is shown in the "Compatible devices in target subnet" list, it must be selected and the download started.

 $(\rightarrow \text{Panel TP700 Comfort} \rightarrow "\text{Download"})$

	Configured access nod	es of "Panel TP700 C	Comfort			
	Device	Device type	Slot	Туре	Address	Subnet
	Panel TP700 Comfort	TP700 Comfort		Ethernet	192.168.0.10	
	Panel TP700 Comfort.	PROFINET Interface	5 X1	PN/IE	192.168.0.10	PN/IE_1
	Panel TP700 Comfort.	MPI/DP Interface	7 X2	MPI	1	
	HMI_RT_1			S7USB		
	т.	inc. of the DC/DC inter	fa.co.			
	Ty	pe of the PG/PC inter	face:			
	Correct	PG/PC Inter	lace:		ernet Connection 1217-L	
	Conne	ection to interface/su	onet:	PN/IE_1		• V
		1st gate	way:			🗾 🛡
	Compatible devices in	target subnet:			Show all compatib	ole devices
1972 (1971)	Compatible devices in Device	Device type	Type PNI/IE	4	Show all compatib	ble devices Target device
	Compatible devices in Device panel tp700 comfort 	target subnet: Device type SIMATIC-HMI	Type PN/IE PN/IE	 	Show all compatib ddress 192.168.0.10 Access address	Target devices
	Compatible devices in Device panel tp700 comfort 	target subnet: Device type SIMATIC-HMI	Type PN/IE PN/IE	 	Show all compatib Address 192.168.0.10 Access address	Target device
Flash LED	Compatible devices in Device panel tp700 comfort 	target subnet: Device type SIMATIC-HMI	Type PN/IE PN/IE	 	Show all compatib Address 192.168.0.10 Access address	De devices Target device
Flash LED	Compatible devices in Device panel tp700 comfort	target subnet: Device type SIMATIC-HMI	Type PN/IE PN/IE	 	Show all compatib	De devices Target device <u>Start sea</u>
Flash LED	Compatible devices in Device panel tp700 comfort 	target subnet: Device type SIMATIC-HMI	Type PN/IE PN/IE	 	Show all compatib Address 192.168.0.10 Access address	Image: selection of the
Flash LED	Compatible devices in Device panel tp700 comfort n: compatible devices of 2 a	target subnet: Device type SIMATIC-HMI ccessible devices for	Type PN/IE PN/IE	 	Show all compatib	Je devices Target device
Flash LED	Compatible devices in Device panel tp700 comfort in: compatible devices of 2 and nformation	target subnet: Device type SIMATIC-HMI ccessible devices for	Type PN/IE PN/IE	 	Show all compatib	De devices Target device
Flash LED	Compatible devices in <u>Device</u> <u>panel tp700 comfort</u> in: compatible devices of 2 and nformation nessages	target subnet: Device type SIMATIC-HMI 	Type PN/IE PN/IE	4 1 1	Show all compatib	ble devices Target device <u>Start sear</u>

→ You first obtain a preview. Confirm the prompt → "Overwrite all" and continue with → "Load".

Load pr	eviev Check	w before loading		×
Status	1	Target	Message	Action
τŭ	<u> </u>	 Panel TP700 Comfort 	Ready for loading.	
	4	 Protection 	Protection against unauthorized access	
	0	 Overwrite 	Overwrite if object exists online?	Overwrite all
	0	 HMI Runtime 	Informations	
	0		The Runtime has the following version: V13.00.01.08_02.01	
	0		The firmware has the following version: V13.00.01.08_02.01	_
<				>
				Refresh
			Finish	Load Cancel

Note: The Symbol should be visible in every line of the "Load preview". You can find additional information in the "Message" column.

7.12 Process visualization in the simulation

For a connection to be set up between the runtime simulation on the PG/PC and the S7-1500 CPU, first the PG/PC interface has to be set to TCP/IP.

No.	Procedure:				
1	 Open the Control Panel with "Start > Control Panel" (Start menu for easy access to programs under Windows XP), or via "Start > Settings > Control Panel" (with class Start menu as is the case in previous Windows versions). 				
2	In the Control Panel, double-click the icon "Set PG/PC Interface".				
3	Set the following parameters in the "Access Path" tab: 1. For the access point of the application, select "S7ONLINE [STEP 7]" from the drop-down list. 2. From the list of interface parameter assignment used, select the interface "TCP/IP(Auto) -> with your network adapter that is connected directly with the Panel and the controller, e.g., 3Com EtherLink XL. 3. Then click OK and confirm the next message with OK. Set PG/PC Interface Set PG/PC Interface Access Path LLDP / DCP Access Path LLDP / DCP Access Path LLDP / DCP Access Path CSTEP 7) Interface TCP/IP >> Realtek PCIe GBE Famil * (Standard for STEP 7) Interface Parameter Assignment Used: TCP/IP >> DW 1501 Wireless-N W Image: TCP/IP >> Infineon ADM851X USB Image: TCP/IP >> Realtek PCIe GBE Famil * (Assigning Parameters to Your NDIS CPs with TCP/IP Protocol (RFC-1006)) Interfaces Add/Remove: Select				
	OK Cancel Help				

 \rightarrow Select "Panel TP700 Comfort" and click the

 \rightarrow **\blacksquare** "Start simulation" button.

Siemens - D:\00_TIA_Portal\042 201_WinCC_Advanced_TP7	00_CPU1516F\042 201_WinCC_/	Advanced_TP700_CPU1516	F		_ 🗆 ×
Project Edit View Insert Online Options Tools Wind Project 📑 🎇 🖬 🗎 🗙 🖘 ± 🖓 ½ 🖏 [low Help 🗓 🏠 🖳 🐺 💋 Go online 🖉	Go offline 🛔 🖪 🗶		Totally Integrated Au	tomation PORTAL
Project tree III 4CC_A	dvanced TP700_CPU1516F				_ = = × 4
Devices	Start Simulation				A
	II 17 ▼ B I U			Ⅲ±臣±訓± ♂ 1±± द	10
					-
042 201_WinCC_Advanced_TP700_CPU151	MENS	C	an Lik la	12/31/2000	×
Add new device SIM	ATIC HMI	Scre	en title	10.50.30 ΔΜ	
networks				20.05.05 AN	
• 🕞 CPU1516F [CPU 1516F-3 PN/DP]					
Panel TP700 Comfort [TP700 Comfort]		Distantia Contra			nat l
Device configuration	peed motor Magazi	ne Plastic System	screens		
Online & diagnostics					
Y Runtime settings			-B6		
Screens				11	
Screen management	P4	PC	Metall/	87	ay
HMI tags	-04	-03	metal	-57	e e e e e e e e e e e e e e e e e e e
2 Connections		_			
HMI alarms	Butsche/Slide	Eörderband/Conv	war	Plastik/	_ *
Recipes		r orderballu/Corre	y01	plastic	
Historical data					str

 \rightarrow The process visualization will be implemented completely on the PC with a connection to

the process data in the CPU 1516F. To close the simulation, you can select the \rightarrow button for "Exit Runtime" in the application or simply close the window by clicking \rightarrow "

ATTC WinCC Runtime Advanced		-	SIMATIC HMI
SIEMENS SIMATIC HMI	Over	view Sorting Station	5/29/2016 12:44:38 AM
Speed Motor	-B4 -B5 Forde	System screens	-B7 Plastik/ plastic
-B3 Motor active Speed actual val	ue +0.00 rpm	Text M4	
7.13 Switches and buttons for the process operation

 \rightarrow To have an interface to the process operation available in the PLC, select \rightarrow "Add new block" in the "Program blocks" folder in "CPU_1516F" and create a global data block



→ In the "OPERATION_HMI" data block, create the following four tags of data type BOOL:
 → "Mode selection", → "Automatic_Start", → "Automatic_Stop" and →
 "Reset_Counter_Plastic". The start value of the "Automatic_Stop" tag
 is preset with → "true".

C)42 2	201_WinCC_Advanced_TP	700_CPU1516F ▸	CPU1516F [CP	U 1516F-3	PN/DP] • F	Program bl	ocks 🕨 (DPERATING_HMI [DB4] 🛛 🗕 🖬 🗮 🗙
13	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2								
	OP	PERATING_HMI							
		Name	Data type	Start value	Retain	Accessible f	Visible in	Setpoint	Comment
1	-00	 Static 							
2		mode_selector	Bool	false					HMI mode selector manual(0) / automatic(1)
З		automatic_start	Bool	false					HMI pushbutton automatic start
4		automatic_stop	Bool	true					HMI pushbutton automatic stop
5		reset_counter_plastic	Bool	false					HMI reset counter workpieces plastic
6	i i	Add new>							

 → The "MOTOR_AUTO[FB1]" function block is now expanded to include an input tag → "Reset_Workpiece_Counter_Plastic" of type → "Bool". This tag is moved onto the → "R" input of the "CTUD" counter in network 2 using drag-and-drop.



→ The call of the function block "MOTOR_AUTO[FB1]" must be updated in the "Main[OB1]" block. This is done by clicking the icon \rightarrow ^(*) "Update inconsistent block calls".

Siemens - D:\00_TIA_Portal\042 201_WinCC_Advanced	TP700_CPU1516Fl042 201_WinCC_Advanced_TP700_CPU1516F	_ 8
Project Edit View Insert Online Options Tools	Window Help Totally	Integrated Automation
💁 🚰 🔚 Save project 📕 🔏 🗐 🗐 🗶 🌱 🛨	🖞 🛄 🔛 🛃 💋 Goonline 🖉 Gooffine 🏭 🖪 🖪 🛠 🖃 🛄	PORTAL
Project tree	042 201_WINCC_Advanced_TP700_CPU1516F CPU1516F [CPU 1516F-3 PN/DP] Program blocks N	lain [OB1] 🛛 🗖 🗮 🗙
Devices		
	. * . X == = = = = = = = = + = + = + = + = +	
- D 042 201 WinCC Advanted 70700 CB 1516	Brock interface	
Add new device	8 >=1 [??] → -0 → -[=] SR RS	
Devices & networks		
CPU1516E [CPU1516E.3 PN/DP]		^
Device configuration	"MOTOR_AUTO_DB"	
Online & diagnostics	%FB1	
Regram blocks	"MOTOR AUTO"	
Add new block		
Main [OB1]		
MOTOR SPEEDCONTROL [FC10]	%IO.2 Automatic_mode_	
MOTOR_SPEEDMONITORING [FC11]	"-so" — active	
MOTOR_AUTO [FB1]	& %0.3	
MAGAZINE_PLASTIC [DB3]	940 1 "-S1" - Start	
MOTOR_AUTO_DB [DB1]	"-KO"	
OPERATING_HMI [DB4]		
SPEED_MOTOR [DB2]	%0.5 -52 - Stop	
Technology objects	B1Enable_OK	
 External source files 		
🔻 🔚 PLC tags	>=1	=
la Show all tags	840.0	
Add new tag table	"-41"	
👋 Default tag table [54]	-71>	
lag table_sorting station [30]	#Motor_speed_	
PLC data types	monitoring_error_	
 Watch and force tables 	max	
Online backups	in the second	
Traces	#Motor_speed_	
Program info	min w satety_shutott_	
✓ Details view		×
		▼
Name Address	🔍 Properties 🔰 🗓	Diagnostics 💦 📑 📥
Portal view Overview Overvie	v So 👍 Main 🗸 The project 042 2	01 WinCC Advanced

→ In network 3 of the "Main[OB1]" block, drag an \rightarrow "OR" in front of the input tag \rightarrow "Start command".



→ The second free input of the → "OR" is connected to the → "Automatic_Start" tag from the "OPERATION_HMI" data block.



→ In network 3 of the "Main[OB1]" block, drag an \rightarrow "AND" in front of the input tag \rightarrow "Stop_command".



→ The second free input of the → "AND" is connected to the → "Automatic_Stop" tag from the "OPERATION_HMI" data block.



→ The input tag → "Automatic_mode_active" is connected to the → "Mode selection" tag from the "OPERATION_HMI" data block.



→ The input tag → "Reset_part_counter_plastic" is connected to the → "Reset_counter_plastic" tag from the "OPERATION_HMI" data block.



→ Compile the CPU again and save the project.

 $(\rightarrow CPU_{1516F} \rightarrow \textcircled{1} \rightarrow \textcircled{2} \rightarrow \textcircled{3} \rightarrow \textcircled{3}$

→ You download the modified program including the hardware configuration to the CPU 1516F. (→ □]) → In order to implement a pushbutton that resets the workpiece counter for the plastic parts, use drag-and-drop to move the →"Button" object from → "Elements" in "Tools" to a location below the plastic parts storage.



 \rightarrow Under "General" in "Properties", enter \rightarrow "Reset" as the label.

Button_1 [Butto	n]	🔍 Properties 🚺 Info 🔋 🖳 Diagnostics 📰 🖃 🔻
Properties	Animations Events Texts	
📑 Property list	General	
General	Mode	Labol
Appearance	Mode	Laber
Fill pattern	 Text 	Text
Design		
Layout	Graphic	O Text list
Text format	Graphics or text	Text when button is "not pressed"
Flashing		Reset
Style/Designs	Graphics and text	
Miscellaneous	O Invisible	
Security		Text when button is "pressed"

 $\rightarrow\,$ Under "Appearance" in "Properties", change the "Color" of the "Background" to $\rightarrow\,$ "Blue".

Button_1 [Butto	on]			🖳 Proj	perties	🚺 Info 🔒 📱 Diagnostics 👘 🗉 📼
Properties	Animations	Events	Texts			
📑 Property list	Appe	arance				
General	Ba	ckaround			Borde	er
Appearance	Da	ckylounu			Doru	
Fill pattern			Color:	51, 102, 255 💌		Width: 2
Design	-	F	ill pattern:			Style: 🗾 3D style 🔻
Layout	1	Cor	ner radius.			Color: 227, 227, 227
Text format		201	ner ruurus.			
Flashing	-					Background color: 105, 105, 105
Style/Designs	Te	xt				
Miscellaneous			Color:			
Security						
				More colors		

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→ The functionality must now be configured as a pushbutton. For this, change to the "Events" menu, select \rightarrow "Press" as the event and \rightarrow "<Add function>".

Button_1 [Butto	n]			Rroperties	🗓 Info 🔒 📱 Diagnostics	
Properties	Animations	Events Text	S			
	1	∓⊟ E ×				
Click						
Press		<add function=""></add>				-
Release						
Activate	4					
Deactivate						
Change	-					
		<		1111		>

 $\rightarrow\,$ Under "System functions", select "Bit processing" as the function and select $\rightarrow\,$ "SetBitWhileButtonPressed" there.

Button_1 [Button]		🗟 Properties	🗓 Info 📵 🗓 Diagnostics	
Properties Animation	ns Events Texts			
	±∓⊟≣×			
Click				
Press				I -
Release	 System functions 			^
Activate	 All system functions 	Edit bits		
Deactivate	Alarms	InvertBit		
Change +	 Calculation script 	InvertBitInTag		
-	Edit bits	ResetBit		
	Historical data	ResetBitInTag		
	Keyboard	SetBit		
	Keyboard operation	SetBitInTag		× ,
		SetBitWhileKeyPressed		

 → For the process connection, select the → "Program blocks" of the → "CPU_1516F" and the → "OPERATION_HMI[DB4]" data block there. Then drag the →"Reset_counter_plastic" tag from the → "Detail view" into the field for "Tag (input/output)".



→ As shown previously in the document, now insert a text → "Plastic parts counter" above the button and a display of the → "Plastic_parts_actual" tag from the "MAGAZINE_PLASTIC[DB3]" block to the left of the button.



→ In order to implement the pushbutton, use drag-and-drop to move the →"Button" object
 Implements from → "Elements" in "Tools" to a location at the top next to the button for the screen change.



→ Under "General" in "Properties", change the "Mode" to → "Graphics and text". To do this, open the selection dialog for → "Graphic when button is not pressed" by clicking the icon.

Button_2 [Butto	n]	🖻 Properties 🚺 Info 🔒 🗓 Diagnostics 👘 🖃 🤝
Properties	Animations Events Texts	
Properties Property list General Appearance Fill pattern Design Layout Text format Flashing Style/Designs Miscellaneous Security	Animations Events Texts General Mode Text Graphic Graphics or text Graphics and text Invisible	Label Text when button is "not pressed" Start Text when button is "pressed" Text when button is "pressed" Start Graphic Graphic Graphic Graphic v Specifies the graphic displayed in the "OFF" state.

→ Then click the icon for "Create graphic from file" 2 and select the "Pushbutton-Round-G_Off_256c.bmp" file from the "SCE_EN_042-201_Screens" folder by double-clicking it.

[
	Name	Format	Size			
	Left_Arrow	.png	96 x 96	~		
	Logo of Panel TP700 Co	.png	663 x 371			
	NavigateHome_TP700_C	.png	78 x 58			
	Navigates to Different jo	.png	38 x 32			
	Navigates to Project info	.png	38 x 32			
	Navigates to SIMATIC PL.	.png	38 x 32			
	Navigates to System info.	.png	38 x 32			
	Navigates to System setti	.png	38 x 32			
	Navigates to User admini.	.png	38 x 32			
	Pushbutton-Round-G_Of	.bmp	504 x 504			
	Right_Arrow	.png	96 x 96			
	Up_Arrow	.png	96 x 96			
				*		
*						✓

→ In exactly the same way, select the "Pushbutton-Round-G_On_256c.bmp" file from the "SCE_EN_042-201_Screens" folder for the "Graphic when button is pressed".

Button_2 [Butto	n]				Rise Properties	🗓 Info 🔒	Diagnostics	▋▋▼
Properties	Anim	ations	Events	Texts				
📑 Property list	Γ	Genera	d					
General Appearance		Mod	e		Label			
Fill pattern		<u>О</u> т	ext		Text when butto	on is "not presse	:d"	
Design Layout		O G	raphic		Start			
Text format		🛛 🔾 G	raphics or text					
Flashing		💽 G	raphics and te	xt	Text when bu	utton is "pressed	1"	
Style/Designs					Start			
Miscellaneous			IVISIDIE					
Security	•							
					Graphic			
					Graphic when b	utton is "not pre	ssed"	
					Pushbutton-Rou	nd-G_Off_256c		
					Graphic when	n button is "pres	sed"	
					Pushbutton-Rou	nd-G_On_256c		

Note: The generated graphics are stored in the "Languages & Resources" path under "Project graphics".

 \rightarrow Under "Layout" in "Properties", adapt the size of the button under \rightarrow Position & Size.

Button_2 [Butto	n]				🖳 Pro	operties	🗓 Info 🔒 🗄	Diagnostics	
Properties	Animations	Events	Texts						
Properties Property list General Appearance Fill pattern Design Layout Text format Flashing Style/Decigns	Layout Positi	tion & size X: 574 Y: 22 O size o stretching of		50 🗢 50 🗢		Fit to si Fit of Text m	ize bject to contents argins		
Miscellaneous Security	Align	tretch screen nment Horizonta Vertica	al: Centere al: Middle	ed	•	Picture	margins 0		

→ The pushbutton functionality is realized here again as event → "Press" with "System function" → "SetBitWhileButtonPressed". The → "Automatic_Start" tag from the data block → "OPERATION_HMI[DB4]" is used for the process connection.

₩3	1/2 Siemens - D:00_TIA_Porta1042 201_WinCC_Advanced_TP700_CPU1516F042 201_WinCC_Advanced_TP700_CPU1516F				
Pro	oject Edit View Insert Online Option	s Tools Window Help			Totally Integra
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	Project tree	ced TP700 CPU1516F	Panel TP700 Comfort [TP70]	00 Comfort] → Screens → O	verview Sorting Station 📃 🖬 🗮 🗙
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fi	 042 201_WinCC_Advanced_TP7C 	Speed Motor	Magazine Plastic Syst	tem screens	Start
liza	Add new device				
ens	Devices & networks			-86	
1	CPUISTOF [CPUISTOF-3 PN.				
	Opline & diagnostics			Metall/	
	Program blocks		-B4 -B5	metal	-87
	Add new block				
	Main [OB1]				Plastik/
	MOTOR SPEEDCONTRO	Rutsche/Slide	Förderband/Co	onveyor	plastic
	MOTOR_SPEEDMONITO				
	STOR_AUTO [FB1]			100%	[
	MAGAZINE_PLASTIC [D.	<		3 100%	·
	MOTOR_AUTO_DB [DB1	Button_2 [Button]		🖳 Properties 🚺	🖌 Info 🔒 🗓 Diagnostics 👘 🔍 🗖 🚽 📉
	OPERATING_HMI [DB4]	Properties Animat	ions Events Texts		
	SPEED_MOTOR [DB2]				
	Technology objects				
	 External source files 	Click			
	< >	Press	 SetBitWhileKeyPressed 		
-	✓ Details view	Release	Tag (Input/output)	OPERATING	_HMI_automatic_start
		Activate	Bit	0	
	Name Off	Deactivate	<add function=""></add>		
	mode_selector	Change	•		
	automatic_start				
	automatic_stop				
	reset_counter_plastic				

→ As shown in the last steps, a "button" for the Stop button is inserted. The files "Pushbutton-Stop_Off_256c.bmp" and "Pushbutton-Stop_On_256c" from the "SCE_EN_042-201_Screens" folder are used as graphics.

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Speed	Motor Magazine Plastic S	ystem screens
<pre></pre>	III) 100% V
Button_3 [Butto	n]	🖳 Properties 🚺 Info 🚺 📱 Diagnostics 🚽 🗉 🔫
Properties	Animations Events Texts	
📑 Property list	General	·
General Appearance	Mode	Label
Fill pattern	◯ Text	Text when button is "not pressed"
Design	◯ Graphic	Stop
Text format	 Graphics or text 	
Flashing	Graphics and text	Text when button is "pressed"
Style/Designs		Stop
Miscellaneous	• O Invisible	
security		
		Graphic
		Graphic when button is "not pressed"
		Pushbutton-Stop_Off_256c
		Graphic when button is "pressed"
		Pushbutton-Stop_On_256c

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→ The functionality as a normally-closed switch is implemented with two events. The first event is → "Press" with "System function" → "ResetBit" and the second event → "Release" with "System function" → "SetBit". The → "Automatic_Stop" tag from the data block → "OPERATION_HMI[DB4]" is used for the process connection in both cases.

Button_3 [Button]		Rroperties	🗓 Info 🔋 🗓 Diagnostics	∎∎▼
Properties An	imations Events Texts			
	±∓⊟≣×			
Click				
Press	 ResetBit 			
🛗 Release	 Tag (Input/output) 	OP	ERATING_HMI_automatic_stop	
Activate	<add function=""></add>			
Deactivate	•			
Change				
	<			>

Button_3 [Butto	n]		S Properties	🗓 Info 追 🗓 Diagnostics 👘 🗖 🗉 🗸
Properties	Aniı	mations Events Texts		
		±∓⊟≣×		
Click				
Press		 SetBit 		
🛗 Release	4	Tag (Input/output)	0	PERATING_HMI_automatic_stop
Activate		<add function=""></add>		
Deactivate	•			
Change				
		<	1111	>

→ In order to implement the mode switch, use drag-and-drop to move the \rightarrow "Switch" by object from \rightarrow "Elements" in "Tools" to a location at the top between the buttons for the screen change and the Start button.



→ Under "General" in "Properties", select the "Show label" → option. Next, enter the texts → "Auto" for the "ON" state and → "Manual" for the "OFF" state. The → "Mode selection" tag from the data block → "OPERATION_HMI[DB4]" is used for the process connection.

Siemens - D:\00_TIA_Portal\042 201_WinC	C_Advanced_TP700_CPU1516F042.201_WinCC_Advanced_TP700_CPU1516F	_ □ X
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		·····
Add new device	Speed Motor Magazine Plastic System screens	
Devices & networks	Man d	
CPU1516F [CPU 1516F-3 PN. =	-B6 n	
Contract consignation	Metall/	
Program blocks	-B4 -B5 metal -B7	
Add new block		
MOTOR_SPEEDCONTRO	Rutsche/Slide Förderband/Conveyor Plas	tik/
MOTOR_SPEEDMONITO		
MAGAZINE_PLASTIC [D.		
MOTOR_AUTO_DB [DB1	Switch Switch	
OPERATING_HMI [DB4]	Properties Animations Events Texts	Istri
Technology objects	Property list General	Icti
	General Process Mode	su
✓ Details view	Fill pattern Tag: OPERATING_HMI_mode_selector	•
	Design PLC tag: OPERATING_HMI.mode_selector	
Name Off	Layout - Address: Bool Label	sks
automatic_start	Flashing Value for "ON": 1	
automatic_stop	Limits Title: Switch	
reset_counter_plastic	Miscellaneous ON: Auto	
< m >	Security OFF: Man	▲
Portal view Overview	Overview So	lvanced

→ Under "Layout" in "Properties", adapt the size of the mode switch under →Position & Size.

anced_TP700_CPU15	16F → Panel TP700 Comfort [TP700 Comfort] →	Screens → Overview Sorting Station 🛛 🗕 🖬 🗮 🗙
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Speed Motor	Magazine Plastic System screens	III Man Start
	-B6	
<	-B4 -B5 Metall/ matal	-B7
Switch_1 [Switch]	🔍 P	roperties 🚺 Info 🚺 🗓 Diagnostics 💿 💷 🤜
Properties Anima	tions Events Texts	
Property list	l avout	
General Appearance	Position & size	Settings
Fill pattern Design	X: 539 ➡ ➡ 100 ➡ Y: 23 ➡ \$ 50 ➡	Change direction: Left to right Fit object to contents
Text format	Fit to size	Margins text
Limits Style/Designs	No stretching of screen Stretch screen	
Security	Alignment graphic	Margins graphic
	Horizontal: Centered v Vertical: Middle v	

 \rightarrow Now compile the CPU and save the project.

 $(\rightarrow \text{Panel TP700 Comfort} \rightarrow \square \rightarrow \square \text{Save project})$

 \rightarrow Afterwards, download the changed visualization to the panel.



7.14 Adapting the headers in the template

- → The plant states are to be shown overall in the header. "Template_1" for our header and footer was already created by the wizard when the panel was created. The footer contains the system buttons and a logo, date and time as well as the "Screen title" text field was previously created in the header.
- → You would now like to adapt the screen title to the dimensions specified here under "Layout" in "Properties" in \rightarrow "Position & Size".

Mi Siemens - D:\00_TIA_Portal\042 201_WinCC	_Advanced_TP700_CPU1516F\042 201_WinCC	_Advanced_TP700_CPU1516F		_ ¤ ×
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📑 🎦 🔚 Save project 🚇 🐰 🗓 🛍 🗙 🛎	🕽 🛨 (📲 🔚 🛄 🌆 🖳 💋 Go online 🖉	Go offline 🛔 🖪 🖪 🛄	lotany m	PORTAL
Project tree 🔲 🖣		omfort] 🔸 Screen management 🔸	Templates → Template_1 🛛 🗕 🖬 🗮 🗙	Toolbox 📑 🗉 🕨
Devices				Options A
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			· · · · · · · · · · · · · · · · · · ·	▼ Basic objects
.5 • Cal modules •				
📱 🔻 🔁 Panel TP700 Comfort [TP70.	SIEMENS		12/31/2	
C Device configuration		Screen title	B	
S Online & diagnostics				
Kunume setungs				A 🔽 🚽 🖶
 Screen management 				✓ Elements
Templates				
Add new template				
Template_1				
Slide-in screens				
Global screen			<u> </u>	🛄 💵 🕂 🛄
🕨 🔚 HMI tags	< III	> 100%	_	🔊 🕒 !
2 Connections		S Properties	🗓 Info 🔒 📱 Diagnostics 👘 💷 🔻	nstr
HMI alarms	Properties Animations Events	Texts		uct
HER LAND A LAND	Property list			iong
< III >	Layout			
✓ Details view	Appearance Position & size	Marg	gins	
N	Layout X: 251	♦ ₩₩ 300 ♦	3 • *** 2 •	Y Controls
Name	Text format Y: 0	♦ 1 60 ♦	2 0 2 0	
	Flashing			🔼 🕮 👖 🗍
	Style/Designs - Fit to size			🔚 🎹 🔽 🗒
	Fit object to co	intents 🔣		
				Graphics
Portal view Overview	Overview So 🖻 Template_1		V The project 042 201	_WinCC_Advanced

→ Delete the logo on the left in the header by selecting the → graphic display for the LOGO with the right mouse button and clicking → "Delete".

;16F ► Panel	TP700 Comfort [TP700 Co	omfort] 🕨
	<u>24</u> ■ B I <u>U</u> S A [*]	±≣± ₫
SIEMENS		
	Cut	Ctrl+X
	Сору	Ctrl+C
î	Paste	Ctrl+V
	Copy to excel format	:
×	Delete	Del
	Create faceplate	:
	Order	•
	Group	• •

 \rightarrow In the "Panel TP700 Comfort", open the \rightarrow "Text and Graphic lists" folder.

VA	Siemens - D:\00_TIA_Portal\042 201_Wi	nCC_	Advanced_T	P700_CPU1	516F\042 201_WinC	_Advanced_TP700_CP	U1516F			
Pro	oject Edit View Insert Online Op } 🎦 🔚 Save project 블 💥 🗐 🗎 🗙	tions	Tools W	indow Hel	p 🛛 🙀 💋 Go online 🦼	🕅 Go offline 🛛 🛔 🚺	×			Totally Inte
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zal	Panel TP700 Comfort [TP70.		<add i<="" td=""><td>new></td><td></td><td></td><td></td><td></td><td></td><td></td></add>	new>						
len	Device configuration									
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	 Screens 						-			
	 Screen management 		Text list	entries						
	HMI tags		Default	Value 🔺	Text					
	2 Connections	=								
	HMI alarms									
	Recipes									
	Historical data									
	Cim Scripts									
	5 Scheduled tasks									
	Cycles									
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	2. I text and graphic lists									
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	✓ Details view									
	Name									

 \rightarrow Under "Graphic lists", create a \rightarrow "Graphic_List_Warning" with \rightarrow selection "Bit(0,1)".

i	nCO	C_Advanced_	TP700_CPU1	516F 🕨	Panel 1	P700 Comfort	[TP7	00 Comfort] 🕨	Text and gra	aphic lists	_ # # X
									上 Text li	sts 🖹 Gr	aphic lists
	Gr	aphic lists									
		Name 🔺				Selection		Comment			
	2	Graphic_list_W	arning			Bit (0, 1)	-]			
		<add new=""></add>				Bit (0, 1)					
						Bit number (0 - 31))				
						Value/Range					
								_			
-	Gr	anhic list entr	ries			• •					
	-	Value	Graphic na	Graphic							
		<add new=""></add>	Graphic fia	arapine							

→ Click the icon for "Value 0" to open the selection dialog for the graphics stored under "Project graphics" in the "Language & Resources" path. Click the icon for "Create graphic from file" and select the "Warning.bmp" file from the "SCE_EN_042-201_Screens" folder by double-clicking it. This file is stored in the "Languages & Resources" path under "Project graphics".

nCC	_Advanced_	TP	700_	_CPU1516	F▶	Panel TP	700 Com	fort [TP7	00 (Comfo	rt] 🕨	Тех	t and g	jraphi	c lists	_	ר ר	>
												1	Text	lists	20	araphic	list	;
																	E	1
Gra	aphic lists																	
	Name 🔺					S	election		Cor	mment								
2	Graphic_list_W	Varn	ning			B	it (0, 1)	•										
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				Pushbut	ton-	Round-G_O	bmp	497 x 49	97									
				Pushbut	ton-	Stop_Off_2	bmp	108 x 10	8(
				Pushbut	ton-	Stop_On_2	5bmp	108 x 10)7									
				Right_A	rrow		.png	96 x 96		=								
				Up_Arro	w		.png	96 x 96		_								
			-	Warning	J		jpg	640 x 64	10									
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→ The graphic that you want to assign to "Value 1" is already stored in the "Languages & Resources" path under "Project graphics". After clicking the → I icon, you can select the →"Logo of Panel TP700 Comfort" file directly.

inC	C_Advanced_T	P700_CPU1516F Panel	TP700 Comfort [1	[P700 Comfort]	Text and graphic lists	_ # = ×
					🗄 Text lists 🖹 Gra	aphic lists
					<u>.</u>	-
Gr	aphic lists					
	Name 🔺		Selection	Comment		
2	Graphic_list_Wa	rning	Bit (0, 1)	•		
	<add new=""></add>					
Gr	aphic list entrie	es li				
	Value 🔺	Graphic name Graphic				
F	0	Warning	$\mathbf{\Lambda}$			
	-					
			SIEMENS			
<u></u>	1 💌	Logo of Panel TP: 🖉 💌	SIMATIC HMI			
			SIMATETIM			
			7			
		Name	Format	Size		
		<none></none>		~		
		Down_Arrow	.png	96x96 ≣	SIEMENS	
		ExitRuntime_TP700_	Comfort_TF .png	78 x 58		
		Foerderband_Convey	/or .bmp	912 x 322	SIMATIC HM	
		Home	.png	96 x 96	Show the rive	
		Logo of Panel TP700	.prig Comfort .png	663 x 371 -		
		<	III	>		
					·	

→ Now change to the "Text lists" and create the following three text lists: → "Text list_Emergency stop" → "Text list_Main switch" and → "Text list_Automatic". Use the → selection "Bit(0,1)" in each case.

042 201_WinCC_Advanced_TP700_CPU1516F	_ = = ×			
			1 Text lists	🚡 Graphic lists
Text lists				
Name 👻	Selection	Comment		
Text_list_main_switch	Bit (0, 1)	Display status main switch		
Text_list_emergency_stop	Bit (0, 1)	Display status emergency stop		
E Text_list_automatic	Bit (0, 1)	Display automatic start/stop		
<add new=""></add>				

 $\rightarrow~$ Make the following assignments in "Text list_Emergency stop": "Value 0" $\rightarrow~$

"EMERGENCY STOP triggered" and \rightarrow "Value 1" \rightarrow "EMERGENCY STOP OK".

042 201_WinCC_Advanced_TP700_CPU1516F	Panel TP700 Com	ifort [TP700 Comfort] 🔸 Text an	d graphic lists	_ 🖬 🖬 🗙						
			1 Text lists	🚡 Graphic lists						
Text lists										
Name 👻	Selection	Comment								
L Text_list_main_switch	Bit (0, 1)	Display status main switch								
1: Text_list_emergency_stop	Bit (0, 1)	Display status emergency stop								
1 Text_list_automatic	Bit (0, 1)	Display automatic start/stop								
<add new=""></add>										
		▲ ▼								
Text list entries										
Value 🔺 Text										
0 emergency stop released										
1 emergency stop OK										

→ Make the desired assignments in "Text list_Main switch": "Value 0" → "Main switch OFF" and → "Value 1" → "Main switch ON".

042 201_WinCC_Advanced_TP700_CPU1516F	Panel TP700 Com	nfort [TP700 Comfort] 🔸 Text an	d graphic lists	_∎≡×				
			E Text lists	🚡 Graphic lists				
Text lists								
Name 👻	Selection	Comment						
1 Text_list_main_switch	Bit (0, 1)	Display status main switch						
E Text_list_emergency_stop	Bit (0, 1)	Display status emergency stop						
1 Text_list_automatic	Bit (0, 1)	Display automatic start/stop						
<add new=""></add>								
		*						
Text list entries								
Value 🔺 Text								
0 main switch OFF								
1 main switch ON								

 $\rightarrow~$ Make the following assignments in "Text list_Automatic": "Value 0" \rightarrow "Automatic

stopped" and \rightarrow "Value 1" \rightarrow "Automatic started".

042 2	201_WinCC_Adv	anced_TP700_CPU1516F	Panel TP700	Com	ifort [TP700 Comfort] 🕨 Tex	xt and graphic lists	_ = = ×		
						🗄 Text lists	🔓 Graphic lists		
•									
Te	Text lists								
	Name 👻		Selection		Comment				
1-	Text_list_main_s	witch	Bit (0, 1)		Display status main switch				
1-	Text_list_emerge	ency_stop	Bit (0, 1)		Display status emergency stop				
1-2-	Text_list_automa	itic	Bit (0, 1)	-	Display automatic start/stop				
	<add new=""></add>								
					▲ ▼				
Те	xt list entries								
	Value 🔺	Text							
1.	0	automatic stopped							
1.	1 💌	automatic started							

→ Back in "Template_1" for our header, use drag-and-drop to move the → "Graphic IO field" object from → "Elements" in Tools to the top left corner.



→ Under "General" in "Properties", change the "Mode" to → "Output".
 Then open the selection dialog for → "Graphic list" by clicking the ... icon. Select the "Graphic list_Warning" you just created.

Graphic I/O field	_1 [Graphic I/O field]	🖾 Properties 🚺 Info 追 🗓 Diagnostics 👘 💷 🔻
Properties	Animations Events Texts	
📑 Property list	General	
General	Process	Contants
Appearance	FIOLESS	contents
Layout	Taq:	Graphics list: Graphic_list_Warning 🔳 🛄 🥕
Flashing	PIC tage	Craphic list Warning
Limits		
Miscellaneous	Address:	
Security	Bit number: 0	
	Mode	
	Mode: Output	~

→ To establish the connection to the global tag in the CPU, select → "PLC tags" under → "CPU_1516F" and below that → "Tag_table_sorting_station". Now drag the → "-A1" tag from the "Detail view" into the "Tag" field In addition, select → "Bit number 0" as the type of evaluation.

Vß	Siemens - D:\00_TIA_Portal\042 201_WinCC_Ad	anced_TP700_CPU1516F\042 201_WinCC_Advanced_TP700_CPU1516F	
Pr	roject Edit View Insert Online Options	ols Window Help	Totally Integrated Automation
	🛉 🎦 🔚 Save project 🚐 🐰 🛅 🗊 🗙 🎝 🛨	🛎 🗄 🛄 🕼 🖳 💋 Goonline 🖉 Gooffine 🏪 🖪 🚺 🕺 🚍 🛄	PORTAL
	Project tree 🔲 🖣		Templates → Template 1 🛛 🗕 🖬 🗮 🗙
	Devices		
			ta t≣ z 👌 🗟 z 🗝
	- D 042 201 WinCo Advanted 70700 d		
	Add new device		
	Devices & networks		12/31/2
	👻 🚺 CPU1516F [CPU 1516F-3 PN/DP]	• II • Screen title	10.59.39
	Device configuration		20105105
	😟 Online & diagnostics		
	Program blocks		
	External source files		
	PLC tags		
	Show all tags		·····
	📑 Add new tag table	t III > 100%	······································
	🗳 Default tag table [54]	Graphic I/O field_1 [Graphic I/O field]	🗓 Info 🚺 🗓 Diagnostics 👘 🗐 🗖 🔽
	Tag table_sorting station [30	Properties Animations Events Texts	
	Watch and force tables		
	Colice backups	General	
		Appearance Process Contents	
	✓ Details view	Lavout Tage 41	shire list, Graphic list Warning
		Flashing Di Citage 1 A11	and a second sec
	Name Details Data type Comm	Limits diduce	
	PCU -AI %IU.U BOOI = return A	Miscellaneous Address: Bool	
	-B2 %I0.6 Bool sensor	Security Bit number: 0	
	-B3 %I0.7 Bool sensor	Mada	
	-B4 %I1.0 Bool sensor	WOUC	
	📲 -B5 %I1.1 Bool sensor 🗸	Mode: Output	
	< III >		

→ Under "Layout" in "Properties", adapt the size of the "Graphic IO field" under → "Position & Size".



→ To display the status of the EMERGENCY STOP in the header, use drag-and-drop to move the → "Symbolic IO field" object III from → "Elements" in Tools to the right of the "Graphic IO field".



→ Under "General" in "Properties", change the "Mode" to → "Output". Next, open the selection dialog for → "Text list" by clicking the icon. Select the "Text list_Emergency stop" you just created.

Symbolic I/O field	i_1 [Symbolic I/O field]	🖳 Properties	🗓 Info 🔋 📱 Diagnostics 👘 🗉 📼
Properties	Animations Events Texts		
Property list	General		
General Appearance	Process	Co	ontents
Design	Tag:	■	Text list: Text_list_eme 🔳 🦰
Layout	PLC tage	7	12 Text_list_emergency_stop
Text format	i construction i constructi construction i construction i construction i construc	· ·	
Flashing	Address:		
Limits	, Bit number: 0 🗢		
Style/Designs			
Miscellaneous	Mode		
Security	Mode: Output	•	v,
	<	111	

- → To establish the connection to the global tag in the CPU, select → "PLC tags" under → "CPU_1516F" and below that → "Tag_table_sorting_station". Now drag the
 - \rightarrow "-A1" tag from the "Detail view" into the "Tag" field and also select \rightarrow "Bit number 0"

VA	Siemens - D:\00_TIA_Portal\042 201_WinCC_Advanced_TP7	00_CPU1516F\042 2	201_WinCC_Advanced_TP700_CPU1516F	— C
PI	roject Edit View Insert Online Options Tools Wind	ow Help	Totally Integrated Automatic	
E	🕴 🎦 Save project 🚐 🗶 🗐 🖆 🗙 🍤 🛨 🖓 🗄 🖡	0 Illî 🖳 🔛 💋 Ge	Go online 🖉 Go offline 👃 🖪 🖪 🗶 - 🔲 POP	RTAL
_	Project tree) CPU1516E)	Panel TP700 Comfort [TP700 Comfort]) Screen management) Templates) Template 1	Ξ×
			ranei 1700 connorc[1700 connord] > scieen management > rempiates > rempiate_1 = =	
	Devices			
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				^
.ē	042 201_WinCC_Advanced_TP700_CPU1516F			
z	🚔 Add new device		13/31/2000	=
E I	Devices & networks		emergency stop relea	
<is< th=""><td>▼ [] CPU1516F [CPU 1516F-3 PN/DP]</td><td></td><td>10:59:39 AM</td><td></td></is<>	▼ [] CPU1516F [CPU 1516F-3 PN/DP]		10:59:39 AM	
	Device configuration			L
	Contine & diagnostics			
	Technology objects			C
	External source files			
	PLC tags	4	III 100%	
	Show all tags			
	🌁 Add new tag table	Symbolic I/O field	d_1 [Symbolic I/O field] Q Properties Life Diagnostics	
	💥 Default tag table [54]	Properties /	Animations Events Texts	
	Tag table_sorting station [30]	Property list	Count .	
	Lei PLC data types	Cananal	General	
	Quine backups	Appearance	Process Contents	
		Design	Tag. 11 Taglich Taglich Taglich Taglich	
	✓ Details view	Layout		
		Text format	PLC tag: "-A1" Field length: 20	
	Name Details Data type Comment	Flashing	Address: Bool Visible entries: 3 🗘	
	-A1 %IO.0 💽 Bool 🔳 return signal emerge 🔺	Limits	Bit number: 0 🗢	
	📲 -B1 %I0.5 Bool sensor cylinder - M4 r 🗏	Style/Designs		
	-B2 %IO.6 Bool sensor cylinder - M4 e.	Miscellaneous	Mode	
	-B3 %IO.7 Bool sensor motor - M1 ac	Security	Mode: Outout	
	на - вня мытьо Bool sensor part at slide (n.			

 \rightarrow Under "Layout" in "Properties", adapt the size of the "Graphic IO field" under \rightarrow "Position & Size".

CPU1516F > Panel IP/00 Comfort [IP/00 Comfort] > Screen man	agement → Templates → Template_1 🛛 🗕 🖬 🖬 🗙						
	- 호 📑 호 쇼 호 릐 호 印 호 해 호 🛷 1달 호 🔍						
	~						
screen title	12/31/2000						
	10:59:39 AM						
	C						
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Symbolic I/O field_1 [Symbolic I/O field]	Properties 🚺 Info 🔋 🗓 Diagnostics 📄 🗏 🔻						
Properties Animations Events Texts	Properties Animations Events Texts						
Property list Layout							
Property list Layout Desition & size	Fit to size						
Property list Layout General Position & size Appearance X: 60 ♥ ►★ 197 ♥	Fit to size						
Property list Layout General Appearance Design X: 60 ◆ Layout Y: 0 ◆	Fit to size Fit object to contents						
Property list General Appearance Design Layout Text format Elashing Marnins Marnins Layout Layout Y: 0 ① Ť Text format	Fit to size Fit object to contents Characteristics						
Property list Layout General Appearance Design X: 60 ♥ Layout Y: 0 ♥ Text format Flashing Limits # 2	Fit to size Fit object to contents Characteristics Display selection list:						
Property list Layout General Appearance Design X: 60 ◆ Layout Y: 0 ◆ Text format Flashing Limits # Style/Designs #	Fit to size Fit object to contents Characteristics Display selection list: Button for selection list:						
Property list Layout General Appearance Design X: 60 ◆ Layout Y: 0 ◆ Text format Flashing Limits Imits Style/Designs Imits Margins Imits Y: 0 ◆ Imits Imits Imits Style/Designs Imits Miscellaneous Imits Societie Imits	Fit to size Fit object to contents Characteristics Display selection list: Button for selection list:						
Property list General Appearance Design Layout Text format Flashing Limits Style/Designs Miscellaneous Security Limits Security Security Limits Security Limits Security Limits Security Limits Security Security Limits Security Security	Fit to size Fit object to contents Characteristics Display selection list: Button for selection list:						
Property list Layout General Appearance Design X: 60 ◆ Layout Y: 0 ◆ Text format Flashing Flashing Imits Style/Designs Imits Miscellaneous Security	Fit to size Fit object to contents Characteristics Display selection list: Button for selection list:						

- → Repeat the preceding steps again for the text lists → "Text list_Main switch" and → "Text list_Automatic" to insert these left of the date and time directly one beneath the other.
- → The "Text list_Main switch" is connected using the \rightarrow "-K0" tag from Tag_table_sorting_station".

~	Details	view			Symbolic I/O fiel	2 [Symbolic I/O field]
-	Name -B7	Details %I1.3	Data type Bool	e Comment	Properties Property list	Animations Events Texts General
9	-B8 -K0	%IW64 %I0.1	Int Bool	sensor a main sw	General Appearance	Process Contents
6666	-M2 -M3 -P1 -P2 -P3	%Q0.3 %Q0.4 %Q0.5 %Q0.6 %Q0.7	Bool Bool Bool Bool Bool	cylinder cylinder display " display " display "	Design Layout Text format Flashing Limits	Tag: Image: Tag: Text.list: Text.list:
A A A A A A A A A A A A A A A A A A A	-P4 -P5 -P6 -P7 -Q1	%Q1.0 %Q1.1 %Q1.2 %Q1.3 %Q0.0	Bool Bool Bool Bool Bool	display "… display "… display … display … conveyo…	Style/Designs Miscellaneous Security	Mode: Output

→ The "Text list_Automatic" is connected using the → "-Memory_Automatic_Start_Stop" tag from "MOTOR_AUTO_DB1[DB1]".

~	Details view		Symbolic I/O fie	ld_3 [Sy	mbolic I/O field]				Service Services	🗓 Info 追 🗓 Diagnos	tics 🗖 🗖 🗖 🗸
1	lame Offset		Properties	Anima	ations Events	Texts					
	Automatic_mode_active	^	Property list		General						
	Start		General		Dracasa				Contonto		
	Stop		Appearance		Process				contents		
	Enable_OK	≡	Design		Tag:	MOTOR_AUTO	_DB_Memory_autor	matic 🔳 📖	1	Fext list: Text_list_automatic	
	Safety_shutoff_active		Layout		PLC too	MOTOR AUT	O DR Momony aut	tomati 🧸	Field	longth 20	
	Sensor_slide		Text format		FLC tag:	MOTOR_AUT	O_DB.Memory_au	tomati F	Field	riengui: 20 👻	
	Sensor_end_of_conveyor		Flashing	-	Address:			Bool	Visible	entries: 3	
	Setpoint_Capacity_Magazine_Pla.		Limits		Bit number:	0					
	reset_counter_workpieces_plastic		Style/Designs	-							
	Conveyor_motor_automatic_mo		Miscellaneous		Mode						
	Actual_Value_Magazine_plastic		Security								
	Memory_automatic_start_stop				Mode:	Output		-			
	Memory_conveyor_start_stop	~									
<											

→ Under "Appearance" in "Properties", change the "Color" of the "Background" for \rightarrow "Text list_Main switch" and \rightarrow "Text list_Automatic" to \rightarrow "Gray".

Symbolic I/O fiel	d_3 [Symbolic	l/O field]			Roperties	🗓 Info 🔋 📱 Diagnostics	▏∎∎▼
Properties	Animations	Events	Texts				
Property list	Appea	rance					
General	Bac	karound			Border		
Appearance	Dac	kground			boluci		
Design			Color:	192, 192, 192 🔻		Width: 2	
Layout			Fill pattorn.			Et do	
Text format			Fill pattern:			Style: 50 style	
Flashing						Color: 105, 105, 105 🔻	
Limits	, Tex	t			Backgrou	nd color: 227, 227, 227 💌	
Style/Designs	-		Color:				
Miscellaneous							
Security							
				More colors			

→ For → "Text list_Main switch" and → "Text list_Automatic", change to the "Animation" tab and select "Display" and click → "Add new animation" $\stackrel{\bullet}{\blacksquare}$.

Symbolic I/O field_2 [Symbolic I	/O field]	Service Services	🗓 Info 🔒 📱 Diagnostics	∎∎▼
Properties Animations	Events Texts			
	Animation types			
Overview				
Tag connections	Display			
👻 🐏 Display	- Appearance	📑 🗡	Dynamize colors and flashing	
Add new animation	Control enable	📑 🎽 🔁	Animate enabled state	
Movements	Visibility	📑 🗡	Make visibility dynamic	

 $\rightarrow~$ In the displayed dialog, select \rightarrow "Appearance" and click \rightarrow "OK".

Add animation	×
Celect the onimption you want to add	
Select the animation you want to add.	
Control enable	
	OK Cancel

→ In "Appearance" of both "Symbolic IO fields", add an area with the value \rightarrow "1" (signal state "High") and change the "Background color" to \rightarrow "Green".

Symbolic I/O fie	ld_2 [Symbolic I	/O field]		🖳 Properti	es 🚺 Info 🔒	Diagnostic	s 🗆 🗆 🗸
Properties	Animations	Events	Texts				
	Ap	pearance					
Overview		[an				Туре	
🕨 📲 Tag connecti	ions '	ay _				Type	
👻 🖺 Display		Name:			■	💿 Range	
💕 Add new a	animation	Address:				 Multiple bit 	s
ᢇ Appearan	ce 🗸					O Single hit	0
Movements							
	•	Range 🔺	Backgrou	nd color	Foreground color	Flashing	
		1	v 0, 25	5,0 💌	0,0,0	 No 	-
		<add new=""></add>					
<	>						

 $\rightarrow~$ The "Text list_Main switch" is connected using the \rightarrow "-K0" tag from

Tag_table_sorting_station".

VA	Sie	mens -	D:\00_TIA_Po	ortal\042	201_WinCC_	Adv	anced_TP700_CPU1516FI042 201_WinCC_Advanced_TP700_CPU1516F	
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	Pro	oject tre	е			4	Panel TP700 Comfort [TP700 Comfort] > Screen management > Templates > Template_1	_∎■×
		Devices						
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tion		۱ 🖌	External sour	ce files		^		
lizat		- 🍃	PLC tags					
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N.			👕 Add new t 🎽 Dofault ta	ag table a table [54	11	=	automatic stopped	LO:
			👆 Tag table	sorting st	ation [30]			
		اه ا	PLC data type					
		🕨 🕨	Watch and fo	rce tables				
		- • 🛐	Online backu	ps				•
		• •	Traces			~	< III > 100% T	<u> </u>
	~	Details	view				Symbolic I/O field_2 [Symbolic I/O field]	
						1	Properties Animations Events Texts	
		Name	Details	Data typ	e Comment			
		-A1	%10.0	Bool	return si	^	Appearance	
		-81	%10.5	Bool	sensor c		Overview Tag Type	
		-B2 -B3	%10.7	Bool	sensor	≡	P Display Name: K0 Bange	
	-	-B4	%11.0	Bool	sensor p		Address:	
	-	-B5	%11.1	Bool	sensor		Appearance	
	-	-B6	%11.2	Bool	sensor p		Movements	
		-B7	%11.3	Bool	sensor p		Range Background color Foreground color Flashing	
		-88	%IW64	Int	sensora		1 0,255,0 0,0,0 No	
		-KU -M2	%00.3	Bool	cylinder		<add new=""></add>	
	-	-M3	%Q0.4	Bool	cylinder			
	-00	-P1	%Q0.5	Bool	display	~		
	<				>			

- \rightarrow The "Text list_Automatic" is connected using the
 - \rightarrow "-Memory_Automatic_Start_Stop" tag from "MOTOR_AUTO_DB1[DB1]".

VA Sie	mens - D:\00_TIA_Portal\042 201_WinC	C_Ad	/anced_TP700_CPU1516F\042	201_WinCC_Advanced_TP700_CPU1516F
Projec	t Edit View Insert Online Optio	ns T	ools Window Help	Totally
	🖥 🛄 Save project 📃 🐰 🛅 🚡 🗙	ا ± د	2 ± 🖥 🖪 🖬 🖉 🖉	Go online 🖉 Go offline 👃 🖪 🖪 🗶 🚽 🔲
		m 4		
Pro	bject tree		Panel IP/00 Comfort	[IP/00 Comfort] Screen management Iemplates Iemplate_1
	Devices			
E P6	0.0	1 과	Tahoma 🔲 17 💌	B J U S A* + = + A + & + 🖉 + = + _ + _ = + 🖪 + () + = + [] + (] + (] + (] + (] + (] + (] + (]
5	- Maia (OB1)			
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- <u>Ř</u>		=	A emergency s	stop released
- 8				Screen title
5				automatic stopped
		_		
	Taskaslasvakiasta	-		
		~		
<		>	<	
~	Details view		Symbolic I/O field_3 [Syml	polic I/O field] 🔍 Properties 🚺 Info 🤢 🖫 Diagnostics 📰 🖃 🤊
			Droportion Animatic	Prosto Toyto
	Name Offse	t	Properties Animati	
-00	Automatic mode active	~		Appearance
-	Start		Overview	
-	Stop		Tag connections	Tag Type
-	Enable OK	=	▼ ⊕ Display	Name: MOTOR_AUTO_DB_Memory_automatic_st
-	Safety shutoff active		Add new animation	Addross:
-	Sensor slide		Appearance	
	Sensor end of conveyor		► J Movements	Single bit
-0	Setpoint Capacity Magazine Pla.			
-0	reset counter workpieces plastic			kange A Background color Foreground color Flashing
-	Conveyor motor automatic mo			1
-0	Actual Value Magazine plastic			<add new=""></add>
	Memory automatic start stop			
	Memory conveyor start stop			
		1.000		
		× ×		

→ In the default tag table, the "Acquisition cycle" of all tags is also to be accelerated from 1 second to 100 milliseconds here.

1_WinCC_Advanced_TP700_CPU1516F → Pa	nel TP700 Comfort	[TP700 Comfo	ort] ► HMI ta	igs 🕨 Default tag table [18]				. 🗖 🖬 >
							HMI tags 🛛 🖳	Syster	m tags
H 🔁									
ault tag table									
ame 🔺	Data type	Connection	PLC name	PLC tag	Address	Access mode	Acquisition cycle	Logged	Source
-A1	Bool	HMI_Connectio	CPU1516F	"-A1"		<symbolic access=""></symbolic>	1 s		return s.
-B1	Bool	HMI_Connectio	CPU1516F	"-B1"		<symbolic access=""></symbolic>	100 ms		sensor
-B2	Bool	HMI_Connectio	CPU1516F	"-B2"		<symbolic access=""></symbolic>	100 ms		sensor
-B3	Bool	HMI_Connectio	CPU1516F	"-B3"		<symbolic access=""></symbolic>	100 ms		sensor
-B4	Bool	HMI_Connectio	CPU1516F	"-B4"		<symbolic access=""></symbolic>	100 ms		sensor
-B5	Bool	HMI_Connectio	CPU1516F	"-B5"		<symbolic access=""></symbolic>	100 ms		sensor
-B6	Bool	HMI_Connectio	CPU1516F	"-B6"		<symbolic access=""></symbolic>	100 ms		sensor
-B7	Bool	HMI_Connectio	CPU1516F	"-B7"		<symbolic access=""></symbolic>	100 ms		sensor
- K0	Bool	HMI_Connectio	CPU1516F	"-KO"		<symbolic access=""></symbolic>	100 ms		main s
MAGAZINE_PLASTIC_Plastic_Parts_Actual	Int	HMI_Connectio	CPU1516F	MAGAZINE_PLASTIC.Plast		<symbolic access=""></symbolic>	100 ms		Actual
MOTOR_AUTO_DB_Memory_automatic_start_stop	Bool	HMI_Connectio	CPU1516F	MOTOR_AUTO_DB.Mem		<symbolic access=""></symbolic>	100 ms		Memor
OPERATING_HMI_automatic_start	Bool	HMI_Connectio	CPU1516F	OPERATING_HMI.automa.		<symbolic access=""></symbolic>	100 ms		HMI pu
OPERATING_HMI_automatic_stop	Bool	HMI_Connectio	CPU1516F	OPERATING_HMI.automa.		<symbolic access=""></symbolic>	100 ms		HMI pu
OPERATING_HMI_mode_selector	Bool	HMI_Connectio	CPU1516F	OPERATING_HMI.mode_s.		<symbolic access=""></symbolic>	100 ms		HMI mo.
OPERATING_HMI_reset_counter_plastic	Bool	HMI_Connectio	CPU1516F	OPERATING_HMI.reset_c		<symbolic access=""></symbolic>	100 ms		HMI res.
-Q3	Bool	HMI_Connectio	CPU1516F	"-Q3"		<symbolic access=""></symbolic>	100 ms		convey
SPEED_MOTOR_Speed_Actual_Value	Real	HMI_Conne	CPU1516F	SPEED_MOTOR.Speed.	-	<symbolic acce<="" td=""><td>100 ms</td><td></td><td>Speed a</td></symbolic>	100 ms		Speed a
Add new>		_				-			
									1
	1_MINCC_Advanced_TP700_CPU1516F Pai	t	1_WinCC_Advanced_TP700_CPU1516F ➤ Panel TP700 Comfort [TP700 Comfort TP700 Comfort TP700_CPU1516F ➤ Panel TP700 Comfort [TP700 Comfort TP700 Comfort TP	1_WinCC_Advanced_TP700_CPU1516F ➤ Panel TP700 Comfort [TP700 Comfort] ➤ HMI ta TT700 Comfort] ➤ HMI ta TT700 Comfort] ➤ HMI ta TT700 Confort] HMI ta TT700 Confort]	ti	1_WINCC_Advanced_TP700_CPU1516F > Panel TP700_Comfort [TP700_Comfort] > HIMI tags > Default tag table [18]	1	t	1_MINCC_Advanced_TP700_CPU1516F > Panel TP700 Comfort [TP700 Comfort] > HMI tags > Default tag table

- → Before the project is downloaded to the CPU and the panel, compile the CPU and panel again and save the project. (\rightarrow CPU_1516F \rightarrow \blacksquare \rightarrow Panel TP700 Comfort \rightarrow \blacksquare \rightarrow \blacksquare \rightarrow Save project)
- → After successful compilation, the complete controller with the created program including the hardware configuration can be downloaded, as described in the previous modules.
 (→ II)
- → To download the visualization to the panel, proceed in a similar way. Select the \rightarrow "Panel TP700 Comfort [TP700 Comfort]" folder and click the icon

 \rightarrow \blacksquare "Download to device".

7.15 Bar graph

 \rightarrow You would like to specify the setpoint for the speed control of the motor and display the actual value. To do this, open the \rightarrow "SPEED MOTOR" screen by double-clicking it.



→ The text field in the center of the screen is to be removed by right-clicking it and selecting → "Delete" in the displayed dialog.

J_TP700_CPU1516F + Panel TP700 Comfort [TP700 Comfort] + Scree	ens → Speed Motor 💶 🖬 🗮 Toolbox 📑 🔳	
	Options	c.
Tahoma 🗏 16 ▼ B I U S A*± 💽± A± 🖄 ± 🖉 ± = ± -	一千 🍯 千 🖓 千 副 千 田 平 訓 千 , 🕜 🐨 💷 , 👔	
	▲ ► Basic objects	mat
emergency stop released	main switch OFF	
	automatic stopped	
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Back		<u>~</u>
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 \rightarrow In order to graphically display the actual speed value, use drag-and-drop to move the

 \rightarrow "Bar" object from \rightarrow "Elements" in "Tools" to the center of the screen.

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→ Under "General" in "Properties", change the "Maximum scale value" to \rightarrow 50 and the "Minimum scale value" to \rightarrow -50.

Bar_1 [Bar]					Rroperties	🗓 Info 追 🗓 Diagnostics	
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Limits	Mi	nimum scale	-50	_ .	Tag for minimum		
Style/Designs		value:		 _			
Miscellaneous							

→ For the process connection, select the → "Program blocks" of the → "CPU_1516F" and the → "SPEED_MOTOR[DB2]" data block there. Then drag the →"Actual speed value" tag from the → "Detail view" into the field for "Process tag".

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→ Under "Scales" in "Properties", select → \blacksquare "Show scale". Under "Divisions" select → 2. Under "Marks label" select → 1. Under "Interval", select → 10.

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Miscellaneous										

→ Under "Label" in "Properties", select $\rightarrow \blacksquare$ "Label". Under "Unit" select \rightarrow rpm. Under "Decimal places", select \rightarrow 2.

Bar_1 [Bar]				🔍 Pi	operties	🗓 Info 🔒 📱 Diagnostic	s 🗆 🗆 🗸	
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 \rightarrow Under "Layout" in "Properties", adapt the position and size of the bar under \rightarrow "Position"

& Size". Above the bar diagram, insert $a \rightarrow$ "Text field" A for the description with text \rightarrow "Actual speed value".



→ In order to specify the speed setpoint, move the \rightarrow "IO field" object \square from \rightarrow "Elements" in "Tools" to a location above and to the right of the bar display.

201_WinCC_Advanced	I_TP700_CPU1516F ▸ Par	nel TP700 Comfort [1	TP700 Comfort] ▸	Screens > Speed	d Motor 📃 🖬 🖬 🔪	Toolb	ox 🗐 🔳	
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→ Under "General" in "Properties" keep the "Type" as \rightarrow "Input/Output" and change the "Format pattern" to \rightarrow s99.99.

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→ For the process connection, select the → "Program blocks" of the → "CPU_1516F" and the → "SPEED_MOTOR[DB2]" data block there.

Now drag the \rightarrow "Speed setpoint" tag from the \rightarrow "Detail view" into the field for "Tag".

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 \rightarrow Under "Appearance" in "Properties", change the "Color" of the "Background" to \rightarrow "Blue".

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 \rightarrow Under "Text format" in "Properties", change the "Horizontal" setting of "Alignment" to \rightarrow "Right".

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- \rightarrow Under "Layout" in "Properties", adapt the position and size of the IO field under \rightarrow "Position & Size".
- → Above the bar diagram, insert $a \rightarrow$ "Text field" A for the description with text → "Speed setpoint".

201_WinCC_Advance	ed_TP700_CPU1516F Panel TP700 Comfort [TP700 Comfo	ort] + Screens + Speed Motor 🛛 🗕 🖬 🗮 🗙
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I/O field_1 [I/O field] Properties Anima	ations Events Texts	ies 🚺 Info 🚺 🖞 Diagnostics 👘 🗖 🗖 🗸
Property list General Appearance Characteristics Layout Text format Flashing Limits Style/Designs Miscellaneous Security	Layout Marging X: 574 Y: 50 I 22 Fit to size Fit object to contents	

- → In the default tag table, the "Acquisition cycle" of the newly created
 "SPEED_MOTOR_speed setpoint" tag is again changed from 1 second to 100 milliseconds.
- → Before the visualization is downloaded to the panel, compile the panel again and save the project.
 - $(\rightarrow \text{Panel TP700 Comfort} \rightarrow \square \rightarrow \square \text{Save project})$
- → Select the → "Panel TP700 Comfort [TP700 Comfort]" folder and click the icon→ \blacksquare "Download to device".

7.16 Alarms

When you created the TP700 Comfort Panel using the wizard, you created a pair of alarm windows at the same time. You should now look these over in more detail.

7.16.1 General alarm settings

→ You first want to make a pair of settings for the display of alarms in Runtime. To do this, double-click the→ "Runtime settings" folder in → "Panel TP700 Comfort" to select it. Under "General" in "Alarms", select → I Colors of alarm classes". Under "System events", change → display duration in seconds to "10". Under "Controller alarms", check whether the "System diagnostics" check box is selected I.

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> Details view		S Properties	🗳 Info 🛛 💆 Diagnostics 👘 💷 🖻 🦳			
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7.16.2 Alarm window

→ In order for the alarm window to be shown in the foreground in every screen, there is a
 → "Global screen" in the → "Screen management" folder in → "Panel TP700 Comfort".
 Open this with a double-click. An alarm window → "System events" has already been created in this screen. Under "General" in "Properties", I Pending alarms" of I "System" alarm class are already activated.



 \rightarrow System events will thus automatically be displayed for ten seconds in Runtime.

SIENENS emergency stop OK SMATCHA Active system events No. Trime Date Status Text Acknowledge group Sp 5 140000 4:08:15 AM 5/29/2016 1 Connection established: 0 HMI_Connection_1, Station 192.168.0.1, Rack 0, Stot 1.	SIEMENS			SIM	ATIC HMI
Active system events No. ITime Poate Status Text Acknowledge group Sp 5 140000 4:08:15 AM 5/29/2016 1 Connection established: HMI_Connection 1, Station 192.168.0.1. Rack 0, Slot 1.	SIEMENS emergency	stop OK	rview Sorting S	tation automatics	ON 5/29/2016
Sp \$ 140000 4:08:15 AM 5/29/2016 1 Connection established: HMI_Connection_1, Station 192:168.0.1, Rack 0, Slot 1.	Active syste	em events	Status Toxt	Acknowl	
	Sp \$ 140000	4:08:15 AM 5/29/2016	I Connection (HMI_Conne 192.168.0.1	established: 0 ction_1, Station . Rack 0. Slot 1.	
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→ As a second alarm window in the "Global screen" there is → "Pending alarms". Under "General" in "Properties", activate I "Pending alarms" and I "Unacknowledged alarms". Activate I "Errors", I "Warnings" and I "No Acknowledgment" as alarm classes.



Note: You will create alarm classes of types "Errors" and "Warnings" in the panel itself in the following steps. The alarm class of the "No acknowledgment" type is produced automatically by the settings for the system diagnostics in the CPU 1516F.

 \rightarrow Under "Miscellaneous" in "Properties", change the "Name" to \rightarrow "Alarm window_pending_not_acknowledged".

Alarm window_	Pendin	g_Unackn	owledg	ed [Alarm \	vindow]		Seroperties	🔄 🛄 Inf	o 追 🗓 Diagnostics	
Properties	Anim	ations	Events	s Texts						
Property list		Miscella	neous _							
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Flashing	1			Name: 🖪	arm windo	ow_Pending_L	Jnacknowledged			
Style/Designs										
Miscellaneous										
Mode	=									
Security	~									

 \rightarrow Under "Mode" in "Properties", change the "Title" to \rightarrow "Pending/not acknowledged alarms".

Alarm window_	Pendin	g_Unacknowledged [Alarm wi	indow]	Properties	🕽 Info 🔋 🖞 Diagnostics 🚽	
Properties	Anim	ations Events Texts				
📑 Property list	Γ	Mode				^
Alarm filter	~	Mindow		Caption		
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Flashing	4	Display automatically:		Enabled:	: 🗹	=
Style/Designs		Closable:		Title:	Pending Unacknowledged alarm	ns
Miscellaneous		Modali				
Mode	=	wodai.				
Security		Sizeable:				_
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7.16.3 Alarm indicator

→ In addition to the alarm windows there is an → "Alarm indicator" in the "Global screen".
 This is used so that an alarm window that was closed by the user is displayed again.
 Under "General" in "Properties", activate the alarm classes I "Errors: Pending alarms",
 I "Errors: Acknowledged", I "Warnings: Pending alarms" and I "No Acknowledgment: Pending alarms".

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			Warnings			<u>~</u>					
			System		l						
		-	Diagnosis e	events	l						
			Acknowled	gement							
		-	No Acknow	ledgement		~					
			<			1111			>		

 $\rightarrow~$ In \rightarrow "Events", the display of the alarm window "Alarm

window_pending_not_acknowledged" with function "ShowMessageWindow" has already been stored for "Click" and "Click when flashing".

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	ick when flashin	g T t	ShowAlarmWindow Object name Display mode	Alarm window_Pending_Unacknowledged Toggle

7.16.4 Alarms for system diagnostics of CPU 1516F

→ Open the "Device configuration" of the "CPU_1516F" and select the → "System diagnostics" menu under → "General" in → "Properties".

System diagnostics is always activated for devices of the SIMATIC S7-1500 series.

Under \rightarrow "Alarm setting", you see which alarm classes are being used. Here, the alarm class is "No Acknowledgment". These alarm classes are referenced in turn by the HMI systems in the alarm windows and for the other settings for the alarms.



 \rightarrow Select the analog output module \rightarrow "AQ4xU/I" and activate \rightarrow "Diagnostics" \rightarrow

"Missing voltage supply L+" for all channels under \rightarrow "Outputs" in \rightarrow Properties.



→ Before the project is downloaded to the CPU and the panel, compile the CPU and panel again and save the project.

 $(\rightarrow CPU_1516F \rightarrow \square \rightarrow Panel TP700 Comfort \rightarrow \square \rightarrow \square \rightarrow Save project)$

- → After successful compilation, the complete controller with the created program including the hardware configuration can be downloaded, as described in the previous modules.
 (→ CPU 1516F → III)
- → To download the visualization to the panel, proceed in a similar way. Select the → "Panel TP700 Comfort [TP700 Comfort]" folder and click the icon → \square "Download to device".
- → Alarms for system diagnostics of the CPU 1516F are now automatically displayed in the alarm window "Pending/Unacknowledged alarms". Details and help texts can be displayed and alarms can be acknowledged if necessary in this alarm window. If the alarm window has been closed, it can be displayed again by clicking the displayed

alarm indicator. This example shows a failure of the supply voltage for the "AQ4xU/I" module.

SIEMI	ENS				S	IMATIC	ΗMI	
SIEMENS eme	rgency stop Of Unacknowled Time	ged alarms	Status Te	ext	Main : Ackno	switch ON	5/29/2016 4:10 AM	
NA 34 II NA 34 II S	nfo text hort name: AQ 32-5HD00-0AB	4xU/I ST Or 0	der number	× : 6ES7	are mission 0 are mission 0		astik/	JCH
							istic	

7.16.5 Alarm class settings

→ The item → "HMI alarms" is available in the → "Panel TP700 Comfort" for configuring the alarm system and creating individual alarms. Open this with a double-click. The alarm classes we are using have already been created in the menu command "Alarm classes" but these can also be changed. For alarm class → "Warnings", change the background color for the "Incoming" and "Outgoing" states to → "Yellow".

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	Add new device			Warnings	Alarm without acknowle <no log=""> 255, 255, 0</no>	255, 255, 0 255, 255, 255
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	CPU1516F [CPU 1516]		🛁 S	System	Alarm without acknowle <no log=""> 255, 255, 255</no>	255, 255, 255 255, 255
	 Panel TP700 Comfort. 		🛁 A	Acknowledgement	Alarm with single-mode <no log=""> 255, 0, 0</no>	255,0,0 255,255,255
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	Online & diagnostics		S7	Diagnosis events	Alarm without acknowle <no log=""> 255, 255, 255</no>	255, 255, 255
	T Runtime settings		<		111	>
	Screens		Warnings [Alarm c	lass]		Properties
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	Scripts		Status		Backg	round Flashing
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	Reports			-		
	Text and graphic lists			,	Incoming/Acknowledged: 🔁 🗸 🖻	
	🙀 User administration			-	Incoming/Outgoing/Acknowledged: 🗾 🗸 🌖	
	Common data					
	Documentation settings					
	Languages & resources	*				
	< III >	•				
	> Details view					More colors
	🔹 Portal view 🔛 Over	rview	Watch table	_1 Overview So	HMI alarms	😪 Loading completed (errors: 0; warnings

7.16.6 System events

→ With the menu command "System events", you can have these automatically imported by clicking → "Yes".

0422	01 WinCC Advand	ced TP700 CPU1516F Panel TP700 Comfort [TP700 Comfort] HMI alarms	∎∎×
		🖂 Discrete alarms 🖂 Analog alarms 🔄 Controllar alarms 📮 System events 🖂 Alarm classes 📑 Alarm	aroups
			Joups
		Import system events X	-1
Sy	stem events		
	ID Alarm	n text Do you want to import the system events?	
		Apparently, no system events have been imported yet.	
		Yes No	
0422	01 WinCC Advan	ced TP700 CPU1516F → Panel TP700 Comfort [TP700 Comfort] → HMI alarms	·■■×
		Controller slame Controller slame Controller slame Controller slame support	anouno
		A Discrete alaritis A Analog alaritis 🛶 Controller alaritis 🔤 System events 📠 Alariti Classes 🔟 Alariti	groups
			-4
Sy	stem events		
	ID	Alarm text	
	9999	Global: Unknown error %1,%2,%3,%4,%5,%6,%7,%8,%9.	^
	10000	Print: Unknown error %1.	=
	10001	Printing not possible: no default printer available.	
-	10002	Overflow: graphics will not be printed.	
	10003	Overflow status on printing of graphics ended.	
-	10004	Overflow: lines in text mode will not be printed.	
-	10005	Overflow status on printing of text lines ended.	
-	10006	Printer error %1: %2.	
	10100	No.	
	10101	Time	
	10102	Date	
	10103	AGR	
	10104	Status	*

7.16.7 Controller alarms

→ The controller alarms have already been created with the menu command "Controller alarms".

042	2	01_WinCC_A	Advanced_TP700_CPU1516F Panel TP700 Comfort [T	P700 Comfort] 🕨 H	IMI alarms		_∎≡×
			🙀 Discrete alarms 🛛 🗔 Analog alarms 🕞	Controller alarms	🖶 System events 🛛	Alarm classes	dlarm groups
							
C	Co	ntroller alar	ms				
		ID	Alarm text	Common alarm class	PLC	Report	
ų	2.	3	CPU error: @1W%t#7W@ @5W%t#7W@¶ @6W%t#258K@	No Acknowledgement	CPU1516F		^
ų	2.	5	CPU maintenance demanded: @1W%t#7W@ @5W%t#7W@¶ @61	No Acknowledgement	CPU1516F		
ų	2.	7	CPU maintenance required: @1W%t#7W@ @5W%t#7W@¶ @6W9	No Acknowledgement	CPU1516F		_
ų	2.	A	Error:@1W%t#7W@@5W%t#7W@¶@6W%t#257K@	No Acknowledgement	CPU1516F		=
ų	2.	С	Error:@1W%t#7W@@5W%t#7W@¶@6W%t#257K@	No Acknowledgement	CPU1516F		
ų	2.	E	Error:@1W%t#7W@@5W%t#7W@¶@6W%t#276K@	No Acknowledgement	CPU1516F		
ų	2.	10	Error:@1W%t#7W@@5W%t#7W@¶@6W%t#257K@/@6W%t#	No Acknowledgement	CPU1516F		
ų	2.	12	Error:@1W%t#7W@@5W%t#7W@¶@6W%t#257K@/@6W%t#	No Acknowledgement	CPU1516F		
ų	2	14	CPU status message: @1W%t#7W@ @5W%t#7W@¶ @6W%t#25	No Acknowledgement	CPU1516F		
ų	1	16	PLC alarm: @1W%t#7W@ @5W%t#7W@¶ @6W%t#256K@	No Acknowledgement	CPU1516F		
ų	1	1C	Error:@1W%t#7W@¶@6W%t#257K@/@6W%t#258K@.@6W%	No Acknowledgement	CPU1516F		
ų	2.	1E	Maintenance demanded: @1W%t#7W@ ¶ @6W%t#257K@ / @6V	No Acknowledgement	CPU1516F		
ų	2	20	Maintenance required: @1W%t#7W@ ¶ @6W%t#257K@ / @6W%	No Acknowledgement	CPU1516F		*

7.16.8 Analog alarms

→ You can monitor tags to determine whether they are within limits in "Analog alarms".
 Create a new alarm by clicking "Add". For monitoring purposes, select the → "Default tag table" in → "Panel TP700 Comfort" and drag the →
 "SPEED_MOTOR_actual_speed_value" tag that is to be monitored from the → "Detail view" into the field for "Trigger tag". Drag the variable

limit \rightarrow "SPEED_MOTOR_positive_speed_error limit" from the \rightarrow "Detail view" into the field for "Limit".

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=		Analog alar	ms					
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lize	Add new device	S 1 🗢	Errors	SPEED_N	10TOR_Speed_Actual_Value	SPEED_MOTOR_Positive_Speed_Thr	eshold_Error 🔳 🕢	Higher
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	Pool new tag table							
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	V HMI alarms	General	C					
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	Name 🚽 Data ty	Miscellaneous		Delay:	0 🌒 Millisecond	•		
	SPEED MOTOR Speed Setpoint Real		4					
	SPEED MOTOR Speed Actual Value Real		, Lim	it		Deadband		
	SPEED_MOTOR_Positive_Speed_Threshold_Warning Real			Mode:	Higher	 Mode: Off 	F	
	SPEED_MOTOR_Positive_Speed_Threshold_Error Real			Value	SPEED MOTOR Positive Spec	Value: 0		
	SPEED_MOTOR_Negative_Speed_Threshold_Warning Real			value.				
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	Portal view Dverview Watch table_1	Overview So	🖂 HMI alarms			😪 Loadi	ing completed (errors: 0; wa	arnings

→ Enter the text → "Error limit exceeded positive motor speed", select the "Alarm class" →
 "Errors" and "Mode" → "High". Create the three other alarms of alarm classes
 "Warnings" and "Errors" shown below in the same way.

042 2	042 201_WinCC_Advanced_TP700_CPU1516F > Panel TP700 Comfort [TP700 Comfort] > HMI alarms												
				🔀 Discrete alarms	🐊 Analog alarm	s 🖬 Controller alaı	rms 🛛 🖶 System events	🔚 Alarm c	asses 👩	D Alarm groups			
	ł												
An	nalog	alarms											
_	ID	Alarm text	Alarm class	Trigger tag	Li	imit			Limit mode	Report			
	1	Error threshold exceeded motor pos. speed	Errors	SPEED_MOTOR_Speed_Actual	Value S	PEED_MOTOR_Positive_S	peed_Threshold_Error		Higher				
	2	Warning threshold exceeded motor pos. speed	Warnings	SPEED_MOTOR_Speed_Actual	Value S	PEED_MOTOR_Positive_S	peed_Threshold_Warning		Higher				
	3	Error threshold exceeded motor pos. speed	Errors	SPEED_MOTOR_Speed_Actual	Value S	PEED_MOTOR_Negative_	Speed_Threshold_Error		Lower				
3	4 🖨	Warning threshold exceeded motor pos. speed	Warnings	SPEED_MOTOR_Speed_Actual	Value S	PEED_MOTOR_Negative_Sp	eed_Threshold_Warning	■	Lower				
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7.16.9 Discrete alarms

→ Before you can create discrete alarms in the panel, you need a global tag with at least 16 bits in the CPU 1516F. You will use this tag to trigger the discrete alarms from the PLC. In "CPU 1516F", open the data block → "OPERATION_HMI[DB4]" in the→
 "Program blocks" folder and create a global tag → "Group alarms 01" of data type →
 "Word" there.





→ In the → "Program blocks" folder, click → "Add new block" to create → Funktion → "Discrete alarm_assignment".

View Inse Project Edit View Inse Image: Save project Image: Save p	rtal/042.201_WintC_Art rt Online Options メ モー ごっ メ ゆうま dvanced_TP700_CPU151 wrks 1516F3-PN/DP] uration nostics s kock]	dvanced_T Tools Wi (#4 ± ⅓) III ◀ 6F			
Add new block			_		×
Name: Assign discrete alarn	ns				
	Language:	FBD			
OB	Number:	1			
Organization block		 Manual Automatic 			
FB	Description:				
Function block	Functions are code	e blocks or subroutines with	nout dedicated	memory.	
Function					
DB					
Data block	Mara				
> Additional infor	more				
	nation			01	Create
Add new and open				OK	Cancel

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→ In the "Discrete alarm_assignment" function, create a local input tag →
 "DiscreteAlarmX0" of data type → "Bool" and a local output tag → "GroupAlarms01" of data type → "Word". In the first network, program a single -f=] assignment of the →
 "DiscreteAlarmX0" tag to Bit X0 in the → "GroupAlarms01" tag.

(5F	•	CPU1	516F	[CPU	1516	F-3 P	N/DP]) ∣	Prograi	n bl	ocks	• <i>1</i>	\ssig	n_disc	rete_	_alaı	rms [[FC	1]	-		×
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Note: The "Tag1.%X0" syntax is referred to as **Slice** access in the TIA Portal. This enables access to the individual bits of a tag of data type Byte, Word or DWord: If you need additional information about this, search for the term "Slice" in the online help for STEP 7 Professional V13.

→ Open the → "Main[OB1]" block from the "Program blocks" folder and call the →
 "Discrete_alarm_assignment[FC1]" function in → "Network 4". Connect the input of the
 "Discrete_alarm_assignment[FC1]" function to the inverted global tag →
 "-K0" / %I0.1 / Station "ON"(no) from the "Tag_table_sorting_station". Connect the
 output of the "Discrete_alarm_assignment[FC1]" function to the global tag →
 "GroupAlarms01" from the data block "OPERATION_HMI[DB4]".

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	MOTOR_SPEEDCONTROL [FC10]	Comment						ks
	MOTOR_SPEEDMONITORING [FG	C11]			WEG				
	MOTOR_AUTO [FB1]				%I-C				
	MAGAZINE_PLASTIC [DB3]				"Assign_discre	te_alarms"			Lib
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→ Return to → "HMI alarms" → "Discrete alarms" in the "Panel TP700 Comfort". Create a new alarm by clicking → "Add". Select the → "GroupAlarms01" tag you just created from the "OPERATION_HMI[DB4] data block as the "Trigger tag". Enter the text → "Main switch OFF" in the "Alarm text" column, select the "Alarm class" → "Warnings" and "Trigger bit" → "0". In the "Trigger address" column, "OPERATION_HMI. GroupAlarms01.x0" is now displayed.

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CPU1516F [CPU 1516F-3 PN/DP]		II.
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Assign_discrete_alarms [FC1]	Properties Events Texts	
MOTOR_SPEEDCONTROL [FC10]	Trigger	
MOTOR_SPEEDMONITORING [FC11]	General	
MOTOR_AUTO [FB1]	Trigger	
MAGAZINE_PLASTIC [DB3]	Info text Tag: OPERATING_HMI_group_signals01 II	
	Acknowledgment Bit: 0	
SPEED MOTOR [DB2]	Miscellaneous	
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group_signals01 Word		
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→ The alarm display is also adapted in "Template_1" in the "Screen management" folder.
 Under "General" in "Properties", activate → I "Pending alarms". Activate → I "Errors",
 → I "Warnings" and → I "No Acknowledgment" as alarm classes.

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 \rightarrow Under "Miscellaneous" in "Properties", change the "Name" to \rightarrow "Alarm line".

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→ Before the project is downloaded to the CPU and the panel, compile the CPU and panel again and save the project.

 $(\rightarrow CPU_1516F \rightarrow \square \rightarrow Panel TP700 Comfort \rightarrow \square \rightarrow \square Save project)$

- → After successful compilation, the complete controller with the created program including the hardware configuration can be downloaded, as described in the previous modules.
 (→ CPU_1516F → □)
- → To download the visualization to the panel, proceed in a similar way. Select the → "Panel TP700 Comfort [TP700 Comfort]" folder and click the icon→ \blacksquare "Download to device".
- → Analog alarms and discrete alarms for system are now automatically displayed in the alarm window "Pending/Unacknowledged alarms" and in the "Alarm line". Details and help texts can be displayed and alarms can be acknowledged if necessary in the alarm window. If the alarm window has been closed, it can be displayed again by clicking the displayed alarm indicator. Various alarm classes appear in different colors.

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	1	5:21:41 AM	5/29/2016	I	main switch OFF	0	
	4	5:21:02 AM	5/29/2016	Ι	Warning threshold excee	ded 0	
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7.17 Remote control of the TP700 Comfort Panel

7.17.1 Activating web services for Runtime

→ To enable remote control, double-click the → "Runtime settings" in the configuration for the → Panel TP700 Comfort to open them. The → I "Start Sm@rtServer" option is activated for → "Layout" under "Remote control" and the → I "HTML pages" option is activated under "Diagnostics".

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7.17.2 WinCC Internet settings in the TP700 Comfort Panel

 \rightarrow Settings must also be made directly on the panel. Select \rightarrow "Settings" in the "Start Center" directly after switching on the voltage supply and the start of the panel.



Note: The selection of "Settings" must occur fast enough, and before the automatic "Start" of Runtime.



→ With menu command "Web Server", first select the $\boxed{}$ "Start automatically after booting" option and click on → "User Administration".



→ Assign the administrator password in the "Password" field → "100", confirm it in the "Confirm Password" field → "100" and apply it with → "Apply".

UserDatabas		ок >	<	
User Manager	Description	Authorization	าร	
Administrator				
User Name:	Administrator		New	
Password:	****		Apply	
Confirm Password:	****		Remove	

→ With menu command "Remote", first select the \checkmark "Start automatically after booting" option and click → "Change settings".



→ Also assign → "100" for Password1 and → "100" for Password2 and put this into effect with → "Apply".



7.17.3 Starting remote access to the TP700 Comfort Panel

→ To start the remote access to your panel, enter the IP address of the in your browser \rightarrow "192.168.0.10".



Note: A current installation of Java Runtime Environment is required for secure access to the web services of the TP700 Comfort Panel.

 \rightarrow Enter the password that was previously set in the panel \rightarrow "100".

Siemens Sm@rtClient Desktop × +											
 (i) (i)											
Disconnect Options Clipboard Record Send Ctrl-Alt-Del Refresh	^										
VNC Authentication											
Password: *** OK											

→ You then have the option of monitoring, and operating the panel remotely and even changing the settings in Windows CE of the device.

Siemens Sm@rtClient De	esktop × +										
	0 :5800	C	Suchen	☆ 自	♥ ↓	>>	≡				
Disconnect Options Clipboa SIEMENS emergency stop Ok SIMATIC HMI	Disconnect Options Clipboard Record Send Ctrl-Alt-Del Refresh IEMENS emergency stop OK MATICHMI Overview Sorting Station automatic started										
Speed Motor	Magazine Plastic	System scre	ens	Auto Sta	stop						
-B4	-В5		-B6 Metall/ metal		-B7		Ш				
Rutsche/Slide	Förde	erband/Conveyor			plastic						
-B3 Motor active Speed actual value	+0.00 rpm	Text	M4 -B1	Counter workpiec	es plastic Reset						
					0						
•		111					•				

7.18 Archiving the project

→ As the final step, you want to archive the complete project. Select the → 'Archive ...' command in the → 'Project' menu. Open a folder where you want to archive your project and save it with the file type "TIA Portal project archive".

 $(\rightarrow \text{Project} \rightarrow \text{Archive} \rightarrow \text{TIA Portal project archive} \rightarrow \text{SCE}_\text{EN}_042\text{-}201_\text{WinCC}$ Advanced with TP700 and S7-1500.... \rightarrow Save)

M Siemens - D:\00_TIA_Portal\042 201_WinC	C_Advanced_T	700_CPU1516F\042 201_WinCC_Advanced_TP700_CPU1516F _ 🛛 🗸
Project Edit View Insert Online Optio	ns Tools Wi	dow Help Totally Integrated Automation
Open Ctrl+O Migrate project		TP700_CPU1516F + Panel TP700 Comfort [TP700 Comfort] + Screens + Overview Sorting Station 📃 🖬 🗮 🗙 📢
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Upgrade Print Ctrl+P Print preview		Speed Motor Magazine Plastic System screens
Dd1042 201_WinCC_Advanced_TP700 Ddde042 201_WinCC_Advanced_TP70 Dd00_TIA1032-600_Global_Data_Blocks Dd001032-600_Globale_Datenbausterine Dd00_TIA_PortalIHIM_1500IHIM_1500 Dd00_TIA_PortalIHIM_1500IHIM_1500 Dd00_TIA_PortalITA_ProjeTIA_Project_3 Dd032-300_IEC_2tient_Zaehler Mit P Dd00_TIACPU315F_Profisafe_V13_SP1		-B4 -B5 Metall/ metal -B7 Plastic Plastic Plastic
Exit Exit Exit Exit Exit and graphic lists P Common data Exit Common data Exit Common data Exit Common data		-B3 Motor active Text Speed actual value +000.00 rpm
Languages & resources Details view	*	
Name	^	x
Devices & networks	v	🖳 Properties 🔂 Info 🔂 Diagnostics 🗖 🗖 🚽
Portal view Overview	Overview S	o ✓ Loading completed (errors: 0; warnings

8 Checklist

No.	Description	Completed
1	Program changes successfully performed in the CPU 1516F	
2	CPU 1516F successfully compiled without error message	
3	CPU 1516F successfully downloaded without error message	
4	Process visualization for the Touch Panel TP700 Comfort successfully created	
5	Touch Panel TP700 Comfort successfully compiled without error message	
6	Touch Panel TP700 Comfort successfully downloaded without error message	
7	Switch on station (-K0 = 1) Cylinder retracted/Feedback activated (-B1 = 1) EMERGENCY OFF (-A1 = 1) not activated AUTOMATIC mode (in the panel) Pushbutton automatic stop not actuated (-S2 = 1) Briefly press the automatic start pushbutton (in the panel) Sensor part at slide activated (-B4 = 1) then conveyor motor -M1 variable speed (-Q3 = 1) switches on and remains active The speed corresponds to the speed setpoint in the range +/- 50 rpm	
8	Sensor part at end of conveyor activated (-B7 = 1) \rightarrow -Q3 = 0 (after 2 seconds)	
9	Briefly press the automatic stop pushbutton (-S2 = 0) \rightarrow -Q3 = 0	
10	Activate EMERGENCY OFF (-A1 = 0) \rightarrow -Q3 = 0	
11	Manual mode (in the panel) \rightarrow -Q3 = 0	
12	Switch off station (-K0 = 0) \rightarrow -Q3 = 0	
13	Cylinder not retracted (-B1 = 0) \rightarrow -Q3 = 0	
14	Speed > SPEED_MOTOR_monitoring_error_max \rightarrow -Q3 = 0	
15	Speed < SPEED_MOTOR_monitoring_error_min \rightarrow -Q3 = 0	
16	Values and alarms are displayed in the panel.	
17	Project successfully archived	

9 Exercise

9.1 Task – Exercise

In this exercise, the process visualization is to expanded to include the following functions:

In the **"Overview of sorting station"** screen, "Set" and "Actual" will now be displayed for the count of "Plastic" workpieces.

In the "**Motor Speed**" screen, the actual and setpoint speed of the motor will now be displayed graphically and in IO fields. The setpoint speed can also be specified here.

The error and warning limits for the positive and negative motor speed are also to be displayed and can be set in IO fields. Before the IO fields, a small red box indicates when a limit has been exceeded.

In the "**Plastic Magazine**" screen, "Set" and "Actual" will be displayed graphically and in IO fields. The setpoint for the plastic parts can be specified in the IO field or with a slider in the range of 0 to 20. It is also possible to reset the counter here.

In the **Alarm system**, the emergency stop and the status of automatic mode are also to be monitored. If the emergency stop is triggered or the automatic mode is stopped, a warning is to be displayed.

9.2 Technology diagram

Here, you see the technology diagram for the task.



Figure 6: Technology diagram



Figure 7: Control panel

9.3 Reference list

DI	Туре	Identifier	Function	NC/NO
I 0.0	BOOL	-A1	Return signal emergency stop OK	NC
I 0.1	BOOL	-K0	Main switch "ON"	NO
10.2	BOOL	-S0	Mode selector manual (0)/ automatic (1)	Manual = 0 Auto = 1
I 0.3	BOOL	-S1	Pushbutton "Automatic Start"	NO
I 0.4	BOOL	-S2	Pushbutton "Automatic Stop"	NC
I 0.5	BOOL	-B1	Sensor cylinder -M4 retracted	NO
I 1.0	BOOL	-B4	Sensor part at slide	NO
I 1.3	BOOL	-B7	Sensor part at end of conveyor	NO
IW64	BOOL	-B8	Sensor actual value speed of the motor +/-10V corresponds to +/- 50 rpm	

The following signals are required as global operands for this task.

DO	Туре	Identifier	Function	
Q 0.2	BOOL	-Q3	Conveyor motor M1 variable speed	
QW 64	BOOL	-U1	Manipulated value speed of the motor in two directions +/-10V corresponds to +/-50 rpm	

Legend for reference list

- DI Digital input DO Digital output
- AI Analog input AO Analog output
- I Input O Output
- NC Normally Closed
- NO NO Normally Open

9.4 Planning

Plan the implementation of the task on your own.

9.5 Checklist – Exercise

No.	Description	Completed
1	Program changes successfully performed in the CPU 1516F	
2	CPU 1516F successfully compiled without error message	
3	CPU 1516F successfully downloaded without error message	
4	Process visualization for the Touch Panel TP700 Comfort successfully created	
5	Touch Panel TP700 Comfort successfully compiled without error message	
6	Touch Panel TP700 Comfort successfully downloaded without error message	
7	Switch on station (-K0 = 1) Cylinder retracted / Feedback activated (-B1 = 1) EMERGENCY OFF (-A1 = 1) not activated AUTOMATIC mode (in the panel) Pushbutton "Automatic stop" not actuated (-S2 = 1) Briefly press the "Automatic start" pushbutton (in the panel) Sensor part at slide activated (-B4 = 1) then conveyor motor -M1 variable speed (-Q3 = 1) switches on and remains active The speed corresponds to the speed setpoint in the range +/- 50 rpm	
8	Sensor part at end of conveyor activated (-B7 = 1) \rightarrow -Q3 = 0 (after 2 seconds)	
9	Briefly press the automatic stop pushbutton (-S2 = 0 or in the panel) \rightarrow -Q3 = 0	
10	Activate EMERGENCY OFF (-A1 = 0) \rightarrow -Q3 = 0	
11	Manual mode (in the panel) \rightarrow -Q3 = 0	
12	Switch off station (-K0 = 0) \rightarrow -Q3 = 0	
13	Cylinder not retracted (-B1 = 0) \rightarrow -Q3 = 0	
14	Speed > SPEED_MOTOR_monitoring_error_max \rightarrow -Q3 = 0	
15	Speed < SPEED_MOTOR_monitoring_error_min \rightarrow -Q3 = 0	
16	Values and alarms are displayed in the panel.	
17	Project successfully archived	

10 Additional information

You can find additional information as an orientation aid for initial and advanced training, for example, Getting Started, videos, tutorials, apps, manuals, programming guidelines and trial software/firmware, at the following link:

www.siemens.com/sce