

The background image shows a man in a light blue shirt looking at a tablet. Overlaid on the image are various digital graphics: a Siemens logo in the top right, a '24/7' icon with a circular arrow, a 'NEWS' section with a person icon, a 'Home' button, and a network diagram with three people icons. The overall theme is industrial digitalization.

SIEMENS

Getting started manual – SimitCtrls for SIMIT with SIMATIC S7-PLCSIM Advanced

<https://support.industry.siemens.com/cs/ww/en/view/109775634>

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To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under <https://www.siemens.com/cert>.

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1 Introduction

1.1 Overview

The Getting Started manual for working with a "Ready-to-Use" PLC application example project is designed for entry-level users with little or no experience in motion control, Siemens PLC/HMI, or SIMIT simulations to easily try a "Ready-to-Use" PLC application example project.

With our cloud virtual environment called VLAB, you do not need any hardware to try the application example. You can easily access and try the example without the need to install anything on your own machine. The virtual environment includes a simulation of the PLC using SIMATIC S7-PLCSIM Advanced and provides an HMI where users can jog the motors and experiment with the application.

Core content

- This manual is designed to show entry-level users how to open, start and test downloaded Getting Started TIA and SIMIT projects.
- In this manual is shown how to import Simit Controls Library into SIMIT project.
- No hardware, license or software installation is needed to try the "Ready-to-Use" PLC application example project.
- The project is designed to present the functionalities of the Simit Controls components.
- VLAB, a cloud virtual environment, enables users to quickly start PLC programming and experiment with the application.
- This manual provides step-by-step guidance, allowing anyone to have a solid understanding of the basics of PLC application testing in a short amount of time.

1.2 SIMIT Controls Library Advantages

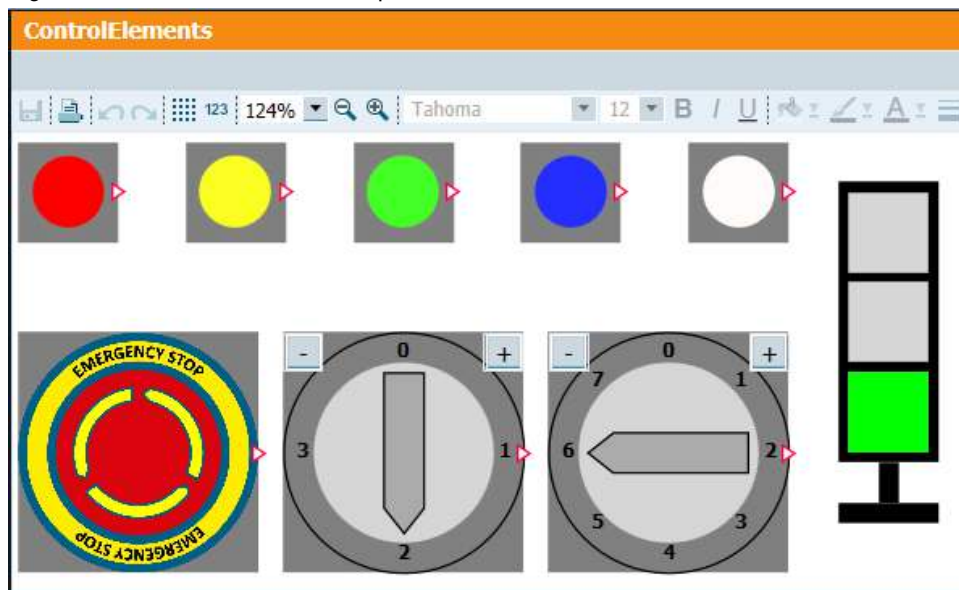
To lower risks and effort of the real commissioning of a machine, virtual commissioning is an efficient alternative. This includes control elements such as illuminated pushbuttons, indicator lights, emergency stop etc. This application example provides you with a control element library, which can be expanded from time to time.

The SIMIT behavior library already contains some standard components, such as buttons, indicators, actuators, and valves. With this library you receive an extension of the control and indicator elements library of SIMIT contained in the standard.

The library contains the following components:

- Emergency Stop
- Indicator
- Indicator Tower
- Key Switch
- Light button
- Rotary Switch
- F-Direct Keys

Figure 1-1: Control elements example



The use of the blocks yields the following advantages:

- Simulation of operating and indicating elements of the real machine line or plant.
- Increasing the accuracy and thus the benefit of the simulation model.
- Possibility of virtual commissioning of a machine, line, or plant.
- Training of personnel (operator training) on a realistic machine, line, or plant.

1.3 Components used

The "Ready-to-Use" PLC application example project can be downloaded as a zip file from the SiePortal.

However, since this application is being tested in VLAB, there is no need to download anything. Simply log in to the VLAB cloud virtual environment and all the required components, including the application, manuals, etc., will be available for use.

To show the SIMIT control library in use, there is a program constructed with LSafe Library which will be visualized in SIMIT using the components from the control library.

Table 1-1: Used libraries

Component	SIOS entry ID	Note
LSafe Library for TIA Portal V17	109793462	Download from SiePortal
SIMIT_ControlLibrary_V2.0.zip	109775634	Download from SiePortal

Table 1-2: Components

Component	File Name
Documentation	SimitCtrls_GettingStarted_R2U_Manual_en_v1_0_0.pdf
TIA Portal Project	GettingStarted_SimitCtrls_TIA.zip
SIMIT Project	GettingStarted_SimitCtrls_SIMIT.zip

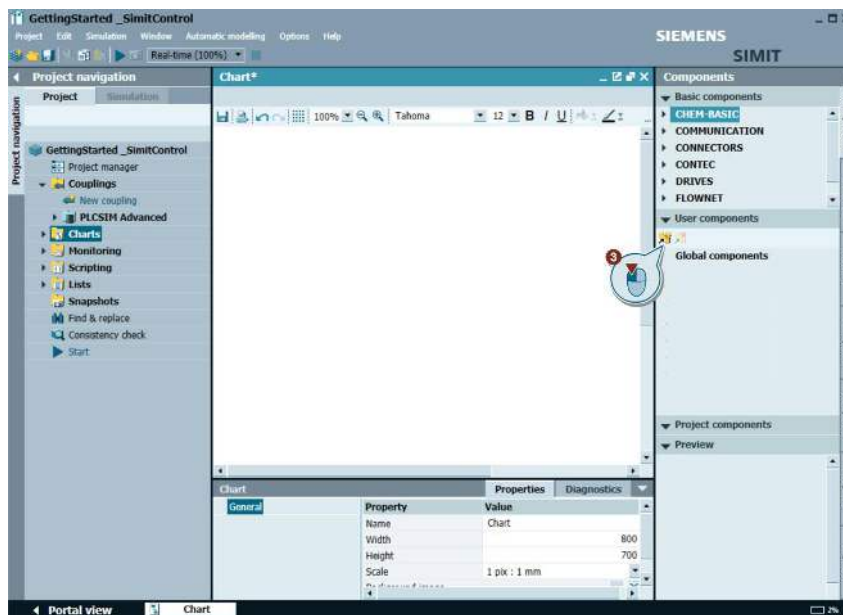
1.4 Importing Library into SIMIT

The control elements library is an extension of SIMIT, which provides components for the creation of control and indicator functionality simulations.

To import library to SIMIT project, proceed as follows:

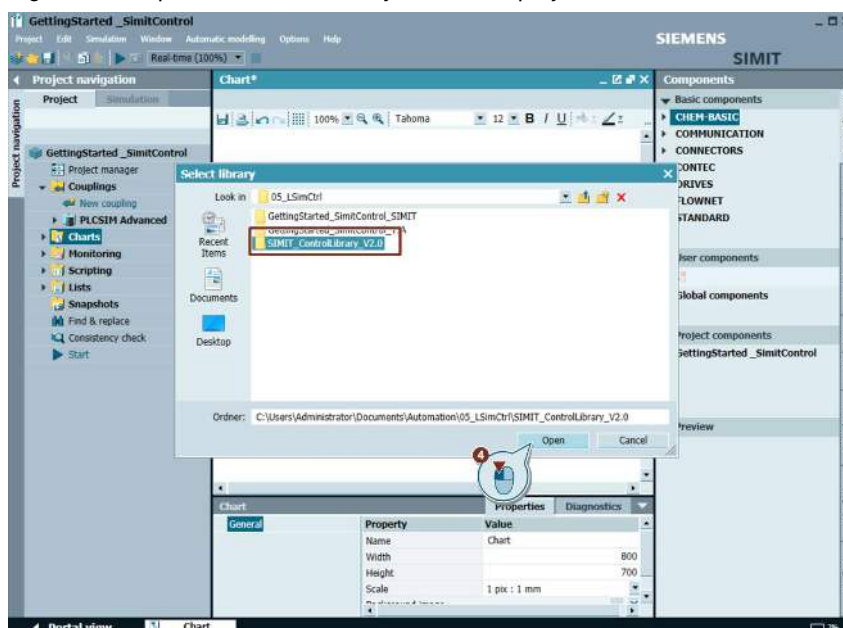
1. Download the library from SiePortal.
2. Extract the downloaded ZIP file into any directory on the SIMIT host system.
3. Open the "Components" task card. Expand the "User components" area and click on the "Open library" button.

Figure 1-2: Open the "User Components" area.



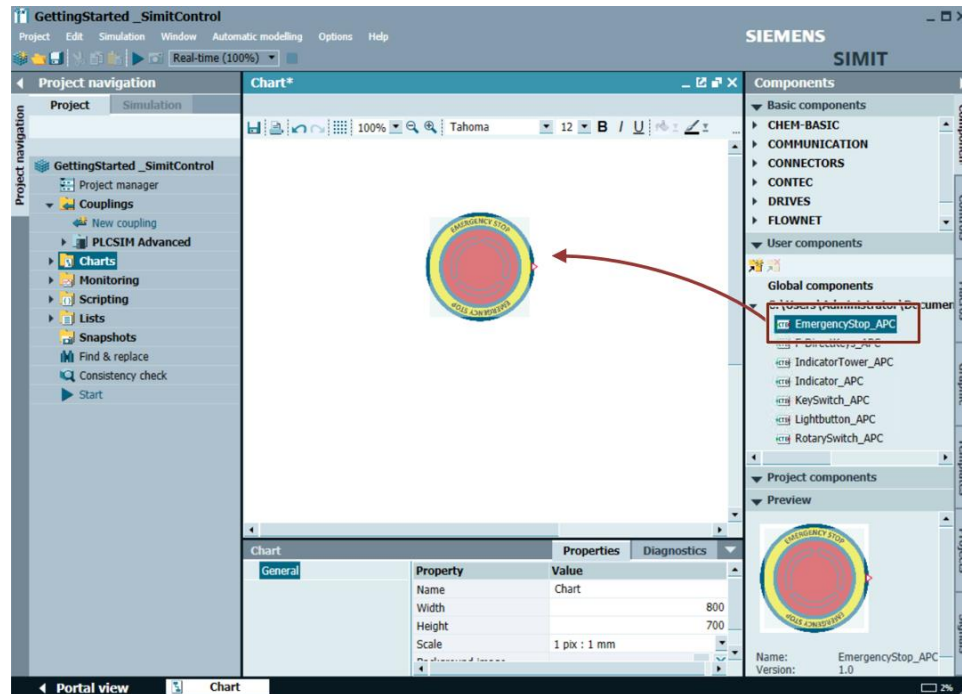
4. Navigate to the storage location of the SIMIT device library and press "Open".

Figure 1-3: Import the Control library into SIMIT project.



After the library has been loaded, you can use it just like the standard SIMIT libraries. To add component into SIMIT project, just drag component from user component area and drop it on project chart.

Figure 1-4: Drag and drop components onto project chart.



1.5 Example Project

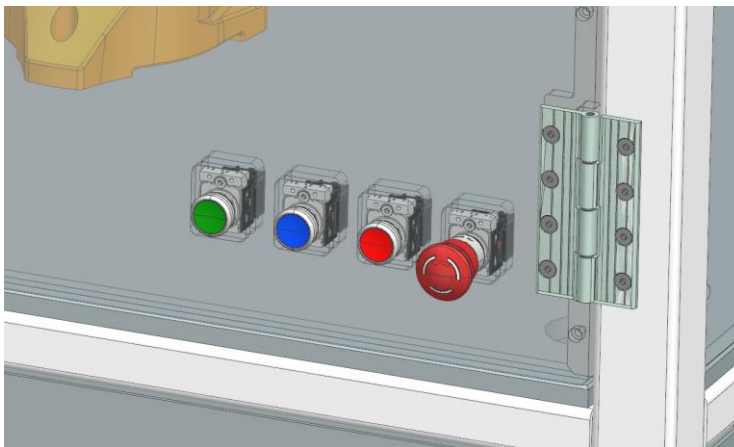
This project is intended to resemble the safety functions of a robot cell. [Figure 1-5](#) shows a safety cell for a Stäubli robot, with basic buttons for “Start”, “Stop” and “Reset”. As well as safety components such as the safety door and the Emergency stop button.

Figure 1-5: Stäubli robot cell 3D-model.



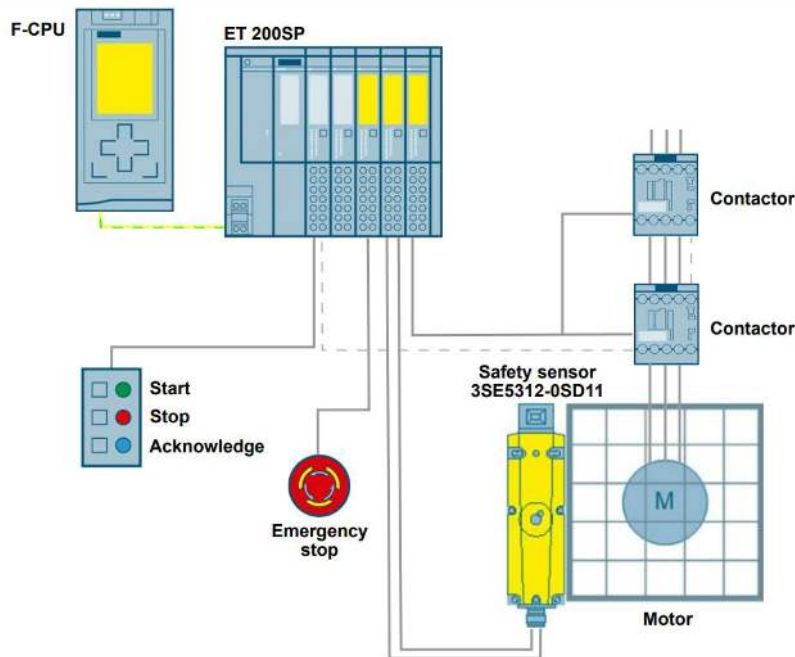
In the images below you can see the control panel of the robot cell, which will be simulated in the SIMIT software.

Figure 1-6: Robot cell buttons.



The next figure shows a schematic overview of the most important components of the solution:

Figure 1-7: Overview of control components and signals of the example robot cell.

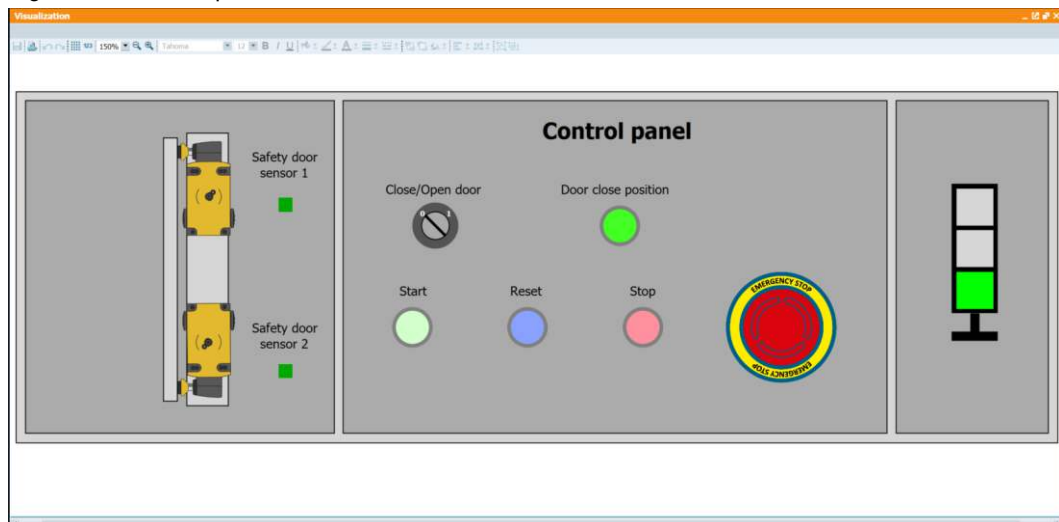


While 3D design software can simulate the mechanical layout of a system, it cannot test the full wiring and connections or the PLC logic, including the safety part. SIMIT and the "control elements for SIMIT" library enable complete simulation and testing of the operator panel's functionality, including the wiring and connection of control elements to the PLC.

This comprehensive testing allows for the validation of the control logic and safety functions of the operator panel without the need for physical hardware. By accurately simulating the behavior of the entire system, SIMIT helps to identify and correct errors early in the development process, reducing the risk of costly mistakes and delays.

Overall, SIMIT and the "control elements for SIMIT" library provide a powerful toolset for testing and validating automation projects, ensuring the accuracy and reliability of the wiring, PLC logic, and safety functions.

Figure 1-8: Control panel shown in SIMIT.



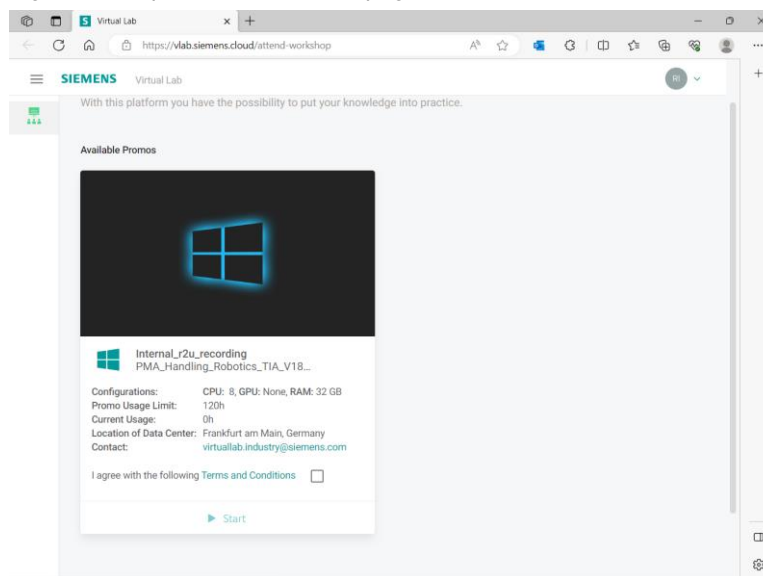
2 VLAB

2.1 Start virtual VLAB in the web browser.

Once you receive the email, you will be directed to our VLAB environment - a cloud virtual machine hosted on AWS. Simply follow the link provided in the email and start the VM to begin testing your PLC application.

Before accessing the VLAB environment, ensure that you have registered for a Siemens ID using the following link: [SiePortal](#). Once you have registered, use your Siemens ID to login to the VLAB environment and start testing your PLC application.

Figure 2-1: Open Siemens VLAB page in the web browser.



After opening the link provided in the email on the home screen, agree to the following Terms and Conditions and then press Start.

Wait for the VLAB virtual environment to be prepared (it should take approx. 5 min).

After the virtual environment preparation process is complete, you can connect to the VLAB by pressing the Connect button, and you can start testing your PLC application in the VLAB environment.

Within the VLAB environment, all software required for testing Ready-to-use applications is already pre-installed, and no license activations are required.

3 Software requirements

This chapter provides information on the software requirements needed to run the "Ready-to-Use" PLC application example project. If you are using VLAB, our cloud virtual environment, you may skip this chapter as all the necessary components will be available for use.

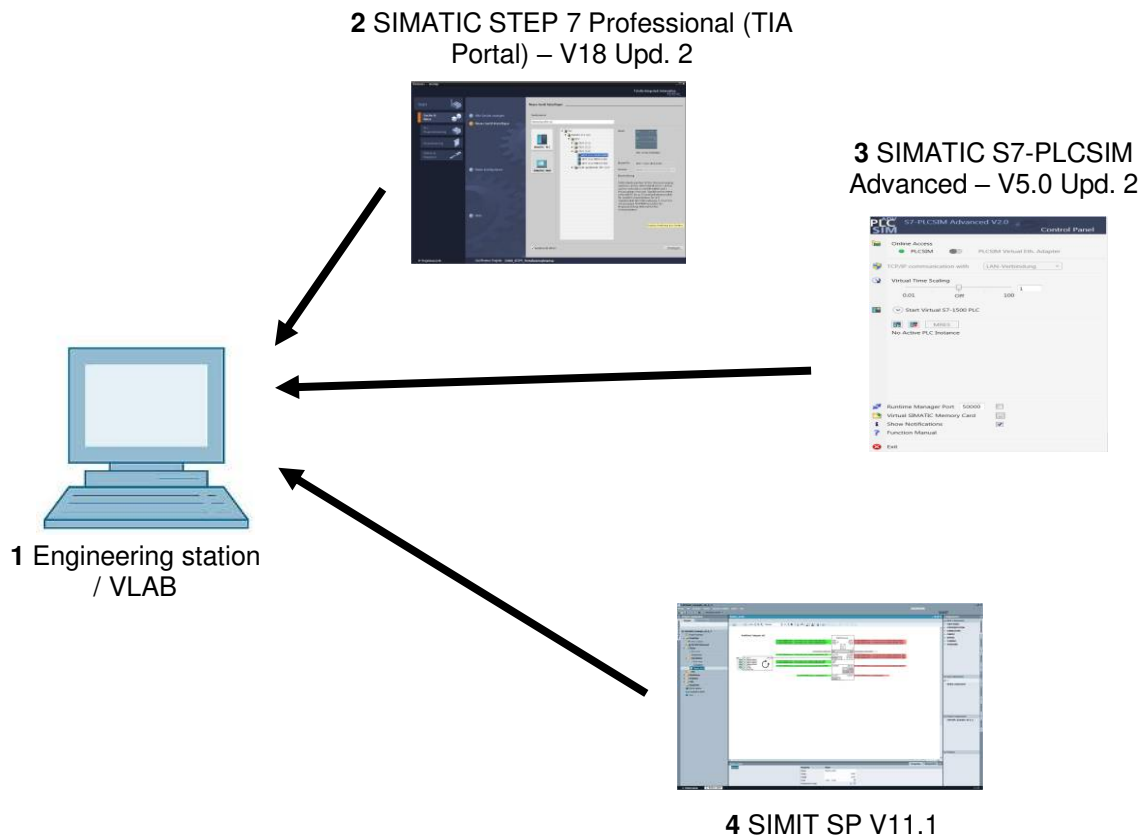


Table 3-1: Software requirements.

Component	Version Number	SIOS entry ID	Download Link
STEP 7 Basic/Professional, WinCC Basic/Comfort/Advanced and WinCC Unified	V18 Update 2	109817218	Download from SiePortal.
SIMATIC S7-PLCSIM Advanced	V5.0 Update 2	109809300	Download from SiePortal.
SIMIT	V11.1	109820441	Download from SiePortal.

4 Downloading and Running the Getting Started Project for PLC and HMI

To run and test the "Ready-to-Use" PLC application example project, you can use VLAB's cloud virtual environment or install the HMI and PLC simulators and SIMIT software on your local machine.

Here are the steps:

1. Navigate to the "Ready-to-Use" PLC application example project folder.
2. Open the project and test it using the PLC simulator (SIMATIC S7-PLCSIM Advanced) and SIMIT software.

VLAB vs Local Installation:

The steps for launching the PLC and HMI simulators and SIMIT software differ between VLAB and local installation. Below are the steps for each.

Please note that VLAB provides a cloud-based environment, whereas local installation provides a standalone environment on your machine. Depending on your needs, you can choose to use either option.

VLAB

1. Open an internet browser and navigate to the VLAB portal.
2. Log in to VLAB using your credentials.
3. Once you are logged in, navigate to the PLC application, and click on its icon.

5 Starting the project

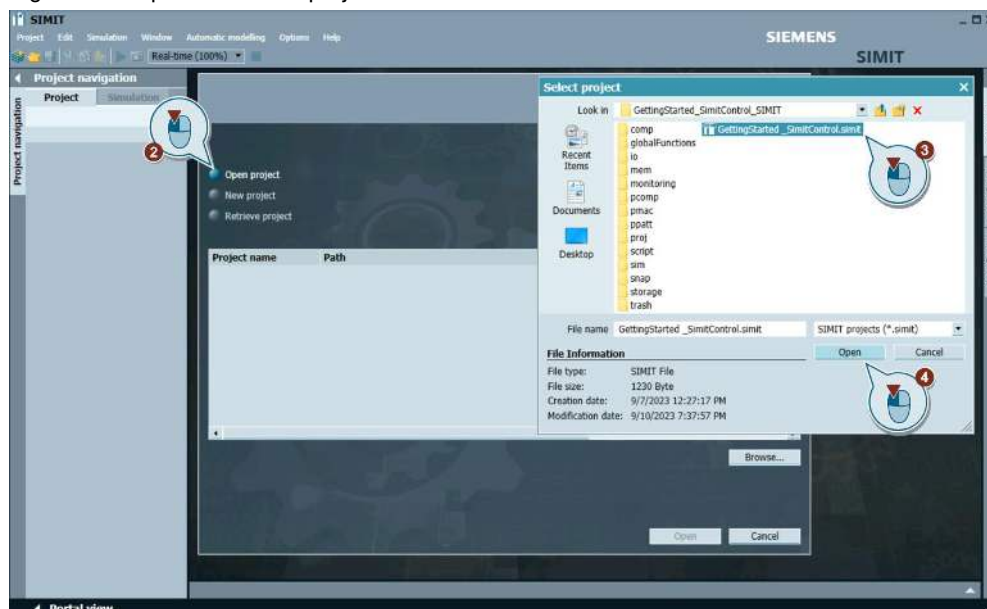
SimitCtrls example project contains two files – TIA Portal example project (*.ap18) and SIMIT SP example project (*.simit). Necessary steps to open and run whole simulation are:

5.1 Opening SIMIT SP project

To open SIMIT project (*.simit) follow next steps:

1. Open SIMIT SP software.
2. Select the “Open project” option.
3. Navigate to the SIMIT project folder and find the .simit file.
4. Fill the target folder and press “Open” button.

Figure 5-1: Open the SIMIT project.



5. To open visualization of control panel in the SIMIT project open “Visualization” chart.

Figure 5-2: Visualization of Control panel

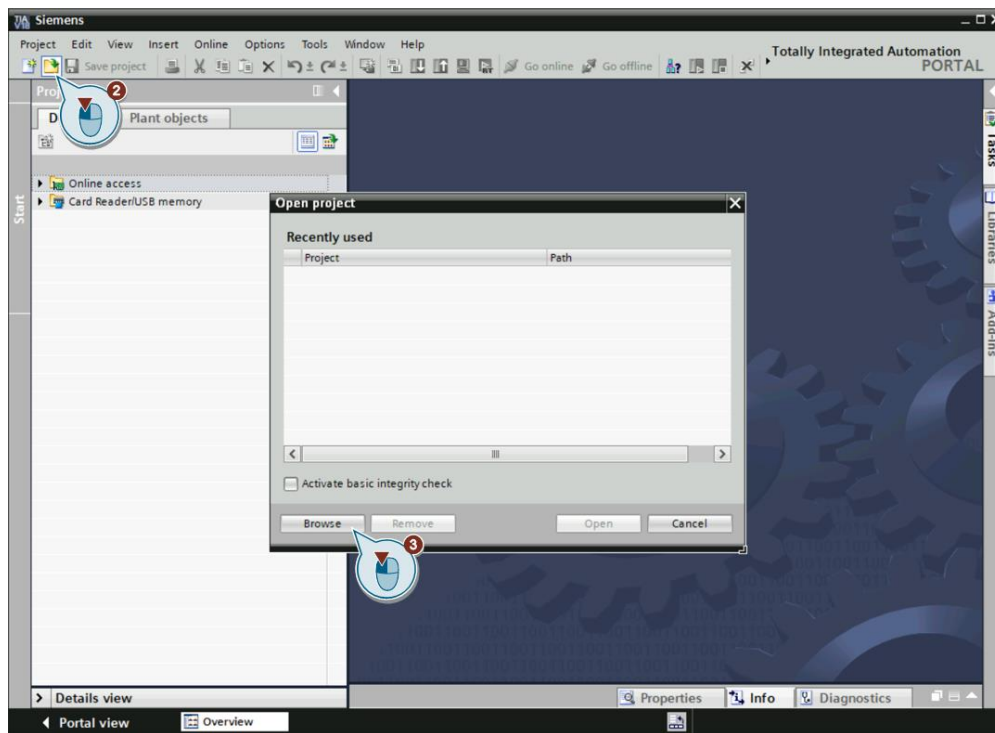


5.2 Opening the TIA Portal project

TIA Portal project file has extension *.ap18. To open it, please follow these steps:

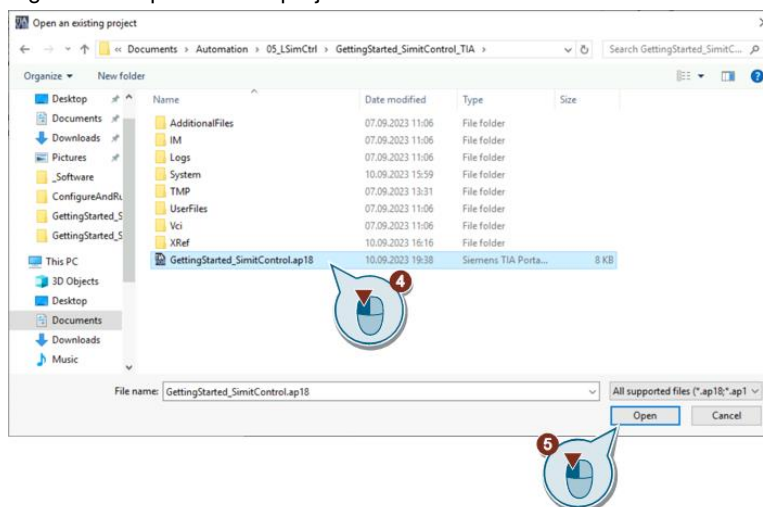
1. Open TIA Portal v18 software.
2. On the toolbar press button “Open project”.
3. Press button “Browse” to navigate path to TIA project.

Figure 5-3: Open select directory window.



4. Next opened window will prompt you to select directory. Select the TIA project and press button “Open”.

Figure 5-4: Open the TIA project.



5.3 Starting the simulation

To start the simulation, follow the following steps:

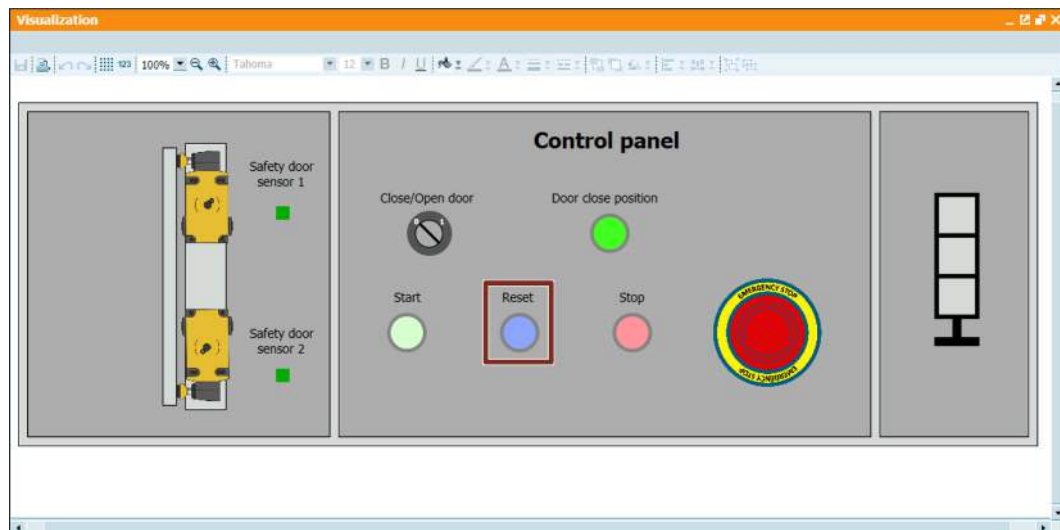
1. In SIMIT press the “Start Simulation” button. SIMIT will create a new simulated PLC instance in S7-PLCSIM Advanced.

Figure 5-5: Starting simulation in SIMIT.



After starting the simulation, the “Reset” button should light up. If not, the PLC instance is empty.

Figure 5-6: Control panel when the TIA project is not downloaded to the PLC instance.

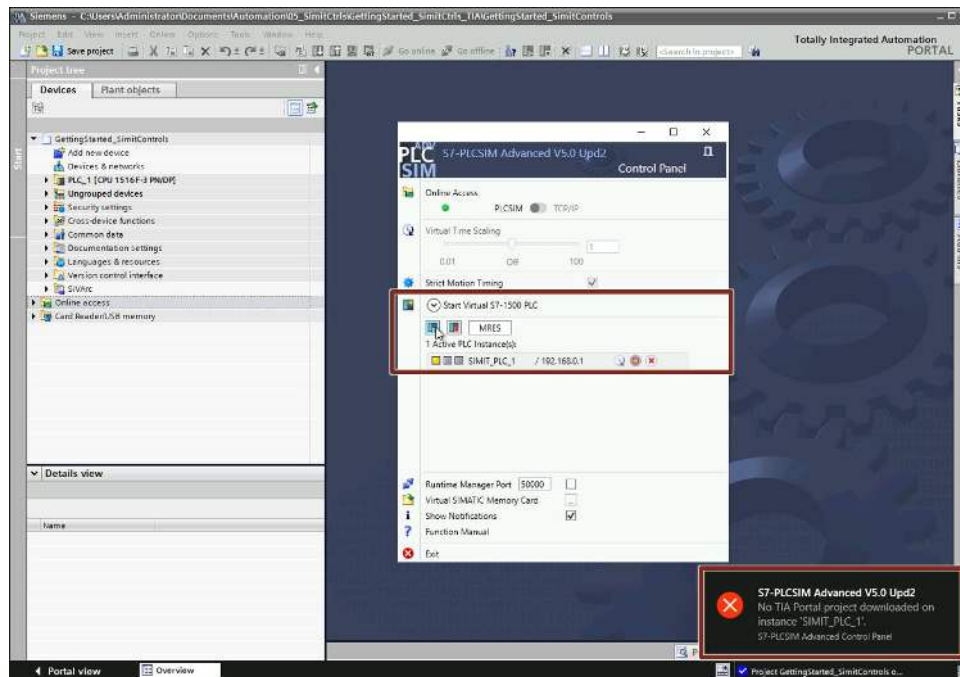


Check also within S7-PLCSIM Advanced if the TIA project is loaded into PLC instance (run, green) or not (stop/empty, yellow).

5 Starting the project

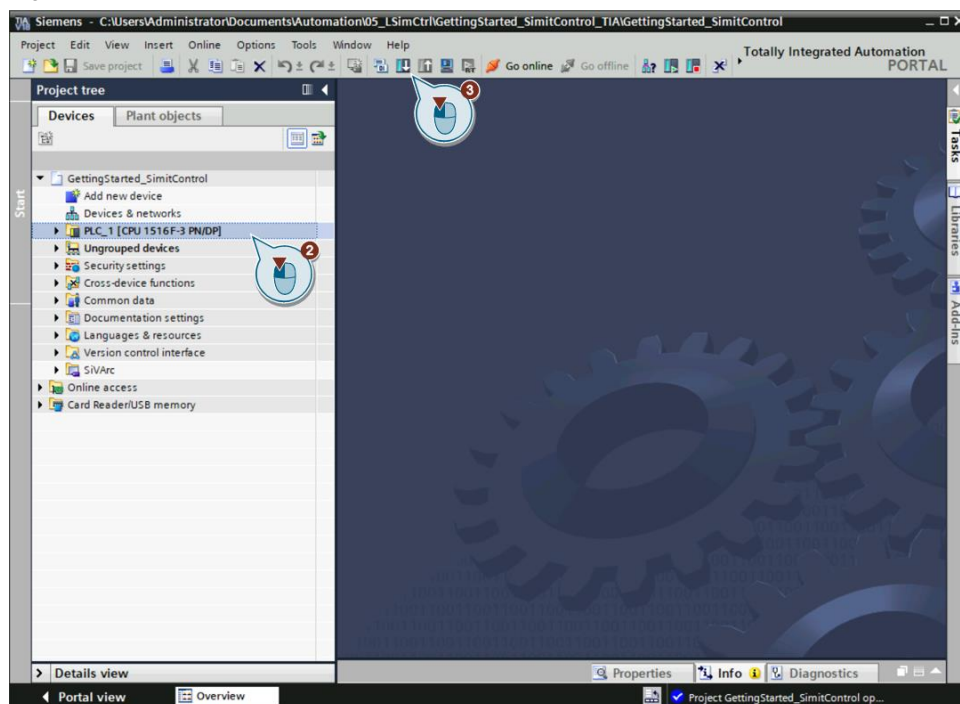
If the TIA project is not loaded, but you try to start the PLC instance, you will get message like shown in the next image.

Figure 5-7: Error message if TIA project is not loaded into PLC instance.



2. From TIA Portal download your project to the running S7-PLCSIM Advanced instance.

Figure 5-8: Download to device.



NOTE

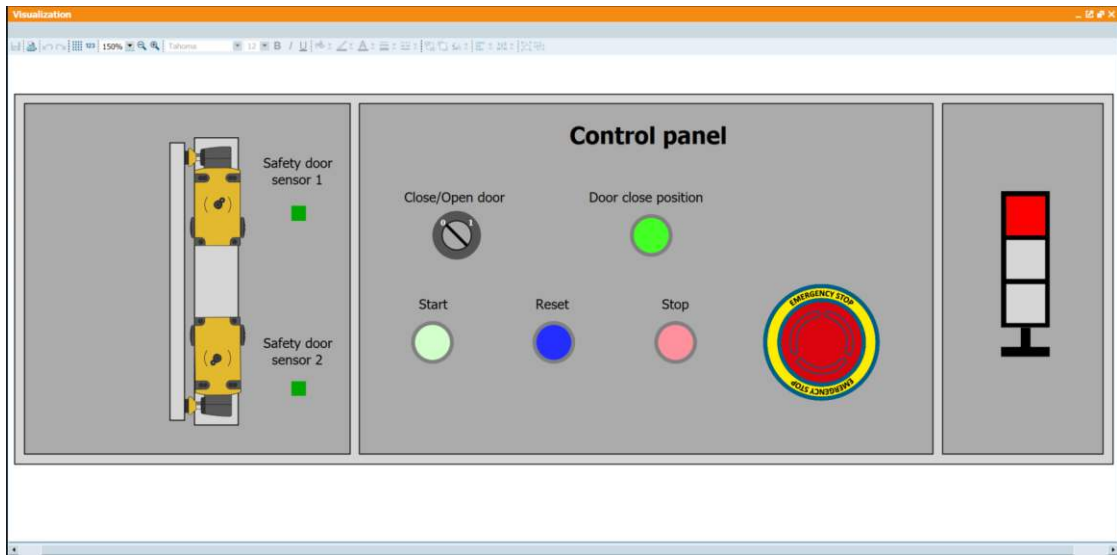
After downloading the project from TIA Portal, start the PLC (choose option "Start module" in Start modules combo box).

5.4 Operating the simulation

The visualization chart got the buttons “Start”, “Reset”, and “Stop” as well as a switch that closes the door and an E-Stop button. This setup is like what you will typically find for a fail-safe system.

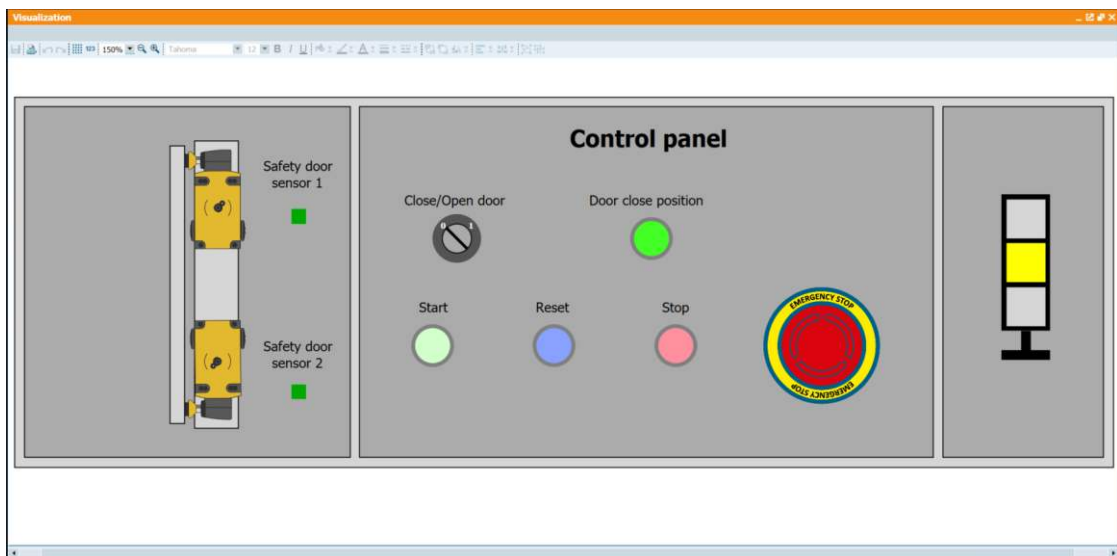
While the Simulation is now running, it can be noticed that the red light on the indicator tower is ON and the reset button is blue, see [Figure 5-9](#).

Figure 5-9: Visualization chart in SIMIT that is stopped.



As the E-Stop and door are both OK, but the light indicator on the right is still showing a red light. In this case it is necessary to press the “Reset” button, which will acknowledge the safety stops and allow us to start the program again.

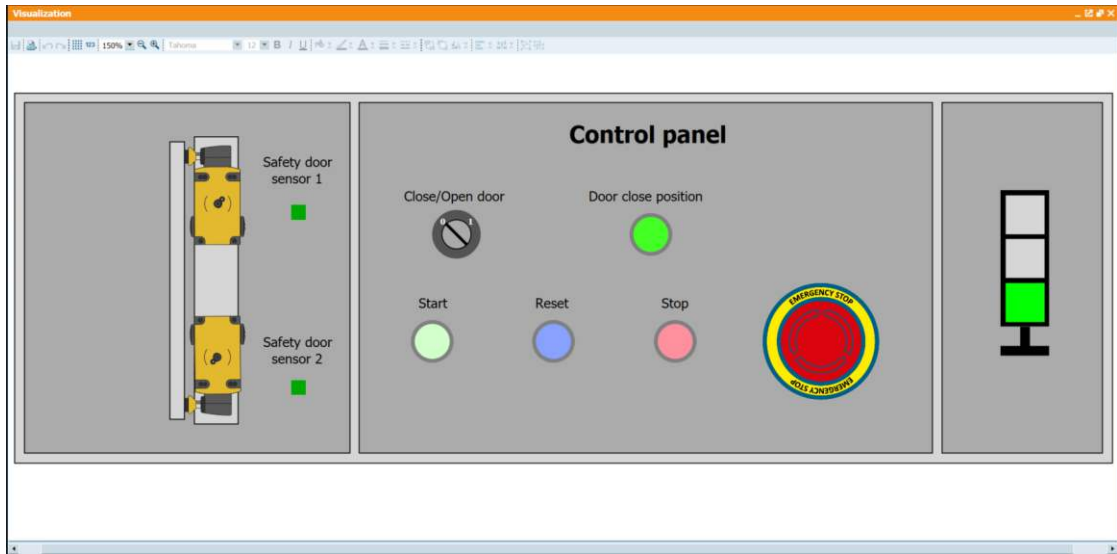
Figure 5-10: Yellow Indicator on the Indicator tower.



5 Starting the project

Once the safety alarms have been acknowledged and reset, and the safety components are OK, we can start the program by pressing the “Start” button.

Figure 5-11: Indicator tower green light turned on.

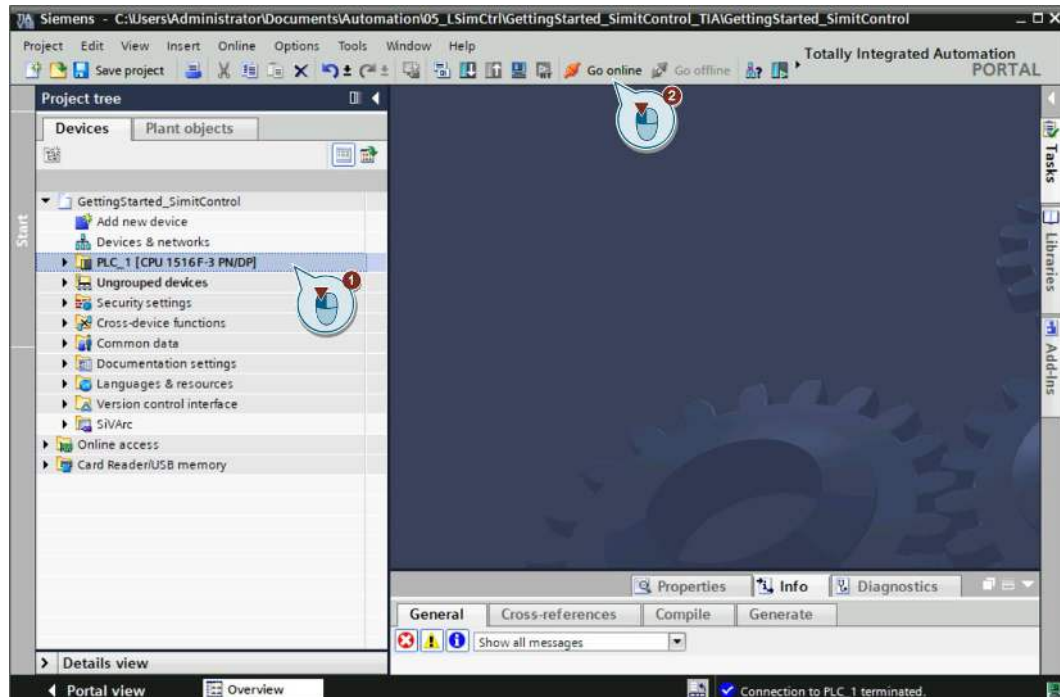


5.5 Traces in TIA portal

In the TIA portal, you can trace used signals and check them in the watch table.

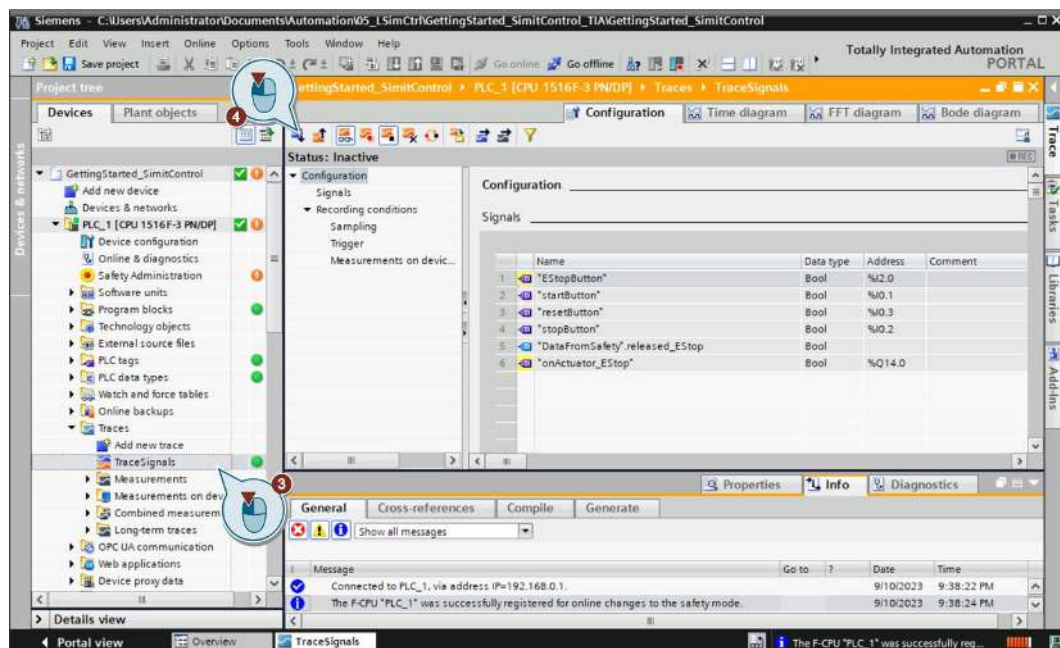
1. Select PLC in the "Devices tree"
2. Press the "Go online" button.

Figure 5-12: TIA project in the Online mode.



3. To trace used signals, in the Devices tree under Traces folder, open "TraceSignals" trace.
4. Press the "Transfer trace configuration to device" button.

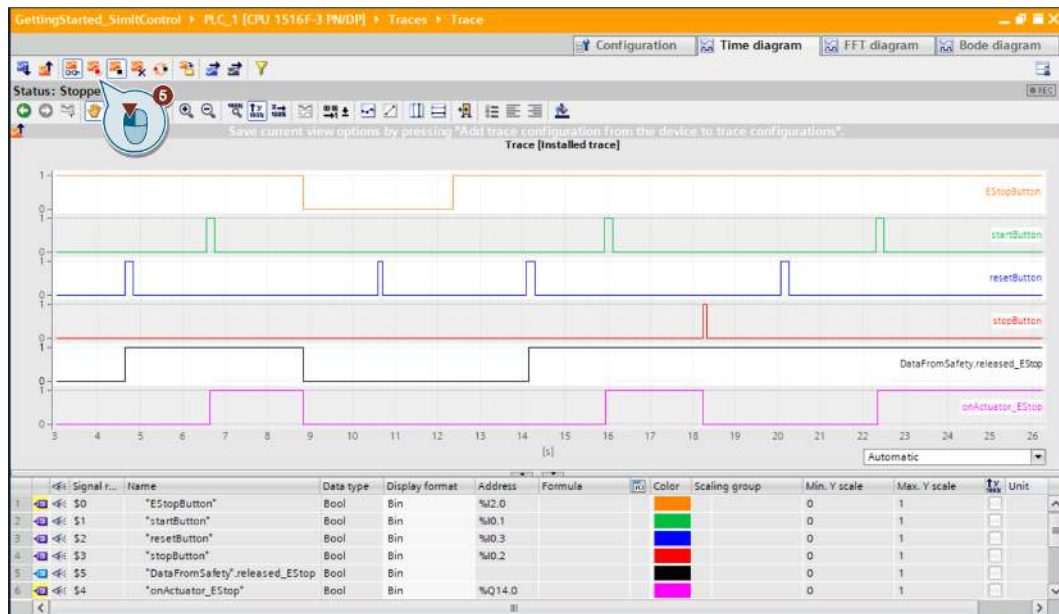
Figure 5-13: Transfer trace configuration to the PLC instance.



5 Starting the project

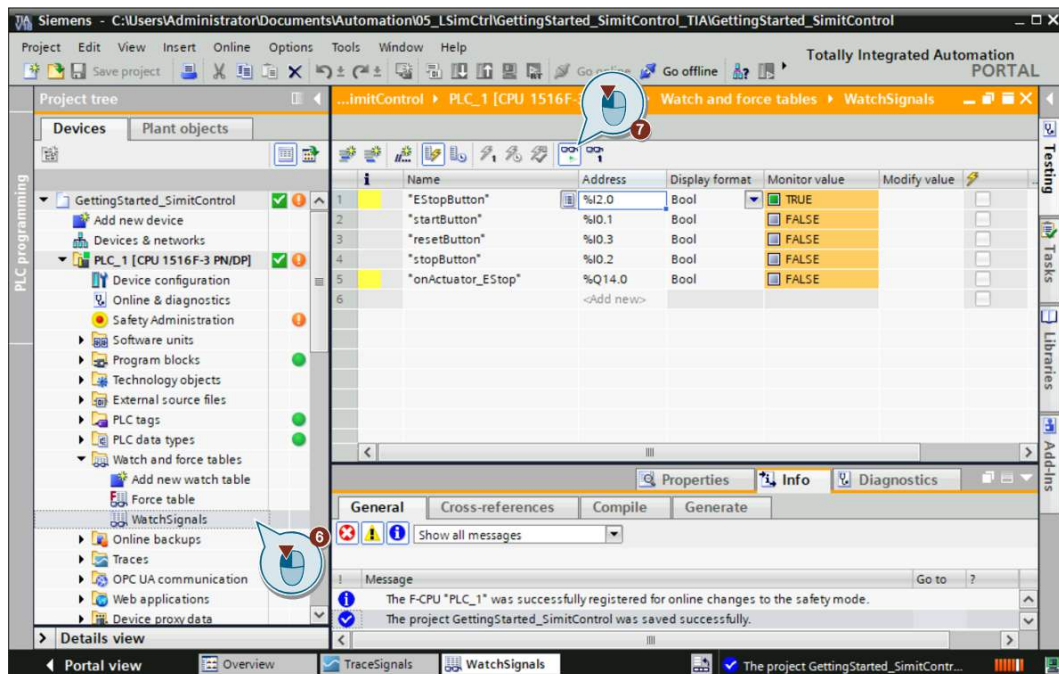
- To trace signals in real time, press the “Activate recording” button.

Figure 5-14: Trace used signals.



- To check signals in the watch table, in the Devices tree under “Watch and force tables” folder, open "WatchSignals" table.
- Press the “Monitor all” button.

Figure 5-15: Watch used signals.



6 Appendix

6.1 Service and support

Industry Online Support

Do you have any questions or need assistance?

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

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

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– ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:

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siemens.com/sitrain

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

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Industry Online Support app

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

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

6.2 Industry Mall



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

mall.industry.siemens.com

6.3 Application support

Siemens AG
 Digital Factory Division
 Factory Automation
 Production Machines
 DF FA PMA APC
 Frauenausracher Str. 80
 91056 Erlangen, Germany
 mailto: tech.team.motioncontrol@siemens.com

6.4 Links and literature

Table 6-1:

Nr.	Thema
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/109775634
\3\	SINAMICS/SIMOTICS servo drive system SINAMICS S210 operating instructions https://support.industry.siemens.com/cs/ww/en/view/109753800
\4\	SIMATIC – Failsafe library LDrvSafe to control the Safety Integrated functions of the SINAMICS drive family. https://support.industry.siemens.com/cs/ww/en/view/109485794
\5\	Controlling SINAMICS S210 Safety Integrated Functions using SIMATIC S7-1500TF via PROFIsafe https://support.industry.siemens.com/cs/cz/en/view/109760341
\6\	Configuring Technology Objects with SIMATIC S7-1500 and SINAMICS S210 in TIA-Portal https://support.industry.siemens.com/cs/cz/en/view/109749795
\7\	SIMIT Control Library https://support.industry.siemens.com/cs/cz/en/view/109775634
\8\	SIMIT components for the simulation of fail-safe modules of the S7-1500 / ET 200MP / ET 200SP https://support.industry.siemens.com/cs/cz/en/view/109775634

6.5 Change documentation

Table 6-2

Version	Date	Modifications
V1.0	10/2023	First version