



References

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options







Integrated Engineering



Transparent Operation





Totally Integrated Automation Portal (TIA Portal) enables complete access to the entire digitalized automation, from digital planning and integrated engineering to transparent operation. As part of the Digital Enterprise Software Suite, it joins PLM and MES in rounding out the comprehensive offering from Siemens for companies on the path to Industrie 4.0, making it the perfect access to automation in the Digital Enterprise.

With TIA Portal, machine builders and system integrators as well as plant operators will benefit from:

- shorter time to market thanks to innovative simulation tools, among other things
- increased plant productivity thanks to additional diagnostic and energy management functions
- greater flexibility thanks to coordinated teamwork

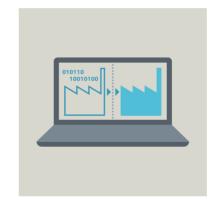


# Open, virtual and connected

# **Digital workflow with TIA Portal**

"The ability to simulate machines gives me security in design, security in sales and security in machine configuration."

Rainer Feuchter, CEO Optima Consumer GmbH



#### Flexible simulation

By simulating the entire installation, including the controller and HMI, and by evaluating it based on a virtual model, local commissioning time is reduced thanks to PLCSIM Advanced, the controller's digital twin.



## **Seamless connectivity**

The cloud offers new possibilities in engineering as well as for the operation of plants. TIA Portal Cloud Connector makes it possible to work with TIA Portal regardless of the location or device. For you, this means greater flexibility and less installation effort. During operation, you can benefit from additional digital services thanks to the connection of plants to the Siemens MindSphere Cloud.



## Open system

TIA Portal allows you to efficiently create your project using software generators, thus reducing the number of redundant workflows. With Teamcenter, you also merge the project versions from planning, engineering and design.



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# Shorten your time to market

# **Integrated engineering with TIA Portal**

"You work with a team-enabled, fully integrated tool landscape with access to a complete portfolio of necessary control and drive components."

Andreas Martin Linck, Head of E-Technik



## One for all

With TIA Portal, you integrate all important components of your automation project: safety, security, control, HMI, drives, distributed I/O and now even motion control and power distribution. With only a few multiple entries, a shared database and a standard interface across all tasks, your engineering time is reduced.



## **Coordinated teamwork**

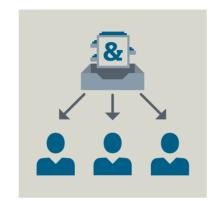
With TIA Portal Multiuser Engineering, multiple people can access a project at the same time. Synchronization is automatic. You can flexibly process tasks and complete them simultaneously – both device-oriented and task-based.





## Reliably avoid errors

You reduce the amount of extra work by reliably identifying errors and quickly correcting them with numerous programming code templates. Many new and efficient diagnostic tools as well as cyclical system test recordings provide help in analyzing sporadic errors during commissioning.



## Handle know-how safely and efficiently

Thanks to the comprehensive library concept, you can easily reuse all project objects and thus avoid extra work. Safeguard your specialist knowledge over the long term with know-howprotected blocks, and easily further develop existing systems and projects in TIA Portal.





## Generation instead of programming

Develop your solutions even faster thanks to automatic generation of HMI visualization with SiVArc, fast and easy machine and plant diagnostic, efficient energy management system implementation as well as automatic program creation using software generators that are linked via the TIA Portal Openness interface.



Software

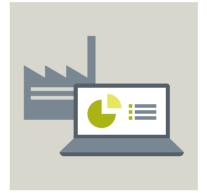
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# Increase your productivity

# **Transparent operation with TIA Portal**

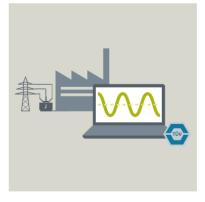
"A standard engineering platform is desirable for engineering energy efficiency systems: consistently from the device to the configuration to data storage, all the way to the customer's desk."

Stephan Vömel, Proprietor and managing director, Quintec Automatisierungs- und Datentechnik GmbH



## Information management

The greatest possible transparency through consistent data storage in production lets you make the right decisions quickly. You can prepare data according to specific target groups with SIMATIC Information Server locally or on a mobile device when you are in the field. The system supports WinCC/WebUX as well as WebNavigator for remote access and control.



## **Energy management**

The integrated SIMATIC Energy Suite automation solution, the S7 Energy Efficiency Monitor, and the universally connected Energy Manager energy management system help you get a handle on your energy costs at all times. The Energy Suite makes energy data record easy and efficient and gives you the transparency you need to save energy according to ISO 50001.





## **Diagnosis management**

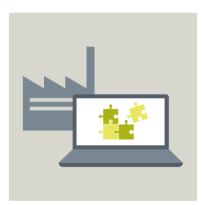
Efficient and integrated diagnosis of process errors reduce production downtimes and increase the availability of your machines and plants. The standardized ProDiag machine and plant diagnostic function gives you efficient analyses of process errors. Integrated system diagnosis helps you quickly identify errors in the automation system across all system components.



### **User management**

Efficient user management is a key part of every security concept. User management in the TIA Portal enables system-wide, central maintenance of users, including an optional connection to Windows Active Directories. The person-specific assignment of roles and authorizations minimizes maintenance effort while achieving a high degree of transparency. This provides a solid foundation for efficient and consistent administration of personalized access rights in the plant, which significantly reduces security risks.





## **Open communication**

Connecting automation and IT level by means of open communication makes it easy to integrate higher-level MES/ERP solutions. The standardized OPC UA communication protocol lets you forward production data to systems of other manufacturers. Industrial Data-Bridge is used for bidirectional, cross-system communication via standard interfaces, without any programming work.

# WinCC Unified System

SIMATIC WinCC Unified is a completely new visualization system, which enables you to master the challenges of digitalization in machine building and plant engineering. The latest hardware and software technologies make this possible, today and in the future.

With the new SIMATIC HMI Unified Comfort Panels and the PC-based SIMATIC Systems you're able to use the power of WinCC Unified optimally. Thanks to HTML5 and SVG support, visualization provides new possibilities that can be implemented easily and efficiently with Totally Integrated Automation Portal (TIA Portal).

Learn more 🗾

Reference Heizomat





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# Standardization as the basis for digitalization

Standardization is required in order to parallelize work steps. But what are the expectations for this process? Standardization should increase flexibility and ensure reusability. This can be achieved with the help of libraries, uniform programming languages, and a uniform programming style quide.

For example, how can a machine be standardized? A module can be easily changed or swapped through suitable interconnection of function units.

Implementation

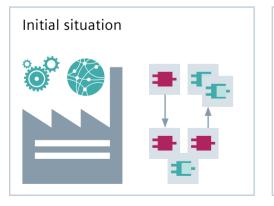
#### The benefits of standardization:

- Software becomes more transparent for the user (service, maintenance) and thus easier to use
- Error sources are significantly reduced thanks to the use of already-proven program parts (modules)
- Expenses are minimized for IBN, service, and maintenance
- Diagnostics/troubleshooting are simplified
- Clear documentation of the module with defined behavior
- "Parallel engineering" of the same tasks is prevented
- Defined interfaces to other machines and plants (line integration)

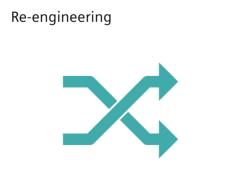
Learn more > Reference Tenaris

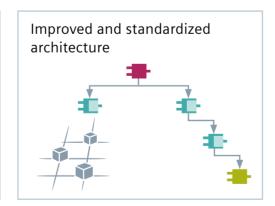
#### Standardization

Analysis of the machine structure



Interface design





# Continuous Integration

In the IT sector, there are many methods and processes for optimizing software development while also improving the quality of the results. One such process is Continuous Integration, which can also be applied to engineering in automation projects with TIA Portal and offers numerous benefits.

Standardization is an essential prerequisite in order to use Continuous Integration in automation. This allows all disciplines to work efficiently, simultaneously, and reliably on a joint automation project.

Continuous Integration allows developers to integrate their changes in the common source code base as often as necessary and to generate and test these changes automatically.

Learn more 🗾





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# **Motion Control** with TIA Portal



Thanks to the integration of motion control systems into Totally Integrated Automation Portal (TIA Portal) it's now possible to use their functionality in TIA Portal. This allows to control single and multiple-axis drive systems easily and efficiently.

The SIMATIC S7-1500 Technology CPU (T-CPU) enables functionalities such as transmission and cam disk synchronization and can be used for safety applications as well.

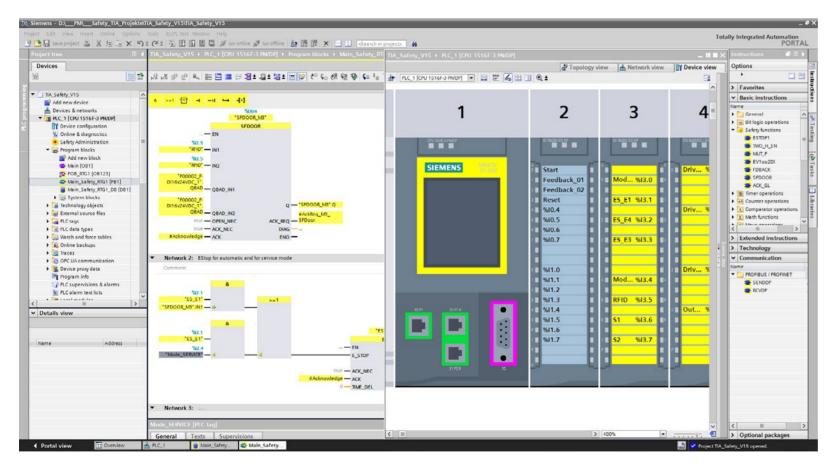
To meet growing demands, PLC experts can integrate robots using the TIA Portal, with no need for extra tools, in a shared development environment.

Learn more 🔳

Reference Bozhon



# Failsafe Automation with TIA Portal and SIMATIC STEP 7 Safety



Create safety functions directly with TIA Portal! This is possible with the seamlessly integrated option packages SIMATIC STEP 7 Safety Advanced and SIMATIC Safety Basic. Safety programs can be created using programming languages like KOP and FUP. Safety functions can be engineered with the familiar user interface of TIA Portal. Testing the created functions is possible with PLCSIM or PLCSIM Advanced, even without using real hardware.

Numerous prefabricated function modules from the STEP 7 Safety Library accelerate daily work just as much as the possibility to put programs, modules, and hardware configurations into libraries for reuse. A CRC for the program and each module enables to quickly and reliably identify all changes.

Learn more 🛪



Intro

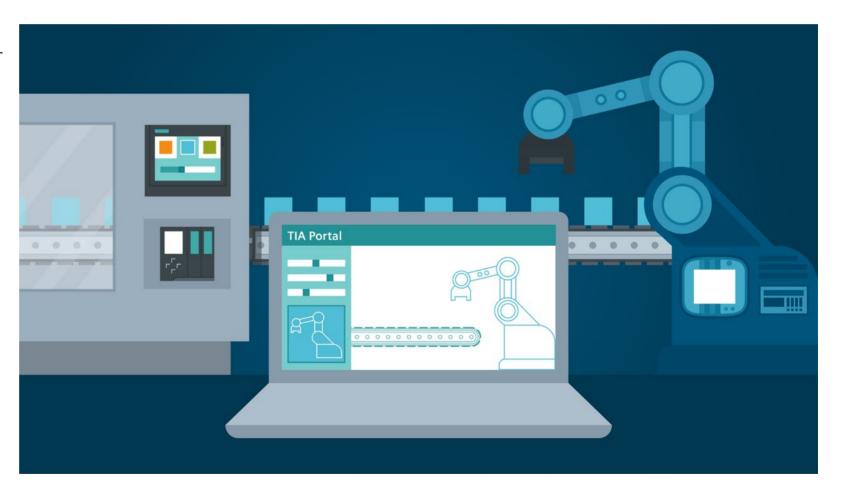
# Robot integration in TIA Portal

Reducing time to market, increasing flexibility and efficiency: Digitalization offers both challenges and opportunities. Robot integration in TIA Portal makes it faster and easier to integrate robots while reducing engineering effort and operating complexity. This approach helps you efficiently bring together the PLC world and robots and allows you to take advantage of additional optimization potential while boosting both availability and productivity.

Integrating robots in your automation environment with the help of the TIA Portal is suitable for teaching applications such as palletizing or pick and place. Simulation applications such as welding, gluing, or sorting are also supported by linking PLM software such as Process Simulate to the TIA Portal.

Learn more 🛪

Reference Zellwag





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# Simulate and optimize in a fully virtual environment

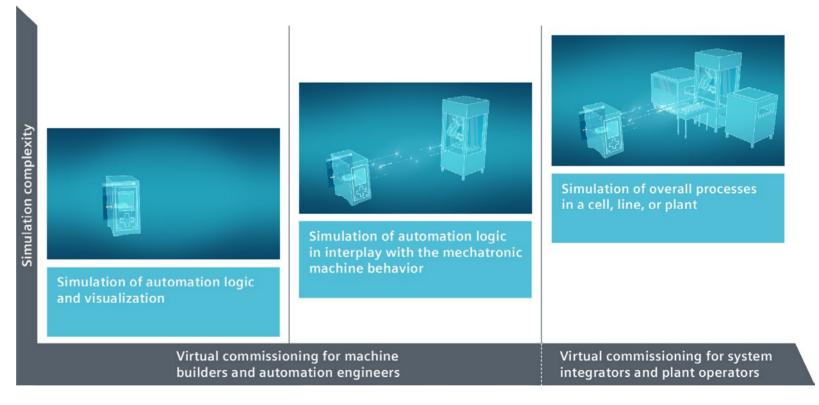
As a general rule, the later an error is found, the more expensive it becomes to correct. That's why it's particularly important for machine builders and plant operators to start searching for errors as early as possible in the development process. The goal is to ensure that the fewest possible errors arise during actual commissioning and that no defects occur.

The virtual commissioning of a machine using PLCSIM Advanced in TIA Portal offers an efficient alternative for reducing risk and effort during actual commissioning. It's even possible to use a virtual environment to simulate and optimize how the individual components of entire production lines work together.

Learn more 🗾

Reference Tronrud

Reference DISA >





# Digitalization and the TIA Portal

TIA Portal options provide answers to customer requirements

# **TIA Portal options**

#### SIMATIC S7-PLCSIM Advanced

Comprehensive simulation of the controller functionality including interaction with virtual plant and machine models

#### **TIA Portal Cloud Connector**

#### **TIA Portal Teamcenter Gateway**

Safeguarding projects plant-wide with the storage of TIA Portal

#### SIMATIC Target 1500S for SIMULINK

#### TIA Portal Multiuser Engineering



Open, virtual, and networked **Digital workflow with TIA Portal** 

<sup>1</sup>Part of WinCC Runtime Professional

#### SIMATIC ODK 1500S

Supports the development of Windows and real-time functions and provides for the integration of high-level languages

#### SIMATIC STEP 7 Safety

#### SIMATIC Visualization Architect SiVArc

#### SINAMICS Drive Control Chart (DCC)

Configuration and expansion of device functionality by means of

#### TIA Portal Test Suite

Automated generation and validation of programming guidelines as



Shorten your time to market Integrated engineering with TIA Portal

#### SIMATIC OPC UA

Open communication standard for the communication concepts of Industrie 4.0

#### SIMATIC Energy Suite/S7 Energy Efficiency Monitor

#### SIMATIC ProDiag

Diagnosis of application errors reduces production downtimes and

#### WinCC/WebUX1

#### TIA User Management Component



Increase your productivity **Transparent operation with TIA Portal** 



# Easy access to the TIA Portal

### **Action packages**



#### Trial user

TIA Portal V15 TRIAL download collections

www.siemens.com/tia-portal-trial

Trial period: limited (21 days)

#### First-time users

#### Starter kit with S7-1500 hardware

The starter kit includes everything you need to immediately put the high-performance SIMATIC S7-1500 into use.

www.siemens.com/s7-1500-starter-kits

#### Starter kit with S7-1200 hardware

With the SIMATIC S7-1200 starter kits, you can quickly and easily implement your simple automation tasks.

www.siemens.com/s7-1200-starterkits

#### Starter kit with Comfort Panel hardware

With high-resolution wide-screen displays ranging from 4" to 22" and the option of touch operation or operating buttons, the starter kits include everything you need to use the hardware.

www.siemens.com/comfort-panel-starter-kits

#### Temporary use

#### SIMATIC 50-h engineering license for infrequent use of the software (rental license)

Scope: STEP 7 Professional (TIA Portal & 2017), WinCC Professional (TIA Portal & WinCC flexible 2008), STEP 7 Safety Advanced

(TIA Portal & Distributed Safety) **Product no.: 6ES7823-1GE05-0YA5**Trial period: 50 hours of actual use

## Configuration of required software licenses

You can easily configure all required software packages with TIA Selection Tool that's available as desktop and cloud versions.

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TIA Selection Tool

www.siemens.com/tst 🔀

TIA Selection Tool Cloud

www.siemens.com/tstcloud



#### Good to know



#### **Software Update Service (SUS)**

With the Software Update Service, you automatically receive all released versions of the software you use delivered right to your door – in other words, all upgrades and service packs.

www.siemens.com/SUS >

#### Online Software Delivery (OSD)

The clever alternative to traditional software delivery! Downloading automation software reduces your administrative expense and storage costs, and ensures simple, reliable, and always clearly organized license management.

www.siemens.com/OSD >

## Your step into the future - migration made easy



Migration to the TIA Portal is supported with several powerful tools and helpful documents, which you can simply download.

- TIA Portal readydiness check tool: Check quickly and easily whether the hardware contained in your projects is supported by the TIA Portal. **Readiness-check**
- Compatibility tool: The tool allows you to assemble a compatible selection of software products or to check existing configurations for compatibility. www.siemens.com/kompatool



#### Individual modernization support

On request, Siemens can provide you with personal support for very specific requirements:

www.siemens.com/industry/contact 🔀

www.siemens.com/fa-services 🗡

From consultation and implementation to final project completion, Siemens offers comprehensive modernization services:

www.siemens.com/fa-migration

Details are available at:

www.siemens.com/tia-migration

#### Documentation

Migration guides:

From SIMATIC S7-300/400 to S7-1500

www.siemens.com/s7-300/400-s7-1500

From SIMATIC S5 to S7-1500

www.siemens.com/s5-s7-1500

From SIMATIC WinAX RTX to

S7-1500 Software Controller

www.siemens.com/winax-rtx-s7-1500

## On the path to the digital enterprise – discover your potential with training courses for SIMATIC S7-1500 training in the TIA Portal



Industry is undergoing rapid developments that are being further accelerated by digitalization. The technologies today are so complex that continuous education and regular courses on training equipment are essential in order to keep skills up to date.

We offer you product training tailored to match all topic areas so that you can get the most from the capabilities of the extensive SIMATIC range of products. The training covers the entire life cycle of your plant. SIMATIC S7 service and programming training form the core of product training. The course content covers not only the main topics of SIMATIC S7-1500 in the TIA Portal but also includes programming languages, operator control and monitoring systems, drive technology, industrial communication and safety technology.

References

www.siemens.com/sitrain-tiaportal



#### Good to know



#### Siemens automation tasks

Efficient automation begins with efficient engineering. Consistent, end-to-end engineering enables savings with regard to time, costs, and effort. Based on specific tasks, our web tutorials show you how you can reduce your project planning time in your daily work. We ensure that step by step, you will arrive at a result in less than 10 minutes. We offer you a total of nine topics with more than 50 web tutorials. These include:

- TIA digitalization use cases 🗾
- Automatic generation of HMI visualizations with SiVArc
- Efficient teamwork with TIA Portal Multiuser
- Open communication standard OPC UA with SIMATIC S7

www.siemens.com/automation-tasks



#### **TIA Portal Tutorial Center**

The TIA Portal Tutorial Center gives you an overview of the functions and tools in the TIA Portal as well as how the configuration and programming tools work smoothly together. The tutorials are aimed at planners and project engineers as well as commissioning and service personnel. The videos cover technical content and provide assistance for all stages of the machine and plant lifecycle. These include:

- Explanations regarding the SIMATIC S7 architecture
- Introduction to the programming languages
- Introduction to standardization with the TIA Portal libraries



www.siemens.com/tia-portal-tutorial-center



#### TIA Portal - Online Support - An overview of the most important documents and links

Software

options

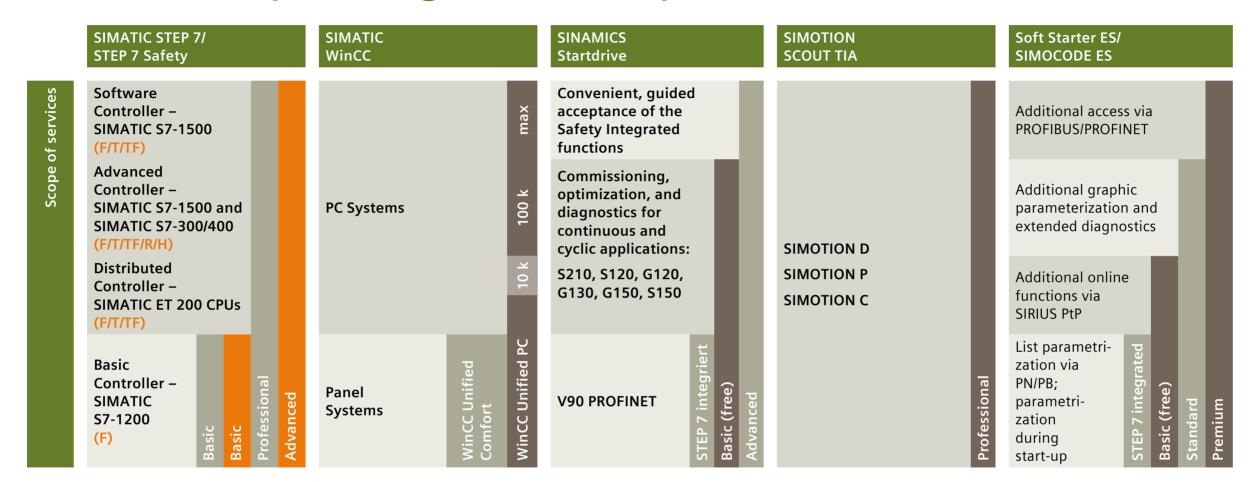
This page gives you an overview of the most important documents and links to TIA Portal. Both beginners and experienced TIA Portal users will find the most important TIA Portal information here.

www.siemens.com/tia-portal-online-support



Intro

# Software packages and options





Intro

Intro

	SIMATIC STEP 7/ STEP 7 Safety	SIMATIC WinCC	SINAMICS Startdrive	SIMOTION SCOUT TIA	Soft Starter ES/ SIMOCODE ES
Engineering options	TIA Portal Multiuser Engineering				
	TIA Portal Teamcenter Gateway	у			
	TIA Portal Cloud Connector				
	SIMATIC Energy Suite ES				
	SIMATIC S7-PLCSIM Advanced				
	SIMATIC STEP 7 Safety				
	SIMATIC ODK 1500S				
	SIMATIC Target 1500S for SIMULINK				
	TIA Portal Test Suite	SIMATIC Visualization Architect	SINAMICS Drive Control Chart (DCC)		
ime options	SIMATIC ProDiag				
	SIMATIC Energy Suite RT				
	SIMATIC OPC UA	WinCC/WebUX			



**TIA User Management Component** 

# References

# Transparency in the colorful world of spices

Customer: Juan José Albarracin S.A., Murcia, Spain

Juan José Albarracín was founded in 1854 and is the oldest company in the production and marketing of high-quality spices, paprika, and pepper mixtures in all variations. The company enjoys a leading position in the market thanks to its exceptional quality and outstanding service. TIA Portal makes it possible to guickly and easily combine all components in a single solution. Juan José Albarracín was even able to implement this system and increase productivity without interrupting operations. Better control of the production lines enables the company to set the ideal grinding parameters to ensure perfect product quality. Problems can be identified earlier, often even before they occur, and production data can easily be integrated into the higher-level planning system.

Learn more (PDF)

Siemens Industry Reference Center

"Thanks to TIA Portal, we can easily create and implement the complete automation – you don't have to be a programmer to do it. WinCC and TIA Portal also made it very easy for us to create the visualization."

Diego Saura, Project Manager Juan José Albarracin S.A.





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# The world's largest automated seamless pipe-making plant counts on the Siemens portfolio

**Customer: Tenaris, USA** 

The Tenaris Bay City seamless pipe mill covers 1.2 million square meters. It is the world's largest automation implementation using the Siemens TIA Portal to program and manage nearly 50,000 IO points across 4,000 network nodes. The challenge was to build the world's safest and most efficient seamless pipe mill to provide customers with better service.

With the help of advanced automation, network, drive, and power technology as well as expertise from Siemens, Tenaris was able to create a digital showcase for integrated automation, drive systems, and power that ensures efficiency and safety, along with a flagship operating model for the global production network.

The goal was to put the plant in Bay City into operation on time without sacrificing safety or quality. To streamline this final phase, the plan was to use software to perform test simulations of almost everything in a virtual environment before moving to the real version – virtual commissioning.

Learn more 🛪

"With the Siemens gear and using the TIA Portal code, we were able to build a 3D model of the plant and test all the Siemens controllers, drives, networks, IO, and other components in simulation before installation. We were able to make hundreds of adjustments, which translated into significant time savings in the commissioning phase, allowing us to open the plant on time."

Pablo Fushimi, Tenaris Project Senior Director







# The fastest packaging machine in record time

**Customer: Tronrud Engineering, Norway** 

To meet the requirements of their customers, Norwegian machine builder Tronrud Engineering developed an innovative prototype in close cooperation with Siemens. Their goal was a machine that can pack 300 pillow bags per minute into boxes while maintaining the same footprint, which relates to twice the speed of traditional machines.

During development, the project team used Teamcenter, NX Mechatronics Concept Designer (MCD) and the Totally Integrated Automation Portal (TIA Portal) as well as SIMATIC S7-PLCSIM Advanced to create 3d models of the machine and its parts, and to simulate its behavior.

This virtual image of the machine – the digital twin – enabled parallel work on design, mechanics, and programming. Tronrud Engineering managed to reduce the design phase by 10 percent and commissioning time by 25 percent, which lead to a significantly shorter time to market.

Learn more

"Digitalization is a huge opportunity. It's a matter of not being afraid of the challenges but rather take the benefit that helps us to create more value."

Olav Tronrud, CEO Tronrud Engineering





# **Efficient engineering of kinematics**

## Customer: Zellwag Pharmtech AG, Switzerland

The filling and sealing systems from Zellwag Pharmtech AG in Frauenfeld are in great demand across the globe in the pharmaceutical and cosmetics industry. To ensure efficient engineering of the systems, the company turned to Siemens: An innovative application allows robots to be operated directly in the TIA Portal. Kinematics technology objects in the control system boost performance of the plants and facilitate development, commissioning, and operation.

The main actors are the S7-1500 technology CPU, or T-CPU for short: Technology objects for advanced motion control functionalities are incorporated in the control system to provide a clear view of the various motion sequences. These include the technology object kinematics (TO kinematics), which controls up to four interpolating axes for movement of a tool in the space. As well as saving time for engineering, the technology objects also increase the efficiency of the system, which results in time savings of 15%.

Learn more 🗾

"We are continuously linking new interfaces with one another. This is where the support from Siemens is invaluable, thanks to their experience with other applications. Siemens does not differentiate between major customers and small to medium-sized businesses."

Patrik Thoma – Managing Director, Zellwag Pharmtech AG





# Faster time-to-market with a digital twin

**Customer: Bozhon Precision Industry** Technology Co. Ltd, China

New machines for the innovation-driven electronics industry have to be developed and put into operation very quickly. Chinese company Bozhon has joined forces with Siemens to do just that. Fast engineering is required, as are fault-free machines.

Chinese machine manufacturer Bozhon Precision Industry Technology Co.Ltd. worked with Siemens on one of its many current projects that included the development of a digital twin. It involved an assembly cell with robot arms, and it was used at the trade show to demonstrate how the front and back of a cell phone housing are joined together.

Bozhon's objective: to achieve up to 30% in time savings by improving engineering efficiency accelerate the development, delivery, and commissioning of new machines at the customer site. While the developers at Siemens in Germany were working step-by-step to simulate the machine using the digital twin while also completing a virtual commissioning process, the real machine was being manufactured at the same time in China.

Learn more 🗾

"The development of a digital twin enabled us to meet the demand for simulations. We expect digital twins to include more functions in the future and therefore further enhance companies' long-term competitiveness."

Karl Chen, CMO Bozhon





# Heating control for sustainably produced heat

**Customer: Heizomat, Germany** 

Heizomat is producing heatings with automatically fed wood and wood chippers for many years. Almost the entire control technology is provided by Siemens, as well as the touch panels for operation of heating systems and machines.

The new SIMATIC HMI Unified Comfort Panels provide new possibilities, which improve the devices usability significantly. It's also important for Heizomat to have operating panels that can keep up with a heating's lifetime of 30 years.

Moreover, Heizomat appreciates the possibility to run their own apps on the operating panels, even though it isn't required yet. However, this option increases security of investment because features can be downloaded as easy as with every smartphone.

Learn more **7** 

"The increased performance of the panels has benefits not only for our customers – because they can operate it better – but also for us, because we see more possibilities in it."

Klaus Regler, Software Developer, Heizomat





# Tips and tricks



# **Expert tips around TIA Portal: Mister Automation**

Tobias Schuh is Mister Automation. He collaborated on the development of TIA Portal and knows how to reach the goal at daily work the easiest and fastest way. He's sharing his comprehensive automation expertise via social media and on his own website.

Mister Automation's concentrated knowledge provides you with an extra portion of efficiency and virtuosity while working with TIA Portal. This way you save time and increase your productivity.

Follow Mr. Automation on LinkedIn, Twitter, and Youtube – or download the latest collection of all tips and tricks here for offline reading.

- Youtube
- in LinkedIn
- **Twitter**



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may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed

