

SIEMENS

SIMATIC STEP 7 in the Totally Integrated Automation Portal

Intuitive and efficient engineering –
from the microcontroller to the PC-based controller

SIMATIC Software

Brochure

Edition
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Answers for industry.

SIMATIC STEP 7 in the TIA Portal

Intuitive and efficient engineering –
from the microcontroller to the PC-based controller

With SIMATIC, users rely on an integrated engineering environment. Efficient software supports users over the entire life cycle of the machine or plant – from the planning and design stages, through configuring and programming, all the way to commissioning, operation and upgrading. With its integration capability and harmonized interfaces, SIMATIC software permits a high degree of data consistency – throughout the entire engineering process.

SIMATIC STEP 7 is the world's best known and most widely used engineering software in industrial automation. And: STEP 7 is standard-compliant

SIMATIC STEP 7 Version 12 – the engineering system in the Totally Integrated Automation Portal – continues the success story of SIMATIC STEP 7. With SIMATIC STEP 7 V12, users configure, program, test and diagnose all modular and PC-based SIMATIC controllers.

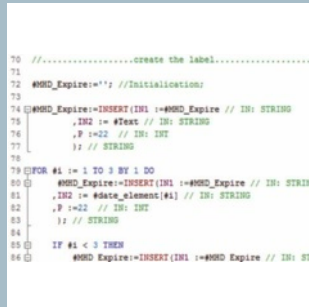
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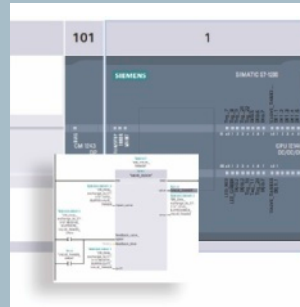
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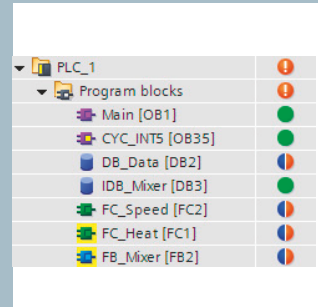
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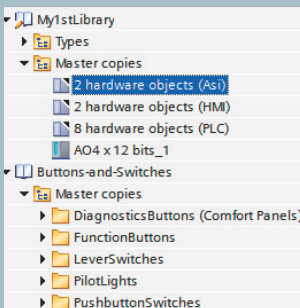
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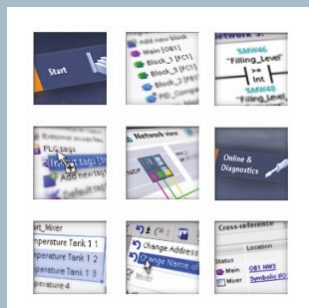


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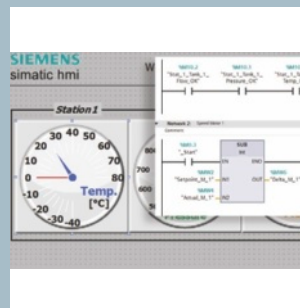


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- Intuitive and fast programming – with newly developed program editors: SCL, LAD, FBD, STL and GRAPH
- Increased efficiency thanks to STEP 7 language innovations – integrated symbolic programming, Calculate-Box, block expansion during operation, and much more
- Increased performance thanks to integrated functions: Simulation with PLCSIM, remote maintenance with TeleService and integrated system diagnostics
- Flexible technology – Scalable and effective motion functionality for S7-1500 and S7-1200 controllers
- More security with Security Integrated – know-how protection, copy protection, access protection, and manipulation protection
- Shared configuration environment with HMI devices and drives in the TIA Portal engineering framework

¹⁾ Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates and that you use only the latest versions. Please find further information on this subject at :

<http://support.automation.siemens.com>.

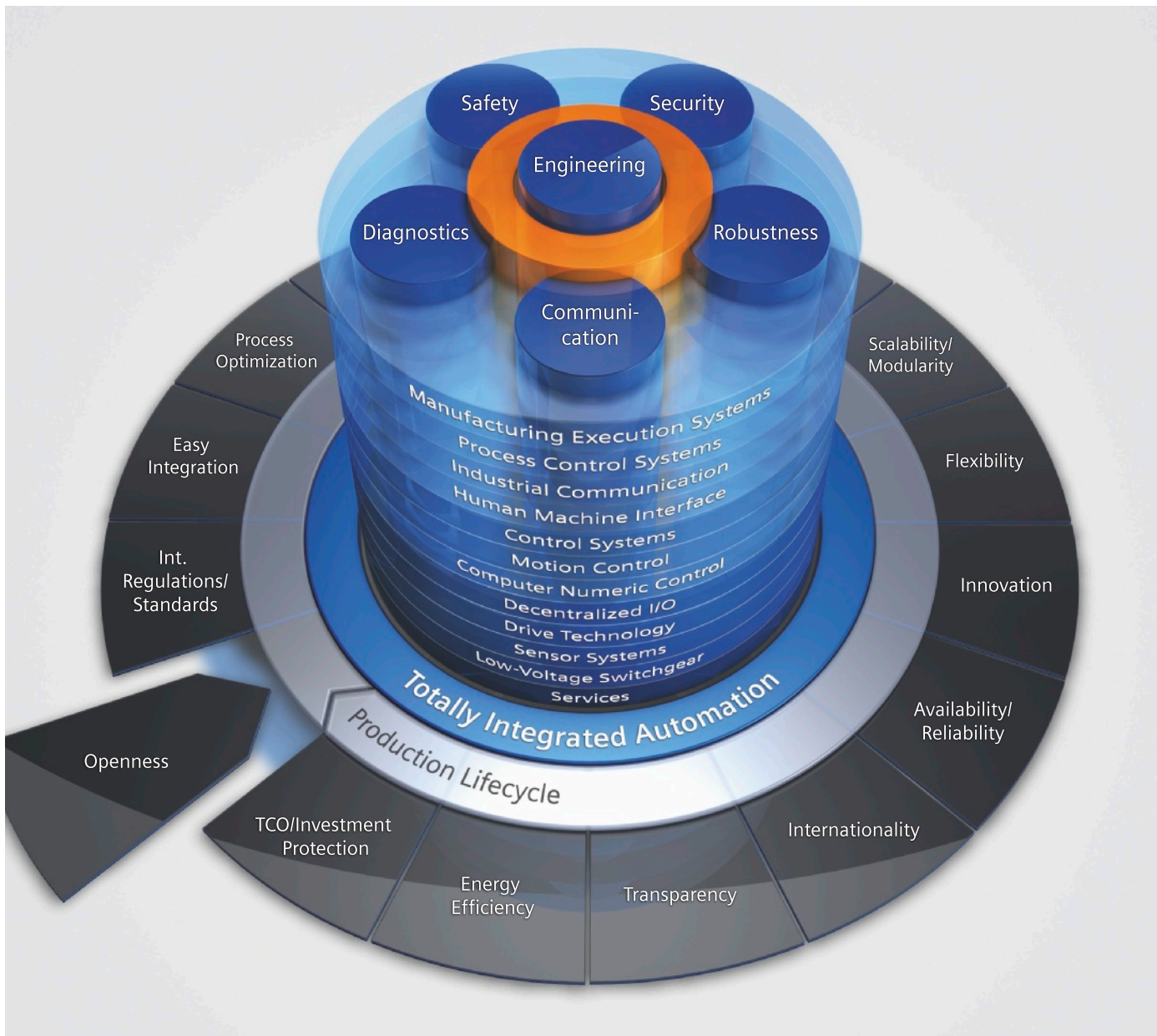
You may also register for a product-specific newsletter at this address. To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account.

Please find further information at www.siemens.com/industrialsecurity.

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Totally Integrated Automation

Rely on new productivity standards
for sustained competitive advantages



To be able to respond to the increasing international competitive pressure, it is more important than ever to consistently make full use of the potential for optimization – over the complete lifecycle of a machine or plant.

Optimized processes reduce the total cost of ownership, shorten the time to market, and improve quality. This perfect balance between quality, time, and costs is now, more than ever, the decisive success factor in industry.

Totally Integrated Automation is optimally aligned to all requirements and open for international standards and third-party systems. With its six characteristic system features, Totally Integrated Automation supports the complete lifecycle of a machine or plant. The complete system architecture offers holistic solutions for every automation segment on the basis of a comprehensive range of products.

SIMATIC: more efficient and systematic automation

SIMATIC, a core component of Totally Integrated Automation, includes a variety of standardized, flexible, and scalable products – such as SIMATIC STEP 7 presented in this brochure.

SIMATIC is currently considered to be the global number one in automation. One of the decisive reasons for this is that SIMATIC exhibits the six system features of Totally Integrated Automation:

- Engineering
- Communication
- Diagnostics
- Safety
- Security
- Robustness

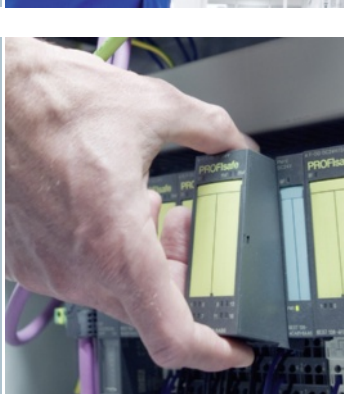
In addition, SIMATIC features two additional system features:

- Technology
- High availability

You can find more about the system features and the resulting advantages in the following chapter “System features”.



System features

Engineering		Maximum engineering efficiency – in all phases of the lifecycle of the machine and plant With SIMATIC you rely on an integrated engineering environment. Efficient software supports you over the complete lifecycle of your machine or plant – from the planning and design stages through configuring and programming as far as commissioning, operation and upgrading. With its integration capability and harmonized interfaces, SIMATIC software supports a high degree of data consistency – throughout the entire engineering process. Siemens has redefined engineering with its Totally Integrated Automation Portal (TIA Portal). The new TIA Portal engineering framework combines the SIMATIC STEP 7, SIMATIC WinCC and SINAMICS Startdrive automation software tools in a unique development environment.
Communications		Maximum data transparency on all automation levels – based on proven standards SIMATIC creates the foundations for unlimited integration in communication – and thus for maximum transparency on all levels, from the field and control level to the operations management level all the way up to the corporate management level. SIMATIC relies on international, cross-vendor standards which can be combined flexibly: PROFINET, the leading Industrial Ethernet standard and PROFIBUS, the global No. 1 fieldbus.
Diagnostics		Minimization of downtimes – through efficient diagnostic concepts All SIMATIC products feature integrated diagnostic functions with which a fault can be identified and eliminated to provide increased system availability. Even with larger plants, the Maintenance Station provides you with a uniform view of the maintenance-relevant information of all automation components.
Safety		Protection of personnel and machines – within the framework of an integrated complete system SIMATIC Safety Integrated offers TÜV-certified products, which facilitate compliance with relevant standards: IEC 62061 up to SIL 3, EN ISO 13849-1 up to PL e, as well as EN 954-1. Due to the integration of safety technology in standard technology, only one controller, one I/O, one engineering, and one bus system are required. Thus the system advantages and comprehensive functionality of SIMATIC are also available for fail-safe applications.

Data security in the networked world – through harmonized, scalable security systems

Due to the increased use of Ethernet connections penetrating the field level, security issues are gaining in importance in industry. For comprehensive protection of a plant, a variety of suitable measures must be implemented. These range from the company organization and its guidelines regarding protective measures for PC and control systems through to protection of automation cells by segmenting the network. Siemens follows the cell protection concept and, with the modules of the SCALANCE series and the Security modules, offers components for building up protected cells.

www.siemens.com/industrialsecurity



Security

Maximum industrial suitability – through increased robustness

Each standard product from the SIMATIC range is characterized by the highest quality and robustness and is perfect for use in industrial environments. Specific system tests ensure the planned and required quality. SIMATIC components meet all relevant international standards and are certified accordingly. Temperature and shock resistance are defined in the SIMATIC quality guidelines, as are vibration resistance or electromagnetic compatibility. For demanding to extreme rated conditions, special versions such as SIPLUS extreme or special versions of SIMATIC ET200 are available. These include an increased degree of protection, extended temperature ranges, and exceptional environmental stress.



Robustness

More possibilities, less complexity – through integrated technology functionality

Counting and measuring, cam control, closed-loop control, or motion control: You can integrate technological tasks in many different combinations and with various degrees of complexity without a system changeover into the world of SIMATIC – easily, conveniently, consistently. Parameter assignment and programming are implemented in the familiar STEP 7 environment.



Technology

Maximum availability – with integrated high availability concepts

Siemens offers a comprehensive high availability concept to ensure high availability for the entire plant: from the field level to the control level all the way up to the management level. For example, field-tested controllers ensure high availability through bumpless switching with automatic event synchronization.



High availability

Totally Integrated Automation Portal (TIA Portal)

One integrated engineering framework for all automation tasks

The new TIA Portal engineering framework unites all automation engineering systems in one single development environment. It is a milestone in software development – the first automation software in industry with "One Engineering Environment" – one software project for all automation tasks.

Intuitive, efficient and a proven success

With its intuitive user interface, its efficient navigation and proven technology, the TIA Portal provides innovative highlights in several areas at the same time. From the development, installation and commissioning to the servicing and expansion of automation systems, the framework saves engineering time and costs.

The design of the software editors in the TIA Portal is based on a shared layout and shared navigation concept. The configuration of the hardware, logic programming, parameterization of a frequency converter, or the design of an HMI screen – each environment has the same editor design, which is specifically designed for intuitive use to save time and costs. Functions, properties, and libraries are automatically displayed in their most intuitive view depending on the desired activity.

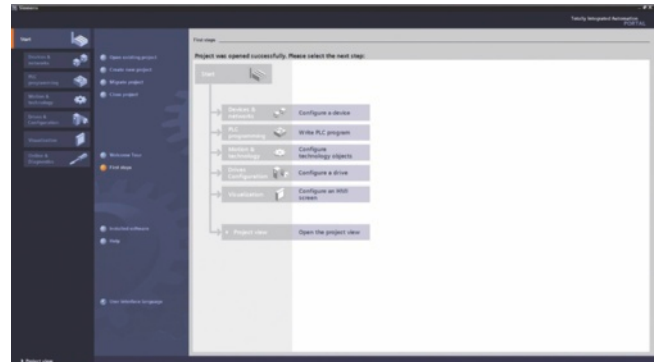
It is very easy to switch between the editors with "Intelligent Drag & Drop", "Autocompletion for tags", and many other helpful features. They allow the user to engineer a complete automation system, rather than just individual parts of the system.

Framework architecture in an appealing design

The TIA Portal provides advanced software architecture, the design of which is based on a simple navigation scheme. Its well-conceived ergonomics ensures the greatest possible efficiency and time savings. All editors are clearly arranged and easily accessible. The user always has a complete overview of the project, without having to click through complicated menus or structures.

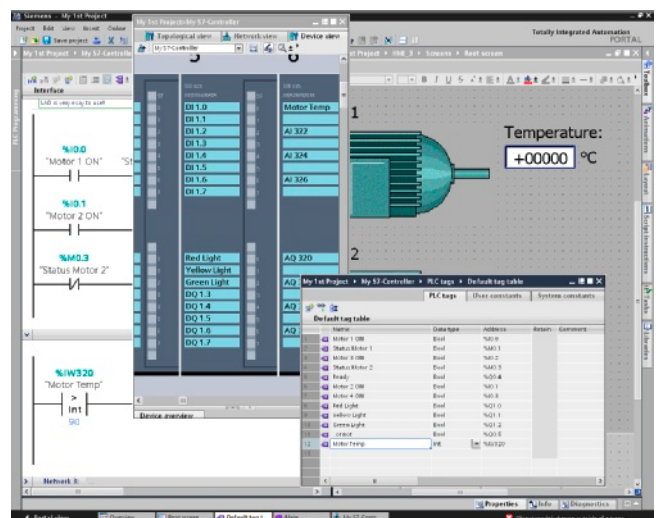
At the start of a project, the portal view offers the user quick access to all editors such as controller programming, visualization, configuration of the network connection or online access. The project view permits task-oriented working.

In this way, the TIA Portal helps both new and experienced users to work as productively as possible.



Task-oriented view of the TIA Portal

High performance capability with shared services



Complete automation in one engineering system

Shared services such as associated download, integrated cross-references, as well as powerful and clearly arranged online functionalities are managed centrally within the framework and are easily accessible to every editor. Intelligent filters facilitate the work when selecting objects or when switching editors. Links and cross-references eliminate the need for lengthy searches for information or menus. The self-generated list of favorites allows direct access to frequently used objects and commands.

SIMATIC STEP 7 V12

Tools and functions

With a wealth of user-friendly functions, SIMATIC STEP 7 ensures significantly greater efficiency in all automation tasks: programming, simulation, commissioning and service.

SIMATIC STEP 7 V12 is available in two versions:

- **SIMATIC STEP 7 Basic V12** – Common engineering for SIMATIC S7-1200 and the SIMATIC HMI Basic Panels. SIMATIC WinCC Basic is included in the scope of supply of the SIMATIC Basic Panels for simple visualization tasks.
- **SIMATIC STEP 7 Professional V12** – Uniform engineering for all SIMATIC controllers.

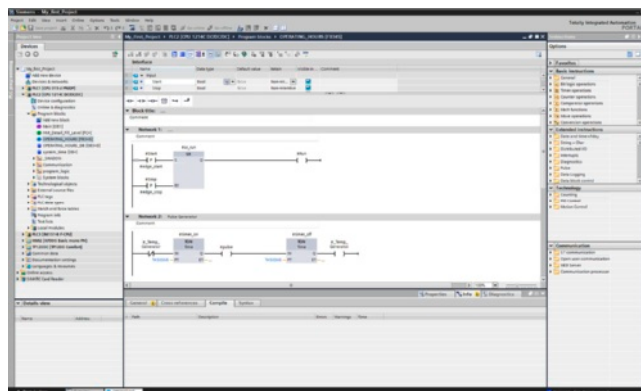
STEP 7 Professional is suitable for configuring and programming the SIMATIC controllers S7-1200, S7-1500, S7-300, S7-400, and WinAC for PC-based control. SIMATIC WinCC Basic is also included for simple visualization tasks with the SIMATIC Basic Panels. The supplied block library contains a series of technology functions including a PID control. The optional packages S7-SCL, S7-GRAPH, S7-PLCSIM, plant documentation and TeleService¹⁾ familiar from STEP 7 V5.5 are already integrated into STEP 7 Professional V12 and do not require any additional licenses. Registered users of the STEP 7 Professional Software Update Service automatically receive SIMATIC STEP 7 Professional V12.

The following STEP 7 Professional V12 option is available:

- SIMATIC STEP 7 Safety V12 for fail-safe SIMATIC controllers

The highlights of SIMATIC STEP 7 V12

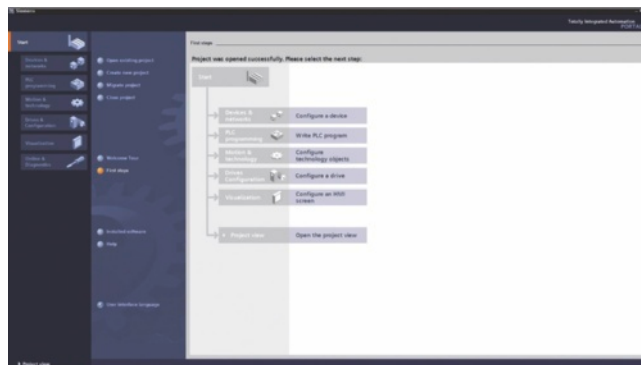
Diverse language innovations, especially for SCL, but also for LAD and FBD, increase engineering efficiency. Integrated symbolic programming enables consistent data access, increased transparency in project creation, and minimization of errors. The automatic system diagnostics is even more user-friendly. Clear plain text messages have the same appearance in STEP 7, WinCC, the CPU Web server, and on the display of the S7-1500, without any programming overheads. Security Integrated stands for know-how and copy protection, as well as for controller access protection. Integrated technology functions: The scalable and flexible motion functionality for the S7-1500 supports analog and digital drives. PLCOpen blocks are available for programming.



Project view

With SIMATIC STEP 7, absolute user-friendliness is guaranteed, regardless of whether you are a beginner in the engineering field or already have many years of experience. For new users, the engineering is easy to learn and apply, while for experts it is fast and efficient.

With the portal view, the user can see at a glance all editors for an automation project, such as network configuration, controller programming, motion and technology, visualization, or online access. With the project view, the user sees the hierarchical structures of the entire project in the project tree. This facilitates quick and easy access to all parameters and project data. Thanks to object-oriented, centralized data management in the TIA Portal, changes to application data in a project are updated automatically for all devices such as controllers and operator panels.



Self-explanatory user interface

¹⁾ Suitable protective measures (among others Industrial Security, e.g. network segmentation) have to be taken up to ensure a safe operation of the plant. For additional information on the topic of industrial security, refer to the footnote 1) on page 3 of this brochure.

Network and device configuration

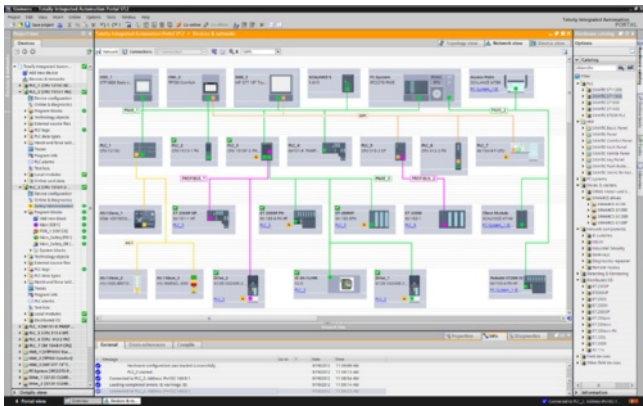
Easy setup and parameterization of devices; intuitive graphical networking

A complete plant can easily be configured with a single graphical editor. For a clear differentiation of tasks between networking and device configuration, the editor offers three views:

- Connections between the devices can be set up graphically in the **network view**.
- Individual devices are parameterized and configured in the **device view**.
- In the **topology view**, the actual interconnection of the PROFINET devices is shown.

This means that complex systems are easy to handle and large projects remain manageable. In online mode, diagnostic information can be presented in a clear graphic form.

Network view

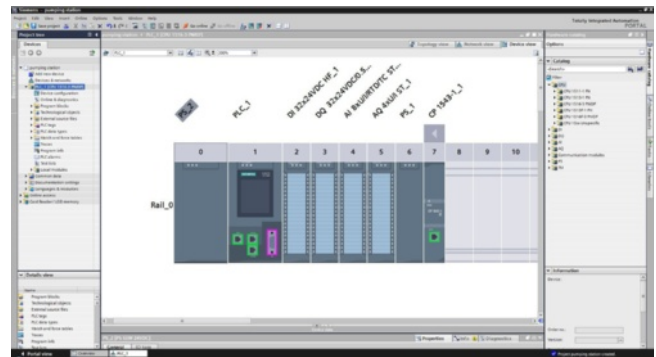


Network view – Clear presentation of the automation devices of a complete plant

The network view permits the configuration of the plant communication. Here the communication links between individual stations is configured graphically and very vividly.

- Combined view of all network resources and network components
- Pixel-graphics configuration of individual stations
- Multi-line view of all components in a project
- Resources are networked through connecting the communication interfaces by mouse click
- Multiple controllers, HMI devices, SCADA stations, drives and PC stations are possible in a single project
- Process when integrating AS-i devices is identical to PROFIBUS/PROFINET
- Zoom and page navigation
- Copying/pasting of entire stations including configuration, or of individual hardware modules

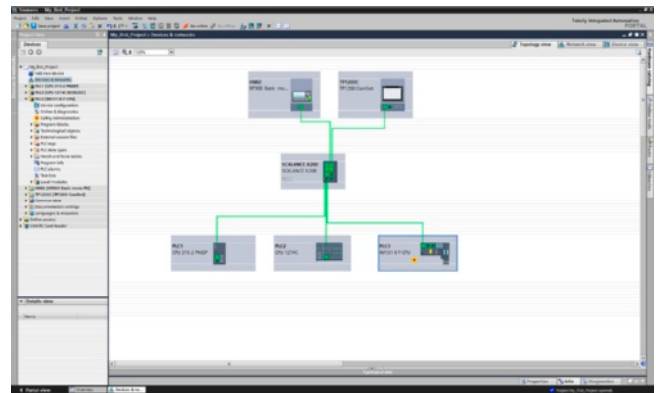
Device view



Device view – hardware configuration with realistic look and feel

- Buffering of configured hardware modules and their reuse in another controller
- When zoomed to at least 200%, the I/Os with their symbolic names or addresses are displayed.
- Automatic readout of the available hardware
- Full text search in the hardware catalog
- Option of filtering the hardware catalog to show just those modules that can currently be used
- All parameters and configuration data are displayed on a hierarchical and context-sensitive basis

Topology view



Topology view – Actual interconnection of PROFINET devices

Distributed I/O on PROFINET is configured in the network view. This enables the controllers and the distributed I/O assigned to them to be displayed graphically. During operation, however, it is not possible to see which ports are actually connected and communicating with each other.

But this is often important for diagnostics. For PROFINET networks, the topology view enables this information to be displayed quickly and easily. An online/offline comparison identifies the communicating ports. By detecting, presenting and monitoring the physical connections between devices on PROFINET IO, the administrator can easily monitor and maintain even complex networks.

IEC programming languages

Powerful programming editors for efficient engineering

SIMATIC STEP 7 V12 provides powerful compilers and programming editors for programming SIMATIC S7 controllers:

- The structured text (SCL), ladder logic (LAD), and function block diagram (FBD) languages are available for all controllers.
- Statement list (STL) and step sequence programming (GRAPH, SFC) are additionally available for the controller series S7-1500, S7-300, S7-400 and WinAC.

Intuitive tools with functionalities such as drag & drop, project-wide cross-reference list, Intellisense, etc. are available to the user for all tasks. Even complex technological functions such as controlling, positioning or tracing are quickly and graphically implemented in the engineering software.

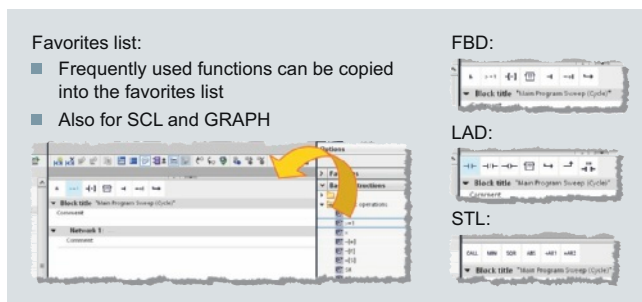
Programming editors and current Windows technologies adapted to the tasks and the processing are the basis of the intuitive operating concept of STEP 7 V12.

The embedding of the various editors in a common working environment ensures that all data is available to the user on a consistent basis and an overview of the project data is guaranteed at any time.

Program blocks can be saved at any time. Troubleshooting is made easier and quicker by means of several tools: a syntax window lists all errors in the current block. This permits simple navigation between the errors and also has an indicator for faulty networks.

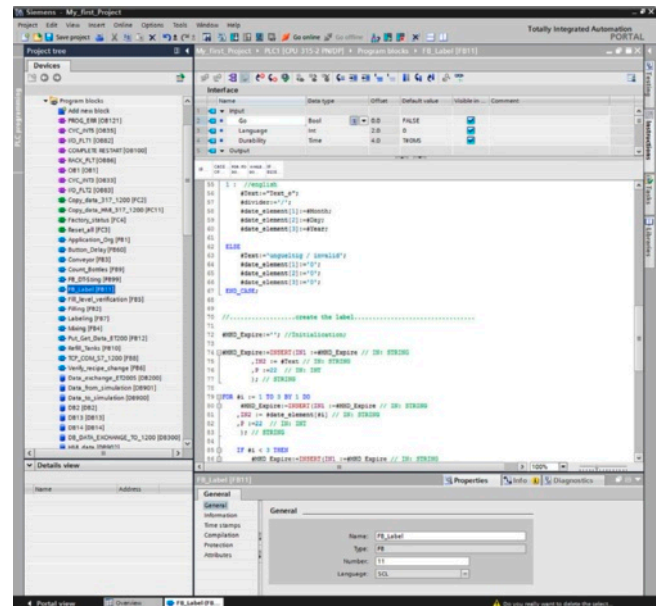


The integrated symbolic programming ensures even more consistency and thus reduces the probability of errors. High-performance compilers for LAD, FBD and SCL ensure optimum runtime performance.



Frequently used functions can be stored in the favorites list

SCL – Programming of complex algorithms



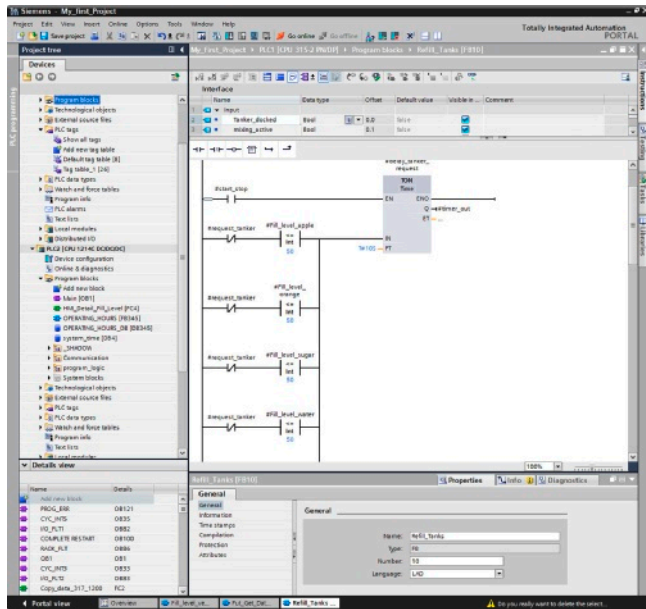
(Structured Control Language) editor

The Structured Control Language (SCL) corresponds to the textual high-level language ST (Structured Text) defined in the standard IEC 61131-3 and fulfills base level and reusability level requirements according to PLCopen. SCL is particularly suitable for the high-speed programming of complex algorithms and arithmetic functions and for data processing tasks. The SCL code is simpler, shorter and clearer to implement and handle.

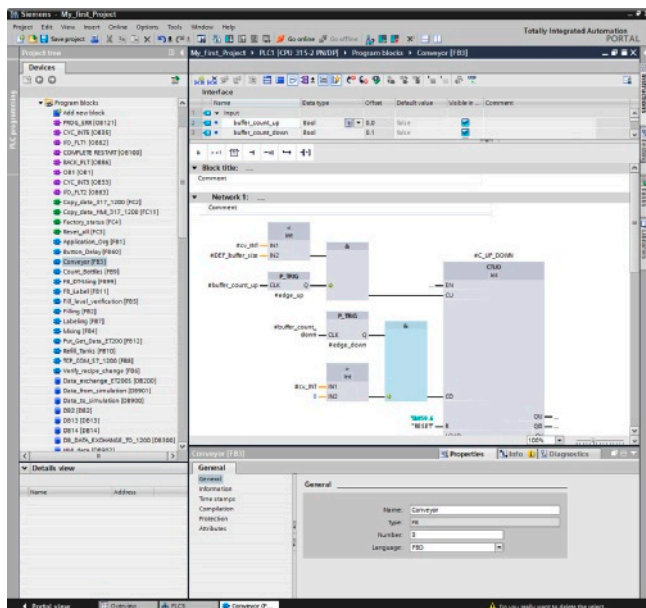
S7-SCL Editor offers the following functionalities:

- Complete areas of program code can be activated/deactivated with one click
- Loops and multi-line comments can be expanded and collapsed
- Bookmarks
- Fast access to tag parts with "slicing"
- The values of all tags are displayed clearly online
- SCL blocks can be used in other STEP 7 languages
- Perfect for user-defined function blocks for libraries
- SCL blocks form the basis for exchanging program code between S7-1200, S7-1500, S7-300, S7-400, and WinAC
- Considerable time savings compared to programming in LAD/FBD/STL

LAD and FBD – Graphic programming languages



Ladder Logic (LAD) editor



Function Block Diagram (FBD) editor

By means of powerful tools and the integrated functionality, such as indirect programming, programs can be generated at a speed that equals, if not surpasses that of the textual languages for the first time.

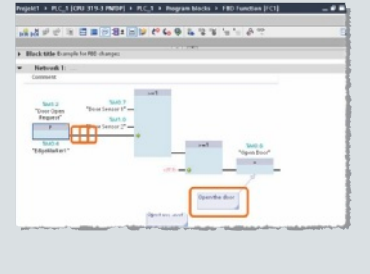
The fully graphical LAD and FBD editors offer excellent clarity and fast navigation thanks to

- Indirect addressing for S7-1200 and S7-1500
- Opening and closing entire networks
- Showing and hiding symbols and addresses
- Direct zooming and saving of layouts
- A host of keyboard shortcuts

- Lasso function, copying and pasting for individual commands and command structures
- Comments
- New CalculateBox permits the direct input of formulas on the S7-1200 and S7-1500.

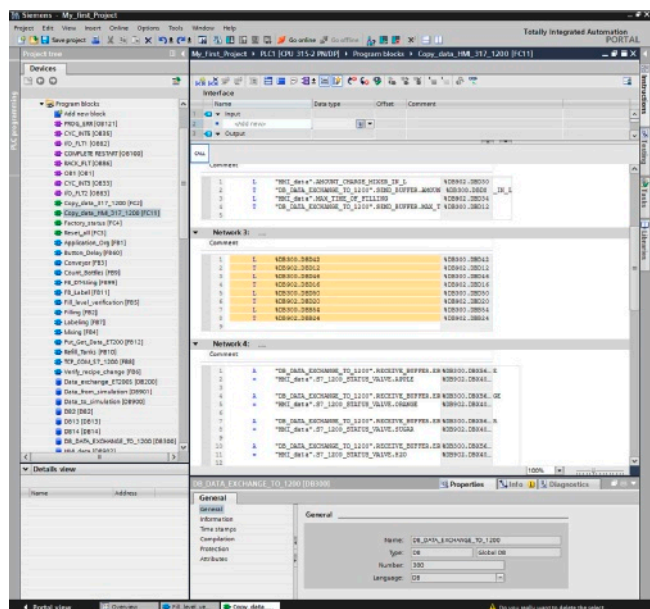
Highlights:

- Change the function directly at the block
- Add inputs at a click
- Target display for drag & drop
- Comments for assignments



New functions for simpler LAD and FBD programming

Statement list (STL)



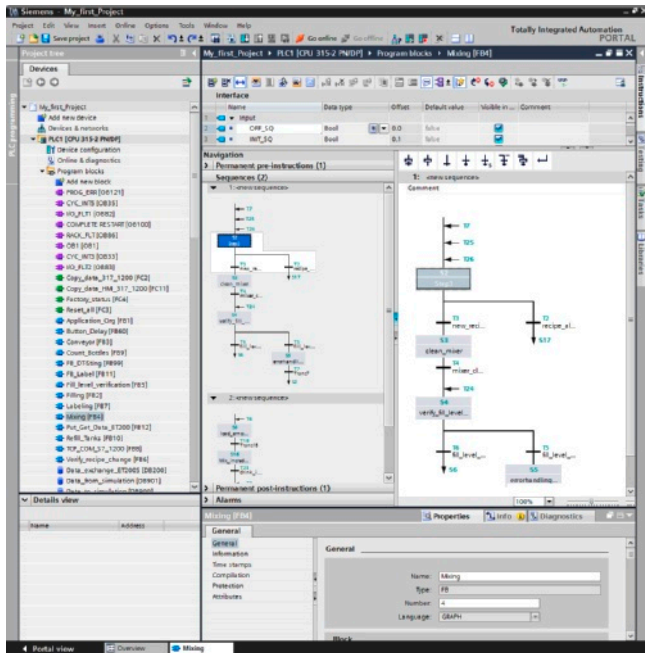
Statement list (STL) editor

The statement list (STL) textual programming language enables the creation of hardware-level runtime- and memory-optimized user programs.

It supports the user with a host of new user-friendly editing functions:

- Intelligent selection of symbols from PLC tags, DBs, local tags
- Clear presentation even of complex program code
- Code can be activated/deactivated with one click
- Option of adding display of absolute addresses
- Breakpoints can be set directly
- Clear online presentation

GRAPH (SFC) - Programming of sequencers



S7-GRAPH Editor

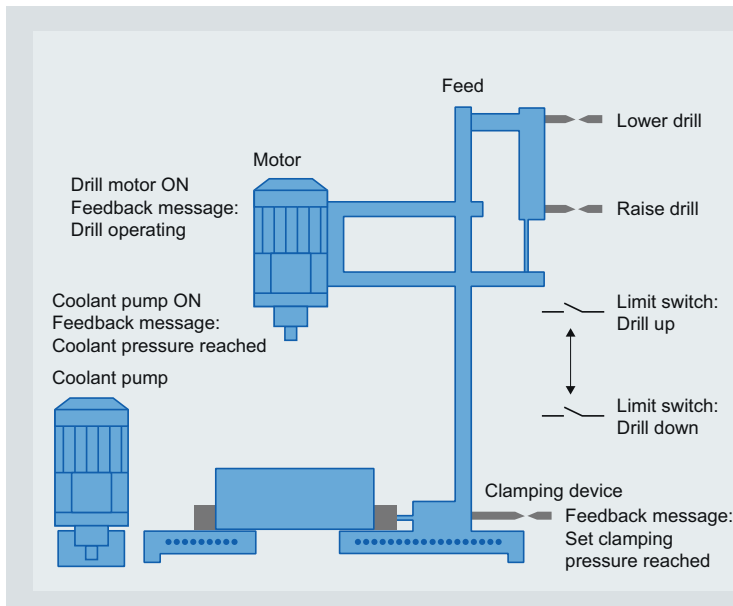
Sequential Function Chart (SFC) is used for describing procedures with alternative or parallel sequencers. The sequencers are configured and programmed clearly and quickly in a standardized method of representation (according to IEC 61131-3, DIN EN 61131).

Basic functions

- Flexible sequencer structure:
Simultaneous and alternative branches, jumps within the sequencers, step enabling and disabling.
- Selective processing of steps. The processing time of a sequencer is thus independent of the number of steps.
- Synchronizing of automatic and manual mode:
The process is no longer synchronous if it was put into a different state manually. GRAPH supports the locating of synchronization points for restarting automatic operation. To do so, the relevant steps are marked. Transitions or interlocks can be defined as criteria.
- Single-step presentation shows all details of a step at a glance
- Considerable time savings compared to programming in LAD/FBD/STL

Test and diagnostics functions

- Online functions: The online functions can result in considerable time savings, particularly during the commissioning phase. For example, it is possible to display active steps, the status of the interlocking, monitoring and step enabling conditions, as well as past actions online.



Example for motion monitoring

Does the drill reach the "Drill down" limit switch at the correct time? In the case of a fault, different fault reasons can be displayed, e.g.:

- "Feed not activated" (defective motor?),
- "End position cannot be exited" (mechanically blocked?).

Example for general monitoring

Has the drill motor been activated with a start command? In the event of a fault, the system indicates which requirement has not been met for operation of the drill motor, e.g.:

- "Target tension of clamping device not reached" or
- "Coolant pressure not reached".

The right component can then be repaired.

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Symbols

The tag table serves as a common editor for global tags and constants. Large numbers of tags can be quickly generated using mechanisms familiar from Microsoft Excel. In the same way, many addressed can also be rewired simultaneously.

Shared data management and uniform symbols

Project data usually has to be reused at different locations of a project and linked together across different editors. Intelligent Drag & Drop automatically generates these links for users. By means of central, consistent data management with a shared database for all editors, all changes to the application data are immediately and automatically updated within the entire project.

The user can, of course, create the symbols in the customary way in the symbol table. In addition, STEP 7 V12 offers new, efficient methods of generating the symbols. Using the simple drag-and-drop function between the user program and the device view, the user can define the assignment of hardware to symbols. These symbols are automatically created in the symbol table. This saves the laborious searching for errors due to typing mistakes when filling the symbol table. The automatic data consistency ensures that all locations at which a symbol is used are updated immediately, regardless of which editor was used to change a symbol.

This one-time data input and the automatic data consistency save the user a lot of time.

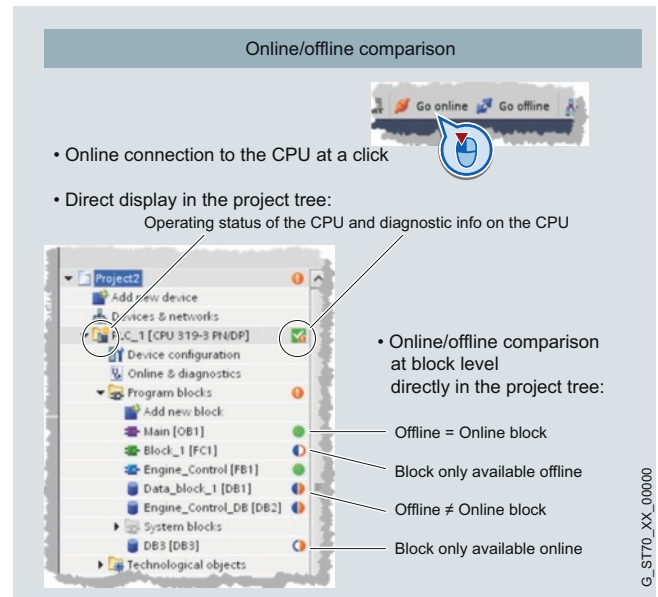
Online functions

Users are online with a single click, even if no project has yet been opened in STEP 7.

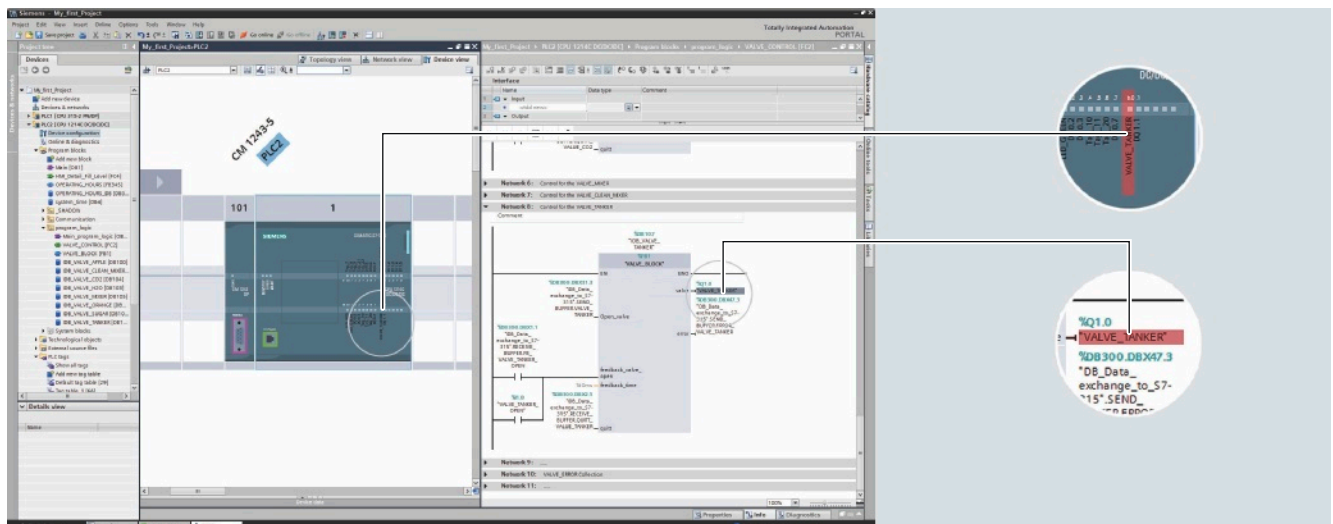
The online/offline data of a project are compared automatically and differences are clearly highlighted. The online/offline comparison at block level takes place directly in the project tree. Following an online connection, the display of the operating status, a diagnostic overview, and an online/offline comparison at block level are immediately available in the project tree.

Other user-friendly online functions:

- Full software upload to empty Field PG (programming device)
- Data restore and online backup
- HW detect
- Download in RUN
- PLCSIM for program simulation

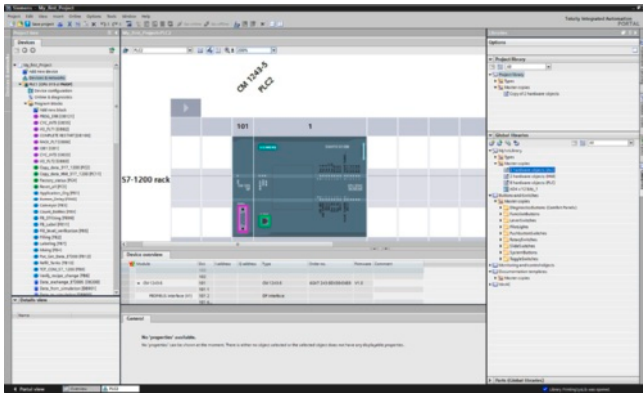


Online/offline comparison for S7-1200 and S7-1500



Symbolic programming

Integrated library concept



Comprehensive library concept for all automation tasks

TIA Portal offers a comprehensive library concept to facilitate the reuse and simple standardization of frequently used project parts.

STEP 7 and WinCC elements of an automation project can be stored in local or global libraries.

With the global library, elements can be exchanged between different projects. The library can be set up in any folder of the Windows file system. The user can compress this folder and store it on a server or send it by e-mail around the world, for example.

The local library is saved together with the automation project. Here, users can store objects that they want to reuse within their project.

- Creation, storage and reuse of any project parts, e.g.:
 - Program blocks
 - Tags
 - HMI screens
 - Graphic objects from HMI screens
 - Configured modules
 - Complete stations
- Numerous pre-engineered library objects available

Diagnostics

System diagnostics is an integral part of the TIA Portal and requires no additional license. A new high-performance administration concept in engineering and in runtime systems is available for S7-1500 controllers. The system diagnostics provides all the relevant information regarding errors present in the system. This information is automatically packaged in messages, which comprise the following elements:

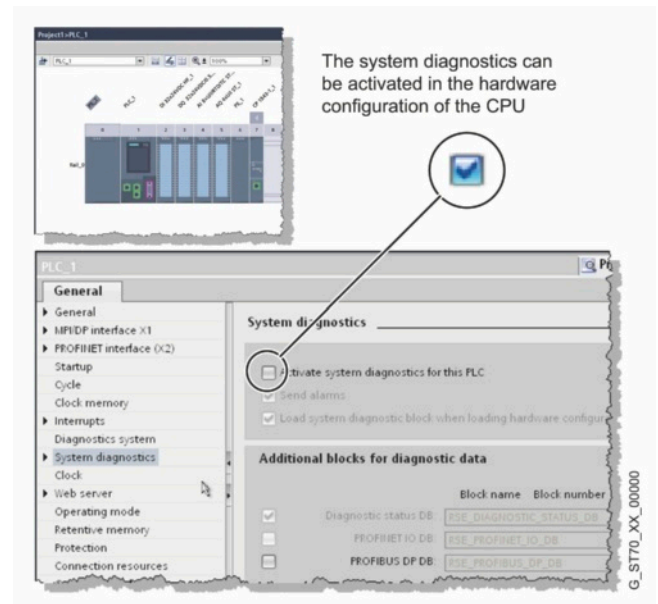
- Module
- Message text
- Message status

Advantages of automatic message generation:

- No programming of system diagnostics required
- Faster, more economical implementation
- Fast fault localization
- Automatic updating of the system diagnostics when modifying the hardware configuration
- Transparent status message for controller, I/O and drives (motion control messages)

System diagnostics only has to be activated in the device view of the controller. Connection configuration is not necessary with STEP 7 V12.

One new feature is that the clear and compact message texts have an identical appearance in STEP 7, in WinCC V12, in the CPU Web server, and on the display of the S7-1500. The system diagnostics provides a channel-specific display concept and is also effective when the CPU is in STOP mode.



Activating the system diagnostics

Additional functions

Security Integrated¹⁾

SIMATIC STEP 7 offers comprehensive support in the implementation of industrial security concepts for machines/plants:

- Know-how protection: Improved password protection against unauthorized reading, copying and modification of contents.
- Copy protection: Greater protection against unauthorized duplication of program blocks.
- Access protection: A four-level security concept for improved protection against unauthorized configuration changes for the S7-1500 controllers.
- Manipulation protection: Improved protection of the data transferred to the controller against unauthorized manipulation.

Integrated support of UNDO

A list box shows the user which processing step can be undone in which editor. Editors that have already been closed are automatically opened. Project consistency is guaranteed.

Six selectable user interface languages

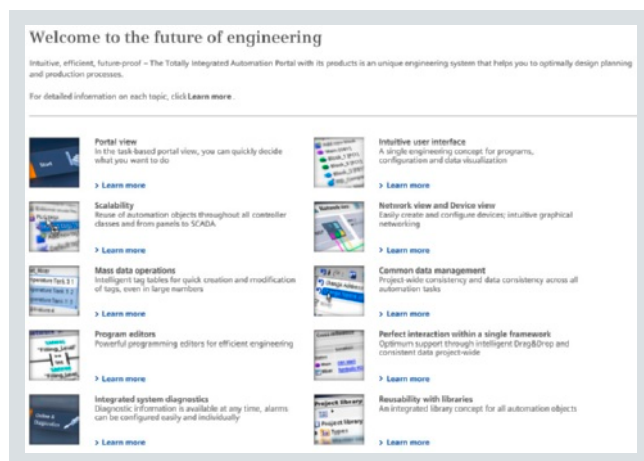
SIMATIC STEP 7 V12 is supplied as standard with six user interface languages:

English, German, French, Spanish, Italian, and Chinese simplified. You can switch the language without restarting.

Welcome Tour as integrated tutorial

All highlights of the TIA Portal and overall benefits for the user can be found in the Welcome Tour. The Welcome Tour starts automatically the first time STEP 7 V12 is launched after its installation.

www.siemens.com/tia-portal-welcometour-en



The Welcome Tour with numerous multimedia tutorials

3-stage help system

The integrated multi-stage help system of STEP 7 offers users exactly the information they require when programming and editing:

Stage 1: The tool tip offers key word information on a field, symbol, modules, etc.

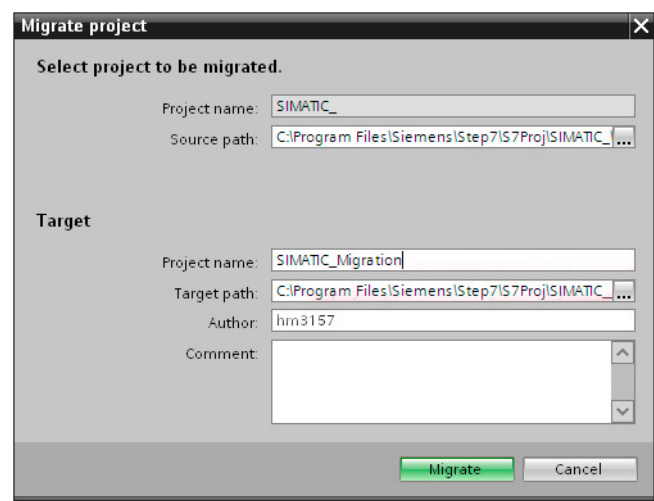
Stage 2: After a short delay, the tool tip is automatically expanded with a brief description.

Stage 3: This description provides a direct link to the appropriate page of the Online Help, which contains detailed information.

From the Online Help, more in-depth information can be retrieved from the Internet: FAQs, application examples, etc.

Migration

Transfer of existing automation projects is guaranteed for all five programming languages. The reuse of existing automation solutions and integration of all future software products into the TIA Portal engineering framework guarantee a long-term security of investment.



Engineering compatibility with projects created with STEP 7 V11:

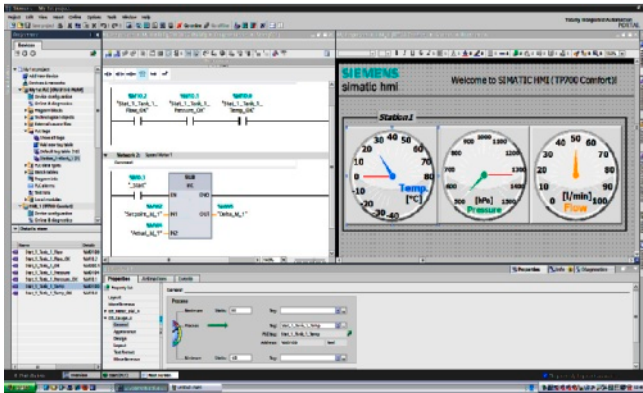
- User-friendly opening and saving of V11 projects with V12 – without migration
- Investment protection and reuse of existing projects when migrating from S7-300/400 to S7-1500.
- S7-1200 programs can be copied and pasted to S7-1500.

¹⁾ Suitable protective measures (among others Industrial Security, e.g. network segmentation) have to be taken up to ensure a safe operation of the plant. For additional information on the topic of industrial security, refer to the footnote 1) on page 3 of this brochure.

Integration

It's the interaction that makes the difference

The perfect interaction of controller and HMI



STEP 7 and WinCC – perfect interaction

SIMATIC STEP 7 V12 contains the powerful SIMATIC WinCC Basic HMI software for efficient programming and configuration of SIMATIC HMI Basic Panels. Efficient engineering means, for example, using process values from the controller directly in the HMI project by dragging and dropping. HMI is part of the overall project, therefore consistent HMI data is always guaranteed. Connections between HMI and controller can be defined centrally. Several templates can be created and also assigned to other HMI screens. Fully integrated HMI functionality makes the configuration of the SIMATIC HMI Basic Panels easy, effective and efficient at the same time.

Symbols can be assigned to the corresponding hardware by dragging and dropping; tags can also be connected easily between controller and HMI in this way. The user has the opportunity of using both HMI and controller editors efficiently in one shared engineering environment.

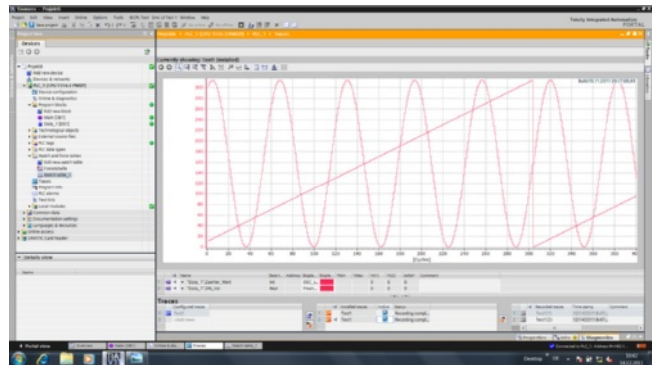
STEP 7 works together with the separately available WinCC V12 products such as WinCC Professional V12, just as closely as it does with the integrated WinCC Basic product. If you install STEP 7 and WinCC on one computer, the TIA Portal integrates the two products seamlessly.

Technology and drives

The new SIMATIC S7-1500 has integrated motion functionality. The new portal view Motion & Technology facilitates fast access to all technology objects.

- Time savings thanks to user-prompted configuration and parameterization
- Error avoidance thanks to user-friendly programming and the use of PLCopen blocks

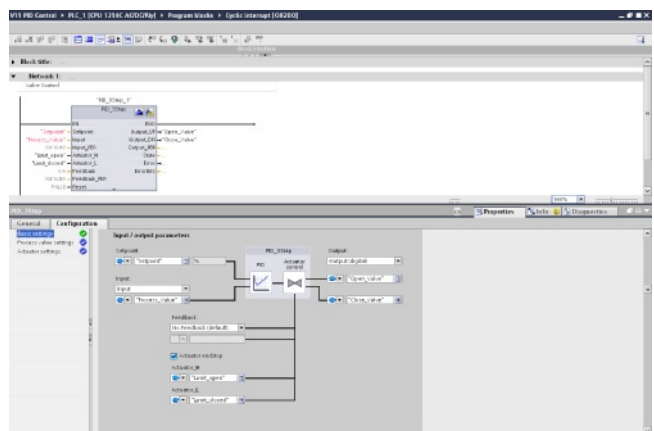
- Control of analog or digital drives connected in centralized or distributed configurations (PROFINET/PROFIBUS with PROFIdrive interface)
- Simple diagnostics and fast commissioning with real-time trace for S7-1500



Trace S7-1500

The control panel included with the SIMATIC STEP 7 simplifies the commissioning of stepper drives and servo drives with a pulse/direction interface. It provides both automatic and manual control of individual single motion axes as well as online diagnostics information.

The SIMATIC S7-1200 can also be used for speed and position control of stepper motors and servo drives.



PID 3-Step in the program editor with S7-1200

A PID control with high-quality autotuning is integrated in addition.

Engineering of SINAMICS frequency inverters

There are many drive tasks in automation applications. The variety of the projects, which extends from low to high drive performances and from simple speed control to complicated motion control tasks, demands powerful tools for commissioning, diagnostics and maintenance. SINAMICS StartDrive is integrated into the TIA Portal. In this way drive tasks can be performed using the SINAMICS G120 frequency inverter. SINAMICS StartDrive is based on the tried-and-tested SINAMICS STARTER and consistently uses the TIA Portal technologies. There are convincing advantages to this solution:

- The TIA Portal framework enables SINAMICS frequency inverters to be integrated easily into your automation solution without requiring additional tools
- Fast configuration of SINAMICS drives by means of simple and efficient parameterization using context-sensitive menus, setup wizard and graphical user interfaces
- Shorter commissioning times for the frequency inverter with integrated control panel for direct operation of the drive from the TIA Portal
- Reduced plant downtimes thanks to integrated tools for diagnostics of the drives

Software test without hardware using controller simulation

Simulation systems provide effective support with the development of programs and the actual application. A simulated test environment including controller and process reduces, for example, commissioning times and thus costs. Early discovery of programming errors and optimization of programs enable the optimized and error-free use of the programs in the actual system.

The integrated controller simulation simulates a controller for functional testing of user blocks and programs for S7-1500, S7-300, S7-400 and WinAC on the PG/PC. Online access and test functions of the programming tools can be carried out in exactly the same manner as with a real controller. This allows the entire program test to be performed on-site in the development office.

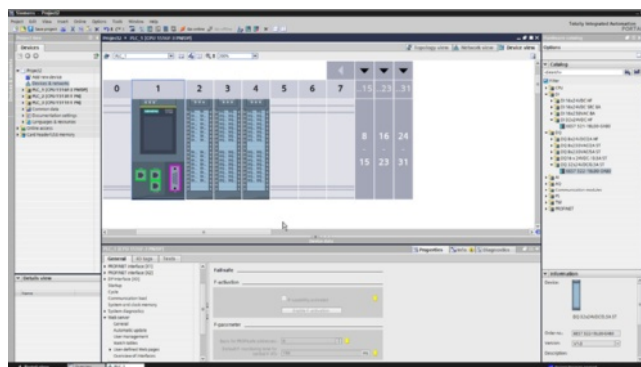
The integrated controller simulation can be started several times to enable several controllers to be tested simultaneously in a network. The ability to communicate via MPI, PROFIBUS DP and TCP/IP ensures a high degree of flexibility.

Seamless safety integration

All configuration and programming tools required for generating a safety-oriented program are integrated into the STEP 7 user interface and use a common project structure. Using the SIMATIC STEP 7 Safety Advanced V12 option, you can benefit from all the advantages of the TIA Portal for your fail-safe automation as well.

- Intuitive operation and the same operating concept as for the generation of standard programs permit a quick entry into the generation of fail-safe programs
- The same configuration of the F-system as for the standard automation system
- Ready-to-start: F-runtime group is set up automatically on insertion of the F-CPU
- Creation of the safety program in the FBD or LAD programming languages
- Thanks to the integrated library with TÜV-certified function blocks, safety functions can easily be implemented
- In connection with special signatures for the device parameters, the library concept supports in-house standardization and simplifies the validation of safety-oriented applications
- The Safety Administration Editor provides central support for the administration, display and modification of safety-related parameters
- Standardized and integrated identification of safety-related resources simplify the overview

SIMATIC Safety Integrated is the seamless consistent and user-friendly integration of safety-oriented functions into the standard automation. This also applies to the engineering with STEP 7 Safety Advanced V12.



Seamless safety integration

For additional information, please refer to the brochure: "SIMATIC Safety Integrated for factory automation – Standard and safety technology in a single system".

Technical specifications

Engineering package	SIMATIC STEP 7 Basic	SIMATIC STEP 7 Professional
Recommended PG/PC hardware - Processor - RAM - Graphic	Core i5, 2.4 GHz 3 GB (32-bit), 8 GB (64-bit) 1280 x 1024	
Supported operating systems - MS Windows XP Home SP3 - MS Windows XP Professional SP3 - MS Windows 7 Home Premium SP1 (32-bit) - MS Windows 7 Home Premium SP1 (64-bit) - MS Windows 7 Professional SP1 (32-bit) - MS Windows 7 Professional SP1 (64-bit) - MS Windows 7 Enterprise SP1 (32-bit) - MS Windows 7 Enterprise SP1 (64-bit) - MS Windows 7 Ultimate SP1 (32-bit) - MS Windows 7 Ultimate SP1 (64-bit) - MS Windows Server 2003 R2 Std. SP2 - MS Windows Server 2008 Std. SP2 (32-bit) - MS Windows Server 2008 Std. R2 SP1 (64-bit)	 	
HMI programming PLC programming	WinCC Basic included S7-1200, Basic Panels	WinCC Basic included S7-1200, S7-300, S7-400, S7-1500, WinAC, Basic Panels
Programming languages	LAD, FBD, STL (ST)	LAD, FBD, STL, SCL (ST), GRAPH (SFC)
Libraries Options		SIMATIC STEP 7 Safety Advanced SIMATIC PID Professional, Easy Motion Control

Purchasing and licensing

Application-oriented licensing

The licensing model for SIMATIC software offers a tailor-made solution for each application:

- **Trial License** - the license for evaluation
 - For a limited period (21 days)
 - For test and evaluation purposes
- **Floating License** - the license per user
 - Enables access for any user
 - Regardless of the number of installations
- **Single License** - the license per installation
 - Enables one installation

Engineering software includes all software products for the creation of user software, e.g. configuration and programming.

The Software Update Service (SUS) always keeps you up to date

The cycles of innovation in the world of software are very short these days. New developments are advancing this sector all the time and you have to stay on the ball if you want to remain a leading player. That is why we are continually updating and improving our software so that our customers are always fully up to date –

With our Software Update Service (SUS) the user's software is always kept up to date automatically, enabling the user to benefit from the latest developments. The SUS entitles the user to one year of all updates to the SIMATIC software product with free delivery.

Highlights

- Use of the latest technology and functionality for efficient engineering
- Considerable time savings and improved workflow efficiency since updating the software is easy and convenient and there are no time-consuming downloads of the latest versions
- Software update costs can be planned due to low annual fee

Promotional packages for migration to STEP 7 V12 (TIA Portal)

- Promotional package "NEW" for STEP 7 customers without Software Update Service (SUS)
Scope of delivery: Upgrade and 1 year SUS
- Promotional package "LOYAL" for STEP 7 customers with SUS
Scope of delivery: Upgrade and 1 year SUS

For more information, contact your SIMATIC partner.
siemens.com/automation/partner

Downloading of license key and automation software

In addition to downloading the license key for registering software licenses, it is now also possible to download selected, current software products for specific countries from the Internet.

Online software delivery allows much faster availability of the software at any global location. Furthermore, electronic handling of orders and downloads makes a contribution toward reducing administration and storage costs.

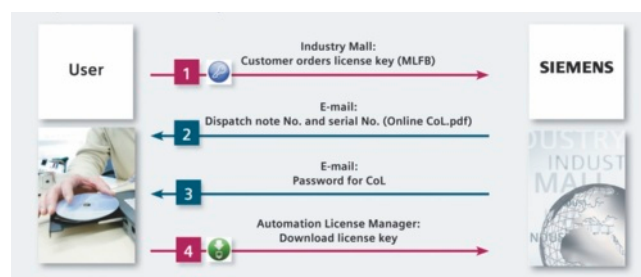
How the download works:

- Customers orders the software or license key electronically via the Industry Mall.
- They receive a delivery note and serial number in an email, and a password in a further, separate email.
- Using the serial number and password, secure downloading is possible using the Automation License Manager.

Up to now, the following software products are available via Online Software Delivery:
STEP 7 V12, WinCC V12, SCOUT V4.2,
SINEMA Server Basic V11, SIRIUS Engineering.

Further information:

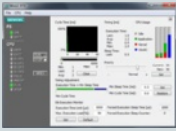
siemens.com/tia-online-software-delivery



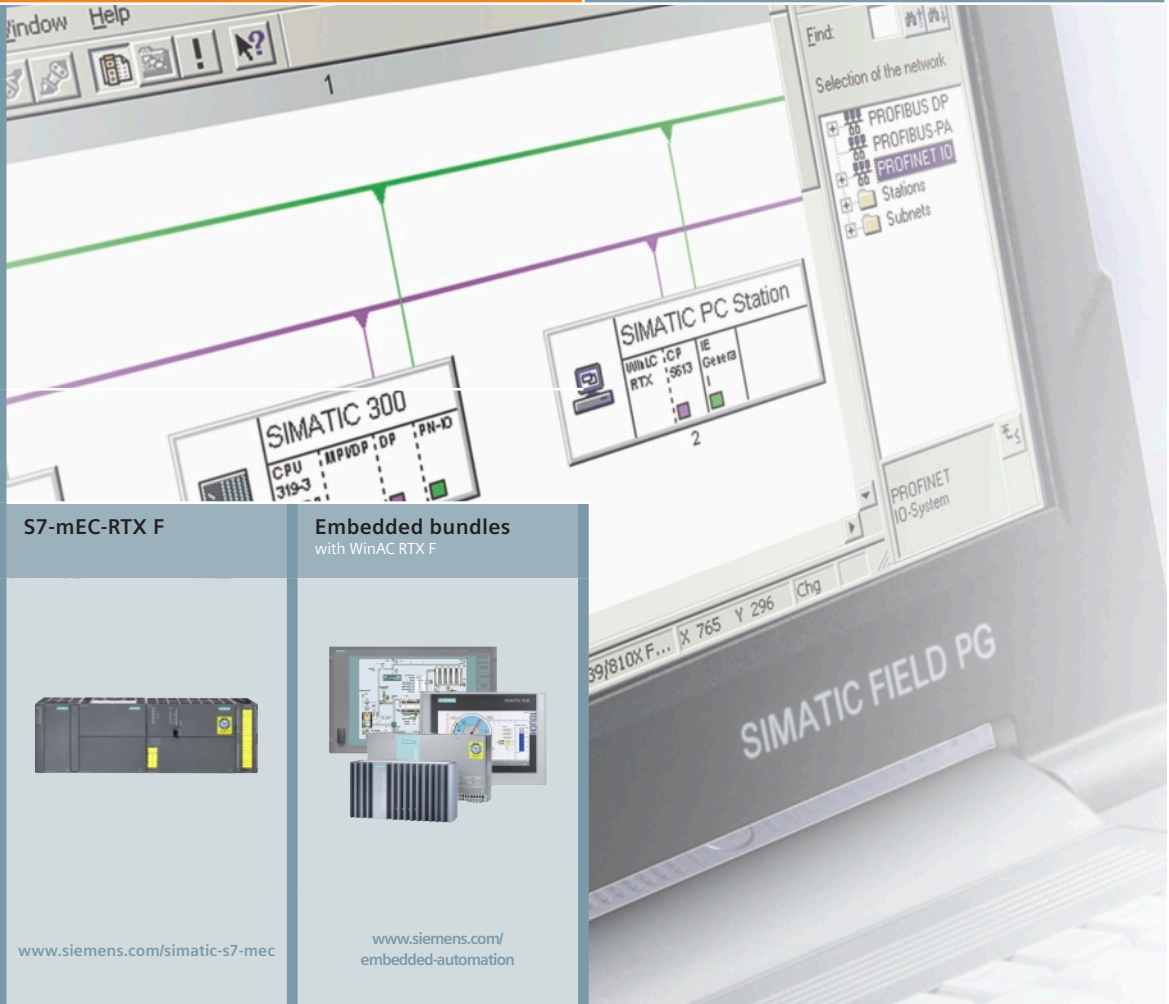
SIMATIC PC-based Controllers

Software Controllers for Multi Panels

WinAC RTX



www.siemens.com/simatic-winac



WinAC RTX F



www.siemens.com/simatic-winac-rtx-f

S7-mEC-RTX F



www.siemens.com/simatic-s7-mec

Embedded bundles
with WinAC RTX F

www.siemens.com/embedded-automation

S7 Modular Embedded
Controller

www.siemens.com/simatic-s7-mec

IPC227D/IPC427C bundles
with WinAC RTX (F) and HMI software

www.siemens.com/simatic-ipc227d

HMI IPC277D/IPC477C
bundles
with WinAC RTX (F) and HMI software

www.siemens.com/simatic-ipc277d

WinAC MP 177/277



WinAC MP 377



Get more information

Totally Integrated Information Portal:
www.siemens.com/tia-portal

Information on STEP 7:
www.siemens.com/simatic-step7-tia-portal

Information on maintenance:
www.siemens.com/maintenance

SIMATIC system properties:
www.siemens.com/simatic-system-properties

SIMATIC Guide manuals:
www.siemens.com/simatic-docu

Info material for downloading:
www.siemens.com/simatic/printmaterial

Service & Support:
www.siemens.com/automation/support

SIMATIC contacts:
www.siemens.com/automation/partner

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