SIEMENS

Ingenuity for life

Engineered with TIA Portal

Be open and independent

SIMATIC S7-1500 Software Controller

Safety Integrated

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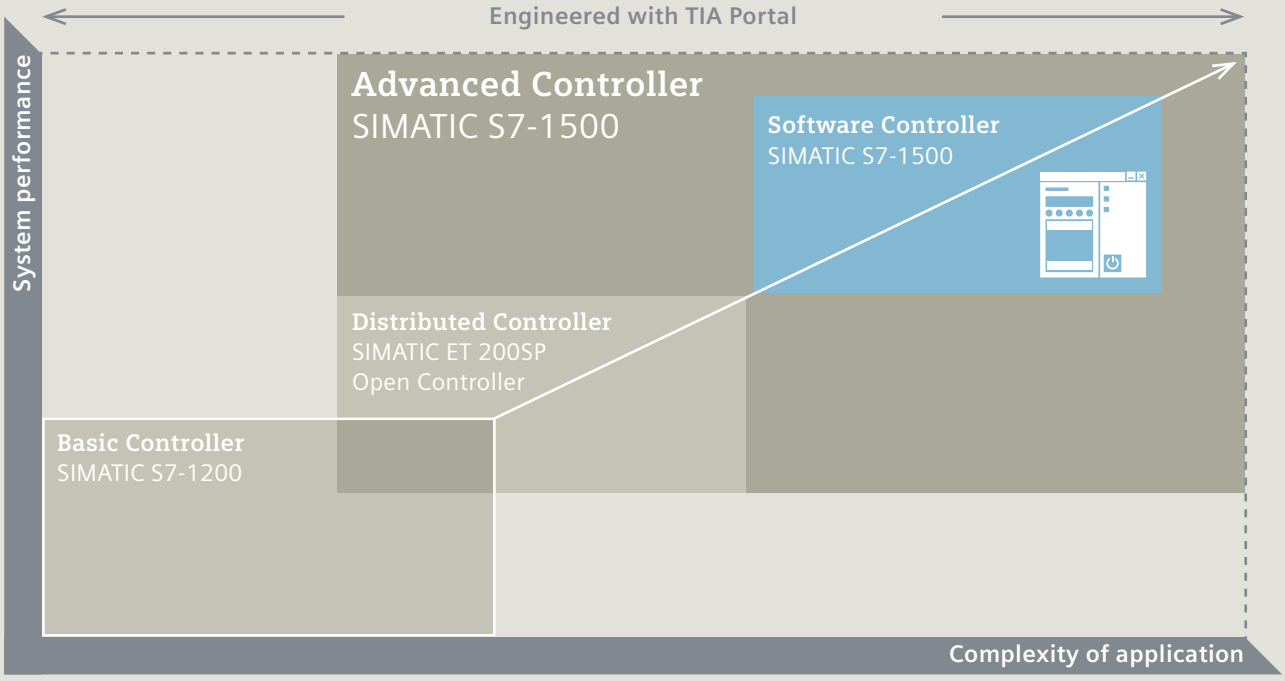
SIMATIC S7-1500 Software Controller – the PC-based controller from the SIMATIC series of controllers



Every machine or system makes individual demands in terms of system performance and application complexity. With its comprehensive range of controllers, Siemens offers you the perfect control solution for every application.

- S7-1200 Basic Controller for simple and standalone applications
- S7-1500 Advanced Controller for medium-sized and complex applications
- ET 200SP Distributed Controller for decentralized applications
- S7-1500 Software Controller for PC-based applications

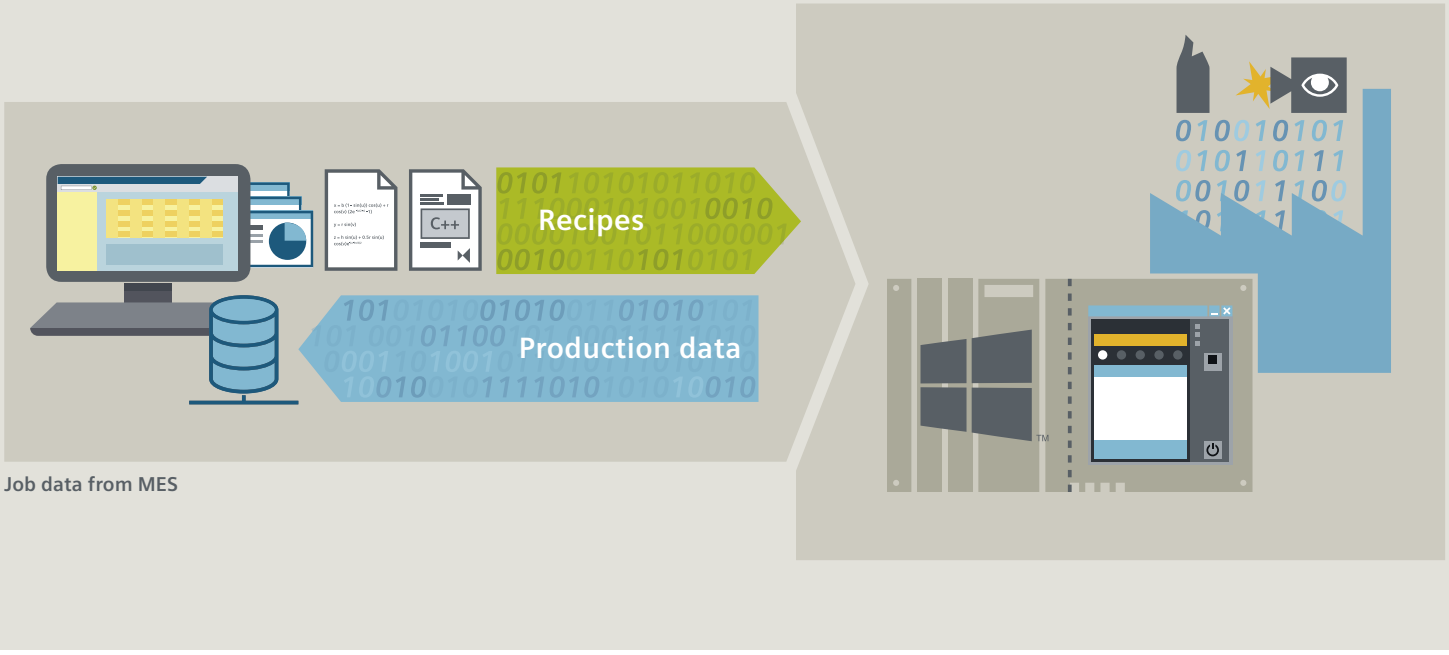
SIMATIC Controllers and their advantages

SIMATIC Controllers are impressively user-friendly, offering both functional integration and scalability. The coordinated selection of products offers the ideal controller for every application.

User programs for SIMATIC Controllers are largely identical in terms of handling and design. Once they have been created, they can easily be transferred – from small to large and vice versa.

Thanks to the standardized engineering in the Totally Integrated Automation (TIA) Portal, universal software and hardware functions perform all automation tasks efficiently.

Software Controller for PC-based automation



The use of PC-based automation with the SIMATIC S7-1500 Software Controller and industrial PCs

The S7-1500 Software Controller runs on Siemens SIMATIC industrial PCs, completely independently of the operating system. In this way, it combines the advantages of SIMATIC controllers with those of PC-based automation without any adverse effect on the acknowledged high reliability and system availability of the SIMATIC controllers. The advantages of independence from the operating system are evident as soon as the controller is started up – but especially due to the fact that even Windows updates and reboots can be performed without any risk while the controller is running.

Solution for the toughest demands

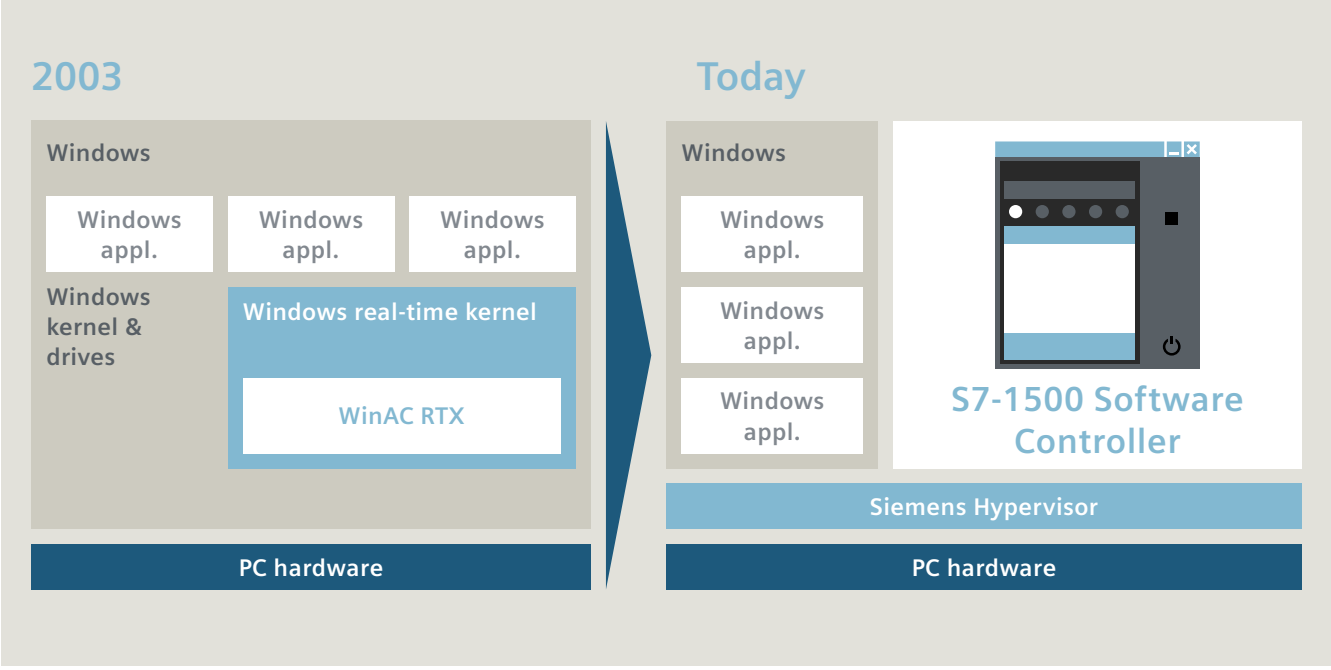
With regard to the programs and handling for engineering, the new Software Controller corresponds to the SIMATIC S7-1500 Advanced Controllers. Know-how and access protection are just as much part of the package as interfaces to PROFIBUS and PROFINET.

Typical fields of application

The combination of PC-based control and high-level language programming pays particular dividends when implemented in a series of applications such as:

- Combination of multiple tasks on a single device, for example control, visualization and PC applications
- Linking of databases
- Integration of complex algorithms
- Integration of existing high-level codes
- Integration of third-party software, e.g. image processing software

Independence from operating system



The challenge: Reliability and availability

Until now, a real-time kernel had to be embedded within Windows in order to implement a software controller with real-time capability. The control functionality is therefore only available with a correctly functioning operating system – a restart or crash inevitably results in the failure of the controller, and a standstill of the entire machine or plant. In production use, this entails considerable costs. Possible factors causing the failure of an operating system include malicious software, crashes caused by overloading, or intentional system restarts when installing new software.

If the controller is handling processes involving heating or adhesives, for example, shutting down and restarting the process is extremely time-consuming. It is necessary to ensure that the adhesives used do not harden, while heating processes usually have to be reset and restarted in several stages.

The solution: The SIMATIC S7-1500 Software Controller

The S7-1500 Software Controller offers the functionality of an S7-1500 for PC systems; however, it does not run within the operating system, but in parallel with it. The Siemens hypervisor allocates the PC resources such as interfaces, processor cores or memory directly and exclusively to the operating system or to the Software Controller. This means that even a crash or restart has no effect whatsoever on the execution of the control program.

Despite the independence of the Software Controller from Windows, data can still be exchanged between the two sides. On the one hand, S7 blocks permit direct TCP/IP communication, while on the other hand, the ODK 1500S open development kits enable high-level languages to be integrated into the STEP 7 user program. The Eclipse development environment for programs with real-time capability is also included in the scope of delivery. Alternatively, Visual Studio can be used. The Open Development Kit independently creates the required S7 blocks, which can then be integrated into the STEP 7 program in the TIA Portal without any high-level language skills.

Maximum engineering efficiency with the TIA Portal

Benefits

- Everything is done in the TIA Portal: no settings necessary in Windows
- Safety Integrated
- Best fit for modular machines: full compatibility with S7-1500/ET 200SP CPUs
- Know-how protection for the machine builder
- Access protection for the end user (Security Integrated)

SIMATIC Controllers & the advantages of the TIA Portal

Thanks to the standardized engineering in the TIA Portal, universal software and hardware functions efficiently perform all automation tasks with the aid of:

- Safety Integrated
- Security Intergrated
- Integrated system diagnostics
- Integrated motion functionality
- Integrated trace functionality
- TIA Portal engineering framework
- Library concept

The engineering and complete configuration of the Software Controller take place in the TIA Portal engineering framework. This means that no settings are necessary within Windows.

Distinguishing features of the Software Controller:

The SIMATIC S7-1500 Software Controller operates autonomously and independently of Windows. This also means that no Windows settings have to be performed on the controller. The entire configuration is performed in the TIA Portal. This has noticeable advantages in terms of engineering efficiency, safety and user-friendliness. In addition, the SIMATIC S7-1500 Software Controller offers maximum know-how protection for the machine builder, and excellent access protection for the end user. As the SIMATIC S7-1500 Software Controller is fully compatible with SIMATIC S7-1500/ET 200SP CPUs, it represents an ideal solution for modular machines.

Additional benefits provided by the integrated safety functions are a smaller footprint and cost savings since an additional safety controller is not needed.

The hardware platforms for SIMATIC S7-1500 Software Controllers

SIMATIC Rack PCs

SIMATIC Box PCs

SIMATIC Panel PCs

SIMATIC IPCs offer flexibility in the choice of design, and maximum performance for complex control algorithms and Windows applications for automation. Together with the SIMATIC S7-1500 Software Controller they are particularly suitable for special machine building tasks.

The outstanding advantages of the SIMATIC Industrial PCs:

Reliable continuous operation

- High production and development standards
- Own mainboard and BIOS development
- Proven quality thanks to endurance and stress tests

Security for future planning

- Long-term availability for 4 to 6 years (plus 5 years for spare parts)
- Competitive edge due to early availability of the latest technologies

SIMATIC ET 200SP Open Controller

The SIMATIC ET 200SP Open Controller is a PC-based controller with the design of the ET 200SP I/O system. For control purposes, the pre-installed SIMATIC S7-1500 Software Controller is used.

Thanks to the integrated safety functions the system is especially compact and thus saves space in the control cabinet because the additional safety controller which would otherwise be necessary is eliminated.

Try out the SIMATIC S7-1500 Software Controller and benefit from:

- High system availability through independence from operating system
- A fail-safe controller with Safety Integrated
- A high degree of security due to fine-grained protection of know-how and access (Security Integrated)
- User-friendly engineering exclusively in the TIA Portal, no Windows settings necessary
- Easy implementation of interfaces to PC applications and integration of high-level language code with real-time capability
- Versatile hardware platforms with the SIMATIC IPCs and the Open Controller

Find out more:

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PC-based automation with the SIMATIC S7-1500 Software Controller:

- Independence from the operating system
- Integrated safety functions
- User-friendly engineering
- High level of security

Discover more:
siemens.com/software-controller