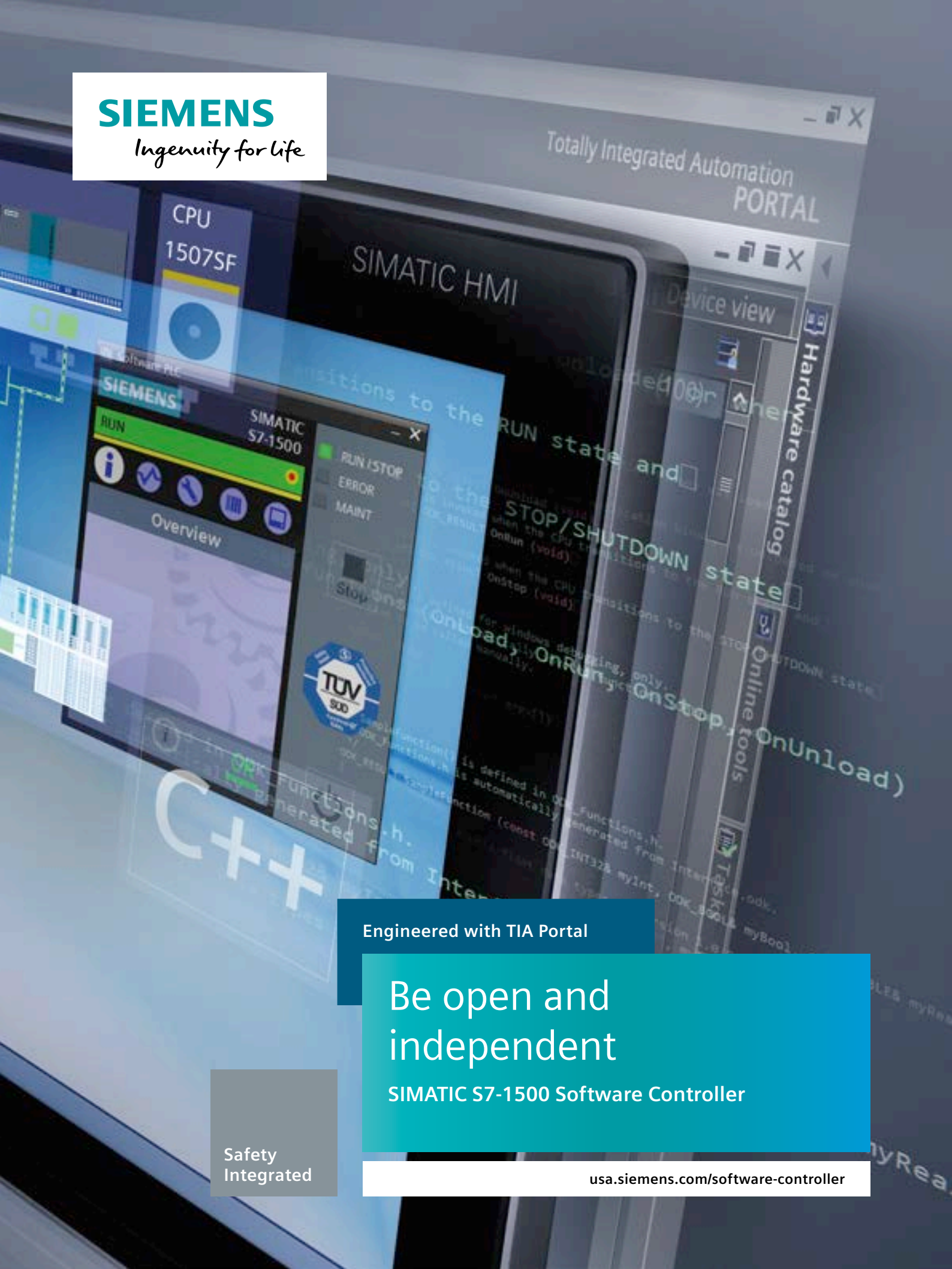
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Ingenuity for life
Totally Integrated Automation
PORTAL
CPU
1507SF
SIMATIC HMI
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RUN
SIMATIC
S7-1500
Overview
RUN/STOP
ERROR
MAINT
Stop
TÜV
Device view
Hardware catalog
Online tools
C++
Engineered with TIA Portal
Be open and independent
SIMATIC S7-1500 Software Controller
Safety Integrated
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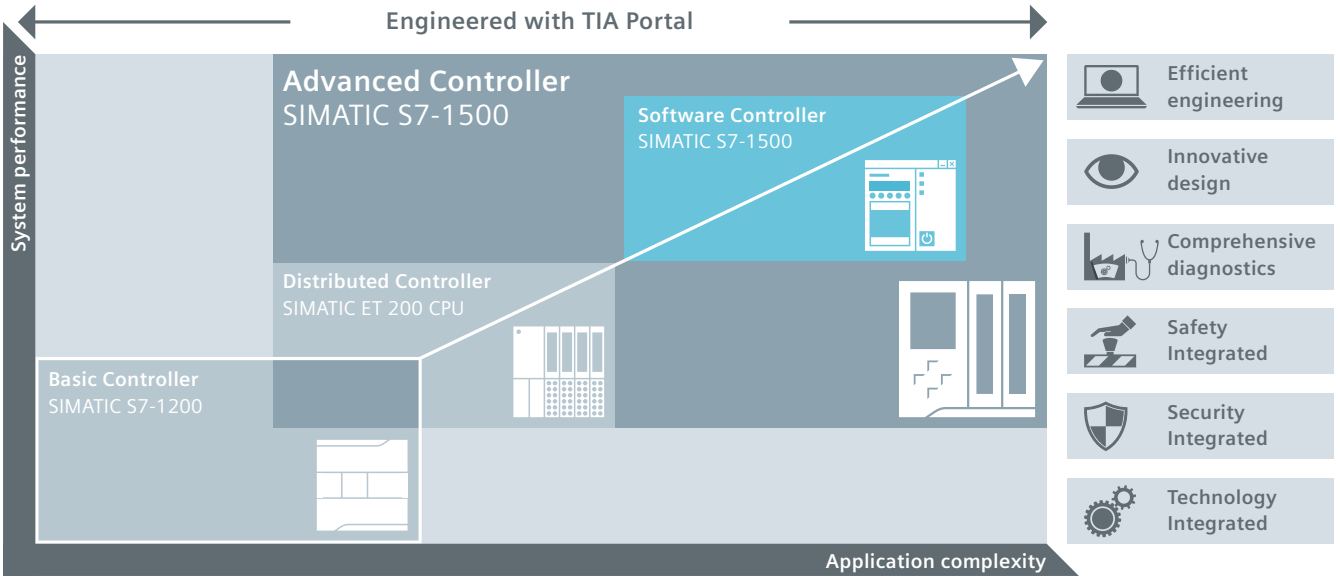
SIMATIC S7-1500 Software Controller – the PC-based controller from the SIMATIC series of controllers



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 Controllers for simple and stand-alone applications
- S7-1500 Advanced Controllers for medium-sized and complex applications
- ET 200SP Distributed Controllers for decentralized applications
- S7-1500 Software Controllers for PC-based applications

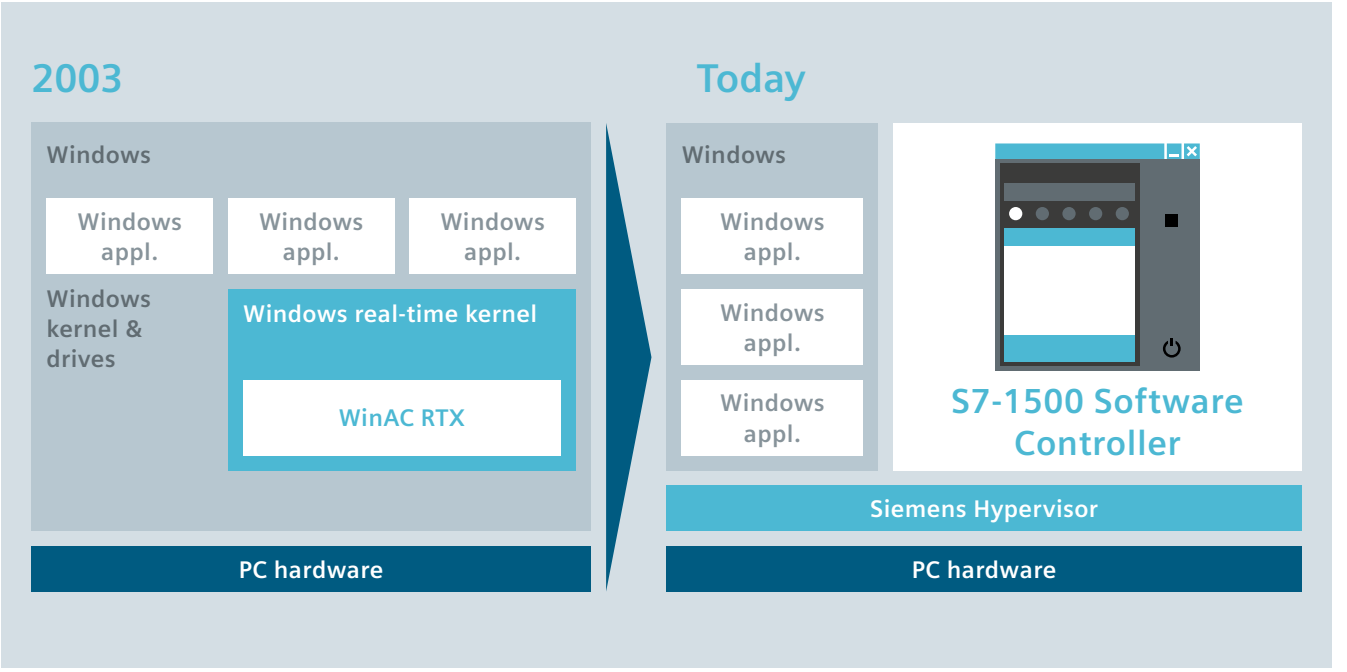
SIMATIC Controllers and their advantages

SIMATIC Controllers are impressively user-friendly, offering both functional integration and scalability. The coordinated selection of products offers the ideal controller for every application. As with all SIMATIC controllers, the SIMATIC Software Controller is also available with Safety Integrated.

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.

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 a crash inevitably results in the failure of the controller, and a standstill of the entire machine or a 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.

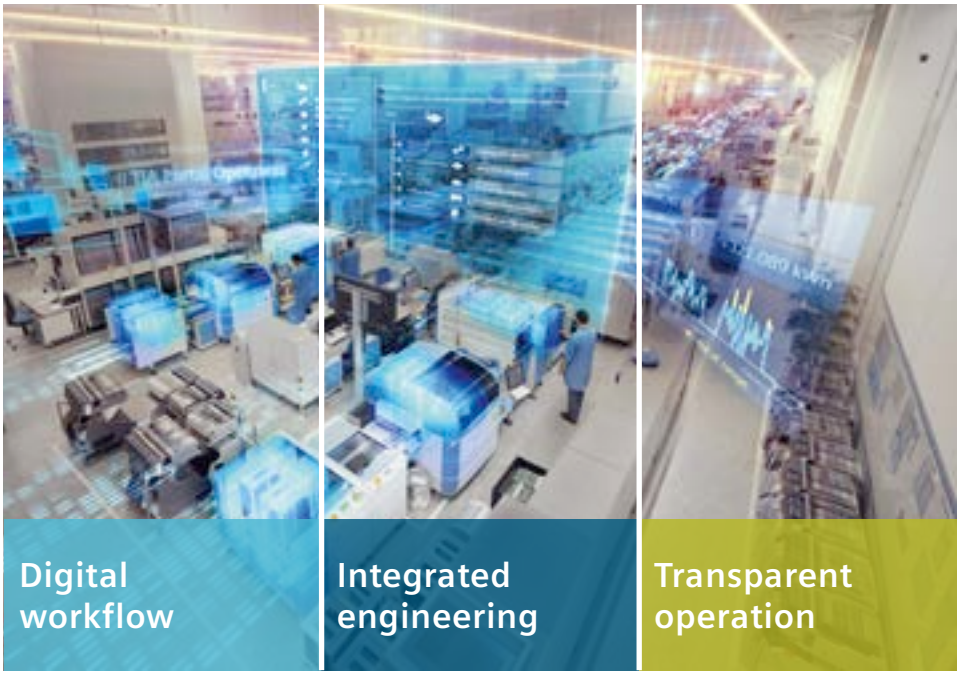
If the controller is handling processes involving heating or adhesives, for example, shutting down and restarting the process is extremely time-consuming. It is necessary to ensure that the adhesives used do not harden, while heating processes usually have to be reset and restarted in several stages.

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 a 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 Kit enables high-level languages to be integrated into the STEP 7 user program. With version V2.5 or later, the Software Controller additionally has an OPC UA server. 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 intergrated into the STEP 7 program in the TIA Protal without any high-level language skills.

TIA Portal – your gateway to automation in the digital enterprise



Digital workflow | **Integrated engineering** | **Transparent operation**

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 Integrated
- 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.

Integration of model-based development:
Real advantages of simulation data. To transfer model-based controller and machine simulation directly from MATLAB Simulink to SIMATIC S7-1500 Software Controller or to CPU 1518 MFP / 1518 ODK makes simulation fast and simply possible without high-level and ODK knowledge.

Try out the SIMATIC S7-1500 Software Controllers 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
- Modulation of systems with the Target 1500S for Simulink
- Versatile hardware platforms with the SIMATIC IPCs and the Open Controller

The hardware platforms for SIMATIC S7-1500 Software Controllers

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. The pre-installed S7-1500 Software Controller can also optionally be used for control as a fail-safe version with Safety Integrated.

The SIMATIC ET 200SP Open Controller's compact design and modular expandability makes it particularly suited for series machine manufacturing. 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.

SIMATIC IPCs

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

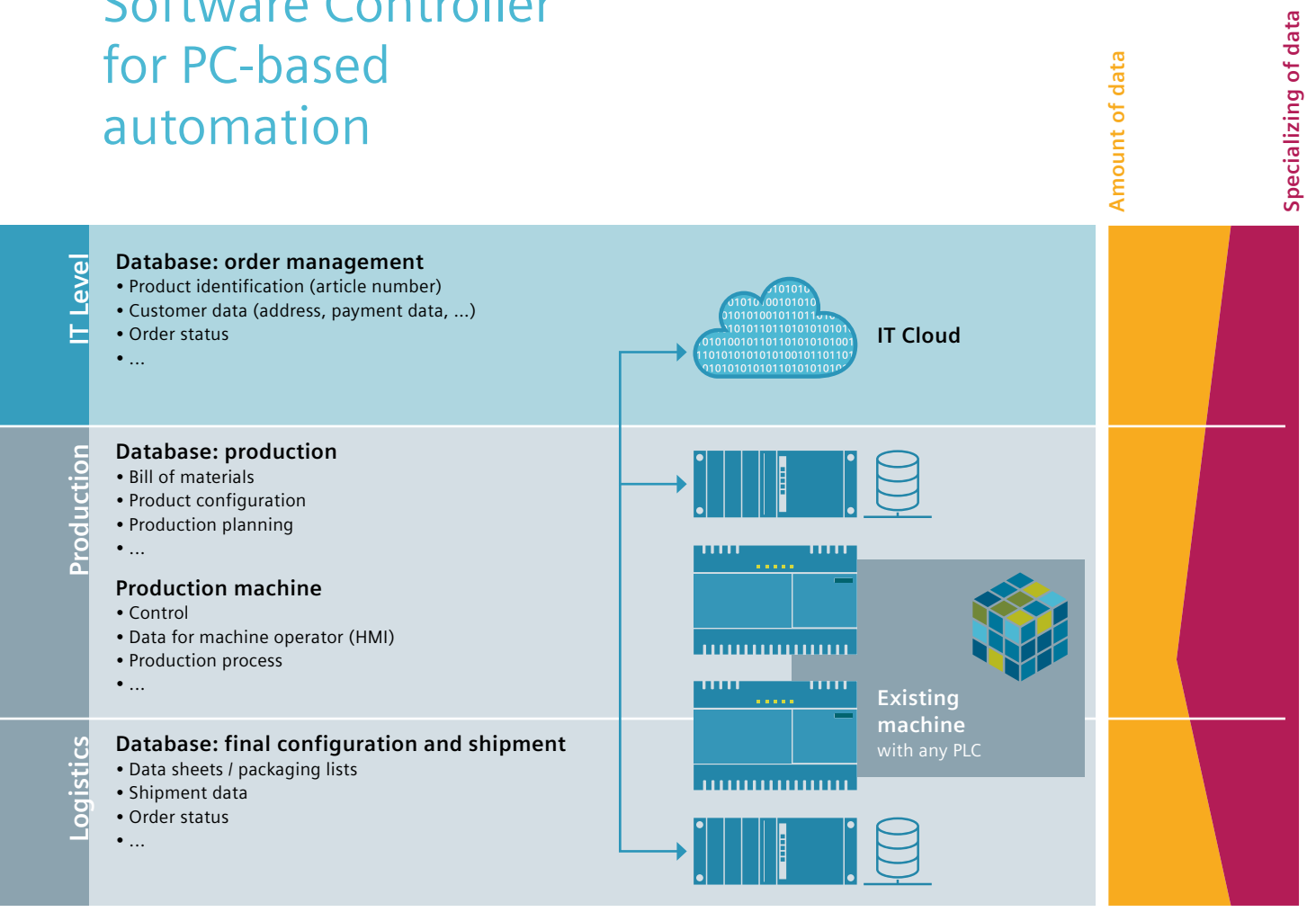
Reliable continuous operation

- 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

Software Controller for PC-based automation



Digitalization with PC-based Automation – common data flow within the industrial environment

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, access protection, and Safety Integrated are just as much part of the package as interfaces to PROFIBUS and PROFINET. A new feature in version V2.5 or later is engineering-free updating of the PLC program on series-production machines on site.

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
- Integration of “model-based development” with the Target 1500S™ for Simulink

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U.S. Order No.: BAGF-B10006-0118
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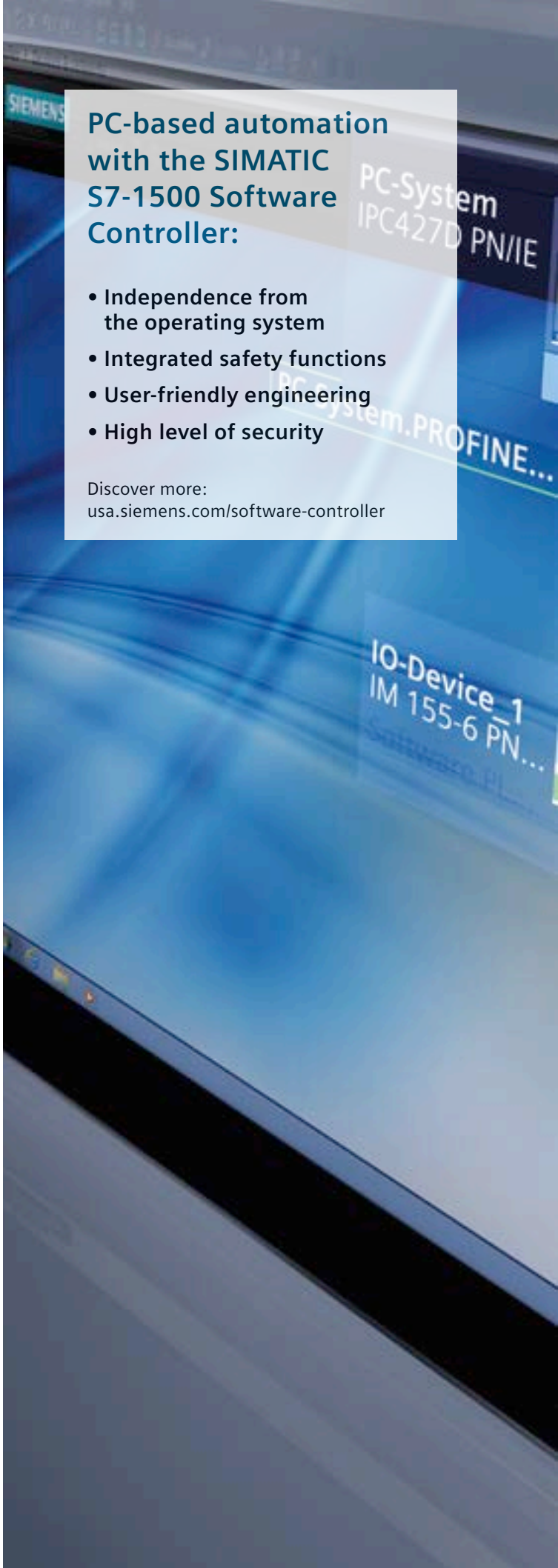

PC-based automation with the SIMATIC S7-1500 Software Controller:

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

Discover more:
usa.siemens.com/software-controller