

# Integrated functions in all SIMATIC controllers

Apart from scalability, every controller offers integrated system functions such as efficient engineering, high performance, innovative design, reliable diagnostics, Safety Integrated, Technology Integrated and Security Integrated. This allows flexibility in the design or adaption of automation solutions, without repeatedly having to accumulate further know-how and expertise.



## Efficient engineering

The seamless integration of SIMATIC controllers in the common TIA Portal engineering framework permits the consistent storage of data, the smart library concept, and a uniform operating philosophy. This makes the use of universal functions particularly easy.

## High performance

The highest performance in every class: The controllers are scalable not only in their speed of processing, but also in their performance characteristics. In addition, they offer networking options across different communication standards.

## Reliable diagnostics

The integrated system diagnostics with efficient fault analysis and fast troubleshooting cuts commissioning times and minimizes downtimes in production. Faults are uniformly indicated in the engineering on the HMI, in the web server and in the display of the SIMATIC S7-1500.

## Innovative design

Each controller can be set up and wired differently. The SIMATIC controller portfolio offers modular, compact and PC-based CPUs.

## Safety Integrated

Fail-safe SIMATIC controllers offer the greatest possible level of integration: one controller, one communication system and one engineering for both standard and fail-safe automation.

## Technology Integrated

Technology functions for metering and measuring tasks, closed-loop control and motion control are integrated into all SIMATIC controllers.

## Security Integrated

Intellectual property and the investment it represents are safeguarded by the integration of know-how protection, protection against copying and manipulation, and additional password protection for access to program contents.

**Find out more:**

**siemens.com/controller**

**Find the right controller for your application:**

- Detailed overview of all controllers
- Transparent representation with videos and 3-D animations
- References and applications

**SIMATIC Controllers – everything at a glance!**



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Article No.: DFFA-B10100-00-7600  
Dispo 06303  
756210 WS 111510.  
Printed in Germany  
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The image shows a Siemens SIMATIC controller cabinet in a factory setting. The cabinet is white with a transparent door. On the door, there is a label for 'CPU 1507S' and 'S7-1500'. The cabinet is filled with various modules, including a power supply unit (PS 70W 120V/230V), digital input modules (DI 32x24VDC BA), digital output modules (DO 32x24VDC BA), and a digital output module (DQ 32x24VDCIO). The background shows a factory floor with other equipment and a worker in a hard hat. The Siemens logo is in the top left corner.

**SIEMENS**

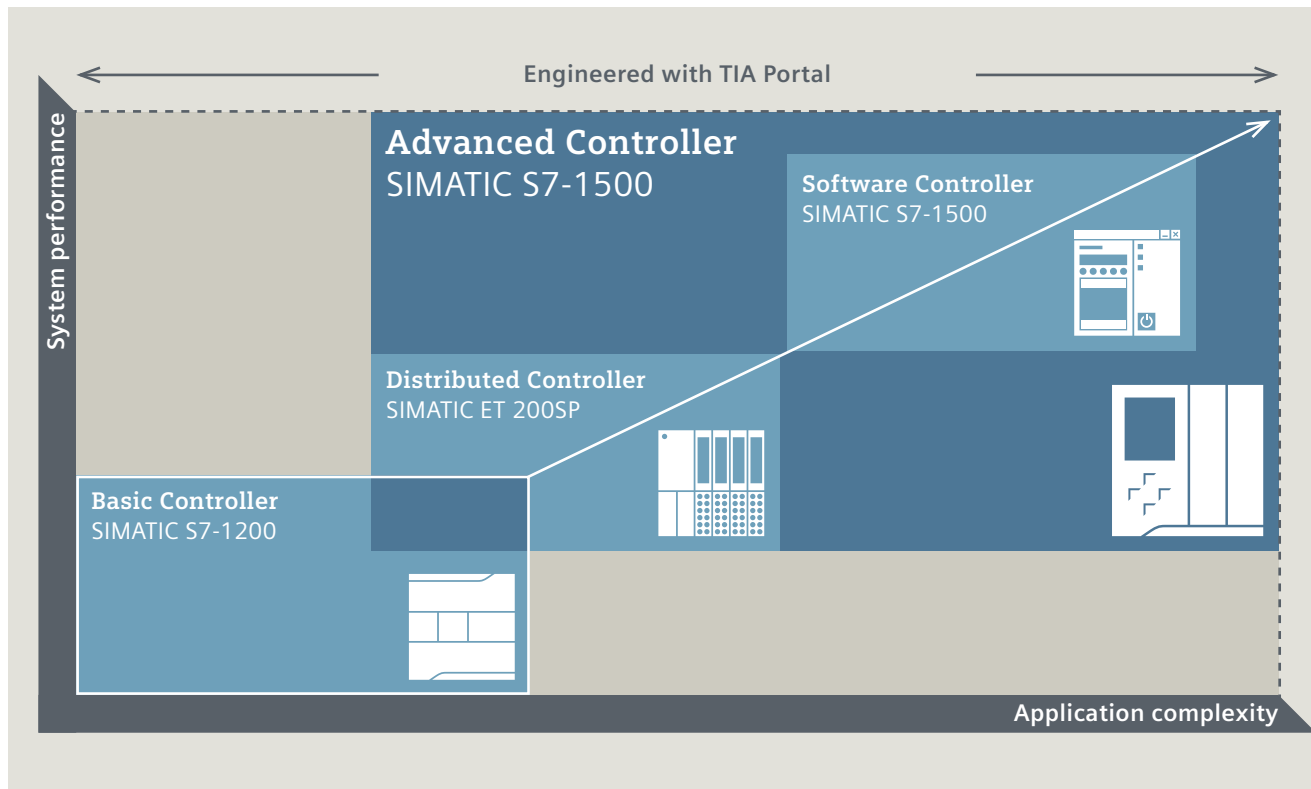
The intelligent choice for  
your automation tasks

SIMATIC Controllers

[siemens.com/controller](https://www.siemens.com/controller)

# Overview of the SIMATIC controller portfolio

Siemens offers the right controller for a wide range of automation requirements. The SIMATIC range of controllers comprises of Basic, Advanced, Distributed and Software Controllers offering impressive scalability and integration of their functions. The engineering in the Totally Integrated Automation Portal (TIA Portal) enables optimum automation solutions to be found for every application.



## Basic Controller

Basic Controllers are the intelligent choice for compact automation solutions with integrated communication and technology functions. They are available in both standard and safety versions.

## Distributed Controller

Distributed Controllers are used for machines with a distributed architecture and for series machines with limited space available. They combine the advantages of a SIMATIC S7-1500 with the design of a SIMATIC ET 200SP.

## Advanced Controller

Advanced Controllers automate not only complete production plants, but also applications which demand the greatest performance, flexibility and networking capability. A new addition to the portfolio is the SIMATIC S7-1500 controller in a compact design.

## Software Controller

The Software Controller is used wherever maximum precision and speed are required as well as PC-based automation. The PC-based controller is fully independent of the operating system during operation.

# The intelligent choice for every requirement

Every machine or plant is different in terms of system performance needs and complexity. Requirements regarding technology and safety systems may be applied. With its comprehensive range of SIMATIC controllers, Siemens offers the perfect control solution for every application. The overview below simplifies the intelligent choice for every requirement!

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## Application

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## CPU types

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### Engineering efficiency

Programming software  
Programming languages

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### Innovative design

Portfolio  
Design of the IO modules

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Wiring  
Mounting

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PROFINET interfaces/ports (max.)

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### High performance

Performance characteristics  
Communication options\*

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Isochronous mode (IRT)

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### Reliable diagnostics

Integrated system diagnostics  
User-defined messages  
Display of the diagnostic message

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### Safety Integrated

Fail-safe

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### Technology Integrated

Speed-controlled axis  
Positioning  
Relative synchronous operation  
Counters

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PID controller

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### Security Integrated

Know-how protection  
Copy protection





**Basic Controller –  
Be flexible thanks to networking possibilities**

- Compact controllers with integrated IOs, technology and communication functions
- Networking options via various communication standards by means of integrated functions (PROFINET, Modbus, etc.) or add-on modules (IO-Link, AS-i, etc.)
- Flexible in design and with modular expansion options

Compact automation solution with requirements for integrated communication and technology functions – often combined with cost effectiveness

CPU 1211C, 1212C, 1214C (F), 1215C (F), 1217C

STEP 7 Basic or Professional in the TIA Portal

LAD, FBD, SCL

Compact CPUs

Expandable centrally (up to 8 modules)

Screw terminals

IP20 DIN rail

1/2 (RJ45)

Small

PROFINET, PROFIBUS, PtP, AS-Interface, IO-Link, CANopen, Modbus RTU and TCP, Telecontrol

+

Engineering, HMI, web server, SIMATIC S7 App

+

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**Advanced Controller –  
Increase productivity with the ultimate power**

- Controllers with extensive system functions and high performance
- Unique power thanks to high-performance backplane bus, extremely short terminal-to-terminal response times and high-speed signal processing
- Ensures maximum performance and user-friendliness

Complete production automation and applications for medium-sized and high-end machines with high demands in terms of performance, communication, flexibility and technology functions

CPU 1511C, 1512C, 1511 (F), 1513 (F), 1515 (F), 1516 (F), 1517 (F), 1518 (F)

STEP 7 Professional in the TIA Portal

LAD, FBD, STL, SCL, GRAPH

Compact and modular CPUs

Expandable centrally (up to 30 modules) and on distributed basis

Push-in and screw terminals

IP20 mounting bar

3/4 (RJ45)

Large

PROFINET (including PROFINsafe, PROFInergy and PROFIdrive), PROFIBUS, PtP, Modbus RTU and TCP

+ (distributed)

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Display, engineering, HMI, web server, SIMATIC S7 App

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++ (S7-1500 compact CPU integrated or with technology modules)

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**Distributed Controller –  
Save space with the smallest footprint**

- Distributed controllers
- ET 200SP controller: combines the advantages of the S7-1500 and the very compact design of the ET 200SP with a high channel density
- Space savings in the control cabinet and financial savings due to the use of distributed intelligence
- ET 200pro controller with IP65/67 protection for use outside the control cabinet

Machines with distributed architecture, series machines, with limited space requirements for the mid-performance range

CPU 1510SP-1PN (F), 1512SP-1PN (F), 1515SP PC

STEP 7 Professional in the TIA Portal

LAD, FBD, STL, SCL, GRAPH

Modular CPUs

Expandable centrally (up to 64 modules) and on distributed basis

Push-in

IP20 DIN rail and IP67

2/3 (RJ45, FC, FOC), flexible bus adapter

Average

PROFINET (including PROFI-safe, PROFI-energy and PROFI-drive), PROFIBUS, PtP, Modbus RTU and TCP, AS-Interface, IO-Link

+ (distributed)

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Engineering, HMI, web server, SIMATIC S7 App

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++ (with technology modules)

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**Software Controller –  
Be open and independent**

- PC-based controller independent of the operating system
- Complete engineering 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
- Comprehensive hardware platforms with SIMATIC IPCs

Machines in the high-performance range which require maximum precision and speed, as well as a PC connection

CPU 1507S

STEP 7 Professional in the TIA Portal

LAD, FBD, STL, SCL, GRAPH, high-level languages (C++)

Software-based CPU

Expandable on distributed basis

Distributed I/O system

Hardware dependent

Hardware dependent

Large

Via PC interfaces for PROFINET (including PROFI-energy), PROFIBUS, PtP, Modbus RTU and TCP, AS-Interface, IO-Link

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Software display, engineering, HMI, web server

+

+

+

++ (with distributed technology modules)

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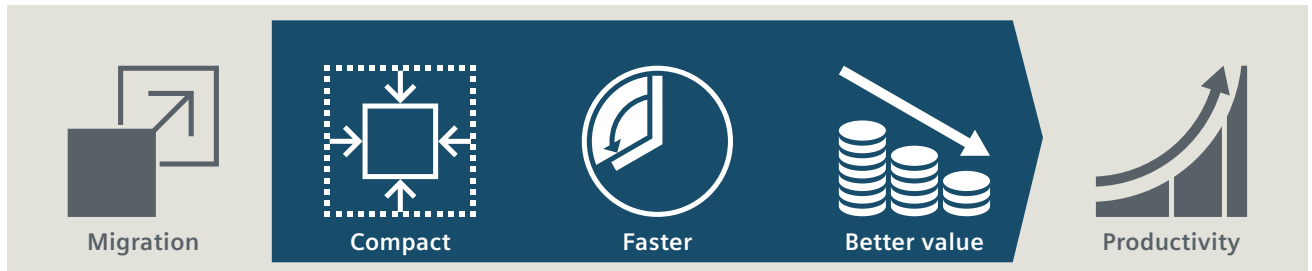
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# Now is the time to try something new

## Modernization with SIMATIC controllers – Higher productivity, efficiency and availability by means of retrofit or modernization

To remain competitive in the long term, machines and plants must be continually adapted to the latest requirements. If your automation systems are no longer state-of-the-art, then a modernization will bring your company advantages in productivity, efficiency and availability. For this purpose, Siemens offers solutions using SIMATIC technologies tailored to your individual needs. Benefit from the time-saving simulation of automation while production is in progress, optimized control options by means of I/O adapters and integrated system diagnostics, as well as global support for retrofitting or modernization. Regardless of whether you want to completely modernize your plant or just replace parts of it.



### Your advantages at a glance

- **Higher productivity, overall efficiency and usability:**  
All-in-one solution, where SIMATIC controllers, SIMATIC HMI and SINAMICS drives work optimally together – engineered in the TIA Portal
- **The latest manufacturing standards, machine safety requirements, and industrial security requirements:**  
Unrestricted participation in technological progress
- **Minimized downtimes:**  
Integrated fault diagnostics and detailed display of faults
- **Increased profitability:**  
Global long-term availability of all Siemens components
- **Improved competitiveness:**  
Optimized availability and efficiency due to the latest generation of SIMATIC automation systems

For detailed information, visit:

**[siemens.com/tia-migration](https://www.siemens.com/tia-migration)**

### Planning of modernization strategy

With a host of online tools from Siemens, individual migration strategies can be planned according to needs:

- **Documentation:**  
Migration and conversion guides
- **Hardware:**  
Module code conversion
- **Software:**  
Integrated and external program converter
- **I/O conversion:**  
I/O adapter table
- **Communication:**  
Wide range of sample projects

### Individual modernization support

On request, Siemens provides personal support for quite specific requirements. The analysis and testing of the core functionalities are performed by your Siemens contact:

**[siemens.com/industry/contact](https://www.siemens.com/industry/contact)**

For the complete service from consulting, through implementation, right up to full project completion, Siemens offers extensive modernization services:

**[siemens.com/fa-migration](https://www.siemens.com/fa-migration)**