

# SIMATIC Controllers

The innovative solution for all automation tasks

Overview · April 2008



# SIMATIC

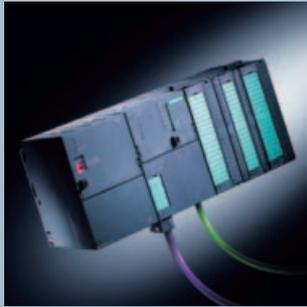
[www.siemens.com/automation](http://www.siemens.com/automation)

# SIEMENS

# SIMATIC Controllers

## Integration in engineering, communication and diagnostics

### Modular Controllers



#### Your benefits

- Ready-to-use
- Long-term compatibility and availability
- Can be used in harsh environments
- Modular expandability and scalability
- Maintenance-free

#### Application areas

- Control with centralized and distributed I/O
- Technological tasks
- Fault-tolerant
- Fail-safe

### Embedded Automation



#### Your benefits

- Ready-to-use
- Multifunctional
- Vibration-proof
- Maintenance free
- Customized versions

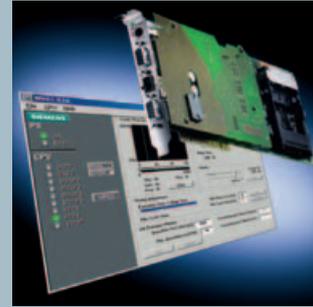
**To be able to automate your machines and plants economically and flexibly, you need optimum solutions for every application area. Whether you want control "only", or you also want to implement other automation tasks such as operator control and monitoring , technology or data archiving – we always have the right solution for you! And we provide it with unique integration in engineering, communication and diagnostics.**

Our SIMATIC Controllers are based on various hardware and software architectures:

#### Modular Controllers

Modular Controllers are optimally designed for control tasks and for ruggedness and long-term availability. They can be flexibly expanded at any time via plug-in I/O modules, function modules and communications modules. Depending on the size of the application, the right controller can be selected from a large range according to performance, quantity frameworks and communications interfaces. The modular controllers can also be used as fault-tolerant or fail-safe systems.

## PC-based Controllers



### Application areas

- Control and Operator control and monitoring
- Technological tasks
- Integration of user programs
- Integration of C/C++ programs
- Data exchange via OPC

### Your benefits

- Flexible in use
- Open in hardware and software configuration
- Use of available PC resources
- Participation in constant PC innovations
- Multifunctional
- Customized PC versions

### Application areas

- Control and Operator control and monitoring
- Technological tasks
- Data acquisition and archiving
- Link to PC hardware and software
- Integration of C/C++ programs
- Data exchange via OPC

### Embedded Automation

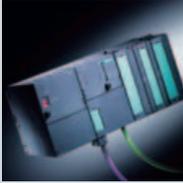
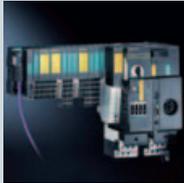
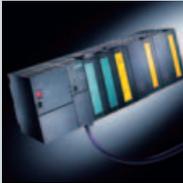
Embedded Automation products use the openness of PC-based systems and also offer an increased level of ruggedness. The controller, PC applications and operator control and monitoring system, if required, run on a shared and rugged platform – without using rotating parts such as hard disks or fans. The operating system used is tailored and optimized to the hardware architecture in each case. The Embedded Automation products are ready-to-use and can be installed directly on DIN rails or at the machine on-site.

### PC-based Controllers

PC-based Controllers can run on standard PC systems either as exclusively software PLCs or as slot PLCs in the form of a plug-in card. Any PC applications, operator control and monitoring tasks, control tasks and technological functions can all be easily combined into an overall automation solution. The extensive resources of an industrial PC, such as the work memory, are used for this purpose.

# SIMATIC Controllers

## The entire range at a glance

Modular Controllers				
<b>Control</b>	<b>S7-200</b> 	<b>ET 200 with CPU</b> 	<b>S7-300</b> 	<b>S7-400</b> 
<b>Fail-safe control</b>		<b>ET 200 with F-CPU</b> 	<b>S7-300 with F-CPU</b> 	<b>S7-400 with F-CPU</b> 
<b>High-available or fault-tolerant control</b>				<b>S7-400</b> – H-CPU – FH-CPU 
<b>Control with technology functions</b>	<b>S7-200</b> 	<b>ET 200S</b> with technology modules 	<b>S7-300</b> – Compact, T-CPU and FMs – Easy Motion Control 	<b>S7-400</b> – FM 458-1DP – Easy Motion Control 
<b>Control, operator control and monitoring</b>			<b>C7</b> 	
<b>Control, operator control and monitoring and PC applications</b>				

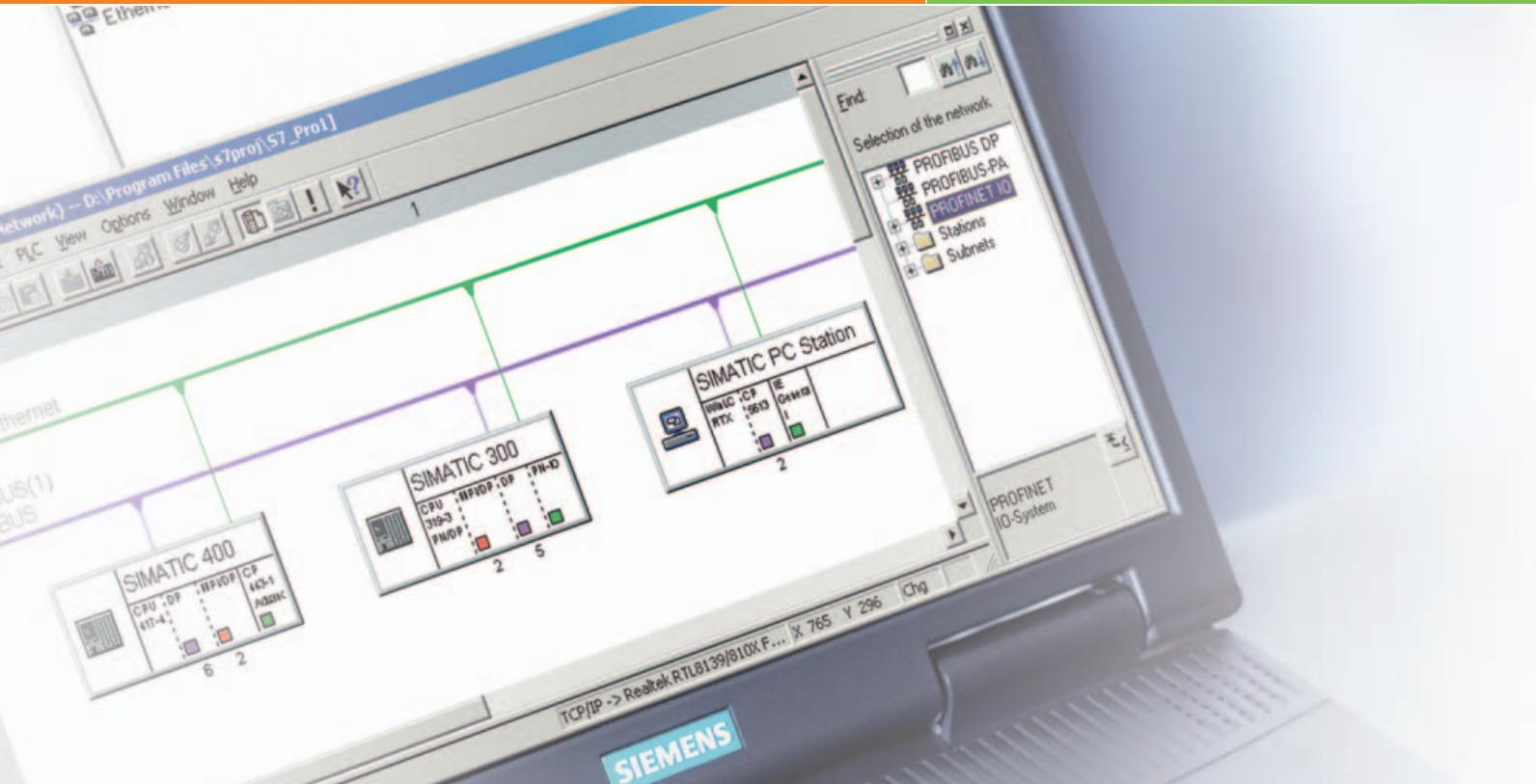
## Totally Integrated Automation

SIMATIC Controllers are an essential component part of Totally Integrated Automation. The extensive product range enables the right solutions for the most diverse application areas – in

cost-sensitive standard production, as well as in plant building and special mechanical equipment manufacture, where it is crucial to reduce engineering and startup costs.

### Embedded Automation

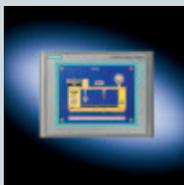
### PC-based Controllers



**Microbox 420-T**



**WinAC MP 277**



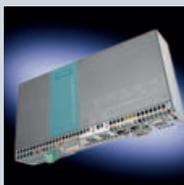
**WinAC MP 377**



**S7-mEC RTX**



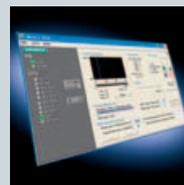
**Microbox 427B-RTX,  
427B-HMI/RTX**



**Panel PC 477B-HMI/RTX**



**WinAC RTX**

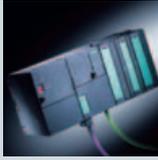


**WinAC Slot PLC**



# Selection guide

## Modulare Controller

	S7-200	S7-300	S7-400	ET 200 with CPU		C7
						
<b>SIMATIC product/family</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
Brief description	Modular micro-controllers for control tasks in the low-end performance range	Modular controllers for system solutions in manufacturing automation in the low to mid-performance range	Modular controllers for system solutions in manufacturing and process automation in the mid to high-end performance range	Distributed, bit-modular I/O system with local intelligence With degree of protection IP20	With degree of protection IP65/67	S7-300 controller and operator panel in one control unit
Range	• 5 compact CPUs	• 7 standard CPUs • 6 compact CPUs • 5 fail-safe CPUs • 2 technology CPUs	• 9 standard CPUs • 2 fail-safe CPUs • 3 fault-tolerant CPUs	• 3 standard CPU • 2 fail-safe CPU	• 1 standard CPU	• 3 versions (different CPU/panel combination) • Customized design on request
Spare parts guaranteed for	10 years	10 years	10 years	10 years		10 years
Temperature range	0...55 °C <sup>1)</sup>	0...60 °C <sup>2)</sup>	0...60 °C <sup>3)</sup>	0...60 °C <sup>2)</sup>	0...55 °C	0...50 °C <sup>3)</sup>
<b>Performance</b>						
Execution time for bit operation, min.	0.22 µs	0.01 µs (CPU 319)	0.018 µs (CPU 417)	0.1 µs		0.1 µs
<b>Memory</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
Main memory, max.	Program 24 KB, Data 10 KB	1400 KB (CPU 319)	30 MB (CPU 417)	128 KB <sup>5)</sup>	256 KB	128 KB
Load memory/mass storage, max.	Memory cassette 256 KB	Micro Memory Card 8 MB	Memory Card 64 MB	Micro Memory Card 8 MB		Micro Memory Card 8 MB
Backup, max.	Program on EEPROM, dynamic data on integral capacitor or optionally on battery module	Program and data on Micro Memory Card (maintenance-free)	Program and data on battery module	Program and data on Micro Memory Card (maintenance-free)		Program and data on micro memory card (maintenance-free)
<b>I/O</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
I/O address area, max.	128 / 120 digital 30 / 15 analog	8192 / 8192 byte	16384 / 16384 byte	244 / 244 byte	2048 / 2048 Byte	2048 / 2048 byte
Central · I/O integrated in CPU · I/O modules on CPU	● ●	● (compact CPU) ●	●	●	●	● ●
Distributed · I/O modules on PROFIBUS · I/O modules on PROFINET		All ET 200 I/O devices ET 200S, ET 200pro, ET 200M	ET 200S, ET 200pro, ET 200M	ET 200S, ET 200pro, ET 200M		ET 200S, ET 200pro, ET 200M (via CP)
<b>Technological functions</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
Loadable function blocks	●	●	●	●	●	●
Basic functions integrated into CPU	●	● (compact CPUs)				●
Special modules, plugged in centrally	●	●	●	●	●	●
Special technology controllers		● (technology CPUs)				
Isochronous mode		●	●		●	
<b>Safety/availability</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
Fail-safety		● (F-CPU)	● (F-CPU / FH-CPU)	●		
Fault tolerance			● (H/ FH CPU)			
Configuration changes during operation (CIR)			●			
Connection/disconnection of centralized I/O during operation (hot swapping)			●	●		
<b>HMI functions</b>						
Integrated						● (Touch Panel or Operator Panel)
<b>PC functions</b>						
Interfacing of C/C++						
Data acquisition and archiving						
Expandable with PC standard hardware						
Integration of PC standard hardware/software						
<b>Engineering</b>						
Configuring/programming software	STEP 7 Micro/WIN	STEP 7 / STEP 7 Professional				
Programming languages	LD, FBD, IL	KOP (LD), FUP (FBD), AWL (IL), S7-Graph (SFC), S7-SCL (ST), S7-HiGraph, CFC				
Configuring of integrated HMI functions						WinCC flexible (C7-613: STEP 7)
<b>Communication</b>				<b>ET 200S</b>	<b>ET 200pro</b>	
MPI	●	●	●	●	●	●
PtP	● (Freepoint)	● (also via CP)	● (via CP)			● (via CP)
AS-Interface	● (via CP)	● (via CP)				● (via CP)
PROFIBUS	● (via CP as DP-Slave)	● <sup>4)</sup> (also via CP)	● (also via CP)	●	●	● (also via CP)
PROFINET		● (also via CP)	● (also via CP)	●	●	● (via CP)
Others integrated	Freepoint, PPI, via CP: Ind. Ethernet					
Web-Server		● (PN-CPU)	● (PN-CPU)	●	●	

<sup>1)</sup> with SIPLUS components, also for extended temperature range -25...+70°C and aggressive atmosphere/condensation ([www.siemens.com/siplus](http://www.siemens.com/siplus))  
<sup>2)</sup> as <sup>1)</sup>, but temperature range -25...+60°C

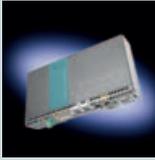
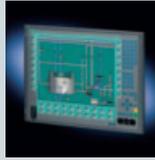
<sup>3)</sup> with SIPLUS components also for aggressive atmosphere/condensation ([www.siemens.com/siplus](http://www.siemens.com/siplus))

<sup>4)</sup> with Technology CPU, additionally PROFIdrive

<sup>5)</sup> 192 K F instructions

Embedded Automation

PC-based Controllers

S7-mEC RTX	Microbox 427B-RTX, 427B-HMI/RTX	Microbox 420-T	Panel PC 477B-HMI/RTX	WinAC MP 277/377	WinAC RTX	WinAC Slot-PLC	
							
Modular controller in S7-300 design (fanless, diskless) with Win XP Embedded and WinAC RT	Embedded DIN rail PC (fan-free, hard-disk-free) with Windows XP Embedded and software PLC	Embedded DIN rail PC (fan-free, hard-disk-free) with Windows XP Embedded and software PLC	Embedded rail-mounted PC (fan-free hard-disk-free) with Windows XP Embedded, software PLC and technological functions	Embedded Panel PC (fan-free, hard-disk-free) with Windows XP Embedded, software PLC and HMI	S7 controller as software PLC for the PC with Windows operating system	S7 controller as PCI plug-in card for the PC with Windows operating system	
• 1 Standard product	• 1 Standard product • Customized/OEM product on request	• Standard product • Customized/OEM product on request	• Panel PC with 12", 15" or 19", key or touch • Customized design and OEM product on request	• Standard product • Customized design and OEM product on request	• 1 software PLC WinAC RTX 2008	• 2 slot PLCs	
5 years	5 years	5 years	5 years	10 years		5 years	
0...50 °C	0...50 °C	0...50 °C	5...45 °C	0...50 °C	PC dependent	PC dependent	
	0,01 µs (Pentium M 1,4 GHz)	0.01 µs (PIII 933 MHz)	0,01 µs (Pentium M 1,4 GHz)		0.004 µs (Pentium IV, 2.4 GHz)	0.04 µs (WinAC Slot 416)	
1 GB RAM	1 GB RAM	512 MB RAM	1 GB RAM	256 kB	512 kB	Available PC main memory <sup>3)</sup>	3.2 MB
2 GB Flash Disk	2 or 4 GB compact flash card	1 or 2 GB compact flash card	2 or 4 GB compact flash card			Dependent on PC mass memory	Memory Card 64 MB
Controller data (256 kB SRAM) without UPS, all data with UPS	Controller data (128 kB SRAM) without UPS, all data with UPS	Controller data (30kB SRAM) without UPS, all data with UPS	Controller data (128 kB SRAM) without UPS, all data with UPS	Controller data (128kB MRAM) without UPS	Controller data (256kB MRAM) without UPS	All data with UPS <sup>4)</sup>	All data
16384 / 16384 byte	16384 / 16384 byte	2048 / 2048 byte	16384 / 16384 byte	4096 / 4096 byte	8192 / 8192 byte	16384 / 16384 byte	16384 / 16384 byte
●	● (via PCI-104 cards and ODK)	● (8 DA)	● (via PCI-104 cards and ODK)			● <sup>2)</sup>	● <sup>2)</sup>
Available soon	All ET 200 I/O devices						
ET 200S, ET 200pro, ET 200M						ET 200S/pro/M	
●	●	●	●	●		●	●
		●					
	●	●	●			●	●
● optional <sup>1)</sup>	● (427B-HMI/RTX)		●	● (Multipanel)		● (can be installed on PC)	● (can be installed on PC)
● (via ODK)	● (via ODK)	● (via ODK)	● (via ODK)			● (via ODK)	● (via ODK)
● (Large data volumes)	●		● (Extremely large data volumes)	● (Extremely large data volumes)			
● (max. 3 x PCI-104 cards) <sup>2)</sup>	● (max. 3 x PCI-104 cards)		● (max. 3 x PCI-104 cards)			● (PC-dependent)	● (PC-dependent)
● (via ODK, OPC) <sup>2)</sup>	● (via ODK, OPC)	● (via ODK, OPC)	● (via ODK, OPC)			● (via ODK, OPC)	● (via ODK, OPC)
STEP 7 / STEP 7 Professional					STEP 7 / STEP 7 Professional		
LD, FBD, IL, SCL (ST), S7-Graph (SFC), S7-HiGraph, CFC	WinCC flexible (optional)		WinCC flexible	WinCC flexible Standard, Advanced	KOP (LD), FUP (FBD), AWL (IL), S7-Graph (SFC), S7-SCL (ST), S7-HiGraph, CFC		
	● (via CP distributed)	● (via CP distributed)	● (via CP distributed)	●	● (via CP distributed)	●	● (via CP distributed)
●	●	● <sup>1)</sup>	●	●	● (via CP in PC)	●	●
Ind. Ethernet, USB	Ind. Ethernet, USB, RS232, DVI/VGA			Ind. Ethernet, USB, RS232	PC interfaces		

<sup>1)</sup> for Microbox 420-T additionally PROFIdrive  
<sup>2)</sup> via PC-cards and ODK  
<sup>3)</sup> non-paged memory  
<sup>4)</sup> 128 kB with specific SIMATIC PCs without UPS  
<sup>5)</sup> Available soon

## Get more information

SIMATIC Controllers:

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SIMATIC Automation Systems:

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