

SIMATIC Controllers

The innovative solution for all automation tasks

Overview • November 2011



SIMATIC

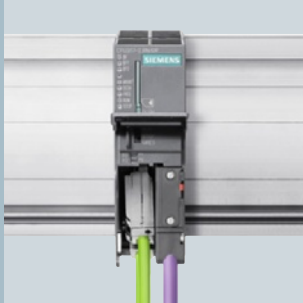
Answers for industry.

SIEMENS

SIMATIC Controllers

System-wide engineering, communications and diagnostics

SIMATIC Modular Controllers



Your benefits

- Ready to use
- Long-term compatibility and availability
- For use in harsh environments
- Modular expansion and scalability
- Vibration-resistant
- Maintenance-free

Fields of application

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

You need optimal solutions for every application area to enable you to automate your machines and plants economically and flexibly.

Whether you want open-loop control, or you also want to cover other additional automation applications such as visualization, technology or data archiving – we always have the right solution for you! And with a unique level of integration in engineering, communications and diagnostics.

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

SIMATIC Modular Controllers

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

SIMATIC PC-based Controllers



Your benefits

- Flexible in use
- Openness in hardware and software configuration
- Use of existing PC resources
- Participation in the continuous PC innovation process
- Multifunctional
- Customized PC variants
- Embedded bundles:
 - Ready to use
 - Rugged
 - Maintenance-free

Fields of application








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

SIMATIC PC-based Controllers

SIMATIC PC-based Controllers use the realtime-capable software controller WinAC RTX or its fail-safe variant WinAC RTX F on the basis of Windows operating systems. Any PC applications, operator control and monitoring tasks, as well as technological functions can simply be combined here to form an overall automation solution. The SIMATIC embedded bundles, with their highly rugged design and pre-installed, ready-to-use automation software, allow the advantages of PC-based Automation to be implemented at the machine.

SIMATIC Controllers

The complete range at a glance

SIMATIC Modular Controllers				
Control	S7-1200 	ET 200 with CPU 	S7-300 	S7-400 
Controlling with technology functions	S7-1200 	ET 200 	S7-300 with Easy Motion Control or technology CPU (optionally with Safety) 	S7-400 with FM 458 
Fail-safe control		ET 200 with F-CPU 	S7-300 with F-CPU 	S7-400 with F-CPU 
Fault-tolerant control				S7-400 H system optionally with Safety 
Control, operator control and monitoring				

Totally Integrated Automation

SIMATIC Controllers are an essential component of Totally Integrated Automation. The extensive range of products makes it possible to find 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 reduction of the engineering and startup costs plays a crucial role.

SIMATIC PC-based Controllers

Software Controllers for Multi Panels

WinAC RTX



WinAC RTX with Easy Motion Control



Customized functions with WinAC ODK



WinAC RTX F



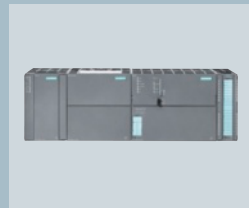
S7-mEC-RTX F



Embedded bundles with WinAC RTX F



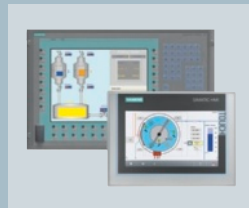
S7 Modular Embedded Controller



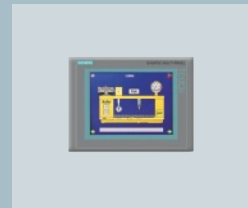
IPC227D/IPC427C bundles with WinAC RTX (F) and HMI-Software



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




WinAC MP 177/277



WinAC MP 377







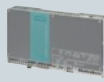
Selection guide

SIMATIC Modular Controllers				
S7-1200		ET 200 with CPU		S7-300
				
SIMATIC product/family		ET 200S		ET 200pro
Product Brief	Modular, compact controller for discrete and stand-alone automation solutions	Distributed, discretely-modular I/O system with local intelligence		Modular controllers for system solutions in production automation in the low to mid-performance ranges
Product range	<ul style="list-style-type: none"> 3 compact CPUs 	<ul style="list-style-type: none"> 3 standard CPUs 2 fail-safe CPUs 	<ul style="list-style-type: none"> 1 standard CPU 1 fail-safe CPU 	<ul style="list-style-type: none"> 7 standard CPUs 7 compact CPUs 5 fail-safe CPUs 2 technology CPUs 1 fail-safe technology CPU
Spare parts guaranteed for	10 years	10 years	10 years	10 years
Temperature range	0 to 55°C ¹⁾	0 to 60°C ²⁾	0 to 55°C	0 to 60°C ²⁾
Performance				
Execution time for bit operation, min.	0.1 µs	0.06 µs	0.05 µs	0.004 µs (CPU 319)
Memory				
Main memory, max.	50 KB (CPU 1214C)	192 KB ⁵⁾	384 KB ⁶⁾	2 MB (CPU 319) 2.5 MB (CPU 319F)
Load memory/mass storage, max.	2 MB (CPU 1214C)	Micro Memory Card 8 MB		Micro Memory Card 8 MB
Backup, max.	2 KB	Program and data due to Micro Memory Card (maintenance-free)		Program and data due to Micro Memory Card (maintenance-free)
I/O devices				
I/O address area, max.	1024 / 1024 bytes	2048 / 2048 bytes	2048 / 2048 bytes	8192 / 8192 bytes
Centralized · I/O integrated in CPU	●			● (compact CPU)
· I/O modules on CPU	●	●	●	●
Distributed · I/O modules on PROFIBUS	●	●	●	●
· I/O modules on PROFINET	●	●	●	●
Technology functions				
Loadable function blocks	●	●	●	●
Basic functions integrated in CPU	●			● (compact CPU)
Special modules, plugged in centrally		●	●	●
Special technology controllers				● (technology CPUs)
Isochronous mode			●	●
Safety / availability				
Fail-safety		●	●	● (F-CPU)
Fault tolerance				
Configuration changes during operation (CIR)				
Connection / disconnection of centralized I/O during operation (hot swapping)		●		
HMI functions				
PC functions				
C/C++/C#/Visual Basic link				
Data acquisition and archiving	●			
Expandable with PC standard hardware				
Integration of PC standard HW/SW				
Engineering				
Configuration / programming software	STEP 7 Basic V10.5/V11, STEP 7 Professional V11			STEP 7 / STEP 7 Professional
Programming languages	LAD, FBD, SCL		LAD, FBD, STL, S7-Graph (SFC), S7-SCL (ST), S7-HiGraph, CFC	
Configuration of integral HMI functions				
Communications				
MPI		●	●	●
PtP	● (character-based serial comm.)			● (also via CP)
AS-Interface	● (via CP with STEP 7 V11 SP2)			● (via CP)
PROFIBUS	●	●	●	● (also via CP) ⁴⁾
PROFINET	●	● (PN CPUs)	●	● (also via CP)
Others integrated				
Web server		● (PN CPUs)	●	● (PN CPUs)




1) as SIPLUS component also for extended temperature range -40/-25 to +55/+70°C and corrosive atmosphere / condensation (www.siemens.com/siplus)
 2) as 1), but temperature range -25 to +60°C
 3) as SIPLUS component also for corrosive atmosphere / condensation (www.siemens.com/siplus-extreme)

4) with Technology CPU, additionally PROFIdrive
 5) 256 KB with F version
 6) 512 KB with F version

SIMATIC PC-based Controllers

S7-400	WinAC RTX (F)	S7 modular Embedded Controller	SIMATIC IPC227D bundles	SIMATIC IPC427C bundles
				
Modular controllers for system solutions in production and process automation in the medium to upper performance ranges	S7 controller as software controller for PC with Windows operating system (Windows XP, Windows Embedded Standard, Windows 7)	Embedded Controller in S7-300 design (fanless, diskless) with Windows Embedded Standard and software controller and HMI	Embedded rail-mounted PC (fanless, diskless) with Windows Embedded Standard, software controller and HMI	Embedded rail-mounted PC with Windows Embedded Standard, software controller and HMI
<ul style="list-style-type: none"> 10 standard CPUs 3 fail-safe CPUs 4 fault-tolerant CPUs (also fail-safe) 	<ul style="list-style-type: none"> 1 software controller WinAC RTX 1 fail-safe variant WinAC RTX F (the first safety-related real-time software controller worldwide for Windows-based automation solutions up to SIL3, PL e, Cat. 4) 	<ul style="list-style-type: none"> PC-based controller in the following variants: <ul style="list-style-type: none"> Pre-installed operating system Plus WinAC RTX (F) Plus HMI WinCC flexible/WinAC RTX 1 fail-safe variant 	<ul style="list-style-type: none"> 1 hardware platform fail-safe variant 3 device versions with different expansion capabilities Customized / OEM product on request 	<ul style="list-style-type: none"> 2 platforms (PROFINET, P with 3 software versions) 1 fail-safe variant Customized / OEM product
10 years 0 to 60°C ³⁾	PC-dependent	5 years 0 to 50°C	5 years 0 to 50°C	5 years 0 to 50°C
0.018 µs (CPU 417)	0.004 µs (Pentium IV, 2.4 GHz, PC-dependent)	0.004 µs (Intel CoreDuo 1.2 GHz)		0.004 µs (Intel Core2Solo 1.2 GHz)
30 MB (CPU 417)	PC main memory ²⁾	1 GB RAM	1 GB RAM	4 GB RAM
Memory card 64 MB	PC mass storage	4 GB CompactFlash card	4 or 8 GB CompactFlash card or 50 GB SSD (SLC)	2, 4 or 8 GB CompactFlash card or 32 GB SSD (SLC)
Program and data due to backup-battery or Program due to MC FEPROM	All data with UPS ³⁾	Control data (512 KB SRAM) without UPS, all data with UPS	Control data (128 KB MRAM) without UPS, all data with UPS	Control data (128 KB SRAM) without UPS, all data with UPS
16384 / 16384 bytes	16384 / 16384 bytes	16384 / 16384 bytes	16384 / 16384 bytes	16384 / 16384 bytes
●	● ¹⁾	●	● (via PCIe, ODK)	● (via PCI-104 cards and ODK)
●	●	● (via CP 5603)	●	●
●	●	●	●	●
●	●	●	●	●
● (F- / FH-CPU)	●	●	●	●
● (H- / FH-CPU)				
●				
	● (can be installed on PC)	● (S7-mEC-HMI/RTX)	● (bundle with WinCC RT Advanced)	● (bundle with WinCC flexible WinCC single-user station)
	● (via ODK) ● (very large volumes of data) ● (PC-dependent) ● (via ODK, OPC)	● (via ODK) ● (large volumes of data) ● (4 PCI-104 cards max.) ● (via ODK, OPC)	● (via ODK) ● (large volumes of data) ● (1 PCI-104 card max.) ● (über ODK, OPC)	● (via ODK) ● (large volumes of data) ● (3 PCI-104 cards max.) ● (via ODK, OPC)
		WinCC flexible (optional)	WinCC RT Advanced	WinCC flexible, WinCC (optional)
●				
● (via CP)	● (via CP distributed)	● (via EM PC)	● (via CP distributed)	● (via CP distributed)
● (also via CP)	● (via CP in PC)	● (via CP 5603)		●
● (also via CP)	● (via CP in PC)	●	●	●
● (PN CPUs)	PC interfaces ● ⁵⁾	Industrial Ethernet, USB ● ⁵⁾	Industrial Ethernet, USB, RS232, DVI-D ● ⁵⁾	Industrial Ethernet, USB, RS232 ● ⁵⁾

1) via PC cards and ODK
 2) non-paged memory
 3) 128 KB with specific SIMATIC PC without UPS
 4) with F variant: S7 Distributed Safety, LAD, FBD for F program
 5) with WinAC RTX 2010

			Software Controllers for Multi Panel		
	SIMATIC HMI IPC277D bundles	SIMATIC HMI IPC477C bundles	WinAC MP 177/277/377		
					
			MP 177/277	MP 377	SIMATIC product/family
(fanless, diskless) standard, software	Embedded Panel PC (fanless, diskless) with Windows Embedded Standard, software controller and HMI	Embedded Panel PC (fanless, diskless) with Windows Embedded Standard, software controller and HMI	Software controllers for Multi Panels		Product Brief
PROFIBUS), each s uct on request	<ul style="list-style-type: none"> Panel PC with 7", 9" and 12" Touch (15", 19" in preparation) Customized design and OEM product on request 	<ul style="list-style-type: none"> Panel PC, 12", 15" or 19" Touch or 12", 15" Key each with 3 software versions, bundle with IPC477C PRO all-round protection to IP 65 also available Customized design and OEM product on request 1 fail-safe variant 	<ul style="list-style-type: none"> 1 standard product for Multi Panels with 6" to 19" Customized design and OEM product on request 		Product range
	5 years 0 to 50°C	5 years 0 to 50°C	10 years 0 to 50°C		Spare parts guaranteed for
					Temperature range
					Performance
0.2 GHz)		0.004 µs (Intel Core2Solo 1.2 GHz)			Execution time for bit operation, min.
					Memory
	1 GB RAM	4 GB RAM	128 KB / 256 KB	512 KB	Main memory, max.
card	4 or 8 GB CompactFlash card or 50 GB SSD (SLC)	2, 4 or 8 GB CompactFlash card or 32 GB SSD (SLC)			Load memory/mass storage, max.
) without UPS,	Control data (128 KB MRAM) without UPS, all data with UPS	Control data (128 KB SRAM) without UPS, all data with UPS	Control data (64 KB / 128 KB MRAM)	Control data (256 KB MRAM)	Backup, max.
	16384 / 16384 bytes	16384 / 16384 bytes	2048 / 2048 bytes 4096 / 4096 bytes	8192 / 8192 bytes	I/O devices
					I/O address area, max.
DK)					Centralized · I/O integrated in CPU · I/O modules on CPU
	●	●	●	●	Distributed · I/O modules on PROFIBUS · I/O modules on PROFINET
	●	●	●	●	Technology functions
					Loadable function blocks
					Basic functions integrated in CPU
					Special modules, plugged in centrally
		●			Special technology controllers
		●			Isochronous mode
	●	●			Safety / availability
					Fail-safety
					Fault tolerance
					Configuration changes during operation (CIR)
					Connection / disconnection of centralized I/O during operation (hot swapping)
					HMI functions
ible or n or client)	● (bundle with WinCC RT Advanced)	● (bundle with WinCC flexible or WinCC (single-user station or client)	● (Multi Panel)	● (Multi Panel)	Integrated
					PC functions
	● (via ODK)	● (via ODK)			C/C++/C#/Visual Basic link
	● (large volumes of data)	● (large volumes of data)	●	●	Data acquisition and archiving
					Expandable with PC standard hardware
	● (via ODK, OPC)	● (via ODK, OPC)			Integration of PC standard HW/SW
					Engineering
rofessional					Configuration / programming software
SCL (ST), S7-HiGraph, CFC 4)					Programming languages
ional)	WinCC RT Advanced	WinCC flexible, WinCC (optional)	WinCC flexible Standard, Advanced		Configuration of integral HMI functions
					Communications
	● (via CP distributed)	● (via CP distributed)	●	●	MPI
					PTP
					AS-Interface
	●	●	●	●	PROFIBUS
	●	●			PROFINET
232, DVI/VGA	Industrial Ethernet, USB ● 5)	Industrial Ethernet, USB, DVI/VGA ● 5)	Industrial Ethernet, USB, RS232		Others integrated
					Web server



SIMATIC 400

DP	MP/DP	CP 443-1
6	2	1

SIMATIC 300

CPU 319-3	MP/DP	DP	PN-IO
2	5	1	1

SIMATIC PC Station

WINCC RTX	CP 343-1	IE Geth12
2	1	1

Find

Selection of the network

- PROFIBUS DP
- PROFIBUS-PA
- PROFINET IO
- Stations
- Subnets

TCP/IP -> Realtek RTL8139/810X F... X 765 Y 296 Chg

SIMATIC FIELD PG

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SIMATIC automation systems:

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