

For System Solutions with
Emphasis on Production Engineering



Product Brief • April 2004

simatic S7-300



SIEMENS

Introduction, application, benefits

Machine and plant constructors are being increasingly requested to offer more flexible and productive machines at reduced prices. This places new demands on the automation systems with respect to e.g. scope of functions, processing speed and size, as well as engineering and networking. PLCs are required with a large scope of functions and high processing speeds in a compact design. The networking facilities should be improved at the same time, but the engineering requirements should be simultaneously reduced.

SIMATIC® S7-300® is the most widely sold PLC within the context of Totally Integrated Automation with many successful reference applications worldwide found in many different industrial sectors. S7-300 users profit from the experience and global servicing facilities of the market leader as well as the quality associated with SIMATIC. This is the basis for increasing profits and improving competitiveness using innovative automation solutions.

The S7-300 has been designed for system solutions with the emphasis on production engineering, and is a universal automation platform providing optimum solutions for applications with central or distributed designs. Permanent innovations upgrade this automation platform even further. Examples include regular further development of the powerful CPU modules whose range now also includes a CPU with integral Ethernet/PROFINET interface for Component Based Automation.

Application

The SIMATIC S7-300 offers solutions for the most diverse automation tasks in the following areas:

- Production engineering
- Automobile industry
- General machine construction
- Specialized machine construction
- Machine construction in series, OEM



Production line in the automobile industry – automated with the S7-300

- Processing of plastics
- Packaging industry
- Food and drink industry
- Process engineering

Special applications

For special applications there are additional product designs available based on S7-300:

- **Fail-safe applications:** S7-300F and matching I/O¹⁾
- For applications requiring powerful **technological and motion control functions:** Technology CPU 317T-2 DP¹⁾
- **Machine control in compact form:** SIMATIC C7 all-in-one control systems with integral HMI on basis of the S7-300 CPUs¹⁾
- **Distributed, intelligent preprocessing:** CPU in ET 200S and ET 200X design¹⁾

Low engineering costs

The S7-300 is characterized by efficient configuring and programming which results in low engineering costs. The huge quantity frameworks of the CPUs make the S7-300 an ideal platform for the task-oriented STEP 7 Engineering Tools complying to IEC 61131-3, for example high-level languages such as SCL. In addition, technology-oriented runtime software, e.g. Easy Motion Control can be used for motion control tasks.

The Engineering Tools also facilitate modular programming and re-usability of existing software. Engineering Tools not only support development but also readability, ease of maintenance and documentation of programs.

Additionally, powerful integrated system diagnostics increase controller availability and thus productivity. Configurable process diagnostics for analyzing process faults, reducing downtimes and further enhancing productivity are also implemented.

Low operating costs

The Micro Memory Card (MMC) can act as data and program memory so that no backup battery is required and maintenance costs can partly be saved. The MMC can also accommodate a complete project, including symbols and comments, which makes servicing easier since no project data are required on the respective device.

The MMC also facilitates program updating. It permits read and write access during RUN so that, for instance, archiving of measured values or processing of recipes becomes easy.

¹⁾ Please refer to page 20 for order numbers of more detailed documentation

Design and networking

Design

The S7-300 permits a space-saving and modular design without observation of slot rules for compact machine controls. Apart from the modules, only a DIN rail is required where the modules are swung into place and secured by screws. A configuration is then possible which is robust and electromagnetically compatible.

The backplane bus is integrated into the module and is assembled by insertion in the bus connector. The diverse S7-300 module spectrum can be used for centralized expansions as well as for simple configuration of distributed structures with ET 200M; this results in a very cost-efficient spare-parts maintenance.

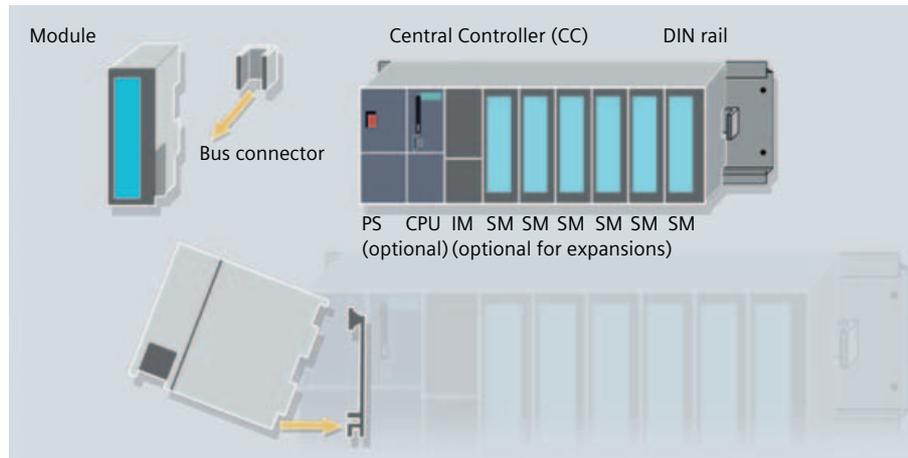
Powerful, flexible networking

Interfaces that are directly integrated in the CPUs permit the configuration of a powerful communication landscape that employs standard bus technologies, e.g. for HMI and programming device functions. Sufficient connectivity is provided for numerous HMI devices. A routing function enables a programming device to be connected at any point in the network and to address all network nodes.

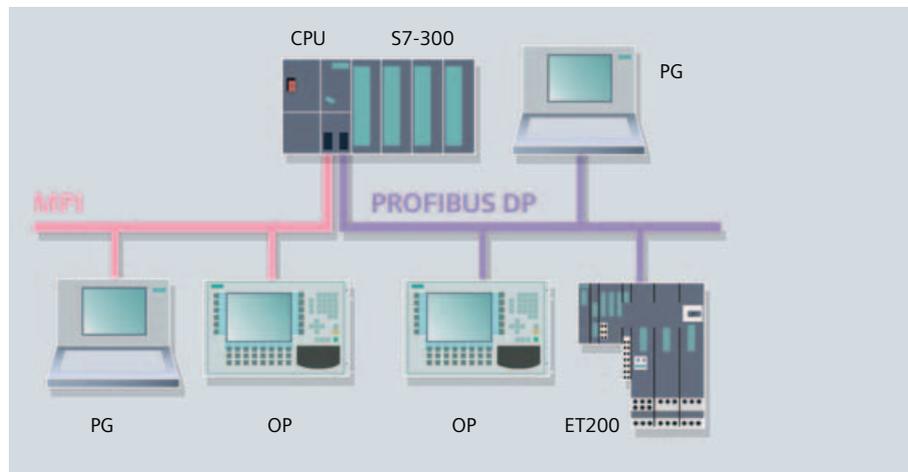
Multi-point interface - MPI

MPI is the low-cost solution for communications with programming devices and PCs, HMI systems and other SIMATIC S7/C7/WinAC® controllers. A total of 125 MPI stations can be connected at transmission rates of 187.5 kbit/s, e.g. for exchanging process data among various controllers or for HMI functions without any programming overhead.

With the CPU 317 and 318-2 DP, the MPI can also be used as PROFIBUS DP interface and permits the configuration of two DP lines.



Configuration of the S7-300: space-saving, modular and extremely simple



Integrated interfaces of the S7-300 CPUs for direct connection to MPI and PROFIBUS DP

PROFIBUS DP

For the economical configuration of large distributed networks, the SIMATIC S7-300 can also be connected to PROFIBUS DP (according to IEC 61158/EN 50170). This opens up communications options with a variety of communications partners - from the SIMATIC controller to third-party field devices.

Communications with existing SIMATIC S5 or SIMATIC 505 systems is also possible.

Distributed I/Os can be configured with STEP 7 like centralized I/Os which saves a lot of engineering overheads. The S7-300 can be used both as master and slave.

Support of the DP V1 functionality permits programming and optimization of field devices during operation, and therefore also shorter machine setup times. Detailed device diagnostics additionally reduces plant down times.

Ethernet (PROFINET)

The new CPU with integral PROFINET interface is predestined for Component Based Automation as well as programming and HMI via Ethernet. Omission of a communications processor which is otherwise required leads to lower purchasing costs and further space advantages.



It also permits control of distributed field devices connected directly to the Ethernet (see also page 13).

CPU spectrum

For setting up a programmable controller system, the user can choose from a graded spectrum of CPUs, from the starter model to the high-performance CPU. The CPUs enable short machine cycles thanks to their high processing speed. The narrow module width permits compact controller configurations and small control cabinet dimensions.

The so-called standard CPUs have a width of only 40 mm and are also available in two fail-safe designs.

A variety of compact CPUs with a width of 80 or 120 mm featuring additional integrated I/Os and technological functions are also available. This onboard I/O (digital/analog) and the technological functions, such as for counting, positioning and closed-loop control may save you from investing in additional modules.

This range is rounded off by a special technology CPU with powerful technological functions.



CPU 314C-2 DP and CPU 315-2 DP (right)

Design	CPU	Integrated interfaces	Integrated I/O	Integrated technological functions	Technical specifications: see page
Standard CPUs	CPU 312, 314	MPI			6
	CPU 315-2 DP	DP, MPI			
	CPU 317-2 DP	DP, DP/MPI			
	 CPU 317-2 PN/DP	DP/MPI, PROFINet			
	CPU 318-2 DP	DP, DP/MPI			7
Fail-safe CPUs	CPU 315F-2 DP	DP, MPI		Fail-safety	7
	CPU 317F-2 DP	DP, DP/MPI		Fail-safety	
Compact CPUs	CPU 312C	MPI	Digital	<ul style="list-style-type: none"> Counting Loop Control Frequency measuring Pulse width modulation Pulse generator 	8
	CPU 313C	MPI	Digital, analog		
	CPU 313C-2 PtP	PtP, MPI	Digital		
	CPU 313C-2 DP	DP, MPI	Digital		
	CPU 314C-2 PtP	PtP, MPI	Digital, analog	as above; in addition	9
	CPU 314C-2 DP	DP, MPI	Digital, analog	<ul style="list-style-type: none"> Positioning 	
Technology CPU	CPU 317T-2 DP	DP, DP/MPI	Digital	<ul style="list-style-type: none"> Synchronism Travel to fixed stop Print mark control Cam switching Controlled positioning 	9

CPU spectrum

All CPUs 317 have 512 KB of working memory and enable extensive use of STEP 7 Engineering Tools and technologically oriented runtime software. They also offer highly flexible networking since up to 32 active links with other nodes, e.g. programming devices and operator panels can be built up simultaneously.

As many as four versions of high-end CPUs are available for a variety of applications:

- The 317-2 DP standard CPU is suitable for the most common control tasks with a high share of communications functions. In addition to the DP interface a combined DP/MPI interface is available and can be configured either as PROFIBUS master or PROFIBUS slave.
- The PROFINET-CPU 317-2 PN/DP offers a combined PROFIBUS DP/MPI interface and a PROFINET interface for 100 Mbit/s, based on Ethernet as the communications standard. It can therefore also be used as a router between Ethernet and PROFIBUS. The PROFINET communications functions (PN stands for PROFINET) are used for Component Based Automation in modular plant and machine construction. They also permit control of distributed field devices connected directly to the Industrial Ethernet. Communication is carried out using Ethernet-TCP/IP with the PROFINet and S7 protocols. The CPU 317-2 PN/DP can also be programmed via the PROFINET interface using STEP 7.
- The fail-safe 317F-2 DP CPU offers fail-safety system expansions in comparison to the standard CPU and the PROFIsafe profile for safe communications. It complies with major specifications/standards:
 - IEC 61508 (SIL 3),
 - EN 954 (Category 4) and
 - NFPA 79, NFPA 85

It has an approval from the German Technical Inspectorate (TÜV).

Safety-relevant programs can be programmed using the STEP 7 LAD and FBD languages and certi-



CPU 317-2 DP – the standard CPU with two DP interfaces

fied programming examples from the F library of Distributed Safety.

For expansion, the fail-safe ET 200S and ET 200M stations are available.

- The technology CPU 317T-2 DP integrates powerful technology and motion control functions in the CPU. It is designed for dynamic motion control of multiple axes. Pre-programmed, PLCopen-compliant motion control functions, integral discrete I/O, equidistance and isochronous mode of PROFIBUS DP permit flexible motion control of several (even coupled) axes, for example controlled positioning, synchronism and/or cam switching.

STEP 7 enables convenient configuration and parameterization of the axes.

The six compact CPUs

- CPU 312C
- CPU 313C
- CPU 313C-2 PtP
- CPU 313C-2 DP
- CPU 314C-2 PtP
- CPU 314C-2 DP

with integral I/O and technological functions have additional convincing features:

- Fast recording of actual values with direct access to hardware counters and inputs for the counting and frequency measurement



CPU 317T-2 DP – the technology CPU for motion control functions

functions permits an excellent dynamic response, e.g. for positioning tasks.

- In cooperation with the integral analog output, the positioning functions permit direct control of MICROMASTER frequency converters.
- The high processing rate for floating-point commands permits extremely fast program execution where mathematical tasks are involved.
- By scanning the serial number of the MMC during operation, it is possible to implement copy protection for the user software.
- The large number of function calls and data blocks facilitate the portability of user programs which were developed for "standard" CPUs and are now also to be used on compact CPUs.



Standard CPUs



Standard CPUs					
	CPU 312	CPU 314	CPU 315-2 DP	CPU 317-2 DP	CPU 317-2 PN/DP
Main memory/ instructions	16 KB/5 K	48 KB/16 K	128 KB/42 K	512 KB/170 K	
Load memory	64 KB to 4 MB through MMC	64 KB to 8 MB through MMC			
Backup	all blocks through MMC			all blocks to max. 256 KB	
Processing times					
• Bit operations	0.2 µs	0.1 µs		0.05 µs	
• Word operation	2 µs	1 µs		0.2 µs	
• Fixed-point arithmetic	5 µs	2 µs		0.2 µs	
• Floating-point arithmetic	6 µs	3 µs		1 µs	
Bit memories/timers/ counters					
• Bit memories	128 byte	256 byte	2048 byte	4096 byte	
• S7 timers / counters	128/128	256/256	256/256	512/512	
• IEC timers / counters	✓	✓	✓	✓	
Number of blocks					
• Number of loadable blocks (FCs+FBs+DBs)	1024		1024	2048	
• Range of numbers	512 FC, 512 FB, 511 DB		2048 FC, 2048 FB, 1023 DB	2048 FC, 2048 FB, 2047 DB	
Organization blocks (OB)	free cycle (OB 1), real-time interrupt (OB 10), delay alarm (OB 20), time-trig- gered (OB 35), interrupt-triggered (OB 40), restart (OB 100), asyn. error (OB 80, 82, 85, 87), syn. error (OB 121,122)		free cycle (OB 1), real-time interrupt (OB 10), delay alarm (OB 20), (OB 21 [not 315-2 DP]), time-triggered (OB 35), (OB32-34 [not 315-2 DP]), interrupt-triggered (OB 40), DPV1 restart (OB 55-57), restart (OB 100), asyn. error (OB 80, 82, 85-87), syn. error (OB 121,122)		
Address ranges					
• I/O address area	1024/1024 byte	1024/1024 byte	2048/2048 byte	8192/8192 byte	8192/8192 byte
• I/O process image	128/128 byte	128/128 byte	128/128 byte	256/256 byte	2048/2048 byte ¹⁾
• Digital channels (central)	256	1024	1024	1024	1024
• Analog channels (central)	64	256	256	256	256
Expansions					
• Racks	1	max. 4			
• Modules per rack	8	8			
DP interfaces					
• Number of DP master systems int./CP 342-5	–	–	1/1	2/2	1/2
• Equidistant	–	–	✓	✓	✓
• Activat./deact. DP slaves	–	–	✓	✓	✓
• Transmission speed	–	–	12 Mbit/s	12 Mbit/s	12 Mbit/s
• No. of slaves per station	–	–	124	124	124
• Lateral communication	–	–	✓	✓	✓
PROFINet interface					
• Transmission rate	–	–	–	–	✓ 100 Mbit/s
• PROFINET/CBA	–	–	–	–	✓
• PROFINET/IO	–	–	–	–	✓ ¹⁾
• S7 communication	–	–	–	–	✓
• PG/OP communication	–	–	–	–	✓
• TCP/IP	–	–	–	–	✓ ¹⁾
Dimensions (mm)	40 x 125 x 130	40 x 125 x 130	40 x 125 x 130	80 x 125 x 130	
Order No. group	6ES7312-1AD..	6ES7314-1AF..	6ES7315-2AG..	6ES7317-2AJ..	6ES7317-2EJ..



¹⁾ With new CPU version (from 08/2004)

Standard CPUs – Fail-safe CPUs

	Standard CPU	Fail-safe CPUs	
	CPU 318-2 DP	CPU 315F-2 DP	CPU 317F-2 DP
Main memory/ instructions	512 KB, of which max. 256 KB Code and max. 256 KB instructions	192 KB/36 K F-instructions	512 KB/100 K F-instructions
Load memory	–	64 KB to 8 MB through MMC	
Backup	<ul style="list-style-type: none"> 8 KB bit memories, timers, counters, data without battery all blocks with battery 	all blocks to max. 256 KB	
Processing times <ul style="list-style-type: none"> Bit operations Word operation Fixed-point arithmetic Floating-point arithmetic 	0.1 µs 0.1 µs 0.1 µs 0.6 µs	0.1 µs 1 µs 2 µs 3 µs	0.05 µs 0.2 µs 0.2 µs 1 µs
Bit memories/ timers/counters <ul style="list-style-type: none"> Bit memories S7 timers / counters IEC timers / counters 	1024 byte 512/512 ✓	2048 byte 256/256 ✓	4096 byte 512/512 ✓
Number of blocks <ul style="list-style-type: none"> Number of loadable blocks (Sum of FCs + FBs + DBs) Range of numbers 	1024 FC, 1024 FB, 2047 DB 1024 FC, 1024 FB, 2047 DB	1024 2048 FC, 2048 FB, 1023 DB	2048 2048 FC, 2048 FB, 2047 DB
Organization blocks (OB)	real-time interrupt (OB 10, 11) delay alarm (OB 20, 21) time-triggered (OB 32, 35) interrupt-triggered (OB 40, 41) background OB (OB 90) restart (OB 100), asyn. error (OB 80, 81, 82, 84-87) syn. error (OB 121, 122)	free cycle (OB 1) real-time interrupt (OB 10) delay alarm (OB 20) time-triggered (OB 35) interrupt-triggered (OB 40) DPVI restart (OB 55-57) restart (OB 100) asyn. error (OB 80, 82, 85-87) syn. error (OB 121,122)	as for 315F-2 DP Supplementary: Delay alarm (OB 21) Time-triggered (OB 32-34)
Address ranges <ul style="list-style-type: none"> I/O address area I/O process image Digital channels (central) Analog channels (central) 	8192/8192 byte 2048/2048 byte 1024 256	2048/2048 byte 384/384 byte 1024 256	8192/8192 byte 1024/1024 byte 1024 256
Expansions <ul style="list-style-type: none"> Racks Modules per rack 	max. 4 8	max. 4 8	
DP interfaces <ul style="list-style-type: none"> Number of DP master systems int./CP 342-5 Equidistant Activation/deactivation of slaves Transmission speed No. of slaves per station Lateral communication 	2/2 ✓ – 12 Mbit/s 32 (MPI-SS), 125 (DP-SS)/ 64 ✓; sender and receiver	1/1 ✓ ✓ 12 Mbit/s 124 ✓	2/2 ✓ ✓ 12 Mbit/s 124 ✓
Dimensions (mm)	160 x 125 x 130	40 x 125 x 130	80 x 125 x 130
Order No. group	6ES7318-2AJ..	6ES7315-6FF..	6ES7317-6FF..

Compact CPUs

	Compact CPUs			
	CPU 312C	CPU 313C	CPU 313C-2 PtP	CPU 313C-2 DP
Main memory/instruc.	16 KB/4 K	32 KB/10 K	32 KB/10 K	32 KB/10 K
Load memory	64 KB to 4 MB through MMC			
Backup	all blocks through MMC			
Processing times				
• Bit operations	0.2 µs	0.1 µs		
• Word/fixed point/float- ing-point arith. ops	2/5/6 µs	1/2/3 µs		
Bit mem./tim./counters				
• Bit memories	128 byte	256 byte		
• S7 timers / counters	128/128	256/256		
• IEC timers / counters	✓	✓		
Number of blocks	1024			
• No. of loadable blocks	512 FC, 512 FB, 511 DB			
• Range of numbers				
Organization blocks (OB)	free cycle (OB 1), real-time controlled (OB 10), delay alarm (OB 20), time-triggered (OB 35), interrupt-triggered (OB 40), restart (OB 100, 102), asynchronous error (OB 80, 82, 85, 87), synchronous error (OB 121, 122), station failure/restoration (OB 86, only with CPU 313C-2 DP)			
Address ranges				
• I/O address range	1024/1024 byte	1024/1024 byte	1024/1024 byte	1024/1024 byte
• I/O process range	128/128 byte	128/128 byte	128/128 byte	128/128 byte
• Digital channels (cent.)	266	1016	1008	1008
• Analog channels (cent.)	64	253	248	248
Expansions				
• Racks	1	max. 4		
• Modules per rack	8	8		
DP interfaces				
• No. of DP master systems int./CP 342-5	–			1/1
• Equidistant	–			✓
• Act./deact. of slaves	–			✓
• Transmission speed	–			12 Mbit/s
• No. of DP slaves/station	–			32
• Lateral communication	–			✓
Integrated functions				
• Counters	2 incremental encoders 24 V/10 kHz	3 incremental encoders 24 V/30 kHz		
• Pulse outputs	2 ch. pulse-width modulation max. 2.5 kHz	3 channel pulse-width modulation max. 2.5 kHz		
• Freq. measurement	2 channels max. 10 kHz	3 channels max. 30 kHz		
• Controlled positioning	–	–		
• Integ. FBs "loop control"	PID controller	PID controller		
Integrated I/O				
• Digital inputs	10; 24 V DC; all channels can be used for process alarms	24; 24 V DC; all channels can be used for process alarms	16; 24 V DC; all channels can be used for process alarms	
• Digital outputs	6; 24 V DC, 0.5 A	16; 24 V DC, 0.5 A	16; 24 V DC, 0.5 A	
• Analog inputs	–	4: ± 10 V, 0 to 10 V, ± 20 mA, 0/4 to 20 mA; 1: 0 to 600 Ω, PT100	–	
• Analog outputs	–	2: ± 10 V, 0 to 10 V, ± 20 mA, 0/4 to 20 mA	–	
PtP interface				
• Physics	–		RS485/422	–
• Protocol driver	–		3964 (R), ASCII	–
Dimensions (mm)	80 x 125 x 130	120 x 125 x 130		
Req. front connector	1 x 40 pin	2 x 40 pin	1 x 40 pin	1 x 40 pin
Order No. group	6ES7312-5BD..	6ES7313-5BE..	6ES7313-6BE..	6ES7313-6CE..

Compact CPUs – Technology CPU

	Compact CPUs		Technology CPU
	CPU 314C-2 PtP	CPU 314C-2 DP	CPU 317T-2 DP
Main memory / instructions	48 KB/16 K	48 KB/16 K	512 KB/170 K
Load memory	64 KB to 8 MB through MMC		4 MB...8 MB through MMC
Backup	all blocks through MMC		all blocks up to 256 KB through MMC
Processing times			
• Bit operations	0.1 µs	0.1 µs	0.05 µs
• Word operations/fixed point a./floating point arithmetic	1/2/3 µs	1/2/3 µs	0.2/0.2/1 µs
Bit memories/timers/counters			
• Bit memories	256 byte	256 byte	4096 byte
• S7 timers / counters	256/256	256/256	512/512
• IEC timers / counters	✓	✓	✓
Number of blocks			
• Number of loadable blocks	1024	1024	2048
• Range of numbers	512 FC, 512 FB, 511 DB	512 FC, 512 FB, 511 DB	2048 FC, 2048 FB, 2047 DB
Organization blocks (OB)	Free cycle (OB 1), real-time controlled (OB 10), delay alarm (OB 20), time-triggered (OB 35), interrupt-triggered (OB 40), restart (OB 100, 102), fault (OB 80, 82, 85, 87), synchronous error (OB 121, 122), station failure/restoration (OB 86, only with CPU 314C-2 DP)		as for CPU 317-2 DP
Address range			
• I/O address range	1024/1024 byte	1024/1024 byte	8192/8192 byte
• I/O process range	128/128 byte	128/128 byte	256/256 byte
• Digital channels (central)	1016	1016	256
• Analog channels (central)	253	253	64
Expansions			
• Racks	max. 4	max. 4	1
• Modules per rack	8	8	8
DP interfaces			
• No. of DP master systems int./ CP 342-5	–	1/1	2/2
• Equidistant	–	✓	✓
• Activation/deactivation of slaves	–	✓	✓
• Transmission speed	–	12 Mbit/s	12 Mbit/s
• No. of DP slaves / station	–	32	124
• Lateral communication	–	✓	✓
Integrated functions	<ul style="list-style-type: none"> Counters: 4 incremental encoders 24 V/60 kHz Pulse outputs: 4 channel pulse-width modulation max. 2.5 kHz Frequency measurement: 4 channels max. 60 kHz Controlled positioning: SFB for positioning 1 axis using 2 DA, AA Integrated FBs "loop control": PID controller 		<ul style="list-style-type: none"> Gear and curve synchronism Travel to fixed stop Print mark control via measuring probes Path or time-controlled cam switching Controlled positioning
Integrated I/Os			
• Digital inputs	24; 24 V DC; all channels can be used for process alarms		4; 24 V DC; for BERO evaluation
• Digital outputs	16; 24 V DC, 0.5 A		8; 24 V DC; 0.5 A; for fast cam switching functions
• Analog inputs	4: ± 10 V, 0 to 10 V, ± 20 mA, 0/4 to 20 mA; 1: 0 to 600 Ω, PT100		–
• Analog outputs	2: ±10 V, 0-10 V, ± 20 mA, 0/4-20 mA		–
PtP interface	RS485/422	–	–
• Protocol driver	3964 (R), RK512, ASCII	–	–
Dimensions	120 x 125 x 130	120 x 125 x 130	160 x 125 x 130
Required front connector	2 x 40 pin	2 x 40 pin	1 x 40 pin
Order No. group	6ES7314-6BF..	6ES7314-6CF..	6ES7317-6TJ..

Programming with STEP 7 and Engineering Tools

The S7-300 is programmed with the basic software STEP 7 or STEP 7 Lite. This enables the performance capability of the S7-300 to be used in a simple, user-friendly manner. Both contain functions for all phases of an automation project - from configuring to commissioning, testing and servicing.

STEP 7 Lite

The cost-efficient software STEP 7 Lite is available to achieve stand-alone applications with the SIMATIC S7-300.

STEP 7 Lite is characterized by very fast entry into programming and simple project handling.

Additional SIMATIC software packages, such as Engineering Tools, cannot be used for simulation. Programs which were generated with STEP 7-Lite, can also be processed using STEP 7.

STEP 7

STEP 7 is used for, among other things, larger or more complex applications, with which, e.g. programming with high-level languages or graphic concept languages (see Engineering Tools) takes place or the use of function or communications modules is required.

STEP 7 enables the use of additional SIMATIC software packages, for instance Engineering Tools.

Engineering Tools

Engineering Tools open additional possibilities to program automation solutions in a user-friendly, task oriented manner. The following tools are available for programming:

S7-SCL

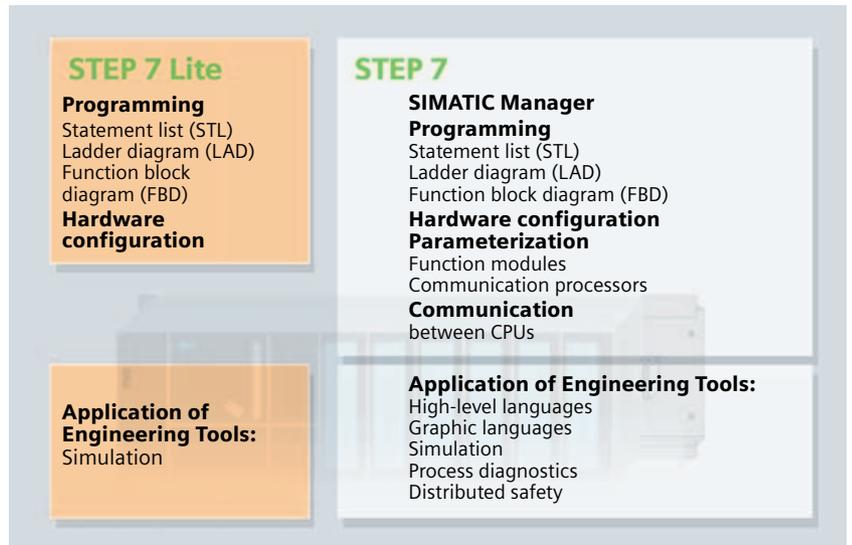
(Structured Control Language), the high-level language based on PASCAL for programming SIMATIC S7/C7 controllers

S7-GRAPH

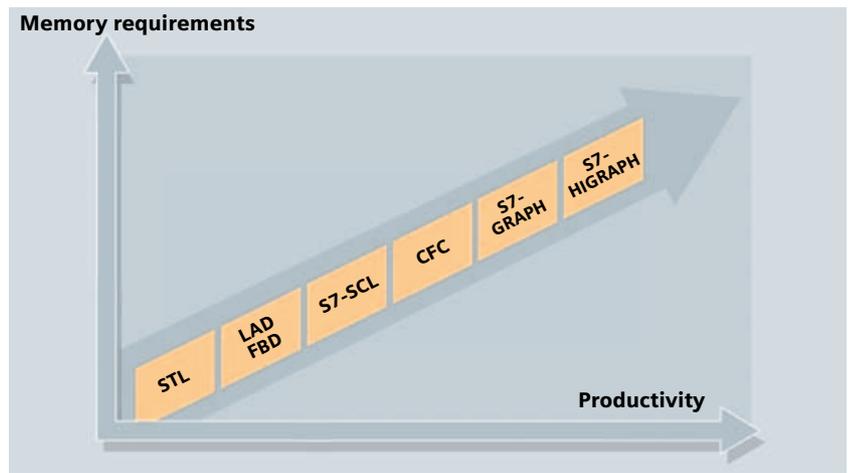
for graphic configuration of sequential controls for SIMATIC S7/C7

S7-HiGraph®

for graphic description of sequential or asynchronous processes with state graphs for SIMATIC S7/C7



STEP 7 and STEP 7 Lite scope of functions



Memory requirement of engineering tools

CFC

(Continuous Function Chart), the technological plan for graphic interconnection of complex functions for SIMATIC S7

Distributed Safety

Software package for generating safety-related programs in LAD and FBD, including F library with programming examples

The use of Engineering Tools is advantageous above all for larger, more complex applications and correspondingly greater CPUs.

CPUs/Engineering Tools

- All CPUs can be programmed in STL, LAD and FBD basic languages.
- Should the S7-SCL high-level language be used, CPUs 313C, 314 and above are recommended.
- If graphic concept languages (S7-GRAPH, S7-HiGraph and CFC) are used, CPUs 314 and higher are recommended.

Communication - Ethernet, PROFIBUS and more

Communication networks are of central importance in modern automation solutions:

Industrial Ethernet (IEEE 802.3 and 802.3u) – the international standard for area and cell networking.

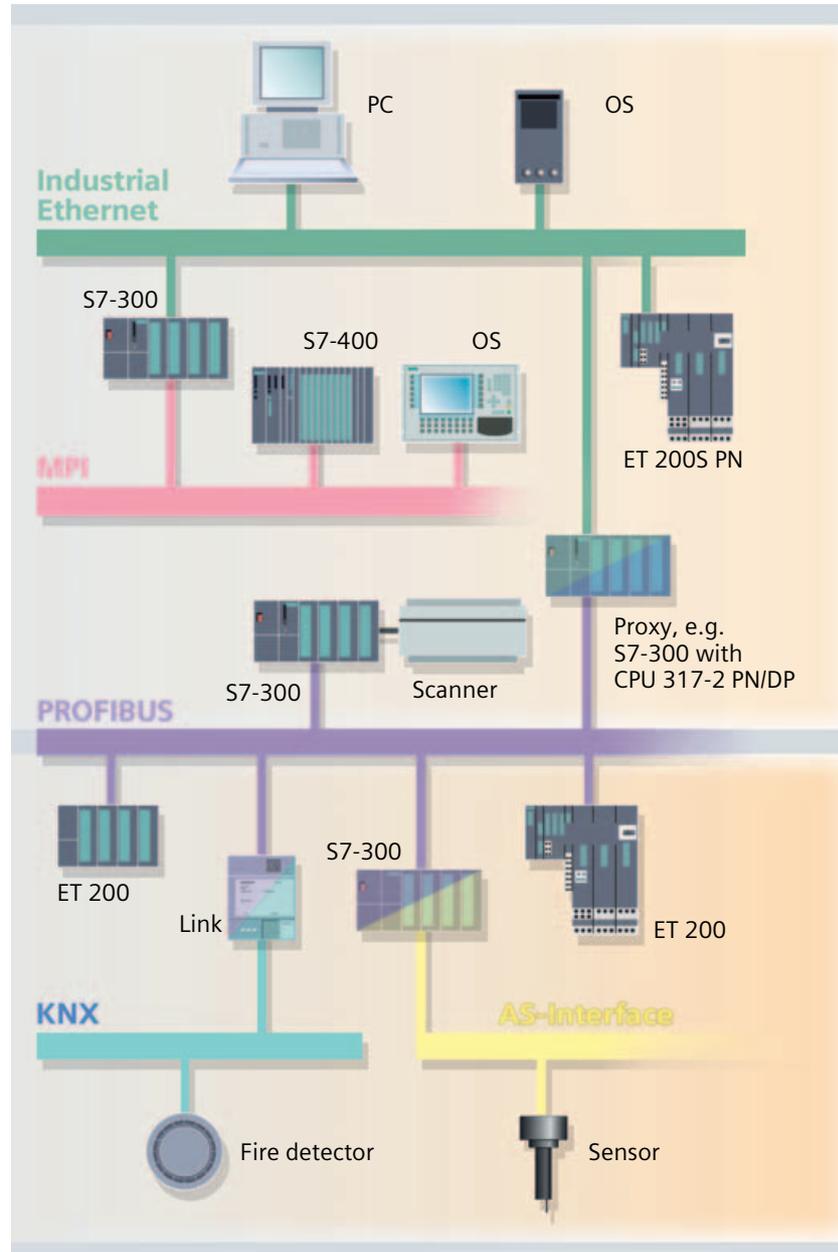
PROFIBUS (IEC 61158/EN 50170) – the international standard for the cell and field areas, as well as PROFIBUS PA for intrinsically-safe process automation applications.

AS-Interface (EN 50295) – the international standard for communication with sensors and actuators.

KNX (EN 50090, ANSI EIA 776) – the world-wide standardized building installation system and basis for building automation.

MPI – Multi point interface – for communication between CPUs, PG/PC and TD/OP.

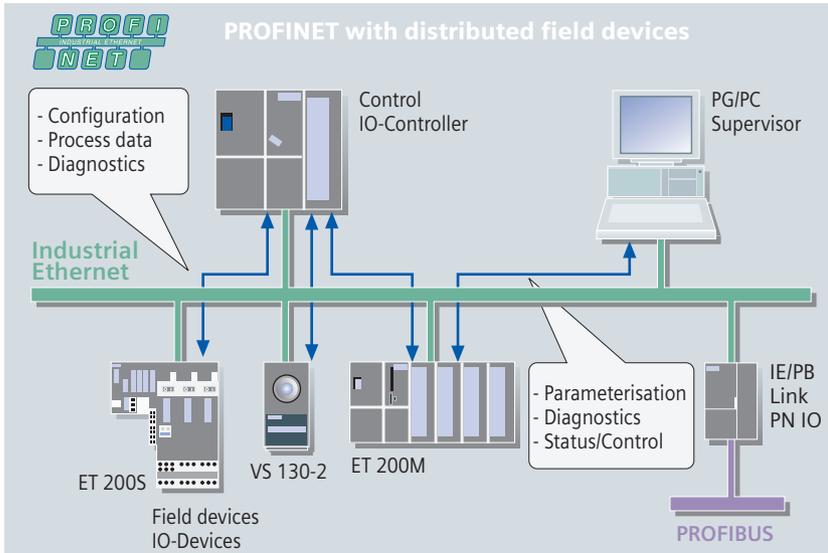
Point-to-point coupling – for communication between two nodes with special protocols (e.g. RK 512, 3964(R) and ASCII).



The S7-300 can be connected to all kinds of networks



PROFINET – the open Industrial Ethernet standard



PROFINET (according to IEC 61158 / EN 50170) is the open Industrial Ethernet standard for industrial automation. PROFINET permits the implementation of distributed automation structures, the linking of simple distributed field devices on the Ethernet, as well as use of isochronous motion control applications. Applications based on PROFIBUS can be linked via a proxy.

PROFINET with distributed field devices

PROFINET is used to directly link distributed field devices to Industrial Ethernet. In the case of the proven STEP 7 configuration known from PROFIBUS, these field devices (IO devices) are assigned to a central controller (IO controller). In order to safeguard investments, existing modules or devices can be used further by means of PROFINET-capable interfaces or links. An IO supervisor

is used for HMI and diagnostics purposes (overview and detailed diagnostics).

The following products are available from the S7-300 environment, and can be configured using STEP 7:

- IM 151-3 PN: direct connection of ET 200S as IO device to Industrial Ethernet
- CPU 317-2 PN/DP: central module as IO controller for processing the process signals and for direct connection of field devices to Industrial Ethernet (existing CPUs can be upgraded for PROFINET IO using a firmware update)
- CP 343-1: communications module for expansion of S7-300 by an Industrial Ethernet interface in order to connect field devices as IO devices to Industrial Ethernet via S7-300

PROFINET and distributed intelligence

PROFINET permits distributed automation using component technology. The modular design of plants using mechanical, electronic and software components results in advantages with respect to standardization, expansion and reuse.

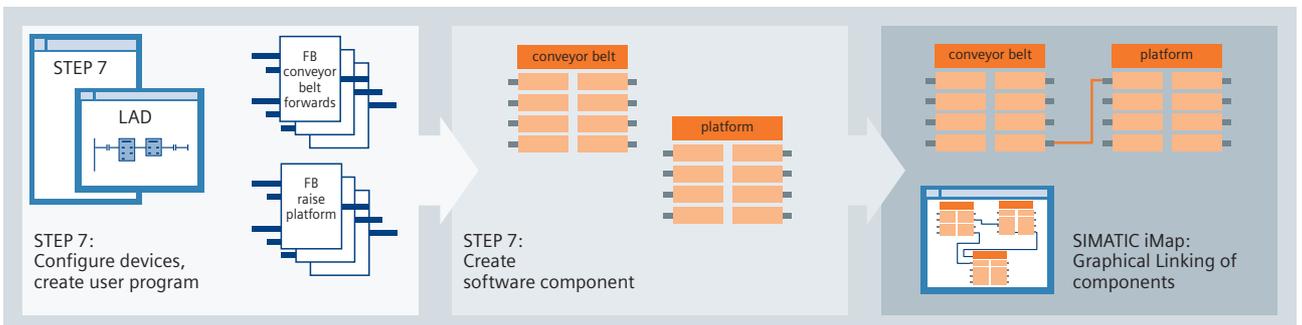
STEP 7 is used to generate reusable, intelligent technological modules including their unambiguous interfaces. SIMATIC iMap is used to configure the complete plant by graphically linking these modules, and also serves for simple diagnostics.

Linking to the IT world

The S7-300 permits simple linking of the modern IT world to the automation technology. The following functions are possible using the plug-in CP 343-1IT:

- Generation of own Web sites using any HTML tools, where the process variables of the S7-300 can be simply assigned to the HTML objects
- Monitoring of the S7-300 via these Web sites using a standard browser
- Sending of e-mails from the user program of the S7-300 using FC calls
- Remote programming using the WAN property of TCP/IP also via a telephone network (e.g. ISDN)

CBA-capable S7-300 products are the CPU 317-2 PN/DP and the CP 343-1 ▼



Module spectrum

The comprehensive range of modules enables modular adaptation of the S7-300 to a wide variety of applications.

The following are available:

- Digital and analog I/O modules for almost all types of signals, including interrupt processing and diagnostics (see selection guides on following pages)
- Digital and analog Ex I/O modules for use in hazardous areas¹⁾
- Function modules for technological tasks for counting/measuring, positioning, closed-loop control and cam control.¹⁾
- Communication modules for point-to-point coupling or bus communication using AS-Interface, PROFIBUS and Industrial Ethernet with IT functionality
- Load supply units which provide 24 V DC operating voltage
- Interface modules for connection of subracks with multi-tier design of the SIMATIC S7-300.

Expansion options

Should the automation task require more than 8 modules, the central controller (CC) of the S7-300 can be expanded using expansion units (EU)²⁾. Altogether up to 32 modules can be used, up to 8 per expansion unit.

Communication between the individual devices is carried out independently by interface modules (IM).

In the case of plants covering an extensive area, CC/EUs can be configured in greater distances (up to 10 m).

This means that for a single-tier installation, the maximum configuration is 256 I/O, with up to 1024 I/O for multiple line installations.

For a distributed system using PROFIBUS DP 65536 I/O connections can be used (up to 125 stations, for example ET 200M using IM 153).

The slots are freely addressable, i.e. no slot rules exist³⁾.

Communication

Point-to-point coupling with data transmission rates up to 115 kbit/s and various protocols, e.g. for connecting printers, scanners and third-party devices (see page 22)

Connection to the fieldbus AS-Interface for communicating with binary sensors and actuators

Connection to PROFIBUS using either the DP or the FMS protocol or by using fiber-optic cable.
Connection of PROFIBUS PA field devices using DP/PA link

Connection to Industrial Ethernet using ISO/TCP or TCP/IP protocol for data communication

Technology

Counting in different operating modes up to 500 kHz, measuring up to 100 kHz and proportioning

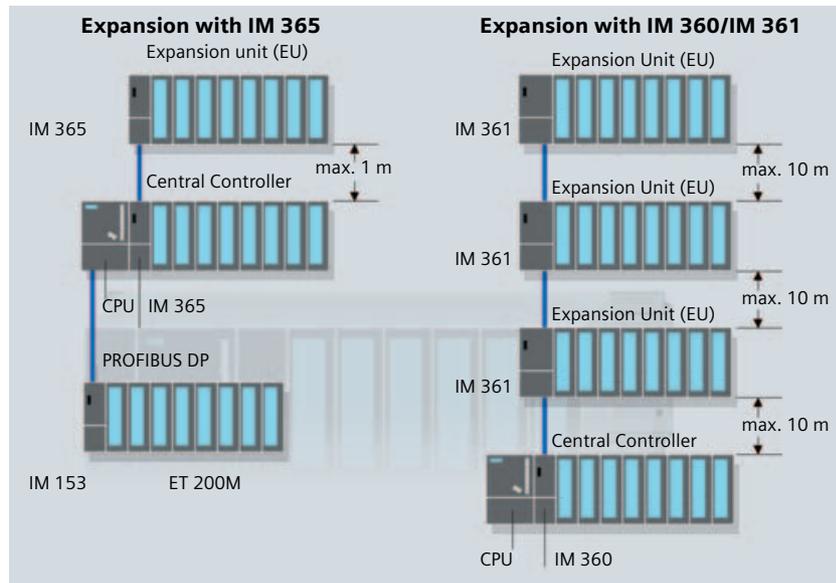
Cam controls with up to 13 cam tracks per module

All sorts of positioning tasks:

- Controlled positioning in rapid-traverse/creep-speed mode
- Point-to-point positioning and profiles using stepper and servomotors
- Point-to-point multi-axis interpolation using stepper and servomotors

Connection of positioning drives with PROFIBUS DP

PID controller with backup capability and integrated, online self configuration for different types of controllers (continuous controllers, stepper controllers, pulse controllers)



Central expansion of the S7-300 to max. 32 modules

¹⁾ Order Nos. of more detailed documentation on page 20

²⁾ Except CPU 312 IFM, 312C, 313C and 317T-2 DP

³⁾ Except with CPU 312, 312 IFM, 312C, 313, 314, 314 IFM and 317T-2 DP

I/O modules – Special features

Signal modules are the interface of the SIMATIC S7-300 to the process. A number of various digital and analog modules make those I/Os available which are required for the respective task.

Easy installation

Sensors and actuators are connected using front connectors. The connector is simply plugged into the new module when the module is replaced, the wiring remains unchanged. Coding of the front connector prevents confusion.

Fast connection

Using SIMATIC TOP connect makes it even easier to connect (not for onboard I/Os of compact CPUs). You can choose between prewired front connectors with individual strands and a completely modular building block system, consisting of front connector module, cable and terminal block.

High packaging density

The large number of channels on each module is the one reason for the space-saving design of the S7-300: Modules are available with 8 to 32 channels (digital) and 2 to 8 channels (analog).



Signal modules for universal and special applications

I/O modules – Special features

Simple parameterization

Modules are configured and parameterized using STEP 7, there are no complicated switch settings. Data is stored centrally and, when modules have been replaced, automatically transferred to the new module to prevent setup errors. No software upgrading is necessary when using new modules. Configurations which have been carried out once can be repeated identically any number of times, e.g. for series machines.

Diagnostics, interrupts

Many modules monitor signal acquisition (diagnostics) and signals from the process as well (process alarm). In this way it is possible to react quickly to any irregularities or process events. Whether the controller should react and what the reaction should be can be parameterized in STEP 7.

Special modules

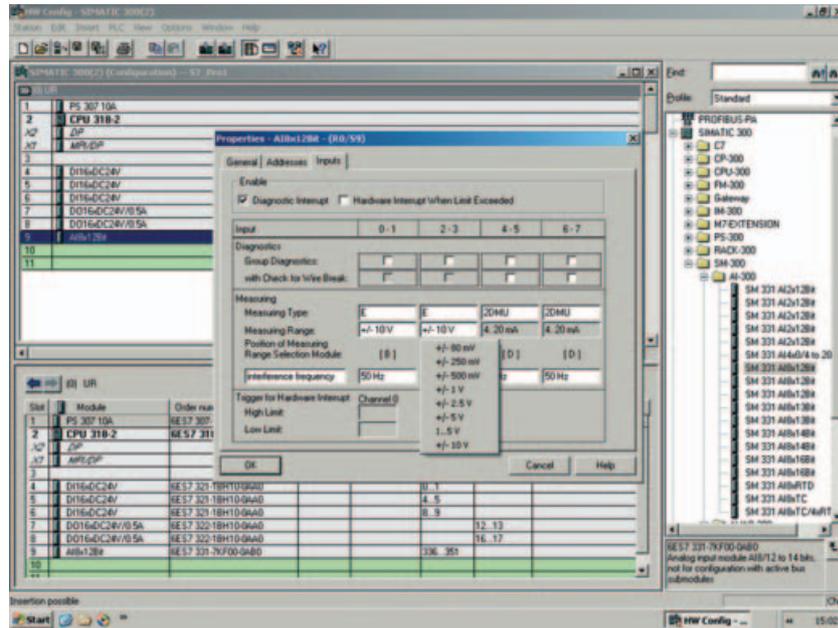
The simulation module can be inserted in the S7-300 for testing and simulation purposes. It enables encoder signals to be simulated with the switch and displays output signals using LEDs. The module can be plugged in anywhere without worrying about slot rules.

The dummy module reserves a slot which has not yet been configured. The mechanical configuration and address allocation remain unchanged when the module is slotted at a later date.

On the following pages you will find criteria for selecting the right signal module for a given application.

Detailed technical specifications are available in the latest version of Catalog CA 01.

Internet:
www.siemens.com/automation/ca01
www.siemens.com/automation/mall



Parameterization of an analog input module

I/O modules - Selection guide for analog outputs

Type of module	Selection guide for analog outputs					
Physical measured variable	Voltage					
Encoder measurement range	0 to 10 V, 1 to 5 V, ± 10 V			0 to 10 V		0 to 10 V 0 to 2 V
Diagnostics capability	✓			–		✓
Operating error	± 0.5 %		± 0.12 %	± 0.6 %	± 1 %	± 0.5 %
No. of channels	4	2	4	2	2	4
No. of groups	4	2	4	1	1	4
Resolution	12 bit	12 bit	max. 15 bit + sign	8 bit	12 bit + sign	13 bit + sign
Conversion time per channel	0.8 ms	0.8 ms	1.5 ms	2.5 ms	min. 85 ms	0.8 ms
Additional functions	Current output	Current output	Current output, suitable for isochronous operation	Current output 4 analog inputs	4 analog inputs	Current output, 4 analog inputs
Order No. group	6ES7 332-5HD0.-...	6ES7 332-5BH0.-...	6ES7 332-7ND0.-...	6ES7 334-0CE0.-...	6ES7 334-0KE0.-...	6ES7 335-7HG0.-...

Type of module	Selection guide for analog outputs			
Physical measured variable	Current			
Encoder measurement range	± 20 mA, 0 to 20 mA, 4 to 20 mA			0 to 20 mA
Type of connection	2 wire connection			
Diagnostics capability	✓			–
Operating error	± 0.6 %		± 0.18 %	± 1.0 %
No. of channels	4	2	4	2
No. of groups	4	2	4	1
Resolution	12 bit	12 bit	max. 15 bit + sign	12 bit
Conversion time per channel	0.8 ms	0.8 ms	1.5 ms	0.8 ms
Additional functions	Voltage output	Voltage output	Voltage output	Voltage output, 4 analog inputs
Order No. group	6ES7 332-5HD0.-...	6ES7 332-5HB0.-...	6ES7 332-7ND0.-...	6ES7 334-0CE0.-...

I/O modules - Selection guide for analog inputs

Module type	Selection guide for analog inputs															
Physical measured variable	Voltage															
Encoder measurement range	± 80 mV ± 250 mV ± 500 mV ± 1 V ± 2.5 V		± 5 V 1 to 5 V ± 10 V		0 to 10 V		± 1 V ± 2.5 V ± 10 V 0 to 2 V 0 to 10 V		± 10 V ± 50 mV ± 500 mV 1 to 5 V ± 1 V ± 5 V		± 1 V ± 5 mV ± 10 mV 1 to 5 V					
Diagnostics/interrupt capability	✓				–		✓		–		✓ (at 1..5 V)					
Operating error	± 1 %		± 0.1 %		± 0.9 %		± 0.7 %		± 0.15 %		± 0.6 %		± 0.4 %			
No. of channels	8		2		8		4		2		4		8			
No. of groups	4		1		4		1		1		4		1			
Resolution	max. 14 bit + sign		max. 14 bit + sign		15 bit + sign		8 bit		12 bit + sign		13 bit + sign		12 bit + sign		13 bit + sign	
Conversion time / channel	min. 3 ms		min. 3 ms		min. 10 ms		5 ms		min. 85 ms		min. 0.2 ms		< 70 ms		52 µs	
Additional functions	Measurement of current, resistance and temperature (TC + RTD)		–		Measurement of current		2 analog outputs		Measurement of resistance and temperature (RTD), 2 analog outputs		Measurement of current, 4 analog outputs		Measurement of current, resistance and temperature		Suitable for isochronous mode	
Order No. group	6ES7 331-7KF0.-...		6ES7 331-7KB0.-...		6ES7 331-7NF0.-...		6ES7 334-OCE0.-...		6ES7 334-OKE0.-...		6ES7 335-7HG0.-...		6ES7 331-1KF0.-...		6ES7 331-7HF0.-...	

Module type	Selection guide for analog inputs													
Physical measured variable	Current													
Encoder measurement range	± 3.2 mA, ± 10 mA, ± 20 mA, 0 to 20 mA, 4 to 40 mA			± 20 mA 0 to 20 mA 4 to 40 mA		0 to 20 mA		± 10 mA 0 to 20 mA 4 to 40 mA		0 to 20 mA		± 20 mA 0 to 20 mA 4 to 20 mA		
Type of connection	2 and 4 wire transducer				4 wire transducer				2 and 4 wire transducer					
Diagnostics/interrupt capability	✓				–		✓		–		✓ (at 4..20 mA)			
Operating error	± 1 %			± 0.3 %		± 0.8 %		± 0.25 %		± 0.5 %		± 0.3 %		
No. of channels	8		2		8		4		4		8		8	
No. of groups	4		1		4 (8)		1		4		1		1	
Resolution	max. 14 bit + sign		max. 14 bit + sign		15 bit + sign		8 bit		13 bit + sign		12 bit + sign		13 bit + sign	
Conversion time / channel	min. 3 ms		min. 3 ms		min. 10 ms		5 ms		min. 0.2 ms		< 70 ms		52 µs	
Additional functions	Measurement of voltage, resistance and temperature (TC + RTD)		–		Measurement of voltage		2 analog outputs		Measurement of voltage, 4 analog outputs		Measurement of voltage, resistance and temperature		Suitable for isochronous mode	
Order No. group	6ES7 331-7KF0.-...		6ES7 331-1BH0.-...		6ES7 331-7NF0.-... (6ES7 331-7NF1.-...)		6ES7 334-OCE0.-...		6ES7 335-7HG0.-...		6ES7 331-1KF0.-...		6ES7 331-7HF0.-...	

Module type	Selection guide for analog inputs				
Physical measured variable	Resistance				
Encoder measurement range	150 Ω, 300 Ω, 600 Ω		10 kΩ	600 Ω, 6 kΩ	
Type of connection	2- /3- /4 wire connection				
Diagnostics/interrupt capability	✓		–		
Operating error	± 1 %		± 0.1 %	± 3.5 %	± 0.5 %
No. of channels	4	1	8	4	8
No. of groups	4	1	4	2	1
Resolution	max. 14 bit + sign	max. 14 bit + sign	max. 15 bit + sign	12 bit + sign	12 bit + sign
Conversion time per channel	min. 3 ms	min. 3 ms	min. 10 ms	min. 85 ms	< 140 ms
Additional functions	Measurement of voltage, current and temperature (TC + RTD)	–	Measurement of temperature (RTD)	Measurement of temperature (RTD) 2 analog outputs	Measurement of current, voltage and temperature
Order No. group	6ES7 331-7KF0.-...	6ES7 331-7KB0.-...	6ES7 331-7PF0.-...	6ES7 334-0KE0.-...	6ES7 331-1KF0.-...

Module type	Selection guide for analog inputs							
Physical measured variable	Temperature							
Encoder measurement range	Pt 100 (-120 to +130 °C)	Pt 100 Ni 100 (-200 to +385 °C)		Pt:100; 200; 500; 1000; Ni:100; 120; 200; 500; 1000; Cu 10 (-200 to +850 °C and -120 to +130 °C)	Thermocouples Type E, N, J, K, L		Thermocouples Type B, E, N, J, K, L, R, S, T, U	Pt 100 (-120 to +130 °C) Ni 100; Ni 1000; LG-Ni 1000; (both standard and climate)
Diagnostics/interrupt capability	–	✓						–
Operating error	± 1 %			± 0.1 %	± 1 %		± 0.1 %	± 1 %
No. of channels	4	4	1	8	8	2	8	8
No. of groups	2	4	1	4	4	1	4	1
Resolution	max. 14 bit + sign	max. 14 bit + sign	max. 14 bit + sign	15 bit + sign	max. 14 bit + sign	max. 14 bit + sign	15 bit + sign	12 bit + sign
Conversion time per channel	min. 85 ms	min. 3 ms	min. 3 ms	min. 10 ms	min. 3 ms	min. 3 ms	min. 10 ms	< 140 ms
Additional functions	Measurement of resistance, 2 analog outputs	Meas. of voltage, current and temperature (TC)	–	Measurement of resistance	Meas. of voltage, current and temperature (RTD)	–	–	Measurement of voltage, current and temperature
Order No. group	6ES7 334-0KE0.-...	6ES7 331-7KF0.-...	6ES7 331-7KB0.-...	6ES7 331-7PF0.-...	6ES7 331-7KF0.-...	6ES7 331-7KB0.-...	6ES7 331-7PF1.-...	6ES7 331-1KF0.-...

I/O modules - Selection guide for digital inputs

Module type	Selection guide for digital inputs					
Voltage	DC					
Suitable for	Switches and 2-/3-/4 wire proximity switches (BEROs)					
Input voltage	24 V					
Source/sink inputs	P					
Diag/interrupt capability	✓	–				
Input delay	0.1 - 20 ms (parameterizable)	typ. 3 ms (fixed)				
Number of channels	16	16	32	8	16	16
Galvanic isolation: Number of groups	1	1	2	1	1	1
Extras	suitable for isochronous mode	–	–	8 DO	16 DO	8 DI, 8 DX ¹⁾
MLFB group	6ES7 321-7BH0-....	6ES7 321-1BH0-....	6ES7 321-1BL0-....	6ES7 323-1BH0-....	6ES7 323-1BL0-....	6ES7 327-1BH0-....

Module type	Selection guide for digital inputs				
Voltage	DC				UC Universal voltage
Suitable for	Switches and 2-/3-/4 wire proximity switches (BEROs)		NAMUR encoders	Switches and 2-/3-/4 wire proximity switches (BEROs)	
Input voltage	24 V			48 to 125 V	UC 24/48 V
Source/sink inputs	M	P			
Diag/interrupt capability	–		✓	–	
Input delay	typ. 3 ms	0.05 ms	3 ms	10 ms	< 6 ms
Number of channels	16	16	16	16	16
Galvanic isolation: Number of groups	1	1	2	8	16
Extras	–	suitable for isochronous mode	includes many functions for control and instrumentation technology	–	–
MLFB group	6ES7 321-1BH5-....	6ES7 321-1BH10-...	6ES7 321-7TH00-...	6ES7 321-1CH20-...	6ES7 321-1CH00-...

Module type	Selection guide for digital inputs			
Voltage	AC			
Suitable for	Switches and 2-/3-/4-wire AC proximity switches			
Input voltage	120/230 V	120/230 V	120/230 V	120/230 V
Source/sink inputs	P	P	P	P
Diag/interrupt capability	–	–	–	–
Input delay	< 25 ms	< 25 ms	< 25 ms	< 25 ms
Number of channels	16	32	8	8
Galvanic isolation: Number of groups	4	4	4	8
Extras	–	–	–	–
MLFB group	6ES7 321-1FH0-....	6ES7 321-1FL0-....	6ES7 321-1FF0-....	6ES7 321-1FF1-....

¹⁾ Can be parameterized for each channel as input or output

I/O modules - Selection guide for digital outputs

Module type	Selection guide for digital outputs					
Voltage	DC					
Suitable for	Solenoid valves, DC contactors and signaling lamps					
Output voltage	24 V					
Output current	0.5 A					
Diagnostics/interrupt capability	–					
Number of channels	16	16	32	8	16	16
Galvanic isolation: Number of groups	2	2	4	1	1	1
Extras	–	Suitable for isochr. mode	–	8 DI	16 DI	8 DI, 8 DX ¹⁾
Order No. group	6ES7 322-1BH0-....	6ES7 322-1BH10-....	6ES7 322-1BL0-....	6ES7 323-1BH0-....	6ES7 323-1BL0-....	6ES7 327-1BH0-....

Module type	Selection guide for digital outputs			
Voltage	DC			
Suitable for	Solenoid valves, DC contactors and signaling lamps			
Output voltage	24 V		48 to 125 V	
Output current	0.5 A		2 A	1.5 A
Diagnostics/interrupt capability	✓		–	
Number of channels	8	16	8	8
Galvanic isolation: Number of groups	1	4	2	4
Extras	–	Comprehensive I & C functions	–	–
Order No. group	6ES7 322-1BF0-....	6ES7 322-8BH00-....	6ES7 322-1BF0-....	6ES7 322-1CF00-....

Module type	Selection guide for digital outputs									
Voltage	AC					UC (relay)				
Suitable for	AC magnet coils, contactors, motor starters, low-power motors and signaling lamps					AC/DC solenoid valves, contactors, motor starters, low-power motors and signaling lamps				
Output voltage	120/230 V	120/230 V		120 V	DC: 24 - 120 V AC: 24 - 230 V	24 to 120 V DC 48 to 230 V AC			24 V/ 48 V	
Output current	1 A	1 A	2 A	1 A	2 A	3 A	5 A		0,5 A	
Diagnostics/interrupt capability	–	–	✓/–	–	–	–		✓/–	✓	
Number of channels	16	8	8	32	16	8	8	8	16	
Galvanic isolation: Number of groups	2	2	8	4	2	4	8	8	16	
Extras	–	–	–	–	–	–	–	–	–	
Order No. group	1FH0-....	1FF0-....	5FF0-....	1ELO-....	1HH0-....	1HF0-....	1HF1-....	5HF0-....	5GH00-....	
	6ES7 322-									

¹⁾ Can be parameterized for each channel as input or output

Point-to-point coupling with S7-300

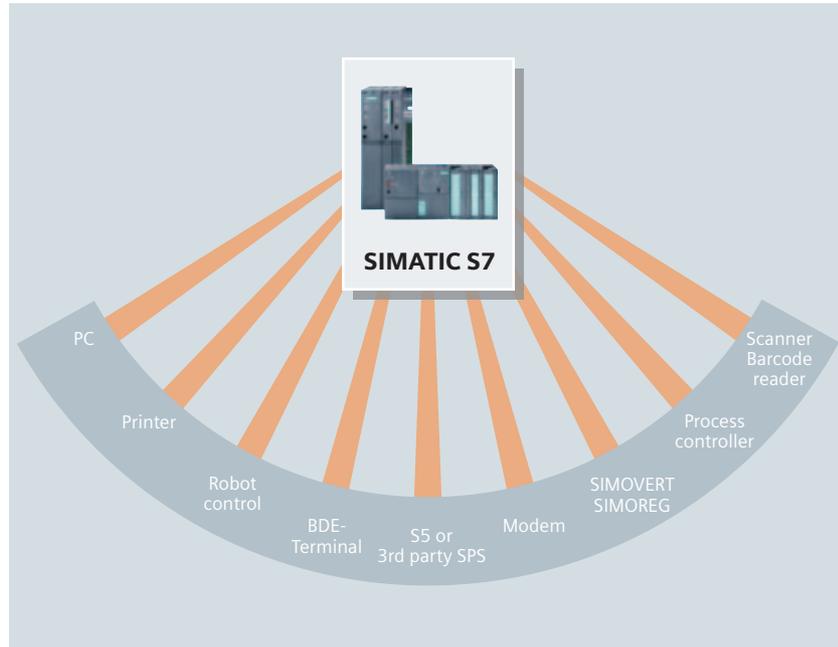
The coupling modules for the S7-300 are available in three versions, each with an interface for the different physical transmission systems. They possess a rugged plastic housing with LEDs for displaying operating states and faults.

A configuration package is available for each CP on a CD with electronic manual, parameterization screen forms and standard function blocks for communication between the CPU and CP.

The configuration data are stored in a system data block which is saved in the CPU. When replacing a module, the new module is therefore immediately ready for operation.

The point-to-point coupling via communications modules (CPs) is a very powerful and cost-effective alternative to bus solutions. The advantage of the point-to-point coupling compared to bus systems is particularly evident if only a few (RS 485) devices are to be coupled to the SIMATIC® S7.

The CPs can also link non-Siemens systems cost-effectively to the SIMATIC S7. Because of the great flexibility of the CPs, various physical transmission systems, speeds or even customized transmission protocols can be implemented.



Application	Low-cost starter solution	Powerful computer link, loadable protocols
Transmission rate	Low (19200 bit/s)	High (76800 bit/s)
Loadable protocols	–	<ul style="list-style-type: none"> • MODBUS Master (6ES7 340-1AA-.....) • MODBUS Slave (6ES7 340-1AB-.....) • Data Highway (6ES7 340-1AE-.....)
Module	CP 340	CP 341
Order No. group	6ES7 340-1...	6ES7 341-1...
Physical transmission system <ul style="list-style-type: none"> • RS 232C (V.24) • 20 mA (TTY) • RS 422/485 (X.27) 	<ul style="list-style-type: none"> • CP 340-1A • CP 340-1B • CP 340-1C 	<ul style="list-style-type: none"> • CP 341-1A • CP 341-1B • CP 341-1C
Integral transmission protocols	ASCII Printer drivers 3964 (R)	ASCII Printer drivers 3964 (R) RK 512

Product Briefs available for further product versions of the S7-300 for special applications



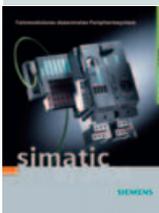
SIMATIC fail-safe controllers
6ZB5310-0KE02-0BA.

Technology CPU 317T-2 DP
6ZB5310-OLM02-0BA.



C7 all-in-one control systems
6ZB5310-0FM02-0BA.

Technological tasks with SIMATIC
E20001-A430-P210



ET 200S bit-modular distributed I/O system
6ZB5310-0KG02-0BA.

AS-Interface
E20001-A150-P302



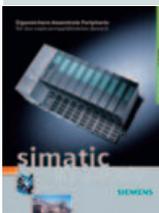
Cabinetless distribution with SIMATIC ET 200 in
IP65/67 degree of protection
6ZB5310-0KN02-0BA.

PROFIBUS
6ZB5530-0AQ02-0BB.



Fundamentals of explosion protection
6ZB5310-0LE02-0BA.

Industrial Ethernet
6ZB5530-0AK02-0BA.



Intrinsically-safe and flexible distributed I/O for
hazardous areas
6ZB5310-0LX02-0BA.

Standards

The SIMATIC S7-300 fulfills the following national and international standards:	The fail-safe CPUs <i>additionally</i> comply with the following standards:
<ul style="list-style-type: none">• DIN, EN, IEC• UL certificate• cULus• FM class 1 div. 2; groups A, B, C and D• Temperature group T4 (≤ 135 °C)• Marine approvals from:<ul style="list-style-type: none">• American Bureau of Shipping• Bureau Veritas• Des Norske Veritas• Germanischer Lloyd• Lloyds Register of Shipping• Ambient temperature 0 to 60 °C for all components• Earthquake-proof• EU regulation 94/9/EC (ATEX 100a)	<ul style="list-style-type: none">• IEC 61508 (SIL 3)• EN 954 (Cat. 4)• NFPA 79, NFPA 85

obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.

You can find more detailed information in the **SIMATIC Guide documentation**:

www.siemens.com/simatic-docu

You can order **further documents** on the topic of SIMATIC at:

www.siemens.com/simatic/printmaterial

To get in touch with **your contact person** near you, look in the Internet under:

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The information provided in this brochure contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An

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