



SIMATIC **S7-300**

**The universal PLC for system solutions with
production engineering as focal point**

SIEMENS



SIMATIC S7-300 within the system family

SIMATIC S7-300

Introduction

CPU

Highlights

Modules

Design, Installation

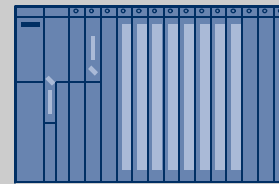
Communications
and HMI

Configuring

Maintenance

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High-end range/
Medium range
S7-400



Mid- and low-end
Performance range
S7-300

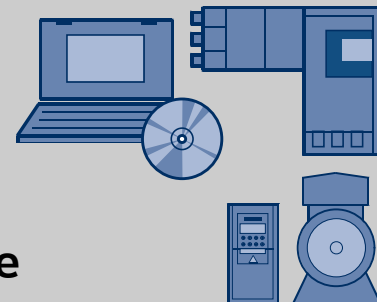


The **universal PLC** for
system solutions with
production engineering
as focal point

Micro PLCs
S7-200



+ Programming devices
+ STEP 7 software
+ Communication
+ Human Machine Interface





SIMATIC S7-300

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Totally Integrated Automation

**S7-300 – The best-selling controller from
Totally Integrated Automation**

**S7-300 – The automation platform for production
engineering**



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<https://sites.google.com/site/chauchiduc>





SIMATIC S7-300

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The CPUs

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The new standard CPUs - Highlights

Shorter machine cycle times

- Reduced command execut. times

Cut engineering costs

- Platform for engineering tools and Runtime-Software
- Modular programming

Cut operating costs

- Micro Memory Card (MMC) instead of batteries
- Project archiving on MMC
- Change programs by just switching MMC

Less mounting volume

- 40 mm instead of 80 mm wide



The Innovation of the S7-300 family



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The CPU family - Overview

CPU 312

- The cost-effective entry into TIA

CPU 314

- The sophisticated solution for medium-range I/O configurations

CPU 315-2 DP / CPU 315-2 PN/DP

- The standard CPU for a wide range of applications
 - With integrated PROFIBUS DP or PROFINET/Ethernet Interface

CPU 317-2 DP / CPU 317-2 PN/DP

- The new high-end CPU in S7-300
 - With integrated PROFIBUS DP or PROFIBUS/Ethernet Interface
 - More quantity breakdowns, processing and communications performance

CPU 318-2 DP

- The high-performance CPU with system features of the S7-400

**For every application
the right CPU**





The new standard CPUs

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CPU-Type	312	314	315-2 DP 315-2 PN/DP	317-2 DP 317-2 PN/DP	318
					
User Memory	16 KB	48 KB*	128 KB	512 KB	512 KB
DI / DO	256	1024	1024	1024	1024
AI / AO	64	256	256	256	256
Processing Time					
Bit/Word	0,2/2 µs	0,1/1 µs	0,1/1 µs	0,05/0,2 µs	0,1/0,1 µs
Fix-Float. Point	5/6 µs	2/3 µs	2/3 µs	0,2/1 µs	?/0,6 µs
Flags	1024	2048	16384	32768	8192
Timers	128	256	256	512	512
Counters	128	256	256	512	512
Connections	6	12	16	32	32
Communication			PROFIBUS-DP Master/Slave	PROFIBUS-DP Master/Slave MPI usable as DP	PROFIBUS-DP Master/Slave MPI useable as DP
			PROFINET/Ethernet u. PROFINET IO		

*from 12/04 64 kB



The Compact CPUs - Highlights

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Integrated functions

- Count/measure, control, positioning

Integrated I/O

- Digital, analog

**Integration saves additional
modules, space and costs**

Integrated communication interfaces

- In addition to MPI, also PROFIBUS DP and point-to-point

CPU 312C



**CPU 313C
CPU 313C-2 PtP
CPU 313C-2 DP**



**CPU 314C-2 PtP
CPU 314C-2 DP**





Compact-CPUs

Integrated technological functions

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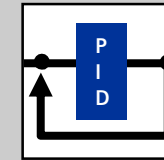
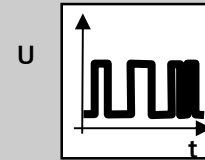
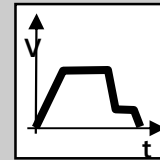
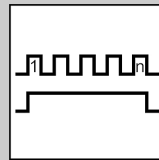
Design, Installation

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CPU type	CPU 312C	CPU 313C CPU 313C-2PtP CPU 313C-2DP	CPU 314C-2PtP CPU 314C-2DP
			
Counting			
Connectable sensors	Incremental encoder (24V DC), pulse encoder with directional signal	Incremental encoder, pulse encoder with directional signal	Incremental encoder, pulse encoder with directional signal
Number of channels	2	3	4
Limit frequency	max. 10 kHz	max. 30 kHz	max. 60 kHz
Frequency measurement	Yes, 2 channels, max.10 kHz	Yes, 3 channels,max.30 kHz	Yes, 4 channels,max.60 kHz
Pulse-width measurement			
Number of pulse outputs	2	3	4
Limit frequency	2.5 kHz	2.5 kHz	2.5 kHz
Controlled positioning	No	No	1 axis
Closed-loop control	No	PID	PID



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Compact CPUs – Benefits

Integrated technological functions

No supplementary modules required

Save cost and money

Optimized memory requirement and runtime

- Technological functions are an integral part of the operating system

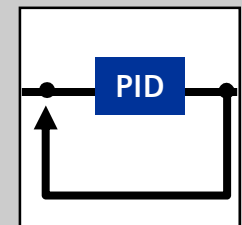
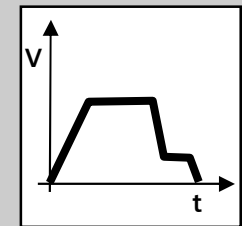
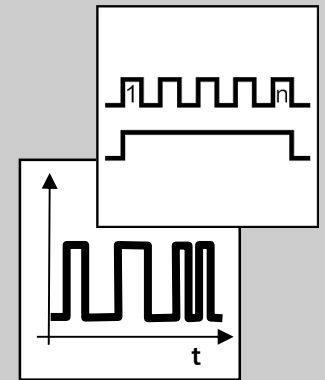
No additional programming overhead

Save resources

Simple and flexible

- Pre-configured functions can be integrated into the user program via standard blocks
- Parameters can be modified by program

Parameterization instead of programming





SIMATIC Technology – our offering

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"With our range of products, we can offer SIMATIC customers smart solutions for their technological tasks, i.e. from various designs for simple subfunctions of machines to sophisticated applications and complete machines."



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SIMATIC Technology

- Reliable hardware
- Flexible software
- Proven systems
- Solutions that secure your investment

**for industrial
automation**





Highlights - Performance

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- **Efficient** processing speed for short machine cycle times

50 ns / binary instr.

- **Graduated line of CPUs** - from the entry-level CPU to the high-capacity CPU



- **Communication via integrated interfaces**

- **MPI**
- **Point to Point**
- **PROFIBUS-DP**
- **PROFINET/Ethernet**

Integration

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Design, Installation
Aufbau und Montage
Communications
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Highlights - Diverse applications

- **C7 control systems**
with integrated HMI on the
basis of the S7-300

HMI



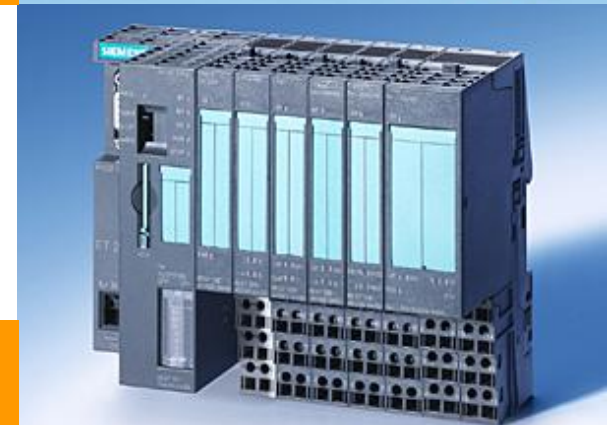
- **Distributed Safety - S7-300F** with fail safe I/O modules for central and distributed applications

Failsafe



- **ET 200S, ET200X**
Intelligent Interface modules,
based on S7-300 – or the standard
S7-300 as PROFIBUS DP Slave

Distributed





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Highlights - Micro Memory Card concept

- Backup of program and data **without battery**

Maintenance-free

- STEP 7 project management (symbols, comments)

Easy to use

- Easy program update by means of Micro Memory Card (MMC)

- Access to MMC in RUN
 - Archiving of meas. values
 - Recipe management



Service-friendly

Process optimization

Quality assurance



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Highlights - Communications integrated: MPI, PROFIBUS-DP interface

■ Interfaces

- MPI integrated into every CPU
- DP in 315-2 DP, 316-2 DP, 318-2 DP

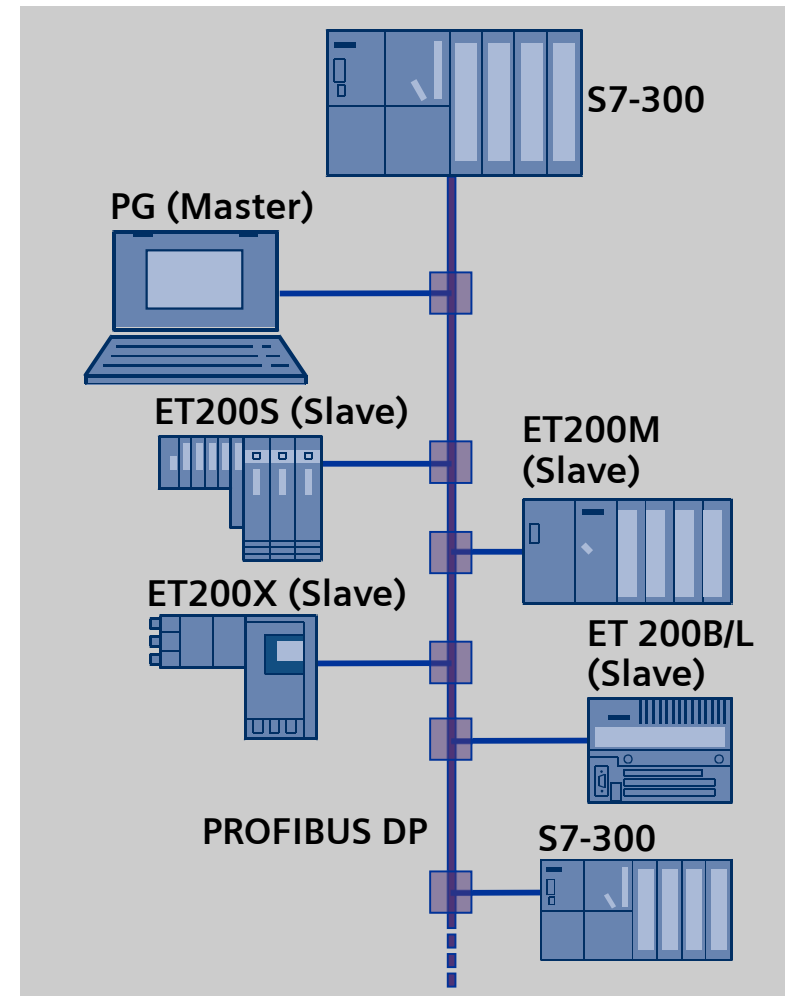
■ Programming from any point in the network (Routing)

■ HMI services for connection of OP/OS

- no additional programming
- minimal CPU cycle load

■ Communications functions for S7

■ Low-cost communication without the need for additional hardware





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Highlights - Engineering

- Efficient configuring and programming with world standard **STEP 7**

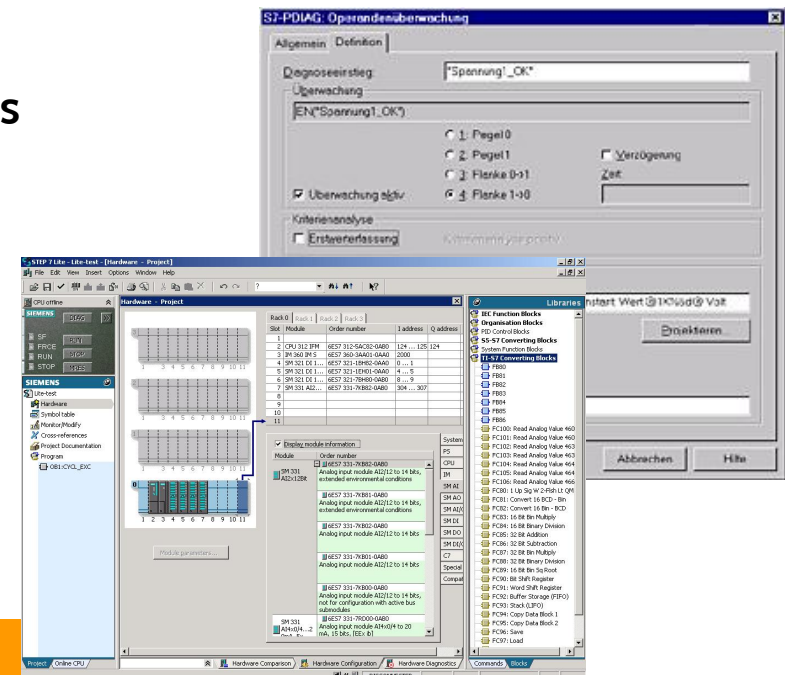
IEC 61131-3

- Higher **availability** thanks to powerful **integrated** diagnostics

Availability

- **Easiest start imaginable** with **STEP 7 Lite** - the programming package for basic functions

Intuitive operating





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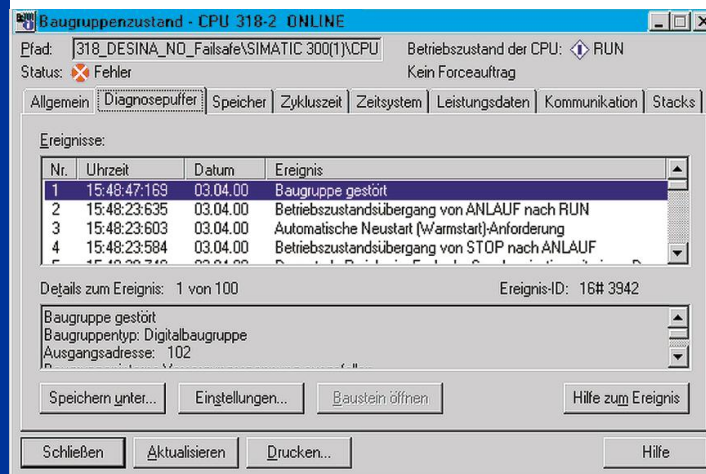
Maintenance

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Highlights - Test and diagnostics functions

■ System diagnostics

- System wide fault diagnostics from CPU to I/O
- Internal CPU services (e.g. error message with time stamp)



**Shorten
down times**

**Increase
productivity**

■ Process diagnostics

- Monitoring critical process signals at the program level
- Simply assign parameters using S7-PDIAG and ProAgent
- CPU generates messages automatically for S7 HMI for more transparency for service personnel



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Highlights - I/O

- Comprehensive line of I/O modules
- For technological tasks
 - Runtime software,
 - Functions integrated in the CPU
 - Function modules
- Identical I/O modules for
 - centralized configurations
 - distributed configurations (ET 200M)



**Wide variety
of applications**



**Cost reduction for
warehousing and logistics**



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Highlights - Modular packaging system

- **Space-saving, modular design without slot rules** for compact machine controls



- **Fanless operation** without rotating parts

- **Versatile connection systems**
 - Screw-type terminal system
 - Spring-type terminal system
 - Prefabricated (TOP Connect)

**Reduced
maintenance costs**

**Less installation
overhead**



Modules for S7-300

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The Modules

Design, Installation

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- **Power Supplies**
classified according to capacity
- **Signal modules**
for digital and analog signals
and hazardous areas
- **Point-to-Point CPs**
for I/O devices of all kinds
- **Function modules**
for high-speed counting,
positioning, closed-loop
control and cam control



Flexible combinations for all applications

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Signal modules to suit any requirement - Digital modules

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	Digital inputs	Digital outputs
Voltage/ current range	DC 24...125 V AC 120 / 230 V	DC 24 / 48...125 V AC 5...230 V 0,5 / 1 / 2 / 5 A
Channels (optically isolated)	8, 16, 32	8, 16, 32 electr./ Relais
Sensors	Switches, 2-wire Beros	
Resolution		
Encoding time		
Ex (i)	Namur / Ex (i)	Namur / Ex(i)
Diagnostics	yes	yes



Signal modules to suit any requirement - Analog modules

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	Analog inputs	Analog outputs
Voltage/ current range	+/- 80mV...10 V, +/-3,2mA, 0/4...20mA u.a.	+/- 10 V, 0...10 V, +/- 20 mA, 0/4...20mA, u.a.
Channels (optically isolated)	2, 4, 8 with integrated linearization	2, 4, 8
Sensors	2-,3-,4-wire resistor (Pt100), thermocouples	
Resolution	9 to 16 bit incl. sign bit	9 to 16 bit incl. sign bit
Encoding time	2,5 ... 100 ms	0,8 ms
Ex (i)	Namur / Ex (i)	Namur / Ex(i)
Diagnostics	yes	yes



Point-to-point CPs - for special interfaces

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The Modules

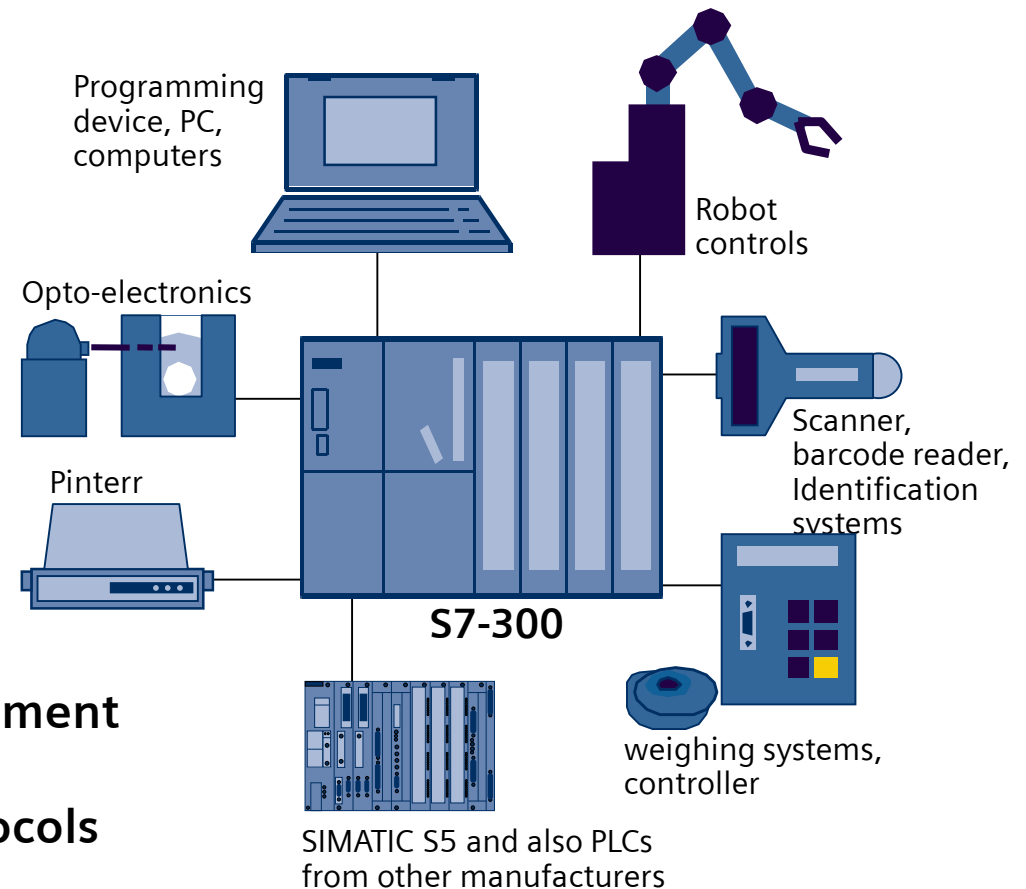
Design, Installation

Communications and HMI

Configuring

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- 1 or 2 interfaces, up to 76 kbit/s
- Different physical transmission environment
- Standard or custom-specific protocols



Easy and flexible

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Function Modules (FM) - for all technologies

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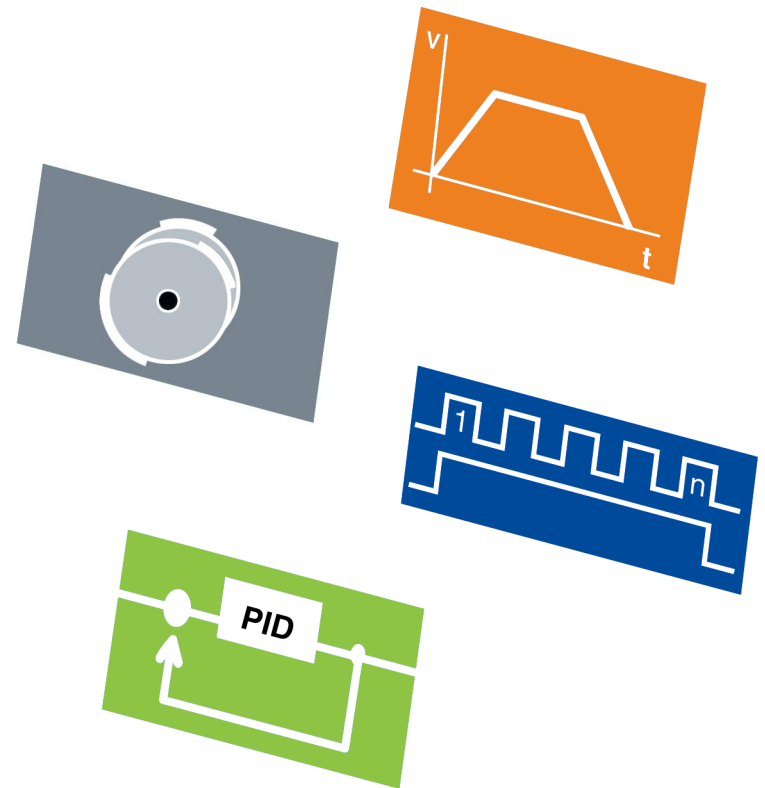
The right choice when

... tasks have to be taken care of
at top speed

... **The very highest accuracy and
reproducibility** are required

... **Special sensors or actuators**
are required

... **technological** tasks require
practical solutions



**Counting, measuring, cam control,
positioning, closed-loop control**

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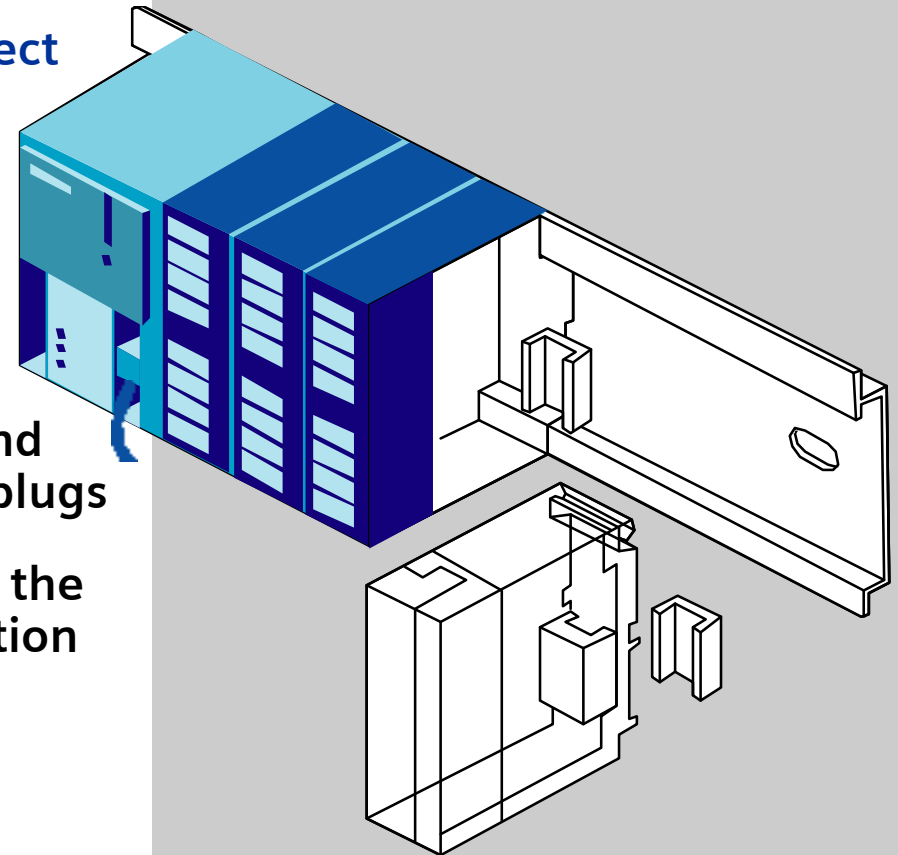
Configuring

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A modular system with compact design

- Rugged, enclosed modules
- Integrated, easy-to-connect backplane bus
- High module density, up to 32 channels per module
- Minimum mounting depth due to recessed and covered connectors and plugs
- Power supply modules in the case of AC mains connection for supplying the S7-300 and sensors/actuators





Mounting made easy

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- **Simply snap** the module onto the mounting rail
- **No slot rules**
- **No jumper settings required** on the module
- **Horizontal or vertical** mounting
- **Front connectors with in**
 - Screw- or
 - Spring-loaded terminals
- **Self-coding** front connectors make sure that the right connector is plugged in after module replacement



Reduction of installation costs thanks to extremely easy handling

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TOP Connect - the user-friendly wiring solution

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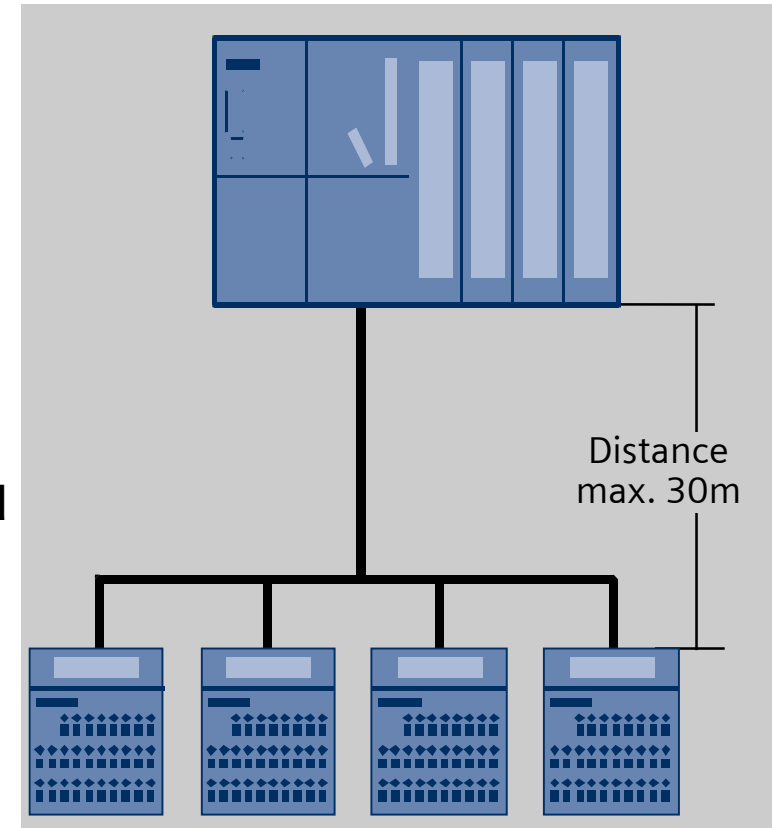
Maintenance

Direct connection of sensors/
actuators using 2, 3 and 4
wiring techniques

- inexpensive and polarized
thanks to prefabricated wiring
- saves the intermediate terminal
in the switchgear cubicle

Terminal blocks can be connected
to S7-300 standard I/O modules
via front
connectors

- screw-type or
- spring-type terminals



Reduction in high-overhead wiring

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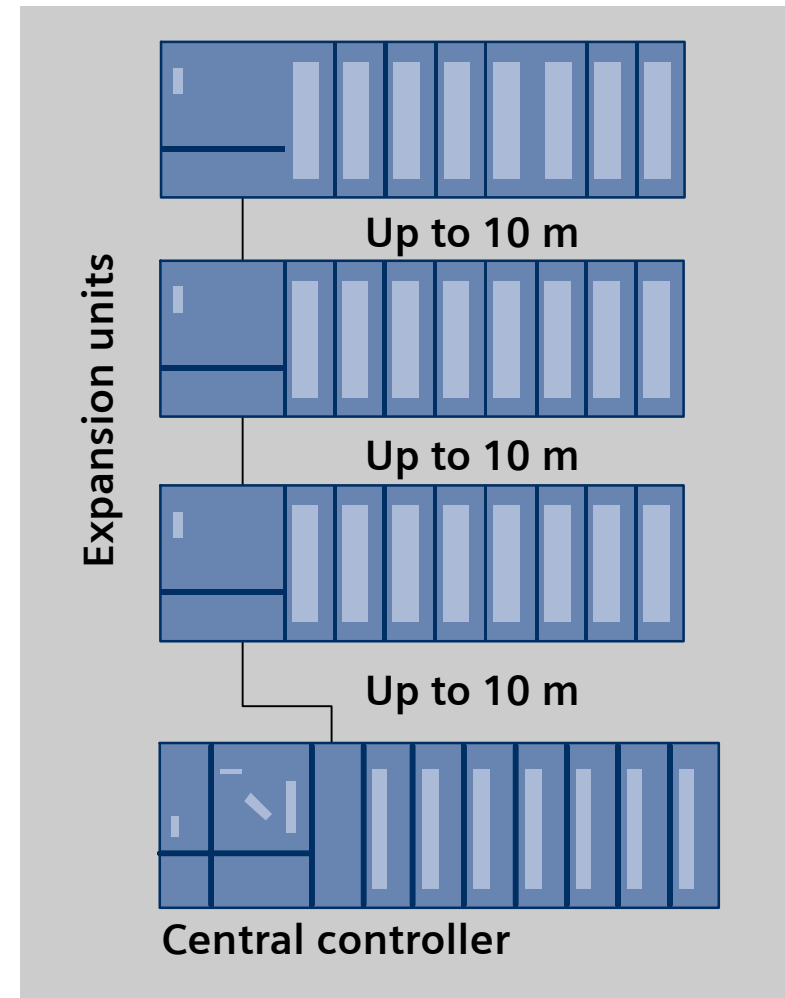
Multi-tier expansion via interface modules

Two-tier configuration

- up to 16 modules in central controller and expansion units (for signal modules)
- **Low-cost solution**

Four-tier configuration

- up to 32 modules in central controller and expansion units (for any modules)
- **Flexible solution**





With S7-300 to all communication networks

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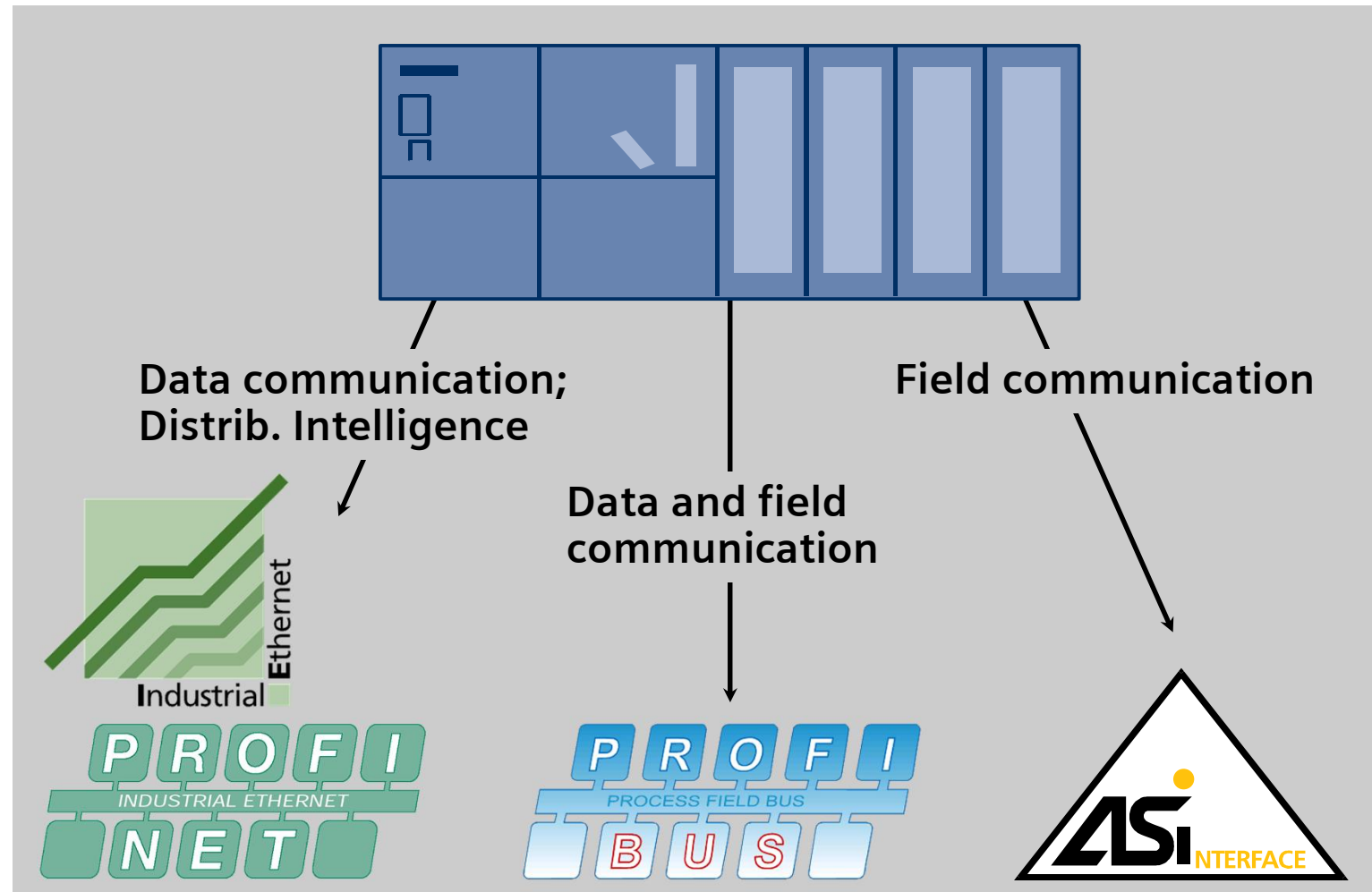
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SIMATIC Human-Machine Interface - The window to your plant/process/machine

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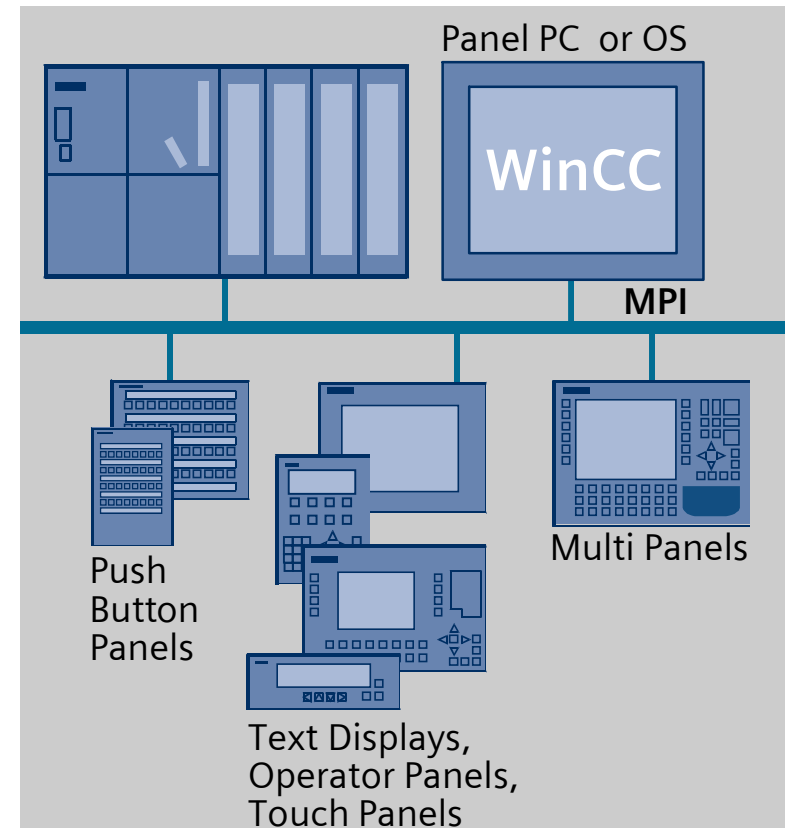
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SIMATIC Panels:

- Push Button Panels, Text Displays, Operator Panels, Touch Panels or Multi Panels via MPI or PROFIBUS-DP
- Multi Panels for an S7-300
- One panel for several automation systems

WinCC flexible - for simple PC-based visualization tasks

WinCC V6- the powerful process visualization system



Easy parameterizing



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Programming and configuring - Made easy with STEP 7

■ Easy to use

- Object-oriented, intuitive user interface
- Configuring instead of programming
- Standard function blocks parameterizing instead of programming

■ Uniformity across the family – common database

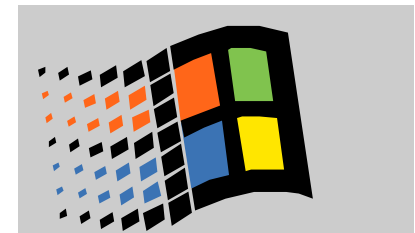
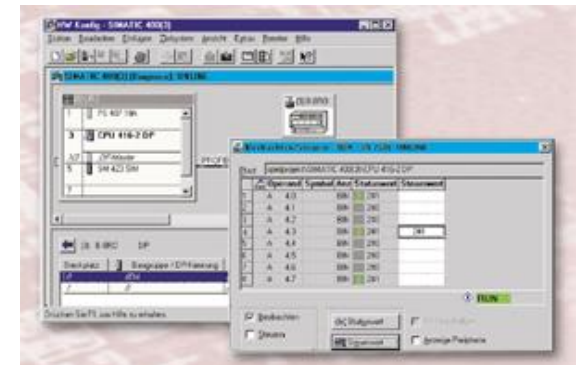
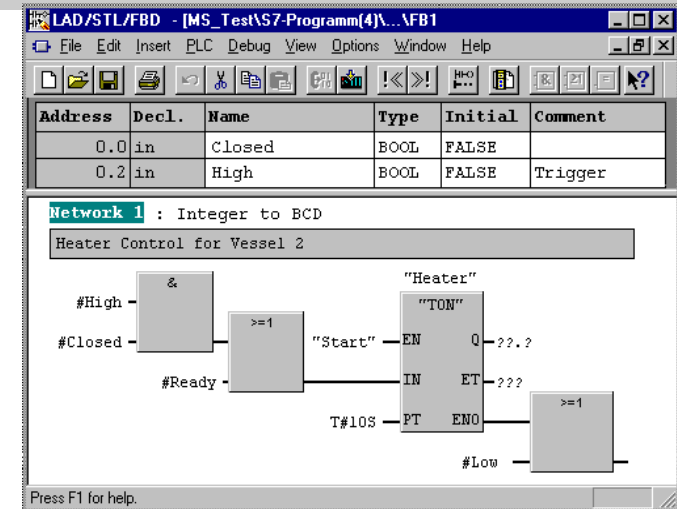
■ Powerful functions -

e.g. module parameters set by software

■ Offline simulation

■ We work according to standard!

- Programming languages in conformity with IEC 61131-3
- Windows 95/98/NT/2000/XP Professional operating system





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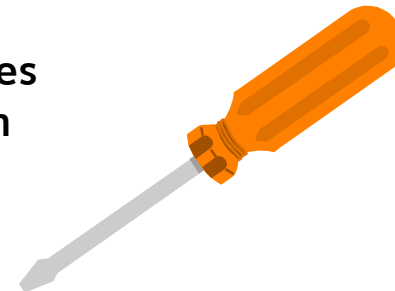
Configuring

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Maintenance - just as easy as everything else

- **Easy change of user program without the need for a programmer**
 - Micro Memory card
 - Update device
 - Download via teleservice
- **Easy, safe module replacement without the need for a programmer**
 - Module parameters are stored centrally in the CPU
 - CPU initializes newly replaced modules
 - so that you can replace modules even during operation (hot swapping)
- **Maintenance-free thanks to battery-less operation**
 - Retentive feature for data, flags, timers and counters



Reduction in service time



SIMATIC **S7-300**

**The universal PLC for system solutions with
production engineering as focal point**

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