

SIMATIC S7-200

The **compact**
Micro PLC





SIMATIC S7-200

Positioning

Features

Expandability

Communication

Software

Summary

Examples

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Overview

- Positioning S7-200 within SIMATIC
- Features of S7-200 CPU´s
- Expandability of S7-200
- Communication and networking with S7-200
- Software STEP7-Micro/WIN32: Easy to use
- Application Examples



Positioning within the SIMATIC family

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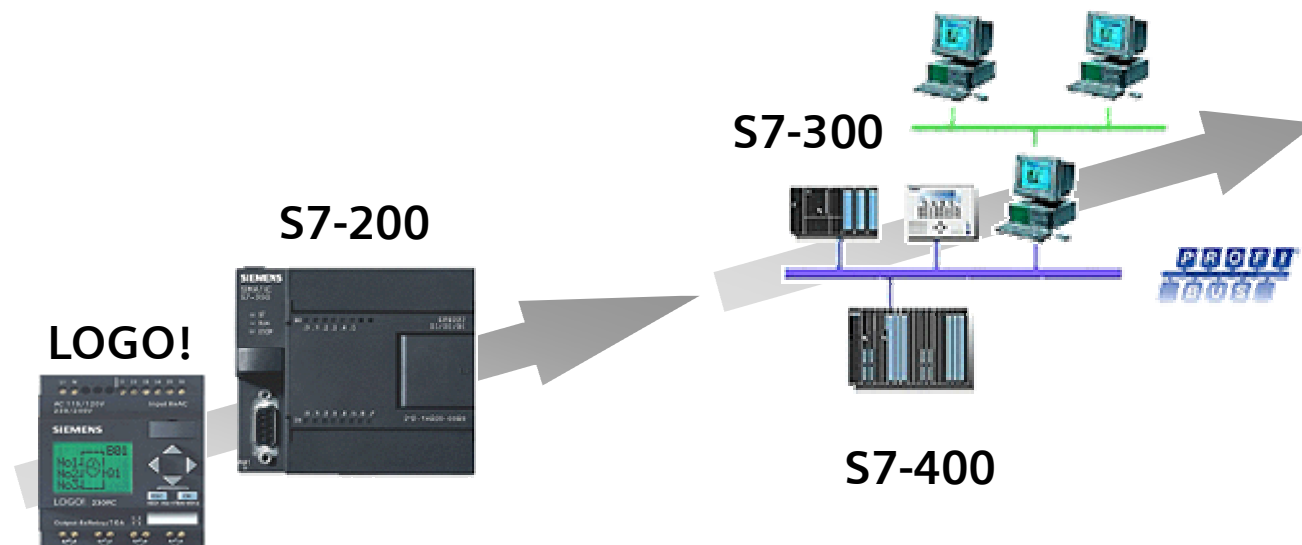
Examples

Micro Automation

- Small, compact systems
- Easiest programming tools with Wizards
- micro automation sets as solution from one supplier

Totally Integrated Automation

- Shared data management, configuring and communications
- Highest performance
- Programming with high-level languages



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Features of S7-200 CPU's

Features:

	CPU 221	CPU 222	CPU 224	CPU 226	CPU 226XM
Integral inputs/outputs	6DE/4DA	8DE/6DA	14DE/10DA	24DE/16DA	24DE/16DA
Max. expansion modules	-	2	7	7	7
Max. inputs and outputs	10	78	168	248	248
Analog channels (I/O/max)	-	8/4/10	28/14/35	28/14/35	28/14/35
Program data memory	4KB/2KB	4KB/2KB	8KB/5KB	8KB/5KB	16KB/10KB
Execution time	0,37 µs	0,37 µs	0,37 µs	0,37 µs	0,37 µs
Memory bits/counters/timers	256/256/256	256/256/256	256/256/256	256/256/256	256/256/256
High-speed counters	4 x 30 kHz	4 x 30 kHz	6 x 30 kHz	6 x 30 kHz	6 x 30 kHz
Real-time clock	Optional	Optional	Integrate	Integrate	Integrate
Pulse outputs	2 x 20 kHz	2 x 20 kHz	2 x 20 kHz	2 x 20 kHz	2 x 20 kHz
Comms. interface	1x RS-485	1x RS-485	1x RS-485	2x RS-485	2x RS-485
Analog potentiometer	1	1	2	2	2



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S7-200 Standards

■ Standards Compliance:



European
Community



Underwriters
Laboratory
Canada
&
United States



Factory
Mutual
Approved



C-Tick for
Australia
&
New Zealand

■ Maritime Approvals:



Lloyds Register
of Shipping (LRS)



American Bureau
of Shipping (ABS)



Det Norske
Veritas (DNV)



German
Lloyd (GL)



Nippon Kaiji
Kyokai (NK)



Bureau
Veritas (BV)



Polski Rejestr
Statkow

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BUREAU
VERITAS



Outstanding real-time features

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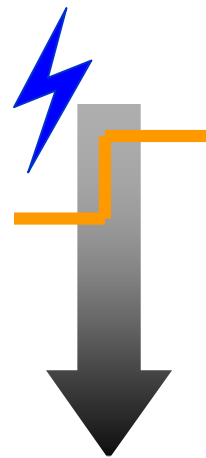
Expandability

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Event interrupt

Fastest possible
signal acquisition

e.g.
signals of a cam
sequencer



Time interrupt

Precise acquisition
of signals

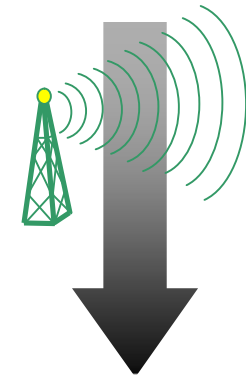
e.g.
analog values
such as pressure,
temperature,
rotational speed



Counter

Counting of
high-speed
events

e.g.
position
acquisition
using
incremental
encoders



Pulse outputs

High-speed pulse
outputs

e.g.
positioning with
stepper motors

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SIMATIC S7-200 in detail ...

SIMATIC S7-200

Real-time clock, password protection, 24V sensor power supply and ...

Positioning

Features

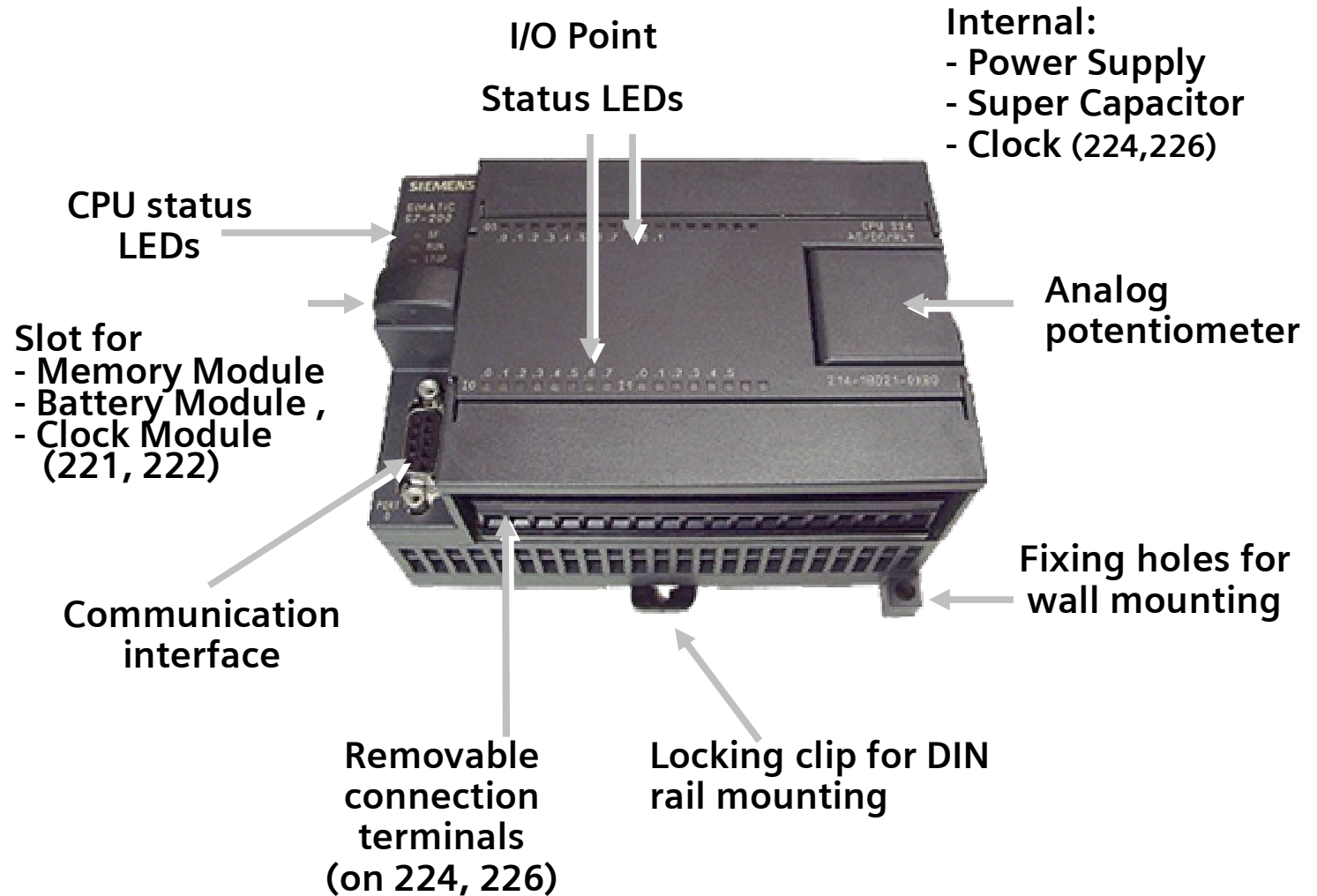
Expandability

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SIMATIC S7-200 in detail ...

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Examples

Memory module

- For program transfer and backup
- Data backup of the complete image of the EEPROM

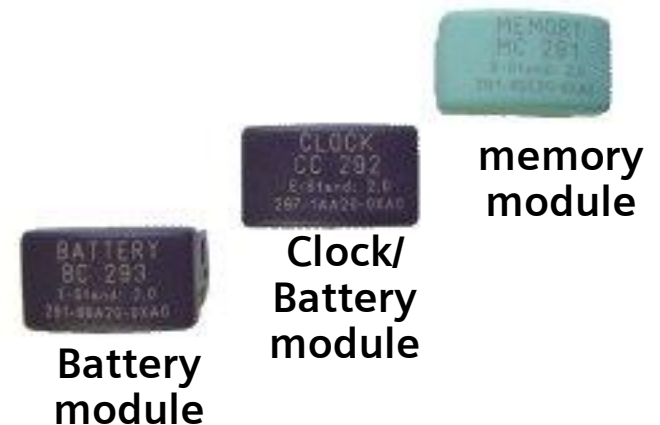


Battery module

- Optional Backup of the internal data (data block)
- Typically 200 days backup

Clock / Battery module

- Real-time clock for CPU 221, 222
- Additional battery buffers clock and data block
- Typically 200 days backup


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SIMATIC S7-200 modular expandability

- Up to 2 Modules (EM) for 222 CPUs
....up to 7 EMs for 224/226 CPUs
- Removable Terminals on digital I/O Modules
- Module Connection via I/O Expansion Ribbon Cable
- Parameters for intelligent modules are stored in the PLC data block

CPU basic unit

+

Expansion modules



Connection
interface

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Connector





Expansion Modules at a Glance

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Digital

- 8 In DC
- 8 In AC
- 16 In DC
- 4 Out DC- 5
- 4 Out Relais – 10A
- 8 Out DC - 0,75 A
- 8 Out AC – 0,5 A
- 8 Out Relais – 2 A
- 4 In /4 Out DC-DC
- 4 In/4 Out DC-Relais
- 8 In/8 Out DC-DC
- 8In/8 Out DC-Relay
- 16 In/16 Out DC-DC
- 16 In/16 Out DC-Relais

Analog

- 4 IN (0-20 mA)
- 2 Out (0-20 mA)
- 4 in/1 Out

Temperature-measurement

- T/C (4 In)
- RTD (2 In)

Technology

- Positioning

Communication

- PROFIBUS DP SLAVE
- Ethernet
- Internet Technology
- AS-Interface Master
- Modem



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PROFIBUS DP slave module EM277

- Integrates the S7-200 as slave node into a Profibus DP network
- Up to 12 MBit/s data transfer rate (with autodetection)
- Max. 126 devices on the bus (Profibus standard), 32 per segment
- Station address can be selected with rotary switches (0..99)
- Use as additional MPI communications interface
 - for connecting an operator panel
 - for connecting PC for maintenance, diagnosis and programming



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CP 243-1 Ethernet Module

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Examples

- Simple...
 - Connections as an EM
 - Allows processing data
 - Simple Network administration
 - Easy Exchanging of Modules (plug & play)
- Provides
 - Ethernet access via an RJ45 socket
 - A connection to S7-OPC
 - Remote programming, configuration and diagnostics via industrial Ethernet
 - Simultaneous communication with up to 8 S7 controllers
32 data transfers with max. 212 byte each
- Flexible use of existing Ethernet facilities
- Simple Programming with the Wizard





CP 243-1 IT Communications Module

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Examples

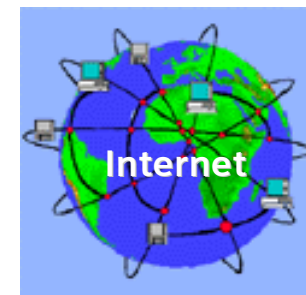
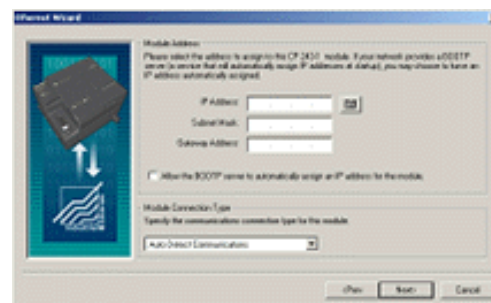
- Provides:
 - The same peer-to-peer features like the CP 243-1 Ethernet
 - Send up to 32 E-Mail's
 - Integrated Web Server
 - Built-in user diagnostic HTML pages
 - Built-in system diagnostic HTML pages

Supports:

- Visualization with JAVA and HTML
- Data exchange of files by means of FTP



- Simple Programming with the Wizard



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AS-Interface master module CP243-2

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Examples

- In accordance with the specification V2.1 class M1e Master, up to 61 slaves (A/B slaves) can be connected to one master
- Max. cycle time 5 ms (with 31 slaves) or 10 ms (with 61 Slaves)
- Maximum cable length 100m (with amplifiers 300m)
 - linear, star or tree topology
- 2 pushbuttons on the module for setting the display an operating mode
- LEDs for indicating slave status, faults and bus status
- Standard Operation (accessing I/O Data Blocks of the Slaves)
- Extended Operation (also Write Parameter Data or Poll Diagnostic Data)
- Unshielded two-wire cable (2x1.5mm²) for data and auxiliary power
 - easy to install and maintain
- Also allows to connect "Safety at work" components
- Simple Programming with the Wizard





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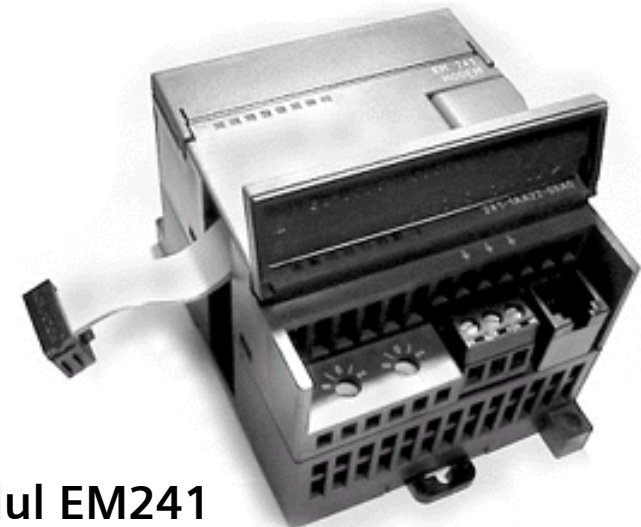
Summary

Examples

Modem module EM241

Remote communication with the S7-200 via telephone line

- Access to a PLC with Micro/WIN connection for remote programming and debugging (TeleService)
- Modbus RTU master/slave communication
- Alphanumeric/SMS messages and numeric paging (depending on local provider's services)
- CPU-CPU data exchange also to third party modems
- Modem password and call-back function
- COM port of the CPU remains free for other purposes
 - HMI
 - free port communication



Modem Modul EM241



S7-200 Networking Possibilities

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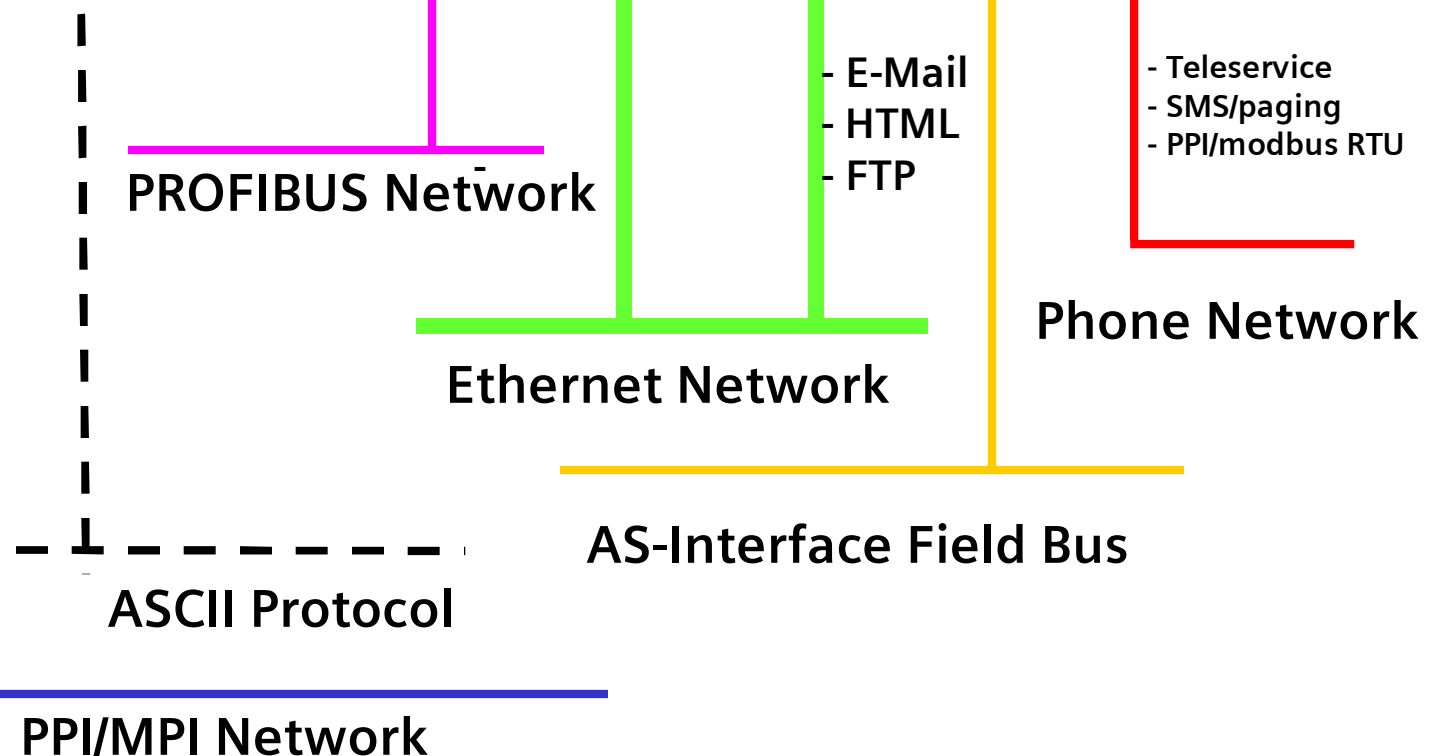
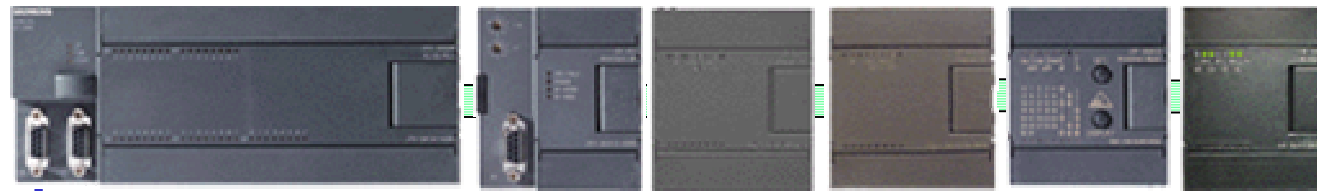
Communication

Software

Summary

Examples

S7-22x

EM
277CP
243-1CP
243-1 ITCP
243-2EM
241

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TD200 Text Display

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Examples

- Display of up to 80 messages from the S7-200 CPU
- Permits modification of variables in the controller
- Max. data transfer rate 187.5 kBit/s
- Max. 32 TD200s per network*
- Low price, simple programming and high degree of protection in IP65 on front
- Simple replacement since messages are stored in the CPU data memory
- Supports broken-line graphics, Cyrillic alphabet and simplified Chinese characters



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TP070 Touch Panel

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Summary

Examples

- The TP070 is a low-cost touch-screen graphical operator interface
- 5.7" monochrome LCD display
 - 320x240 pixels, 4 blue scales
 - Super Twisted Nematic Technology (STN)
 - Bright CCFL (Cold Cathode Fluorescent Lamp) backlight
- Based on the Microsoft® Windows® CE operating system
- System keyboard display integrated
- Simple programming with TP Designer
- Point-to-point connection with the S7-200 CPU (max. 1 TP070 per network)*
- Specially designed for the S7-200



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STEP 7-Micro/Win32

Setting THE Standard in Micro PLC Programming

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Examples

- Simple Installation and Configuration under Windows 95, 98, NT 4.0, 2000, ME and XP
- No Authorizations Required
- EASY to Learn, EASY to Use
- User-friendly editors for
 - Ladder diagram,
 - Function block diagram and
 - Statement list
- Large instruction set
 - From simple "AND" operations to special math and string functions
- Time savings thanks to off-the-shelf subroutines in libraries
- Extensive aids for program test
- "Find & Correct" quickly fixes errors
- Software, Documentation, Help-files in 6 Standard Languages


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SIMATIC S7-200 Summary

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... Loads of power

**Simplest possible entry/
simple handling**

- ⇒ e.g. thanks to 1 h primer, starter box with manual, software etc.
- ⇒ Simple programming software

Positioning

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Summary

Examples

... low space requirements

Compact dimensions

- ⇒ Low space requirements
- ⇒ Smaller control cabinets
- ⇒ Maximum automation technology at a minimum price!

High functionality

- ⇒ Boundless communications potential
- ⇒ Unbeaten real-time features

Graded product range

- ⇒ For different applications

... at low cost!

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Application examples

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... over 1 million applications world wide

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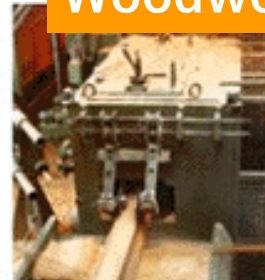
Communication

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Examples

Woodworking



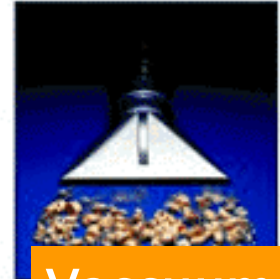
Conveyor systems



Pump controls



Filling plants



Vaccuum suction systems

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Examples

Elevators with optimal stopping accuracy

Cost savings

- Easy to adjust to individual customer requests
- Remote monitoring for cost-effective service
- All important certifications for export business onboard

Quality enhancement

- Digital monitoring of actual shaft position using incremental encoders (exact position acquisition of the elevator)
- Saves on magnetic switches





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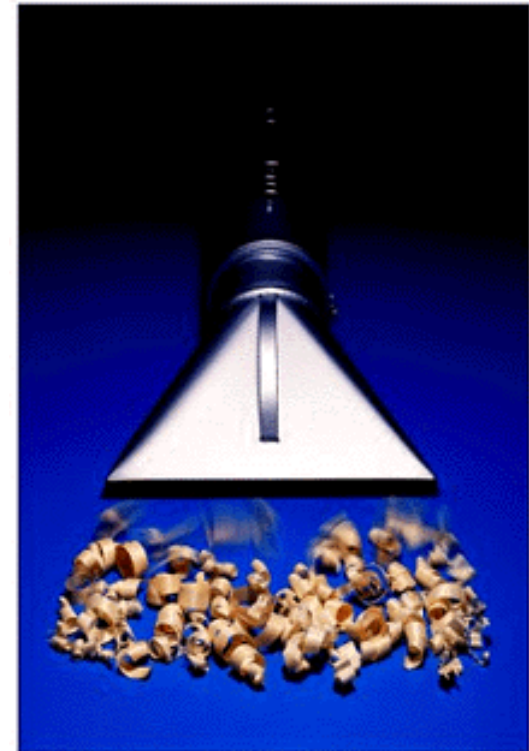
Suction extraction systems for woodworking

Cost savings

- Reduction in wiring and startup costs using the AS-Interface
- Connection of all shutoff valves in the suction system
- Efficient service using modem technology

Quality enhancement

- Calculation of the optimal suction power
- Reduction in power consumption

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Woodworking machinery

Cost savings

- Flexible solution allows for easy expansion
- Customer wishes easily incorporated

Quality enhancement

- Precise positioning for high quality of final product



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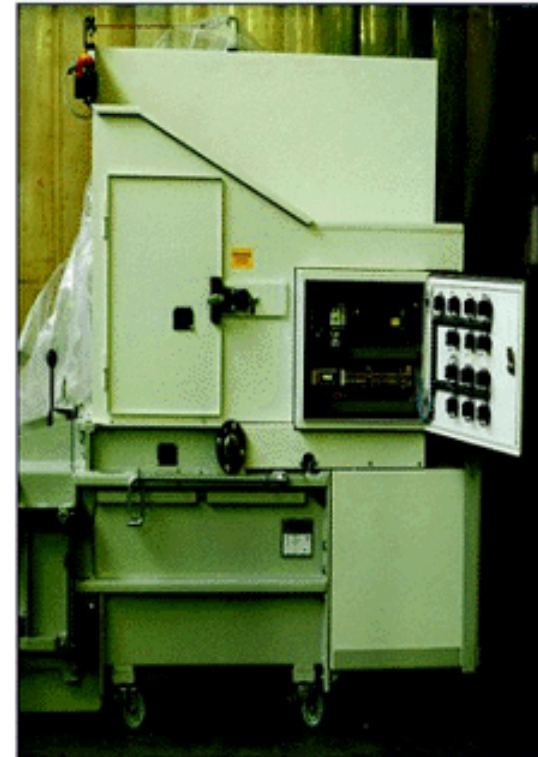
Low-cost waste presses

Cost savings

- Simple and fast changeover from relay technology to PLC electronics
- Low space requirements allow for smaller control cabinet

Quality enhancement

- Flexible solution allows for easy expansion
- Increased operational information using non-volatile data backup

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