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# SIMATIC ET 200SP

Simple – smaller – stronger

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[siemens.com/ET200sp](http://siemens.com/ET200sp)

## Requirements for a distributed I/O system

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### Compact

Reduced space requirements in the control box

### Fast

Fast cycle times for increasing production capacity

### Energy efficiency

Transparency of consumption down to the machine level



### Wiring

Simple installation/wiring and fast commissioning

### Environment

Integrated solutions with IP20 and IP65/67

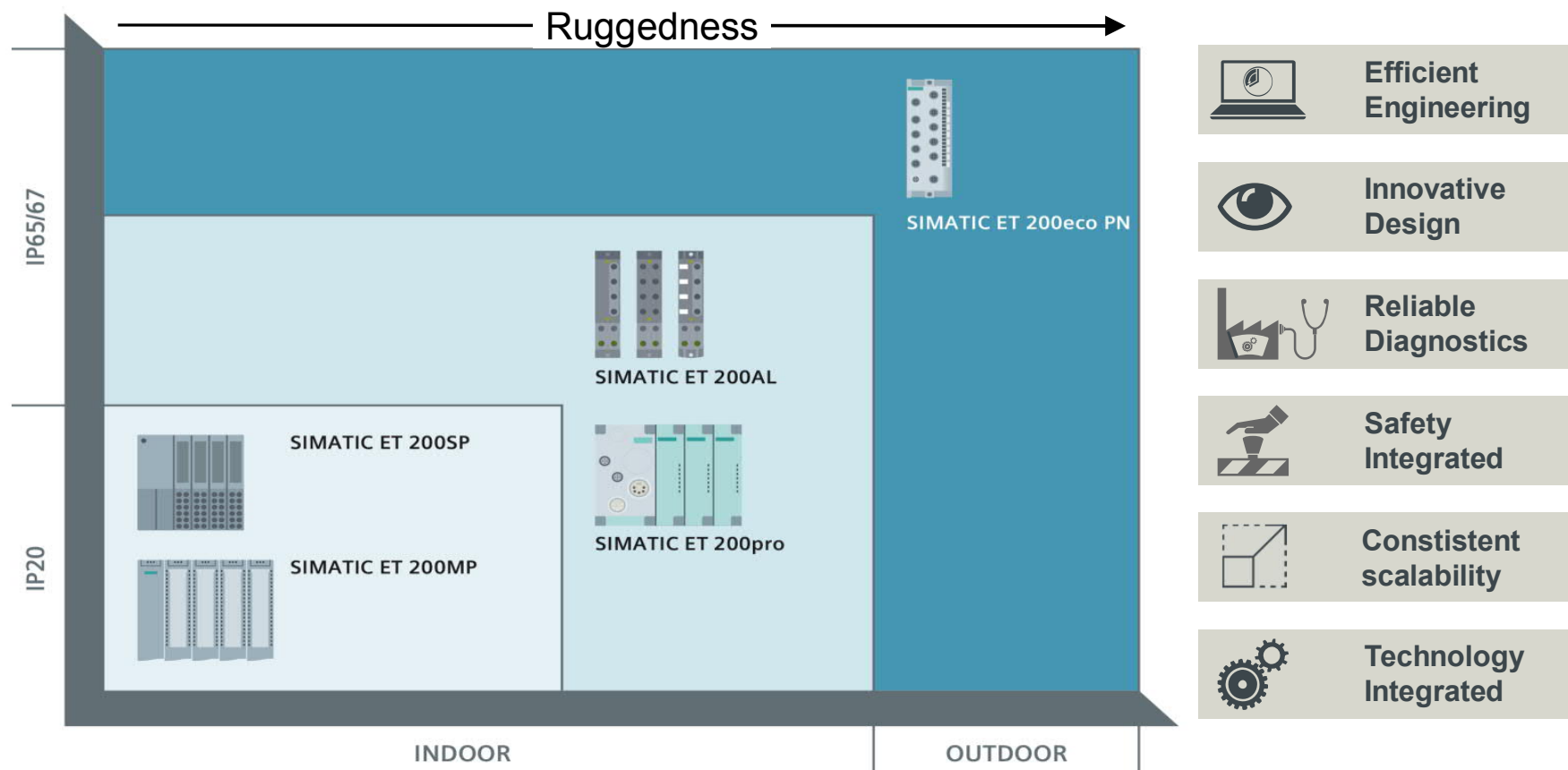
### Diagnostics

Fast diagnostics directly at the programmable controller

**The automation market demands enhanced intelligence in the field that can be integrated in a flexible and space-saving manner**

# SIMATIC ET 200SP

## Overview of ET 200 portfolio



# SIMATIC ET 200SP

The highly modular IO system

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Fail-safe modules



Intelligence in the I/O



Compact design



Push-in terminals



Energy efficiency



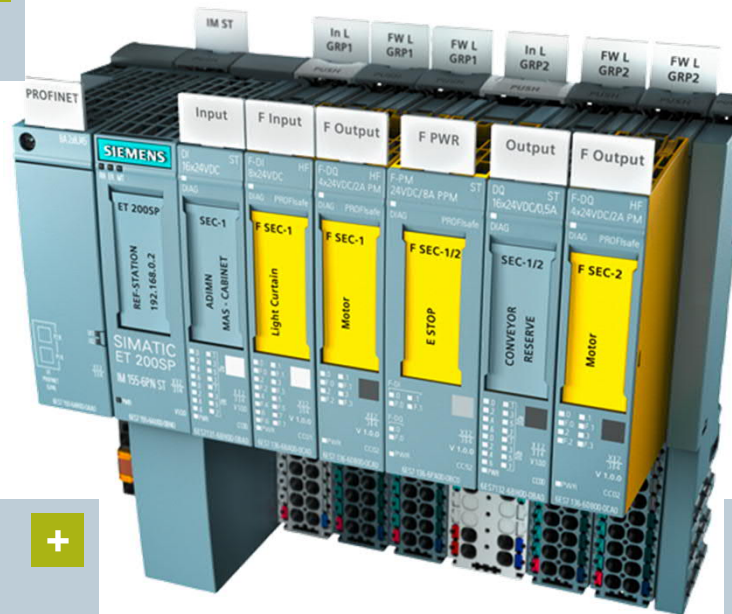
Tool-free connections



Ruggedness



Reduced parts variance

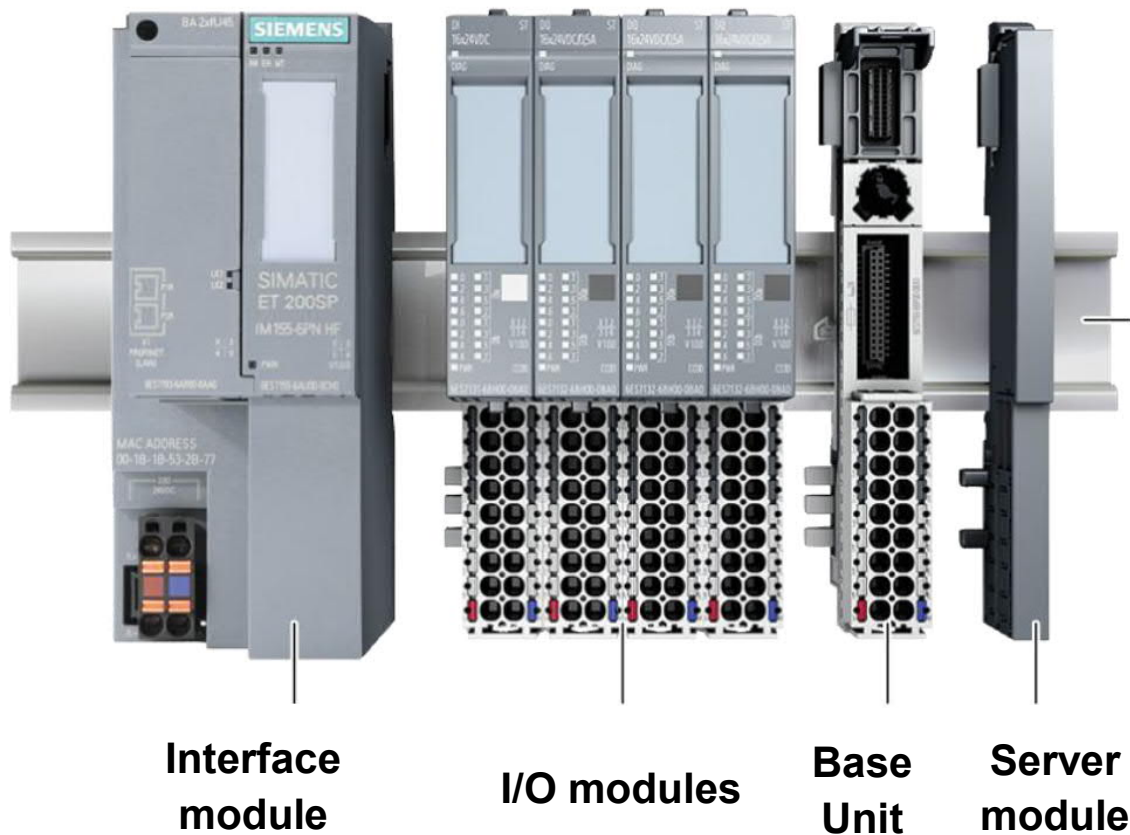


Easy to use - smaller size - more powerful performance

Simple - smaller - stronger

# SIMATIC ET 200SP

## Mechanical design



**Interface module**

**I/O modules**

**Base Unit**

**Server module**

### Feature/function

Interface module

I/O modules

BaseUnit:  
Light-colored: new load group  
Dark: continue LG  
Long: +10 auxiliary terminals

### Benefits

▶ Flexible connection to PROFINET/PROFIBUS via copper or fiber optic

▶ Large selection of I/O modules flexible in use






- ▶
- Reduced module variance through module/BaseUnit combination
  - 1- to 3-conductor connection with the same space requirements

# SIMATIC ET 200SP

The right connection for every performance requirement

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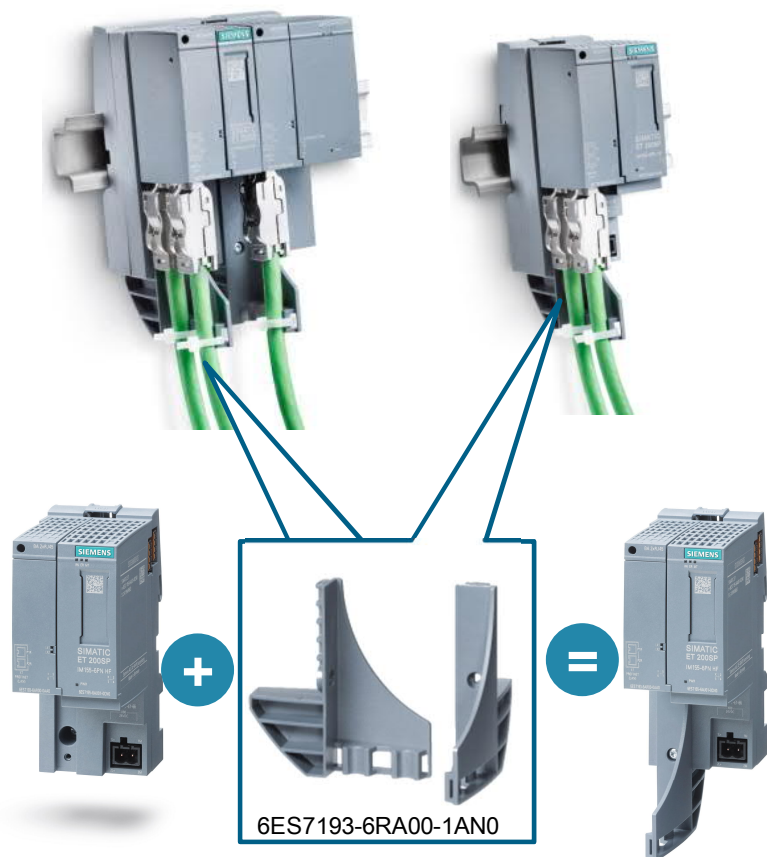


	<b>Basic</b> Up to 12 modules	<ul style="list-style-type: none"><li>• Basic functions (all modules except Safety can be used)</li><li>• Operation with gaps</li><li>• 2 x Ethernet ports</li></ul>
	<b>Standard</b> up to 32 modules	<ul style="list-style-type: none"><li>+ Safety Integrated modules</li><li>+ Expansion in IP 67 (ET 200AL connection)</li><li>+ Single hot swapping</li></ul>
	<b>High Feature</b> up to 64 modules	<ul style="list-style-type: none"><li>+ Flexible connection via copper or fiber optic BusAdapter</li><li>+ Isochronous mode: 250 <math>\mu</math>s</li><li>+ Multi hot swapping</li></ul>
	<b>High Speed</b> up to 30 modules	<ul style="list-style-type: none"><li>+ Isochronous mode: 125<math>\mu</math>s</li></ul>
	<b>CPU</b> up to 64 modules	<ul style="list-style-type: none"><li>+ S7-1500 CPU integrated</li><li>+ Web server onboard</li><li>+ Local data backup using memory card</li></ul>

# SIMATIC ET 200SP **New**

New High Feature interface modules & accessories

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## Feature / Function

### New „High Feature“ Interface modules

- 3-port-IM (6ES7155-6AU30-0CN0)
- IM HF V4.2. (6ES7155-6AU01-0CN0)

### Features:

- Mountable strain relief
- 10ms bridging of power failure
- Module to module communication
- time synchronization (for timestamp with Energy Meter HF)
- 2 pluggable BusAdapters (only 3-Port-IM)

## Benefit

Higher machine availability due to the increased robustness against power supply fluctuations and bus cable strains

### 3 PN Ports for more flexibility:









- Additional stub line
- Infield connection of a programming device
- Direct connection of HMI

# SIMATIC ET 200SP

the flexible connection with the Busadapter (BA)

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	<b>BA 2xRJ45</b> <ul style="list-style-type: none"><li>• 2 RJ 45 Ports</li></ul>		<b>BA 2xSCRJ</b> <ul style="list-style-type: none"><li>• 2 FO* with SCRJ plug</li></ul>		<b>BA 2xLC</b> <ul style="list-style-type: none"><li>• 2 LC** glass fiber-optic</li></ul>
	<b>BA 2xFC</b> <ul style="list-style-type: none"><li>• 2 Fast Connect</li></ul>		<b>BA SCRJ/RJ45</b> <ul style="list-style-type: none"><li>• 1 RJ 45 Ports</li><li>• 1 FO*</li></ul>		<b>BA LC/RJ45</b> <ul style="list-style-type: none"><li>• 1 RJ 45 Ports</li><li>• 1 LC* -glass fiber</li></ul>
			<b>BA SCRJ/FC</b> <ul style="list-style-type: none"><li>• 1 Fast Connect</li><li>• 1 FO*</li></ul>		<b>BA LC/FC</b> <ul style="list-style-type: none"><li>• 1 Fast Connect</li><li>• 1 LC* -glass fiber</li></ul>

\* Fibre optic POF, PCF, PCF-GI

\*\* Lucent Connector







# SIMATIC ET 200SP

The I/O system with all the options

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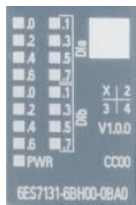


	<b>Basic</b> <ul style="list-style-type: none"><li>• Basic diagnostics</li><li>• Basic functions</li></ul>		
	<b>Standard</b> <ul style="list-style-type: none"><li>+ Adjustability using parameters</li><li>+ Module-based diagnostics</li><li>+ Faster data processing</li></ul>		
	<b>High Feature</b> <ul style="list-style-type: none"><li>+ Channel-specific diagnostics</li><li>+ Alternative operating modes</li><li>+ Expanded functionalities</li></ul>		<b>High Speed</b> <ul style="list-style-type: none"><li>+ Isochronous mode</li><li>+ Fastest possible data exchange</li><li>+ Oversampling</li></ul>

# SIMATIC ET 200SP

The I/O system with all functionalities

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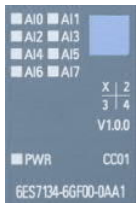
## Digital inputs

- 24V/ 120V / 230V
- 4-16 channels per module



## Digital outputs

- 24V/ 120V / 230V – 0.5 -> 5A
- 4-16 channels per module



## Analog inputs

- I , U, RTD, TC , Energy
- 2-8 channels per module



## Analog outputs

- I, U output
- 2-4 channels per module



## Communication

- IO Link, PtP, AS-i (incl. F)
- PROFIBUS master module



## Technology and special modules

- Counting, positioning, cams
- Energy measurement, weighing

# SIMATIC ET 200SP

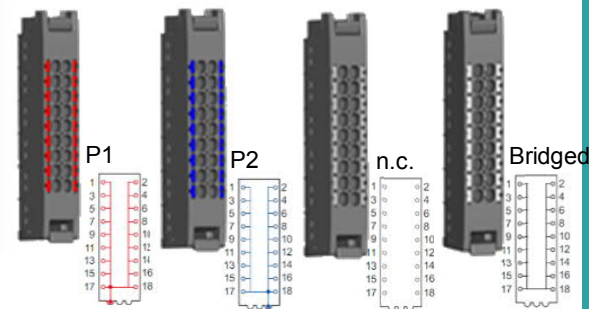
## Potential Distribution modules (PotDis) New

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### Feature

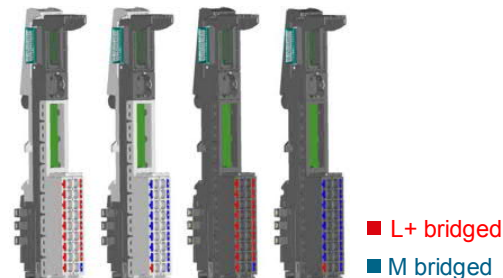
- System-integrated series terminals for connecting 2, 3, and 4-wire sensors / actuators for 8- and 16-channel modules
- Any combination of PotDis-TB and PotDis-BU for different potential types (P1, P2, n.c.)
- Up to 36 potential clamp spots on 15mm width (for 24V DC/AC – 230V AC)

#### PotDis-TB (Terminalbox)



+

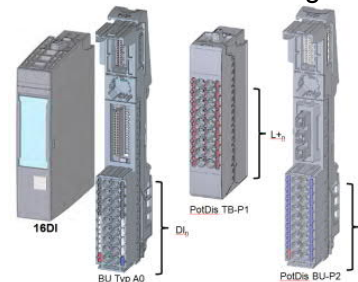
#### PotDis-BU (BaseUnit)



=



**Application-example:**  
16 DI with 3-wire  
at the same station height



### Benefit

- + **Space saving in the control cabinet** by the elimination of additional conventional series terminals
- + **Higher flexibility and clarity** with the potential distribution in the control cabinet
- + **Saving of wiring time** through system integration with direct connection to the internal potential rails P1, P2

# SIMATIC ET 200SP

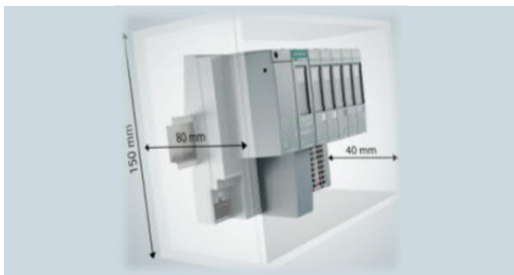
## Added values

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### Quick and easy station setup

- Tool-free cabling with push-in terminals
- Shield terminal element for analog signals
- Tool-free setup of the station



### Effective footprint

- About 50% narrower than other distributed I/O systems
- BaseUnits enable sufficient space for standardized bending radii, even in the smallest control cabinets



### Maximum clarity

- Reference identification labels for assigning the module/BU
- Clear terminal assignments with color coding of the terminal
- Color and data matrix code on the module

# SIMATIC ET 200SP

## Added values

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### Simple expansion in IP67

- Direct connection of the ET 200AL IO modules
- Integrated diagnostics from IP20 to IP67
- Integrated functionality, e.g. configuration control



### Safety Integrated

- Safety-related communication
- SIL 3 with Safety DI/DQ modules
- SIL 2 with Standard AQ/DQ via safe group shutdown



### Highest flexibility

- Configuration control with option handling
- Easy expandability thanks to design with gaps
- Quick replacement of modules with multiple hot-swapping

# SIMATIC ET 200SP

Intelligence in the I/O with the distributed controller

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## S7-1500 in ET 200SP design:

The controllers can be configured with the TIA Portal and they support the programming languages LAD/FBD/STL/SCL and S7-Graph. Blocks can be transferred directly from another S7-1500 or S7-1200.



## Safety Integrated:

One controller for distributed standard and fail-safe automation reduces space requirements and complexity



## Open controller:

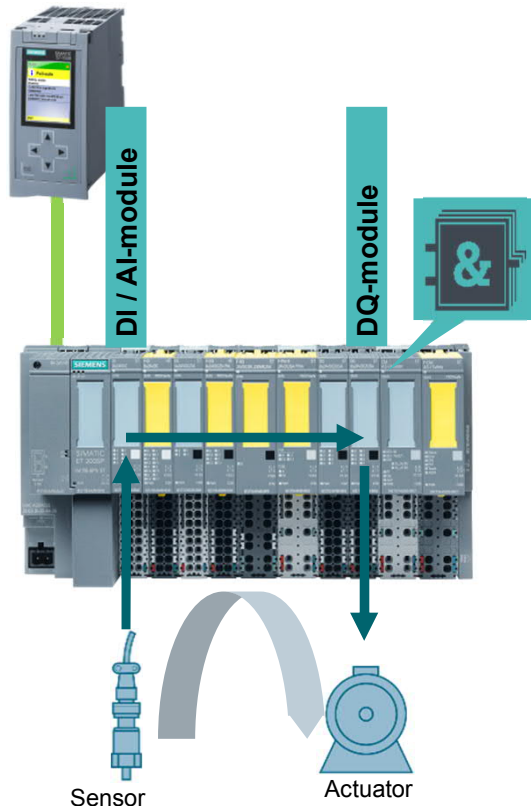
- High-level language applications in C and C++ or VB can be integrated
- Available with pre-installed WinCC Advance Runtime for direct connection of a SIMATIC Flat Panel



# SIMATIC ET 200 – Module to Module Communication (MtM)

Shortest response times without detour via the CPU

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## Feature / Function

**New**

New for ET 200SP IM HF from FW V4.1

### Module to Module Communication (MtM):

- Direct transmission of data from an input module to one or more output modules in the same ET 200 station without detour via the PLC program
- Reaction in the receiver module via implemented parameterizable logic
- significantly shorter reaction times (Only 1 Profinet cycle for clamp / clamp reaction = 250µs)
- Unlimited quantity structure



Based on MtM-Communication:

**New operating mode "Cam controller"** for ET 200SP DQ 4x24VDC/2A HS via FW-Update for up to 16 cams per module

**New**

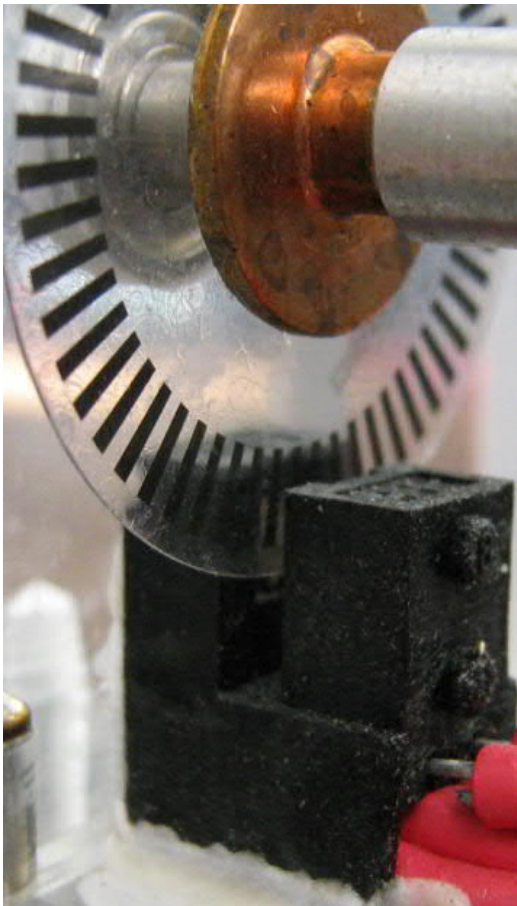
## Benefit

- **Saving space in the machine**, thanks to the possibility of moving sensors and actuators closer together (less reaction time requires less space)
- **Increase product quality by reducing** von Fluctuations of the reaction time (jitter) for most precise reactions and optimization of the deterministic
- **Saving CPU performance and storage**

**Saving of Engineering effort** with the implementation of cam controllers (parameterization instead of programming) e.g. for setting glue dots

# SIMATIC ET 200SP

## Technological functions in ET 200SP High Speed modules



### Feature/function

#### DI 8x24VDC High Speed

- DI
- Counting (4-channel)

#### DQ 4x24VDC/2A High Speed

- DQ (energy-saving mode)
- PWM

#### Alle High Speed Module (digital/ analog)

- Oversampling

### Benefits

#### Counting

- Four 32-bit pulse counter inputs
- One gate or direction input per channel
- Max. counting frequency approx. **10 kHz**

#### Pulse Width Modulation

- Four PWM outputs
- Activation via pulse/pause ratio 0.0% to 100.0%
- Period duration configurable from **0.2ms to 59.73ms**

#### Oversampling

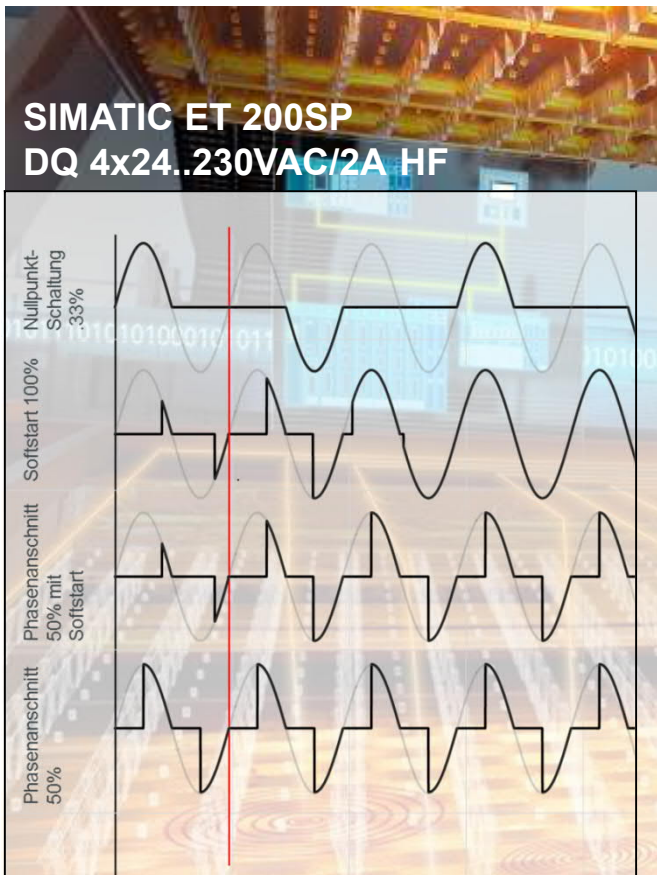
- Output of analog values with maximum resolution of **31.25µs**
- Acquire analog values with maximum resolution **50µs**



# SIMATIC ET 200SP – dimmer module

Fast & fine grained power control for the factory automation

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## Feature

### 4 control modes (parameterizable by channel)

- Half-wave control
  - Full-wave control
  - Phase angle control
- 
- Parameterizable start-up delay of the output power during module / CPU start-up
  - Parameterizable output filter for softstarts & -stops

Channel-wise parameterizable diagnostics

## Benefit

- **Space-saving solution for simple heating and drying processes** (e.g. for the power control of IR-lamps)

### Ensuring product quality & machine availability

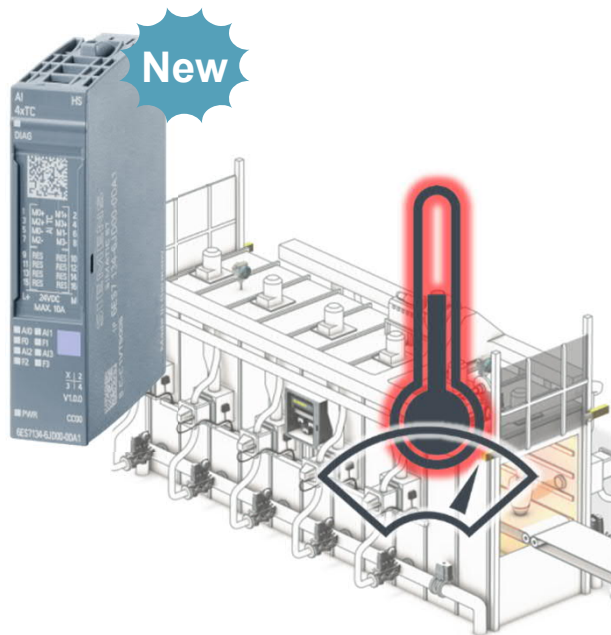
- Relieving the power supply network by avoiding peak currents
    - on startup
    - when switching the outputs
  - Protection of heating objects by reducing thermal stress during heating and cooling
- 
- **Minimal downtimes** due to detailed diagnostics in clear text

# AI 4xTC HighSpeed (6ES7 134-6JD00-0DA1)

High measuring accuracy and precision in temperature measurements



Conformity acc. to  
AMS 2750E & CQI-9



## Feature / Function

### Declared Conformity\* acc. to

- **AMS2750E**  
(Aerospace Material Specification)
- **CQI-9**  
(Chartered Quality Institute)

### New parameter: outliers cleanup

Suppression of interference pulses, e. g. through switching operations in the system

Increase of the Common Mode Voltage\* from 10V to 60V

\*(Max. potential difference between the inputs)

## Benefit

### Handling Security for furnace manufacturers in the industries

- Aerospace (AMS)
- Automotive (CQI-9)

through the certified measuring accuracy and performance when measuring temperature values for heat treatment of metals

**Increasing the availability** and robustness of temperature measurements in harsher environmental conditions

## AI 4xTC HighSpeed (6ES7 134-6JD00-0DA1)

Suitable for fast and precise temperature measurements

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Characteristics	AI 4xTC HS
Number of channels	4
Channels isolated	NO
BaseUnit Typ	A0 / A1* *(for temperature compensation with internal junction)
Measuring ranges	<b>Voltages:</b> $\pm 50$ mV / $\pm 80$ mV / $\pm 250$ mV / $\pm 1$ V <b>Temperature via TC:</b> Type E, N, J, K, L, S, R, B, T, C, U, TXK (acc. to GOST)
Scalable measuring range	YES
Resolution	16 Bit incl. sign
Conversion time	from 1,25ms per channel
MSI (Multiple Shared Input)	YES
Spare parts Compatible (Plug without new configuration)	YES, for Voltage and TC-measurements: AI 4xRTD/TC 2-/3-/4-wire HF (6ES7134-6JD00-0CA1)



# New module DI 8x24VAC/48VUC BA (6ES7131-6CF00-0AU0)

## Digital input module for variable input voltages

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Characteristics	DI 8x24VAC/48VUC BA
Number of channels	8
Channels isolated	NO
BaseUnit Type	U0
Supply voltage / Input-voltages (DI)	<b>AC:</b> 24 - 48V (50 / 60Hz) <b>DC:</b> 48V (40,8 – 57,3V)
encoder supply <ul style="list-style-type: none"> <li>• Amount</li> <li>• Short Circuit protection</li> </ul>	8 Yes; per module, (Fuse replaceable)
Diagnostics	Monitoring of the supply voltage Monitoring of the encoder supply

**Flexible connection of variable input voltages** for use in outdoor areas, e.g.:



Tunnel



sewage treatm.



Railway appl.

...

**New**



**Fuse**  
(replaceable)

**Sensor connection**

1-/2-wire



BU

3-/4-wire



BU + PotDis

# SIMATIC ET 200SP

## Overview

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### Usability

- Fast station setup with push-in wiring and tool-free installation
- Reliable diagnostics in the controller with channel precision
- Compact design saves space in the control cabinet



### Performance

- Scalable from simple applications to high-precision applications
- The power of the S7-1500 in a compact design
- Easily expandable outside the control cabinet with the ET 200AL

**Easy to use - smaller size - more powerful performance**

## SIMATIC ET 200SP

GOEBEL & Siemens: faster, more efficient, higher output

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In innovating the roller cutter, substantial savings were achieved with the ET 200SP



Customer: Goebel / Darmstadt, Germany  
Industry: Mechanical engineering

Benefits for the customer:

- 50% space savings through simple connection system
- Improved diagnostics depth and simple remote access using PROFINET
- Simple connection system:

*"Thanks to the improved diagnostics depth, we increase the availability of our machine by up to 15 %"*

Harald Knechtel  
Sales Director GOEBEL

# SIPLUS Extreme

The ET 200SP portfolio for extreme operating conditions



**Extended temperature range**  
Ambient temperature range in operation from -40° C to +70° C

**Installation altitude up to 5000m**  
Improved voltage strength and heat dissipation and reduction of failures due to cosmic radiation

**Requirements of the railway industry**  
e.g. Fire Protection EN 45545, Rolling Stock EN 50155, and Trackside EN 50121

**Salt mist**  
e.g., seaside and offshore environmental conditions

**Chem. active substances**  
e.g. corrosive gas atmospheres

**Mech. active substances**  
e.g. large amount of sand or dust in the air

**Condensation and high humidity**  
With 100% RH (relative humidity) including condensation/frost

IO-Systems for specific challenges

**SIPLUS extreme - for extreme operation conditions**

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

## Order and commission your ET 200SP soon!

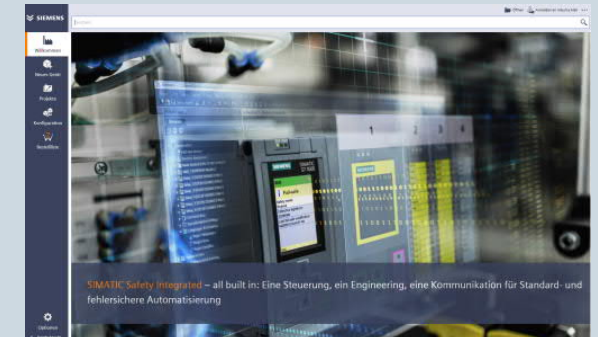
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Configure your  
I/O system simply online!

Produktauswahl mit  
TIA Selection  
Tool



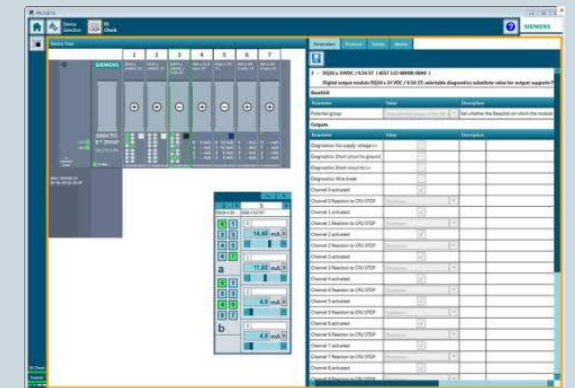
[www.siemens.de/tia-selection-tool](http://www.siemens.de/tia-selection-tool)



Simple and free  
test of your I/O system

I/O Check mit  
Proneta

[www.siemens.de/proneta](http://www.siemens.de/proneta)







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