SIMATIC ET 200SP

Simple – smaller – stronger

siemens.com/ET200sp

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Requirements for a distributed I/O system

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
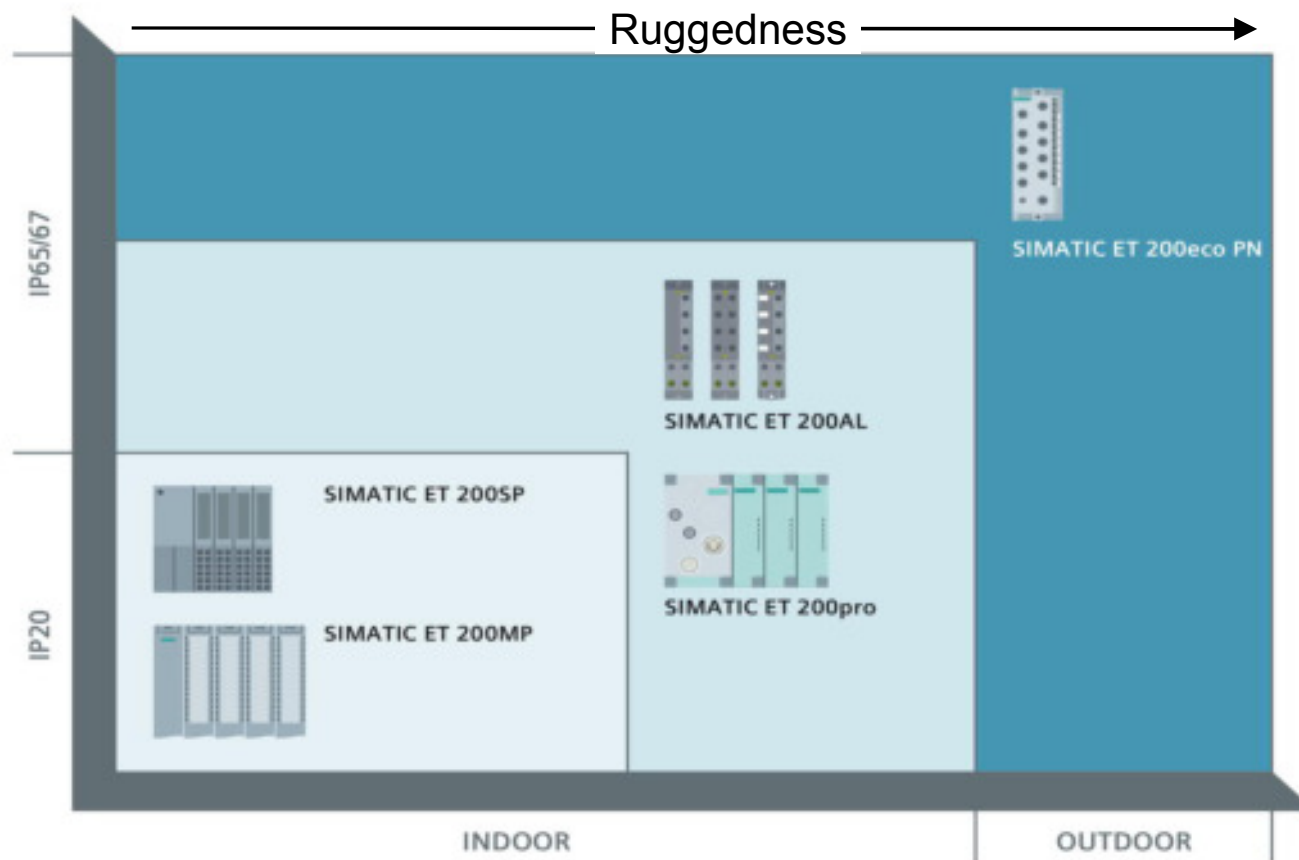Integrated solutions with IP20 and IP65/67

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

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Ruggedness →

IP65/67

IP20

SIMATIC ET 200eco PN

SIMATIC ET 200AL

SIMATIC ET 200SP

SIMATIC ET 200pro

SIMATIC ET 200MP

INDOOR   OUTDOOR

- **Efficient Engineering**
- **Innovative Design**
- **Reliable Diagnostics**
- **Safety Integrated**
- **Constistent scalability**
- **Technology Integrated**

SIMATIC ET 200SP
The highly modular IO system

Fail-safe modules +

Compact design +

Energy efficiency +

Ruggedness +

Intelligence in the I/O +

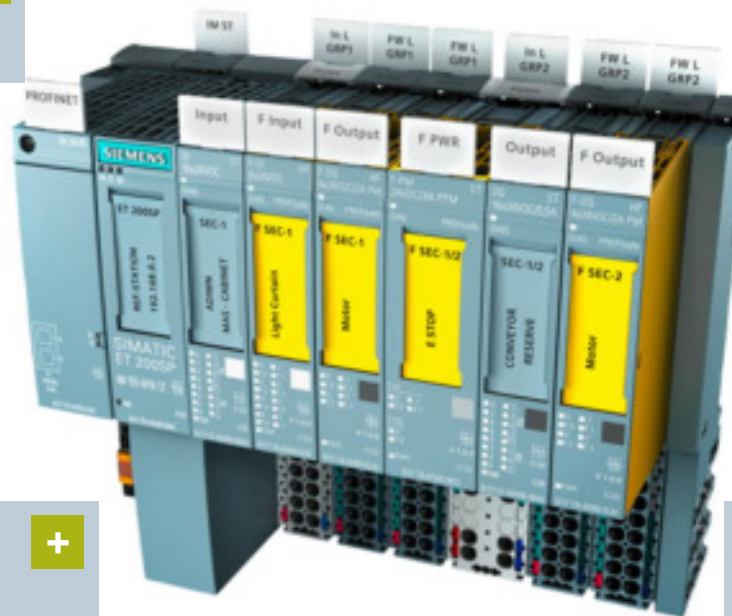Push-in terminals +

Tool-free connections +

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		Benefits
Interface module	▶	Flexible connection to PROFINET/PROFIBUS via copper or fiber optic
I/O modules	▶	Large selection of I/O modules flexible in use
BaseUnit: Light-colored: new load group Dark: continue LG Long: +10 auxiliary terminals	▶	• 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

|		
	Basic Up to 12 modules	• Basic functions (all modules except Safety can be used) • Operation with gaps • 2 x Ethernet ports
	Standard up to 32 modules	+ Safety Integrated modules + Expansion in IP 67 (ET 200AL connection) + Single hot swapping
	High Feature up to 64 modules	+ Flexible connection via copper or fiber optic BusAdapter + Isochronous mode: 250 µs + Multi hot swapping
New	**High Speed** up to 30 modules	+ Isochronous mode: 125µs
	CPU up to 64 modules	+ S7-1500 CPU integrated + Web server onboard + Local data backup using memory card

SIMATIC ET 200SP New
New High Feature interface modules & accessories

6ES7193-6RA00-1AN0
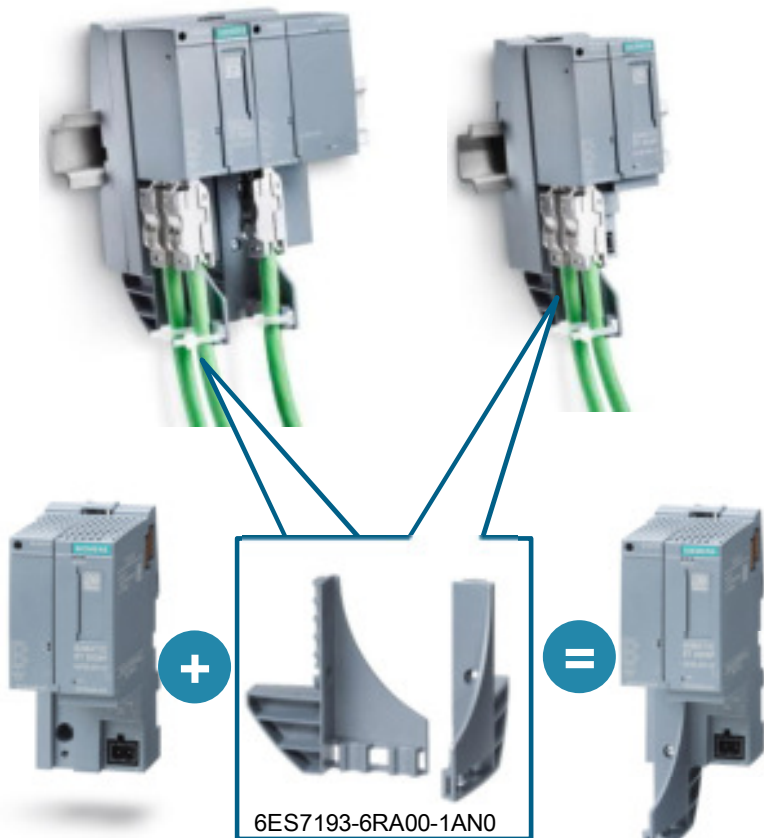
Feature / Function

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 BusAdapaters (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)

Up to 100m → **Up to 300m** → **Up to 2km**

BA 2xSCRJ
- 2 FO* with SCRJ plug

BA 2xLC
- 2 LC** glass fiber-optic

BA 2xRJ45
- 2 RJ 45 Ports

BA SCRJ/RJ45
- 1 RJ 45 Ports
- 1 FO*

BA LC/RJ45
- 1 RJ 45 Ports
- 1 LC* -glass fiber

BA 2xFC
- 2 Fast Connect

BA SCRJ/FC
- 1 Fast Connect
- 1 FO*

BA LC/FC
- 1 Fast Connect
- 1 LC* -glass fiber

* Fibre optic POF, PCF, PCF-GI

** Lucent Connector

SIMATIC ET 200SP
The I/O system with all the options

Basic
- Basic diagnostics
- Basic functions

Standard
+ Adjustability using parameters
+ Module-based diagnostics
+ Faster data processing

High Feature
+ Channel-specific diagnostics
+ Alternative operating modes
+ Expanded functionalities

High Speed
+ Isochronous mode
+ Fastest possible data exchange
+ Oversampling

SIMATIC ET 200SP
The I/O system with all functionalities
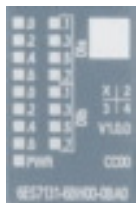
Digital inputs

- 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)

P1   P2   n.c.   Bridged

+
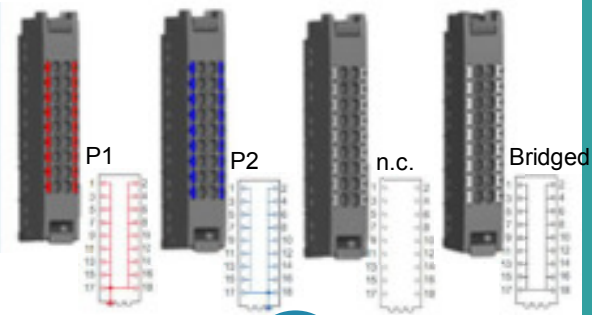
PotDis-BU (BaseUnit)

■ L+ bridged
■ M bridged

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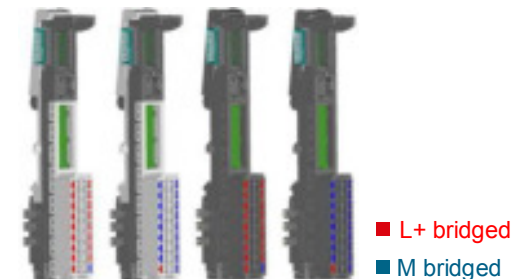
Application-example:
16 DI with 3-wire
at the same station height
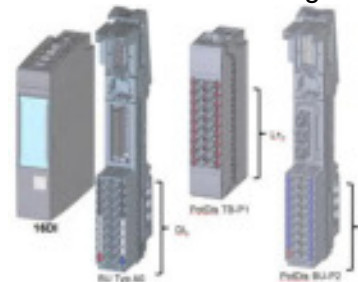
Benefit

- ✚ **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

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Added values

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

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

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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DI / AI-module

DQ-module

&

Sensor

Actuator
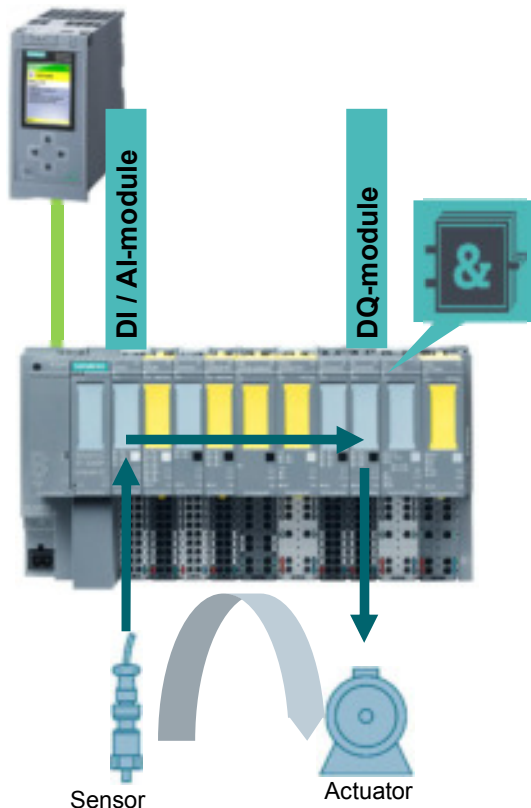
Feature / Function

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)

- Unlimitied quanitity structure

New

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

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	Benefits
DI 8x24VDC High Speed • DI • Counting (4-channel)	**Counting** • Four 32-bit pulse counter inputs • One gate or direction input per channel • Max. counting frequency approx. **10 kHz**
DQ 4x24VDC/2A High Speed • DQ (energy-saving mode) • PWM	**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**
Alle High Speed Module (digital/ analog) • Oversampling	**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

**SIMATIC ET 200SP
DQ 4x24..230VAC/2A HF**
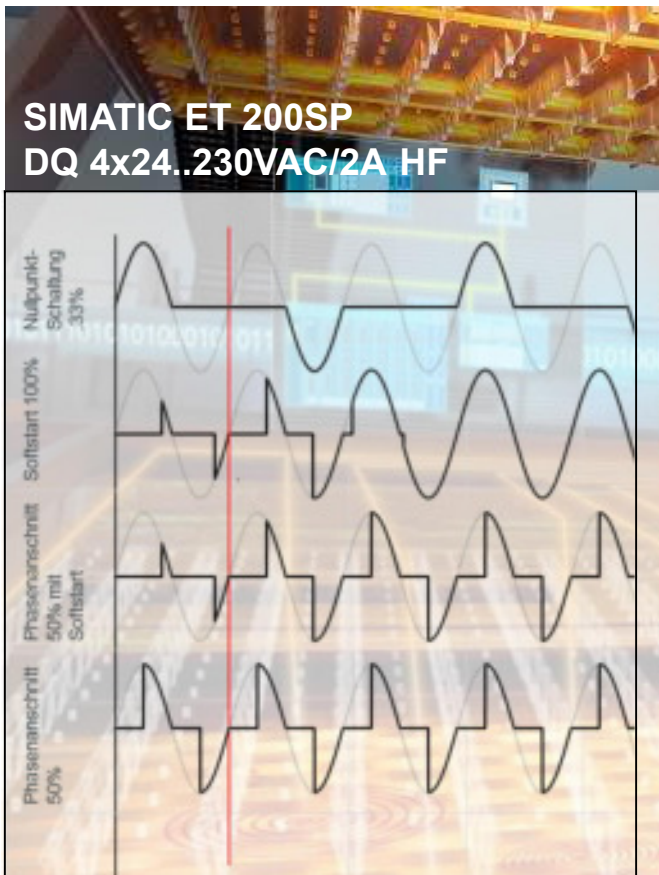
Feature	Benefit
4 control modes (parameterizable by channel) • Half-wave control • Full-wave control • Phase angle control	▸ **Space-saving solution for simple heating and drying processes** (e.g. for the power control of IR-lamps)
• Parameterizable start-up delay of the output power during module / CPU start-up • Parameterizable output filter for softstarts & -stops	▸ **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
Channel-wise parameterizable diagnostics	▸ ▪ **Minimal downtimes** due to detailed diagnostics in clear text

AI 4xTC HighSpeed (6ES7 134-6JD00-0DA1)
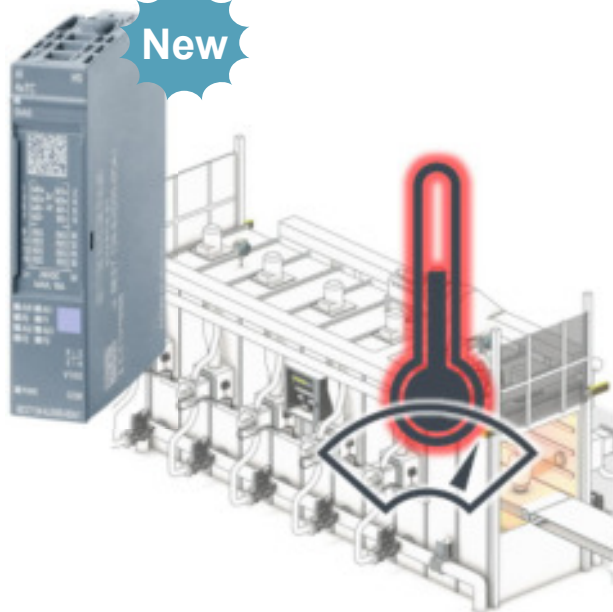## High measuring accuracy and precision in temperature measurements

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Conformity acc. to
AMS 2750E & CQI-9 ☑

New

Feature / Function	Benefit
Declared Conformity* acc. to • **AMS2750E** (Aerospace Material Specification) • **CQI-9** (Chartered Quality Institute)	**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
New parameter: outliers cleanup Suppression of interference pulses, e. g. through switching operations in the system	**Increasing the availability** and robustness of temperature measurements in harsher environmental conditions
Increase of the Common Mode Voltage* from 10V to 60V *(Max. potential difference between the inputs)	

* Declaration of Conformity *in SIOS:* Link

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	**Voltages:** $\pm$50 mV / $\pm$80 mV / $\pm$250 mV / $\pm$1 V **Temperature via TC:** 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

New module DI 8x24VAC/48VUC BA (6ES7131-6CF00-0AU0)
Digital input module for variable input voltages

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Characteristics	DI 8x24AC/48VUC BA
Number of channels	8
Channels isolated	NO
BaseUnit Type	U0
Supply voltage / Input-voltages (DI)	**AC:** 24 - 48V (50 / 60Hz) **DC:** 48V (40,8 – 57,3V)
encoder supply • Amount • Short Circuit protection	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   3-/4-wire

BU   BU + PotDis

SIMATIC ET 200SP
Overview

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

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

Harald Knechtel
Sales Director,
GOEBEL
Schneid- & Wickelsysteme GmbH

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

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Order and commission your ET 200SP soon!

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I/O system simply online!

Produktaus-
wahl mit
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Tool

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