

# SIMATIC S7-1200 G2

Smart choice for basic automation



<http://www.siemens.com/s7-1200g2>



## Challenge

# Increasing demand for smart automation solutions

The advancement of technology is placing greater pressure on industry and machine building. It is not only high-end applications that are impacted, but there is also a growing demand for cutting-edge technology to enhance productivity in simpler automation solutions. This requires a well-coordinated automation system that minimizes complexity and is optimized for cost efficiency over the entire life cycle.

## Challenges and opportunities



Technological advancements require constant improvements and state-of-the-art technology, leading to the need for increased **productivity**.

Versatile customer requirements demand scalable and tailored automation solutions with maximum **flexibility**.

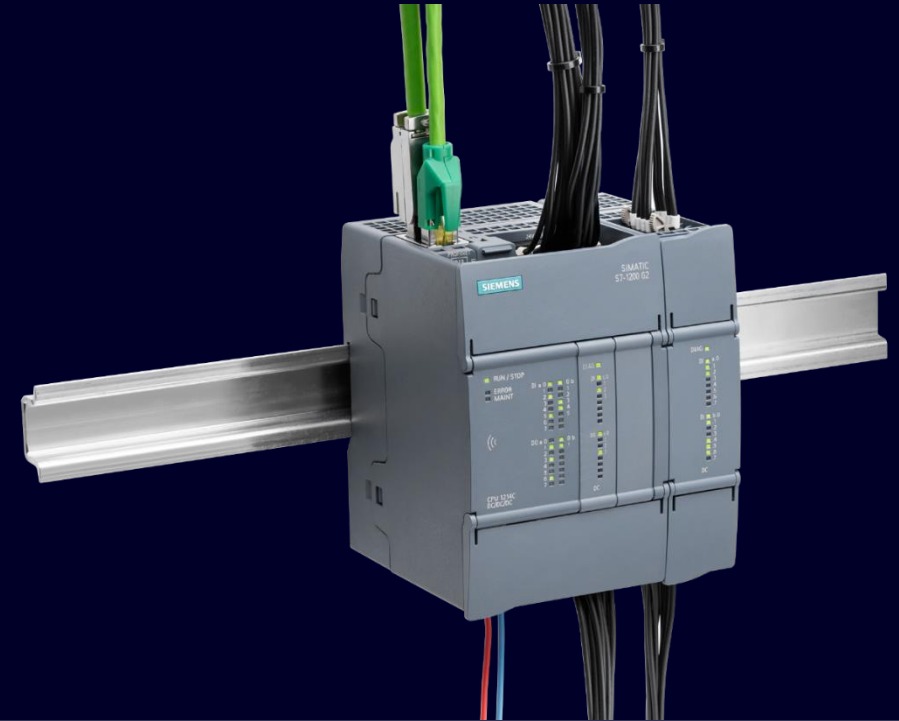
Legal regulations (such as machine safety) must be met without compromising productivity, even under high **cost pressure**.

## Solution

# New standards in the field of basic automation controllers

SIMATIC S7-1200 G2 sets new standards for simple but high-precision automation controllers. The new controller family now offers efficient motion control for complex motion requirements with enhanced performance and scalability within the SIMATIC controller portfolio.

It allows for more flexible machine safety solutions and increased data transparency, making it the smart choice for all basic automation solutions.



Added value



Enhanced performance & scalability



Efficient motion control



Flexible machine safety

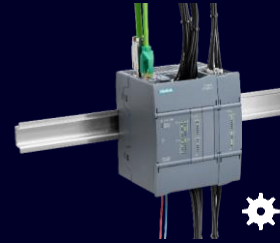


Increased data transparency



# Overview

## Added value fields with highlights of SIMATIC S7-1200 G2



### Enhanced performance & scalability

- Enhanced processing power, more memory and communication performance
- Synchronized program execution with PROFINET IRT and up to 31 PROFINET devices
- Optimized program scalability across all SIMATIC controllers
- Engineering performance with S7-PLCSIM Advanced for testing PLC code and simulating applications
- Analysis and optimization of PLC runtime with SIMATIC Profiling

### Flexible machine safety

- Fail-safe integrated in the complete range (PROFIsafe communication, I/Os)
- Improved F-IO Portfolio with F-SBs and mixed I/O modules
- Fail-safe engineering integrated in STEP 7 Basic

### Efficient motion control

- New motion control functions based on the same instructions across the SIMATIC controller portfolio
- Control of single axes, coordinated axes and simple kinematics
- Integrated motion control technology objects simplifying configuration



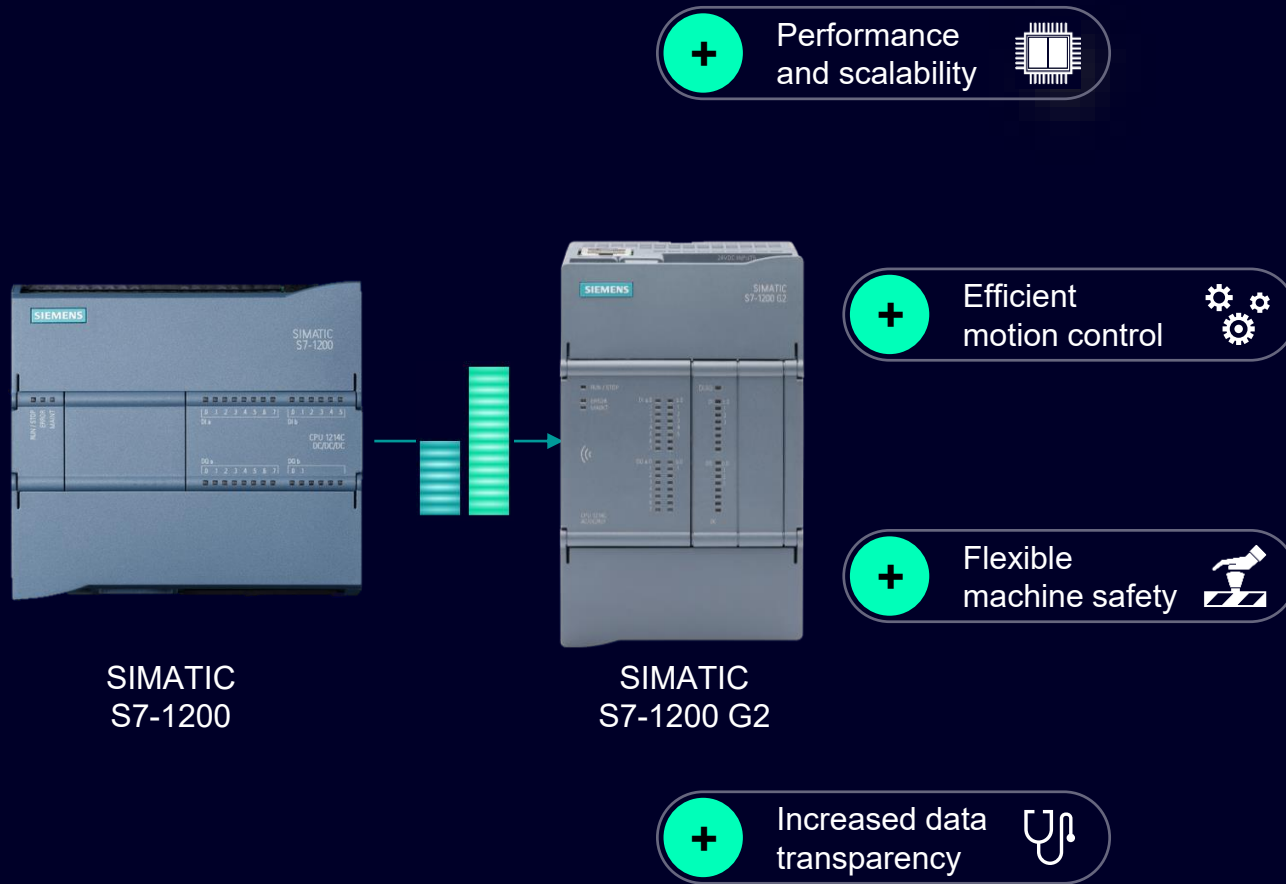
### Increased data transparency

- Near Field Communication (NFC) for wireless access to diagnostic, operational and device data
- Integrated webserver with modernized default websites in a uniform display concept
- New Web API as an interface for reading and writing CPU data
- OPC UA Server support for improved connectivity and integration

**i** Scalable, cost-optimized and powerful portfolio for the basic automation segment

# Machine Performance and Reliability

## Increase Machine Performance



## Powerful controller system for the basic automation market

### Challenge

- Find a reliable and transparent automation system to avoid production downtimes
- Select a perfectly coordinated and target-oriented, not oversized system that is nevertheless scalable
- Achieve optimum price-performance ratio

### Solution

SIMATIC S7-1200 G2 ensures that simpler automation systems can handle increased demands, such as:

- New performance requirements for faster data processing and multitasking
- New motion control functions to realize versatile motion control solutions
- New machine safety options for cost-effective fail-safe applications
- New levels of data transparency for quick access to diagnostic/device data

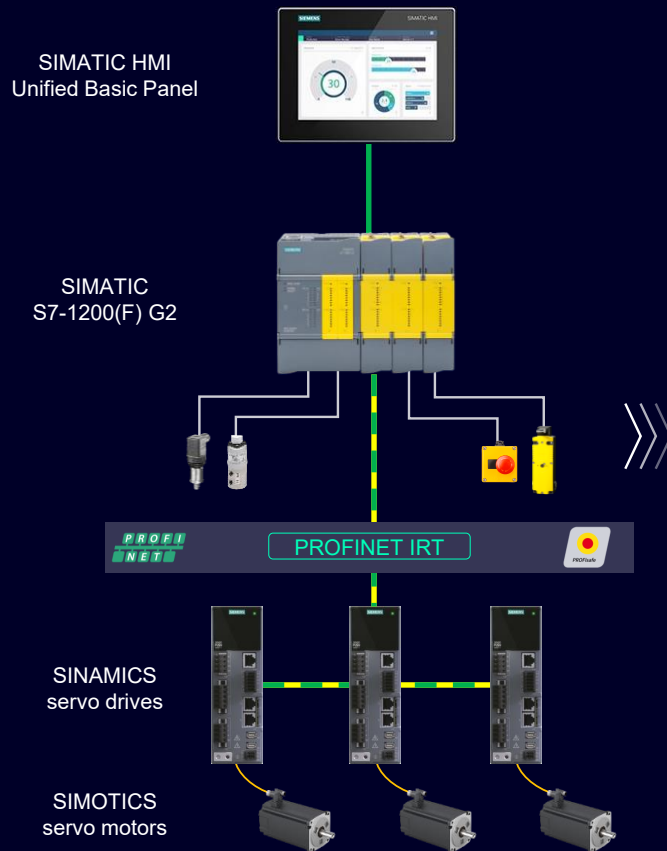
Full engineering standardization with unified libraries and a common firmware architecture across all SIMATIC controllers

### Value

- High productivity
- Maximum scalability
- Cost optimization

# Efficient Motion Control

## Motion Control System Scalability



## Scalable motion control systems for basic automation

### Challenge

- Ensuring scalability of motion control systems when starting in the basic automation segment
- Selecting motion control components and solutions with low complexity and high consistency in the engineering
- Meeting specific performance requirements with equidistant and synchronous signal processing for all motion control components

### Solution

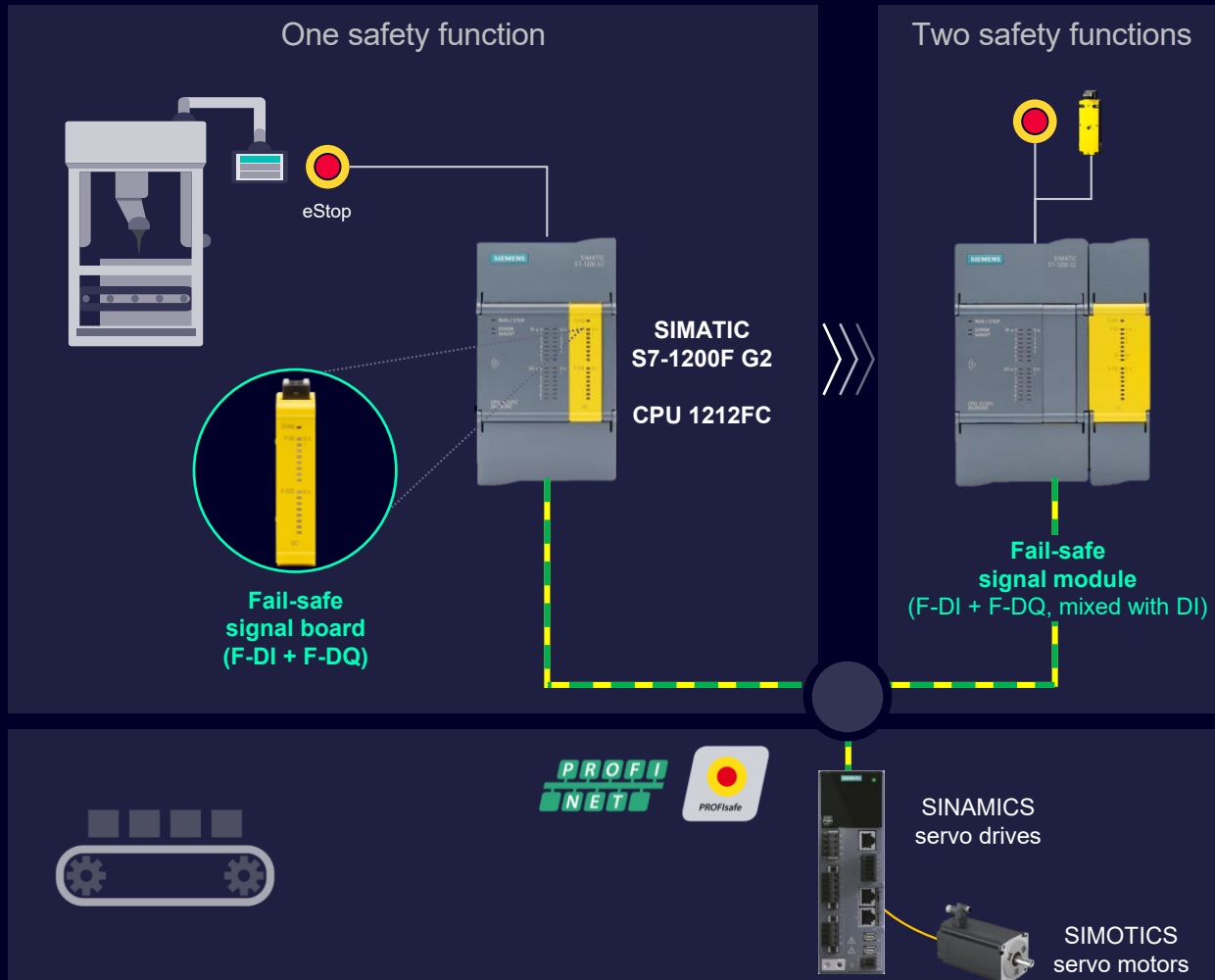
- SIMATIC S7-1200 G2 enables the control single axes, coordinated axes and simple kinematics with PROFINET IRT communication
- Technology objects for Motion Control simplifying system configuration during engineering, commissioning and service
- Seamlessly scalable portfolio, to expand the functionality of machines simply by selecting a CPU of a higher performance class

### Value

- Easy engineering
- Consistent tool landscape
- Flexible adaptation

# Machine Safety for Industrial Automation

## Flexible Machine Safety



## Space-saving machine safety for basic automation

### Challenge

- Identifying and implementing suitable safety hardware solutions for different levels of complexity
- Ensuring diagnostic capabilities and easy integration into control systems
- For a huge number of safety functions, many hardware devices might be necessary, leading to high wiring effort and complex system architectures

### Solution

SIMATIC S7-1200F G2 with improved fail-safe portfolio and SINAMICS servo drives enable the implementation of flexible operating and safety modes:

- Flexible expansion of fail-safe I/Os with mixed fail-safe signal modules or fail-safe signal boards directly on the CPU
- Unified engineering environment (TIA Portal) for standard and fail-safe automation tasks, with fail-safe engineering integrated in STEP 7 Basic
- Safety integrated in SIMATIC S7-1200F G2 also with the associated communication (PROFIsafe) to safety integrated SINAMICS drives

### Value

- Space-saving
- Flexible
- Cost-efficient

# Simulation for Industrial Systems

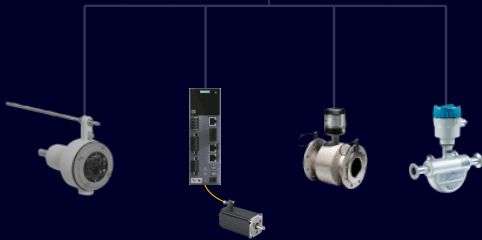
## Validate and optimize production machines

### Real world

**S7-1200 G2**  
Hardware Controller

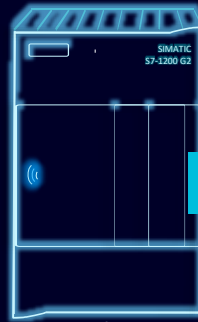


Process



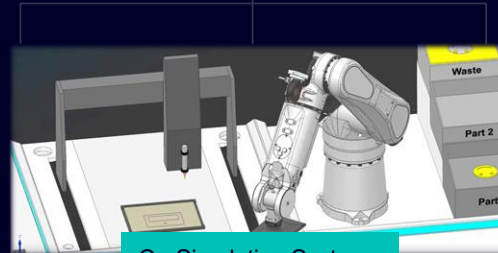
### Simulation system

**PLCSIM Advanced**  
Simulated S7-1200 G2 CPU



New

API



Co-Simulation Systems

## Development performance through virtual commissioning of PLC code

### Challenge

- PLC code needs to be debugged and validated before actual commissioning
- Hardware-in-the-loop setups for components are a lot of effort and often infeasible

### Solution

- Test the PLC code using a simulated SIMATIC S7-1200 G2 controller with S7-PLCSIM Advanced
- Simulated controllers can also be tested and validated in the context of a plant/machine (Co-Simulation) thanks to API connection

### Value

- Ensure deployment-ready PLC code through comprehensive functionality validation
- Provide risk-free testing environment to mitigate system damages
- Enable more extensive testing in a simulated environment

# Operational Performance and Reliability

## Increase Data Transparency



## Smart solutions along the machine life cycle via NFC

### Challenge

- On-site programming required for adaptation of customer-specific network settings in the PLC
- Additional hardware devices with direct access necessary
- Long machine downtimes in the event of machine failure if efficient diagnostics are not provided
- High programming effort for availability of diagnostic information

### Solution

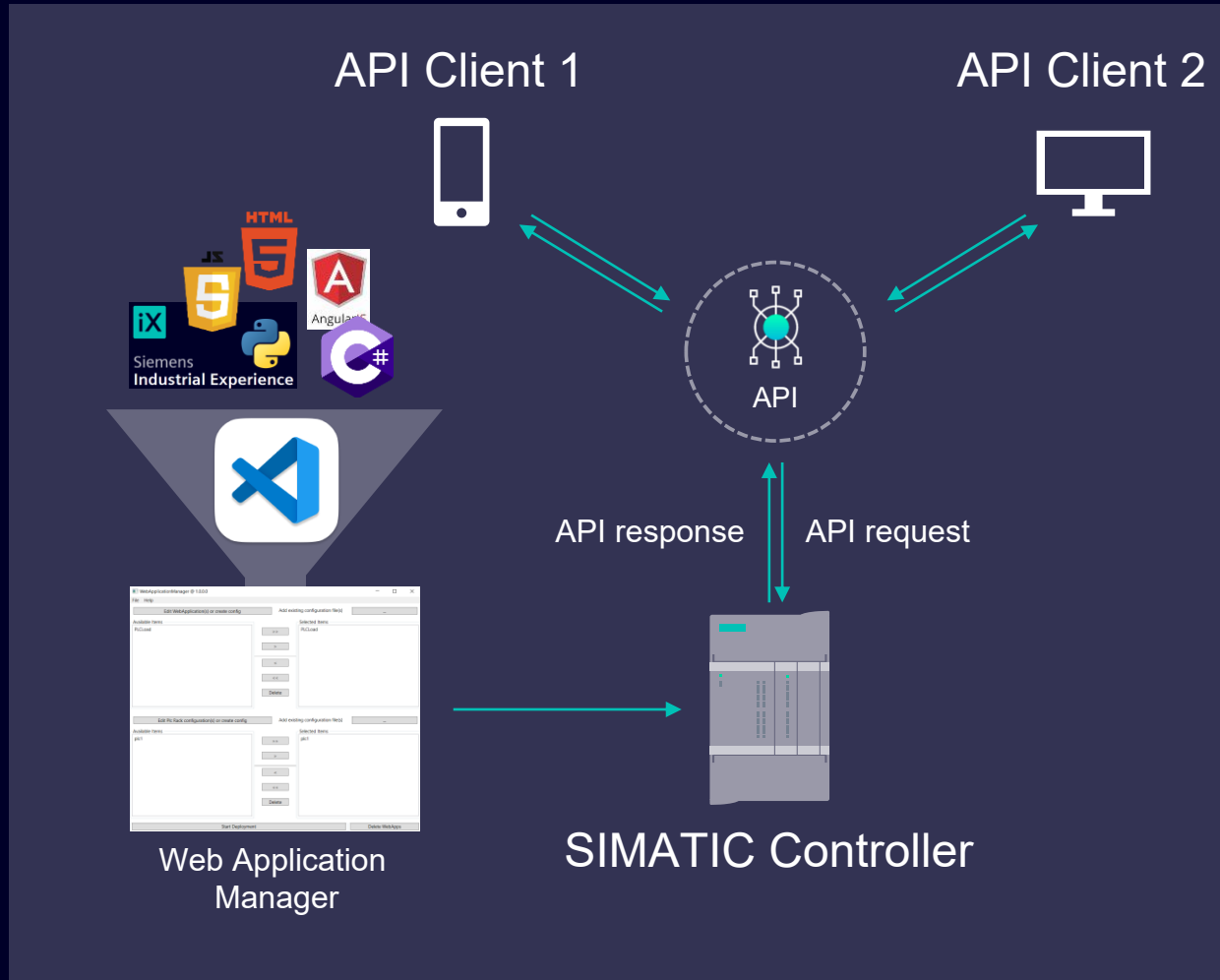
- SIMATIC S7-1200 G2 with Near-Field-Communication (NFC) in every PLC
- NFC can be configured in TIA Portal to enable NFC and to enable write access with NFC security protection via password
- Access to diagnostic and device data for quick and easy machine service to reduce downtimes
- Setting time, IP-addresses and other network settings without additional programming devices and licenses during commissioning
- SIMATIC S7-1200 G2 NFC app available for Android and iOS

### Value

- Reduced downtime
- Efficient diagnostics
- Easy integration

# Operational Performance and Reliability

## Increase Data Transparency



## Custom web applications tailored to specific requirements

### Challenge

- Monitoring and controlling equipment without investing in additional hardware
- Flexibility to implement customized user interfaces and applications without high investment
- Access to operational data and process variables from standard browsers and mobile devices

### Solution

SIMATIC S7-1200 G2 and its integrated web server with standard web pages enable easy display of service and diagnostic information. Additionally, individually created user-defined web applications can be developed and accessed via Web API:

- Develop front end by creating the HTML Files
- Download the web application to the PLC with the Web Application Manager
- Access the custom-made web pages on every device (also mobile devices) worldwide via standard internet browser

### Value

- Cost-effectiveness thanks to integrated web server and web API
- Highest flexibility with customized web applications
- Location-independent access via standard web browsers

# Design and handling

## S7-1200 G2 CPU new hardware design

PROFINET interface (2 ports)

Optional memory extension

NFC tag

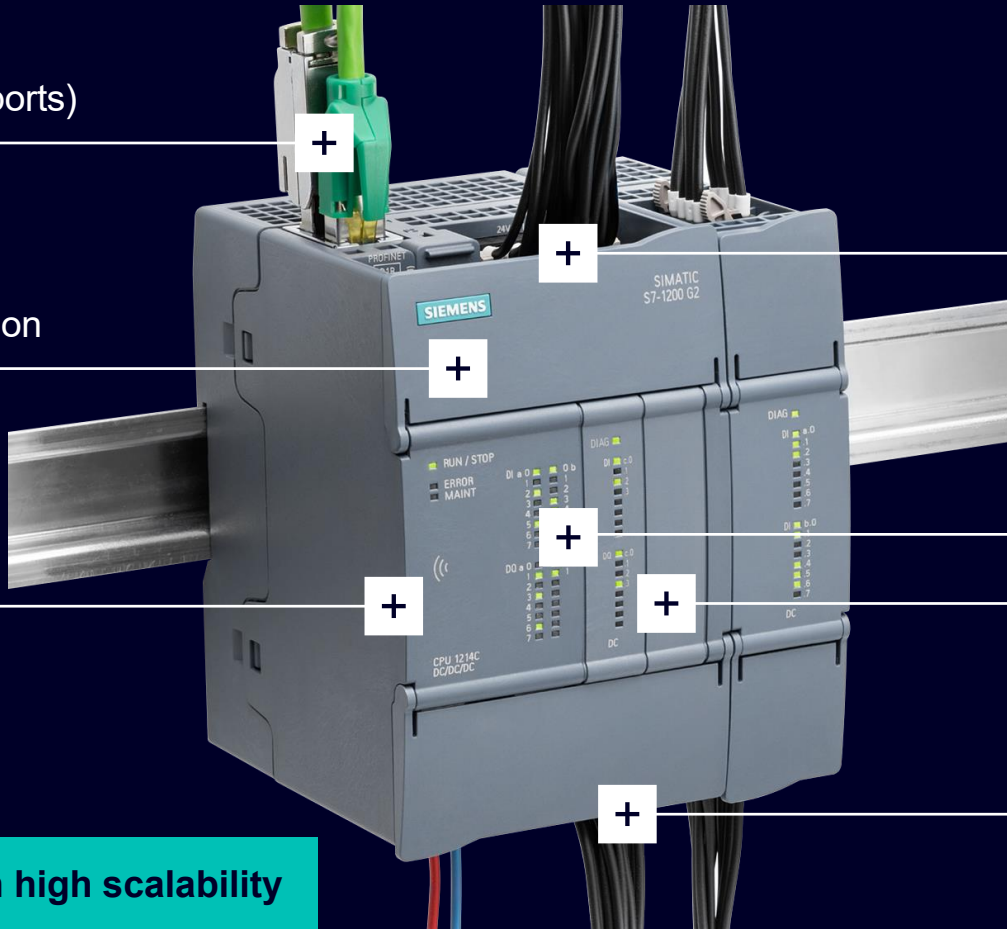
Digital inputs  
(Push-in wiring design)

Integrated HSCs  
& PTOs/PWMs

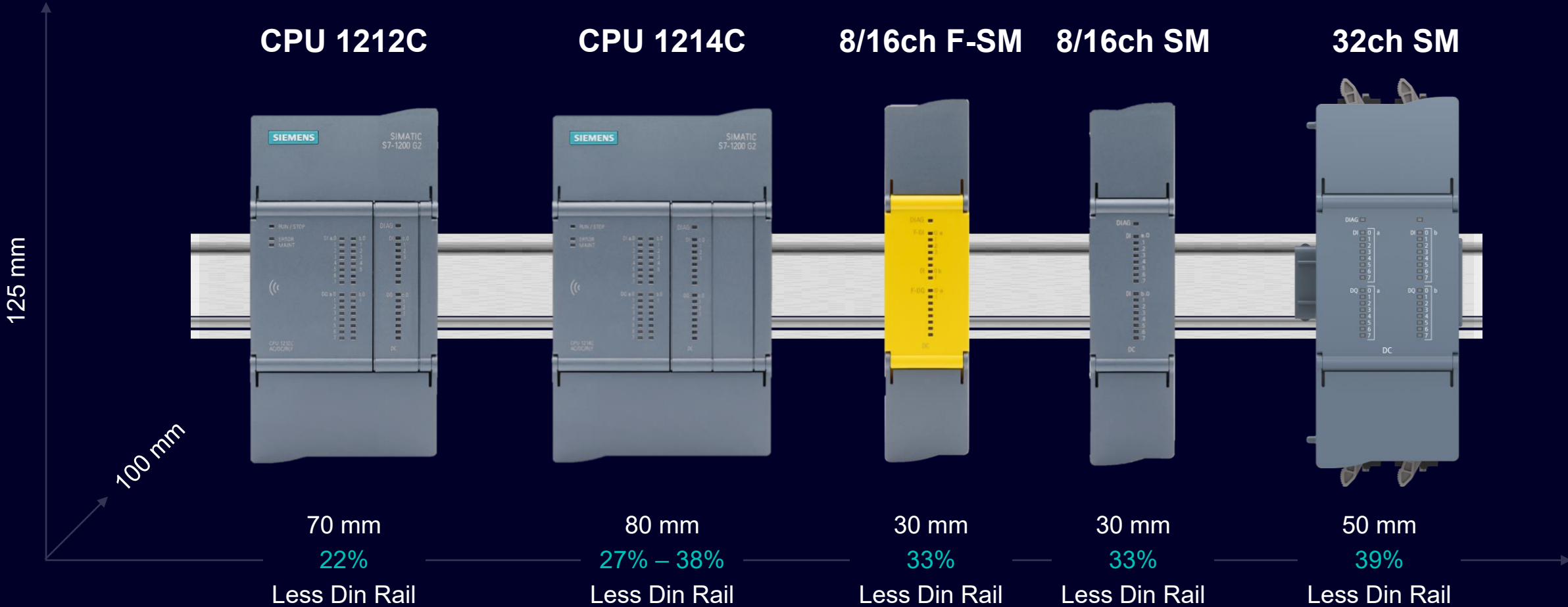
Optional plug-in  
expansion board

Digital outputs (DC or relay)

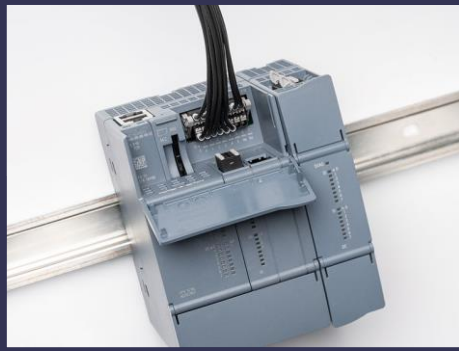
**i** Innovative & modular design with high scalability



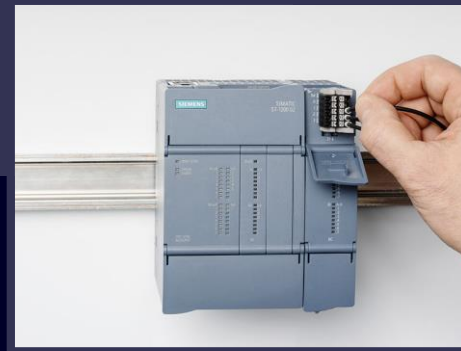
# New hardware design Dimensions



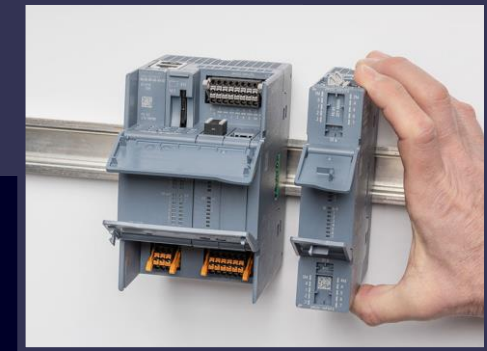
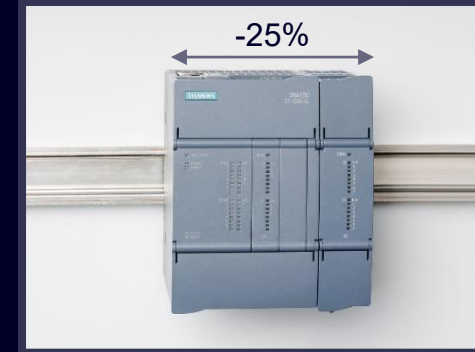
# New hardware design Handling



Memory Card access, 2xPN Ports and improved signal board concept (up to two SBs).



Removable high(er) density terminal blocks with push-in wiring for ease of use → non-contact pre-wiring position.



DIN rail footprint reduced by ~ 25%. Single, reliable bus connection system for both SMs and CMs.

# Overview

## CPUs and communication

	CPU 1212(F)C	CPU 1214(F)C
RAM Data	500 k	750 k
RAM Progr.	150/200 k	250/300 k
Retentive Memory	20 kB	20 kB
Bit performance	37 ns	37 ns
W x H x D (mm)	70 x 125 x 100	80 x 125 x 100
Integrated DI/DO	8/6	14/10
PROFINET/Modbus TCP	2 ports IRT	2 ports IRT
Communication Modules	3 max	3 max
Total SMs + CMs	6 max	10 max
High-Speed Counter	8	8
Total SBs	1 max	2 max
Position axes Typical <sup>1</sup>   Maximum <sup>2</sup>	4   10	4   10
Motion Control (MC) Resources <sup>3</sup>	800	800
Extended MC Resources <sup>4</sup>	40	40
NFC	✓	✓
SIMATIC Memory card	Optional	Optional
Variants	DC/DC/DC & DC/DC/RLY & AC/DC/RLY (Std. only)	

## Communication

**CB 1241**

RS485

**CM 1241**

PtP (RS232/RS485/RS422)



<sup>1</sup> At 4 ms Servo/IPO cycle time and 35% CPU load due to Motion Control. Estimated values are subject to implementation of use case | <sup>2</sup> No further TOs applicable

<sup>3</sup> Resources for Motion Control technology objects: Speed axis = 40 | Positioning axis = 80 | Synchr. Axis = 160 | Output cam = 20 | Output cam track = 160 | Measuring input = 40 | Ext. Encoder = 80

<sup>4</sup> Resources for Extended Motion Control technology objects: Cams (1,000 points and 50 segments) = 2 | Cams (10,000 points and 50 segments) = 20 | Kinematic objects = 30 | Interpreter = 60 | Leading axis proxy = 3

# Overview

## Signal boards and signal modules

### SBs

#### Digital SBs

8 DI 24V 100 kHz

8 DQ 24V 100 kHz

4 DI/4 DQ 24V 100 kHz

4 DI/4 DQ 5V 200 kHz

#### Analog SBs

4 AI

4 AQ

2 AI/2 AQ

4 TC

2 RTD



### SMs

#### Digital SMs

DI 16 x 24 V DC

DQ 16 x 24 V DC 0.5 A

DQ 16 x Relay

8 DI/8 DQ

8 DI/8 RLY

#### Analog SMs

8 AI

8 AQ

4 AI/4 AQ

8 AI TC

4 AI RTD



# Overview

## Fail-safe: signal boards and signal modules

### SBs

4x F-DI(1oo1)/2x F-DI(1oo2), 4-Vs<sup>1</sup>

2x F-DQ, PP-PM<sup>1</sup>

2x F-DI(1oo1)/1x F-DI (1oo2),  
1x F-DQ. PP-PM<sup>1</sup>

### SMs

8x F-DI(1oo1)/4x F-DI(1oo2), 8-Vs<sup>1</sup>

4x F-DQ, PP-PM<sup>1</sup>

4x F-DI(1oo1)/2x F-DI (1oo2),  
2x F-DQ. PP-PM, 2x DI

#### 1oo1 (One out of One):

1oo1 as simple redundancy, a single input connected to a fail-safe digital input

#### 1oo2 (One out of Two):

Redundancy with cross-diagnosis: There are two independent sensors, each connected to an F-DI. Both sensors provide signals to the F-DI. The F-DI monitors the signals and makes decisions based on both inputs. This configuration is normally used in safety-critical applications

#### Vs: Integrated Sensor supply,

allows to detect short-circuit or overload scenarios, and react accordingly

**i** Initial failsafe portfolio release expected in spring 2026

<sup>1</sup> Not within initial failsafe Portfolio release



# Overview

SIMATIC S7-1200 G2 configured in the TIA Portal fits perfectly

Modular space-saving controller for automation systems requiring simple or extended functionality in the area of logic, HMI and networking.

- Perfect for stand-alone and interconnected machines as well as cost-effective automation solutions
- Enabling more flexible, scalable, and higher-performance motion control demands
- Increasing operational performance and reliability with smart automation solutions and fail-safe integration
- Simple integration into interconnected systems and into systems that require one or more HMI devices
- Extended functionality for small motion control systems and small process applications
- Two communication ports on each CPU

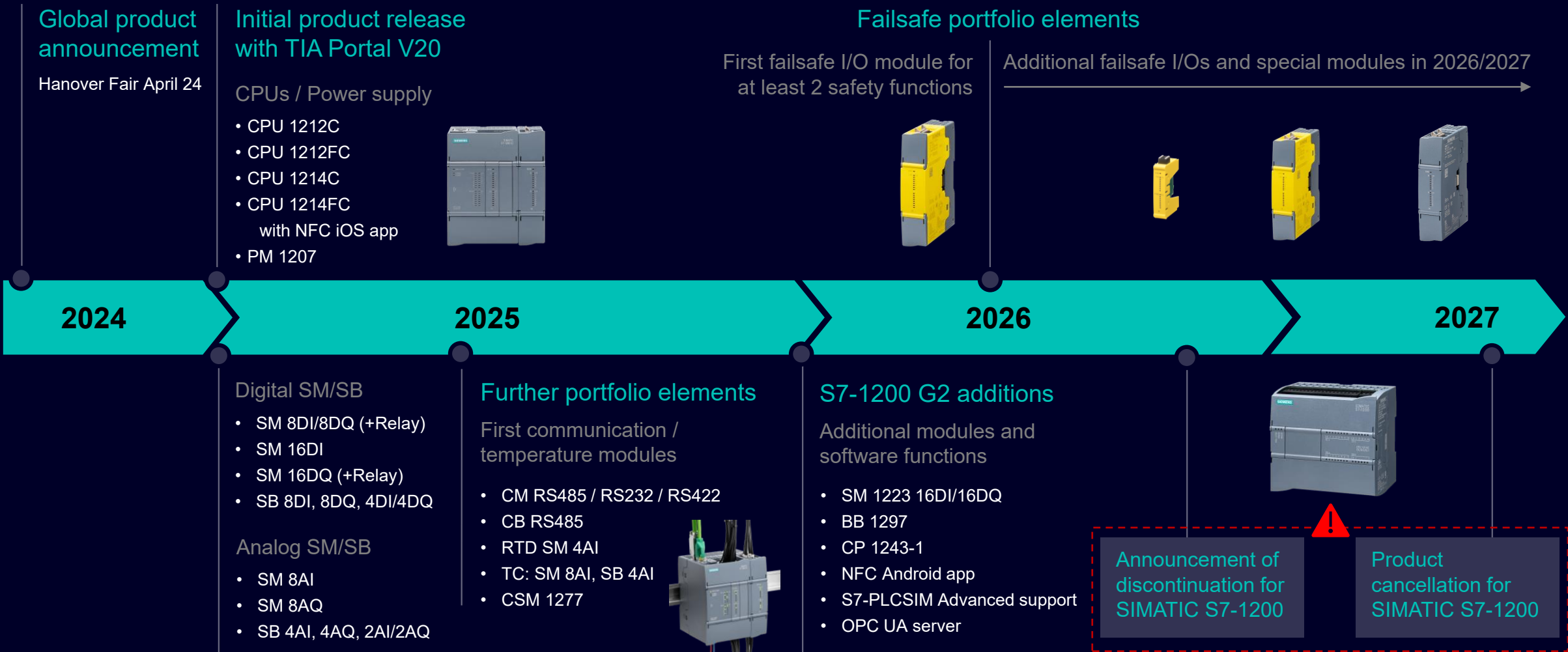
## Controller, HMI and Networking

Everything developed in one software architecture



# SIMATIC S7-1200 G2

## Roadmap – Summary and Outlook



\*Current planning status of the portfolio roadmap

# SIMATIC S7-1200 G2

The right basic controller for all market challenges

+

## Globalization

- Global service network
- Worldwide availability of products

+

## Digitalization

- Extensive standardization opportunities
- Cloud connectivity
- Optimization, transparency through data analyses

+

## Protection of humans and machines

Integrated safety and leading-the-way security functions

+

## Smart handling

- Easy installation, wiring, and fast, efficient commissioning
- Efficient engineering

+

## Increased production output

High communication performance, fast system response and efficient data processing

+

## Factory availability

- Fast error localization and elimination to reduce downtime
- High spare part compatibility and availability



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