SIMATIC Safety Integrated – Integrated Added Value

One controller, engineering and communication for standard and fail-safe automation

siemens.com/simatic-safety

Most powerful fail-safe CPU SIMATIC S7-1500F

Answers for industry.
Standard and safety technology in a single system

Machine manufacturers and operators are required by law to ensure the protection of persons and the environment. Any potential risks posed by a machine should be largely eliminated from the start also for economic reasons. After all, unplanned plant downtimes inevitably lead to productivity losses and frequently entail enormous costs. The target lies in the attainment of the required level of safety with maximum efficiency and economic profitability. Siemens provides the intelligent solution for this challenge – SIMATIC Safety Integrated.

One controller, bus and engineering – for safety and standard

SIMATIC Safety Integrated facilitates the seamless integration of safety technology in factory automation – and is the consistent implementation of safety technology within the Totally Integrated Automation concept. In other words:

One controller, bus and engineering for standard and fail-safe automation. This approach allows for the considerably faster, easier and more efficient realization of safe machines and provides additional value added in every respect. Our comprehensive portfolio covers all requirements, supports flexible architectures as required and ensures minimized expenditures in terms of logistics, wiring and training due to its consistency from the start. Furthermore, the systematic reduction of product types and sizes facilitates significantly more compact control cabinet assembly and reduces inventory. A further clear advantage over conventional, hard-wired safety technology: The programmable solutions within the scope of SIMATIC Safety Integrated can be easily replicated. Once approved and certified, they can be reused multiple times as complete blocks consistently.

Advantages compared to a separate and independent safety solution

- Uniform diagnostic functions for standard and safety
- Data consistency and uniform look & feel
- Uniform engineering for standard and fail-safe automation
- Standard-compliant printout of the F-program
- Minimization of product types and sizes due to
  - uniform controller for standard and safety
  - safety logics programming via FBD and LAD instead of wiring
  - easy replication of the once programmed safety solution
Safety Integrated within the scope of Totally Integrated Automation

facilitates the reliable protection of persons, machines and the environment – coupled with maximum efficiency and flexibility.

Our comprehensive safety portfolio comprising control, drive and switching technology meets all requirements placed upon the functional safety of machines and plants and is complemented by competent support and consolidated know-how across all safety application functionality.

Maximum engineering efficiency

Just like standard systems, fail-safe systems are also configured in the TIA Portal – due to which your standard programming know-how can also be used for safety programming. The LAD and FBD languages as well as preconfigured, certified blocks are used for safety programming. Integration in the TIA Portal with its intuitive functionality ensures maximum engineering efficiency with time savings of up to 30%. Moreover, you will also be a part of all future innovations of our trend-setting engineering framework in terms of safety.
**SIMATIC Safety Integrated**

Integrated system for the protection of people and machines

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**Fail-safe controllers**

SIMATIC Safety Integrated comprises a scalable range of safety-related controllers in various designs based on diverse hardware and software architectures – for all areas of factory automation: Modular, embedded and PC-based.

**Product Highlight S7-1500**

The fail-safe SIMATIC S7-1500F controllers facilitate the processing of standard and safety program on a single controller – based on the uniform operating functionality of the TIA Portal. This allows for the evaluation of fail-safe data in the standard user program. Due to this integration, the system advantages and comprehensive functionality of SIMATIC are also available for fail-safe applications.

**Certification acc. to EN 61508 2nd Edition**

- Proven coded processing instead of multiprocessor system

**Efficient engineering**

- Separate F-runtime group to enable prioritization and time settings for faster execution

**Onboard status display**

- Availability of diagnostic messages without programming device
  - Diagnostic data
  - Safety status (enabled/disabled)
  - Safety signature
  - Last F-program change

**Maximum manipulation protection**

- Additional password protection for access to F-configuration and F-program

**Minimization of product types and sizes**

- Only one controller for standard and fail-safe automation
- Integration of PROFINET and PROFIBUS

**Advantages at a glance:**

- Investment protection
- Easy standard I/O expansion by fail-safe modules
- Easy commissioning
- PROFIsafe address configuration via software and backup in the coding module
- Easy device replacement
- Automatic transfer of the PROFIsafe address from the intelligent coding module
- Comprehensive diagnostics
- Signal test onboard (e.g. short circuit, wire breakage)
- Support of the “signal system fault” function
- Channel-granular diagnostics
- Optimum utilization of the control cabinet space
- Reduction of the module width by 50 % and more
- Support of load group formation without power modules

Find out more: [siemens.com/s7-1500](http://siemens.com/s7-1500)

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**Fail-safe I/O**

Distributed field devices from the ET 200 range are also available as fail-safe I/O. ET 200 family consists of modular and block designs, that can be used, in control cabinets and for applications without control cabinets that require a high degree of protection. Connection of the I/O is realized by means of PROFIsafe via PROFIBUS and/or PROFINET.

**Product Highlight ET 200SP**

The SIMATIC ET 200SP system range has been expanded by fail-safe modules, certified for functional safety in accordance with IEC 61508. They are certified for safety-related applications up to SIL 3 in accordance with IEC 62061 and PL e in accordance with ISO 13849.

**Advantages at a glance:**

- Investment protection
- Easy standard I/O expansion by fail-safe modules
- Easy commissioning
- PROFIsafe address configuration via software and backup in the coding module
- Easy device replacement
- Automatic transfer of the PROFIsafe address from the intelligent coding module
- Comprehensive diagnostics
- Signal test onboard (e.g. short circuit, wire breakage)
- Support of the “signal system fault” function
- Channel-granular diagnostics
- Optimum utilization of the control cabinet space
- Reduction of the module width by 50 % and more
- Support of load group formation without power modules

Find out more: [siemens.com/et200sp](http://siemens.com/et200sp)
The SIMATIC panel portfolio offers the suitable solution for every application: From simple keypads, to mobile and stationary operator panels, down to “all-rounders” for demanding applications – with integrated ruggedness, compactness and manifold connection options.

Using WLAN functionality, the mobile panels offer the added value of maximum flexibility also for on-site safety functions (EMERGENCY-STOP and acknowledgement button).

The SIMATIC Mobile Panel 277F IWLAN for particularly high safety requirements is TÜV-tested and TÜV-certified.

Fail-safe key panels facilitate the connection of an EMERGENCY-STOP button or two other fail-safe signals.

Find out more: siemens.com/hmi
Fail-safe communication

PROFIsafe

PROFIsafe represents an open solution for safety-related communication via standard field buses and is listed as international standard in IEC 61784-3-3. This not only entails enormous saving potentials in terms of wiring and component variety, but also offers the advantage of retrofitting. The PROFIsafe profile facilitates safe communication for the open standard buses PROFIBUS and PROFINET on the basis of standard network components. In connection with PROFINET, PROFIsafe also supports fail-safe wireless communication via IWLAN.

ASIsafe

The SIMATIC AS-i F-Links support the very easy connection of AS-i networks to safety controls. SIMATIC AS-i F-Links for one, two, three or more AS-i networks are available for small to large and complex plant configurations. These links can be safely integrated in larger safety configurations via PROFIsafe and can also be modularly expanded as required. Moreover, when plugging an AS-i safety module next to an AS-i master, it can be expanded by ASIsafe without additional wiring.

Fail-safe engineering

All configuration and programming tools required for the creation of a safety-related program are integrated in the STEP 7 user interface in a single project structure. With the SIMATIC STEP 7 Safety Advanced option (TIA Portal), you will benefit from all advantages of the TIA Portal also for your fail-safe automation applications.

Advantages at a glance:

Faster start-up
- Uniform usability
- Automatic safety program structure generation on adding a F-CPU
- Certified library for all conventional safety functions

Transparency
- Uniform look & feel for all safety resources

Validation made easy
- Global library concept for modules and blocks, incl. signature

Approval support
- Standard-compliant program documentation

Diagnostics without programming device
- Safety diagnostics via onboard display of SIMATIC S7-1500F controllers

Find out more: siemens.com/tia-portal
A convincing connection:
SIMATIC controllers and SINAMICS drives

Application examples
Functioning and tested automation configurations based on our standard products are available on the Internet – for the easy, fast and cost-effective realization of fail-safe automation tasks. Besides a list of all required software and hardware components and a description of their interconnection, the functional examples also comprise the tested and commented code. As a result, the functionalities described here can be quickly replicated and can also be used as a base for individual expansions.
siemens.com/safety-functional-examples

References
For your review, references proving the advantages offered by SIMATIC Safety Integrated in different industry applications
https://webservices.siemens.com/referenzen/

Solution Partner Safety Integrated for Factory Automation
You are looking for a qualified Solution Partner to support you with your safety application implementation? Or you are looking for information on reference projects which comply with specific requirements? Then our Solution Partner Finder is the right tool for you.
siemens.com/automation/solutionpartner

Training and support
Our training offer for SIMATIC Safety Integrated provides you with know-how directly from the manufacturer. You can choose whether you first want to start with standards and regulations or directly get started with product training – for optimum familiarization with Safety Integrated.
siemens.com/sitrain-safetyintegrated

Safety Evaluation Tool

With the Safety Evaluation Tool, we offer a TÜV-tested online tool which quickly and safely guides you through the calculation steps for the realization of your machines’ safety functions. It supports the successive determination of the attained safety integrity (SIL/PL) – from specification of the system structure down to component selection. The result: A standard-compliant report which can be integrated in your documentation as proof of safety.
siemens.com/safety-evaluation-tool

Integrated safety technology reduces component variety and wiring expenditures
The application of drives with integrated safety technology allows for the elimination of previously required electromechanical components and corresponding wiring. Even the transfer of safety-relevant signals can be realized via standard field buses, which in turn ensures minimized wiring complexity and expenditures. This results in considerably simpler safety architectures, reduced system costs and space savings in the control cabinet. Uniform operating functionality, elimination of interfaces and maximum user friendliness allow for faster integration of SINAMICS in the automation system and for faster commissioning by means of the TIA Portal.
Find out more: siemens.com/safety-drives
The information provided in this brochure contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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Industrial security
Siemens offers automation and drive products with industrial security functions which support safe plant or machine operation. They essentially contribute to the realization of a holistic industrial security concept. Our products are continuously advanced under this aspect. We therefore recommend you to regularly inform yourself on updates of our products and to only use the respectively current versions. Relevant information is available at:

http://support.automation.siemens.com

You can also subscribe to a product-specific newsletter via this link.

Moreover, safe plant or machine operation necessitates the implementation of suitable protective measures (e.g. cell protection concept) and the integration of automation and drive components in a holistic state-of-the-art industrial security concept for the entire plant or machine. Also third-party products have to be taken into account in this context.

Further information is available at:

www.siemens.com/industrialsecurity

Opt for integrated added value:

› Maximum flexibility through programmable safety technology
› Maximum integration through comprehensive, consistent portfolio
› Maximum efficiency through uniform engineering

Find out more:
siemens.com/simatic-safety

SIMATIC Safety
Integrated – take a look!

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