

Safety for the manufacturing industry – Functional Safety Services

The modular service package
for safe, efficient machines

Industrial Technologies

SIEMENS

Machine safety is one of the key factors in ensuring that your production is efficient. Reliable systems that are simple to operate and maintain reduce the probability of accidents as well as the susceptibility of your equipment to faults.



The challenge

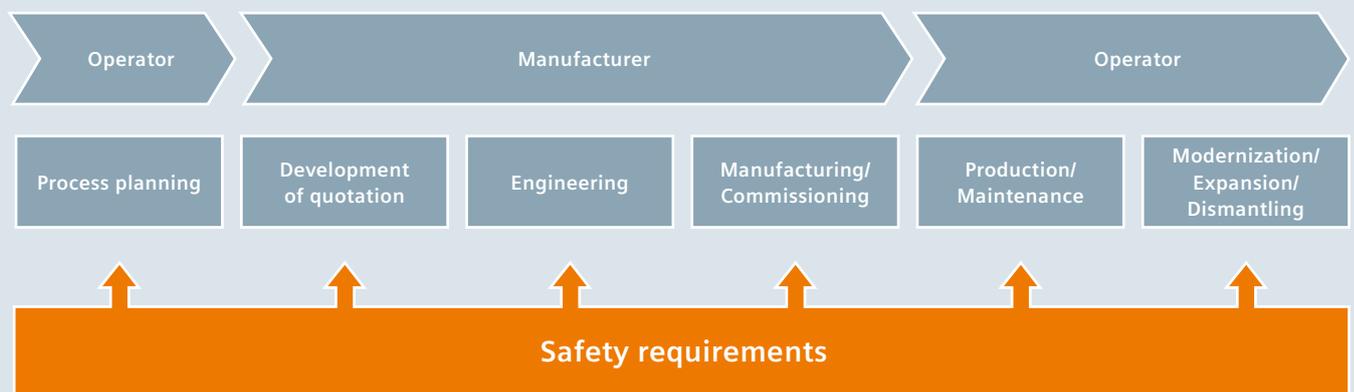
Maximum safety for the manufacturing industry

You can only achieve plant safety if existing risks are recognized in advance and, where necessary, reduced as quickly as possible. The manufacturing industry also faces the challenges of meeting current standards and legislation, such as IEC 62061, ISO 13849-1, ISO 14121, and MRL 2006/42/EG.

Safety systems must fulfill very high standards today. The probability of a fault, for example, must be calculated for every protection function. On the other hand, you can also gain flexibility with new standards which, for instance, allow complex safety functions to be assessed. Functions such as these allow the design of a dynamic protection zone – dependent on

the tool used – as well as the possibility of selectively disconnecting danger zones. This means that you can optimally adapt the safety systems to your production processes.

To determine the risk potential arising from your plants and systems, you need an effective and systematic risk assessment process. This is the only way to reliably define suitable measures and implement them quickly. The challenge here is to develop a “functional safety management” system in which safety technology is defined for every phase of the plant life cycle. This enables you to avoid systemic faults from the outset.



The goal: Efficient implementation of safety requirements over the entire plant life cycle



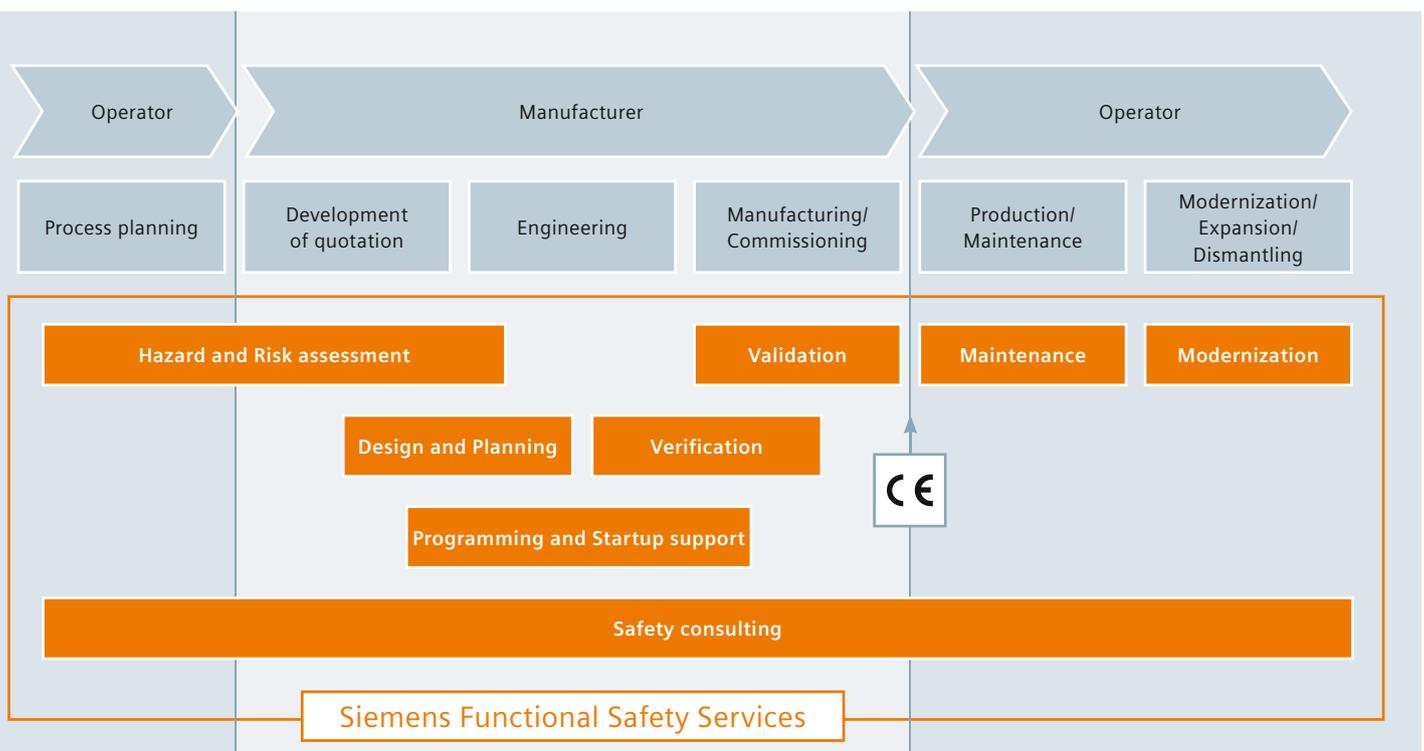
As a leading supplier of automation solutions, we have solid expertise and a wealth of experience, built up over many years in the manufacturing industry. With Siemens Functional Safety Services, we support you throughout the entire life cycle of your plant, allowing you to achieve the highest safety standard possible.

The solution

Siemens Functional Safety Services for the manufacturing industry

With Siemens Functional Safety Services, we support you with a comprehensive package of services that cover everything from risk identification and verification to plant start-up and modernization. The individual service modules allow you to selectively enhance your development, modification, and maintenance processes. We thus offer you an effective means of preventing, right from the start, faults inherent in processes and of keeping an efficient, verified record of functional safety and operational plant safety. Important parts of the process, necessary for CE-Marking

and safe plant operation, will be carried out and documented in close collaboration. All of our activities are based on international standards. We can also easily accommodate country and company specifics. Our service for the manufacturing industry is rounded out by a service package for the process industry. If desired, we can thus integrate approaches to safety from the process industry environment into your safety concept.



Functional Safety Services from Siemens stand for maximum safety

Siemens Functional Safety Services is a modular service package that we tailor to meet your specific needs. For you, that means customized support in defining and implementing your safety life cycle.



Our modules

One concept with many components

Our service portfolio is as broad and varied as your requirements. For example, for your existing concept, we can perform SIL verification (calculation of the probability of a dangerous failure), programming of the individual safety function, or verification of the software.

Safety consulting

IEC 62061 and ISO 13849-1 both stipulate “robust” processes in the development, operation, modification, maintenance, and dismantling of safety-related control systems. This means that an analysis must be performed, in collaboration with Quality Management, to determine whether the existing processes are adequate for avoiding systemic faults in the above-mentioned life cycle phases. This includes, for example, checking and modification as needed of the following subprocesses: requirements management, configuration management, modification management, documentation management, and information management. In our safety consulting, we rely on our many years of experience in the manufacturing industry environment to help you design your processes efficiently and in line with the standards.

Our experts are your partners for all safety measures

- Definition of the safety function
- Specification of the safety requirements
- Programming
- Verification and validation
- Maintenance
- Modernization
- Implementation of the safety life cycle

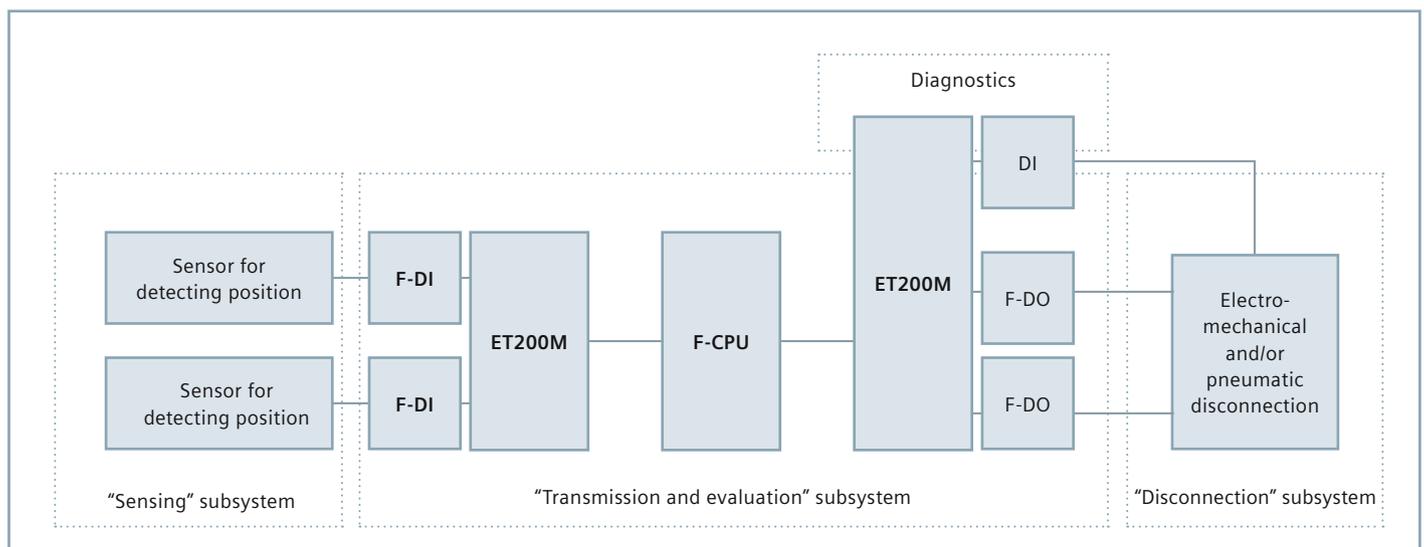


Hazard and risk assessment

We offer you systematic support with the assessment of your plant for hazards and risks. In cooperation with your machine experts, we determine the potential hazards in order to define necessary risk reduction measures. Our focus is on the facilitation and documentation of the hazards and risk assessment activities. Siemens Functional Safety Services provides support based on international standards and company-specific guidelines. The object of this interdisciplinary cooperation is to reduce to an acceptable level the risks originating from the machinery. Should it prove necessary to use safety-related control systems to do this, we also specify the detailed requirements.

Design and planning

We formulate an individualized concept for you based on the requirements specification that we have drawn up for your plant. In addition to the safety integrity (SIL classification), we also take into account requirements for maintenance and user-friendly handling of the protection system. Our objective is to equip your plant with workable components whose inspection intervals are as far apart as possible. To achieve this, we draw on the comprehensive system and service portfolio of Siemens automation technology, such as wireless safety via PROFINET, SINAMICS drives with integrated safety functions, and fail-safe SIMATIC components.



Simplified example of the safety function for position-dependent disconnection ("Design and planning" module)



Programming and start-up assistance

We use programs such as SIMATIC F-Systems or SIMATIC Distributed Safety to develop the complete safety-relevant software or individual software modules for your project as a company-specific library expansion. This is drawn up and thoroughly tested by our experts in a defined development process. In addition to delivering the software documentation needed for integration, we can also assist you with the start-up of the software. As an option, we can also have the software certified by an independent test institute.

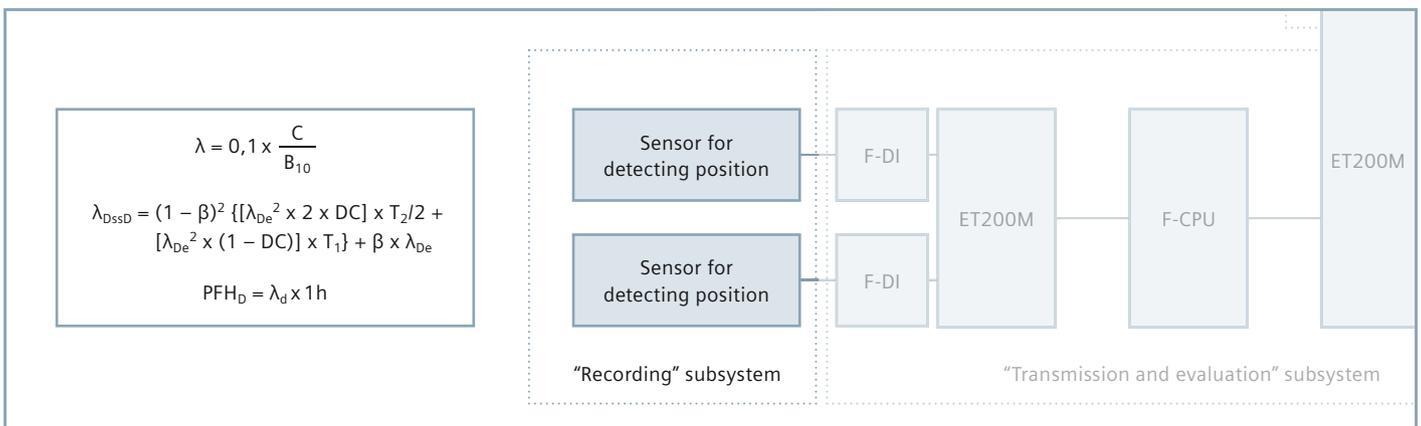
Verification

In the verification process, we verify by analysis or other tests that the project results comply with the specification. The methods that we offer you depend on the safety plan and especially on the verification and validation plan.

Verification activities can be

- SIL or PL verification: We provide mathematical proof that the protection system achieves the necessary safety integrity level. This includes calculation of the PFH value and accommodating the required hardware fault tolerance.
- Verification of the safety-relevant software: Our specialists can check the software for safety-relevant systems that were developed with the Siemens products SIMATIC F-Systems or SIMATIC Distributed Safety.

Verification is performed by independent experts for fail-safe SIMATIC systems and documented for you. We also offer the option of setting up a test automation and simulation environment.



SIL verification based on a simplified example for safety-focused position recording



Validation

As part of a safety validation audit, an analysis is performed to determine whether your system fulfils the safety requirements. If the end-of-work inspection has already been carried out, the focus is on the project documentation and random checking of functionality and integration quality. The basis for this is the validation plan of your project.

Maintenance

The maintenance of plant components is an important factor in maintaining the safety integrity of the system. With our global service structure, which includes more than 200 locations in nearly 50 countries, we support you with the regular checks on your safety systems.

Maintenance activities can be

- Annual inspection of safety light curtains, laser scanners, etc. – including re-measuring
- Checking the parameterization of safety-relevant components

With all these measures, we offer you an independent and documented inspection.

Modernization

Safety technology plays a key role in modernization projects. We help you clarify basic points for your modernization measures. For example, an assessment of the plant should be performed with regard to new potential hazards. This assessment is then used as the basis for defining the extent of the modernization of the safety system and the scope of the safety documentation.

Where necessary, we rely on the individual modules of the Siemens Functional Safety Services – for example, programming and start-up support, verification, and validation – to support the modernization measures.

Your advantages

- The entire safety life cycle is covered, thus reducing the number of interfaces and lowering the project costs
- An interdisciplinary team of experts will help you with the fast, effective implementation of your safety requirements
- Practical safety concepts and fast system acceptance tests, thanks to our extensive experience accumulated over years in the manufacturing industry
- A modular service package tailored to your requirements
- Deployment of experts appropriate for your needs in order to cut development times and costs
- Independent verification and validation activities to avoid systemic faults during the development phase and to reduce nonconformance costs (costs for improvements, dealing with complaints, compensation for damages, etc.)

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The information in this document contains general descriptions of the technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

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