

Integrate safety – Increase productivity

Safety Integrated for Drives and Motion

Brochure • March 2010



Safety Integrated

Answers for industry.

SIEMENS

Safety Integrated in automation and drive technology

Today, machines and systems are becoming increasingly automated and flexible. Nevertheless, the machines must satisfy the safety requirements of the respective country and they must not pose risks to operating personnel.

Conventional safety technology is at its limits here. With integrated safety technology, you can satisfy today's requirements. With integrated safety functions, entirely new safety concepts can be cost-effectively implemented thanks to the short response times and the low wiring overhead. This means that safety and productivity can both be increased at the same time. Siemens offers a comprehensive range of products for this, which can be used to create a coherent overall concept for safety.

Integrated safety technology from Siemens is characterized by:

- A complete range of products, from safety sensors, industrial controls all the way to controllers, from communication to drive technology, all from a single source
- Integration of safety technology into the standard automation and drive technology
- Uniform engineering
- Reliable communication via standard fieldbus systems

Benefits

- Highly effective safety: integrated, from the sensor and processing unit all the way to the actuator
- Extremely cost-effective: thanks to reduced hardware and installation costs
- Easy system coupling: by means of safety-related communication via standard fieldbuses
- Effective and fast diagnostics: for a high degree of availability of machines and plants
- Products, systems, solutions, and service: everything from a single source
- Increased productivity:
 - Fast troubleshooting and comprehensive diagnostics functions reduce downtimes
 - The products are certified according to the applicable safety standards (see tables on pages 23 – 25)
 - Rapid restart of systems after operator interventions

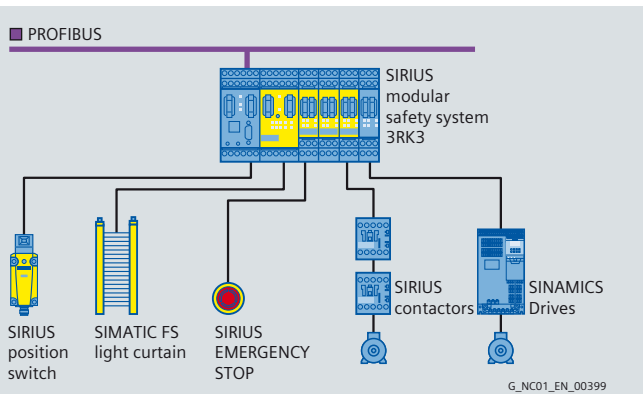
Detecting safely	Evaluating safely	Reacting safely
<ul style="list-style-type: none"> ■ SIMATIC Sensors <ul style="list-style-type: none"> – light barriers – light curtains – laser scanners ■ SIRIUS <ul style="list-style-type: none"> – position, hinge, short-stroke, magnetically-operated switches – EMERGENCY STOP – cable-operated switches – two-hand operation consoles – foot switches ■ SIMATIC Mobile Panel 	<ul style="list-style-type: none"> ■ SIRIUS safety relay 3TK28 ■ SIRIUS modular safety system 3RK3 ■ ASIsafe safety monitor ■ SIMATIC S7-300 / 400 F, Win AC RTX-F fail-safe PLC ■ SINUMERIK 840D / 840D sl numerical control ■ SIMATIC ET 200M, ET 200S, ET 200pro, ET 200eco fail-safe I/O 	<ul style="list-style-type: none"> ■ SIMATIC ET 200S / ET 200pro fail-safe motor starters and frequency converters ■ SINAMICS G120 / G120D / G130 / G150 fail-safe frequency converters ■ SINAMICS S110 fail-safe positioning drive ■ SINAMICS S120 / S150 fail-safe high-performance and motion control drives
Communicate safely		
<ul style="list-style-type: none"> ■ AS-Interface with ASIsafe, PROFIBUS and PROFINET with PROFIsafe 		

The Siemens product portfolio for safety engineering

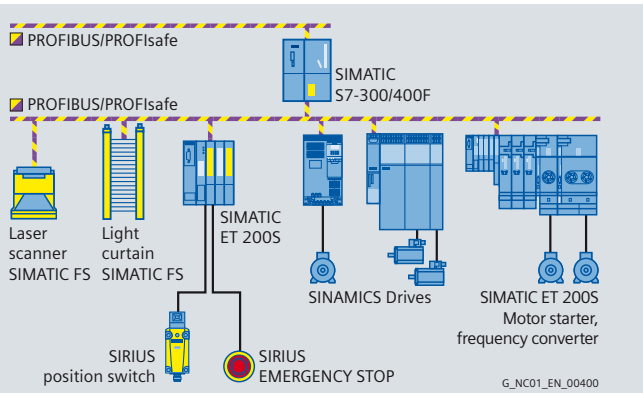
Safety Integrated –

Customized safety solutions for any automation task

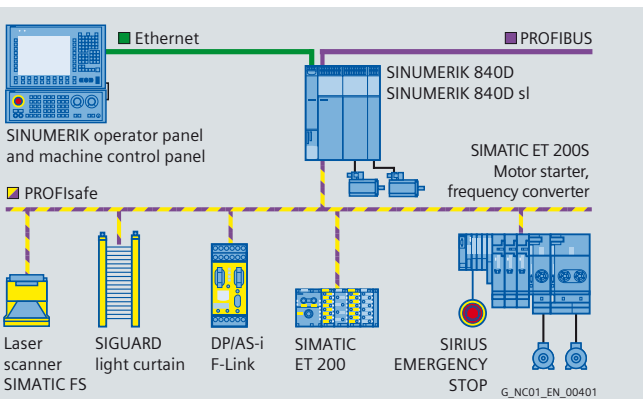
With its range of safety components, Siemens is able to offer a customized safety solution for almost any application: this includes both stand-alone solutions in simple automation tasks and integrated solutions with a higher-level controller in comprehensive automation applications.



Stand-alone solution



Integrated safety solution with SIMATIC



Integrated safety solution with SINUMERIK

Stand-alone safety solutions for small to medium-sized automation tasks

For small automation solutions, it is often sufficient to connect (hardwire) a limited number of safety-related components to an evaluation unit. To do this, you can use either the SIRIUS 3TK28 safety relay or a modular SIRIUS 3RK3 safety system. As an alternative to the 3TK28, safety-relevant signals can be evaluated via the AS-i bus using the AS-i safety monitor.

Integrated safety solutions for production automation with SIMATIC

The SIMATIC automation system plays a central role in processing and coordinating safety-relevant processes in industrial automation and it is now the standard in many instances. The Safety Integrated portfolio is harmonized along these lines so that applications can be integrally designed: a SIMATIC operates without any problems in conjunction with the drive technology (SINAMICS, SIMATIC ET 200), low-voltage switchgear and controlgear (SIRIUS), and sensors (SIMATIC Sensors) from Siemens. Communication is carried out via PROFIBUS or PROFINET using the PROFIsafe standard.

Integrated safety solutions for machine tools with SINUMERIK

The integrated safety functions of SINUMERIK Safety Integrated are used in the machine tools sector. They are redundantly integrated in NC¹⁾, the drive and the internal PLC and are used to monitor speed, standstill, and position. Such monitoring is necessary if the danger zone of the machines and systems is not blocked off. However, even in test mode or production mode, it provides effective operator protection as well as protection of tools, materials, and machines.

¹⁾ NC: Numeric Control

In machines and systems, automated movements present huge potential risks.

For this reason, drives always play a central role in safety solutions, regardless of the complexity of an automation task. Siemens drives are designed in such a way that they can be easily integrated into any of the safety solutions shown. With their integrated safety functions, they provide the basis for implementing highly effective safety concepts.

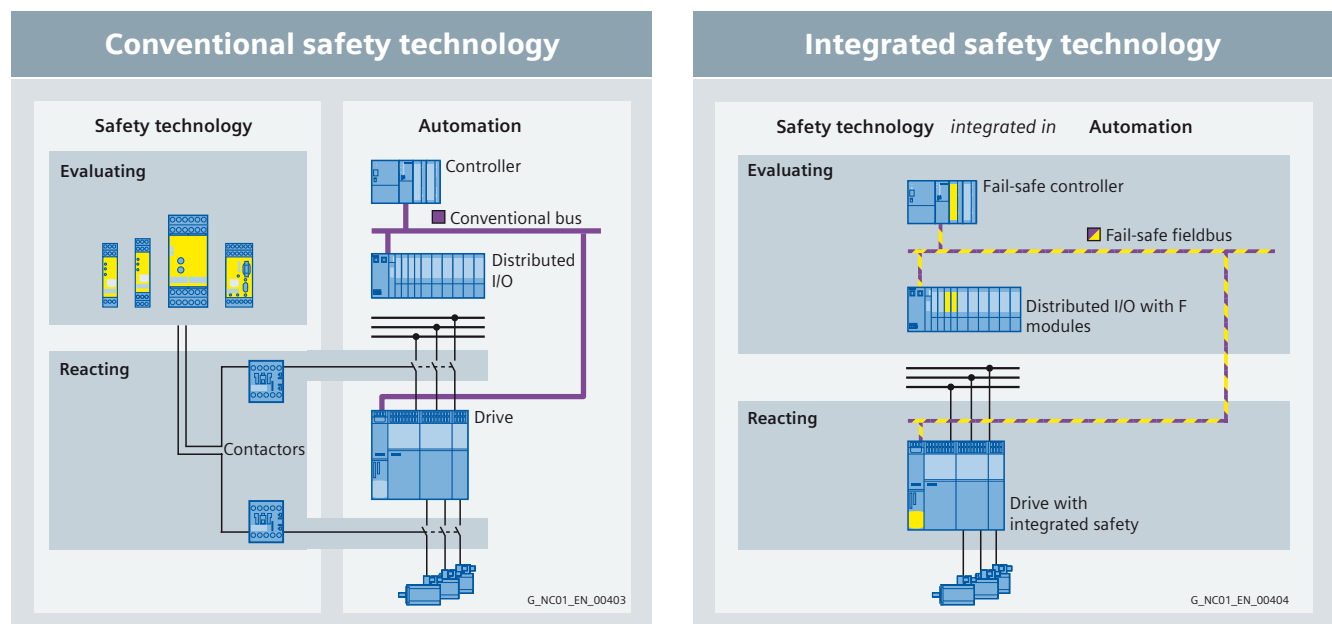
Advantages of drive-integrated safety functions

Electrically driven assemblies and machine components often pose a huge potential risk. Rotating units such as saws, rollers and spindles can cause serious or even fatal injuries. The same applies to machine units that have a linear motion such as handling axes and machine slides. The measures for guaranteeing the safety of the operating personnel are governed by country-specific regulations.

When drives without integrated safety technology are used, operator protection was previously implemented through the use of additional hardware components such as contactors and safety relays, and interlock circuits. In danger situations, the systems are simply shut down and they have to be restarted later. This sometimes leads to long downtimes and has a negative impact on productivity. At the worst, the operator is tempted to manipulate the safety devices.

In modern drives, safety functions are becoming increasingly integrated. Using drives with integrated safety technology can mean that previously required electromechanical components and their associated wiring can be omitted. Even the transmission of safety-relevant signals can be done via standard field-buses, which also reduces the complexity and overhead of wiring. This considerably simplifies the implementation of safety concepts. In addition, they allow for considerably more efficient safety concepts, both in terms of functionality and in terms of response times. This often even causes an increase in productivity.

The use of certified integrated safety functions simplifies the certification of the safety category that is required for a machine. The user is additionally supported by the online safety evaluation tool to meet this requirement (see www.siemens.com/safety-evaluation-tool).



Integrated safety technology reduces the number of components and the costs for wiring

