



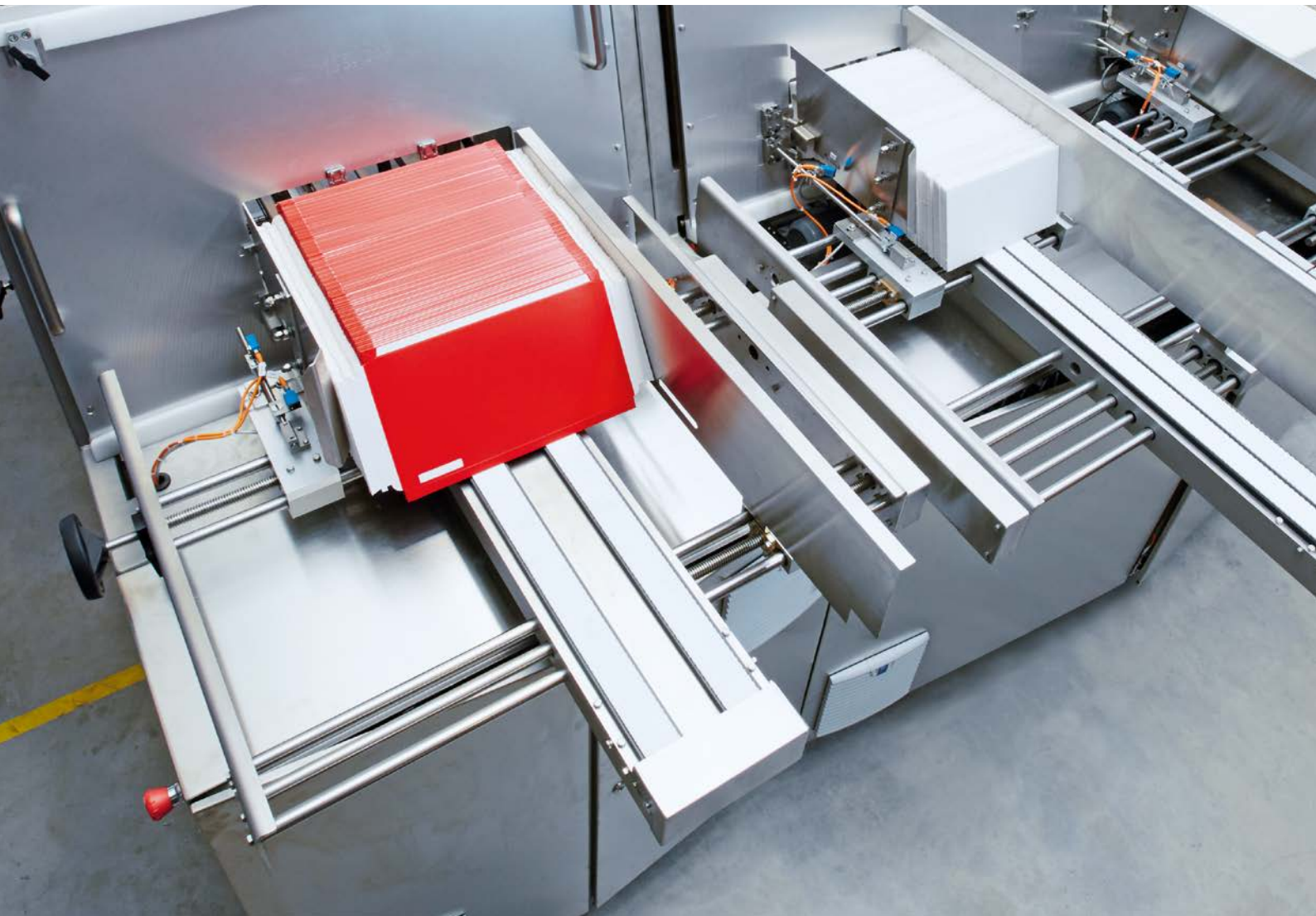
Safe Packaging Machine Solutions

FUNCTIONAL SAFETY SERVICES FROM SICK – FOR PROTECTING PACKAGING MACHINES

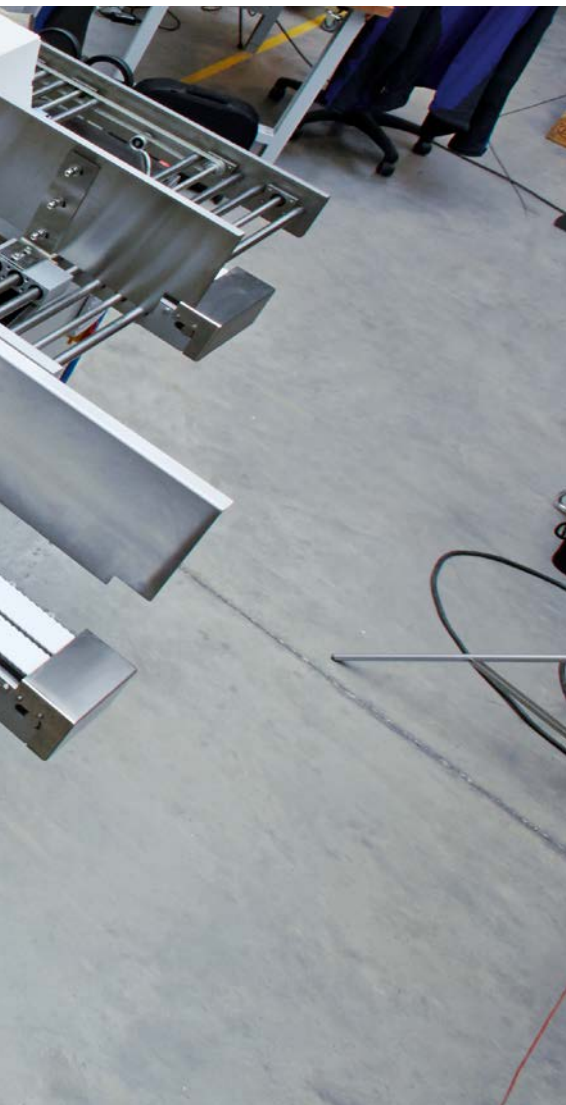
Safety solutions

SICK
Sensor Intelligence.

PRODUCTIVITY? OF COURSE – BUT NOT AT THE EXPENSE OF SAFETY!



Solving packaging problems is a fine balance between productivity and costs. Operators need quick and easy processes for changing formats and materials in the input magazine or troubleshooting. However, the machine operator's safety must not lose out. All in all, it is the ideal working environment for Safe Packaging Machine Solutions from SICK.



Protecting

The modular construction of modern packaging requires an intelligent and flexible safety concept. SICK safety solutions ensure the protection of personnel and machines, optimize production, reduce machine footprint requirements, and decrease downtime.

Solution concepts

On the following pages, we will present solution concepts for the protection of packaging machines and also introduce the Safeguard Detector safety system.

Individual project support

Based on many decades of experience, SICK is able to offer customer-oriented solutions for specific requirements and can be relied upon for active support in all relevant work steps.

Safety services

Whether you are the manufacturer or machine operator, you can benefit from our expertise and take advantage of our range of services to guarantee the safety of your machines.



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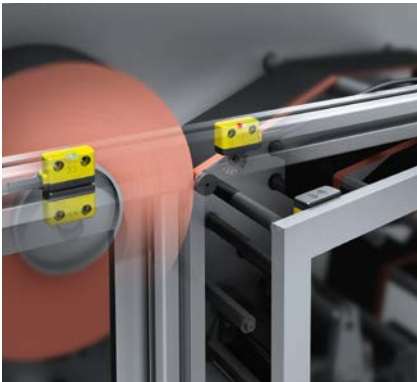


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SOLUTION CONCEPTS FOR PROTECTING PACKAGING MACHINES



Intelligent and non-contact door monitoring

The STR1 non-contact safety switch protects physical guards on packaging machines. The large door-offset-tolerance and high level of shock and vibration resistance, increase machine availability. Mounting holes on both sides, three active sensor surfaces and three different sizes of actuator open up countless mounting possibilities. In safe series connection, the STR1 with Flexi Soft ensures that a machine cannot be started if a protective door is open, and that a running machine is stopped whenever a door is opened.

- Non-contact safety switch



→ www.sick.com/STR1



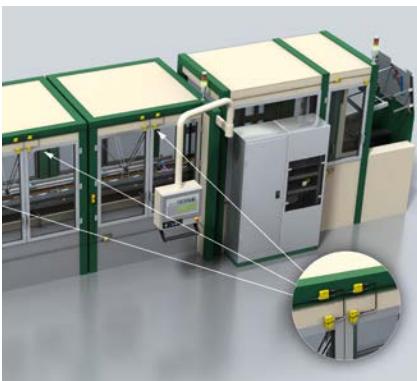
Efficient hazardous point protection

The deTec4 Core safety light curtain protects the hazardous area on an overwrapping machine when changing the film. The reliable sensor takes up little space and has no blind zones. The integrated alignment indicator positions the sender and receiver quickly and safely. When used in combination with the Flexi Soft safety controller, SICK offers a complete machine safety solution.

- Safety light curtain



→ www.sick.com/deTec4_Core
 → www.sick.com/detec4core-video



Safe sensor cascade with convenient diagnostics

The numerous safety switches and safety sensors installed on a packaging machine require a wiring concept that supports diagnosis of the connected components. The Flexi Loop ensures that up to eight sensor cascades – each with up to 32 dual-channel safety switches and safety sensors – can be connected and diagnosed in a cost-effective way. Locking devices, signal lamps, and pushbuttons can also be connected via standard inputs and outputs.

- Safety controller



→ www.sick.com/Flexi_Soft
 → www.sick.com/flexiloop-video



Modular and safe networking

Packaging lines with a modular construction require the networking of safe data, e.g., emergency stop information, between the individual elements of the system. Here the Flexi Soft safety controller offers the option of networking multiple controls safely. Available as an option: Flexi Soft Drive Monitor for safe monitoring of drives, e.g., as required for a setup with safely limited speed. Gateways are also available for integration into all standard automation systems.

- Safety controller



→ www.sick.com/Flexi_Soft
 → www.sick.com/flexiline-video
 → www.sick.com/drivemonitor-video

SOLUTION CONCEPTS FOR PROTECTING MATERIAL TRANSPORTATION SYSTEMS: SAFEGUARD DETECTOR



Conventional protection

With packaging machines, there is a danger of the operator reaching through the empty magazine and into the machine while it is running, particularly when it comes to material transportation (e.g., for flat carton blanks). The conventional way to stop this from happening is to use mechanical tunnel systems with matching covers. Alternatively, magazines can be positioned so that they are almost out of reach to guarantee the necessary safety.

Downsides for the machine operator

Should the operator need to access the machine, this is exactly where the problem arises. After all, covers make it difficult to access components. And this takes up just as much time as loading difficult-to-access material magazines.

The material as a movable physical guard

In open systems on the other hand, the packaging material in the conveyor magazine acts as a physical guard. If there is sufficient material in the magazine, then it is not possible to reach into the mechanics while the machine is running. This protection ceases to function as soon as there is no material left in the magazine.

Safety and productivity – Safeguard Detector

The Safeguard Detector safety system is the ideal solution for your productivity and safety: This means that you can get rid of any covers while still adhering to any protection requirements – even if the conveyor magazine is empty. Distances from hazardous points and, as a result, the space needed for the machine itself remain small and the magazine is easier for the machine operator to load.

- Functional safety systems



→ www.sick.com/Safeguard_Detector

TO MAKE SURE NOTHING GETS IN THE WAY



With productivity and safety as the main priorities, we offer Safeguard Detector as a solution for safeguarding material transportation systems. Safeguard Detector not only makes sure that everything runs smoothly when setting up the carton and loading the input magazine, it also ensures that only the required material is fed into the machine.

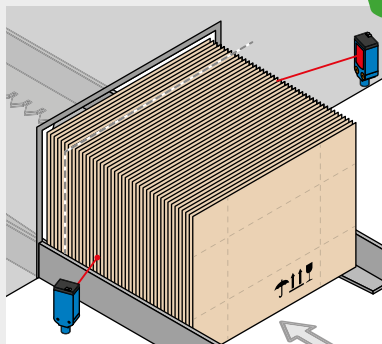
Compact sensors and flexible control

Two MultiPulse photoelectric proximity sensors are mounted on both sides of the induction line and monitor the packaging machine's magazine. The logic for analyzing the signals is provided by certified function blocks in the modular Flexi Soft safety controller.

Intelligent application solution

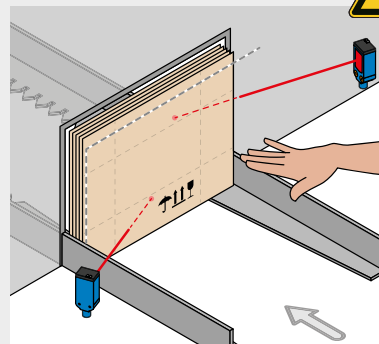
If there is not enough material in the magazine, the hazardous area is no longer covered. Flexi Soft then safely switches the machine off and the machine's dangerous movement is stopped.

Magazine full



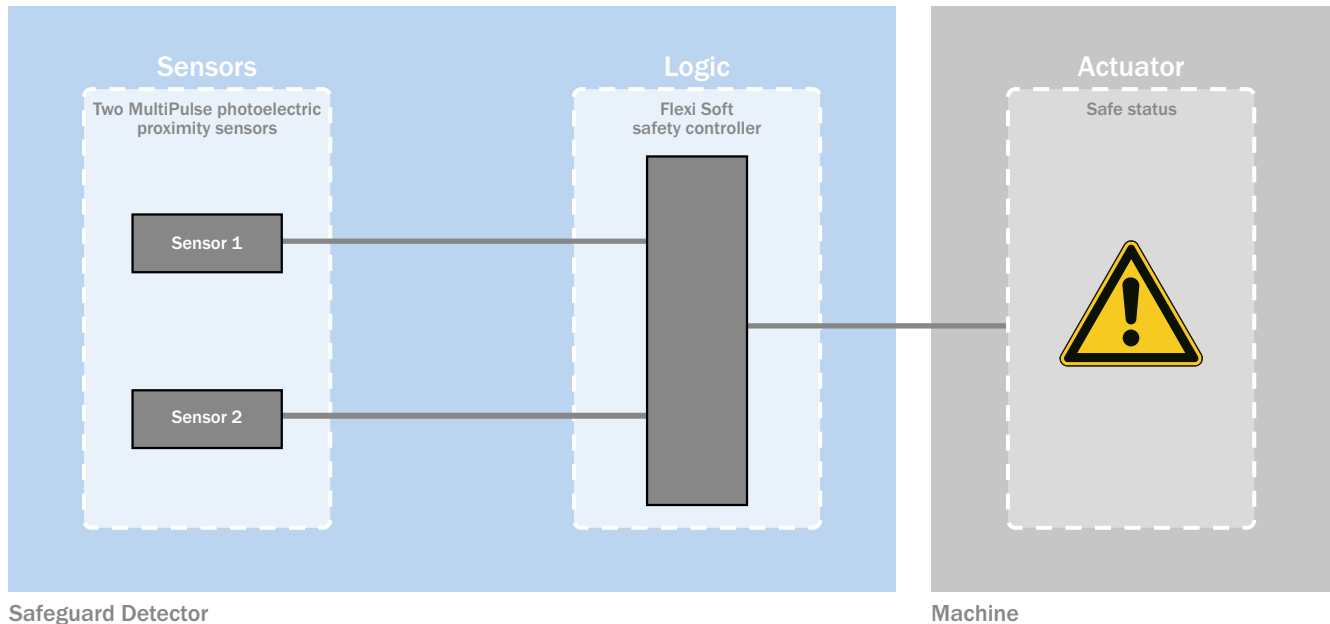
Two MultiPulse photoelectric proximity sensors are installed at a distance of between 30 mm and 100 mm from the material. They detect whether the input magazine contains enough material.

Magazine almost empty



As soon as the material is almost empty, the sensors detect that material is missing. The hazardous area is no longer covered. This leads to a safety shutdown in the system.

Block diagram of the Safeguard Detector



Functional safety in the system

The system’s functional safety system is made up of the “sensors” and “logic” components (see block diagram). There is also an extensive range of diagnostics options available. The two MultiPulse photoelectric proximity sensors generate a dual-channel structure and the Flexi Soft safety controller analyzes the pulsed signals for safety purposes.

The Safeguard Detector switches the machine to a safe status in the following circumstances:

- There is no material in the detection zone of at least one sensor, while the logic unit is permanently analyzing the sensors’ signals. The output of at least one of the sensors is therefore in an off state (LOW).
- The connection between one sensor and the logic unit has been interrupted.
- The voltage supply to one sensor and/or the logic unit has been interrupted.
- An internal error has occurred in one sensor. The output of the sensor is therefore permanently in the operational status (HIGH).
- The logic unit reports an internal error.



Our expertise in machine safety

Do you export or utilize machinery worldwide? Then we have the expertise to ensure your compliance with legal requirements all over the world. We have over 150 experts in functional safety in over 80 countries who are close to you and your projects. We are close by and can support you with our expertise in functional safety.

BLUE MEETS YELLOW – A GREEN LIGHT FOR SAFE MATERIAL TRANSPORTATION

The MultiPulse* photoelectric proximity sensor's key features

- Highly visible light spot
- Oscillating emitted light with 2 Hz or 10 Hz (depending on type)
- Precise background suppression for reliable detection
- PinPoint technology
- Tried-and-tested measurement principle for high availability
- Space-saving miniature housing
- Sensing range: 30 mm to 100 mm



*SICK offers a range of variants for the MultiPulse photoelectric proximity sensor. However, only selected variants have been certified for the Safeguard Detector safety function (see Safeguard Detector product information, 8018945). Only these variants meet the necessary safety requirements, taking the operating instructions into account.

The modular Flexi Soft safety controller contains all of the components needed for modern machine safety

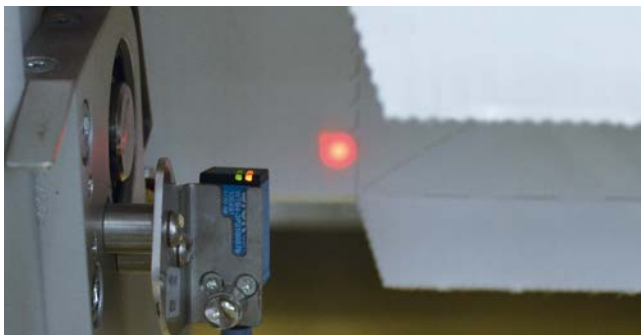
- Main modules with or without safe networking
- “Safety” and “Standard” extension modules
- Gateways – Interfaces to all conventional bus systems
- Motion control systems
- Flexi Loop for diagnostics-supported and safe cascading



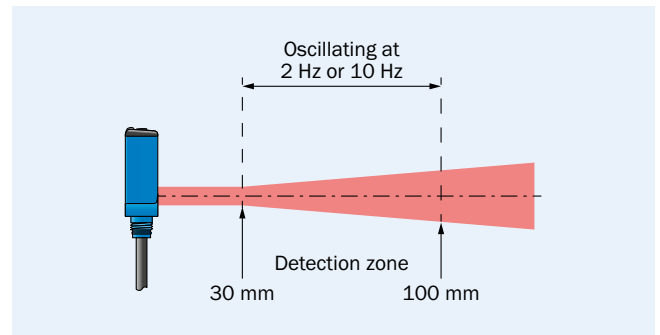
MultiPulse photoelectric proximity sensor – Reliable detection in a miniature housing

The MultiPulse photoelectric proximity sensor is best suited to applications where a confirmed sensor signal and reliable functioning are essential. The MultiPulse photoelectric proximity sensor detects when the opening to the hazardous point is covered by an object, e.g., carton blanks. If there is an object in the detection zone, the sensor's emitted light oscillates with

2 Hz or 10 Hz (depending on the type), clearly visible due to the pulsating light spot. If there is no object in the detection zone, the light spot remains static. The light spot is also permanently visible if there is an internal error in the sensor. Thanks to foreground and background suppression, an object is only detected if it is located in the detection zone.



Reliable detection of various packaging materials.



Self-monitoring due to oscillating emitted light.

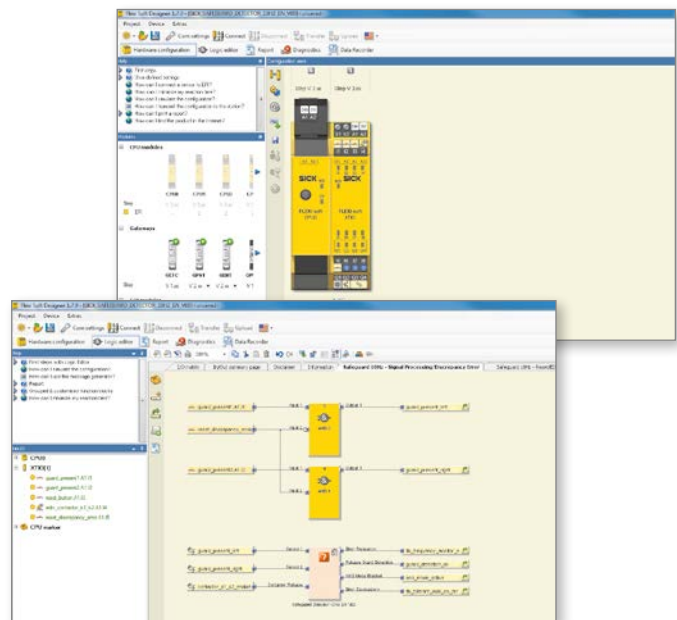
Flexi Soft – The software-programmable safety controller

Modular and intuitive configuration: the Flexi Soft safety controller from SICK. The safety application offers a whole range of main modules, extension modules, motion control modules, and gateways. It is also an efficient tool in the packaging industry, which uses machines with a large number of doors and flaps that require protective measures. In applications like these, the Flexi Loop and the Flexi Soft keep the amount of wiring used to a minimum. Not only that, but Flexi Soft also makes it possible to network safety functions in modular machines – and integrate these into the standardized equipment control system.



Flexi Soft Designer

The license-free Flexi Soft Designer configuration software offers intuitive programming, rapid commissioning, and continuous monitoring. The entire configuration can be documented in multiple languages at just the touch of a button.



Your benefits at a glance

- ✔ High productivity for the machine
 - Thanks to quick changeover of carton profiles
 - Thanks to quick loading due to easy access
 - Thanks to quick troubleshooting
- ✔ Everything from a single source – Rugged sensors, reliable machine controllers, and certified safety
- ✔ Without extra work – Safety function does not need additional testing and can be used straight away to meet standard requirements
- ✔ Safe investment – Various expansion options available for additional safety and automation tasks
- ✔ Minimal spatial requirements – Ultra-compact, miniature sensor housing
- ✔ Easy integration – Even into existing machines and plants
- ✔ Flexible applications – Magazine monitoring does not depend on the material type
- ✔ Lower costs – Particularly in comparison to conventional mechanical protection solutions

FUNCTIONAL SAFETY SERVICES FROM SICK – FOR PROTECTING PACKAGING MACHINES



Description of the solution

The Safe Packaging Machine Solutions are designed specifically to safeguard packaging machines in compliance with standards.

The modular construction of modern packaging machines requires an intelligent and flexible safety concept. SICK safety solutions ensure the protection of personnel and machines, optimize

production, reduce machine footprint requirements, and decrease downtime. The solution includes all technical protective devices as well as the associated engineering. It also features configuration and validation on site as well as diagrams in E-PLAN format. This saves time and gives you security on all levels.

At a glance

- Protection of packaging machines in compliance with standards
- Custom-made solution including hardware and engineering
- Engineering documentation with SICK VERIFIED SAFETY quality seal
- Flexible adaptation to the production process
- Commissioning and acceptance (optional)

Your benefits

- Best possible productivity thanks to an intelligent safety system
- Safety by satisfying the legal requirements
- Solution featuring state-of-the-art technology without binding of own resources
- Can be used in existing and new equipment
- Cost-effective solution thanks to quick and experienced implementation by SICK
- SICK safety services available world-wide

More information

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Project workflow

Identification of requirements

Retrofitting protective devices to existing machines requires careful planning in order to ensure accurate dimensioning and compliance with standards.

In practice it has proven worthwhile to work through the following tasks systematically in separate work packages:

Task	Description
Risk assessment	Specification of the limits and functions of the machine, identification of hazards, risk evaluation and analysis, documentation of risk assessment
Safety hardware design	Hardware planning on CAD (e.g., EPLAN) taking into account the specifications as well as relevant laws and directives and including technical clarification. Creation of connection diagrams and technical documentation in electronic format. Creation of hardware list with selection of the most suitable devices and accessories.
Control cabinet	Construction of a new or adaptation of an existing control cabinet in compliance with the specification and relevant laws and directives
Safety software design	Creation, testing, and verification of the complete application software for the safety controller and the configuration of all safety sensors
Commissioning	Commissioning of the entire safety system on site at the machine
Validation of functional safety	Validation of all functions of the safety system on site at the machine
Acceptance report	Report documenting in detail the acceptance of the entire safety system against the specification on every machine at every location in the world

Project planning

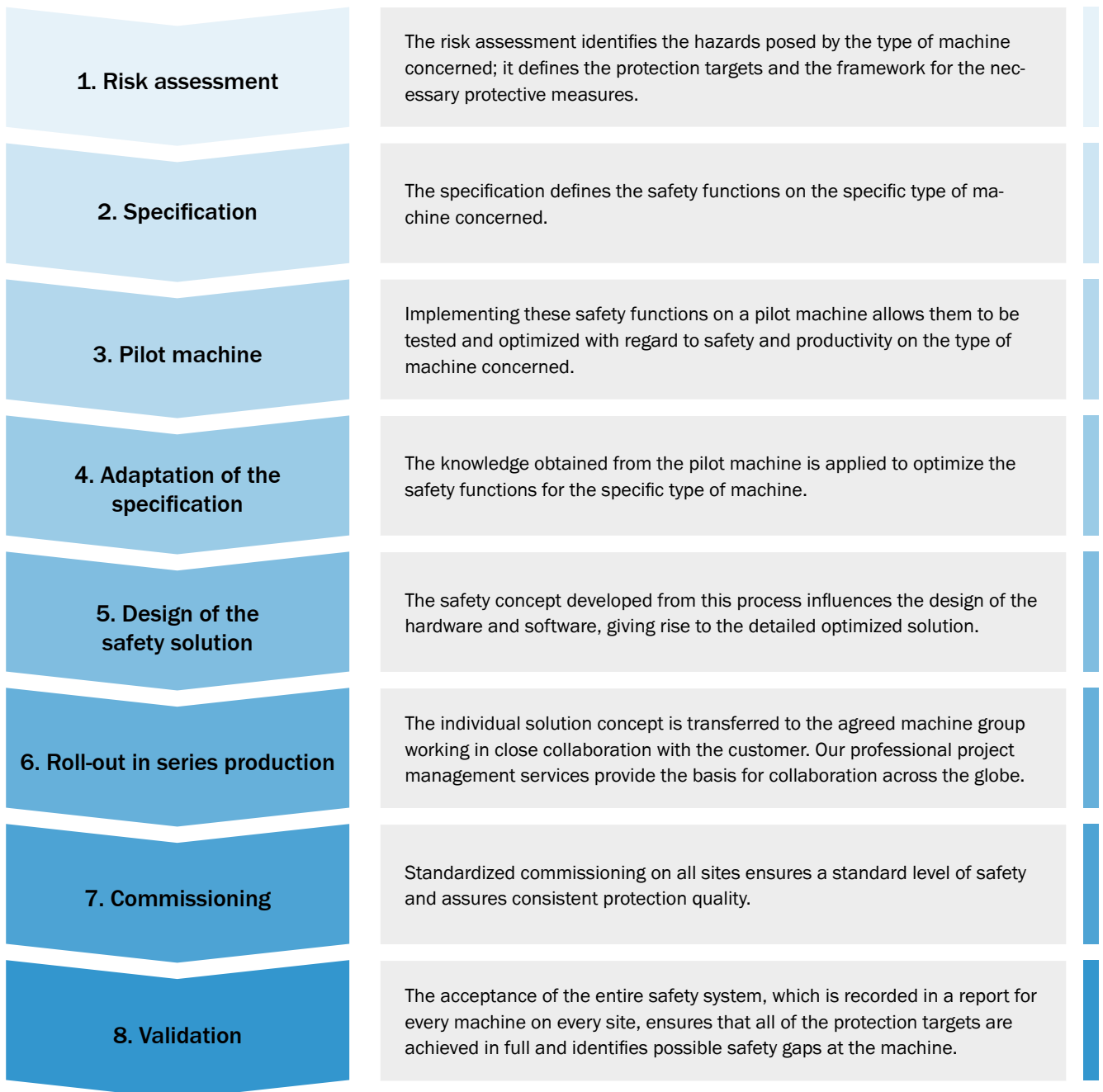
An example project workflow to help guide you through the work packages you need to process can be found on the following pages. You will also find an extract from the comprehensive portfolio of safety services that SICK is able to provide all over the world.



INDIVIDUAL PROJECT SUPPORT

Based on many decades of experience, SICK is able to offer customer-oriented solutions for specific requirements and can be relied upon for active support in all relevant work steps.

Example project workflow





IDENTIFICATION OF REQUIREMENTS WITHIN THE ORGANIZATION

The implementation of an individual end-to-end solution starts with a comprehensive analysis of the actual situation within your organization. This analysis is carried out based on the following questionnaire, which is designed to identify your specific requirements. Contact us once you have worked through the questions in your organization. We will happily work with you to develop a suitable solution.

- Do risks exist at the packaging machine?
- Which operating modes are there and which different operating modes are to be implemented?
- Should a set-up operating mode with enabling switch and reduced speed be implemented?
- Are safety switches or sensors connected in series?
- If series connection exists: can fault masking be ruled out?
- Is space at a premium?

Our end-to-end solutions for supplying packaging machines are characterized by safety engineering that is compliant with standards and produces verifiable results, offering you professional outcomes based on comprehensive empirical values from a large variety of retrofitted machines all over the world.



Machine safeguarding evaluation

- Identification of electrical and mechanical hazards
- Risk assessment of identified hazards
- Evaluation of existing protective measures
- Recommendation of new or improvement of existing protective measures
- Consideration of valid provisions and regulations
- Service can be retrieved worldwide

→ www.sick.com/machine_safeguarding_evaluation

Your benefits

- Detailed knowledge of the safety status of the machines
- Concrete statements on the urgency of improvement measures
- High flexibility thanks to product-neutral perspective
- Economic, well-thought-out recommendations for reducing detected risks
- Reduced effort when drafting safety concepts
- Enables simple and standard-compliant implementation of the recommended protective measures for safety technology
- Foundation for fulfilling due diligence with documented inspection of the machine
- Guaranteed quality thanks to standardized processes and sustainable competence management



Risk assessment

- Performance of or instruction for risk assessments
- Determination of applicable directives and standards
- Identification of hazards
- Risk evaluation
- Specification of safety requirements

→ www.sick.com/risk_assessment

Your benefits

- Saves time and resources thanks to involvement of experienced SICK experts
- Independent and comprehensive expertise provide certainty when assessing risks
- Periodic qualification of SICK specialists ensures the latest directives and standards are incorporated in new and repeat projects
- High level of quality thanks to standardized processes and sustainable competency management



Safety concept

- Specification of safety functions and required safety level (PLr or SILr)
- Recommendation for technical implementation of safety functions in the form of a block diagram
- Definition of parameters for the selection of protective devices
- Safety concept specification

→ www.sick.com/safety_concept

Your benefits

- Saves time and resources thanks to involvement of experienced SICK experts
- Increases machine safety as a result of compliance with essential safety and health requirements and standards
- Choose from any safeguarding component available on the market
- Ensures effectiveness and competitiveness by preventing unnecessary measures
- High level of quality thanks to standardized processes and sustainable competency management



Safety hardware design

- Selection and interconnection of suitable components
- Specification of measures for controlling and avoiding systematic errors
- Determination and verification of the safety level
- Hardware concept specification
- Creation of a SISTEMA project file

→ www.sick.com/safety_hardware_design

Your benefits

- Saves time and resources thanks to the involvement of experienced SICK experts
- Provides greater safety by implementing measures for avoiding and controlling systematic errors
- Incorporates all technologies (pneumatic, hydraulic and electrical) for comprehensive service
- High level of quality thanks to standardized processes and sustainable competency management



Safety software design

- Specification of safety-related application software, including the definition of input and output signals
- Creation and verification of safety-related application software according to the V-model for software development

→ www.sick.com/safety_software_design

Your benefits

- Saves time and resources thanks to involvement of experienced SICK experts
- Provides safety through standardized implementation according to the V-model, including measures for avoiding and controlling errors
- Reduces complexity by using modular and clearly structured programming of safety functions
- High level of quality thanks to standardized processes and sustainable competency management



Commissioning

- Configuration and parameter setting of components or systems, optimized for each application
- Final functional testing of components or systems
- Documentation of the configuration and parameter setting in the acceptance report
- Briefing of operating personnel

→ www.sick.com/commissioning

Your benefits

- High productivity: via application-optimized components and system settings
- Cost savings: quick transition to normal operation under professional supervision
- Planning reliability: via effective cooperation between SICK, the system integrator and the customer



Validation of functional safety

- Creation of a verification and validation plan to thoroughly check for proper selection, installation, implementation and functioning of the safety-related parts of the control system (SRP/CS)
- Configuration of safety-related parts of the control system
- Analysis and testing according to the verification and validation plan
- Specification of the necessary adjustment and, if necessary, revision of the safety-related application program

→ www.sick.com/validation_of_functional_safety

Your benefits

- Saves time and resources: experienced SICK experts provide efficient execution
- Ensures protection objectives have been met thanks to standardized validation using analysis and testing
- Implements the two-man rule: execution and checking completed by two qualified individuals
- Comprehensive service: specification and implementation of any adjustments that may be necessary
- High level of quality thanks to standardized processes and sustainable competency management



Periodic inspection

- Evaluation of the optical protective devices to ensure they have been installed correctly and according to the specification
- Inspection of whether the protective device is operating according to current machine usage
- Identification of operational changes and manipulations
- Readjustment of the optical protective devices and removal of contamination
- Production of an inspection report and issuance of a test seal

→ www.sick.com/inspection

Your benefits

- Safety is determined and corresponding documentation is provided in the inspection report as proof that the legal obligation for testing has been fulfilled
- High testing quality through certification and periodic inspections in accordance with IEC 17020 is carried out by independent bodies and with on-going competency management
- Quick identification of the safety status and the period of validity by means of test seals as proof to regulators of current inspections
- Safety is ensured due to early detection of changes to application conditions and manipulations
- High machine reliability due to periodic checking and, if necessary, removal of contamination or readjustment
- Automatic reminder of required testing periods within the framework of the service contracts to ensure equipment is working properly



VERIFIED SAFETY – Safety made by SICK

With its VERIFIED SAFETY seal of quality, SICK provides an assurance that the results have been obtained and verified by certified staff in line with a defined process. VERIFIED SAFETY means guaranteed functional safety with verifiable quality.

Specialists – On site, wherever you are

SICK has specialists to support you wherever you are in the world. Our experts are entirely familiar with local standards and directives. All of our specialists are part of a global network. This means that we can offer you the right skills for local and international projects.



Competence management – Knowledge assured in the long term

Competence is not just about theoretical knowledge. At SICK, every specialist must also have the necessary experience and prove his or her capability by taking regular tests. Across the globe, competence is shared and secured for the future through the SICK Competence Management program.

We are happy to provide seminars to share our knowledge further. SICK is a recognized provider of Functional Safety Engineer training as part of the TÜV Rheinland Functional Safety Program.

Customer project management – Project risks under control at all times

At SICK, all management systems for developing projects follow a uniform and consistent management philosophy.

Projects follow a defined process from acquisition through customer approval. Regular checks against milestones guarantee completeness, reveal any deviations early on, and enable corrective measures to be introduced promptly. Professional and standardized project management is the basis for successful planning, economic implementation, and precise control of projects.



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- ✔ Create, save, and share as many wish lists as you want.
- ✔ Use the direct order to quickly order a big amount of products.
- ✔ Check the status of your orders and quotes and get information on status changes by e-mail.
- ✔ Save time by using past orders.
- ✔ Easily export orders and quotes, suited to your systems.



SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.



- 
Consulting and design
 Safe and professional
- 
Product and system support
 Reliable, fast, and on-site
- 
Verification and optimization
 Safe and regularly inspected
- 
Upgrade and retrofits
 Easy, safe, and economical
- 
Training and education
 Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com