

**Safety in System
Protection for man and machine**

PACKAGING INDUSTRY INDUSTRY BROCHURE



INTRODUCTION



New solutions to improve production efficiency and machine safety

We have ample experience in packaging technology. Our products are used wherever special explosion protection requirements exist and a high degree of resistance to temperature, moisture, and chemical cleaning agents and disinfectants is required.

- Food-processing industry
- Beverage industry
- Pharmacy
- Bio-medicine
- Medical technology
- Cosmetic industry
- Non-food industry

Very strict hygiene requirements apply to the processing and packaging of food and pharmaceutical products. Schmersal provides specially developed solutions for the different hygiene areas (dry zone, injection zone, wet area and aggressive area). The particularly smooth surfaces of the sensors make them easy to clean and their concealed mounting means they never come into direct contact with the food product.

This brochure gives a first impression of our product range and its various application possibilities in the packing industry. Every piece of switchgear presented here distinguishes itself by a very long service life, even under extreme operating conditions. From shock freezing and frozen storage, through evaporation, homogenisation, drying, condensation, distillation in hot plants to explosion-endangered areas: Regardless of moisture, vibrations or rough handling, Schmersal switchgear has been developed from scratch to cope with the requirements of the industry.

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Web shop

Already familiar with our new web shop?
Here you will find all details and data
on our products which you can order
directly online:

products.schmersal.com

SCHMERSAL WORLDWIDE OFFICES IN GERMANY



WUPPERTAL

K.A. Schmersal GmbH & Co. KG

- Founded in 1945
- Around 760 employees

Focal points

- Headquarters of the Schmersal Group
- Development and manufacture of switchgears and switching systems for safety, automation and lift engineering
- Accredited test laboratory
- Central research and development
- Logistics centre for European markets



WETTENBERG

K.A. Schmersal GmbH & Co. KG

- Founded in 1952 (1997)
- Around 130 employees

Focal points

- Development and manufacture of switchgears for operation and monitoring, safety-related relay modules and controls as well as switchgears for explosion protection



MÜHLDORF / INN

Safety Control GmbH

- Founded in 1994 (2008)
- Around 30 employees

Focal points

- Development and manufacture of optical electronic components for safety and automation engineering



BERGISCH GLADBACH

Böhnke + Partner GmbH Steuerungssysteme

- Founded in 1991 (2013)
- Around 90 employees

Focal points

- Development and manufacture of components, controls and remote diagnostic systems for the lift industry

() = inclusion in the Schmersal Group

SCHMERSAL WORLDWIDE INTERNATIONAL OFFICES

BOITUVA / BRAZIL

ACE Schmersal

- Founded in 1974
- Around 400 employees

Focal points

- Manufacture of electromechanical and electronic switchgears
- Customer-specific control systems for the North and South American market



SHANGHAI / CHINA

Schmersal Industrial Switchgear Co. Ltd

- Founded in 1999
- Around 150 employees

Focal points

- Development and manufacture of switchgears for safety, automation and lift engineering



PUNE / INDIA

Schmersal India Private Limited

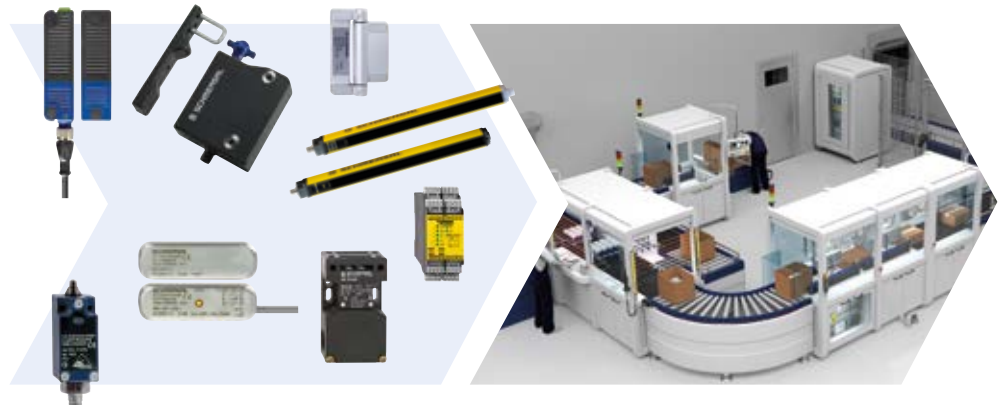
- Founded in 2013
- Around 60 employees

Focal points

- Development and manufacture of switchgears for safety, automation and lift engineering



1. STRATEGIC DEVELOPMENT FROM COMPONENT MANUFACTURER TO INDUSTRY-ORIENTED SOLUTIONS PROVIDER



SAFE SOLUTIONS FOR YOUR INDUSTRY

Following this motto, the Schmersal Group develops and manufactures safety switchgears and switching systems for machine building and plant engineering.

This is how we meet the requirements of an increasingly differentiated market. There are specific risks and specific environmental conditions in key industries using machines and systems such as the food industry, machine tool industry and heavy industry, they have different conditions for machine safety, availability and accessibility.

We have developed precise safety switchgears and solutions for these and other industries. Industry management with appropriate application expertise carries out knowledge transfer from industries to product management and sales.

On our website at www.schmersal.com/en/industry, we don't just present our products and solutions; we also keep you up to date with the latest technology trends from within the industry, demonstrate "best practices" and report on the rumours buzzing around the "industry grapevine".

CONSULTING AND SERVICE OF EXPERTS

The Schmersal Group is not only a developer and manufacturer of products and system solutions but is also a consultant and service provider. Our certified functional safety engineers offer you qualified support in the configuration of protective gear and the standards-compliant selection of safety switchgear. This also includes support for your designers when making risk assessments pursuant to EN ISO 12100.

In addition, we work with standardisation committees and co-operate closely with government safety organisations, other institutions and unions for machine and occupational safety. We have initiated the CE network, a union of engineering firms that specialise in various fields of machine safety.

In our tec.nicum in Wuppertal, the new Bietegheim-Bissingen Technology Centre and other external locations, we offer you a wide seminar programme on diverse subjects about human and machine safety. Please visit www.technikum.com for information about our seminar programme.

2. MACHINE SAFETY FOR YOUR INDUSTRY

A BRIEF OVERVIEW OF THE VARIOUS REQUIREMENTS

Long lifetime and availability

In the packaging industry where short cycle times, three-shift operation and interlinked machinery are commonplace, high availability of plant and machinery equipment is a must. Speed, accuracy and

failsafe performance are of paramount priority. Schmersal switchgear functions flawlessly under these conditions and hence meets the tough requirements of the packaging industry. However, should

customers need assistance, it's reassuring to know there are Schmersal representatives all around the world.

Temperature resistance

Switchgear used in the food industry, for example, must be able to cope with both extremes of temperature, as automated processes often take place

at low temperatures. By contrast, during evaporation, homogenisation, drying, condensation and distillation, switchgear needs to be able to cope with high

temperatures. There are also additional requirements, such as moisture resistance.

Explosion protection

Organic dusts can present an explosive danger if the dust/air ratio falls within explosive limits. For this reason, regulations regarding dust-explosion protection must

be observed in the packaging industry. This applies both to foodstuffs in powder form such as flour, cake mixes and coffee powder, and to pharmaceuticals and

animal feeds. The Schmersal Group offers a comprehensive range of switchgear for automation and machine safety, which is approved and certified to the ATEX and IECEx Directives.

Hygiene

"Hygienic Design" distinguishes between four different hygienic areas:

- Dry zone (non-contact area; protection against soiling required)
- Splashing zone (foodstuff can splash; the operators touch the foodstuff and the machines; risk of contamination or cross-contamination)

- Wet zone (high risk of bacterial contaminations; low-pressure cleaning with chemicals or hot cleaning)
- Aggressive zone (even higher risk of contamination; frequent hot steam cleaning or high-pressure cleaning with aggressive detergents)

Schmersal Group solutions for each of these areas include safety sensors with smooth surfaces for easy cleaning and the possibility of concealed mounting.

Branch-specific certifications

The specific properties required of plant and machinery used in the food-processing industry are defined by various regulations, some of which are very detailed. This includes, amongst others, the following norms and certification to the following standards:

- EN 1672-1 and EN 1672-2
- 3A Sanitary
- EHEDG
- FDA
- HACCP
- Ecolab
- Diversey

Switchgear from Schmersal is approved and certified in accordance with these regulations depending on the requirements.

2. PRODUCT OVERVIEW



COMMAND AND SIGNALLING DEVICES

Push buttons and pilot lights

- N range with high degree of protection IP69K for the food-processing industry
- Spring-return/maintained joystick switches with high degree of protection IP65, IP67, IP69K temperature range of $-40\text{ °C} \dots +80\text{ °C}$

Control panels

- Range BDF 100 and BDF 200
- Slim, shock-resistant thermoplastic enclosure, Degree of protection IP65
- AS-Interface Safety at Work available
- Emergency stop, start/stop and reset functions available

Assembly housing

- Empty stainless steel enclosure V4A, 1.4404, 316L
- 1 up to 5 command positions
- High degree of protection IP69K
- For applications in food processing machinery

Pull-wire emergency stop switches

- Metal and thermoplastic enclosure
- One-side operation / wire length up to 10 m or 50 m
- Wire pull and breakage detection monitoring with position indicator
- Temperature range $-25\text{ °C} \dots +70\text{ °C}$

POSITION DETECTION

Position switch

- Metal and thermoplastic enclosure
- Wide range of actuators
- ATEX II 2D, II 3D, II 2GD, II 3GD
- Temperature range $-40\text{ °C} \dots +200\text{ °C}$

Sensors

- Metal and thermoplastic enclosure
- Cylindrical or square enclosure
- Protection class IP65, IP67, IP69K
- Switch distances to 50 mm
- Diverse sensor technologies



SAFETY SWITCHGEAR

Guard door monitoring

- Safety switches
- Safety sensors
- Solenoid interlocks

ACTIVE OPTOELECTRONIC PROTECTION EQUIPMENT

Optoelectronic safety devices

- Safety light barriers
- Safety light grids and safety light curtains

SAFE SIGNAL PROCESSING

Safety monitoring modules

- Monitoring of electromechanical and non-contact switchgear
- Safety outputs with STOP 0 or STOP 1
- Signalling outputs for diagnostic

PROTECT SELECT

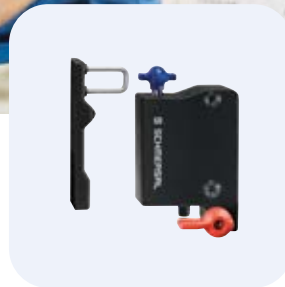
- Flexible compact safety controller
- Simple and flexible parameter setting
- Optimal adaptation of the basic programme to the individual application
- Connection of up to 9 dual-channel safety switching devices (with or without potential) up to PL e/SIL 3
- Safety semi-conductor and relay outputs with STOP 0 or STOP 1



IEC 60947-5-1
DIN EN ISO 13850
DIN EN 60947-5-5

DIN EN 60947-5-1
EN 620, BGI 710
DIN EN 60204-1

4. PACKAGING



ALMOST EVERYTHING IS PACKAGED

The packaging industry is a key sector not only for industrial production, but also for all aspects of everyday life in the industrialised world. Almost every product purchased by a private consumer is packaged, from medicines through everyday food products to tools and furniture. The design and functions of the packaging are just as diverse as the packaging materials themselves.

DIVERSE FUNCTIONS OF PACKAGING

The purpose of packaging is not only to provide protection whilst in transit and storage. It also serves a major role in identifying, recognising and labelling the product, and plays a key part in sales promotion and marketing as innovative and attention-catching packaging upgrades the product inside. Consumer goods manufacturers in particular have noticed this trend. As a consequence packaging is becoming more important and elaborate, allowing packaging designers and manufacturers to demonstrate a high level of creativity and flexibility.

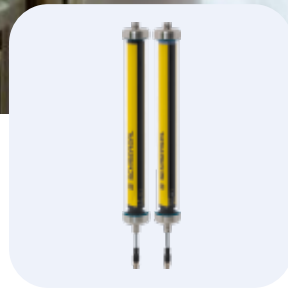
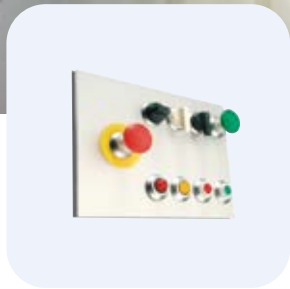
PROGRAMMED GROWTH

There are numerous global trends indicating ongoing growth in this sector, not only in terms of innovation but also in terms of volume market. The world's population continues to grow. Today the earth is populated by well over 7.2 billion people, by 2050 this number is expected to increase to more than 9.6 billion, according to UN calculations. As living standards rise in "emerging markets", so will the demand for goods and their packaging. A soar in the consumption of convenience food is also resulting in an upsurge of demand for packaging.

HIGH SPEED, HIGH AVAILABILITY, INTERLINKED MACHINERY

Typically plant and machinery in the packaging industry operate at high speeds with short cycle times. They are frequently integrated into the entire production and/or packaging lines. This has the following implications for the design of the protective equipment: In the ideal case the equipment should not interrupt production cycles or impact plant productivity. It must offer the highest level of reliability, even in 24/7 operation.

4.1. FOOD AND BEVERAGES



SAFETY IN HYGIENE-SENSITIVE AREAS

Cleanliness and safety: This neatly sums up the requirements of protective equipment used on food processing machinery. Safety requirements defined by legislation and standards (keyword "Machinery Directive") apply to all areas of machine construction. Add to this the requirements of cleanliness or hygiene, and the standard machine safety solutions effectively used elsewhere can only be used partly or not at all here.

BASIS: FOUR HYGIENE AREAS

For this reason, the food industry was the first to use active optoelectronic safety switches instead of conventional electromechanical safety switches. This type of switchgear is easy to clean thanks to the smooth surfaces of the sensor and actuator, and can be mounted in a concealed position.

Safety switchgear for food processing machinery have been designed with four hygiene areas in mind, with separate specifications for each area:

Foodstuff: Non-contact area; protection against contamination required

Splashing zone: Foodstuff can splash; the operators touch the foodstuff and the machines; risk of contamination or cross-contamination

Non-food: High risk of bacterial contamination; low-pressure cleaning with chemicals or hot cleaning

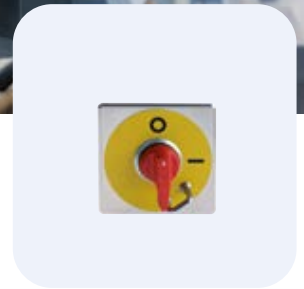
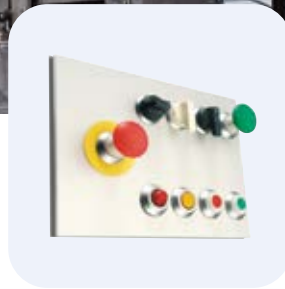
Aggressive zone: Even higher risk of contamination; frequent hot steam cleaning or high-pressure cleaning with aggressive detergents

DEMANDING REQUIREMENT PROFILE

There are also additional requirements, depending on the area of use: switchgear with an increased range of temperature stability is required for temperature-controlled processes ranging from shock freezing to homogenisation and distillation. Machinery designed in accordance with the Hygienic Design principles often needs to be resistant to water spray (e.g. water spray from high pressure cleaners during cleaning) and aggressive detergents. Explosion protection also plays a role during the processing of powdered raw materials or products such as flour, bread and cake mixes, coffee or cocoa powder. Furthermore, many machine designers and users demand compliance with standards, directives and regulations (FDA, GMP, EHEDG, ECOLAB etc).

After considering all these requirements, the Schmersal Group decided the best solution was to develop a new family of safety switchgears with features and functions beyond those of the standard product range. In the meantime a product portfolio is available which is widely used throughout the food machinery industry.

4.2 PHARMACEUTICALS – BIO-PHARMACEUTICALS – COSMETICS



CRITICAL AMBIENT CONDITIONS FOR EFFECTIVE PRODUCTS

Disposable syringes or headache tablets: In terms of design, selection and cleaning of safety switchgears, the packaging of pharmaceutical and medical products is subject to the same strict requirements as food packaging.

PROTECTION FROM CONTAMINATION

Depending on the hygiene area, contamination protection including high pressure cleaning with cleaning agents may be necessary. Furthermore, as organic dust is potentially inflammable, the dust explosion directive must be observed during the processing, filling or storage of pharmaceuticals and their primary products.

In many areas of pharmaceutical production, safety switchgear originally designed for hygiene applications in the food industry can be used. However there are other standards and directives which apply specifically to pharmaceuticals and biotechnology (e.g. Good Manufacturing Practice, Medical Devices Directive). As some stages of production are carried out under clean room conditions, it must be ensured that particle emissions from machine parts do not exceed the specified limits.

NEW TECHNOLOGIES AND FACILITIES

With research playing a major role in the pharmaceutical industry – companies spend about 15% of their revenue on the discovery and approval of new active agents and drugs – it is important to provide safety switchgears for laboratory-sized production facilities. The hygiene requirements here are equally high. The same applies to modern pharmaceutical and medical engineering sectors such as biotechnology.

Pharmaceuticals typically comprise of powdered materials. As organic dust is potentially inflammable, the dust explosion directive must be observed during the processing, filling or storage of pharmaceuticals and their primary products. Much of Schmersal safety switchgear is tested and certified in accordance with the ATEX and IECEx Directives.

4.3 HYGIENE PRODUCTS



Ever-improving medical care and demographic change: The consequences of these two trends are already evident i.e. increased demand for nursing care and hygiene products for professional and private use. There are no signs of a turnaround in this trend in the near future.

Maximum cleanliness and sterility are of utmost importance when it comes to packaging hygiene products which range from bandages, medical products and cosmetics to operating theatre clothing, cleansing agents and disinfectants. Items are sterilised beforehand to prevent the spread of viruses and bacteria. Needless to say, impurities and contamination must be completely avoided when cleansing agents are packaged.

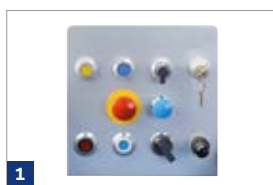
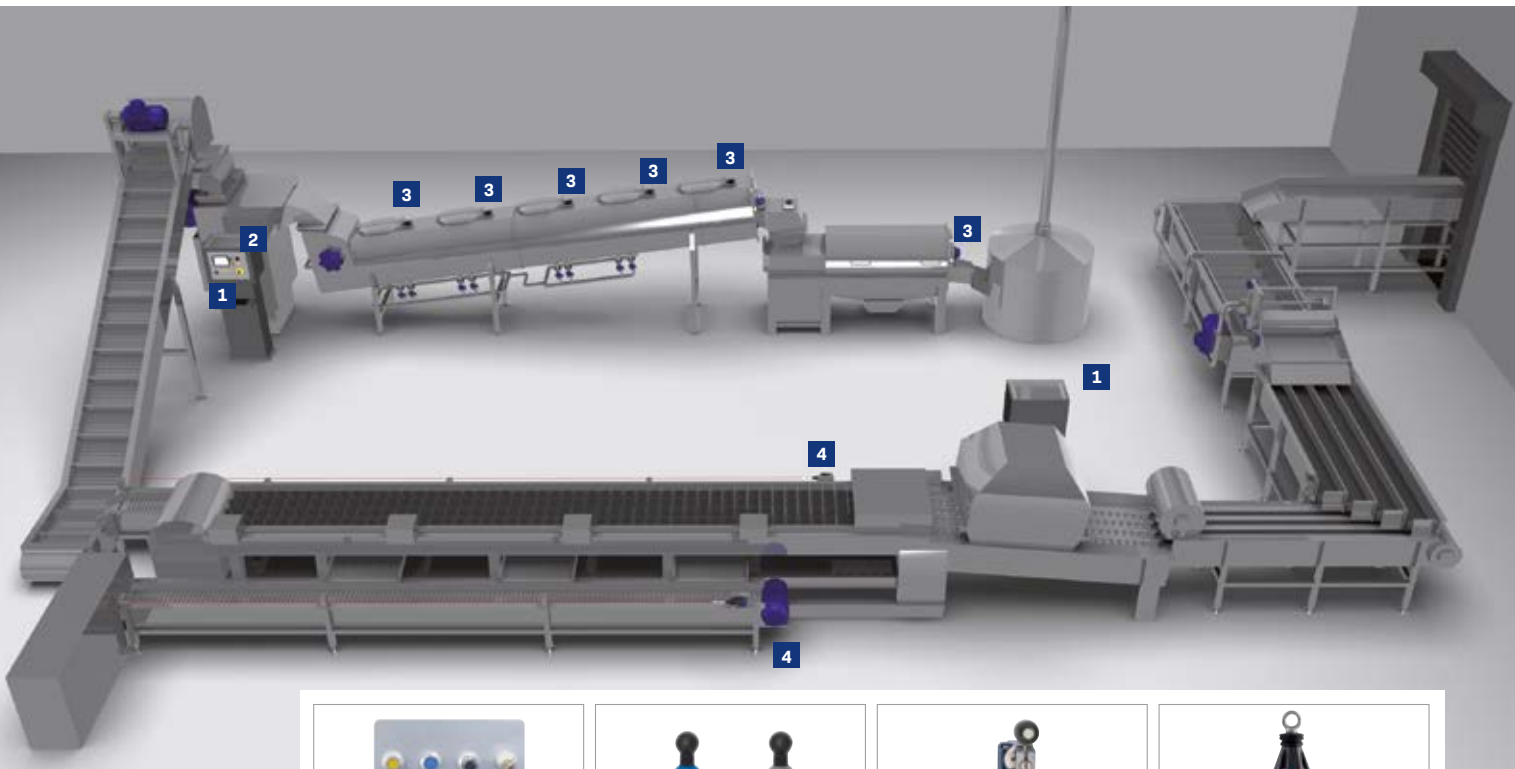
The requirements on the packaging machinery used, as well as their safety switchgear, are particularly stringent and must be consistent with the principles of Hygienic Design at a minimum. This switchgear includes safety sensors, which, thanks to the smooth surfaces of the sensor and actuator, can be cleaned easily and mounted in a concealed position.

Furthermore the explosion protection directive is relevant to some extent here too: Not only is there a risk of dust explosion from powdered materials, there is also a potential risk of gas explosion from volatile fluids such as explosive solvents, if they are used.

5. PRODUCTION AND PROCESSING

Widest diversity of high requirements

The properties demanded of safety systems are as diverse as the production and processing procedures in the food industry. The Schmersal Group provides machine designers and food manufacturers with an extensive range of products specifically designed to comply with the relevant standards and to meet the technical requirements of the industry.



Command devices and indicator lights

- N range for hygiene-sensitive areas
- Mounting hole Ø 22.3 mm
- Indicator lights with LED
- Degree of protection IP69K
- Easy to clean
- Seawater-resistant

Code number:
N range



Joysticks

- Up to 4 actuating directions
- Wide range of contact variants
- Degree of protection IP65, IP67 and IP69K
- Suitable for outdoor use
- -40 °C ... +80 °C

Code name:
Maintained joystick switch



Position switch

- Temperature-resistant up to 160 °C
- Metal enclosure
- Gold flashed contacts
- Degree of protection IP65
- Viton gaskets
- Interlocked lever and shaft
- V4A roller
- Widest diversity of actuator heads

Code number:
M.330-11y-1366



Pull-wire emergency stop switches

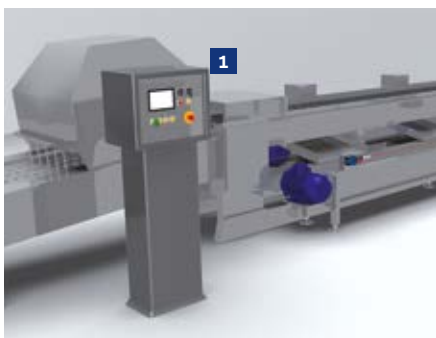
- Robust plastic and metal enclosures
- Degree of protection IP65
- One-side operation
- Wire length up to 10 m or 50 m
- Reset pushbutton
- Position indication

Code number:
TQ/ZQ 700, TQ/ZQ 900

APPLICATIONS

Beside the widest diversity of form factors of the electromagnetic and active optoelectronic safety switchgear, the portfolio also includes a variety of command and control devices for man-machine interfaces in hygiene-sensitive food production.

Application 1: Sorter



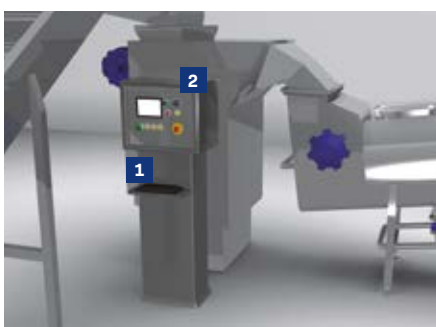
Control panels

Very rough ambient conditions often exist at the plant and machinery man-machine interface. Our command and signalling devices have been designed from scratch to deal with these demands.

The N range of switchgears are a versatile range of command and signalling devices specially created for food machinery and packaging plants in hygiene-sensitive areas, with degree of protection IP69K integrated into the Hygienic Design.

Device geometries have been optimised to minimise the number of edges and corners, and smooth surfaces chosen to facilitate effective cleaning of the device heads.

Application 2: Peeling



Command devices for rough environments

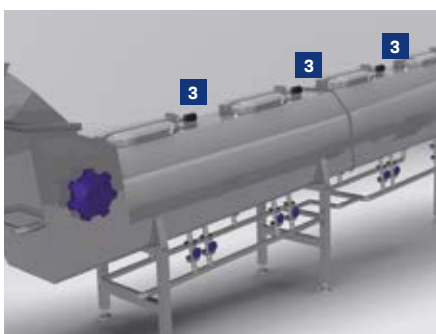
In the food and process engineering industry, the MK/WK range of very compact, extremely robust and versatile spring-return and maintained joystick switches with protection classes IP65, IP67 and IP69K are used to operate plant and machinery in particularly rough and humid environments.

Maintained joystick switch:
Up to 4 switch positions, latching, reset by touch and spring force.

Spring-return joystick switch:
Up to 4 switch positions, touch action, reset by spring force.

Maintained/spring-return joystick switch:
Up to 4 switch positions, touch action, latching, reset by touch and spring force

Application 3: Chopping, Straining



Safety switchgear

Safety switchgears with the widest diversity of actuator heads to transmit safety-related signals to the safety relay module or safety-related control system is often used to secure the doors, flaps and protective covers of production and processing machinery.

The T.330-11Y-1903 switch has been specifically designed for particular temperature-critical applications. Features include gold-plated contacts, a maximum operating temperature of 160 °C, a special Viton gasket and compliance with degree of protection IP65.

6. FILLING COMPLEX AND ONGOING PROCESSES

The filling of liquid and paste-like or powdered foods is an ongoing process which comprises many steps such as weighing, batching, conveying, sealing and labelling, all of which need to be coordinated. These are often high speed processes synchronised to other processes such as palleting, for example. Therefore high machine availability is essential, and the overall process must be protected to prevent contact with hazard points or access to hazardous areas.



Safety interlock

- High level tamper protection
- Only one version for hinged and sliding doors
- Switchable latching force (25 N or 50 N)
- PLe / SIL 3
- Series-wiring without reduction of the safety level
- Degree of protection IP66, IP67, IP69

Code number:
AZM 300



Safety sensors

- Robust models: plastic, brass or V4A stainless steel enclosure
- Degree of protection IP69
- EN 50041/47
- Solutions up to PLe / SIL 3
- Contact-free, coded electronic system
- Concealed mounting possible

Code number:
BNS 40 S



Safety switch for hinged guards

- Metal and thermoplastic enclosure
- Widest diversity of actuator heads
- Tried and tested solution
- Actuator head can be repositioned in steps 4 x 90°

Code number:
T.C 235, T.C 236



Position switches with safety function

- Metal or thermoplastic enclosure
- Degree of protection IP66, IP67
- -30 °C ... +80 °C
- Quick connection technology
- Simple and quick to adjust the control elements by 45°.

Code number:
PS116, PS215, PS216,
PS226, PS315, PS316

APPLICATIONS

As it's usually impossible to avoid product spillages during filling, the safety switchgear in use must meet additional requirements such as providing water intrusion protection (during drink bottling), explosion protection (during filling of powdered or dust creating products), and facilitating very effective (general) cleaning.

Application 1

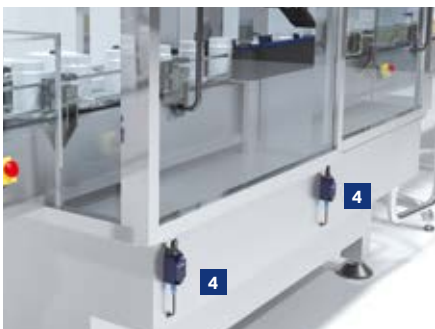


Securing the operating area

A lot of plant and machinery must be secured with hinged, sliding or removable guards.

The Schmersal Group has developed a range of different solutions that are ideally suited to use in the packaging industry. These include the universal AZM 300 electronic solenoid interlock, which can be integrated easily into surrounding structures.

Application 2



Securing safety guards

The "classical" solution for securing safety guards: Our EN 50047/50041-compliant position switches with safety function can be used for positioning tasks and to protect movable and detachable safety guards.

A comprehensive range of actuator heads are available to meet the requirements of many everyday tasks.

Application 3



Monitoring flaps

We provide the widest range of safety switchgear for protecting the doors, flaps and protective covers on processing and packaging machinery.

The spectrum ranges from position switches with safety function over electromechanical safety switches and hinged safety switches to tamper-proof safety switches with magnetic or RFID-coded targets.

7. OUTER PACKAGING



Safety guard monitoring

- Safety switches with separate actuator
- Position switches
- Safety switches for hinged guards
- Safety sensors
- Solenoid interlocks



Optoelectronic safety devices

- Safety light grid
- Safety light curtains
- Safety light barriers



Command devices with safety function

- Pull-wire emergency stop switches
- Safety foot switches
- Emergency-stop buttons
- Enabling switches
- Two-hand control panels



Safety-related tactile sensors

- Safety mats
- Safety edges
- Safety bumpers









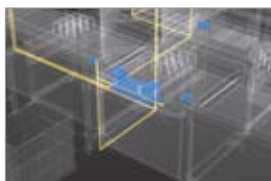
IP66 IP67 IP69

IEC 60947-5-1
 DIN EN ISO 13850
 DIN EN 60947-5-5

DIN EN 60947-5-1
 EN 620, BGI 710
 DIN EN 60204-1



Operators of, for example, carton erecting machines and any other outer packaging machinery, must be able to quickly deal with faults without putting themselves in danger. In many cases, the handling of weight-optimised and delicate packaging materials is complex, which means faults cannot be completely ruled out. Consequently it is important to consider any possible faults in the operating and safety concept. Protection against tampering shall also be included here.



Safe signal processing

- Programmable safety controllers
- Compact safety controls
- Safety relay modules
- Output extensions
- Input extensions
- Fail-safe standstill monitors
- Fail-safe delay timer

Command and signalling devices

- Control panels
- Command devices and indicator lights
- LED signal towers CleanSIGN

**AS interface
Safety at Work**

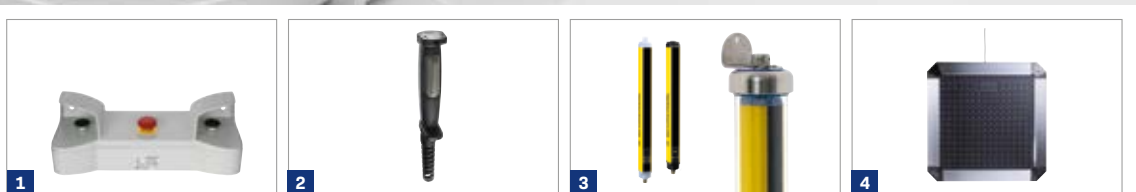
- Solenoid interlocks
- Safety sensors
- Safety switches
- Emergency stop and command devices
- Safety monitors
- Master monitor combinations
- Safety gateways
- Installation accessories

Explosion protection switchgear

- Explosion protection solenoid interlocks
- Explosion protection safety switches
- Explosion protection position switches
- Explosion protection safety sensors
- Explosion protection pull-wire emergency stop switches
- Explosion protection command devices and indicator lights
- Explosion protection safety relay modules

8. FINAL PACKAGING

High productivity and, increasing, flexibility are required for tasks such as grouping, cartonising and palleting. Modern concepts for securing hazardous zones are taking this trend into account, which is why we've developed a very wide range of diverse safety solutions. Solutions which are both productive and safe are available for the highly-skilled task of coordinating interaction between man and machine, or man and robot.



Two-hand control panel

- Degree of protection IP54 or IP65
 - Operating panel for additional command devices and indicator lights
 - Metal and thermoplastic enclosure
 - Stand and wall mounting possible
 - Monitoring to DIN EN 574-1 III C with safety relay module
- Code number:
SEP

Enabling switches

- Thermoplastic enclosure
 - Degree of protection IP65
 - -10 °C ... +60 °C
 - Good resistance to oil and petroleum spirit
 - Suitable for robot applications complying with the ANSI Robotics Standard
 - Category 3/4 to EN ISO 13849-1 only with SRB-E, PROTECT SELECT or PSC1
- Code number:
ZSD

Safety light curtains and safety light grids

- Degree of protection IP67
 - Protection field heights from 170 mm to 1770 mm
 - Resolution: 14, 30 and 50 mm
 - Degree of protection IP69 with protective casing for harsh industrial environments, with polycarbonate protective pipe and polyamide or V4A stainless steel end plugs.
- Code number:
SLC, SLG

Safety mats

- Ambient temperature 0 °C ... + 60 °C
 - Protection class IP65 to IEC/EN 60529
 - Surface: PUR (polyurethane)
 - Category 3/4 to EN ISO 13849-1 only with SRB-E, PROTECT SELECT or PSC1
- Code number:
SMS 4, SMS 5

APPLICATIONS

Application 1: Grouping



Securing workspaces

In many production and packaging plants, automated workflow as well as manual work activities, such as putting advertising material (e.g. promotional items such as pamphlets, giveaways etc.) into the cartons, need to be carried out in a safe manner. This usually means using two-hand control panels or optoelectronic light grids/curtains to secure hazardous areas. Two-hand control panels are non-separating protection devices.

These command devices ensure the operator is not in the way of dangerous moving parts when a machine or plant is started.

Application 2: Composite packaging



E-STOP BUTTON

Emergency stop buttons are an important component of man-machine interfaces in plant and machinery installations. They are used on conveyors and material handling equipment, at the run-on and run-off of packaging machinery, and on the two-hand control panels. Manual actuation of the devices ensure the machine is always switched off in a safe manner.

Agreement switches are frequently used together with other safety measures for personal protection when the machine is operating in special modes such as set-up or inching mode, and the protective equipment has to be partially or completely removed.

Application 3: Palletting



Access protection with double acknowledgement/reset

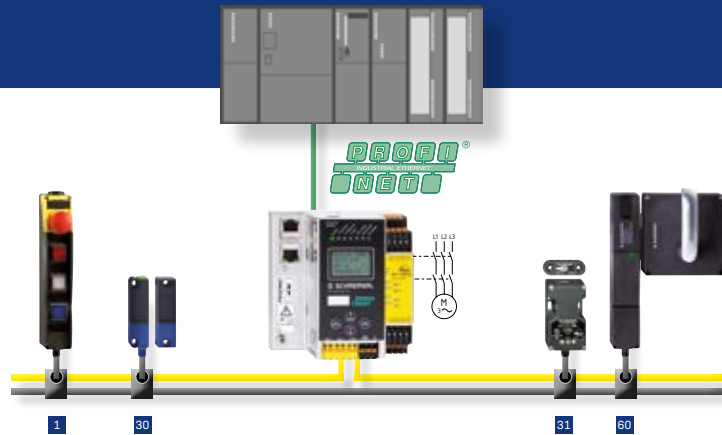
Schmersal provides numerous solutions for access and area protection including the SLG 440 safety light grid with special double acknowledgement/reset function.

Large production areas which are only partly visible, present multiple risks which include persons walking behind the safety equipment, or third parties pushing the acknowledgment button thereby inadvertently restarting of the machine. Use of the SLG 440 eliminates this risk.

To restart the machine, the operator first must actuate the command device S2, located inside the hazardous area and when he has left the area the command device S1.

This is just one example of Schmersal's many intelligent solutions for the packaging industry.

9. AS-INTERFACE SAFETY AT WORK



DESCRIPTION

Fast mounting, smooth installation

The AS interface enables fast mounting and installation of the components in the safety circuit. The safety switchgear devices are connected to each other and also to the AS-i master and the safety monitor via the yellow AS-i two-wire unshielded line. The power supply also comes from the AS-i unshielded 2-wire line. For AS-i slaves with higher power requirements, the black profile cable with 24 VDC auxiliary voltage is available. It is possible to connect not only operational but also fail-safe AS-i slaves to an AS-i master in mixed configuration. The safety functions are smoothly configured in the AS-i safety monitor through the ASIMON software.

Flexible use

Even after installation it is possible to change or enhance an AS-i safety system at any time. This applies to both safety switchgear add-ons and switchgear configuration (e.g. safety links, STOP category, filter times etc.).

A tried-and-tested "multilingual" system

With over 10 million safety switchgears in the field, AS-i Safety is the most successful safety bus in the world. In addition to the smooth wiring and configuration, the fact that AS-Interface can communicate with all conventional and commonly used bus systems, has considerably contributed to this success. For the user of the AS-i Safety System, this means that his system speaks many languages – for instance: PROFIBUS, PROFINET, EtherNet/IP and ModbusTCP. For AS-i safety there are also solutions for the field buses DeviceNet, CC-Link, CANopen and Sercos III. In this way, a universal application through different communication standards is enabled.

An economic solution – also for smaller machines

When does the installation of an AS-i Safety System generate return on investment? When purely considering the costs, cost advantages are already generated – depending on the application – as of six safety switchgear with 6 m connecting cable each – compared to the parallel wiring.

In addition to that, there are advantages which cannot be directly included in the cost savings. These advantages include the smooth extension possibilities, the increased flexibility for making changes to the safety circuit afterwards and the clearly enhanced diagnostic possibilities. Also the comfortable configuration through the safety monitor is an advantage, which is already featured by the smallest AS-i Safety System.





USER ADVANTAGES

- Individually scalable safety solutions for different machine sizes
- Smooth, fail-safe installation and interface connection of the safety switchgear through AS-Interface
- Comfortable configuration of the safety solution through the "ASIMON" Drag & Drop software
- Complete diagnostics of the entire safety circuit and all connected safety switchgear by the control system
- High operational safety through individually configurable safety-monitoring modules with multiple filter functions, e.g. for bouncing safety guards
- The safety functions can be easily changed or extended at a later date
- Cost-advantageous parallel wiring, approximately six switchgears each with a 6m connecting cable .

SAFETY SWITCHGEAR

The range of products from Schmersal includes a variety of switchgear devices with AS-i Safety at Work:



AZ 16-AS



RSS 36-AS



BNS 260-AS



BNS 36-AS



BNS 16-AS



AZM 161-AS



AZM 170-AS



AZM 201-AS



AZM 300-AS



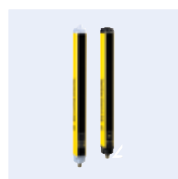
MZM 100-AS



NAS 311-AS



BDF 200-AS



SLC/SLG 440-AS



ASIM-C



BWU

10. SERIAL DIAGNOSTICS

Solenoid interlocks with serial diagnostic feature have a serial input and output cable instead of the conventional diagnostic output. When solenoid interlocks are wired in series, the serial diagnostic cables are wired in series, in addition to the safety channels. The created "common diagnostic line" is wired to a serial Diagnostic Gateway for evaluation. Up to 31 different Schmersal electronic safety devices can be wired in series.



1 Universal fieldbus gateway

- For the series wiring of the diagnostic signals with integrated SD interface
- Profinet IO
- EtherNet IP
- Device Net
- CC-Link
- CANopen

Code number:
SD-I-U-...



2 Profibus gateway

- For the series wiring of the diagnostic signals with integrated SD interface
- Extendable up to 31 devices
- Automatic addressing
- Reduced wiring

Code number:
SD-I-DP-V0-2



3 Y-adapter

- For the series wiring of electronic sensors and solenoid interlocks with SD interface for the safety channels and serial diagnosis
- Bolting device: screw locking, stainless steel (V4A)

Code number:
CSS-Y-8P

For the evaluation of the serial diagnostics line either the PROFIBUS-Gateway SD-I-DP-V0-2 or the Universal-Gateway SD-I-U-... are used. This serial diagnostic interface is integrated as slave in an existing field bus system. In this way, the diagnostic signals can be evaluated by means of a PLC. In addition to the comprehensive diagnostic and status information, the solenoid interlock is locked or unlocked through the diagnostic cable. The device can be wired either directly to the machine through a special Y-adapter or in the control cabinet by means of terminal blocks. Because of the use of serial diagnostics, an input (diagnostic) and an output (locking signal) can be saved for each device in the PLC.

11. SAFE SIGNAL PROCESSING

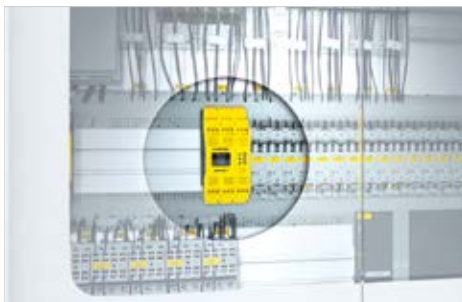


Besides the traditional safety-monitoring modules, the Schmersal Group product range also includes diverse microprocessor based safety devices. Depending on the complexity and number of safety circuits, integral solutions with safety monitoring modules and control units, and featuring many visualisation and diagnostic possibilities are available.



Safety-monitoring modules

The AES and SRB range of safety-monitoring modules features the greatest diversity of design and safety functionality. All modules correctly evaluate switching commands. Besides the standard devices which integrate Emergency-stop buttons and solenoid interlocks into safety circuits, the product range also includes fail-safe standstill monitors and time relays. Specialist solutions have been developed for specific problem areas, for example, a safety relay module with double acknowledgement is available for hazardous walk-in zones.



Multifunctional safety controller

With the multi-functional PROTECT SELECT compact safety module, the engineer has greater flexibility during configuration of the safety device and its subsequent integration into the machine functions. Four different programs are available. Each program can be precisely adapted – without any programming knowledge, simply with the menu and clear text messages – to the specific application case. The release delay and debounce times can be individually set, and various parameters such as short circuit monitoring can be configured according to requirements. PROTECT SELECT saves space in the switch cabinet as soon as it replaces more than three conventional safety-monitoring modules.



Modular safety control PROTECT PSC1

The user can put together their own system depending on the number of required inputs and outputs. Programming is done with an object-oriented software interface with pre-configured safety functional modules. For diverse sector solutions there are comprehensive safe axis monitoring functions and a universal communication interface for all common field-bus systems. This reduces programming and commissioning time.

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THE SCHMERSAL GROUP

PROTECTION FOR MAN AND MACHINE

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2,000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 countries.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including food & beverage, packaging, machine tools, lift switchgear, heavy industry and automotive.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: Certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they design and realise complex solutions for safety around the world in close collaboration with the clients.



SAFETY PRODUCTS

- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

SAFETY SYSTEMS

- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

SAFETY SERVICES

- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation



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