

Product overview

Safety in system: Protection for man and machine.



Introduction



Heinz and Philip Schmersal, Executive Directors of the Schmersal Group

How does one introduce a new customer or an interested designer to a portfolio of around 25,000 products and diverse but always complex services? Our sales engineers are faced with this question whenever they need to talk about our company and its range of services.

This brochure should give you an initial overview of what you can expect from us. It describes the company and the individual product groups where we have been developing complete solutions for machine safety over recent years. We are ever more focused on the qualified services we can offer you and which, in conjunction with our products and solutions, embody our key objective. It is our desire to provide you with up to date safety engineering solutions, thereby making the world a little safer.

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1. History

Milestones 1945 – 2017



Schmersal Brazil 1974



Schmersal China 2013



Startup of the new central warehouse in 2013

1945

The brothers Kurt Andreas Schmersal and Ernst Schmersal **form the company** in Wuppertal.

1950s

The **product portfolio** is continuously expanded. Many switchgears are used in safety related applications such as in explosive areas.

1970s

Schmersal is one of the first companies to begin development and production of **electronic proximity switches**.

1974

ACE Schmersal is formed in Boituva, Brazil.

1982

Generational change: Heinz and Stefan Schmersal take over the company from their fathers.

1997

ELAN Schaltelemente GmbH & Co. KG based in Wettenberg is acquired.

1999

The production facility **Schmersal Industrial Switchgear Co. Ltd** (SISS) is formed in Shanghai, China.

2007

Philip Schmersal joins the **third generation of the** Schmersal Group.

2008

In October 2008 the Schmersal Group takes over **Safety Control GmbH** and its affiliate Protec GmbH in Mühldorf/Inn.

2013

Böhnke + Partner Steuerungssysteme GmbH is acquired.
Schmersal India becomes a production facility.
Startup of the new **European central warehouse** in Wuppertal.

2015

In 2015, the Schmersal Group celebrated its **70th anniversary**.

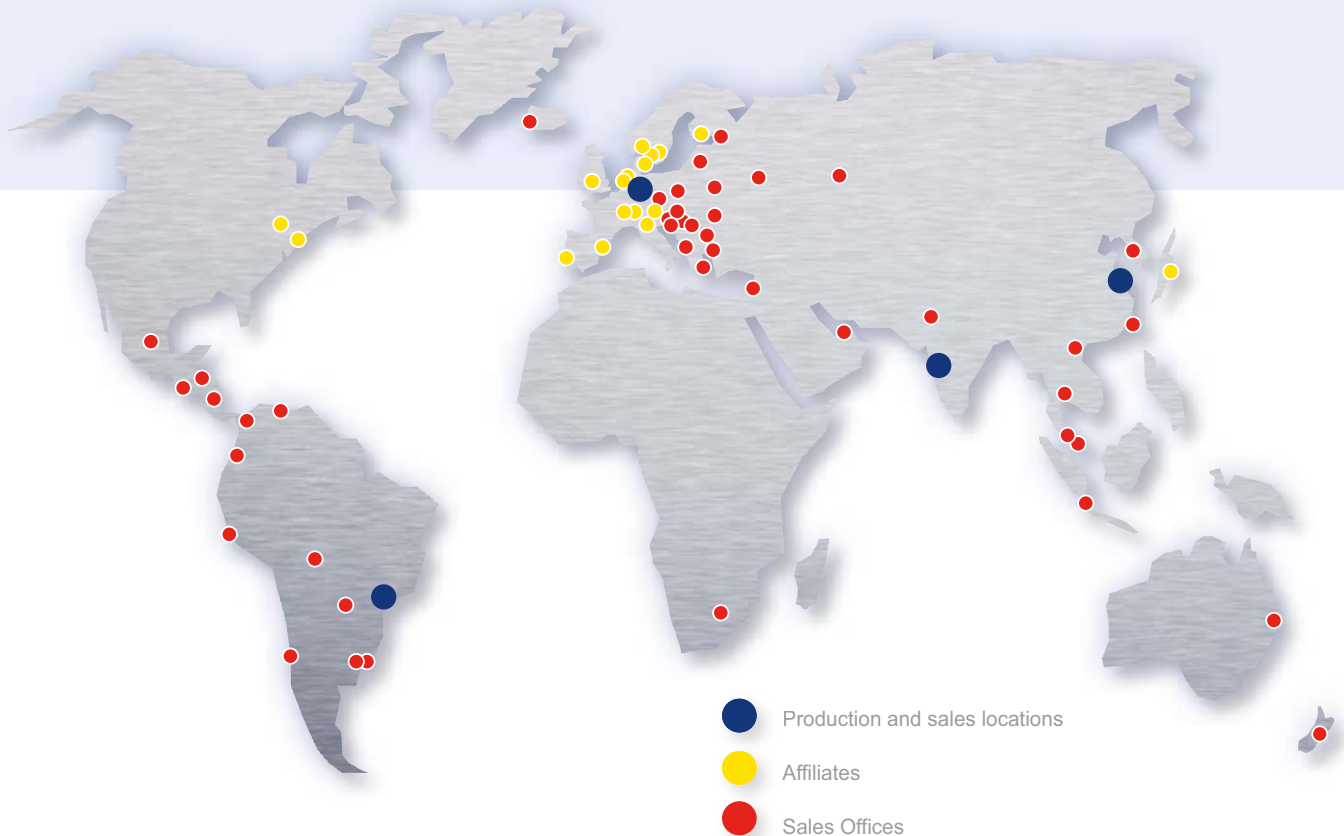
Schmersal Böhnke+Partner move into a **new production and office building** in Bergisch Gladbach.

2016

The Schmersal Group is establishing its own business area for services under the name **tec.nicum**.

2. Schmersal Worldwide

2.1 Offices



With its own affiliates in around 20 countries and capable sales and service partners in 30 more countries, the Schmersal Group has operations worldwide.

We started quite early with the internationalisation of sales, consultancy and production. This is also one of the reasons that we are a favoured global partner for machinery and plant construction and also an approved partner for many medium sized engineering companies with local presence. Wherever there are machines that work with Schmersal safety switches, the nearest branch or representative is not far away.

- | | | |
|---|------------------------------------|---------------------------------|
| ■ Germany, Wuppertal | ■ Argentina, Buenos Aires | ■ Paraguay, Minga Guazú |
| ■ Germany, Wettenberg | ■ Australia, Brisbane | ■ Peru, Lima |
| ■ Germany, Mühldorf | ■ Baltic States, Kaunas | ■ Poland, Warsaw |
| ■ Germany, Bergisch Gladbach | ■ Bolivia, Santa Cruz de la Sierra | ■ Romania, Sibiu |
| ■ Brazil, Boituva | ■ Bulgaria, Ruse City | ■ Russia, Moscow |
| ■ China, Shanghai | ■ Chile, Santiago | ■ Serbia, Belgrade |
| ■ India, Pune | ■ Ecuador, Quito | ■ Singapore, Singapore |
| | ■ Greece, Athens | ■ Slovenia, Ljubljana |
| ■ Belgium, Aarschot | ■ Guatemala, Guatemala-City | ■ South Africa, Johannesburg |
| ■ Denmark, Ballerup | ■ Indonesia, Jakarta | ■ Taiwan, Taichung |
| ■ Finland, Helsinki | ■ Iceland, Reykjavik | ■ Thailand, Bangkok |
| ■ France, Seyssins | ■ Israel, Petach Tikva | ■ Czech Republic, Prague |
| ■ United Kingdom, Malvern, Worcestershire | ■ Kazakhstan, Ayrán | ■ Turkey, Istanbul |
| ■ Italy, Borgosatollo | ■ Colombia, Medellín | ■ Ukraine, Kiev |
| ■ Japan, Tokyo | ■ South Korea, Seoul | ■ Hungary, Győr |
| ■ Canada, Brampton | ■ Croatia, Zagreb | ■ Uruguay, Montevideo |
| ■ Netherlands, Harderwijk | ■ Malaysia, Rawang | ■ United Arab Emirates, Sharjah |
| ■ Norway, Oslo | ■ Macedonia, Skopje | ■ Venezuela, Caracas |
| ■ Austria, Vienna | ■ Mexico, Mexico City | ■ Vietnam, Hanoi |
| ■ Portugal, Póvoa de Sta. Iria | ■ New Zealand, Christchurch | ■ Belarus, Minsk |
| ■ Sweden, Mölnlycke | ■ Pakistan, Islamabad | |
| ■ Switzerland, Arni | | |
| ■ Spain, Barcelona | | |
| ■ USA, Tarrytown NY | | |

2. Schmersal Worldwide

2.2 Offices in Germany

Wuppertal



K.A. Schmersal GmbH & Co. KG

- Founded in 1945
- Around 700 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 180 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

Mühdorf / 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 70 employees

Focal points

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

() = inclusion in the Schmersal Group

2. Schmersal Worldwide

2.3 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 165 employees

Focal points

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

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 for the Indian market

3. Strategic Development



Provider of systems and solutions for machine safety

The Schmersal Group – Provider of systems and solutions for machine safety

The Schmersal Group offers its customers around the world systems and solutions for machine safety, work protection and sub-areas of automation technology. Our focus here is on industrial automation, conveying and elevator technology.

With its extensive range of services – comprising training courses, consultation, technical planning and execution – our business area, tec.nicum, contributes decisively towards our range of solutions. The chief aim of tec.nicum here is to develop optimum approaches to solutions based on manufacturer-neutral knowledge transfer and consultation.

Our definition of systems is the sophisticated selection and combination of in house and third party components to achieve the best possible, safe and regulation-compliant design of the machines and systems of our customers which, at the same time, facilitates greater productivity.

Digitalisation and networking will play a decisive role in tomorrow's industrial production. To be in a position to realise future-orientated concepts, the development and manufacture of innovative components and systems are among the most important tasks of the Schmersal Group. We continue to extend our expertise so that we can support our customers in the introduction of digital next generation technologies with automation and safety concepts along with competent consultation services.

As a reliable partner, we assist our customers in all matters relating to functional machine safety and work protection and offer them turnkey solutions from a single source. Our customers can confidentially entrust us with the provision of efficient safety technology so that they can concentrate on their core competencies. We consider our efforts to be successful once the expectations of our customers have been met and we can contribute towards the safe, sustainable and future-orientated improvement of their production processes.

4. Commitments and Responsibility



Environmental protection worldwide

One of the objectives of the Schmersal Group is to adhere to the principles of a sustainable economy and to consider environmental and social issues as of equal value in conjunction with economic aspirations.

For this reason, over the last years we have been making the best use of energy generation on our Wuppertal site and, among other things, have commissioned our own combined heat and power unit (CHP), installed a new condensing boiler, refurbished the air-conditioning and heat recovery systems in the injection moulding station and compressed air station. The result is an annual reduction of CO₂ emissions of the plant by approximately 150 tonnes. The new facilities in China and India were designed based on ambitious energy standards.

Social responsibility

The Schmersal Group takes responsibility as a corporate citizen at all production locations. We sponsor activities, local community initiatives and sports clubs. We are very committed to educational projects for children.

The Schmersal Group offers personnel and their families lasting job security and pays attention to family unity, leisure and occupation. This is evidenced, for example, by the company's own kindergarten in Wuppertal or the many sports activities it carries out on company sites all over.

Beyond its responsibility towards the environment and its employees, the Schmersal Group complies with the Codes of Conduct of the ZVEI and the European Coordinating Committee of Manufacturers of Electrical Switchgear and Controlgear (CAPIEL) in corporate governance and in the establishment of business relations. A basic understanding and the recommendations for action of both documents are part of our corporate philosophy and practice.

5. Industrial Solutions

5.1 Food



Industries

Harvesting, drying, filleting, heating, shredding, mixing, filling, packing: the foodstuff production process has many process steps which are generally taken over by machine automation. Not only do machine safety standards and guidelines need to be followed during these processes, safety switchgear or control gear at the human-machine interface also have to meet strict hygiene requirements. In other areas, a high degree of temperature resistance or resistance to moisture is required. Explosion protection also plays a role in the processing of powdered raw materials or products.

Products

Schmersal, for example, has developed the BNS 40S safety sensors with stainless steel enclosure and under protection class IP69K especially for safety door monitoring on food processing machines. The same applies to the SLC 420 IP69K safety light curtain. Another product group dedicated to food production is the N series of command and signalling devices which meets the requirements of EN 1672-2 (Food processing machinery: Basic concepts – Hygiene requirements) and, in addition, is certified for clean rooms.

Please visit our website www.industry.schmersal.com for more information.

Applications



5. Industrial Solutions

5.2 Packaging



Industries

Machines and systems used in the packaging industry are often operated at high speed and with short cycle times. They are frequently integrated into the entire production and/or packaging lines. For this reason, guard systems should only interrupt production processes or negatively influence system productivity when absolutely necessary. They must also work with extreme accuracy on a 24/7 basis.

Products

Many safety switchgears from the Schmersal Group - especially those preferred in the packaging machine building industry are designed so that unplanned stoppages of machinery are avoided. Safety switchgears with an integrated AS safety at work interface and our compact safety control PROTECT-SELECT and -PSC1 are also often used in this industry. New and innovative solenoid interlocks such as the MZM 100 and AZM 300 were also developed with the special needs of the packaging industry in mind.

Please visit our website www.industry.schmersal.com for more information.

Applications



5. Industrial Solutions

5.3 Elevators and Escalators



Industries

The Schmersal Group has a hand in the fact that lifts are the safest transport device in the world. For many decades now we have been one of the world's leading makers of switchgears for lifts and escalators, offering the lift industry a wide range of products. All lift switchgears meet pertinent international requirements and operate fault-free and fail-proof even under unsuitable conditions.

Products

Our lift switchgears are generally used in the active and passive safety circuit of lift systems, locking and safety monitoring lift doors. The product palette includes floor and fine-adjustment switches, positive-break door contacts, position switches, solenoid switches, emergency call systems as well as the USP non-contact positioning system. We have also developed custom switchgear for special tasks such as the electric shutdown of the lift system upon actuation of the speed limiter. In addition, through the merger of Böhnke & Partner with the Schmersal Group we can offer complete control technology at the highest level of engineering and quality.

Please visit our website www.industry.schmersal.com for more information.

Applications



5. Industrial Solutions

5.4 Heavy industry



Industries

We have more than six decades of experience within the heavy industry, as the Schmersal Group was originally a manufacturer of high-grade switchgear. Today our products are used everywhere where special requirements exist in difficult and harsh operating environments e.g. mining, construction machinery, ship engineering, various types of cranes and hoisting devices as well as energy generation.

Products

Many switchgears we have developed for heavy industry, at first glance, differ from other series in the same product group. They are very robust, oftentimes even significantly larger, and are radically designed for high durability even at extreme stresses. This applies, among others, to our heavy position switches, foot switches, heavy-duty command devices, belt alignment switches and pull-wire emergency stop switches.

Applications



5. Industrial Solutions

5.5 Machine tools



Industries

Machines in the metal processing industry operate with extremely high accuracy requirements at ever increasing speeds and need to be as flexible as possible. They may not affect machine productivity or flexibility. In addition, they must be easy to retrofit and must allow quick troubleshooting. Protection against tampering must always be in the forefront.

The Schmersal Group offers a wide product range for the most diverse requirements, covering even special operating modes such as process monitoring and setting mode.

Products

Solenoid interlocks are often used in machine tool building to prevent the interruption of processes or to protect against hazards arising due to overrunning. There is an extensive product portfolio available for the most diverse requirements: for example, safety switchgears for special operating modes such as process monitoring and setting mode.

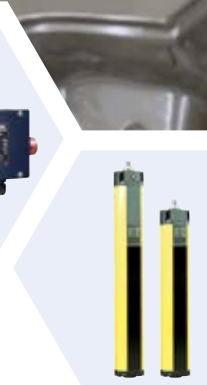
Please visit our website www.industry.schmersal.com for more information.

Applications



5. Industrial Solutions

5.6 Automobile



Industries

High degree of automation, interruption-free processes, high degree of standardisation, great importance of factory standards: these, in brief, are the key features of automobile manufacturing in terms of machine safety. Another characteristic is the intensive use of robots and interlinked production lines.

Products

Our solenoid interlock programme includes systems that were explicitly developed for accessible hazardous areas and offer numerous additional properties such as an emergency exit with emergency handle. In the control engineering field we have also developed solutions that make it almost impossible for persons to be shut inside a hazardous area. In addition, we have extensive experience in the design of safe robot workstations with or without perimeter guarding.

Applications



6. tec.nicum



tec.nicum
excellence in safety

Safety services from tec.nicum

Machine safety is a challenging and multi-layered topic, which presents real challenges not only to machine builders but also safety engineers. During the selection of safety equipment, consideration has to be given to technical aspects as well as applicable directives and sub-stantiated standards. This complexity often requires extensive specialist knowledge.

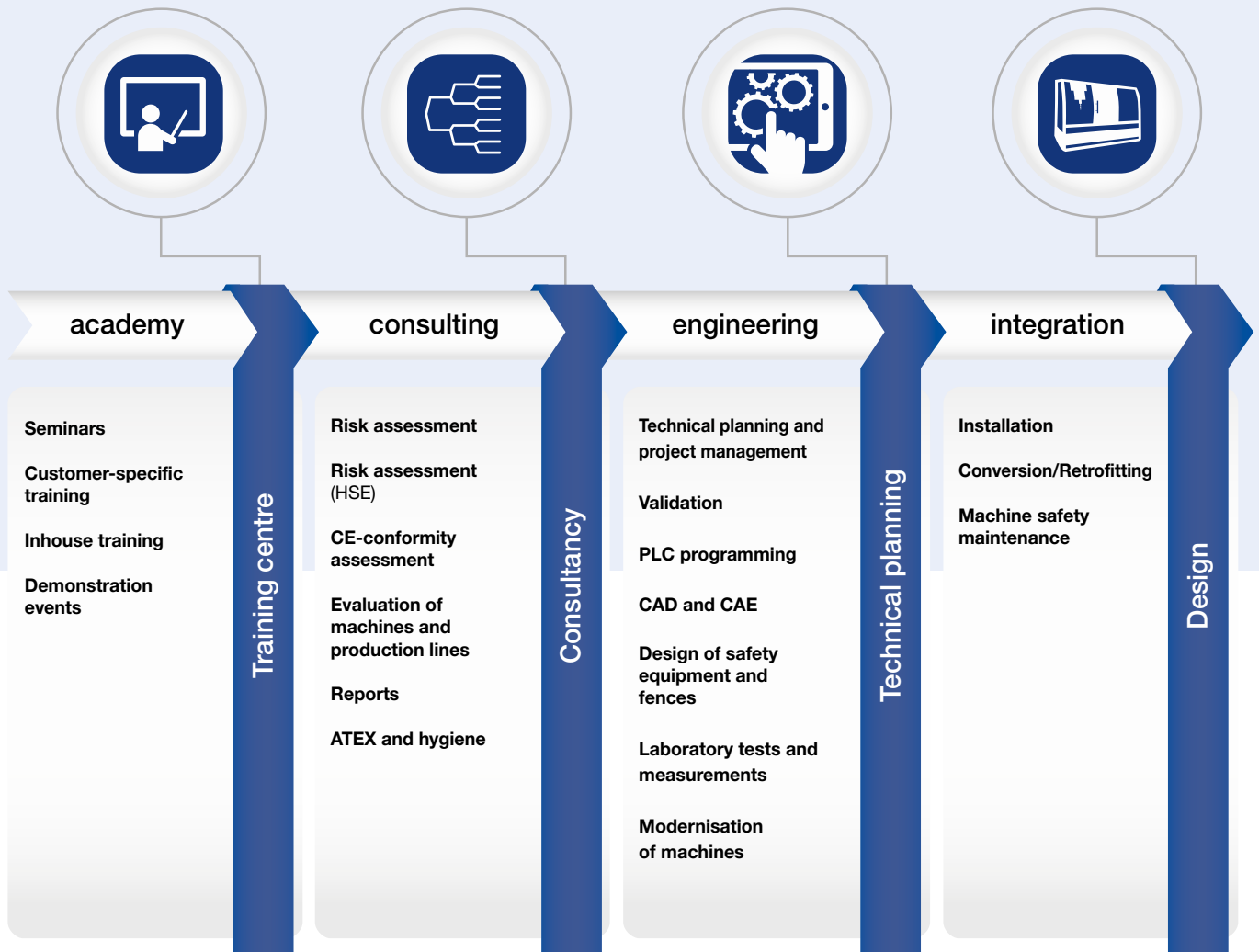
tec.nicum offers machine builders, operators, system integrators and distributors competent, product and manufacturer-neutral consultation on important matters relating to machine safety and work protection. Furthermore, experts from tec.nicum plan and realise complex solutions for safety around the world in close collaboration with the clients.

The four pillars of tec.nicum

The range of services offered by tec.nicum cover four segments:

- | | | |
|----------------------|---|-----------------------|
| Learning | ■ | tec.nicum academy |
| Consultancy services | ■ | tec.nicum consulting |
| Technical planning | ■ | tec.nicum engineering |
| Implementation | ■ | tec.nicum integration |

Our experts implement all sorts of safety-related projects - from analysis of the status quo through planning and documentation to the final handover of the finished, norm-compliant machine. The customer can request one or more of the four service modules or a complete package.



tec.nicum academy

In the complex area of machine safety, it is important to stay ahead of the game. To do this, we offer a variety of opportunities through our tec.nicum academy: With a comprehensive range of seminars on numerous topics, covering e.g. specific standards and legal backgrounds or matters relating to safety in machine construction.

tec.nicum consulting

With regard to consulting, our experts provide safety appraisals and check conformity with applicable legislation and standards of machine safety and work protection. From the results of these investigations, they derive recommendations for action and corrective measures with the aim of configuring the systems in accordance with the relevant directives. All the results of the investigations are fed into a comprehensive final report.

tec.nicum engineering

tec.nicum engineering supports the client in the development of new machines and systems or the modification of existing machines and systems so that, even from the projection phase, machine safety is implemented as efficiently as possible. Specialists in this area accompany the whole process, from initial planning talks to the definition of requisite safety elements to safety testing and inspection of the overall installation as well as handover of the complete project documentation. The aim is to create a safe working environment for employees and, at the same time, to achieve optimum productivity of the systems.

tec.nicum integration

The experts at tec.nicum have built up extensive experience from projects in the packaging and food industry, automotive construction, paper manufacture, metal processing industry, chemicals and pharmaceuticals. They install safety switchgear and sensors and also take account of special features, such as explosive areas. Furthermore, they are responsible for the parametrisation, programming and installation of complex components such as optoelectronic safety products and safety controllers.

7. Products

7.1 Application Finder



1

Safety guard monitoring

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



2

Optoelectronic safety devices

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



3

Command devices with safety function

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

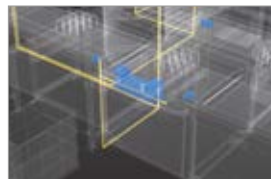
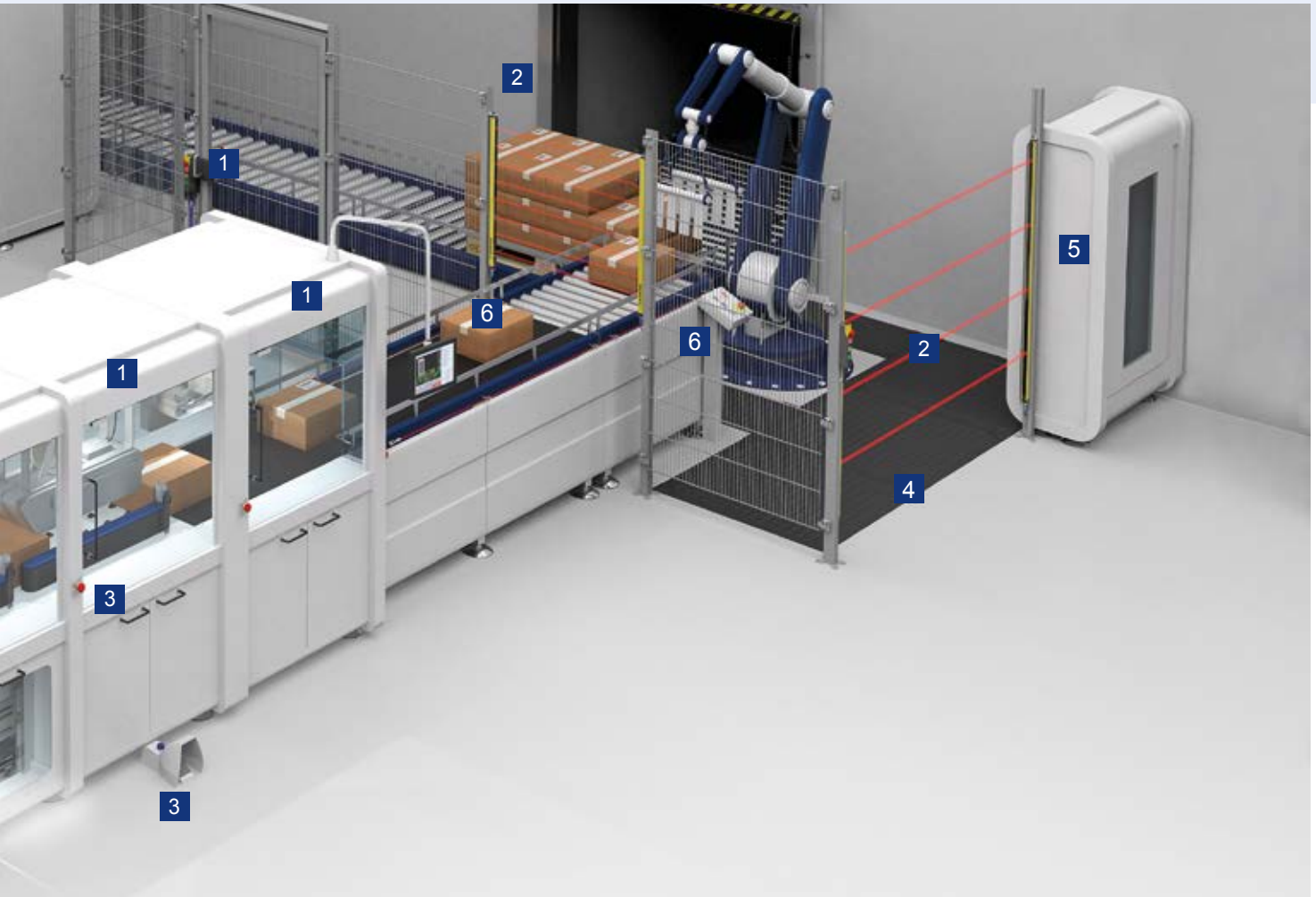


4

Safety-related tactile sensors

- Safety mats
- Safety edges
- Safety bumpers





Safe signal processing

- Programmable safety controls
- 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

7. Products

7.2 Safety door monitoring

The Schmersal Group's extensive product spectrum for monitoring hinged, removable and sliding safety doors allows the guard system of any application to be precisely adjusted to requirements. If special requirements exist e.g. with regard to explosion protection, hygiene, compactness, clamping force, actuation or wiring possibilities, suitable solutions are also available, including for walk-in zones.



Safety switch with separate actuator

Safety switches with separate actuator are suitable for sliding, hinged and, in particular, removable guard systems which need to be closed to guarantee the necessary operational safety. They can also be fitted on profile sections and retrofitted on existing equipment. The Schmersal product spectrum includes the AZ 16 which has been manufactured a million times over and is considered "the" safety switch by many companies.



Position switch with safety function

Position switches with safety function are suitable for sliding and hinged guards, which need to be closed in order to ensure the required operational safety. Through an actuating element (such as a roller lever) they sense the position of the safety door and send a corresponding signal to the safety relay module or to the control unit.



Safety switch for hinged guards

For hinged safety doors, there's an elegant, space saving and tamper-proof alternative to safety switches with separate actuator and position switches with safety function. Hinge safety switches fixed to the hinge side of the safety door eliminate the need for switches on the door itself and hence keep the operator's work area free of switches. Positive fixing of the hinge switches means they are particularly tamper-proof.



Safety sensors

Typical applications of safety sensors include machines where a high concentration of dust and contamination is expected to appear in hypersensitive areas such as food processing machines. Due to their non-contact operating principle, safety sensors feature smooth fitting and a large tolerance with regard to misalignments of sensor and actuator. Apart from the classic safety solenoid switches, Schmersal also offers safety sensors with innovative, proprietary operating principles that allow a simplified and safe signal evaluation and the integration of additional functions.



Solenoid interlocks

The solenoid interlocks of the AZM and MZM series have been designed to prevent, in conjunction with the control part of a machine, e.g. fail-safe delay timers or fail-safe standstill monitors, sliding, hinged and removable safety guards from being opened before hazardous conditions (e.g. run-on movements) have been eliminated. The Schmersal Group portfolio also offers non-contact solenoid interlocks, integrated solutions with door handle as well as the AZM 300 solenoid interlock with a new and innovative operating principle.



Door handle actuator

There are door handle actuators available for the various series of safety switches and solenoid interlocks, either integrated or as a separate component. This allows the safety, actuation function and, where applicable, the release button to be combined into one ergonomic unit.

7. Products

7.3 Optoelectronic safety devices

The Schmersal Group protective equipment come in two categories: electromechanical protective equipment with physical separation or non-contact protective equipment. The "Center of Competence" for Opto-Electronics in Mühlendorf/ Inn designs and manufactures a wide range of optoelectronic components for securing hazard zones and areas. There are many situations in which this type of switchgear offers greater flexibility than conventional electromechanical switchgear.



Safety light curtains

Safety light curtains secure hazard spots and areas in a number of application areas, for example in presses, die casting machines and palletisers. Transmitter and receiver are housed in separate enclosures. The transmitter emits a set of invisible infrared beams thereby creating a protective field. The receiver detects these beams, and if any person or object interrupts them, the transmitter is stopped and the machine is halted.

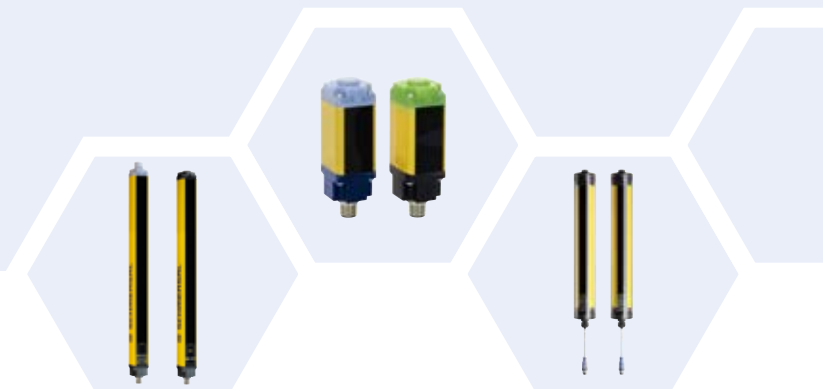
Safety light curtains are frequently used in automated material handling plants because they allow, for example, the safety functions to be individually adapted to the production processes.



Safety light grids

Just like safety light curtains, safety light grids are frequently found in application areas where materials need to be transported in and out of hazard zones. The safety solution is based on functions such as "muting" and "blanking".

In addition to its standard series, which, among other things, includes compact models and devices with protection class IP69K, Schmersal also designs and manufactures customised optoelectronic guard systems.



Safety light barriers

The SLB series of safety light barriers are used to cordon off hazard zones, for example, in automatic machining centres and on transfer lines and robots. Their compact design means they can be easily integrated into any machine construction.



SLC / SLG 440 safety light curtains and light grids:

- Automatic parameter configuration
- Set-up tool and large status display
- Many extra functions
- Immunity to electromagnetic interference

7. Products

7.4 Command devices with safety function

Schmersal control devices always transmit operator commands safely and reliably, regardless of whether the commands stop hazardous movements or start critical machine functions.

The command devices from the Schmersal program are distinguished by a variety of special constructive features, such as longevity and clever ergonomic design.



Pull-wire emergency-stop switches

For machine parts which can't be protected using safety covers, pull-wire Emergency-Stop switches with their "extended arm" offer an excellent alternative to Emergency-Stop buttons. The advantage of pull-wire switches over mushroom head Emergency-Stop push buttons is that the Emergency-Stop command can be triggered anywhere along the wire.



Safety foot switches

Safety foot switches are used as enabling devices for machines and systems where, for example, manual operation is not possible. The main application areas are machines in the metal working industry.



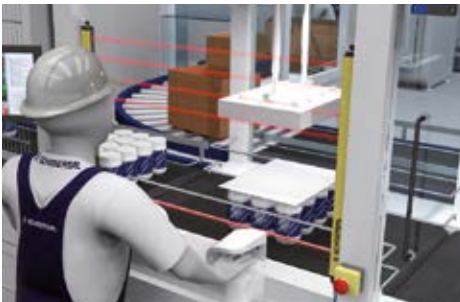
Emergency-Stop button

These command and signalling devices are very important for man-machine interfaces in industrial applications. They are typically used in control cabinets, control panels, two-hand control panels, elevator construction or conveyor and material handling plants. When manually triggered, the devices initiate the switching off procedure.



Enabling switches

Enabling switches are used - perhaps together with other safety measures to provide personal protection in potentially hazardous environments where the special operating modes of a machine necessitate partial or complete removal of the safety guards. The current Machinery Directive (2006/42/EC) as well as diverse product-specific EC standards specially underline how machine operation can be simplified.



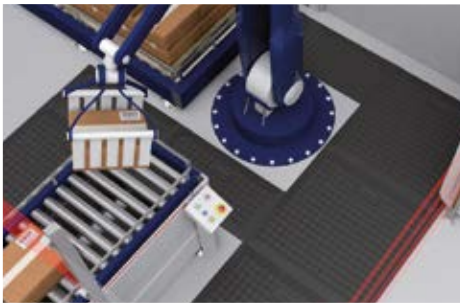
Two-hand control panels

Two-hand control panels belong to the family of non-separating protective equipment . In general, they serve to ensure the machine operator's hands are located on the control panel when the control signal for a hazardous movement is issued. These command devices thus ensure the operator is not in the way of dangerous moving parts when a machine or plant is started.

7. Products

7.5 Safety-related tactile sensors

Wherever there is a risk of injury from crushing or shearing, such as with elevating platforms, rising stages, sliding doors or industrial gates, tactile safety devices provide a simple and easy to fit solution. Two dimensional safety sensors are often needed in the hazardous area to monitor, for example, industrial robots, or punching, bending and woodworking machines.



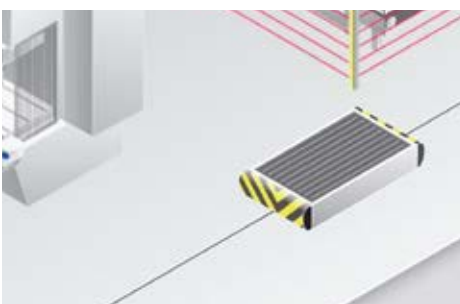
Safety mats

Safety switch mats can be used in hazardous zones with clearly defined boundaries as an alternative to other constructional types of protective switchgear. Entry of the operator into the active area triggers a safety signal which brings the machine or plant to a standstill.



Safety edges

If there is a risk of crushing or piercing from automatically moving machine or machine parts, these areas can be secured using safety edges, for example, on lift tables, lifting platforms, or the lift gates of automated production plants, driverless transportation systems (DTS) and mobile shelving systems.



Safety bumpers

Safety-related bumpers trigger switch-off as soon as they become deformed by a hazardous movement. They offer protection from the risk of crushing and piercing. In direct comparison with safety edges, they have a greater deformation area. The shape of the bumper can be adjusted to requirements.

7. Products

7.6 Safe signal processing

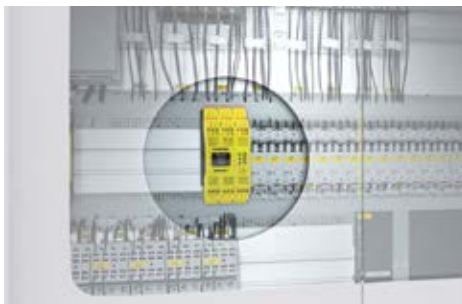


Besides the traditional safety-monitoring modules, the Schmersal Group product range also includes diverse microprocessor based safety devices. Depending on the complexity and number of safety circuits, integral solutions with safety monitoring modules and control units, and featuring many visualisation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

7. Products

7.7 AS-Interface Safety at Work



AS-Interface Safety at Work (AS-i Safety) is a safe bus system designed in accordance with the open AS International standard. Safety components such as Emergency-Stop buttons, safety switches, solenoid interlocks and safety light curtains are connected via the unshielded 2-wire line of the AS interface which also supplies the components with energy.

The safety components transmitted information via the AS-Interface network which is monitored by a safety monitor. If a safety circuit is triggered or a safety component fails, the safety monitor puts the machine or installation safely into a hold position.

Simplified and fail-safe installation

Safety circuits with AS-i SaW communication benefit from, among other things, straightforward installation and commissioning. It's impossible to make a mistake during wiring as the amount of wiring required is minimal. The safety function parameters are easily configured via the ASIMON drag & drop software. Furthermore, additional diagnostic information is available to help eliminate faults quickly.

Broad range of devices with integrated interface

Many companies around the world are enjoying the benefits of AS-i Safety. This safety-relevant communications standard is particularly prevalent in sectors where Schmersal is widely present, for example, in the packaging machinery industry. As a driving force behind the implementation of this standard, Schmersal has equipped all its major safety switchgear product ranges with AS-i safety interfaces. These include:

- Safety switches
- Solenoid interlocks
- Safety sensors
- Safety light curtains
- Emergency-Stop buttons
- Control panels
- Pull-wire emergency stop switches
- Safety foot switches



If the desired safety switchgear is not available with AS-i safety nodes, it can still be integrated into the AS-i safety network by simply using an external input module.



Safety with system: that neatly sums up the basic idea behind the Schmersal system of safety switchgear with integrated AS-i safety interface. Devices are connected in master-monitor combination or via safety gateway modules, and can process up to 60 safe, two channel input and output signals. The status and diagnostic signals can be evaluated by higher-level control systems and from there on transmitted to control or visualisation systems. There are two basic concepts available to the user.

Safety Separated

Even though the operation of PLC-based systems can vary greatly, most mechanical engineers want to use a uniformly designed safety circuit. They therefore prefer a safety control system which is physically separate to the normal control system. For this so-called "Safety Separated" concept, Schmersal system offers master-monitor combinations with different field bus interfaces. The entire safety logic is programmed in the safety monitors using the ASIMON software.

Through the conventional field bus interfaces PROFIBUS, PROFINET, EtherNet/IP or Modbus TCP, the master-monitor combinations with the normal PLC to transmit the non-safety-related status and diagnostic signals. The entire integration of the safety control system simplifies the diagnostics and reduces the standstill times in case of failures.

... or Safety Integrated?

The Schmersal System also includes Safety Gateways, which can be directly connected to safety control systems with safe field bus. These have been designed for two AS-i circuits and can transmit up to 60 safe I/O signals to the safety control system via a safe field bus. The operational diagnostic signals are transmitted as well to the higher-level control system, where they can be evaluated accordingly. A pre-processing of the safe signals in the Safety Gateway is also enabled through the ASIMON Software.

A complete product portfolio including consulting

With the Schmersal System, the machine builder has complete solutions for machinery safety from a single source. For both concepts - either Safety Separated or Safety Integrated – multiple master-monitor combinations or Safety Gateways for the commonly used field bus systems are available.

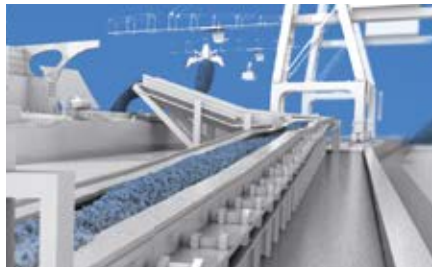
At field level the user has access to a wide range of fail-safe switchgear with integrated ASi safety interface. The Schmersal system also encompasses other monitoring modules, such as safe speed monitoring, safe input and output modules, repeaters as well as a comprehensive range of accessories (bus distributors, power supply units, bus cables, M12 connecting cables...). The complete solution includes consultancy from Schmersal application engineers during system design, and support during commissioning.

7. Products

7.8 Position and limit switches, sensors



For work process automation in both industrial plants and mobile machinery, the Schmersal Group has a full spectrum of position and limit switches ranging in size from big to small. The product range starts with microswitches for mechanical engineering projects. Long-life standard switches are universally deployed in a wide variety of machines. Application areas for gear switches are as diverse as stage engineering and lifting equipment. The product portfolio also covers robust switchgear for operation in the rough ambient conditions typical of heavy engineering industries such as the materials handling, mining and steel industries.



Back in the 1970s, Schmersal had begun work on a range of non-contact switchgear, and was soon a pioneer in the development and manufacture of inductive proximity switches. Today's products for the automation industry include, among others, magnetic reed switches for the materials handling and lift switchgear industries. Robotics and automated production lines are just two areas where the IFL range of inductive proximity switches are deployed. Besides the standard versions, customised variants compliant with special requirements such as high operating temperatures or sector-specific approvals (e.g. Germanischer Lloyd) are also available.

A variety of sensors for safety-relevant applications are also available.

7. Products

7.9 Switchgear for explosion protection



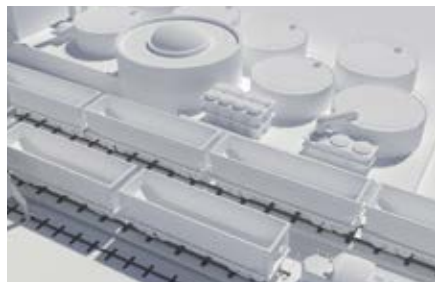
Explosion protection regulations exist in many industries besides the chemical industry, for example, in the food production industry which processes, manufactures and stores powdered basic substances and end products.

For this area of special responsibility, the Schmersal Group has formed its own competence centre which, over the last few decades, has gathered valuable experience in the development and production of (safety) switchgear compliant with explosion protection regulations.

Machine and plant engineers have access to an extensive range of products encompassing, among other things, a variety of safety switches, position switches and solenoid interlocks. In these application areas, non-contact safety sensors are commonly used in machines and plants, and particularly in heavy duty applications, ex-versions of pull-wire emergency stop switches and belt alignment switches.

The product portfolio continues to grow. Besides field switchgear the portfolio also covers a wide range of safety-monitoring modules for signal evaluation. This makes Schmersal a complete systems solution provider for machine safety, in accordance with its motto "safety in system".

Ex-switchgear is designed in compliance with ATEX 9/49/EC and, depending on the product range, is suitable for ex-zone 1 or 2 (gas-ex), and 21 or 22 (dust-ex).



7. Products

7.10 Command and signalling device

Ergonomic operation of the main machine functions at the human-machine interface is a key factor in safety. For this reason, the Schmersal Group has added its own manufactured command and signalling devices to its product portfolio. These devices provide for transparency by transmitting relevant information to the operator, and allowing the machine to be operated while the work process are observed, even in adverse ambient conditions.



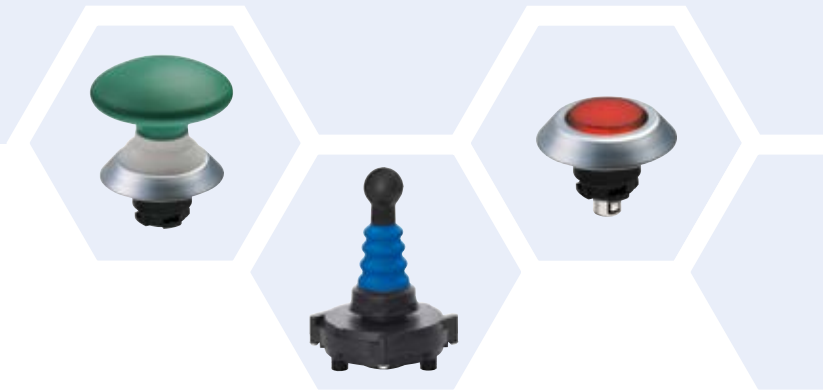
Control panels

BDF products are enclosed in a high quality slimline housing made from shock-resistant plastic and are easily attached to the machine's commercially available aluminium profile system, with space for up to four operating controls. The user can choose from a large product portfolio of illuminated control push buttons, selector switches, LED illuminated indicators, key-operated switches and standard-compliant Emergency-Stop command devices.



The control panel of the BDF product range

- Ergonomic design
- Slimline shock-resistant housing
- Simple mounting on commercially available profile systems
- Variable configuration using command devices and indicator lights



Control devices and indicator lights

The user has the choice of several product series suitable for use, for example, in hygiene-sensitive application areas such as the food industry (N range) or in especially rugged environments (R range). Each range encompasses a diversity of button types and indicator lights.



LED Signal Tower CleanSIGN

The CleanSIGN LED signal tower is state-of-the-art. Its use of modern electronics enables a completely modular approach to the design of the individual stages. Its easy-to-clean and hygienic form means cleansing and disinfection couldn't be simpler, making it suitable for use in the sensitive areas of the food production industry.

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The Schmersal Group

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 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 nations.

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 foodstuff production, the packaging industry, machine tool industry, lift switchgear, heavy industry and the automotive industry.

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 plan 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

The details and data referred to have been carefully checked.
Subject to technical amendments and errors.

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 **SCHMERSAL**
Safe solutions for your industry