

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

MACHINE SAFETY FOR INTRALOGISTICS SYSTEMS AND SOLUTIONS



INTRODUCTION



Heinz and Philip Schmersal,
Managing Directors of the Schmersal Group

New solutions to improve production efficiency and machine safety

SCHMERSAL GROUP

The Schmersal Group offers customers the world's largest product portfolio of safety switchgear devices and systems for personal and machine protection. Through its extensive portfolio, the company is firmly on the side of safety in the workplace, one of the company's core activities is the development and manufacture of innovative components and systems. The Schmersal Group is one of the international market leaders in the field of machine safety.

SCHMERSAL – GLOBAL PARTNER FOR INTRALOGISTICS

There is growing worldwide demand for intralogistics solutions. At the same time, intralogistics is a highly complex, interdisciplinary field. In order to design an internal material flow that is as efficient as possible, it is important that technologies, such as sorting, picking and palletising technologies, work together seamlessly. Schmersal is a competent partner for intralogistics with profound technological expertise and a global presence. With an international network of national companies and sales partners, Schmersal is represented in more than 60 countries around the world.

A DIVERGENT RANGE OF SAFETY SYSTEMS FOR INTRALOGISTICS

The logistics industry faces major challenges: processes are increasingly automated and customers expect more rapid and more reliable order processing. The requirements imposed on productivity and reliability of systems are extremely high. Schmersal's divergent range of safety solutions steps up to meet these requirements: we offer a wide range of industry-specific safety systems and solutions for warehousing and material flows, as well as a multifaceted range for industrial trucks.

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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

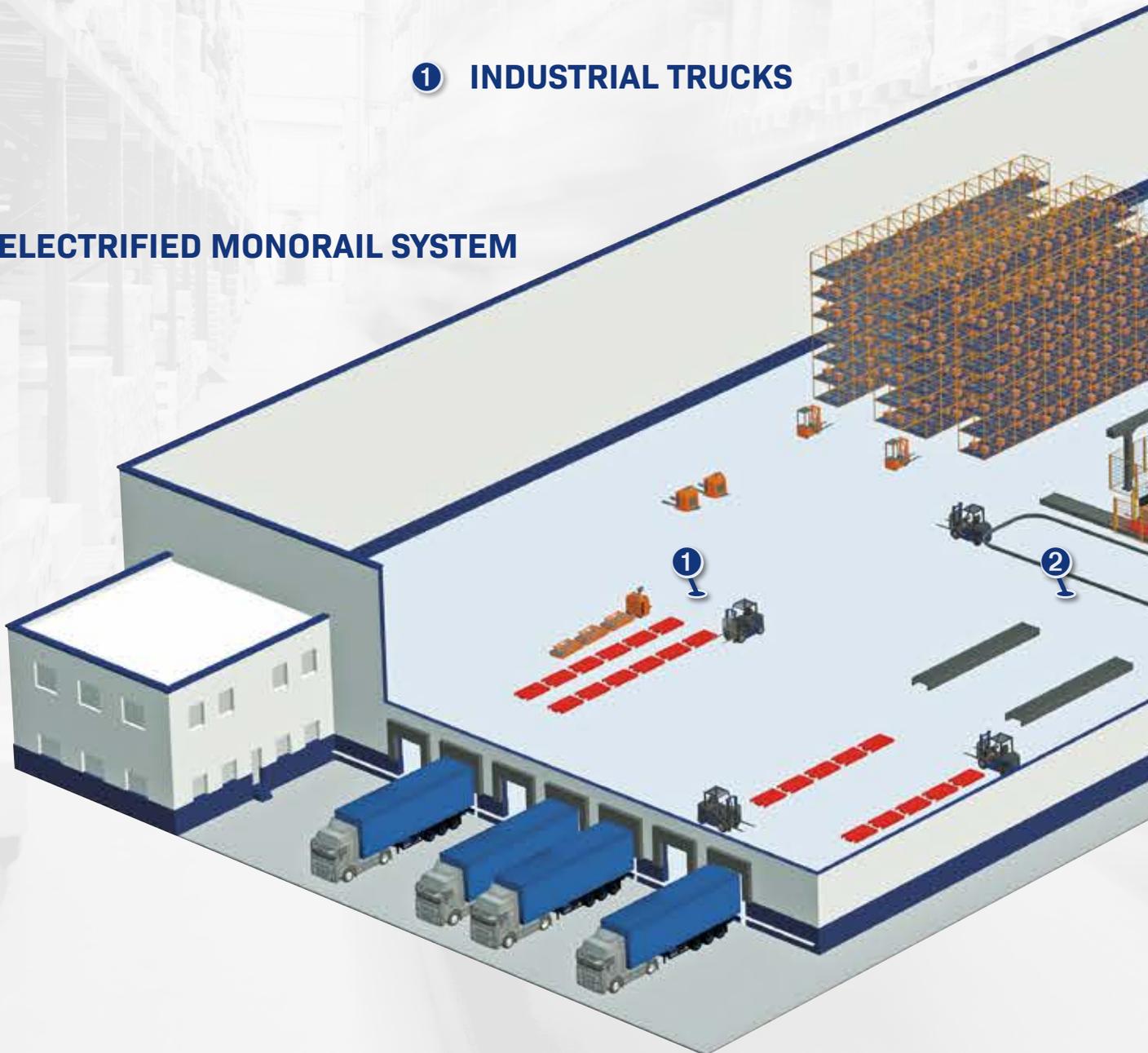
SAFETY SOLUTIONS FOR AN OPTIMISED MATERIAL FLOW

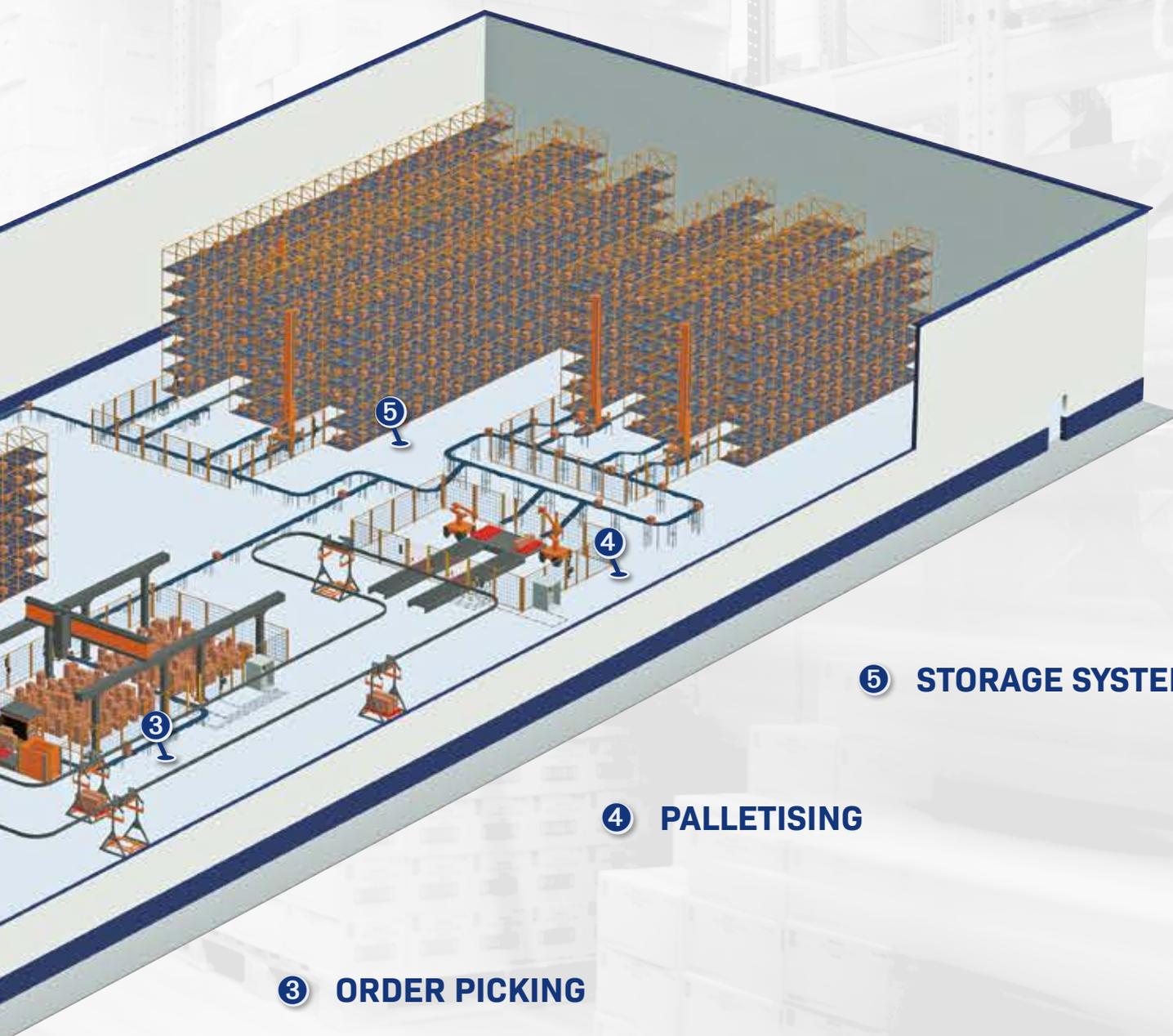
Properly organised and efficient internal material flows are the key to success in many businesses in industry and commerce. Intralogistics encompasses a wide range of processes and fields, from goods receipt to storage and warehouse management, order picking, packaging and outgoing goods.

Every station within the process poses a risk, whether it is accidents involving industrial trucks or collisions between people and robots. Schmersal has the ideal solution for every potential hazard point - either an individual product or an integrated system solution, tailored to the individual processes, Always with the aim of boosting system availability.

① INDUSTRIAL TRUCKS

② ELECTRIFIED MONORAIL SYSTEM





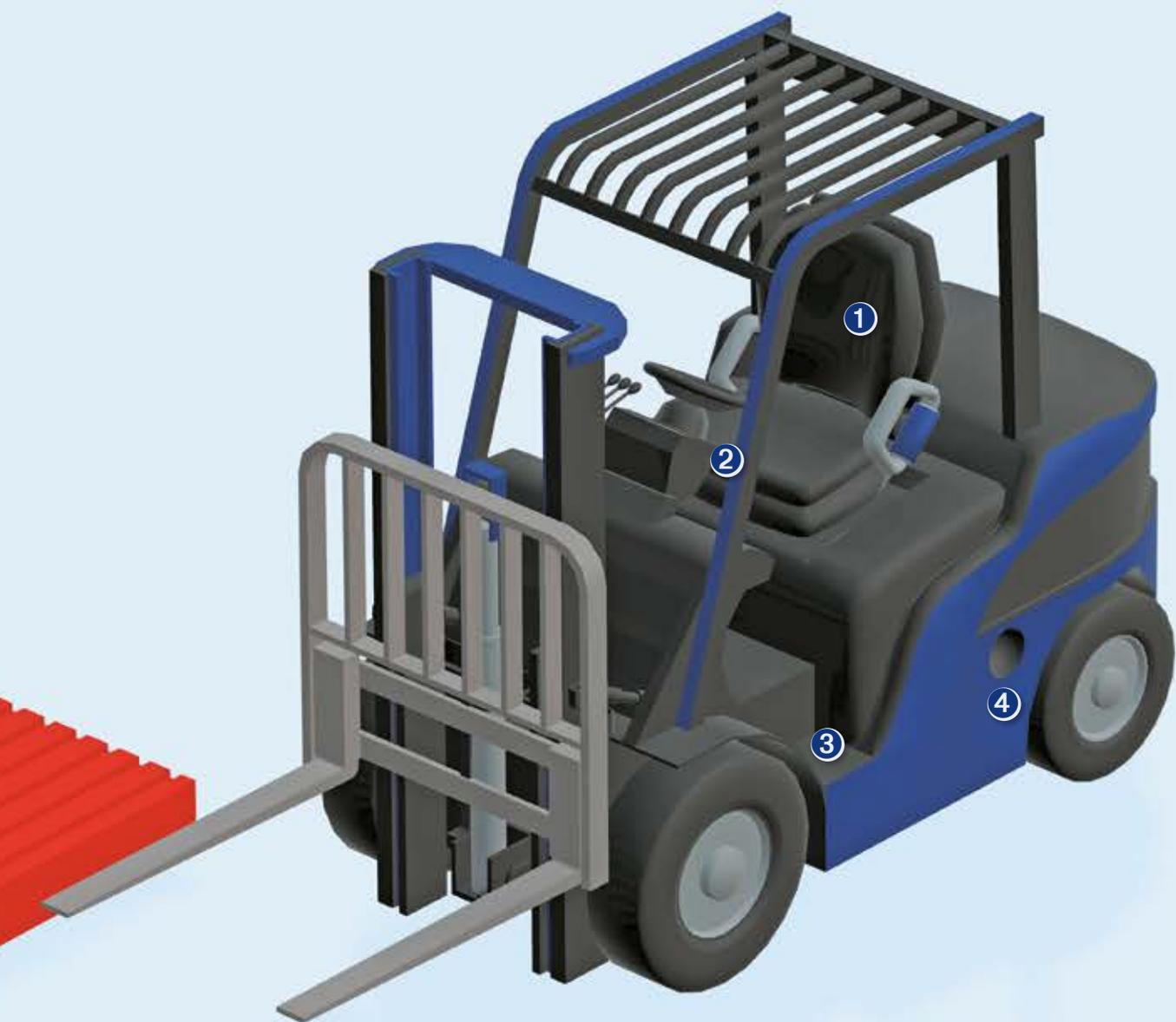
⑤ STORAGE SYSTEMS

④ PALLETISING

③ ORDER PICKING

INDUSTRIAL TRUCKS

SAFE TRANSPORT



SAFE TRANSPORT

Industrial trucks are an essential part of the internal transport of goods – whether as driverless transport systems or non-autonomous vehicles.

Flexible solutions: Schmersal offers a range of products for the operation and safeguarding of transport vehicles, including position switches, controls, cross switches and the MS6600 microswitch, which is used under the operator's seat in the industrial truck.

1



DRIVER'S SEAT

MICRO SWITCH MS6600

- Rubber enclosure
- Soldering terminals and spade terminals
- Metal sheath or metal enclosure

2



COCKPIT

COMMAND AND SIGNALLING DEVICES

- Joystick switches
- Key-operated switches
- Various indicator lights and pushbuttons

3



FOOTWELL

SAFE TACTILE SENSOR TECHNOLOGY SMS 5

- Robust design
- Slip-free surface
- Maintenance free

4



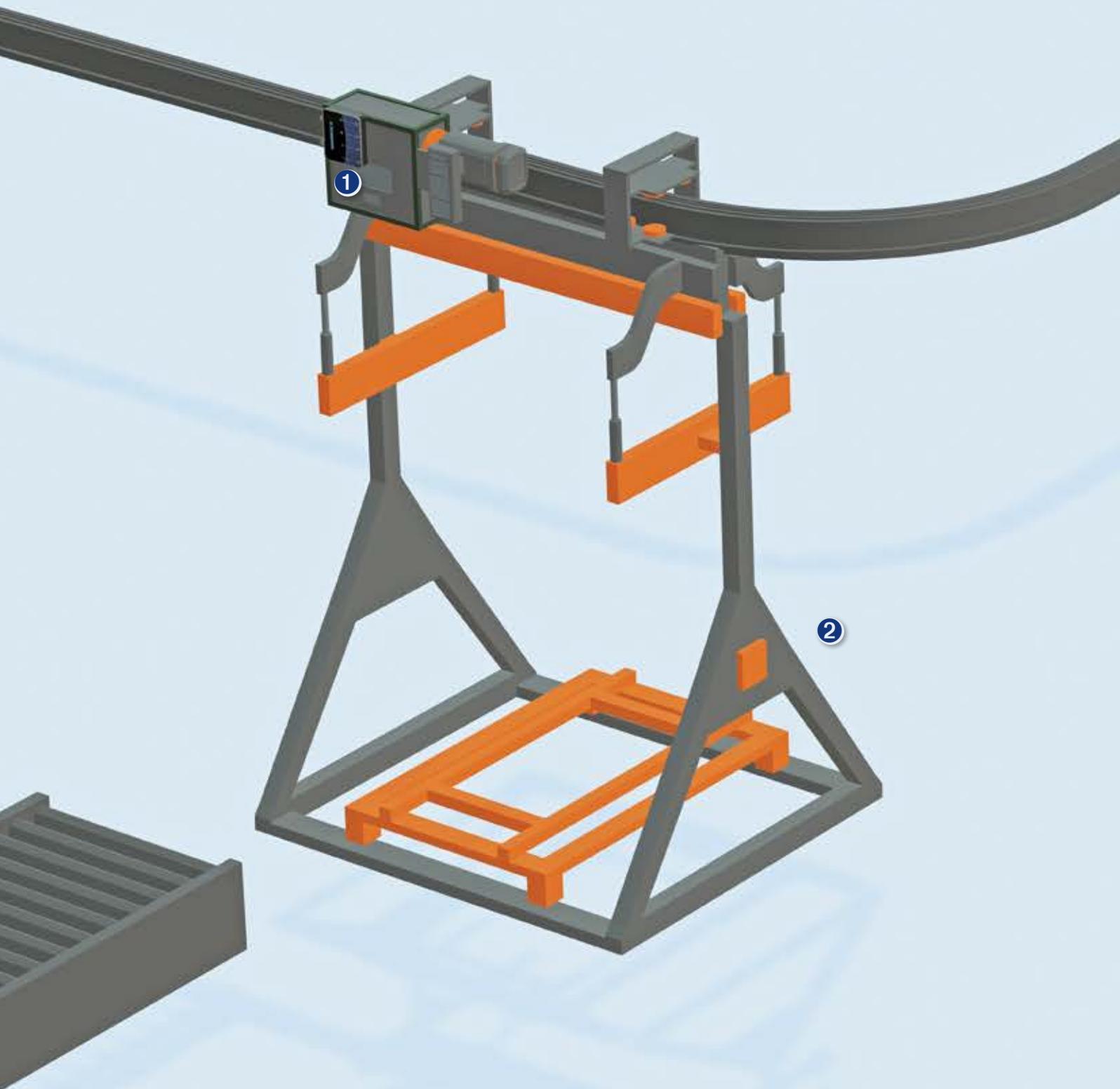
CHARGING SOCKETS

POSITION SWITCHES PS116

- Thermoplastic or metal enclosure
- Various actuators to choose from
- Type 1
- Up to cat. 4 possible

LIGHT LOAD ELECTRIC MONORAIL SYSTEMS

ACCURATE POSITION DETECTION



ELECTRIFIED MONORAIL SYSTEM DRIVES FOR LIGHT LOADS

Electrified monorail system drives for light loads are used widely in industry, not solely in automobile manufacturing, for the movement of parts and tools.

In addition to a wide range of position switches, Schmersal now has a new solution for this application in the form of the SSB-R sensor box, a cost-efficient and maintenance-free solution for defining route sections for speed control of electrified monorail system (EMS). In addition, it also enables precise approach of park positions. Maximum productivity by means of magnetic signal storage: this continues to function in the event of a power failure, and enables rapid restoration of operation.

1



DRIVE

SSB-R MAGNET TRACK SENSOR BOX

- 4 magnet tracks
- Speed regulation
- Stored state in case of power failure
- 2 optional hall sensors for fine positioning

2



END POSITIONS

POSITION SWITCHES PS116

- Thermoplastic or metal enclosure
- Various actuators to choose from
- Type 1
- Up to cat. 4 possible

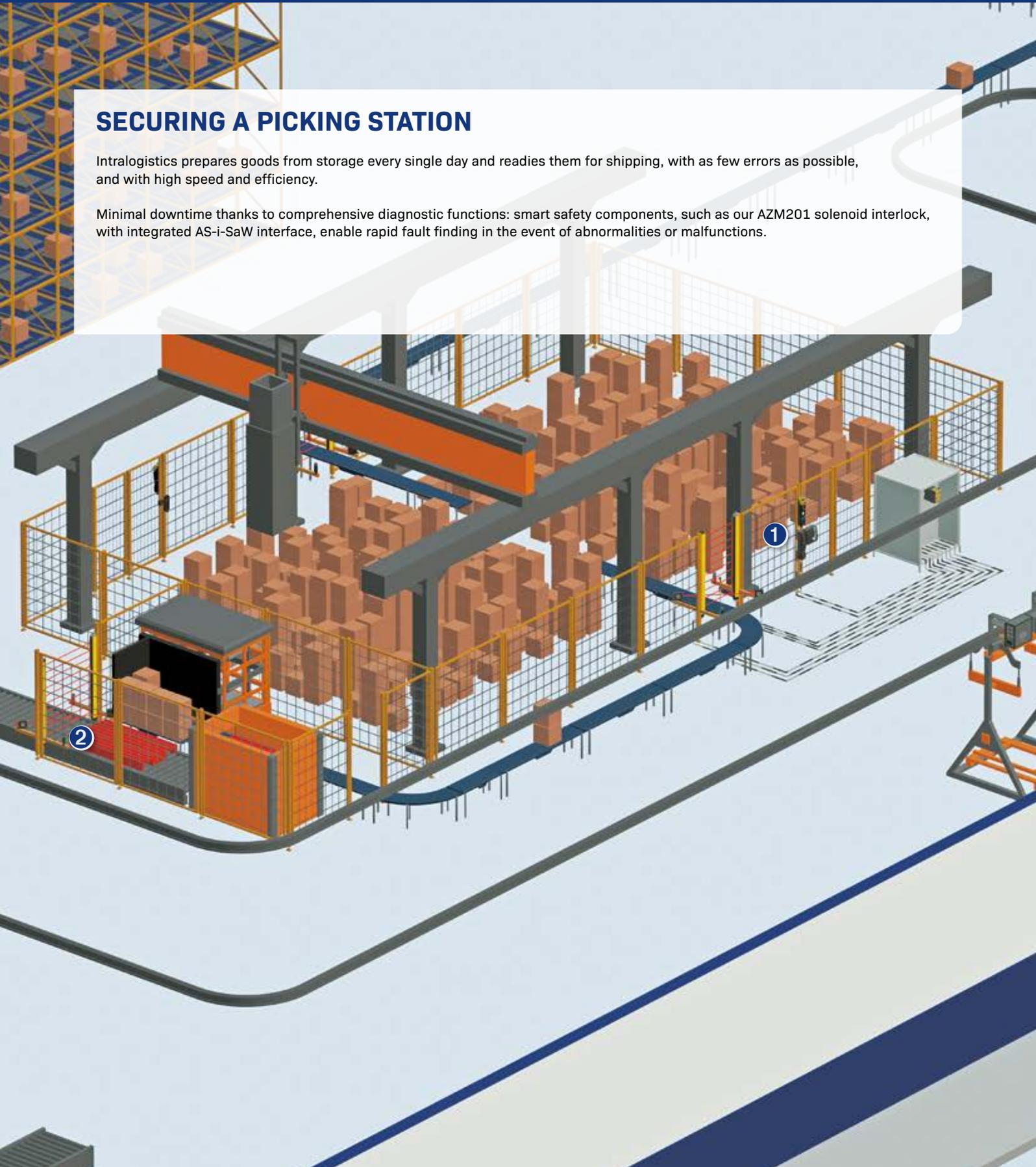
ORDER PICKING

COMPREHENSIVE DIAGNOSTIC FUNCTIONS

SECURING A PICKING STATION

Intralogistics prepares goods from storage every single day and readies them for shipping, with as few errors as possible, and with high speed and efficiency.

Minimal downtime thanks to comprehensive diagnostic functions: smart safety components, such as our AZM201 solenoid interlock, with integrated AS-i-SaW interface, enable rapid fault finding in the event of abnormalities or malfunctions.

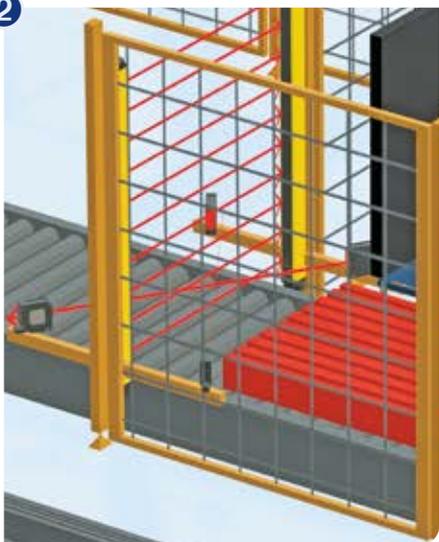


1

ACCESS PROTECTION

Before entering the machine, a stop of the process must be requested. This task can be solved with the BDF200 control panel. The running process is completed after the stop request and then the door is unlocked. The AZM201 solenoid interlock prevents unintentional start of the machine after opening the door. All safety functions of the cell are performed by the PSC1 modular safety controller.

→ You can find more info and products from page 16.

2

SECURING MATERIAL SUPPLY AND REMOVAL

For example, pallets are transported into a hazardous area via the infeed and outfeed. Here it is necessary to protect the worker from dangerous movements. To distinguish the worker from a pallet, a differentiation between people and material is necessary. This is easily and reliably solved with the SLC445 safety light curtain and the MCU-02 muting module.

→ You can find more info and products from page 18.

PALLETISING

MINIMAL WIRING EFFORT

SECURING A PALLETISING STATION

Palletisers often handle loads at high speeds, necessitating proper, compliant safeguarding of work areas.

Cost-efficient connection concepts thanks to smart solutions from Schmersal: the failsafe PROFINET Safety Fieldbox offers a flexible solution for reduced wiring in large systems for safety switches, solenoid interlocks and safety light curtains.

Schmersal's range of optoelectronic protective devices comes into play in the safeguarding of palletiser supply and discharge routes. With muting/blanking functions, they provide for safe separation of man and material.





ACCESS PROTECTION

Before the robot cell can be entered, a stop of the process must be requested. This task can be solved with the BDF200 control panel. The running process is completed after the stop request and then the door is unlocked. The AZM201 solenoid interlock prevents unintentional start of the machine after opening the door. All safety functions of the cell are handled by the PROTECT PSC1 modular safety controller.

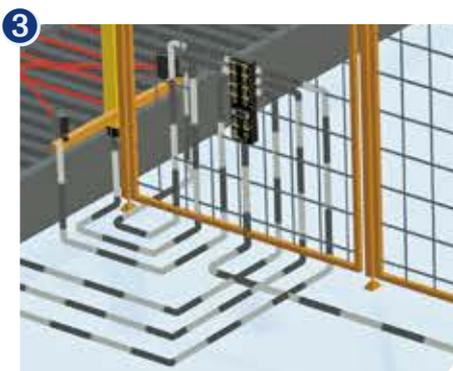
→ You can find more info and products from page 16.



SECURING MATERIAL SUPPLY AND REMOVAL

Pallets are conveyed to the palletising station via the infeed and outfeed. Here it is necessary to protect the worker from dangerous movements. To distinguish the worker from a pallet, differentiation between people and material is necessary. This is easily and reliably solved with the SLC445 safety light curtain and the MCU-02 muting module.

→ You can find more info and products from page 18.



DECENTRALISED SIGNAL PROCESSING

In extensive plants, a high wiring effort quickly arises in the task of routing all signals of the safety components to the safety controller. The SFB safety field box offers an efficient solution. Safety-related signals are collected decentrally and sent to the central safety controller via a safe fieldbus.

→ You can find more info and products from page 19.



SAFE SIGNAL EVALUATION

The safety functions of the machine are performed by the PROTECT PSC1 safety controller. Control devices such as the BDF200 or solenoid interlocks such as the AZM201 are evaluated or controlled in a safety-related manner. Thanks to the modular concept of the PROTECT PSC1, the safety controller can be individually adapted to the requirements of the application.

→ You can find more info and products on page 17 and 20.

STORAGE SYSTEMS

OCCUPATIONAL AND PROCESS PROTECTION

ACCESS PROTECTION AT THE STORAGE AND RETRIEVAL SYSTEM

Emergency stop devices, solenoid interlocks and safe limit switches also play an important role in safeguarding storage aisles and other areas of application.

Maximum safety thanks to reliable products: solenoid interlocks from Schmersal keep doors locked until hazardous movements have come to a halt. This helps to protect people, but also ensures interruption-free operations at the same time.



1



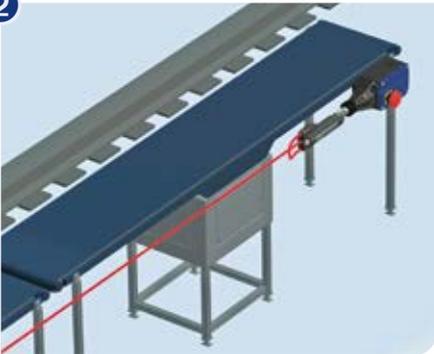
ACCESS PROTECTION

The access of the storage and retrieval machine (SRM) is reserved for authorised personnel. In addition, an operating mode selection must be made by the operator, which is implemented with the ESS21S1 key-operated switch. Up to 1,000 individual closures can be implemented, ensuring maximum safety.

The AZM201 solenoid interlock prevents an unintentional start of the SRM after opening the door.

→ You can find more info and products from page 16.

2



EMERGENCY STOP IN THE INTERIOR

With emergency stop buttons and pull-wire switches, Schmersal offers numerous components for standard-compliant protection against hazards, such as the ZQ900 pull-wire emergency stop switch.

→ You can find more info and products from page 21.

3



SAFE END POSITION

By using the position switch PS116, with safety function, the normative requirement of the end limitation of the SRM is fulfilled in a safety-oriented manner.

→ You can find more info and products from page 22.

ACCESS PROTECTION

SAFE SOLUTIONS FOR MAXIMUM PRODUCTIVITY



AZM40

- PL e / Cat. 4
- Small, flat design, 119.5 mm x 40 mm x 20 mm
- High holding force 2,000 N
- Latching force 40 N
- Protection against tampering through RFID technology
- Individually coded version with coding level "High" according to ISO 14119
- Universally applicable for hinged and sliding doors
- Actuator can approach interlock continuously within a 180 degree angle
- Symmetrical mounting, can be bolted on either side



AZM150

- Holding force of 1,500 N
- Latching force 50 N
- Up to PL d / Cat. 3
- Thermoplastic enclosure
- Eight approach levels thanks to rotating head
- Simple fitting, especially on 40 mm profiles



DHS-150-BKBU

- Length of the actuator: 60 mm
- Width of the actuator: 194.2 mm
- Height of the actuator: 71.8 mm
- Mechanical life at least 1,000,000 operations



AZM201

- Coding in accordance to ISO 14119 by using RFID-Technology
- PL e / Cat. 4
- OSSD safety outputs
- Symmetrical construction form, assembly on 40 mm profiles
- High holding force 2,000 N
- 3 LEDs to indicate operating modes
- Offset between actuator and interlock of ± 5 mm vertically and ± 3 mm horizontally
- Suitable for hinged and sliding guards
- Intelligent diagnosis
- Manual release
- Degree of protection IP66, IP67



AZM 201 ACTUATOR

- With door handle and emergency exit handle
- Actuator for hinged guards
- Smooth and intuitive operation
- No risk of injury from protruding actuator
- No supplementary door handles required
- Does not protrude into the door opening



AZM300

- PL e / Cat. 4
- Suitable for mounting to profile systems
- RFID technology for needs-based protection against tampering
- Compact design
- 3 LEDs to indicate operating modes
- Suitable for hinged and sliding guards
- Series-wiring
- Manual release



BDF200

- Slim, shock-resistant thermoplastic enclosure
- For installation in an ergonomically favourable position
- For mounting on commercially available aluminium profile systems
- The position of the pushbuttons on the control panel can be freely selected
- Field labelling with separate plastic cover
- Freely selectable pushbutton caps for optimum adaptation to the installations



ESS21S1

- Mechanical life at least 1,000,000 operations
- Position for key retraction: position 0
- Up to 1,000 individual closures
- Diameter of the front ring: 29.5 mm
- Diameters for the cylinder lock: 22 mm
- Mounting hole: 22.3 mm
- Height with key inserted: 60 mm

SECURING MATERIAL SUPPLY AND REMOVAL

MATERIAL FLOW SAFELY AND EFFICIENTLY



SLC445

- Multifunctional
- Muting
- Cyclic operation
- Double acknowledgement/reset
- Multiscan
- Safety type 4 according to IEC 61496-1, PL e
- Active integrated set-up tool
- Blanking: fixed/movable
- Status and diagnostics via 7-segment display
- Integrated contactor control
- User-friendly parameter setting, no tools required



MCU02

- Decentral expansion for SLC445
- Cross and parallel muting
- User-friendly parameter setting, no tools required
- Easy installation due to M12 connector



SLC440

- Safety type 4 according to IEC 61496-1, PL e
- Status and diagnostics via App with bluetooth
- Active integrated set-up tool
- Blanking: fixed/movable
- Double acknowledgement/reset
- Integrated contactor control
- Beam coding
- Process safety with highest availability
- User-friendly parameter setting, no tools required
- Optionally with protective enclosure (accessory) for protection class IP69

DISTRIBUTED SIGNAL PROCESSING UNIVERSAL. SAFE. COST EFFECTIVE.

SAFETY FIELDBOX

- Safety fieldbox for PROFINET/PROFIsafe
- For connection of up to 8 safety switchgears
- Integrated dual-port switch, IRT-capable
- Degree of protection IP67

Device ports

8x connector M12,
8-pole

LED diagnostic

Extended status indication
of the safety switchgear

Communication

PROFINET with PROFIsafe
EtherNet/IP with CIP Safety

Power supply

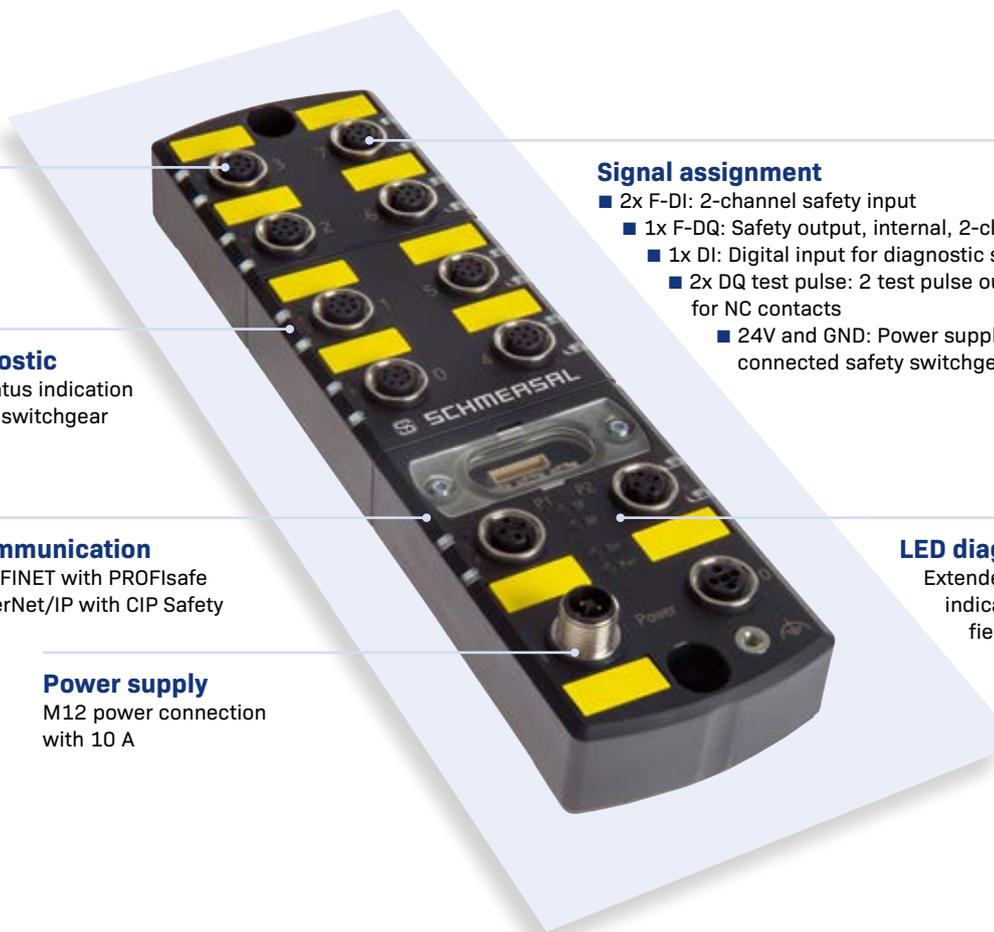
M12 power connection
with 10 A

Signal assignment

- 2x F-DI: 2-channel safety input
- 1x F-DQ: Safety output, internal, 2-channel
- 1x DI: Digital input for diagnostic signal
- 2x DQ test pulse: 2 test pulse outputs for NC contacts
- 24V and GND: Power supply of the connected safety switchgear

LED diagnostic

Extended status
indication of the safety
fieldbox



SAFE SIGNAL EVALUATION

MAXIMUM FLEXIBILITY



PSC1

- PL e / Cat. 4
- Modularly expandable to up to 64 safe inputs/outputs
- 4 safe 2 A pp-switching semiconductor outputs, switchable to 2 safe p-/n-switching semiconductor outputs
- 14 safe inputs on the basic module
- 2 Signalling outputs
- 2 safe relay contacts



PROTECT SELECT

- PL e / Cat. 4
- Simple and flexible parameter setting
- No programming skills required
- 18 safe inputs for the redundant inquiry of all common safety sensors
- 4 safe semi-conductor outputs
- 2 safe relay outputs
- 4 optional signalling outputs
- Replaces up to 8 safety-monitoring modules up to PL e / SIL 3
- Error and status messages in plain text
- Multilingual menu navigation via colour display



SRB-E

- Multi-purpose use, easy installation, low cost solution
- Simple adjustment using rotary switch
- 1 or 2 channel signal evaluation
- Input expanders for 4 sensors up to PL e
- Up to 5 safety outputs
- Quick response time (< 10 ms)
- Also for areas at risk of explosion

EMERGENCY STOP IN THE INTERIOR

ROBUST AND RELIABLE



ZQ700

- One-side operation / wire length up to 10 m
- Reset pushbutton
- Position indication
- Large wiring compartment
- Twisting of towing eye not possible
- Wire pull and breakage detection



ZQ900

- Integrated emergency stop button
- One-side operation / wire length up to 10 m
- Spring force for a wire length up to 10 m
- Reset pushbutton
- Position indication
- Large wiring compartment
- Twisting of towing eye not possible
- Wire pull and breakage detection

SAFE END POSITION POSITION DETECTION AND MONITORING WITH SYSTEM



PS116

BASIC SWITCH
PS116-Z11-STR-S200

Modular selection (construction kit), to be ordered separately

For assembly of the modular selection, the enclosure of the thrust pin included in the basic switch must be removed and replaced by the roller lever PS-H200.



ACTUATOR HEAD:



PS-K200



PS116

COMPLETE DEVICE
PS116-Z11-STR-H200

- Thermoplastic or metal enclosure
- Symmetrical casing
- Lever angle adjustable in 15° steps
- Degree of protection IP66, IP67
- Actuator heads can be repositioned by 8 x 45°



PS-K210



PS-K230



PS-R200



PS-H200



PS-J200



PS-N200



PS-K250



PS-K240

The position switches of the PS116, PS2xx and PS3xx series contain the actuating element S200 as a basic switch. In the modular system, all position switches can be used with all actuating elements. The following ordering example can therefore be transferred to all of the series listed.

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

MILLIMETRE-PRECISE 3D DEPTH IMAGES

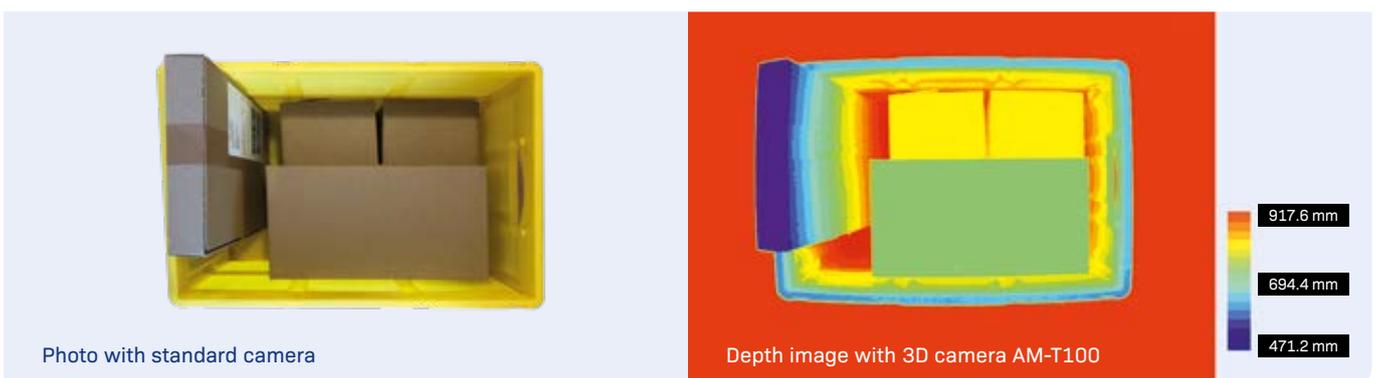
LOGISTICS AND ROBOTICS

AM-T100

TIME OF FLIGHT CAMERA

The AM-T100 is a time-of-flight (ToF) camera that uses a Sony DepthSense™ sensor to produce millimetre-precise 3D depth images. The high frame rate of up to 60 fps enables efficient use in industrial manufacturing processes, logistics and robotics.

With powerful IR illumination and 640 x 480 pixel image resolution, the AM-T100 achieves a 67° x 51° field of view with a range of up to 6 m*. High-performance algorithms enable pre-filtering of the data so that the camera can be optimally adapted to different ambient conditions.





Original size

AM-T100

- Sony DepthSense™ technology for millimetre-precise 3D depth images
- High frame rate of up to 60 fps
- 67° x 51° field of view with a range of up to 6 m*.
- Optimally adaptable to different ambient and installation conditions
- Easy data exchange via standardised data interface GenICam
- Software for easy configuration of 3D monitoring areas

* Depending on the remission properties of the target objects, a range of up to 30 m can be achieved.

ACCESSORIES



MOUNTING BRACKET FOR AM-T100

- ACC-AM-MS-F



CONNECTING CABLE M12, 8 POLE, A-CODED

- ACC-AM-CON-A-K8P-M12-G-5M-S



ETHERNET CONNECTOR M12, X-CODED

- ACC-AM-CON-VIE-SS8P-M12-RJ45-G-5M-S

Camera AM-T100 not included in delivery



excellence in safety

Functional machine safety is a complex matter which involves complying with a range of standards and directives. tec.nicum offers all machine manufacturers, operators and distributors a completely product and manufacturer-neutral consultancy on all currently relevant statutory regulations and supports them in ensuring their machines and workplaces are designed to comply with the relevant standards.

tec.nicum services cover four areas, which can be obtained as individual modules or as complete packages:

- **tec.nicum academy – Learning**
- **tec.nicum consulting – Consultancy services**
- **tec.nicum engineering – Technical planning**
- **tec.nicum integration – Practical implementation**

Experts at tec.nicum advise and support customers and clients with training, on-site consultation, documentation and planning and implementation, such as the installation of protective equipment and safety systems.

tec.nicum is the Schmersal Group's service division and comprises a global consultancy network of TÜV Rheinland-certified Functional Safety Engineers and Machinery CE Experts. Services can be called upon around the world. tec.nicum's core philosophy is to offer advice that is independent of manufacturers and as objective as possible.

We strive to develop the best possible safety-related solution for each individual application, to implement it and completely safeguard its intended use – always in line with our commitment "**excellence in safety – we care!**"

tec.nicum
Schmersal Group

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academy



- Seminars and training
- In-house training
- Customer-specific workshops
- Demonstration events
- Symposia

consulting



- Safety analysis of machines and production lines
- Conformity assessment and verification
- Risk assessments
- Hazard assessments
- Technical documentation

engineering



- Technical project planning
- Validation of safety functions
- Measurements and tests
- Modernisation of machines
- Safety controller programming

integration



- Conversion / Retrofitting
- Installation of protective devices and fences
- Integration of safety functions
- Maintenance and service

tec.nicum

The range at tec.nicum covers four modules: learning in the academy section, consultancy services in the consulting section, designing safety solutions in the engineering section and practical implementation in the integration section.



Contact

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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 nations.

Customers of the Schmersal Group include “Global Players” in mechanical engineering and plant manufacturing and operators of machinery. They benefit from the company’s extensive expertise as a provider of systems and solutions for machine safety. In addition, Schmersal specialises in various areas including intralogistics, 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 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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SCHMERSAL
THE DNA OF SAFETY

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

www.schmersal.com