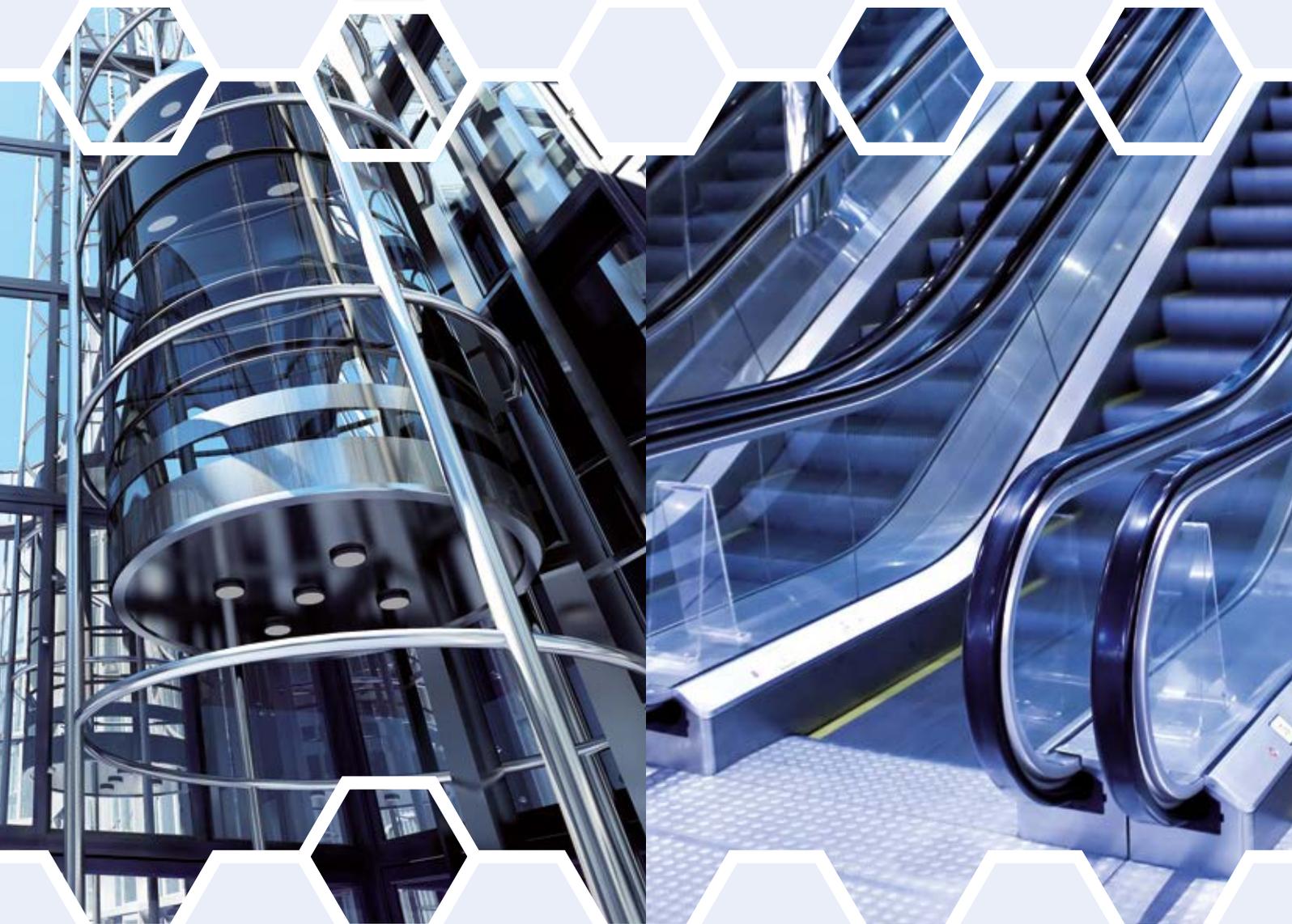


System solutions for every lift. Everywhere.

Lifts and Escalators



SCHMERSAL
BÖHNKE + PARTNER

Introduction



Philip Schmersal, Executive Director of the Schmersal Group, and Dr. Andreas Hunscher, Managing Director of Böhnke + Partner GmbH Steuerungssysteme.

Solutions for Lifts and Escalators – Safe and reliable.

Lifts are among the safest means of transport. Control systems and switchgear from the Schmersal Group play no small part in this. For almost 50 years we have been producing switchgear developed completely from scratch for the special requirements of lift technology.

Like lift customer, the Schmersal Group has also taken the route to internationalization. We produce switchgear at the main factory in Wuppertal, in Boituva / Brazil (since 1974), Shanghai / China (since 1999) and Ranjangaon / India (since 2013). With the acquisition of Böhnke + Partner GmbH Steuerungssysteme to the Schmersal Group in 2013, the business area of lift technology was extended to the important area of control technology. All production sites are certified in accordance with DIN EN ISO 9001, thus all our products are manufactured to a high standard.

Experts are available for consulting, choosing control systems, components and also service in more than 50 countries. As an efficient supplier and partner, we collaborate both with global players in the lift industry and with specialised regional companies.

The programme is constantly being expanded in close collaboration with lift manufacturers. Today, for almost any conceivable application in which a complete lift control system or even just one switchgear is required we offer a reliable and high quality solution with practicality in mind – from the shaft pit to the machine room.

This brochure gives you an initial overview of our product range and its versatile application possibilities in the area of lifts and escalators.



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History

Milestones 1945 – 2016



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.

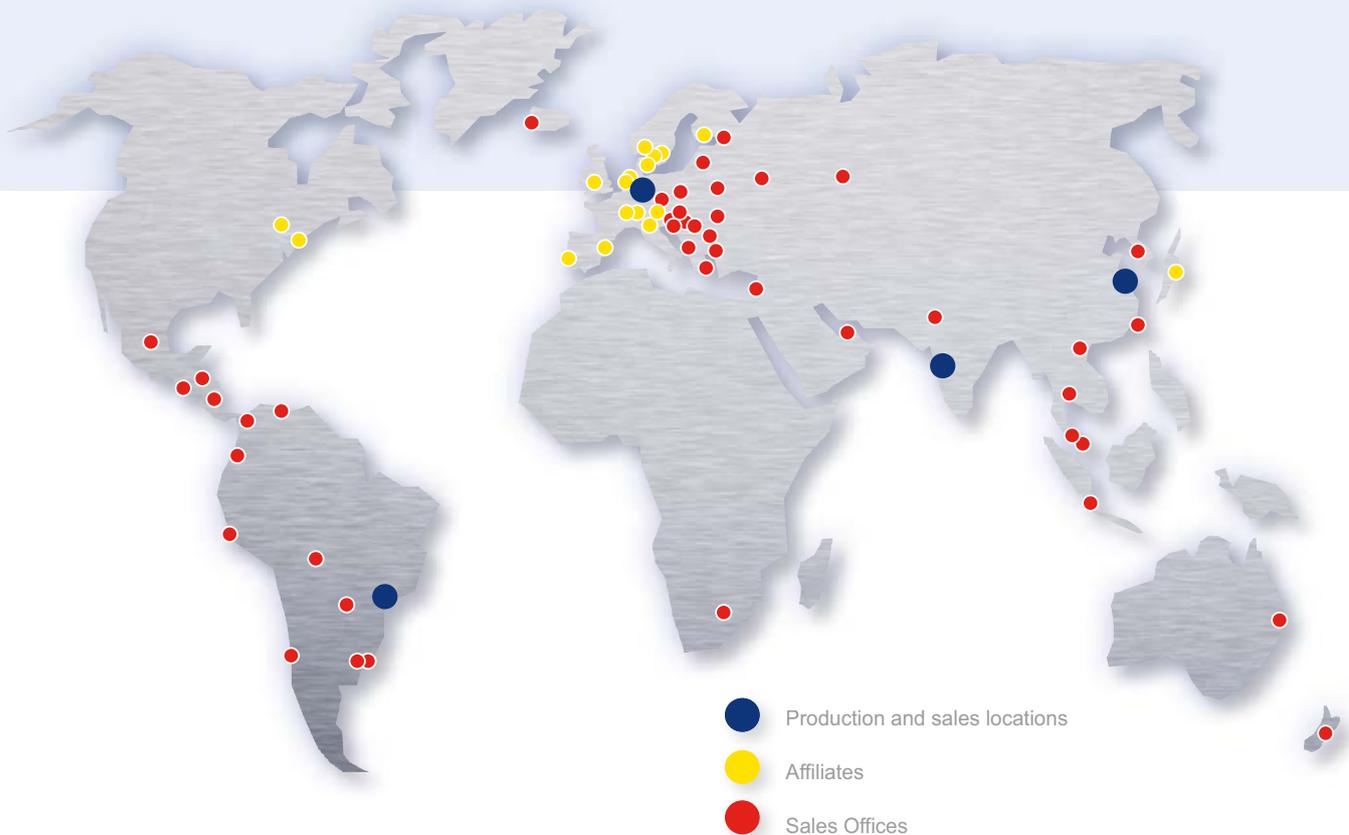
2015

In 2015, the Schmersal Group celebrated its **70th anniversary**.
Michael Mandel is appointed **Managing Director of K.A. Schmersal GmbH & Co. KG** in April (Wuppertal/Wettenberg).
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**.

Schmersal worldwide



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

Schmersal Worldwide

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

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 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



Safety and cost-effectiveness

Lift control systems and switchgear from Schmersal ensure that lifts have a high level of safety and operational reliability. Over time, however, other factors became more important for the development of new generations of control systems and switchgear.

- Standards and guidelines have set the scope of development for control systems and safety-related switchgear in the lift industry and have created new opportunities for the integration of safety functions in the lift controller (keyword PESSRAL). Furthermore, the revision of EN 81-1/2 to EN 81-20/50, which was published in 2014, is moving the lift industry and places new demands above all on the control systems.
- Cost effectiveness – Lift manufacturers are experiencing intense pressure from competition and not only expect solutions from partners and suppliers to be inexpensive, but also fast and economic to install.

These requirements are the base of the development of new lift control systems and switchgear. Over decades, Schmersal has accrued a great amount of industrial experience in lift technology, which ensures solutions that have the market and practicality in mind to further improve the function and safety of lifts and enable low cost assembly and maintenance.

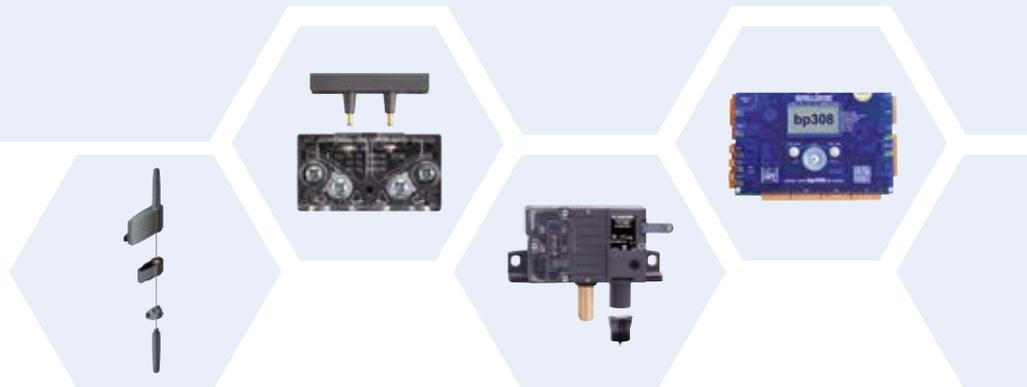
For new build and modernisation

Lift control systems and elevator switchgear from Schmersal can be used in new builds, renovations and modifications for improving the safety of existing lifts. We offer suitable solutions and options for different control and safety concepts.

New developments for lift switchgear

Among the latest innovations there is the control generation bp408. It is characterized above all by the compact dimensions, which allow all possible installation locations to be covered by one system:

- Systems with door frame control
- Machine room less systems
- Normal systems with machine room



With its characteristics of a compact and robust design, new position switches can be used in a wide range of applications, including lift technology. All position switches of the PS116, PS2xx and PS3xx series are equipped with positively-opening break contacts in accordance with IEC 60947-5-1 and are available with snap action and also slow action. There is also a wide range of actuators available that can all be offset or mounted in 45° increments and can be quickly replaced and implemented thanks to the simple attachment concept. In addition, the roller levers can be adjusted in 15° increments.

Service and consulting

In the area of lift control systems, in particular, competent and high quality consulting is required to generate an optimal solution for the customer. We are happy to provide comprehensive support in all matters relating to the use of our control systems, components, switchgear and software solutions. In agreement with our customers, we create the right solution to meet the requirement. Closeness to the customer, here, plays an important role for us.

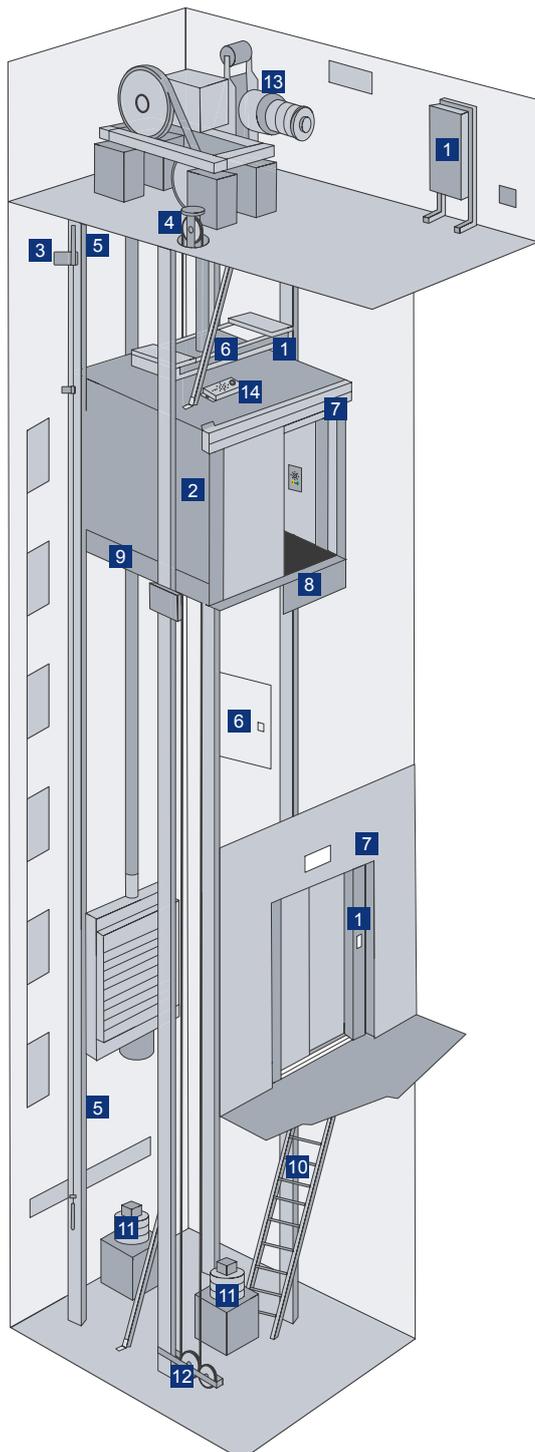
The catalogue: overview of a comprehensive product range

This catalogue provides an overview of the diversity of our lift control systems and switchgear for passenger and load lifts and also for escalators. All items of equipment comply with the relevant regulations and guidelines. The safety components have the latest approvals and comply with the requirements of the EN 81 series and EN 115-1. Detailed technical information about all of the product groups can be found in the online catalogue at www.schmersal.net.

Visit our industry portal at www.aufzug.schmersal.com! There, you will find a selection of the latest information and products prepared for the lift industry.

1. System overview

1.1 Lift



Control system:

1 Irrespective if complete control system or controller:
The heart of a lift is the control system or the controller.

Shaft components:

Detecting of the lift car position can be done in classic way by magnetic reed switches **2** or in an innovative way by absolute positioning encoder system **3**.

With our door contacts, door locking systems and position switches we monitor:

- 4** Overspeed governor
- 5** Upper / lower limit switch
- 6** Escape and service covers
- 7** Closed position of doors
- 8** Apron
- 9** Safety gear
- 10** Position of pit ladder
- 11** Lift car buffer / counterweight buffer
- 12** Slack rope monitor overspeed governor

Monitoring, operating and maintenance

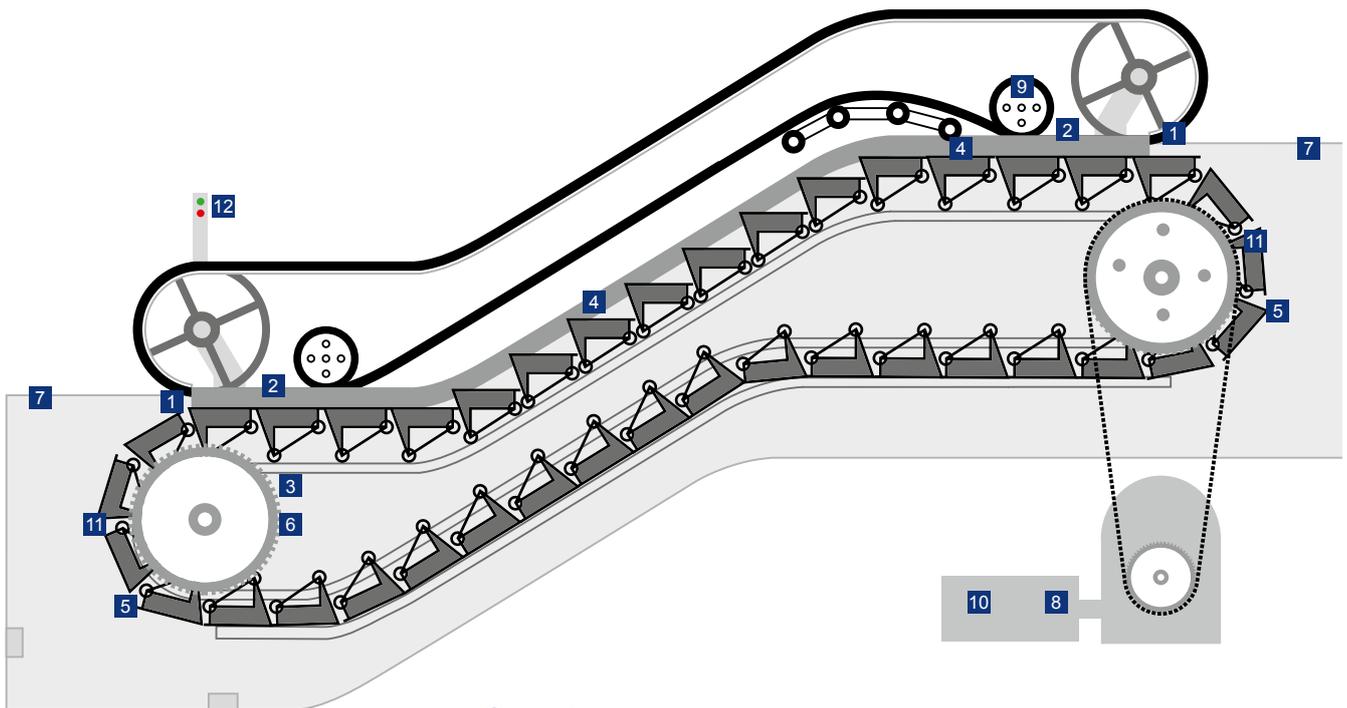
Certain functions can be monitored during operation with sensors.

- 13** Brake monitor release / wear

Special functions in the control system as well as the inspection control elements **14** support the service technician during maintenance of the lift system.

With our modular diagnostics software WinMOS®300, opportunities are presented for on-demand maintenance, comprehensive error and report statistics, emergency call management as well as general remote monitoring of the lift system.

1.2 Escalator



Control

With our inductive proximity switches and position switches we monitor:

- 1 Handrail inlet (left/right)
- 2 Comb plate (left/right)
- 3 Chain breakage
- 4 Skirt
- 5 Step breakage
- 6 Chain tension
- 7 Floor cover (maintenance cover)

Monitoring, operating and maintenance

Typical functions that are monitored are:

- 8 Brake monitor release / wear
- 9 Handrail speed
- 10 Speed monitoring
- 11 Missing steps

In normal operating mode the escalator can be controlled by the operating elements 12 like emergency switch and key switch. With the inspection box, the step band can be moved by the technician during maintenance.

1. System overview

1.3 System solutions for every lift. Everywhere.



Lift controller bp408

The reliable control system concept of Schmersal Böhne + Partner realised in a new way. With its compact dimensions it can be even fitted in door frames. And also traditional control cabinets for lift systems with machine room or machine room less systems can be equipped optimally with the bp408 controller generation.

■ Page 16

Magnetic reed switches

Non-contact magnetic switches (with Reed-technology) are often used to create zone signals, levelling signals and delay points. The BN series sensors which Schmersal has developed for lifts feature bias magnets to ensure safe switching. Faulty switching or "wobbles" can be virtually eliminated.

■ Page 26

Position switch with safety function

Our various position switches are suitable for applications where reliable position detection is important – as a safety gear contact on the lift car, as switches in the shaft head or in the shaft pit or for monitoring maintenance covers. A large selection of field-tested actuators are available in our range of position switches.

■ Page 30

Door locking device

The AV series door locking device have been used for decades to lock lift doors securely. The range includes single- and double-leaf versions with metal and plastic housings. Our type-tested door devices fit a wide range of door designs and are equipped with fail-safe locking mechanism, if required.

■ Page 34



Positive-break door contact

The AZ-series positive-break door contacts monitor the door position and door lock. The circuit only closes when the actuator is inserted in the switch. Disconnection is forced by the actuator fixed on the door leaf. The non-contact and waterproof door contact BNS 260 is also available as an alternative.

■ Page 38

Inspection boxes and manual control

For many international lift manufacturers, the Schmersal Group makes inspection boxes with customer-specific equipment and – if required – an individual design. The control devices for the maintenance personnel are usually equipped pre-assembled with cables and connectors or terminals.

■ Page 44

Configuration and diagnostics software

For simple configuration of CANopen Lift (CiA 417) components, our portfolio includes CANwizard®, a useful software tool. For remote management and diagnostics, the modular WinMOS®300 system is available to the customer as an ideal software solution.

■ Page 45

Components for lifts according to the Machinery Directive

Lifts according to the Machinery Directive in the area of platform lifts and construction lifts use components such as solenoid interlocks or safety relay modules.

■ Page 46

2. Control system

2.1 Applications



Controller

Multiprocessor controller for all lift applications

- User-friendly operation
- Versatile application area
- All common standard functions and numerous special functions

Code numbers:
bp408, bp308

Diagnostics / configuration

Software for configuration and for remote management

- Monitoring
- Diagnostics
- Statistics
- Emergency call management
- Overview with layout maps
- Cyclical calls
- Fault registration

Code numbers:
WinMOS®300

Control components

CANopen lift components for individual control system extension

- Input/output module
- Lift car module
- Exterior panel module
- Serial interfaces
- WLAN interface and many more.

Code numbers:
CIO, CLK, CAP, CWI

Safety-monitoring device

Multifunction safety modules for realisation of safety functions

- 1- or 2-channel control of safety sensors
- with or without cross-wire short detection

Code numbers:
SRB

Service and consulting

For all matters relating to use of our controller and components

- Control systems for new installation and modernisation
- Shaft, lift car and machine room installation systems
- Services for commissioning and modernisation

Application 1



Door frame control

Today's lifts often have to be adapted to the local conditions in the building. This means that there are instances in which lift system has no space for a conventional switch cabinet and thereby no space for a conventional lift control system.

The compact lift controller bp408 is an ideal choice here. Thanks to the compact dimensions, it can be housed in a switch cabinet door enclosure. Used in this way, the controller bp408 offers everything necessary for a conventional lift control system.

A variety of inputs and outputs as well as freely programmable relays make it possible to design a customer oriented control cabinet. Integrated interfaces enable optimal networking with additional control components or CANopen bus shaft components, where required.

Application 2



Maintenance with app support

New technologies even find their way into the area of lift technology. With the WinMOS[®]300 software, which can be installed as an app on the smartphone or tablet, a new technician/lift interface opportunity is presented. Systems with Schmersal Böhne + Partner control system, which are monitored with the WinMOS[®]300 diagnostics software, can send a message to the technician's smartphone by means of travel counters and status monitoring if a maintenance routine needs to be performed. In this way, advanced planning of maintenance visits is possible.

With the WinMOS[®]300 app, the technician can even receive support on-site during maintenance. Special maintenance assistants allow the technician simple access to the lift car roof, for example.



WinMOS[®]300
app for Android



WinMOS[®]300
App for iOS

2. Control system

2.2 Controller



■ bp408

Technical features

Standards	EN 81-20/-50
------------------	--------------

Mechanical data

Dimensions (H x W x D)	315 x 100 x 80 mm
-------------------------------	-------------------

Electrical data

Supply voltage	24 VDC
Ports	<ul style="list-style-type: none"> - 8 inputs, 24 VDC, input current 10 mA - 8 outputs, 24 VDC, overcurrent protected 280 mA - 16 inputs / outputs (calls), 24 VDC, overcurrent and short circuit protected - (PTC) resistor input - Safety circuit inputs 230 VAC - Safety switch inputs 230 VAC - 3 precontrol relays (NO contact) - 4 freely programmable relays (changers)
Interfaces	<ul style="list-style-type: none"> - CAN 1 (lift car), CANopen lift (CiA 417) - CAN 2 (shaft/group), CANopen lift (CiA 417) - USB host - USB device - Ethernet 10/100MBit, full-duplex (network connection) - RS-485 (DCP) - RS-232 (Gateways, e.g. for Profibus, Modbus, etc.)
Display and operating elements	<p>Graphic display with navigation buttons:</p> <ul style="list-style-type: none"> - Second menu level and separate call menu - Permanent display of door status (max. 3), safety circuit, travel signal, lift status and direction independent of menu

Performance data

Application	Persons and freight lifts
Stops	up to 127
Operating mode	<ul style="list-style-type: none"> - Cable lifts regulated/unregulated - Hydraulic lifts
Copying mechanism	Digital with absolute encoder system

Software

Memory	Fault, maintenance and message stack with max. 128 entries
Language settings	German, English, French, Italian, Swedish, Dutch
Groups	Highly-developed integrated group algorithm for up to 8 lifts
Functions	Extensive standard and special functions such as collective controls, self-driver, priority and guest calls, functions for freedom of barriers (EN 81-70), fire and rescue service, fire, maintenance assistant and many more
Control menu remote-controllable	Via WLAN/ethernet with mobile device or PC with WinMOS®300 as app or PC software
Backup/update	Backup and update via USB stick



■ bp308

EN 81-20/-50

170 x 270 x 180 mm

Integrated mains unit 24 VDC / 2.2 A

- 14 inputs, 24 VDC, input current 10 mA
- 8 outputs, 24 VDC, overcurrent protected 280 mA
- 16 inputs / outputs (calls), 24 VDC, overcurrent and short circuit protected
- (PTC) resistor input
- Safety circuit inputs
- Safety switch inputs 230 VAC (optional with SMZ)
- 4 precontrol relays (NO contact)
- 8 freely programmable relays (2 NC, 2 NO, 4 changer contacts)
- CAN 1 (lift car), CANopen lift (CiA 417)
- CAN 2 (shaft/group), CANopen lift (CiA 417)
- USB host
- USB device
- Ethernet 10/100MBit, full-duplex (network connection)
- SD card interface
- Optional RS-232 (Gateways, e.g. for Profibus, Modbus, etc.)
- Optional RS-485 (DCP) SD card interface

Graphic display with navigation buttons:

- Second menu level and separate call menu
- Permanent display of door status (max. 3), safety circuit, travel signal, lift status and direction independent of menu

Persons and freight lifts

up to 127

- Cable lifts regulated/unregulated
- Hydraulic lifts

Digital with absolute encoder system

Fault, maintenance and message stack with max. 128 entries

German, English, French, Italian, Swedish, Dutch

Highly-developed integrated group algorithm for up to 8 lifts

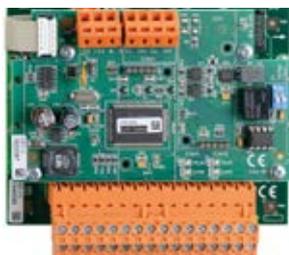
Extensive standard and special functions such as collective controls, self-driver, priority and guest calls, functions for freedom of barriers (EN 81-70), fire and rescue service, fire, maintenance assistant and many more

Via WLAN/ethernet with mobile device or PC with WinMOS®300 as app or PC software

Backup and update per SD card or USB stick

2. Control system

2.3 Components



■ CIO-01A



■ CLK-03A

Technical features

Description

CANopen Lift input-output module
The CAN-I/O module makes 32 calls available via the CANopen bus. Status LEDs facilitate initial rapid diagnosis of the CAN bus.

CANopen Lift power board
For transmission of the lift car signals via the CANopen bus to the processor Status LEDs facilitate initial rapid diagnosis of the CAN bus SUB-D 9-pin interface for CANopen absolute value sender can be extended to 32 calls with CLE-01A.

Mechanical data

Connection:	Detent base for support rail 35mm	Detent base for support rail 35mm
Dimensions (H x W x D)	120 x 110 x 50	115 x 90 x 50

Electrical data:

Ports	32 calls; outputs short circuit resistant	16 inputs, 8 outputs, 6 relays (1 NC, 4 NO, 2 changer contacts)
Nominal voltage	24 VDC	24 VDC
Power consumption	50 mA	50 mA
Input current	20 mA	20 mA
max. Output current	280 mA per output	280 mA per output
Bus connection	CANopen	CANopen
Extension	per 10-pin ribbon cable to SBE-01A	per 10-pin ribbon cable to CLE-01A
Status LED (run)	LED green, in standard mode permanently on	LED green, in standard mode permanently on
Error LED (ERR)	LED red, in standard mode permanently off	LED red, in standard mode permanently off



■ CLE-01A



■ CSI-01C



■ CAP-02A



■ CWI-01A

CANopen Lift power board extension
For extending CLK to 32 calls.

CANopen Lift serial interface
For coupling two CANopen strands.

CANopen Lift exterior panel board
Serves to actuate exterior panel via CANopen bus.

CANopen lift wireless interface (WLAN)
For access via WLAN to CANopen bus
WLAN-capable end device required (smartphone, tablet, ...)
In housing as an option (CWI-01G)

Detent base for support rail 35mm
115 x 90 x 50

Detent base for support rail 35mm
120 x 80 x 30

For assembly on panel
63 x 76 x 13

For assembly / (in housing)
63 x 76 x 13 / (145 x 35 x 70)

32 calls; outputs short circuit resistant		8 calls; outputs short circuit resistant	
24 VDC	24 VDC	24 VDC	24 VDC
50 mA 20 mA	35 mA	25 mA 3.8 mA	30 mA
280 mA per output CANopen	CANopen	max 500 mA sum of all outputs CANopen	CANopen
per 10-pin ribbon cable to CLE-01A			
LED green, in standard mode permanently on			
LED red, in standard mode permanently off			

2. Control system

2.4 Multifunctional safety module



■ SRB301ST V.2

Key Features

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- 1 auxiliary contact

Technical features

Electrical characteristics

Operating voltage	24 VDC -15% / +20% 24 VAC -15% / +10%
Operating current	0.1 A
Electronic fuse	■
Hybrid fuse	■
Pull-in delay (typ.) Automatic start	100 ms
with reset-button / start button	15 ms
Max. switching capacity of the safety contacts	250 VAC / 8 A
of the auxiliary contacts	24 VDC / 2 A
of the signalling outputs	-
Switching capacity AC15, DC13	
STOP 0	230 VAC / 6 A, 24 VDC / 6 A
STOP 1	-
Drop-out delay (typ.) in case of emergency stop	25 ms
Mechanical data	
With removable terminals	■
Dimensions (H x W x D)	22.5 x 121 x 120 mm
Ambient conditions	
Ambient temperature	-25 °C ... +60 °C

Safety classification

Standards	ISO 13849-1, IEC 61508, approved to EN 81-20/-50
PL/SIL	e/3
Category	4
PFH	$\leq 2.0 \times 10^{-9}/h$
Certificates	

Up-to-date without fail

Online on the world wide web



Always there for you, the trade portal
“Lifts and escalators” at:

www.aufzug.schmersal.com

3. Shaft components

3.1 Applications



Detection of lift car position

- Contact less detection of lift car position
- Zone detection with magnetic reed switches

Code numbers:
USP30, USP100, BN



Position switches

- Enclosure made of metal or plastic
- Wide range of actuators
- Positive break
- Switches with latching function with mechanical or electrical release

Code numbers:
235, 236, 256, 335, 336, 355



Door locks

- One- or two-leaf lift landing doors
- With or without fail-safe locking mechanism and inclined section at locking bolt
- Actuation with pull strap or roller lever

Code numbers:
AV



Door contacts

- Large range of different shapes

Code numbers:
AZ

Application 1



Overspeed governor

The overspeed governor is a safety component of a lift system. It prevents the lift car from travelling too fast and crashing up or down by actuation of the safety gear at the car. Mainly the device is built up with a cable loop that runs through pulleys at the top and bottom of the shaft and the safety gear attached to the lift car. If a limit value is exceeded, the drive is electronically deactivated via the position switch and the lift car is brought to a halt mechanically.

With its electronic resetting feature, ZSM476 is particularly suitable for monitoring the overspeed governor. This is because the overspeed governor is often located in the shaft head which is difficult to access.

ZSM476 is supplied prefitted with variable cable length and three possible cable positions according to the customer's requirements. Prefitted in this way and the opportunity of selecting various actuators mean that the switch is adapted ideally to the respective application.

Application 2



Door locking devices

The lift door locking devices of the AV series are utilized to monitor and lock one- or two-leaf lift landing doors. These safe door locking devices meet the requirements in accordance with the lift directive and the EN 81.

There are versions with aluminium pressure cast housings and plastic housings, one or two locking elements either on the left or right, with lever, pull strap or attached brackets.

The transparent cover means that the safety function can be monitored. With a triangle key, the emergency release can be actuated from outside.

Application 3



Door contact

The AZ series of positive-break door contacts are used as door and locking mechanism contacts. Due to a wide range of different positive break door contacts there is always one available for all common types of lifts for monitoring the door position or interlocking device (hook bolt).

With the AZ safety switches, the switching element and actuator are not connected to each other in terms of the design. However, when they are switched they are joined together functionally or separated.

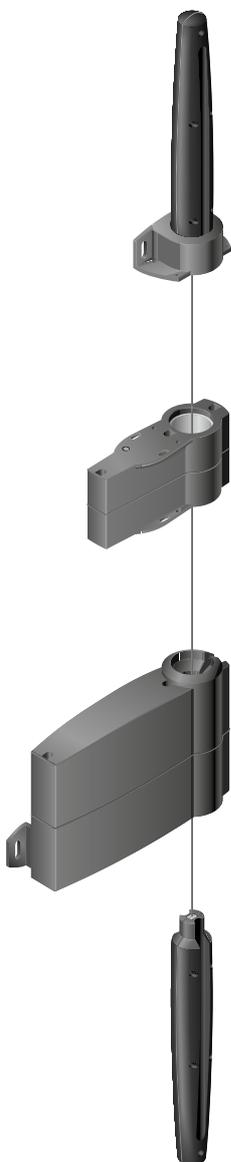
When the safety device is opened, the actuator is separated from the base device. In the process, the NC contact in the safety switch is opened through positive breaking.

Round or elongated holes serve to attach the switch; on some types, captive securing bolts are included in the scope of delivery.

3. Shaft components

3.2 Ultrasonic Position System USP

Function



The ultrasonic position system (USP) is an absolute encoder, which operates according to the magnetostriction principle. Because of the non-contact procedure there is no mechanical wear and no maintenance required. It measures the distance between the transmitter and the receiver and returns the measured value to the controller as a binary code or Gray code via an interface. The system can be used for rises up to 130 m and speeds up to 8 m/s.

The mode of operation is simple, precise and reliable

The transmitter attached to the lift car induces a pulse contactless to the signal wire which is suspended vertically in the shaft. The receiver in the shaft head or in the shaft pit calculates the exact distance between the transmitter and receiver based on the travel time of the pulse. The calculated position is passed to the lift controller via an interface. The two dampers at either end of the signal wire neutralise the signals and prevent them being fed back again to the receiver. The basic version USP 30 is suitable for lift heights of up to 30 m. For lift heights up to 130 m, the USP 100 version is available. It is fitted with a correction sensor and correction magnets to compensate for thermal changes in the building.

Standard interfaces
RS422 SSI and UART
CANopen 417

The USP can be used with controller from the following manufacturers:

Böhne + Partner GmbH
Georg Kühn Steuerungstechnik
Kollmorgen Steuerungstechnik GmbH
KW Aufzugstechnik GmbH
Langer & Laumann Ingenieurbüro GmbH
Lester Controls Ltd.
NEW-Lift Steuerungsbau GmbH
Pelazza Peppino s.r.l.

Technical features	USP 30	USP 100
Repeat accuracy under normal shaft conditions	± 3 mm	± 1 mm
Repeat accuracy at calibration temperature	± 1 mm	± 1 mm
Ambient temperature	-10 °C ... +50 °C	-20 °C ... +60 °C
Maximum rise	30 m	130 m
Maximum travel speed	2 m/s	8 m/s
Operating voltage	24 VDC +15 % / -10 %	24 VDC +15 % / -10 %
Rated current	180 mA	180 mA
Protection class	max. IP54 depending on the USP receiver cable	max. IP54 depending on the USP receiver cable
Interference radiation	EN 50081-2, EN 12015	EN 50081-2, EN 12015
EMC rating	IEC 61000-6-2, EN 12016	IEC 61000-6-2, EN 12016
Approvals		

Parallel interface USP-PI

A universal system – multiple interfaces

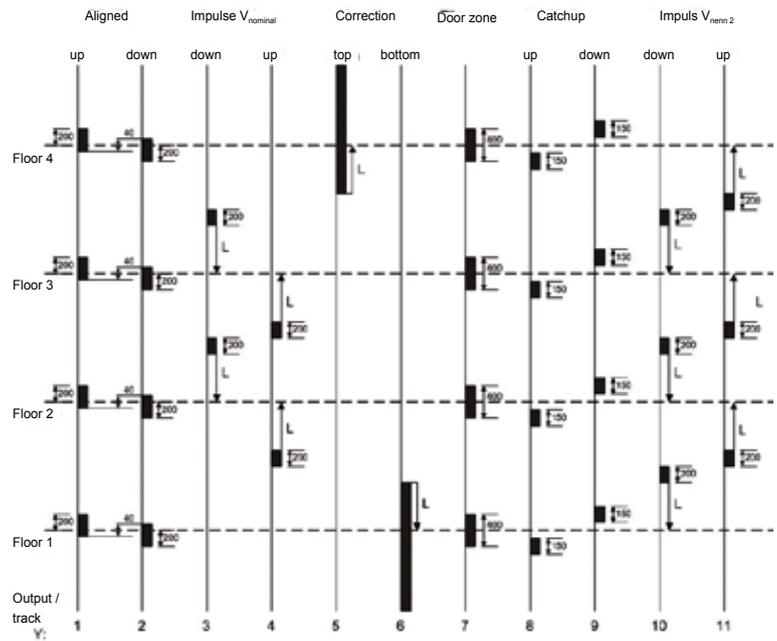
The Schmersal Group has created different interfaces, such as the parallel interface USP USP-PI for connection to controllers with conventional digital technology, so that the USP can operate with different control systems. It converts the absolute position value of the USP 24 VDC signals, which can be used just like the shaft signals from magnetic switch copying units, via two pre-programmed and one programmable profile. A number of different direct interfaces for connecting the USP to lift controllers from various manufacturers is also available.

Easy to put into operation

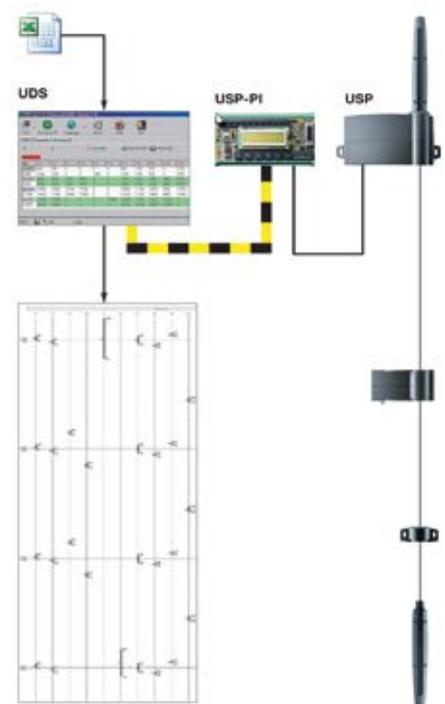
The USP is not only easy to put into operation but is also easy to maintain. One learning cycle is usually sufficient to read the floor positions. If the USP is used with the parallel interface, the signals can be shifted easily by programming, without having to enter the lift shaft. An upload / download software UDS is available to make it easy to program the PI, and for the visualisation. The UDS software enables you to read the values from the USP-PI parallel interface via a PC (download).

All of the downloaded values can be stored on Excel®-spreadsheets for further processing. Values can also be displayed graphically, as known from magnetic reed switch shaft copying.

Data which have been changed on the PC can be transferred back to the parallel interface (upload). The UDS software is ideal for documenting and archiving the PI settings.



Technical features	USP-PI
Interference radiation	EN 50081-1, EN 12015
EMC rating	IEC 61000-6-2, EN 12016
Material of the enclosure	PVC
Fixing	Snaps onto standard DIN rails according to EN 50022 and EN 50035
Connection type	Screw connection 0.5 ... 1.5 mm ²
Protection class	IP00
Operating voltage	24 VDC +15 % / -10 %
Operating current without outputs I _o	0.15 A
Input L _e	Learning button
Maximum current	35 mA
Input resistance	approx. 3 kΩ to GND
Input signal "1"	10 ... 30 V
Input signal "0"	0 ... 2 V
Outputs Y1 ... Y16	short-circuit proof, p-type
Max. cable length	30 m
Output voltage U _a	U _e - 1 V
Output current I _a	max. 100 mA each output
Overvoltage category	III
Degree of pollution	2
Resistance to vibrations	10 ... 55 Hz / 0,0375 mm
Resistance to shock	15 g / 11 ms
Ambient temperature	-5 °C ... +60 °C
Storage and transport temperature	-25 °C ... +70 °C



3. Shaft components

3.3 Magnetic reed switches BN-series



■ BN 85 ¹⁾



■ BN 310



■ BN 325 ²⁾

Technical features

Material of the enclosure	Thermoplastic rectangular	Thermoplastic rectangular, flat	Thermoplastic rectangular
Enclosure construction form			
Dimensions (H x W x D)	40 x 35 x 16,5	88 x 25 x 13	85 x 24 x 26
Protection class	IP40	IP67	IP40 / IP67
Connection:	Enclosure hole, pluggable on C-rail	Enclosure hole	rear with 2 threaded bolts
Actuation direction	front side	side or front available on request	From side
Contact variants	Bistable contact	Bistable contact NC / NO	Bistable contact
Lift speed ³⁾	18 m/s	18 m/s	18 m/s
Switching frequency		< 300 Hz	< 300 Hz
Switching voltage	max. 60 VAC/VDC	max. 250 VAC/VDC	max. 250 VAC/VDC
Switching current	max. 1 A	max. 3 A	max. 3 A
Switching capacity	max. 30 VA / W	max. 120 VA / W	max. 120 VA / W
LED status display	not available	not available	LED (IndexG)
Ambient temperature	0 °C ... +75 °C	-25 °C ... +75 °C	-25 °C ... +75 °C
Approvals			

¹⁾ The magnetic switch BN 85-5 enables installing up to 5 BN 85 units in one enclosure. Mutual interference can be avoided due to integrated shielded plates.

²⁾ Because of its integrated shield and plug connector, BN 325 is suitable especially for close together installations. Protection class: IP40 with insulated plug, IP67 with cable outlet on additional shielding plate

³⁾ The lift speed is in reference to the application with round magnets.



■ BN 65 / BN 65V

■ BN 650 / BN 650V

■ BN 12 / BN 12V

■ BN 120 / BN 120V

■ BN 120L / BN 120L/V

Thermoplastic cylindrical Ø13, 103 IP67 central with threaded flange side or front Bistable contact NC / NO 18 m/s < 300 Hz max. 250 VAC max. 3 A max. 120 VA / W not available -25 °C ... +75 °C 	Thermoplastic cylindrical Ø13, 103 IP67 central with threaded flange side or front Bistable contact NC / NO 18 m/s < 300 Hz max. 200 VAC/DC max. 1 A max. 30 VA / W not available -25 °C ... +70 °C	Metal cylindrical Ø12, 71 IP67 central with thread side or front Bistable contact NC / NO 18 m/s < 300 Hz max. 200 VAC max. 1 A max. 30 VA / W not available -25 °C ... +70 °C	Thermoplastic cylindrical Ø12, 71 IP67 central with thread side or front Bistable contact NC / NO 18 m/s < 300 Hz max. 200 VAC max. 1 A max. 30 VA / W not available -25 °C ... +70 °C	Thermoplastic cylindrical Ø12, 102 IP67 central with thread side or front Bistable contact NC / NO 18 m/s < 300 Hz max. 200 VAC max. 1 A max. 30 VA / W not available -25 °C ... +70 °C
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More information:

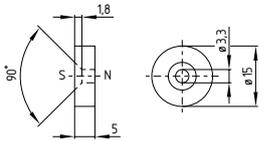
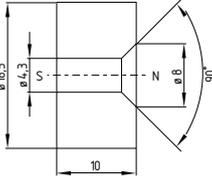
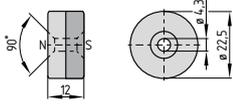
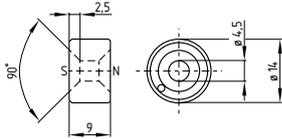
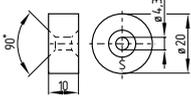
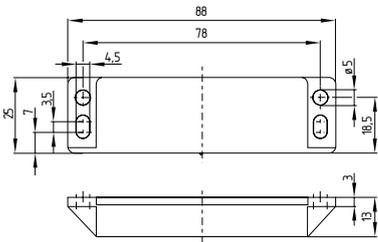
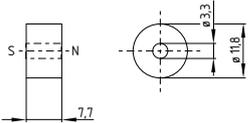
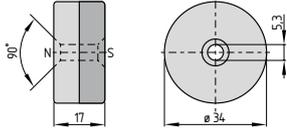
The electrical life is between 1 million and 1 billion operations, dependant on load.

The magnetic switches are supplied with pre-assembled cables or connectors.

System components, such as clamps and brackets are available for magnetic switches BN 65, BN 65/V, BN 12, BN 12/V and BN 120, BN 120/V.

3. Shaft components

3.4 Magnetic reed switches actuator-overview

BP 6 unenclosed	BP 10 unenclosed	BP 15 with plastic enclosure
		
BP 7 unenclosed	BP 15/2 unenclosed	BP 310 with plastic enclosure
		
BP 8 unenclosed	BP 34 with plastic enclosure	BP 34 with plastic enclosure
		

Different actuating magnets are available for the magnetic switches presented here. These must be selected according to the specific installation situation.

3. Shaft components

3.5 Magnetic reed switches selection table: Switching distances

Actuating magnet	BN 85-5 N or S	BN 85 N or S	BN 310 NC contact/NO contact N/S	BN 310 Bistable contact S or N	BN 325 S or N	BN 65 NC contact/NO contact N/S	BN 65 Bistable contact S or N	BN 65/V NC contact/NO contact S or N	BN 65/V Bistable contact N/S	BN 650, 12, 120, 120L NC contact/NO contact N/S	BN 650, 12, 120, 120L Bistable contact S or N	BN 650/V, 12/V, 120/V, 120L/V NC contact/NO contact S or N	BN 650/V, 12/V, 120/V, 120L/V NC contact/NO contact S or N	BNS 260
Unenclosed														
BP 6 S		2 - 12												
BP 7 S	6 - 22													
BP 8 S		2 - 10												
BP 10			0 - 5	0 - 15	0 - 10	0 - 5	0 - 15	0 - 5		0 - 5	0 - 15	5		
2 x BP 10		6 - 27	0 - 17	0 - 20	0 - 15	0 - 17	0 - 20	0 - 10	0 - 3	0 - 19	0 - 22	0 - 11	0 - 3	
2 x BP 15/2			0 - 17	0 - 22	0 - 17	0 - 17	0 - 22			0 - 19	0 - 24			
Plastic enclosure														
BP 15		5 - 22	0 - 6	0 - 17	0 - 12	0 - 6	0 - 17	0 - 6		0 - 7	0 - 19	0 - 7		
2 x BP 15		7 - 28	0 - 17	0 - 22		0 - 17				0 - 19	0 - 22			
BP 34		10 - 40	5 - 20	15 - 30	10 - 25	15 - 22	15 - 30	0 - 20	0 - 15	16 - 22	16 - 35	0 - 22	0 - 16	
BP 310-1S			0 - 10											
BP 310-1N			0 - 10											
BP 310-2S			0 - 15											
BP 310-2N			0 - 15											
BPS 260														0 - 5

All dimensions in millimeter (mm)

Note:

The specified switching distances are applicable for the actuation of individually mounted components without ferromagnetic influence. A change of the distance, positive or negative, is possible due to ferromagnetic influences. The mutual interference between multiple actuating magnets must be observed. (For special versions: diverging values possible.)

3. Shaft components

3.6 Position switch with safety function – series overview



Technical features

Electrical characteristics			
Switching system	Snap-/slow action	Snap-/slow action	Snap-/slow action
Latching variant	■	■	■
Max. number of contacts	3 ¹⁾	3 ¹⁾	3 ¹⁾
Max. switching capacity U/I	230 VAC / 3 A; 24 VDC / 1.5 A	230 VAC / 3 A; 24 VDC / 3 A	230 VAC / 3 A; 24 VDC / 3 A
Mechanical data			
Housing material	Metal / thermoplastic enclosure	Metal enclosure, painted	Thermoplastic enclosure
Connection	Cable 4/6 pole M12 connector 4/6 pole	1 x M20 M12 connector 5/8 pole	1 x M20 M12 connector 4/8 pole
Cable section ³⁾	4/6 x 0.5 mm ²	max. 1.5 mm ² (incl. conductor ferrules)	max. 1.5 mm ² (incl. conductor ferrules)
Dimensions (W x H x D)	31 x 52 x 16.6 mm	31 x 66 x 33 mm	31 x 66 x 33 mm
Ambient conditions			
Ambient temperature	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C
Protection class	IP66, IP67	IP66, IP67	IP66, IP67
Actuator heads	see page 32	see page 32	see page 32

Safety classification

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
B_{10D} NC contact	20,000,000	20,000,000	20,000,000
Certificates		 under preparation: 	 under preparation:

Note:

All position switches have fixing dimensions compliant with EN 50047.

¹⁾ Switching function: max. 3 NC, max. one as NO also possible

²⁾ Switching function: 2 NC, 1 NC / 1 NO or 2 NO (also with different switching points - overlapping and early switching)

³⁾ Switches ZxM 476 and Z 231-01yr-1256 feature a small release force and small trip mode.

⁴⁾ In place of the x, the actuator element type is used. See overview of Actuator elements on page 32.



■ PS226



■ Z/T 236



■ Z/T 335



■ Z 231-01yr-1256 ³⁾



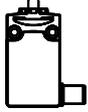
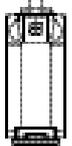
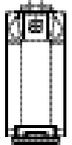
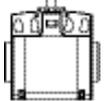
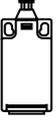
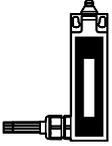
■ ZxM 476 ^{3) 4)}

Snap-/slow action	Snap-/slow action	Snap-/slow action	Snap action	Snap action (electrical reset)
■	■	—	■	■
3	2 ²⁾	2 ²⁾	1 NC contacts	3 ¹⁾
230 VAC / 3 A; 24 VDC / 3 A	230 VAC / 4 A; 24 VDC / 1 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A
Thermoplastic enclosure	Thermoplastic enclosure	Aluminium die-cast, paint finish	Thermoplastic enclosure	Thermoplastic enclosure
2 x M20 M12 connector 4/8 pole	1x M20 M12 connector	1x M20 M12 connector	1x M20 connecting cable	connecting cable
max. 1.5 mm ² (incl. conductor ferrules)	0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	0.75 ... 2.5 mm ²	—
31 x 59.2 x 33 mm	30 x 61.5 x 30 mm	40.5 x 76 x 38 mm	30 x 58 x 31 mm	30 x 104 x 36 mm
-30 °C ... +80 °C	-30 °C ... +80 °C	-25 °C ... +70 °C	-30 °C ... +80 °C	-25 °C ... +50 °C
IP66, IP67	IP67	IP67	IP65	IP67
see page 32	see page 32	see page 32	see page 32	see page 32

ISO 13849-1 20,000,000	ISO 13849-1 20,000,000	ISO 13849-1 20,000,000	ISO 13849-1 20,000,000	ISO 13849-1 300,000
under preparation: 				

3. Shaft components

3.7 Position switches – overview of actuators

Position switches		Actuator heads				
						
						
	PS116 • Metal / thermoplastic enclosure • Cable / connector M12 bottom/right • Mounting details to DIN EN 50047	S200	R200			K200
	PS215 • Metal enclosure, painted • 1 cable entry or Connecting cable/connector plug M12 bottom/right • Mounting details to DIN EN 50047	S200	R200			K200
	PS216 • Thermoplastic enclosure • 1 cable entry or Connecting cable/connector plug M12 bottom/right • Mounting details to DIN EN 50047	S200	R200			K200
	PS226 • Thermoplastic enclosure • 2 cable entries or connector plugs M12 • Mounting details to DIN EN 50047	S200	R200			K200
	Z/T 236 • Thermoplastic enclosure • 1 Cable entry • Mounting details to DIN EN 50041	S	R	4NO	4R	1R
	Z/T 335 • Aluminium die-cast, paint finish • 1 Cable entry • Mounting details to DIN EN 50047	S				1R
	Z 231 • Thermoplastic enclosure • 1 cable entry • Mounting details to DIN EN 50047	S				
	ZxM 476 • Thermoplastic enclosure • Right, left or central cable output • Mounting details to DIN EN 50047	S				1R

¹⁾ This actuator is not suitable for safety applications.

Actuator heads

									
									
K210	K230	K250	K240	H200		N200			J200
K210	K230	K250	K240	H200		N200			J200
K210	K230	K250	K240	H200		N200			J200
K210	K230	K250	K240	H200		N200			J200
K	3K	4K	K4	H	H-1058	7H-2138-	7H-1058/ -2138		10H
	3K			H	H-1058	7H-2138-	7H-1058/ -2138		10H
	3K		K4		V7H V12H V14H V15H				

3. Shaft components

3.8 Door locking devices – AV-series



■ AV 15

■ AV 20

Technical features

Material of the enclosure	Metal	Thermoplastic
Dimensions (H x W x D)	165 x 80 x 36	165 x 80 x 37
Number of door leafs	1	1
Anti-faulty closing protection	Yes ¹⁾	Yes ¹⁾
Emergency release	with M5 triangular key	with M5 triangular key
Auxiliary contact	optional	Yes
Protection class	IP20, IP41	IP54
Execution of the actuator head	selectable (pull strap, lever, bearing block)	selectable (pull strap, lever, bearing block)
operating current I_e / operating voltage U_e	2 A/230 VAC; 2 A/200 VDC	2 A/230 VAC; 2 A/200 VDC
Ambient temperature	-15 °C ... +70 °C	-15 °C ... +70 °C
Approvals		

¹⁾The AV series anti-faulty closing protection devices are based on a magnetic operating principle which allows the door lock to be operated even with large tolerances of the door leaf. These door locking devices are relatively insensitive to soiling and are subject to little wear. The actuating magnets for the AV anti-faulty closing protection device are included in delivery.



■ AV 18



■ AV 21



■ AV 25



■ AV 28

Metal	Thermoplastic	Metal	Metal
165 x 80 x 37.5	165 x 80 x 37	285 x 80 x 36	285 x 80 x 36
1	1	2	2
No	No	Yes ¹⁾	No
with M5 triangular key	with M5 triangular key	with M5 triangular key	with M5 triangular key
optional	Yes	optional	optional
IP20, IP41	IP54	IP20	IP20
selectable	selectable	Pull Strap	Pull Strap
(pull strap, lever, bearing block)	(pull strap, lever, bearing block)		
2 A/230 VAC; 2 A/200 VDC	2 A/230 VAC; 2 A/200 VDC	2 A/230 VAC; 2 A/200 VDC	2 A/230 VAC; 2 A/200 VDC
-15 °C ... +70 °C	-15 °C ... +70 °C	-15 °C ... +70 °C	-15 °C ... +70 °C

More information:

The door locking devices can be supplied with different locking bolt lengths (see definition X dimension, page 23). In order to comply with the requirements of EN 81-1/-2, the locking bolts have a 45° bevel, right, left, top or bottom. The door locking devices are available with a standard M20 cable gland or with cable entries for a single conductor.

SOL-AV 15 / AV 18 solenoid

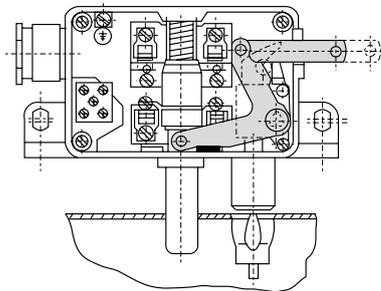
The SOL-AV 15 / AV 18 solenoid was developed for the electrical actuation of the AV 15 and AV 18 door interlocks, which have been used all over the world for many years to lock single-leaf lift shaft doors.

In addition to the conventional mechanical actuation by roller levers, the SOL-AV 15 / AV 18 solenoid now also enables an electrical actuation of the above-mentioned door interlocks. It requires very little space and therefore offers excellent application possibilities. Mounting brackets, fork head and pull strap adapter are included in delivery.

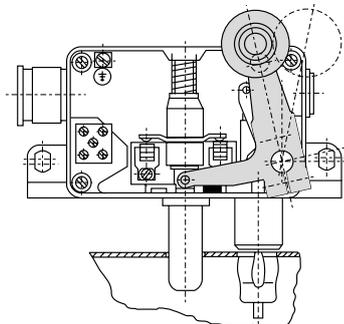
3. Shaft components

3.9 Door locking devices – overview of actuators

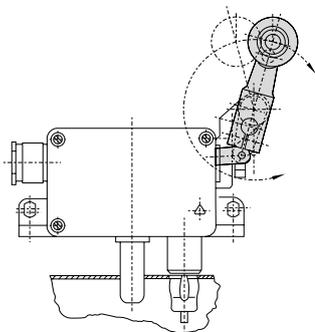
Version R with pull strap



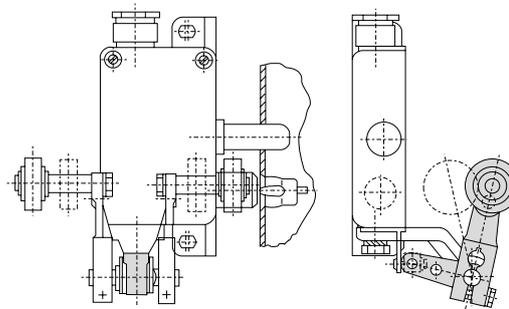
Version RH with roller lever



Version RB with roller lever and bearing block B



Version LB2 with roller lever and bearing block B2



The door locking devices can be adjusted to the individual application via a variety of actuators. Different types of lever and different lever lengths, deflections and bearing blocks are available.

More information:

When looking from the car to the device, which is integrated in the door post, the definition is as follows:

- If the door locking device is actuated from the right-hand side, it is a right-hand version.
- If the door locking device is actuated from the left-hand side, it is a left-hand version

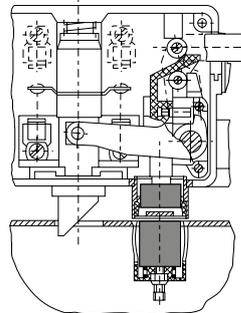
3. Shaft components

3.10 Door locking devices – explanations

Definition of "anti-faulty closing protection"

According to the lift standards, door locking devices for passenger lifts must be equipped with an anti-faulty closing protection feature. This protection is designed to prevent the lift car from being locked and thereby moved while the door is open.

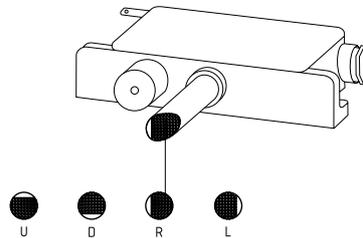
This requirement is met by the AV 15, AV 20 and AV 25 door locking devices with magnetic anti-faulty closing protection. The large sphere of action of the solenoids provides for a quick and smooth fitting as well as for a permanent adjustment-free use.



Definition of "locking bolt bevel"

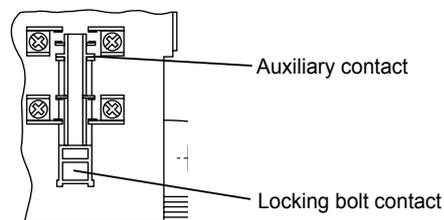
The bevel of the locking bolt is always located on the side, where the shaft door hits the locking bolt during the closing operation.

For standard hinged doors, this is below the AV door locking device, bevel U. For sliding doors, this can be either on the right-hand side or the left-hand side. Cover-side bevels are very rare, as in this case the triangular emergency release indicates to the lift shaft and is therefore inaccessible from the outside.



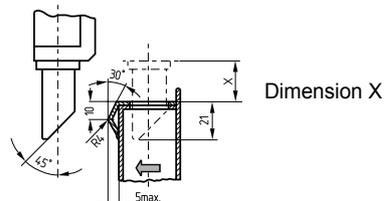
Auxiliary contact K

The auxiliary contact K indicates the unlocked position of the bolt. In this way, it is possible e.g. to detect which door is unlocked or which electric door opener is actuated. This is always the upper contact. The AV 20 and AV 21 door locking devices are equipped by default with an auxiliary contact, for AV 25, AV 28, AV 15 and AV 18, it can be ordered optionally.



Dimension X

The entire locking bolt length results from the prescribed insertion depth of the locking bolt into the door leaf of 21 mm and dimension X. Dimension X represents the distance between the bottom of the enclosure of the door closing device and the top of the door.



3. Shaft components

3.11 Door contacts – AZ-series



Technical features

Actuator	selectable	selectable	selectable
Longitudinal mounting holes for fine adjustment	No	No	Yes
Fixing screws	Allen	Allen	Allen
Protection class	IP00	IP20	IP20
Double insulated	No	No	No
Contact design	Contact pins in the switch ²⁾	Contact pin in actuator bridge	Contact pin in actuator bridge
Cable entry	Single conductor entry	Single conductor entry	Single conductor entry
operating current I_o / operating voltage U_o	2A / 230 VAC, 1A / 200 VDC	2A / 230 VAC, 2A / 200 VDC	2A / 230 VAC, 2A / 200 VDC
Ambient temperature	-15 °C ... +70 °C	-15 °C ... +70 °C	-15 °C ... +70 °C
Approvals			

¹⁾ The AZ 15-zo door contact is suitable for use in dusty and wet environments.

²⁾ Contact pins in the switch allow the actuator to be supplied in small radii and allow greater mobility for the actuator when closed.

³⁾ optional integrated plug

⁴⁾ TÜV expert opinions



■ AZ 051 / 052 / 053

■ AZ 061 / 062 / 063

■ AZ 08

■ AZ 14-1

■ AZ 15-zo ¹⁾

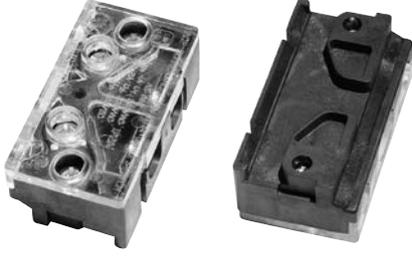
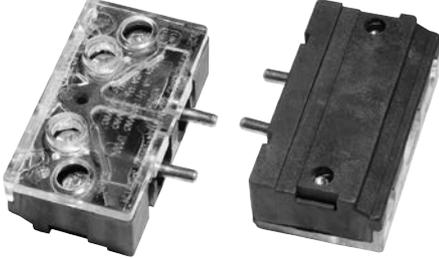
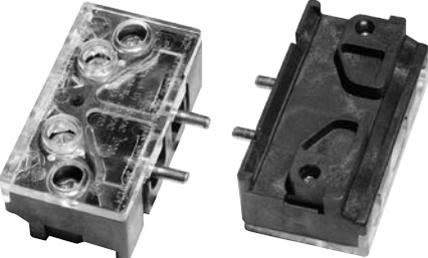
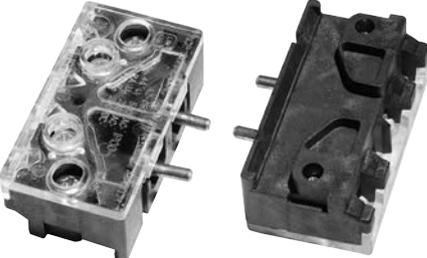
selectable No	selectable No	selectable Yes	selectable Yes	included Yes
self-forming PoziDriv screws IP00 No	self-forming PoziDriv screws IP20 No	Without IP20 No	Without IP20 No	Without IP67 Yes
Contact pins in the switch ²⁾	Contact pin in actuator bridge	Contact pin in actuator bridge	Contact pin in actuator bridge	actuating bracket (without electrical function)
Single conductor entry plastic-sheathed cable 2A / 230 VAC, 1A / 200 VDC	Single conductor entry plastic-sheathed cable 2A / 230 VAC, 2A / 200 VDC	Single conductor entry 2A / 230 VAC, 2A / 200 VDC	Sheathed cable 2A / 230 VAC, 2A / 200 VDC	Sheathed cable 2A / 230 VAC, 0.5A / 200 VDC
-30 °C ... +70 °C	-30 °C ... +70 °C	-30 °C ... +80 °C	-30 °C ... +70 °C	-30 °C ... +80 °C

More information:

The Series AZ door contacts have self-extinguishing thermoplastic enclosures. All screws are captive and can be supplied in different lengths on request. Self-forming Pozidriv screws can be used instead of Allen screws.

3. Shaft components

3.13 Door contacts – overview of AZ 05x and AZ 06x

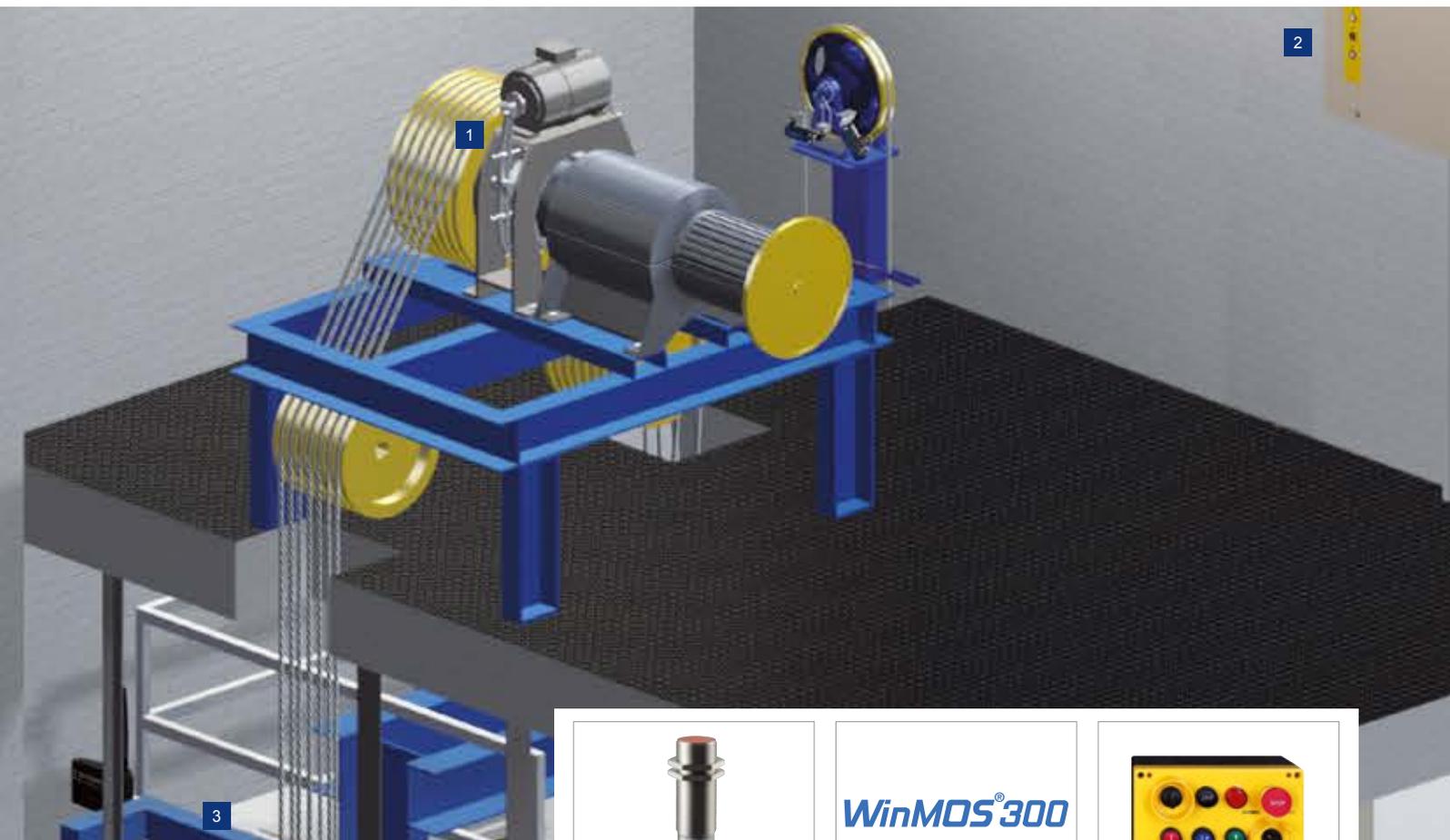
AZ 061	Standard	AZ 062	Standard	AZ 063	Standard
					
AZ 051	Alternative	AZ 052	Alternative	AZ 053	Alternative
					
<ul style="list-style-type: none"> ■ Enclosure height 16 mm ■ without cable duct ■ Self-tapping M4 Pozidrive screws 		<ul style="list-style-type: none"> ■ Enclosure height 19 mm ■ Bottom-side cable duct ■ Self-tapping M4 Pozidrive screws 		<ul style="list-style-type: none"> ■ Enclosure height 19 mm ■ Bottom- and rear-side cable duct ■ Self-tapping M4 Pozidrive screws 	

Note:

The rear of the door contact provides for wiring possibilities both for single conductors and for sheathed cables. The cable insulation is led into the enclosure through largely dimensioned openings.

4. Monitoring, operating and maintenance

4.1 Applications



1 Inductive Proximity switches

- Reliable switching action without contact chatter
- Non-sensitive to vibration
- Long life

Code numbers:
IFL



2 Software for diagnostics / Configuration

- Monitoring
- Diagnostics
- Statistics
- Emergency call management
- Overview with layout maps
- Cyclical calls
- Fault registration

Code numbers:
WinMOS[®]300

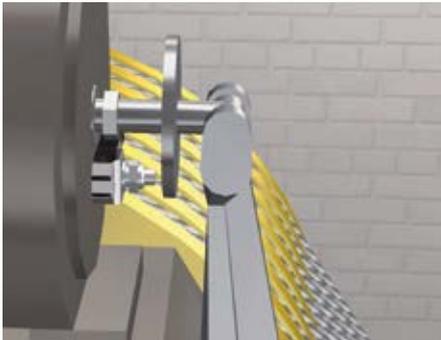


3 Inspection boxes (TOCI)

- Customer-specific arrangement
- Can be supplied either prefitted with cables and connectors or with terminals

Code numbers:
TOCI

Application 1

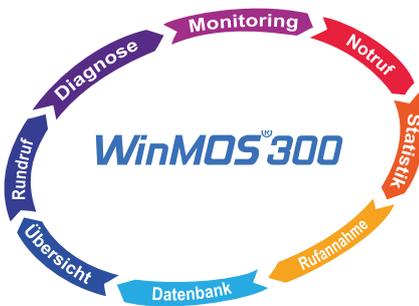


Monitoring of the brake

The brake is among the most important elements of a lift system. The position of the brake can be monitored by inductive proximity switches of the IFL-series.

The sensors, here, are distinguished by their reliable switching action without contact chatter. In addition, they are non-sensitive to vibration and due to their contact free operation they assure a long lifetime.

Application 2



Remote management with WinMOS®300

As part of our control concept, all controller are prepared for remote data transfer with the WinMOS®300 program. For different areas of application, various software modules are available which can be configured and tuned precisely for your application. With WinMOS®300, any number of control systems from different manufacturers can be monitored. In this way, you can check the number of lift operations, view current messages and e.g. parametrise holding times in the control system. A service visit is made before errors in performance turn in malfunctions.

Instead of time-orientated maintenance, demand-orientated maintenance is carried out based on the number of lift travels, operating hours or when a scheduled appointment is reached. This increases the availability of the lift system and reduces costs.

Available modules:

- Monitoring
- Diagnostics
- Statistics
- Overview with layout maps
- Cyclical calls
- Fault registration

4. Monitoring, operating and maintenance

4.2 Inspection boxes and manual control

Inspection boxes (lifts)



- Design
 - according to customer specification
 - according to different national regulations
- Supply
 - labelled and assembled
 - labelled and assembled and wired
 - tested, with customer nameplate and number
- Standard-inspect switches as cam switches with positive break
- Button, standard version
- Switch element for DC 24 V and AC 230 V
- Button with recessed actuator against accidental operation
- Buttons and switches with guard collar against accidental operation

Inspection boxes (lifts / North America)



- Design
 - according to customer specification
 - according to different national regulations
- Supply
 - labelled and assembled
 - labelled and assembled and wired
 - tested, with customer nameplate and number
- Standard-inspect switches as cam switches with positive break
- Button, standard version
- Buttons and switches with guard collar against accidental operation
- With lamp and GFCI according to US code
- Enclosure and components with UL / CSA certification for USA and Canada
- With UL/CSA assembly inspection available on request

Manual control for lifts and excalators



- Design
 - according to customer specification
 - according to different national regulations
- Supply
 - labelled, assembled and wired
 - tested, with customer nameplate and number
- Minimum dimensions
- Ergonomic design
- Button, standard version
- Button with recessed actuator against accidental operation

Command devices for shaft and lift control cabinets



- Enclosure
- Button
- Switch
- Indicator lamp

Not all products in this folder are available in all countries. Please check local availability with your sales contact. To get detailed information about the products, visit www.schmersal.net

4. Monitoring, operating and maintenance

4.3 Configuration and diagnostics software

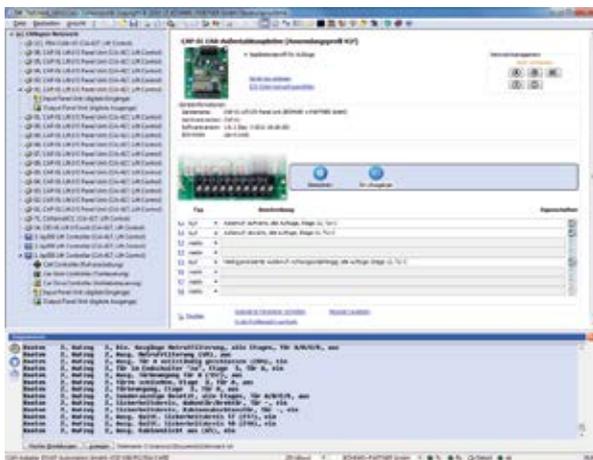
Configuration software



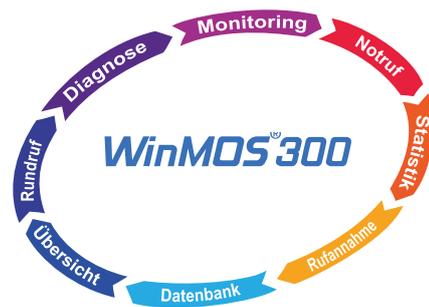
The software CANwizard® is a configuration tool for CANopen devices and networks. It contains special features for the application profile CANopen CiA-417 (lift control). For the lift technician the CANwizard provides an easy way to configure devices from many different brands without any knowledge of CANopen networks.

For developers of CANopen devices the software provides many diagnostic features, firmware update via the CAN bus and to write own extensions.

Further information can be found at www.canwizard.de



Diagnostics software



The WinMOS®300 system is part of our control concept. All controllers are prepared for remote data transfer using our WinMOS®300 program.

For different areas of application, various software modules are available, which can be configured and tuned precisely for your application. With a conventional EDP set-up (computer, modem, telephone or network connection) and WinMOS®300, any number of control systems from different manufacturers can be monitored. In this way, you can check the number of lift operations, view current messages and e.g. parametrise holding times in the control system. A service visit is made before errors in performance turn in malfunctions. Instead of time-orientated maintenance, demand-orientated maintenance is carried out based on the number of lift travels, operating hours or when a scheduled appointment is reached. This increases the availability of the lift system and reduces costs. Satisfied users and operators are grateful for it.

Available modules:

- Monitoring
- Diagnostics
- Statistics
- Emergency call management
- Overview with layout maps
- Cyclical calls
- Fault registration

Further information can be found at www.winmos.de



5. Components for lifts according to the Machinery Directive

5.1 Applications



Solenoid interlock

- Actuator on moving part of door
- Power to unlock and power to lock

Code numbers:
AZM161, AZM300



Monitoring of safety sensors

- Realisation of safety functions
- 1- or 2-channel monitoring of safety sensors
- with or without cross-wire short detection

Code numbers:
SRB, SRB-E, PSC1



Command and signalling devices

- Man-machine interface
- Extensive program for different areas of application

Application 1

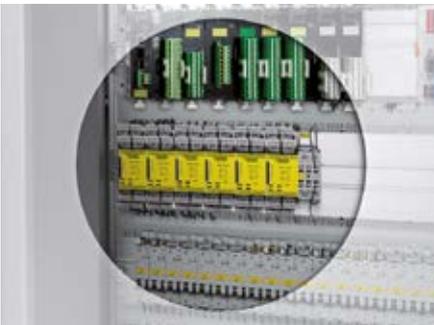


Door monitoring with solenoid interlock

The solenoid interlock of the Schmersal Group is based on the principle of separate actuators: The actuator element is fixed in the moveable part (mostly a safety door) of the guard system. The interlock itself is fixed, such as on the post of a safety door. Shutting the safety equipment immerses the actuator in the device and interlock locks the safety door. Only then can the machine be started. The position of the locked actuator is continuously being monitored. When the safety guard is opened in the unlocked condition, the actuator is separated from the base unit. During this process, the NC contacts are positively opened and the

NO contacts closed. There are two interlocking principles: The "Power to unlock" principle is where the locking bolt is held into position with a spring. By energizing the interlocking solenoid coil, the interlock unlatches and the NC contact is opened, and the protection equipment can be opened. With the "Power to lock" principle, the operation is reversed. For the selection of the principle an analysis of the accident risk has to be made, as you should be able to open the protection equipment in the event of a fault (e.g. broken cable) or with a loss of power.

Application 2



Monitoring of safety sensors

The multifunctional safety modules of the SRB – series are for the safe evaluation of switching signals. Signalling devices are mounted to the side on slidable, rotating or removable safety equipment and can, for example be an EMERGENCY STOP button, an electromechanical position switch, a safety switch, or a solenoid interlock. The modules can be used universally, regardless of the manufacturer of the safety switchgear, which signals are monitored.

5. Components for lifts according to the Machinery Directive

5.2 Solenoid interlocks



■ AZM 161



■ AZM 300

Key Features

- Thermoplastic enclosure
- Individual coding possible
- Holding force 2000 N
- Power to unlock / Power to lock
- Up to 6 contacts
- Manual release, emergency exit or emergency release
- Cut clamps, screw terminals or connector plug

- Thermoplastic enclosure
- Individual coding possible
- Holding force 1000 N
- 2 safety outputs and 1 diagnostic output
- Manual release, emergency exit or emergency release
- 3 different directions of actuation

Other versions

ATEX / IECEx

■

-

AS-i SaW

■

■

SD-Interface

-

■

Technical features

Electrical characteristics

Operating voltage

-

24 VDC

Power consumption

-

0.25 A (without load)

Max. switching capacity U/I

230 VAC / 4 A;
24 VDC / 2.5 A

24 VDC / 0.25 A

Mechanical data

Dimensions (W x H x D)

130 x 90 x 30 mm

88 x 135 x 35 mm

Ambient conditions

Ambient temperature

-25 °C ... +60 °C

0 °C ... +60 °C

Protection class

IP67

IP66, IP67, IP69

Safety classification

Standards

ISO 13849-1

ISO 13849-1,
IEC 61508

B_{10D} NC contact

2,000,000

-

PL/ SIL

-/-

e/3

Category

-

4

PFH

-

4.3 x 10⁻⁹ / h

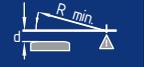
Certificates



* Schmersal is a certified company to appendix X of the Machinery Directive. As a result, Schmersal is entitled to autonomously conduct the conformity assessment procedure for the products listed in Appendix IV of the MD without involving a notified body.

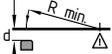
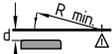
5. Components for lifts according to the Machinery Directive

5.3 AZM 161 – Actuator-Overview

Actuator type	Actuator description	Designed for					Type designation	Material number
			R _{min} [mm]	d [mm]	R _{min} [mm]	d [mm]		
 Flexible actuator	Standard		95	11	95	11	AZM 161-B6	101144420
	For right-hand side door hinge with individual coding		95	11	95	11	AZM 161i-B6R	Included in delivery
	For left-hand side door hinge with individual coding		95	11	95	11	AZM 161i-B6L	Included in delivery
	With centering guide		95	17	95	17	AZM 161-B6-2177	101174113
	Shortened		95	---	95	---	AZM 161-B6S	101170375
 Straight actuator	Standard		---	---	---	---	AZM 161-B1	101145117
	Shortened		---	---	---	---	AZM 161-B1S	101171125
	With magnetic latch		---	---	---	---	AZM 161-B1-1747	101164100
	With slot lip-seal		---	---	---	---	AZM 161-B1-2024	101178199
	With ball latch		---	---	---	---	AZM 161-B1-2053	101173089
	With centering guide		---	---	---	---	AZM 161-B1-2177	101176642
	Standard		---	---	---	---	AZM 161-B1E	101144416
	Shortened		---	---	---	---	AZM 161-B1ES	101171859
	Standard		---	---	---	---	AZM 161-B1F	101175431

Actuating radii The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R_{min} [mm].

Key

-  Actuating radius over the small edge of the actuator
-  Actuating radius over the wide edge of the actuator
-  Sliding and removable safety guards
-  Hinged safety guards

Actuators must be ordered separately.

5. Components for lifts according to the Machinery Directive

5.4 AZM 161 – Accessories

SLOT SEALING PLUG AZM 161	Triangular key M5	Centering device
 <ul style="list-style-type: none">■ To cover unused actuator slots■ For protection against the ingress of dirt■ Easy to install by just clipping in	 <ul style="list-style-type: none">■ For manual release	 <ul style="list-style-type: none">■ Centring device for pre-positioning■ Mounting outside: TFA-020■ Mounting inside: TFI-020
Tamperproof screws		
 <ul style="list-style-type: none">■ Tamperproof screws with unidirectional slots■ M5 x 12■ M5 x 16■ M5 x 20■ Quantity 2 pcs		

5. Components for lifts according to the Machinery Directive

5.5 AZM 300 – Actuators and accessories

SZ 200	MP-AZ/AZM300-1	MS-AZ/AZM300-B1-1
 <ul style="list-style-type: none"> ■ Lockout tag with 5 bore holes for AZM 200 and AZM 201 ■ To prevent inadvertent closing, e.g. during maintenance 	 <ul style="list-style-type: none"> ■ Mounting plate 	 <ul style="list-style-type: none"> ■ Mounting set for actuators
AZM300-...-T / -N		
 <ul style="list-style-type: none"> ■ Emergency exit (-T) for fitting and actuation only from within the hazardous area ■ Emergency release (-N) for fitting and actuation only on the outside of the safety guard 		

Actuators must be ordered separately.

5. Components for lifts according to the Machinery Directive

5.6 Multifunctional safety module – SRB-E



■ SRB-E-301ST

Key Features

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 3 Safety outputs
- 1 auxiliary contact

Technical features

Electrical characteristics	
Operating voltage	24 VAC / VDC –20 % / +20 %
Operating current	0.1 A
Max. switching capacity of the safety contacts	3 x 230 V / 6 A
of the safe semi-conductor outputs	–
of the auxiliary contacts	1 x 24 V / 1 A
of the signalling outputs	–
Drop-out delay STOP 0	< 10 ms
STOP 1	–
Mechanical data	
With removable terminals	■
Dimensions (H x W x D)	22.5 x 98 x 115 mm
Ambient conditions	
Ambient temperature	–25 °C ... +60 °C

Safety classification

Standards	ISO 13849-1, IEC 61508
PL/SIL	e/3
Category	4
PFH	< 1.8 x 10 ⁻¹⁰ /h
Certificates	

5. Components for lifts according to the Machinery Directive

5.7 Programmable modular safety controller – PROTECT PSC1



The safety control system PSC1 consists of freely programmable compact safety controller and I/O extension modules for reliable signal processing of EMERGENCY STOP switches, guard door switches, light grids and additional mechanical and electronic safety switchgear. Additionally there is the possibility via numerous functions to monitor axes. Using the universal communications interface a connection can be established to all the standard field bus systems.

- Safe logic control according to Annex IV of the Machinery Directive 2006/42/EC
- Connection for all standard safety relays up to PL e and SIL 3
- Modular expansion with up to 272 inputs / outputs
- Four secure 2 A p-switching semiconductor outputs, can be switched to secure pn-switching semiconductor outputs
- Freely programmable inputs / outputs, 2 A p-switching
- Safe drive monitoring according to EN 61800-5-2 (SDM – Safe Drive Monitoring)
- Up to 12 axes
- Universal communication interface:
 - Supports all standard fieldbus systems
 - Setting and resetting of fieldbus protocols by software
 - Safe remote I/Os via Ethernet Safety Device to Device Communication (SDDC)
 - Safe cross communication via Ethernet Safety Master to Master Communication (SMMC)
- Integrated Schmersal SD Bus connection to the standard field bus systems
- Safety functionalities up to SIL 3 according to IEC 61508 / IEC 62061, PL e and Cat. 4 according to ISO 13849-1



5. Components for lifts according to the Machinery Directive

5.8 Command and signalling devices – Overview

Command and signalling devices makes communication possible between human beings and machines. People expect high levels of reliability from them. Intuitive operation is desirable not just from an ergonomic point of view, but also with regards to safety at work. The type of machine and the environmental conditions mean that the demands made of command and signalling devices are very different. Consequently, there is a wide range of different designs available.

For the human machine interface, the Schmersal Group offers a range of products for all areas of application. These include command and signalling device series that have been developed for dedicated use in hygiene-sensitive areas (Series N) as well as for extremely harsh ambient conditions (Series R).

All our series are distinguished by their very high levels of quality and their long service lives. They are of modular structure, which means you can adapt them in an optimum way to meet the exact requirements of your own individual application. With contact systems too, users have different choices.

	"E" program	"N" program	"R" program	"A" program
Area of Application	Applications under difficult operating conditions	Food, hygiene and outdoor applications	Heavy-duty applications	Industrial applications
Emergency-Stop push buttons				
Illuminated signal				
Pushbutton				
Illuminated pushbutton				
Mushroom head impact button/ Mushroom push button				
Selector switch / button				
Key-operated selector switch/button		—		
Step selector switch				—
Potentiometer drive				—
Main switches	—		—	—

Command and signalling devices
Product information



 **SCHMERSAL**
Safe solutions for your industry

Detailed information about the individual series
can be found in our catalogue:

Command and signalling devices





Service and consulting

In the area of lift control systems, in particular, competent and high quality consulting is required to generate an optimal solution for the customer. We are happy to provide comprehensive support in all matters relating to the use of our control systems, components, switchgear and software solutions. In agreement with our customers, we create the right solution to meet the requirement.

We are happy to adapt to your requirements.

A tailored solution is designed and developed at low cost according to your requirements profile.

Take advantage of our strengths:

- Adapted control systems for modernisation and new installation
- Demand-orientated shaft, lift car and machine room installation systems
- Controller for systems with machine room, machine room less systems or systems with door frame controls
- Standard lift functions and individual special functions
- Configuration and diagnostics software
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■ **Hauptsitz – Headquarters**
K.A. Schmersal GmbH & Co. KG
Industrielle Sicherheitssysteme
 Postfach 24 02 63,
 42232 Wuppertal
 Möddinghofe 30
 D-42279 Wuppertal
 Phone: +49 202 6474-0
 Fax: +49 202 6474-100
 info@schmersal.com
 www.schmersal.com

Germany – Northern region

■ **Bergisch Gladbach**
BÖHNKE + PARTNER
GmbH Steuerungssysteme
 Heinz-Fröling-Str. 12
 D-51429 Bergisch Gladbach
 Phone: +49 2204 9553-0
 Fax: +49 2204 9553-555
 info@boehnkepartner.de

■ **Hamburg / Münster**
K.A. Schmersal GmbH & Co. KG
Vertriebsbüro Hamburg
 Innungsstraße 3
 D-21244 Buchholz i.d.N.
 Phone: +49 41 81 9220-0
 Fax: +49 41 81 9220-20
 vbhamburg@schmersal.com

■ **Berlin**
**KSA Komponenten der Steuerungs-
 und Automatisierungstechnik GmbH**
 Pankstr. 8-10 / Aufg. L
 D-13127 Berlin
 Phone: +49 30 474824-00
 Fax: +49 30 474824-05
 info@ksa-gmbh.de
 www.ksa-gmbh.de

■ **Hannover**
ELTOP GmbH
 Robert-Bosch-Str. 8
 D-30989 Gehrden
 Phone: +49 51 089273-20
 Fax: +49 51 089273-21
 eltop@eltop.de
 www.eltop.de

■ **Köln**
Stollenwerk
Technisches Büro GmbH
 Scheuermühlenstr. 40
 D-51147 Köln
 Phone: +49 2203 96620-0
 Fax: +49 2203 96620-30
 info@stollenwerk.de
 www.stollenwerk.de

■ **Siegen**
Siegfried Klein
Elektro-Industrie-Vertretungen
 In der Steinwiese 46
 D-57074 Siegen
 Phone: +49 271 6778
 Fax: +49 271 6770
 info@sk-elektrotechnik.de
 www.sk-elektrotechnik.de

■ **Leipzig**
K.A. Schmersal GmbH & Co. KG
Vertriebsbüro Leipzig
 Servicepark
 Druckereistraße 4
 D-04159 Leipzig
 Phone: +49 341 48734-50
 Fax: +49 341 48734-51
 vbleipzig@schmersal.com

Germany – Southern region

■ **Nürnberg**
K.A. Schmersal GmbH & Co. KG
Vertriebsbüro Nürnberg
 Lechstraße 21
 D-90451 Nürnberg
 Phone: +49 911 6496053
 Fax: +49 911 63290729
 vbnuernberg@schmersal.com

■ **Saarland**
**Herbert Neundörfer Werks-
 vertretungen GmbH & Co. KG**
 Am Campus 5
 D-66287 Göttingen
 Phone: +49 6825 9545-0
 Fax: +49 6825 9545-99
 info@herbert-neundoerfer.de
 www.herbert-neundoerfer.de

■ **Bayern Süd**
INGAM Ing. Adolf Müller GmbH
Industrievertretungen
 Elly-Staegmeyr-Str. 15
 D-80999 München
 Phone: +49 89 8126044
 Fax: +49 89 8126925
 info@ingam.de
 www.ingam.de

■ **Bietigheim**
K.A. Schmersal GmbH & Co. KG
Technologiezentrum
 Pleidelsheimer Straße 15
 74321 Bietigheim-Bissingen
 Phone: +49 7142 91028-0
 Fax: +49 7142 91028-28
 tzbw@schmersal.com

Europe

■ **Austria – Österreich**
AVS-Schmersal Vertriebs Ges. m.b.H.
 Biröstraße 17
 1232 Wien
 Phone: +43-1-6 10 28
 Fax: +43-1-6 10 28-1 30
 info@avs-schmersal.at
 www.avs-schmersal.at

■ **Belgium – Belgien**
Schmersal Belgium NV/SA
 Nieuwlandlaan 73
 Industriezone B413
 3200 Aarschot
 Phone: +32-16-57 16 18
 Fax: +32-16-57 16 20
 info@schmersal.be
 www.schmersal.be

■ **Bulgaria – Bulgarien**
CDL Sensorik OOD
 Stefan Caragea Street
 No 10 Office 4
 7002 Ruse City
 Phone: +359-0 40-7 35 16 55 25
 Fax: +359-0 40-2 69 25 33 44
 office@cdlsensorik.com
 www.cdlsensorik.com

■ **Bosnia and Herzegovina**
Tipteh d.o.o. Sarajevo
 Ulica Ramiza Salčina 246
 71000 Sarajevo
 Phone: +387- 61 92 36 23
 nadir.durmic@tipteh.ba
 www.tipteh.ba

■ **Croatia – Kroatien**
Tipteh Zagreb d.o.o.
 Pescanska 170
 10000 Zagreb
 Phone: +385-1-3 81 65 74
 Fax: +385-1-3 81 65 77
 tipteh@tipteh.hr

■ **Czech Republic – Tschech. Republik**
MERCOM COMPONENTA s.r.o.
 Bechyňská 640
 199 00 Praha 9 – Letňany
 Phone: +4 20-267 31 46 40-2
 mercom@mercom.cz
 www.mercom.cz
 www.schmersal.cz

■ **Denmark – Dänemark**
Schmersal Danmark A/S
 Lautruphøj 1-3
 2750 Ballerup
 Phone: +45-70 20 90 27
 Fax: +45-70 20 90 37
 info@schmersal.dk
 www.schmersal.dk

■ **Finland – Finnland**
Advancetec Oy
 Äyritie 12 B
 01510 Vantaa
 Phone: +3 58-2 07 19 94 30
 Fax: +3 58-9 35 05 26 60
 advancetec@advancetec.fi
 www.schmersal.fi

■ **France – Frankreich**
Schmersal France
 BP 18 - 38181 Seyssins Cedex
 8, rue Raoul Follereau
 38180 Seyssins
 Phone: +33-4 76 84 23 20
 Fax: +33-4 76 48 34 22
 info-fr@schmersal.com
 www.schmersal.fr

■ **Greece – Griechenland**
Kalamarakis Sapounas S.A.
Ionias & Neromilou
 PO Box 46566 Athens
 13671 Chamomilos Acharnes
 Athens
 Phone: +30-210-2 40 60 00-6
 Fax: +30-210-2 40 60 07
 ksa@ksa.gr
 www.ksa.gr

■ **Hungary – Ungarn**
NTK Ipari-Elektronikai és
Kereskedelmi Kft
 Gesztenyefa u. 4.
 9027 Győr
 Phone: +36-96-52 32 68
 Fax: +36-96-43 00 11
 info@ntk-kft.hu
 www.ntk-kft.hu

■ **Iceland – Island**
Reykjafell Ltd.
 Skipholt 35
 125 Reykjavik
 Phone: +354-5 88 60 10
 Fax: +354-5 88 60 88
 reykjafell@reykjafell.is

■ **Italy – Italien**
Schmersal Italia s.r.l.
 Via Molino Vecchio, 206
 25010 Borgosatollo, Brescia
 Phone: +39-0 30-2 50 74 11
 Fax: +39-0 30-2 50 74 31
 info@schmersal.it
 www.schmersal.it

■ **Macedonia – Mazedonien**
Tipteh d.o.o. Skopje
 Ul. Jani Lukrovski br. 2/33
 1000 Skopje
 Phone: +389-70-39 94 74
 Fax: +389-23-17 41 97
 tipteh@on.net.mk

■ **Netherlands – Niederlande**
Schmersal Nederland B.V.
 Lorentzstraat 31
 3846 AV Harderwijk
 Phone: +31-3 41-43 25 25
 Fax: +31-3 41-42 52 57
 info-nl@schmersal.com
 www.schmersal.nl

■ **Norway – Norwegen**
Schmersal Norge
 Hoffsvæien 92
 0377 Oslo
 Phone: +47-22 06 00 70
 Fax: +47-22 06 00 80
 info-no@schmersal.com
 www.schmersal.no

■ **Poland – Polen**
Schmersal - Polska Sp.j.
 ul. Baletowa 29
 02-867 Warszawa
 Phone: +48-22-8 16 85 78
 Fax: +48-22-8 16 85 80
 info@schmersal.pl
 www.schmersal.pl

■ **Portugal – Portugal**
Schmersal Ibérica, S.L.
 Apartado 30
 2626-909 Póvoa de Sta. Iria
 Phone: +351 - 21 959 38 35
 info-pt@schmersal.com
 www.schmersal.pt

■ **Romania – Rumänien**
CD SENSORIC SRL
 Str. George Enescu 21
 550248 Sibiu
 Phone: +40-2 69-25 33 33
 Fax: +40-2 69-25 33 44
 proiecte@cdl.ro
 www.cdl.ro

■ **Russia – Russland**
OOO AT electro Moskau
 ul. Avtosavodskaya 16-2
 109280 Moskau
 Phone: +7-49 5-9 21 44 25
 Fax: +7-49 5-9 26 46 45
 info@at-e.ru
 www.at-e.ru

OOO AT electro Petersburg
 Polytechniskaya str, d.9,B
 194021 St. Petersburg
 Phone: +7-81 2-7 03 08 17
 Fax: +7-81 2-7 03 08 34
 spb@at-e.ru

AT- Electronics Ekaterinburg
 Bebya str. 17, room 405
 620034 Ekaterinburg
 Phone: +7-34 3-2 45 22 24
 Fax: +7-34 3-2 45 98 22
 ural@at-e.ru

■ **Slovakia – Slowakei**
MERCOM COMPONENTA s.r.o.
 Bechyňská 640
 199 00 Praha 9 – Letňany
 Phone: +4 20-267 31 46 40-2
 mercom@mercom.cz
 www.mercom.cz
 www.schmersal.cz

■ **Slovenia – Slowenien**
Tipteh d.o.o.
 Ulica Ivana Roba 21
 1000 Ljubljana
 Phone: +386-1-2 00 51 50
 Fax: +386-1-2 00 51 51
 info@tipteh.si
 www.tipteh.si

■ **Spain – Spanien**
Schmersal Ibérica, S.L.
 Rambla P. Catalanes, 12
 08800 Vilanova i la Geltrú
 Phone: +34-902 56 64 57
 info-es@schmersal.com
 www.schmersal.es

■ **Sweden – Schweden**
Schmersal Nordiska AB
 F O Petersons gata 28
 421 31 Västra Frölunda
 Phone: +46-31-3 38 35 00
 Fax: +46-31-3 38 35 39
 info-se@schmersal.com
 www.schmersal.se

■ **Switzerland – Schweiz**
Schmersal Schweiz AG
 Moosmattstraße 3
 8905 Arni
 Phone: +41-43-3 11 22 33
 Fax: +41-43-3 11 22 44
 info-ch@schmersal.com
 www.schmersal.ch

Addresses

- **Turkey – Türkei**
Entek Otomasyon Urunleri San. ve Tic. A.S.
 Mahmutbey Mah.
 Tasocagi Yolu Cad. No: 9 Entek Plaza
 34218 Bagcilar / Istanbul
 Phone: +90 850 201 4141
 Fax: +90 212 320 1188
 info@entek.com.tr
 www.entek.com.tr
- **United Kingdom – Großbritannien**
Schmersal Ltd.
 Sparrowhawk Close
 Enigma Business Park
 Malvern Worcestershire WR14 1GL
 Phone: +44-16 84-57 19 80
 Fax: +44-16 84-56 02 73
 support@schmersal.co.uk
 www.schmersal.co.uk
- **Ukraine – Ukraine**
VBR Ltd.
 41, Demiyivska Str.
 03040 Kyiv Ukraine
 Phone: +38 (044) 259 09 55
 Fax: +38 (044) 259 09 55
 office@vbr.com.ua
 www.vbr-electric.com.ua/schmersal
- **Chile – Chile**
Vitel S.A.
 francisco@vitel.cl
 www.vitel.cl
SOLTEX
 central@soltext.cl
 www.soltext.com.cl
INSTRUTEC
 gcaceres@instrutec.cl
 www.instrutec.cl
OEG
 jmp@oegggroup.com
 www.oegggroup.cl
EECOL INDUSTRIAL ELECTRIC
 ventas@eecol.cl
 www.eecol.cl
- **PR China – VR China**
Schmersal Industrial Switchgear (Shanghai) Co. Ltd.
 Cao Ying Road 3336
 201712 Shanghai / Qingpu
 Phone: +86-21-63 75 82 87
 Fax: +86-21-63 75 82 97
 sales@schmersal.com.cn
 www.schmersal.com.cn
- **Colombia – Kolumbien**
EQUIPELCO
 aospina@equipelco.com
 www.equipelco.com
SAMCO
 jvargas@samcoingenieria.com
 www.samcoingenieria.com
- **Ecuador – Ecuador**
SENSORTEC S.A.
 AV. Napo y Pinto Guzmán
 Quito
 Phone: +593 091 40 27 65
 +593 095 04 86 11
 infogy@sensortecsa.com
 www.sensortecsa.com
- **Guatemala – Guatemala**
PRESTELECTRO
 AV Petapa 44-22,
 Zona 12; Cent. Com Florencia 01012
 Phone: +502 24 42-33 46
 Anabella.Barrios@prestelectro.com
 www.prestelectro.com
- **India – Indien**
Schmersal India Private Limited
 Plot No G 7/1,
 Ranjangaon MIDC,
 Taluka Shirur,
 District Pune 412220, India
 Phone: +91 21 38 61 47 00
 Fax: +91 20 66 86 11 14
 info-in@schmersal.com
 www.schmersal.in
- **Indonesia – Indonesien**
PT. Wiguna Sarana Sejahtera
 Jl. Daan Mogot Raya No. 47
 Jakarta Barat 11470
 Phone: +62-21-5 63 77 70-2
 Fax: +62-21-5 66 69 79
 email@ptwiguna.com
 www.ptwiguna.com
- **Iran – Iran**
Omid Electric
 No. 1-5, 1st Floor, Azizi passage,
 Southern Lalehzar Str. Tehran
 ZIP: 1144944181
 Phone: +98 21 33924027
 +98 21 33911022
 Fax: +98 21 33936635
 sales@omidelectric.com
- **Israel – Israel**
A.U. Shay Ltd.
 23 Imber St. Kiriat. Arieah.
 P.O. Box 10049
 Petach Tikva 49222 Israel
 Phone: +9 72-3-9 23 36 01
 Fax: +9 72-3-9 23 46 01
 shay@uriel-shay.com
 www.uriel-shay.com
- **Japan – Japan**
Schmersal Japan Branch Office
 3-39-8 Shoan, Sugunami-ku
 Tokyo 167-0054
 Phone: +81-3-3247-0519
 Fax: +81-3-3247-0537
 safety@schmersaljp.com
 www.schmersal.jp
- **Korea – Korea**
Mahani Electric Co. Ltd.
 20, Gungmal-ro, Gwacheon-si,
 Gyeonggi-do 427-060, Korea
 Phone: +82-2-21 94-33 00
 Fax: +82-2-21 94-33 97
 yskim@mec.co.kr
 www.mec.co.kr
- **Litauen/Estland/Lettland**
BOPLALIT
 Mus galite rasti:
 Baltų pr. 145, LT-47125, Kaunas
 Phone: +370 37 298989
 Phone: +370 37 406718
 infoboplalit.lt
 www.boplalit.lt
- **Malaysia – Malaysiaien**
Ingermark (M) SDN.BHD
 No. 29, Jalan KPK 1/8
 Kawasan Perindustrian Kundang
 48020 Rawang, Selangor Darul Ehsan
 Phone: +6 03-60-34 27 88
 Fax: +6 03-60-34 21 88
 enquiry@ingermark.com
- **Mexico – Mexiko**
ISEL SA de CV
 mario.c@isel.com.mx
 www.isel.com.mx
INNOVATIVE AUTOMOTION SOLUTIONS
 ias@iasmx.com
 www.iasautomation.com.mx
EASA ENERGIA Y AUTOMATIZACION
 ias@iasmx.com
 www.iasautomation.com.mx
DINAMICA S.A de C.V
 ias@iasmx.com
 www.iasautomation.com.mx
SIGRAMA S.A de C.V
 ias@iasmx.com
 www.iasautomation.com.mx
VGR TECHNOLOGIES
 ias@iasmx.com
 www.iasautomation.com.mx
- **New Zealand – Neuseeland**
Hamer Automation
 85A Falsgrave Street
 Phillipstown
 Christchurch, New Zealand
 Phone: +64-33 66 24 83
 Fax: +64-33 79 13 79
 sales@hamer.co.nz
 www.hamer.co.nz
- **Pakistan – Pakistan**
eurotech JLT
 Office No.3404, 34th Floor,
 HDS Tower, Sheikh Zayed Road,
 Jumeirah Lakes Towers (JLT),
 P.O.Box 643650, Dubai, UAE
 Phone: +9 71-4-4 21 46 00
 Fax: +9 71-4-4 21 46 01
 sales@eurotech.ae
 www.eurotech.ae
- **Paraguay – Paraguay**
Brasguay S.R.L.
 R. Internaciona 07
 KM 14 ; Minga Guazu
 Phone: +595 (61) 583-418/218/577
 brasguay@brasguay.com.py
 www.brasguay.com.py
- **Peru – Peru**
Fametal S.A.
 fametal@fametal.com
 www.fametal.com
AYD
 informes@ayd.com.pe
 www.ayd.com.pe
- **Serbia/Montenegro – Serbien/Montenegro**
Tipteh d.o.o.
 Toplice Milana 14A
 11050 Belgrade
 Phone: +3 81-11-2 89 22 50
 Fax: +3 81-11-3 01 83 26
 www.tipteh.rs
- **Singapore – Singapur**
AZAREL International Pte Ltd.
 Empire Techno Centre
 30 Kaki Bukit Road 3 #01-10
 Singapore 417819
 Phone: +65-67 42 29 88
 Fax: +65-67 42 26 28
 sales@azarel.com.sg
 www.azarel.com.sg
- **South Africa – Südafrika**
A+A Dynamic Distributors (Pty) Ltd.
 20 - 24 Augusta Road
 Regents Park
 2197 Booyens
 Phone: +27-11-6 81 59 00
 Fax: +27-11-4 35 13 18
 awkayser@iafrica.com
- **Taiwan – Taiwan**
Golden Leader Camel Ent. Co., Ltd.
 No. 453-7, Pei Tun Rd.
 Taichung City 40648, Taiwan
 Phone: +886-4-22 41 29 89
 Fax: +886-4-22 41 29 23
 camel88@ms46.hinet.net
 www.leadercamel.com.tw
- **Thailand – Thailand**
M. F. P. Engineering Co. Ltd.
 64-66 Buranasart Road
 Sanchaoporsva
 Bangkok 10200
 Phone: +66-2-2 26 44 00
 Fax: +66-2-2 25 67 68
 info@mfpthai.com
 www.mfpthai.com
- **United Arab Emirates – Vereinigte Arabische Emirate**
Multitech fze
 Office No.3404, 34th Floor,
 HDS Tower, Sheikh Zayed Road,
 Jumeirah Lakes Towers (JLT),
 P.O.Box 643650, Dubai, UAE
 Phone: +9 71-4-4 21 46 00
 Fax: +9 71-4-4 21 46 01
 sales@eurotech.ae
 www.eurotech.ae
- **USA – USA**
Schmersal Inc.
 15 Skyline Drive
 Hawthorne, NY 10532
 Phone: +1-(0) 8 88-4 96-51 43
 Fax: +1-(0) 9 14-3 47-15 67
 infousa@schmersal.com
 www.schmersalusa.com
- **Uruguay – Uruguay**
Gliston S.A.
 Pedernal 1896 – Of. 203
 Montevideo
 Phone: +598 (2) 2 00 07 91
 colmedo@gliston.com.uy
 www.gliston.com.uy
- **Venezuela – Venezuela**
EMI Equipos y Sistemas C.A.
 Calle 10, Edf. Centro Industrial
 Martinisni, Piso 3, La Urbina, Caracas
 Phone: +58 (212) 2 43 50 72
 ventas@emi-ve.com
 www.emi-ve.com
- **Vietnam – Vietnam**
Ingermark (M) Sdn Bhd, Rep Office
 No. 10 Alley 1/34, Lane 1,
 Kham Thien Str.,
 Kham Thien Ward Dong Da Dist.,
 10000 Hanoi, Vietnam.
 Phone: +04-35 16 27 06
 Fax: +04-35 16 27 05
 ingvietn18@gmail.com
 www.ingermark.com



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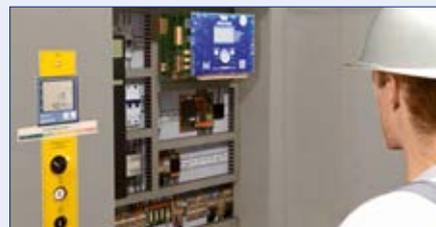
Lift controller



Components for lift construction



Control system assembly



The details and data referred to have been carefully checked.
Technical amendments and errors possible.

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