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.

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.

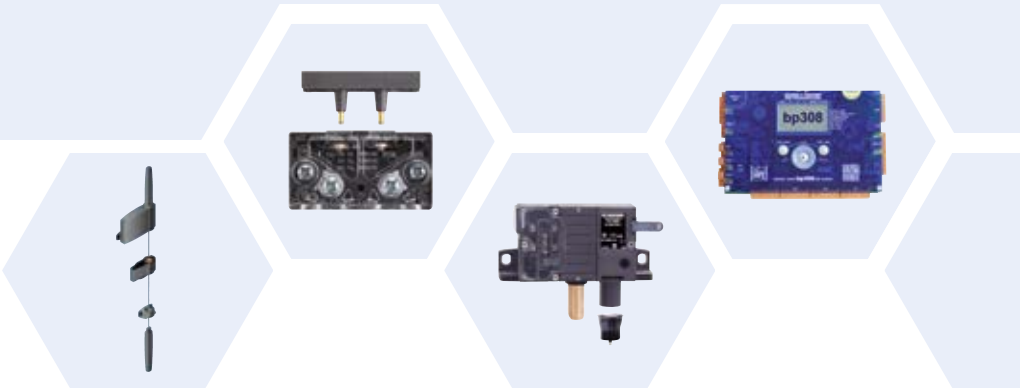
For new build and modernisation

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

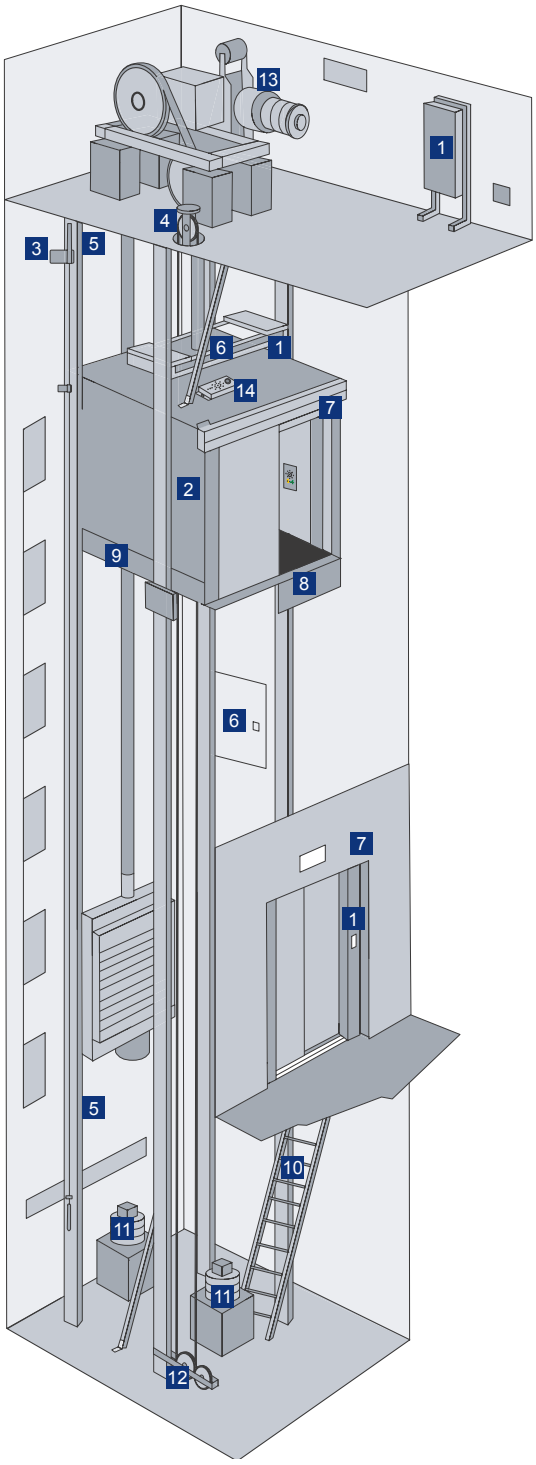
In the area of lift control systems, in particular, competent and high quality consulting is required to generate an optimal solution for the customer. We are happy to provide comprehensive support in all matters relating to the use of our control systems, components, switchgear and software solutions.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

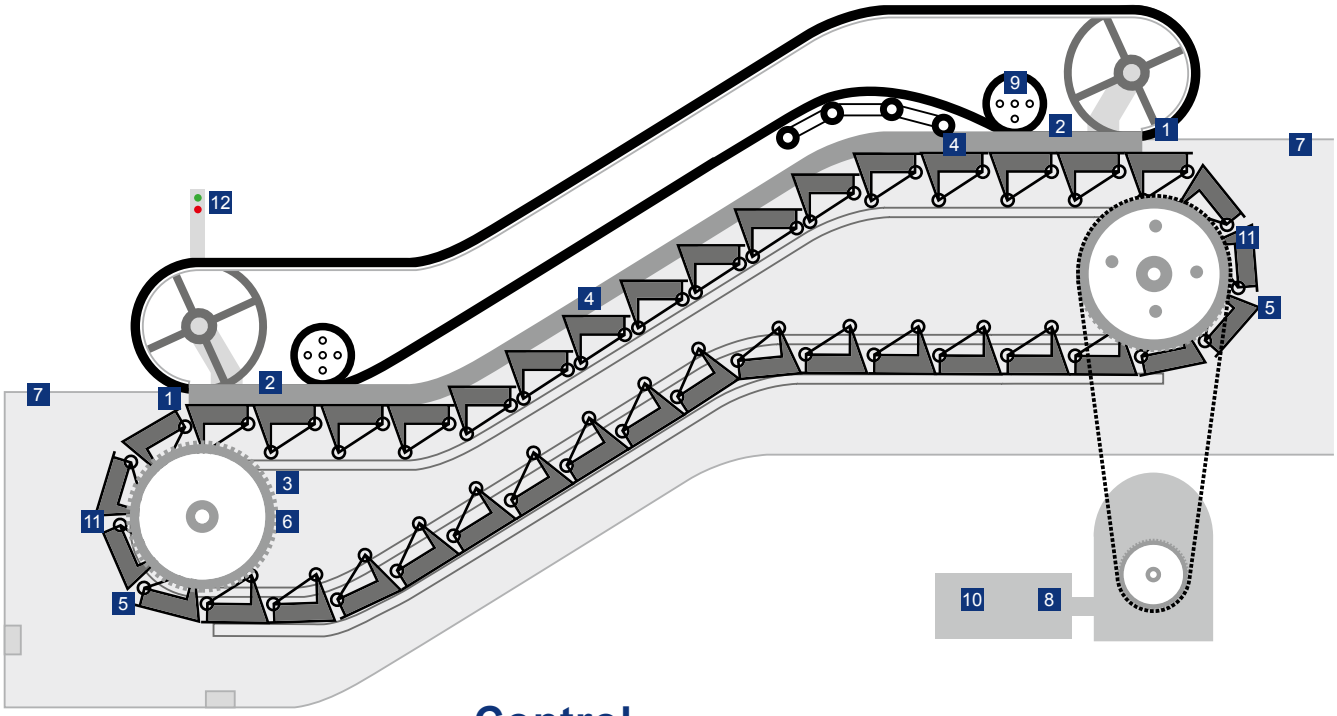
Monitoring, operating and maintenance
Certain functions can be monitored during operation with sensors.

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

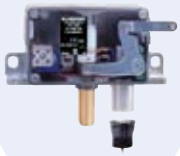
10 Speed monitoring

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 Böhnke + 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


1

WinMOS®300
2


3


4


5

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

Detailed information about the products can be found at: www.schmersal.net below the indicated code numbers

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 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 Böhnke + 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	- 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	- 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	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
Performance data	
Application	Persons and freight lifts
Stops	up to 127
Operating mode	- 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

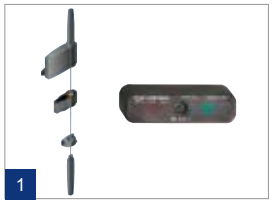
			
■ CLE-01A	■ CSI-01C	■ CAP-02A	■ CWI-01A
CANopen Lift power board extension For extending CLK to 32 calls.	CANopen Lift serial interface For coupling two CANopen strands.	CANopen Lift exterior panel board Serves to actuate exterior panel via CANopen bus.	CANopen lift wireless interface (WLAN) For access 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	Detent base for support rail 35mm	For assembly on panel	For assembly / (in housing)
115 x 90 x 50	120 x 80 x 30	63 x 76 x 13	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	35 mA	25 mA	30 mA
20 mA		3.8 mA	
280 mA per output		max 500 mA sum of all outputs	
CANopen	CANopen	CANopen	CANopen
per 10-pin ribbon cable to CLE-01A			
LED green, in standard mode permanently on	LED green, in standard mode permanently on	LED green, in standard mode permanently on	LED green, in standard mode permanently on
LED red, in standard mode permanently off	LED red, in standard mode permanently off	LED red, in standard mode permanently off	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	≤ 2.0 x 10^{-8}/h
Certificates	TÜV cULus EAC

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

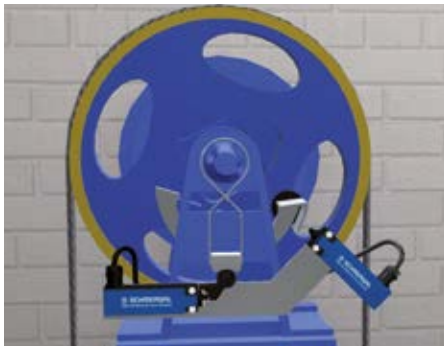
- Large range of different shapes

Code numbers:
AZ

Detailed information about the products can be found at: www.schmersal.net below the indicated code numbers

Application 1

Overspeed govenor



The overspeed governor is a safety component of a lift system. It prevents the lift car from travelling to fast and crashing up or down by actuation of the safety gear at the car.
Mainly the device is build up with a cable loop that runs through pulleys at the top and button 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 govenor. This is because the overspeed govenor 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 accordace to 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).

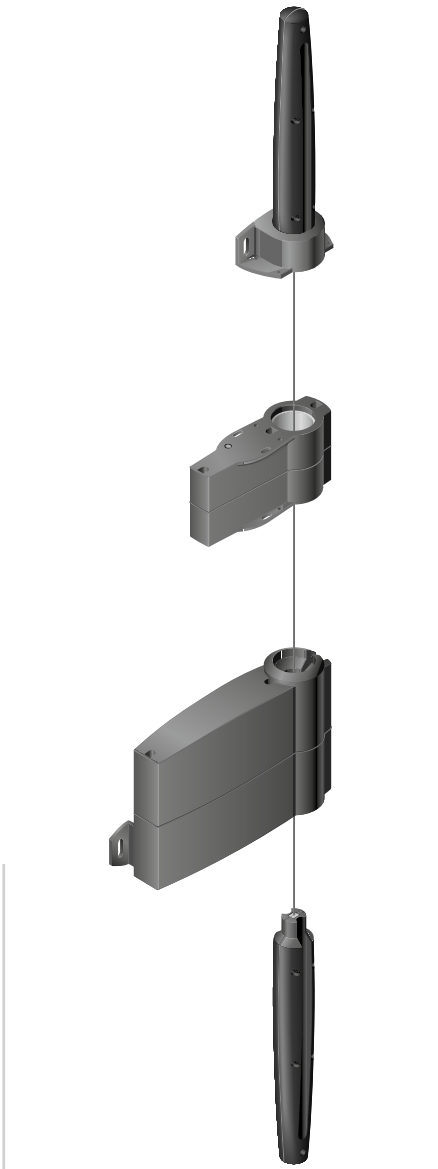
With the AZ safety switches, the switching element and actuator are not connected to each other in terms of the design. However, when they are switched they are joined together functionally or separated.

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.

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	cULus	cULus

Standard interfaces
RS422 SSI and UART
CANopen 417

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

Parallel interface USP-PI

A universal system – multiple interfaces

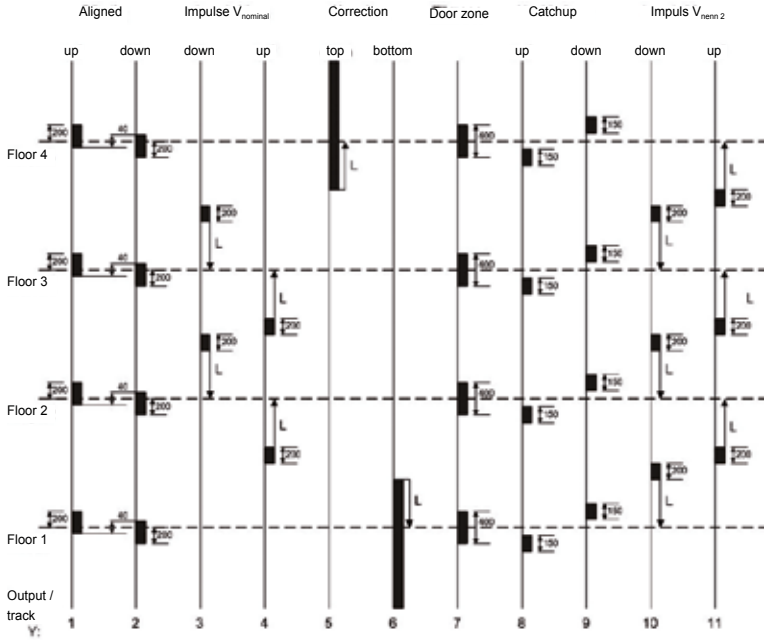
The Schmersal Group has created different interfaces, such as the parallel interface USP USP-PI for connection to controllers with conventional digital technology, so that the USP can operate with different control systems. It converts the absolute position value of the USP 24 VDC signals, which can 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

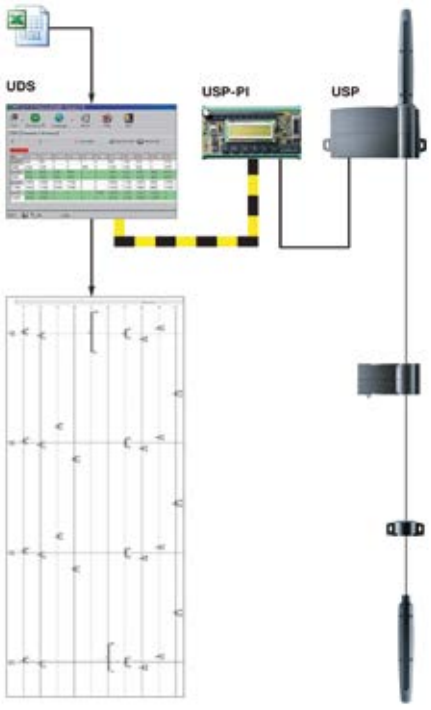
The USP is not only easy to put into operation but is also easy to maintain. One learning cycle is usually sufficient to read the floor positions. If the USP is used with the parallel interface, the signals can be shifted easily by programming, without having to enter the lift shaft. An upload / download 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 mm²
Protection class	IP00
Operating voltage	24 VDC +15 % / −10 %
Operating current without outputs I_e	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	Thermoplastic	Thermoplastic
Enclosure construction form	rectangular	rectangular, flat	rectangular
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		c UL us	

[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 outled on additional shielding plate
[3)] The lift speed is in reference to the application with round magnets.

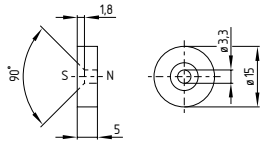
				
■ BN 65 / BN 65V	■ BN 650 / BN 650V	■ BN 12 / BN 12V	■ BN 120 / BN 120V	■ BN 120L / BN 120L/V
Thermoplastic	Thermoplastic	Metal	Thermoplastic	Thermoplastic
cylindrical	cylindrical	cylindrical	cylindrical	cylindrical
Ø13, 103	Ø13, 103	Ø12, 71	Ø12, 71	Ø12, 102
IP67	IP67	IP67	IP67	IP67
central with threaded flange	central with threaded flange	central with thread	central with thread	central with thread
side or front	side or front	side or front	side or front	side or front
Bistable contact NC / NO	Bistable contact NC / NO	Bistable contact NC / NO	Bistable contact NC / NO	Bistable contact NC / NO
18 m/s	18 m/s	18 m/s	18 m/s	18 m/s
< 300 Hz	< 300 Hz	< 300 Hz	< 300 Hz	< 300 Hz
max. 250 VAC	max. 200 VAC/DC	max. 200 VAC	max. 200 VAC	max. 200 VAC
max. 3 A	max. 1 A	max. 1 A	max. 1 A	max. 1 A
max. 120 VA / W	max. 30 VA / W	max. 30 VA / W	max. 30 VA / W	max. 30 VA / W
not available	not available	not available	not available	not available
−25 °C … +75 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C	−25 °C … +70 °C
c UL us				

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.

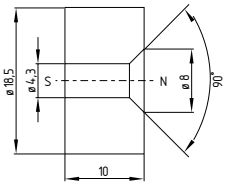
3. Shaft components

3.4 Magnetic reed switches actuator-overview

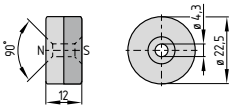
BP 6 unenclosed



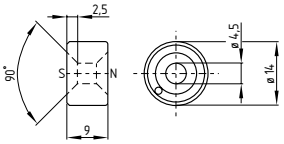
BP 10 unenclosed



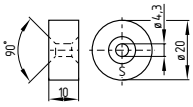
BP 15 with plastic enclosure



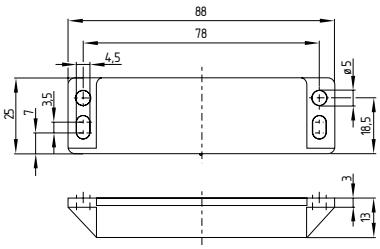
BP 7 unenclosed



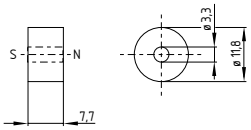
BP 15/2 unenclosed



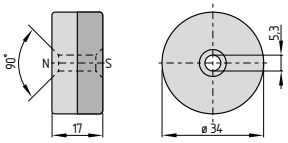
BP 310 with plastic enclosure



BP 8 unenclosed



BP 34 with plastic enclosure



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

To get detailed information about the actuating magnets, visit **www.schmersal.net**

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

■ PS116

■ PS215

■ PS216

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 mm²	max. 1.5 mm² (incl. conductor ferrules)	max. 1.5 mm² (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	cULus, EAC	cULus under preparation: EAC	cULus under preparation: EAC

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)

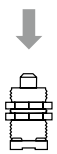
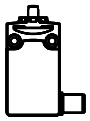
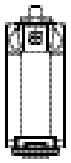
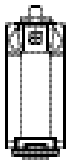
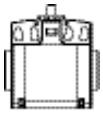
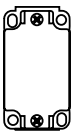
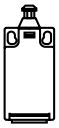
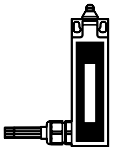
[3)] Switches ZxM 476 and Z 231-01yr-1256 feature a small release force and small trip mode.

[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 mm² (incl. conductor ferrules)	0.75 … 2.5 mm²	0.75 … 2.5 mm²	0.75 … 2.5 mm²	–
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	ISO 13849-1	ISO 13849-1	ISO 13849-1	ISO 13849-1
20,000,000	20,000,000	20,000,000	20,000,000	300,000
cULus	BG cULus CCC EAC	BG cULus CCC	cULus CCC	cULus CCC
under preparation: CCC EAC				

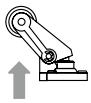
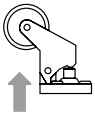
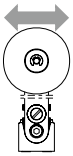
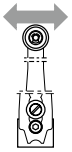
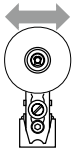
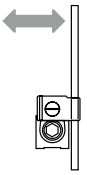
3. Shaft components

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

								 1)
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

Technical features	■ AV 15	■ AV 20
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 (pull strap, lever, bearing block)	selectable (pull strap, lever, bearing block)	Pull Strap	Pull Strap
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

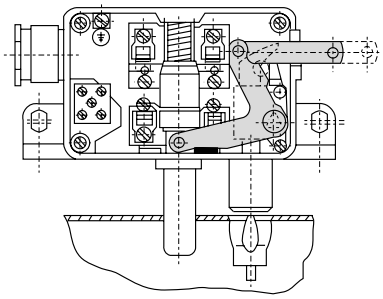
More information:
The door locking devices can be supplied with different locking bolt lengths (see definition X dimension, page 23). In order to comply with the requirements of EN 81-1/-2, the locking bolts have a 45° bevel, right, left, top or bottom. The door locking devices are available with a standard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

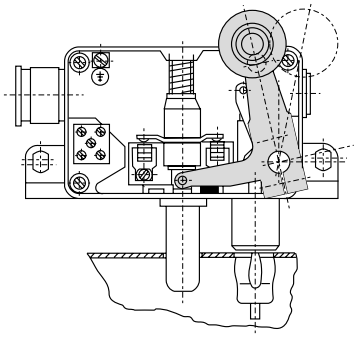
3. Shaft components

3.9 Door locking devices – overview of actuators

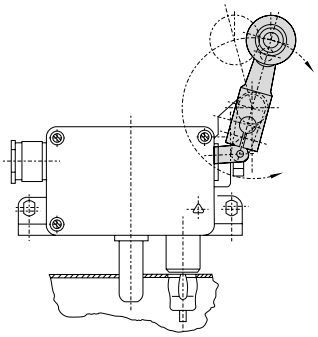
Version R with pull strap



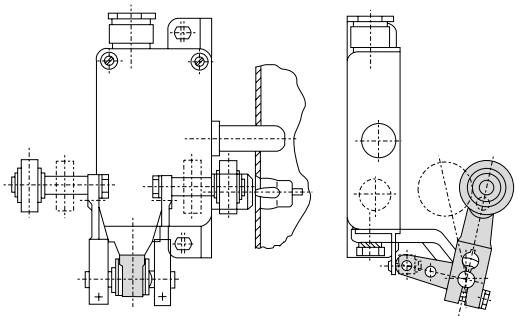
Version RH with roller lever



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:

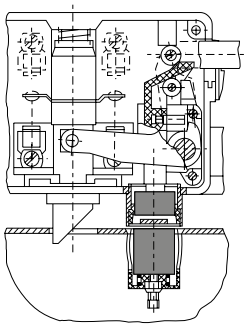
- If the door locking device is actuated from the right-hand side, it is a right-hand version.
- If the door locking device is actuated from the left-hand side, it is a left-hand version

3. Shaft components

3.10 Door locking devices – explanations

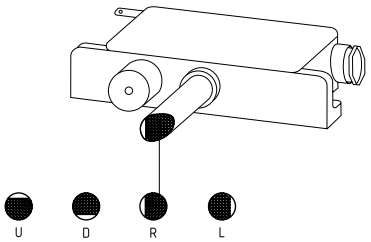
Definition of "anti-faulty closing protection"

According to the lift standards, door locking devices for passenger lifts must be equipped with an anti-fault 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.



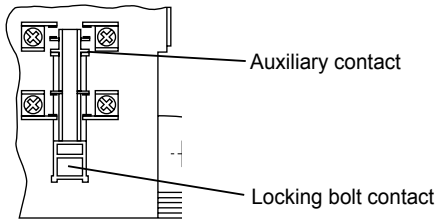
Definition of "locking bolt bevel"

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.



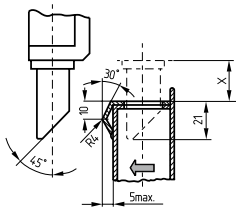
Auxiliary contact K

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.



Dimension X

3. Shaft components

3.11 Door contacts – AZ-series

■ AZ 05

■ AZ 06

■ AZ 07

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_e / operating voltage U_e	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	cSAus cULus CCC PG TÜV [4]	cSAus cULus CCC PG TÜV [4]	cSAus cULus CCC PG TÜV [4]

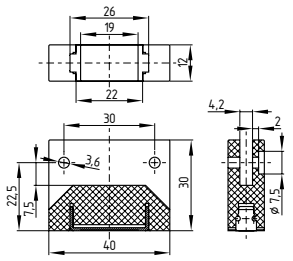
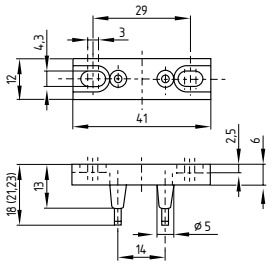
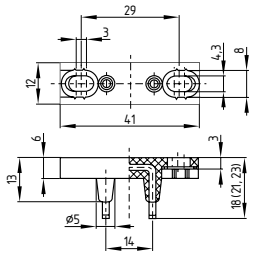
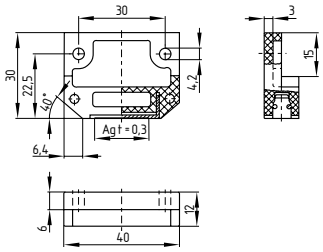
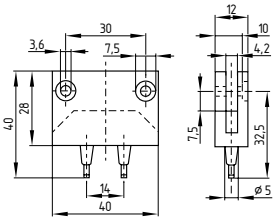
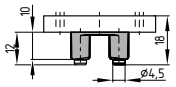
[1] The AZ 15-zo door contact is suitable for use in dusty and wet environments.
[2] Contact pins in the switch allow the actuator to be supplied in small radii and allow greater mobility for the actuator when closed.
[3] optional integrated plug
[4] TÜV expert opinions

				
■ AZ 051 / 052 / 053	■ AZ 061 / 062 / 063	■ AZ 08	■ AZ 14-1	■ AZ 15-zo [1]
selectable	selectable	selectable	selectable	included
No	No	Yes	Yes	Yes
self-forming PoziDriv screws	self-forming PoziDriv screws	Without	Without	Without
IP00	IP20	IP20	IP20	IP67
No	No	No	No	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	Single conductor entry plastic-sheathed cable	Single conductor entry	Sheathed cable	Sheathed cable
2A / 230 VAC, 1A / 200 VDC	2A / 230 VAC, 2A / 200 VDC	2A / 230 VAC, 2A / 200 VDC	2A / 230 VAC, 2A / 200 VDC	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
cULus, CCC, PG, TÜV [4]	cULus, CCC, PG, TÜV [4]	CCC, PG, TÜV [4]	CCC, PG, TÜV [4]	CCC, PG, TÜV [4]

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

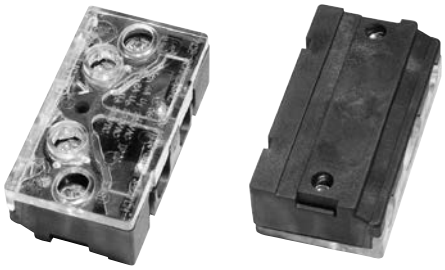
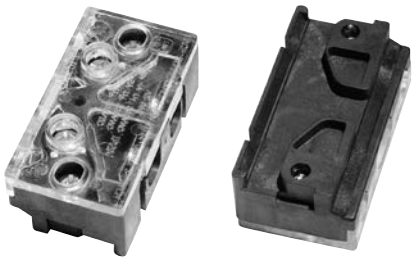
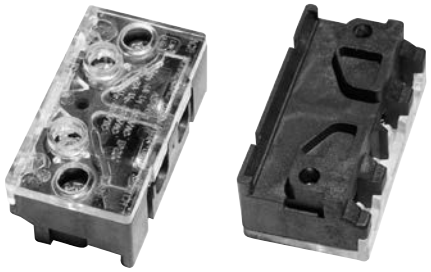
3.12 Door contacts – overview of actuators

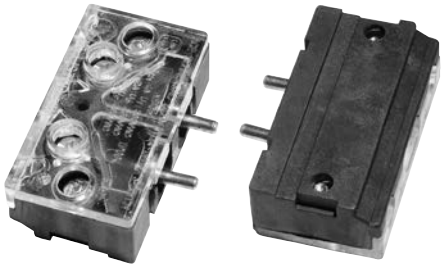
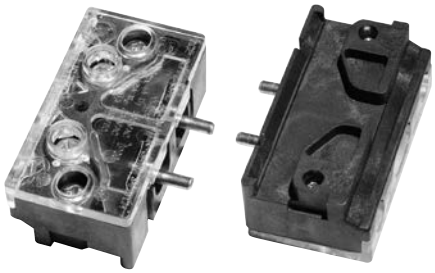
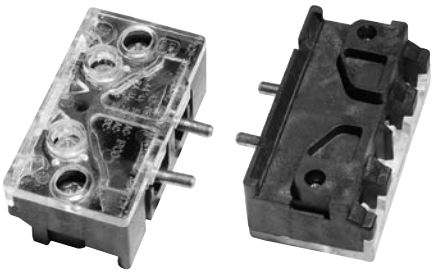
AZ 05 B (Standard) [1]	AZ 06-13 B/18, 21, 23 [2]	AZ 07-14 B/18, 21, 23 [2]
		
AZ 05 B-1684 [1]	**AZ 06 B-1284 [2]**	**Spez. 1949-1 with alignment kit [2]**
		

[1] Actuators for AZ 05x, 05
[2] Actuators for AZ 06x, 06, 07, 08, 13, 14-1, 19

3. Shaft components

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

AZ 061	Standard	AZ 062	Standard	AZ 063	Standard
					
■ Enclosure height 16 mm ■ without cable duct ■ Self-tapping M4 Pozidrive screws		■ Enclosure height 19 mm ■ Bottom-side cable duct ■ Self-tapping M4 Pozidrive screws		■ Enclosure height 19 mm ■ Bottom- and rear-side cable duct ■ Self-tapping M4 Pozidrive screws	

AZ 051	Alternative	AZ 052	Alternative	AZ 053	Alternative
					

Note:
The rear of the door contact provides for wiring possibilities both for single conductors and for sheated 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

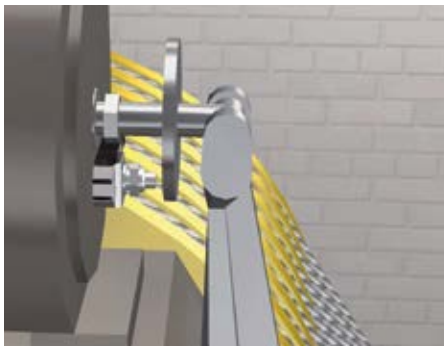
Inspection boxes (TOCI)

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

Code numbers:
TOCI

Detailed information about the products can be found at: www.schmersal.net below the indicated code numbers

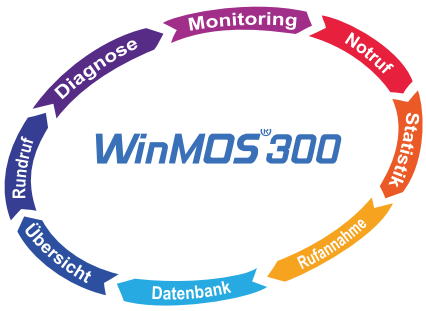
Application 1



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

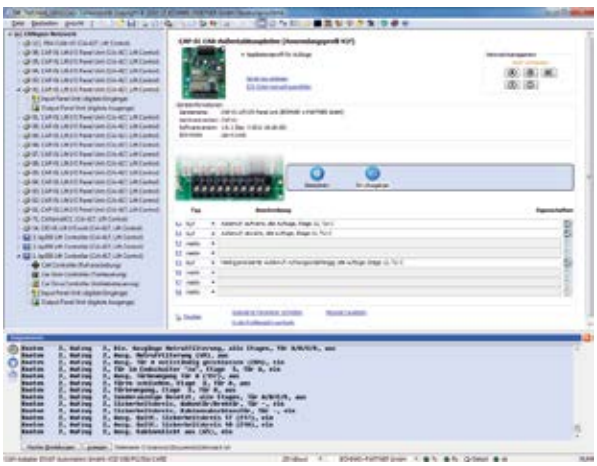
Command devices for shaft and lift control cabinets

- 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

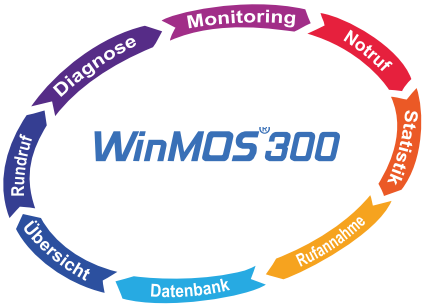
Configuration software

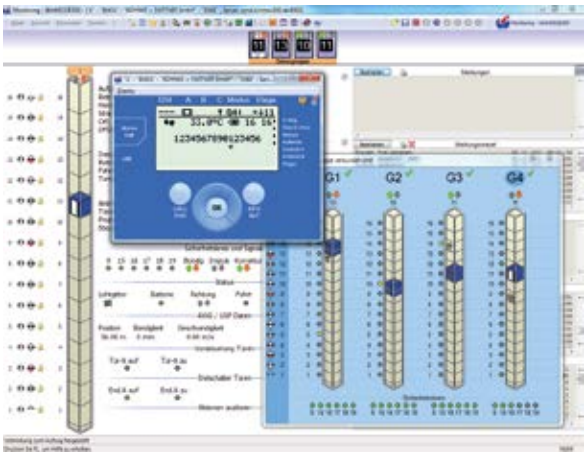


The software CANwizard® is a configuration tool for CANopen devices and networks. It contains special features for the application profil CANopen CiA-417 (lift control). For the lift technician the CANwizard provides an easy way to configure devices from many different brands without any knowledge of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

Detailed information about the products can be found at: www.schmersal.net below the indicated code numbers

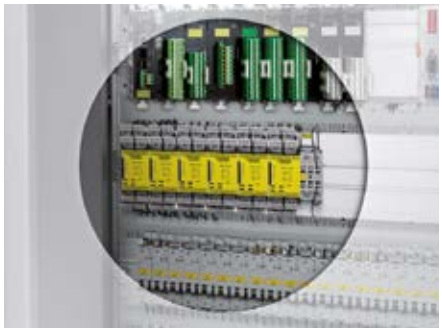
Application 1

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 multifuctional 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.

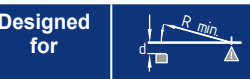
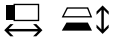
5. Components for lifts according to the Machinery Directive
5.2 Solenoid interlocks

	■ 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.

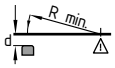
5. Components for lifts according to the Machinery Directive

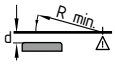
5.3 AZM 161 – Actuator-Overview

Actuator type	Actuator description	Designed for	 R_{min} [mm]	d [mm]	 R_{min} [mm]	d [mm]	Type designation	Material number
 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

- To cover unused actuator slots
- For protection against the ingress of dirt
- Easy to install by just clipping in

Triangular key M5

- For manual release

Centering device

- Centring device for pre-positioning
- Mounting outside: **TFA-020**
- Mounting inside: **TFI-020**

Tamperproof screws

- 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

- Lockout tag with 5 bore holes for AZM 200 and AZM 201
- To prevent inadvertent closing, e.g. during maintenance

MP-AZ/AZM300-1

- Mounting plate

MS-AZ/AZM300-B1-1

- Mounting set for actuators

AZM300-…-T / -N

- 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	TÜV c UL us

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	—		—	—

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
- Services for commissioning or modernisation on request

System solutions for every lift. Everywhere.

Our customers lift systems are at the focus of our attention. Regardless if it's a new system or a modernisation – with our years of experience we identify an individual or standardised solution according to your requirements. Our common goal is to guarantee the safe movement of the lift system for the users.

Schmersal Böhnke + Partner is a member of the Schmersal Group. With its products, the ownermanaged Schmersal Group has dedicated itself to the safety of people and machines for many decades. The company was founded in 1945, and is represented by seven manufacturing sites on three continents and with its own companies and sales partners in more than 60 nations. In the demanding field of machine safety the Schmersal Group is one of the international market and competence leaders. Based on a comprehensive product portfolio, the company's approximately 2,000 employees develop and plan complete safety-related system solutions.

For over 50 years we have supplied high-quality components for the lift industry. With the acquisition of Böhnke + Partner to the Schmersal Group, we took over the system concept to our lift area. Since then, the product portfolio – with control systems and components – includes all necessary elements for equipping a lift system from electrical point of view.

We supply lift manufacturers with our products all over the world. The Schmersal Group has four production plants in Germany and one each in Brazil, China and India. We offer the flexibility of a medium-sized company, combined with the international presence of a company group.

Lift controller

Components for lift construction

Control system assembly

www.boehnke-partner.com

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