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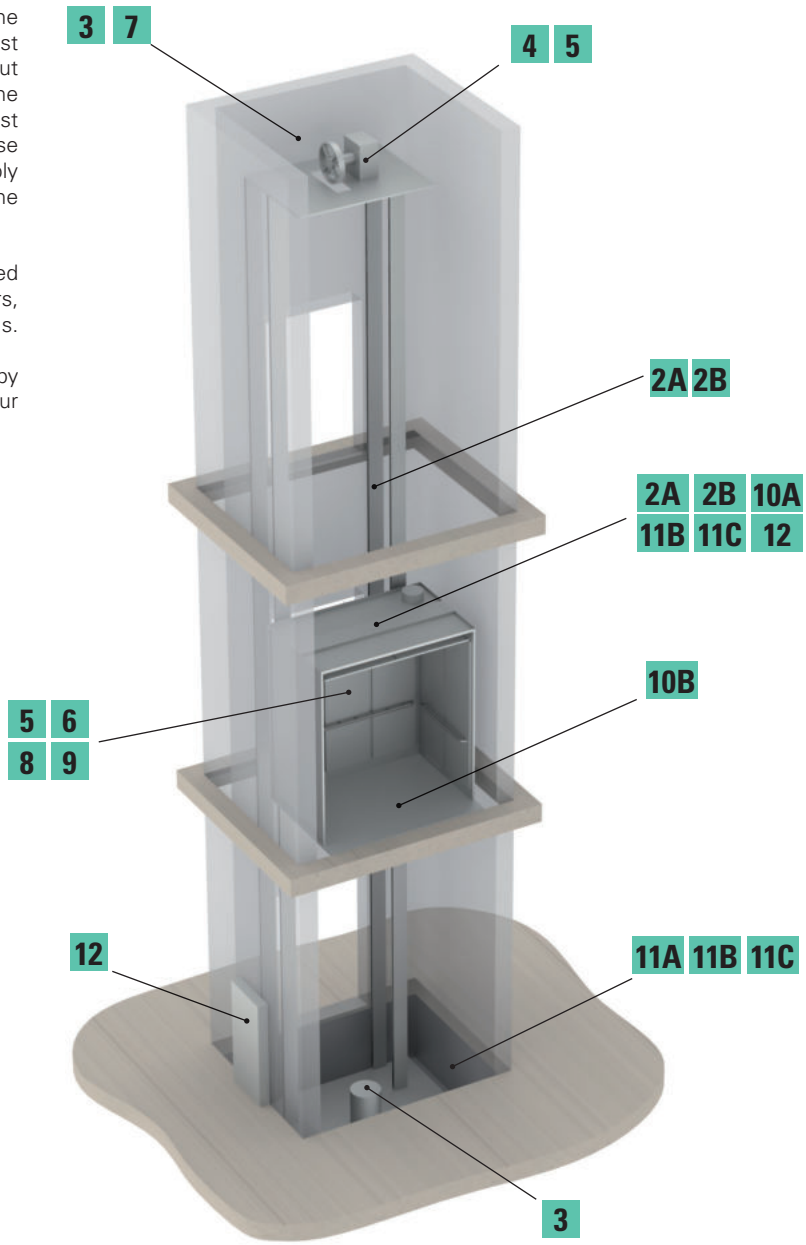
Index - Lift General Catalogue

Profile

Pizzato Elettrica devices have been used for many years in the lift sector, for their proven reliability and quality to price ratio. Some of the products shown here have been the first choice of some of the most important multinational players; they are therefore used throughout the world. The range of position switches, traditionally used in the lift sector, is vast; for this reason, the following pages contain just some of the Pizzato Elettrica products available, chosen from those typically used in this sector. We, as a company, can however supply other switch types. For example, custom versions to better meet the demands of customers.

Pizzato Elettrica has also developed some series of products aimed specifically at the lift sector: for example, switches for speed limiters, devices to carry out floor levelling operations, or our control stations.

All of the products listed in this catalogue are produced entirely by Pizzato Elettrica - with the passion for quality that has always set our company apart.



Index

MORE THAN 300 PROFESSIONALS WITH PASSION

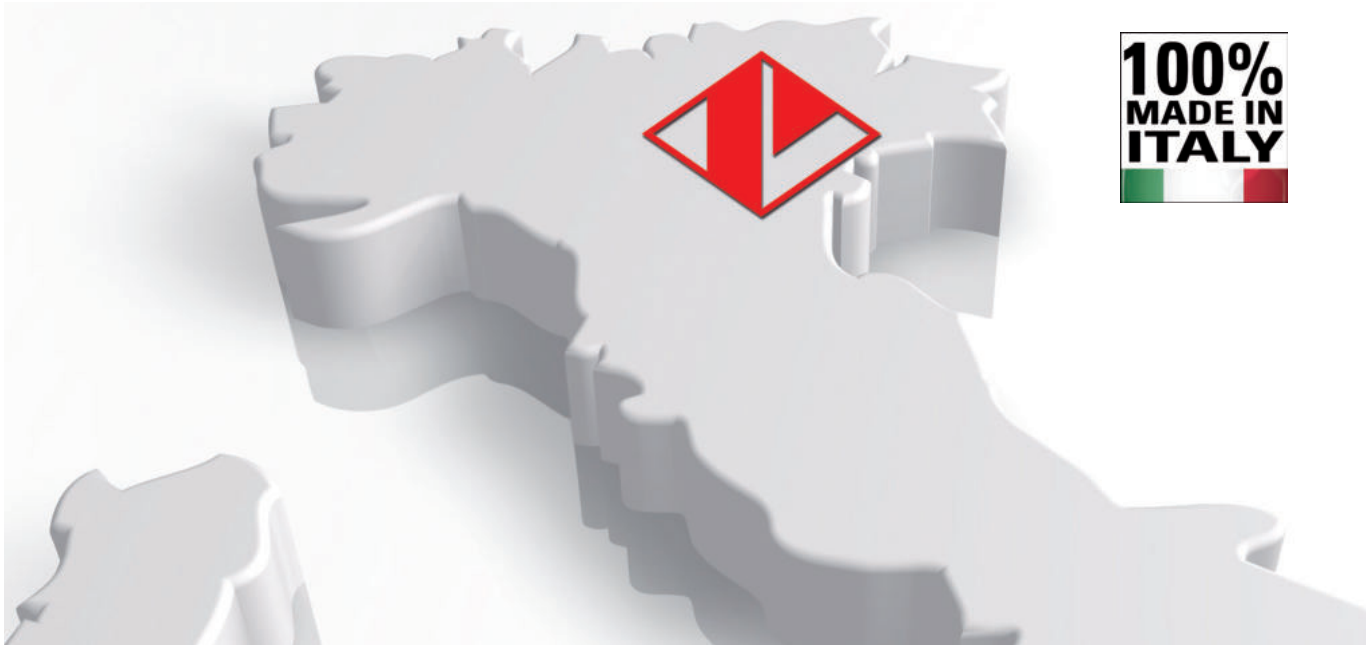
It is people, with their professionalism and dedication that make a great company. This profound conviction has always guided Pizzato Elettrica in their choice of employees and partners.

Today, Giuseppe and Marco Pizzato lead a tireless team providing the fastest and most efficient response to the demands of the market. This team has grown over the last 10 years and has achieved a considerable increase in sales in all the countries where Pizzato Elettrica is present.

The various strategic sectors of the business are headed by professionals with significant experience and expertise. Many of these people have developed over years with the company.

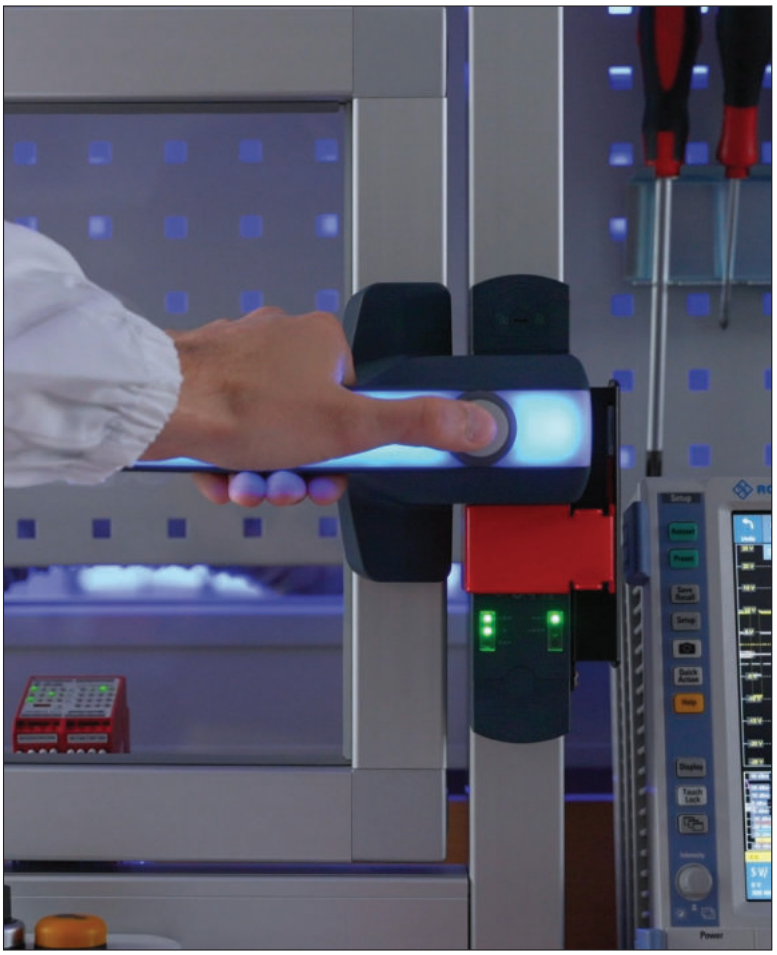
Others are experts in their specific field and have integrated personal experience with the Pizzato Elettrica ethos to extend the company's capability and knowledge.

From the design office to the technical assistance department, from managers to workers, every employee believes in the company and its future. Pizzato Elettrica employees all give the best of themselves secure in the knowledge they are the fundamental elements of a highly valuable enterprise.



100% MADE IN ITALY

Pizzato Elettrica is one of the leading European manufacturers of position switches, microswitches, safety devices, safety modules, foot switches, control and signalling devices, and devices for lifts. An entrepreneurial company such as Pizzato Elettrica bases its foundations on a solid and widely shared value system. The pillars that form the basis of the company's work have remained constant, and constitute the fundamental guiding principles for all company activities.



PASSION FOR QUALITY

Passion for product quality, orientation towards excellence, innovation, and continuous development, represent the key principles of Pizzato Elettrica's everyday work.
Anyone using Pizzato Elettrica's products does so in the certainty that these devices are of certified quality, since they are the result of a process that is scrupulously controlled at every stage of the production.
The company's goal is to offer the market safe, reliable, and innovative solutions.

CARE FOR THE CUSTOMER

In order to be successful, a product must respond to the specific needs of those who will use it. Market developments must be carefully monitored in order to understand, in advance, which new applications will prove themselves truly useful. This is why Pizzato Elettrica has always cultivated close synergies with the companies that have chosen it as a supplier, using this continuous dialogue to identify the potential developments of the own product range in order to make it highly flexible, complete and capable to respond to the most diverse needs.

100% MADE IN ITALY

All Pizzato Elettrica products are designed, developed, and tested entirely at the company plants in Marostica, in the province of Vicenza in Italy. The company is thus able to meet specific customer requirements at all times, by offering a comprehensive range of products and technologically advanced solutions.

1984: AN ENTREPRENEURIAL STORY BEGINS

1984 The company Pizzato di Pizzato B. & C. snc. manufacturer of position switches is founded.

1988 The company becomes a limited liability partnership, and is renamed Pizzato Elettrica, a brand shortly destined to become renowned and valued nationwide.
The first company-owned plant (P1) geared towards mechanical processing was built.

1990 By the end of the decade, thanks to the development of quality products and the experience built on the Italian market, Pizzato Elettrica turns to the international market.

1995 Building of the second plant (P3) geared towards the moulding of plastic materials. Development of the position switch range continues in parallel. Start of significant years in terms of safety devices planning. The safety sector becomes a key sector to the company.

1998 Construction of the third plant (P4), housing the assembly department.

2002 Achievement of the ISO 9001:2000 certification. Launching of the first safety modules. The new factory headquarters and logistics centre (P5) is built and will remain the company's headquarters for many years. Continued expansion of the industrial safety and automation product range.

2007 Pizzato Elettrica faces its first generational change: Giuseppe and Marco Pizzato take over the company directorship.

2010 Extension of Pizzato Elettrica product portfolio, with the launch of the innovative EROUND line consisting of control and signalling devices. This product range accompanies position switches and safety devices, thus offering complete solutions to customers.

2012 Introduction of Gemnis Studio, the first software produced by Pizzato Elettrica. A graphic development environment for the creation, simulation, and debugging of programs that can be integrated in the Gemnis line modules.

2013 Foundation of first subsidiary of Pizzato Elettrica, Pizzato Deutschland GmbH, in Germany.

2014 A new production facility (P8) dedicated to switches and automatic machines is opened, spanning a surface area of 6000 m^2.

2016 The new NS series of safety switches with electromagnets and RFID technology is introduced, fruit of the company's experience, spanning more than thirty years in the field of industrial safety. To date it is the state of the art in its industry.
Foundation of second subsidiary of Pizzato Elettrica, Pizzato France SARL, in France.

2017 The company continues to expand and achieves the quality certification based on the more recent version of standard ISO 9001 of 2015.
In Spain, the third Pizzato Elettrica subsidiary is founded: Pizzato Iberica SL.
The foundation stone is laid for the new factory (P6), which is to become the company's headquarters.

2018 The safety handle P-KUBE Krome is launched, a brand new product in the market, confirming that Pizzato Elettrica thrives on innovation in the sectors of automation and industrial safety.
Foundation of fourth subsidiary of Pizzato Elettrica, Pizzato USA Inc, in the United States.

2019 The new factory (P6) is opened, a modern building of 28,000 m^2 realized with the most advanced Industry 4.0 technologies, where all offices and production divisions are transferred, allowing to further improve the flow of material and information. The logistics and shipment department is optimised with the introduction of a new completely automated warehouse.

2021 Pizzato Elettrica India Ltd. and Pizzato Korea Ltd., commercial branches of Pizzato Elettrica, are established in India and South Korea, respectively.

2022 Foundation of Pizzato Academy, Pizzato Elettrica's new training site for getting better acquainted with our products and following the constant regulatory developments in the sector.

Today, Giuseppe and Marco Pizzato lead a company in constant growth in terms of new product launches, number of employees, turnover, and new markets. Pizzato Elettrica is continuing its new product internationalisation and development process.

100 MILLION PARTS SOLD WORLDWIDE

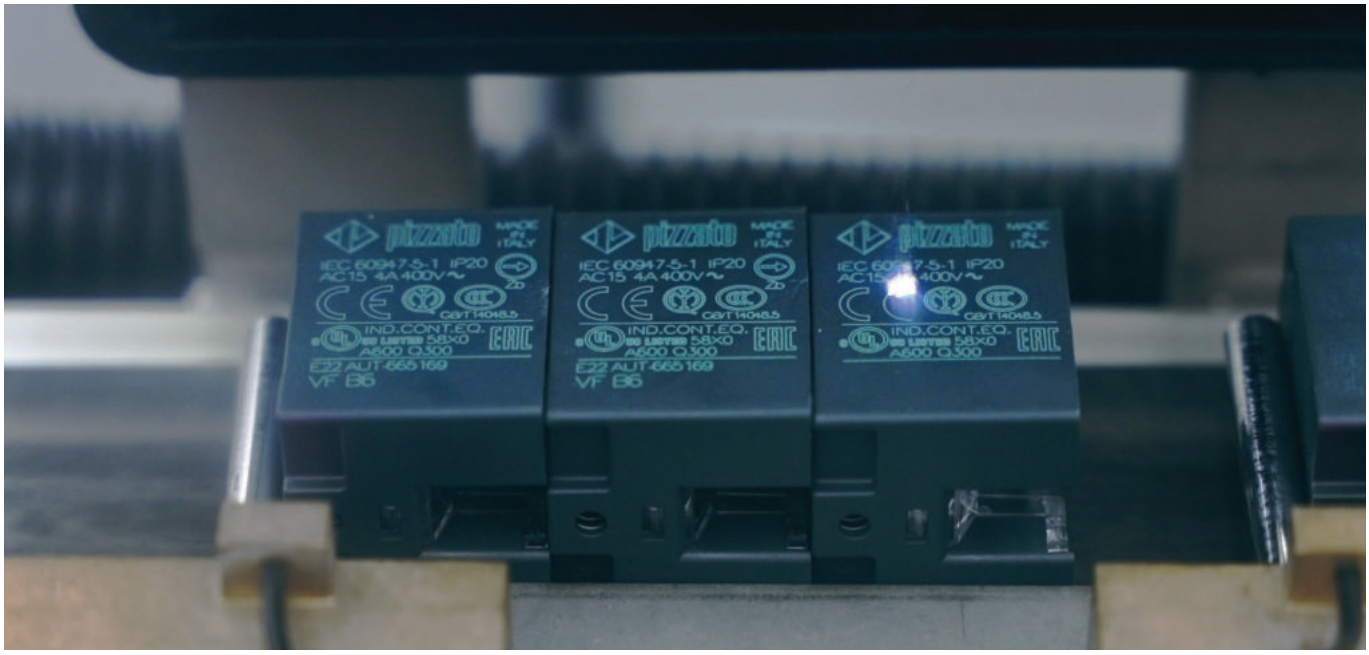
Pizzato Elettrica's product catalogue contains more than 10,000 articles, with more than 1,500 special codes developed for devices personalised according to clients' specific needs.
Pizzato Elettrica devices can be grouped, according to typology, into three main macro-categories.

POSITION SWITCHES
Pizzato Elettrica position switches are daily installed in every type of industrial machinery all over the world for applications in the sector of wood, metal, plastic, automotive, packaging, lifting, medicinal, naval, etc.
In order to be used in a such wide variety of sectors and countries, Pizzato Elettrica position switches are made to be assembled in a lot of configurations thanks to the various body shapes, dozens of contact blocks, hundreds of actuators and materials, forces, assembling versions.
Pizzato Elettrica can offer one of the widest product range of position switches in the world. Moreover, the use of high quality materials, high reliability technologies (e.g. twin bridge contact blocks) as well as the IP67 protection degree make this range of position switches one of the most technologically evolved.

SAFETY DEVICES
The company Pizzato Elettrica has been one of the first Italian companies developing dedicated items for this sector, creating and patenting dozens of innovative products, thus becoming one of the main European manufacturers of safety devices.
The vast range of products aimed specifically at the safety of machinery, fully designed and assembled at the Marostica (VI) company premises, includes not only more traditional safety switches with separate actuator (with or without locking mechanism) and hinge switches but also state-of-the-art anti-tampering devices with RFID technology, such as the ST series sensors, and NG and NS series locking devices.
The product range is complemented by safety handles for guards, with the innovative P-KUBE Krome model whose grip can be illuminated with multicolour signalling LEDs, as well as by the CS series safety modules, available in single function versions, or user-programmable with the use of the Gemnis Studio software; fully implemented by Pizzato Elettrica and distributed with a free licence.

MAN-MACHINE INTERFACE
Pizzato Elettrica's control and signalling devices of the EROUND line are designed for the use in the human-machine interface sector. Thanks to the elegant design, the care for details and the elegance of the product combined with its maximum safety and reliability, this series is one of the most complete and cutting-edge on the market.

In order to satisfy its customers' needs and requests, Pizzato Elettrica offers a lot of accessories purposely designed not only to complete its wide range of products, but also to help device installation on machineries.



MILLIONS OF CERTIFIED PRODUCT CODES

A simple brand isn't enough: the company is aiming for the Pizzato Elettrica brand to be widely recognised as a synonym for absolute quality and certainty.

A result that has been reached and consolidated over the years, updating and expanding the series of certifications obtained from the most important Italian and international control organisations. Product quality is assessed by seven accredited external bodies: IMQ, UL, CCC, TÜV SÜD, EAC, BSI, BV. These bodies lay out high technical and qualitative standards for the company to achieve and maintain, verified yearly with several inspections: these are performed, without prior notice, by qualified inspectors, who extract samples of products and materials destined for sale from plants, or from the market directly, to subject them to apposite tests.

• CE MARK. All Pizzato Elettrica products bear the CE marking in conformity with the European Directives in force.

• UKCA MARK. All Pizzato Elettrica products bear the UKCA marking in conformity with the United Kingdom directives in force.

• ISO 9001 CERTIFICATION. The company's production system is compliant with the international ISO 9001 standard, in its most recent 2015 revision. The certification covers all of the company's plants and their production and managerial activities: entry checks, technical, purchasing and commercial department activities, manufacturing operations assessments, final pre-shipping product tests and checks, equipment reviews and the management of the metrological lab.
The Pizzato Elettrica quality management system ensures that all sensitive company processes – from component design to implementation, from materials provisioning to verification of non-compliant products – are carried out according to the procedures laid down, with the aim of providing our customers with continuously improved and reliable products.

• CERTIFICATION OF COMPANY QUALITY SYSTEMS. Pizzato Elettrica has obtained the certificate of compliance with the UNI EN ISO 9000 regulations in force in Italy and abroad. It is issued by a recognised independent body that guarantees the quality and reliability of the service offered to clients worldwide.

• CSQ, CISQ AND IQNET. The CSQ system is part of the CISQ (Italian Certification of Quality Systems) federation, which consists of the primary certification bodies operating in Italy in the various product sectors. CISQ is the Italian representative body within IQNet, the biggest international Quality Systems and Company Management certification network, which is adhered to by 25 certification organs in as many countries.

TRADE FAIRS AND EVENTS

TRADE FAIRS

Pizzato Elettrica regularly participate to many trade fairs in Italy and abroad, presenting in this way to the market the products, the latest news, etc.

EVENTS

Besides offering qualified technical assistance, Pizzato Elettrica presents itself as a dynamic partner who is attentive to the needs of its customers. For this reason, the company organises several meetings and training courses with particular attention to the regulatory aspect of machinery safety.

EL AN series
control stations with visual and audible signalling functions

- The EL AN series control station for lifts is available is available in a 1-unit version with visual and audible signalling functions.
- The visual and audible signalling can be configured for continuous or pulsed operation using the internal terminal strips.
- The mounting is made even more flexible thanks to the flanged base and additional mounting points with a hole spacing of 100x70 mm.
- The control station has four M20 and two M25 side outputs.
- The transparent cover is equipped with LEDs that ensure uniform brilliancy both from the front and the side, making the light indicators visible from every angle.
- Minimum sound intensity of 55 dB at a distance of 1 metre, in accordance with the EN 81-20 standard.
- The buzzer is located inside the control station, keeping the protection degree of the housing unchanged.

► 109

FG series safety switch for lift door locking, in accordance with EN 81

- Device for locking sliding or hinged doors, equipped with actuator input and auxiliary release with variable orientations.
- Entirely made of sturdy metal, with IP67 protection degree and three M20 conduit entries.
- Door locking resistant to a pulling force of 3000 N.
- With auxiliary key release with triangular key with spring return.

► 71

UKCA declaration of conformity

- Following the withdrawal of the United Kingdom from the European Union, the UKCA mark (UK Conformity Assessment) for products that are placed on the market in Great Britain must be used instead of the European CE marking. For products that previously required a CE marking, the new UKCA mark for Great Britain (England, Scotland and Wales), in effect since 1 January 2021, is required.
- At the time of printing this catalogue, the British government specified 1 January 2025 as the date from which the UKCA mark will be mandatory for products that are placed on the market in Great Britain; the UKCA mark can also be used prior to this date.
- Pizzato Elettrica has already started to update the mark and will mark its own products with the newly required mark within the time frame specified in the last legislative changes.

EL AN series
control stations with 72 x 80 mm cover

- The new covers offer the option of using two devices or electrical sockets within the compact housing of the of 72 x 80 mm box.
- New cover configurations available.
- Same capacity for modularity and customization as larger boxes.

► 97

EL AD series control stations

- Larger dimensions, to enable use of a greater number of devices.
- Easy to configure, thanks to the wide selection of available covers.
- Simplified wiring, due to the sockets on the cover.
- Sturdy protection guards.
- Up to 6 lateral M20-M25-M16 knock-out conduit entries, and 4 bottom M20 knock-out entries.
- Knurled base for easy grip on control station.
- Versions with height reduced to 60 mm, suitable for cramped spaces in lift shaft.
- Standard contact block and device dimensions.
- Wall fixing hook.
- Built-in devices and electrical socket.

▸ 115

Products compliant with standards EN 81-20 and EN 81-50

- International standards EN 81-20 and EN 81-50 set new, updated, technical and safety requirements in comparison to current standards. They are a significant development in terms of lift construction and installation.
- Pizzato Elettrica products intended for use in the lift industry are implemented in accordance with standards EN 81-20 and EN 81-50, in order to provide specific and up-to-date solutions to meet the demands of the market.
- All devices meet requirements laid down by the new standards for safety contacts.

Signalling boxes compliant with standards EN 81-20 and EN 81-50

- 12Vac/dc or 24Vac/dc signalling box, complete with luminous discs and buzzers.
- Signalling via luminous disc with flashing yellow light.
- Signalling via luminous disc with steady white light, with an intensity of 5 lux at a distance of 1 metre; as laid down in EN 81-20 paragraph 5.4.10.4.
- Buzzers with continuous or pulsed tone, with minimum 55dB sound intensity at a distance of 1 metre; as laid down in EN 81-20 paragraph 5.12.1.8.3(G).

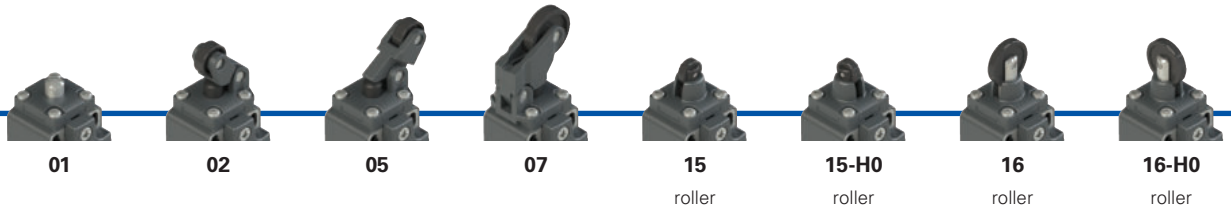
▸ 97

Padlockable protection for bypass device

- Padlockable protection for bypass device, to allow maintenance of floor and cabin doors, and of door locking devices, as laid down in EN 81-20 paragraph 5.12.1.8.
- With padlockable, snap-on protection cover to prevent unintended use of the device.
- Ability to lock with padlocks.
- Padlockable protection for mounting on Pizzato EL series control stations, or on any electrical panel with compatible hole pattern.

▸ 98

Selection diagram



01

02

05

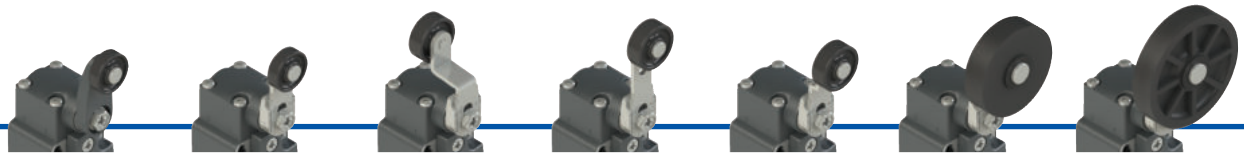
07

15
roller
Ø 11 mm

15-H0
roller
Ø 11 mm

16
roller
Ø 20 mm

16-H0
roller
Ø 20 mm



30

31

51

52

54

54-R5
rubber roller,
Ø 40 mm

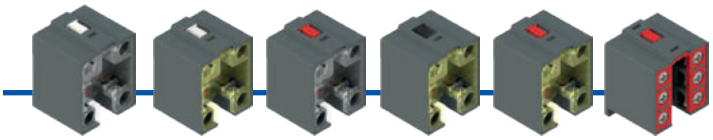
54-R26
rubber roller,
Ø 50 mm

ACTUATORS

FR

FX

CONTACT BLOCKS



5
1NO+1NC,
snap action

6
1NO+1NC,
slow action

7
1NO+1NC,
slow action,
make before
break

9
2NC
slow action

16
2NC
slow action,
independent

20
1NO+2NC,
slow action

PLATES

P11	plate for FR housing
P31	plate for FX housing

CONDUIT ENTRY

Threaded conduit entry

M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

With cable gland

K23	for cables Ø 6 … 12 mm
K27	for cables Ø 3 … 7 mm

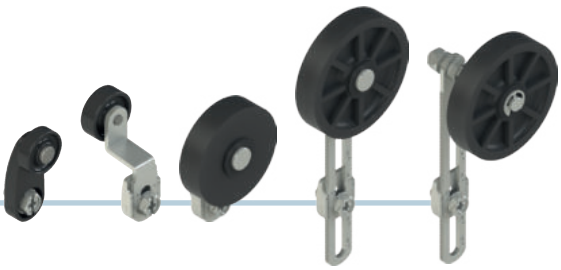
Wired
Wiring with custom connectors and cables available on request.

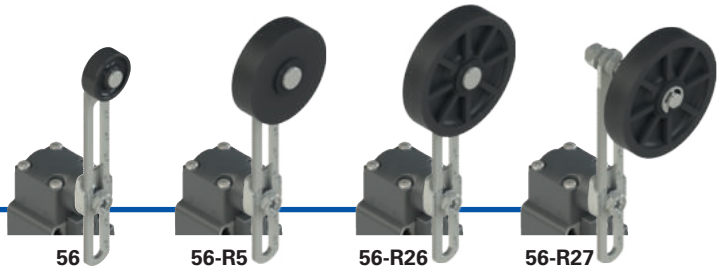
Product options

Sold separately as accessory

38

SEPARATE ACTUATORS
See page 20





56
adjustable safety lever

56-R5
rubber roller, Ø 40 mm / adjustable safety lever

56-R26
rubber roller, Ø 50 mm / adjustable safety lever

56-R27
rubber roller, Ø 50 mm / adjustable safety lever

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article | option | options

FR 654-GM2K23P11R26T6

Housing	
FR	technopolymer, one conduit entry
FX	technopolymer, two conduit entries

Contact block	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
9	2NC, slow action
16	2NC, slow action, independent
20	1NO+2NC, slow action

Actuators	
01	short plunger
02	roller lever
05	angled lever with roller
...	...

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 20)

Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

Pre-installed cable glands	
K23	for cables Ø 6 ... 12 mm
K27	for cables Ø 3 ... 7 mm

Fixing plates	
	without plate (standard)
P11	with VF SFP1 plate for FR housing
P31	with VF SFP3 plate for FX housing

Rollers	
	standard roller
R5	rubber roller, Ø 40 mm
R26	rubber roller, Ø 50 mm
R27	rubber roller, protruding, Ø 50 mm

Ambient temperature	
	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

Main features

- Technopolymer housing, from one to two conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing
- Protection degree IP67 and IP69K
- Wired versions
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

FR series, one conduit entry:	M20x1.5 (standard)
FX series, two knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree IP69K acc. to ISO 20653 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Mounting position:	any
Safety parameter B_{10D}:	40,000,000 for NC contacts
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 156. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact block 20)
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact block 20)
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact block 20)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact block 20)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X
Positive opening contacts on contact blocks 5, 6, 7, 9, 16, 20
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

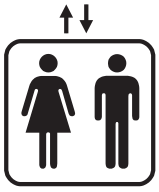
Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX: Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

The hub is to be connected to the conduit before the hub is connected to the enclosure.

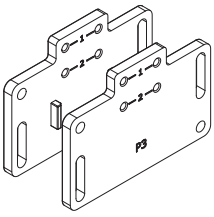
Please contact our technical department for the list of approved products.

Compliant with EN 81-20 and EN 81-50



- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10^6 cycles.

Adapter plates



Fixing plate with large slotted holes for switching point adjustment. Developed for backwards compatibility with previous products. Each plate is provided with two pairs of mounting holes, one for standard switches and one for switches with reset device. The actuator thus always has the same actuating point.

Protection degrees IP67 and IP69K

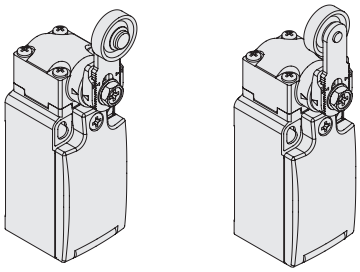
IP69K
IP67

These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing. All switches with actuator that do not have an external rubber hood also have a protection degree of IP69K in accordance with ISO 20653, and can be used on machinery subject to washing with water jets at 100 bar and 80°C.

Reversible levers

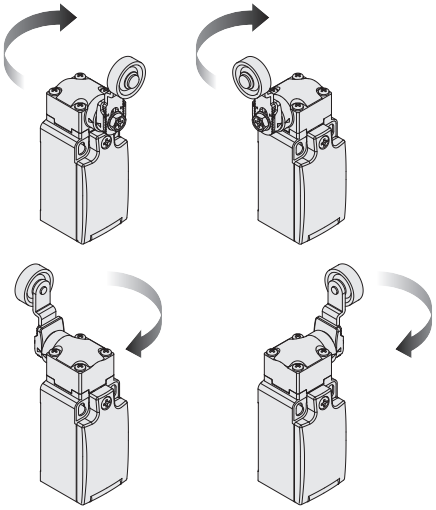
For switches with swivelling lever, the lever can be fastened on straight or reverse side maintaining the positive coupling.

In this way two different working planes of the lever are possible.



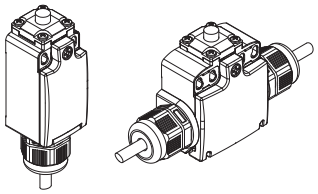
Head with variable orientation

The head of all switches is adjustable in 90° steps.

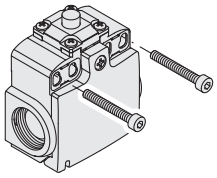


Cable outlets

Switches available with cable outlets in various directions, for use in the most confined of spaces.

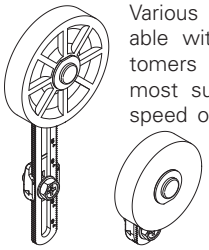


Metal fixing plates



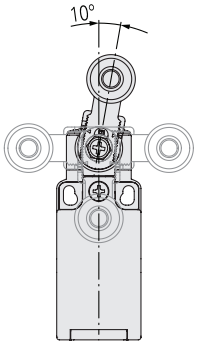
The technopol-ymer switches of the series FR, FK and FX are equipped with two robust metal plates on the mounting holes of the housings. This enables more reliable fixing of the switch without using washers under the screws. The fixing plates are made of thick zinc-plated steel; they are also available in stainless steel on request ("X" versions).

Rubber rollers

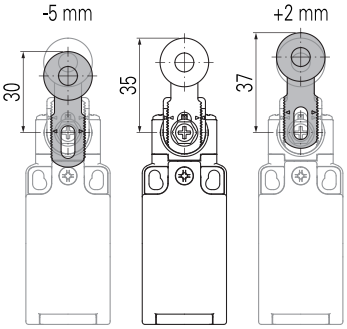


Various actuators are available with rubber rollers. Customers can therefore use the most suitable product for the speed of their particular lift, to reduce cabin noise to a minimum.

Adjustable levers

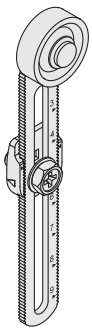


For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



The switches equipped with swivelling lever with roller enable adjustment of lever height, along the length of the actuator, with increments of 1 mm. This enables compensation for variability of the fixings or structural work and precise final adjustment.

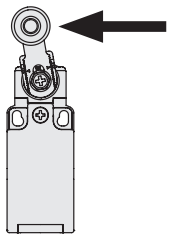
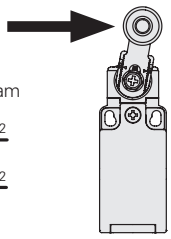
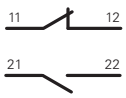
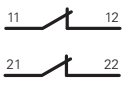
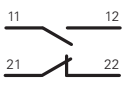
Adjustable safety lever



The adjustable lever code 56 (and variants) is provided with a notching that prevents the sliding also in case the fastening screw becomes loose.

Operation of contact block 16 with independent contacts

The contact block 16 is provided with two NC contacts, **both with positive opening**, that can be independently switched depending on the lever turning direction.

Lever turned to left	Lever not actuated	Lever turned to right
		
Contact diagram	Contact diagram	Contact diagram
		
11 12 21 22	11 12 21 22	11 12 21 22

Extended temperature range

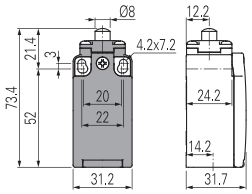
-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C. They can therefore be used for applications in cold stores, sterilisers, and other equipment operated in very low-temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

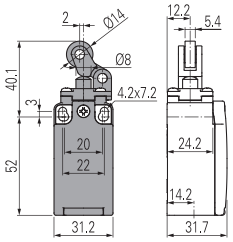
FR, FX series position switches

Contact type:

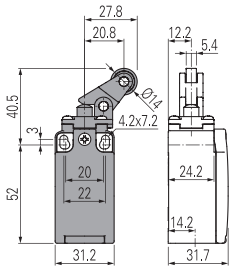
R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

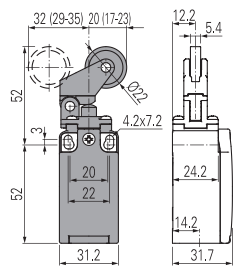


With stainless steel roller on request



With stainless steel roller on request





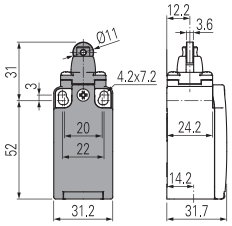
Contact block

5	R	FR 501-M2	1NO+1NC		FR 502-M2	1NO+1NC		FR 505-M2	1NO+1NC		FR 507-M2	1NO+1NC
6	L	FR 601-M2	1NO+1NC		FR 602-M2	1NO+1NC		FR 605-M2	1NO+1NC		FR 607-M2	1NO+1NC
7	LO	FR 701-M2	1NO+1NC		FR 702-M2	1NO+1NC		FR 705-M2	1NO+1NC		FR 707-M2	1NO+1NC
9	L	FR 901-M2	2NC		FR 902-M2	2NC		FR 905-M2	2NC		FR 907-M2	2NC
16	LI	/			/			/			/	
20	L	FR 2001-M2	1NO+2NC		FR 2002-M2	1NO+2NC		FR 2005-M2	1NO+2NC		FR 2007-M2	1NO+2NC
Max. speed		page 155 - type 4			page 155 - type 3			page 155 - type 3			page 155 - type 3	
Actuating force		8 N (25 N →)			6 N (25 N →)			6 N (25 N →)			4 N (25 N →)	
Travel diagrams		page 156 - group 1a			page 156 - group 2a			page 156 - group 2a			page 156 - group 3a	

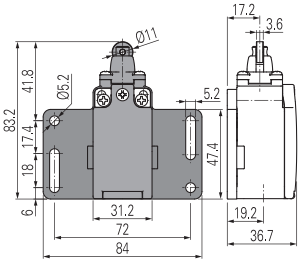
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

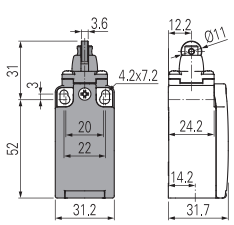
With Ø 12 mm stainless steel roller on request



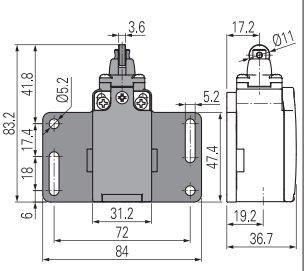
With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request

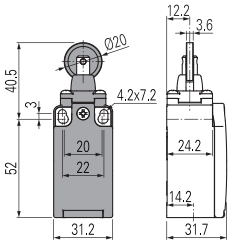


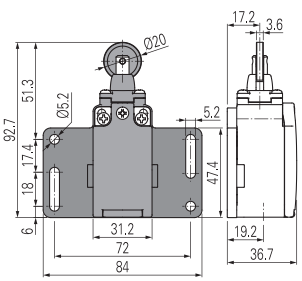
Contact block

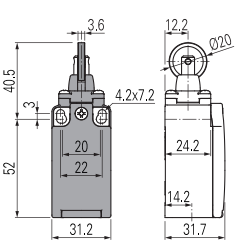
5	R	FR 515-M2	1NO+1NC		FR 515-M2P11	1NO+1NC		FR 515-H0M2	1NO+1NC		FR 515-H0M2P11	1NO+1NC
6	L	FR 615-M2	1NO+1NC		FR 615-M2P11	1NO+1NC		FR 615-H0M2	1NO+1NC		FR 615-H0M2P11	1NO+1NC
7	LO	FR 715-M2	1NO+1NC		FR 715-M2P11	1NO+1NC		FR 715-H0M2	1NO+1NC		FR 715-H0M2P11	1NO+1NC
9	L	FR 915-M2	2NC		FR 915-M2P11	2NC		FR 915-H0M2	2NC		FR 915-H0M2P11	2NC
16	LI	/			/			/			/	
20	L	FR 2015-M2	1NO+2NC		FR 2015-M2P11	1NO+2NC		FR 2015-H0M2	1NO+2NC		FR 2015-H0M2P11	1NO+2NC
Max. speed		page 155 - type 2			page 155 - type 2			page 155 - type 2			page 155 - type 2	
Actuating force		8 N (25 N →)			8 N (25 N →)			8 N (25 N →)			8 N (25 N →)	
Travel diagrams		page 156 - group 1a			page 156 - group 1a			page 156 - group 1a			page 156 - group 1a	

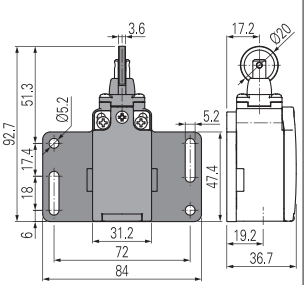
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent









Contact block

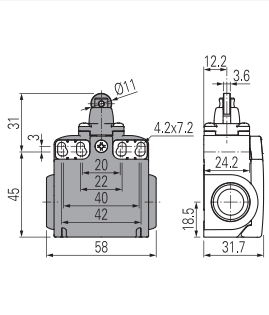
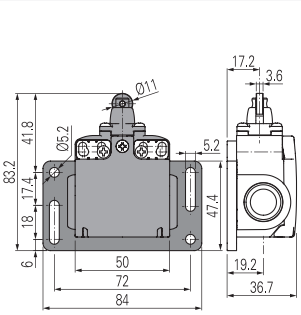
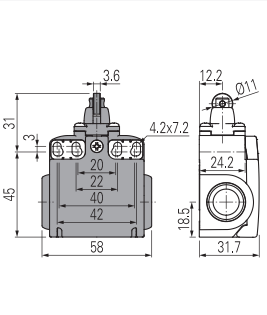
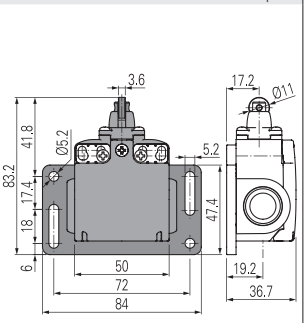
5	R	FR 516-M2	1NO+1NC		FR 516-M2P11	1NO+1NC		FR 516-H0M2	1NO+1NC		FR 516-H0M2P11	1NO+1NC
6	L	FR 616-M2	1NO+1NC		FR 616-M2P11	1NO+1NC		FR 616-H0M2	1NO+1NC		FR 616-H0M2P11	1NO+1NC
7	LO	FR 716-M2	1NO+1NC		FR 716-M2P11	1NO+1NC		FR 716-H0M2	1NO+1NC		FR 716-H0M2P11	1NO+1NC
9	L	FR 916-M2	2NC		FR 916-M2P11	2NC		FR 916-H0M2	2NC		FR 916-H0M2P11	2NC
16	LI	/			/			/			/	
20	L	FR 2016-M2	1NO+2NC		FR 2016-M2P11	1NO+2NC		FR 2016-H0M2	1NO+2NC		FR 2016-H0M2P11	1NO+2NC
Max. speed		page 155 - type 2			page 155 - type 2			page 155 - type 2			page 155 - type 2	
Actuating force		8 N (25 N →)			8 N (25 N →)			8 N (25 N →)			8 N (25 N →)	
Travel diagrams		page 156 - group 1a			page 156 - group 1a			page 156 - group 1a			page 156 - group 1a	

All values in the drawings are in mm

Accessories See page 149

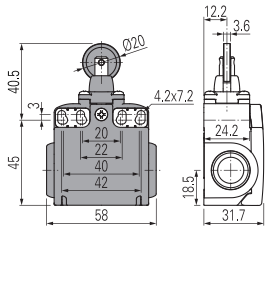
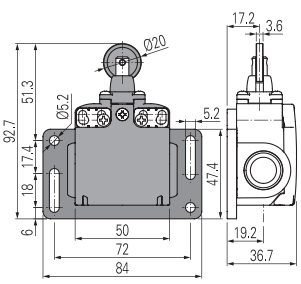
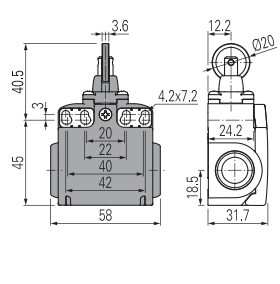
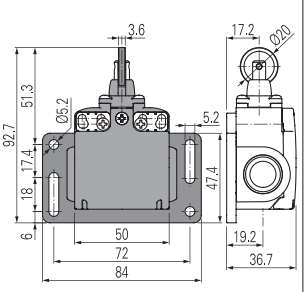
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

Contact block		With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request
					
5	R	FX 515-M2 → 1NO+1NC	FX 515-M2P31 → 1NO+1NC	FX 515-H0M2 → 1NO+1NC	FX 515-H0M2P31 → 1NO+1NC
6	L	FX 615-M2 → 1NO+1NC	FX 615-M2P31 → 1NO+1NC	FX 615-H0M2 → 1NO+1NC	FX 615-H0M2P31 → 1NO+1NC
7	LO	FX 715-M2 → 1NO+1NC	FX 715-M2P31 → 1NO+1NC	FX 715-H0M2 → 1NO+1NC	FX 715-H0M2P31 → 1NO+1NC
9	L	FX 915-M2 → 2NC	FX 915-M2P31 → 2NC	FX 915-H0M2 → 2NC	FX 915-H0M2P31 → 2NC
16	LI	/	/	/	/
20	L	FX 2015-M2 → 1NO+2NC	FX 2015-M2P31 → 1NO+2NC	FX 2015-H0M2 → 1NO+2NC	FX 2015-H0M2P31 → 1NO+2NC
Max. speed		page 155 - type 2	page 155 - type 2	page 155 - type 2	page 155 - type 2
Actuating force		8 N (25 N →)	8 N (25 N →)	8 N (25 N →)	8 N (25 N →)
Travel diagrams		page 156 - group 1a	page 156 - group 1a	page 156 - group 1a	page 156 - group 1a

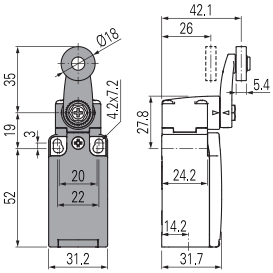
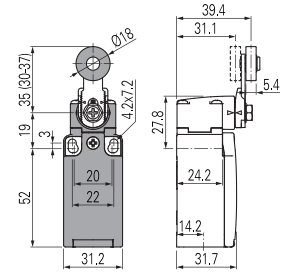
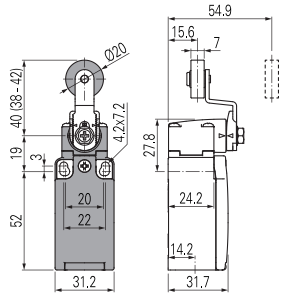
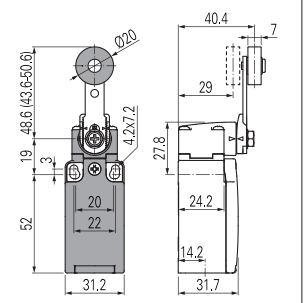
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

Contact block					
					
5	R	FX 516-M2 → 1NO+1NC	FX 516-M2P31 → 1NO+1NC	FX 516-H0M2 → 1NO+1NC	FX 516-H0M2P31 → 1NO+1NC
6	L	FX 616-M2 → 1NO+1NC	FX 616-M2P31 → 1NO+1NC	FX 616-H0M2 → 1NO+1NC	FX 616-H0M2P31 → 1NO+1NC
7	LO	FX 716-M2 → 1NO+1NC	FX 716-M2P31 → 1NO+1NC	FX 716-H0M2 → 1NO+1NC	FX 716-H0M2P31 → 1NO+1NC
9	L	FX 916-M2 → 2NC	FX 916-M2P31 → 2NC	FX 916-H0M2 → 2NC	FX 916-H0M2P31 → 2NC
16	LI	/	/	/	/
20	L	FX 2016-M2 → 1NO+2NC	FX 2016-M2P31 → 1NO+2NC	FX 2016-H0M2 → 1NO+2NC	FX 2016-H0M2P31 → 1NO+2NC
Max. speed		page 155 - type 2	page 155 - type 2	page 155 - type 2	page 155 - type 2
Actuating force		8 N (25 N →)	8 N (25 N →)	8 N (25 N →)	8 N (25 N →)
Travel diagrams		page 156 - group 1a	page 156 - group 1a	page 156 - group 1a	page 156 - group 1a

Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

Contact block		With Ø 20 mm stainless steel roller on request	Other rollers available. See page 20	Other rollers available. See page 20	Other rollers available. See page 20
					
5	R	FR 530-M2 → 1NO+1NC	FR 531-M2 → 1NO+1NC	FR 551-M2 → 1NO+1NC	FR 552-M2 → 1NO+1NC
6	L	FR 630-M2 → 1NO+1NC	FR 631-M2 → 1NO+1NC	FR 651-M2 → 1NO+1NC	FR 652-M2 → 1NO+1NC
7	LO	FR 730-M2 → 1NO+1NC	FR 731-M2 → 1NO+1NC	FR 751-M2 → 1NO+1NC	FR 752-M2 → 1NO+1NC
9	L	FR 930-M2 → 2NC	FR 931-M2 → 2NC	FR 951-M2 → 2NC	FR 952-M2 → 2NC
16	LI	FR 1630-M2 → 2NC	FR 1631-M2 → 2NC	FR 1651-M2 → 2NC	FR 1652-M2 → 2NC
20	L	FR 2030-M2 → 1NO+2NC	FR 2031-M2 → 1NO+2NC	FR 2051-M2 → 1NO+2NC	FR 2052-M2 → 1NO+2NC
Max. speed		page 155 - type 1	page 155 - type 1	page 155 - type 1	page 155 - type 1
Actuating force		0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)
Travel diagrams		page 156 - group 4a	page 156 - group 4a	page 156 - group 4a	page 156 - group 4a

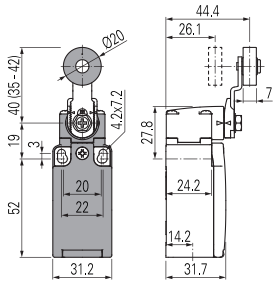
All values in the drawings are in mm

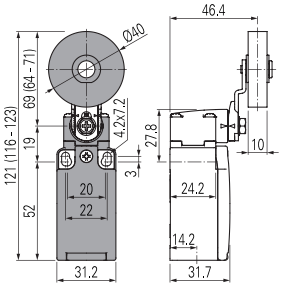
Accessories See page 149

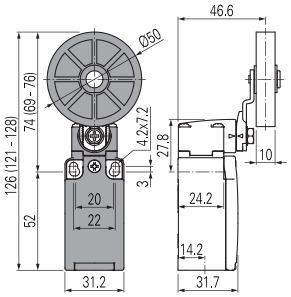
FR, FX series position switches

Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent





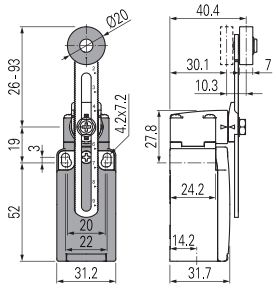


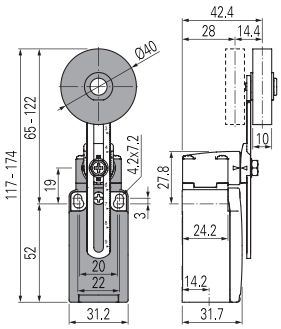
Contact block

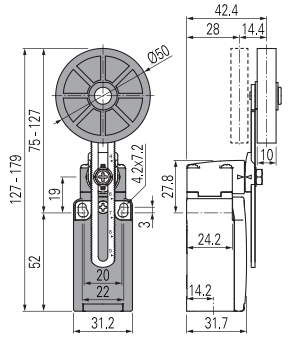
5	R	FR 554-M2	1NO+1NC	FR 554-M2R5	1NO+1NC	FR 554-M2R26	1NO+1NC
6	L	FR 654-M2	1NO+1NC	FR 654-M2R5	1NO+1NC	FR 654-M2R26	1NO+1NC
7	LO	FR 754-M2	1NO+1NC	FR 754-M2R5	1NO+1NC	FR 754-M2R26	1NO+1NC
9	L	FR 954-M2	2NC	FR 954-M2R5	2NC	FR 954-M2R26	2NC
16	LI	FR 1654-M2	2NC	FR 1654-M2R5	2NC	FR 1654-M2R26	2NC
20	L	FR 2054-M2	1NO+2NC	FR 2054-M2R5	1NO+2NC	FR 2054-M2R26	1NO+2NC
Max. speed		page 155 - type 1		page 155 - type 1		page 155 - type 1	
Actuating force		0.06 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)	
Travel diagrams		page 156 - group 4a		page 156 - group 4a		page 156 - group 4a	

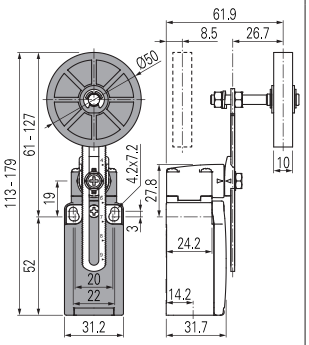
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent









Contact block

5	R	FR 556-M2	1NO+1NC	FR 556-M2R5	1NO+1NC	FR 556-M2R26	1NO+1NC	FR 556-M2R27	1NO+1NC
6	L	FR 656-M2	1NO+1NC	FR 656-M2R5	1NO+1NC	FR 656-M2R26	1NO+1NC	FR 656-M2R27	1NO+1NC
7	LO	FR 756-M2	1NO+1NC	FR 756-M2R5	1NO+1NC	FR 756-M2R26	1NO+1NC	FR 756-M2R27	1NO+1NC
9	L	FR 956-M2	2NC	FR 956-M2R5	2NC	FR 956-M2R26	2NC	FR 956-M2R27	2NC
16	LI	FR 1656-M2	2NC	FR 1656-M2R5	2NC	FR 1656-M2R26	2NC	FR 1656-M2R27	2NC
20	L	FR 2056-M2	1NO+2NC	FR 2056-M2R5	1NO+2NC	FR 2056-M2R26	1NO+2NC	FR 2056-M2R27	1NO+2NC
Max. speed		page 155 - type 1		page 155 - type 1		page 155 - type 1		page 155 - type 1	
Actuating force		0.06 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)	
Travel diagrams		page 156 - group 4a		page 156 - group 4a		page 156 - group 4a		page 156 - group 4a	

(1) Positive opening only with actuator set to max.

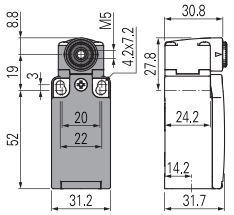
All values in the drawings are in mm

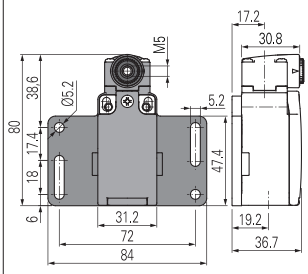
Accessories See page 149

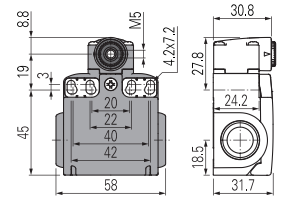
Position switches with swivelling lever without actuator

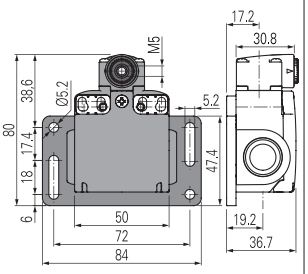
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent









Contact block								
5	R	FR 538-M2	1NO+1NC	FR 538-M2P11	1NO+1NC	FX 538-M2	1NO+1NC	FX 538-M2P31	1NO+1NC
6	L	FR 638-M2	1NO+1NC	FR 638-M2P11	1NO+1NC	FX 638-M2	1NO+1NC	FX 638-M2P31	1NO+1NC
7	LO	FR 738-M2	1NO+1NC	FR 738-M2P11	1NO+1NC	FX 738-M2	1NO+1NC	FX 738-M2P31	1NO+1NC
9	L	FR 938-M2	2NC	FR 938-M2P11	2NC	FX 938-M2	2NC	FX 938-M2P31	2NC
16	LI	FR 1638-M2	2NC	FR 1638-M2P11	2NC	FX 1638-M2	2NC	FX 1638-M2P31	2NC
20	L	FR 2038-M2	1NO+2NC	FR 2038-M2P11	1NO+2NC	FX 2038-M2	1NO+2NC	FX 2038-M2P31	1NO+2NC
Actuating force		0.06 Nm (0.25 Nm ⊖)		0.06 Nm (0.25 Nm ⊖)		0.06 Nm (0.25 Nm ⊖)		0.06 Nm (0.25 Nm ⊖)	
Travel diagrams		page 156 - group 4a		page 156 - group 4a		page 156 - group 4a		page 156 - group 4a	

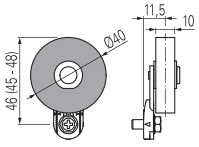
IMPORTANT

For safety applications: join only switches and actuators marked with symbol ⊖ next to the product code.
For more information about safety applications see details on page 153.

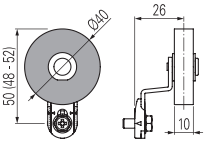
Special separate actuators

IMPORTANT: These separate actuators can be used only with items of the FR, FX series.

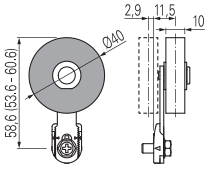
Rubber rollers, Ø 40 mm



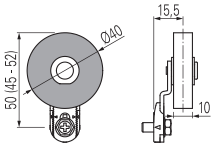
VN A00KB-R5 ⊖ (1)



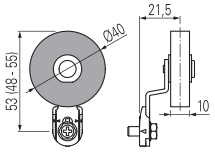
VN A00KE-R5 ⊖ (1)



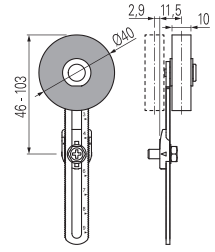
VN A00KF-R5 ⊖



VN A00KG-R5 ⊖ (1)

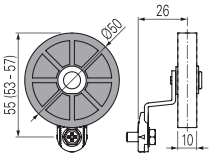


VN A00KH-R5 ⊖ (1)

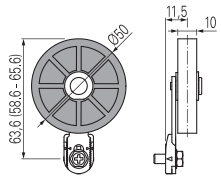


VN A00KP-R5 ⊖

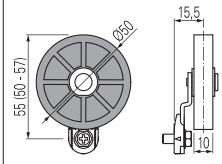
Rubber rollers, Ø 50 mm



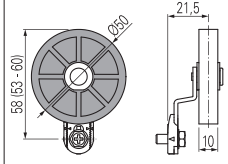
VN A00KE-R26 ⊖ (1)



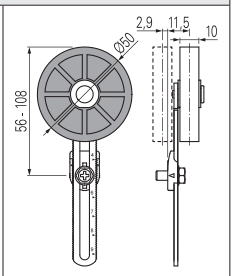
VN A00KF-R26 ⊖ (1)



VN A00KG-R26 ⊖ (1)

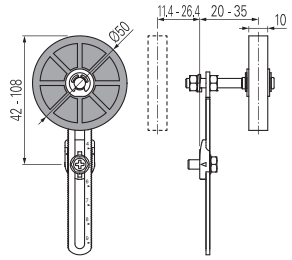


VN A00KH-R26 ⊖ (1)



VN A00KP-R26 ⊖

Protruding rubber rollers, Ø 50 mm



VN A00KP-R27 ⊖

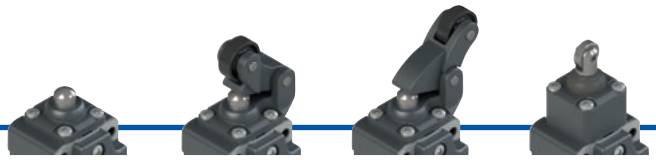
- (1) The actuator cannot be rotated to the inside because it will hit the switch head upon actuation.

Note: To check the correspondence with previous lever codes, please consult the table "Changed article codes" on page 171. Example: VF LE31-R5 -> VN A00KB-R5.

All values in the drawings are in mm

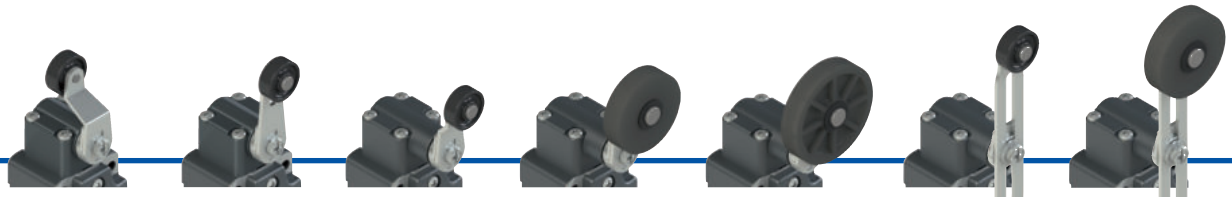
Accessories See page 149

Selection diagram



01 **02** **05**

15
stainless steel roller, external gasket



51 **52** **31**

31-R5
rubber roller, Ø 40 mm

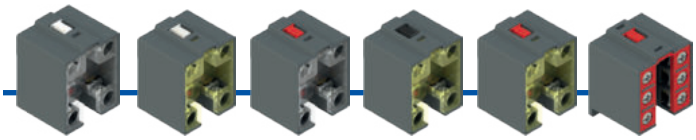
31-R26
rubber roller, Ø 50 mm

35
adjustable lever

35-R5
rubber roller, Ø 40 mm, adjustable lever

ACTUATORS

CONTACT BLOCKS



5
1NO+1NC snap action

6
1NO+1NC, slow action

7
1NO+1NC, slow action, make before break

9
2NC slow action

16
2NC slow action, independent

20
1NO+2NC slow action

CONDUIT ENTRY

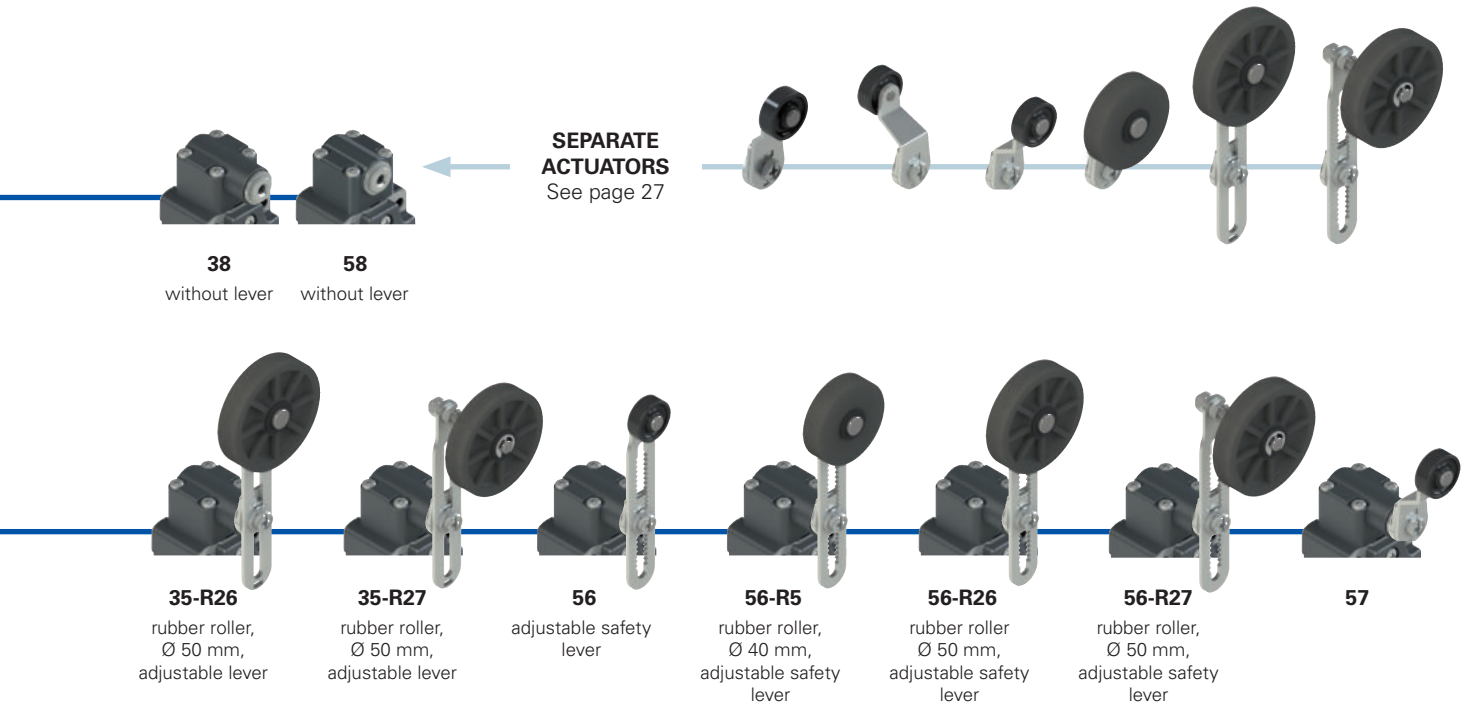
Threaded conduit entry	
M2	M20x1.5 (standard)
	PG 13.5

With cable gland	
K23	for cables Ø 6 … 12 mm
K27	for cables Ø 3 … 7 mm

Wired
Wiring with custom connectors and cables available on request.

Product options

Sold separately as accessory



Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article | option | options

FP 635-GM2K23R26T6

Housing	
FP	technopolymer, one conduit entry

Contact block	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
9	2NC, slow action
16	2NC, slow action, independent
20	1NO+2NC, slow action

Actuators	
01	short plunger
02	roller lever
05	angled lever with roller
...	...

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 20)

Threaded conduit entry	
M2	M20x1.5 (standard)
	PG 13.5

Pre-installed cable glands	
K23	for cables Ø 6 ... 12 mm
K27	for cables Ø 3 ... 7 mm

Rollers	
	standard roller
R5	rubber roller, Ø 40 mm
R26	rubber roller, Ø 50 mm
R27	rubber roller, protruding, Ø 50 mm

Ambient temperature	
	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

FP series position switches

Main features
- Technopolymer housing, one conduit entry
- Protection degree IP67
- Stainless steel fixing plates
- Wired versions
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2021000305000099
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

One threaded conduit entry:	M20x1.5 (standard)
Protection degree acc. to EN 60529:	IP67 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Mounting position:	any
Safety parameter B_{10D}:	40,000,000 for NC contacts
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 157
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14

Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1.** Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 157. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact block 20)
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact block 20)
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact block 20)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact block 20)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X
Positive opening contacts on contact blocks 5, 6, 7, 9, 16, 20
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

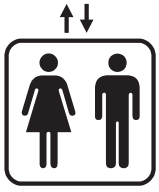
Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

The hub is to be connected to the conduit before the hub is connected to the enclosure.

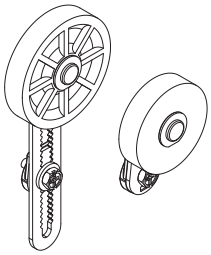
Please contact our technical department for the list of approved products.

Compliant with EN 81-20 and EN 81-50



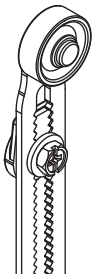
- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10^6 cycles.

Rubber rollers



Actuators are available with rubber rollers of varying degrees of elasticity. Customers can therefore use the most suitable product for the speed of their particular lift, to reduce cabin noise to a minimum.

Adjustable safety lever



The adjustable lever code 56 (and variants) is provided with a notching that prevents the sliding also in case the fastening screw becomes loose.

Protection degree IP67

IP67

All switches of this series have protection degree IP67.

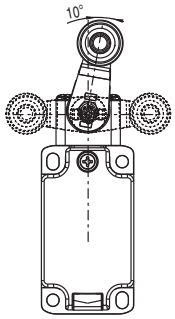
Extended temperature range

-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C. They can therefore be used for applications in cold stores, sterilisers, and other equipment operated in very low-temperature environments.

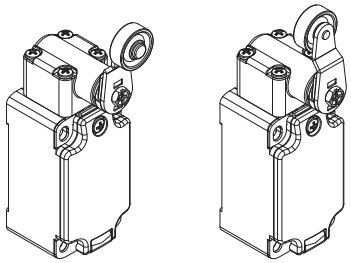
Adjustable levers

For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



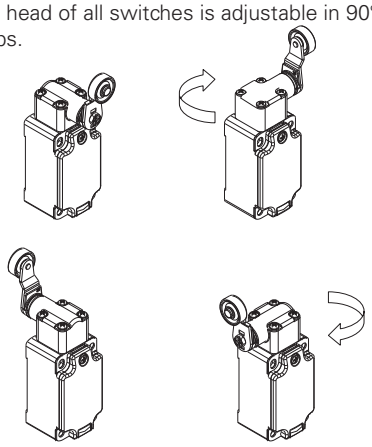
Reversible levers

For switches with swivelling lever, the lever can be fastened on straight or reverse side maintaining the positive coupling.
In this way two different working planes of the lever are possible.



Head with variable orientation

The head of all switches is adjustable in 90° steps.

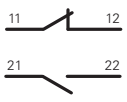


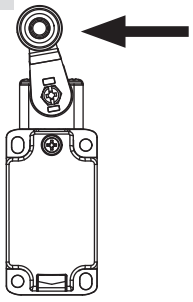
Operation of contact block 16 with independent contacts

The contact block 16 is provided with two NC contacts, **both with positive opening**, that can be independently switched depending on the lever turning direction.

Lever turned to left

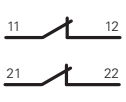
Contact diagram

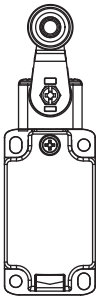




Lever not actuated

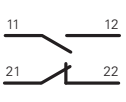
Contact diagram

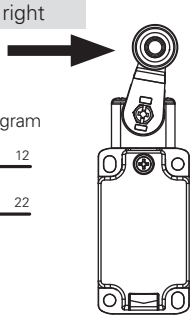




Lever turned to right

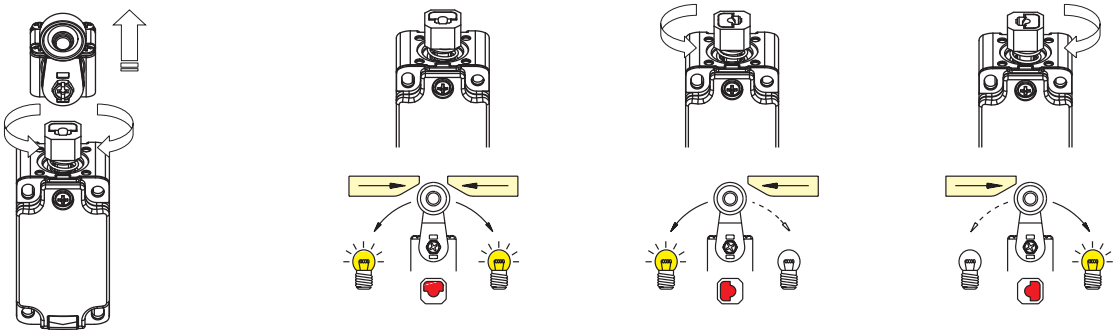
Contact diagram





Unidirectional heads

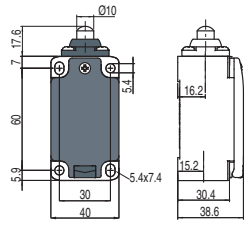
For switches with swivelling lever, the unidirectional operation can be set by removing the four head screws and rotating the internal plunger (except contact block 16).



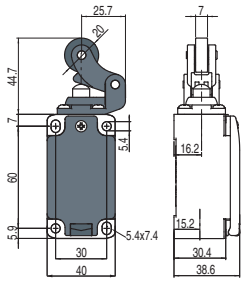
FP series position switches

Contact type:

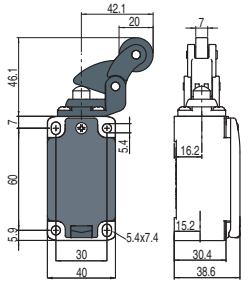
R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



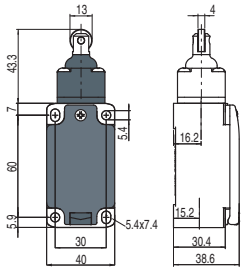
With stainless steel roller on request



With stainless steel roller on request



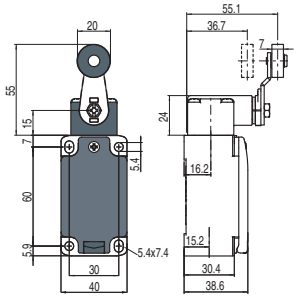
External gasket

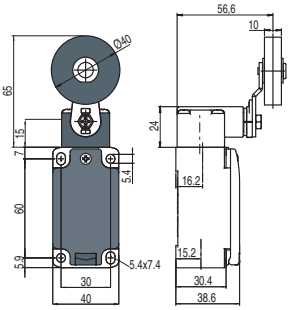


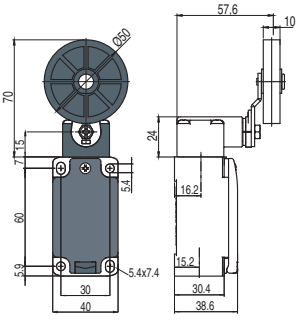
Contact block								
5	R	FP 501-M2	1NO+1NC	FP 502-M2	1NO+1NC	FP 505-M2	1NO+1NC	FP 515-M2	1NO+1NC
6	L	FP 601-M2	1NO+1NC	FP 602-M2	1NO+1NC	FP 605-M2	1NO+1NC	FP 615-M2	1NO+1NC
7	LO	FP 701-M2	1NO+1NC	FP 702-M2	1NO+1NC	FP 705-M2	1NO+1NC	FP 715-M2	1NO+1NC
9	L	FP 901-M2	2NC	FP 902-M2	2NC	FP 905-M2	2NC	FP 915-M2	2NC
16	LI	/		/		/		/	
20	L	FP 2001-M2	1NO+2NC	FP 2002-M2	1NO+2NC	FP 2005-M2	1NO+2NC	FP 2015-M2	1NO+2NC
Max. speed		page 157 - type 4		page 157 - type 3		page 157 - type 3		page 157 - type 2	
Actuating force		8 N (25 N →)		6 N (25 N →)		6 N (25 N →)		11 N (25 N →)	
Travel diagrams		page 157 - group 1b		page 157 - group 2b		page 157 - group 2b		page 157 - group 1b	

Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



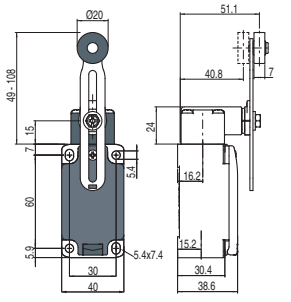


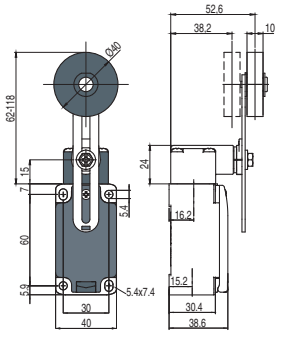


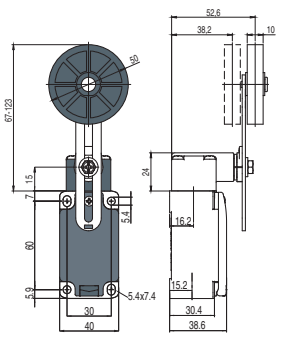
Contact block								
5	R	FP 531-M2	1NO+1NC	FP 531-M2R5	1NO+1NC	FP 531-M2R26	1NO+1NC		
6	L	FP 631-M2	1NO+1NC	FP 631-M2R5	1NO+1NC	FP 631-M2R26	1NO+1NC		
7	LO	FP 731-M2	1NO+1NC	FP 731-M2R5	1NO+1NC	FP 731-M2R26	1NO+1NC		
9	L	FP 931-M2	2NC	FP 931-M2R5	2NC	FP 931-M2R26	2NC		
16	LI	FP 1631-M2	2NC	FP 1631-M2R5	2NC	FP 1631-M2R26	2NC		
20	L	FP 2031-M2	1NO+2NC	FP 2031-M2R5	1NO+2NC	FP 2031-M2R26	1NO+2NC		
Max. speed		page 157 - type 1		page 157 - type 1		page 157 - type 1			
Actuating force		0.1 Nm (0.25 Nm →)		0.1 Nm (0.25 Nm →)		0.1 Nm (0.25 Nm →)			
Travel diagrams		page 157 - group 3b		page 157 - group 3b		page 157 - group 3b			

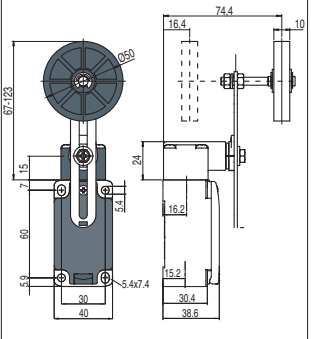
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent









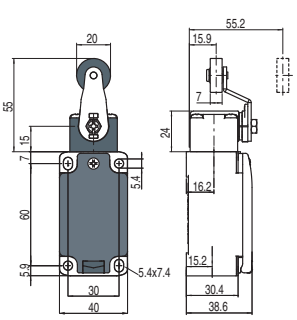
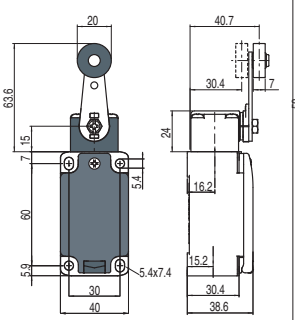
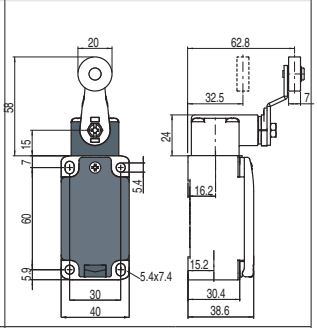
Contact block									
5	R	FP 535-M2	(1) 1NO+1NC	FP 535-M2R5	(1) 1NO+1NC	FP 535-M2R26	(1) 1NO+1NC	FP 535-M2R27	(1) 1NO+1NC
6	L	FP 635-M2	(1) 1NO+1NC	FP 635-M2R5	(1) 1NO+1NC	FP 635-M2R26	(1) 1NO+1NC	FP 635-M2R27	(1) 1NO+1NC
7	LO	FP 735-M2	(1) 1NO+1NC	FP 735-M2R5	(1) 1NO+1NC	FP 735-M2R26	(1) 1NO+1NC	FP 735-M2R27	(1) 1NO+1NC
9	L	FP 935-M2	(1) 2NC	FP 935-M2R5	(1) 2NC	FP 935-M2R26	(1) 2NC	FP 935-M2R27	(1) 2NC
16	LI	FP 1635-M2	(1) 2NC	FP 1635-M2R5	(1) 2NC	FP 1635-M2R26	(1) 2NC	FP 1635-M2R27	(1) 2NC
20	L	FP 2035-M2	(1) 1NO+2NC	FP 2035-M2R5	(1) 1NO+2NC	FP 2035-M2R26	(1) 1NO+2NC	FP 2035-M2R27	(1) 1NO+2NC
Max. speed		page 157 - type 1		page 157 - type 1		page 157 - type 1		page 157 - type 1	
Actuating force		0.1 Nm (0.25 Nm →)		0.1 Nm (0.25 Nm →)		0.1 Nm (0.25 Nm →)		0.1 Nm (0.25 Nm →)	
Travel diagrams		page 157 - group 3b		page 157 - group 3b		page 157 - group 3b		page 157 - group 3b	

All values in the drawings are in mm

Accessories See page 149

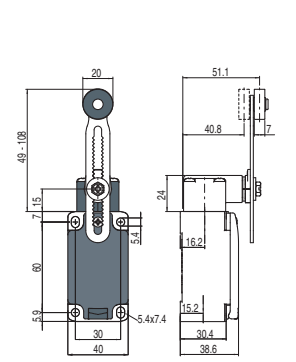
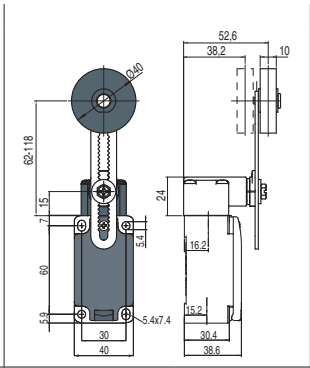
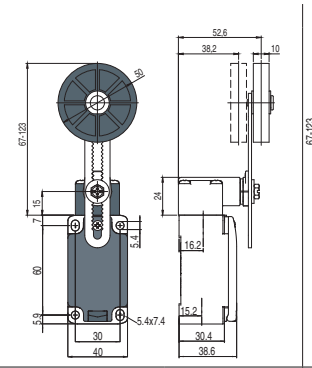
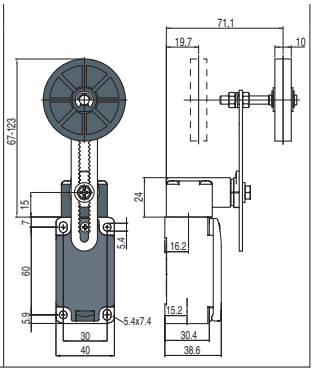
Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

Contact block		Other rollers available. See page 27	Other rollers available. See page 27	Other rollers available. See page 27
				
5	R	FP 551-M2 → 1NO+1NC	FP 552-M2 → 1NO+1NC	FP 557-M2 → 1NO+1NC
6	L	FP 651-M2 → 1NO+1NC	FP 652-M2 → 1NO+1NC	FP 657-M2 → 1NO+1NC
7	LO	FP 751-M2 → 1NO+1NC	FP 752-M2 → 1NO+1NC	FP 757-M2 → 1NO+1NC
9	L	FP 951-M2 → 2NC	FP 952-M2 → 2NC	FP 957-M2 → 2NC
16	LI	/	/	FP 1657-M2 → 2NC
20	L	FP 2051-M2 → 1NO+2NC	FP 2052-M2 → 1NO+2NC	FP 2057-M2 → 1NO+2NC
Max. speed		page 157 - type 1	page 157 - type 1	page 157 - type 1
Actuating force		0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)
Travel diagrams		page 157 - group 3b	page 157 - group 3b	page 157 - group 3b

Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

Contact block					
					
5	R	FP 556-M2 → 1NO+1NC	FP 556-M2R5 → 1NO+1NC	FP 556-M2R26 → 1NO+1NC	FP 556-M2R27 → 1NO+1NC
6	L	FP 656-M2 → 1NO+1NC	FP 656-M2R5 → 1NO+1NC	FP 656-M2R26 → 1NO+1NC	FP 656-M2R27 → 1NO+1NC
7	LO	FP 756-M2 → 1NO+1NC	FP 756-M2R5 → 1NO+1NC	FP 756-M2R26 → 1NO+1NC	FP 756-M2R27 → 1NO+1NC
9	L	FP 956-M2 → 2NC	FP 956-M2R5 → 2NC	FP 956-M2R26 → 2NC	FP 956-M2R27 → 2NC
16	LI	FP 1656-M2 → 2NC	FP 1656-M2R5 → 2NC	FP 1656-M2R26 → 2NC	FP 1656-M2R27 → 2NC
20	L	FP 2056-M2 → 1NO+2NC	FP 2056-M2R5 → 1NO+2NC	FP 2056-M2R26 → 1NO+2NC	FP 2056-M2R27 → 1NO+2NC
Max. speed		page 157 - type 1	page 157 - type 1	page 157 - type 1	page 157 - type 1
Actuating force		0.1 Nm (0.25 Nm →)	0.1 Nm (0.25 Nm →)	0.1 Nm (0.25 Nm →)	0.1 Nm (0.25 Nm →)
Travel diagrams		page 157 - group 3b	page 157 - group 3b	page 157 - group 3b	page 157 - group 3b

(1) Positive opening only with actuator set to max.

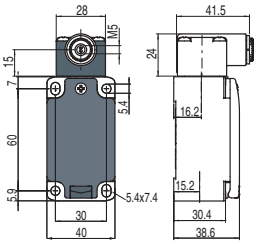
All values in the drawings are in mm

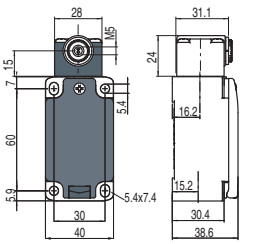
Accessories See page 149

Position switches with swivelling lever without actuator

Contact type:

R = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent





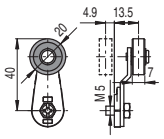
Contact block		Regular head		Compact head	
5	R	FP 538-M2	1NO+1NC	FP 558-M2	1NO+1NC
6	L	FP 638-M2	1NO+1NC	FP 658-M2	1NO+1NC
7	LO	FP 738-M2	1NO+1NC	FP 758-M2	1NO+1NC
9	L	FP 938-M2	2NC	FP 958-M2	2NC
16	LI	FP 1638-M2	2NC	/	
20	L	FP 2038-M2	1NO+2NC	FP 2058-M2	1NO+2NC
Actuating force		0.1 Nm (0.25 Nm)		0.06 Nm (0.25 Nm)	
Travel diagrams		page 157 - group 3b		page 157 - group 3b	

IMPORTANT
For safety applications: join only switches and actuators marked with symbol ⊕ next to the product code.
For more information about safety applications see details on page 153.

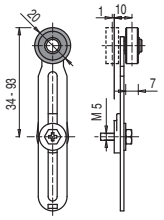
Separate actuators

IMPORTANT: These separate actuators can be used only with items of the FP series.

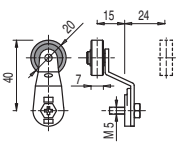
Technopolymer rollers, Ø 20 mm



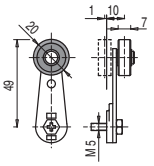
VF L31



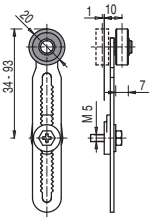
VF L35 (1) (3)



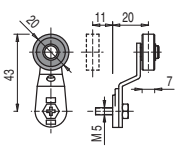
VF L51



VF L52

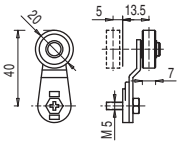


VF L56

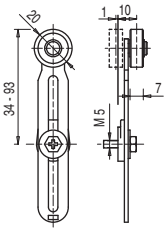


VF L57

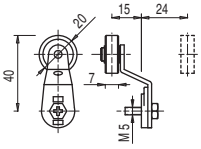
Stainless steel rollers, Ø 20 mm



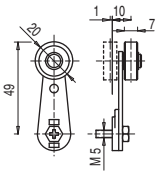
VF L31-R24



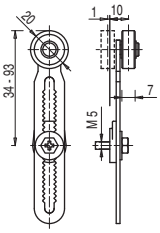
VF L35-R24 (1) (3)



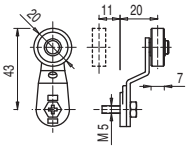
VF L51-R24



VF L52-R24



VF L56-R24 (3)



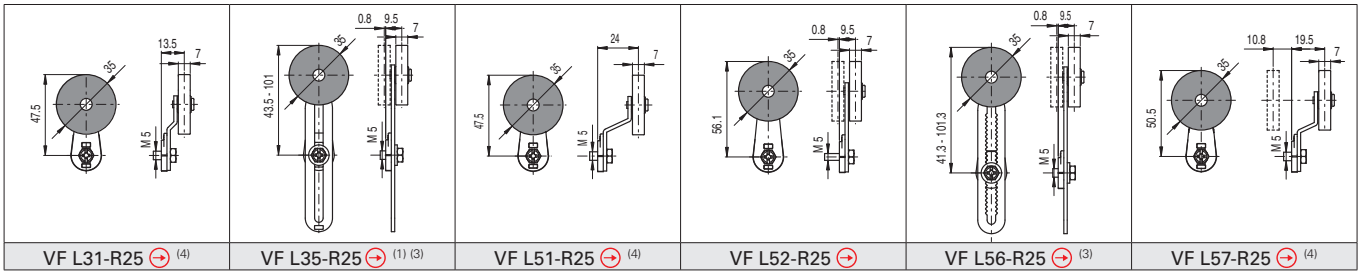
VF L57-R24

All values in the drawings are in mm

Accessories See page 149

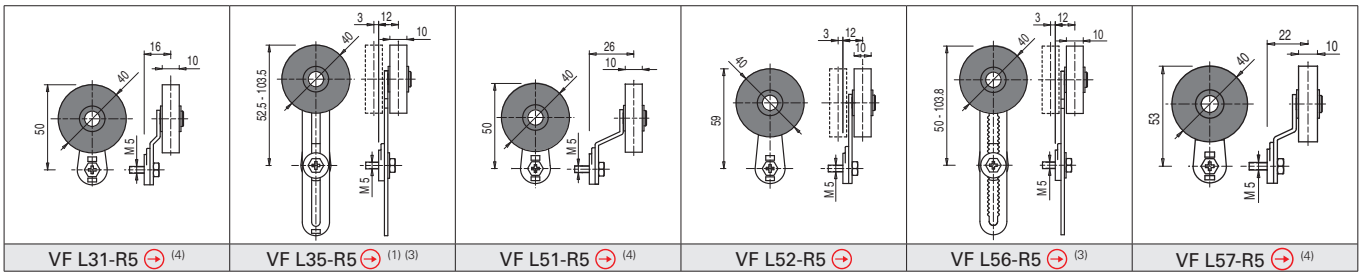
Special separate actuators

Technopolymer rollers, Ø 35 mm



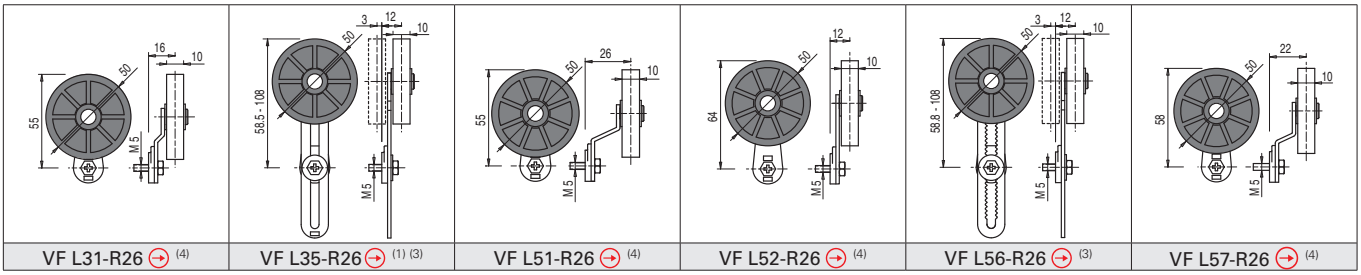
VF L31-R25 (4) | VF L35-R25 (1) (3) | VF L51-R25 (4) | VF L52-R25 | VF L56-R25 (3) | VF L57-R25 (4)

Rubber rollers, Ø 40 mm



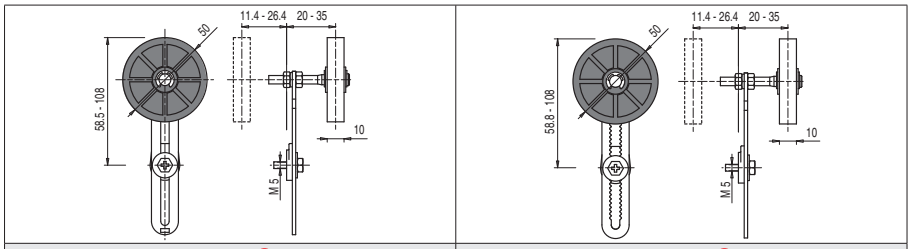
VF L31-R5 (4) | VF L35-R5 (1) (3) | VF L51-R5 (4) | VF L52-R5 | VF L56-R5 (3) | VF L57-R5 (4)

Rubber rollers, Ø 50 mm

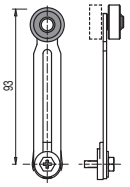


VF L31-R26 (4) | VF L35-R26 (1) (3) | VF L51-R26 (4) | VF L52-R26 (4) | VF L56-R26 (3) | VF L57-R26 (4)

Protruding rubber rollers, Ø 50 mm



VF L35-R27 (1) (3) | VF L56-R27 (3)

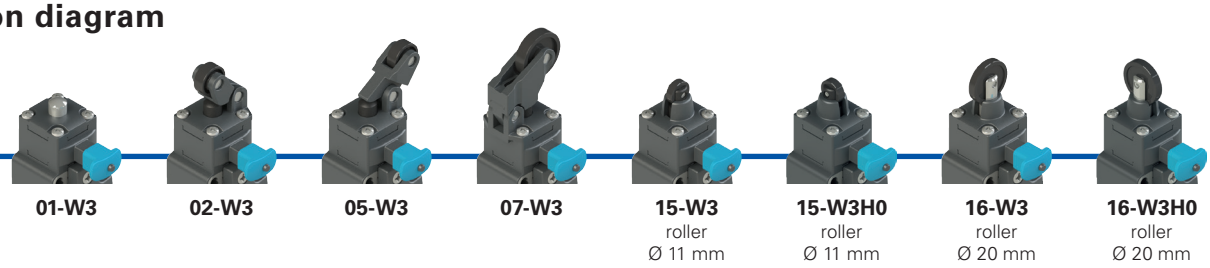


- (1) Lever VF L35 can only be used in safety applications if adjusted to its max. length, as shown in the figure to the right.
If an adjustable lever is required for safety applications, use the VF L56 adjustable safety lever.
- (3) If installed with switch FP •58 (e.g. FP 558, FP 658…) the actuator may hit the housing of the switch upon actuation. This possible interference depends on the fixing position of actuator and switch head.
- (4) The actuator cannot be rotated to the inside because it will hit the switch head upon actuation.

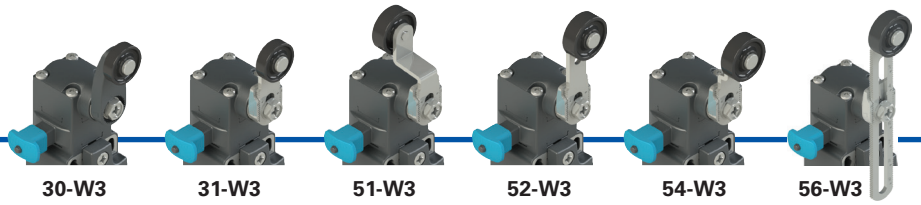
All values in the drawings are in mm

Accessories See page 149

Selection diagram

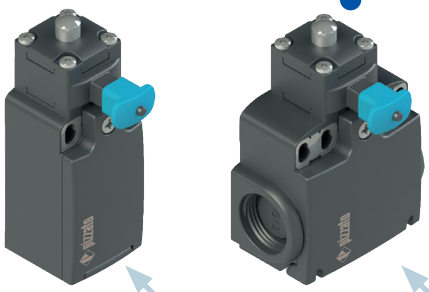


01-W3 | **02-W3** | **05-W3** | **07-W3** | **15-W3** roller Ø 11 mm | **15-W3H0** roller Ø 11 mm | **16-W3** roller Ø 20 mm | **16-W3H0** roller Ø 20 mm



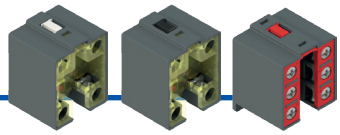
30-W3 | **31-W3** | **51-W3** | **52-W3** | **54-W3** | **56-W3** adjustable safety lever

ACTUATORS



FR | **FX**

CONTACT BLOCKS



6 1NO+1NC, slow action | **9** 2NC slow action | **20** 1NO+2NC, slow action

PLATES

P12	plate for FR housing
P32	plate for FX housing

CONDUIT ENTRY

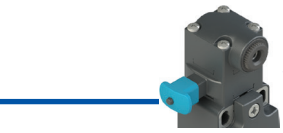
Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

With cable gland	
K23	for cables Ø 6 … 12 mm
K27	for cables Ø 3 … 7 mm

Wired
Wiring with custom connectors and cables available on request.

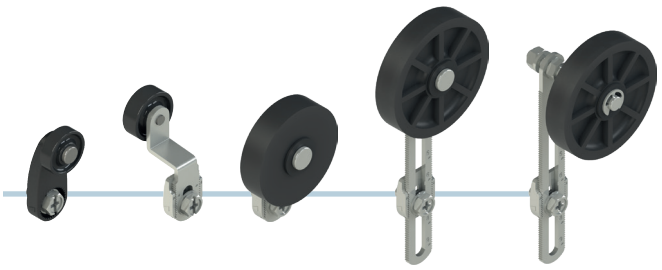
Product options

Sold separately as accessory



38-W3
without lever

SEPARATE ACTUATORS
See page 36



Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article | option | options

FR 655-W3GM2K23P12R26T6

Housing	
FR	technopolymer, one conduit entry
FX	technopolymer, two conduit entries

Contact block	
6	1NO+1NC, slow action
9	2NC, slow action
20	1NO+2NC, slow action

Actuators	
01	short plunger
02	roller lever
05	angled lever with roller
...	...

Engagement reset	
W3	simultaneous reset (standard)
W4	simultaneous reset with increased force

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 20)

Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

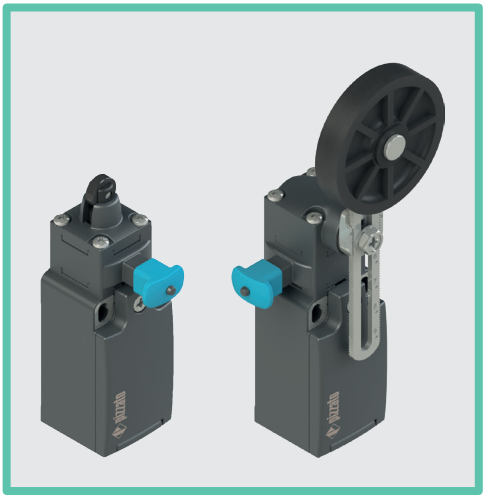
Pre-installed cable glands	
K23	for cables Ø 6 ... 12 mm
K27	for cables Ø 3 ... 7 mm

Fixing plates	
	without plate (standard)
P12	with VF SFP1 plate for FR housing
P32	with VF SFP3 plate for FX housing

Rollers	
	standard roller
R5	rubber roller, Ø 40 mm
R26	rubber roller, Ø 50 mm
R27	rubber roller, protruding, Ø 50 mm

Ambient temperature	
	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

Switches with **manual reset**



Main features
- Technopolymer housing, from one to two conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing
- Protection degree IP67 and IP69K
- Wired versions
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C_IT.YT03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

FR series, one conduit entry:	M20x1.5 (standard)
FX series, two knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree IP69K acc. to ISO 20653 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Mounting position:	any
Safety parameter B_{10D}:	40,000,000 for NC contacts
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14

Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 156. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact block 20)
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact block 20)
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact block 20)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact block 20)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X
Positive opening of contacts on contact blocks 6, 9, 20
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX: Types 1, 4X, 12, 13

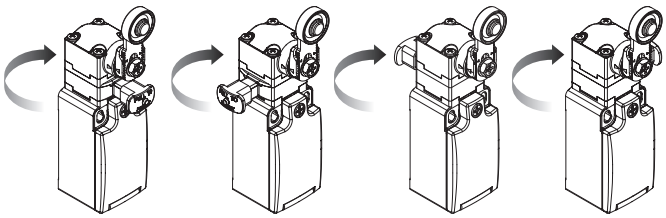
For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

The hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

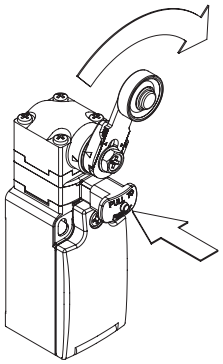
Orientation of reset device adjustable

The reset device can be turned independently of the above actuator, making positioning of the product incredibly flexible. Extracting the blue button resets the device – as laid down in the standards – to prevent unintentional reset.

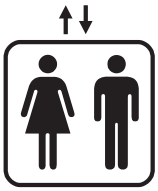


W3 simultaneous reset

Pizzato Elettrica has developed and patented an innovative reset device. This device ensures that, when the switch is activated, the electrical contacts trip and the reset system latches simultaneously. As a result, snap action contact blocks are no longer required, and furthermore, problems resulting from delays between the reset button latching and contacts opening are avoided.



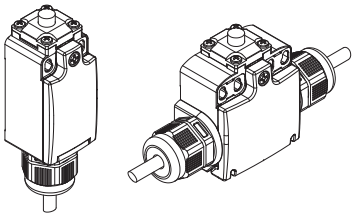
Compliant with EN 81-20 and EN 81-50



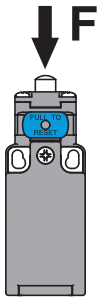
- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10^6 cycles.

Cable outlets

Switches available with cable outlets in various directions, for use in the most confined of spaces.



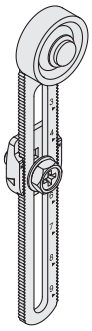
Increased actuating force



The switch can be delivered with increased actuating force (option W4). Ideal for vibration applications.

Actuators	Force
01, 14, 15, 16	7 N
02, 05	6 N
07	3.5 N
30 … 56	0.08 Nm

Adjustable safety lever



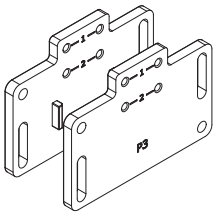
The adjustable lever code 56 (and variants) is provided with a notching that prevents the sliding also in case the fastening screw becomes loose.

Protection degrees IP67 and IP69K

IP69K
IP67

These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing. All switches with actuator that do not have an external rubber hood also have a protection degree of IP69K in accordance with ISO 20653, and can be used on machinery subject to washing with water jets at 100 bar and 80°C.

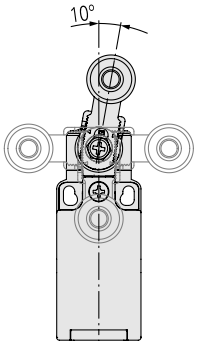
Adapter plates



Fixing plate with large slotted holes for switching point adjustment. Developed for backwards compatibility with previous products.

Each plate is provided with two pairs of mounting holes, one for standard switches and one for switches with reset device. The actuator thus always has the same actuating point.

Adjustable levers

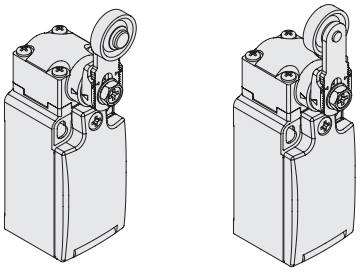


For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

Reversible levers

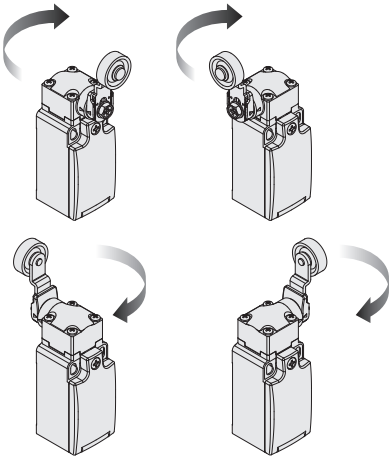
For switches with swivelling lever, the lever can be fastened on straight or reverse side maintaining the positive coupling.

In this way two different working planes of the lever are possible.



Head with variable orientation

The head of all switches is adjustable in 90° steps.



Extended temperature range

-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

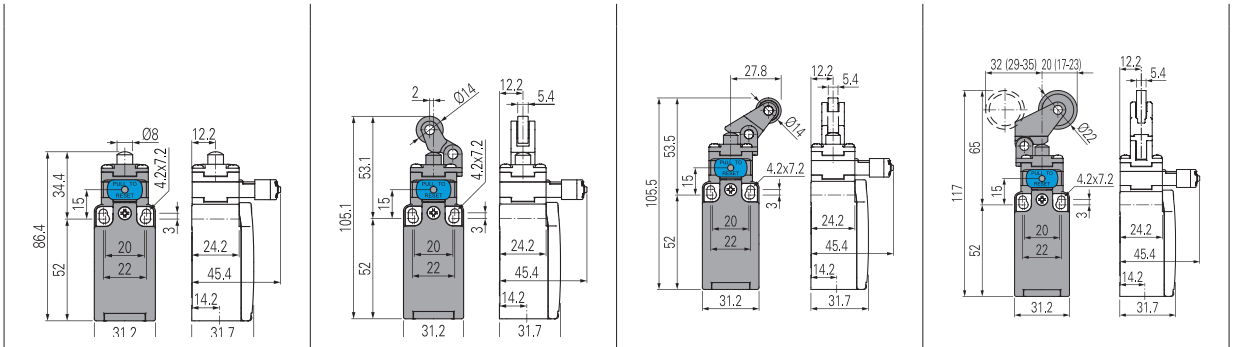
They can therefore be used for applications in cold stores, sterilisers, and other equipment operated in very low-temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Switches with **manual reset**

Contact type:

L = slow action

Contact block



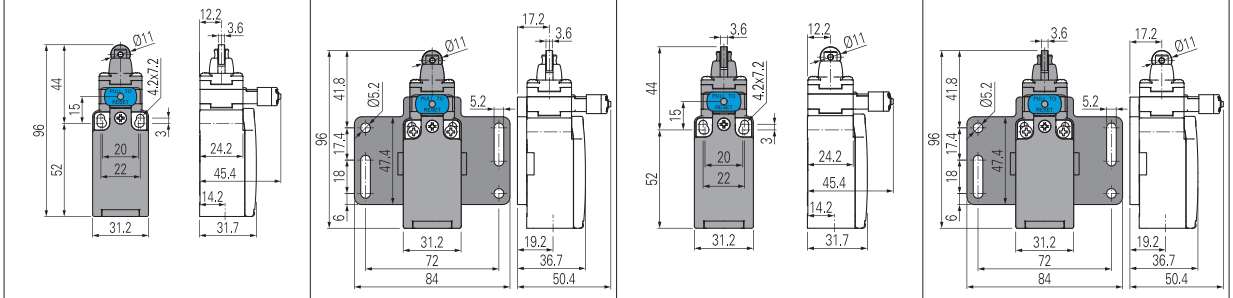
Contact block								
6	L	FR 601-W3M2	1NO+1NC	FR 602-W3M2	1NO+1NC	FR 605-W3M2	1NO+1NC	FR 607-W3M2	1NO+1NC
9	L	FR 901-W3M2	2NC	FR 902-W3M2	2NC	FR 905-W3M2	2NC	FR 907-W3M2	2NC
20	L	FR 2001-W3M2	1NO+2NC	FR 2002-W3M2	1NO+2NC	FR 2005-W3M2	1NO+2NC	FR 2007-W3M2	1NO+2NC
Max. speed		page 155 - type 4		page 155 - type 3		page 155 - type 3		page 155 - type 3	
Actuating force		4.5 N (25 N →)		4 N (25 N →)		4 N (25 N →)		2.5 N (25 N →)	
Travel diagrams		page 156 - group 1c		page 156 - group 2c		page 156 - group 2c		page 156 - group 3c	

Contact type:

L = slow action

Contact block

With Ø 12 mm stainless steel roller on request

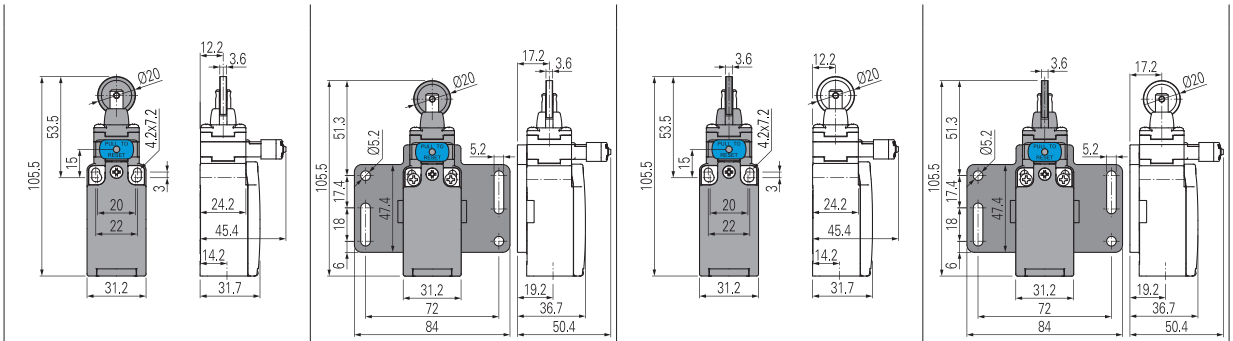


Contact block									
6	L	FR 615-W3M2	1NO+1NC	FR 615-W3M2P12	1NO+1NC	FR 615-W3H0M2	1NO+1NC	FR 615-W3H0M2P12	1NO+1NC
9	L	FR 915-W3M2	2NC	FR 915-W3M2P12	2NC	FR 915-W3H0M2	2NC	FR 915-W3H0M2P12	2NC
20	L	FR 2015-W3M2	1NO+2NC	FR 2015-W3M2P12	1NO+2NC	FR 2015-W3H0M2	1NO+2NC	FR 2015-W3H0M2P12	1NO+2NC
Max. speed		page 155 - type 2		page 155 - type 2		page 155 - type 2		page 155 - type 2	
Actuating force		4.5 N (25 N →)		4.5 N (25 N →)		4.5 N (25 N →)		4.5 N (25 N →)	
Travel diagrams		page 156 - group 1c		page 156 - group 1c		page 156 - group 1c		page 156 - group 1c	

Contact type:

L = slow action

Contact block



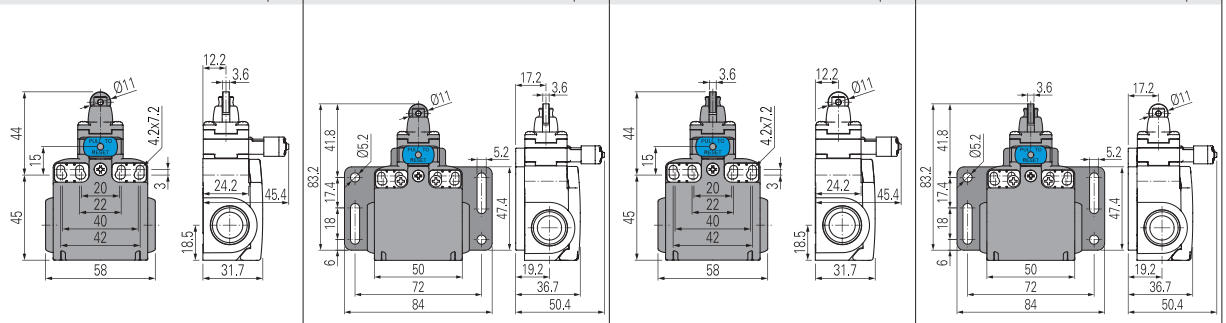
Contact block									
6	L	FR 616-W3M2	1NO+1NC	FR 616-W3M2P12	1NO+1NC	FR 616-W3H0M2	1NO+1NC	FR 616-W3H0M2P12	1NO+1NC
9	L	FR 916-W3M2	2NC	FR 916-W3M2P12	2NC	FR 916-W3H0M2	2NC	FR 916-W3H0M2P12	2NC
20	L	FR 2016-W3M2	1NO+2NC	FR 2016-W3M2P12	1NO+2NC	FR 2016-W3H0M2	1NO+2NC	FR 2016-W3H0M2P12	1NO+2NC
Max. speed		page 155 - type 2		page 155 - type 2		page 155 - type 2		page 155 - type 2	
Actuating force		4.5 N (25 N →)		4.5 N (25 N →)		4.5 N (25 N →)		4.5 N (25 N →)	
Travel diagrams		page 156 - group 1c		page 156 - group 1c		page 156 - group 1c		page 156 - group 1c	

All values in the drawings are in mm

Accessories See page 149

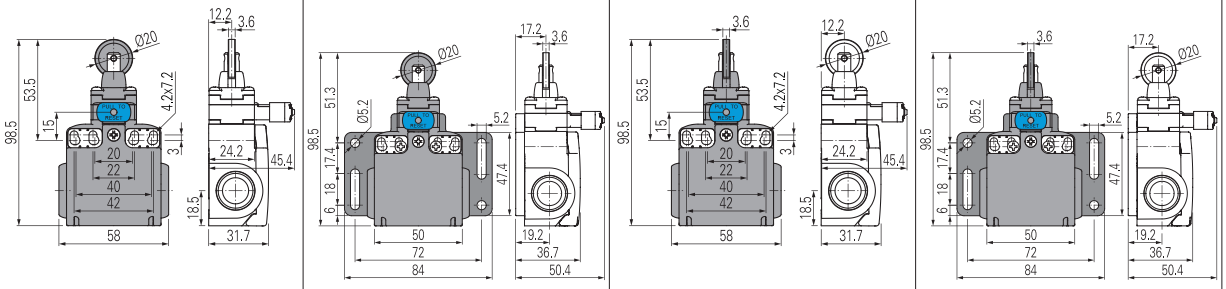
Contact type:

L = slow action

Contact block		With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request
					
6	L	FX 615-W3M2 → 1NO+1NC	FX 615-W3M2P32 → 1NO+1NC	FX 615-W3H0M2 → 1NO+1NC	FX 615-W3H0M2P32 → 1NO+1NC
9	L	FX 915-W3M2 → 2NC	FX 915-W3M2P32 → 2NC	FX 915-W3H0M2 → 2NC	FX 915-W3H0M2P32 → 2NC
20	L	FX 2015-W3M2 → 1NO+2NC	FX 2015-W3M2P32 → 1NO+2NC	FX 2015-W3H0M2 → 1NO+2NC	FX 2015-W3H0M2P32 → 1NO+2NC
Max. speed		page 155 - type 2	page 155 - type 2	page 155 - type 2	page 155 - type 2
Actuating force		4.5 N (25 N →)	4.5 N (25 N →)	4.5 N (25 N →)	4.5 N (25 N →)
Travel diagrams		page 156 - group 1c	page 156 - group 1c	page 156 - group 1c	page 156 - group 1c

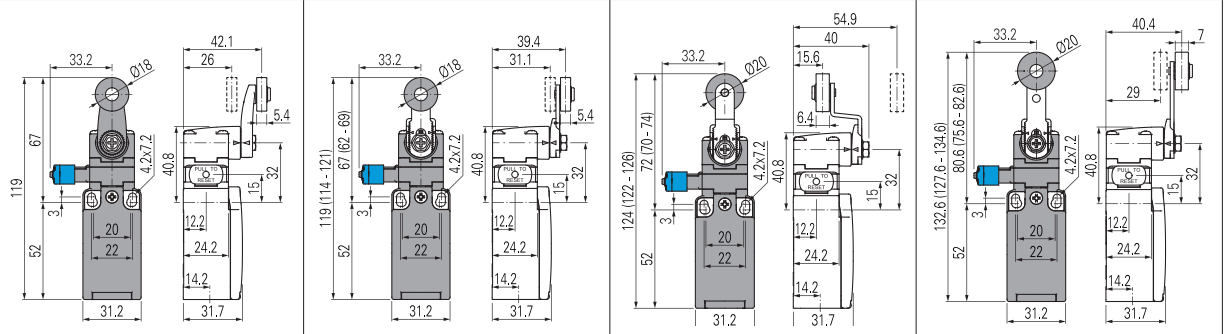
Contact type:

L = slow action

Contact block					
					
6	L	FX 616-W3M2 → 1NO+1NC	FX 616-W3M2P32 → 1NO+1NC	FX 616-W3H0M2 → 1NO+1NC	FX 616-W3H0M2P32 → 1NO+1NC
9	L	FX 916-W3M2 → 2NC	FX 916-W3M2P32 → 2NC	FX 916-W3H0M2 → 2NC	FX 916-W3H0M2P32 → 2NC
20	L	FX 2016-W3M2 → 1NO+2NC	FX 2016-W3M2P32 → 1NO+2NC	FX 2016-W3H0M2 → 1NO+2NC	FX 2016-W3H0M2P32 → 1NO+2NC
Max. speed		page 155 - type 2	page 155 - type 2	page 155 - type 2	page 155 - type 2
Actuating force		4.5 N (25 N →)	4.5 N (25 N →)	4.5 N (25 N →)	4.5 N (25 N →)
Travel diagrams		page 156 - group 1c	page 156 - group 1c	page 156 - group 1c	page 156 - group 1c

Contact type:

L = slow action

Contact block		With Ø 20 mm stainless steel roller on request	Other rollers available. See page 36	Other rollers available. See page 36	Other rollers available. See page 36
					
6	L	FR 630-W3M2 → 1NO+1NC	FR 631-W3M2 → 1NO+1NC	FR 651-W3M2 → 1NO+1NC	FR 652-W3M2 → 1NO+1NC
9	L	FR 930-W3M2 → 2NC	FR 931-W3M2 → 2NC	FR 951-W3M2 → 2NC	FR 952-W3M2 → 2NC
20	L	FR 2030-W3M2 → 1NO+2NC	FR 2031-W3M2 → 1NO+2NC	FR 2051-W3M2 → 1NO+2NC	FR 2052-W3M2 → 1NO+2NC
Max. speed		page 155 - type 1	page 155 - type 1	page 155 - type 1	page 155 - type 1
Actuating force		0.07 Nm (0.25 Nm →)	0.07 Nm (0.25 Nm →)	0.07 Nm (0.25 Nm →)	0.07 Nm (0.25 Nm →)
Travel diagrams		page 156 - group 4c	page 156 - group 4c	page 156 - group 4c	page 156 - group 4c

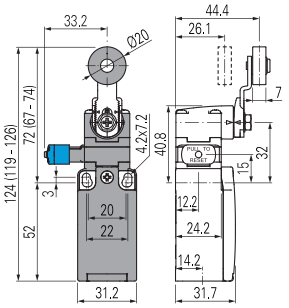
All values in the drawings are in mm

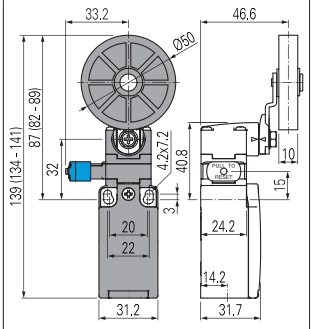
Accessories See page 149

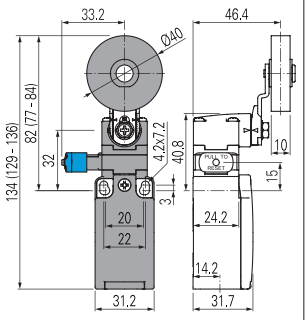
Switches with **manual reset**

Contact type:

L = slow action



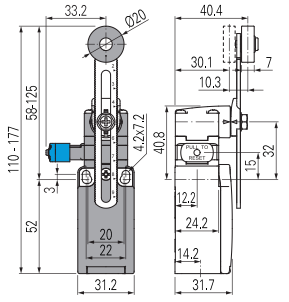


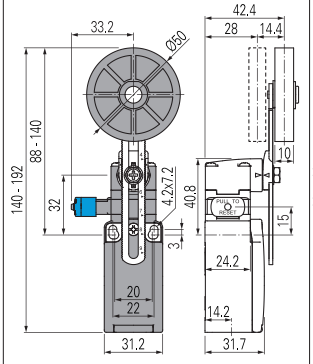


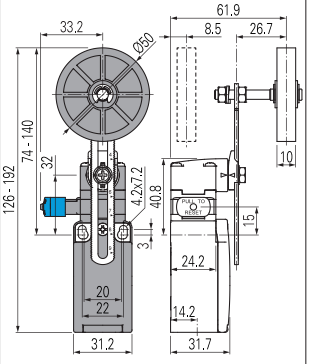
Contact block								
6	L	FR 654-W3M2	1NO+1NC	FR 654-W3M2R26	1NO+1NC	FR 654-W3M2R5	1NO+1NC
9	L	FR 954-W3M2	2NC	FR 954-W3M2R26	2NC	FR 954-W3M2R5	2NC
20	L	FR 2054-W3M2	1NO+2NC	FR 2054-W3M2R26	1NO+2NC	FR 2054-W3M2R5	1NO+2NC
Max. speed		page 155 - type 1		page 155 - type 1		page 155 - type 1	
Actuating force		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)	
Travel diagrams		page 156 - group 4c		page 156 - group 4c		page 156 - group 4c	

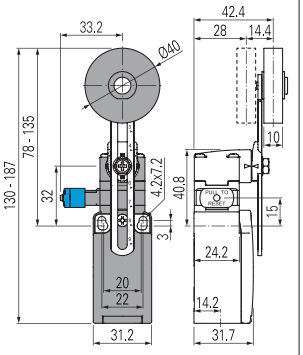
Contact type:

L = slow action









Contact block													
6	L	FR 656-W3M2	1NO+1NC	FR 656-W3M2R26	1NO+1NC	FR 656-W3M2R27	1NO+1NC	FR 656-W3M2R5	1NO+1NC
9	L	FR 956-W3M2	2NC	FR 956-W3M2R26	2NC	FR 956-W3M2R27	2NC	FR 956-W3M2R5	2NC
20	L	FR 2056-W3M2	1NO+2NC	FR 2056-W3M2R26	1NO+2NC	FR 2056-W3M2R27	1NO+2NC	FR 2056-W3M2R5	1NO+2NC
Max. speed		page 155 - type 1		page 155 - type 1		page 155 - type 1		page 155 - type 1	
Actuating force		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)	
Travel diagrams		page 156 - group 4c		page 156 - group 4c		page 156 - group 4c		page 156 - group 4c	

(1) Positive opening only with actuator set to max.

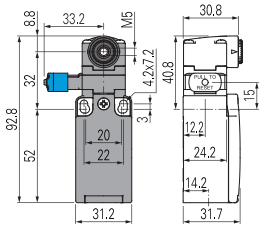
All values in the drawings are in mm

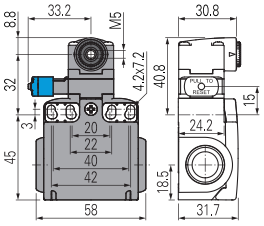
Accessories See page 149

Position switches with reset device for swivelling lever, without actuator

Contact type:

L = slow action





Contact block					
6	L	FR 638-W3M2	1NO+1NC	FX 638-W3M2	1NO+1NC
9	L	FR 938-W3M2	2NC	FX 938-W3M2	2NC
20	L	FR 2038-W3M2	1NO+2NC	FX 2038-W3M2	1NO+2NC
Actuating force		0.07 Nm (0.25 Nm)		0.07 Nm (0.25 Nm)	
Travel diagrams		page 156 - group 4c		page 156 - group 4c	

IMPORTANT

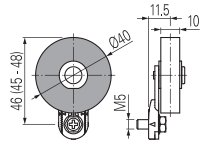
For safety applications: join only switches and actuators marked with symbol ⊖ next to the product code.

For more information about safety applications see details on page 153.

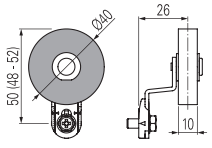
Special separate actuators

IMPORTANT: These separate actuators can be used only with items of the FR, FX series.

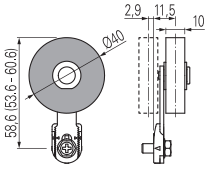
Rubber rollers, Ø 40 mm



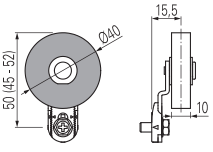
VN A00KB-R5 ⊖ (1)



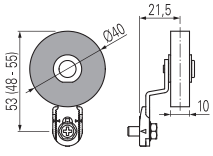
VN A00KE-R5 ⊖ (1)



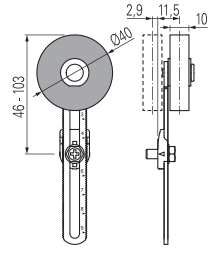
VN A00KF-R5 ⊖



VN A00KG-R5 ⊖ (1)

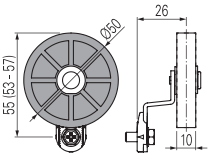


VN A00KH-R5 ⊖ (1)

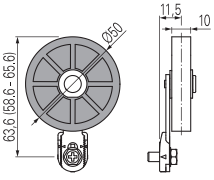


VN A00KP-R5 ⊖

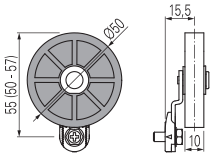
Rubber rollers, Ø 50 mm



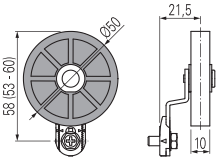
VN A00KE-R26 ⊖ (1)



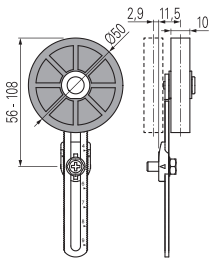
VN A00KF-R26 ⊖ (1)



VN A00KG-R26 ⊖ (1)

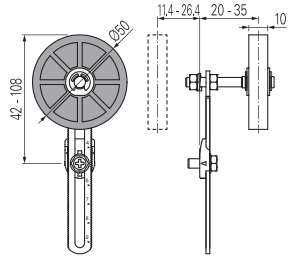


VN A00KH-R26 ⊖ (1)



VN A00KP-R26 ⊖

Protruding rubber rollers, Ø 50 mm



VN A00KP-R27 ⊖

- (1) The actuator cannot be rotated to the inside because it will hit the switch head upon actuation.

Note: To check the correspondence with previous lever codes, please consult the table "Changed article codes" on page 171. Example: VF LE31-R5 -> VN A00KB-R5.

All values in the drawings are in mm

Accessories See page 149

Switches with **manual reset for speed limiters**

Main features
Safety switches designed specifically for speed limiters requiring high sensitivity, with a low actuating force.
Operation: the switch button is pressed up to the switching point. The button then continues to the limit of travel automatically.

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing
Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈
One threaded conduit entry: M20x1.5 (standard)
Protection degree acc. to EN 60529: IP67 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles (FR 5A3-M2 / FR 11A3-M2) 50,000 operating cycles (FR 17A3-M2 / FR 19A3-M2)
Mounting position:	any
Safety parameter B_{10D} for NC contacts:	2,000,000 (FR 5A3-M2 / FR 11A3-M2) 100.000 (FR 17A3-M2 / FR 19A3-M2)
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 156. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data	
Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact block 11)
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact block 11)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X
Positive opening of contacts on contact blocks 5, 11, 17, 19
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

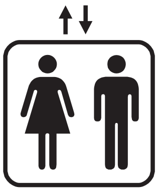
Electrical Ratings: Q300 pilot duty (69 VA, 125-250 V dc)
A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings: Types 1, 4X

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

The hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

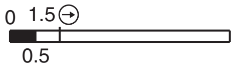
Compliant with EN 81-20 and EN 81-50



- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- All switches meet requirements laid down by the new standards for safety contacts.

Contact blocks 17 and 19

Pizzato Elettrica has developed innovative and specific contact blocks, designed with a very short pre-travel distance and low actuating forces; as required by modern speed limiters.

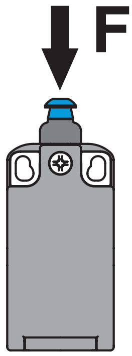


Protection degree IP67

IP67

All switches of these series have protection degree IP67.

Increased actuating force



On request, contact block 19 can be supplied with increased actuating force of 4 or 6 N; ideal for applications with high levels of vibrations.

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article / options / options

FR 19A3-E26GM2K23P11T6

Housing	
FR	technopolymer, one conduit entry

Contact block	
5	1NO+1NC, snap action
11	2NC, snap action
17	1NC, snap action
19	2NC, snap action

Actuators	
A3	short plunger

Actuating force	
	standard actuating force
E26	actuating force 4 N (19 N ⊖) (only with contact block 19)
E27	actuating force 6 N (21 N ⊖) (only with contact block 19)

Ambient temperature	
	-25°C … +80°C (standard)
T6	-40°C … +80°C

Fixing plates	
	without plate (standard)
P11	with VF SFP1 plate

Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

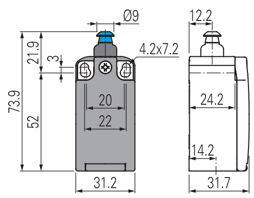
Pre-installed cable glands	
K23	for cables Ø 6 … 12 mm
K27	for cables Ø 3 … 7 mm

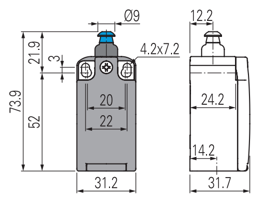
Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts with 2.5 µm gold coating

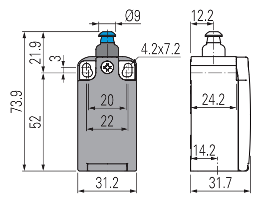
Dimensional drawings

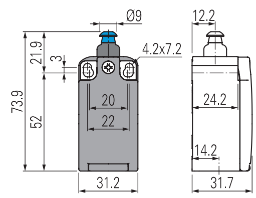
Contact type:

R = snap action







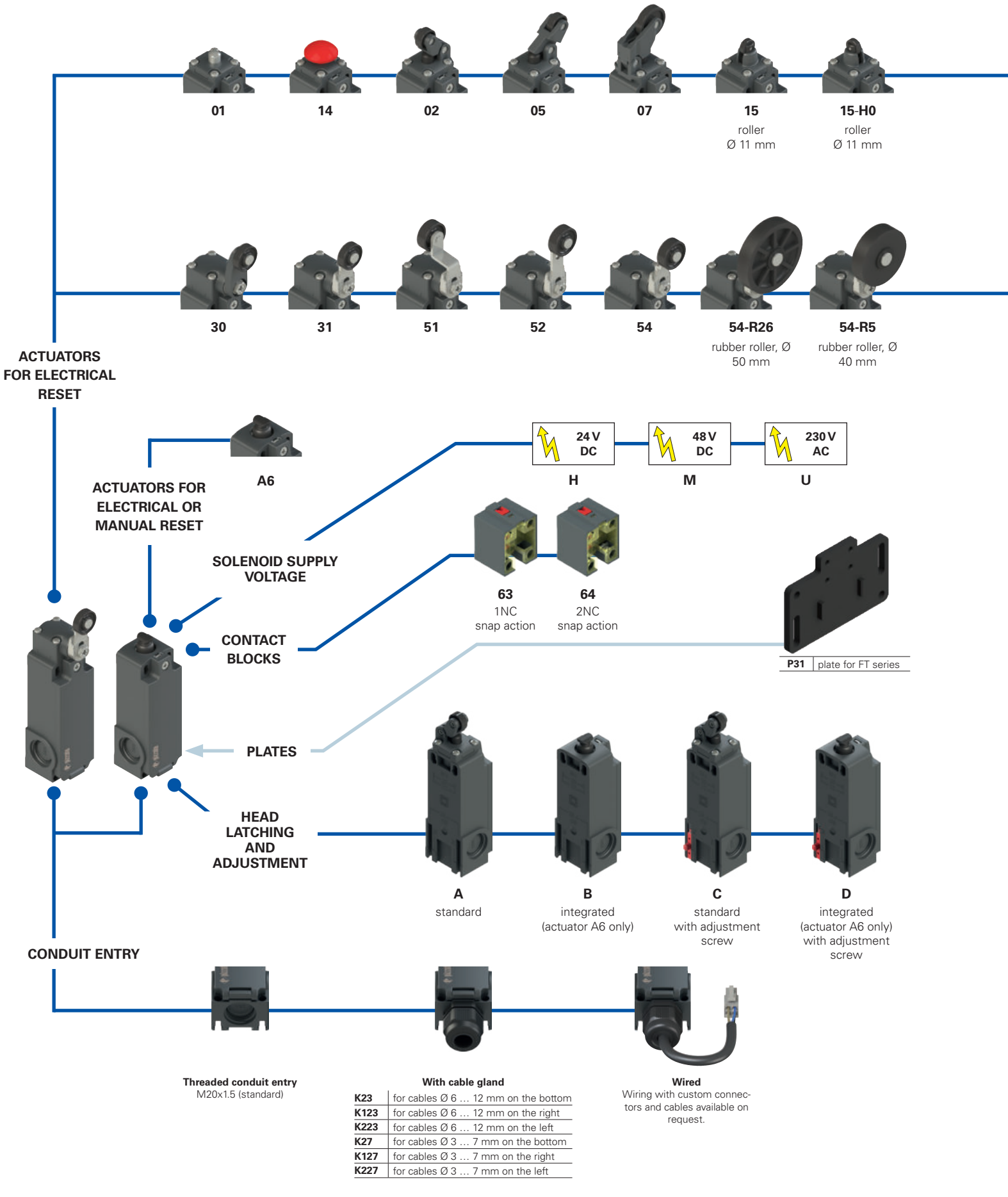


Contact block					
5	R	FR 5A3-M2 ⊖ 1NO+1NC	/	/	/
11	R	/	FR 11A3-M2 ⊖ 2NC	/	/
17	R	/	/	FR 17A3-M2 ⊖ 1NC	/
19	R	/	/	/	FR 19A3-M2 ⊖ 2NC
Max. speed		0.5 m/s	0.5 m/s	0.5 m/s	0.5 m/s
Actuating force		3.5 N (25 N ⊖)	3.5 N (25 N ⊖)	1.5 N (25 N ⊖)	2 N (25 N ⊖)
Travel diagrams		0 2 ⊖4 6	0 2 ⊖4 6	0 1.5⊖ 6 0.5	0 1.5⊖ 4.5 0.5

All values in the drawings are in mm

Legend
Closed contact | Open contact | ⊖ Positive opening travel

Selection diagram



Threaded conduit entry
M20x1.5 (standard)

With cable gland

K23	for cables Ø 6 … 12 mm on the bottom
K123	for cables Ø 6 … 12 mm on the right
K223	for cables Ø 6 … 12 mm on the left
K27	for cables Ø 3 … 7 mm on the bottom
K127	for cables Ø 3 … 7 mm on the right
K227	for cables Ø 3 … 7 mm on the left

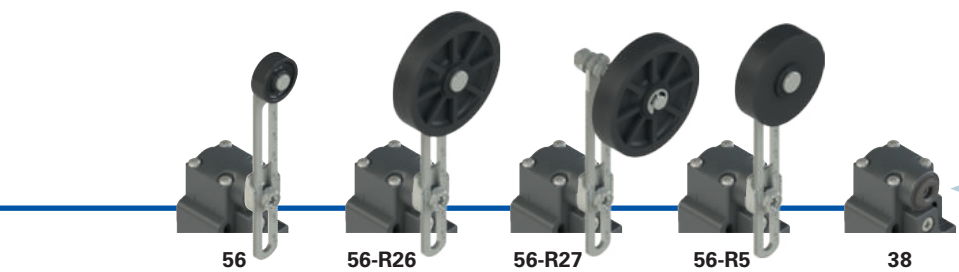
Wired
Wiring with custom connectors and cables available on request.

16
roller
Ø 20 mm

16-H0
roller
Ø 20 mm

12

13



56

56-R26
adjustable safety lever with rubber roller, Ø 50 mm

56-R27
adjustable safety lever with rubber roller, Ø 50 mm, protruding

56-R5
adjustable safety lever with rubber roller, Ø 40 mm

38

SEPARATE ACTUATORS
See page 45

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article | options

FT 2A6454AH-E27GK23P31T9R26

Housing

FT	technopolymer, three conduit entries

Head latching and adjustment

A	standard
B	integrated (actuator A6 only)
C	standard with adjustment screw
D	integrated (actuator A6 only) with adjustment screw

Contact block

63	1NC, snap action
64	2NC, snap action

Actuators

A6	plunger with catch for manual reset
01	short plunger
02	roller lever
05	angled lever with roller
...	...

Solenoid supply voltage

H	24 Vdc 4.2 A (100 W)
M	48 Vdc 2.1 A (100 W)
U	230 Vac 0.5 A (115 W)
K	48 Vdc 0.75 A (36 W) (only with reduced actuating force E28)
J	24 Vdc 1.5 A (36 W) (only with reduced actuating force E28)

Rollers

	standard roller
R5	rubber roller, Ø 40 mm
R26	rubber roller, Ø 50 mm
R27	rubber roller, protruding, Ø 50 mm

Ambient temperature

	-25°C ... +50°C (standard)
T9	-40°C ... +50°C

Fixing plates

	without plate (standard)
P31	with VF SFP3 plate

Pre-installed cable glands

K23	for cables Ø 6 ... 12 mm
K27	for cables Ø 3 ... 7 mm

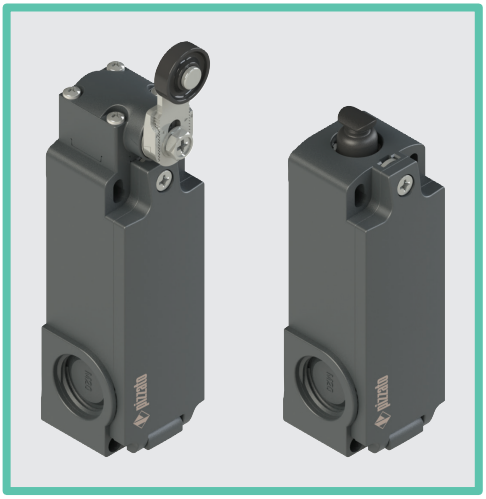
For the complete list of possible combinations please contact our sales department.

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts with 2.5 µm gold coating

Actuating force

E27	standard actuating force
E26	reduced actuating force
E28	reduced actuating force



Main features

- Versions with different actuating forces
- Versions with system for adjustment of the switching point
- Technopolymer housing, three knock-out conduit entries
- Protection degree IP67

Quality marks:

UL approval: E131787
EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation:	⧈
Three knock-out threaded conduit entries:	M20x1.5
Protection degree acc. to EN 60529:	IP67 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +50°C -40°C … +50°C (T9 option)
Mechanical endurance:	50,000 operating cycles
Mounting position:	any
Safety parameter B_{10D}:	100.000 for NC contacts
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

Solenoid

Operating voltage (Ue) and current (Ie):	24 Vdc ±10%; 4.2 A (100 W) 24 Vdc ±10%; 1.5 A (36 W) 48 Vdc ±10%; 2.1 A (100 W) 48 Vdc ±10%; 0.75 A (36 W) 230 Vac ±10%; 0.5 A (115 W)
Power supply time:	minimum 0.2 s, maximum 0.5 s
Time without power supply:	minimum 30 s
Max. operating frequency:	118 operating cycles/hour

In compliance with standards:
EN 60947-5-1, IEC 60947-5-1, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No. 14

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 156. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50 … 60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by UL

Electrical Ratings: Q300 pilot duty (69 VA, 125-250 V dc)
A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings: Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

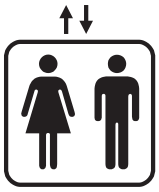
The hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

Introduction

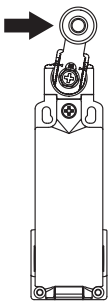
The FT series safety switches with reset retain their switching state when operated: their reset occurs electrically through the integrated solenoid. Thanks to this special feature, the switch can be remotely reset without having to go physically near it. Available with multiple actuators, they are able to adapt to a wide variety of applications, particularly in the area of lifts, speed limiters and, more generally, in the world of security. Some models may also be manually reset.

Compliant with EN 81-20 and EN 81-50



- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- All switches meet requirements laid down by the new standards for safety contacts.

Reduced actuating force (E26/E28)



FT series switches can be supplied with reduced actuating force on request:

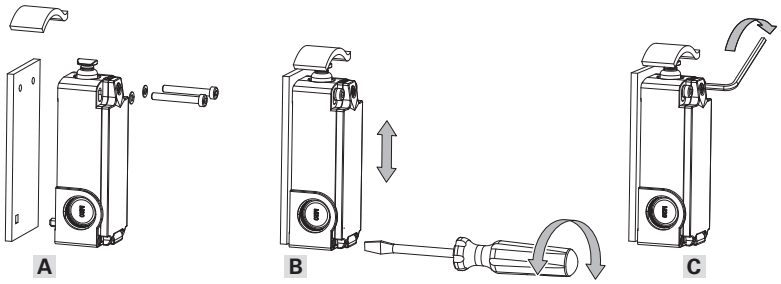
Actuator	Force
A6	3.5 N (25 N ⊖)
01, 12, 13, 14, 15, 16	5.5 N (25 N ⊖)
02, 05	3.6 N (25 N ⊖)
07	2.1 N (25 N ⊖)
30, 31, 38, 51, 52, 54, 56	0.06 Nm (0.25 Nm ⊖)

Protection degree IP67

IP67

All switches of these series have protection degree IP67.

Versions with adjustment system (housings C, D, E, F)



Pizzato Elettrica introduces a new adjustment system, built into the switch, designed specifically for speed limiter applications.
This system allows very fine and sensitive adjustment of the switch position along the vertical axis.

Features:
- easy to install and simple to operate;
- ability to carry out highly precise vertical adjustment;
- broad adjustment range (up to 4mm);
- captive elements.

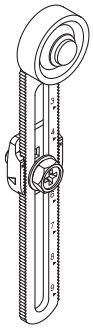
Operation:

A Make a hole in the switch fixing plate, for insertion of the adjustment pin on the back of the switch itself. Insert switch to speed limiter, without obstructing the two fixing screws.

B Adjust the position of the switch, using the screw on the front.

C Finally, secure the switch body to the speed limiter.

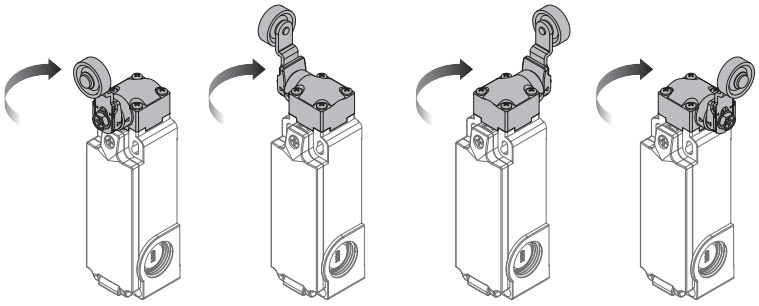
Adjustable safety lever



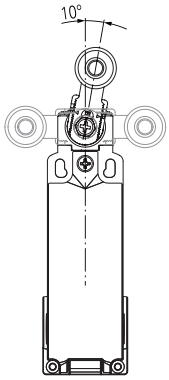
The adjustable lever code 56 (and variants) is provided with a notching that prevents the sliding also in case the fastening screw becomes loose.

Head with variable orientation

The head of all switches is adjustable in 90° steps.



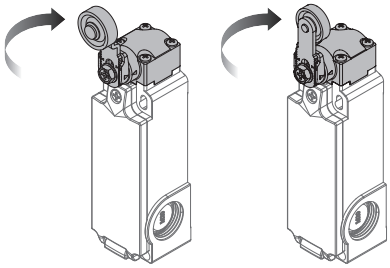
Adjustable levers



For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

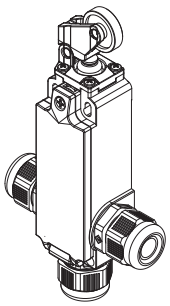
Reversible levers

For switches with swivelling lever, the lever can be fastened on straight or reverse side maintaining the positive coupling. In this way two different working planes of the lever are possible.



Cable outlets

Switches available with cable outlets in various directions, for use in the most confined of spaces.



FT series switches with electrical reset

Contact type:
R = snap action

Contact block		External gasket			With stainless steel roller on request	With stainless steel roller on request
63	R	FT 2B63A6AH-E27 → 1NC	FT 2A6301AH-E27 → 1NC		FT 2A6302AH-E27 → 1NC	FT 2A6305AH-E27 → 1NC
64	R	FT 2B64A6AH-E27 → 2NC	FT 2A6401AH-E27 → 2NC		FT 2A6402AH-E27 → 2NC	FT 2A6405AH-E27 → 2NC
Max. speed		page 155 - type 4	page 155 - type 4		page 155 - type 3	page 155 - type 3
Actuating force		5 N (25 N →)	6 N (25 N →)		5 N (25 N →)	5 N (25 N →)
Travel diagrams		page 156 - group 1d	page 156 - group 2d		page 156 - group 3d	page 156 - group 3d

Contact type:
R = snap action

Contact block						
63	R	FT 2A6307AH-E27 → 1NC	FT 2A6312AH-E27 → 1NC		FT 2A6313AH-E27 → 1NC	FT 2A6314AH-E27 → 1NC
64	R	FT 2A6407AH-E27 → 2NC	FT 2A6412AH-E27 → 2NC		FT 2A6413AH-E27 → 2NC	FT 2A6414AH-E27 → 2NC
Max. speed		page 155 - type 3	page 155 - type 4		page 155 - type 2	page 155 - type 4
Actuating force		3 N (25 N →)	6 N (25 N →)		6 N (25 N →)	6 N (25 N →)
Travel diagrams		page 156 - group 4d	page 156 - group 2d		page 156 - group 2d	page 156 - group 2d

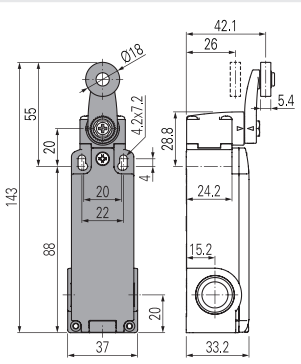
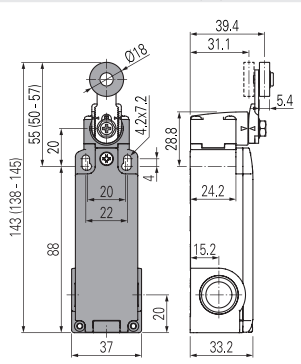
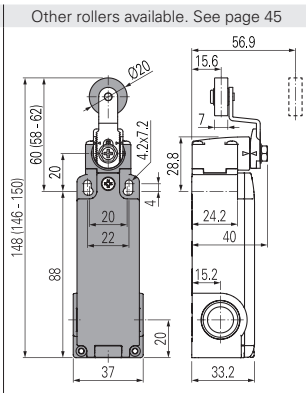
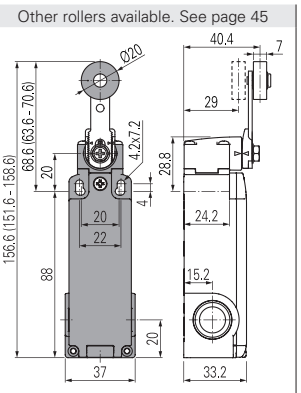
Contact type:
R = snap action

Contact block		With Ø 12 mm stainless steel roller on request	With Ø 12 mm stainless steel roller on request			
63	R	FT 2A6315AH-E27 → 1NC	FT 2A6315AH-E27H0 → 1NC		FT 2A6316AH-E27 → 1NC	FT 2A6316AH-E27H0 → 1NC
64	R	FT 2A6415AH-E27 → 2NC	FT 2A6415AH-E27H0 → 2NC		FT 2A6416AH-E27 → 2NC	FT 2A6416AH-E27H0 → 2NC
Max. speed		page 155 - type 2	page 155 - type 2		page 155 - type 2	page 155 - type 2
Actuating force		6 N (25 N →)	6 N (25 N →)		6 N (25 N →)	6 N (25 N →)
Travel diagrams		page 156 - group 2d	page 156 - group 2d		page 156 - group 2d	page 156 - group 2d

All values in the drawings are in mm

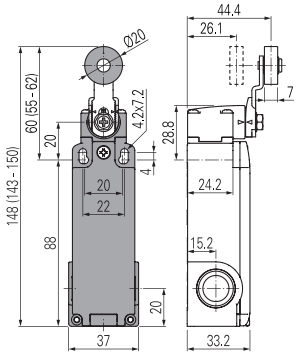
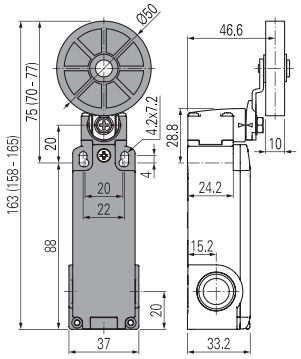
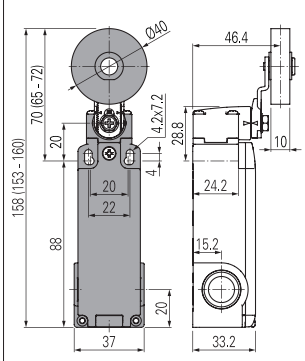
Contact type:

R = snap action

Contact block		With Ø 20 mm stainless steel roller on request	Other rollers available. See page 45	Other rollers available. See page 45	Other rollers available. See page 45
					
63 R		FT 2A6330AH-E27 → 1NC	FT 2A6331AH-E27 → 1NC	FT 2A6351AH-E27 → 1NC	FT 2A6352AH-E27 → 1NC
64 R		FT 2A6430AH-E27 → 2NC	FT 2A6431AH-E27 → 2NC	FT 2A6451AH-E27 → 2NC	FT 2A6452AH-E27 → 2NC
Max. speed		page 155 - type 1	page 155 - type 1	page 155 - type 1	page 155 - type 1
Actuating force		0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)
Travel diagrams		page 156 - group 5d	page 156 - group 5d	page 156 - group 5d	page 156 - group 5d

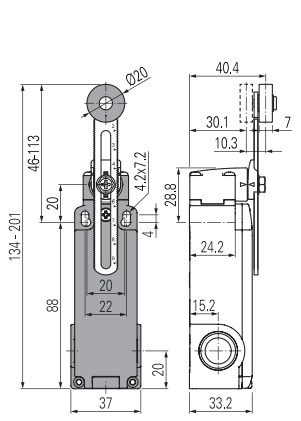
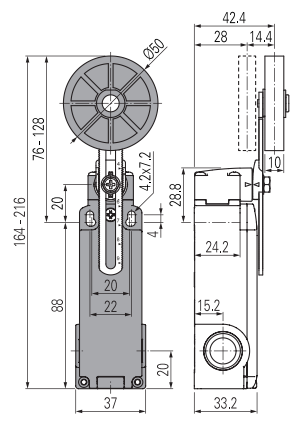
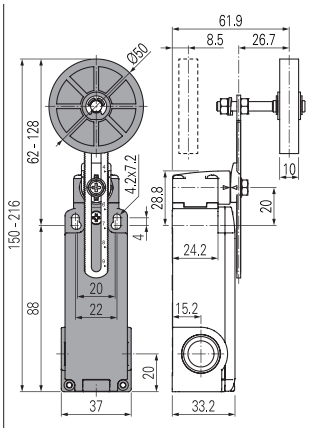
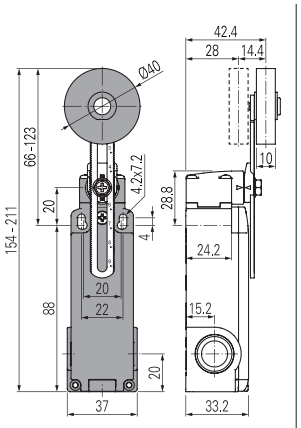
Contact type:

R = snap action

Contact block				
				
63 R		FT 2A6354AH-E27 → 1NC	FT 2A6354AH-E27R26 → 1NC	FT 2A6354AH-E27R5 → 1NC
64 R		FT 2A6454AH-E27 → 2NC	FT 2A6454AH-E27R26 → 2NC	FT 2A6454AH-E27R5 → 2NC
Max. speed		page 155 - type 1	page 155 - type 1	page 155 - type 1
Actuating force		0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)
Travel diagrams		page 156 - group 5d	page 156 - group 5d	page 156 - group 5d

Contact type:

R = snap action

Contact block					
					
63 R		FT 2A6356AH-E27 → 1NC	FT 2A6356AH-E27R26 → 1NC	FT 2A6356AH-E27R27 → 1NC	FT 2A6356AH-E27R5 → 1NC
64 R		FT 2A6456AH-E27 → 2NC	FT 2A6456AH-E27R26 → 2NC	FT 2A6456AH-E27R27 → 2NC	FT 2A6456AH-E27R5 → 2NC
Max. speed		page 155 - type 1	page 155 - type 1	page 155 - type 1	page 155 - type 1
Actuating force		0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)	0.08 Nm (0.25 Nm →)
Travel diagrams		page 156 - group 5d	page 156 - group 5d	page 156 - group 5d	page 156 - group 5d

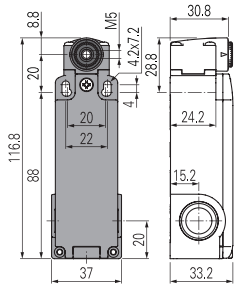
All values in the drawings are in mm

Accessories See page 149

Position switches with swivelling lever without actuator

Contact type:

R = snap action



Contact block		
63	R	FT 2A6338AH-E27 ⊖ 1NC
64	R	FT 2A6438AH-E27 ⊖ 2NC
Actuating force		0.08 Nm (0.25 Nm ⊖)
Travel diagrams		page 156 - group 5d

IMPORTANT

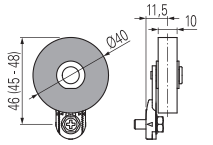
For safety applications: join only switches and actuators marked with symbol ⊖ next to the product code.

For more information about safety applications see details on page 153.

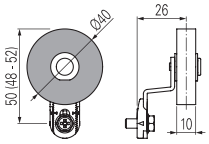
Special separate actuators

IMPORTANT: These separate actuators can be used only with items of the FR, FX series.

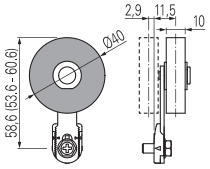
Rubber rollers, Ø 40 mm



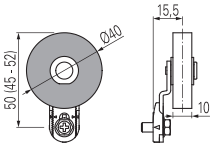
VN A00KB-R5 ⊖ (1)



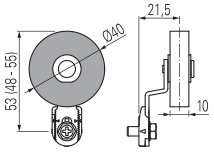
VN A00KE-R5 ⊖ (1)



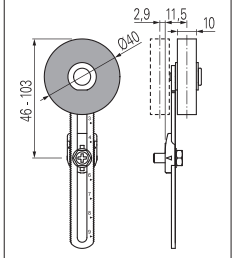
VN A00KF-R5 ⊖



VN A00KG-R5 ⊖ (1)

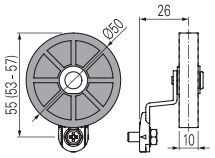


VN A00KH-R5 ⊖ (1)

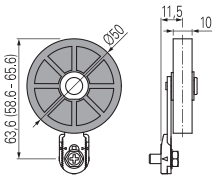


VN A00KP-R5 ⊖

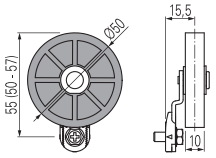
Rubber rollers, Ø 50 mm



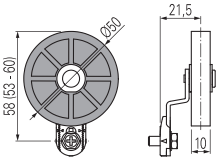
VN A00KE-R26 ⊖ (1)



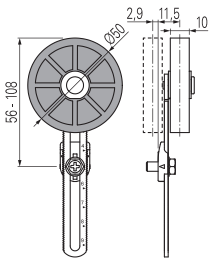
VN A00KF-R26 ⊖ (1)



VN A00KG-R26 ⊖ (1)

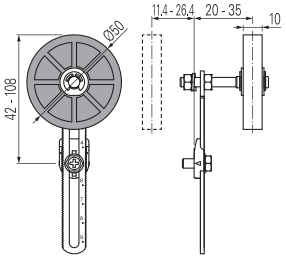


VN A00KH-R26 ⊖ (1)



VN A00KP-R26 ⊖

Protruding rubber rollers, Ø 50 mm



VN A00KP-R27 ⊖

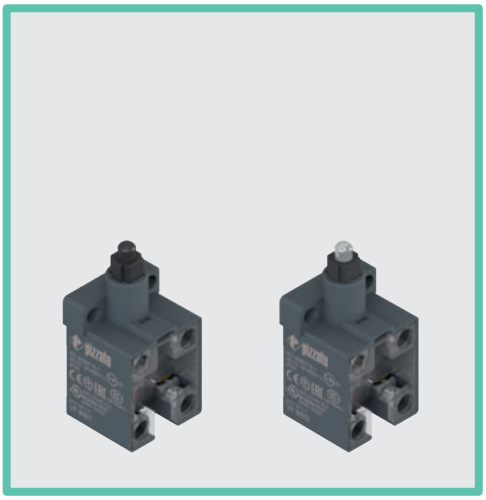
- (1) The actuator cannot be rotated to the inside because it will hit the switch head upon actuation.

Note: To check the correspondence with previous lever codes, please consult the table "Changed article codes" on page 171. Example: VF LE31-R5 -> VN A00KB-R5.

All values in the drawings are in mm

Notes

Position switches with **open design**



Main features

- Technopolymer housing
- Protection degree IP20 (terminals), IP40 (contacts)
- 14 contact blocks available
- Actuators with plastic or metal plunger
- Contact block with positive opening ⊖

Quality marks:

IMQ approval: CA02.06217
UL approval: E131787
CCC approval: 2021000305000102
EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing
Housing made of glass fibre reinforced technopolymer, self-extinguishing and shock-proof

Protection degree acc. to EN 60529:	IP20 (terminals) IP40 (contacts)

General data

Ambient temperature:	-40°C … +80°C
Safety parameter B_{10D}:	40,000,000 for NC contacts
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s (slow action) 0.01 mm/s (snap action)
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.
Approvals:
UL 508, CSA 22.2 No. 14, EN 60947-1, EN 60947-5-1

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1.**Actuate the switch **at least up to the positive opening travel** reported in the travel diagrams. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the minimum force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

Ue (V)	250	400	500
Ie (A)	6	4	1

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (Ui):
500 Vac (for contact blocks [B] 5, 6, 7, 9, 10, 12, 13, 14, 15, 17, 18, 19, 66, 67)
400 Vac (for contact blocks [B] 11, 37)
Conventional free air thermal current (Ith): 10 A
Protection against short circuits: type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}): 6 kV
Protection degree of the housing: IP20
MV terminals (screw terminals)
Pollution degree: 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50/60 Hz)
Operating current (Ie): 4 A
Forms of the contact element: Zb, Y+Y, X+X, Y, X
Positive opening contacts on contact blocks [B] 5, 6, 7, 9, 11, 13, 14, 17, 18, 19, 37, 66
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.
Please contact our technical department for the list of approved products.

Features approved by UL

Electrical ratings: Q300 (69 VA, 125-250 Vdc)
A600 (720 VA, 120-600 Vac)
Housing features: open type.
For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG.
Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

Please contact our technical department for the list of approved products.

Description

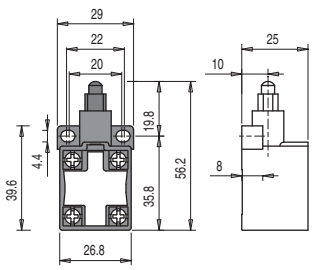
Contact block with captive screws, finger protection and self-lifting clamping screw plates. Provided with positive opening NC contacts for safety applications. Provided with twin bridge contacts, they are particularly suitable for high-reliability applications.

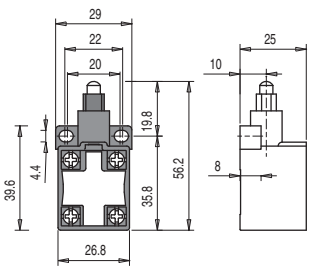
Dimensional drawings

All values in the drawings are in mm

Contact type:

- R = snap action
- L = slow action
- LO = slow action, make before break
- LS = slow action, shifted
- LV = slow action, shifted and spaced
- LA = slow action, close





Contact type	Article	Contacts	Article	Contacts	Travel diagram
R	VF B501	1NO+1NC	VF B502	1NO+1NC	
L	VF B601	1NO+1NC	VF B602	1NO+1NC	
LO	VF B701	1NO+1NC	VF B702	1NO+1NC	
L	VF B901	2NC	VF B902	2NC	
L	VF B1001	2NO	VF B1002	2NO	
R	VF B1101	2NC	VF B1102	2NC	
R	VF B1201	2NO	VF B1202	2NO	
LV	VF B1301	2NC	VF B1302	2NC	
LS	VF B1401	2NC	VF B1402	2NC	
LS	VF B1501	2NO	VF B1502	2NO	
LA	VF B1801	1NO+1NC	VF B1802	1NO+1NC	
L	VF B3701	1NO+1NC	VF B3702	1NO+1NC	
L	VF B6601	1NC	VF B6602	1NC	
L	VF B6701	1NO	VF B6702	1NO	
Max. speed	0.5 m/s		0.5 m/s		
Actuating force	8 N (20 N ⊖)		8 N (20 N ⊖)		

Legend

- Closed contact
- Open contact
- ▶ Pressing the switch
- ◀ Releasing the switch
- ⊖ Positive opening travel acc. to IEC 60947-5-1
- Ⓣ Minimum 2 mm opening travel between contacts, in accordance with UNI EN 81-20

Code structure

article: **VF B501** options: **-G**

Contact block	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
9	2NC, slow action
10	2NO, slow action
11	2NC, snap action
12	2NO, snap action
...	...

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts with 2.5 µm gold coating

Actuators	
01	with technopolymer plunger (standard)
02	with metal plunger

Main features

- Technopolymer housing, from one to two conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing
- Protection degree IP67 and IP69K
- Versions with assembled M12 connector
- Compliant with EN 81

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation:	⧈
FR series, one conduit entry:	M20x1.5 (standard)
FX series, two knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree IP69K acc. to ISO 20653 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Version for operation at ambient temperatures from -40°C … +80°C on request	
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Mounting position:	any
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

Electrical endurance

Load type:	20 single-tube neon lamps 36 W / 230 V (connected in parallel)
Frequency:	10 s ON / 10 s OFF
Maximum number of cycles:	100,000

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.

Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 11, 12)
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact blocks 11, 12)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y, X+X
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

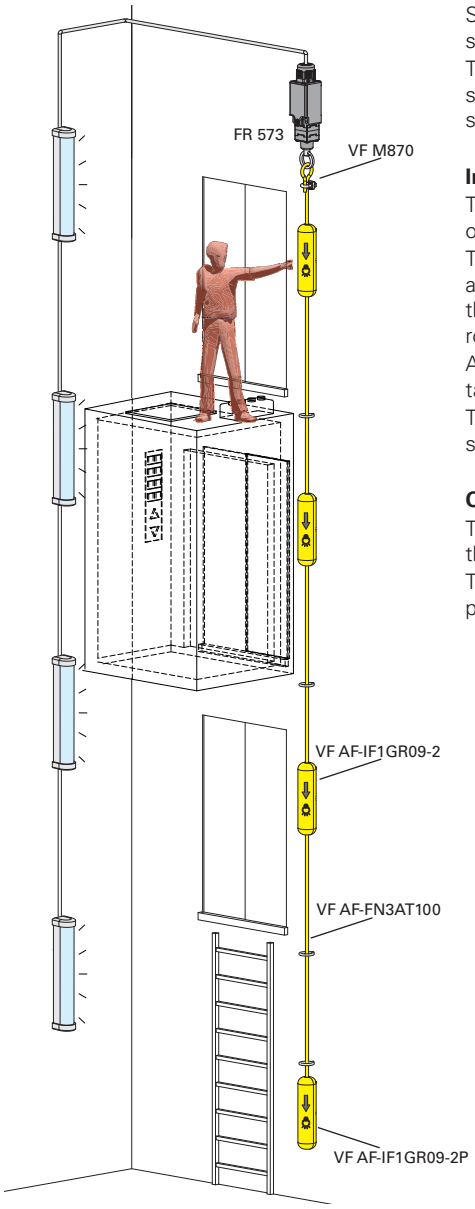
Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX: Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

The hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

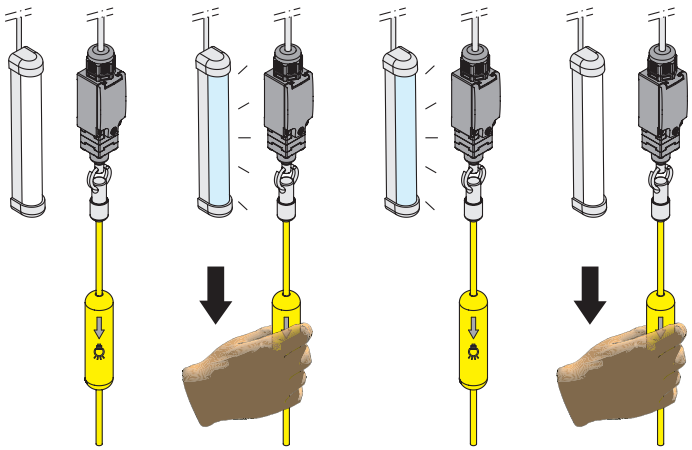
Introduction



Standard EN 81-20, paragraph 5.2.1.5, details the requirement for switches to illuminate the lift shaft, close to each access point, and in machinery spaces.
The FR 573 switch has been designed specifically to operate the lights in the lift shaft, and, as a single unit with a single cabling, allows this requirement to be met without having to install light switches and cabling separately on each floor.

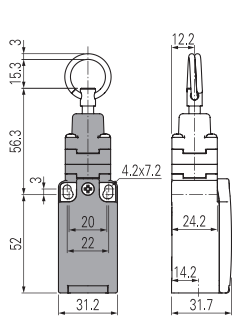
Installation:
The installation is extremely simple: the switch is fixed in the upper part of the lift shaft and it is operated by means of a rope that runs through the entire shaft.
The relevant indicators of the rope's function – placed at regular intervals on each floor – also act as convenient handles. In this way, an operator on the cabin roof, or at any position throughout the lift shaft, is able to actuate the switch by simply pulling the practical indicator device, or the rope itself.
A special function indicator with weights is installed at the end of the rope, in order to keep it taut.
The maximum recommended rope length is 50 metres. For longer lengths, please contact our sales office.

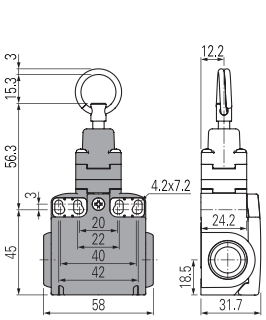
Operation:
The FR 573 switch retains its position after actuation. This means that the first actuation closes the contacts, the next actuation opens them, and so on.
To switch on the light in the lift shaft it is sufficient to pull the rope. To switch the light off, simply pull the rope again.



Dimensional drawings

Contact type:
R = snap action





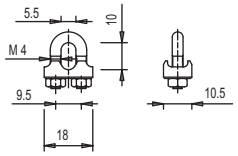
Contact block			
5	R	FR 573-M2 1NO+1NC	FX 573-M2 1NO+1NC
11	R	FR 1173-M2 2NO	FX 1173-M2 2NO
12	R	FR 1273-M2 2NC	FX 1273-M2 2NC
Max. speed		0.5 m/s	0.5 m/s
Actuating force		initial 20 N - final 40 N	initial 20 N - final 40 N

All values in the drawings are in mm

Accessories

Article	Description
VF AF-IF1GR09-2P	End indicator with internal stabilising weight
VF AF-IF1GR09-2	Intermediate rope function indicators
	Rope function indicator. Tightening torque of fastening screws: 0.8 … 1.0 Nm.

Article	Description
VF AF-FN3AT100	100 m rope
	Yellow/transparent rope coil, Ø 3 mm with brass-plated steel core and PVC coating.

Article	Description
VF M870	Rope end clamp
	

Accessories See page 149

Main features

- Technopolymer housing, from one to two conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing
- Protection degree IP67 and IP69K
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

FR series, one conduit entry:	M20x1.5 (standard)
FX series, two knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree IP69K acc. to ISO 20653 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Version for operation at ambient temperatures from -40°C … +80°C on request	
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Mounting position:	any
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Zb, Y+Y
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX: Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

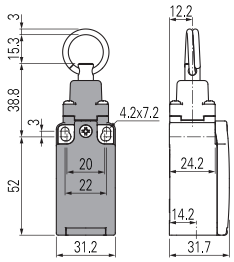
The hub is to be connected to the conduit before the hub is connected to the enclosure.

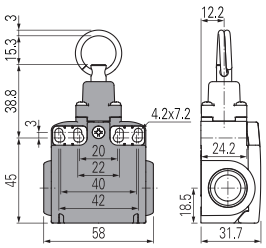
Please contact our technical department for the list of approved products.

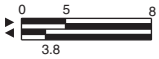
Dimensional drawings

Contact type:

R = snap action
L = slow action





Contact block			
5 R	FR 576-M2 1NO+1NC	FX 576-M2 1NO+1NC
		
9 L	FR 976-M2 2NO	FX 976-M2 2NO
		
Max. speed	0.5 m/s	0.5 m/s
Actuating force	initial 20 N - final 40 N	initial 20 N - final 40 N

Accessories

Article	Description
VF AF-IF1GR09-2P	End indicator with internal stabilising weight
VF AF-IF1GR09-2	Intermediate rope function indicators

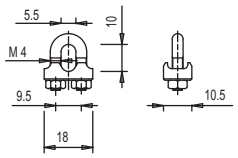
Rope function indicator.

Tightening torque of fastening screws: 0.8 … 1.0 Nm

Article	Description
VF AF-FN3AT100	100 m rope

Yellow/transparent rope coil, Ø 3 mm with brass-plated steel core and PVC coating.

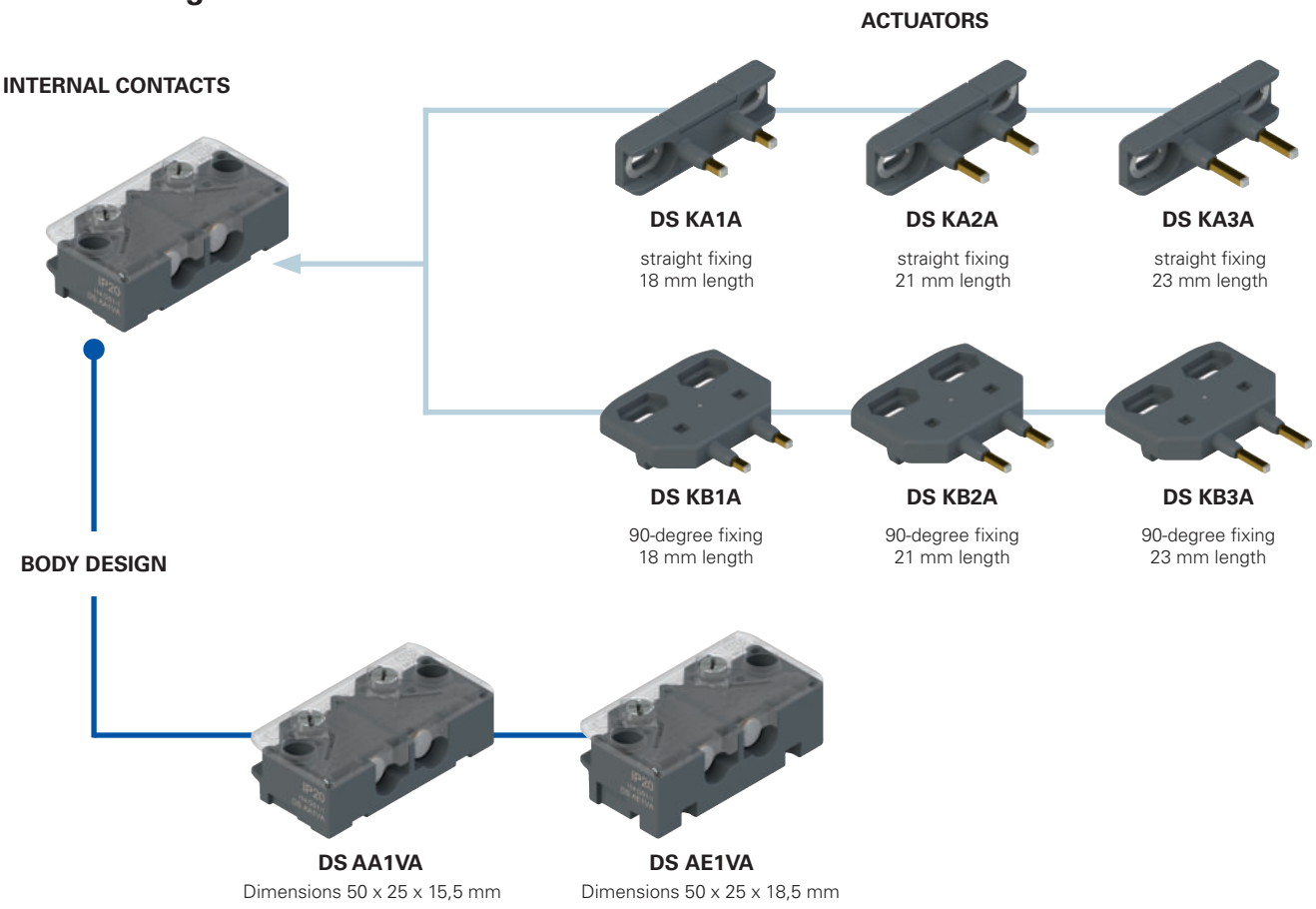
Article	Description
VF M870	Rope end clamp

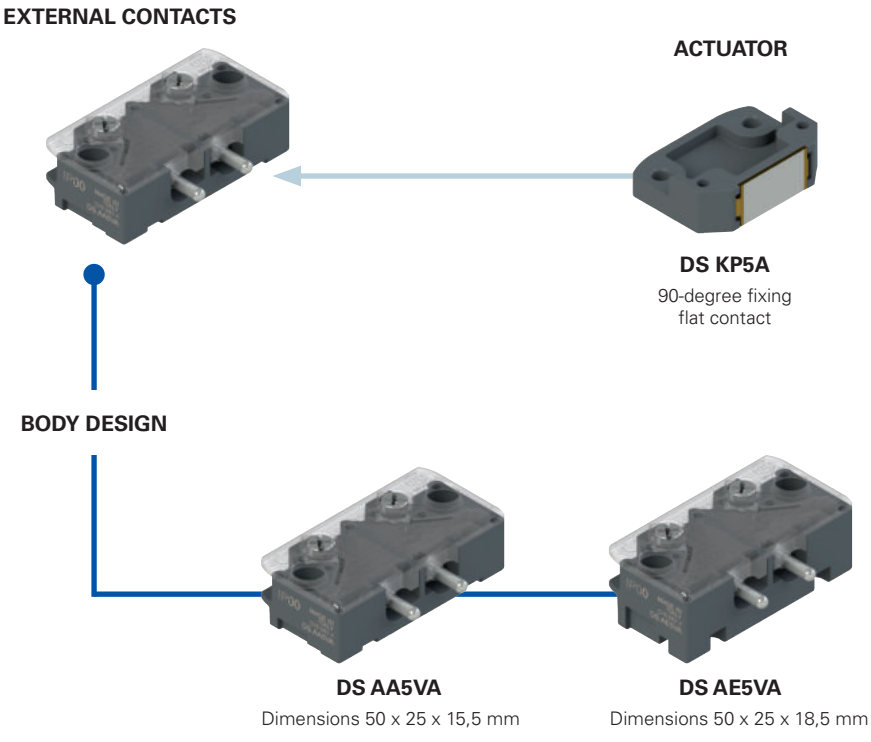


All values in the drawings are in mm

Accessories See page 149

Selection diagram





Product options

Sold separately as accessory

Code structure for door contacts

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

DS AA1VA

Body design	
A	Dimensions 50 x 25 x 15,5 mm mounting hole spacing 40 mm fixing with M4x10 screws
E	Dimensions 50 x 25 x 18,5 mm mounting hole spacing 40 mm fixing with M4x13 screws

Contact type	
1	internal contacts
5	external contacts

Code structure for actuator

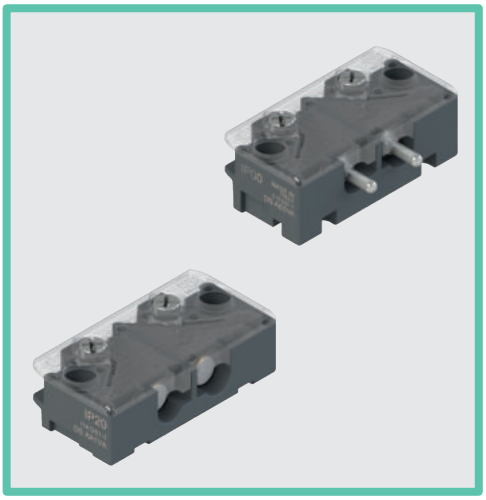
Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

DS KA1A

Body design	
A	Mounting hole spacing 29 mm straight fixing
B	Mounting hole spacing 20 mm 90-degree fixing
P	Mounting hole spacing 30 mm 90-degree fixing, flat contact

Contact type	
1	actuator for internal contacts, 18 mm length
2	actuator for internal contacts, 21 mm length
3	actuator for internal contacts, 23 mm length
5	actuator for external contacts, 12 x 20 mm

DS A series positive opening door contacts



Main features

- Housing made of glass fibre reinforced technopolymer, self-extinguishing
- Self-cleaning contacts in solid silver
- Can be installed with cable side flush with wall
- Front actuation
- Protection degrees IP00 up to IP20
- Transparent cover or head

Quality marks:

UL approval:	E131787
CCC approval:	2021000305000104
EAC approval:	RU C-IT.УТ03.B.00035/19
TÜV SÜD approval	EVOL 722228743

Technical data

Description

Double interruption positive opening safety switch. Suitable for controlling automatic lift doors.

Housing

Housing made of glass fiber reinforced technopolymer, self-extinguishing and shock-proof

Protection degree acc. to EN 60529:	IP00 (articles DS A•5VA) IP20 (articles DS A•1VA)

General data

Ambient temperature:	-30°C … +80°C (humidity ≤ 95%, without condensation)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	10 million operating cycles (DS A•1VA) 5 million operating cycles (DS A•5VA)
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Safety parameter B_{10D}:	20,000,000 (DS A•1VA) 10,000,000 (DS A•5VA)
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Actuating force:	1.2 ... 2.1 N (DS A•1VA) 1.2 … 1.7 N (DS A•5VA)
Available with reduced actuating force on request:	0.8 … 1.3 N (DS A•1VA) 0.8 … 1.1 N (DS A•5VA)
Tightening torques for installation:	see page 158
Fixing screws:	M4 self-tapping Longer fixing screws available on request

Connections:

Cable cross section (flexible copper strands):	min 1 x 0.5 mm² (1 x AWG 20) max 1 x 2.5 mm² (1 x AWG 14)
Cable stripping length:	7 mm

In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 60529, EN ISO 14119, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.

Approvals:

IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

Electrical data

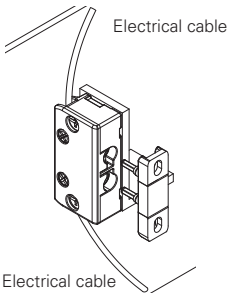
Thermal current (I_{th}):	4 A
Rated insulation voltage (U_i):	500 Vac
Impulse withstand voltage (U_{imp}):	6 kV
Protection against short circuits:	fuse 4 A 500 V type gG
Pollution degree:	3

Utilization categories:

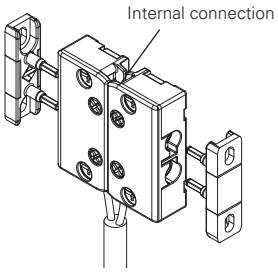
Acc. to EN 60947-5-1, EN 81-20 par. 5.11.2.2			Acc. to EN 81-50 par. 5.2.2.4	Acc. to EN 81-50 par. 5.2.2.2.2
AC15 (50, 60 Hz):			AC (50, 60 Hz):	AC (50, 60 Hz):
U_e (V)	120	250	230 Vac	230 Vac
I_e (A)	3	3	2 A	2 A
DC13:			DC:	DC:
U_e (V)	125	250	200 Vdc	125 Vdc
I_e (A)	0,55	0,27	2 A	0.5 A

Application examples

These devices have additional cable outlets, allowing installation even in tight spaces. For example:

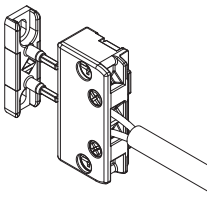


Door contact installation flush with wall



Door contacts installation side-by-side

The electrical circuit is closed only with both actuators inserted



Rear cable outlet

Features approved by UL

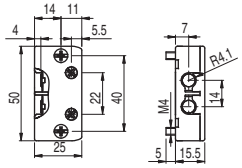
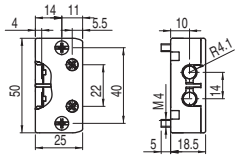
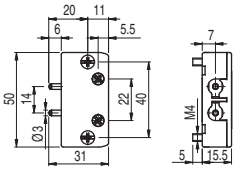
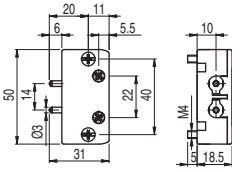
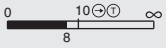
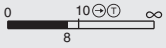
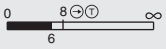
Electrical Ratings: Q300 (69 VA, 125-250 V dc) 120-240 V ac, 3 A pilot duty, 5 A thermal current.

Use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

Please contact our technical department for the list of approved products.

Dimensional drawings

Packs of **10 pcs.**

	Door contacts with internal contacts		Door contacts with external contacts	
	Switch without actuator	Switch without actuator	Switch without actuator	Switch without actuator
				
Slow action contacts	DS AA1VA ⊖ 1NC	DS AE1VA ⊖ 1NC	DS AA5VA ⊖ 1NC	DS AE5VA ⊖ 1NC
Maximum actuation travel	8 mm	8 mm	6 mm	6 mm
Travel diagram				

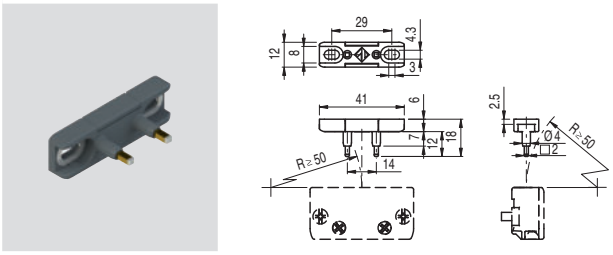
Legend

Closed contact | Open contact | ⊖ Positive opening travel | □ Minimum 2 mm opening travel between contacts, in accordance with UNI EN 81-20

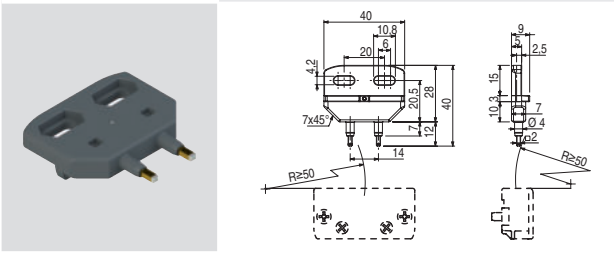
Actuators for door contacts with internal contacts

Packs of **10 pcs.**

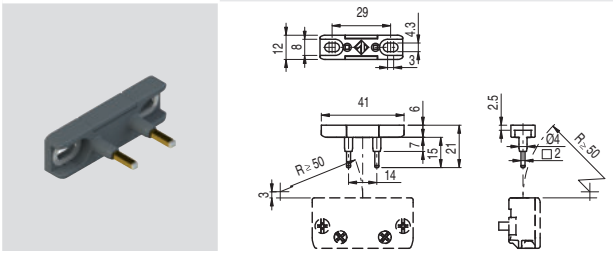
Article	Description
DS KA1A	Straight actuator



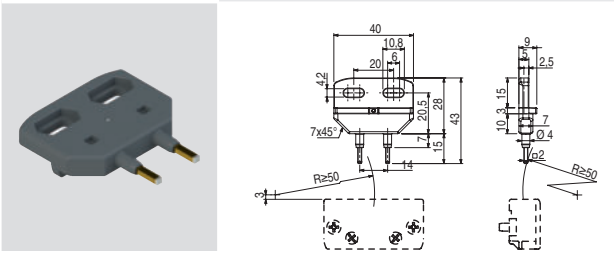
Article	Description
DS KB1A	Angled actuator



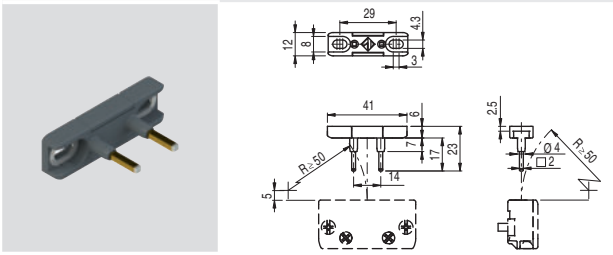
Article	Description
DS KA2A	Straight actuator (*)



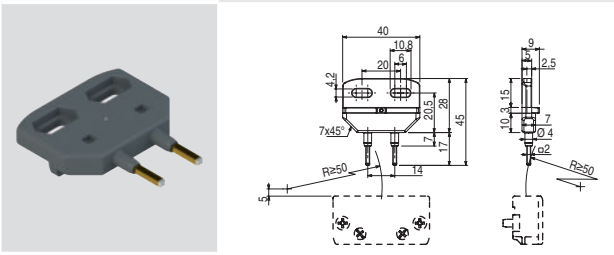
Article	Description
DS KB2A	Angled actuator (*)



Article	Description
DS KA3A	Straight actuator (*)



Article	Description
DS KB3A	Angled actuator (*)

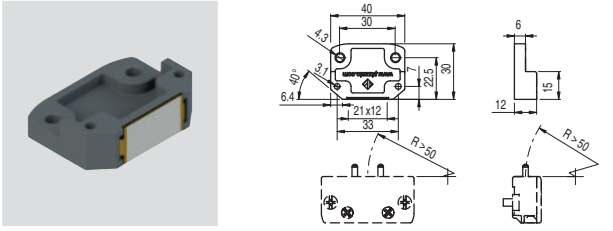


(*) **ATTENTION:** When inserting the actuator, never exceed the maximum actuating travel.

Actuator for door contacts with external contacts

Packs of **10 pcs.**

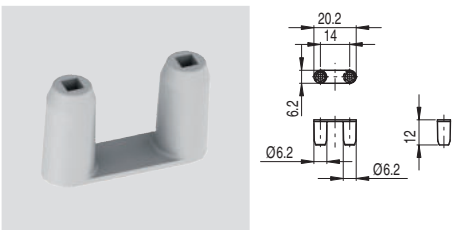
Article	Description
DS KP5A	Flat actuator



Centring device

Packs of **100 pcs.**

Article	Description
VD CE1A20	Centring device

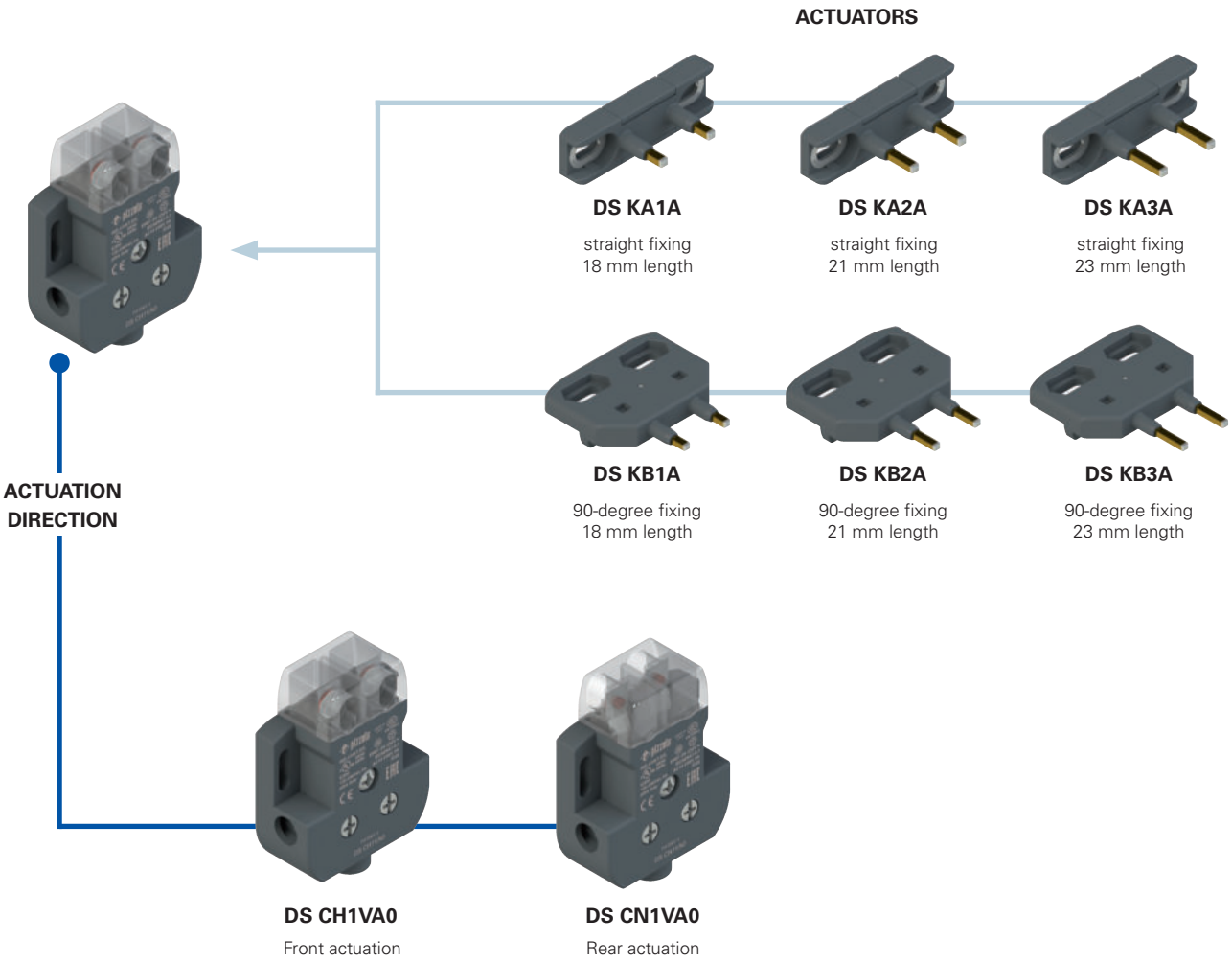


Centring device compatible with DS KA•• and DS KB•• actuators. Facilitates actuator centring with DS A•1VA switches during installation.

All values in the drawings are in mm

Accessories See page 149

Selection diagram



Product options

Sold separately as accessory

Code structure for switch

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

DS CH1VA0

Actuation direction	
H	Front actuation Dimensions 60 x 44 x 19 mm
N	Rear actuation Dimensions 60 x 44 x 19 mm

Code structure for actuator

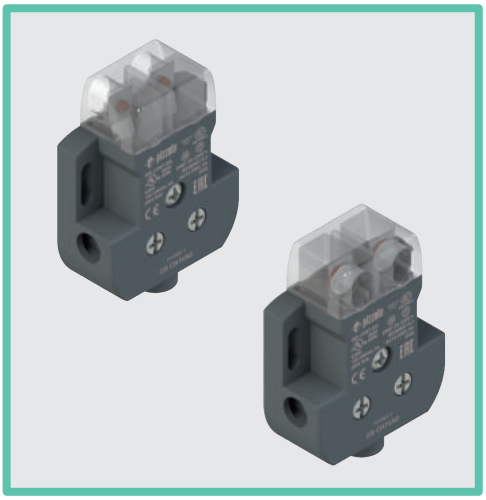
Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

DS KA1A

Body design	
A	Mounting hole spacing 29 mm straight fixing
B	Mounting hole spacing 20 mm 90-degree fixing

Contact type	
1	actuator for internal contacts, 18 mm length
2	actuator for internal contacts, 21 mm length
3	actuator for internal contacts, 23 mm length

DS C series positive opening door contacts



Main features

- Housing made of glass fibre reinforced technopolymer, self-extinguishing
- Self-cleaning contacts in solid silver
- 3 wiring options
- Protection degree IP20
- Transparent orientable head

Quality marks:

UL approval:	E131787
CCC approval:	2021000305000104
EAC approval:	RU C-IT.УТ03.B.00035/19
TÜV SÜD approval	EVOL 722228743

Technical data

Description
Double interruption positive opening safety switch. Suitable for controlling automatic lift doors.

Housing
Housing made of glass fiber reinforced technopolymer, self-extinguishing and shock-proof
Protection degree acc. to EN 60529: IP20

General data

Ambient temperature:	-30°C … +80°C (humidity ≤ 95%, without condensation)
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	20 million operating cycles
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Safety parameter B_{10D}:	40,000,000 for NC contacts
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Max. actuating force:	1.5 N
Tightening torques for installation:	see page 158

Connections:

Cable cross section (flexible copper strands):	min 1 x 0.5 mm² (1 x AWG 20) max 1 x 2.5 mm² (1 x AWG 14)
Cable stripping length:	7 mm

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 60529, EN ISO 14119, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.

Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

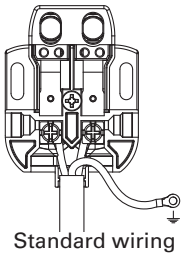
Electrical data

Thermal current (I_{th}):	6 A
Rated insulation voltage (U_i):	500 Vac
Impulse withstand voltage (U_{imp}):	6 kV
Protection against short circuits:	fuse 6 A 500 V type gG
Pollution degree:	3

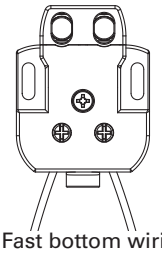
Utilization categories:

Acc. to EN 60947-5-1, EN 81-20 par. 5.11.2.2			Acc. to EN 81-50 par. 5.2.2.4	Acc. to EN 81-50 par. 5.2.2.2.2	**Ratings:** Acc. to UL508
AC15 (50, 60 Hz):			AC (50, 60 Hz):	AC (50, 60 Hz):	AC (50, 60 Hz):
U_e (V)	120	250	230 Vac	230 Vac	C300
I_e (A)	3	3	2 A	2 A	
DC13:			DC:	DC:	DC:
U_e (V)	125	250	200 Vdc	125 Vdc	Q300
I_e (A)	0.8	0.45	2 A	1 A	

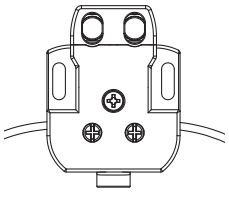
Three wiring options



Standard wiring
With bipolar cable through the centre hole, on the bottom of the housing. It is also possible to use a tripolar cable, with the ground wire exiting via a lateral hole to earth other metallic parts.

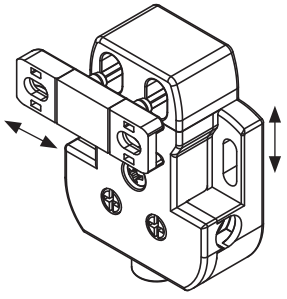


Fast bottom wiring
With two monopolar cables fed through two holes provided on the bottom of the housing. There is no need to open the contact cover during this procedure.



Fast lateral wiring
With two monopolar cables fed through two holes provided on the side of the housing. There is no need to open the contact cover during this procedure.

Transparent head and slotted holes

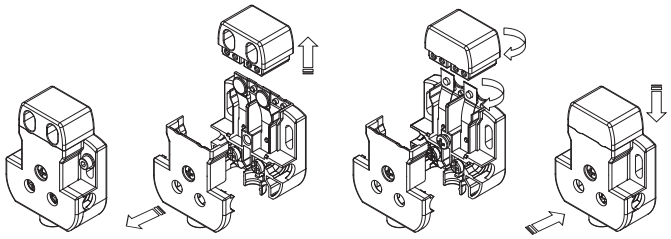


Head transparent on all sides, to allow adjustment and centring of the actuator in relation to contacts.

The slotted holes on the actuator and in the contact housing allow for correct alignment of both devices.

Rotating head

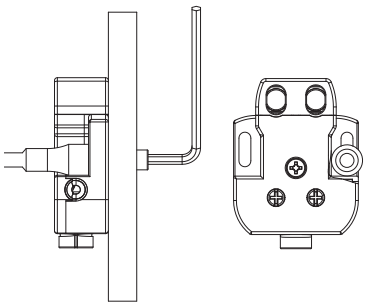
Turning the head and contact springs by 180°, a door contact with rear actuation can be converted to front actuation. Simply by loosening three screws.



Rear fixing of the housing

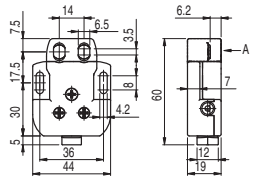
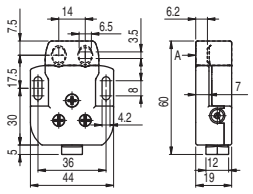
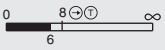
The special housing shape allows rear fixing.

You also have the option of inserting a tubular wrench close to the mounting holes, to hold the nut in place during fixing.



Dimensional drawings

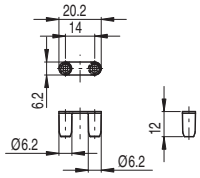
Packs of **10 pcs.**

	Front actuation Switch without actuator A= Actuator insertion direction	Rear actuation Switch without actuator A= Actuator insertion direction
		
Slow action contacts	DS CH1VA0 ⊕ 1NC	DS CN1VA0 ⊕ 1NC
Maximum actuation travel	6 mm	6 mm
Travel diagram		

Centring device

Packs of **100 pcs.**

Article	Description
VD CE1A20	Centring device



Centring device compatible with DS KA•• and DS KB•• actuators. Facilitates actuator centring with DS C•1VA switches during installation.

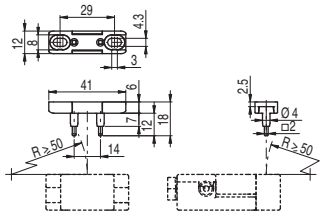
Legend

Closed contact | Open contact | ⊕ Positive opening travel | □ Minimum 2 mm opening travel between contacts, in accordance with UNI EN 81-20

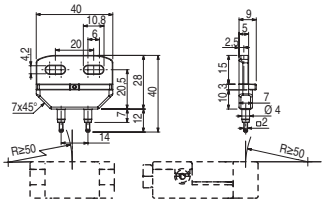
Actuators

Packs of **10 pcs.**

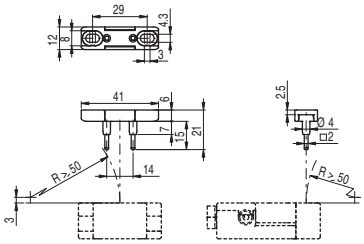
Article	Description
DS KA1A	Straight actuator



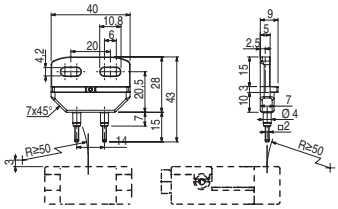
Article	Description
DS KB1A	Angled actuator



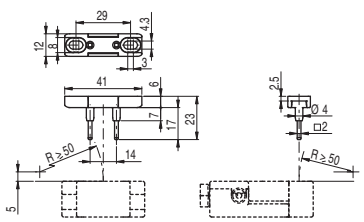
Article	Description
DS KA2A	Straight actuator (*)



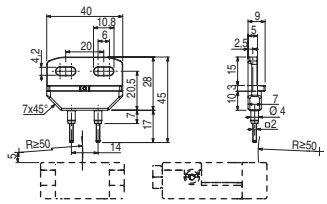
Article	Description
DS KB2A	Angled actuator (*)



Article	Description
DS KA3A	Straight actuator (*)



Article	Description
DS KB3A	Angled actuator (*)



(*) **ATTENTION:** When inserting the actuator, never exceed the maximum actuating travel.

All values in the drawings are in mm

Accessories See page 149

Protected positive opening door contacts

Main features
- Reduced actuating force
- Technopolymer housing, one or two conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing
- Protection degree IP67 and IP69K
- Ability to affix actuator in 2 positions, perpendicular to one another

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Description
Double interruption positive opening safety switch. Suitable for controlling automatic lift doors.

Housing
Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

FR series, one conduit entry:	M20x1.5 (M16x1.5 on request)
FX series, two knock-out threaded conduit entries:	M20x1.5 (M16x1.5 on request)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree IP69K acc. to ISO 20653 with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Version for operation at ambient temperatures from -40°C … +80°C on request	
Max. operating frequency:	3600 operating cycles/hour
Mechanical endurance:	10 million operating cycles
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Safety parameter B_{10D}:	20,000,000 for NC contacts
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Mounting position:	any
Tightening torques for installation:	see page 155
Wire cross-sections and wire stripping lengths:	see page 169

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** reported in the travel diagrams. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac 600 Vdc
Rated impulse withstand voltage (U_{imp}):	6 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Y, Y+Y
Positive opening of contacts on contact blocks 38, 39
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

Please contact our technical department for the list of approved products.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX: Types 1, 4X, 12, 13

For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

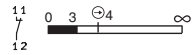
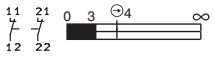
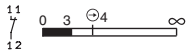
The hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

Dimensional drawings

Contact type:

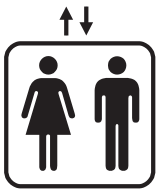
L = slow action

Contact block					
38	L	FR 38B1-D30M2 ⊖ 1NC	/	FX 38B1-D30M2 ⊖ 1NC	/
39	L	/	FR 39B1-D30M2 ⊖ 2NC	/	FX 39B1-D30M2 ⊖ 2NC
Actuating force		3 N (25 N ⊖)	4.2 N (25 N ⊖)	3 N (25 N ⊖)	4.2 N (25 N ⊖)
Travel diagrams					

Legend

Closed contact | Open contact | ⊖ Positive opening travel

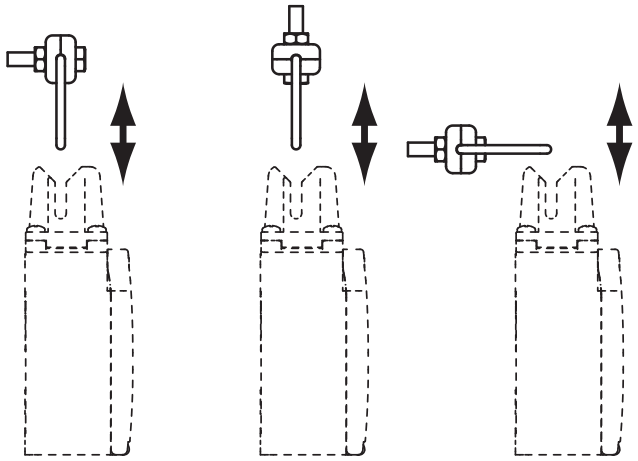
Compliant with EN 81-20 and EN 81-50



- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10^6 cycles.

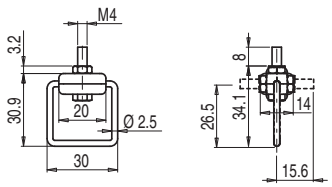
Adjustable actuator

The actuator can be fixed in two positions, perpendicular to one another. The switch can also be actuated from different directions.



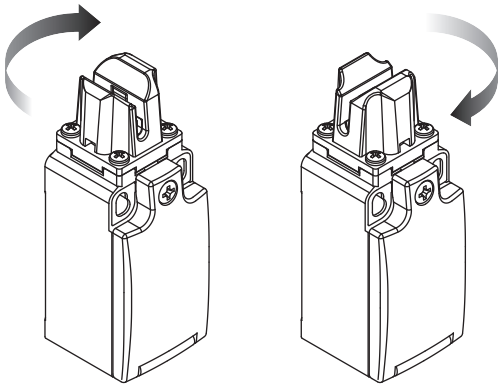
Separate actuator

Article	Description
VF KEYD30	Adjustable actuator



Head with variable orientation

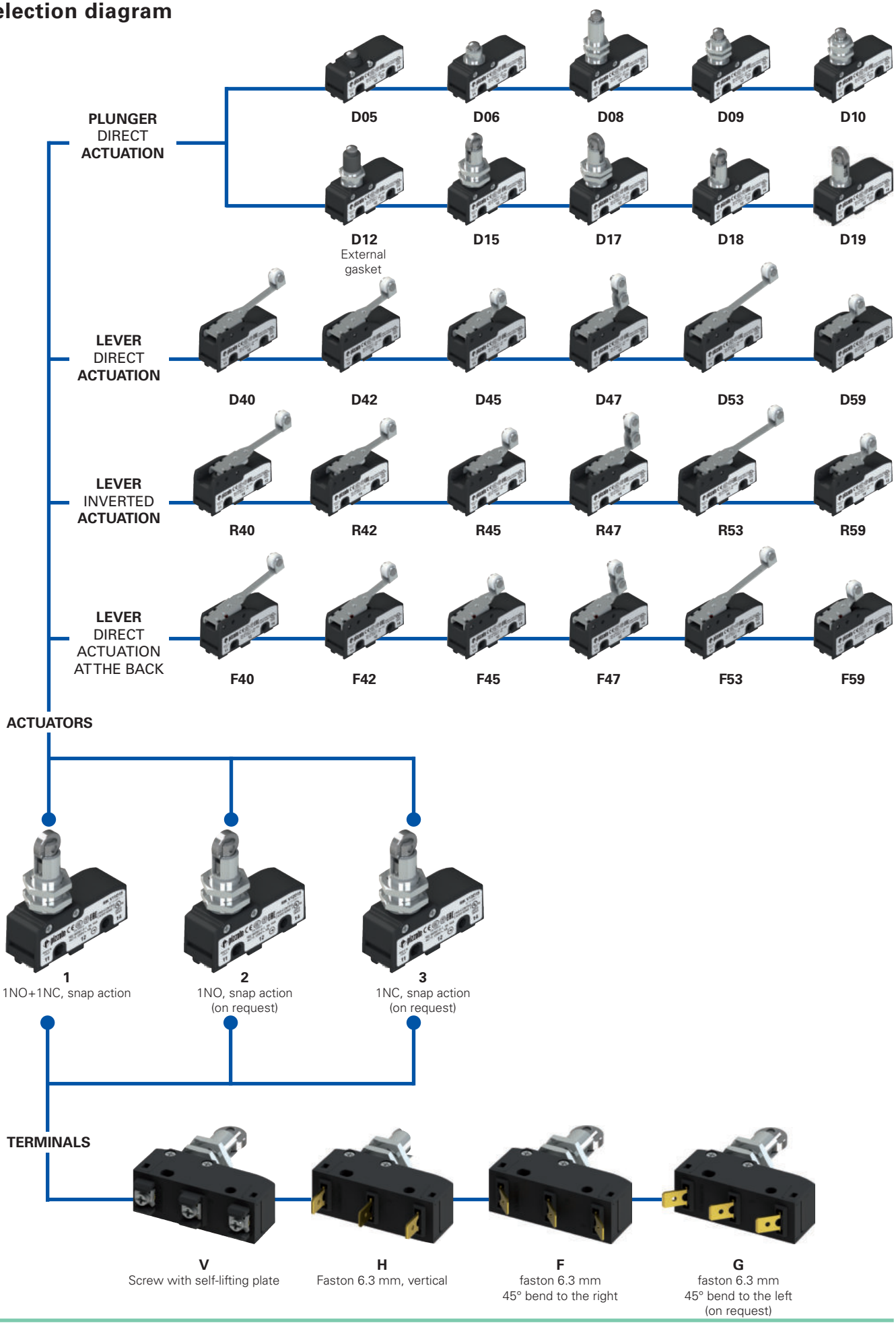
The head of all switches is adjustable in 90° steps.



All values in the drawings are in mm

Accessories See page 149

Selection diagram



Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article options

MK V12D40-GR16T6

Terminal type	
V	screw with self-lifting plate
H	vertical faston
F	Faston, 45° bend to the right
G	Faston, 45° bend to the left (on request)

Contact block	
1	1NO+1NC, snap action
2	1NO, snap action (on request)
3	1NC, snap action (on request)

Maximum protection degree	
1	IP40 (with terminal cover)
2	IP65 (with terminal cover)

Type of actuation	
D	direct actuation
R	inverted actuation
F	direct actuation at the back

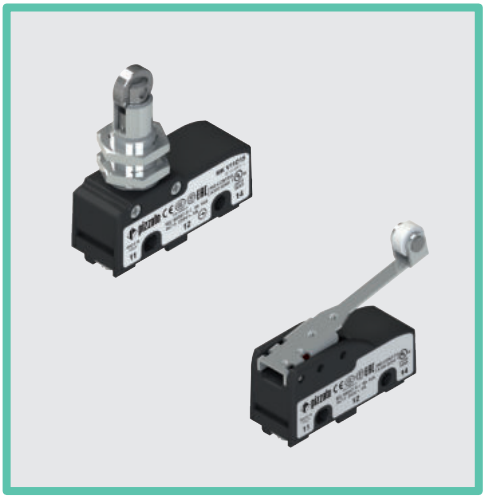
Actuator	
01	pin
02	pin
03	narrow plunger
...	...

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating

Rollers	
	standard roller
R16	metal roller Ø 9.5x4 mm (for actuators 40, 42 ,45, 47, 53, 59 only)
R10	large plastic roller Ø 9.8x8.4 mm (for actuators 40, 42, 45, 53 only)

Ambient temperature	
	-25°C ... +85°C (standard)
T6	-40°C ... +85°C

MK series switches for door operators



Main features
- Technopolymer housing
- Protection degree IP20, IP40 or IP65
- 4 terminal types available
- Versions with positive opening ⊖
- Versions with gold-plated silver contacts
- Terminal covers with strain relief cable gland

Quality marks:

IMQ approval:	CA02.05772
UL approval:	E131787
CCC approval:	2021000305000105
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing
Housing made of glass fibre reinforced technopolymer, self-extinguishing and shock-proof.

Protection degree acc. to EN 60529:	IP00 without terminal cover IP20 (with terminal covers VF C01, VF C03) IP40 (with terminal covers VF MKC•1•, VF C02) IP65 (with terminal covers VF MKC•22 + MK V•2••• or VF MKC•23 + MK H•2•••)

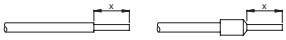
General data

Ambient temperature:	-25°C … +85°C (standard) -40°C … +85°C (T6 option)
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	10 million operating cycles
Safety parameter B_{10D}:	20,000,000 for NC contacts
Tightening torques for installation:	see page 158

Conductor cross section (flexible copper strands)

MK series:	min. 1 x 0.34 mm²	(1 x AWG 22)
	max. 2 x 1.5 mm²	(2 x AWG 16)

Wire stripping length (x):
MK V••••• articles (screw connection): 7 mm



In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60529, EN 60529, EN 60947-1, IEC 60947-1, EN IEC 63000.
Approvals:
UL 508, CSA 22.2 No.14, EN 60947-1, EN 60947-5-1.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only microswitches marked with the ⊖ symbol beside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel (CAP)** reported next to the article code. Actuate the switch **at least with the positive opening force (FAP)** reported next to the article code.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

Electrical data

Thermal current (I_{th}):	16 A
Rated insulation voltage (U_i):	250 Vac 300 Vdc
Rated impulse withstand voltage (U_{imp}):	4 kV
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type gG fuse 16 A 250 V
Pollution degree:	3
Dielectric strength	2000 Vac/min.

Utilization category

Alternating current: AC15 (50 … 60 Hz)

U_e (V)	120	250
I_e (A)	3	5

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	4	0.6	0.3

Features approved by IMQ

Rated insulation voltage (U_i):	250 Vac
Conventional free air thermal current (I_{th}):	16 A
Protection against short circuits:	type gG fuse 16 A 250 V
Rated impulse withstand voltage (U_{imp}):	4 kV
Conditional short circuit current:	1000 A
Protection degree of the housing:	IP00
Terminals: screw terminals / faston	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	250 Vac (50 Hz)
Operating current (I_e):	5 A

Forms of the contact element: A, B, C
Positive opening of contacts on contact blocks 1, 3
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

Please contact our technical department for the list of approved products.

Features approved by UL

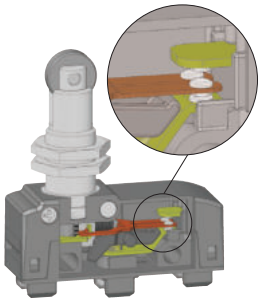
Electrical Ratings: Q300 pilot duty (69 VA, 125-250 V dc)
A300 pilot duty (720 VA, 120-300 V ac)

Please contact our technical department for the list of approved products.

Contact reliability

Thanks to the double and redundant execution, the electrical contact of the microswitch has been designed with a technology providing increased reliability.

For high-volume part orders, the microswitch can be also supplied with the NO or NC contact only, in order to reduce the costs.



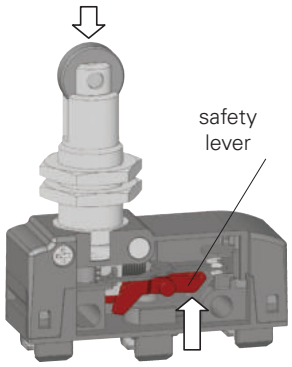
Versions with protection degree IP65

IP65

Inside the housing of the microswitch it is possible to insert gaskets to protect the mechanism against fine dusts or liquids up to the protection degree IP65.

To achieve a protection degree of IP65, please order the IP65-compatible version of the microswitch, with the IP65 terminal cover version.

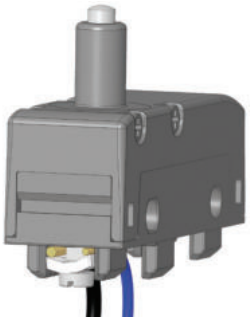
Microswitches for safety applications



All microswitches showing the symbol ⊖ besides the product code are with positive opening and therefore suitable for safety applications. These microswitches are provided with a rigid connection between the plunger and the NC contacts, which are forcibly actuated by a internal sturdy safety lever.

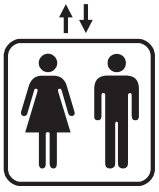
The positive opening has been designed in compliance with the standard EN 60947-5-1, Annex K. Therefore, these microswitches are suitable for safety applications.

Clamping screw plates for cables of different diameters (MK V•)



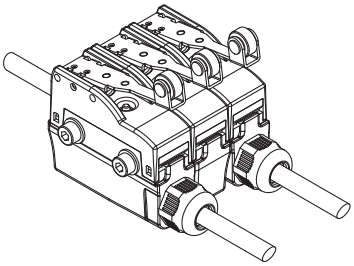
The clamping screw plates are provided with a particular "roofing tile" structure and are loosely coupled to the clamping screw. The design causes connection wires of different diameter to be pulled towards the screw when tightening the screw (see figure), preventing the wires from escaping towards the outside.

Compliant with EN 81-20 and EN 81-50



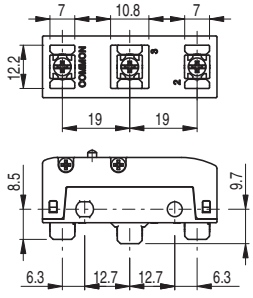
- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10^6 cycles.

Stackable terminal covers with cable gland

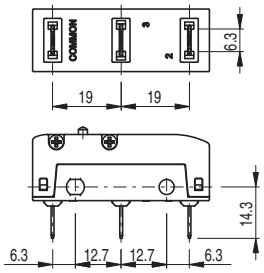


The terminal covers are provided with strain relief cable gland and protection degree up to IP65. These are snap-on terminal covers and have reduced dimensions contained in the profile of the microswitch so that these can be installed on microswitches fixed side by side as well. See page 70.

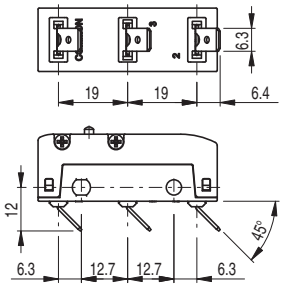
Terminal dimensions



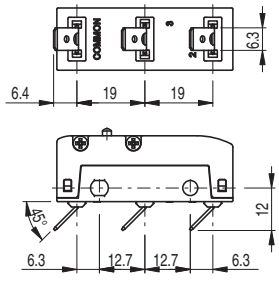
Screw terminals **V** with plate



Faston terminals **H**, vertical



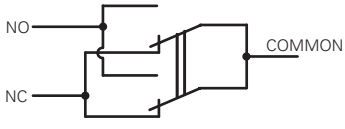
Faston terminals **F**, right angle



Faston terminals **G**, left angle (on request)

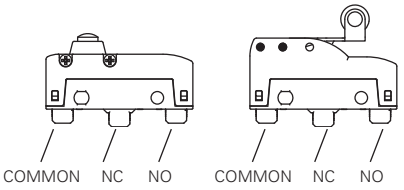
Note: The vertical faston terminals H can be bent according to specific installation requirements.
We recommend to bend the faston with an angle not higher than 45° and to carry out this operation no more than 5 times.

Circuit diagram

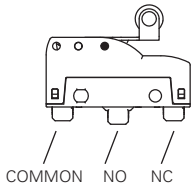


Mobile contact with single interruption and double contacts

With direct actuation and direct actuation at the back (F, D)

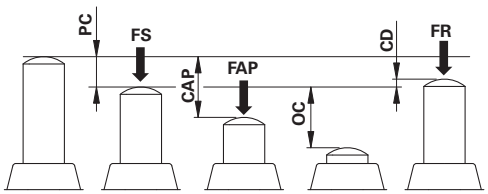


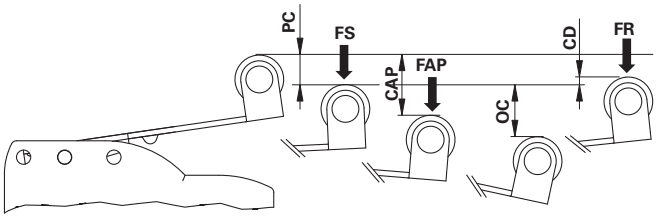
With inverted actuation (R)



MK series switches for door operators

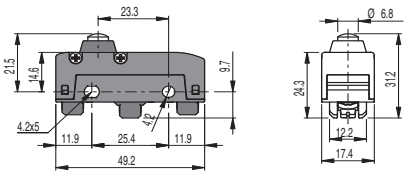
Legend





CD differential travel
PC pre-travel
OC over-travel
CAP positive opening travel
FS Trigger force
FR release force
FAP positive opening force

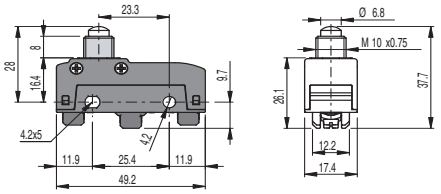
Microswitches with direct actuation



MK V11D05 1NO+1NC

PC	0,5 mm	FS	4 N
OC	2 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

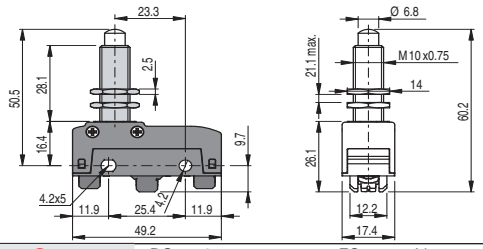
Maximum and minimum speed see page 158 - type 1



MK V11D06 1NO+1NC

PC	0,5 mm	FS	4 N
OC	3 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

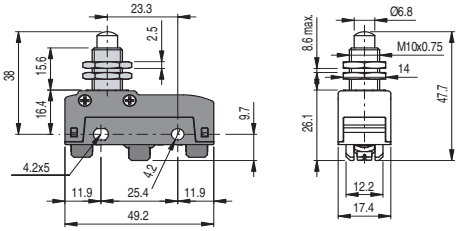
Maximum and minimum speed see page 158 - type 1



MK V11D08 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

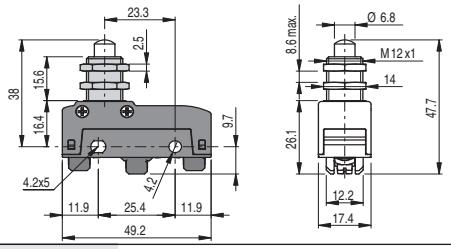
Maximum and minimum speed see page 158 - type 1



MK V11D09 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

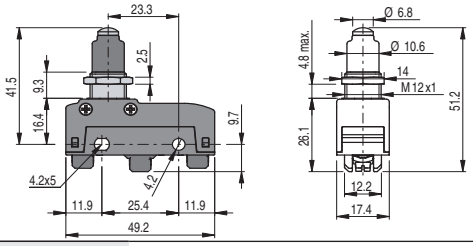
Maximum and minimum speed see page 158 - type 1



MK V11D10 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

Maximum and minimum speed see page 158 - type 1

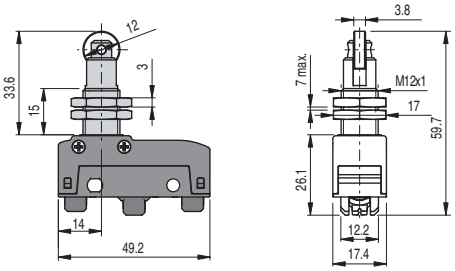


MK V11D12 1NO+1NC

PC	0,5 mm	FS	4.5 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

Maximum and minimum speed see page 158 - type 1

Mounting only through threaded fitting

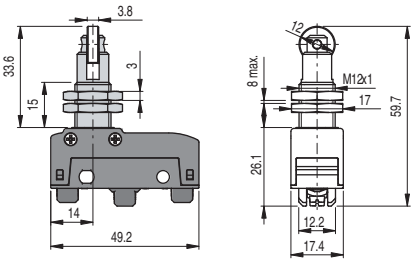


MK V11D15 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

Maximum and minimum speed see page 158 - type 2

Mounting only through threaded fitting



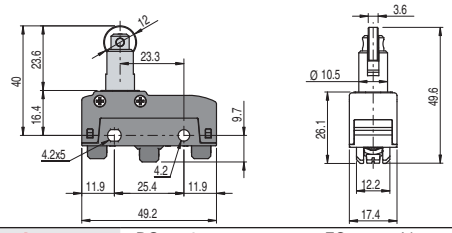
MK V11D17 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

Maximum and minimum speed see page 158 - type 2

All values in the drawings are in mm

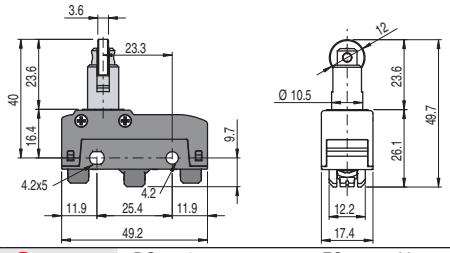
Accessories See page 149



MK V11D18 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

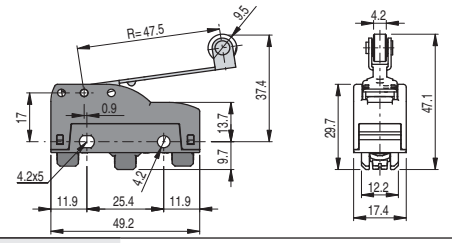
Maximum and minimum speed see page 158 - type 2



MK V11D19 1NO+1NC

PC	0,5 mm	FS	4 N
OC	5,5 mm	FR	3 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

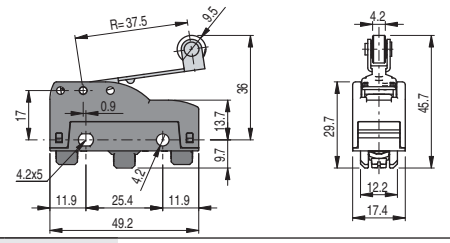
Maximum and minimum speed see page 158 - type 2



MK V11D40 1NO+1NC

PC	8,2 mm	FS	0,86 N
OC	6,1 mm	FR	0,66 N
CD	0,8 mm		

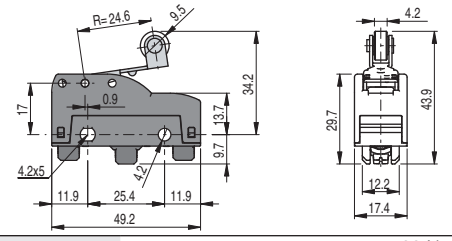
Maximum and minimum speed see page 158 - type 6



MK V11D42 1NO+1NC

PC	6,5 mm	FS	1,09 N
OC	4,8 mm	FR	0,84 N
CD	0,6 mm		

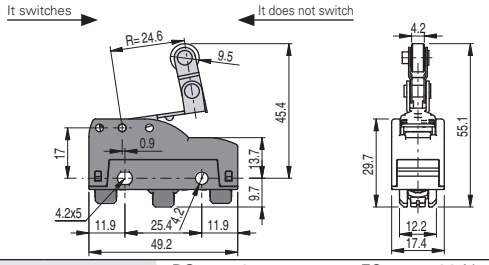
Maximum and minimum speed see page 158 - type 6



MK V11D45 1NO+1NC

PC	4,5 mm	FS	1,66 N
OC	3,2 mm	FR	1,28 N
CD	0,4 mm		

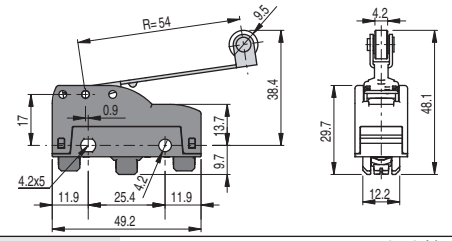
Maximum and minimum speed see page 158 - type 6



MK V11D47 1NO+1NC

PC	4,2 mm	FS	1,66 N
OC	2,8 mm	FR	1,28 N
CD	0,4 mm		

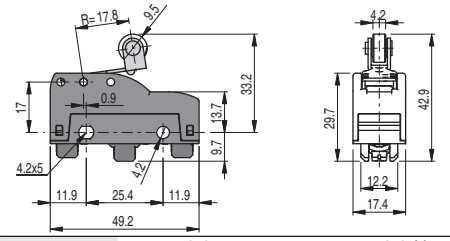
Maximum and minimum speed see page 158 - type 6



MK V11D53 1NO+1NC

PC	7,7 mm	FS	0,76 N
OC	7,8 mm	FR	0,58 N
CD	0,9 mm		

Maximum and minimum speed see page 158 - type 6

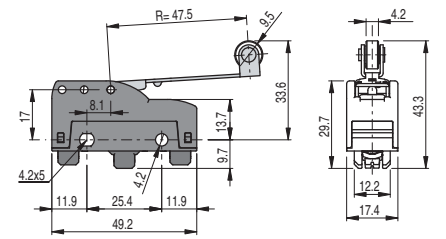


MK V11D59 1NO+1NC

PC	2,3 mm	FS	2,3 N
OC	4,5 mm	FR	1,77 N
CD	0,2 mm		

Maximum and minimum speed see page 158 - type 6

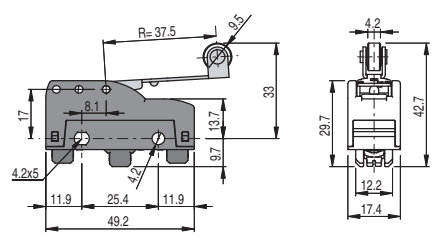
Microswitches with inverted actuation



MK V11R40 1NO+1NC

PC	2,8 mm	FS	0,8 N
OC	10,9 mm	FR	0,5 N
CD	0,45 mm		

Maximum and minimum speed see page 158 - type 7



MK V11R42 1NO+1NC

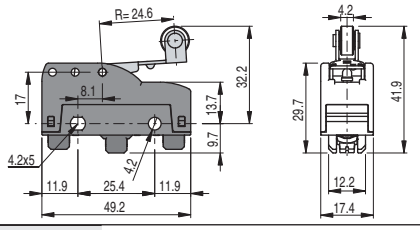
PC	2,7 mm	FS	1,2 N
OC	8,4 mm	FR	1,7 N
CD	0,5 mm		

Maximum and minimum speed see page 158 - type 7

All values in the drawings are in mm

Accessories See page 149

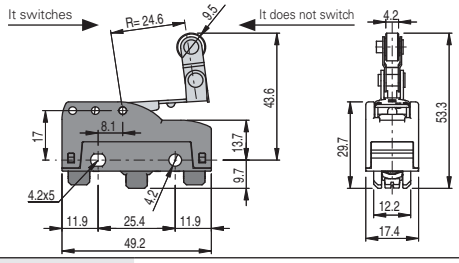
MK series switches for door operators



MK V11R45 1NO+1NC

PC	1,5 mm	FS	1,7 N
OC	5,5 mm	FR	1 N
CD	0,3 mm		

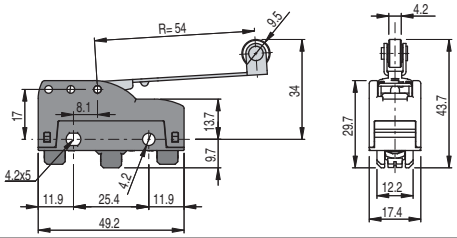
Maximum and minimum speed see page 158 - type 7



MK V11R47 1NO+1NC

PC	1,7 mm	FS	1,7 N
OC	5,3 mm	FR	1 N
CD	0,3 mm		

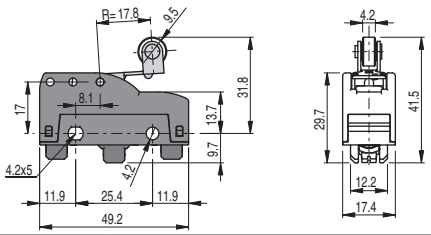
Maximum and minimum speed see page 158 - type 7



MK V11R53 1NO+1NC

PC	3,6 mm	FS	0,8 N
OC	11,2 mm	FR	0,4 N
CD	0,5 mm		

Maximum and minimum speed see page 158 - type 7

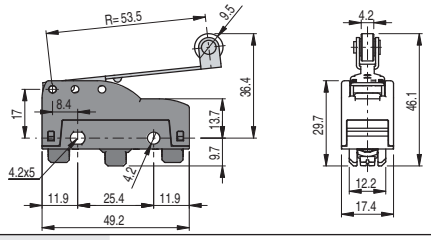


MK V11R59 1NO+1NC

PC	1,5 mm	FS	2,4 N
OC	3,9 mm	FR	1,3 N
CD	0,2 mm		

Maximum and minimum speed see page 158 - type 7

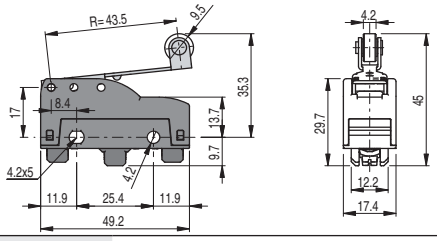
Microswitches with direct actuation at the back



MK V11F40 1NO+1NC

PC	2,1 mm	FS	0,85 N
OC	8,3 mm	FR	0,65 N
CD	0,25 mm		

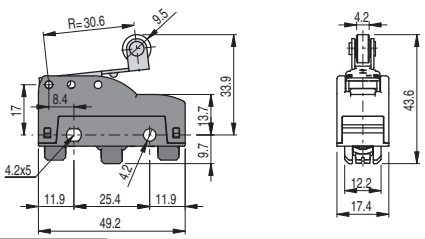
Maximum and minimum speed see page 158 - type 8



MK V11F42 ⊖ 1NO+1NC

PC	1,8 mm	FS	1 N
OC	6,7 mm	FR	0,7 N
CD	0,2 mm	FAP	4,9 N
CAP	8 mm		

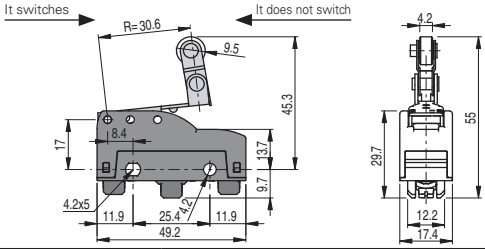
Maximum and minimum speed see page 158 - type 8



MK V11F45 ⊖ 1NO+1NC

PC	1,1 mm	FS	1,5 N
OC	4,9 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	5,8 mm		

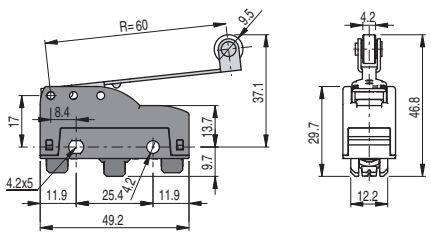
Maximum and minimum speed see page 158 - type 8



MK V11F47 ⊖ 1NO+1NC

PC	1,3 mm	FS	1,6 N
OC	4,7 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	5,8 mm		

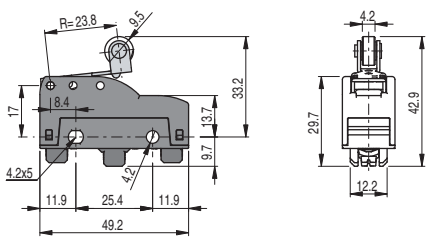
Maximum and minimum speed see page 158 - type 8



MK V11F53 1NO+1NC

PC	2,5 mm	FS	0,7 N
OC	9,3 mm	FR	0,6 N
CD	0,3 mm		

Maximum and minimum speed see page 158 - type 8



MK V11F59 ⊖ 1NO+1NC

PC	0,8 mm	FS	1,9 N
OC	4,5 mm	FR	1,3 N
CD	0,08 mm	FAP	8,9 N
CAP	4,9 mm		

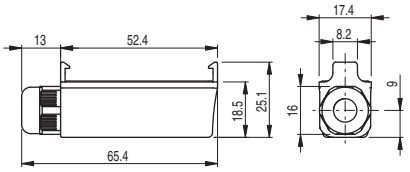
Maximum and minimum speed see page 158 - type 8

All values in the drawings are in mm

Accessories See page 149

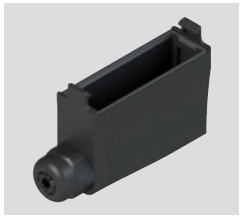
Protective terminal covers

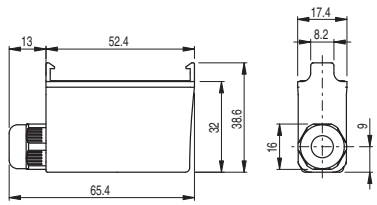
Packs of **10 pcs.**



Protective terminal cover for screw terminals with strain relief cable gland and snap-in mounting. It allows to install mutiple switches side-by-side.

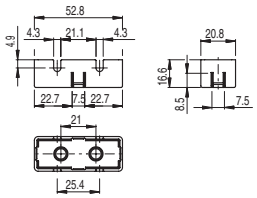
Article	Description	Protection degree
VF MKCV11	Protective terminal cover without gasket for multipolar cables Ø 5 … 7.5 mm	IP40
VF MKCV12	Protective terminal cover without gasket for multipolar cables Ø 4 … 7.5 mm	IP40
VF MKCV13	Protective terminal cover without gasket for multipolar cables Ø 2 … 5.5 mm	IP40
VF MKCV22	Protective terminal cover with gasket for multipolar cables Ø 4 … 7.5 mm	IP65
VF MKCV23	Protective terminal cover with gasket for multipolar cables Ø 2 … 5.5 mm	IP65



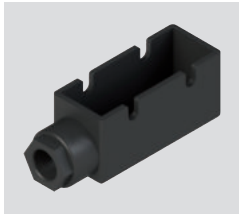


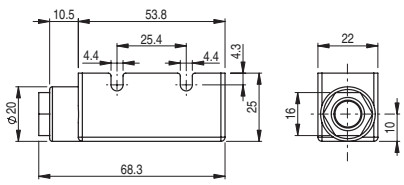
Protective terminal cover for vertical faston terminals with strain relief cable gland and snap-in mounting. It allows to install mutiple switches side-by-side.

Article	Description	Protection degree
VF MKCH11	Protective terminal cover without gasket for multipolar cables Ø 5 … 7.5 mm	IP40
VF MKCH12	Protective terminal cover without gasket for multipolar cables Ø 4 … 7.5 mm	IP40
VF MKCH13	Protective terminal cover without gasket for multipolar cables Ø 2 … 5.5 mm	IP40
VF MKCH22	Protective terminal cover with gasket for multipolar cables Ø 4 … 7.5 mm	IP65
VF MKCH23	Protective terminal cover with gasket for multipolar cables Ø 2 … 5.5 mm	IP65

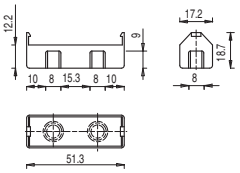


Article	Description	Protection degree
VF C01	Protective terminal cover for screw terminals	IP20





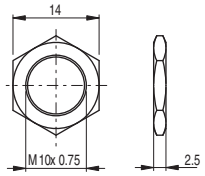
Article	Description	Protection degree
VF C02	Protective terminal cover for screw terminals with PG9 cable gland for multipolar cables Ø 5 … 7 mm	IP40



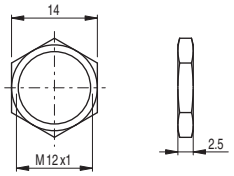
Article	Description	Protection degree
VF C03	Protective terminal cover for screw terminals, snap-in mounting. It allows to install mutiple switches side-by-side	IP20

Accessories

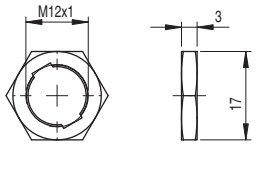
Packs of **10 pcs.**



Article	Description
VF AC83	Hex threaded nut for microswitches with actuators D06, D08, D09



Article	Description
VF AC72	Hex threaded nut for micro-switches with actuators D10, D12, D13



Article	Description
AC 35	Hex threaded nut, notched, for microswitches with actuators D15, D16

All values in the drawings are in mm

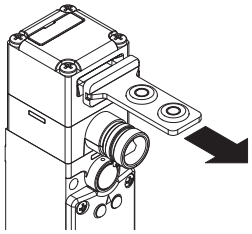
Accessories See page 149

FG series safety switches for door locking

Description

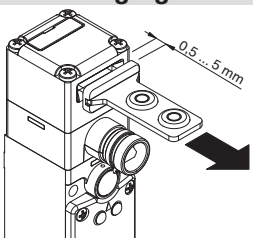
These switches, compliant with EN 81, are used as locking devices for hinged and sliding lift doors.
The door is unlocked by powering the internal solenoid, which then unlocks the actuator inserted in the head, thus allowing the door to be unlocked and opened. Equipped with a locking system with enhanced force, they meet the retention requirements (3000 N) set by the standards EN 81-20 and EN 81-50.
The versions with solenoid actuated NC contacts are considered interlocks with locking in accordance with ISO 14119, and the product's label is marked with the symbol shown.

Holding force of the locked actuator



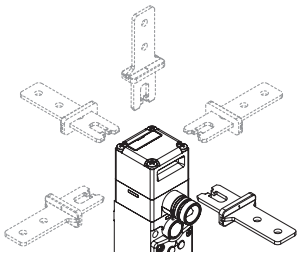
The strong interlocking system guarantees a maximum actuator holding force of 3000 N.

Wide-ranging actuator travel



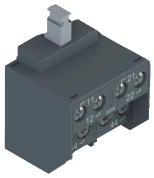
The actuation head of this switch features a wide range of travel. In this way the guard can oscillate along the direction of insertion (4.5 mm) without causing unwanted machine shutdowns. This wide range of travel is available in all actuators in order to ensure maximum device reliability.

Heads and devices with variable orientation



The system can be variably configured by loosening the 4 screws on the head.
The key release device and the release button can also be rotated and secured independently of one another in steps of 90°. The device can thus assume 32 different configurations.

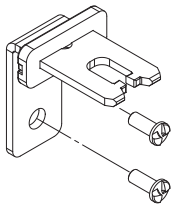
Contact blocks with 4 contacts



Innovative contact block with 4 contacts, available in various contact configurations for monitoring the actuator or the solenoid (patented). The unit is supplied with captive screws and self-lifting clamping plates. Removable finger protection for eyelet terminal.
High-reliability electrical contacts with 4 contact points and double interruption.

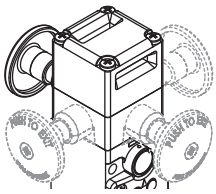
Key release devices with triangular key

Safety screws for actuators



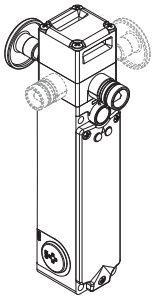
As required by EN ISO 14119, the actuator must be fixed immovably to the guard frame. Pan head safety screws with one-way fitting are available for this purpose. With this screw type, the actuators cannot be removed or tampered by using common tools. See accessories on page 149.

Escape release button

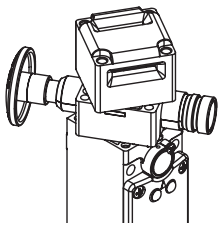


This device is used to safeguard a hazardous area that an operator may enter with his entire body. The release button allows for exit even in the event of possible blackouts. Pushing the button results in the same function as the auxiliary release device. To reset the switch, simply return the button to its initial position. The escape release button can be rotated and is available with different lengths. It is fixed to the switch by means of a screw allowing the installation of the switch both inside and outside the guards.

Key release device and escape release button



Non-detachable heads and release devices



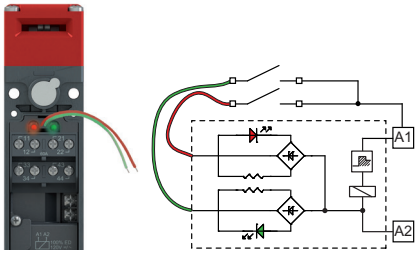
The head and the release device can be rotated but cannot be detached from each other. This makes the switch more secure since the problem of incorrect assembly by the installer cannot occur; in addition, the risk of damage is lower (loss of small parts, penetration of dirt, etc.).

Compliant with EN 81-20 and EN 81-50

LED display unit, type A

In the version with LED display unit of type A, two green LEDs are switched-on directly by the power supply of the solenoid. Wiring is not necessary.

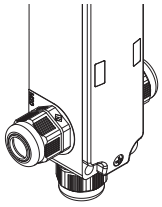
LED display unit, types B and C



Protection degree IP67

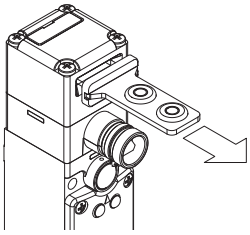
IP67

Three conduit entries



The switch is provided with three conduit entries in different directions. This allows its application in series connections or in narrow places.

Holding force of the unlocked actuator



Laser engraving

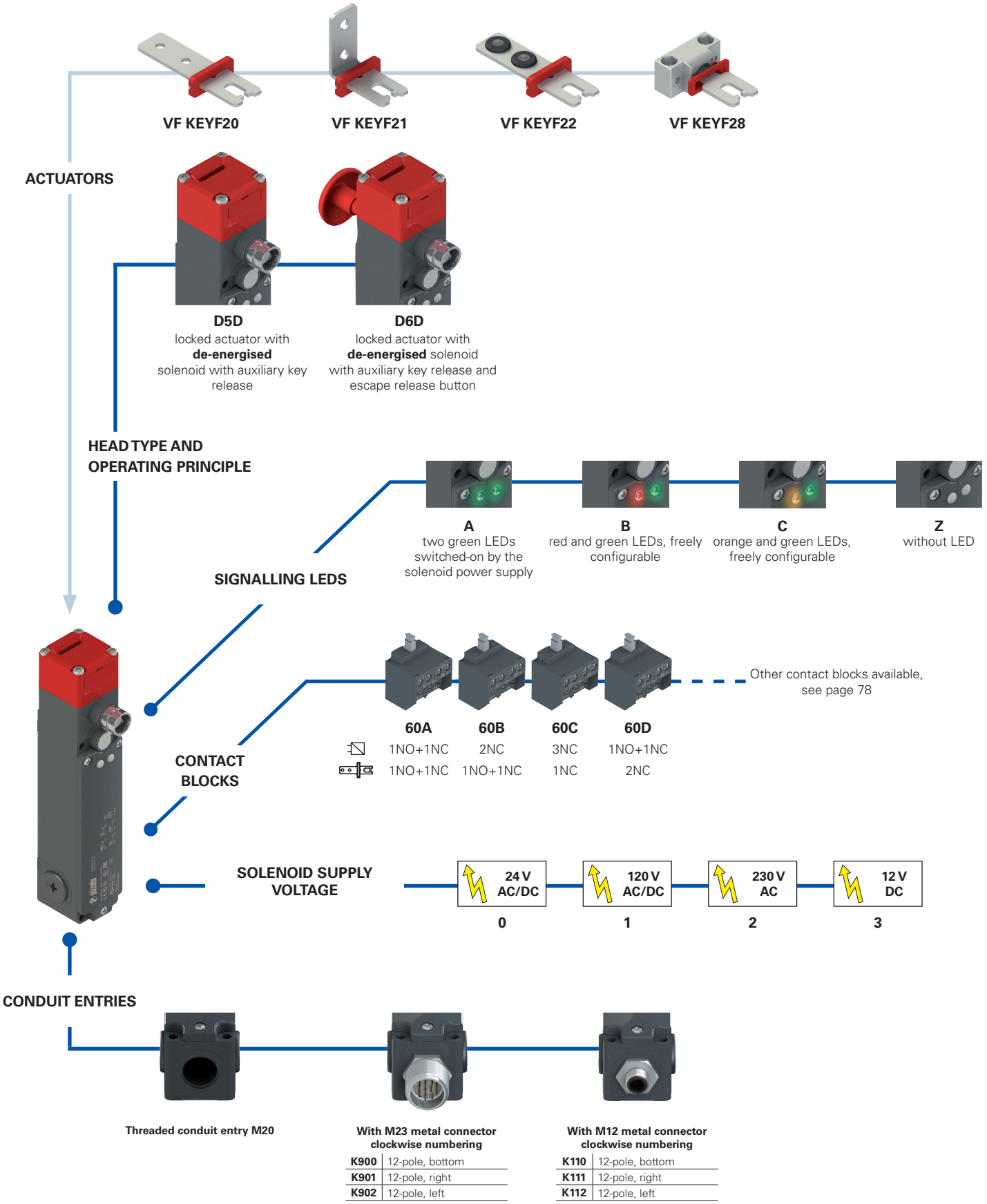
All FG series switches are permanently marked with a special laser system. As a result, the marking remains legible even under extreme operating conditions. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

Extended temperature range

-40°C

LED signalling lights

Selection diagram



product option

Sold separately as accessory

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

article: **FG 60AD1D0A** — options: **-LP30F20GK900T6V70V90**

Contact block

	Contacts activated by the solenoid	Contacts activated by the actuator
60A	1NO+1NC	1NO+1NC
60B	2NC	1NO+1NC
60C	3NC	1NC
60D	1NO+1NC	2NC
60E	1NO+2NC	1NC
60G	2NC	2NC
60L	2NO+1NC	1NC
60P	1NC	3NC
60S	1NC	2NO+1NC
60T	1NC	1NO+2NC
60X	1NO	3NC
60Y	1NO	1NO+2NC
61E	1NO	2NO+1NC
61G	2NO	1NO+1NC
61H	2NO	2NC
61M	3NO	1NC

Operating principle

D5D	locked actuator with de-energised solenoid. With auxiliary key release.
D6D	locked actuator with de-energised solenoid. With auxiliary key release and escape release button.

Solenoid supply voltage

0	24 Vac/dc (-10% … +10%)
1	120 Vac/dc (-15% … +10%)
2	230 Vac (-15% … +10%)
3	12 Vdc (-10% … +10%)

Signalling LEDs

A	two green LEDs switched-on by the solenoid power supply
B	red and green LEDs, freely configurable
C	orange and green LEDs, freely configurable
Z	without LED

Release button length

	for max. 15 mm wall thickness (standard)
LP30	for max. 30 mm wall thickness
LP40	for max. 40 mm wall thickness
LP60	for max. 60 mm wall thickness
LPRG	adjustable, for wall thickness from 60 mm to 500 mm

Actuators

	without actuator (standard)
F20	straight actuator VF KEYF20
F21	angled actuator VF KEYF21
F22	actuator with rubber pads VF KEYF22
F28	universal actuator VF KEYF28

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating

Pre-installed connectors

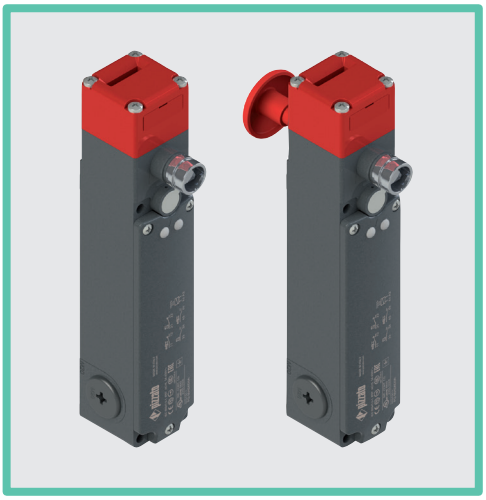
	without connector (standard)
K900	M23 metal connector, 12-pole, bottom
...	…
K110	M12 metal connector, 12-pole, bottom
...	…

For the complete list of possible combinations please contact our technical department.

Ambient temperature

	-25°C … +60°C (standard)
T6	-40°C … +60°C

FG series safety switches for door locking



Main features

- Actuator locking force: 3000 N
- 16 contact blocks with 4 contacts
- Metal housing, three M20 conduit entries
- Protection degree IP67
- Auxiliary key release with triangular lock and spring return
- 4 stainless steel actuators
- Head and release devices, individually turnable and non-detachable
- Signalling LEDs

Quality marks:

IMQ approval (dir. 2014/35/EU):	CA02.03808
IMQ approval (dir. 2014/33/EU):	CA50.00781
UL approval:	E131787
CCC approval:	2021000305000103
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

Metal head and housing, baked powder coating.

Three threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

General data

SIL (SIL CL) up to:	SIL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Interlock with mechanical lock, coded:	type 2 acc. to EN ISO 14119
Coding level:	low acc. to EN ISO 14119
Safety parameters:	
B_{10D}:	5,000,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C … +60°C (standard) -40°C … +60°C (T6 option)
Max. actuation frequency:	600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Locking closure force:	3000 N
Maximum clearance of locked actuator:	4.5 mm
Released actuator extraction force:	30 N
Tightening torques for installation:	see page 159
Wire cross-sections and wire stripping lengths:	see page 170

Solenoid

Duty cycle:	100% ED (continuous operation)
Solenoid consumption:	9 VA

In compliance with standards:
IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, IEC 61000-6-2, IEC 61000-6-3, EN IEC 63000, EN 81-20, EN 81-50, BG-GS-ET-15, BG-GS-ET-19, UL 508, CSA C22.2 No. 14.

Approvals:
EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, Lift Directive 2014/33/EU, Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 153 to 162.**

	Electrical data		Utilization category
without connector	Thermal current (I_{th}):	10 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (U_i):	400 Vac 300 Vdc	U_e (V) 120 250 400
	Rated impulse withstand voltage (U_{imp}):	6 kV	I_e (A) 6 5 3
	Conditional short circuit current:	1000 A acc. to EN 60947-5-1	Direct current: DC13
	Protection against short circuits:	type gG fuse 10 A 500 V	U_e (V) 24 125 250
	Pollution degree:	3	I_e (A) 3 0.7 0.4
with M23 connector, 12-pole	Thermal current (I_{th}):	8 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (U_i):	250 Vac 300 Vdc	U_e (V) 120 250
	Protection against short circuits:	type gG fuse 8 A 500 V	I_e (A) 6 5
	Pollution degree:	3	Direct current: DC13
			U_e (V) 24 125 250
			I_e (A) 3 0.7 0.4
with M12 connector, 12-pole	Thermal current (I_{th}):	1.5 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (U_i):	30 Vac 36 Vdc	U_e (V) 24
	Protection against short circuits:	type gG fuse 1.5 A	I_e (A) 1.5
	Pollution degree:	3	Direct current: DC13
			U_e (V) 24
			I_e (A) 1.5

Features approved by IMQ

In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

Rated insulation voltage (U_i):	400 Vac
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type gG fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: X+X+X+X, Y+Y+Y+Y, X+Y+Y+Y, X+X+Y+Y, X+X+X+Y
Positive opening of contacts on all contact blocks: 60A, 60B, 60C, 60D, 60E, 60G, 60L, 60P, 60S, 60T, 60X, 60Y, 61E, 61G, 61H, 61M

In compliance with standards: EN 81-20, EN 81-50, fundamental requirements of the Lift Directive 2014/33/EU.

Protection degree of the housing:	IP67
Resistance to tracking:	TK 175V
MV terminals (screw terminals)	
Operating voltage (U_e):	250 V c.a. / a.c. – 200 V c.c. / d.c.
Operating current (I_e):	2 A c.a. / a.c. – 0,5 A c.c. / d.c.

Forms of the contact element: Y+Y+Y+Y, X+Y+Y+Y, X+X+Y+Y
Positive opening of contacts on all contact blocks: 60A, 60B, 60C, 60D, 60E, 60G, 60L, 60P, 60S, 60T

Please contact our technical department for the list of approved products.

Features approved by UL

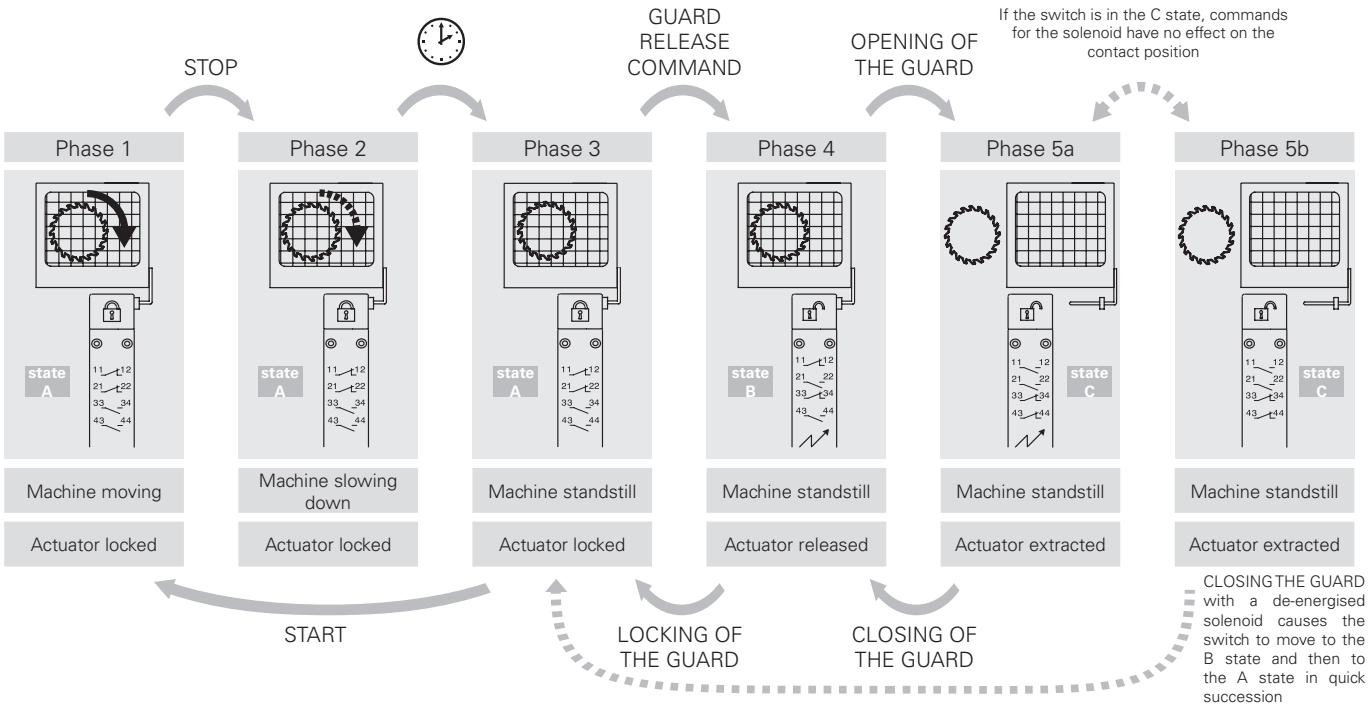
Electrical Ratings:	A300 pilot duty (720 VA, 120-300 Vac) Q300 pilot duty (69 VA, 125-250 Vdc)
Environmental Ratings:	Types 1, 4X, 12, 13

Please contact our technical department for the list of approved products.

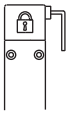
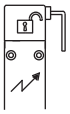
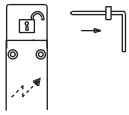
Operating principle

The operating principle of these safety switches allows three different operating states:
state A: with inserted and locked actuator
state B: with inserted but not locked actuator
state C: with extracted actuator
All or some of these states can be monitored by means of electrical NO contacts or NC contacts with positive opening by selecting the appropriate contact blocks. In detail, contact blocks that have electric contacts marked with the symbol of the solenoid ( ) are switched in the transition between the state A and state B, while the electric contacts marked with the symbol of the actuator ( ) are switched between state B and state C.
According to the operating principle, the actuator is locked when the solenoid is de-energised. The actuator is released by energising the solenoid (see example of operating phases).

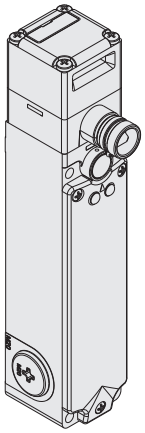
Example of the operating phases



Contact positions related to switch states

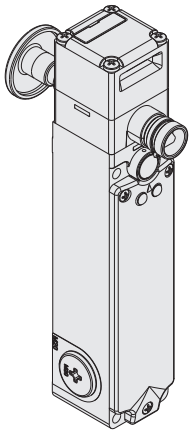
Operating state	Operating principle with locked actuator with de-energised solenoid		
	state A	state B	state C
Actuator	Inserted and locked	Inserted and released	Extracted
Solenoid	De-energised	Energised	-
			
FG 60A••••• 1NO+1NC controlled by the solenoid 1NO+1NC controlled by the actuator	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44
FG 60B••••• 2NC controlled by the solenoid 1NO+1NC controlled by the actuator	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44
FG 60C••••• 3NC controlled by the solenoid 1NC controlled by the actuator	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42
FG 60D••••• 1NO+1NC controlled by the solenoid 2NC controlled by the actuator	13 14 21 22 31 32 41 42	13 14 21 22 31 32 41 42	13 14 21 22 31 32 41 42
FG 60E••••• 1NO+2NC controlled by the solenoid 1NC controlled by the actuator	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44
FG 60G••••• 2NC controlled by the solenoid 2NC controlled by the actuator	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42
FG 60L••••• 2NO+1NC controlled by the solenoid 1NC controlled by the actuator	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44
FG 60P••••• 1NC controlled by the solenoid 3NC controlled by the actuator	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42	11 12 21 22 31 32 41 42
FG 60S••••• 1NC controlled by the solenoid 2NO+1NC controlled by the actuator	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44
FG 60T••••• 1NC controlled by the solenoid 1NO+2NC controlled by the actuator	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44	11 12 21 22 31 32 43 44
FG 60X••••• 1NO controlled by the solenoid 3NC controlled by the actuator	13 14 21 22 31 32 41 42	13 14 21 22 31 32 41 42	13 14 21 22 31 32 41 42
FG 60Y••••• 1NO controlled by the solenoid 1NO+2NC controlled by the actuator	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44
FG 61E••••• 1NO controlled by the solenoid 2NO+1NC controlled by the actuator	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44
FG 61G••••• 2NO controlled by the solenoid 1NO+1NC controlled by the actuator	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44
FG 61H••••• 2NO controlled by the solenoid 2NC controlled by the actuator	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44	11 12 21 22 33 34 43 44
FG 61M••••• 3NO controlled by the solenoid 1NC controlled by the actuator	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44	13 14 21 22 33 34 43 44

Contact type
L = slow action



Operating principle		Provided with key release with triangular key, without actuator				
Contact block						
60A	L	FG 60AD5D0A-V70V90	✓	✓	1NO+1NC	1NO+1NC
60B	L	FG 60BD5D0A-V70V90	✓	✓	2NC	1NO+1NC
60C	L	FG 60CD5D0A-V70V90	✓	✓	3NC	1NC
60D	L	FG 60DD5D0A-V70V90	✓	✓	1NO+1NC	2NC
60E	L	FG 60ED5D0A-V70V90	✓	✓	1NO+2NC	1NC
60G	L	FG 60GD5D0A-V70V90	✓	✓	2NC	2NC
60L	L	FG 60LD5D0A-V70V90	✓	✓	2NO+1NC	1NC
60P	L	FG 60PD5D0A-V70V90	✓	✓	1NC	3NC
60S	L	FG 60SD5D0A-V70V90	✓	✓	1NC	2NO+1NC
60T	L	FG 60TD5D0A-V70V90	✓	✓	1NC	1NO+2NC
60X	L	FG 60XD5D0A-V70V90		✓	1NO	3NC
60Y	L	FG 60YD5D0A-V70V90		✓	1NO	1NO+2NC
61E	L	FG 61ED5D0A-V70V90		✓	1NO	2NO+1NC
61G	L	FG 61GD5D0A-V70V90		✓	2NO	1NO+1NC
61H	L	FG 61HD5D0A-V70V90		✓	2NO	2NC
61M	L	FG 61MD5D0A-V70V90		✓	3NO	1NC
Actuating force		30 N (60 N ✓)				
Travel diagrams		Page 170				

Contact type
L = slow action



Operating principle		Provided with key release with triangular key, escape release button, without actuator				
Contact block						
60A	L	FG 60AD6D0A-V70V90	✓	✓	1NO+1NC	1NO+1NC
60B	L	FG 60BD6D0A-V70V90	✓	✓	2NC	1NO+1NC
60C	L	FG 60CD6D0A-V70V90	✓	✓	3NC	1NC
60D	L	FG 60DD6D0A-V70V90	✓	✓	1NO+1NC	2NC
60E	L	FG 60ED6D0A-V70V90	✓	✓	1NO+2NC	1NC
60G	L	FG 60GD6D0A-V70V90	✓	✓	2NC	2NC
60L	L	FG 60LD6D0A-V70V90	✓	✓	2NO+1NC	1NC
60P	L	FG 60PD6D0A-V70V90	✓	✓	1NC	3NC
60S	L	FG 60SD6D0A-V70V90	✓	✓	1NC	2NO+1NC
60T	L	FG 60TD6D0A-V70V90	✓	✓	1NC	1NO+2NC
60X	L	FG 60XD6D0A-V70V90		✓	1NO	3NC
60Y	L	FG 60YD6D0A-V70V90		✓	1NO	1NO+2NC
61E	L	FG 61ED6D0A-V70V90		✓	1NO	2NO+1NC
61G	L	FG 61GD6D0A-V70V90		✓	2NO	1NO+1NC
61H	L	FG 61HD6D0A-V70V90		✓	2NO	2NC
61M	L	FG 61MD6D0A-V70V90		✓	3NO	1NC
Actuating force		30 N (60 N ✓)				
Travel diagrams		Page 170				

Legend: ✓ With positive opening according to EN 60947-5-1, ✓ interlock with lock monitoring acc. to EN ISO 14119

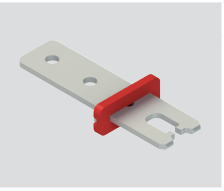
Contacts activated by the actuator

Contacts activated by the solenoid

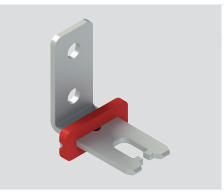
Accessories See page 149

Stainless steel actuators

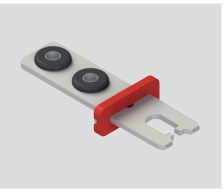
IMPORTANT: These actuators can be used only with items of the FG series (e.g. FG 60AD5D0A-F20V70V90).
Low level of coding acc. to EN ISO 14119.



Article	Description
VF KEYF20	Straight actuator



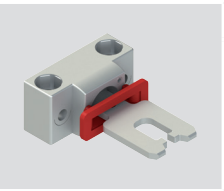
Article	Description
VF KEYF21	Angled actuator



Article	Description
VF KEYF22	Actuator with rubber pads

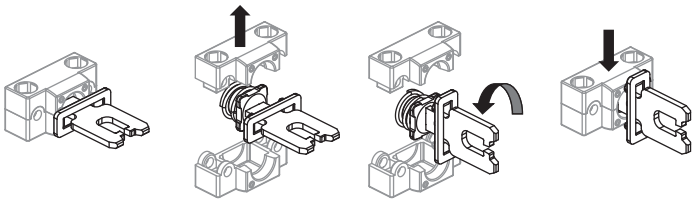
Universal actuator VF KEYF28

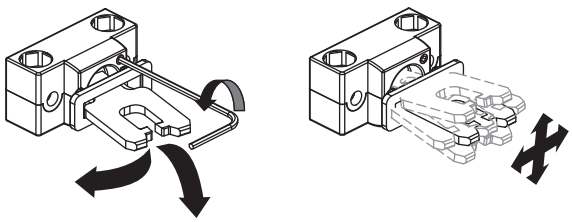
IMPORTANT: These actuators can be used only with items of the FG series (e.g. FG 60AD5D0A-F28V70V90).
Low level of coding acc. to EN ISO 14119.

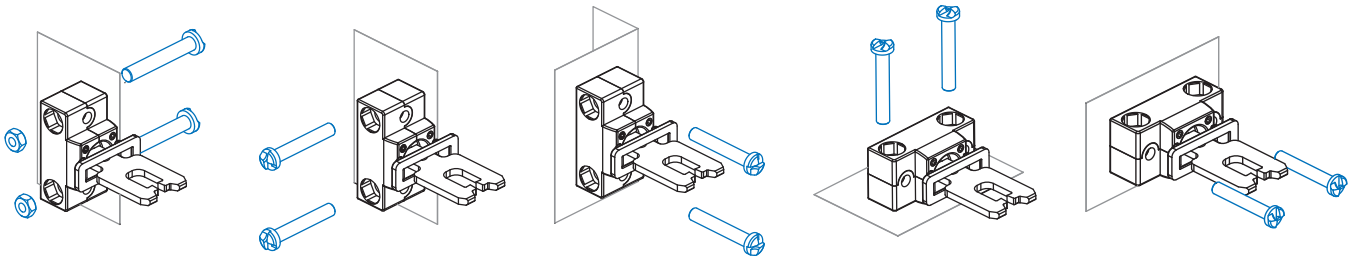


Article	Description
VF KEYF28	Universal actuator

Jointed actuator for guards with poor alignment, adjustable in two dimensions for small doors; can be mounted in various positions.
The metal fixing body has two pairs of bore holes; it is provided for rotating the working plane of the actuator by 90°.





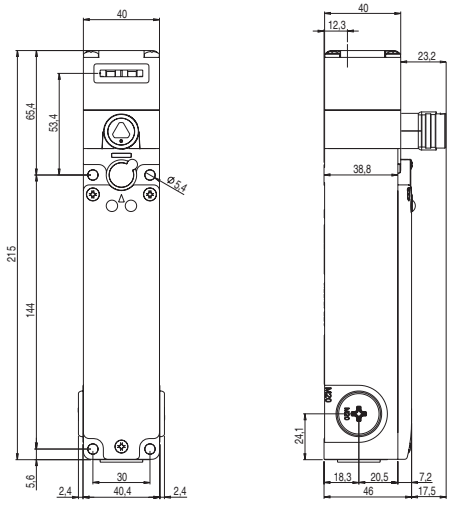


All values in the drawings are in mm

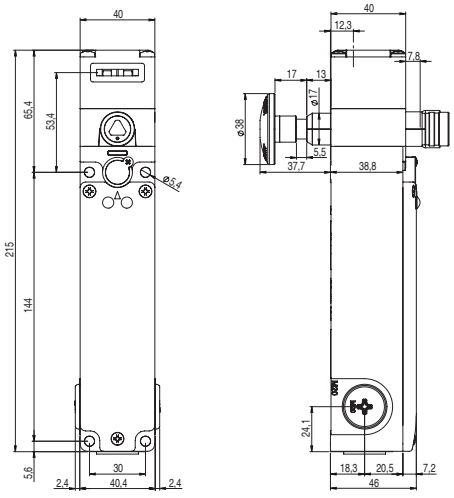
Accessories See page 149

Dimensional drawings

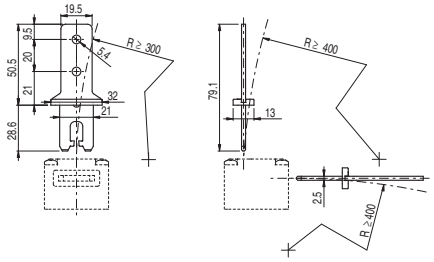
Switch FG 6••D5D••-V70V90
With auxiliary key release
with triangular key



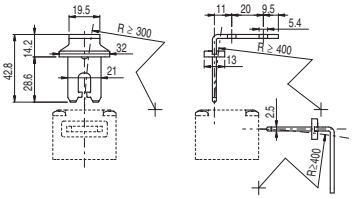
Switch FG 6••D6D••-V70V90
With auxiliary key release with triangular key and escape release button



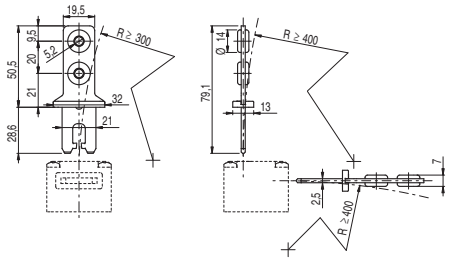
Actuator VF KEYF20



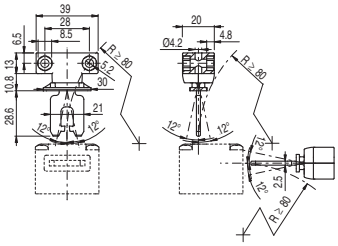
Actuator VF KEYF21



Actuator VF KEYF22



Actuator VF KEYF28

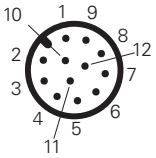


All values in the drawings are in mm

Accessories See page 149

Wiring diagram for M12 connectors

M12 connector, 12-pole



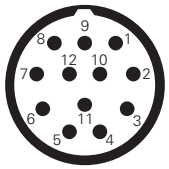
Contact block 60A 2NO+2NC		Contact block 60B 1NO+3NC		Contact block 60C 4NC		Contact block 60D 1NO+3NC		Contact block 60E 1NO+3NC		Contact block 60G 4NC		Contact block 60L 2NO+2NC		Contact block 60P 4NC		Contact block 60S 2NO+2NC		Contact block 60T 1NO+3NC	
Contacts	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**
A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2
NC	3-4	NC	3-4	NC	3-4	NO	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4
NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6
NO	7-8	NC	7-8	NC	7-8	NC	7-8	NC	7-8	NC	7-8	NO	7-8	NC	7-8	NO	7-8	NC	7-8
NO	9-10	NO	9-10	NC	9-10	NC	9-10	NO	9-10	NC	9-10	NO	9-10	NC	9-10	NO	9-10	NO	9-10

Contact block 60X 1NO+3NC		Contact block 60Y 2NO+2NC		Contact block 61E 3NO+1NC		Contact block 61G 3NO+1NC		Contact block 61H 2NO+2NC		Contact block 61M 3NO+1NC	
Contacts	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**
A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2
NO	3-4	NC	3-4	NO	3-4	NO	3-4	NC	3-4	NO	3-4
NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6
NC	7-8	NO	7-8	NO	7-8	NO	7-8	NO	7-8	NO	7-8
NC	9-10	NO	9-10	NO	9-10	NO	9-10	NO	9-10	NO	9-10

Note: the wires connected to pins 11 and 12 of the M12 connector can be used to activate the LEDs in FG series configurations with freely connectable LEDs.

Wiring diagram for M23 connectors

M23 connector, 12-pole

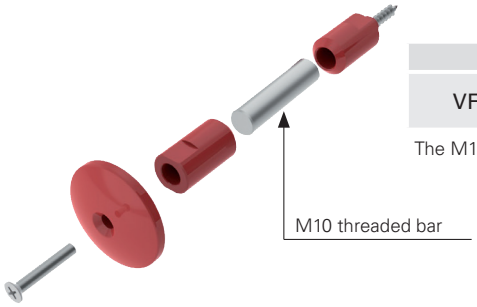


Contact block 60A 2NO+2NC		Contact block 60B 1NO+3NC		Contact block 60C 4NC		Contact block 60D 1NO+3NC		Contact block 60E 1NO+3NC		Contact block 60G 4NC		Contact block 60L 2NO+2NC		Contact block 60P 4NC		Contact block 60S 2NO+2NC		Contact block 60T 1NO+3NC	
Contacts	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**
A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2
NC	3-4	NC	3-4	NC	3-4	NO	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4	NC	3-4
NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6
NO	7-8	NC	7-8	NC	7-8	NC	7-8	NC	7-8	NC	7-8	NO	7-8	NC	7-8	NO	7-8	NC	7-8
NO	9-10	NO	9-10	NC	9-10	NC	9-10	NO	9-10	NC	9-10	NO	9-10	NC	9-10	NO	9-10	NO	9-10
ground	11	ground	11	ground	11	ground	11	ground	11	ground	11	ground	11	ground	11	ground	11	ground	11

Contact block 60X 1NO+3NC		Contact block 60Y 2NO+2NC		Contact block 61E 3NO+1NC		Contact block 61G 3NO+1NC		Contact block 61H 2NO+2NC		Contact block 61M 3NO+1NC	
Contacts	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**	**Contacts**	**Pin no.**
A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2	A1-A2	1-2
NO	3-4	NC	3-4	NO	3-4	NO	3-4	NC	3-4	NO	3-4
NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6	NC	5-6
NC	7-8	NO	7-8	NO	7-8	NO	7-8	NO	7-8	NO	7-8
NC	9-10	NO	9-10	NO	9-10	NO	9-10	NO	9-10	NO	9-10
ground	11	ground	11	ground	11	ground	11	ground	11	ground	11

Release button

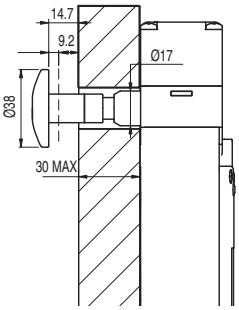
Article	Description
VF FG-LP15	Technopolymer release button for max. 15 mm wall thickness, supplied with screw
VF FG-LP30	Technopolymer release button for max. 30 mm wall thickness, supplied with screw
VF FG-LP40	Technopolymer release button for max. 40 mm wall thickness, supplied with screw
VF FG-LP60	Metal release button for max. 60 mm wall thickness, supplied with screw



Article	Description
VF FG-LPRG	Metal release button for wall thickness from 60 to 500 mm, supplied with 2 supports and 2 screws, without M10 threaded bar

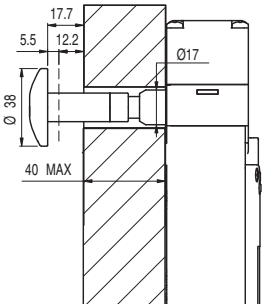
The M10 bar can be supplied in zinc-plated steel with 1 m length. Article: AC 8512.

Other release button lengths



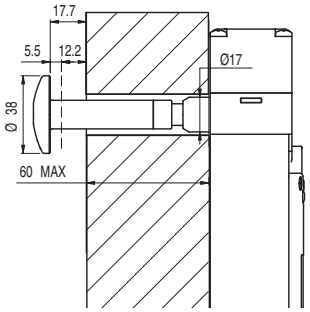
-LP30

For wall thickness
15 … 30 mm



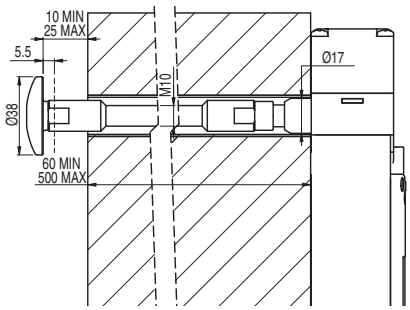
-LP40

For wall thickness
30 … 40 mm



-LP60

For wall thickness
40 … 60 mm



-LPRG

For wall thickness
60 … 500 mm

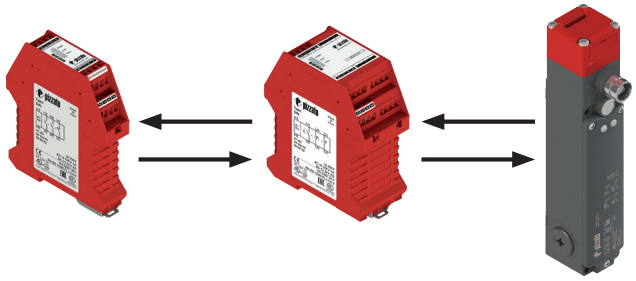
-LP30, -LP40, -LP60:
- Avoid bending and twisting the release button.
- To guarantee correct device operation, keep a distance of 10 … 25 mm between the wall and the release button.
- The actuation path of the release button must always be kept clean. Dirt or chemical products could compromise the device operation.
- Periodically check the device for proper function.

-LPRG:
- Avoid bending and twisting the release button.
- On the inside of the wall, use a bushing or a tube with an inner diameter of 18±0.5 mm as a guide.
- Guide in the M10 threaded rod in such as way so as to prevent bending. The M10 threaded rod is not supplied with the device.
- Use medium-strength thread locker to secure the threaded rod.
- Do not exceed an overall length of 500 mm between the release button and the switch.
- To guarantee correct device operation, keep a distance of 10 … 25 mm between the wall and the release button.
- The actuation path of the release button must always be kept clean. Dirt or chemical products could compromise the device operation.
- Periodically check the device for proper function.

Safety modules

Pizzato Elettrica offers its customers a wide range of safety modules. These were developed taking into consideration typical problems encountered during the monitoring of safety switches under actual operating conditions. Safety modules with instantaneous or delayed contacts for emergency circuits of type 0 (immediate stop) or type 1 (controlled stop).

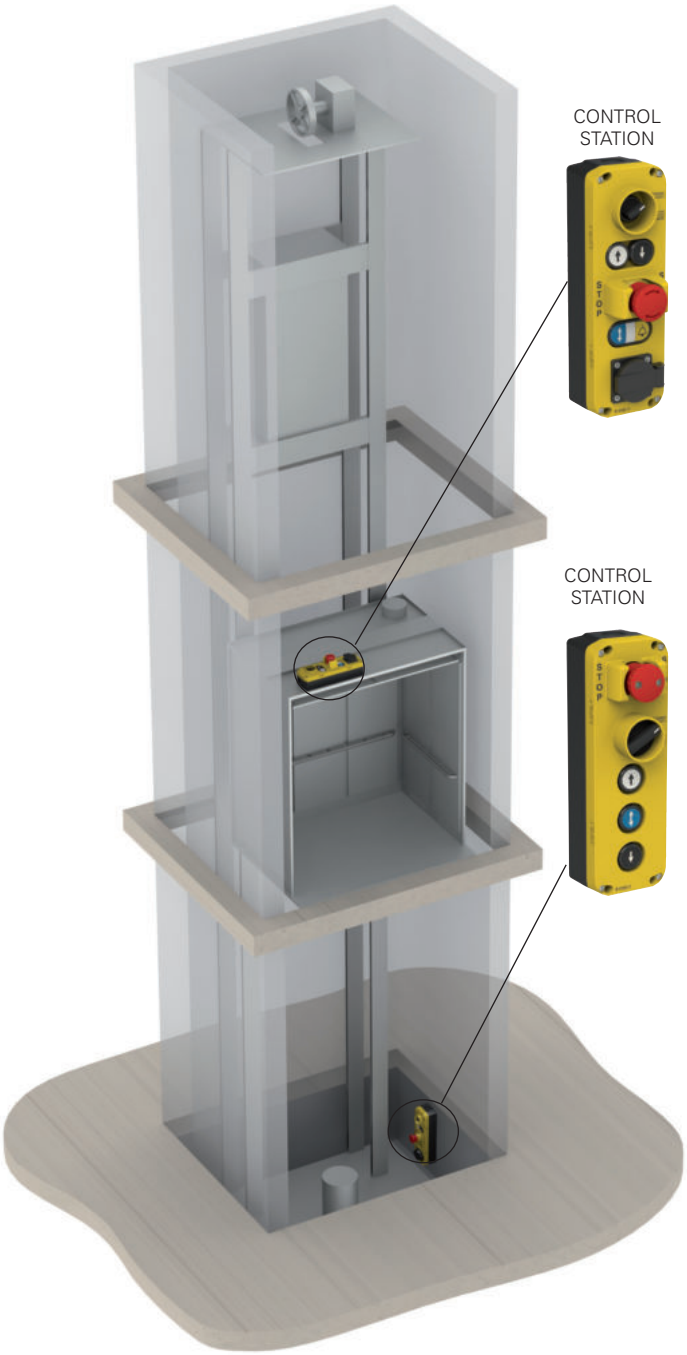
Safety switches with solenoid of the FG series can be connected to safety modules for the realization of safety circuits up to PL e acc. to EN ISO 13849. For technical information or wiring diagrams, please contact our technical office.



All values in the drawings are in mm

Accessories See page 149

EL AC series control stations



Introduction

The experience and knowledge acquired in decades of activity in the field of safety and automation enables Pizzato Elettrica to offer innovative solutions in other areas as well, combining maximum functionality and flexibility of use with clear lines and attention to detail.

The EL AC series lift control stations are designed for motion control of elevators during inspection and maintenance. The control stations are equipped with Pizzato Elettrica EROUND signalling and control devices.

In compliance with standards EN 81-20 and EN 81-50

International standards EN 81-20 and EN 81-50 set new, updated, technical and safety requirements in comparison to current standards. They are a significant development in terms of lift construction and installation.

The EL range of signalling and control stations is designed to meet all of the requirements included in these standards, to ensure that products are fully compliant.

Modularity

The number, type and location of holes made in the control stations to accommodate devices can be freely selected by the customer: The number of possible variants is very high.

This wide range of options is made possible by an innovative mould, made up of modular and interchangeable elements (patent pending). It allows free positioning of the various hole patterns and shapes required to accommodate devices. This modular mould allows the entire cover to be produced as a single piece in a single casting process.

Robustness

The protection of devices against impacts or kicks is guaranteed by both the laterally-hinged guard (in versions equipped with this feature), and by the use of recessed buttons, which do not protrude from the surface of the control station.

In addition, the use of robust guards for particularly bulky control switches, such as emergency stop buttons or selector switches, makes the product applicable in the toughest environments.

Station holder

The EL AC control stations can also be wall-mounted, using the dedicated VE SF series control station holder. This accessory is suitable for use in all situations where it is useful to be able to insert the station in a fixed and secure holder, when not in use by the operator.

The reinforced structure and fitted design of the holder ensure easy insertion of the control station, secure hold, and sturdy protection.

The snap-in attachment, felt when the station is fully inserted, provides feedback to the operator that the control station is held firmly in place, preventing poor positioning of the device that could allow it to slip from its retainer.

Changeover switches and selector switches

In the EL AC series control stations, a changeover switch can be installed instead of a selector on request.

The cam switches have a wide, ergonomic actuation knob, are available in versions with 2 or 3 stable positions, and can be internally wired to customer specifications, up to a maximum of 8 contacts.

The cover shapes designed to accommodate the switches provide a suitable enclosure with protection guard.

Equipped with a gasket below the knob, the switch achieves a protection degree of IP67.

Treadproof

The hinged lateral protective cover has a dual function: it protects devices from dust and dirt, and also from impacts or loads (up to a maximum of 100 kg).

Its special shape means that it is still easy to actuate the emergency stop button, while at the same time the protective function remains in place, even in the event of a distracted maintenance engineer accidentally treading on the control station.

The installed devices will remain unaffected, thanks to the shape of the protection, which allows the pressure exerted to be dispersed onto the robust structure of the control station.

Custom wiring

The control stations can be supplied wired, with the wiring implemented according to customer specifications; both in terms of cables used, and connectors.

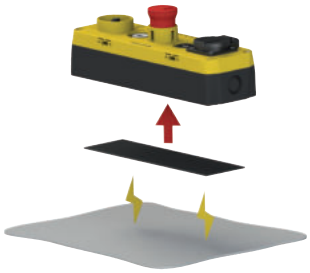
This additional adaptation to customer requirements means that the control stations are supplied ready for final installation.

Aesthetics

The shape of the lower part of the control station merges seamlessly with that of the protection; thus forming a single body, characterised by the absence of any protruding elements.

This allows the station to be used even when an attractive design is required, which is increasingly the case when the lift shaft is framed in glass and the cabin is thus visible.

Magnetic bases



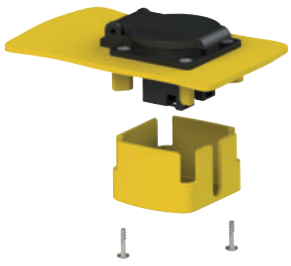
All EL AC series control stations can be supplied with a magnetic base, installed at the bottom of the housing; this allows the control stations to be anchored to walls and metallic surfaces, in such a way that they are removable, and no drilling is required.

The adhesive magnetic bases can also be retrofitted.

Electrical socket

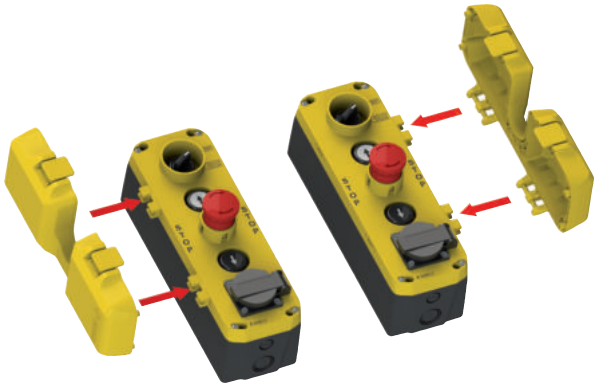
The interior parts of the socket are protected against accidental contact by a removable cover.

It is available in various versions to comply with different country-specific regulations.



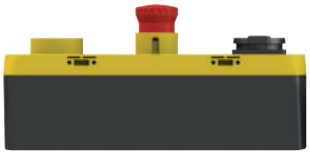
Protective cover available separately

In the control station versions with centrally positioned emergency stop button, with no protruding guards, the laterally hinged protective cover can be retrofitted, as it is available separately to the control station.



Two heights

The Pizzato Elettrica EL AC series control stations are available in both a high base version (2 levels of contacts) and a low base version (1 level of contacts). This significantly increases the number of application possibilities for the product itself.



2 levels of contacts

1 level of contacts

LASER engraving

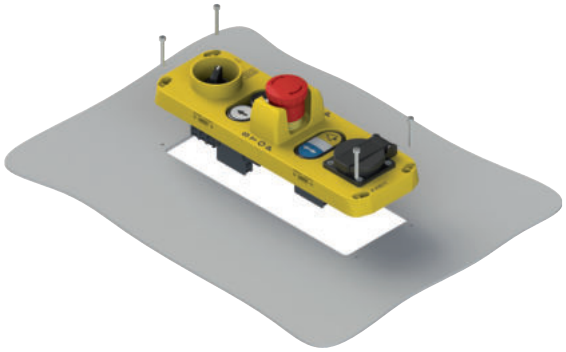
Pizzato Elettrica has introduced a new LASER engraving system for EL AC series control stations.

Thanks to this new system, which does not use pad printing or labels, engravings on the products are indelible and durable over time.

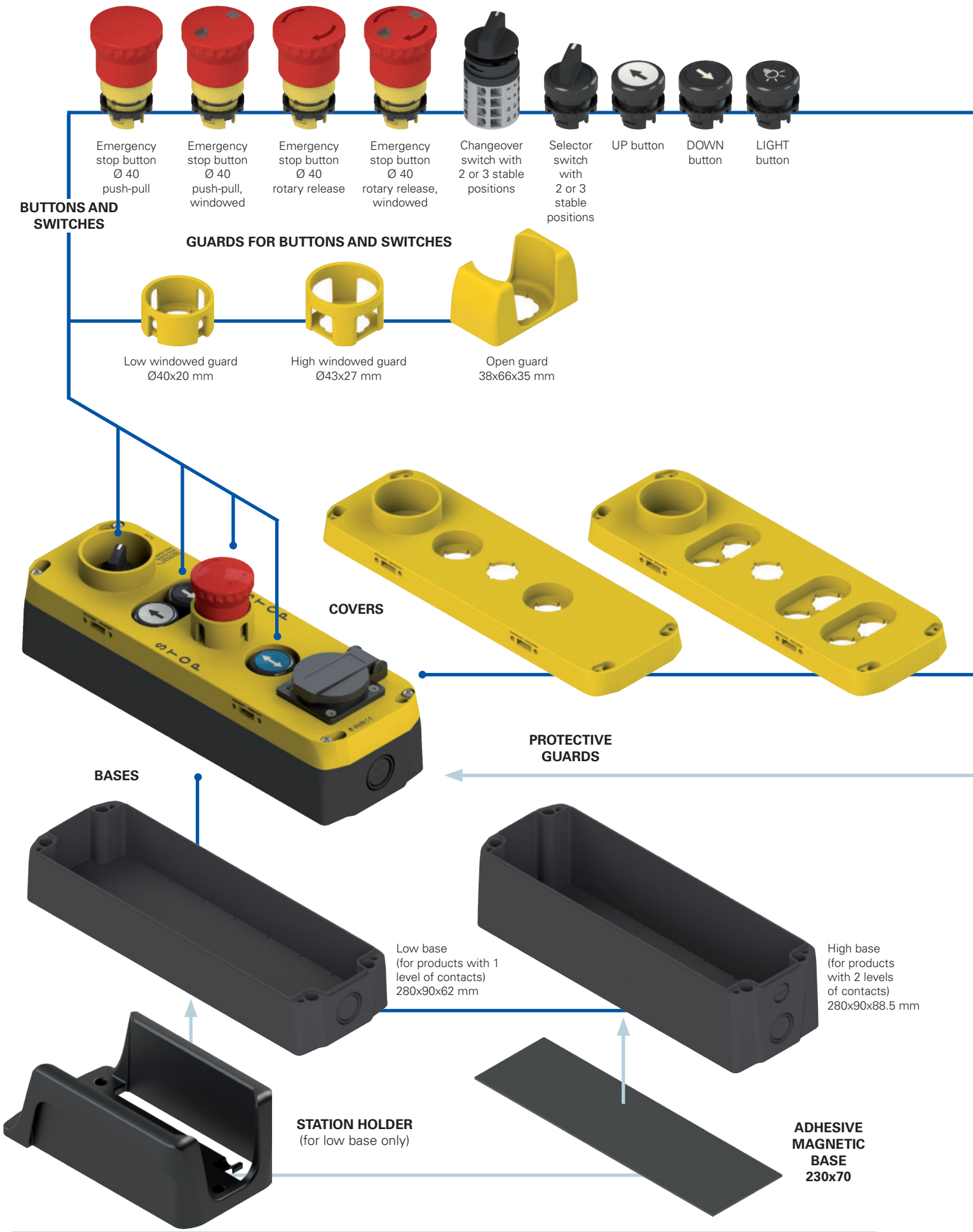
The laser engravings of the EL AC series control stations now include pictograms and icons compliant with the EN 81-20 standard; the control stations can also be customised using indicators, symbols, and logos, on customer request.

Cover without base

The EL AC control stations are also available as as covers without base. These are designed for cases where the control station is to be mounted directly on a wall or in switching cabinet.



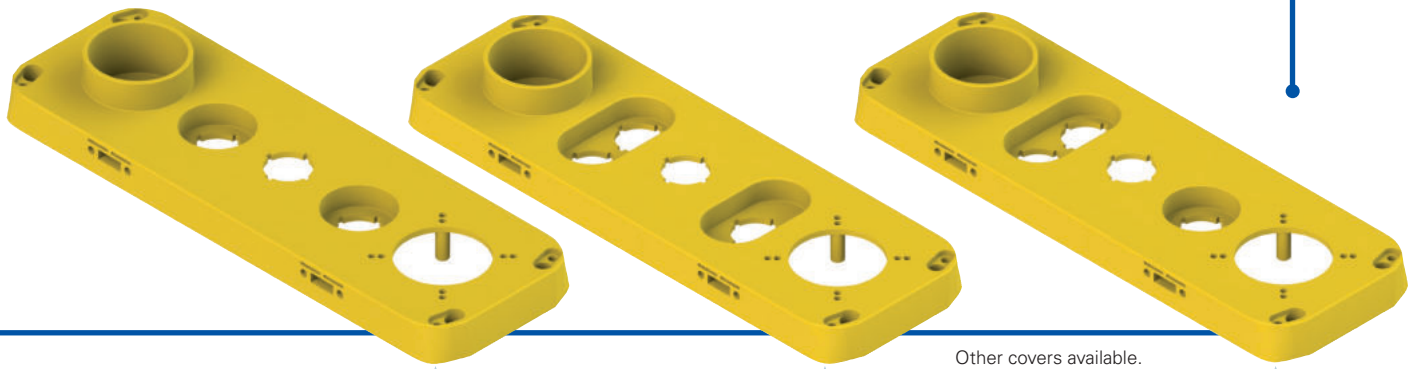
Selection diagram



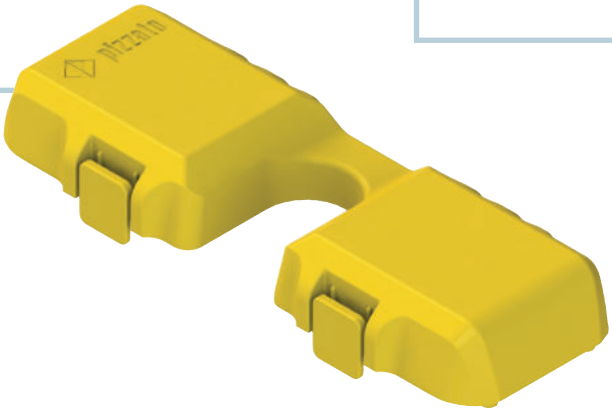
ALARM button | ENABLE button | Key selector switch, 2 positions | Double button UP DOWN | Double button ALARM LIGHT | Triple button ENABLE ALARM LIGHT | Triple button UP ALARM DOWN | Quadruple button | Indicator light | Buzzer | Luminous disc

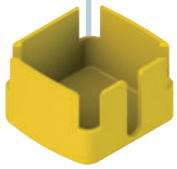
SOCKETS

China/Australia | Europe Schuko | USA | France | United Kingdom | Switzerland



Other covers available.
See page 95.





Internal socket cover

Product options

Sold separately as accessory

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

EL AC27010

Housing shape	
7	base 280 x 90 mm

Incremental configuration number	
010	configuration 010
011	configuration 011
012	configuration 012
...	...

EL AC series control stations

Main features

- Various configurations available
- With treadproof protective cover
- Protection degree IP54, IP65, or IP67
- Internal and external fixing
- Devices flush-mounted or protected by guard
- Customisable electrical socket

Housing quality marks:

EAC approval: RU C-IT.УТ03.B.00035/19

Contact block quality marks:

IMQ approval: CA02.04805
UL approval: E131787
CCC approval: 2021000305000106
EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing

Shockproof, self-extinguishing technopolymer cover. UV resistant and double insulated: ⧈

High base:	
2 lateral knock-out entries:	M20 - M25 - PG 13.5 - 1/2 NPT
2 lateral knock-out entries:	M16 - PG 11
6 knock-out entries at bottom:	M20 - PG 13.5 - 1/2 NPT
Low base:	
2 lateral knock-out entries:	M20 - M25 - PG 13.5 - 1/2 NPT
2 knock-out entries at bottom:	M20 - M25 - PG 13.5 - 1/2 NPT
Base colour:	Black RAL 9005
Cover colour:	Yellow RAL 1023 (standard) Black RAL 9005 (on request)
Protective cover colour:	Yellow RAL 1023 (standard) Black RAL 9005 (on request)
Material of the screws:	Zinc-plated steel; stainless steel available on request
Protection degree acc. to EN 60529:	IP54 (standard) IP65 (on request) IP67 (on request) with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Cover screw tightening torque:	1 … 1.4 Nm

In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, IEC 60947-5-5, EN 60947-5-5, EN 60204-1, EN ISO 14119, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14.

⚠ Installation for safety applications:

Use only contact blocks marked with the symbol ⊖. Always connect the safety circuit to the NC contacts (normally closed contacts: 1-2) as stated in standard EN 81-20 par. 5.11.2.2.1.

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on page 133.

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	8 kV
Pollution degree:	3

Utilization category

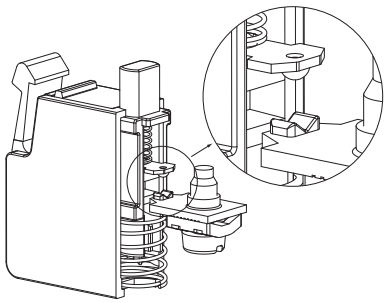
Alternating current: AC15 (50 … 60 Hz)

U_e (V)	24	48	120	250	400
I_e (A)	6	6	6	6	3

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

High-reliability self-cleaning contacts



"V-shape" self-cleaning contacts with quadruple contact point. This type of shape, thanks to the presence of the double contact point, makes it possible to drastically reduce the probability of contact commutation failure. In addition to this, it improves considerably the reliability in the presence of dust (patent pending).

Positive opening

NC contact block suitable for safety applications, with positive opening contacts in accordance with IEC 60947-5-1.

Features approved by UL

Electrical Ratings: A600 pilot duty (720 VA, 120-600 V ac)
Q300 pilot duty (69 VA, 125-250 V dc)

For contact block series E2 C provided with clamping screw terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 14-20 AWG, stranded or solid. The terminal tightening torque of 7.1 Lb In (0.8 Nm).

For contact block series E2 C provided with screw less type terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 16-24 AWG, stranded. These terminals are suitable also for stranded conductors prepared with ZMLF ferrules. Recommended stripping length: 8 mm.

Features approved by IMQ

Rated insulation voltage (U): 500 V
Conventional free air thermal current (I_{th}): 10 A
Thermal current inside housing (I_{the}): 10 A
Rated impulse withstand voltage (U_{imp}):
– Screw terminals or solder terminals 8 kV;
– Terminals without screw 6 kV.
Protection degree of the housing:
– Screw terminals or terminals without screw IP20;
– Solder terminals IP00;
– Screw terminals with dust protection cap, panel mounting only IP20.

Terminals: screw terminals, solder terminals, without screw
Utilization category: AC15
Operating voltage (U_e): 400 Vac (50/60 Hz)
Operating current (I_e): 3 A
Forms of the contact element: X, Y
Positive opening of contacts on contact blocks 01G, 01K
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

EL AC27029

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 3 stable positions, black, with guard	4 NO	NORMAL 0 INSPECTION
UP button flush, spring-return, white	2NO	
Emergency stop button Ø 40 rotary release, with guard	1NC	
DOWN button flush, spring-return, black	2NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27433

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed push-pull release, with guard	1NC	
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+4NC	NORMAL INSPECTION
UP button flush, spring-return, white	1NO+1NC	
ENABLE button flush, spring-return, blue	1NO	
DOWN button flush, spring-return, black	1NO+1NC	

EL AC27616

DEVICES	CONTACTS	DIAGRAM
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Emergency stop button Ø 40 rotary release, with guard	2NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27620

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 windowed push-pull release, with guard	1NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button projecting, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27615

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed push-pull release, with guard	1NC	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27617

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed rotary release, with guard	1NC	
ENABLE button flush, spring-return, blue	1NO	
UP button flush, spring-return, white	2NO	
LIGHT button flush, spring-return, black	1NO	
DOWN button flush, spring-return, black	2NO	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
Selector switch with short handle 3 positions, black, with guard, left spring-return, stable, right spring-return	2NO	0

EL AC27622

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed push-pull release, with guard	1NC	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
WHITE luminous disc 5 LUX steady white light	24 Vac/dc	LED
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	

EL AC27619

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Emergency stop button Ø 40 windowed push-pull release, with guard	2NC	
ENABLE button flush, spring-return, blue	2NO	
ALARM button flush, spring-return, yellow	1NO	

EL AC27618

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 windowed push-pull release, with guard	2NC	
LIGHT button flush, spring-return, black	1NO	
ENABLE button flush, spring-return, blue	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC series control stations

EL AC27025

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 rotary release, with guard	1NC	
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
ENABLE button flush, spring-return, blue	2NO	
Selector switch with short handle 3 positions, black, left spring-return, stable, right spring-return	2NO	0

EL AC27613

DEVICES	CONTACTS	DIAGRAM
Changeover switch Ø 42 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 windowed push-pull release, with guard	1NC	
ENABLE button flush, spring-return, blue	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27058

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Emergency stop button Ø 40 rotary release, with guard	1NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button projecting, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AC27048

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Emergency stop button Ø 40 rotary release, with guard	2NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

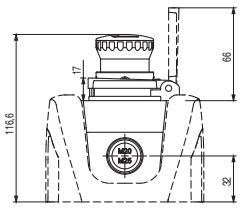
EL AC27623

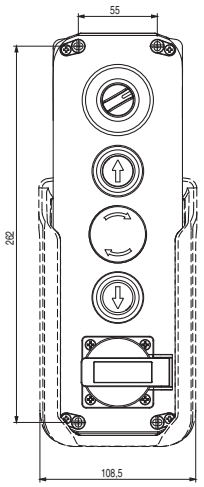
DEVICES	CONTACTS	DIAGRAM
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 rotary release, with guard	2NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

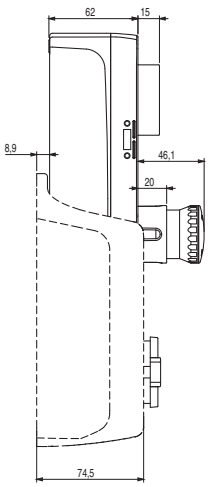
EL AC27614

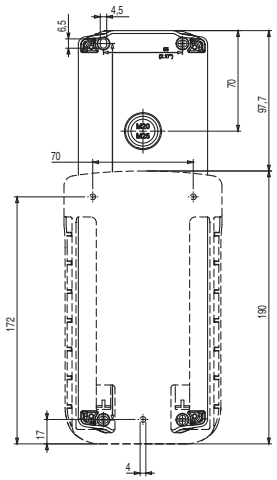
DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with guard	3NO+3NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Emergency stop button Ø 40 windowed push-pull release, with guard	2NC	
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

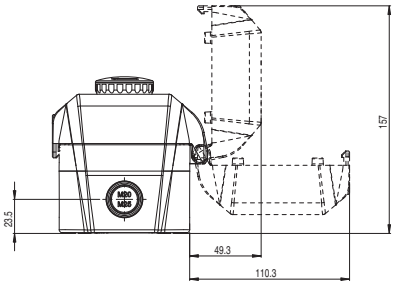
Housing dimensions for EL AC27••• series lift control stations with low base

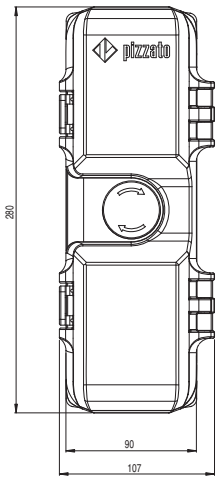


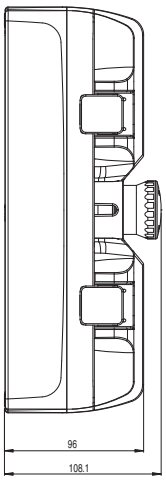


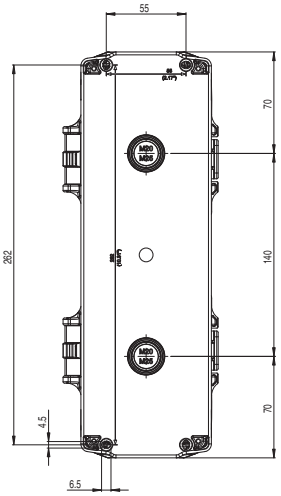






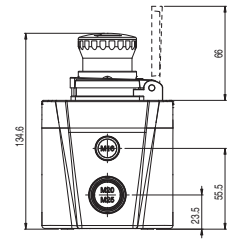


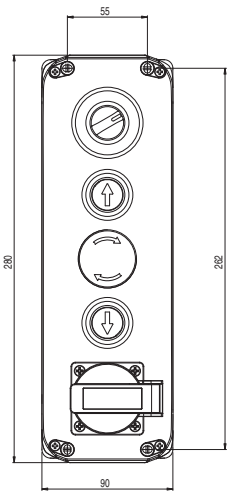


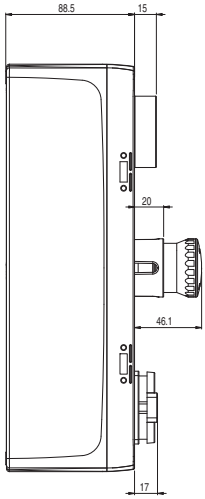


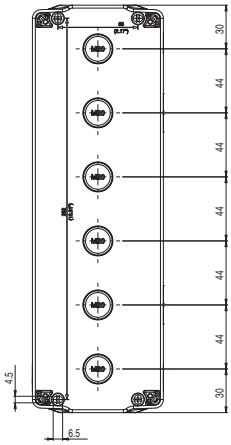
All values in the drawings are in mm

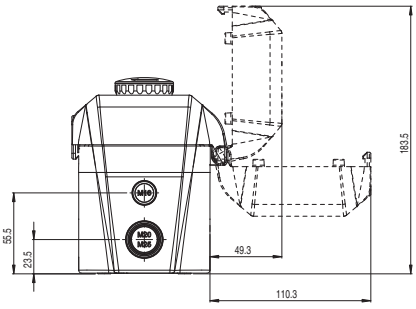
Housing dimensions for EL AC27••• series lift control stations with high base

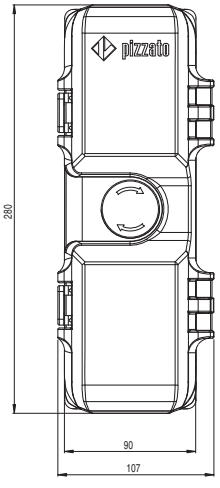


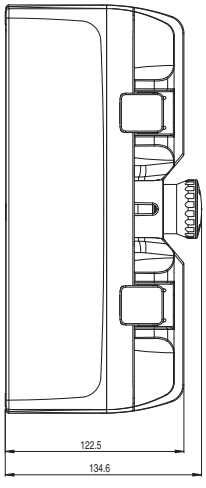


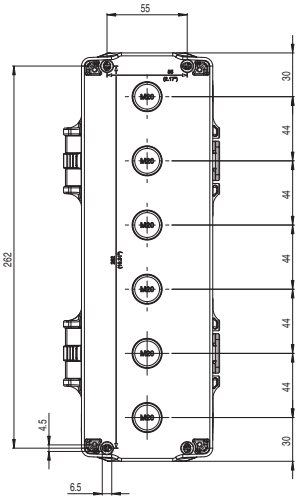












All values in the drawings are in mm

EL AC series cover selection table (selector switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

					
internal code	25001	25068	25074	25075	25076

					
internal code	25081	25103	25116	25125	25129

			
internal code	25146	25150	25154

EL AC series cover selection table (changeover switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

					
internal code	25138	25153	25162	25183	25190

EL AC series cover selection table (selector switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

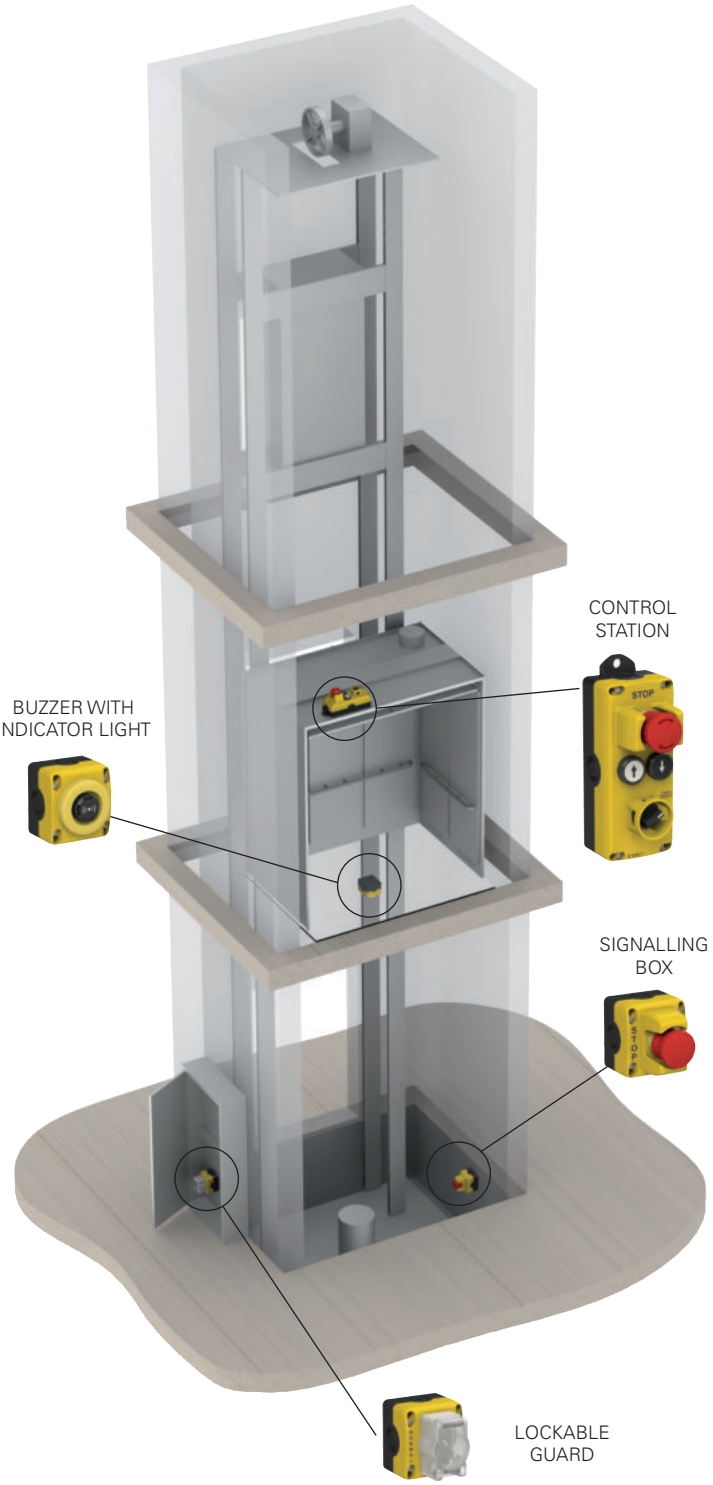
					
internal code	25060	25101	25118	25119	25120

EL AC series cover selection table (changeover switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

	
internal code	25163

EL AN series control stations



Introduction

The experience and knowledge acquired in decades of activity in the field of safety and automation enables Pizzato Elettrica to offer innovative solutions in other areas as well, combining maximum functionality and flexibility of use with clear lines and attention to detail.

The EL AN series control stations are equipped with Pizzato Elettrica EROUND signalling and control devices.

The EL AN series lift control stations are designed for motion control of elevators during inspection and maintenance.

In compliance with standards EN 81-20 and EN 81-50

International standards EN 81-20 and EN 81-50 set new, updated, technical and safety requirements in comparison to current standards. They are a significant development in terms of lift construction and installation.

The EL range of signalling and control stations is designed to meet all of the requirements included in these standards, to ensure that products are fully compliant.

Modularity

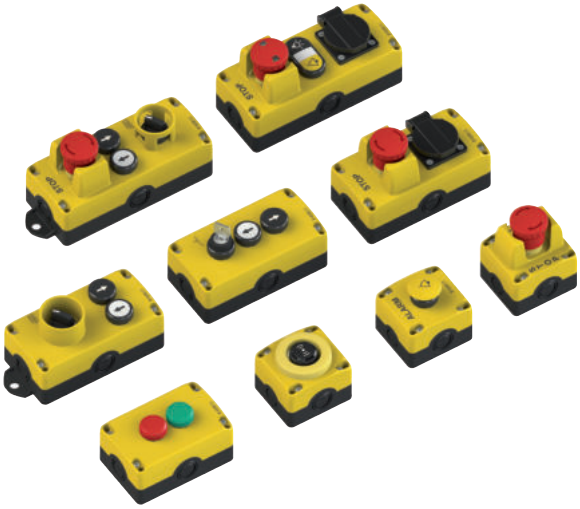
The number, type and location of holes made in the control stations to accommodate devices can be freely selected by the customer: The number of possible variants is very high.

This wide range of options is made possible by an innovative mould, made up of modular and interchangeable elements (patent pending). It allows free positioning of the various hole patterns and shapes required to accommodate devices. This modular mould allows the entire cover to be produced as a single solid piece in a single casting process.

Wide range

The range of available EL AN series control stations includes 4 different dimensions, and multiple configurations.

The shape of the new EL AN control stations has been designed with particular attention to detail; creating a pleasing aesthetic result.



Changeover switches and selector switches

In the EL AN series control stations, a cam switch can be installed instead of a selector switch on request.

The cam switches have a wide, ergonomic actuation knob, are available in versions with 2 or 3 stable positions, and can be internally wired to customer specifications, up to a maximum of 4 contacts.

The cover shapes designed to accommodate the switches provide a suitable enclosure with protection guard.

Equipped with a gasket below the knob, the switch achieves a protection degree of IP67.

Treadproof

The EL AN series of control stations – thanks to their specific design, and the choice of materials used – are particularly resistant, and able to withstand impacts and loads.

They are therefore suitable for use in heavy-duty applications.

Custom wiring

The control stations can be supplied wired, with the wiring implemented according to customer specifications; both in terms of cables used, and connectors.

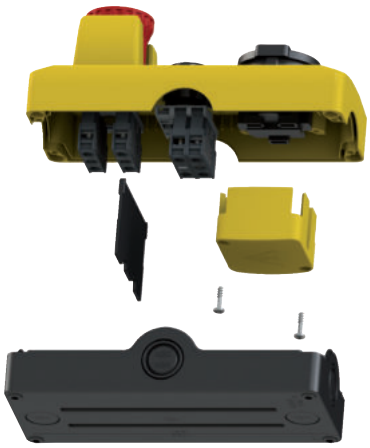
This additional adaptation to customer requirements means that the control stations are supplied ready for final installation.

Electrical socket

The interior parts of the socket are protected against accidental contact by a removable cover.

A separator plate is available (which can be installed in various positions), which is used to separate control station parts with different voltages.

The electrical socket is also always installed on the top of the control station, and never on its side; this makes it easier to use, and its position easier to see. It is available in various versions to comply with different country-specific regulations.



Padlockable protection for bypass device

Paragraph 5.12.1.8 of UN i.e. EN 81-20:2014 stipulates use of a bypass device, to allow maintenance of the contacts of landing and cabin doors, and of door locking devices. This device must be placed in the control or emergency panel, and must be a switch protected against unintended use through the use of mechanically mobile means.

The Pizzato bypass device provides a solid guard with a movable cover, which, if needed, can be locked in a closed position by inserting one or two padlocks, or sealed.

To facilitate operations, the cover also has two shutter-release positions: fully open and fully closed.

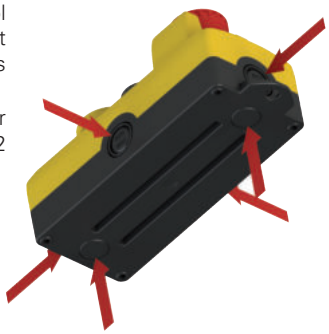
The cover therefore will not open inadvertently, but it must in any case be manually disconnected.

The lockable Pizzato guard can be installed on EL series control stations or on any electrical panel that has the appropriate holes for the fixing screws, as shown.

Conduit entries

The base of the EL AN control station has several knock-out entries for cable routing. This ensures easy wiring.

The control stations have four entries at the sides, and 2 entries on the bottom.



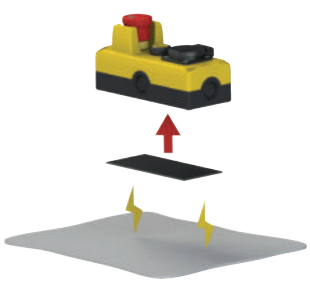
LASER engraving

Pizzato Elettrica has introduced a new LASER engraving system for EL AN series control stations.

Thanks to this new system, which does not use pad printing or labels, engravings on the products are indelible and durable over time.

The laser engravings of the EL AN series control stations now include pictograms and icons compliant with the EN 81-20 standard; the control stations can also be customised using indicators, symbols, and logos, on customer request.

Magnetic bases



All EL AN series control stations can be supplied with a magnetic base, installed at the bottom of the housing; this allows the control stations to be anchored to walls and metallic surfaces, in such a way that they are removable, and no drilling is required.

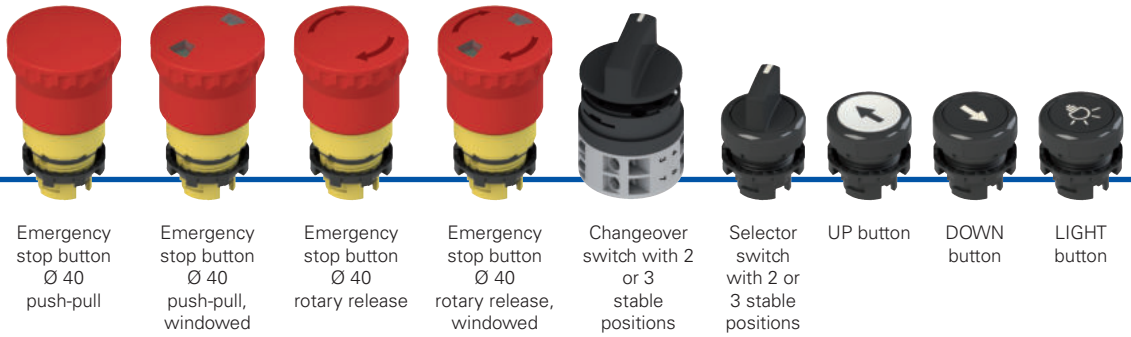
The adhesive magnetic bases can also be retrofitted.

Visual and audible signals

All devices required for compliance with the provisions of standard EN 81-20, in terms of visual and audible signals inside the lift shaft, are available.

All EL series control and signalling stations can therefore be equipped with white lights, with an intensity of 5 LUX at a distance of 1 metre; flashing yellow lights, and buzzers with continuous or pulsed tone, with a minimum sound intensity of 55 dB at a distance of 1 metre.

Selection diagram



Emergency stop button Ø 40 push-pull

Emergency stop button Ø 40 push-pull, windowed

Emergency stop button Ø 40 rotary release

Emergency stop button Ø 40 rotary release, windowed

Changeover switch with 2 or 3 stable positions

Selector switch with 2 or 3 stable positions

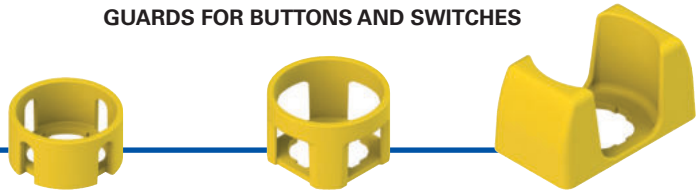
UP button

DOWN button

LIGHT button

BUTTONS AND SWITCHES

GUARDS FOR BUTTONS AND SWITCHES

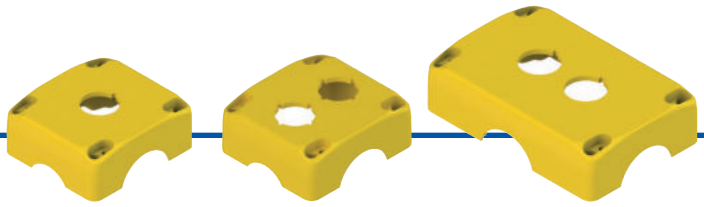


Low windowed guard Ø40x20 mm

High windowed guard Ø43x27 mm

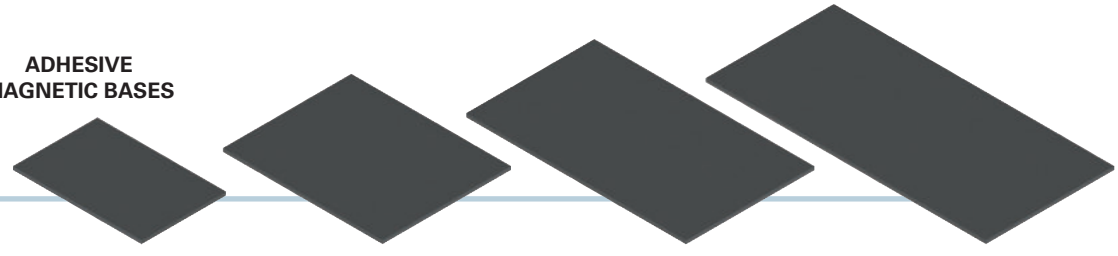
Open guard 38x66x35 mm

COVERS



BASES

ADHESIVE MAGNETIC BASES

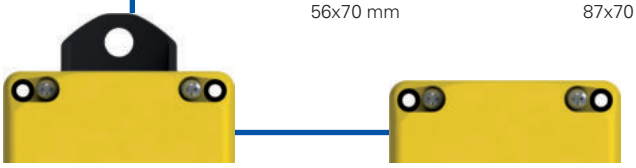


56x70 mm

87x70 mm

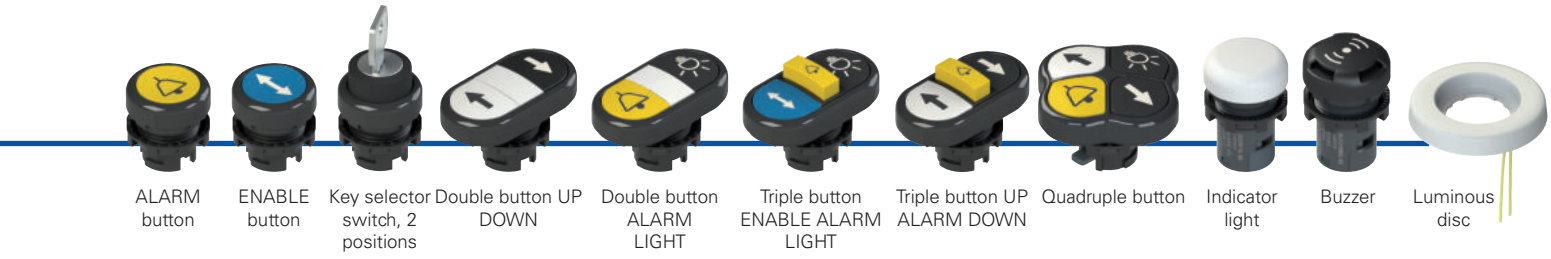
120x70 mm

153x70 mm



Base with hook

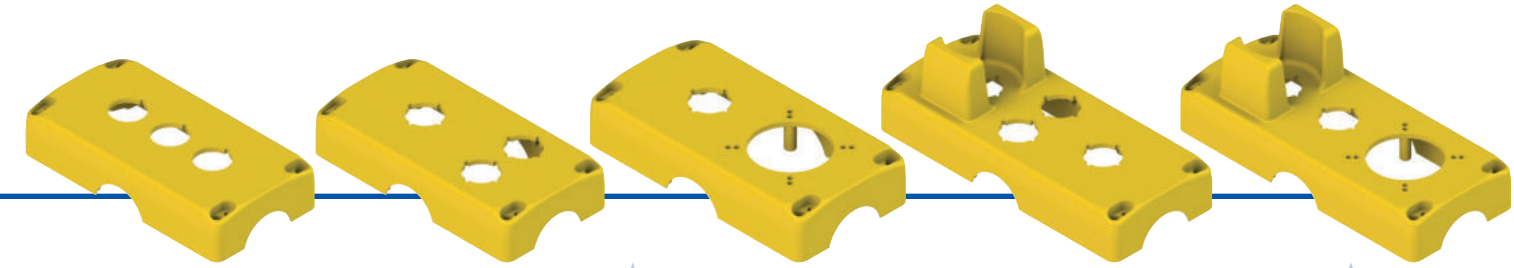
Base without hook



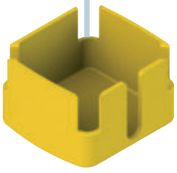
ALARM button | ENABLE button | Key selector switch, 2 positions | Double button UP DOWN | Double button ALARM LIGHT | Triple button ENABLE ALARM LIGHT | Triple button UP ALARM DOWN | Quadruple button | Indicator light | Buzzer | Luminous disc

SOCKETS

China/Australia | Europe Schuko | USA | France | United Kingdom | Switzerland



Other covers available. See page 113.



Internal socket cover

Product options

Sold separately as accessory

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

EL AN23000

Housing shape	
1	72x80h56 mm
2	120x80h56 mm
3	153x80h56 mm
4	186x80h56 mm

Incremental configuration number	
000	configuration 000
001	configuration 001
...	...

EL AN series control stations

Main features
- Various configurations available
- Protection degree up to IP69K
- Guards for buttons and switches
- Internal and external fixing
- Customisable electrical socket
- Captive screws

Housing quality marks:

EAC approval: RU C-IT.УТ03.B.00035/19

Contact block quality marks:

IMQ approval: CA02.04805
UL approval: E131787
CCC approval: 2021000305000106
EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing
Shockproof, self-extinguishing technopolymer cover. UV resistant and double insulated: ⧈

Single element housing:	
2 lateral knock-out entries:	M20 - M25 - PG13.5 - 1/2 NPT
2 lateral knock-out entries:	M20 - PG13.5 - 1/2 NPT
2 knock-out entries at bottom:	M16 - PG11
Housing with 2 or more elements:	
4 lateral knock-out entries:	M20 - M25 - PG 13.5 - 1/2 NPT
2 knock-out entries at bottom:	M20 - PG 13.5 - 1/2 NPT
Base colour:	Black RAL 9005
Cover colour:	Yellow RAL 1023
Material of the screws:	Zinc-plated steel; stainless steel available on request
Protection degree acc. to EN 60529:	IP54 (standard) IP65 (on request) IP67 (on request)
Protection degree acc. to ISO 20653:	IP69K (on request) with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Cover screw tightening torque:	1 … 1.4 Nm

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60947-5-5, EN 60947-5-5, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14

⚠ **Installation for safety applications:**
Use only contact blocks marked with the symbol ⊖. Always connect the safety circuit to the NC contacts (normally closed contacts: 1-2) as stated in standard EN 81-20 par. 5.11.2.2.1.

Compliance with the requirements of:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on page 133.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	8 kV
Pollution degree:	3

Utilization category

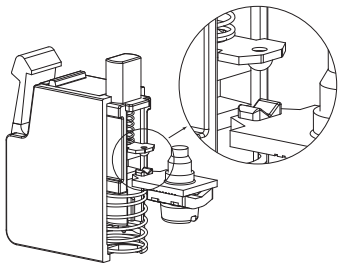
Alternating current: AC15 (50 … 60 Hz)

U_e (V)	24	48	120	250	400
I_e (A)	6	6	6	6	3

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

High-reliability self-cleaning contacts



"V-shape" self-cleaning contacts with quadruple contact point. This type of shape, thanks to the presence of the double contact point, makes it possible to drastically reduce the probability of contact commutation failure. In addition to this, it improves considerably the reliability in the presence of dust (patent pending).

Positive opening

NC contact block suitable for safety applications, with positive opening contacts in accordance with IEC 60947-5-1.

Features approved by UL

Electrical Ratings: A600 pilot duty (720 VA, 120-600 V ac)
Q300 pilot duty (69 VA, 125-250 V dc)

For contact block series E2 C provided with clamping screw terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 14-20 AWG, stranded or solid. The terminal tightening torque of 7.1 Lb In (0.8 Nm).

For contact block series E2 C provided with screw less type terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 16-24 AWG, stranded. These terminals are suitable also for stranded conductors prepared with ZMLF ferrules. Recommended stripping length: 8 mm.

Features approved by IMQ

Rated insulation voltage (U_i): 500 V
Conventional free air thermal current (I_{th}): 10 A
Thermal current inside housing (I_{the}): 10 A
Rated impulse withstand voltage (U_{imp}):
– Screw terminals or solder terminals 8 kV;
– Terminals without screw 6 kV.
Protection degree of the housing:
– Screw terminals or terminals without screw IP20;
– Solder terminals IP00;
– Screw terminals with dust protection cap, panel mounting only IP20.

Terminals: screw terminals, solder terminals, without screw
Utilization category: AC15
Operating voltage (U_e): 400 Vac (50/60 Hz)
Operating current (I_e): 3 A
Forms of the contact element: X, Y
Positive opening of contacts on contact blocks 01G, 01K
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

EL AN21223

	DEVICES	CONTACTS	DIAGRAM
STOP STOP	**Emergency stop button Ø 40** windowed push-pull release, with guard	1NC	

EL AN21224

	DEVICES	CONTACTS	DIAGRAM
STOP STOP	**Emergency stop button Ø 40** rotary release, with guard	1NC	

EL AN21256

	DEVICES	CONTACTS	DIAGRAM
STOP STOP	**Emergency stop button Ø 40** push-pull release, with guard	1NC	

EL AN21257

	DEVICES	CONTACTS	DIAGRAM
STOP STOP	**Emergency stop button Ø 40** windowed rotary release, with guard	1NC	

EL AN21365

	DEVICES	CONTACTS	DIAGRAM
ALARM	**ALARM mushroom button Ø 36** spring-return, yellow	1NO	

EL AN series control stations

EL AN21324

DEVICES	CONTACTS	DIAGRAM
LIGHT button flush, spring-return, black	1NO	

EL AN21369

DEVICES	CONTACTS	DIAGRAM
WHITE luminous disc 5 LUX steady white light	24 Vac/dc	LED
Black closing cap	/	

EL AN21366

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black, with lockable guard for bypass	1NO	NORMAL BYPASS

EL AN21348

DEVICES	CONTACTS	DIAGRAM
YELLOW luminous disc blinking yellow light	24 Vac/dc	LED
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	

EL AN21440

DEVICES	CONTACTS	DIAGRAM
UP button flush, spring-return, white	1NO	
DOWN button flush, spring-return, black	1NO	

EL AN21441

	DEVICES	CONTACTS	DIAGRAM
	Monolithic indicator light Ø 30 colour: red	Red LED 12 ... 30 Vac/dc	LED
	Monolithic indicator light Ø 30 colour: green	Green LED 12 ... 30 Vac/dc	LED

EL AN21439

	DEVICES	CONTACTS	DIAGRAM
	Schuko socket 16 A 250 Vac	/	

EL AN21442

	DEVICES	CONTACTS	DIAGRAM
	Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
	Indicator light Ø 30 red, blinking	Red LED 12 ... 30 Vac/dc	LED

EL AN31435

	DEVICES	CONTACTS	DIAGRAM
	YELLOW luminous cover continuous/blinking yellow light	24 Vdc	LED
	Buzzer continuous/intermittent tone		
	ALARM button flush, spring-return, yellow	1NO	

For all details on this housing, see page 109.
For 12 Vdc versions contact our technical department.

EL AN22070

	DEVICES	CONTACTS	DIAGRAM
	Selector switch with short handle 2 stable positions, black	1NO+1NC	0 1
	UP button flush, spring-return, white	1NO	
	DOWN button flush, spring-return, black	1NO	

EL AN23040

	DEVICES	CONTACTS	DIAGRAM
STOP	**Emergency stop button Ø 40** rotary release	1NC	
	UP button flush, spring-return, white	1NO	
	DOWN button flush, spring-return, black	1NO	

EL AN23072

	DEVICES	CONTACTS	DIAGRAM
STOP	**Emergency stop button Ø 40** windowed push-pull release	1NC	
	LIGHT button flush, spring-return, yellow	1NO	

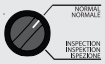
EL AN23023

	DEVICES	CONTACTS	DIAGRAM
STOP	**Emergency stop button Ø 40** rotary release, with guard	1NC	
	Schuko socket 16 A 250 Vac with internal fuse	/	

EL AN23118

	DEVICES	CONTACTS	DIAGRAM
STOP STOP	**Emergency stop button Ø 40** windowed push-pull release, with guard	1NC	
	Selector switch with short handle 2 stable positions, black, with guard	1NO+1NC	NORMAL INSPECTION
	UP button flush, spring-return, white	2NO	
	DOWN button flush, spring-return, black	2NO	

EL AN23052

	DEVICES	CONTACTS	DIAGRAM
	**Selector switch with short handle** 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
	**UP button** flush, spring-return, white	1NO	
	**DOWN button** flush, spring-return, black	1NO	

EL AN23116

	DEVICES	CONTACTS	DIAGRAM
	**Buzzer, continuous alarm** perforated lens, black	24 Vac/dc	
	YELLOW luminous disc blinking yellow light	24 Vac/dc	
	**ALARM button** flush, spring-return, yellow	1NO	

EL AN23117

	DEVICES	CONTACTS	DIAGRAM
	**Buzzer, continuous alarm** perforated lens, black	24 Vac/dc	
	**Monolithic indicator light Ø 30** colour: red	Red LED 12 ... 30 Vac/dc	
	**ALARM button** flush, spring-return, yellow	1NO	

EL AN23119

	DEVICES	CONTACTS	DIAGRAM
	**WHITE luminous disc** 5 LUX steady white light	24 Vac/dc	
	ALARM button flush, spring-return, yellow	1NO	
	**Schuko socket 16 A 250 Vac** with internal fuse	/	

EL AN24025

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 windowed push-pull release, with guard	1NC	
Illuminated LIGHT button flush, spring-return, yellow	1NO White LED 12 ... 30 Vac/dc	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AN24026

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 windowed push-pull release, with guard	1NC	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AN24028

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 windowed push-pull release, with guard	1NC	
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AN24111

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 rotary release, with guard	1NC	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION

EL AN24201

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 push-pull release, with guard	1NC	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION

EL AN24202

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 push-pull release, with guard	1NC	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
Selector switch with short handle 2 stable positions, black, with guard	2NO+3NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	

EL AN24203

DEVICES	CONTACTS	DIAGRAM
Selector switch with short handle 2 stable positions, black	1NO+1NC	0 1
Selector switch with short handle 2 stable positions, red	1NO+1NC	0 1
Monolithic indicator light Ø 30 colour: green	Green LED 12 ... 30 Vac/ dc	LED
UP button flush, spring-return, white	1NO	
DOWN button flush, spring-return, black	1NO	

EL AN24204

DEVICES	CONTACTS	DIAGRAM
WHITE luminous disc 5 LUX steady white light	24 Vac/dc	LED
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
Monolithic indicator light Ø 30 colour: red	Red LED 12 ... 30 Vac/ dc	LED
Monolithic indicator light Ø 30 colour: green	Green LED 12 ... 30 Vac/ dc	LED
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AN series control stations with visual and audible signalling functions

Power supply electrical data

Rated operating voltage Ue:	12 Vdc or 24 Vdc
Tolerance of the operating voltage:	±20 % of Ue
Operating current at Ue voltage:	80 mA (12 Vdc version) 50 mA (24 Vdc version)

Description

The series EL AN control station for lifts in the 1-unit version is also available with visual and audible signalling functions, in order to meet the requirements of the EN 81-20 and EN 81-50 standards, which prescribe the presence of an acoustic signal and flashing light beneath the cabin. Using the terminal block located inside the housing, the visual indicator can be configured as continuous light or flashing light, and the audible indicator can be set as a steady tone or intermittent tone.
The control station is available as 12 Vdc or 24 Vdc version.

Base with installation flange

The base of the EL AN series control station equipped with visual and audible signalling functions is designed with mounting flanges with a hole spacing of 100x70 mm. This design allows additional options for a quick and flexible installation.

Indicator lights

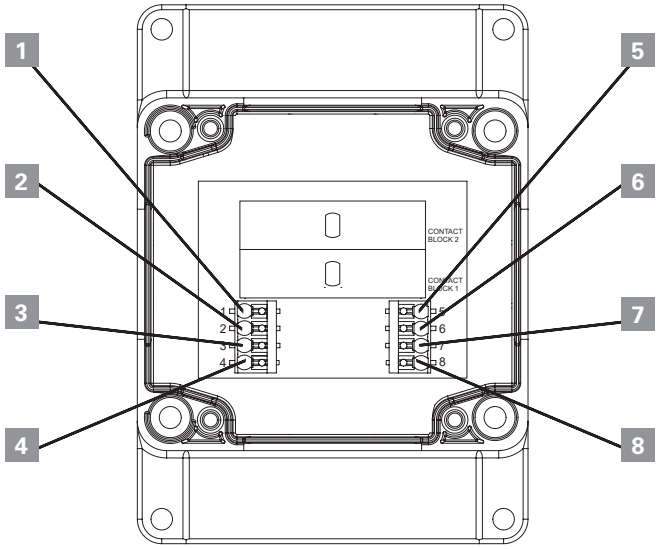
The illuminated cover is equipped with LEDs that ensure highly visible illumination from any viewing direction, including from the side.

Buzzers

The control station guarantees a minimum sound intensity of 55 dB at a distance of 1 metre, in accordance with the EN 81-20 and EN 81-50 standard. The position of the buzzer inside the housing ensures its protection degree and also keeps the system protected from external influences.

Connections and configuration

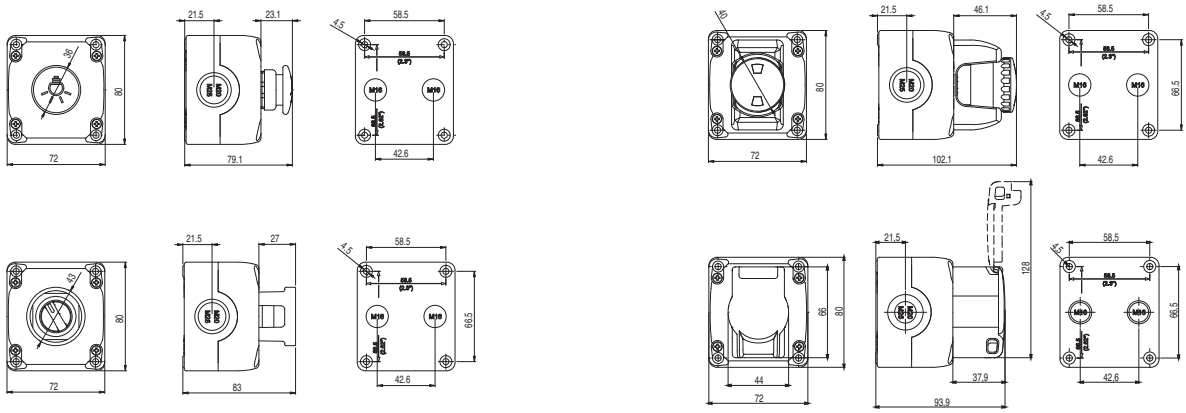
Pin 2 Contact 1	1	5	Power supply for blinking light and buzzer (if available) with intermittent tone (a)
Power supply for continuous light and buzzer (if available) with continuous tone (a)	2	6	Pin 2 Contact 2
Pin 1 Contact 2	3	7	Pin 1 Contact 1
Not used	4	8	Supply input 0 Vdc



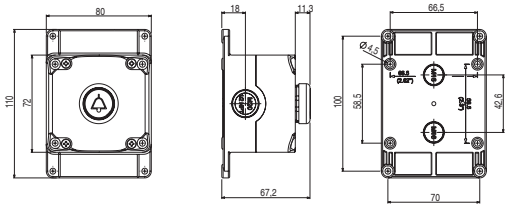
(a) for versions without buzzer please contact our technical department.

Notes

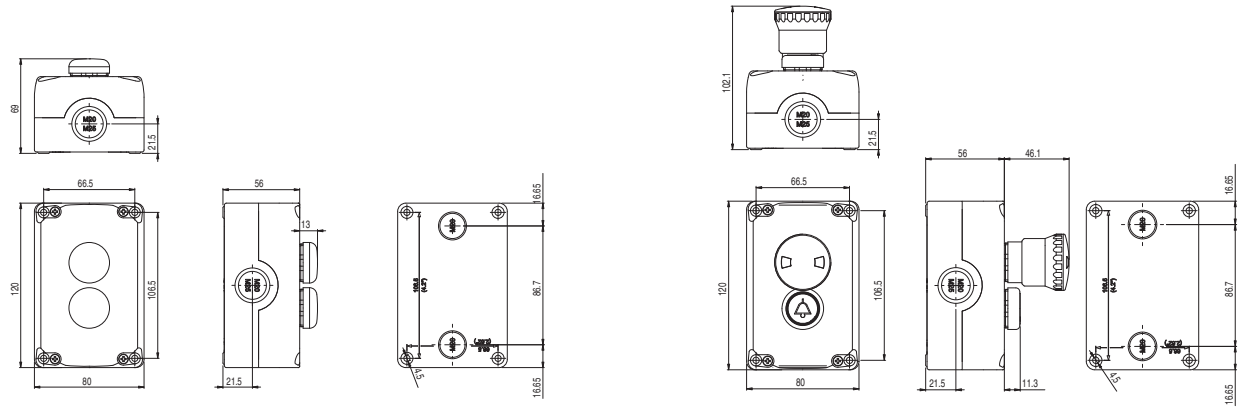
Housing dimensions for EL AN 21••• series lift control stations



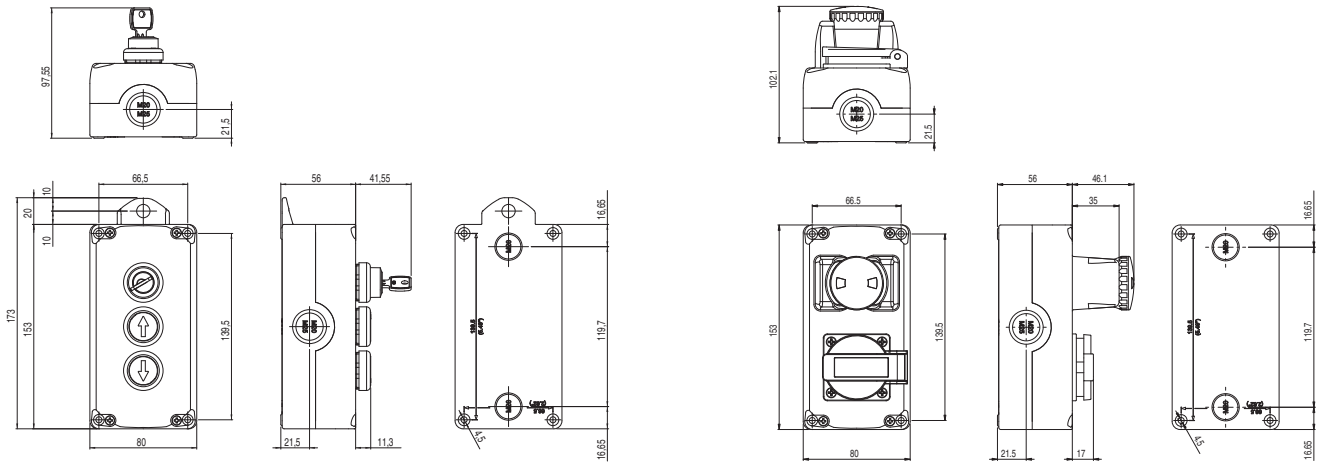
Housing dimensions for EL AN 31••• series lift control stations



Housing dimensions for EL AN 22••• series lift control stations

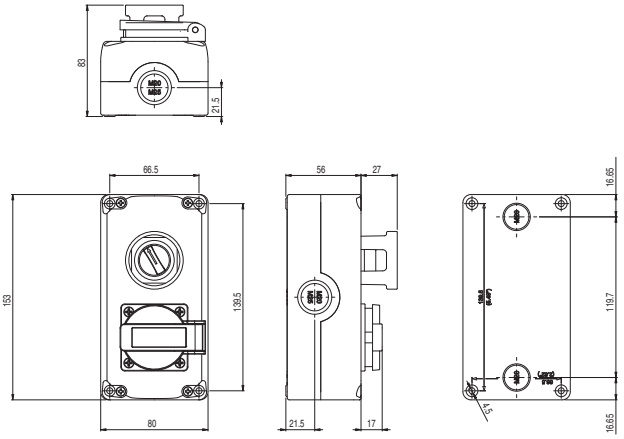


Housing dimensions for EL AN 23••• series lift control stations

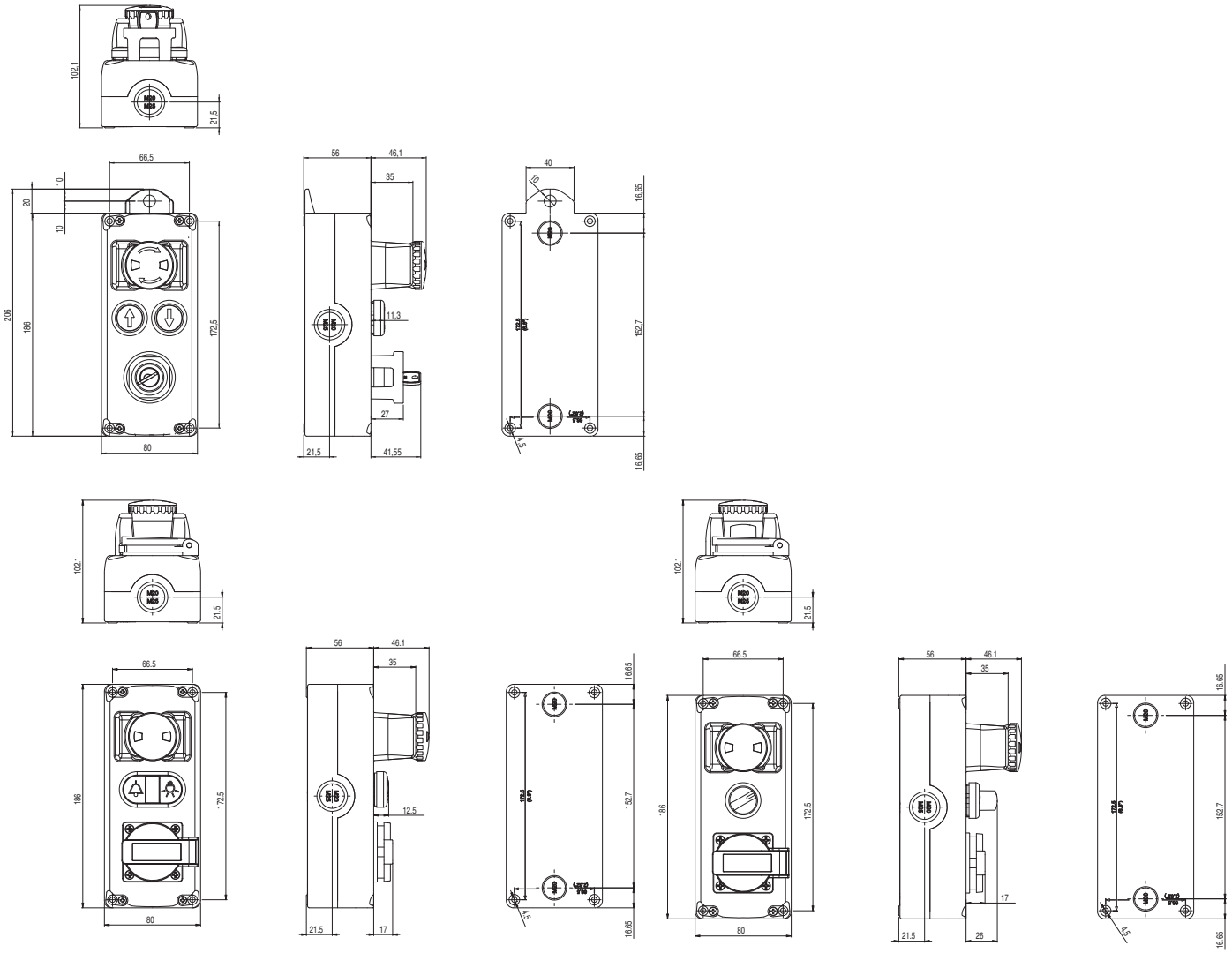


All values in the drawings are in mm

Housing dimensions for EL AN 23••• series lift control stations



Housing dimensions for EL AN 24••• series lift control stations



All values in the drawings are in mm

EL AN 21••• series cover selection table

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

				
internal code	24151	24159	24195	24196

EL AN 22••• series cover selection table

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

		
internal code	24201	24210

EL AN 23••• series cover selection table (selector versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

					
internal code	24251	24258	24260	24262	24263

EL AN 24••• series cover selection table (selector versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

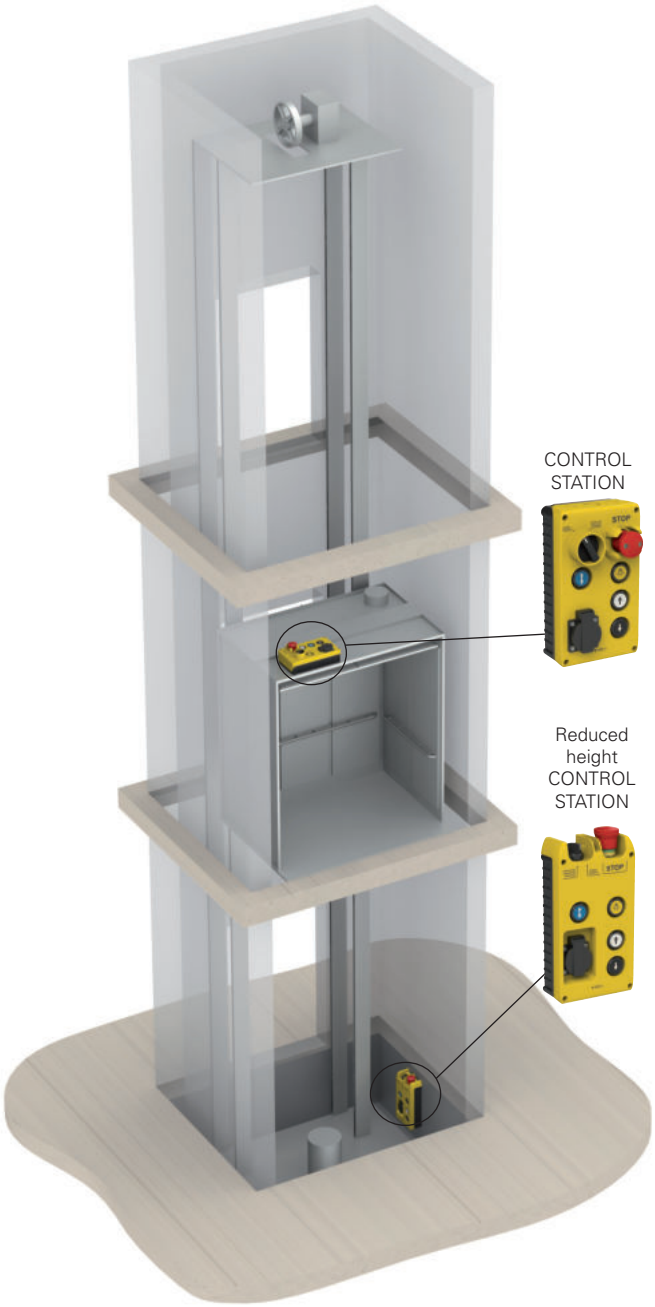
					
internal code	24301	24310	24313	24315	24316

	
internal code	24326

EL AN 24••• series cover selection table (changeover switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

	
internal code	24317



Introduction

The experience and knowledge acquired in decades of activity in the field of safety and automation enables Pizzato Elettrica to offer innovative solutions in other areas as well, combining maximum functionality and flexibility of use with clear lines and attention to detail.

The EL AD series control stations are equipped with Pizzato Elettrica EROUND signalling and control devices.

The EL AD series lift control stations are designed for motion control of elevators during inspection and maintenance.

In compliance with standards EN 81-20 and EN 81-50

International standards EN 81-20 and EN 81-50 set new, updated, technical and safety requirements in comparison to current standards. They are a significant development in terms of lift construction and installation.

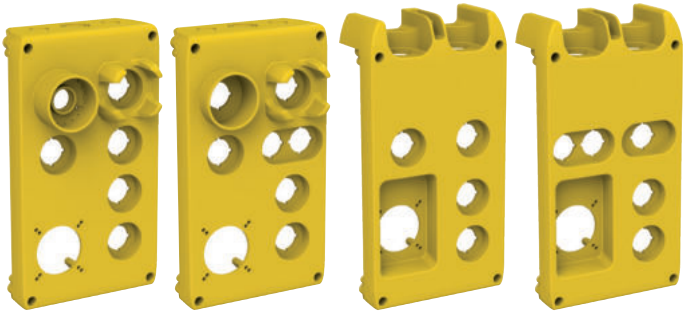
The EL range of control stations is designed to meet all of the requirements included in these standards, to ensure that products are fully compliant.

Reduced height

Continuous optimisation of the space available in the lift shaft has led to the need for control stations with reduced height.

Pizzato meets these requirements by offering the innovative vertical variant of the new EL AD series housing: with a maximum overall height of 60 mm, contact blocks of standard height can be used, as well as recessed devices, including sockets, emergency stop buttons and generously dimensioned selector switches with robust protective guards.

Modularity



The number, type and location of holes made in the control stations to accommodate devices can be freely selected by the customer: The number of possible variants is very high.

This wide range of options is made possible by an innovative mould, made up of modular and interchangeable elements (patent pending). It allows free positioning of the various hole patterns and shapes required to accommodate devices. This modular mould allows the entire cover to be produced as a single solid piece in a single casting process.

Robustness

The protection of devices against impacts or kicks is guaranteed by both the solid structure of the station – which is made from robust, extra thick materials – and by the use of buttons which are integrated and therefore do not protrude from the surface. In addition, the use of robust guards for particularly bulky control switches, such as emergency stop buttons or selector switches, makes the product applicable in the toughest environments.

In the 60mm reduced height version, two solid guards have also been incorporated, designed to protect the two devices mounted on the top.

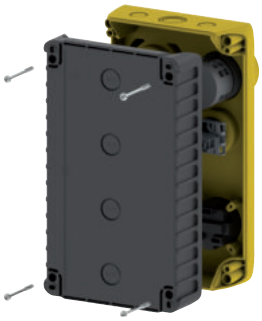
Ease of wiring

The design of the product offers many technical and practical advantages, the first of which is the ease of cabling: in addition to the four entries for cables on the base, there are up to six entries on the cover.
Having the entries directly on the cover means having everything positioned on the same side of the station, thus simplifying and speeding up the cabling and closing of the control station.

Custom wiring

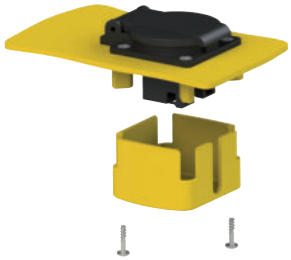
The control stations can be supplied wired, with the wiring implemented according to customer specifications; both in terms of cables used, and connectors.
This additional adaptation to customer requirements means that the control stations are supplied ready for final installation.

Rear fixing of the cover



The cover fixing screws on the base are positioned obscured from view, behind the station; this in turn means that the station can only be opened once removed from the wall where it is fixed – making tampering more difficult.

Electrical socket



The interior parts of the socket are protected against accidental contact by a removable cover.
It is available in various versions to comply with different country-specific regulations.

Changeover switches and selector switches

In the EL AD series control stations, a cam switch can be installed instead of a selector switch on request.
The cam switches have a wide, ergonomic actuation knob, are available in versions with 2 or 3 stable positions, and can be internally wired to customer specifications, up to a maximum of 6 contacts.
The cover shapes designed to accommodate the switches provide a suitable enclosure with protection guard.
Equipped with a gasket below the knob, the switch achieves a protection degree of IP67.

Fixing hook

The specific shape of the reduced height 60mm station also allows a practical fixing hook, positioned between the two devices mounted on the top, to be incorporated.
With this robust hook, the control station can easily be hung on the wall.

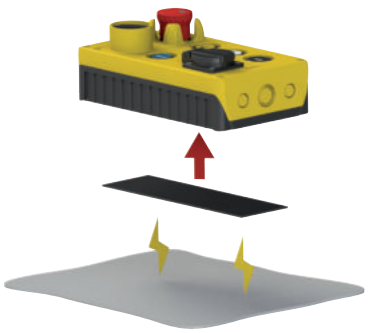
Profiled base

The station base is also knurled, allowing easier grip when picking up and handling the station.

LASER engraving

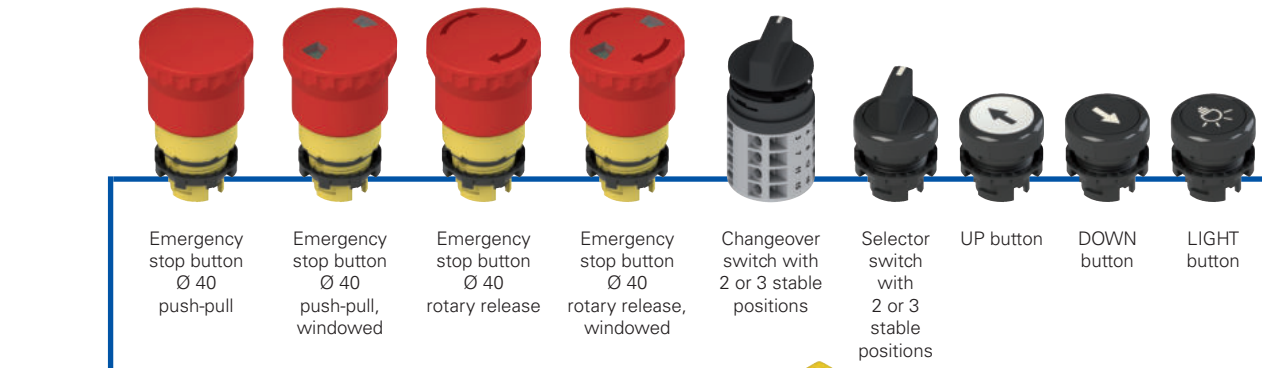
Pizzato Elettrica has introduced a new LASER engraving system for EL AD series control stations.
Thanks to this new system, which does not use pad printing or labels, engravings on the products are indelible and durable over time.
The laser engravings of the EL AD series control stations now include pictograms and icons compliant with the EN 81-20 standard; the control stations can also be customised using indicators, symbols, and logos, on customer request.

Magnetic fixing bases



All EL AD series control stations can be supplied with a magnetic base, installed at the bottom of the housing; this allows the control stations to be anchored to walls and metallic surfaces, in such a way that they are removable, and no drilling is required.
The adhesive magnetic bases can also be retrofitted.

Selection diagram



Emergency stop button Ø 40 push-pull

Emergency stop button Ø 40 push-pull, windowed

Emergency stop button Ø 40 rotary release

Emergency stop button Ø 40 rotary release, windowed

Changeover switch with 2 or 3 stable positions

Selector switch with 2 or 3 stable positions

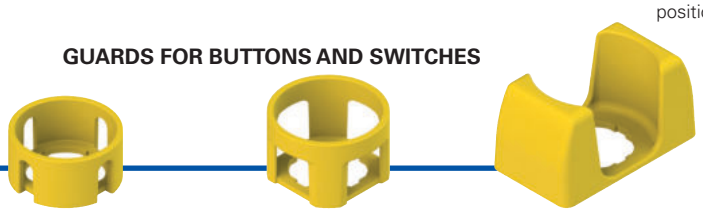
UP button

DOWN button

LIGHT button

BUTTONS AND SWITCHES

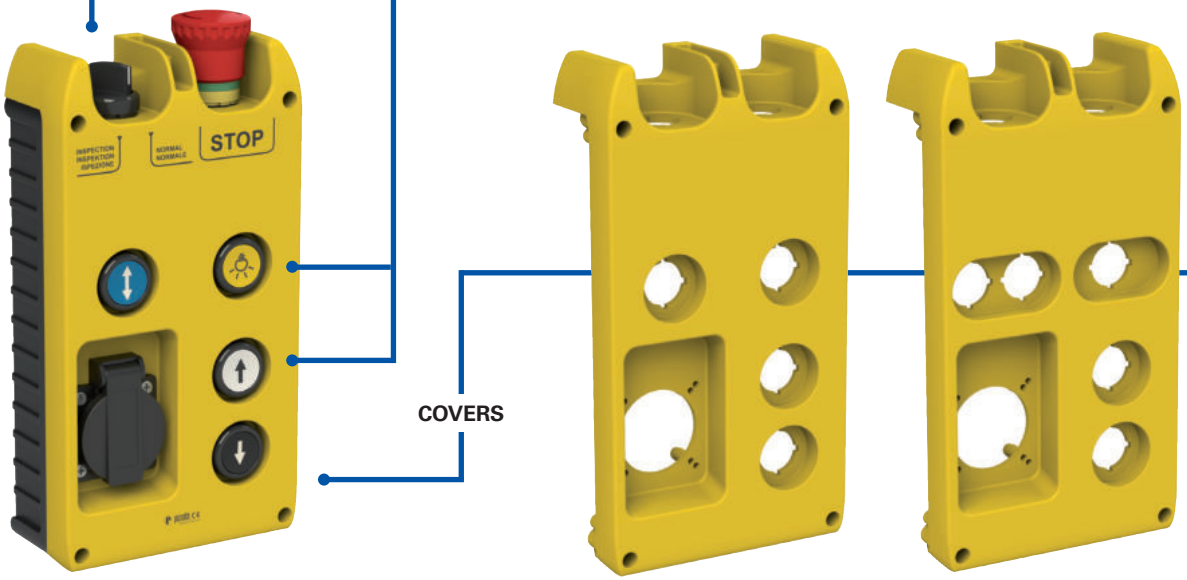
GUARDS FOR BUTTONS AND SWITCHES



Low windowed guard Ø40x20 mm

High windowed guard Ø43x27 mm

Open guard 38x66x35 mm



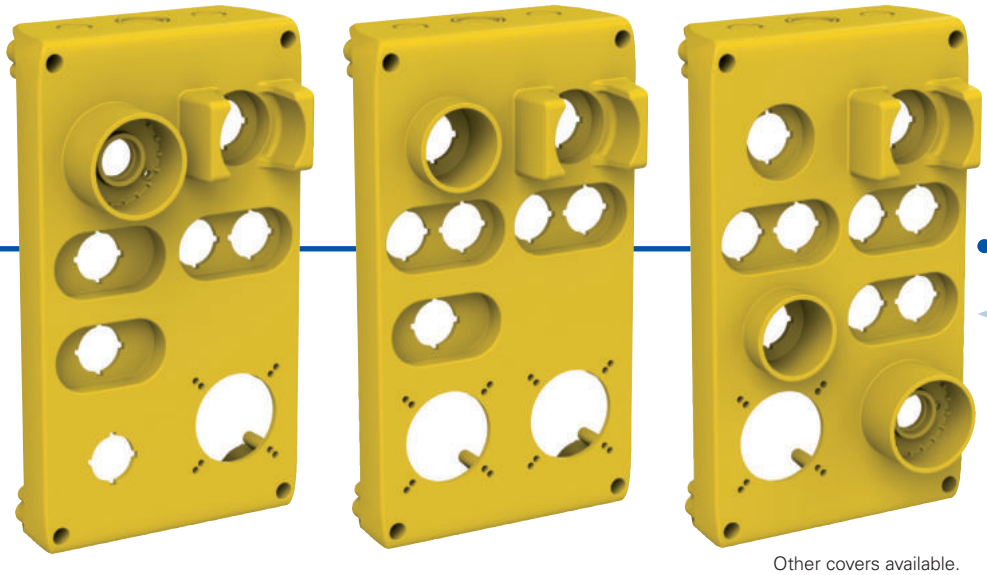
COVERS

ADHESIVE MAGNETIC BASE 230x70

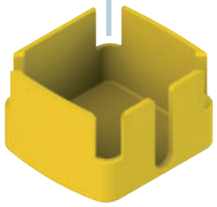
ALARM button | ENABLE button | Key selector switch, 2 positions | Double button UP DOWN | Double button ALARM LIGHT | Triple button ENABLE ALARM LIGHT | Triple button UP ALARM DOWN | Quadruple button | Indicator light | Buzzer | Luminous disc

SOCKETS

China/Australia | Europe Schuko | USA | France | United Kingdom | Switzerland



Other covers available.
See page 124.



Internal socket cover

Product options

Sold separately as accessory

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

EL AD23010

Housing shape	
1	240 x 160 mm (standard height)
3	260 x 160 mm (height 60mm)

Incremental configuration number	
010	configuration 010
011	configuration 011
012	configuration 012
...	...

EL AD series control stations

Main features

- Reduced height version (60mm)
- Entries on cover for easier wiring
- Various configurations available
- Protection degree up to IP69K
- Devices flush-mounted or protected by guard
- Customisable electrical socket

Housing quality marks:

EAC approval: RU C-IT.УТ03.B.00035/19

Contact block quality marks:

IMQ approval: CA02.04805
UL approval: E131787
CCC approval: 2021000305000106
EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing

Shockproof, self-extinguishing technopolymer cover. UV resistant and double insulated: ⧈

Cover:	
Standard version:	
2 lateral knock-out entries:	M20 - M25 - PG 13.5 - 1/2 NPT
4 lateral knock-out entries:	M16 - PG 11
Reduced height version:	
1 lateral knock-out entry:	M20 - M25 - PG 13.5 - 1/2 NPT
2 lateral knock-out entries:	M16 - PG 11
Base:	
4 knock-out entries at bottom:	M20 - PG 13.5 - 1/2 NPT
Base colour:	Black RAL 9005
Cover colour:	Yellow RAL 1023
Material of the screws:	Zinc-plated steel; stainless steel available on request
Protection degree acc. to EN 60529:	IP40 (standard) IP54 (on request) IP65 (on request) IP67 (on request)
Protection degree acc. to ISO 20653:	IP69K (on request) with cable gland of equal or higher protection degree

General data

Ambient temperature:	-25°C … +80°C
Cover screw tightening torque:	1 … 1.4 Nm

In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, IEC 60947-5-5, EN 60947-5-5, EN ISO 14119, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14

⚠ **Installation for safety applications:**

Use only contact blocks marked with the symbol ⊖. Always connect the safety circuit to the NC contacts (normally closed contacts: 1-2) as stated in standard EN 81-20 par. 5.11.2.2.1.

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on page 133.**

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	8 kV
Pollution degree:	3

Utilization category

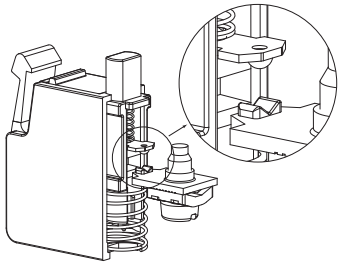
Alternating current: AC15 (50 … 60 Hz)

U_e (V)	24	48	120	250	400
I_e (A)	6	6	6	6	3

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

High-reliability self-cleaning contacts



"V-shape" self-cleaning contacts with quadruple contact point. This type of shape, thanks to the presence of the double contact point, makes it possible to drastically reduce the probability of contact commutation failure. In addition to this, it improves considerably the reliability in the presence of dust (patent pending).

Positive opening

NC contact block suitable for safety applications, with positive opening contacts in accordance with IEC 60947-5-1.

Features approved by UL

Electrical Ratings: A600 pilot duty (720 VA, 120-600 V ac)
Q300 pilot duty (69 VA, 125-250 V dc)

For contact block series E2 C provided with clamping screw terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 14-20 AWG, stranded or solid. The terminal tightening torque of 7.1 Lb In (0.8 Nm).

For contact block series E2 C provided with screw less type terminals: use 60 or 75 °C copper (Cu) conductor and wire size range 16-24 AWG, stranded. These terminals are suitable also for stranded conductors prepared with ZMLF ferrules. Recommended stripping length: 8 mm.

Features approved by IMQ

Rated insulation voltage (U_i): 500 V
Conventional free air thermal current (I_{th}): 10 A
Thermal current inside housing (I_{the}): 10 A
Rated impulse withstand voltage (U_{imp}):
– Screw terminals or solder terminals 8 kV;
– Terminals without screw 6 kV.
Protection degree of the housing:
– Screw terminals or terminals without screw IP20;
– Solder terminals IP00;
– Screw terminals with dust protection cap, panel mounting only IP20.

Terminals: screw terminals, solder terminals, without screw
Utilization category: AC15
Operating voltage (U_e): 400 Vac (50/60 Hz)
Operating current (I_e): 3 A
Forms of the contact element: X, Y
Positive opening of contacts on contact blocks 01G, 01K
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

EL AD23004

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 rotary release, with green indicator, with guard	1NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
LIGHT button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AD23006

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 rotary release, with green indicator, with guard	2NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
Monolithic indicator light Ø 30 white	White LED 12 ... 30 Vac/dc	LED
UP button flush, spring-return, white	2NO+1NC	
CLOSE button flush, spring-return, black	1NO	
OPEN button flush, spring-return, white	1NO	
DOWN button flush, spring-return, black	2NO+1NC	
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
ENABLE button flush, spring-return, blue	1NO	

EL AD23007

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 rotary release, with green indicator, with guard	2NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
Monolithic indicator light Ø 30 colour: red	Red LED 12 ... 30 Vac/dc	LED
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AD series control stations

EL AD21002

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed push pull release, with guard	1NC	
Changeover switch 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
LIGHT button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AD21006

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 push-pull release, with guard	2NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	
USA 15 A 125 Vac socket with internal fuse	/	

EL AD21008

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 push-pull release, with guard	2NC	
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+4NC	NORMAL INSPECTION
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
ENABLE button flush, spring-return, blue	1NO	
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
WHITE luminous disc 5 LUX steady white light	24 Vac/dc	LED
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AD21007

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø40 windowed push-pull release, with guard	2NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ENABLE button flush, spring-return, blue	1NO	
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
Schuko socket 16 A 250 Vac with internal fuse	/	

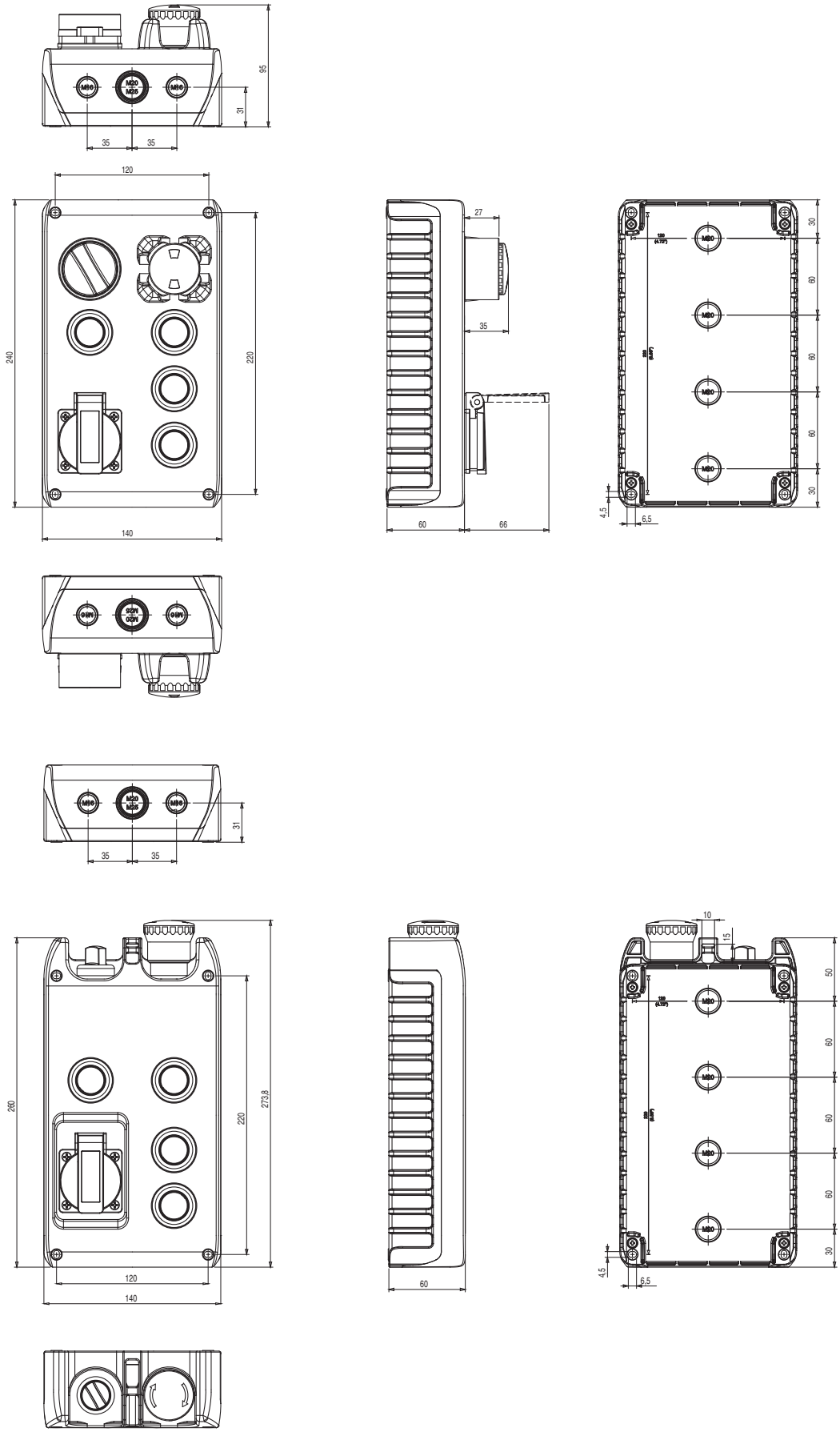
EL AD21004

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed rotary release, with guard	1NC	
Selector switch with short handle 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
UP button flush, spring-return, white	2NO	
DOWN button flush, spring-return, black	2NO	
ENABLE button flush, spring-return, blue	1NO	
LIGHT button flush, spring-return, black	1NO	
ALARM button flush, spring-return, yellow	1NO	
Schuko socket 16 A 250 Vac with internal fuse	/	

EL AD21005

DEVICES	CONTACTS	DIAGRAM
Emergency stop button Ø 40 windowed push-pull release, with guard	2NC	
Changeover switch Ø 42 2 stable positions, black, with guard	2NO+2NC	NORMAL INSPECTION
ALARM button flush, spring-return, yellow	1NO	
LIGHT button flush, spring-return, black	1NO	
Selector switch with short handle 3 positions, black, with guard, left spring-return, stable, right spring-return	2NO	0
Buzzer, continuous alarm perforated lens, black	24 Vac/dc	
Monolithic indicator light Ø 30 white	White LED 12 ... 30 Vac/dc	LED
Schuko socket 16 A 250 Vac with internal fuse	/	
UP button flush, spring-return, white	2NO+1NC	
DOWN button flush, spring-return, black	2NO+1NC	
ENABLE button flush, spring-return, blue	1NO	

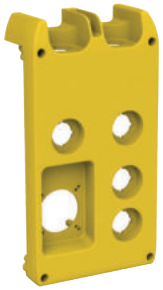
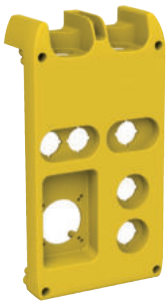
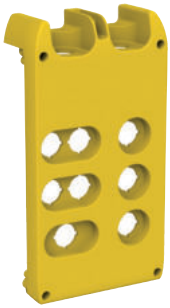
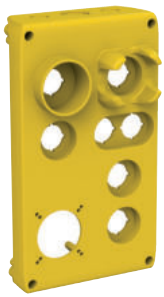
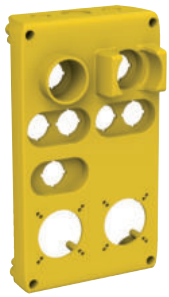
Housing dimensions for EL AD series lift control stations



All values in the drawings are in mm

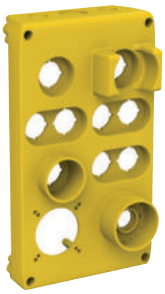
EL AD series cover selection table (selector switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

					
internal code	25502	25523	25527	25519	25526

EL AD series cover selection table (changeover switch versions)

ATTENTION: The internal code does not designate a product. Covers are not available for sale separately.

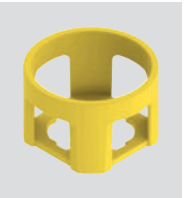
			
internal code	25501	25522	25524

Windowed protection guard

Article	Description
VE GP22A5A	Cylindrical yellow protection guard with 4 windows Ø 40x20 mm

It does not alter the IP protection degree of the associated device.

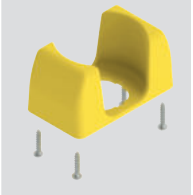
Cylindrical protection guard



Article	Description
VE GP22B5A	Cylindrical yellow protection guard Ø 43x27 mm

Not applicable on emergency stop buttons of the E2 1PE•••••• series
It does not alter the IP protection degree of the associated device.

Open protection guard



Article	Description
VE GP22F5A	Rectangular open yellow protection guard 66x38 mm, 35 mm high With 4 screws (for panel thicknesses between 1 and 3.5 mm).

Closing cap

Packs of **10 pcs.**

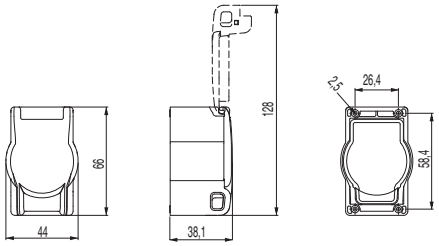
Technical data:

Body and ring material:	technopolymer
Protection degree:	IP67 and IP69K
Tightening torque:	2 … 2.5 Nm

Article	Description
E2 1TA1A110	Black closing cap for Ø 22 mm holes

Lockable guard

Article	Description
VE GG3EA7A	Lockable guard complete with 4 screws (for panel thicknesses between 1 and 3.5 mm)



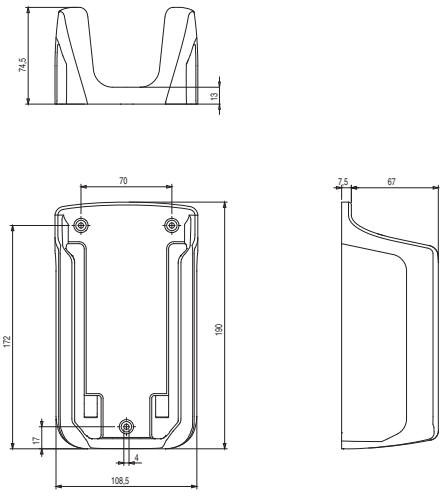
Sockets with IP54 cover

Sockets with 4 screws for fixing

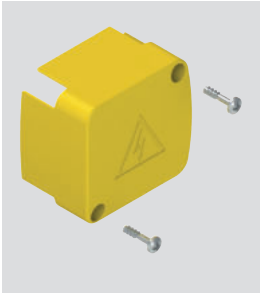
Article	Design	Description
VE PE1E1AA1		Europe Schuko + Italy IEC 60884-1 with child protection 16 A 250 Vac
VE PE1E1BA1		USA UL498/NEMA5-15 CSA22.2 no.4215 A 125 Vac
VE PE1E1CA1		France CEE 7/V IEC 60884-1 NFC 61314 with child protection 16 A 250 Vac
VE PE1E1DA1		United Kingdom BS1363 with child protection 13 A 250 Vac
VE PE1E1EA1		Switzerland IEC 60884-1 SEV 1011 10 A 250 Vac
VE PE1E1FA1		Australia / China AS/NZS 3112 15 A 250 Vac

Station holder

Article	Description
VE SF12AD1003A	Station holder for EL AC••••• housing with low base



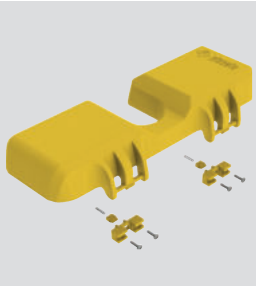
Internal socket cover



Article	Description
VE GG2BA5A	Yellow socket cover

Socket cover with 2 screws for fixing below socket, inside control station.

Protective cover

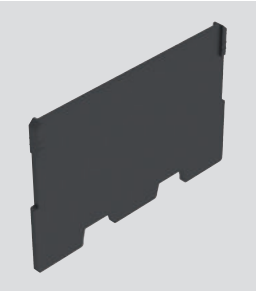


Article	Description
VE GG2CA5A	Yellow cover
VE GG2CB5A	Yellow cover (IP65)
VE GG2CA1A	Black cover (on request)

Product includes hinge and fixing screws, for EL AC••••• control stations only.

All values in the drawings are in mm

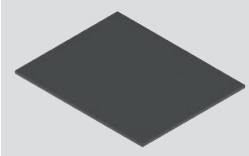
Separator plate



Article	Description
VE GG2DA1A	Separator plate

Separator plate (which can be installed in various positions) to separate control station parts with different voltages. For EL AN••••• control stations only.

Adhesive magnetic bases



Adhesive magnetic base made of magnetic plastoferrite for application on the bottom of EL AC•••••, EL AN•••••, and EL AD control stations. Allows control stations to be attached to metallic surfaces.

Article	Description
VE BM2B56X70	56x70 mm for EL AN21••• housing
VE BM2B87X70	87x70 mm for EL AN22••• housing
VE BM2B120X70	120x70 mm for EL AN23••• housing
VE BM2B153X70	153x70 mm for EL AN24••• housing
VE BM2B230X70	230 x 70 mm for EL AC27••• and EL AD••••• housing

Emergency stop buttons

Body colour and marking	Actuator colour	Push-pull	Rotary release	Windowed push-pull	Windowed rotary release	Key release Key coding PY333
yellow	red	E2 1PEPZ4531	E2 1PERZ4531	E2 1PEPF4531	E2 1PERF4531	E2 1PEBZ4531
yellow with green indication	red	E2 1PEPZ4731	E2 1PERZ4731	E2 1PEPF4731	E2 1PERF4731	E2 1PEBZ4731
yellow	black	E2 1PEPZ4511	E2 1PERZ4511	/	/	E2 1PEBZ4511

Selector switches

Actuator colour and engraving	Positions	2 stable positions Black bezel
black		E2 1SE12AVA11AB

Actuator colour and engraving	Positions	3 stable positions Black bezel
black		E2 1SE13ACE11AB

Key selector switches

Colour and engraving actuator	Positions	2 stable positions Black bezel
black		E2 1SC2AVA11AA

Legend

- Maintained
- Spring-return
- Key extraction position

Luminous discs with steady light

Colour and engraving	Article	Description
	VE DL1A2A00	White luminous disc, Ø 60 mm, 24 Vac/dc, without engraving, 5 LUX at 1m.
	VE DL1A5A00	Yellow luminous disc, Ø 60 mm, 24 Vac/dc, without engraving
	VE DL1A5A13	Yellow luminous disc, Ø 60 mm, 24 Vac/dc, with engraving:

Luminous discs with blinking light

Colour and engraving	Article	Description
	VE DL1A2L00	White luminous disc, blinking (0.5s on, 0.5s off), Ø 60 mm, 24 Vac/dc, without engraving, 5 LUX at 1 m.
	VE DL1A5L00	Yellow luminous disc, flashing (0.5s on, 0.5s off), Ø 60 mm, 24 Vac/dc, without engraving
	VE DL1A5L13	Yellow luminous disc, flashing (0.5s on, 0.5s off), Ø 60 mm, 24 Vac/dc, with engraving:

Double buttons

Colour and engraving actuator		Upper button flush Central cap, flush Lower button flush	
		Function	Black bezel
	"→" black button	DOWN	E2 1PDRL1AABS
	white cap, illuminated		
	"←" white button	UP	
	"↑" white button	UP	E2 1PDRL1AABN
	white cap, illuminated		
	"↓" black button	DOWN	
	yellow button	ALARM	E2 1PDRL1AADJ
	white cap, illuminated		
	blue button	ENABLE	
	black button	LIGHT	E2 1PDRL1AABR
	white cap, illuminated		
	yellow button	ALARM	
	black button	LIGHT	E2 1PDRL1AADL
	white cap, illuminated		
	blue button	ENABLE	

Triple buttons

Actuator colour and engraving		Upper button flush Central button projecting Lower button flush	
		Function	Black bezel
	black button	LIGHT	E2 1PTRS1AADK
	yellow button	ALARM	
	blue button	ENABLE	
	"→" black button	DOWN	E2 1PTRS1AABK
	yellow button	ALARM	
	"←" white button	UP	

Single buttons and mushroom buttons

Actuator colour and engraving	Function	Single button flush	Mushroom button Ø 36 mm flush
		Black bezel	Black bezel
 white	UP	E2 1PU2R221L7	/
 black	DOWN	E2 1PU2R121L8	/
 black	LIGHT	E2 1PU2R121L16	E2 1PU2F141L16
 yellow	LIGHT	E2 1PU2R521L16	E2 1PU2F541L16
 yellow	ALARM	E2 1PU2R521L14	E2 1PU2F541L14
 blue	ENABLE	E2 1PU2R621L170	/

Quadruple buttons

Actuator colour and engraving (starting from the top and clockwise)		upper button flush right button flush lower button flush left button flush	
		Function	black bezel
	"↑" white button	UP	E2 1PQFA1QAAQ
	black button	LIGHT	
	"↓" black button	DOWN	
	yellow button	ALARM	
	"↑" white button	UP	E2 1PQFA1QAAS
	black button	LIGHT	
	"↓" black button	DOWN	
	blue button	ENABLE	
	"↑" white button	UP	E2 1PQFA1QAAR
	yellow button	ALARM	
	"↓" black button	DOWN	
	blue button	ENABLE	

High luminosity monolithic indicator lights

Packs of **10 pcs.**

Colour	Operating voltage		
	12 … 30 Vac/dc	120 Vac	230 Vac
white	E6 1IL1A2110	E6 1IL3A2110	E6 1IL4A2110
red	E6 1IL1A3110	E6 1IL3A3110	E6 1IL4A3110
green	E6 1IL1A4110	E6 1IL3A4110	E6 1IL4A4110
yellow	E6 1IL1A5110	E6 1IL3A5110	E6 1IL4A5110
blue	E6 1IL1A6110	E6 1IL3A6110	E6 1IL4A6110
orange	E6 1IL1A8110	E6 1IL3A8110	E6 1IL4A8110

Buzzers

Sound type	Operating voltage	Perforated lens	Perforation-free lens
Continuous	12 Vac/dc	E6 1IS5A1CV1B	E6 1IS5B1CV1B
	24 Vac/dc	E6 1IS6A1CV1B	E6 1IS6B1CV1B
Pulsing	12 Vac/dc	E6 1IS5A1PV1B	E6 1IS5B1PV1B
	24 Vac/dc	E6 1IS6A1PV1B	E6 1IS6B1PV1B

Minimum level of sound intensity:
24 Vac/dc versions: 95 dB at 10cm (perforated lens)
80 dB at 10cm (perforation-free lens)
12 Vac/dc versions: 90 dB at 10cm (perforated lens)
75 dB at 10cm (perforation-free lens)

USB sockets

For ordering a USB 3.0 socket replace C with A in the respective article code. Example:
E2 1USB9**C**AK → E2 1USB1**A**AK

Rear connection	Front connection A-type USB 2.0 integrated socket black bezel	
A-type USB integrated socket	E2 1USB1CAK	/
Output with PVC cable, length 1.8 m and A-type USB male connector	/	E2 1USB1CN1.8
Output with PVC cable, length 3 m and A-type USB male connector	/	E2 1USB1CN3
Output with PVC cable, length 5 m and A-type USB male connector (available only with USB 2.0 socket)	/	E2 1USB1CN5

RJ45 sockets

For ordering a socket with black bezel replace 9 with 1 in the respective article code. Example:
E2 1RJ45**9**AAK → E2 1RJ45**1**AAK

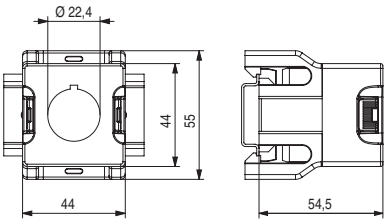
Connection type	Transfer speeds	
	1 Gb/s (for Cat. 5e)	10 Gb/s (for Cat. 6)
Integrated RJ45 socket	E2 1RJ459AAK	E2 1RJ459CAK
Output with PVC cable (length 1 m) and RJ45 male connector	E2 1RJ459AN1	E2 1RJ459CN1
Output with PVC cable (length 1.5 m) and RJ45 male connector	E2 1RJ459AN1.5	E2 1RJ459CN1.5
Output with PVC cable (length 2.5 m) and RJ45 male connector	E2 1RJ459AN2.5	E2 1RJ459CN2.5

Adapter for DIN rail

Packs of **10 pcs.**

Patent pending

Article	Description
VE AD3PF9A0	Support with Ø22 hole for fixing on DIN rail of the signalling and control devices of the EROUND line

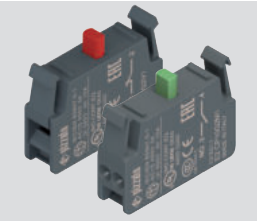


Not suitable for joysticks and quadruple buttons

All values in the drawings are in mm

Single contact blocks

Packs of **10 pcs.**



Article		Contacts
Clamping screw connection	PUSH-IN spring-operated connection	
E2 CP01G2V1	E2 CP01G2M1	Slow action 1NC ⊖
E2 CP10G2V1	E2 CP10G2M1	Slow action 1NO
E2 CP01K2V1	E2 CP01K2M1	Slow action 1NC ⊖ delayed
E2 CP10L2V1	E2 CP10L2M1	Slow action 1NO early make

General data

Protection degree:	IP20 acc. to IEC 60529
Ambient temperature:	-40°C … +80°C
Mechanical endurance:	20 million operating cycles
Max. actuation frequency:	3600 operating cycles/hour
Material of the contacts:	Silver contacts
Contact type:	"V-shape" self-cleaning contacts with quadruple contact point

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	500 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	8 kV
Pollution degree:	3

Clamping screw connection

Cable cross section:	min 1 x 0.5 mm² (1 x AWG 20)
	max 2 x 2.5 mm² (2 x AWG 14)
Tightening torque:	0.6 … 0.8 Nm
Cable stripping length (x):	8 mm

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	24	48	120	250	400
I_e (A)	6	6	6	6	3

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

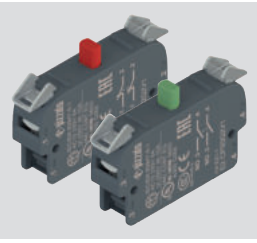
PUSH-IN spring-operated connection

Cable cross section (flexible conductors, with or without wire-end sleeve):

	min. 1 x 0.25 mm² (1 x AWG 24)
	max. 2 x 1.5 mm² (2 x AWG 16)
Cable stripping length (x):	min. 8 mm, max. 10 mm

Double contact blocks

Packs of **5 pcs.**



Article	Contacts
E2 CP11G2V1	Slow action 1NO+1NC ⊖
E2 CP20G2V1	Slow action 2NO
E2 CP02G2V1	Slow action 2NC ⊖

General data

Protection degree:	IP20 acc. to IEC 60529
Ambient temperature:	-40°C … +80°C
Mechanical endurance:	20 million operating cycles
Max. actuation frequency:	3600 operating cycles/hour
Material of the contacts:	Silver contacts
Contact type:	"V-shape" self-cleaning contacts with quadruple contact point
Cable cross section:	min 1 x 0.34 mm² (1 x AWG 22)
	max. 2 x 1.5 mm² (2 x AWG 16)
Screw tightening torque:	0.6 … 0.8 Nm
Cable stripping length (x):	7 mm

Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	250 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	4 kV
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	24	48	120	250
I_e (A)	6	6	6	6

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

High luminosity LED unit

Packs of **5 pcs.**

LED colour	Available device colour	Clamping screw connection			PUSH-IN spring-operated connection		
		Operating voltage					
		12 … 30 Vac/dc	120 Vac	230 Vac	12 … 30 Vac/dc	120 Vac	230 Vac
white	white / yellow	E2 LP1A2V1	E2 LP3A2V1	E2 LP4A2V1	E2 LP1A2M1	E2 LP3A2M1	E2 LP4A2M1
red	red	E2 LP1A3V1	E2 LP3A3V1	E2 LP4A3V1	E2 LP1A3M1	E2 LP3A3M1	E2 LP4A3M1
green	green	E2 LP1A4V1	E2 LP3A4V1	E2 LP4A4V1	E2 LP1A4M1	E2 LP3A4M1	E2 LP4A4M1
blue	blue	E2 LP1A6V1	E2 LP3A6V1	E2 LP4A6V1	E2 LP1A6M1	E2 LP3A6M1	E2 LP4A6M1
orange	orange	E2 LP1A8V1	E2 LP3A8V1	E2 LP4A8V1	E2 LP1A8M1	E2 LP3A8M1	E2 LP4A8M1

General data

Protection degree:	IP20 acc. to IEC 60529
Ambient temperature:	-25°C … +70°C
Endurance:	100,000 hours (at rated voltage and +25 °C ambient temperature)

Electrical data

Operating voltages and currents:	12 … 30 Vac/dc; 5 … 20 mA 102 … 138 Vac; 20 mA max. 195 … 264 Vac; 20 mA max.
Blinking frequency:	1 Hz

Clamping screw connection

Cable cross section:	min 1 x 0.5 mm² (1 x AWG 20) max 2 x 2.5 mm² (2 x AWG 14)
Tightening torque:	0.6 … 0.8 Nm
Cable stripping length (x):	8 mm

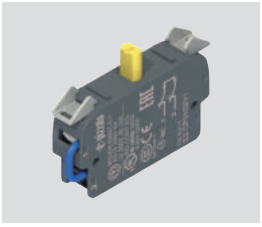
PUSH-IN spring-operated connection

Cable cross section (flexible conductors, with or without wire-end sleeve):

	min. 1 x 0.25 mm² (1 x AWG 24) max. 2 x 1.5 mm² (1 x AWG 16)
Cable stripping length (x):	min. 8 mm, max. 10 mm

Single self-monitored contact blocks

Packs of **5 pcs.**

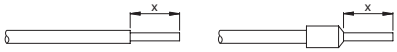


Article	Contacts
E2 CP01S2V1	Slow action, self-monitored 1NC ⊕

The operating principle of the self-monitoring contact blocks ensures that their associated control devices are free from faults and malfunctions caused by contacts separating, and that the safety function remains permanently available during machine operation.

General data

Protection degree:	IP20 acc. to IEC 60529
Ambient temperature:	-40°C … +80°C
Mechanical endurance:	20 million operating cycles
Max. actuation frequency:	3600 operating cycles/hour
Material of the contacts:	Silver contacts
Contact type:	"V-shape" self-cleaning contacts with quadruple contact point
Cable cross section:	min 1 x 0.34 mm² (1 x AWG 22) max. 2 x 1.5 mm² (2 x AWG 16)
Screw tightening torque:	0.6 … 0.8 Nm
Cable stripping length (x):	7 mm



Electrical data

Thermal current (I_{th}):	10 A
Rated insulation voltage (U_i):	250 Vac/dc
Protection against short circuits:	type gG/gL fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	4 kV
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

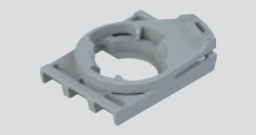
U_e (V)	24	48	120	250
I_e (A)	6	6	6	6

Direct current: DC13

U_e (V)	24	48	125	250
I_e (A)	2.5	1.3	0.6	0.3

Mounting adapter

Packs of **10 pcs.**



Article	Description
E2 1BAC11	3-slot mounting adapter for E2 CP contact blocks and E2 LP LED units

Not combinable with E2 •PQ••••••• quadruple buttons and E2 •MA•••••• joysticks.

Article	Description
E2 1BAC21	4-slot mounting adapter for E2 CP contact blocks

Compatible only with selectors E2 •SE••••••••, key selector switches E2 •SC••••••••, buttons E2 •PU••••••, double buttons E2 •PD•••••••, emergency stop buttons E2 •PE••••••, configured in the appropriate versions for 4-slot adapter.
Compatible with E2 •PQ••••••• quadruple buttons and E2 •MA•••••• joystick

Fixing ring

Packs of **20 pcs.**

Article	Description
VE GF121A	Technopolymer fixing ring

Article	Description
VE GF720A	Metal fixing ring

Fixing key

Article	Description
VE CH121A1	Technopolymer fixing key for VE GF•••• fixing rings

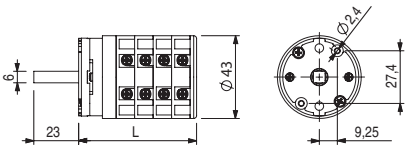
Changeover switches for EL control stations

		Contacts								
Article	Positions	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	L (mm)
EH B2A11B-P01		NC	NO	-	-	-	-	-	-	32
EH B2A22B-P01		NC	NO	NC	NO	-	-	-	-	41.5
EH B2A24B-P01		NO	NO	NC	NC	NC	NC	-	-	51
EH B2A33B-P01		NC	NO	NC	NO	NC	NO	-	-	51
EH B2A35B-P01		NO	NC	NO	NC	NO	NC	NC	NC	60.5

ATTENTION: only available pre-assembled on control stations

General data

Protection degree acc. to IEC 60529:	IP67 only if installed on appropriate EL series cover. IP20 at the terminals
Ambient temperature:	-20°C ... +50°C
Mechanical endurance:	500,000 operating cycles at 120 operating cycles/hour
Material of the contacts:	Silver contacts
Tightening torque of the terminal screws:	1.2 Nm
Thermal current (I_{th}):	16 A
Rated insulation voltage (U_i):	660 Vac
Rated impulse withstand voltage (U_{imp}):	4 kV
Cross-section of stranded wire:	min. 1 x 0.5 mm²
	max. 2 x 2.5 mm²



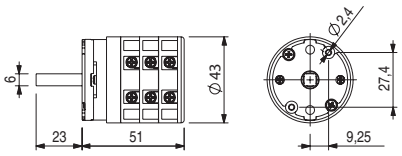
Rated operating current Ie: alternating current (50/60 Hz)					
Vac	AC-21A	AC23A		AC-3	
		1PH	3PH	1PH	3PH
110-120	16 A	0.5 kW	/	0.4 kW	/
220-240	16 A	0.9 kW	2.6 kW	0.75 kW	2.2 kW
380-400	16 A	1.5 kW	7.5 kW	1.3 kW	5.5 kW

All values in the drawings are in mm

Bypass switches

Article	Description
EH AC-005	4-position switch for bypass with padlockable guard, for panel fixing

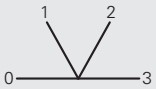
External dimensions and mounting holes:



For external dimensions and device mounting holes for padlockable guard, see page 125.

General data

Ambient temperature:	-20°C ... +50°C
Mechanical endurance:	500,000 operating cycles at 120 operating cycles/hour
Material of the contacts:	Silver contacts
Tightening torque of the terminal screws:	1.2 Nm
Thermal current (I_{th}):	16 A
Rated insulation voltage (U_i):	660 Vac
Rated impulse withstand voltage (U_{imp}):	4 kV
Cross-section of stranded wire:	min. 1 x 0.5 mm²
	max. 2 x 2.5 mm²

	Contact diagram					
Position	1-2	3-4	5-6	7-8	9-10	11-12
 0	X					X
1		X			X	
2			X		X	
3				X	X	

X = closed contact
Other contact configurations available on request.

Rated operating current Ie: alternating current (50/60 Hz)					
Vac	AC-21A	AC23A		AC-3	
		1PH	3PH	1PH	3PH
110-120	16 A	0.5 kW	/	0.4 kW	/
220-240	16 A	0.9 kW	2.6 kW	0.75 kW	2.2 kW
380-400	16 A	1.5 kW	7.5 kW	1.3 kW	5.5 kW

All values in the drawings are in mm

Utilization requirements for control stations

General requirements

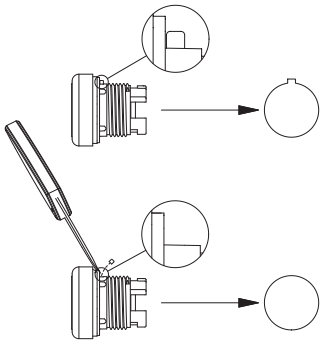
All electrical components and devices of the EROUND series that are to be installed inside switching cabinets or enclosures (e.g. E2 CP, E2 CF, E2 LP, E2 LF), are not provided with suitable protections against: water, high quantities of dust, condensation, humidity, steam, corrosive agents, explosive gases, flammable gases or other polluting agents. The protection degree of switching cabinets or enclosures shall ensure the necessary protection to the electrical components of the EROUND series inside them, depending on the application area.

Reference dowel

The mounting reference dowel on the external diameter of all EROUND line devices enables perfect device alignment and mounting on the panel, while avoiding rotations.

In case of use on holes without reference notches, simply remove the dowel with a slight leverage effect using a screwdriver, making sure that the seal gasket does not get damaged.

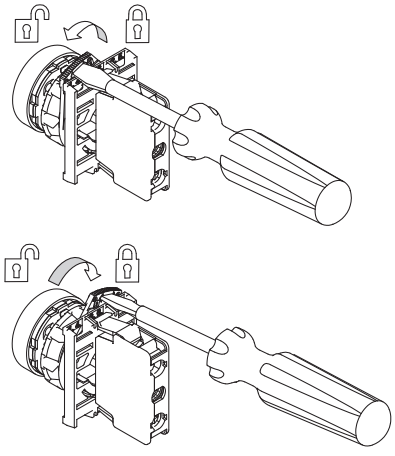
The removal of the reference dowel, is not advisable for the selectors (series E2 •SE, E2 •SL, E2 •SC) and emergency stop buttons (series E2 •PE) with rotary release, as these devices are subject to rotary-type actuation.



Connection to mounting adapter

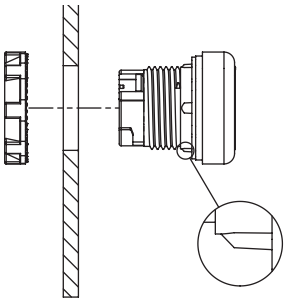
After its installation on the panel using the special ring, the control device can be fixed to the mounting adapter by turning the locking lever. The lever reports the free position (lock open) and locked position (lock closed) indications.

The locking lever rotation can be made smoother by using a flat-head screwdriver.



Seal gasket

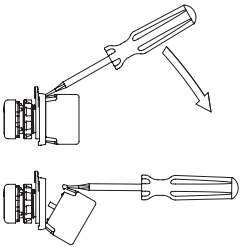
Thanks to its design, the seal gasket ensures a pre-fixing on the panel. This allows to mount the ring without having to hold the device in position.



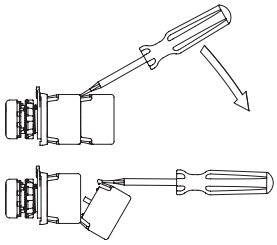
Mounting of contact blocks and LED units

Contact blocks and LED units are provided with two snap-in mounting flaps that ensure a stable fixing between them and the mounting adapter (in the panel mounting version), or between them and the base of the housing (in the base mounting version). The panel contact blocks can be connected to each other, up to three, in observance of the limits specified for each actuator in the respective chapter.

Contact blocks and LED units can be quickly disassembled by using a flat-head screwdriver to leverage on the connection flaps.



Release of the contact block from the base



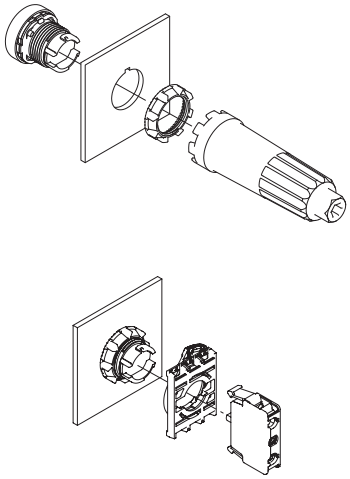
Release of the contact block from another unit

Panel fixing

The control and signalling devices have to be fixed on the rear of the panel with a fixing ring. This has to be tightened with the special fixing key which is supplied as an accessory.

The tightening torque for a correct fixing must be between 2.0 and 2.5 Nm.

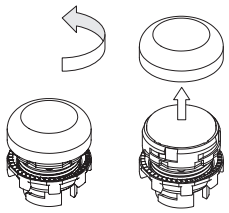
Once the fixing ring has been tightened, the mounting adapter and then the contact blocks or LED units can be mounted on the panel.



Lenses for E2 indicator lights

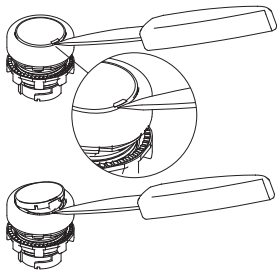
The E2 indicator lights are provided with interchangeable lenses in different colours. The lenses can be removed and mounted by simply turning them clockwise and anticlockwise respectively, without using tools.

For a correct colour rendering, it is necessary to use the correct combination between colour of the indicator light lens and colour of the LED unit applied to it.



Lenses for buttons and illuminated buttons

The buttons and the illuminated buttons feature replaceable lenses. To remove the lenses, leverage them with a pointed object near the reference notch on the external diameter of the lens itself.



Using the devices

- All devices of the EROUND series are hand operated.
- Do not apply excessive force to the device once it has reached the end of its actuation travel.
- Do not exceed the maximum actuation travel.
- Before installation, make sure the device is not damaged in any part.
- Do not disassemble or try to repair the device, in case of defect or fault replace the entire device.
- In case the device is deformed or damaged it must be entirely replaced. Correct operation cannot be guaranteed if the device is deformed or damaged.
- Always attach the device operating instructions (if present) to the manual of the machine in which the device is installed.
- These operating instructions must be kept available for consultation at any time and for the whole period of use of the device.

Shock and vibrations

Avoid collisions with the devices. Excessive shock and vibrations may affect correct operation of the device

Wiring and installation

- Installation must be carried out by qualified staff only.
- Observe minimum distances between devices.
- Observe the tightening torques.
- Keep the electrical load below the value specified by the utilization category.
- Disconnect the power before to work on the contacts, also during the wiring.
- Do not paint or varnish the devices.
- Devices can only be installed on perforated surfaces with a thickness of between 1 mm and 6 mm that comply with the IEC 60947-5-1 standard.
- The protection degree and the correct operation are only guaranteed if the product is installed on a level and smooth surface and if the diameter of the holes is compliant with the IEC 60947-5-1 standard.
- After and during the installation do not pull the electrical cables connected to the contact blocks. If excessive tension is applied to the electrical cables, the contact blocks could detach from the actuator.
- During the coupling and uncoupling of the contact blocks from the mounting adapter or from the base, do not deform or put excessive stress on the coupling flaps. A possible deformation of the flaps could cause the detachment of the contact blocks from their mounting adapter.
- The housings in the EL AC, EL AN, EL AD series are fitted with knock-out holes for the passage of electrical cables. Open these holes using a suitable tool to avoid damaging the housing. Refrain from using housings damaged or cracked as a result of erroneous manoeuvres performed when opening the knock-out holes. After opening the hole, remove any plastic residues and insert a cable gland (or similar device) into the hole with a degree of protection equal or superior to that of the housing.
- After installation and before commissioning of the machine, verify:
  - the correct operation of the device;
  - the correct and full locking of the E2 1BAC•• mounting adapter to the device;
  - the correct coupling of the contact blocks.
- Periodically check for correct device operation.
- Do not deform or modify the device for any reason.
- Before installation, make sure the device is not damaged in any part.
- Refrain from opening, disassembling or attempting to repair the device and replace it immediately if it appears to be damaged.
- Should the installer be unable to fully understand the utilization requirements, the product must not be installed and the necessary assistance may be requested.

Do not use in following environments:

- Environments where dust and dirt can cover the device and by sedimentation stop its correct working.
- Environment where sudden temperature changes cause condensation.
- Environments where coatings of ice may form on the device.
- Environments where the application causes knocks or vibrations that could damage the device.
- Environment with presence of explosive or flammable gas or dust.
- In environments containing strongly aggressive chemicals, where the products used coming into contact with the device may impair its physical or functional integrity.

Limits of use

- Use the devices following the instructions, complying with their operation limits and the standards in force.
- The devices have specific application limits (min. and max. ambient temperature, mechanical endurance, protection degree, utilisation category, etc.) These limits are met by the different devices only if considered individually and not if combined with each other. For further information contact our technical department.
- The utilization implies knowledge of and compliance with following standards: EN 60204-1, EN 60947-5-1, ISO 12100, EN ISO 14119.
- Please contact our technical department for information and assistance (phone +39.0424.470.930 / e-mail tech@pizzato.com) in the following cases:
  - Cases not mentioned in the present utilization requirements.
  - In nuclear power stations, trains, airplanes, cars, incinerators, medical devices or any application where the safety of two or more persons depend on the correct operation of the device.

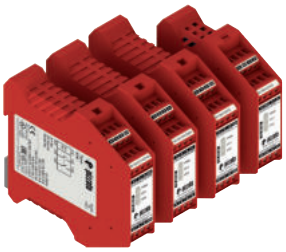
Additional requirements for safety applications

Provided that all previous requirements for the devices are fulfilled, for installations with operator protection function additional requirements must be observed.

- The utilization implies knowledge of and compliance with following standards: IEC 60204-1, IEC 60947-5-1, EN ISO 13849-1, EN 62061, EN ISO 12100.
- For emergency stop buttons the safety circuit must be connected to the .1-.2 NC contacts with the actuator in rest position. The auxiliary contacts NO .3-.4 must be used in signalling circuits only.
- The protection fuse (or equivalent device) must be always connected in series with the NC .1-.2 contacts of the safety circuit.
- Periodically verify the correct working of the safety devices; the periodicity of this verification is settled by the machine manufacturer based on the machine danger degree and it does not have to be less than one a year.
- After installation and before commissioning of the machine, verify:
  - the correct operation of the device;
  - the correct and full locking of the E2 1BAC•• mounting adapter;
  - the correct coupling of the contact blocks.
- For the E2 •PEBZ•••• emergency stop buttons with key release do not leave the key inserted. A possible sudden activation of the emergency stop button with the key inserted could cause injuries to the operator.
- All the safety devices installed on the machine (e.g. emergency stop button, stop button, automatic/manual mode selector etc.) have a limited endurance. Although still functioning, after 20 years from the date of manufacture the device must be replaced completely. The date of manufacture is placed next to the product code, on the label attached to the packing. In case of particularly adverse weather conditions, the endurance of the device can be drastically reduced over time. Regularly check that the safety devices are working properly and if required, replace them, even prior to the above-mentioned expiry date.
- The device is provided with external marking on its packaging. The marking includes: Producer trademark, product code, batch number and date of manufacture. The batch's first letter refers to the month of manufacture (A=January, B=February, etc.). The second and third letters refer to the year of manufacture (24 = 2024, 25 = 2025, etc.).
- If the device is used for safety applications, inadequate installation or tampering can cause people serious injuries and even death.
- These devices must not be bypassed, removed, turned or disabled in any other way.
- If the machine where the device is installed is used for a purpose other than that specified by the producer, the device may not provide the operator with efficient protection.
- The safety category of the system comprising the safety device also depends on external devices and their connection. Check that the device is capable of performing the safety function envisaged by the risk analysis of the machine, as provided by EN ISO 13849-1.

Notes

Introduction



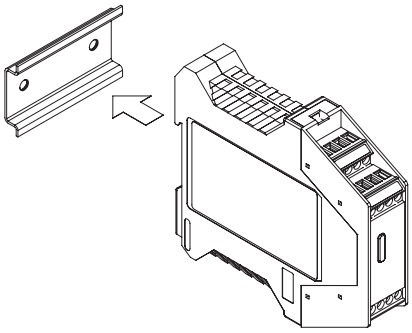
Based on the decades of experience of Pizzato Elettrica in the field of industrial safety and automation, the CS AR series of safety modules for lifts has been developed.
All CS series safety modules are implemented with cutting edge technology, and attention to detail.
They are produced on the premises of Pizzato Elettrica, at Marostica (in Italy), using special SMT (surface mount technology) assembly lines that are able to operate with lead-free technology. This meets eco-compatibility requirements laid down by the RAEE and RoHS Directives.

Maximum safety level

PL e + SIL 3

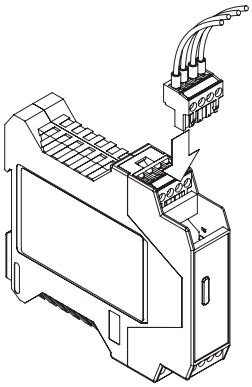
The safety modules of the CS series are equipped with redundant electronics. They enable the construction of circuits with the highest safety levels: PL e according to EN ISO 13849-1 and SIL 3 according to EN 62061.

Mounting on DIN rails



The housings of all CS series safety modules are suitable for DIN rail mounting and are compact (22.5 or 45 mm wide) to minimize the overall dimensions inside the control cabinets.

Fast wiring with removable connectors



The CS series safety modules can be ordered as versions with screw terminals, or with removable connectors and screw or spring terminals.
The versions with removable connectors are faster and easier to wire and install.
Furthermore, should a damaged module require replacement, machine downtimes are significantly reduced.

Final inspection of 100% of all products

To provide the user with a guarantee of the high quality standards of Pizzato Elettrica products, each safety module is tested individually using automated test stations, and identified by a unique serial number.
This process allows preventive identification of products displaying production defects, or deviations from standard operating parameters.

Technical assistance

The technical department of Pizzato Elettrica supports installers of CS series safety modules with useful information before, during, and after the installation phase, in the most complex applications.

Compliant with EN 81-20 standard

EN 81-20

The CS series of safety modules for lifts has been subjected to testing carried out by notified bodies, which have confirmed compliance with technical standard EN 81-20 on the construction and installation of lifts for the transport of persons and goods.
These devices can therefore be used for implementation of the following safety functions:
- levelling and re-levelling with doors open, in accordance with 5.12.1.4 of EN 81-20;
- detection of uncontrolled movements of the car and control of a device that stops and holds the car in accordance with 5.6.7.7 of EN 81-20, with a response time of 15 ms;
- monitoring of correct operation and release of the motor brake in accordance with 5.6.7.3 of EN 81-20;
- detection of uncontrolled movements of the car during levelling operations with doors open and control of a device that stops and holds the car in accordance with 5.6.7.7 of EN 81-20, with a response time equal to 15 ms.

Quality marks

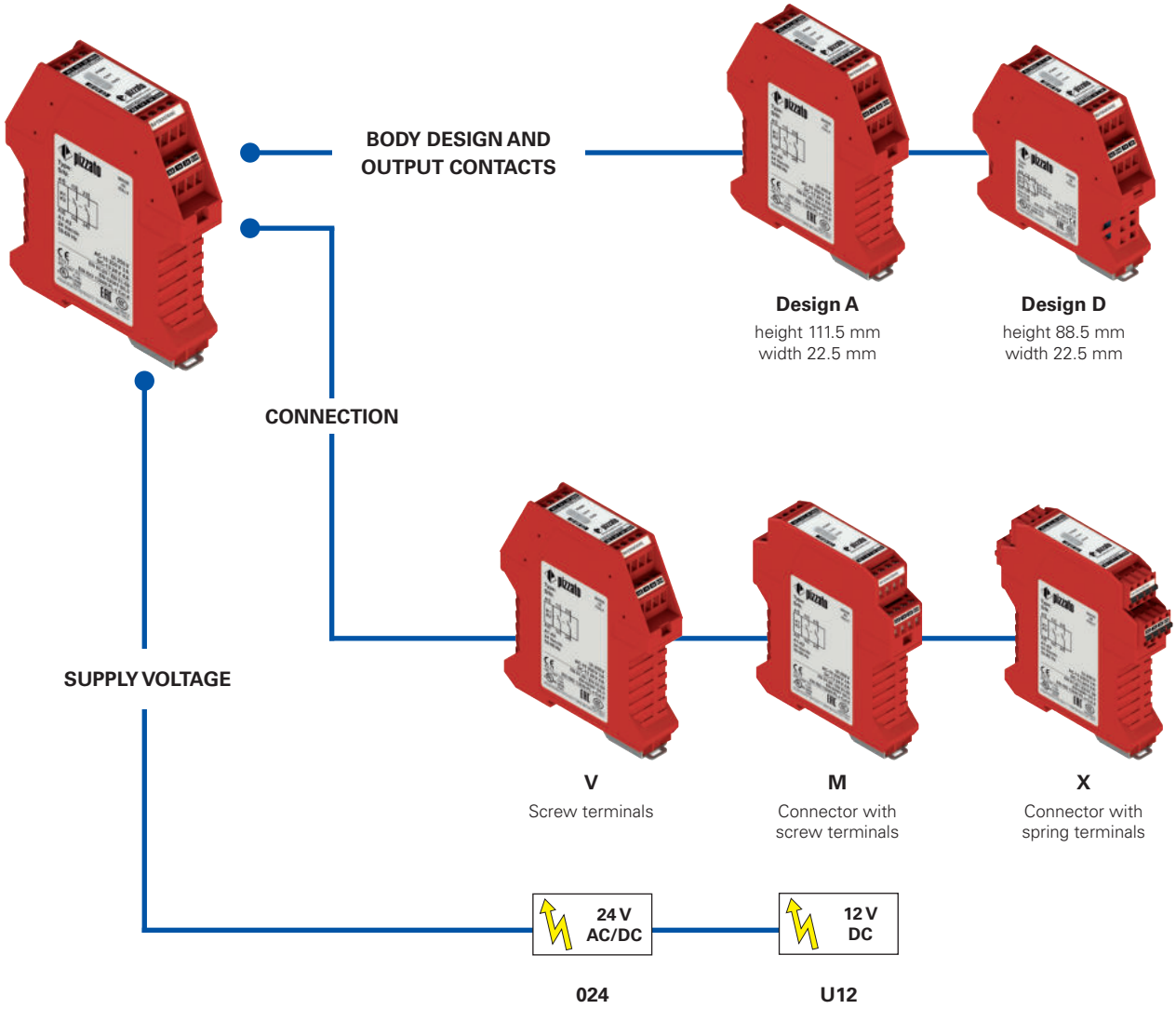
All Pizzato Elettrica safety modules bear quality marks that confirm their fulfilment of safety requirements and compliance with product directives in force in international markets.
Within the European Union, the CE marking is issued in accordance with the most recent version of the 2014/33/EU lift directive.

EC-type examination certificate

CE 0051

The EC-type examination certificate is issued by a Notified Body, and guarantees compliance with the safety requirements of the Machinery Directive and lift directive. The EC-type examination certificate guarantees to the customer, that experts of a Notified Body have verified compliance with directives and continuously monitor the production process and check the conformity of products with the sample (type) verified during approval. A product that is awarded EC-type certification can be marketed with the CE symbol, followed by a four-digit number identifying the Notified Body.

Selection diagram



Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

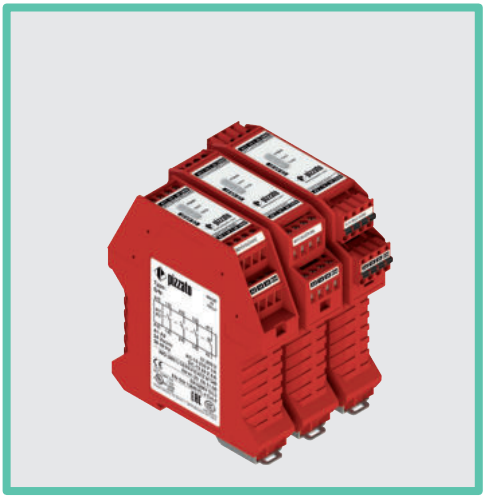
CS AR-94V024

Output contacts and body design	
91	2 NO safety contacts, 1 NO opto-decoupled signalling contact, design A
93	3 NO safety contacts, 1 NC auxiliary contact, design A
94	2 NO safety contacts, design A
95	2 NO safety contacts, design D

Supply voltage	
024	24 Vac/dc
U12	12 Vdc (for CS AR-94 only)

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Safety module **CS AR-91**



Module for floor levelling operations in lifts compliant to EN 81

Main features

- For safety applications up to SIL 3/PL e
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts:
  2 NO safety contacts, 1 NO opto-decoupled signalling contact
- Supply voltage: 24 Vac/dc
- Insensitive to voltage dips

Utilization categories

Alternating current: AC15 (50...60 Hz)
U_e (V) 230
I_e (A) 3
Direct current: DC13 (6 oper. cycles/min.)
U_e (V) 24
I_e (A) 4

Quality marks:

EU-type examination certificate: IMQ no. 340
(EN 81-20/50:2020)
EC type examination certificate: IMQ CP 432 DM
(Machinery Directive)
UL approval: E131787
EAC approval: RU C-IT.УТ03.B.00035/19
CCC approval: 2021000305000107
UKCA approval: 772884
UKCA-type examination certificate: 772883

Compliance with the requirements of:

Machinery Directive 2006/42/EC,
EMC Directive 2014/30/EU,
Lift Directive 2014/33/EU,
RoHS Directive 2011/65/EU.

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 147, design A

General data

SIL level (SIL CL):	up to SIL 3 acc. to EN IEC 62061
Performance Level (PL):	Up to PL e acc. to EN ISO 13849-1
Safety category:	Up to cat. 4 acc. to EN ISO 13849-1
$MTTF_D$:	227 years
DC:	High
PFH_D:	1.18 E-10
Ambient temperature:	-25°C … +55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; ± 15%; 50 … 60 Hz
Max. DC residual ripple in DC:	10%
Power consumption AC:	< 5 VA
Power consumption DC:	< 2.5 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC response time:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	< 40 mA
Min. duration of start impulse t_{MIN}:	> 50 ms
Response time t_A:	< 120 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 65 ms
Simultaneity time t_C:	unlimited
Response time starting from application of the supply:	< 300 ms

Auxiliary signalling circuit

Auxiliary output (Y43-Y44):	1NO opto-decoupled
Rated operating voltage (U_e):	24 Vdc
Rated operating current (I_e):	25 mA
Rated impulse withstand voltage (U_{imp}):	4 kV
Release time t_{R2}:	< 1 ms

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 81-20, EN 81-50, UL 508, CSA C22.2 no. 14, GB/T14048.5-2017.

Output circuit

Output contacts:	2 NO safety contacts,
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See the paragraph on the CS ME series expansion modules in the General Safety Catalogue.

Code structure

CS AR-91V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

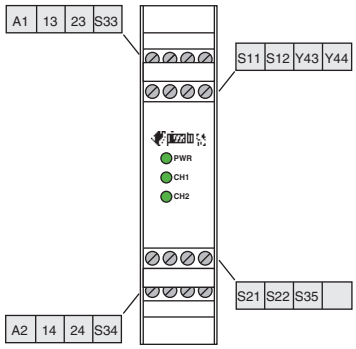
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

Safety module CS AR-91

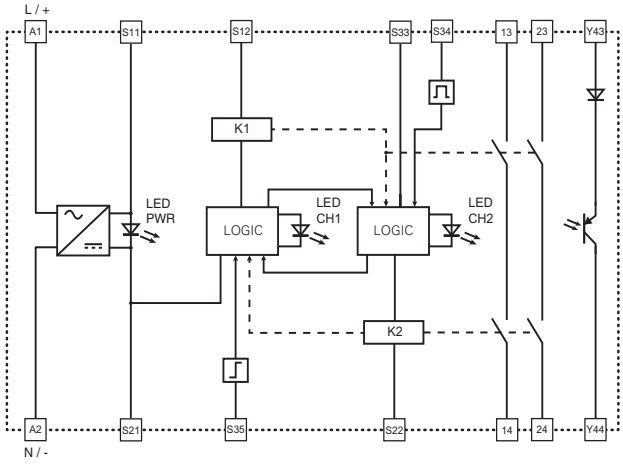
Pin assignment



Voltage dips, short interruptions and voltage variations

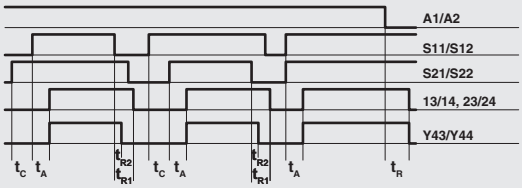
The CS AR-91 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage is restored, the device continues to operate with a switching state that is consistent with the input signals. The safety module retains its normal function during voltage dips and brief interruptions; for longer voltage interruptions, the safety outputs open and reset themselves automatically during an automatic start if voltage is restored or – in the case of a manual or monitored start – require that the system be reset by the operator.

Internal wiring diagram

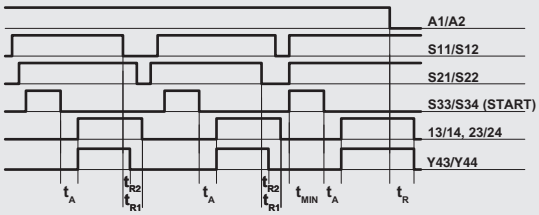


Function diagrams

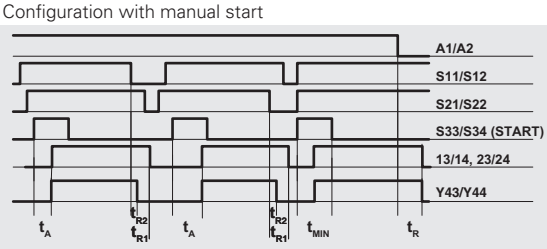
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



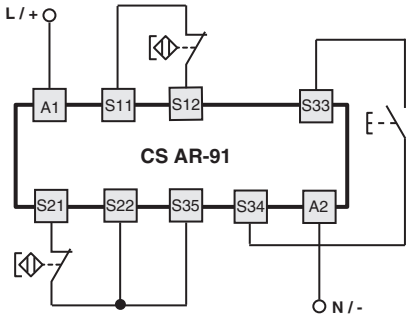
Legend:
t_{MIN}: Min. duration of start impulse
t_c: simultaneity time
t_A: response time
t_{R1}, t_{R2}: release time
t_R: release time in absence of power supply

Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Input configuration

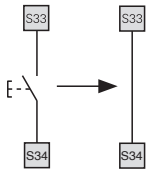
Input configuration with magnetic sensors

2 channels



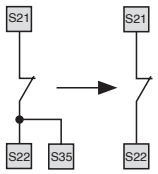
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



Monitored start

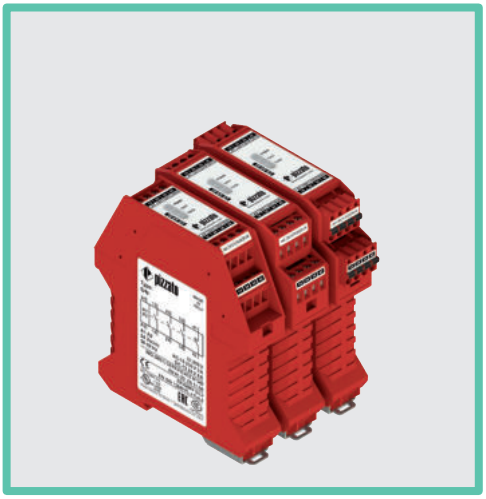
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



Electromechanical switches

The safety module can control both magnetic sensors and electromechanical switches. Replace the sensor contacts with switch contacts.

CS AR-93 safety module



Module for floor levelling operations in lifts compliant to EN 81

Main features

- For safety applications up to SIL 3/PL e
- Choice between automatic start or manual start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts:
  3 NO safety contacts and 1 NC auxiliary contact.
- Supply voltage: 24 Vac/dc
- Insensitive to voltage dips

Utilization categories

Alternating current: AC15 (50...60 Hz)
U_e (V) 230
I_e (A) 3
Direct current: DC13 (6 oper. cycles/min.)
U_e (V) 24
I_e (A) 4

Quality marks:

EU-type examination certificate: IMQ no. 340
(EN 81-20/50:2020)
EC type examination certificate: IMQ CP 432 DM
(Machinery Directive)
UL approval: E131787
EAC approval: RU C-IT.УТ03.B.00035/19
CCC approval: 2021000305000107
UKCA approval: 772884
UKCA-type examination certificate: 772883

Compliance with the requirements of:

Machinery Directive 2006/42/EC,
EMC Directive 2014/30/EU,
Lift Directive 2014/33/EU,
RoHS Directive 2011/65/EU.

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 147, design A

General data

SIL level (SIL CL):	up to SIL 3 acc. to EN IEC 62061
Performance Level (PL):	Up to PL e acc. to EN ISO 13849-1
Safety category:	Up to category 4 acc. to EN ISO 13849-1
$MTTF_D$:	227 years
DC:	High
PFH_D:	1.34 E-10
Ambient temperature:	-25°C … +55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; ± 15%; 50 … 60 Hz
Max. DC residual ripple in DC:	10%
Power consumption AC:	< 5 VA
Power consumption DC:	< 2.5 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC response time:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	< 35 mA
Min. duration of start impulse t_{MIN}:	> 50 ms
Response time t_A:	< 130 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 60 ms
Simultaneity time t_C:	unlimited
Response time starting from application of the supply:	< 300 ms

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 81-20, EN 81-50, UL 508, CSA C22.2 no. 14, GB/T14048.5-2017.

Output circuit

Output contacts:	3 NO safety contacts 1 NC auxiliary contact.
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See the paragraph on the CS ME series expansion modules in the General Safety Catalogue.

Code structure

CS AR-93V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

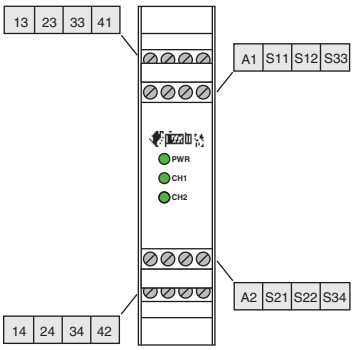
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

CS AR-93 safety module

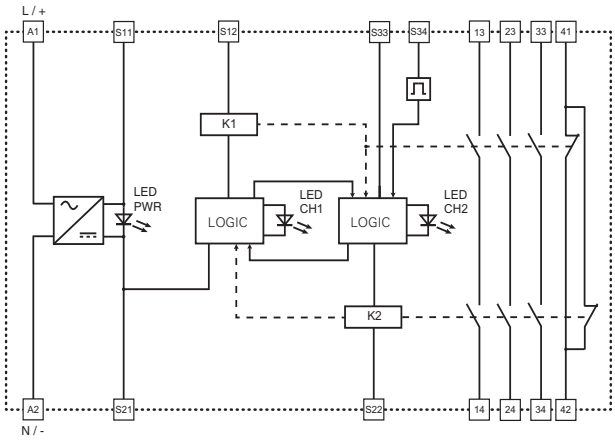
Pin assignment



Voltage dips, short interruptions and voltage variations

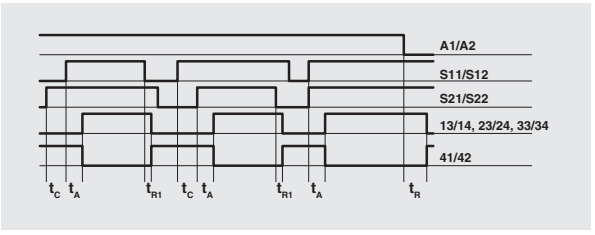
The CS AR-93 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage is restored, the device continues to operate with a switching state that is consistent with the input signals. The safety module retains its normal function during voltage dips and brief interruptions; for longer voltage interruptions, the safety outputs open and reset themselves automatically during an automatic start if voltage is restored or – in the case of a manual or monitored start – require that the system be reset by the operator.

Internal wiring diagram

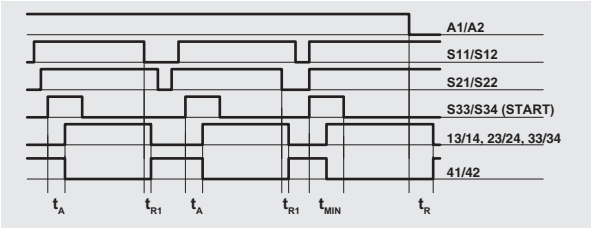


Function diagrams

Configuration with automatic start



Configuration with manual start



Legend:

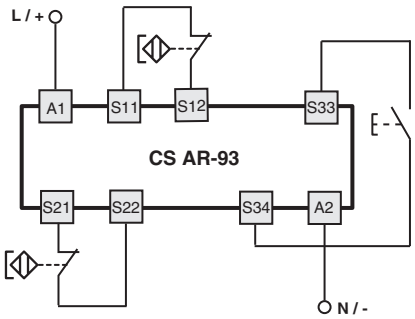
t_{MIN}: Min. duration of start impulse
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply

Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Input configuration

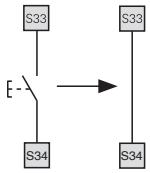
Input configuration with magnetic sensors

2 channels



Automatic start

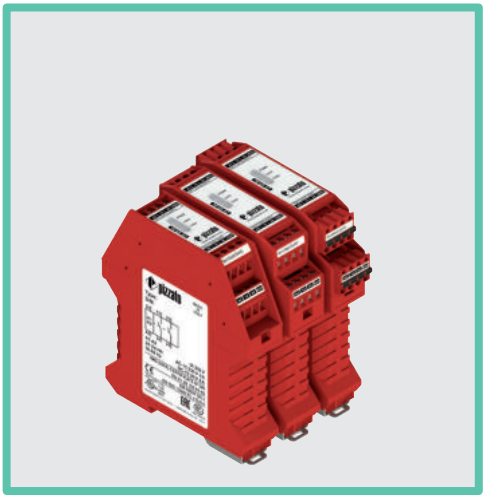
With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



Electromechanical switches

The safety module can control both magnetic sensors and electromechanical switches. Replace the sensor contacts with switch contacts.

CS AR-94 safety module



Module for floor levelling operations in lifts compliant to EN 81

Main features

- For safety applications up to SIL 3/PL e
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts: 2 NO safety contacts
- Supply voltage: 24 Vac/dc, 12 Vdc
- Insensitive to voltage dips

Utilization categories

Alternating current: AC15 (50...60 Hz)
U_e (V) 230
I_e (A) 3
Direct current: DC13 (6 oper. cycles/min.)
U_e (V) 24
I_e (A) 4

Quality marks:

EU-type examination certificate: IMQ no. 340
(EN 81-20/50:2020)
EC type examination certificate: IMQ CP 432 DM
(Machinery Directive)
UL approval: E131787
EAC approval: RU C-IT.УТ03.B.00035/19
CCC approval: 2021000305000107
UKCA approval: 772884
UKCA-type examination certificate: 772883

Compliance with the requirements of:

Machinery Directive 2006/42/EC,
EMC Directive 2014/30/EU,
Lift Directive 2014/33/EU,
RoHS Directive 2011/65/EU.

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 147, design A

General data

SIL level (SIL CL):	up to SIL 3 acc. to EN IEC 62061
Performance Level (PL):	Up to PL e acc. to EN ISO 13849-1
Safety category:	Up to category 4 acc. to EN ISO 13849-1
$MTTF_D$:	227 years
DC:	High
PFH_D:	1.13 E-10
Ambient temperature:	-25°C … +55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; ± 15%; 50 … 60 Hz 12 Vdc; -10% … +15%
Max. DC residual ripple in DC:	10%
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC response time:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 25 Ω (24 Vac/dc), ≤15 Ω (12 Vdc)
Current per input:	< 35 mA (24 Vac/dc), 65 mA (12 Vdc)
Min. duration of start impulse t_{MIN}:	> 300 ms
Response time t_A:	< 130 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 120 ms (24 Vac/dc), 70 ms (12 Vdc)
Simultaneity time t_C:	unlimited
Response time starting from application of the supply:	< 200 ms (24 Vac/dc), 400 ms (12 Vdc)

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 81-20, EN 81-50, UL 508, CSA C22.2 no. 14, GB/T14048.5-2017.

Output circuit

Output contacts:	2 NO safety contacts,
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See the paragraph on the CS ME series expansion modules in the General Safety Catalogue.

Code structure

CS AR-94V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc
U12	12 Vdc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

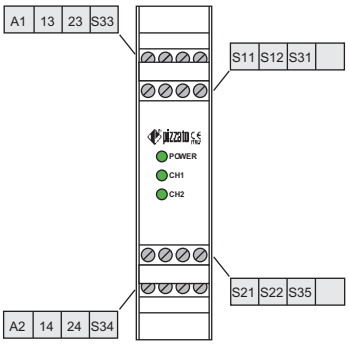
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

CS AR-94 safety module

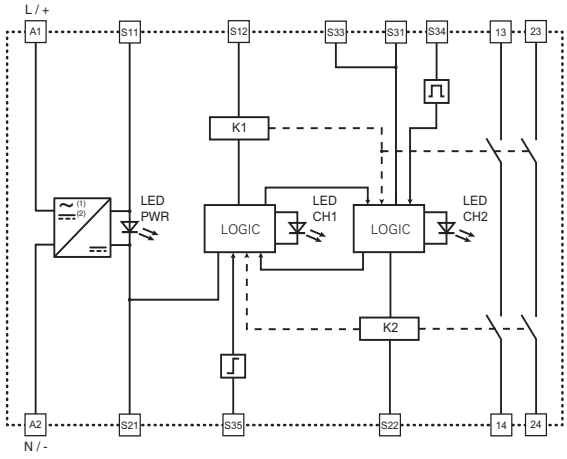
Pin assignment



Voltage dips, short interruptions and voltage variations

The CS AR-94 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage is restored, the device continues to operate with a switching state that is consistent with the input signals. The safety module retains its normal function during voltage dips and brief interruptions; for longer voltage interruptions, the safety outputs open and reset themselves automatically during an automatic start if voltage is restored or – in the case of a manual or monitored start – require that the system be reset by the operator.

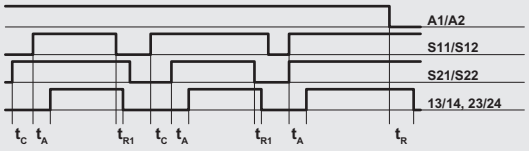
Internal wiring diagram



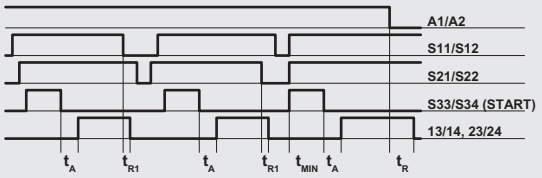
(1) articles CS AR-94•024 (2) articles CS AR-94•U12

Function diagrams

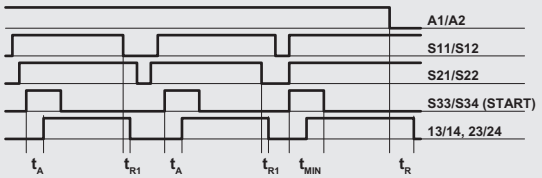
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

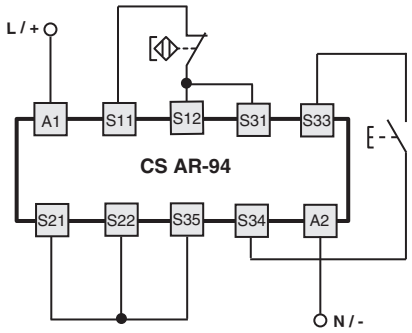
t_{MIN}:	Min. duration of start impulse	t_{R1}:	release time
t_C:	simultaneity time	t_R:	release time in absence of power supply
t_A:	response time		

Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

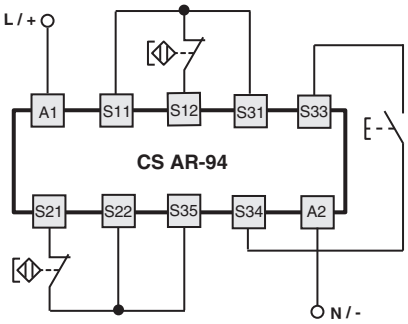
Input configuration

Input configuration with magnetic sensors

1 channel

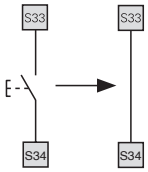


2 channels



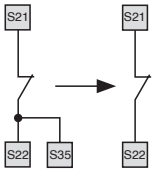
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



Monitored start

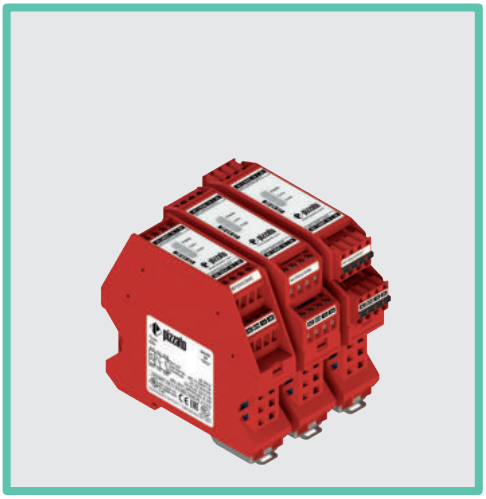
With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



Electromechanical switches

The safety module can control both magnetic sensors and electromechanical switches. Replace the sensor contacts with switch contacts.

CS AR-95 safety module



Module for floor levelling operations in lifts compliant to EN 81

Main features

- For safety applications up to SIL 3/PL e
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- 22.5 × 88.5 mm housing dimensions
- Output contacts: 2 NO safety contacts
- Supply voltage: 24 Vac/dc
- Insensitive to voltage dips

Utilization categories

Alternating current: AC15 (50...60 Hz)

U_e (V)	230
I_e (A)	3

Direct current: DC13 (6 oper. cycles/min.)

U_e (V)	24
I_e (A)	4

Quality marks:

EU-type examination certificate: IMQ no. 340
(EN 81-20/50:2020)
EC type examination certificate: IMQ CP 432 DM
(Machinery Directive)

UL approval:	E131787
EAC approval:	RU C-IT.УТ03.B.00035/19
CCC approval:	2021000305000107

UKCA approval: 772884
UKCA-type examination certificate: 772883

Compliance with the requirements of:
Machinery Directive 2006/42/EC,
EMC Directive 2014/30/EU,
Lift Directive 2014/33/EU,
RoHS Directive 2011/65/EU.

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 147, design D

General data

SIL level (SIL CL):	up to SIL 3 acc. to EN IEC 62061
Performance Level (PL):	Up to PL e acc. to EN ISO 13849-1
Safety category:	Up to category 4 acc. to EN ISO 13849-1
$MTTF_D$:	213 years
DC:	High
PFH_D:	5,42 E-09
Ambient temperature:	-25°C … +55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; ± 15%; 50 … 60 Hz
Max. DC residual ripple in DC:	10%
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC response time:	Response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 25 Ω
Current per input:	< 35 mA
Min. duration of start impulse t_{MIN}:	> 300 ms
Response time t_A:	< 250 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 100 ms
Simultaneity time t_C:	unlimited
Response time starting from application of the supply:	< 200 ms

In compliance with standards:
EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 81-20, EN 81-50, UL 508, CSA C22.2 no. 14, GB/T14048.5-2017.

Output circuit

Output contacts:	2 NO safety contacts,
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	36 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A type F

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See the paragraph on the CS ME series expansion modules in the General Safety Catalogue.

Code structure

CS AR-95V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

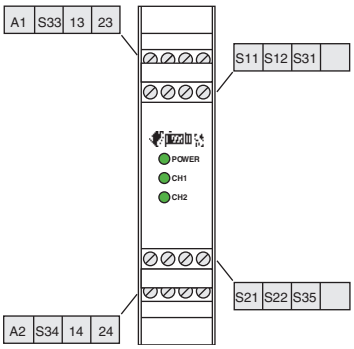
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

CS AR-95 safety module

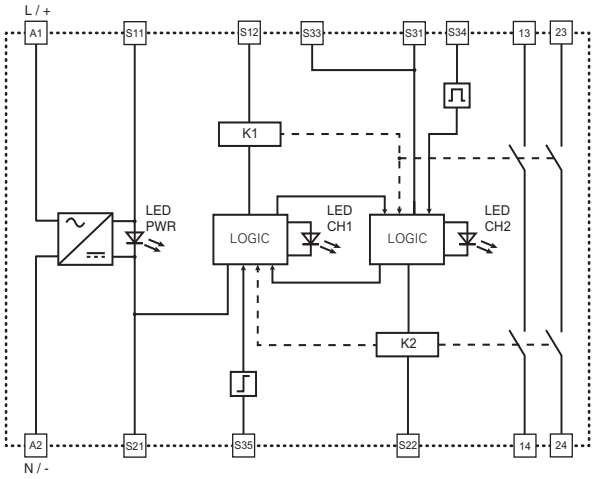
Pin assignment



Voltage dips, short interruptions and voltage variations

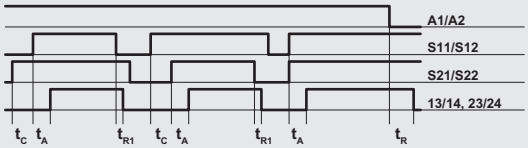
The CS AR-95 safety module has a built-in voltage drop sensor which serves to protect and safeguard the internal state of the safety relays, in the event of dips or short voltage interruptions. This is to prevent unwanted switching states in relation to the state of the inputs from occurring. When voltage is restored, the device continues to operate with a switching state that is consistent with the input signals. The safety module retains its normal function during voltage dips and brief interruptions; for longer voltage interruptions, the safety outputs open and reset themselves automatically during an automatic start if voltage is restored or – in the case of a manual or monitored start – require that the system be reset by the operator.

Internal wiring diagram

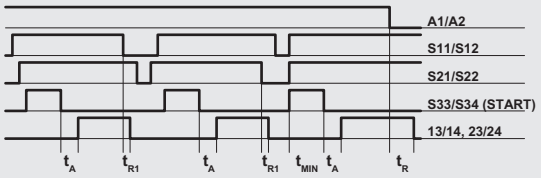


Function diagrams

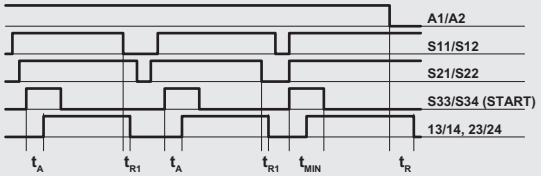
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

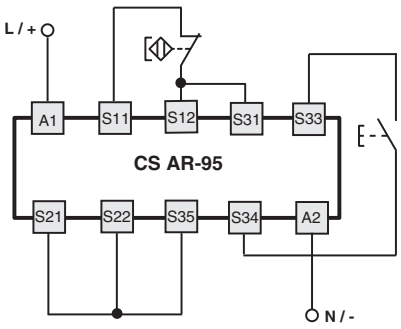
t_{MIN}:	Min. duration of start impulse	t_{R1}:	release time
t_C:	simultaneity time	t_R:	release time in absence of power supply
t_A:	response time		

Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

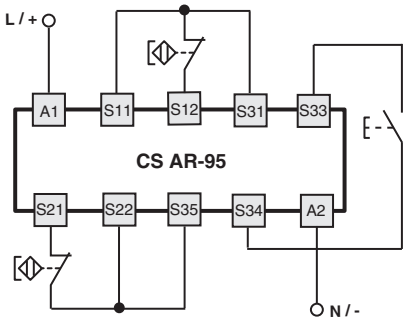
Input configuration

Input configuration with magnetic sensors

1 channel

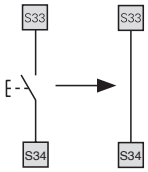


2 channels



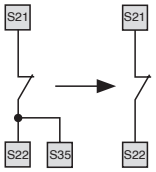
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



Monitored start

With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



Electromechanical switches

The safety module can control both magnetic sensors and electromechanical switches. Replace the sensor contacts with switch contacts.

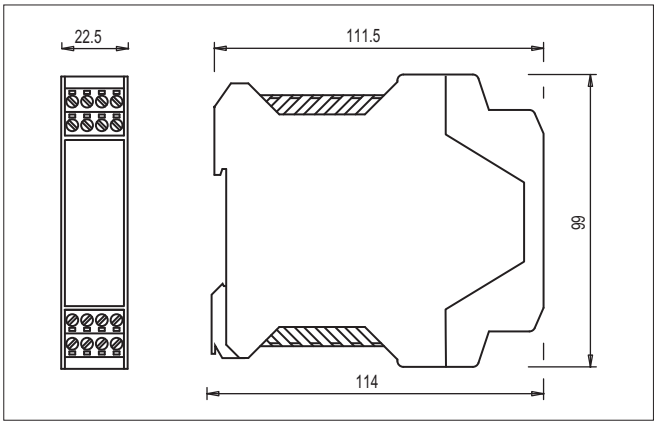
Dimensional drawings, housings features

Design A, housing width 22.5 mm

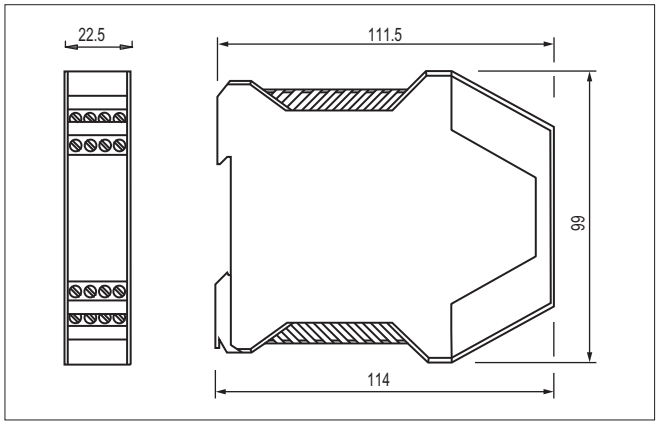
Connection data

Terminal tightening torque:	0.5 … 0.6 Nm
Cable cross section:	0.2…2.5 mm²
	24…12 AWG

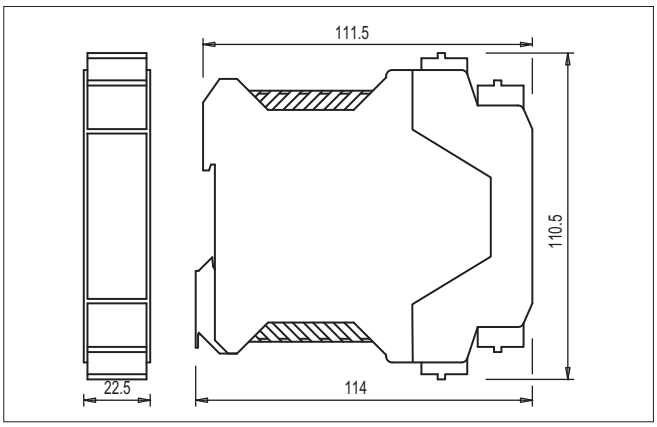
Installation
Snap-mounting on DIN rails



Connector with screw terminals



Screw terminals



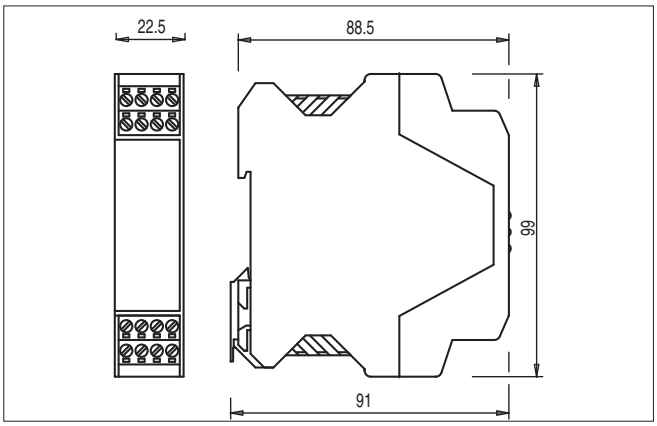
Connector with spring terminals

Design D, housing width 22.5 mm

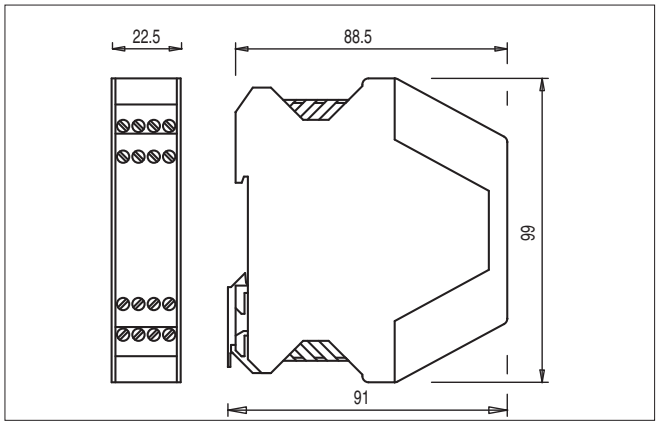
Connection data

Terminal tightening torque:	0.5 … 0.6 Nm
Cable cross section:	0.2…2.5 mm²
	24…12 AWG

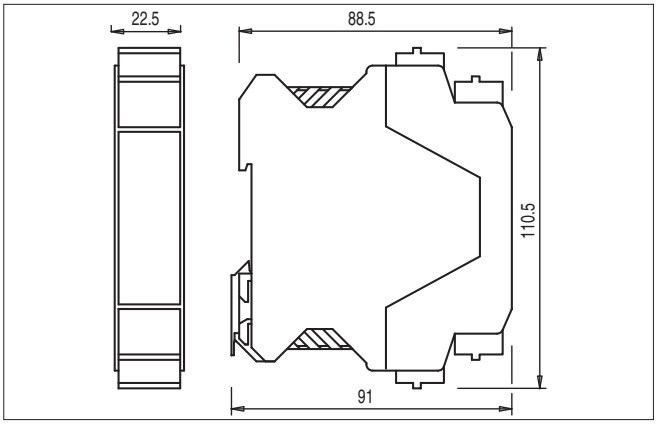
Installation
Snap-mounting on DIN rails



Connector with screw terminals



Screw terminals



Connector with spring terminals

All values in the drawings are in mm

Notes

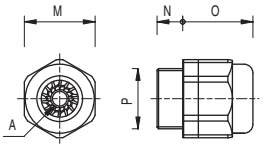
Strain relief cable glands

Packs of **10 pcs.**

This particular design ensures high resistance to traction of the cable glands. All cable glands are also suitable for a wide range of cable diameters.
Suitable for circular cross-section cables only.

Technical data:

Body and ring material:	technopolymer without halogen
Protection degree:	IP67 acc. to EN 60529
Tightening torque:	3 … 4 Nm (PG 13.5/M20/M25) 2 … 2.5 Nm (PG 11/M16)



	Article	Description	A	⬡M	N	O	P
Metric threads	VF PAM25C7N	Cable gland M25x1.5 for a cable from Ø 10 to Ø 17 mm	○	30	10	28	M25x1.5
	VF PAM20C6N	M20x1.5 cable gland for one cable Ø 6 … 12 mm	○	24	9	24	M20x1.5
	VF PAM20C5N	M20x1.5 cable gland for one cable Ø 5 … 10 mm	◯	24	9	24	M20x1.5
	VF PAM20C3N	M20x1.5 cable gland for one cable Ø 3 … 7 mm	◯	24	9	24	M20x1.5
	VF PAM16C5N	M16x1.5 cable gland for one cable Ø 5 … 10 mm	○	22	7.5	23	M16x1.5
	VF PAM16C4N	M16x1.5 cable gland for one cable Ø 4 … 8 mm	◯	22	7.5	23	M16x1.5
	VF PAM16C3N	M16x1.5 cable gland for one cable Ø 3 … 7 mm	◯	22	7.5	23	M16x1.5
	VF PAM20CBN	M20x1.5 multi-hole cable gland for 2 cables Ø 3 … 5 mm	◉	24	9	23	M20x1.5
	VF PAM20CDN	M20x1.5 multi-hole cable gland for 3 cables Ø 1 … 4 mm	◉	24	9	23	M20x1.5
	VF PAM20CEN	M20x1.5 multi-hole cable gland for 3 cables Ø 3 … 5 mm	◉	24	9	23	M20x1.5
	VF PAM20CFN	M20x1.5 multi-hole cable gland for 4 cables Ø 1 … 4 mm	◉	22	9	23	M20x1.5
PG threads	VF PAP13C6N	PG 13.5 cable gland for one cable from Ø 6 … 12 mm	○	24	9	24	PG 13.5
	VF PAP13C5N	PG 13.5 cable gland for one cable from Ø 5 … 10 mm	◯	24	9	24	PG 13.5
	VF PAP13C3N	PG 13.5 cable gland for one cable from Ø 3 … 7 mm	◯	24	9	24	PG 13.5
	VF PAP11C5N	PG 11 cable gland for one cable from Ø 5 … 10 mm	○	22	7.5	23	PG 11
	VF PAP11C4N	PG 11 cable gland for one cable from Ø 4 … 8 mm	◯	22	7.5	23	PG 11
	VF PAP11C3N	PG 11 cable gland for one cable from Ø 3 … 7 mm	◯	22	7.5	23	PG 11

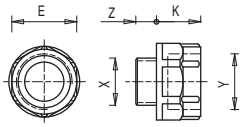
Thread adapters

Packs of **100 pcs.**

Thread adapters make it possible to fulfil requests for switches with a different thread to those generally found in stock. This means it is possible to offer customers a single product type with various threaded connections, while only having to stock the product itself and many kinds of adapters.

Technical data:

Body material:	glass fibre reinforced technopolymer
Tightening torque:	3 … 4 Nm



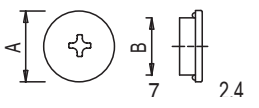
Article	Description	X	Y	Z	K	⬡E
VF ADPG13-PG11	Adapter from PG 13.5 to PG 11	PG 13.5	PG 11	9	12	22
VF ADPG13-M20	Adapter from PG 13.5 to M20x1.5	PG 13.5	M20x1.5	9	14	24
VF ADPG13-1/2NPT	Adapter from PG 13.5 to 1/2 NPT	PG 13.5	1/2 NPT	9	14	24
VF ADPG11-1/2NPT	Adapter from PG 11 to 1/2 NPT	PG 11	1/2 NPT	7	14	24
VF ADPG11-PG13	Adapter from PG 11 to PG 13.5	PG 11	PG 13.5	7	14	24
VF ADM20-1/2NPT	Adapter from M20 x 1.5 to 1/2 NPT	M20 x 1.5	1/2 NPT	9	14	24

Protection caps

Packs of **10 pcs.**

Technical data:

Body material:	technopolymer, self-extinguishing
Protection degree:	IP67 acc. to EN 60529 IP69K acc. to ISO 20653
Tightening torque:	1.2 … 1.6 Nm
Cross-recessed screw:	PH3

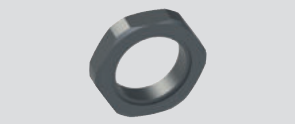


Article	Description	A	B
VF PTM20	Protection cap M20x1.5	24	M20x1.5
VF PTG13.5	Protection cap PG13.5	24	PG 13.5

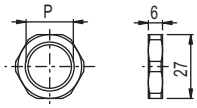
All values in the drawings are in mm

Threaded nuts

Packs of **10 pcs.**



Technical data:
Tightening torque: 1.2 … 2 Nm



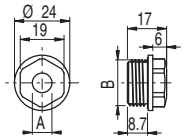
	Article	Description	S	CH	P
Plastic	VF DFPM25	Plastic nut, threaded, M25x1.5	6	32	M25x1.5
	VF DFPM20	Plastic nut, threaded, M20x1.5	6	27	M20x1.5
	VF DFPM16	Plastic nut, threaded, M16x1.5	5	22	M16x1.5
	VF DFPP13	Plastic nut, threaded, PG13.5	6	27	PG 13.5
Metal	VF DFMM20	M20x1.5 threaded nut in nickel-plated brass	3	23	M20x1.5

Chock plugs

Packs of **100 pcs.**

Technical data:
Body material: technopolymer
Protection degree: IP54 acc. to EN 60529
Tightening torque: 0.8 … 1 Nm

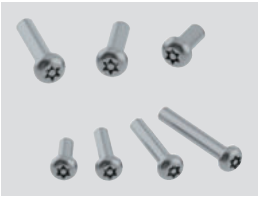
Note: Use a socket wrench for tightening.



Article	Description	A	B
VF PFM20C8N	M20x1.5 chock plug for cables from Ø 8…Ø 12 mm	7.5	M20x1.5
VF PFM20C4N	M20x1.5 chock plug for cables from Ø 4…Ø 8 mm	3.5	M20x1.5

Torx safety screws

Packs of **10 pcs.**



Pan head screws with Torx fitting and pin, stainless steel.
Use a thread locker where required for applications acc. to. EN ISO 14119.

Article	Description
VF VAM4X10BX-X	M4x10 screw, with Torx T20 fitting, AISI 304
VF VAM4X15BX-X	M4x15 screw, with Torx T20 fitting, AISI 304
VF VAM4X20BX-X	M4x20 screw, with Torx T20 fitting, AISI 304
VF VAM4X25BX-X	M4x25 screw, with Torx T20 fitting, AISI 304
VF VAM4X30BX-X	M4x30 screw, with Torx T20 fitting, AISI 304
VF VAM5X10BX-X	M5x10 screw, with Torx T25 fitting, AISI 304
VF VAM5X15BX-X	M5x15 screw, with Torx T25 fitting, AISI 304
VF VAM5X20BX-X	M5x20 screw, with Torx T25 fitting, AISI 304
VF VAM5X25BX-X	M5x25 screw, with Torx T25 fitting, AISI 304
VF VAM5X35BX-X	M5x35 screw, with Torx T25 fitting, AISI 304
VF VAM5X45BX-X	M5x45 screw, with Torx T25 fitting, AISI 304

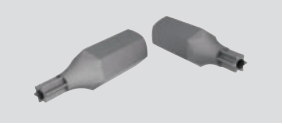
OneWay safety screws

Packs of **10 pcs.**

Pan head screws with OneWay fitting in stainless steel.
This screw type cannot be removed or tampered with using common tools. Ideal for fixing safety device actuators in accordance with EN ISO 14119.

Article	Description
VF VAM4X10BW-X	M4x10 screw, with OneWay fitting, AISI 304
VF VAM4X15BW-X	M4x15 screw, with OneWay fitting, AISI 304
VF VAM4X20BW-X	M4x20 screw, with OneWay fitting, AISI 304
VF VAM4X25BW-X	M4x25 screw, with OneWay fitting, AISI 304
VF VAM5X10BW-X	M5x10 screw, with OneWay fitting, AISI 304
VF VAM5X15BW-X	M5x15 screw, with OneWay fitting, AISI 304
VF VAM5X20BW-X	M5x20 screw, with OneWay fitting, AISI 304
VF VAM5X25BW-X	M5x25 screw, with OneWay fitting, AISI 304

Bits for Torx safety screws



Bits for Torx safety screws with pin, with ¼" hexagonal connection.

Article	Description
VF VAIT1T20	Bits for M4 screws with Torx T20 fitting
VF VAIT1T25	Bits for M5 screws with Torx T25 fitting
VF VAIT1T30	Bits for M6 screws with Torx T30 fitting

All values in the drawings are in mm

Fixing plates

Metal fixing plate, for fixing rope switches on the ceiling.
The plate is provided with bore holes for fasting switches of the series. It is supplied without screws.

Article	Description
VF SFP2	Ceiling fixing plate

Fixing plates

Fixing plate (complete with fastening screws) provided with long slots for adjusting the operating point. Each plate is provided with two pairs of mounting holes, one for standard switches and one for switches with reset device. The actuator thus always has the same actuating point.

Article	Description
VF SFP1	Fixing plate (FR series)
VF SFP3	Fixing plate (FX series)

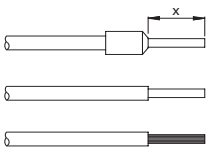
LED signalling lights

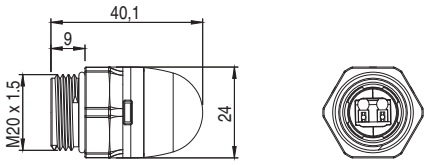
Packs of **5 pcs.**

These signalling lights with high luminosity LEDs are used for signalling that an electric contact has changed its state inside the switch. They can be installed on switches of the FL, FX, FZ, FW, FG, NG or FS series by screwing them on one of the conduit entries not used for electric cables. They can be used for many different purposes: for example, to signal, from a distance, whether the switch has been actuated; whether the guard has closed correctly; or whether the guard is locked or unlocked.
The inner part can rotate in such a way that it can be wired and screwed on the switch without any risk of twisting the wires.

Technical data:

Protection degree:	IP67 acc. to EN 60529 IP69K acc. to ISO 20653
Ambient temperature:	-25°C … +70°C
Operating voltage U_n:	24 Vac/dc (10 mA) 120 Vac (20 mA) 230 Vac (20 mA)
Tolerance on the supply voltages:	±15% of U_n
Operating current:	10 mA
Connection system:	PUSH-IN spring type
Cross-section of rigid/flexible wires w. wire-end sleeve:	min. 1 x 0.34 mm² (1 x AWG 24) max. 1 x 1.5 mm² (1 x AWG 16)
Wire cross-section with pre-insulated wire-end sleeve:	min. 1 x 0.34 mm² (1 x AWG 24) max. 1 x 0.75 mm² (1 x AWG 18)
Tightening torque.	1.2 … 2 Nm
Cable stripping length (x):	min.: 8 mm max.: 12 mm





Application examples

Switch status indicator

Code structure

Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

VF SL1A3PA1

Operating voltage	
1	24 Vac/dc
3	120 Vac
4	230 Vac

Body design	
A	Total height 40 mm, spherical lens, threading M20x1.5mm

Type of light source	
A	standard LED with continuous light

Connection type	
P	PUSH-IN terminal strip

Lens colour	
2	White
3	Red
4	Green
5	Yellow

Stock items

VF SL1A3PA1
VF SL1A5PA1

All values in the drawings are in mm

Installation of single switches with safety functions

- Use **only** switches with the symbol ⊖ (see figure on the side).
- Connect the safety circuit to **the NC normally closed contacts (11-12, 21-22 or 31-32).**
- **The NO normally open contacts (13-14, 23-24, 33-34)** should be used **only for signalling**; these contacts are not to be connected with the safety circuit. However, if two or more switches are used on the same guard, a connection can be established between the NO contacts and the safety circuit.
  In this case at least one of the two switches must have positive opening and a normally closed contact NC (11-12, 21-22 or 31-32) must be connected to the safety circuit.
- Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol ⊖.
- The actuation system must be able to exert a force that is greater than the **positive opening force**, as specified in brackets below each article, next to the minimum force value.
- The device must be affixed in compliance with EN ISO 14119.

Whenever the machine guard is opened and during the whole opening travel, **the switch must be pressed directly** (fig. 1) **or through a rigid connection** (fig. 2)**.**
Only in this way the positive opening of the normally closed NC contacts (11-12, 21-22, 31-32) is guaranteed.

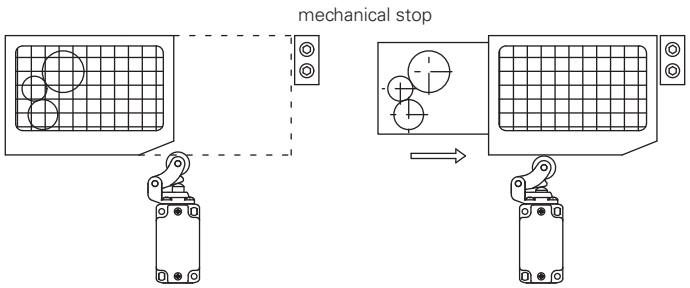


Fig.1

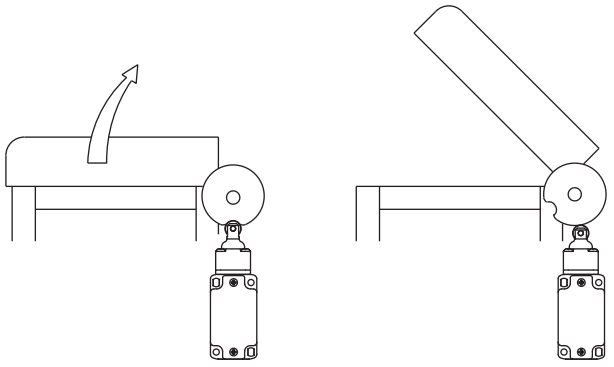


Fig.2

In safety applications with only one switch for each guard, the switches **must never be activated by a release** (fig. 3 and 4) **or through a non rigid connection** (i.e. by a spring).

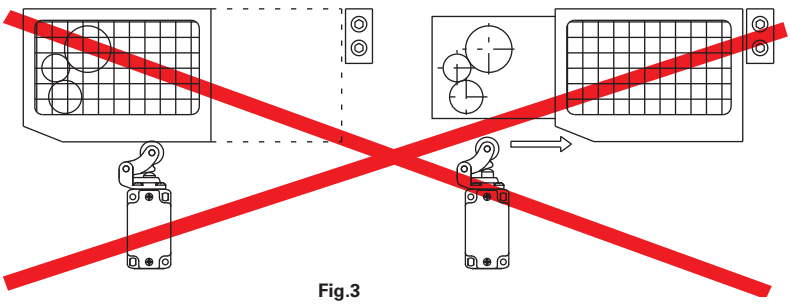


Fig.3

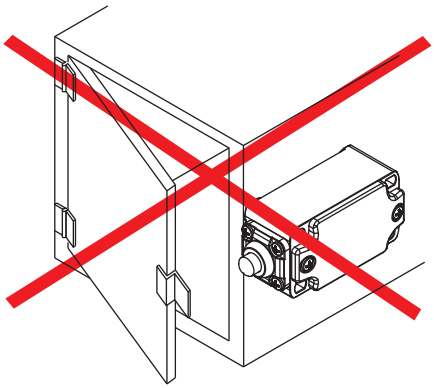
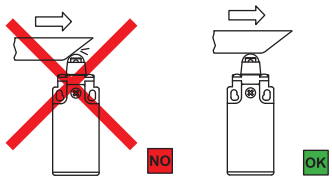


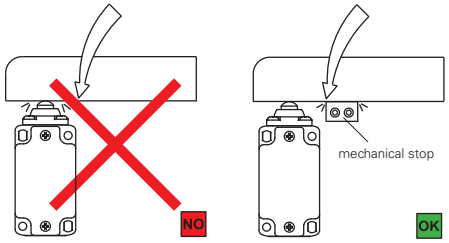
Fig.4

Mechanical stop

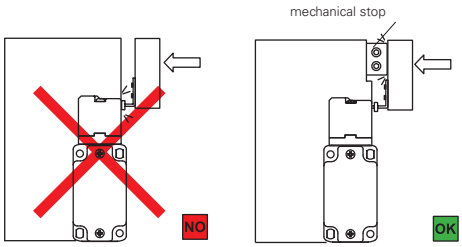
Acc. to EN ISO 14119 paragraph 5.2 letter h) “the position sensors must not be used as mechanical stop”.



The actuator must not exceed the max. travel as indicated in the travel diagrams.

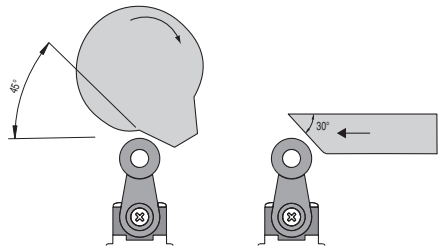
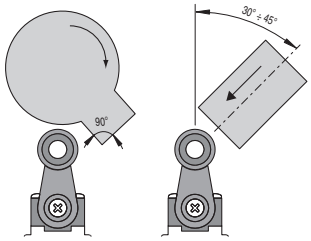
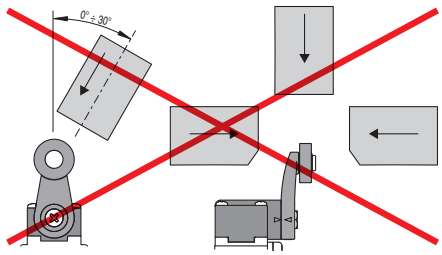
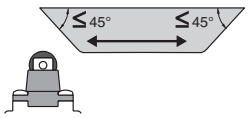
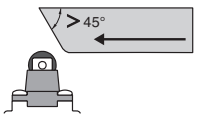
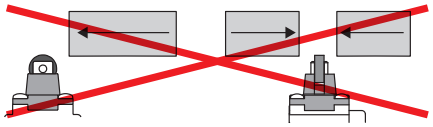
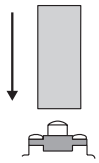
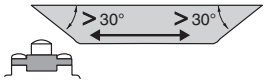
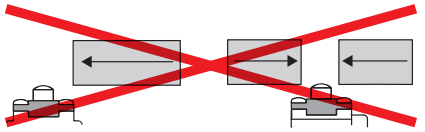


The guard must not use the switch head as a mechanical stop.



The actuator must not strike directly against the switch head.

Actuation modes

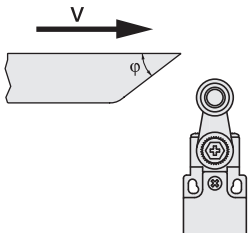
Recommended application	Application to avoid This application is possible, but increased mechanical stress may shorten the operating life of the switch	Forbidden application
		
		
		

FR, FX, FT, VF B series switches for standard applications

Maximum and minimum actuation speed

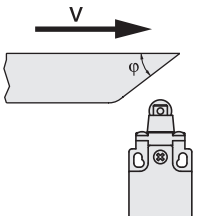
Roller lever - Type 1

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	2.5	9	0.07
30°	1.5	8	
45°	1	7	
60°	0.75	7	



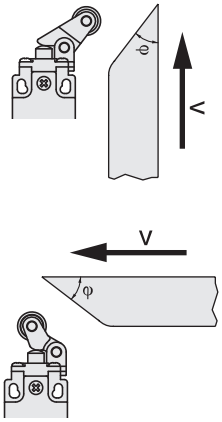
Roller plunger - Type 2

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	1	4	0.04
30°	0.5	2	0.02
45°	0.3	1	0.01



Roller lever - Type 3

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	1	5	0.05
30°	0.5	2.5	0.025
45°	0.3	1.5	0.015

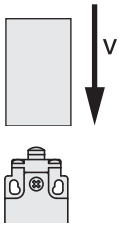


Contact type:

R = snap action
L = slow action

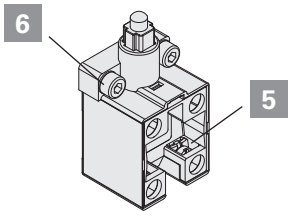
Plunger - Type 4

Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
0.5	1	0.01

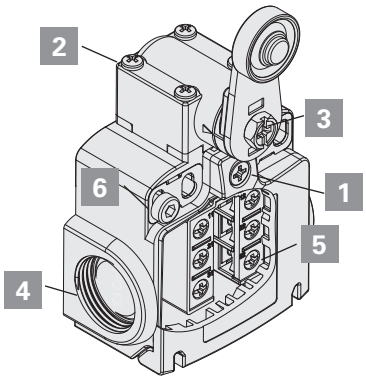


Tightening torques

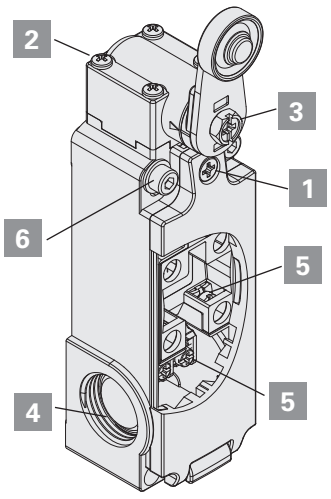
1	Cover screws	**0.7 ... 0.9 Nm**
2	Head screws	**0.5 ... 0.7 Nm**
3	Lever screw	**0.7 ... 0.9 Nm**
4	Protection caps	**1.2 ... 1.6 Nm**
5	Contact block screws	**0.6 ... 0.8 Nm**
6	M4 fixing screws, body (with washer for FR, FT, VF B series)	**2 ... 2.5 Nm**



VF B



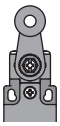
FR - FX

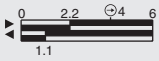
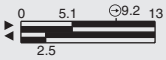
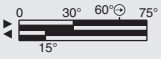
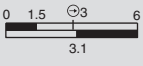
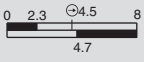
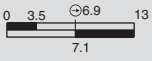
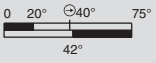


FT

Travel diagrams FR, FX series



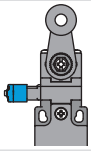



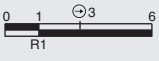
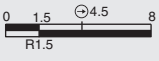
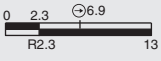
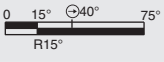
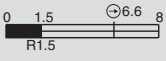
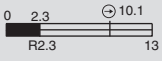
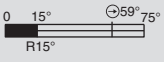
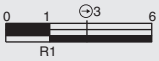
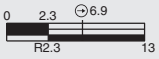
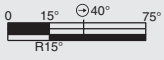
Contact block	Group 1a	Group 2a	Group 3a	Group 4a
5 1NO+1NC				
6 1NO+1NC				
7 1NO+1NC				
9 2NC				
16 2NC	/	/	/	

Legend
Closed contact | Open contact | Positive opening travel acc. to EN 60947-5-1 | ► Switch pressed / ◄ Switch released

Travel diagrams FR, FX series with reset



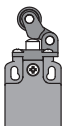



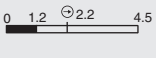
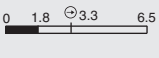
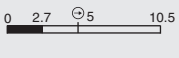
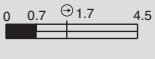
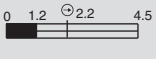
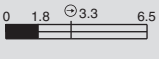
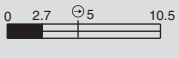
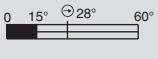
Contact block	Group 1c	Group 2c	Group 3c	Group 4c
6 1NO+1NC				
9 2NC				
20 1NO+2NC				

Legend:
Closed contact | Open contact | Positive opening travel acc. to EN 60947-5-1

Travel diagrams FT series





Contact block	Group 1d	Group 2d	Group 3d	Group 4d	Group 5d
63 1NC					
64 2NC					

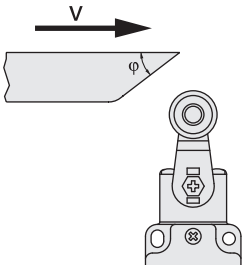
Legend:
Closed contact | Open contact | Positive opening travel acc. to EN 60947-5-1

FP series switches for heavy duty applications

Maximum and minimum actuation speed

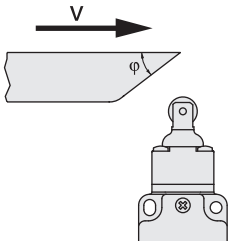
Roller lever - Type 1

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	2.5	9	0.07
30°	1.5	8	
45°	1	7	
60°	0.75	7	



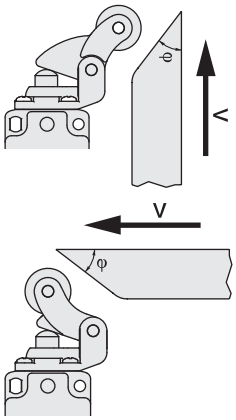
Roller plunger - Type 2

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	1	4	0.04
30°	0.5	2	0.02
45°	0.3	1	0.01



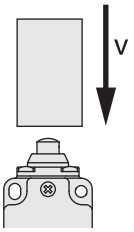
Roller lever - Type 3

φ	Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
15°	1	5	0.05
30°	0.5	2.5	0.025
45°	0.3	1.5	0.015



Plunger - Type 4

Vmax (m/s)	Vmin (mm/s) L	Vmin (mm/s) R
0.5	1	0.01

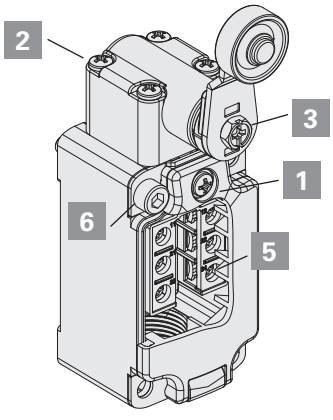


Contact type:

R = snap action
L = slow action

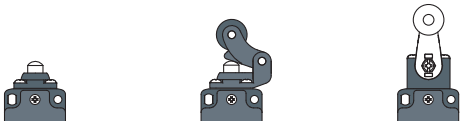
Tightening torques

1	Cover screws	**0.8 ... 1.2 Nm**
2	Head screws	**0.8 ... 1.2 Nm**
3	Lever screw	**0.8 ... 1.2 Nm**
5	Contact block screws	**0.6 ... 0.8 Nm**
6	M5 fixing screws, body	**2 ... 3 Nm**



FP

Travel diagrams



Contact block		Group 1b	Group 2b	Group 3b
5 1NO+1NC	13 21 / 14 22	0 2.2 4 6 / 1.1	0 2.7 4.9 8 / 1.4	0 30° 60° 75° / 15°
6 1NO+1NC	11 23 / 12 24	0 1.5 3 6 / 3.4	0 1.8 3.7 8 / 4.2	0 22° 42° 75° / 42°
7 1NO+1NC	11 23 / 12 24	0 3.1 4.6 6 / 1.6	0 3.8 5.7 8 / 2	0 40° 60° 75° / 23°
9 2NC	11 21 / 12 22	0 2.9 4.4 6	0 3.6 5.4 8	0 40° 60° 75°
16 2NC	11 21 / 12 22	/	/	66° 0 26° 30° / 37° 26° 66°

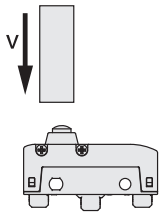
Legend
Closed contact | Open contact | Positive opening travel acc. to EN 60947-5-1 |
▶ Switch pressed / ◀ Switch released

MK series microswitches

Maximum and minimum actuation speed

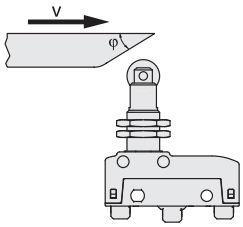
Plunger - Type 1

Vmax (m/s)	Vmin (mm/s)
0.5	0.05



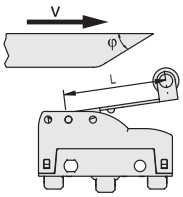
Roller plunger - Type 2

φ	Vmax (m/s)	Vmin (mm/s)
15°	0.6	0.2
30°	0.3	0.1
45°	0.1	0.05



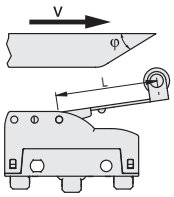
Roller lever with direct action (D) - Type 6

φ	Vmax (m/s)	Vmin (mm/s)
15°	0.1 x L	0.0664 x L
30°	0.05 x L	0.0332 x L
45°	0.03 x L	0.0166 x L



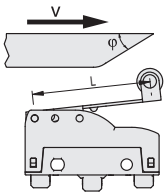
Roller lever with inverted action (R) - Type 7

φ	Vmax (m/s)	Vmin (mm/s)
15°	0.048 x L	0.0332 x L
30°	0.024 x L	0.0166 x L
45°	0.015 x L	0.0083 x L



Roller lever with direct action, rear (F) - Type 8

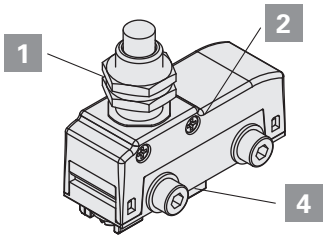
φ	Vmax (m/s)	Vmin (mm/s)
15°	0.032 x L	0.0188 x L
30°	0.016 x L	0.0094 x L
45°	0.01 x L	0.0047 x L

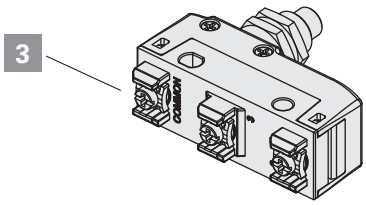


Tightening torques

1 Fixing nuts **2 ... 3 Nm**
2 Head screws **0.4 ... 0.5 Nm**
3 Terminal screws **0.6 ... 0.8 Nm**
4 M4 fixing screws, body (insert washer) **0.8 ... 1.2 Nm**

Attention: A tightening torque higher than 1.2 Nm can cause the breaking of the microswitch.

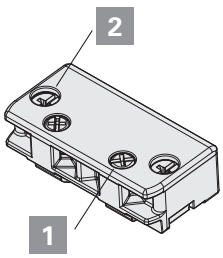


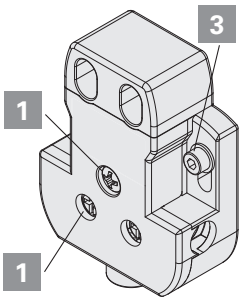


DS series door contacts

Tightening torques

1 Terminal screws **0.8 ... 1.2 Nm**
2 Fixing screws **2 ... 3 Nm**
3 M4 fixing screws (with interposed washer) **1 ... 2 Nm**

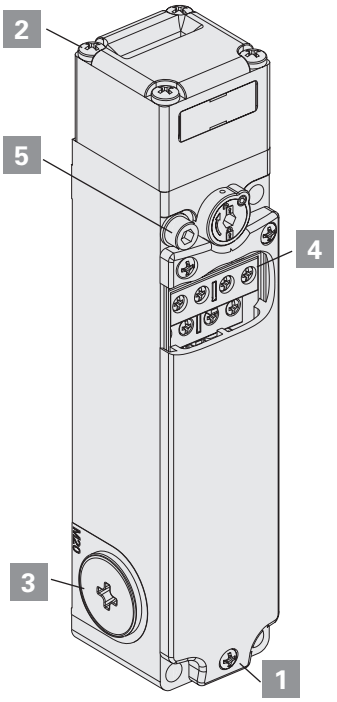




Switches for heavy duty applications

Tightening torques – FD, FP, FL, FC, FG, FY, FS, NG, NS series

1	Cover screws	**0.8 … 1.2 Nm**
2	Head screws	**0.8 … 1.2 Nm**
3	Protection caps (conduit entry M20/PG13.5)	**1.2 … 1.6 Nm**
4	Contact block screws	**0.6 … 0.8 Nm**
5	M5 fixing screws, body FD, FP, FL, FC, FG, FY, FS, NG (with washer for FS series)	**2 … 3 Nm**



FG - FY - NG

Notes

General requirements

The device is designed to be installed on industrial machineries.

The installation must be performed only by qualified staff aware of the regulations in force in the Country of installation.

The device must be used exactly as supplied, properly fixed to the machine and wired.

It is not allowed to disassemble the product and use only parts of the same, the device is designed to be used in its assembly as supplied. It is prohibited to modify the device, even slightly e.g.: replace parts of it, drill it, lubricate it, clean it with gasoline or gas oil or any aggressive chemical agents.

The protection degree of the device refers to the electrical contacts only. Carefully evaluate all the polluting agents present in the application before installing the device, since the IP protection degree refers exclusively to agents such as dust and water according to EN 60529. Thus the device may not be suitable for installation in environments with dust in high quantity, condensation, humidity, steam, corrosive and chemical agents, flammable or explosive gas, flammable or explosive dust or other polluting agents.

Some devices are provided with a housing with openings for connecting the electrical cables. To guarantee an adequate protection degree of the device, the opening that the wiring passes through must be protected against the penetration of harmful materials by means of an appropriate seal. Proper wiring therefore requires the use of cable glands, connectors or other devices with IP protection degree that is equal to or greater than that of the device.

Store the products in their original packaging, in a dry place with temperature between -40° C and +70°C

Failure to comply with these requirements or incorrect use during operation can lead to the damage of the device and the loss of the function performed by the device itself. This will result in termination of the warranty on the item and will release the manufacturer from any liability.

Using the devices

- Before use, check if the national rules provide for further requirements in addition to those given here.
- Before installation, make sure the device is not damaged in any part.
- All devices are designed for actuation by moving parts of industrial machines.
- Do not use the device as a mechanical stop of the actuator.
- Do not apply excessive force to the device once it has reached the end of its actuation travel.
- Do not exceed the maximum actuation travel.
- Avoid contact of the device with corrosive fluids.
- Do not stress the device with bending or torsion.
- Do not disassemble or try to repair the device, in case of defect or fault replace the entire device.
- In case the device is deformed or damaged it must be entirely replaced. Correct operation cannot be guaranteed if the device is deformed or damaged.
- Always attach the following instructions to the manual of the machine in which the device is installed.
- If specific operating instructions exist for a device (supplied or downloadable from .pizzato.com), they must always be included with the machine manual and be available for the entire service life of the machine.
- These operating instructions must be kept available for consultation at any time and for the whole period of use of the device.

Wiring and installation

- Installation must be carried out by qualified staff only.
- Use of the device is limited to function as a control switch.
- Observe minimum distances between devices (if provided).
- Comply with the tightening torques indicated in this catalogue.
- Keep the electrical load below the value specified by the respective utilization category.
- Disconnect the power before to work on the contacts, also during the wiring.
- Do not paint or varnish the devices.
- Install the product on flat and clean surfaces only.
- Do not bend or deform the device during installation.
- Never use the device as support for other machine components (cable ducts, tubes, etc.)
- For installation on the machine, use the intended bore holes in the housing. The device must be fixed with screws of adequate length and resistance to the expected stress. At least two screws (fitted to holes most suitable for the intended use) are required to fix the housing to the machine.
- After and during installation, do not pull the electrical cables connected to the device. If excessive tension is applied to the cables (that is not supported by an appropriate cable gland), the contact block of the device may be damaged.
- Provided that the device has an electrical connector, always switch off the circuit voltage before disconnecting the connector from the switch. The connector is not suitable for separation of electrical loads.
- During wiring comply with the following requirements:
  - for terminals (if present), comply with the minimum and maximum cross-sections of the conductors;
  - tighten the electrical terminals (if present) with the torque indicated in this catalogue;
  - do not introduce polluting agents into the device as: talc, lubricants for cable sliding, powder separating agents for multipolar cables, small strands of copper and other pollutants that could affect the proper functioning of the device;
  - before closing the device cover (if present) verify the correct positioning of the gaskets;
  - verify that the electrical cables, wire-end sleeves, cable numbering systems and any other parts do not obstruct the cover from closing correctly or if pressed between them do not damage or compress the internal contact block;
  - for devices with integrated cable, the free end of the cable must be properly connected inside a protected housing. The electrical cable must be properly protected from cuts, impacts, abrasion, etc.
- After installation and before commissioning of the machine, verify:
  - the correct operation of the device and all its parts;
  - the correct wiring and tightening of all screws;
  - the actuating travel of the actuator must be shorter than the maximum travel allowed by the device.
- After installation, periodically check for correct device operation.

Do not use in following environments:

- Environments where dust and dirt can cover the device and by sedimentation stop its correct working.
- Environment where sudden temperature changes cause condensation.
- Environments where coatings of ice may form on the device.

- Environments where the application causes knocks or vibrations that could damage the device.
- Environment with presence of explosive or flammable gas or dust.

Limits of use

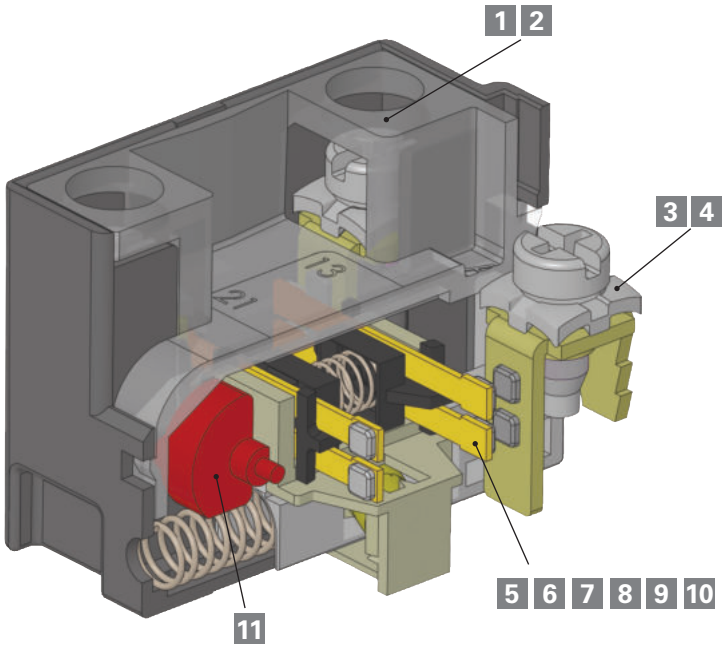
- Use the devices following the instructions, complying with their operation limits and the standards in force.
- The devices have specific application limits (min. and max. ambient temperature, mechanical endurance, protection degree, utilisation category, etc.) These limits are met by the different devices only if considered individually and not if combined with each other. For further information contact our technical department.
- The utilization implies knowledge of and compliance with following standards: EN 60204-1, EN 60947-5-1, ISO 12100, EN ISO 14119.
- Please contact our technical department for information and assistance (phone +39.0424.470.930 / e-mail tech@pizzato.com) in the following cases:
- Cases not mentioned in the present utilization requirements.
- In nuclear power stations, trains, airplanes, cars, incinerators, medical devices or any application where the safety of two or more persons depend on the correct operation of the device.

Additional requirements for safety applications

- Provided that all previous requirements for the devices are fulfilled, for installations with operator protection function additional requirements must be observed.
- The utilization implies knowledge of and compliance with following standards: IEC 60204-1, IEC 60947-5-1, ISO 12100, EN ISO 14119, EN 62061, EN ISO 13849-1, EN ISO 13850.
- The protection fuse (or equivalent device) must be always connected in series with the NC contacts of the safety circuit.
- Periodically verify the correct working of the safety devices; the periodicity of this verification is settled by the machine manufacturer based on the machine danger degree and it does not have to be less than one a year.
- After installation and before commissioning of the machine, verify:
  - the correct operation of the device and all its parts;
  - the correct wiring and tightening of all screws;
  - the actuating travel of the actuator must be shorter than the maximum travel allowed by the device;
  - the actuating travel of the actuator must be greater than the positive opening travel;
  - the actuation system must be able to exert a force that is greater than the positive opening force.
- Devices with a safety function have a limited service life. Although still functioning, after 20 years from the date of manufacture the device must be replaced completely.
- The production date can be derived from the production batch on the item. Example: A24 FD7-411. The batch's first letter refers to the month of manufacture (A=January, B=February, etc.) The second and third letters refer to the year of manufacture (24 = 2024, 25 = 2025, etc.)

Features

The contact blocks developed by Pizzato Elettrica are the result of more than 30 years of development experience and millions of sold switches. The range of available contact blocks is one of the most extensive in the world in the sector of position switches.
This chapter introduces to some features of Pizzato Elettrica contact blocks, in order to give the final user a better understanding of the technologies behind that element simply named "contact".
We underline that contact blocks are not available for sale (to the public) separately from switches, both because some of them are mechanically connected to the switch and because some technical features may change in accordance with the switch and its function. The following data is only intended to serve as an aid for the initial selection of the contact block. It is not to be used for determining the characteristics of the switch that uses this contact block. For example, the use of a contact block with positive opening with a switch with flexible actuator results in the combination of the two devices not having positive opening.
In this chapter, the properties of the E1 electronic contact block are explained in detail. It is used with position switches with multiple monitoring tasks that would require extensive effort to realize with electronic sensors. There is no other electronic sensor on the market that can match this contact unit with respect to precision and repeatability, adjustment of the switching point, operating temperature and price.

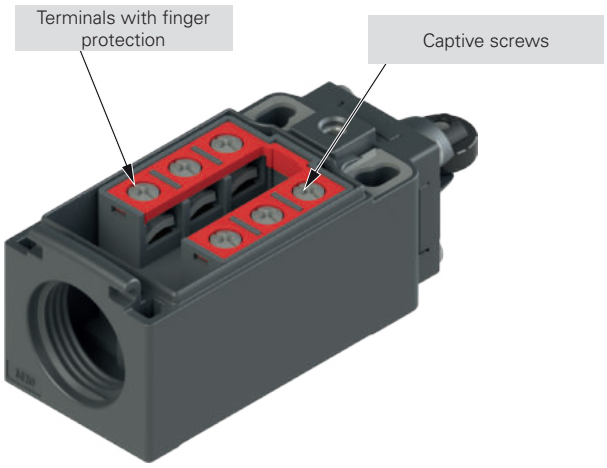


	Description
1	Captive screws
2	Finger protection
3	Clamping screw plates for cables with various diameters
4	Self-lifting clamping screw plates
5	Material of the contacts: Silver alloy or gold-plated silver alloy
6	Contact technology and reliability: Single bridge, double bridge
7	Operating voltages and currents for reliable switching

	Description
8	Classification of the contact type acc. to EN 60947-5-1: X, Y, C, Za, Zb
9	Contact type: Slow action / snap action / snap action with constant pressure
10	Force on contacts
11	Positive opening of contacts

1 Captive screws

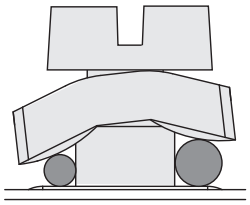
Switches with this characteristic have clamping screws that remain in place even if completely unscrewed. This feature reduces wiring time, since the operator does not have to be careful not to unscrew the screws completely and does not risk to lose them by mistake, which is very useful in case of wirings in uncomfortable position



2 Finger protection

All terminals in the contact blocks have protection degree IP20 in accordance with EN 60529, they are therefore protected against access to dangerous parts with a diameter greater than 12 mm.

3 Clamping screw plates for cables with various diameters



The clamping screw plates are provided with a particular "roofing tile" structure and are loosely coupled to the clamping screw. The design causes connection wires of different diameter to be pulled towards the screw when tightening the screw (see figure), preventing the wires from escaping towards the outside.

4 Self-lifting clamping screw plates

Switches with this feature are equipped with clamping screw plates that move up or down by turning the clamping screw; wiring is easier and faster as a result.

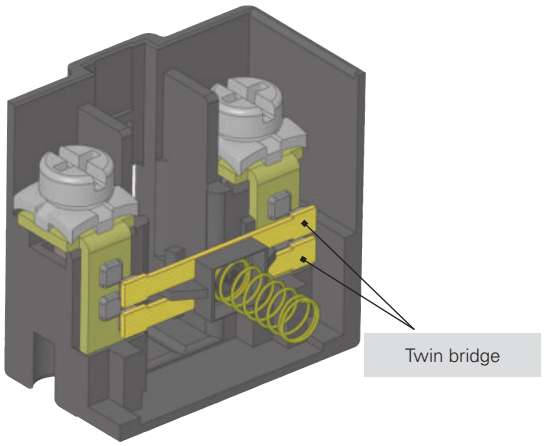
5 Material of the contacts: gold-plated silver alloy

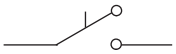
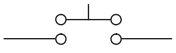
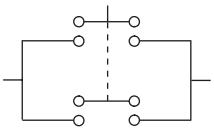
The contact blocks can be supplied with silver electric contacts with a special gold-plated surface, with total gold thickness of one micron. This type of treatment can be useful in environments which are aggressive against silver (very humid or sulphurous atmospheres) and in case of very small electric loads, usually with low voltages and supply currents. This thickness of the gold coating permits several million switching cycles.

6 Contact technology and reliability

Very rarely, an electric contact does not function. A failed switching operation is a typical consequence of an exceptionally high contact resistance caused by dust, a thin layer of oxidation or other impurities that could penetrate the switch during wiring. Thus, the repeated occurrence of faulty switching depends not only on the sensor type, but also on its environmental conditions and the load that the switch drives. These effects are more evident with low electrical loads if the electric voltage cannot penetrate the thin layers of oxide or small grains of dust.
This type of malfunction can normally be tolerated with hand-operated devices, because repeating the operation is enough to restore the function. This is not the case with position switches, as severe machine damage could result if the end position is not ascertained.
In the following table we refer to two typical contact structures (type A and B) normally used in the industry and the ones which have been used by Pizzato Elettrica for several years in most switches: movable contacts with double interruption and twin bridge (type C).
As you can see from the table below, the last structure (type C) has the same contact resistance (**R**) as the simple mobile contact (type A), but with a lower failure probability (**fe**).
With a failure probability of **x** for a single switching operation, the failure probability for type A is **fe = x**, for type B **fe = 2·x**, whereas for type C it is **fe = 4·x²**
This means that if the probability of a switching failure is x in a given situation, e.g., $1x10^{-4}$, (1 switching failure in 10,000), the result is as follows:

- for type A one failed commutation every 10,000.
- for type B one failed commutation every 5,000.
- for type C one failed commutation every 25,000,000.



Type	Diagram	Description	Contact resistance R	Probability of errors fe
A		simple mobile contact	R = Rc	fe = x
B		mobile contact with double interruption	R = 2·Rc	$fe = 2x\text{-}x^2$
C		mobile contact with double interruption and twin bridge	$R = \frac{2 \cdot Rc}{2} = Rc$	$fe = 4x^2\text{-}4x^3+x^4$

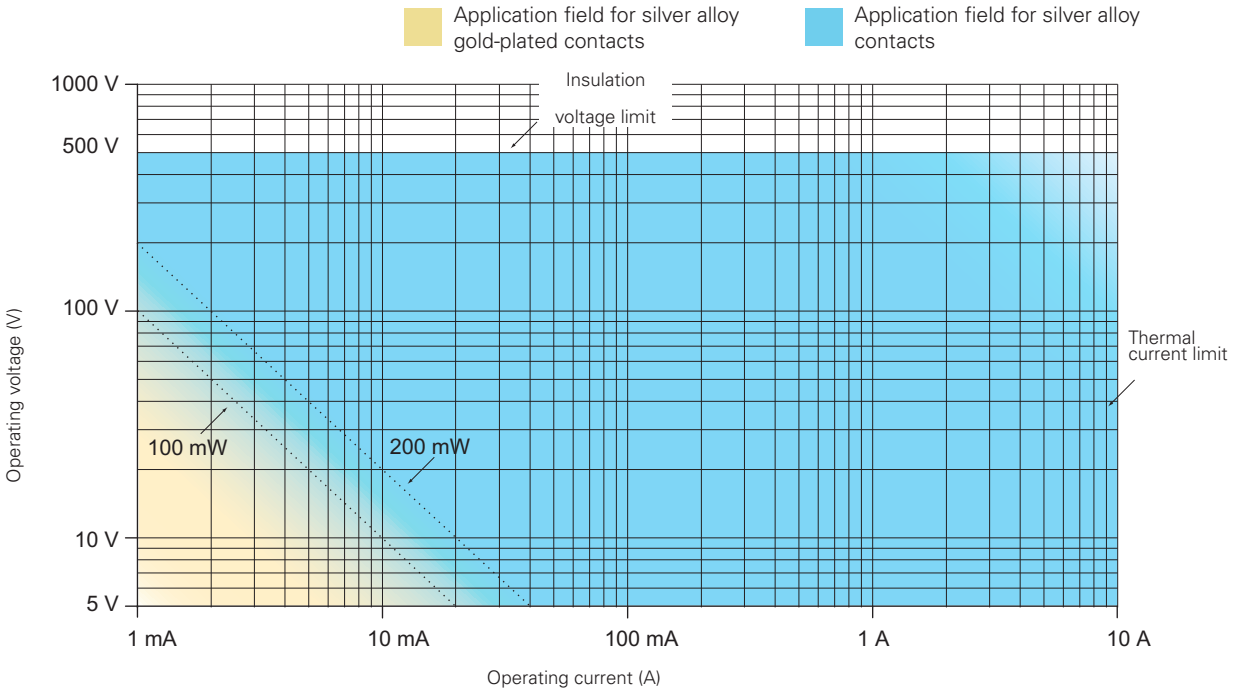
7 Minimum operating voltages and currents for reliable switching

The reliability of an electric contact depends on several factors, whose influence varies depending on the type of load. For high power loads is necessary for the contact to be able to dissipate the heat generated during switching. For low power loads, instead, it is important that it oxides and other impurities do not obstruct the passing of the electric signal. As a result, the material chosen for the electric contacts is a compromise among different and sometimes contrasting needs. In position switches contacts are usually made of a silver that has proved to be suitable for the switching of loads in the range of approximately 1 kW to 0.1 W. However, at lower loads, the effects of the oxide, which silver naturally develops upon contact with air, may occur; additionally to be taken into account are possible contaminations or impurities in the contact switching chamber (for example the talc powder in the cable sheaths that an installer could accidentally insert in the switch may have a similar effect).

It is impossible to define a fix threshold above which the "missing switching phenomenon" does not appear, because there are a lot of mechanical end electric parameters that influence this value. For example, in laboratory environment a good twin bridge electric contact is able to switch loads in the µW range for dozens of millions of handling operations, without losing signals. However, this does not mean that the same contact will have the same performance when the switch operates in environments with sudden changes of temperature (condensation) or where few switching occur (oxidation).

In order to avoid this kind of problem, gold plated contacts are used for very low loads profiting from the non-oxidability of this material. The gold-plating layer should be thick enough to be mechanically resistant to switching as well as electrically resistant to possible sparks that may vaporize it. For this reason Pizzato Elettrica uses micron thickness gold plating suitable for millions of working cycles. Thinner gold plating layers have often a purely aesthetic function and are only suitable to protect the product against oxidation during long time storage.

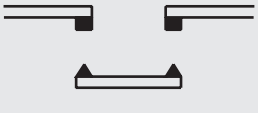
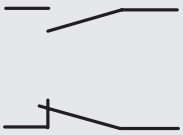
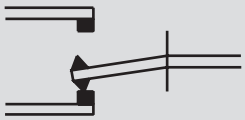
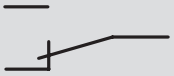
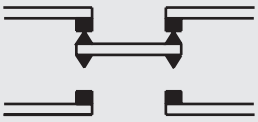
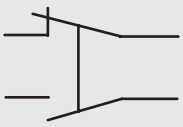
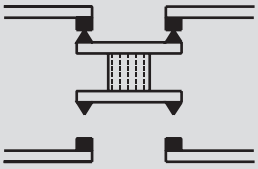
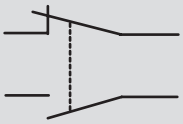
The minimum current and voltage values recommended by Pizzato Elettrica are shown in the diagram below, that is divided into two areas defined by a steady power limit. These values identify voltage and current combinations with high commutation reliability in most industrial fields. The lower voltage and current limits shown in the diagram are typical minimum values for industrial applications. They may also be reduced in non typical conditions. It is recommended, however, to always evaluate that the signal power to be switched is at least one magnitude order higher than the noise produced in the electric circuit, in particular when circuit cables are long and pass through areas with high electromagnetic fields and especially for powers lower than 10 mW.



100 mW Suggested limit for general applications with snap action contact blocks with silver alloy contacts.

200 mW Recommended limit for general applications with slow action contact blocks with silver alloy contacts.

8 Classification of the contact block acc. to the EN 60947-5-1

Design	Figure	Symbol	Description
X Y			Double interruption contact element with two terminals
C			Change-over contact element with single interruption and three terminals
Za			Change-over contact element with double interruption and four terminals. **The contacts have identical polarity**
Zb			Change-over contact element with double interruption and four terminals. **Mobile contacts are electrically separated**

Electrically separated contacts

The "**+**" symbol between two designs (e.g., X+X, Za+Za, X+X+Y, etc.) represents the combination of simple, **electrically separated** contact blocks.

The electrically separated contacts allow different voltages to be applied between the contacts and loads to be connected to different polarities (figure 1).

Requirements and restrictions for Za contacts

Electrical loads must be connected to the same phase or polarity. The contacts **are not** electrically separated. As a result, different voltages may not be applied to the NC and NO contacts (figures 2 and 3).

According to EN 60947-5-1 section K.7.1.4.6.1., the following restrictions apply for positive opening contacts of design Za when used for safety applications.

If the control switch has changeover contact element of design C or Za, **only one contact element may be used** (closure or interruption). For changeover contact elements of design Zb, both contacts may be used.

Contact design Zb

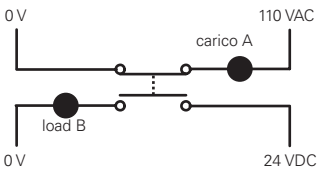


figure 1: **correct**

Contact design Za

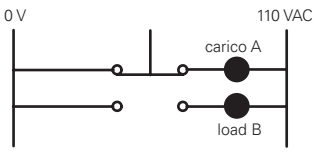


figure 2: **correct**

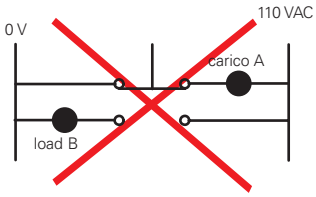
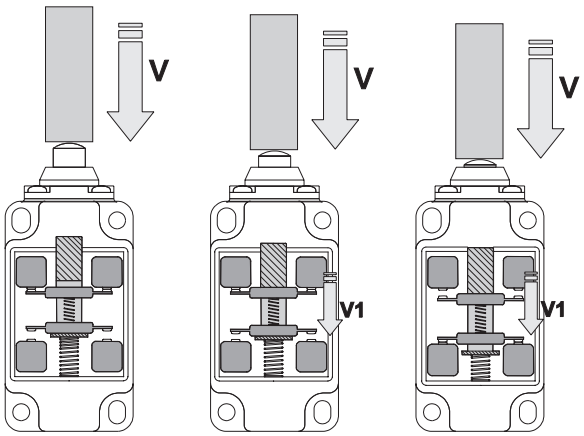


figure 3: **incorrect**

9 Contact blocks with different operating principle: slow action and snap action

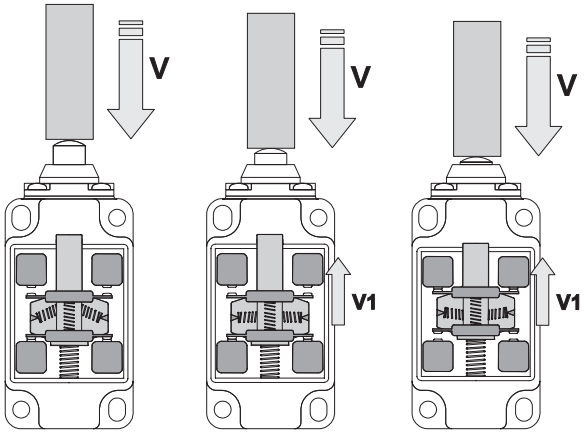
Contact blocks with slow action: component where the speed of the contact movement **(V1)** depends on the speed of the switch actuation **(V).** The contact carrier moves at a rate proportional to the actuation speed.
The slow action contact block is suitable for applications having low to medium currents and quick actuation movements. It has no differential travel.

$$V = V1$$



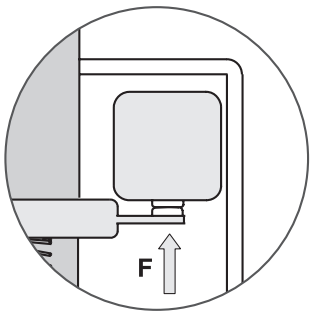
Contact block with snap action: component where the speed of the contact movement **(V1)** doesn't depend on the speed of the switch actuation **(V).** Upon reaching a predetermined point in the actuation travel, the contact carrier triggers and switches the contacts.
The snap action contact block is suitable for applications having high currents and/or slow actuation movements. This kind of contact block has a differential travel.

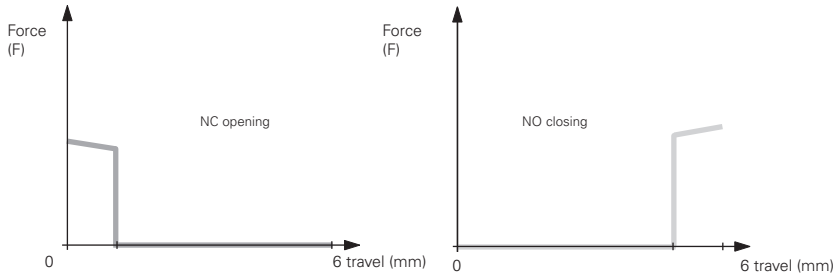
$$V \neq V1$$



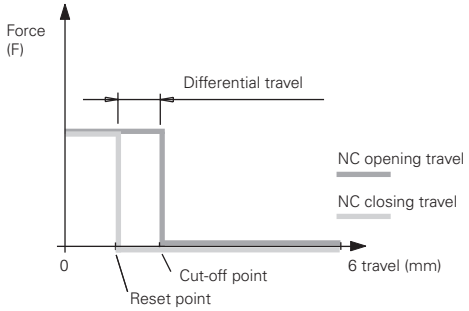
10 Contact blocks: diagrams of the force on the contacts

The following diagrams show the relationship between of the force exerted on the contacts (F) and the actuation travel to the end position.

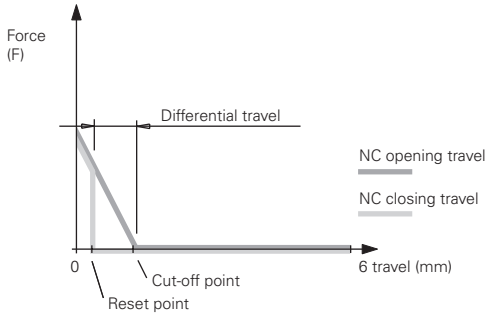




Contact block with slow action

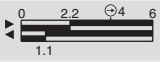
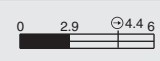
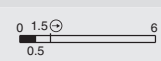
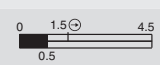
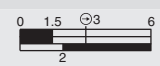
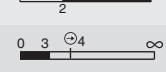
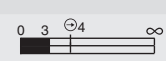
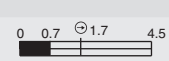


Contact block with snap action and constant pressure: 5, 11, 12.
The pressure on the contacts remains constant as the switching point is approached



Contact block with snap action: 2, 3, 17
The pressure on the contacts decreases as the switching point is approached

FR, FX, FP, FT series contact blocks

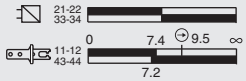
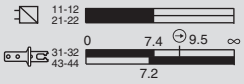
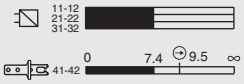
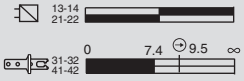
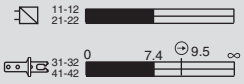
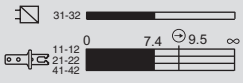
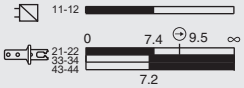
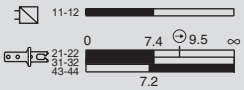
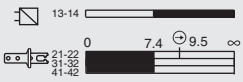
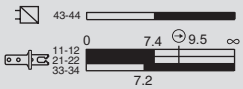
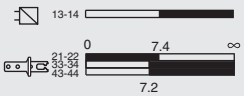
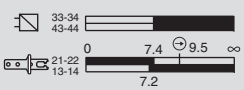
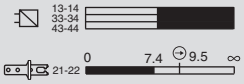
Contact block		Contact diagram	Linear travel diagram	Contact design	Operation type	Positive opening ⊕	Contact type	Wire cross-section min.	Wire cross-section max.	Wire stripping length	Captive screws	Terminals with finger protection	Gold-plated contacts
5	1NO+1NC			Zb	snap action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
6	1NO+1NC			Zb	slow action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
7	1NO+1NC			Zb	slow action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
9	2NC			Y+Y	slow action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
11	2NC			Y+Y	snap action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
12	2NO			X+X	snap action	no	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
16	2NC			Y+Y	slow action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
17	1NC			Y	snap action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
19	2NC			Y+Y	snap action	yes	Double interruption, twin bridge	1 x 0.5 mm² 1 x AWG 20	2 x 2.5 mm² 2 x AWG 14	8 mm	yes	yes	G / G1
20	1NO+2NC			Y+Y+X	slow action	yes	Double interruption, twin bridge	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
38	1NC			Y	slow action	yes	Double interruption, twin bridge	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	8 mm	yes	yes	G / G1
39	2NC			Y+Y	slow action	yes	Double interruption, twin bridge	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	8 mm	yes	yes	G / G1
63	1NC			Y	snap action	yes	Double interruption, twin bridge	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	8 mm	yes	yes	G / G1
64	2NC			Y+Y	snap action	yes	Double interruption, twin bridge	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	8 mm	yes	yes	G / G1

Legend

▬ Closed contact | ▭ Open contact | ⊕ Positive opening travel acc. to EN 60947-5-1 | ► Switch pressed / ◄ Switch released

G = gold-plated contacts 1 µm | G1 = gold-plated contacts 2.5 µm

Contact blocks - FG series

Contact block		Linear travel diagram	Contact design	Operation type	Positive opening ⊕	Contact type	Wire cross-section min.	Wire cross-section max.	Wire stripping length	Captive screws	Terminals with finger protection	Gold-plated contacts
60A	2NO+2NC		X+X+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60B	1NO+3NC		X+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60C	4NC		Y+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60D	1NO+3NC		X+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60E	1NO+3NC		X+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60G	4NC		Y+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60L	2NO+2NC		X+X+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60P	4NC		Y+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60S	2NO+2NC		X+X+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60T	1NO+3NC		X+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60X	1NO+3NC		X+Y+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
60Y	2NO+2NC		X+X+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
61E	3NO+1NC		X+X+X+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
61G	3NO+1NC		X+X+X+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
61H	2NO+2NC		X+X+Y+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G
61M	3NO+1NC		X+X+X+Y	Slow action	yes	Double interruption, twin bridge and double contact point	1 x 0.34 mm² 1 x AWG 22	2 x 1.5 mm² 2 x AWG 16	7 mm	yes	yes	G

Changed article codes

Legend:

FA 4101-•DN → NA B110AB-DN• The codes in grey have been replaced by the code after the arrow

Old Article		New Article
VF L••-1	→	VF L••-R24
VF L••-2	→	VF L••-R25
VF L••-3	→	VF L••-R26
VF L••-4	→	VF L••-R27
VF LE••-1	→	VF LE••-R24
VF LE••-2	→	VF LE••-R25
VF LE••-3	→	VF LE••-R26
VF LE••-4	→	VF LE••-R27
VF IL••••••	→	VF SL••••••
VF LE30	→	VN A00KA
VF LE30-R23	→	VN A00KA-R23
VF LE31	→	VN A00KB
VF LE31-R24	→	VN A00KB-R24
VF LE31-R25	→	VN A00KB-R25
VF LE31-R5	→	VN A00KB-R5
VF LE33	→	VN A00LB
VF LE34	→	VN A00LL
VF LE50	→	VN A00LE
VF LE51	→	VN A00KE
VF LE51-R24	→	VN A00KE-R24
VF LE51-R25	→	VN A00KE-R25
VF LE51-R26	→	VN A00KE-R26
VF LE51-R5	→	VN A00KE-R5
VF LE52	→	VN A00KF
VF LE52-R24	→	VN A00KF-R24
VF LE52-R25	→	VN A00KF-R25
VF LE52-R5	→	VN A00KF-R5
VF LE53	→	VN A00LP
VF LE54	→	VN A00KG
VF LE54-R24	→	VN A00KG-R24
VF LE54-R26	→	VN A00KG-R26
VF LE54-R5	→	VN A00KG-R5
VF LE55	→	VN A00KP
VF LE55-R24	→	VN A00KP-R24
VF LE55-R25	→	VN A00KP-R25
VF LE55-R26	→	VN A00KP-R26
VF LE55-R27	→	VN A00KP-R27
VF LE55-R5	→	VN A00KP-R5
VF LE56	→	VN A00KP
VF LE56-R24	→	VN A00KP-R24
VF LE56-R25	→	VN A00KP-R25
VF LE56-R26	→	VN A00KP-R26
VF LE56-R27	→	VN A00KP-R27
VF LE56-R5	→	VN A00KP-R5
VF LE57	→	VN A00KH
VF LE57-R24	→	VN A00KH-R24
VF LE69	→	VN A00LH

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