pizzato elettrica

2015-2016

# General Catalogue Detection

# Index General Catalogue Detection

## 4 Prewired modular position switches

NA-NB series

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NF series

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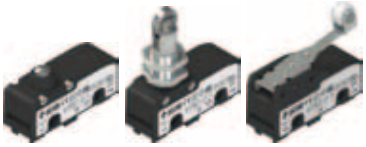
## 5 Microswitches



MK series

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The dedicated catalogue is available.

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## 200 PASSIONATE PROFESSIONALS

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 collaborators. 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 since the year 2000 and has achieved a considerable increase in business 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.

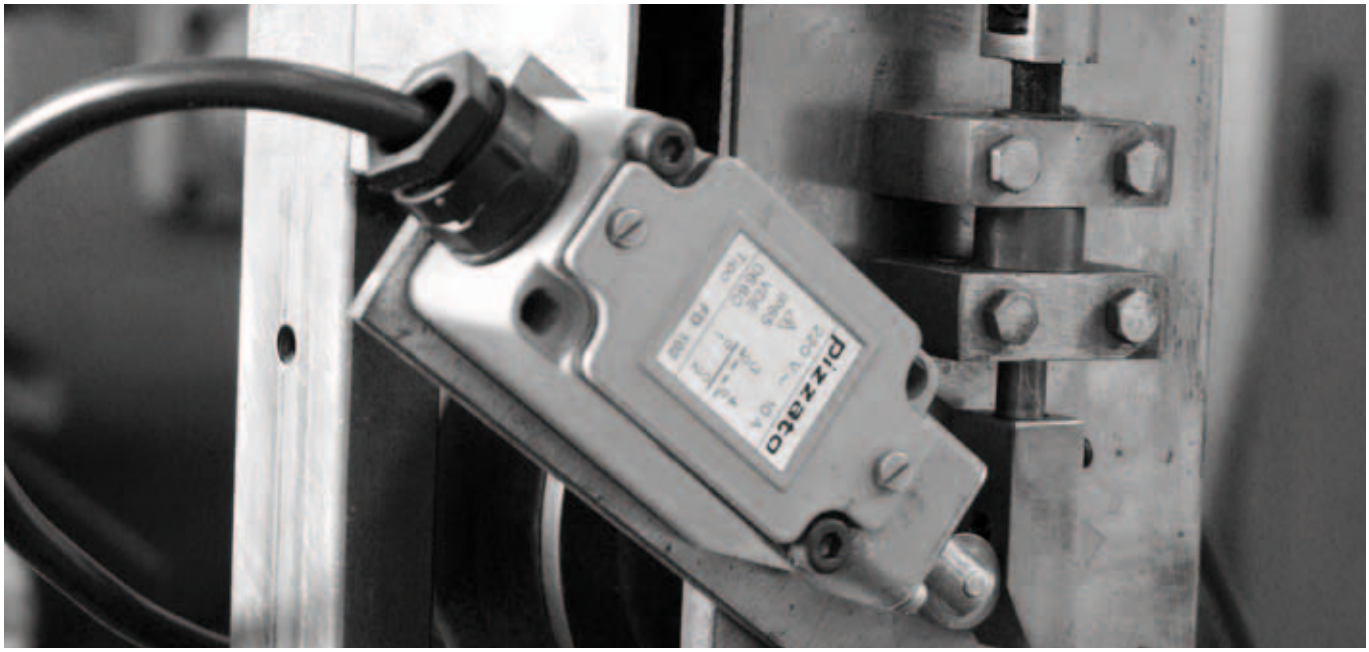

## 100% MADE IN ITALY

An entrepreneurial company such as Pizzato Elettrica, which has grown day after day thanks to the "culture of doing" of a family that benefited from approaching its work with tenacity, intelligence and far-sightedness, has its foundations in a system of solid and deeply-shared values. The pillars that form the basis of the company's work have remained constant and constitute Pizzato Elettrica's fundamental guiding principles.

• TERRITORIAL ROOTS. Pizzato Elettrica is a successful example of the ripe entrepreneurship that characterises the North-East of Italy and Veneto in particular, an area that is tellingly referred to as "Italy's locomotive". The territory is highly productive in every sector, from agriculture to high technology, and makes a fundamental contribution to the generation of Italian wealth; where 100 is the average per capita value added produced at the national level, the figure here has consistently been between 110 and 135. The productivity rate is among the highest in Europe and originates from a tradition of diffuse and markedly export-oriented entrepreneurship.

• ORIENTATION TO EXCELLENCE. Innovation and development: this company philosophy is at the heart of the operations and product quality assessments that Pizzato Elettrica performs in a 360 degree manner, and is also manifest in the heightened propensity for research and innovation that characterises its design work. Every product development in Pizzato Elettrica is born with the aim of bringing a secure, reliable and innovative choice to the market: those using Pizzato Elettrica products do so in the certainty that they are of certified quality as fruits of a process that is scrupulously controlled at every stage.

• ATTENTION TO THE CLIENT. In order to be successful, a product must respond to the specific needs of those who will use it: quality alone is not enough. Market developments must be carefully monitored so that one can understand, in advance, which new applications will prove truly useful. This is why Pizzato Elettrica has always cultivated close synergies with the companies that choose it as a supplier, using this continuous dialogue to identify the potential developments of its product range so as to render it highly flexible, complete and able to offer optimal solutions to diverse needs.




## 1984: AN ENTREPRENEURIAL STORY BEGINS

16 NOVEMBER 1984. This is the date that marks the beginning of a long entrepreneurial story: the story of a family that was able to build a company and allow it to grow consistently, one step at a time, to reach important results, guided by a profound work ethic and a marked spirit of initiative.

• 80s. The company was initially called Pizzato, owned by the Pizzato B. & C. general partnership with headquarters in Marostica. It was immediately able to assert itself on the market thanks to the quality of its products. In the short space of four years, the firm had already developed to the point of making a fundamental upgrade: on 18 April 1988, it became Ltd. company and was re-named Pizzato Elettrica, a brand shortly destined to become renowned and appreciated nationwide. During the year 1988, its first company-owned plant, geared towards mechanical processing, was built. By the end of the decade, thanks to the development of quality products and the experience built on the Italian market, Pizzato Elettrica turned to the international market: in 1989, the commercialisation of products was extended to the USA.

• 90s. The range of products continued to be upgraded and specialised with the introduction of new machinery and the growing input of technology. In 1994, Pizzato Elettrica introduced its first line of prewired switches with immediate success. 1996 and 1997 were important years in the development of safety devices, a sector that became strategic when new European directives on working environments were introduced. Pizzato Elettrica immediately became an Italian leader in this regard, thanks to its evolved safety switches and switches with solenoid. Meanwhile (1995), its second plant, geared towards the moulding of plastic materials, was also born. The brand was now ready to approach the new frontiers of the international market: South Africa in 1995 and Australia in 1997. As a confirmation of its innovative spirit, Pizzato Elettrica was among the first companies to believe in the strong potential of the Web, presenting itself online with a well-constructed and multi-functional site as early as 1996. This exciting, constant growth culminated in 1998 with the construction of the third plant, dedicated to the assembly department.

• 00s. The new millennium heralded the search for quality certifications: the ISO 9002 was achieved in April 2000, followed by the ISO 9001 achieved in November 2002. In the meanwhile, technological evolution continued: in 2000, the design studio began using 3D CAD systems. This allowed new avant garde product models to be developed, such as safety modules (2002) and switches conforming to the European ATEX directives (2005), laid out for equipment operating in potentially explosive environments.
In 2006, the HP switch, the result of an innovative engineering design project combining safety and style in a single product, was introduced to the market.
In 2007, the company extended its range of products for machine safety, introducing two new series of magnetic safety sensors, suitable for the monitoring of protections and repairs.
The initial months of 2009 have witnessed the introduction of the new prewired modular switches NA-NB-NF series.
In 2010 Pizzato Elettrica introduced the new EROUND line control and signalling devices, therefore remarkably widening its offer within the man-machine interface sector.
In 2011, the first pre-programmed safety modules of the GEMNIS CS MF series are introduced.
In 2012, the company integrates its offering in the machine safety field, thanks to the ST series sensors with RFID technology and to the programmable safety modules of the GEMNIS CS MP series.
In 2013, the range of hinge safety switches was expanded with the AISI 316L stainless steel HX switches.
2014 saw the launch on the market of the RFID safety switches with NG series block and of the safety handle of the P-KUBE 2 line for NG series switches.
Thanks to the robust interlocking system, the NG series switches ensure a maximum locking force of the Fzh actuator that is equivalent to 7500 N.
The new safety handle P-KUBE 2, which is installed in combination with the RFID safety switch with NG series block, provides an integrated locking system of the protections with related access control to dangerous areas.


## 59,000,000 PARTS SOLD WORLDWIDE

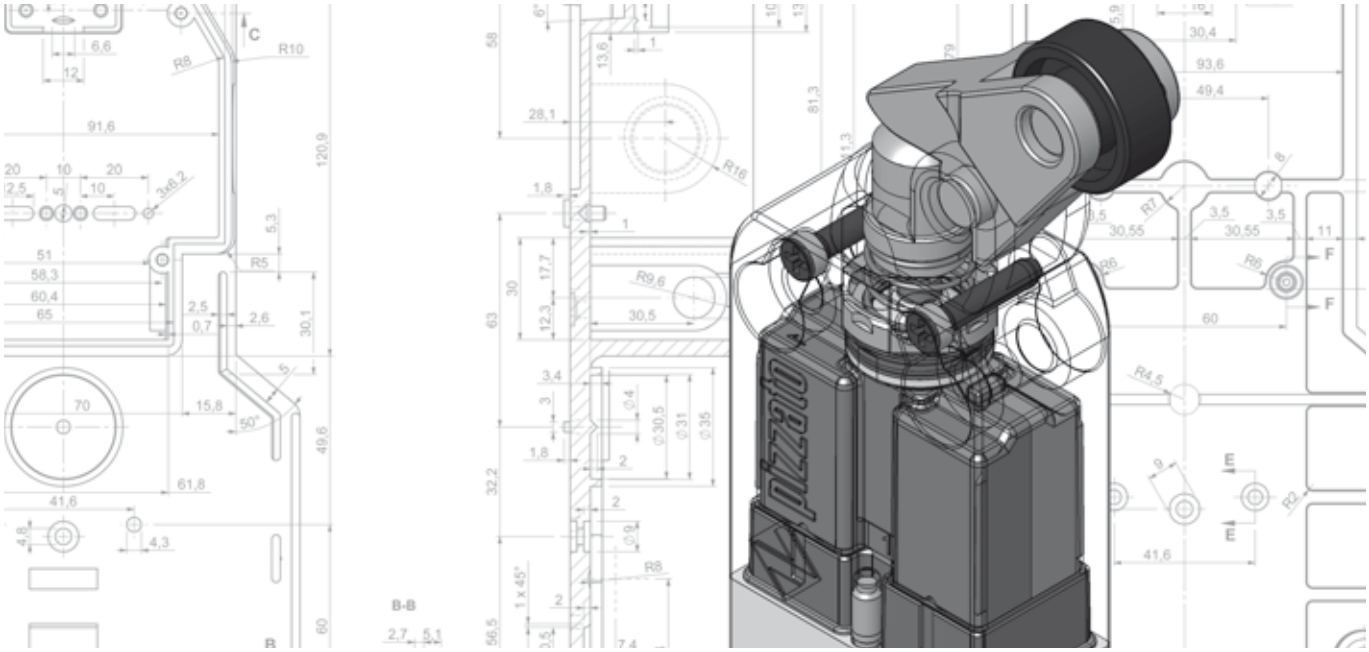
Pizzato Elettrica's product catalogue contains about 7,000 items, with more than 1,300 special codes developed for devices personalised according to clients' specific needs.
Pizzato Elettrica devices can be grouped, according to typology, into three main macro-categories:

• POSITION SWITCHES. They are installed on a daily basis on any type of industrial machinery, for applications in the wood, metal, plastic, elevators, automotive, naval sectors, 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.
The product range that Pizzato Elettrica can offer in the field of position switches is one of the widest in the world. Moreover, the use of high quality materials, high reliability technologies as twin bridge contact blocks and the protection degree IP67, make this range of position switches one of the most technologically evolved.
Furthermore since 2005 Pizzato Elettrica has also started to produce versions of its switches with specific features for some sectors as follows: switches with ATEX homologations and switches for high temperature.

• 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, so becoming one of the main European manufacturers of safety devices. The wide range of specific products for machine safety completely designed and assembled in our company premises in Marostica (VI), has been widened by the introduction of coded magnetic sensors, switches with solenoid provided with anti-panic release device, hinged safety switches and new safety handles. Recent products include the RFID safety sensors of the ST series, the stainless steel hinge safety switches of the HX series, the RFID switches with block of the NG series, and the safety handle of the P-KUBE 2 line.

• MAN-MACHINE INTERFACE. Thanks to the recent introduction of the EROUND control and signalling devices, Pizzato Elettrica considerably widens its offer in the man-machine interface sector.
The new design, the attention to details and the elegance of the product combined with its maximum safety and reliability, take the series to the forefront of the market.
The wide range that our Company offers in the man-machine interface sector includes single and modular foot switches with many patented joint kits.

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 their installations on machineries.



## 140 NEW PROJECTS COMPLETED

There's a key word in the development of latest-generation devices: Mechatronics. This new science has grown in recent years, reaching some of the most important research centres, both national and international, right here in Veneto. It is based on the fusion of the principles of Mechanics with those of Electronics in the design of instruments that guarantee great precision, high performance, versatility and constant improvement.

This is why, in recent years, all new models have indeed been created following careful Mechatronics studies, undertaken directly by the highly specialised technicians and engineers that form part of the R&D department.

The evolution of Pizzato Elettrica's product lines thus proceeds on a double platform: on one side, there are the internally-researched innovative materials and technologies; on the other, the particular needs that emerge from continuous dialogue with big competitors and, above all, clients. Indeed, requests for specific personalisations of a product are quite common: Pizzato Elettrica's duty is to respond to these needs as best it can, guaranteeing maximum flexibility and openness with regards to 'custom made' projects too.


## 10 MILLION 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 organs. Product quality is assessed by five accredited external bodies: IMQ, UL, CCC, TÜV SÜD, EAC. These bodies lay out high technical and qualitative standards for the company to achieve and maintain, verified yearly with seven different 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 mark, in concordance with the European Directives.

• ISO 9001 CERTIFICATION. The company's production system conforms with national UNI EN ISO 9001 and international ISO 9001 standards. 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.

• 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.

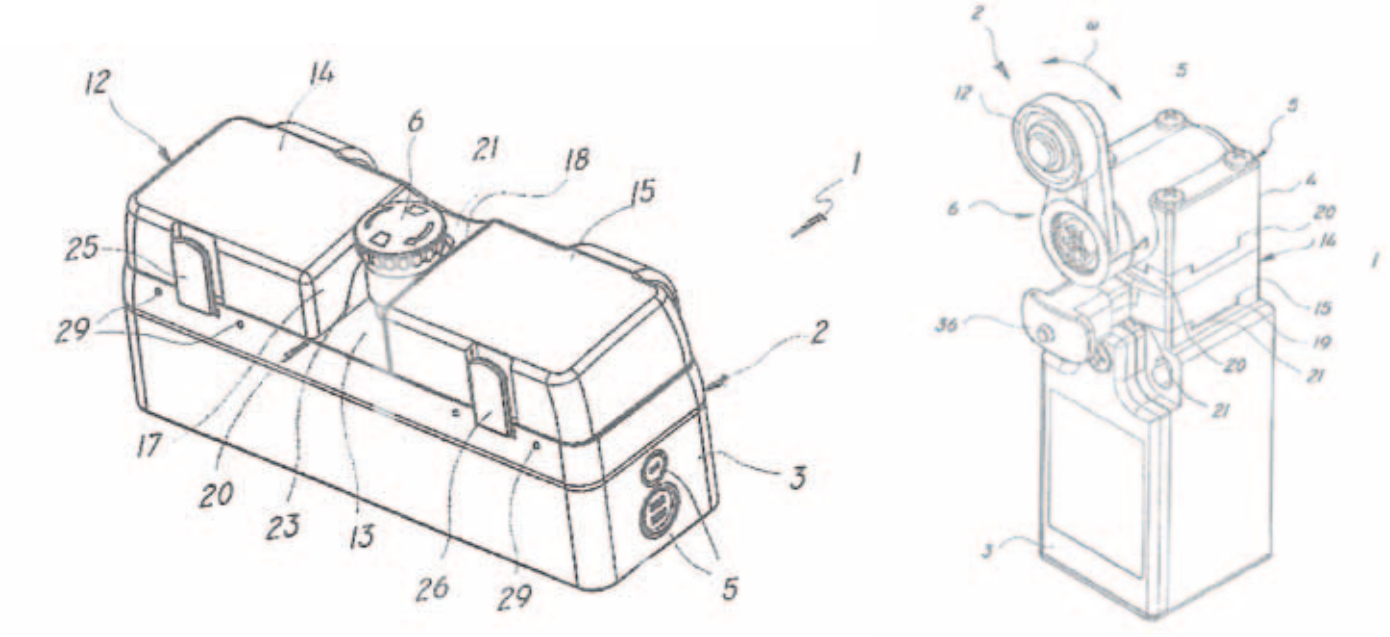
• CSQ, CISQ AND IQNET. The CSQ system is part of the CISQ (Italian Certification of Quality Systems) federation, which consists of the primary certification bodies operating in Italy and its various product sectors. CISQ is the Italian representative within IQNet, the biggest international Quality Systems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

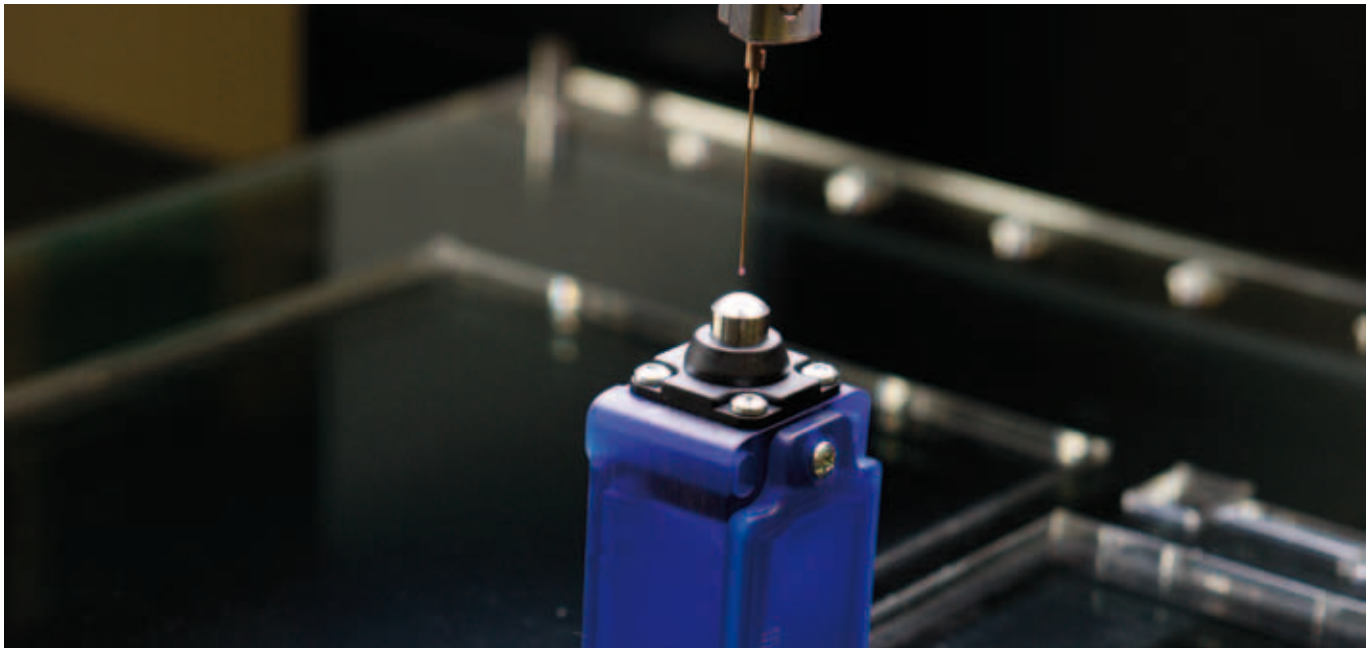
## 140 REGISTERED PATENTS

The fact that Pizzato Elettrica has, over 30 years, been able to take on a leadership role at the European level is also a result of continuous research and innovation, which its labs and internal design studios undertake on a daily basis.

This is a strategic sector that is exploited to the maximum thanks to a constant process of innovation: indeed, this undoubtedly represents the most important value added. This is why, on average, Pizzato Elettrica develops innovative projects to be covered by international patents each year: a route that the company has been following since its birth, immediately understanding the importance of registering and protecting ideas in order to approach the market with the added strength of being truly 'different' from its competitors.

The company's ideas are what have distinguished it and allowed it to come to occupy a highly important market position, through the tens of patents that have been developed and registered. An ever evolving know-how that is renewed daily, as demonstrated, for example, by the more recent innovations introduced in the safety device sector. This field is due to change significantly in the coming years through profound technological developments: a path that Pizzato Elettrica once again intends to take before time, outlining new principles destined to respond to the international market trends of the future.





## 20,800 HOURS DEDICATED TO RESEARCH PER YEAR

Behind every new product lies a careful research and design process that aims to find technologically advanced solutions that can improve the device.

This evolution would not have been possible if Pizzato Elettrica hadn't acquired increasingly well-adapted instruments over time, thus keeping pace with the latest technological frontiers. In this sense, the number of computers used daily within the company is particularly significant: an average of almost one computer per employee (workers included!) represents an exhaustive index of a highly computerised company.

The design effort utilises the most evolved 3D CAD software; the efficiency of the Electrical and Mechanical labs, which operate in strict synergy, allows for immediate assessments to be undertaken for the development and perfection of every functional aspect of the prototypes.

The switches undergo the most thorough of checks, which evaluate their efficiency in extreme conditions too: this ensures that Pizzato Elettrica's clients will have access to a genuinely safe, reliable product.

Measurements are taken using over 200 precision tools, which allow for every single component and every characteristic of the finished products to be evaluated: from measures of humidity and temperature to weight and force, to electrical levels, flammability, mechanical duration, magnetic characteristics, microscopic surveys, the level of IP protection and EMC electromagnetic compatibility.


## 1,000 TECHNICAL SUPPORT ANSWERS PER MONTH

Pizzato Elettrica sees itself as a company that is as attentive to customers needs as it is to the development of its products.

This is why significant resources have always been dedicated to the development of the technical assistance service, giving the company the role of a highly qualified technological partner that is able to fully support technicians and designers.

Pizzato Elettrica offices can be contacted by telephone from Monday to Friday and offer both information and advice relating to the choice of products, the technical characteristics and the correct installation, ensuring to the customers a direct technical assistance service.

**WWW.PIZZATO.COM**

Pizzato Elettrica was one of the first Italian firms of its sector to believe in Internet, developing a web site since 1996.
Pizzato Elettrica website is now available in four languages (Italian, English, French, and German) and it includes plenty of technical data, technical information and news about products and services provided by the company.

- General Catalogue
- Certificates, brochures and leaflets of new products
- Search engine for codes
- List of new products
- Form to require technical and commercial information
- Article cross reference
- Frequently asked questions (FAQ)
- Company profile
- List of trade fairs
- Download 2D CAD drawings in DXF format
- Download 3D CAD drawings in STEP format
- Download Pizzato Elettrica libraries for the SISTEMA software
- Video section with installation examples
- Section dedicated to Machine Safety, explanations of standards and prescriptions for product operation
- Quick News section, with all the latest news on products and services by Pizzato Elettrica
- Newsletter



## MORE THAN 40 MEETINGS ORGANISED EACH YEAR

**EXHIBITIONS**

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

**MEETINGS**

Pizzato Elettrica, in addition to offering a qualified technical assistance, sees itself as dynamic company attentive to customers needs organising several meetings and training courses, with a particular focus on machinery safety standards.

**MULTILINGUAL DOCUMENTATION**

Pizzato Elettrica provides to its customers a wide range of technical documentation available in several languages: Italian, English, German, French, Turkish, etc.

From the general catalogue to the detailed brochures, from leaflets of new products to price lists and CD-ROM, Pizzato Elettrica customers can find in a quick and exact way all the information concerning products, the technical characteristics and functionality, the proper installation, application examples, etc.

## 77,000 PACKAGES SHIPPED PER YEAR

In order to be able to bring its products to distributors and clients operating all over the world, Pizzato Elettrica's guiding principles are speed and efficiency.

These objectives informed the company's creation of a computerised merchandise transfer system, which is managed automatically by an appositely developed company software that is geared towards specific operational needs.

Over 77,000 parcels are sorted by the logistic center each year: a significant volume of merchandise reflecting the needs of an evermore rapid and competitive market.

All shipments and transfers are traced via a barcode system that can immediately identify the contents of any parcel. A pre-arranged system that is easily modulated: this flexibility has also proved key in providing a quick response to particularly urgent shipment requests.

Among the strengths in the company relationship with the commercial network, the direct assistance guaranteed in six languages: Italian, English, French, German, Spanish and Chinese. A service that confirms Pizzato Elettrica quality and attention to customers needs from around the world.

# TECHNICAL AND COMMERCIAL SERVICE

TECHNICAL OFFICES

Pizzato Elettrica technical offices provide a direct technical and qualified assistance in Italian and English, helping in this way the customers to choose the suitable product for their own application explaining the characteristics and the correct installation.

| | |
|---|---|
| Office hours: | from Monday to Friday<br>08.00-12.00 / 14.00-18.00 CET |
| phone: | +39.0424.470.930 |
| fax: | +39.0424.470.955 |
| e-mail: | tech@pizzato.com |

Spoken languages:

SALES OFFICES

Among the strengths in the company relationship with the commercial network, the direct assistance guaranteed in six languages: Italian, English, French, German, Spanish and Chinese. A service that confirms Pizzato Elettrica quality and attention to customers needs from around the world.

| | |
|---|---|
| Office hours: | from Monday to Friday<br>08.00-12.00 / 14.00-18.00 CET |
| phone: | +39.0424.470.930 |
| fax: | +39.0424.470.955 |
| e-mail: | info@pizzato.com |

Spoken languages:

# New products **2015-2016**

## Position switches restyling FD series

- New anthracite grey colour
- Indelible laser marking
- Cover integrated seal
- Protection degree IP67
- Non-loosable cover screws

▸ 19

## Position switches restyling FP series

- Stainless steel plates for fixing screws
- New anthracite grey colour
- Cover and non-loosable cover screw
- Indelible laser marking
- Protection degree IP67

▸ 29

## Position switches restyling FL series

- New anthracite grey colour
- Indelible laser marking
- Cover integrated seal
- Protection degree IP67
- Non-loosable cover screws

▸ 39

## Position switches restyling FC series

- New anthracite grey colour
- Indelible laser marking
- Cover integrated seal
- Protection degree IP67
- Non-loosable cover screw

▸ 49

## In conformity with standard EN ISO 14119

- All products are compliant with standard EN ISO 14119
- The classifications of the devices have been included in each series in accordance with the new standard
- New safety screws OneWay and Torx, for a correct installation according to the EN ISO 14119 anti-tampering directive

M20 / M16

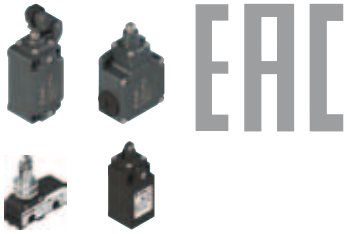
## New metric thread

- All catalogue products with metric thread
- Warehouse handling of the metric products
- All accessories are available with metric thread
- M20 or M16 threads depending on the product series

## M12 connectors available for the FC series

- M12 4- or 5-pole connectors also available for the FC compact series
- Pre-installed metal or plastic connectors
- IP67 protection grade connectors
- For rapid replacement without wiring errors

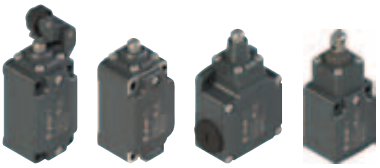
▸ 49



## New type approvals

- New EAC certification for the Russian Customs Union
- Simplified export for Russia, Belarus, and Kazakistan
- New IMQ type-approval for MK series microswitches
- The IMQ type-approval also certifies the positive opening of the MK series

## Description



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.
The product range that Pizzato Elettrica can offer in the field of position switches is one of the widest in the world. Moreover, the use of high quality materials, high reliability technologies as twin bridge contact blocks and the protection degree IP67, make this range of position switches one of the most technologically evolved.

## Protection degree IP67

IP67

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test according to IEC 60529. They can therefore be used in all environments where the maximum protection of the housing is required.

## Extended temperature range

-40°C

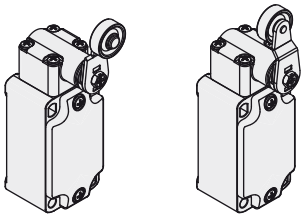
This range of switches is also available in a special version with an ambient operating temperature range of -40°C to +80°C.
They can be used for applications in cold stores, sterilisers and other devices with low temperature environments. Special materials that have been used to realize these versions, maintain unchanged their features also in these conditions, widening the installation possibilities.

## Laser engraving

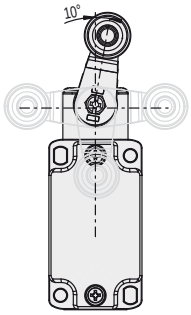
All devices are indelibly marked with a dedicated laser system that allows the marking to be also suitable for extreme environments. This system that does not use labels, prevents the loss of plate data and the marking is more resistant over time.

## Overturning levers

For switches with swivelling lever the lever can be fastened straight or reversed, maintaining the positive coupling.
This makes it possible to have two different work plans of the lever.

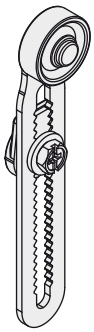


## Adjustable levers




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.

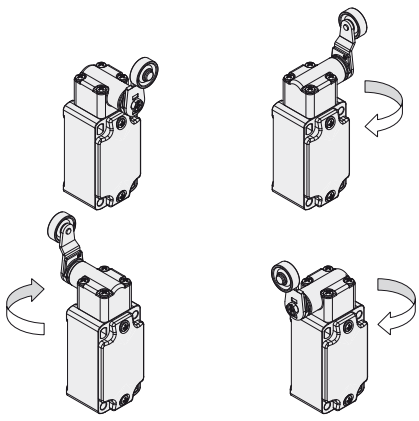
## Adjustable safety lever



The code 56 adjustable lever (and variants) has a notching that prevents the sliding also in case the retaining screw becomes loose.
The particular positive locking makes it suitable for safety applications.

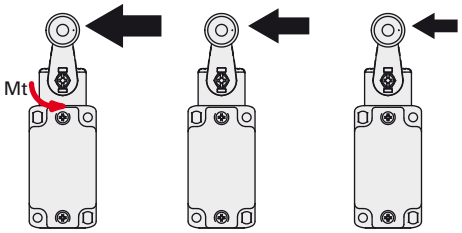
## Orientable heads

In all switches, it is possible to rotate the head in 90° steps.



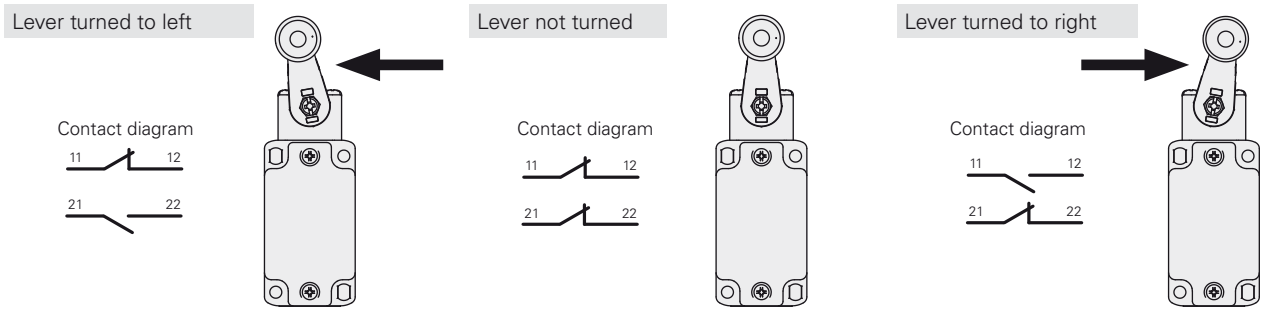
## Increased or reduced actuating force

For actuators with swivelling levers, versions with increased or reduced actuating force are available on request. This feature allows selection of a switch perfectly tailored for the application. For further information contact the Technical Department.



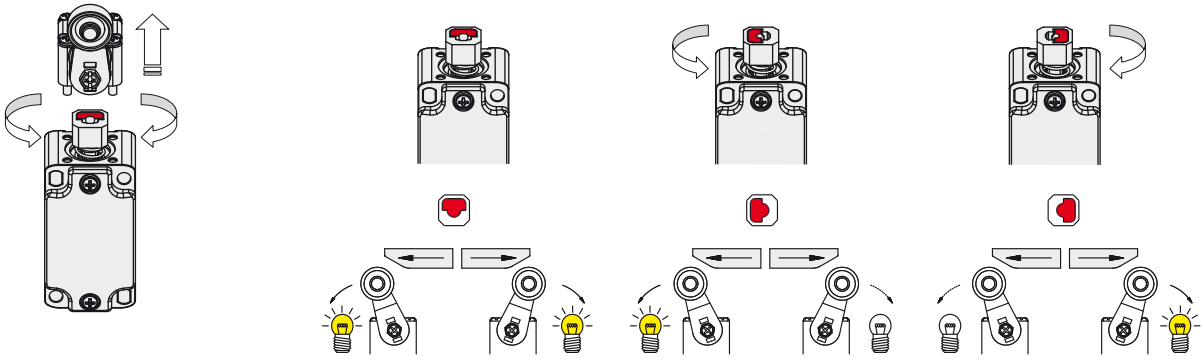
## Independent contacts

The contact block 16 has two NC contacts, **both with positive opening** activated independently according to the lever turning direction.

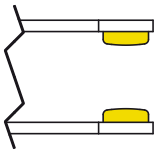



## Unidirectional heads

For switches with swivelling lever, it is possible to select the unidirectional operation by removing the four screws of the head and revolving the internal plunger (contact block 16 excluded).



## Gold-plated contacts

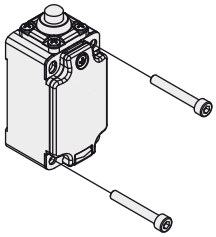


The contact blocks of these devices can be supplied gold-plated upon request. It is ideal for all applications with low voltages or currents and it ensures greater contact reliability. The high-thickness coating > 1 micron ensures the mechanical endurance of the coating over time.

## Contact blocks

Contact blocks with captive screws, finger protection, twin bridge contacts and double interruption for a higher contact reliability. Available in multiple variants with shifted activation strokes, which can be simultaneous or overlapping. They are suitable for different kinds of applications.

## Stainless steel fixing plates



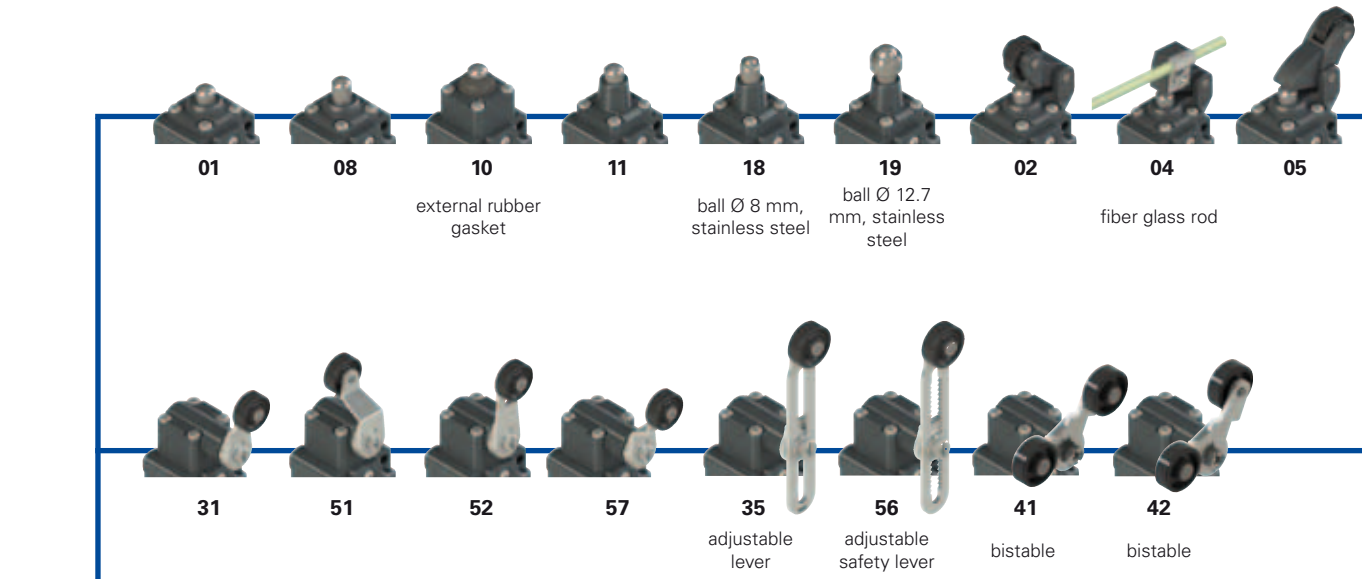
The technopolymer switches of the FP series come with two robust stainless steel fixing plates. This solution makes it possible to avoid the underhead washer and ensures that the fixing of the switch is more stable over time.

## Stainless steel external metallic parts

AISI 304

Upon request some of these devices can be supplied with stainless steel external metallic parts instead of the usual zinc-plated steel. It is an ideal solution for environments with the presence of aggressive chemical agents or saline mist. See page 219.

## Selection diagram

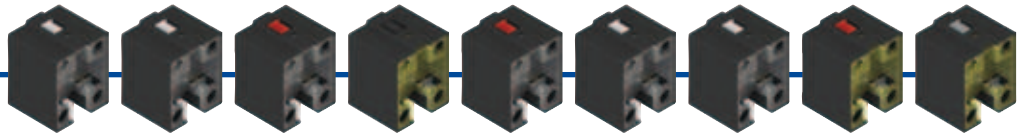


**ACTUATORS**

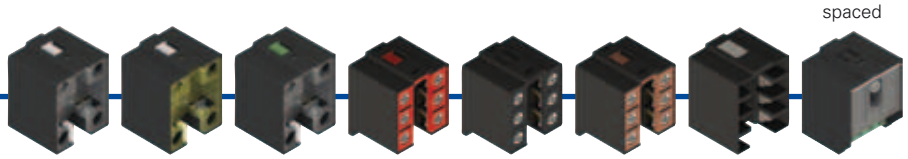
**01**
**08**
**10** external rubber gasket
**11**
**18** ball Ø 8 mm, stainless steel
**19** ball Ø 12.7 mm, stainless steel
**02**
**04** fiber glass rod
**05**

**31**
**51**
**52**
**57**
**35** adjustable lever
**56** adjustable safety lever
**41** bistable
**42** bistable

**CONTACT BLOCKS**



**5** 1NO+1NC, snap action
**6** 1NO+1NC, slow action
**7** 1NO+1NC, slow action, overlapped
**9** 2NC slow action
**10** 2NO slow action
**11** 2NC snap action
**12** 2NO snap action
**13** 2NC slow action shifted and spaced
**14** 2NC slow action, shifted



**15** 2NO slow action, shifted
**16** 2NC slow action independent
**18** 1NO+1NC, slow action, closer
**20** 1NO+2NC, slow action
**21** 3NC slow action
**22** 2NO+1NC, slow action
**2** 2x (1NO-1NC) snap action
**E1** 1NO-1NC electronic PNP

**CONDUIT ENTRY**

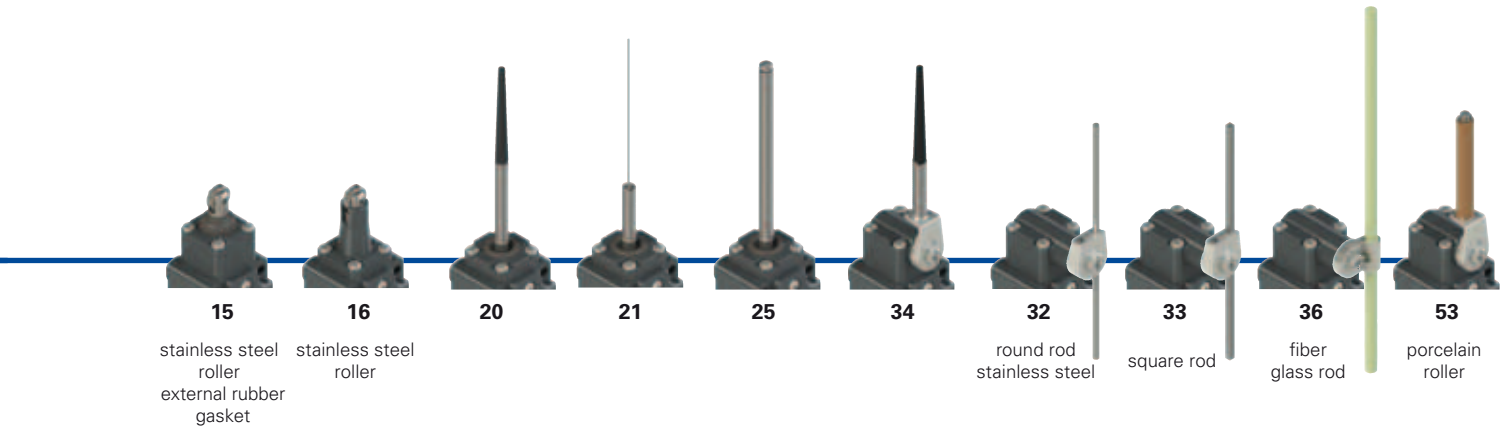
| Threaded conduit entry | |
|---|---|
| **M2** | M20x1.5 (standard) |
| | PG 13.5 |

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

| With M12 metal connector | |
|---|---|
| **K40** | 8 poles |
| **K50** | 5 poles |

product options

accessory sold separately



**15** stainless steel roller external rubber gasket

**16** stainless steel roller

**20**

**21**

**25**

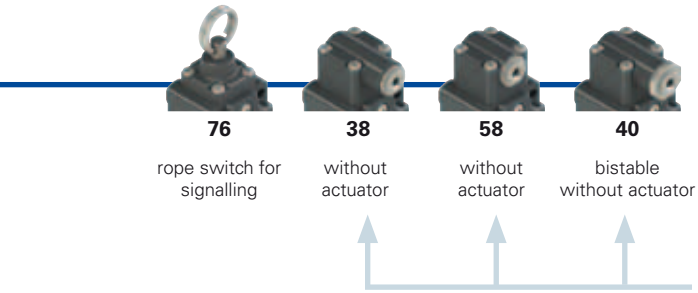
**34**

**32** round rod stainless steel

**33** square rod

**36** fiber glass rod

**53** porcelain roller



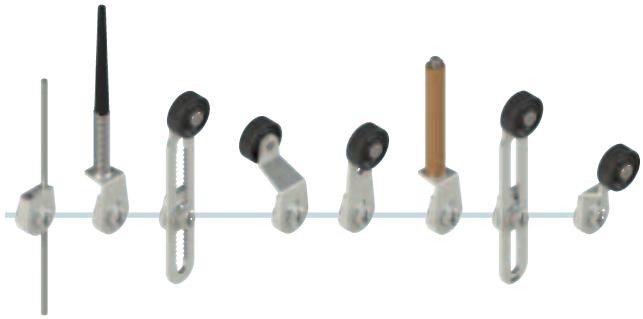
**76** rope switch for signalling

**38** without actuator

**58** without actuator

**40** bistable without actuator

**LOOSE ACTUATORS**
See page 27



## 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

**FD 502-GM2K50R24T6**

| Housing | |
|---|---|
| **FD** | metal, one conduit entry |

| Contact blocks | |
|---|---|
| **5** | 1NO+1NC, snap action |
| **6** | 1NO+1NC, slow action |
| **7** | 1NO+1NC, slow action, overlapped |
| **...** | ..... |

| Actuators | |
|---|---|
| **01** | short plunger |
| **02** | roller lever |
| **05** | angled roller lever |
| **...** | ..... |

| Contact type | |
|---|---|
| | silver contacts (standard) |
| **G** | silver contacts with 1 µm gold coating (not for contact block 2) |

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

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

| Rollers | |
|---|---|
| | standard roller |
| **R24** | stainless steel, Ø 20 mm (for actuators 02, 05, 31, 35, 51, 52, 56, 57) |
| **R25** | technopolymer, Ø 35 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R5** | rubber, Ø 40 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R26** | rubber, Ø 50 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R27** | rubber, protruding, Ø 50 mm (for actuators 35 e 36) |

| Pre-installed cable glands or connectors | |
|---|---|
| | without cable gland or connector (standard) |
| **K23** | cable gland for cables Ø 6…Ø 12 mm |
| **K27** | cable gland for cables Ø 3…Ø 7 mm |
| **K40** | M12 metal connector, 8 poles |
| **K50** | M12 metal connector, 5 poles |

Please contact our technical service for the complete list of possible combinations.

# Position switches **FD** series

**Main features**

- Metal housing, one conduit entry
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

## Technical data

**Housing**

| | |
|---|---|
| Metal housing, baked powder coating | |
| One threaded conduit entry: | M20x1.5 (standard) |
| Protection degree: | IP67 according to EN 60529 with cable gland having equal or higher protection degree |

**General data**

| | |
|---|---|
| Ambient temperature: | -25°C … +80°C |
| Max. actuation frequency: | 3600 operating cycles[1]/hour |
| Mechanical endurance: | 20 million operating cycles[1] |
| Mounting position: | any |
| Safety parameters: | |
| $B_{10d}$: | 40,000,000 for NC contacts |
| Mechanical interlock, not coded: | type 1 according to EN ISO 14119 |
| Tightening torques for installation: | see pages 235-246 |

(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.

**Cable cross section (flexible copper strands)**

| | | | |
|---|---|---|---|
| Contact blocks 20, 21, 22, 33, 34: | min. | 1 x 0.34 mm² | (1 x AWG 22) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |
| Contact block 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 2.5 mm² | (2 x AWG 14) |
| Contact block 2: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |

**In conformity 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 529, EN 60529, UL 508, CSA 22.2 No.14.
**Approvals:**
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB14048.5-2001.

**Markings and quality marks:**

| | |
|---|---|
| IMQ approval: | EG605 |
| UL approval: | E131787 |
| CCC approval: | 2007010305230000 |
| EAC approval: | RU C-IT ДМ94.B.01024 |

**In conformity with the requirements of:**
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC.
**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 ⊖ aside 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 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 238. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.**

| | Electrical data | | Utilization category |
|---|---|---|---|
| without connector | Thermal current (Ith): | 10 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 500 Vac 600 Vdc<br>400 Vac 500 Vdc (contact blocks 2, 11, 12, 20, 21, 22, 33, 34) | Ue (V) 250 400 500<br>Ie (A) 6 4 1 |
| | Rated impulse withstand voltage ($U_{imp}$): | 6 kV<br>4 kV (contact blocks 20, 21, 22, 33, 34) | Direct current: DC13 |
| | Conditional short circuit current: | 1000 A according to EN 60947-5-1 | Ue (V) 24 125 250 |
| | Protection against short circuits: | type aM fuse 10 A 500 V | Ie (A) 6 1.1 0.4 |
| | Pollution degree: | 3 | |
| with M12 connector 5 poles | Thermal current (Ith): | 4 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 250 Vac 300 Vdc | Ue (V) 24 120 250 |
| | Protection against short circuits: | type gG fuse 4 A 500 V | Ie (A) 4 4 4 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 125 250 |
| | | | Ie (A) 4 1.1 0.4 |
| with M12 connector 8 poles | Thermal current (Ith): | 2 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 30 Vac 36 Vdc | Ue (V) 24 |
| | Protection against short circuits: | type gG fuse 2 A 500 V | Ie (A) 2 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 |
| | | | Ie (A) 2 |

## Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 20, 21,22, 33, 34)
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
4 kV (for contact blocks 20, 21, 22, 33, 34)Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Za, Zb, Za+Za, Y+Y, X+X, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening of contacts on contact block 5, 6, 7, 9, 11, 13, 14, 16, 18, 20, 21, 22, 33, 34, 66
In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

**Please contact our technical service for the list of approved products.**

## Characteristics approved by UL

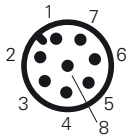
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 14. Terminal tightening torque of 12 lb in (1.4 Nm).

In conformity with standard: UL 508, CSA 22.2 No.14

**Please contact our technical service for the list of approved products.**

## Connection diagram for M12 connectors

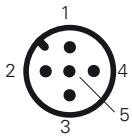
### Contact block 2 — 1NO-1NC+1NO-1NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NO | 3-4 |
| NC | 5-6 |
| NC | 7-8 |
| NO | 1-2 |

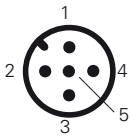
### Contact block 5 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

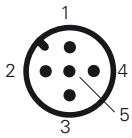
### Contact block 6 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

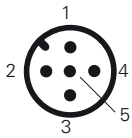
### Contact block 7 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NC | 3-4 |
| ground | 5 |

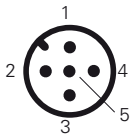
### Contact block 9 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

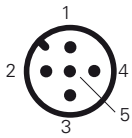
### Contact block 10 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |
| ground | 5 |

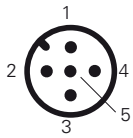
### Contact block 11 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

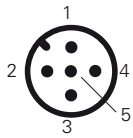
### Contact block 12 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |
| ground | 5 |

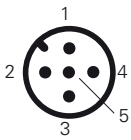
### Contact block 13 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |
| ground | 5 |

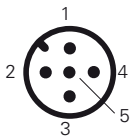
### Contact block 14 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |
| ground | 5 |

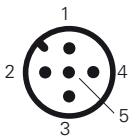
### Contact block 15 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO (1°) | 1-2 |
| NO (2°) | 3-4 |
| ground | 5 |

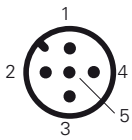
### Contact block 16 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC, lever at the right | 1-2 |
| NC, lever to the left | 3-4 |
| ground | 5 |

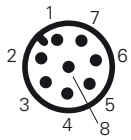
### Contact block 18 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

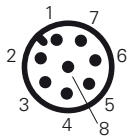
### Contact block 20 — 2NC+1NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NO | 7-8 |
| ground | 1 |

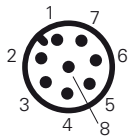
### Contact block 21 — 3NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NC | 7-8 |
| ground | 1 |

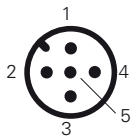
### Contact block 22 — 1NC+2NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NO | 5-6 |
| NO | 7-8 |
| ground | 1 |

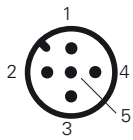
### Contact block 33 — 1NC+1NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

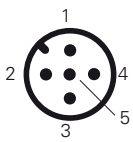
### Contact block 34 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

### Contact block E1 — PNP




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| + | 1 |
| - | 3 |
| NC | 2 |
| NO | 4 |
| ground | 5 |

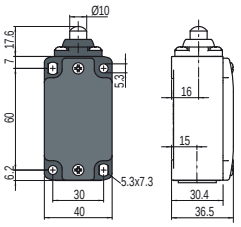
# Position switches **FD** series

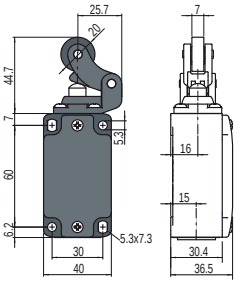
Contact type:

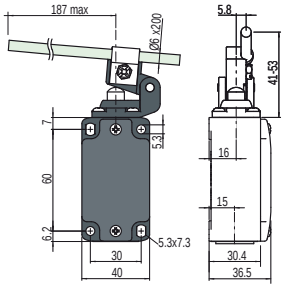
- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

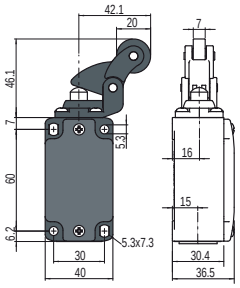
With stainless steel roller on request

With stainless steel roller on request



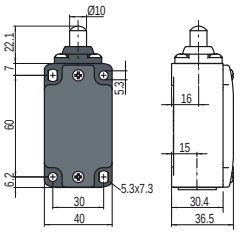



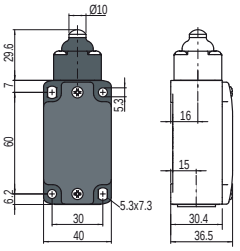



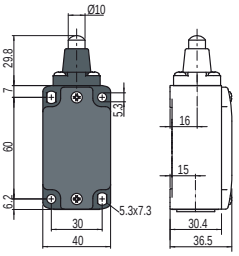

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| 5 | R | FD 501-M2 → 1NO+1NC | FD 502-M2 → 1NO+1NC | FD 504-M2 1NO+1NC | FD 505-M2 → 1NO+1NC |
| 6 | L | FD 601-M2 → 1NO+1NC | FD 602-M2 → 1NO+1NC | FD 604-M2 1NO+1NC | FD 605-M2 → 1NO+1NC |
| 7 | LO | FD 701-M2 → 1NO+1NC | FD 702-M2 → 1NO+1NC | FD 704-M2 1NO+1NC | FD 705-M2 → 1NO+1NC |
| 9 | L | FD 901-M2 → 2NC | FD 902-M2 → 2NC | FD 904-M2 2NC | FD 905-M2 → 2NC |
| 10 | L | FD 1001-M2 2NO | FD 1002-M2 2NO | FD 1004-M2 2NO | FD 1005-M2 2NO |
| 11 | R | FD 1101-M2 → 2NC | FD 1102-M2 → 2NC | FD 1104-M2 2NC | FD 1105-M2 → 2NC |
| 12 | R | FD 1201-M2 2NO | FD 1202-M2 2NO | FD 1204-M2 2NO | FD 1205-M2 2NO |
| 13 | LV | FD 1301-M2 → 2NC | FD 1302-M2 → 2NC | FD 1304-M2 2NC | FD 1305-M2 → 2NC |
| 14 | LS | FD 1401-M2 → 2NC | FD 1402-M2 → 2NC | FD 1404-M2 2NC | FD 1405-M2 → 2NC |
| 15 | LS | FD 1501-M2 2NO | FD 1502-M2 2NO | FD 1504-M2 2NO | FD 1505-M2 2NO |
| 18 | LA | FD 1801-M2 → 1NO+1NC | FD 1802-M2 → 1NO+1NC | FD 1804-M2 1NO+1NC | FD 1805-M2 → 1NO+1NC |
| 20 | L | FD 2001-M2 → 1NO+2NC | FD 2002-M2 → 1NO+2NC | FD 2004-M2 1NO+2NC | FD 2005-M2 → 1NO+2NC |
| 21 | L | FD 2101-M2 → 3NC | FD 2102-M2 → 3NC | FD 2104-M2 3NC | FD 2105-M2 → 3NC |
| 22 | L | FD 2201-M2 → 2NO+1NC | FD 2202-M2 → 2NO+1NC | FD 2204-M2 2NO+1NC | FD 2205-M2 → 2NO+1NC |
| 2 | R | FD 201-M2 2x(1NO-1NC) | FD 202-M2 2x(1NO-1NC) | FD 204-M2 2x(1NO-1NC) | FD 205-M2 2x(1NO-1NC) |
| E1 | | FD E101-M2 1NO-1NC | FD E102-M2 1NO-1NC | FD E104-M2 1NO-1NC | FD E105-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 3 | 0.5 m/s | page 237 - type 3 |
| Min. force | | 8 N (25 N →) | 6 N (25 N →) | 0.17 Nm | 6 N (25 N →) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 2 | page 238 - group 1 | page 238 - group 2 |

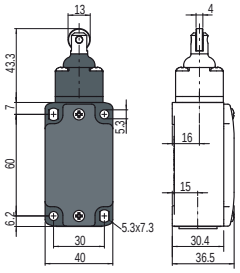
With external rubber gasket

With external rubber gasket




| Contact blocks | | | | | |
|---|---|---|---|---|---|
| 5 | R | FD 508-M2 → 1NO+1NC | FD 510-M2 → 1NO+1NC | FD 511-M2 → 1NO+1NC | FD 515-M2 → 1NO+1NC |
| 6 | L | FD 608-M2 → 1NO+1NC | FD 610-M2 → 1NO+1NC | FD 611-M2 → 1NO+1NC | FD 615-M2 → 1NO+1NC |
| 7 | LO | FD 708-M2 → 1NO+1NC | FD 710-M2 → 1NO+1NC | FD 711-M2 → 1NO+1NC | FD 715-M2 → 1NO+1NC |
| 9 | L | FD 908-M2 → 2NC | FD 910-M2 → 2NC | FD 911-M2 → 2NC | FD 915-M2 → 2NC |
| 10 | L | FD 1008-M2 2NO | FD 1010-M2 2NO | FD 1011-M2 2NO | FD 1015-M2 2NO |
| 11 | R | FD 1108-M2 → 2NC | FD 1110-M2 → 2NC | FD 1111-M2 → 2NC | FD 1115-M2 → 2NC |
| 12 | R | FD 1208-M2 2NO | FD 1210-M2 2NO | FD 1211-M2 2NO | FD 1215-M2 2NO |
| 13 | LV | FD 1308-M2 → 2NC | FD 1310-M2 → 2NC | FD 1311-M2 → 2NC | FD 1315-M2 → 2NC |
| 14 | LS | FD 1408-M2 → 2NC | FD 1410-M2 → 2NC | FD 1411-M2 → 2NC | FD 1415-M2 → 2NC |
| 15 | LS | FD 1508-M2 2NO | FD 1510-M2 2NO | FD 1511-M2 2NO | FD 1515-M2 2NO |
| 18 | LA | FD 1808-M2 → 1NO+1NC | FD 1810-M2 → 1NO+1NC | FD 1811-M2 → 1NO+1NC | FD 1815-M2 → 1NO+1NC |
| 20 | L | FD 2008-M2 → 1NO+2NC | FD 2010-M2 → 1NO+2NC | FD 2011-M2 → 1NO+2NC | FD 2015-M2 → 1NO+2NC |
| 21 | L | FD 2108-M2 → 3NC | FD 2110-M2 → 3NC | FD 2111-M2 → 3NC | FD 2115-M2 → 3NC |
| 22 | L | FD 2208-M2 → 2NO+1NC | FD 2210-M2 → 2NO+1NC | FD 2211-M2 → 2NO+1NC | FD 2215-M2 → 2NO+1NC |
| 2 | R | FD 208-M2 2x(1NO-1NC) | FD 210-M2 2x(1NO-1NC) | FD 211-M2 2x(1NO-1NC) | FD 215-M2 2x(1NO-1NC) |
| E1 | | FD E108-M2 1NO-1NC | FD E110-M2 1NO-1NC | FD E111-M2 1NO-1NC | FD E115-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 4 | page 237 - type 4 | page 237 - type 2 |
| Min. force | | 8 N (25 N →) | 11 N (25 N →) | 8 N (25 N →) | 11 N (25 N →) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 |

All measures in the drawings are in mm

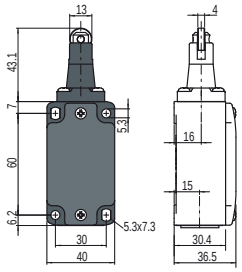
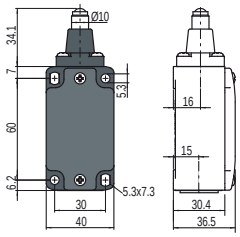
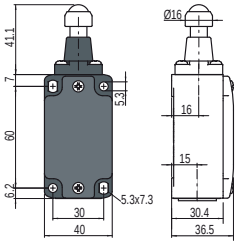
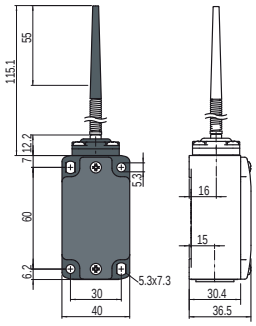
Items with code on **green** background are stock items

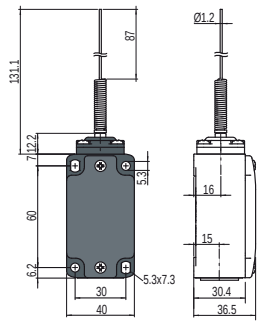
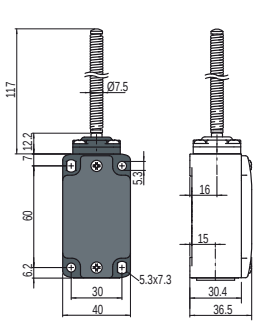
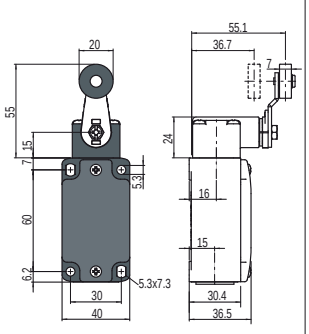
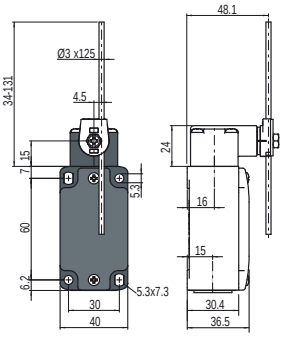
**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
= electronic PNP

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| | |  | Ball, Ø 8 mm, stainless steel<br>  | Ball, Ø 12.7 mm, stainless steel<br>  | With external rubber gasket<br>  |
| 5 | R | FD 516-M2 1NO+1NC | FD 518-M2 1NO+1NC | FD 519-M2 1NO+1NC | FD 520-M2 1NO+1NC |
| 6 | L | FD 616-M2 1NO+1NC | FD 618-M2 1NO+1NC | FD 619-M2 1NO+1NC | |
| 7 | LO | FD 716-M2 1NO+1NC | FD 718-M2 1NO+1NC | FD 719-M2 1NO+1NC | |
| 9 | L | FD 916-M2 2NC | FD 918-M2 2NC | FD 919-M2 2NC | |
| 10 | L | FD 1016-M2 2NO | FD 1018-M2 2NO | FD 1019-M2 2NO | FD 1020-M2 2NO |
| 11 | R | FD 1116-M2 2NC | FD 1118-M2 2NC | FD 1119-M2 2NC | |
| 12 | R | FD 1216-M2 2NO | FD 1218-M2 2NO | FD 1219-M2 2NO | |
| 13 | LV | FD 1316-M2 2NC | FD 1318-M2 2NC | FD 1319-M2 2NC | |
| 14 | LS | FD 1416-M2 2NC | FD 1418-M2 2NC | FD 1419-M2 2NC | |
| 15 | LS | FD 1516-M2 2NO | FD 1518-M2 2NO | FD 1519-M2 2NO | |
| 18 | LA | FD 1816-M2 1NO+1NC | FD 1818-M2 1NO+1NC | FD 1819-M2 1NO+1NC | FD 1820-M2 1NO+1NC |
| 20 | L | FD 2016-M2 1NO+2NC | FD 2018-M2 1NO+2NC | FD 2019-M2 1NO+2NC | FD 2020-M2 1NO+2NC |
| 21 | L | FD 2116-M2 3NC | FD 2118-M2 3NC | FD 2119-M2 3NC | FD 2120-M2 3NC |
| 22 | L | FD 2216-M2 2NO+1NC | FD 2218-M2 2NO+1NC | FD 2219-M2 2NO+1NC | FD 2220-M2 2NO+1NC |
| 2 | R | FD 216-M2 2x(1NO-1NC) | FD 218-M2 2x(1NO-1NC) | FD 219-M2 2x(1NO-1NC) | FD 220-M2 2x(1NO-1NC) |
| E1 | | FD E116-M2 1NO-1NC | FD E118-M2 1NO-1NC | FD E119-M2 1NO-1NC | FD E120-M2 1NO-1NC |
| Max. speed | | page 237 - type 2 | page 237 - type 4 | page 237 - type 4 | 1 m/s |
| Min. force | | 8 N (25 N) | 8 N (25 N) | 8 N (25 N) | 0.09 Nm |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 3 |

| Contact blocks | | | With external rubber gasket<br>  | With external rubber gasket<br>  | Other rollers available. See on page 28<br>  | Round rod, Ø 3 mm, stainless steel<br>  |
|---|---|---|---|---|---|---|
| 5 | R | FD 521-M2 1NO+1NC | FD 525-M2 1NO+1NC | FD 531-M2 1NO+1NC | FD 532-M2 1NO+1NC |
| 6 | L | | | FD 631-M2 1NO+1NC | FD 632-M2 1NO+1NC |
| 7 | LO | | | FD 731-M2 1NO+1NC | FD 732-M2 1NO+1NC |
| 9 | L | | | FD 931-M2 2NC | FD 932-M2 2NC |
| 10 | L | FD 1021-M2 2NO | FD 1025-M2 2NO | FD 1031-M2 2NO | FD 1032-M2 2NO |
| 11 | R | | | FD 1131-M2 2NC | FD 1132-M2 2NC |
| 12 | R | | | FD 1231-M2 2NO | FD 1232-M2 2NO |
| 13 | LV | | | FD 1331-M2 2NC | FD 1332-M2 2NC |
| 14 | LS | | | FD 1431-M2 2NC | FD 1432-M2 2NC |
| 15 | LS | | | FD 1531-M2 2NO | FD 1532-M2 2NO |
| 16 | LI | | | FD 1631-M2 2NC | FD 1632-M2 2NC |
| 18 | LA | FD 1821-M2 1NO+1NC | FD 1825-M2 1NO+1NC | FD 1831-M2 1NO+1NC | FD 1832-M2 1NO+1NC |
| 20 | L | FD 2021-M2 1NO+2NC | FD 2025-M2 1NO+2NC | FD 2031-M2 1NO+2NC | FD 2032-M2 1NO+2NC |
| 21 | L | FD 2121-M2 3NC | FD 2125-M2 3NC | FD 2131-M2 3NC | FD 2132-M2 3NC |
| 22 | L | FD 2221-M2 2NO+1NC | FD 2225-M2 2NO+1NC | FD 2231-M2 2NO+1NC | FD 2232-M2 2NO+1NC |
| 2 | R | FD 221-M2 2x(1NO-1NC) | FD 225-M2 2x(1NO-1NC) | FD 231-M2 2x(1NO-1NC) | FD 232-M2 2x(1NO-1NC) |
| E1 | | FD E121-M2 1NO-1NC | FD E125-M2 1NO-1NC | FD E131-M2 1NO-1NC | FD E132-M2 1NO-1NC |
| Max. speed | | 1 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.08 Nm | 0.14 Nm | 0.1 Nm (0.25 Nm) | 0.1 Nm |
| Travel diagrams | | page 238 - group 3 | page 238 - group 3 | page 238 - group 4 | page 238 - group 4 |

All measures in the drawings are in mm

Items with code on **green** background are stock items

**Accessories** See page 225

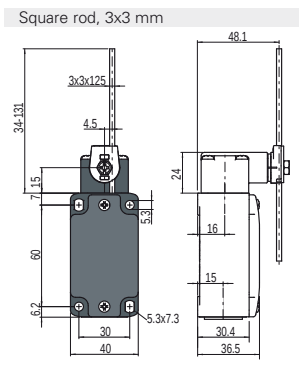
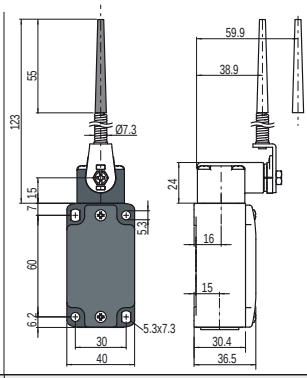
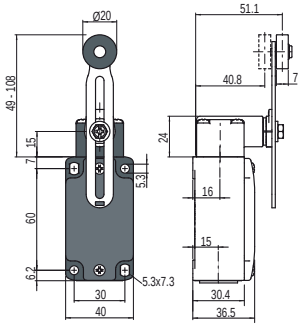
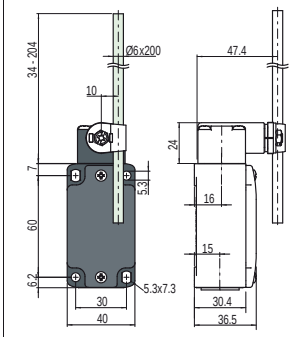
The 2D/3D files are available at **www.pizzato.com**

# Position switches **FD** series

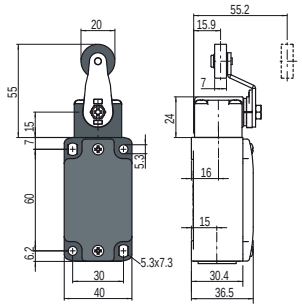
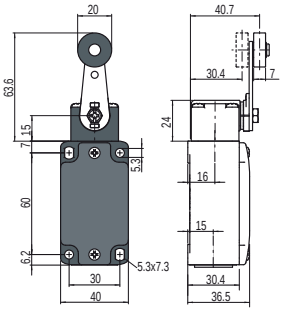
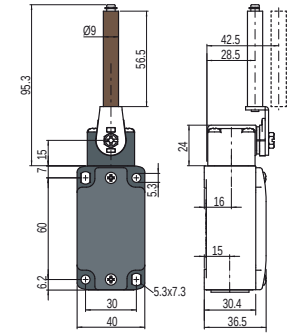
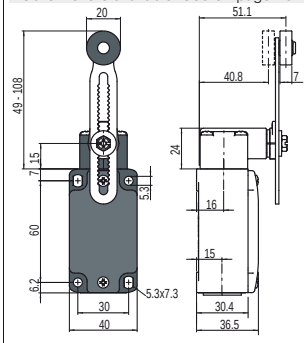
Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

Contact blocks

| | | Square rod, 3x3 mm | | Other rollers available. See on page 28 | Fiber glass rod |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FD 533-M2 1NO+1NC | FD 534-M2 1NO+1NC | FD 535-M2 (1) 1NO+1NC | FD 536-M2 1NO+1NC |
| 6 | L | FD 633-M2 1NO+1NC | FD 634-M2 1NO+1NC | FD 635-M2 (1) 1NO+1NC | FD 636-M2 1NO+1NC |
| 7 | LO | FD 733-M2 1NO+1NC | FD 734-M2 1NO+1NC | FD 735-M2 (1) 1NO+1NC | FD 736-M2 1NO+1NC |
| 9 | L | FD 933-M2 2NC | FD 934-M2 2NC | FD 935-M2 (1) 2NC | FD 936-M2 2NC |
| 10 | L | FD 1033-M2 2NO | FD 1034-M2 2NO | FD 1035-M2 2NO | FD 1036-M2 2NO |
| 11 | R | FD 1133-M2 2NC | FD 1134-M2 2NC | FD 1135-M2 (1) 2NC | FD 1136-M2 2NC |
| 12 | R | FD 1233-M2 2NO | FD 1234-M2 2NO | FD 1235-M2 2NO | FD 1236-M2 2NO |
| 13 | LV | FD 1333-M2 2NC | FD 1334-M2 2NC | FD 1335-M2 (1) 2NC | FD 1336-M2 2NC |
| 14 | LS | FD 1433-M2 2NC | FD 1434-M2 2NC | FD 1435-M2 (1) 2NC | FD 1436-M2 2NC |
| 15 | LS | FD 1533-M2 2NO | FD 1534-M2 2NO | FD 1535-M2 2NO | FD 1536-M2 2NO |
| 16 | LI | FD 1633-M2 2NC | FD 1634-M2 2NC | FD 1635-M2 (1) 2NC | FD 1636-M2 2NC |
| 18 | LA | FD 1833-M2 1NO+1NC | FD 1834-M2 1NO+1NC | FD 1835-M2 (1) 1NO+1NC | FD 1836-M2 1NO+1NC |
| 20 | L | FD 2033-M2 1NO+2NC | FD 2034-M2 1NO+2NC | FD 2035-M2 (1) 1NO+2NC | FD 2036-M2 1NO+2NC |
| 21 | L | FD 2133-M2 3NC | FD 2134-M2 3NC | FD 2135-M2 (1) 3NC | FD 2136-M2 3NC |
| 22 | L | FD 2233-M2 2NO+1NC | FD 2234-M2 2NO+1NC | FD 2235-M2 (1) 2NO+1NC | FD 2236-M2 2NO+1NC |
| 2 | R | FD 233-M2 2x(1NO-1NC) | FD 234-M2 2x(1NO-1NC) | FD 235-M2 2x(1NO-1NC) | FD 236-M2 2x(1NO-1NC) |
| E1 | | FD E133-M2 1NO-1NC | FD E134-M2 1NO-1NC | FD E135-M2 1NO-1NC | FD E136-M2 1NO-1NC |
| Max. speed | | 1.5 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.1 Nm | 0.1 Nm | 0.1 Nm (0.25 Nm →) | 0.1 Nm |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 |

Contact blocks

| | | Other rollers available. See on page 28 | Other rollers available. See on page 28 | Porcelain roller | Other rollers available. See on page 28 |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FD 551-M2 → 1NO+1NC | FD 552-M2 → 1NO+1NC | FD 553-E11M2V9 → 1NO+1NC | FD 556-M2 → 1NO+1NC |
| 6 | L | FD 651-M2 → 1NO+1NC | FD 652-M2 → 1NO+1NC | FD 653-E11M2V9 → 1NO+1NC | FD 656-M2 → 1NO+1NC |
| 7 | LO | FD 751-M2 → 1NO+1NC | FD 752-M2 → 1NO+1NC | FD 753-E11M2V9 → 1NO+1NC | FD 756-M2 → 1NO+1NC |
| 9 | L | FD 951-M2 → 2NC | FD 952-M2 → 2NC | FD 953-E11M2V9 → 2NC | FD 956-M2 → 2NC |
| 10 | L | FD 1051-M2 2NO | FD 1052-M2 2NO | FD 1053-E11M2V9 2NO | FD 1056-M2 2NO |
| 11 | R | FD 1151-M2 → 2NC | FD 1152-M2 → 2NC | | FD 1156-M2 → 2NC |
| 12 | R | FD 1251-M2 2NO | FD 1252-M2 2NO | FD 1253-E11M2V9 2NO | FD 1256-M2 2NO |
| 13 | LV | FD 1351-M2 → 2NC | FD 1352-M2 → 2NC | FD 1353-E11M2V9 → 2NC | FD 1356-M2 → 2NC |
| 14 | LS | FD 1451-M2 → 2NC | FD 1452-M2 → 2NC | FD 1453-E11M2V9 → 2NC | FD 1456-M2 → 2NC |
| 15 | LS | FD 1551-M2 2NO | FD 1552-M2 2NO | FD 1553-E11M2V9 2NO | FD 1556-M2 2NO |
| 16 | LI | | | | FD 1656-M2 → 2NC |
| 18 | LA | FD 1851-M2 → 1NO+1NC | FD 1852-M2 → 1NO+1NC | FD 1853-E11M2V9 → 1NO+1NC | FD 1856-M2 → 1NO+1NC |
| 20 | L | FD 2051-M2 → 1NO+2NC | FD 2052-M2 → 1NO+2NC | FD 2053-E11M2V9 → 1NO+2NC | FD 2056-M2 → 1NO+2NC |
| 21 | L | FD 2151-M2 → 3NC | FD 2152-M2 → 3NC | FD 2153-E11M2V9 → 3NC | FD 2156-M2 → 3NC |
| 22 | L | FD 2251-M2 → 2NO+1NC | FD 2252-M2 → 2NO+1NC | FD 2253-E11M2V9 → 2NO+1NC | FD 2256-M2 → 2NO+1NC |
| 2 | R | FD 251-M2 2x(1NO-1NC) | FD 252-M2 2x(1NO-1NC) | FD 253-E11M2 2x(1NO-1NC) | FD 256-M2 2x(1NO-1NC) |
| E1 | | FD E151-M2 1NO-1NC | FD E152-M2 1NO-1NC | FD E153-E11M2V9 1NO-1NC | FD E156-M2 1NO-1NC |
| Max. speed | | page 237 - type 1 | page 237 - type 1 | 0.5 m/s | page 237 - type 1 |
| Min. force | | 0.06 Nm (0.25 Nm →) | 0.06 Nm (0.25 Nm →) | 0.03 Nm (0.25 Nm →) | 0.1 Nm (0.25 Nm →) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 5 | page 238 - group 4 |

(1) Positive opening only with actuator set to max. See page 27.

All measures in the drawings are in mm

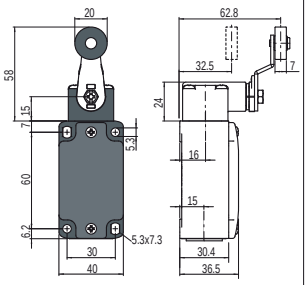
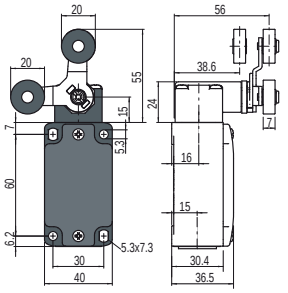
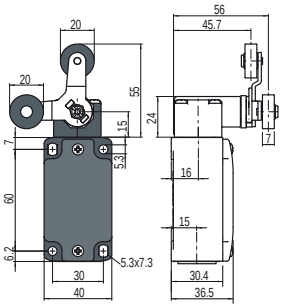
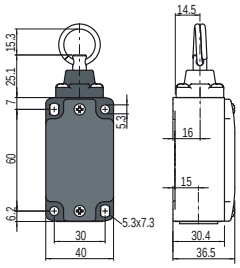
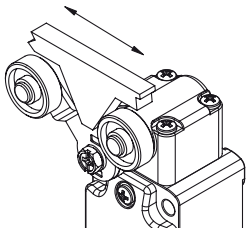
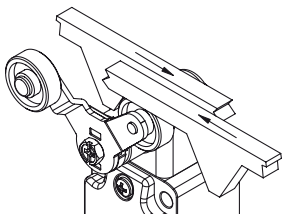
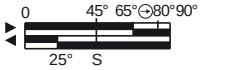
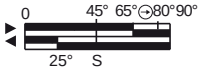
Items with code on **green** background are stock items

**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
= electronic PNP

| Contact blocks | | Other rollers available. See on page 28 | With stainless steel roller on request | With stainless steel roller on request | Rope switch for signalling |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FD 557-M2 ⊖ 1NO+1NC | FD 541-M2 ⊖ 1NO+1NC | FD 542-M2 ⊖ 1NO+1NC | FD 576-M2 1NO+1NC |
| 6 | L | FD 657-M2 ⊖ 1NO+1NC | Bistable switch with single track lyra lever | Bistable switch with dual track lyra lever | FD 676-M2 1NO+1NC |
| 7 | LO | FD 757-M2 ⊖ 1NO+1NC |  |  | FD 776-M2 1NO+1NC |
| 9 | L | FD 957-M2 ⊖ 2NC |  |  | FD 976-M2 2NO |
| 10 | L | FD 1057-M2 2NO | S = mechanical switching point positive opening on contact 21-22 only | S = mechanical switching point positive opening on contact 21-22 only | FD 1076-M2 2NC |
| 11 | R | FD 1157-M2 ⊖ 2NC | | | FD 1176-M2 2NO |
| 12 | R | FD 1257-M2 2NO | | | FD 1276-M2 2NC |
| 13 | LV | FD 1357-M2 ⊖ 2NC | | | FD 1376-M2 2NO |
| 14 | LS | FD 1457-M2 ⊖ 2NC | | | FD 1476-M2 2NO |
| 15 | LS | FD 1557-M2 2NO | | | FD 1576-M2 2NC |
| 16 | LI | FD 1657-M2 ⊖ 2NC | | | |
| 18 | LA | FD 1857-M2 ⊖ 1NO+1NC | | | FD 1876-M2 1NO+1NC |
| 20 | L | FD 2057-M2 ⊖ 1NO+2NC | | | FD 2076-M2 2NO+1NC |
| 21 | L | FD 2157-M2 ⊖ 3NC | | | FD 2176-M2 3NC |
| 22 | L | FD 2257-M2 ⊖ 2NO+1NC | | | FD 2276-M2 1NO+2NC |
| 2 | R | FD 257-M2 2x(1NO-1NC) | | | FD 276-M2 2x(1NO-1NC) |
| E1 | | FD E157-M2 1NO-1NC | | | |
| Max. speed | | page 237 - type 1 | 0.5 m/s with cam at 30° | 0.5 m/s with cam at 30° | 0.5 m/s |
| Min. force | | 0.1 Nm (0.25 Nm ⊖) | 0.21 Nm (0.36 Nm ⊖) | 0.21 Nm (0.36 Nm ⊖) | initial 20 N - final 40 N |
| Travel diagrams | | page 238 - group 4 | | | page 238 - group 6 |

All measures in the drawings are in mm

Items with code on **green** background are stock items

**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

## Position switches with revolving lever without actuator

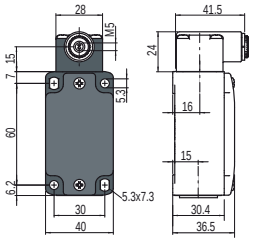
All measures in the drawings are in mm

Contact type:

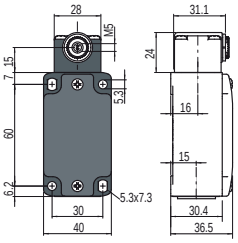
- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

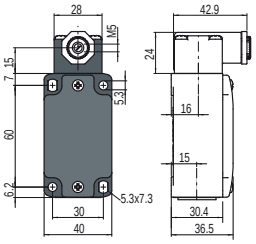
Contact blocks

Regular head



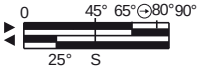

Compact head




| | | Regular head | Compact head | |
|---|---|---|---|---|
| 5 | R | FD 538-M2 ⊕ 1NO+1NC | FD 558-M2 ⊕ 1NO+1NC | FD 540-M2 ⊕ 1NO+1NC |
| 6 | L | FD 638-M2 ⊕ 1NO+1NC | FD 658-M2 ⊕ 1NO+1NC | |
| 7 | LO | FD 738-M2 ⊕ 1NO+1NC | FD 758-M2 ⊕ 1NO+1NC | |
| 9 | L | FD 938-M2 ⊕ 2NC | FD 958-M2 ⊕ 2NC | |
| 10 | L | FD 1038-M2 2NO | FD 1058-M2 2NO | |
| 11 | R | FD 1138-M2 ⊕ 2NC | FD 1158-M2 ⊕ 2NC | |
| 12 | R | FD 1238-M2 2NO | FD 1258-M2 2NO | |
| 13 | LV | FD 1338-M2 ⊕ 2NC | FD 1358-M2 ⊕ 2NC | |
| 14 | LS | FD 1438-M2 ⊕ 2NC | FD 1458-M2 ⊕ 2NC | |
| 15 | LS | FD 1538-M2 2NO | FD 1558-M2 2NO | |
| 16 | LI | FD 1638-M2 ⊕ 2NC | | |
| 18 | LA | FD 1838-M2 ⊕ 1NO+1NC | FD 1858-M2 ⊕ 1NO+1NC | |
| 20 | L | FD 2038-M2 ⊕ 1NO+2NC | FD 2058-M2 ⊕ 1NO+2NC | |
| 21 | L | FD 2138-M2 ⊕ 3NC | FD 2158-M2 ⊕ 3NC | |
| 22 | L | FD 2238-M2 ⊕ 2NO+1NC | FD 2258-M2 ⊕ 2NO+1NC | |
| 2 | R | FD 238-M2 2x(1NO-1NC) | FD 258-M2 2x(1NO-1NC) | |
| E1 | | FD E138-M2 1NO-1NC | FD E158-M2 1NO-1NC | |
| Min. force | | 0.1 Nm (0.25 Nm ⊕) | 0.06 Nm (0.25 Nm ⊕) | 0.5 m/s with cam at 30° |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | 0.21 Nm (0.36 Nm ⊕) |

Bistable switch




S mechanical switching point
positive opening on contact 21-22 only

**IMPORTANT**

**For safety applications:** join only switches and actuators marked with symbol ⊕ aside the product code.

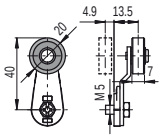
For more information about safety applications see details on page 235.

## Loose actuators

All measures in the drawings are in mm

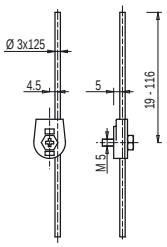
**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

Technopolymer roller Ø 20 mm



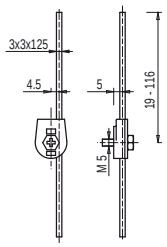

VF L31 ⊕

Adjustable round rod Ø 3x125 mm



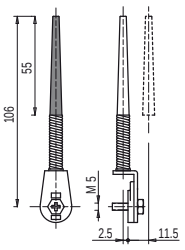

VF L32 (3)

Adjustable square rod 3x3x125 mm



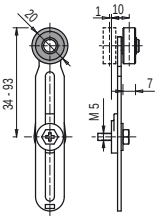

VF L33 (3)

Flexible rod with pointed end



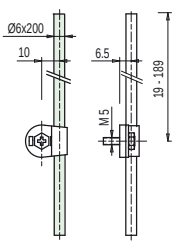

VF L34

Adjustable actuator with technopolymer roller



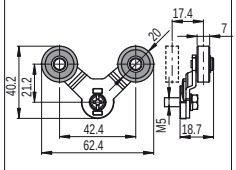

VF L35 ⊕ (1) (3)

Adjustable fiber glass rod



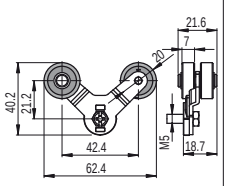

VF L36 (3)

Single track lyra actuator



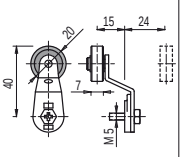

VF L41 ⊕

Dual track lyra actuator



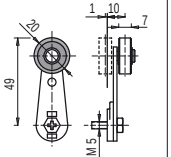

VF L42 ⊕

Technopolymer roller, Ø 20 mm



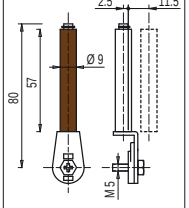

VF L51 ⊕

Technopolymer roller, Ø 20 mm



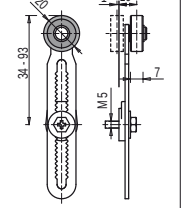

VF L52 ⊕

Porcelain roller



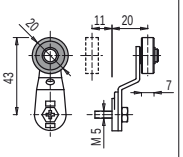

VF L53 ⊕ (2)

Adjustable safety actuator with technopolymer roller

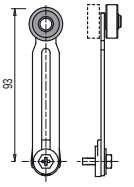



VF L56 ⊕ (3)

Technopolymer roller, Ø 20 mm




VF L57 ⊕




- (1) Actuator VF L35 can only be used in safety applications if adjusted to its max. length, as shown in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling switch FD •58-M2 (e.g. FD 558-M2, FD 658-M2…) with actuator VF L53 will not present the same travel diagrams and actuating forces as switch FD •53-E11M2V9 (e.g. FD 553-E11M2V9, FD 653-E11M2V9…).
- (3) If installed with switch FD •58-M2 (e.g. FC 558-M2, FD 658-M2…) the actuator could mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be rotated to the inside because it will mechanically interfere with the switch head.

Items with code on **green** background are stock items

**Accessories** See page 225

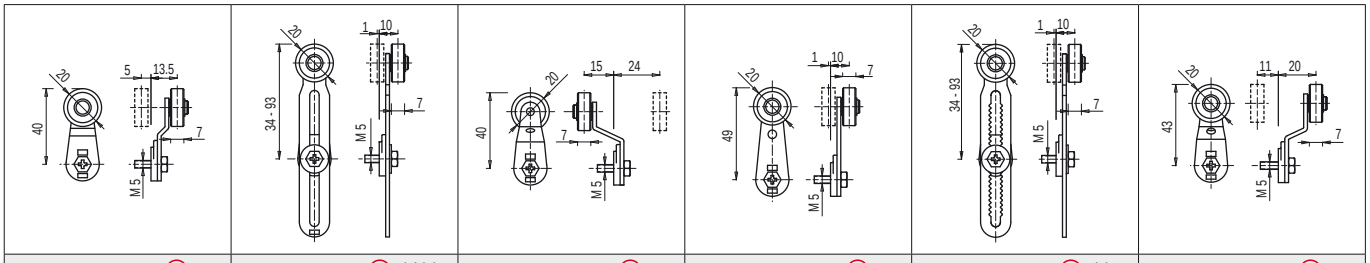
➔ The 2D/3D files are available at **www.pizzato.com**

## Special loose actuators

All measures in the drawings are in mm

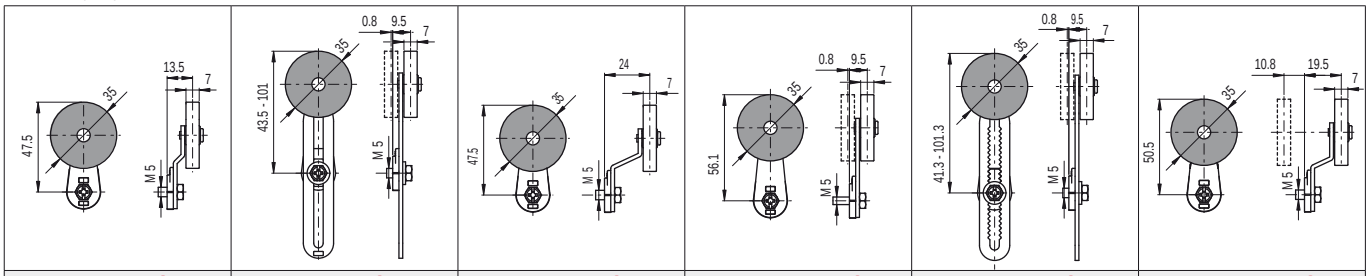
**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

### Stainless steel rollers, Ø 20 mm



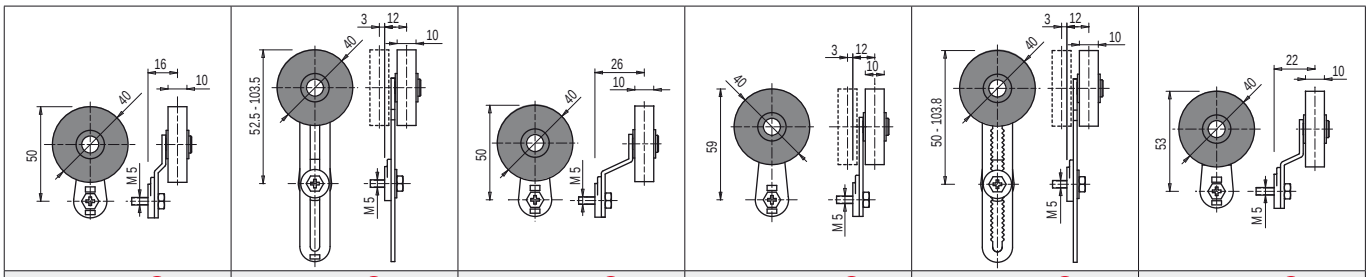

VF L31-R24 | VF L35-R24 (1) (3) | VF L51-R24 | VF L52-R24 | VF L56-R24 (3) | VF L57-R24

### Technopolymer rollers, Ø 35 mm



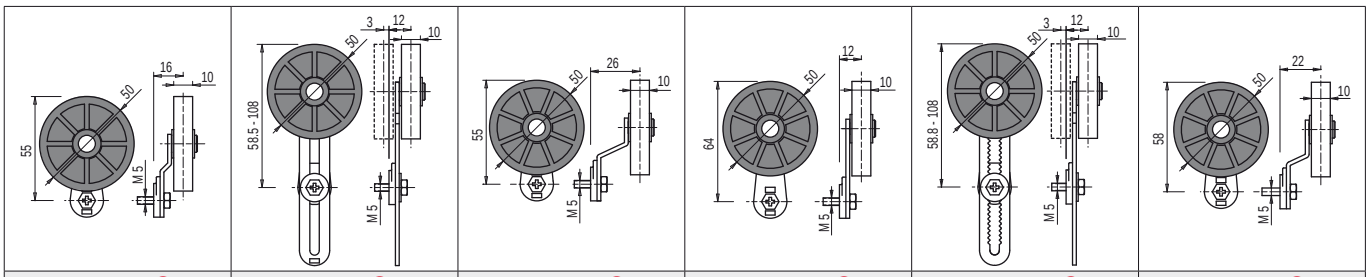

VF L31-R25 (4) | VF L35-R25 (1) (3) | VF L51-R25 (4) | VF L52-R25 | VF L56-R25 (3) | VF L57-R25

### Rubber rollers, Ø 40 mm



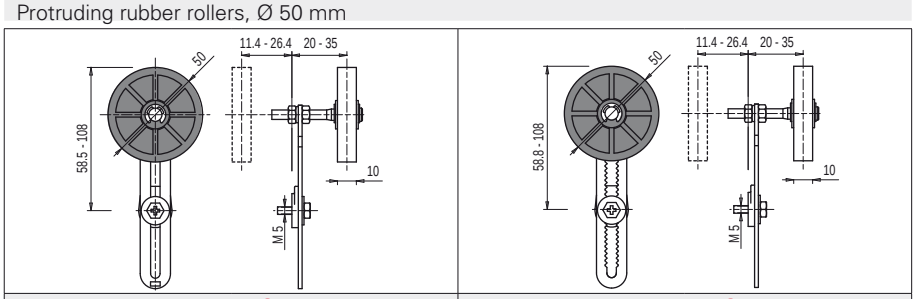

VF L31-R5 (4) | VF L35-R5 (1) (3) | VF L51-R5 (4) | VF L52-R5 | VF L56-R5 (3) | VF L57-R5 (4)

### 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



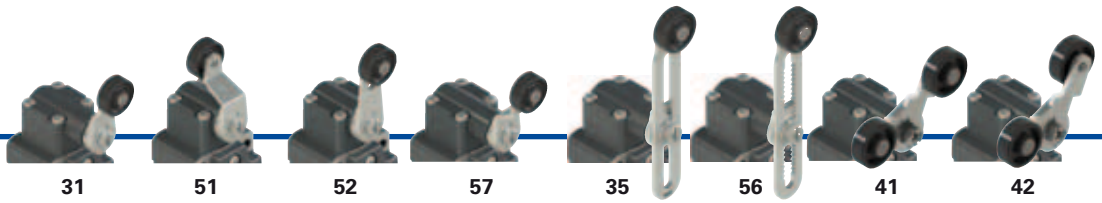

VF L35-R27 (1) (3) | VF L56-R27 (3)

**Accessories** See page 225

➔ The 2D/3D files are available at **www.pizzato.com**

## Selection diagram

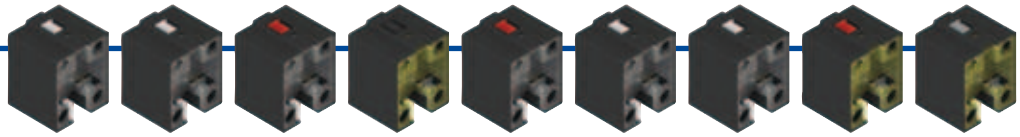
**01** **08** **10** external rubber gasket **11** **18** ball Ø 8 mm, stainless steel **19** ball Ø 12.7 mm, stainless steel **02** **04** fiber glass rod **05**



**31** **51** **52** **57** **35** adjustable lever **56** adjustable safety lever **41** bistable **42** bistable

**ACTUATORS**

**CONTACT BLOCKS**



**5** 1NO+1NC, snap action **6** 1NO+1NC, slow action **7** 1NO+1NC, slow action, overlapped **9** 2NC slow action **10** 2NO slow action **11** 2NC snap action **12** 2NO snap action **13** 2NC slow action shifted and spaced **14** 2NC slow action, shifted

**15** 2NO slow action, shifted **16** 2NC slow action independent **18** 1NO+1NC, slow action, closer **20** 1NO+2NC, slow action **21** 3NC slow action **22** 2NO+1NC, slow action **2** 2x (1NO-1NC) snap action **E1** 1NO-1NC electronic PNP

**CONDUIT ENTRY**

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

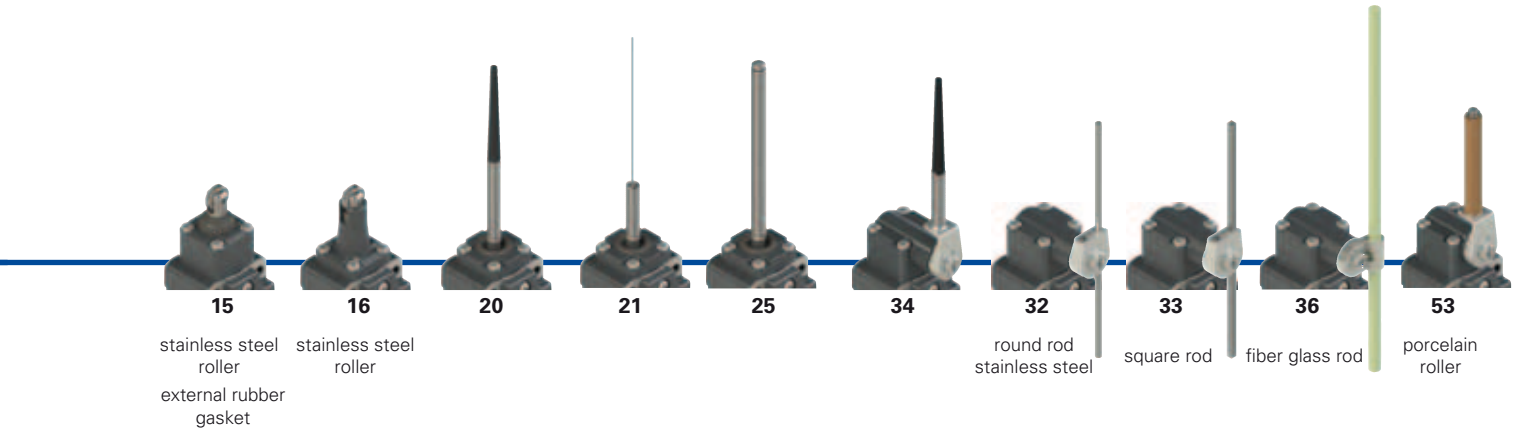
| With cable gland | |
|---|---|
| **K23** | for cables Ø 6…Ø 12 mm |
| **K27** | for cables Ø 3…Ø 7 mm |

| With M12 plastic connector | |
|---|---|
| **K70** | 4 poles, bottom |
| **K45** | 8 poles, bottom |

| With M12 metal connector | |
|---|---|
| **K40** | 8 poles, bottom |
| **K60** | 4 poles, bottom |

product options

accessory sold separately



**15** stainless steel roller external rubber gasket

**16** stainless steel roller

**20**

**21**

**25**

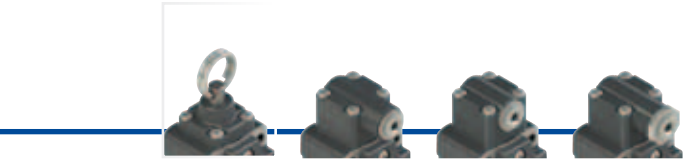
**34**

**32** round rod stainless steel

**33** square rod

**36** fiber glass rod

**53** porcelain roller



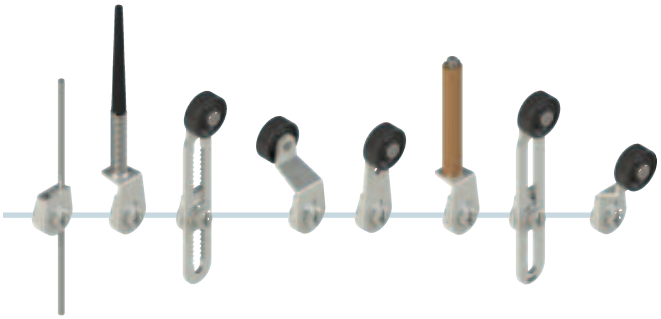
**76** rope switch for signalling

**38** without actuator

**58** without actuator

**40** bistable without actuator

**LOOSE ACTUATORS**
See page 37



## 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

**FP 502-GM2K70R24T6**

| Housing | |
|---|---|
| **FP** | technopolymer, one conduit entry |

| Contact blocks | |
|---|---|
| **5** | 1NO+1NC, snap action |
| **6** | 1NO+1NC, slow action |
| **7** | 1NO+1NC, slow action, overlapped |
| **...** | ..... |

| Actuators | |
|---|---|
| **01** | short plunger |
| **02** | roller lever |
| **05** | angled roller lever |
| **...** | ..... |

| Contact type | |
|---|---|
| | silver contacts (standard) |
| **G** | silver contacts with 1 µm gold coating (not for contact block 2) |

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

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

| Rollers | |
|---|---|
| | standard roller |
| **R24** | stainless steel, Ø 20 mm (for actuators 02, 05, 31, 35, 51, 52, 56, 57) |
| **R25** | technopolymer, Ø 35 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R5** | rubber, Ø 40 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R26** | rubber, Ø 50 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R27** | rubber, protruding, Ø 50 mm (for actuators 35 e 36) |

| Pre-installed cable glands or connectors | |
|---|---|
| | without cable gland or connector (standard) |
| **K23** | cable gland for cables Ø 6…Ø 12 mm |
| **K27** | cable gland for cables Ø 3…Ø 7 mm |
| **K45** | M12 plastic connector, 8 poles |
| **K70** | M12 plastic connector, 4 poles |

Please contact our technical service for the complete list of possible combinations.

**Main features**

- Technopolymer housing, one conduit entry
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

## Technical data

**Housing**

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

**General data**

| | |
|---|---|
| Ambient temperature: | -25°C … +80°C |
| Max. actuation frequency: | 3600 operating cycles[1]/hour |
| Mechanical endurance: | 20 million operating cycles[1] |
| Mounting position: | any |
| Safety parameters: | |
| $B_{10d}$: | 40,000,000 for NC contacts |
| Mechanical interlock, not coded: | type 1 according to EN ISO 14119 |
| Tightening torques for installation: | see pages 235-246 |

(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.

**Cable cross section (flexible copper strands)**

| | | | |
|---|---|---|---|
| Contact blocks 20, 21, 22, 33, 34: | min. | 1 x 0.34 mm² | (1 x AWG 22) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |
| Contact block 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 2.5 mm² | (2 x AWG 14) |
| Contact block 2: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |

**In conformity 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, UL 508, CSA 22.2 No.14.
**Approvals:**
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB14048.5-2001.

**Markings and quality marks:**

| | |
|---|---|
| IMQ approval: | EG605 |
| UL approval: | E131787 |
| CCC approval: | 2007010305230014 |
| EAC approval: | RU C-IT ДМ94.B.01024 |

**In conformity with the requirements of:**
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC.
**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 ⊖ aside 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 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 238. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.**

| Electrical data | | | Utilization category |
|---|---|---|---|
| without connector | Thermal current (Ith): | 10 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 500 Vac 600 Vdc<br>400 Vac 500 Vdc (contact blocks 2, 11, 12, 20, 21, 22, 33, 34) | Ue (V) 250 400 500<br>Ie (A) 6 4 1 |
| | Rated impulse withstand voltage ($U_{imp}$): | 6 kV<br>4 kV (contact blocks 20, 21, 22, 33, 34) | Direct current: DC13 |
| | Conditional short circuit current: | 1000 A according to EN 60947-5-1 | Ue (V) 24 125 250 |
| | Protection against short circuits: | type aM fuse 10 A 500 V | Ie (A) 6 1.1 0.4 |
| | Pollution degree: | 3 | |
| with connector M12, 4 poles | Thermal current (Ith): | 4 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 250 Vac 300 Vdc | Ue (V) 24 120 250 |
| | Protection against short circuits: | type gG fuse 4 A 500 V | Ie (A) 4 4 4 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 125 250 |
| | | | Ie (A) 4 1.1 0.4 |
| with connector M12, 8 poles | Thermal current (Ith): | 2 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 30 Vac 36 Vdc | Ue (V) 24 |
| | Protection against short circuits: | type gG fuse 2 A 500 V | Ie (A) 2 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 |
| | | | Ie (A) 2 |

## Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 33, 34)
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
4 kV (for contact blocks 20, 21, 22, 33, 34)
Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Za, Zb, Za+Za, Y+Y, X+X, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening of contacts on contact blocks 5, 6, 7, 9, 11, 13, 14, 16, 18, 20, 21, 22, 33, 34
In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

**Please contact our technical service for the list of approved products.**

## Characteristics approved by UL

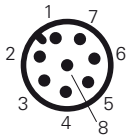
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 14. Terminal tightening torque of 12 lb in (1.4 Nm).

In conformity with standard: UL 508, CSA 22.2 No.14

**Please contact our technical service for the list of approved products.**

## Connection diagram for M12 connectors

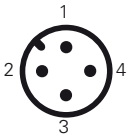
### Contact block 2 — 1NO-1NC+1NO-1NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NO | 3-4 |
| NC | 5-6 |
| NC | 7-8 |
| NO | 1-2 |

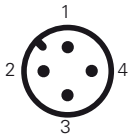
### Contact block 5 — 1NO+1NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |

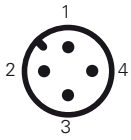
### Contact block 6 — 1NO+1NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |

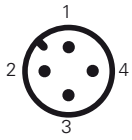
### Contact block 7 — 1NO+1NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |

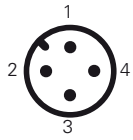
### Contact block 9 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |

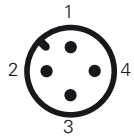
### Contact block 10 — 2NO




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |

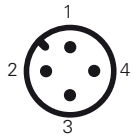
### Contact block 11 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |

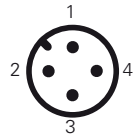
### Contact block 12 — 2NO




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |

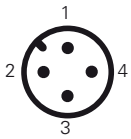
### Contact block 13 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |

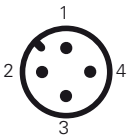
### Contact block 14 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |

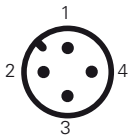
### Contact block 15 — 2NO




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NO (1°) | 1-2 |
| NO (2°) | 3-4 |

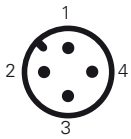
### Contact block 16 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC, lever at the right | 1-2 |
| NC, lever to the left | 3-4 |

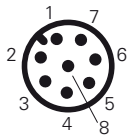
### Contact block 18 — 1NO+1NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |

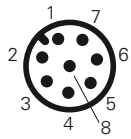
### Contact block 20 — 2NC+1NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NO | 7-8 |

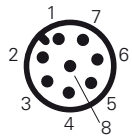
### Contact block 21 — 3NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NC | 7-8 |

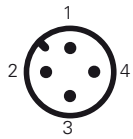
### Contact block 22 — 1NC+2NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NO | 5-6 |
| NO | 7-8 |

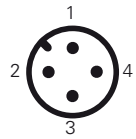
### Contact block 33 — 1NC+1NO




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |

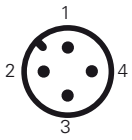
### Contact block 34 — 2NC




M12 connector, 4 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |

### Contact block E1 — PNP




M12 connector, 4 poles

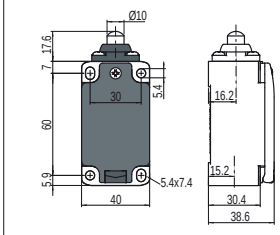
| Contacts | Pin no. |
|---|---|
| + | 1 |
| - | 3 |
| NC | 2 |
| NO | 4 |

# Position switches **FP** series

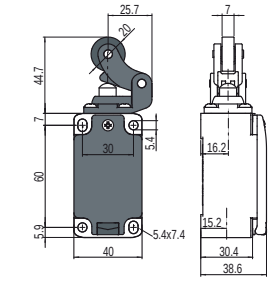
Contact type:

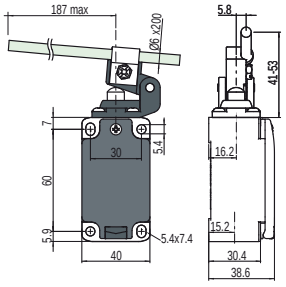
- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

Contact blocks

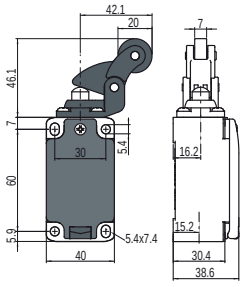



With stainless steel roller on request



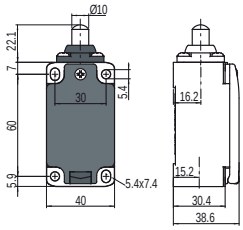




With stainless steel roller on request

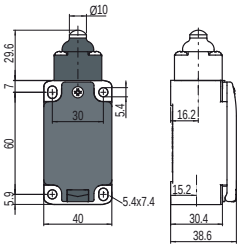


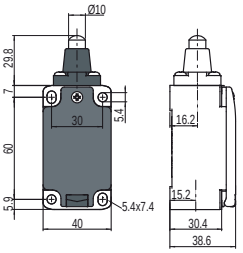

| | | | | | |
|---|---|---|---|---|---|
| 5 | R | FP 501-M2 → 1NO+1NC | FP 502-M2 → 1NO+1NC | FP 504-M2 1NO+1NC | FP 505-M2 → 1NO+1NC |
| 6 | L | FP 601-M2 → 1NO+1NC | FP 602-M2 → 1NO+1NC | FP 604-M2 1NO+1NC | FP 605-M2 → 1NO+1NC |
| 7 | LO | FP 701-M2 → 1NO+1NC | FP 702-M2 → 1NO+1NC | FP 704-M2 1NO+1NC | FP 705-M2 → 1NO+1NC |
| 9 | L | FP 901-M2 → 2NC | FP 902-M2 → 2NC | FP 904-M2 2NC | FP 905-M2 → 2NC |
| 10 | L | FP 1001-M2 2NO | FP 1002-M2 2NO | FP 1004-M2 2NO | FP 1005-M2 2NO |
| 11 | R | FP 1101-M2 → 2NC | FP 1102-M2 → 2NC | FP 1104-M2 2NC | FP 1105-M2 → 2NC |
| 12 | R | FP 1201-M2 2NO | FP 1202-M2 2NO | FP 1204-M2 2NO | FP 1205-M2 2NO |
| 13 | LV | FP 1301-M2 → 2NC | FP 1302-M2 → 2NC | FP 1304-M2 2NC | FP 1305-M2 → 2NC |
| 14 | LS | FP 1401-M2 → 2NC | FP 1402-M2 → 2NC | FP 1404-M2 2NC | FP 1405-M2 → 2NC |
| 15 | LS | FP 1501-M2 2NO | FP 1502-M2 2NO | FP 1504-M2 2NO | FP 1505-M2 2NO |
| 18 | LA | FP 1801-M2 → 1NO+1NC | FP 1802-M2 → 1NO+1NC | FP 1804-M2 1NO+1NC | FP 1805-M2 → 1NO+1NC |
| 20 | L | FP 2001-M2 → 1NO+2NC | FP 2002-M2 → 1NO+2NC | FP 2004-M2 1NO+2NC | FP 2005-M2 → 1NO+2NC |
| 21 | L | FP 2101-M2 → 3NC | FP 2102-M2 → 3NC | FP 2104-M2 3NC | FP 2105-M2 → 3NC |
| 22 | L | FP 2201-M2 → 2NO+1NC | FP 2202-M2 → 2NO+1NC | FP 2204-M2 2NO+1NC | FP 2205-M2 → 2NO+1NC |
| 2 | R | FP 201-M2 2x(1NO-1NC) | FP 202-M2 2x(1NO-1NC) | FP 204-M2 2x(1NO-1NC) | FP 205-M2 2x(1NO-1NC) |
| E1 | | FP E101-M2 1NO-1NC | FP E102-M2 1NO-1NC | FP E104-M2 1NO-1NC | FP E105-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 3 | 0.5 m/s | page 237 - type 3 |
| Min. force | | 8 N (25 N →) | 6 N (25 N →) | 0.17 Nm | 6 N (25 N →) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 2 | page 238 - group 1 | page 238 - group 2 |

With external rubber gasket

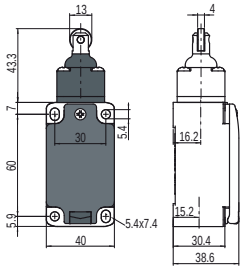



With external rubber gasket




With external rubber gasket




Contact blocks

| | | | | | |
|---|---|---|---|---|---|
| 5 | R | FP 508-M2 → 1NO+1NC | FP 510-M2 → 1NO+1NC | FP 511-M2 → 1NO+1NC | FP 515-M2 → 1NO+1NC |
| 6 | L | FP 608-M2 → 1NO+1NC | FP 610-M2 → 1NO+1NC | FP 611-M2 → 1NO+1NC | FP 615-M2 → 1NO+1NC |
| 7 | LO | FP 708-M2 → 1NO+1NC | FP 710-M2 → 1NO+1NC | FP 711-M2 → 1NO+1NC | FP 715-M2 → 1NO+1NC |
| 9 | L | FP 908-M2 → 2NC | FP 910-M2 → 2NC | FP 911-M2 → 2NC | FP 915-M2 → 2NC |
| 10 | L | FP 1008-M2 2NO | FP 1010-M2 2NO | FP 1011-M2 2NO | FP 1015-M2 2NO |
| 11 | R | FP 1108-M2 → 2NC | FP 1110-M2 → 2NC | FP 1111-M2 → 2NC | FP 1115-M2 → 2NC |
| 12 | R | FP 1208-M2 2NO | FP 1210-M2 2NO | FP 1211-M2 2NO | FP 1215-M2 2NO |
| 13 | LV | FP 1308-M2 → 2NC | FP 1310-M2 → 2NC | FP 1311-M2 → 2NC | FP 1315-M2 → 2NC |
| 14 | LS | FP 1408-M2 → 2NC | FP 1410-M2 → 2NC | FP 1411-M2 → 2NC | FP 1415-M2 → 2NC |
| 15 | LS | FP 1508-M2 2NO | FP 1510-M2 2NO | FP 1511-M2 2NO | FP 1515-M2 2NO |
| 18 | LA | FP 1808-M2 → 1NO+1NC | FP 1810-M2 → 1NO+1NC | FP 1811-M2 → 1NO+1NC | FP 1815-M2 → 1NO+1NC |
| 20 | L | FP 2008-M2 → 1NO+2NC | FP 2010-M2 → 1NO+2NC | FP 2011-M2 → 1NO+2NC | FP 2015-M2 → 1NO+2NC |
| 21 | L | FP 2108-M2 → 3NC | FP 2110-M2 → 3NC | FP 2111-M2 → 3NC | FP 2115-M2 → 3NC |
| 22 | L | FP 2208-M2 → 2NO+1NC | FP 2210-M2 → 2NO+1NC | FP 2211-M2 → 2NO+1NC | FP 2215-M2 → 2NO+1NC |
| 2 | R | FP 208-M2 2x(1NO-1NC) | FP 210-M2 2x(1NO-1NC) | FP 211-M2 2x(1NO-1NC) | FP 215-M2 2x(1NO-1NC) |
| E1 | | FP E108-M2 1NO-1NC | FP E110-M2 1NO-1NC | FP E111-M2 1NO-1NC | FP E115-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 4 | page 237 - type 4 | page 237 - type 2 |
| Min. force | | 8 N (25 N →) | 11 N (25 N →) | 8 N (25 N →) | 11 N (25 N →) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 |

All measures in the drawings are in mm

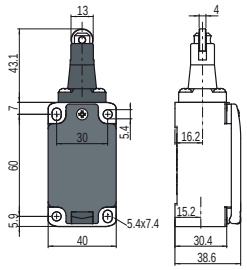
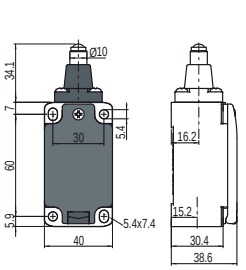
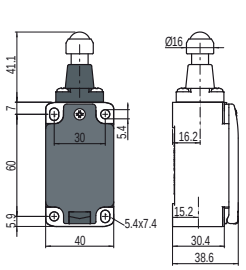
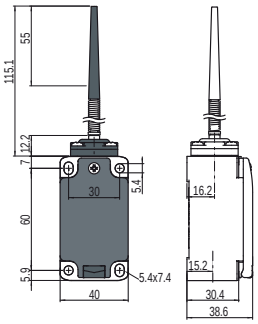
Items with code on **green** background are stock items

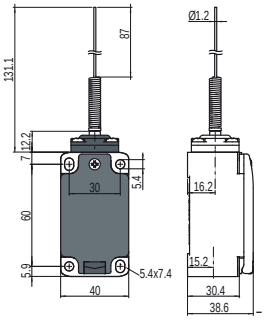
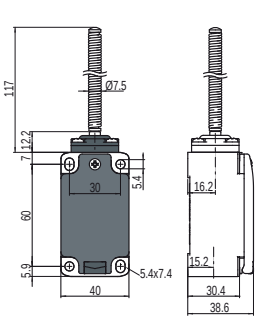
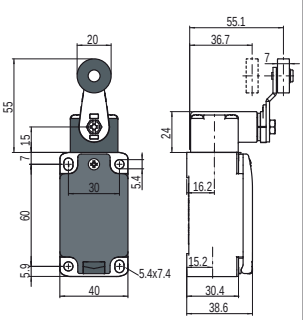
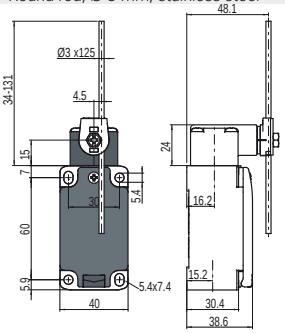
**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

| Contact blocks | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | |  | | Ball, Ø 8 mm, stainless steel<br>  | | Ball, Ø 12.7 mm, stainless steel<br>  | | With external rubber gasket<br>  | |
| 5 | R | FP 516-M2 | 1NO+1NC | FP 518-M2 | 1NO+1NC | FP 519-M2 | 1NO+1NC | FP 520-M2 | 1NO+1NC |
| 6 | L | FP 616-M2 | 1NO+1NC | FP 618-M2 | 1NO+1NC | FP 619-M2 | 1NO+1NC | | |
| 7 | LO | FP 716-M2 | 1NO+1NC | FP 718-M2 | 1NO+1NC | FP 719-M2 | 1NO+1NC | | |
| 9 | L | FP 916-M2 | 2NC | FP 918-M2 | 2NC | FP 919-M2 | 2NC | | |
| 10 | L | FP 1016-M2 | 2NO | FP 1018-M2 | 2NO | FP 1019-M2 | 2NO | FP 1020-M2 | 2NO |
| 11 | R | FP 1116-M2 | 2NC | FP 1118-M2 | 2NC | FP 1119-M2 | 2NC | | |
| 12 | R | FP 1216-M2 | 2NO | FP 1218-M2 | 2NO | FP 1219-M2 | 2NO | | |
| 13 | LV | FP 1316-M2 | 2NC | FP 1318-M2 | 2NC | FP 1319-M2 | 2NC | | |
| 14 | LS | FP 1416-M2 | 2NC | FP 1418-M2 | 2NC | FP 1419-M2 | 2NC | | |
| 15 | LS | FP 1516-M2 | 2NO | FP 1518-M2 | 2NO | FP 1519-M2 | 2NO | | |
| 18 | LA | FP 1816-M2 | 1NO+1NC | FP 1818-M2 | 1NO+1NC | FP 1819-M2 | 1NO+1NC | FP 1820-M2 | 1NO+1NC |
| 20 | L | FP 2016-M2 | 1NO+2NC | FP 2018-M2 | 1NO+2NC | FP 2019-M2 | 1NO+2NC | FP 2020-M2 | 1NO+2NC |
| 21 | L | FP 2116-M2 | 3NC | FP 2118-M2 | 3NC | FP 2119-M2 | 3NC | FP 2120-M2 | 3NC |
| 22 | L | FP 2216-M2 | 2NO+1NC | FP 2218-M2 | 2NO+1NC | FP 2219-M2 | 2NO+1NC | FP 2220-M2 | 2NO+1NC |
| 2 | R | FP 216-M2 | 2x(1NO-1NC) | FP 218-M2 | 2x(1NO-1NC) | FP 219-M2 | 2x(1NO-1NC) | FP 220-M2 | 2x(1NO-1NC) |
| E1 | | FP E116-M2 | 1NO-1NC | FP E118-M2 | 1NO-1NC | FP E119-M2 | 1NO-1NC | FP E120-M2 | 1NO-1NC |
| Max. speed | | page 237 - type 2 | | page 237 - type 4 | | page 237 - type 4 | | 1 m/s | |
| Min. force | | 8 N (25 N ⊕) | | 8 N (25 N ⊕) | | 8 N (25 N ⊕) | | 0.09 Nm | |
| Travel diagrams | | page 238 - group 1 | | page 238 - group 1 | | page 238 - group 1 | | page 238 - group 3 | |

| Contact blocks | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | With external rubber gasket<br>  | | With external rubber gasket<br>  | | Other rollers available. See on page 38<br>  | | Round rod, Ø 3 mm, stainless steel<br>  | |
| 5 | R | FP 521-M2 | 1NO+1NC | FP 525-M2 | 1NO+1NC | FP 531-M2 | 1NO+1NC | FP 532-M2 | 1NO+1NC |
| 6 | L | | | | | FP 631-M2 | 1NO+1NC | FP 632-M2 | 1NO+1NC |
| 7 | LO | | | | | FP 731-M2 | 1NO+1NC | FP 732-M2 | 1NO+1NC |
| 9 | L | | | | | FP 931-M2 | 2NC | FP 932-M2 | 2NC |
| 10 | L | FP 1021-M2 | 2NO | FP 1025-M2 | 2NO | FP 1031-M2 | 2NO | FP 1032-M2 | 2NO |
| 11 | R | | | | | FP 1131-M2 | 2NC | FP 1132-M2 | 2NC |
| 12 | R | | | | | FP 1231-M2 | 2NO | FP 1232-M2 | 2NO |
| 13 | LV | | | | | FP 1331-M2 | 2NC | FP 1332-M2 | 2NC |
| 14 | LS | | | | | FP 1431-M2 | 2NC | FP 1432-M2 | 2NC |
| 15 | LS | | | | | FP 1531-M2 | 2NO | FP 1532-M2 | 2NO |
| 16 | LI | | | | | FP 1631-M2 | 2NC | FP 1632-M2 | 2NC |
| 18 | LA | FP 1821-M2 | 1NO+1NC | FP 1825-M2 | 1NO+1NC | FP 1831-M2 | 1NO+1NC | FP 1832-M2 | 1NO+1NC |
| 20 | L | FP 2021-M2 | 1NO+2NC | FP 2025-M2 | 1NO+2NC | FP 2031-M2 | 1NO+2NC | FP 2032-M2 | 1NO+2NC |
| 21 | L | FP 2121-M2 | 3NC | FP 2125-M2 | 3NC | FP 2131-M2 | 3NC | FP 2132-M2 | 3NC |
| 22 | L | FP 2221-M2 | 2NO+1NC | FP 2225-M2 | 2NO+1NC | FP 2231-M2 | 2NO+1NC | FP 2232-M2 | 2NO+1NC |
| 2 | R | FP 221-M2 | 2x(1NO-1NC) | FP 225-M2 | 2x(1NO-1NC) | FP 231-M2 | 2x(1NO-1NC) | FP 232-M2 | 2x(1NO-1NC) |
| E1 | | FP E121-M2 | 1NO-1NC | FP E125-M2 | 1NO-1NC | FP E131-M2 | 1NO-1NC | FP E132-M2 | 1NO-1NC |
| Max. speed | | 1 m/s | | 1 m/s | | page 237 - type 1 | | 1.5 m/s | |
| Min. force | | 0.08 Nm | | 0.14 Nm | | 0.1 Nm (0.25 Nm ⊕) | | 0.1 Nm | |
| Travel diagrams | | page 238 - group 3 | | page 238 - group 3 | | page 238 - group 4 | | page 238 - group 4 | |

All measures in the drawings are in mm

Items with code on **green** background are stock items

**Accessories** See page 225

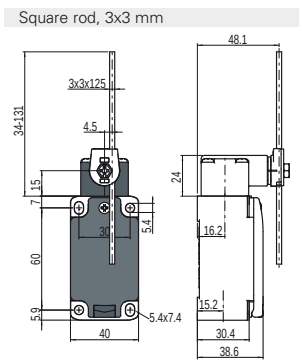
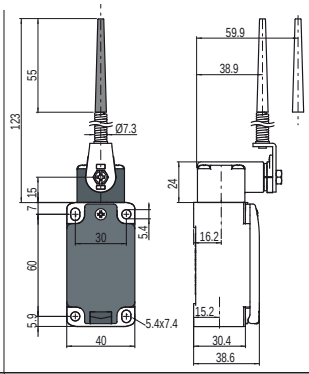
→ The 2D/3D files are available at **www.pizzato.com**

# Position switches **FP** series

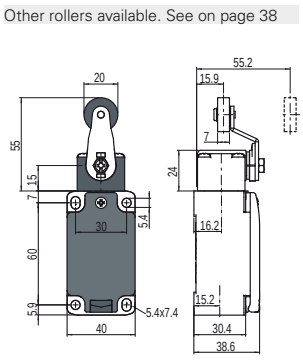
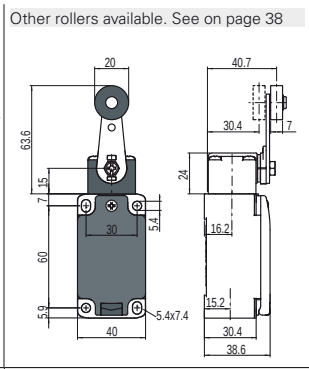
Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

Contact blocks

| | | Square rod, 3x3 mm | | Other rollers available. See on page 38 | Fiber glass rod |
|---|---|---|---|---|---|
|  | | |  | | |
| 5 | R | FP 533-M2 1NO+1NC | FP 534-M2 1NO+1NC | FP 535-M2 → (1) 1NO+1NC | FP 536-M2 1NO+1NC |
| 6 | L | FP 633-M2 1NO+1NC | FP 634-M2 1NO+1NC | FP 635-M2 → (1) 1NO+1NC | FP 636-M2 1NO+1NC |
| 7 | LO | FP 733-M2 1NO+1NC | FP 734-M2 1NO+1NC | FP 735-M2 → (1) 1NO+1NC | FP 736-M2 1NO+1NC |
| 9 | L | FP 933-M2 2NC | FP 934-M2 2NC | FP 935-M2 → (1) 2NC | FP 936-M2 2NC |
| 10 | L | FP 1033-M2 2NO | FP 1034-M2 2NO | FP 1035-M2 2NO | FP 1036-M2 2NO |
| 11 | R | FP 1133-M2 2NC | FP 1134-M2 2NC | FP 1135-M2 → (1) 2NC | FP 1136-M2 2NC |
| 12 | R | FP 1233-M2 2NO | FP 1234-M2 2NO | FP 1235-M2 2NO | FP 1236-M2 2NO |
| 13 | LV | FP 1333-M2 2NC | FP 1334-M2 2NC | FP 1335-M2 → (1) 2NC | FP 1336-M2 2NC |
| 14 | LS | FP 1433-M2 2NC | FP 1434-M2 2NC | FP 1435-M2 → (1) 2NC | FP 1436-M2 2NC |
| 15 | LS | FP 1533-M2 2NO | FP 1534-M2 2NO | FP 1535-M2 2NO | FP 1536-M2 2NO |
| 16 | LI | FP 1633-M2 2NC | FP 1634-M2 2NC | FP 1635-M2 → (1) 2NC | FP 1636-M2 2NC |
| 18 | LA | FP 1833-M2 1NO+1NC | FP 1834-M2 1NO+1NC | FP 1835-M2 → (1) 1NO+1NC | FP 1836-M2 1NO+1NC |
| 20 | L | FP 2033-M2 1NO+2NC | FP 2034-M2 1NO+2NC | FP 2035-M2 → (1) 1NO+2NC | FP 2036-M2 1NO+2NC |
| 21 | L | FP 2133-M2 3NC | FP 2134-M2 3NC | FP 2135-M2 → (1) 3NC | FP 2136-M2 3NC |
| 22 | L | FP 2233-M2 2NO+1NC | FP 2234-M2 2NO+1NC | FP 2235-M2 → (1) 2NO+1NC | FP 2236-M2 2NO+1NC |
| 2 | R | FP 233-M2 2x(1NO-1NC) | FP 234-M2 2x(1NO-1NC) | FP 235-M2 2x(1NO-1NC) | FP 236-M2 2x(1NO-1NC) |
| E1 | | FP E133-M2 1NO-1NC | FP E134-M2 1NO-1NC | FP E135-M2 1NO-1NC | FP E136-M2 1NO-1NC |
| Max. speed | | 1.5 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.1 Nm | 0.1 Nm | 0.1 Nm (0.25 Nm →) | 0.1 Nm |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 |

Contact blocks

| | | Other rollers available. See on page 38 | Other rollers available. See on page 38 | Porcelain roller | Other rollers available. See on page 38 |
|---|---|---|---|---|---|
|  | | |  | | |
| 5 | R | FP 551-M2 → 1NO+1NC | FP 552-M2 → 1NO+1NC | FP 553-E11M2V9 → 1NO+1NC | FP 556-M2 → 1NO+1NC |
| 6 | L | FP 651-M2 → 1NO+1NC | FP 652-M2 → 1NO+1NC | FP 653-E11M2V9 → 1NO+1NC | FP 656-M2 → 1NO+1NC |
| 7 | LO | FP 751-M2 → 1NO+1NC | FP 752-M2 → 1NO+1NC | FP 753-E11M2V9 → 1NO+1NC | FP 756-M2 → 1NO+1NC |
| 9 | L | FP 951-M2 → 2NC | FP 952-M2 → 2NC | FP 953-E11M2V9 → 2NC | FP 956-M2 → 2NC |
| 10 | L | FP 1051-M2 2NO | FP 1052-M2 2NO | FP 1053-E11M2V9 2NO | FP 1056-M2 2NO |
| 11 | R | FP 1151-M2 → 2NC | FP 1152-M2 → 2NC | | FP 1156-M2 → 2NC |
| 12 | R | FP 1251-M2 2NO | FP 1252-M2 2NO | FP 1253-E11M2V9 2NO | FP 1256-M2 2NO |
| 13 | LV | FP 1351-M2 → 2NC | FP 1352-M2 → 2NC | FP 1353-E11M2V9 → 2NC | FP 1356-M2 → 2NC |
| 14 | LS | FP 1451-M2 → 2NC | FP 1452-M2 → 2NC | FP 1453-E11M2V9 → 2NC | FP 1456-M2 → 2NC |
| 15 | LS | FP 1551-M2 2NO | FP 1552-M2 2NO | FP 1553-E11M2V9 2NO | FP 1556-M2 2NO |
| 16 | LI | | | | FP 1656-M2 → 2NC |
| 18 | LA | FP 1851-M2 → 1NO+1NC | FP 1852-M2 → 1NO+1NC | FP 1853-E11M2V9 → 1NO+1NC | FP 1856-M2 → 1NO+1NC |
| 20 | L | FP 2051-M2 → 1NO+2NC | FP 2052-M2 → 1NO+2NC | FP 2053-E11M2V9 → 1NO+2NC | FP 2056-M2 → 1NO+2NC |
| 21 | L | FP 2151-M2 → 3NC | FP 2152-M2 → 3NC | FP 2153-E11M2V9 → 3NC | FP 2156-M2 → 3NC |
| 22 | L | FP 2251-M2 → 2NO+1NC | FP 2252-M2 → 2NO+1NC | FP 2253-E11M2V9 → 2NO+1NC | FP 2256-M2 → 2NO+1NC |
| 2 | R | FP 251-M2 2x(1NO-1NC) | FP 252-M2 2x(1NO-1NC) | FP 253-E11M2 2x(1NO-1NC) | FP 256-M2 2x(1NO-1NC) |
| E1 | | FP E151-M2 1NO-1NC | FP E152-M2 1NO-1NC | FP E153-E11M2V9 1NO-1NC | FP E156-M2 1NO-1NC |
| Max. speed | | page 237 - type 1 | page 237 - type 1 | 0.5 m/s | page 237 - type 1 |
| Min. force | | 0.06 Nm (0.25 Nm →) | 0.06 Nm (0.25 Nm →) | 0.03 Nm (0.25 Nm →) | 0.1 Nm (0.25 Nm →) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 5 | page 238 - group 4 |

(1) Positive opening only with actuator set to max. See page 37.

All measures in the drawings are in mm

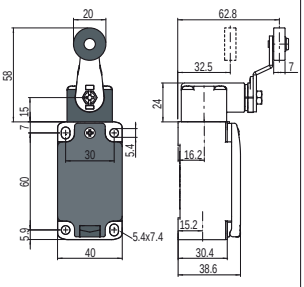
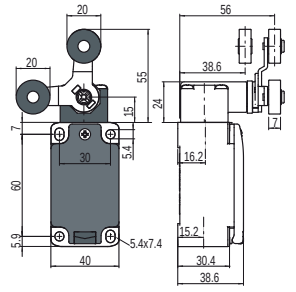
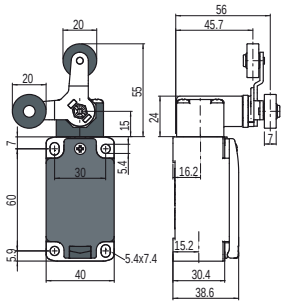
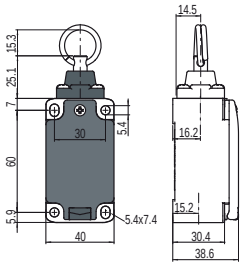
Items with code on **green** background are stock items

**Accessories** See page 225

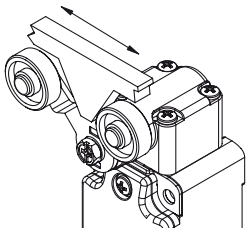
→ The 2D/3D files are available at **www.pizzato.com**

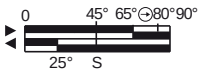
Contact type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
= electronic PNP

| Contact blocks | | Other rollers available. See on page 38 | With stainless steel roller on request | With stainless steel roller on request | Rope switch for signalling |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FP 557-M2 | FP 541-M2 | FP 542-M2 | FP 576-M2 1NO+1NC |
| 6 | L | FP 657-M2 | | | FP 676-M2 1NO+1NC |
| 7 | LO | FP 757-M2 | | | FP 776-M2 1NO+1NC |
| 9 | L | FP 957-M2 | | | FP 976-M2 2NO |
| 10 | L | FP 1057-M2 | | | FP 1076-M2 2NC |
| 11 | R | FP 1157-M2 | | | FP 1176-M2 2NO |
| 12 | R | FP 1257-M2 | | | FP 1276-M2 2NC |
| 13 | LV | FP 1357-M2 | | | FP 1376-M2 2NO |
| 14 | LS | FP 1457-M2 | | | FP 1476-M2 2NO |
| 15 | LS | FP 1557-M2 | | | FP 1576-M2 2NC |
| 16 | LI | FP 1657-M2 | | | |
| 18 | LA | FP 1857-M2 | | | FP 1876-M2 1NO+1NC |
| 20 | L | FP 2057-M2 | | | FP 2076-M2 2NO+1NC |
| 21 | L | FP 2157-M2 | | | FP 2176-M2 3NO |
| 22 | L | FP 2257-M2 | | | FP 2276-M2 1NO+2NC |
| 2 | R | FP 257-M2 | | | FP 276-M2 2x(1NO-1NC) |
| E1 | | FP E157-M2 | | | |
| | | 2x(1NO-1NC) | 1NO+1NC | 1NO+1NC | 1NO+1NC |
| | | 1NO-1NC | | | |
| Max. speed | | page 237 - type 1 | 0.5 m/s with cam at 30° | 0.5 m/s with cam at 30° | 0.5 m/s |
| Min. force | | 0.1 Nm (0.25 Nm ⊕) | 0.21 Nm (0.36 Nm ⊕) | 0.21 Nm (0.36 Nm ⊕) | initial 20 N - final 40 N |
| Travel diagrams | | page 238 - group 4 | | | page 238 - group 6 |

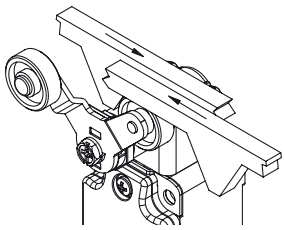
Bistable switch with single track lyra lever

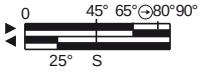





S = mechanical switching point
positive opening on contact 21-22 only

Bistable switch with dual track lyra lever






S = mechanical switching point
positive opening on contact 21-22 only

All measures in the drawings are in mm

**Accessories** See page 225

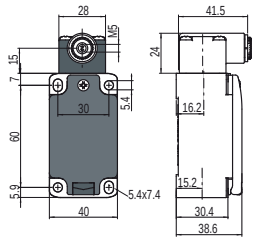
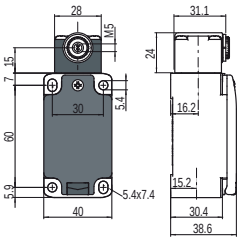
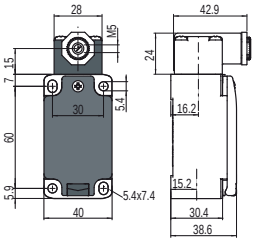
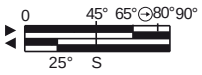
➔ The 2D/3D files are available at **www.pizzato.com**

## Position switches with revolving lever without actuator

All measures in the drawings are in mm

Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

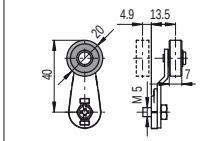
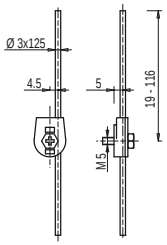
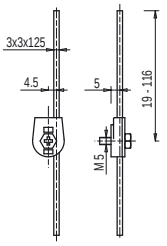
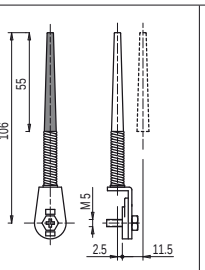
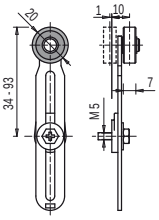
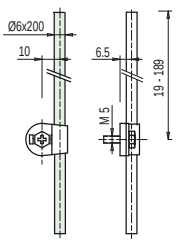
| Contact blocks | | Regular head | Compact head | |
|---|---|---|---|---|
| | |  |  |  |
| 5 | R | FP 538-M2 → 1NO+1NC | FP 558-M2 → 1NO+1NC | FP 540-M2 → 1NO+1NC |
| 6 | L | FP 638-M2 → 1NO+1NC | FP 658-M2 → 1NO+1NC | Bistable switch |
| 7 | LO | FP 738-M2 → 1NO+1NC | FP 758-M2 → 1NO+1NC |  |
| 9 | L | FP 938-M2 → 2NC | FP 958-M2 → 2NC | S = mechanical switching point positive opening on contact 21-22 only |
| 10 | L | FP 1038-M2 2NO | FP 1058-M2 2NO | |
| 11 | R | FP 1138-M2 → 2NC | FP 1158-M2 → 2NC | |
| 12 | R | FP 1238-M2 2NO | FP 1258-M2 2NO | |
| 13 | LV | FP 1338-M2 → 2NC | FP 1358-M2 → 2NC | |
| 14 | LS | FP 1438-M2 → 2NC | FP 1458-M2 → 2NC | |
| 15 | LS | FP 1538-M2 2NO | FP 1558-M2 2NO | |
| 16 | LI | FP 1638-M2 → 2NC | | |
| 18 | LA | FP 1838-M2 → 1NO+1NC | FP 1858-M2 → 1NO+1NC | |
| 20 | L | FP 2038-M2 → 1NO+2NC | FP 2058-M2 → 1NO+2NC | |
| 21 | L | FP 2138-M2 → 3NC | FP 2158-M2 → 3NC | |
| 22 | L | FP 2238-M2 → 2NO+1NC | FP 2258-M2 → 2NO+1NC | |
| 2 | R | FP 238-M2 2x(1NO-1NC) | FP 258-M2 2x(1NO-1NC) | |
| E1 | | FP E138-M2 1NO+1NC | FP E158-M2 1NO+1NC | |
| Min. force | | 0.1 Nm (0.25 Nm →) | 0.06 Nm (0.25 Nm →) | 0.5 m/s with cam at 30° 0.21 Nm (0.36 Nm →) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | |

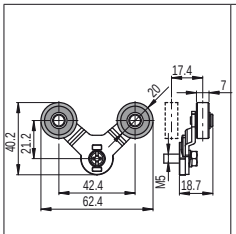
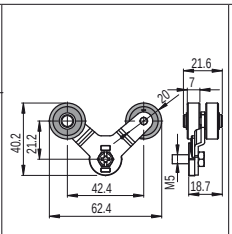
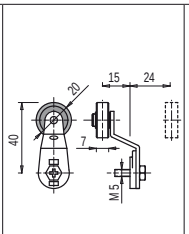
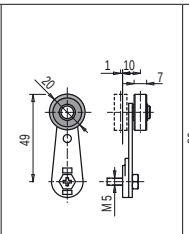
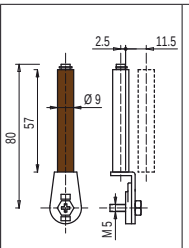
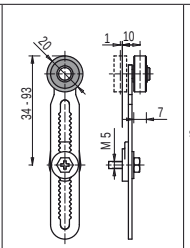
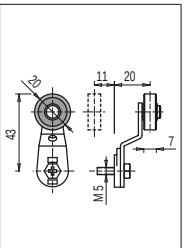
**IMPORTANT**
**For safety applications:** join only switches and actuators marked with symbol → aside the product code.
For more information about safety applications see details on page 235.

## Loose actuators

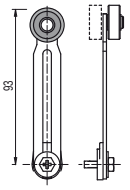
All measures in the drawings are in mm

**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

| Technopolymer roller Ø 20 mm | Adjustable round rod Ø 3x125 mm | Adjustable square rod, 3x3x125 mm | Flexible rod with pointed end | Adjustable actuator with technopolymer roller | Adjustable fiber glass rod |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| VF L31 → | VF L32 (3) | VF L33 (3) | VF L34 | VF L35 → (1) (3) | VF L36 (3) |

| Single track lyra actuator | Dual track lyra actuator | Technopolymer roller, Ø 20 mm | Technopolymer roller, Ø 20 mm | Porcelain roller | Adjustable safety actuator with technopolymer roller | Technopolymer roller, Ø 20 mm |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| VF L41 → | VF L42 → | VF L51 → | VF L52 → | VF L53 → (2) | VF L56 → (3) | VF L57 → |

- (1) Actuator VF L35 can only be used in safety applications if adjusted to its max. length, as shown in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling switch FP •58-M2 (e.g. FP 558-M2, FP 658-M2…) with actuator VF L53 will not present the same travel diagrams and actuating forces as switch FP •53-E11M2V9 (e.g. FP 553-E11M2V9, FP 653-E11M2V9…).
- (3) If installed with switch FP •58-M2 (e.g. FP 558-M2, FP 658-M2…) the actuator could mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be rotated to the inside because it will mechanically interfere with the switch head.



Items with code on **green** background are stock items

**Accessories** See page 225

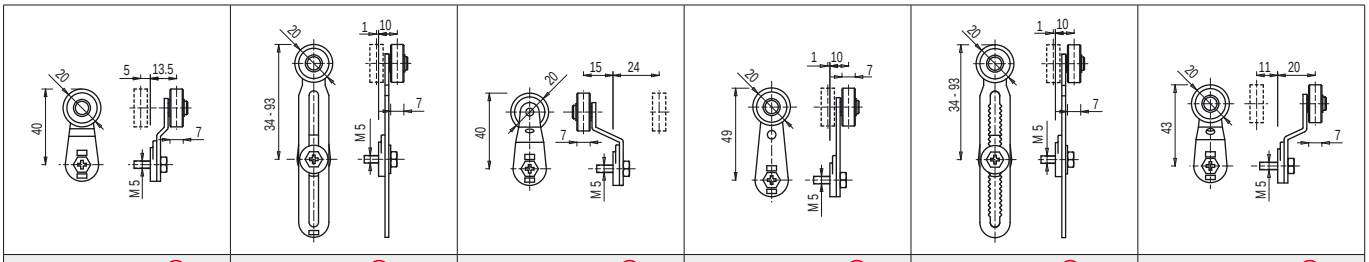
→ The 2D/3D files are available at **www.pizzato.com**

## Special loose actuators

All measures in the drawings are in mm

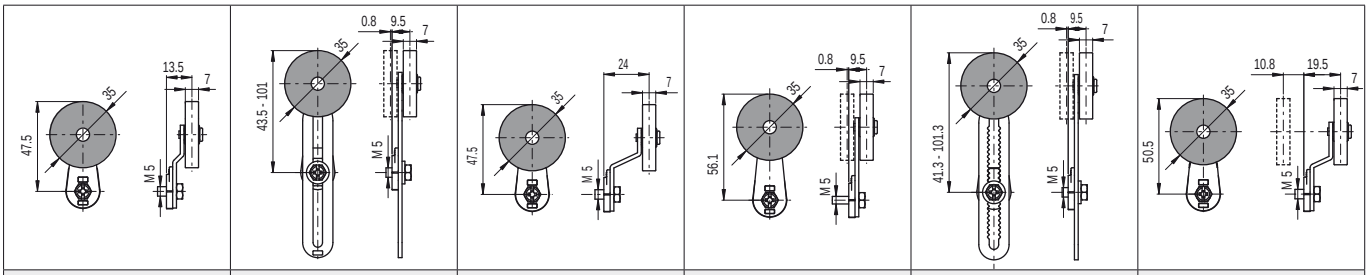
**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

### Stainless steel rollers, Ø 20 mm



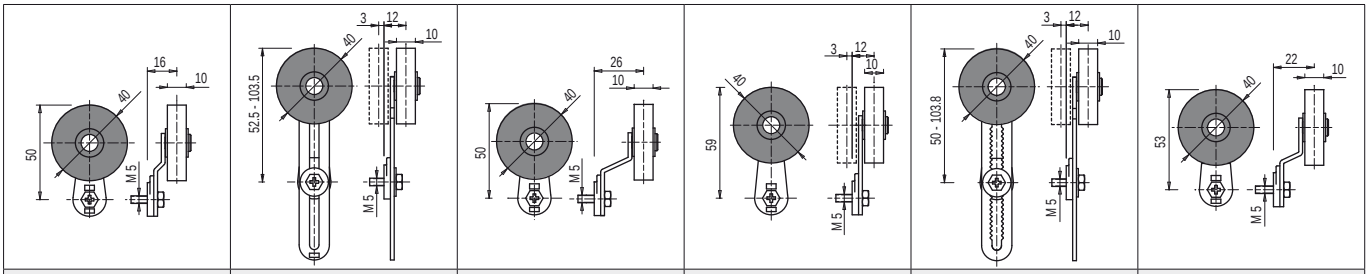

VF L31-R24 | VF L35-R24 (1) (3) | VF L51-R24 | VF L52-R24 | VF L56-R24 (3) | VF L57-R24

### Technopolymer rollers, Ø 35 mm



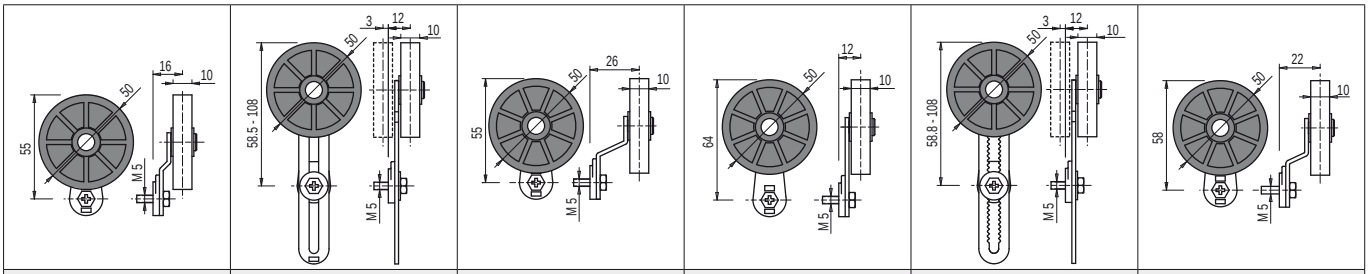

VF L31-R25 (4) | VF L35-R25 (1) (3) | VF L51-R25 (4) | VF L52-R25 | VF L56-R25 (3) | VF L57-R25

### Rubber rollers, Ø 40 mm



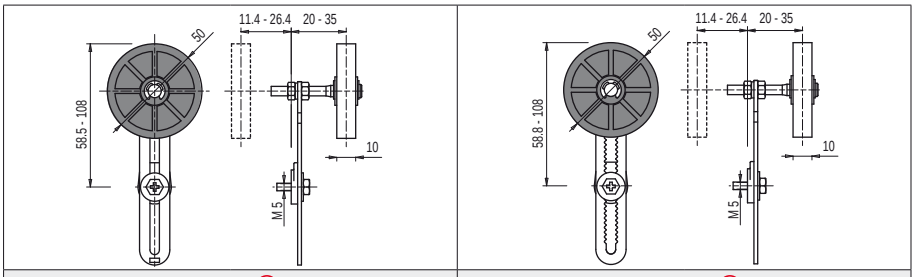

VF L31-R5 (4) | VF L35-R5 (1) (3) | VF L51-R5 (4) | VF L52-R5 | VF L56-R5 (3) | VF L57-R5 (4)

### 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

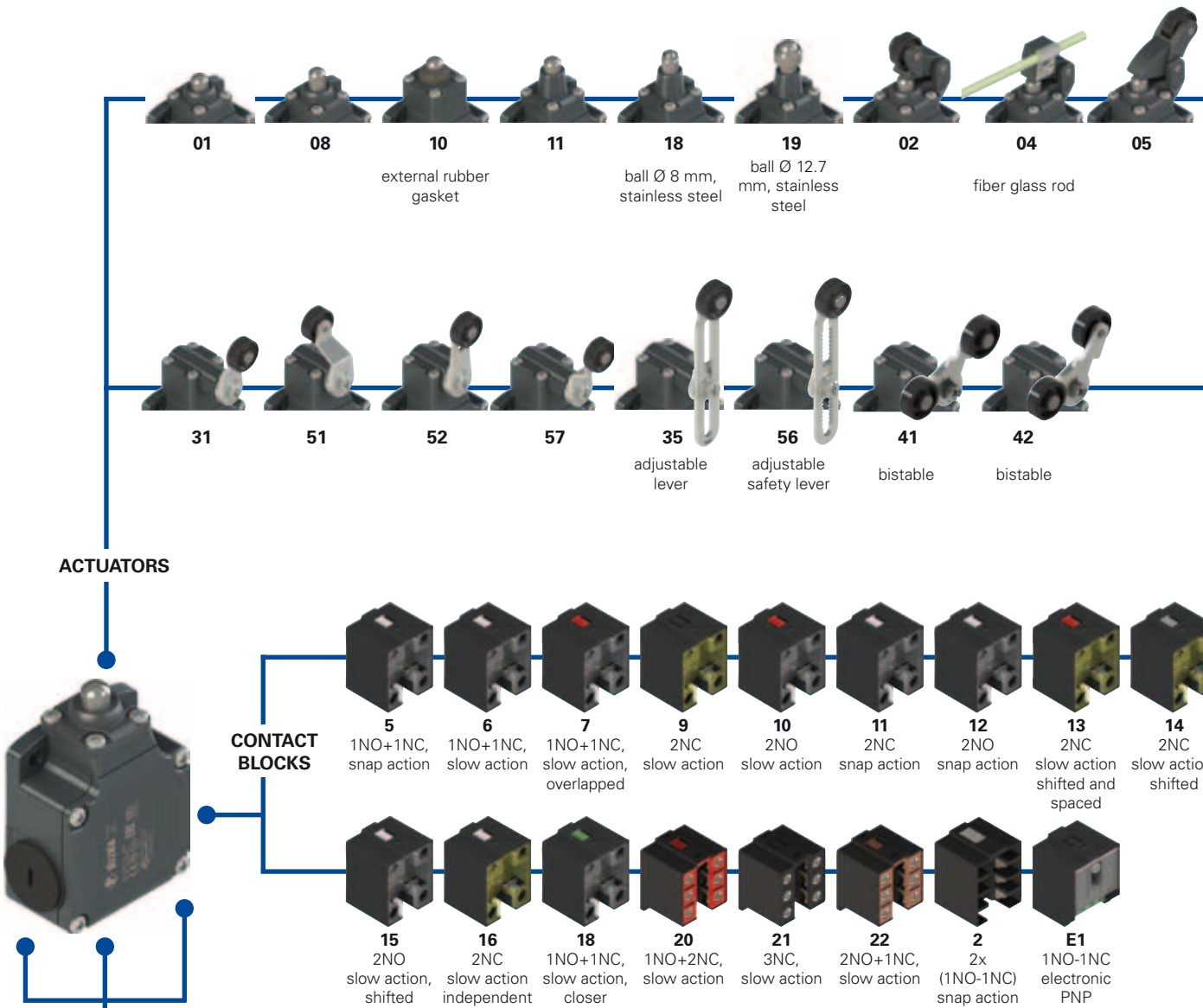



VF L35-R27 (1) (3) | VF L56-R27 (3)

**Accessories** See page 225

➔ The 2D/3D files are available at **www.pizzato.com**

## Selection diagram




**Threaded conduit entries**

| | |
|---|---|
| **M2** | M20x1.5 (standard) |
| | PG 13.5 |

**With cable gland**

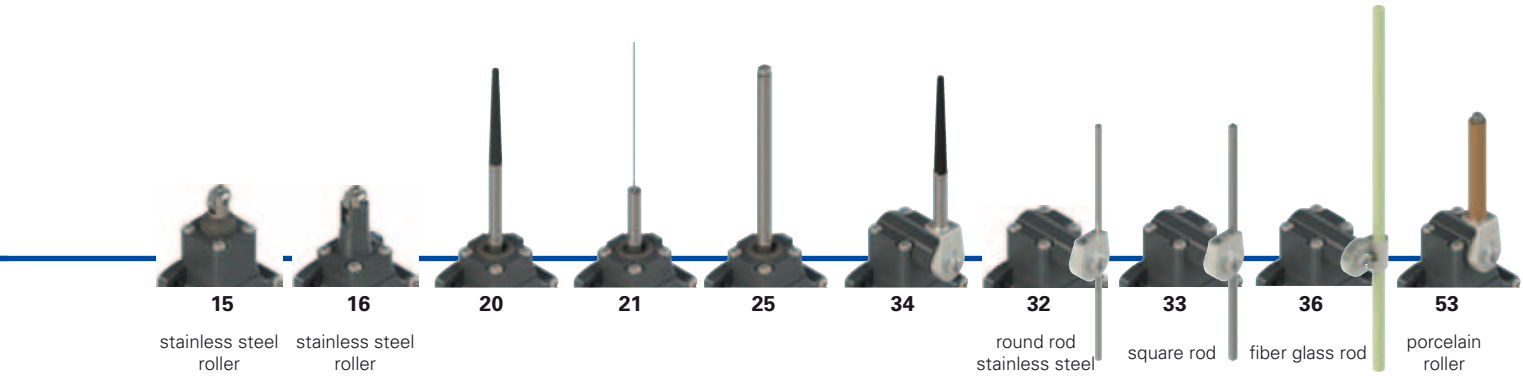
| | |
|---|---|
| **K23** | for cables from Ø 6 to Ø 12 mm from below |
| **K123** | for cables from Ø 6 to Ø 12 mm from the right |
| **K223** | for cables from Ø 6 to Ø 12 mm from the left |
| **K27** | for cables from Ø 3 to Ø 7 mm from below |
| **K127** | for cables from Ø 3 to Ø 7 mm from the right |
| **K227** | for cables from Ø 3 to Ø 7 mm from the left |

**With M12 metal connector**

| | |
|---|---|
| **K40** | 8 poles, bottom |
| **K41** | 8 poles, right |
| **K42** | 8 poles, left |
| **K50** | 5 poles, bottom |
| **K51** | 5 poles, right |
| **K52** | 5 poles, left |

product options

accessory sold separately



**15** stainless steel roller external rubber gasket

**16** stainless steel roller

**20**

**21**

**25**

**34**

**32** round rod stainless steel

**33** square rod

**36** fiber glass rod

**53** porcelain roller

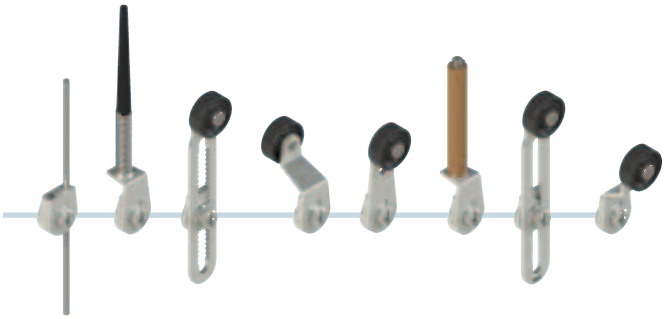
**76** rope switch for signalling

**38** without actuator

**58** without actuator

**40** bistable without actuator

**LOOSE ACTUATORS**
See page 47



## 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

**FL 502-GM2K50R24T6**

| Housing | |
|---|---|
| **FL** | metal, three conduit entries |

| Contact blocks | |
|---|---|
| **5** | 1NO+1NC, snap action |
| **6** | 1NO+1NC, slow action |
| **7** | 1NO+1NC, slow action, overlapped |
| **...** | ..... |

| Actuators | |
|---|---|
| **01** | short plunger |
| **02** | roller lever |
| **05** | angled roller lever |
| **...** | ..... |

| Contact type | |
|---|---|
| | silver contacts (standard) |
| **G** | silver contacts with 1 µm gold coating (not for contact block 2) |

| Threaded conduit entries | |
|---|---|
| **M2** | M20x1.5 (standard) |
| | PG 13.5 |

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

| Rollers | |
|---|---|
| | standard roller |
| **R24** | stainless steel, Ø 20 mm (for actuators 02, 05, 31, 35, 51, 52, 56, 57) |
| **R25** | technopolymer, Ø 35 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R5** | rubber, Ø 40 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R26** | rubber, Ø 50 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R27** | rubber, protruding, Ø 50 mm (for actuators 35 e 36) |

| Pre-installed cable glands or connectors | |
|---|---|
| | without cable gland or connector (standard) |
| **K23** | cable gland for cables Ø 6…Ø 12 mm |
| **K50** | M12 metal connector, 5 poles |

Please contact our technical service for the complete list of possible combinations.

**Main features**

- Metal housing, three conduit entries
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

## Technical data

**Housing**

| | |
|---|---|
| Metal housing, baked powder coating | |
| Three threaded conduit entries: | M20x1.5 (standard) |
| Protection degree: | IP67 according to EN 60529 with cable gland having equal or higher protection degree |

**General data**

| | |
|---|---|
| Ambient temperature: | -25°C … +80°C |
| Max. actuation frequency: | 3600 operating cycles[1]/hour |
| Mechanical endurance: | 20 million operating cycles[1] |
| Mounting position: | any |
| Safety parameters: | |
| $B_{10d}$: | 40,000,000 for NC contacts |
| Mechanical interlock, not coded: | type 1 according to EN ISO 14119 |
| Tightening torques for installation: | see pages 235-246 |

(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.

**Cable cross section (flexible copper strands)**

| | | | |
|---|---|---|---|
| Contact blocks 20, 21, 22, 33, 34: | min. | 1 x 0.34 mm² | (1 x AWG 22) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |
| Contact block 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 18: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 2.5 mm² | (2 x AWG 14) |
| Contact block 2: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |

**In conformity 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, UL 508, CSA 22.2 No.14 .
**Approvals:**
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB14048.5-2001.

**Markings and quality marks:**

| | |
|---|---|
| IMQ approval: | EG605 |
| UL approval: | E131787 |
| CCC approval: | 2007010305230000 |
| EAC approval: | RU C-IT ДМ94.B.01024 |

**In conformity with the requirements of:**
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC.
**Positive contact opening in conformity with standards:**
IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.

**Installation for safety applications:**
Use only switches marked with the symbol ⊖ aside 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 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 238. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.**

| | Electrical data | | Utilization category |
|---|---|---|---|
| without connector | Thermal current (Ith): | 10 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 500 Vac 600 Vdc<br>400 Vac 500 Vdc (contact blocks 2, 11, 12, 20, 21, 22, 33, 34) | Ue (V) 250 400 500<br>Ie (A) 6 4 1 |
| | Rated impulse withstand voltage ($U_{imp}$): | 6 kV<br>4 kV (contact blocks 20, 21, 22, 33, 34) | Direct current: DC13 |
| | Conditional short circuit current: | 1000 A according to EN 60947-5-1 | Ue (V) 24 125 250 |
| | Protection against short circuits: | type aM fuse 10 A 500 V | Ie (A) 6 1.1 0.4 |
| | Pollution degree: | 3 | |
| with connector M12, 5 poles | Thermal current (Ith): | 4 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 250 Vac 300 Vdc | Ue (V) 24 120 250 |
| | Protection against short circuits: | type gG fuse 4 A 500 V | Ie (A) 4 4 4 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 125 250 |
| | | | Ie (A) 4 1.1 0.4 |
| with connector M12, 8 poles | Thermal current (Ith): | 2 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 30 Vac 36 Vdc | Ue (V) 24 |
| | Protection against short circuits: | type gG fuse 2 A 500 V | Ie (A) 2 |
| | Pollution degree: | 3 | Direct current: DC13 |
| | | | Ue (V) 24 |
| | | | Ie (A) 2 |

## Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 33, 34)
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
4 kV (for contact blocks 20, 21, 22, 33, 34)
Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Za, Zb, Za+Za, Y+Y, X+X, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening of contacts on contact blocks 5, 6, 7, 9, 11, 13, 14, 16, 18, 20, 21, 22, 33, 34
In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

**Please contact our technical service for the list of approved products.**

## Characteristics approved by UL

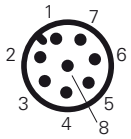
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 14. Terminal tightening torque of 12 lb in (1.4 Nm).

In conformity with standard: UL 508, CSA 22.2 No.14

**Please contact our technical service for the list of approved products.**

## Connection diagram for M12 connectors

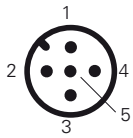
### Contact block 2 — 1NO-1NC+1NO-1NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NO | 3-4 |
| NC | 5-6 |
| NC | 7-8 |
| NO | 1-2 |

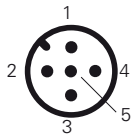
### Contact block 5 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

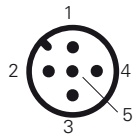
### Contact block 6 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

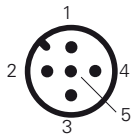
### Contact block 7 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NC | 3-4 |
| ground | 5 |

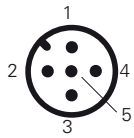
### Contact block 9 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

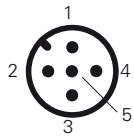
### Contact block 10 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |
| ground | 5 |

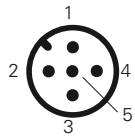
### Contact block 11 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

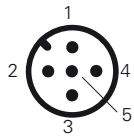
### Contact block 12 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO | 1-2 |
| NO | 3-4 |
| ground | 5 |

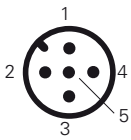
### Contact block 13 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |
| ground | 5 |

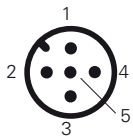
### Contact block 14 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC (1°) | 1-2 |
| NC (2°) | 3-4 |
| ground | 5 |

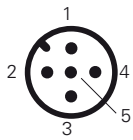
### Contact block 15 — 2NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NO (1°) | 1-2 |
| NO (2°) | 3-4 |
| ground | 5 |

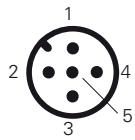
### Contact block 16 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC, lever at the right | 1-2 |
| NC, lever to the left | 3-4 |
| ground | 5 |

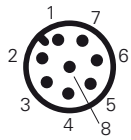
### Contact block 18 — 1NO+1NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

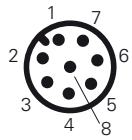
### Contact block 20 — 2NC+1NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NO | 7-8 |
| ground | 1 |

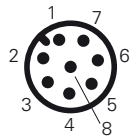
### Contact block 21 — 3NC




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NC | 5-6 |
| NC | 7-8 |
| ground | 1 |

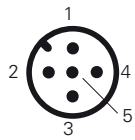
### Contact block 22 — 1NC+2NO




M12 connector, 8 poles

| Contacts | Pin no. |
|---|---|
| NC | 3-4 |
| NO | 5-6 |
| NO | 7-8 |
| ground | 1 |

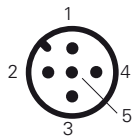
### Contact block 33 — 1NC+1NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

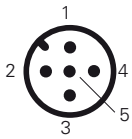
### Contact block 34 — 2NC




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

### Contact block E1 — PNP



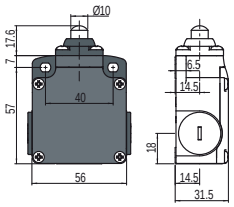
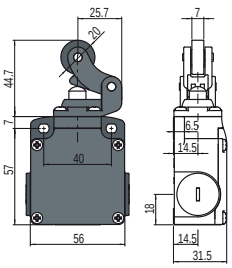
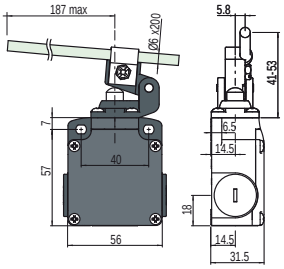
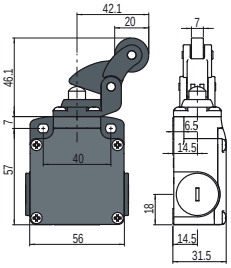

M12 connector, 5 poles

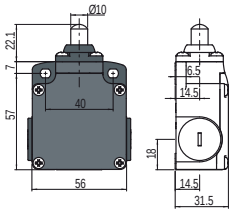
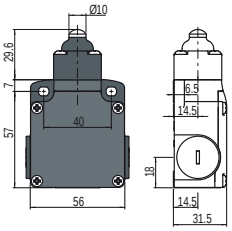
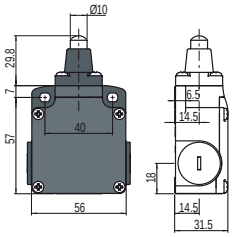
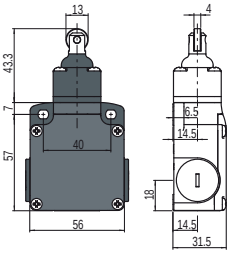
| Contacts | Pin no. |
|---|---|
| + | 1 |
| - | 3 |
| NC | 2 |
| NO | 4 |
| ground | 5 |

# Position switches **FL** series

Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| | |  | With stainless steel roller on request  |  | With stainless steel roller on request  |
| 5 | R | FL 501-M2 1NO+1NC | FL 502-M2 1NO+1NC | FL 504-M2 1NO+1NC | FL 505-M2 1NO+1NC |
| 6 | L | FL 601-M2 1NO+1NC | FL 602-M2 1NO+1NC | FL 604-M2 1NO+1NC | FL 605-M2 1NO+1NC |
| 7 | LO | FL 701-M2 1NO+1NC | FL 702-M2 1NO+1NC | FL 704-M2 1NO+1NC | FL 705-M2 1NO+1NC |
| 9 | L | FL 901-M2 2NC | FL 902-M2 2NC | FL 904-M2 2NC | FL 905-M2 2NC |
| 10 | L | FL 1001-M2 2NO | FL 1002-M2 2NO | FL 1004-M2 2NO | FL 1005-M2 2NO |
| 11 | R | FL 1101-M2 2NC | FL 1102-M2 2NC | FL 1104-M2 2NC | FL 1105-M2 2NC |
| 12 | R | FL 1201-M2 2NO | FL 1202-M2 2NO | FL 1204-M2 2NO | FL 1205-M2 2NO |
| 13 | LV | FL 1301-M2 2NC | FL 1302-M2 2NC | FL 1304-M2 2NC | FL 1305-M2 2NC |
| 14 | LS | FL 1401-M2 2NC | FL 1402-M2 2NC | FL 1404-M2 2NC | FL 1405-M2 2NC |
| 15 | LS | FL 1501-M2 2NO | FL 1502-M2 2NO | FL 1504-M2 2NO | FL 1505-M2 2NO |
| 18 | LA | FL 1801-M2 1NO+1NC | FL 1802-M2 1NO+1NC | FL 1804-M2 1NO+1NC | FL 1805-M2 1NO+1NC |
| 20 | L | FL 2001-M2 1NO+2NC | FL 2002-M2 1NO+2NC | FL 2004-M2 1NO+2NC | FL 2005-M2 1NO+2NC |
| 21 | L | FL 2101-M2 3NC | FL 2102-M2 3NC | FL 2104-M2 3NC | FL 2105-M2 3NC |
| 22 | L | FL 2201-M2 2NO+1NC | FL 2202-M2 2NO+1NC | FL 2204-M2 2NO+1NC | FL 2205-M2 2NO+1NC |
| 2 | R | FL 201-M2 2x(1NO-1NC) | FL 202-M2 2x(1NO-1NC) | FL 204-M2 2x(1NO-1NC) | FL 205-M2 2x(1NO-1NC) |
| E1 | | FL E101-M2 1NO-1NC | FL E102-M2 1NO-1NC | FL E104-M2 1NO-1NC | FL E105-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 3 | 0.5 m/s | page 237 - type 3 |
| Min. force | | 8 N (25 N ⊕) | 6 N (25 N ⊕) | 0.17 Nm | 6 N (25 N ⊕) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 2 | page 238 - group 1 | page 238 - group 2 |

| Contact blocks | | | With external rubber gasket | | With external rubber gasket |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FL 508-M2 1NO+1NC. | FL 510-M2 1NO+1NC | FL 511-M2 1NO+1NC | FL 515-M2 1NO+1NC |
| 6 | L | FL 608-M2 1NO+1NC | FL 610-M2 1NO+1NC | FL 611-M2 1NO+1NC | FL 615-M2 1NO+1NC |
| 7 | LO | FL 708-M2 1NO+1NC | FL 710-M2 1NO+1NC | FL 711-M2 1NO+1NC | FL 715-M2 1NO+1NC |
| 9 | L | FL 908-M2 2NC | FL 910-M2 2NC | FL 911-M2 2NC | FL 915-M2 2NC |
| 10 | L | FL 1008-M2 2NO | FL 1010-M2 2NO | FL 1011-M2 2NO | FL 1015-M2 2NO |
| 11 | R | FL 1108-M2 2NC | FL 1110-M2 2NC | FL 1111-M2 2NC | FL 1115-M2 2NC |
| 12 | R | FL 1208-M2 2NO | FL 1210-M2 2NO | FL 1211-M2 2NO | FL 1215-M2 2NO |
| 13 | LV | FL 1308-M2 2NC | FL 1310-M2 2NC | FL 1311-M2 2NC | FL 1315-M2 2NC |
| 14 | LS | FL 1408-M2 2NC | FL 1410-M2 2NC | FL 1411-M2 2NC | FL 1415-M2 2NC |
| 15 | LS | FL 1508-M2 2NO | FL 1510-M2 2NO | FL 1511-M2 2NO | FL 1515-M2 2NO |
| 18 | LA | FL 1808-M2 1NO+1NC | FL 1810-M2 1NO+1NC | FL 1811-M2 1NO+1NC | FL 1815-M2 1NO+1NC |
| 20 | L | FL 2008-M2 1NO+2NC | FL 2010-M2 1NO+2NC | FL 2011-M2 1NO+2NC | FL 2015-M2 1NO+2NC |
| 21 | L | FL 2108-M2 3NC | FL 2110-M2 3NC | FL 2111-M2 3NC | FL 2115-M2 3NC |
| 22 | L | FL 2208-M2 2NO+1NC | FL 2210-M2 2NO+1NC | FL 2211-M2 2NO+1NC | FL 2215-M2 2NO+1NC |
| 2 | R | FL 208-M2 2x(1NO-1NC) | FL 210-M2 2x(1NO-1NC) | FL 211-M2 2x(1NO-1NC) | FL 215-M2 2x(1NO-1NC) |
| E1 | | FL E108-M2 1NO-1NC | FL E110-M2 1NO-1NC | FL E111-M2 1NO-1NC | FL E115-M2 1NO-1NC |
| Max. speed | | page 237 - type 4 | page 237 - type 4 | page 237 - type 4 | page 237 - type 2 |
| Min. force | | 8 N (25 N ⊕) | 11 N (25 N ⊕) | 8 N (25 N ⊕) | 11 N (25 N ⊕) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 |

All measures in the drawings are in mm

Items with code on **green** background are stock items

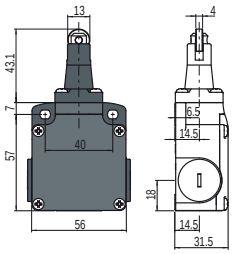
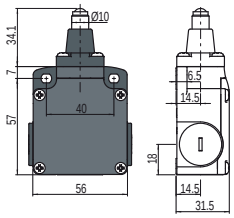
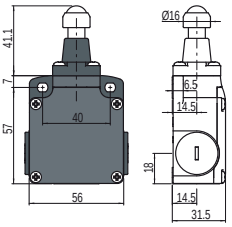
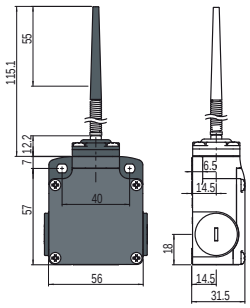
**Accessories** See page 225

➔ The 2D/3D files are available at **www.pizzato.com**

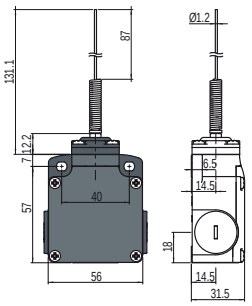
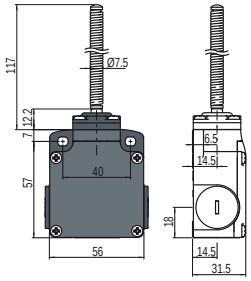
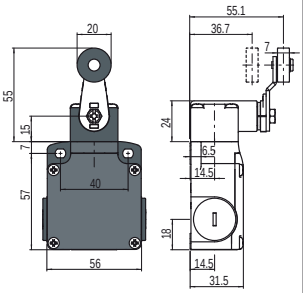
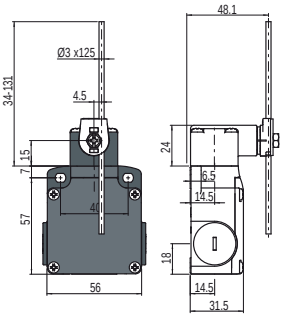
Contact type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
= electronic PNP

Contact blocks

| | | | | | |
|---|---|---|---|---|---|
| | |  | Ball, Ø 8 mm, stainless steel<br>  | Ball, Ø 12.7 mm, stainless steel<br>  | With external rubber gasket<br>  |
| 5 | R | FL 516-M2 1NO+1NC | FL 518-M2 1NO+1NC | FL 519-M2 1NO+1NC | FL 520-M2 1NO+1NC |
| 6 | L | FL 616-M2 1NO+1NC | FL 618-M2 1NO+1NC | FL 619-M2 1NO+1NC | |
| 7 | LO | FL 716-M2 1NO+1NC | FL 718-M2 1NO+1NC | FL 719-M2 1NO+1NC | |
| 9 | L | FL 916-M2 2NC | FL 918-M2 2NC | FL 919-M2 2NC | |
| 10 | L | FL 1016-M2 2NO | FL 1018-M2 2NO | FL 1019-M2 2NO | FL 1020-M2 2NO |
| 11 | R | FL 1116-M2 2NC | FL 1118-M2 2NC | FL 1119-M2 2NC | |
| 12 | R | FL 1216-M2 2NO | FL 1218-M2 2NO | FL 1219-M2 2NO | |
| 13 | LV | FL 1316-M2 2NC | FL 1318-M2 2NC | FL 1319-M2 2NC | |
| 14 | LS | FL 1416-M2 2NC | FL 1418-M2 2NC | FL 1419-M2 2NC | |
| 15 | LS | FL 1516-M2 2NO | FL 1518-M2 2NO | FL 1519-M2 2NO | |
| 18 | LA | FL 1816-M2 1NO+1NC | FL 1818-M2 1NO+1NC | FL 1819-M2 1NO+1NC | FL 1820-M2 1NO+1NC |
| 20 | L | FL 2016-M2 1NO+2NC | FL 2018-M2 1NO+2NC | FL 2019-M2 1NO+2NC | FL 2020-M2 1NO+2NC |
| 21 | L | FL 2116-M2 3NC | FL 2118-M2 3NC | FL 2119-M2 3NC | FL 2120-M2 3NC |
| 22 | L | FL 2216-M2 2NO+1NC | FL 2218-M2 2NO+1NC | FL 2219-M2 2NO+1NC | FL 2220-M2 2NO+1NC |
| 2 | R | FL 216-M2 2x(1NO-1NC) | FL 218-M2 2x(1NO-1NC) | FL 219-M2 2x(1NO-1NC) | FL 220-M2 2x(1NO-1NC) |
| E1 | | FL E116-M2 1NO-1NC | FL E118-M2 1NO-1NC | FL E119-M2 1NO-1NC | FL E120-M2 1NO-1NC |
| Max. speed | | page 237 - type 2 | page 237 - type 4 | page 237 - type 4 | 1 m/s |
| Min. force | | 8 N (25 N ⊕) | 8 N (25 N ⊕) | 8 N (25 N ⊕) | 0.09 Nm |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 3 |

Contact blocks

| | | | | | |
|---|---|---|---|---|---|
| | | With external rubber gasket<br>  | With external rubber gasket<br>  | Other rollers available. See on page 48<br>  | Round rod, Ø 3 mm, stainless steel<br>  |
| 5 | R | FL 521-M2 1NO+1NC | FL 525-M2 1NO+1NC | FL 531-M2 1NO+1NC | FL 532-M2 1NO+1NC |
| 6 | L | | | FL 631-M2 1NO+1NC | FL 632-M2 1NO+1NC |
| 7 | LO | | | FL 731-M2 1NO+1NC | FL 732-M2 1NO+1NC |
| 9 | L | | | FL 931-M2 2NC | FL 932-M2 2NC |
| 10 | L | FL 1021-M2 2NO | FL 1025-M2 2NO | FL 1031-M2 2NO | FL 1032-M2 2NO |
| 11 | R | | | FL 1131-M2 2NC | FL 1132-M2 2NC |
| 12 | R | | | FL 1231-M2 2NO | FL 1232-M2 2NO |
| 13 | LV | | | FL 1331-M2 2NC | FL 1332-M2 2NC |
| 14 | LS | | | FL 1431-M2 2NC | FL 1432-M2 2NC |
| 15 | LS | | | FL 1531-M2 2NO | FL 1532-M2 2NO |
| 16 | LI | | | FL 1631-M2 2NC | FL 1632-M2 2NC |
| 18 | LA | FL 1821-M2 1NO+1NC | FL 1825-M2 1NO+1NC | FL 1831-M2 1NO+1NC | FL 1832-M2 1NO+1NC |
| 20 | L | FL 2021-M2 1NO+2NC | FL 2025-M2 1NO+2NC | FL 2031-M2 1NO+2NC | FL 2032-M2 1NO+2NC |
| 21 | L | FL 2121-M2 3NC | FL 2125-M2 3NC | FL 2131-M2 3NC | FL 2132-M2 3NC |
| 22 | L | FL 2221-M2 2NO+1NC | FL 2225-M2 2NO+1NC | FL 2231-M2 2NO+1NC | FL 2232-M2 2NO+1NC |
| 2 | R | FL 221-M2 2x(1NO-1NC) | FL 225-M2 2x(1NO-1NC) | FL 231-M2 2x(1NO-1NC) | FL 232-M2 2x(1NO-1NC) |
| E1 | | FL E121-M2 1NO-1NC | FL E125-M2 1NO-1NC | FL E131-M2 1NO-1NC | FL E132-M2 1NO-1NC |
| Max. speed | | 1 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.08 Nm | 0.14 Nm | 0.1 Nm (0.25 Nm ⊕) | 0.1 Nm |
| Travel diagrams | | page 238 - group 3 | page 238 - group 3 | page 238 - group 4 | page 238 - group 4 |

All measures in the drawings are in mm

Items with code on **green** background are stock items

**Accessories** See page 225

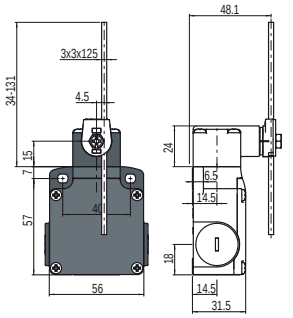
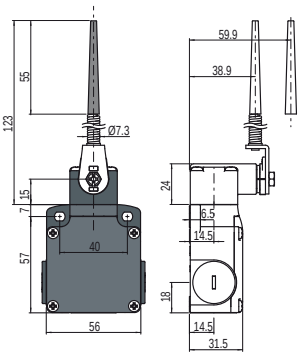
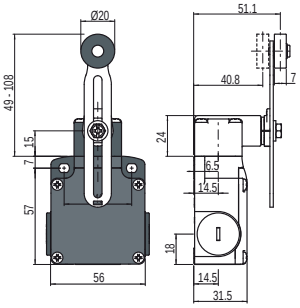
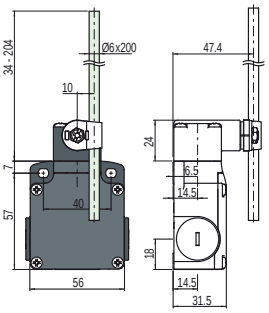
→ The 2D/3D files are available at **www.pizzato.com**

# Position switches **FL** series

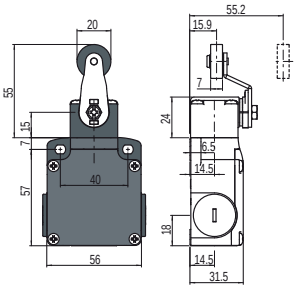
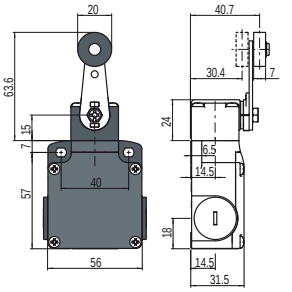
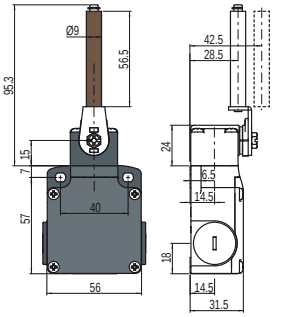
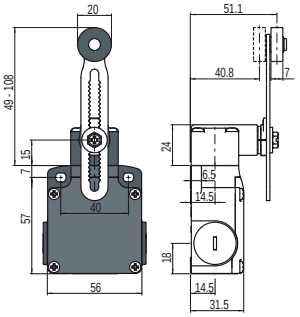
Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

Contact blocks

| | | Square rod, 3x3 mm | | Other rollers available. See on page 48 | Fiber glass rod |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FL 533-M2 1NO+1NC | FL 534-M2 1NO+1NC | FL 535-M2 → (1) 1NO+1NC | FL 536-M2 1NO+1NC |
| 6 | L | FL 633-M2 1NO+1NC | FL 634-M2 1NO+1NC | FL 635-M2 → (1) 1NO+1NC | FL 636-M2 1NO+1NC |
| 7 | LO | FL 733-M2 1NO+1NC | FL 734-M2 1NO+1NC | FL 735-M2 → (1) 1NO+1NC | FL 736-M2 1NO+1NC |
| 9 | L | FL 933-M2 2NC | FL 934-M2 2NC | FL 935-M2 → (1) 2NC | FL 936-M2 2NC |
| 10 | L | FL 1033-M2 2NO | FL 1034-M2 2NO | FL 1035-M2 2NO | FL 1036-M2 2NO |
| 11 | R | FL 1133-M2 2NC | FL 1134-M2 2NC | FL 1135-M2 → (1) 2NC | FL 1136-M2 2NC |
| 12 | R | FL 1233-M2 2NO | FL 1234-M2 2NO | FL 1235-M2 2NO | FL 1236-M2 2NO |
| 13 | LV | FL 1333-M2 2NC | FL 1334-M2 2NC | FL 1335-M2 → (1) 2NC | FL 1336-M2 2NC |
| 14 | LS | FL 1433-M2 2NC | FL 1434-M2 2NC | FL 1435-M2 → (1) 2NC | FL 1436-M2 2NC |
| 15 | LS | FL 1533-M2 2NO | FL 1534-M2 2NO | FL 1535-M2 2NO | FL 1536-M2 2NO |
| 16 | LI | FL 1633-M2 2NC | FL 1634-M2 2NC | FL 1635-M2 → (1) 2NC | FL 1636-M2 2NC |
| 18 | LA | FL 1833-M2 1NO+1NC | FL 1834-M2 1NO+1NC | FL 1835-M2 → (1) 1NO+1NC | FL 1836-M2 1NO+1NC |
| 20 | L | FL 2033-M2 1NO+2NC | FL 2034-M2 1NO+2NC | FL 2035-M2 → (1) 1NO+2NC | FL 2036-M2 1NO+2NC |
| 21 | L | FL 2133-M2 3NC | FL 2134-M2 3NC | FL 2135-M2 → (1) 3NC | FL 2136-M2 3NC |
| 22 | L | FL 2233-M2 2NO+1NC | FL 2234-M2 2NO+1NC | FL 2235-M2 → (1) 2NO+1NC | FL 2236-M2 2NO+1NC |
| 2 | R | FL 233-M2 2x(1NO-1NC) | FL 234-M2 2x(1NO-1NC) | FL 235-M2 2x(1NO-1NC) | FL 236-M2 2x(1NO-1NC) |
| E1 | | FL E133-M2 1NO-1NC | FL E134-M2 1NO-1NC | FL E135-M2 1NO-1NC | FL E136-M2 1NO-1NC |
| Max. speed | | 1.5 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.1 Nm | 0.1 Nm | 0.1 Nm (0.25 Nm →) | 0.1 Nm |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 |

Contact blocks

| | | Other rollers available. See on page 48 | Other rollers available. See on page 48 | Porcelain roller | Other rollers available. See on page 48 |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FL 551-M2 → 1NO+1NC | FL 552-M2 → 1NO+1NC | FL 553-E11M2V9 → 1NO+1NC | FL 556-M2 → 1NO+1NC |
| 6 | L | FL 651-M2 → 1NO+1NC | FL 652-M2 → 1NO+1NC | FL 653-E11M2V9 → 1NO+1NC | FL 656-M2 → 1NO+1NC |
| 7 | LO | FL 751-M2 → 1NO+1NC | FL 752-M2 → 1NO+1NC | FL 753-E11M2V9 → 1NO+1NC | FL 756-M2 → 1NO+1NC |
| 9 | L | FL 951-M2 → 2NC | FL 952-M2 → 2NC | FL 953-E11M2V9 → 2NC | FL 956-M2 → 2NC |
| 10 | L | FL 1051-M2 2NO | FL 1052-M2 2NO | FL 1053-E11M2V9 2NO | FL 1056-M2 2NO |
| 11 | R | FL 1151-M2 → 2NC | FL 1152-M2 → 2NC | | FL 1156-M2 → 2NC |
| 12 | R | FL 1251-M2 2NO | FL 1252-M2 2NO | FL 1253-E11M2V9 2NO | FL 1256-M2 2NO |
| 13 | LV | FL 1351-M2 → 2NC | FL 1352-M2 → 2NC | FL 1353-E11M2V9 → 2NC | FL 1356-M2 → 2NC |
| 14 | LS | FL 1451-M2 → 2NC | FL 1452-M2 → 2NC | FL 1453-E11M2V9 → 2NC | FL 1456-M2 → 2NC |
| 15 | LS | FL 1551-M2 2NO | FL 1552-M2 2NO | FL 1553-E11M2V9 2NO | FL 1556-M2 2NO |
| 16 | LI | | | | FL 1656-M2 → 2NC |
| 18 | LA | FL 1851-M2 → 1NO+1NC | FL 1852-M2 → 1NO+1NC | FL 1853-E11M2V9 → 1NO+1NC | FL 1856-M2 → 1NO+1NC |
| 20 | L | FL 2051-M2 → 1NO+2NC | FL 2052-M2 → 1NO+2NC | FL 2053-E11M2V9 → 1NO+2NC | FL 2056-M2 → 1NO+2NC |
| 21 | L | FL 2151-M2 → 3NC | FL 2152-M2 → 3NC | FL 2153-E11M2V9 → 3NC | FL 2156-M2 → 3NC |
| 22 | L | FL 2251-M2 → 2NO+1NC | FL 2252-M2 → 2NO+1NC | FL 2253-E11M2V9 → 2NO+1NC | FL 2256-M2 → 2NO+1NC |
| 2 | R | FL 251-M2 2x(1NO-1NC) | FL 252-M2 2x(1NO-1NC) | FL 253-E11M2 2x(1NO-1NC) | FL 256-M2 2x(1NO-1NC) |
| E1 | | FL E151-M2 1NO-1NC | FL E152-M2 1NO-1NC | FL E153-E11M2V9 1NO-1NC | FL E156-M2 1NO-1NC |
| Max. speed | | page 237 - type 1 | page 237 - type 1 | 0.5 m/s | page 237 - type 1 |
| Min. force | | 0.06 Nm (0.25 Nm →) | 0.06 Nm (0.25 Nm →) | 0.03 Nm (0.25 Nm →) | 0.1 Nm (0.25 Nm →) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 5 | page 238 - group 4 |

(1) Positive opening only with actuator set to max. See page 47.

All measures in the drawings are in mm

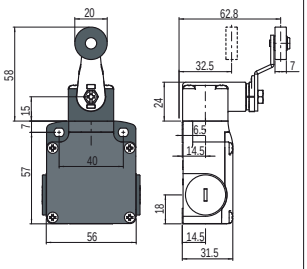
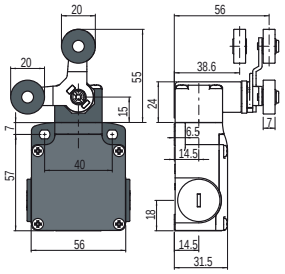
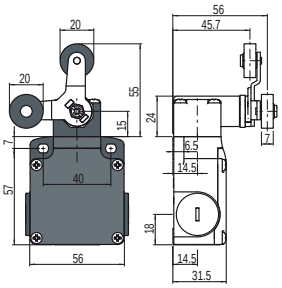
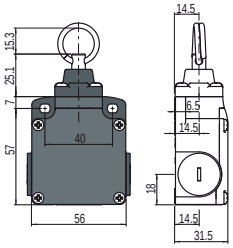
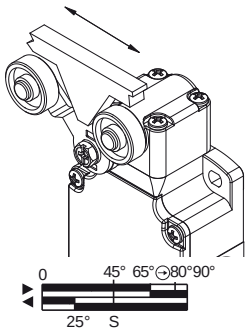
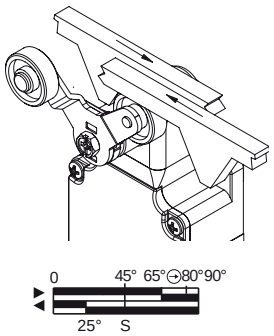
Items with code on **green** background are stock items

**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
= electronic PNP

| Contact blocks | | Other rollers available. See on page 48 | With stainless steel roller on request | With stainless steel roller on request | Rope switch for signalling |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 5 | R | FL 557-M2 → 1NO+1NC | FL 541-M2 → 1NO+1NC | FL 542-M2 → 1NO+1NC | FL 576-M2 1NO+1NC |
| 6 | L | FL 657-M2 → 1NO+1NC | Bistable switch with single track lyra lever | Bistable switch with dual track lyra lever | FL 676-M2 1NO+1NC |
| 7 | LO | FL 757-M2 → 1NO+1NC |  |  | FL 776-M2 1NO+1NC |
| 9 | L | FL 957-M2 → 2NC | | | FL 976-M2 2NO |
| 10 | L | FL 1057-M2 2NO | | | FL 1076-M2 2NC |
| 11 | R | FL 1157-M2 → 2NC | | | FL 1176-M2 2NO |
| 12 | R | FL 1257-M2 2NO | | | FL 1276-M2 2NC |
| 13 | LV | FL 1357-M2 → 2NC | | | FL 1376-M2 2NO |
| 14 | LS | FL 1457-M2 → 2NC | | | FL 1476-M2 2NO |
| 15 | LS | FL 1557-M2 2NO | | | FL 1576-M2 2NC |
| 16 | LI | FL 1657-M2 → 2NC | | | |
| 18 | LA | FL 1857-M2 → 1NO+1NC | | | FL 1876-M2 1NO+1NC |
| 20 | L | FL 2057-M2 → 1NO+2NC | | | FL 2076-M2 2NO+1NC |
| 21 | L | FL 2157-M2 → 3NC | | | FL 2176-M2 3NO |
| 22 | L | FL 2257-M2 → 2NO+1NC | | | FL 2276-M2 1NO+2NC |
| 2 | R | FL 257-M2 2x(1NO-1NC) | | | FL 276-M2 2x(1NO-1NC) |
| E1 | | FL E157-M2 1NO-1NC | | | |
| | | |  |  | |
| | | | 0 45° 65° 80° 90° 25° S | 0 45° 65° 80° 90° 25° S | |
| | | | S = mechanical switching point positive opening on contact 21-22 only | S = mechanical switching point positive opening on contact 21-22 only | |
| Max. speed | | page 237 - type 1 | 0.5 m/s with cam at 30° | 0.5 m/s with cam at 30° | 0.5 m/s |
| Min. force | | 0.1 Nm (0.25 Nm →) | 0.21 Nm (0.36 Nm →) | 0.21 Nm (0.36 Nm →) | initial 20 N - final 40 N |
| Travel diagrams | | page 238 - group 4 | | | page 238 - group 6 |

All measures in the drawings are in mm

Items with code on **green** background are stock items

**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

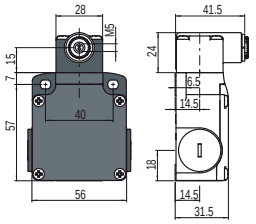
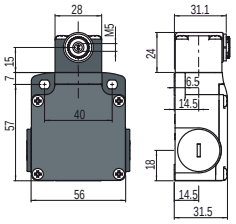
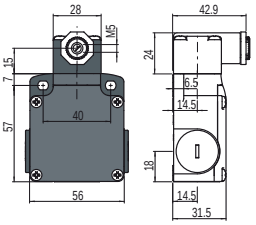
## Position switches with revolving lever without actuator

All measures in the drawings are in mm

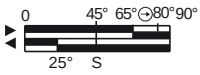
Contact type:

- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LI = slow action independent
- LA = slow action closer
- = electronic PNP

Contact blocks

| | | Regular head | Compact head | |
|---|---|---|---|---|
| | |  |  |  |
| 5 | R | FL 538-M2 1NO+1NC | FL 558-M2 1NO+1NC | FL 540-M2 1NO+1NC |
| 6 | L | FL 638-M2 1NO+1NC | FL 658-M2 1NO+1NC | |
| 7 | LO | FL 738-M2 1NO+1NC | FL 758-M2 1NO+1NC | |
| 9 | L | FL 938-M2 2NC | FL 958-M2 2NC | |
| 10 | L | FL 1038-M2 2NO | FL 1058-M2 2NO | |
| 11 | R | FL 1138-M2 2NC | FL 1158-M2 2NC | |
| 12 | R | FL 1238-M2 2NO | FL 1258-M2 2NO | |
| 13 | LV | FL 1338-M2 2NC | FL 1358-M2 2NC | |
| 14 | LS | FL 1438-M2 2NC | FL 1458-M2 2NC | |
| 15 | LS | FL 1538-M2 2NO | FL 1558-M2 2NO | |
| 16 | LI | FL 1638-M2 2NC | | |
| 18 | LA | FL 1838-M2 1NO+1NC | FL 1858-M2 1NO+1NC | |
| 20 | L | FL 2038-M2 1NO+2NC | FL 2058-M2 1NO+2NC | |
| 21 | L | FL 2138-M2 3NC | FL 2158-M2 3NC | |
| 22 | L | FL 2238-M2 2NO+1NC | FL 2258-M2 2NO+1NC | |
| 2 | R | FL 238-M2 2x(1NO-1NC) | FL 258-M2 2x(1NO-1NC) | |
| E1 | | FL E138-M2 1NO-1NC | FL E158-M2 1NO-1NC | |
| Min. force | | 0.1 Nm (0.25 Nm) | 0.06 Nm (0.25 Nm) | 0.5 m/s with cam at 30° |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | 0.21 Nm (0.36 Nm) |

Bistable switch




S = mechanical switching point
positive opening on contact 21-22 only

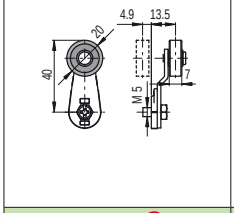
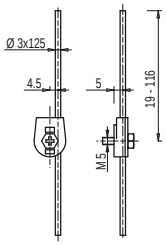
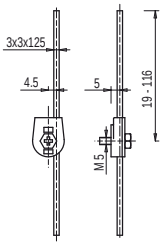
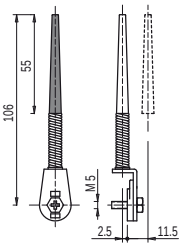
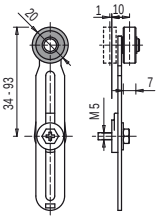
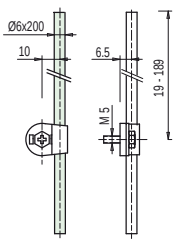
**IMPORTANT**
**For safety applications:** join only switches and actuators marked with symbol aside the product code.
For more information about safety applications see details on page 235.

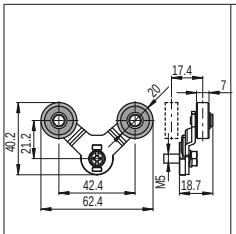
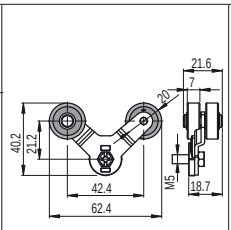
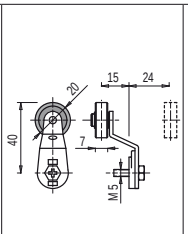
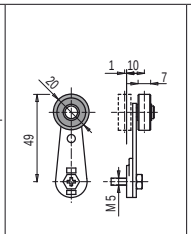
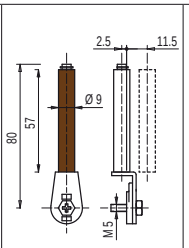
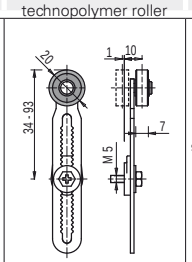
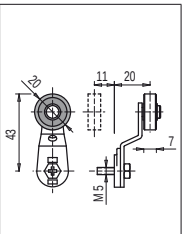
All measures in the drawings are in mm

## Loose actuators

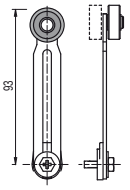
All measures in the drawings are in mm

**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

| Technopolymer roller Ø 20 mm | Adjustable round rod Ø 3x125 mm | Adjustable square rod 3x3x125 mm | Flexible rod with pointed end | Adjustable actuator with technopolymer roller | Adjustable fiber glass rod |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| VF L31 | VF L32 (3) | VF L33 (3) | VF L34 | VF L35 (1) (3) | VF L36 (3) |

| Single track lyra actuator | Dual track lyra actuator | Technopolymer roller, Ø 20 mm | Technopolymer roller, Ø 20 mm | Porcelain roller | Adjustable safety actuator with technopolymer roller | Technopolymer roller, Ø 20 mm |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |
| VF L41 | VF L42 | VF L51 | VF L52 | VF L53 (2) | VF L56 (3) | VF L57 |

- (1) Actuator VF L35 can only be used in safety applications if adjusted to its max. length, as shown in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling switch FL •58-M2 (e.g. FL 558-M2, FL 658-M2...) with actuator VF L53 will not present the same travel diagrams and actuating forces as switch FL •53-E11M2V9 (e.g. FL 553-E11M2V9, FL 653-E11M2V9...).
- (3) If installed with switch FL •58-M2 (e.g. FL 558-M2, FL 658-M2...) the actuator could mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be rotated to the inside because it will mechanically interfere with the switch head.



Items with code on **green** background are stock items

**Accessories** See page 225

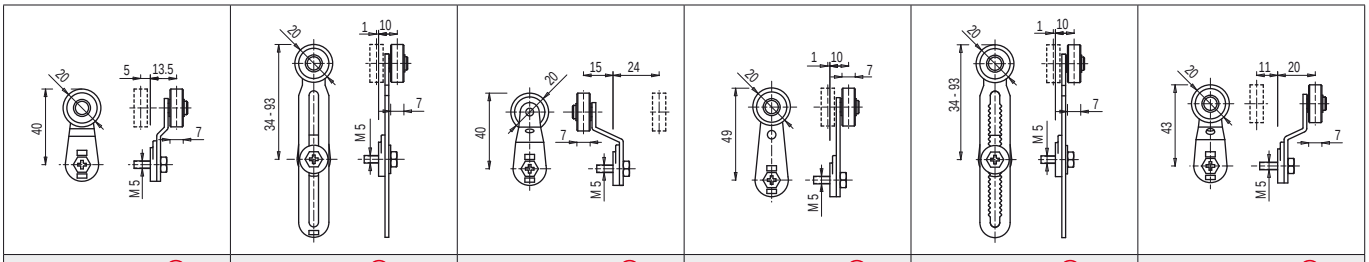
The 2D/3D files are available at **www.pizzato.com**

## Special loose actuators

All measures in the drawings are in mm

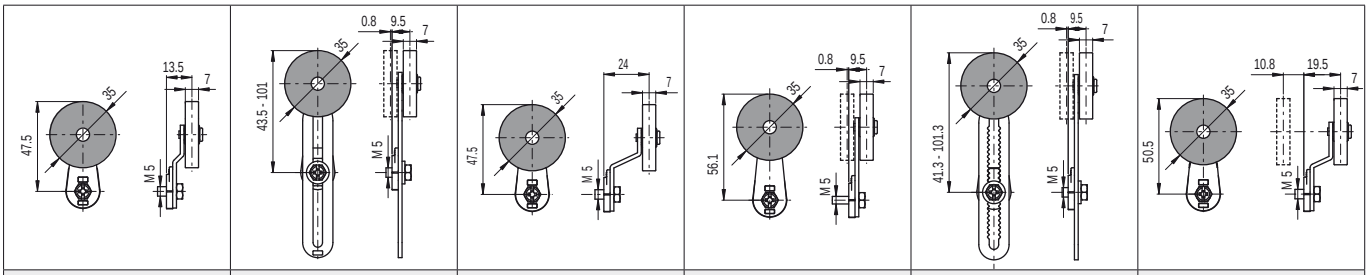
**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

### Stainless steel rollers, Ø 20 mm



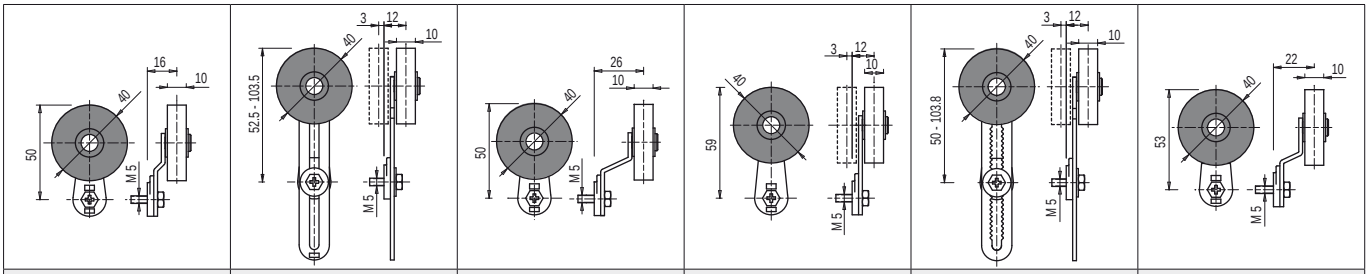

VF L31-R24 | VF L35-R24 (1) (3) | VF L51-R24 | VF L52-R24 | VF L56-R24 (3) | VF L57-R24

### Technopolymer rollers, Ø 35 mm



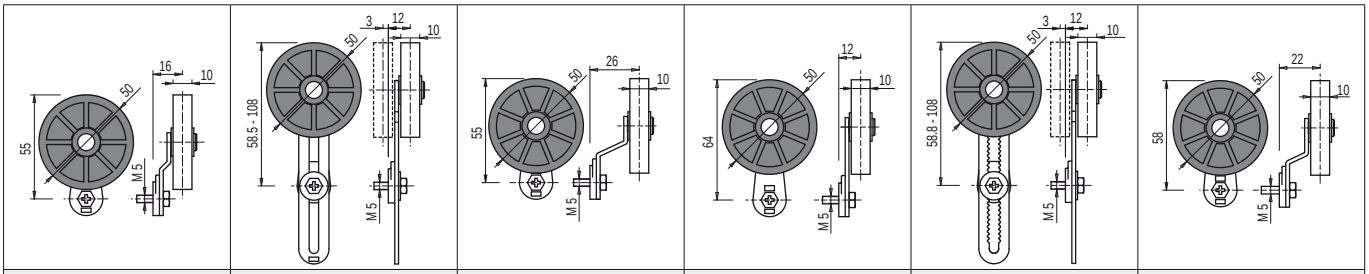

VF L31-R25 (4) | VF L35-R25 (1) (3) | VF L51-R25 (4) | VF L52-R25 | VF L56-R25 (3) | VF L57-R25

### Rubber rollers, Ø 40 mm



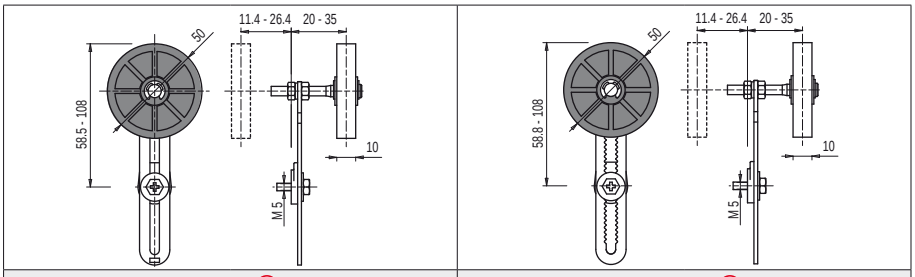

VF L31-R5 (4) | VF L35-R5 (1) (3) | VF L51-R5 (4) | VF L52-R5 | VF L56-R5 (3) | VF L57-R5 (4)

### 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

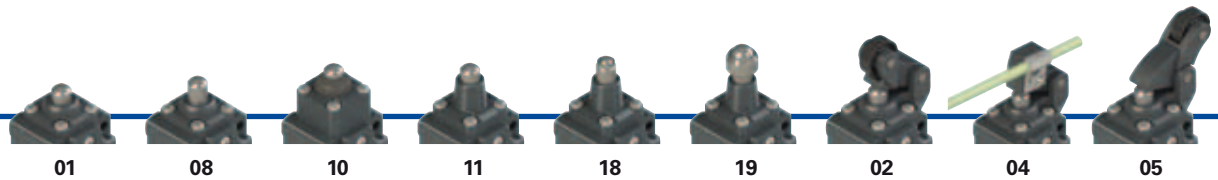



VF L35-R27 (1) (3) | VF L56-R27 (3)

**Accessories** See page 225

➔ The 2D/3D files are available at **www.pizzato.com**

## Selection diagram



**01**

**08**

**10**
external rubber gasket

**11**

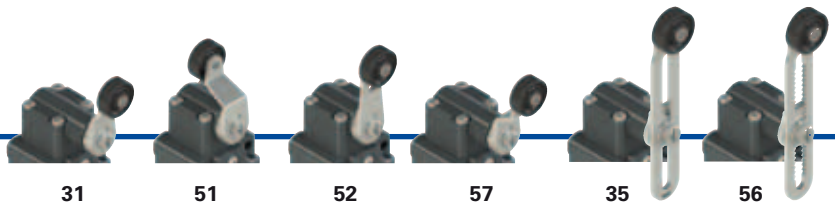
**18**
ball Ø 8 mm, stainless steel

**19**
ball Ø 12.7 mm, stainless steel

**02**

**04**
fiber glass rod

**05**



**31**

**51**

**52**

**57**

**35**
adjustable lever

**56**
adjustable safety lever

**ACTUATORS**

**CONTACT BLOCKS**

**3**
1NO-1NC
snap action

**33**
1NO+1NC,
slow action

**34**
2NC
slow action

**CONDUIT ENTRY**

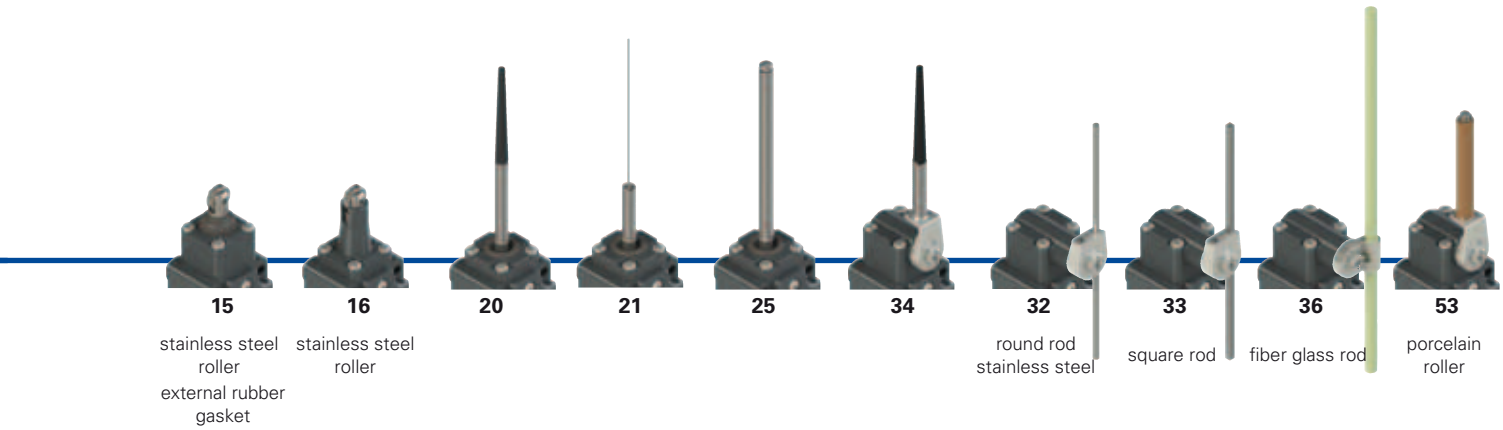
| Threaded conduit entry | |
|---|---|
| **M2** | M20x1.5 (standard) |
| | PG 11 |

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

| With M12 metal connector | |
|---|---|
| **K50** | 5 poles, bottom |

product options

accessory sold separately



**15** stainless steel roller external rubber gasket

**16** stainless steel roller

**20**

**21**

**25**

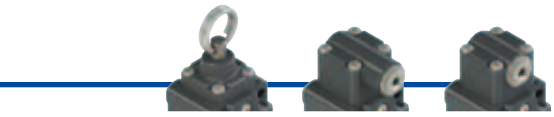
**34**

**32** round rod stainless steel

**33** square rod

**36** fiber glass rod

**53** porcelain roller



**76** rope switch for signalling

**38** without actuator

**58** without actuator

**LOOSE ACTUATORS**
See page 55

## 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

**FC 302-GM2K50R24T6**

| Housing | |
|---|---|
| **FC** | metal, one conduit entry |

| Contact blocks | |
|---|---|
| **3** | 1NO-1NC, snap action |
| **33** | 1NO+1NC, slow action |
| **34** | 2NC, slow action |

| Actuators | |
|---|---|
| **01** | short plunger |
| **02** | roller lever |
| **05** | angled roller lever |
| **...** | ..... |

| Contact type | |
|---|---|
| | silver contacts (standard) |
| **G** | silver contacts with 1 µm gold coating (not for contact block 3) |

| Threaded conduit entry | |
|---|---|
| **M2** | M20x1.5 (standard) |
| | PG11 |

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

| Rollers | |
|---|---|
| | standard roller |
| **R24** | stainless steel, Ø 20 mm (for actuators 02, 05, 31, 35, 51, 52, 56, 57) |
| **R25** | technopolymer, Ø 35 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R5** | rubber, Ø 40 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R26** | rubber, Ø 50 mm (for actuators 31, 35, 51, 52, 56, 57) |
| **R27** | rubber, protruding, Ø 50 mm (for actuators 35 e 36) |

| Pre-installed cable glands | |
|---|---|
| | without cable gland (standard) |
| **K23** | cable gland for cables Ø 6…Ø 12 mm |
| **K27** | cable gland for cables Ø 3…Ø 7 mm |
| **K50** | M12 metal connector, 5 poles |

Please contact our technical service for the complete list of possible combinations.

**Main features**

- Metal housing, one conduit entry
- Protection degree IP67
- 3 contact blocks available
- 26 actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

## Technical data

**Housing**

| | |
|---|---|
| Metal housing, baked powder coating | |
| One threaded conduit entry: | M20x1.5 (standard) |
| Protection degree: | IP67 according to EN 60529 with cable gland having equal or higher protection degree |

**General data**

| | |
|---|---|
| Ambient temperature: | -25°C … +80°C |
| Max. actuation frequency: | 3600 operating cycles[1]/hour |
| Mechanical endurance: | 20 million operating cycles[1] |
| Mounting position: | any |
| Safety parameters: | |
| $B_{10d}$: | 40,000,000 for NC contacts |
| Mechanical interlock, not coded: | type 1 according to EN ISO 14119 |
| Tightening torques for installation: | see pages 235-246 |

(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.

**Cable cross section (flexible copper strands)**

| | | | |
|---|---|---|---|
| Contact blocks 33, 34: | min. | 1 x 0.34 mm² | (1 x AWG 22) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |
| Contact block 3: | min. | 1 x 0.5 mm² | (1 x AWG 20) |
| | max. | 2 x 1.5 mm² | (2 x AWG 16) |

**In conformity 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, UL 508, CSA 22.2 No.14 .
**Approvals:**
IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB14048.5-2001.

**Markings and quality marks:**

| | |
|---|---|
| IMQ approval: | EG605 |
| UL approval: | E131787 |
| CCC approval: | 2007010305230000 |
| EAC approval: | RU C-IT ДМ94.B.01024 |

**In conformity with the requirements of:**
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC.
**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 ⊖ aside 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 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 238. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.**

**Electrical data**

| | | | **Utilization category** |
|---|---|---|---|
| without connector | Thermal current (Ith): | 10 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 500 Vac 600 Vdc<br>400 Vac 500 Vdc (contact blocks 33, 34) | Ue (V) 250 400 500<br>Ie (A) 6 4 1 |
| | Rated impulse withstand voltage ($U_{imp}$): | 6 kV<br>4 kV(contact blocks 33, 34) | Direct current: DC13 |
| | Conditional short circuit current: | 1000 A according to EN 60947-5-1 | Ue (V) 24 125 250 |
| | Protection against short circuits: | type aM fuse 10 A 500 V | Ie (A) 6 1.1 0.4 |
| | Pollution degree: | 3 | |
| with M12 connector 5 poles | Thermal current (Ith): | 4 A | Alternating current: AC15 (50÷60 Hz) |
| | Rated insulation voltage (Ui): | 250 Vac 300 Vdc | Ue (V) 24 120 250<br>Ie (A) 4 4 4 |
| | Protection against short circuits: | type gG fuse 4 A 500 V | Direct current: DC13 |
| | Pollution degree: | 3 | Ue (V) 24 125 250<br>Ie (A) 4 1.1 0.4 |

## Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 33, 34)
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
4 kV (for contact blocks 33, 34)
Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Zb, Y+Y
Positive opening of contacts on contact blocks 33, 34

In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

**Please contact our technical service for the list of approved products.**

## Characteristics approved by UL

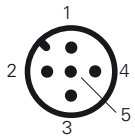
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 14. Terminal tightening torque of 12 lb in (1.4 Nm).

In conformity with standard: UL 508, CSA 22.2 No.14

**Please contact our technical service for the list of approved products.**

## Connection diagram for M12 connectors

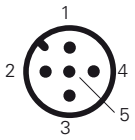
Contact block 3
1NC-1NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

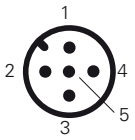
Contact block 33
1NC+1NO




M12 connector, 5 poles

| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NO | 3-4 |
| ground | 5 |

Contact block 34
2NC

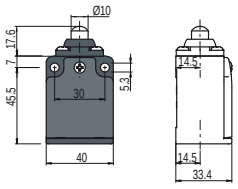
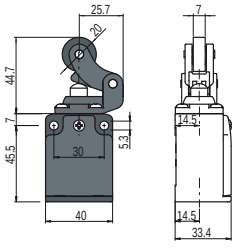
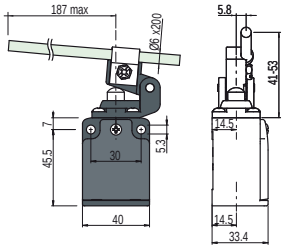
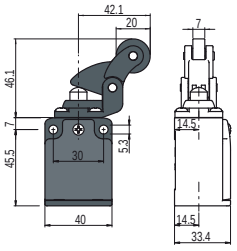


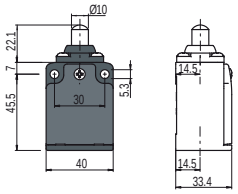
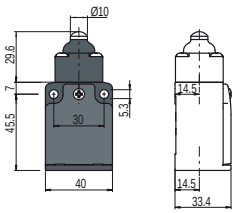
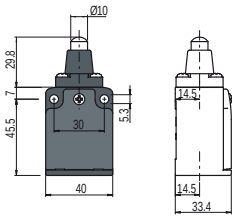
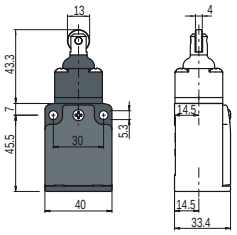

M12 connector, 5 poles

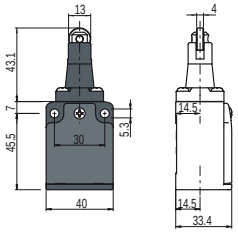
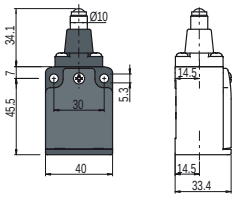
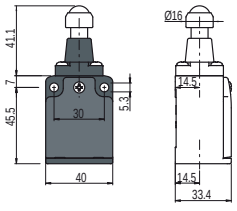
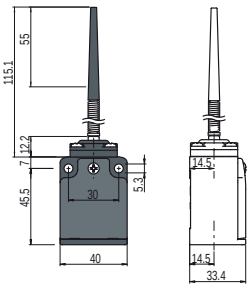
| Contacts | Pin no. |
|---|---|
| NC | 1-2 |
| NC | 3-4 |
| ground | 5 |

# Position switches **FC** series

Contact type:
R = snap action
L = slow action

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| | |  | With stainless steel roller on request  |  | With stainless steel roller on request  |
| 3 | R | FC 301-M2 1NO-1NC | FC 302-M2 1NO-1NC | FC 304-M2 1NO-1NC | FC 305-M2 1NO-1NC |
| 33 | L | FC 3301-M2 1NO+1NC | FC 3302-M2 1NO+1NC | FC 3304-M2 1NO+1NC | FC 3305-M2 1NO+1NC |
| 34 | L | FC 3401-M2 2NC | FC 3402-M2 2NC | FC 3404-M2 2NC | FC 3405-M2 2NC |
| Max. speed | | page 237 - type 4 | page 237 - type 3 | 0.5 m/s | page 237 - type 3 |
| Min. force | | 6 N (25 N) | 4 N (25 N) | 0.17 Nm | 4 N (25 N) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 2 | page 238 - group 1 | page 238 - group 2 |

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| | |  | With external rubber gasket  |  | With external rubber gasket  |
| 3 | R | FC 308-M2 1NO-1NC | FC 310-M2 1NO-1NC | FC 311-M2 1NO-1NC | FC 315-M2 1NO-1NC |
| 33 | L | FC 3308-M2 1NO+1NC | FC 3310-M2 1NO+1NC | FC 3311-M2 1NO+1NC | FC 3315-M2 1NO+1NC |
| 34 | L | FC 3408-M2 2NC | FC 3410-M2 2NC | FC 3411-M2 2NC | FC 3415-M2 2NC |
| Max. speed | | page 237 - type 4 | page 237 - type 4 | page 237 - type 4 | page 237 - type 2 |
| Min. force | | 6 N (25 N) | 7 N (25 N) | 6 N (25 N) | 7 N (25 N) |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 |

| Contact blocks | | | | | |
|---|---|---|---|---|---|
| | |  | Ball, Ø 8 mm, stainless steel  | Ball, Ø 12.7 mm, stainless steel  | With external rubber gasket  |
| 3 | R | FC 316-M2 1NO-1NC | FC 318-M2 1NO-1NC | FC 319-M2 1NO-1NC | FC 320-M2 1NO-1NC |
| 33 | L | FC 3316-M2 1NO+1NC | FC 3318-M2 1NO+1NC | FC 3319-M2 1NO+1NC | FC 3320-M2 1NO+1NC |
| 34 | L | FC 3416-M2 2NC | FC 3418-M2 2NC | FC 3419-M2 2NC | FC 3420-M2 2NC |
| Max. speed | | page 237 - type 2 | page 237 - type 4 | page 237 - type 4 | 1 m/s |
| Min. force | | 6 N (25 N) | 6 N (25 N) | 6 N (25 N) | 0.07 Nm |
| Travel diagrams | | page 238 - group 1 | page 238 - group 1 | page 238 - group 1 | page 238 - group 3 |

All measures in the drawings are in mm

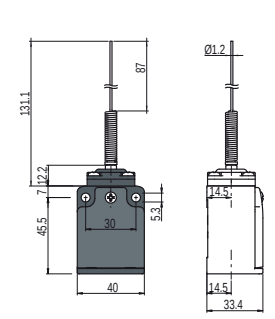
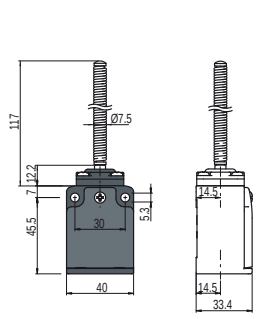
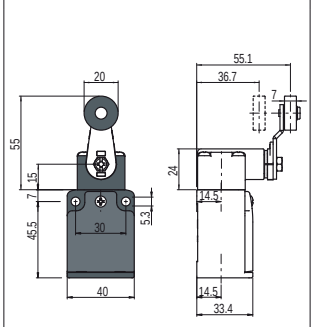
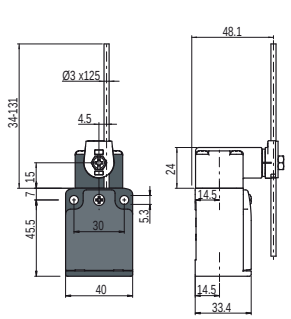
Items with code on **green** background are stock items

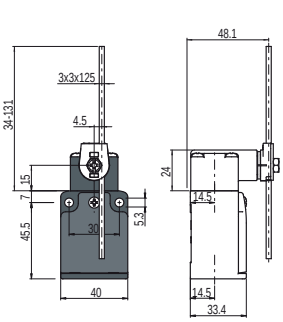
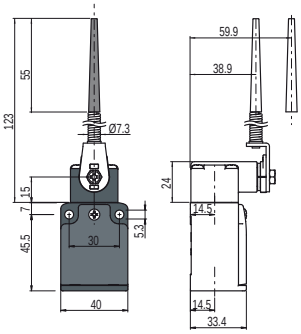
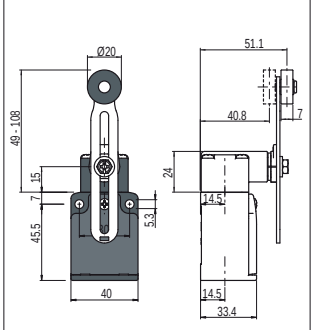
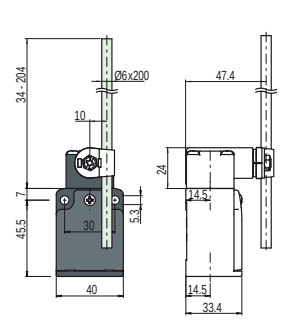
**Accessories** See page 225

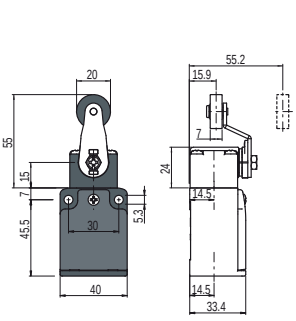
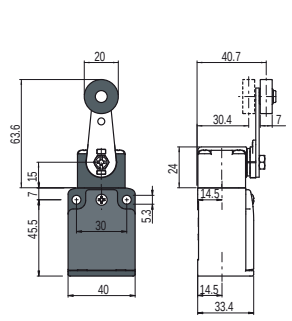
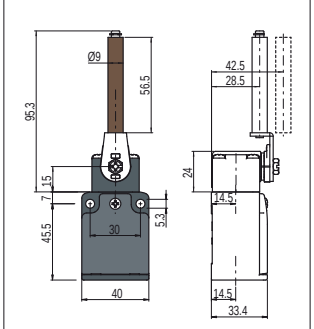
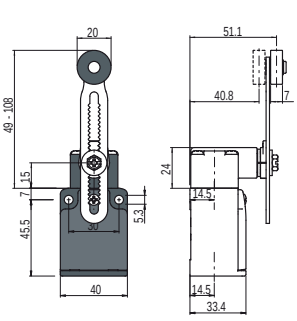
The 2D/3D files are available at **www.pizzato.com**

Contact type:

R = snap action
L = slow action

| Contact blocks | | With external rubber gasket | With external rubber gasket | Other rollers available. See on page 56 | Round rod, Ø 3 mm, stainless steel |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 3 | R | FC 321-M2 1NO-1NC | FC 325-M2 1NO-1NC | FC 331-M2 1NO-1NC | FC 332-M2 1NO-1NC |
| 33 | L | FC 3321-M2 1NO+1NC | FC 3325-M2 1NO+1NC | FC 3331-M2 → 1NO+1NC | FC 3332-M2 1NO+1NC |
| 34 | L | FC 3421-M2 2NC | FC 3425-M2 2NC | FC 3431-M2 → 2NC | FC 3432-M2 2NC |
| Max. speed | | 1 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.06 Nm | 0.1 Nm | 0.09 Nm (0.25 Nm →) | 0.09 Nm |
| Travel diagrams | | page 238 - group 3 | page 238 - group 3 | page 238 - group 4 | page 238 - group 4 |

| Contact blocks | | Square rod, 3x3 mm | | Other rollers available. See on page 56 | Fiber glass rod |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 3 | R | FC 333-M2 1NO-1NC | FC 334-M2 1NO-1NC | FC 335-M2 1NO-1NC | FC 336-M2 1NO-1NC |
| 33 | L | FC 3333-M2 1NO+1NC | FC 3334-M2 1NO+1NC | FC 3335-M2 → (1) 1NO+1NC | FC 3336-M2 1NO+1NC |
| 34 | L | FC 3433-M2 2NC | FC 3434-M2 2NC | FC 3435-M2 → (1) 2NC | FC 3436-M2 2NC |
| Max. speed | | 1.5 m/s | 1 m/s | page 237 - type 1 | 1.5 m/s |
| Min. force | | 0.09 Nm | 0.09 Nm | 0.09 Nm (0.25 Nm →) | 0.09 Nm |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 | page 238 - group 4 |

| Contact blocks | | Other rollers available. See on page 56 | Other rollers available. See on page 56 | Porcelain roller | Other rollers available. See on page 56 |
|---|---|---|---|---|---|
| | |  |  |  |  |
| 3 | R | FC 351-M2 1NO-1NC | FC 352-M2 1NO-1NC | FC 353-E11M2 1NO-1NC | FC 356-M2 1NO-1NC |
| 33 | L | FC 3351-M2 → 1NO+1NC | FC 3352-M2 → 1NO+1NC | FC 3353-E11M2V9 → 1NO+1NC | FC 3356-M2 → 1NO+1NC |
| 34 | L | FC 3451-M2 → 2NC | FC 3452-M2 → 2NC | FC 3453-E11M2V9 → 2NC | FC 3456-M2 → 2NC |
| Max. speed | | page 237 - type 1 | page 237 - type 1 | 0.5 m/s | page 237 - type 1 |
| Min. force | | 0.05 Nm (0.25 Nm →) | 0.05 Nm (0.25 Nm →) | 0.02 Nm (0.25 Nm →) | 0.09 Nm (0.25 Nm →) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 | page 238 - group 5 | page 238 - group 4 |

(1) Positive opening only with actuator set to max. See page 55.

All measures in the drawings are in mm

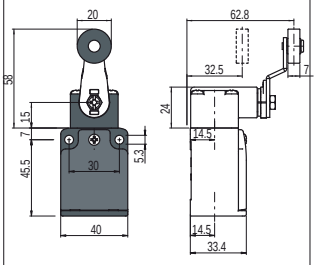
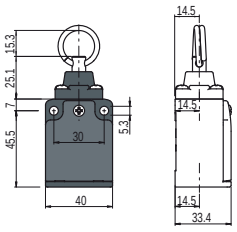
Items with code on **green** background are stock items

**Accessories** See page 225

→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

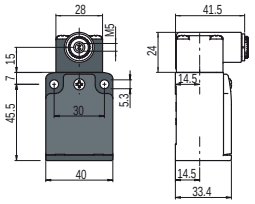
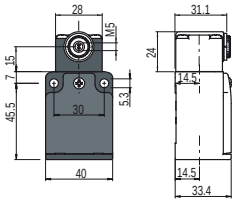
R = snap action
L = slow action

| Contact blocks | | Other rollers available. See on page 56 | Rope switch for signalling |
|---|---|---|---|
| | |  |  |
| 3 | R | FC 357-M2 1NO-1NC | FC 376-M2 1NO-1NC |
| 33 | L | FC 3357-M2 ⊖ 1NO+1NC | FC 3376-M2 1NO+1NC |
| 34 | L | FC 3457-M2 ⊖ 2NC | FC 3476-M2 2NC |
| Max. speed | | page 237 - type 1 | 0.5 m/s |
| Min. force | | 0.09 Nm (0.25 Nm ⊖) | initial 20 N - final 40 N |
| Travel diagrams | | page 238 - group 4 | page 238 - group 6 |

All measures in the drawings are in mm

## Position switches with revolving lever without actuator

All measures in the drawings are in mm

| Contact blocks | | Regular head | Compact head |
|---|---|---|---|
| | |  |  |
| 3 | R | FC 338-M2 1NO-1NC | FC 358-M2 1NO-1NC |
| 33 | L | FC 3338-M2 ⊖ 1NO+1NC | FC 3358-M2 ⊖ 1NO+1NC |
| 34 | L | FC 3438-M2 ⊖ 2NC | FC 3458-M2 ⊖ 2NC |
| Min. force | | 0.09 Nm (0.25 Nm ⊖) | 0.05 Nm (0.25 Nm ⊖) |
| Travel diagrams | | page 238 - group 4 | page 238 - group 4 |

All measures in the drawings are in mm

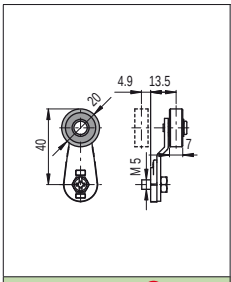
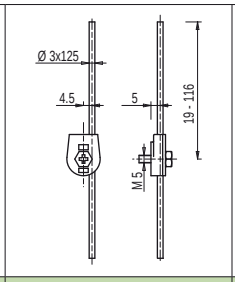
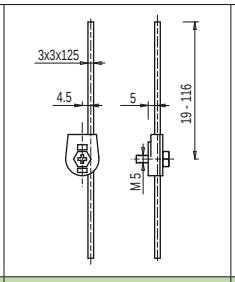
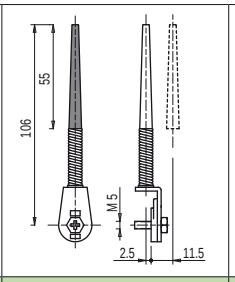
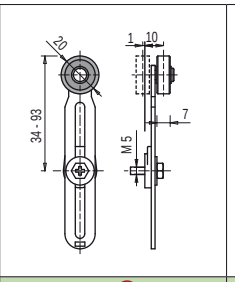
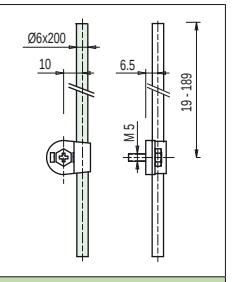
**IMPORTANT**

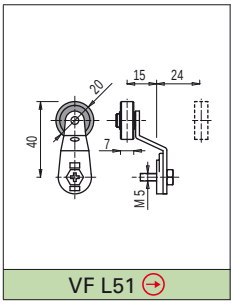
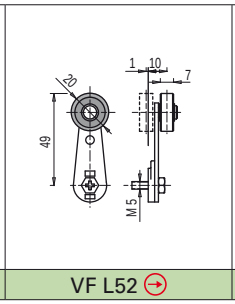
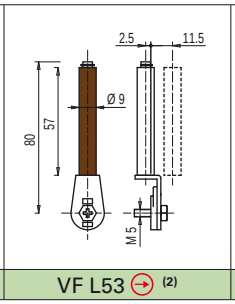
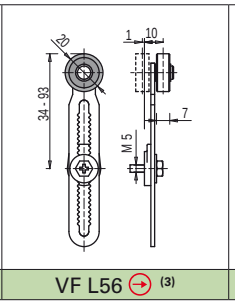
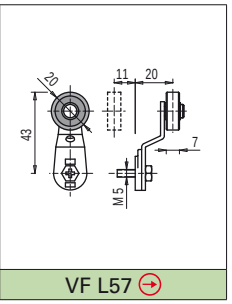
**For safety applications:** join only switches and actuators marked with symbol ⊖ aside the product code.
For more information about safety applications see details on page 235.

## Loose actuators

All measures in the drawings are in mm

**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

| Technopolymer roller Ø 20 mm | Adjustable round rod Ø 3x125 mm | Adjustable square rod 3x3x125 mm | Flexible rod with pointed end | Adjustable actuator with technopolymer roller | Adjustable fiber glass rod |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| VF L31 ⊖ | VF L32 (3) | VF L33 (3) | VF L34 | VF L35 ⊖ (1) (3) | VF L36 (3) |

| Technopolymer roller Ø 20 mm | Technopolymer roller Ø 20 mm | Porcelain roller | Adjustable safety actuator with technopolymer roller | Technopolymer roller Ø 20 mm |
|---|---|---|---|---|
|  |  |  |  |  |
| VF L51 ⊖ | VF L52 ⊖ | VF L53 ⊖ (2) | VF L56 ⊖ (3) | VF L57 ⊖ |

Items with code on **green** background are stock items

**Accessories** See page 225

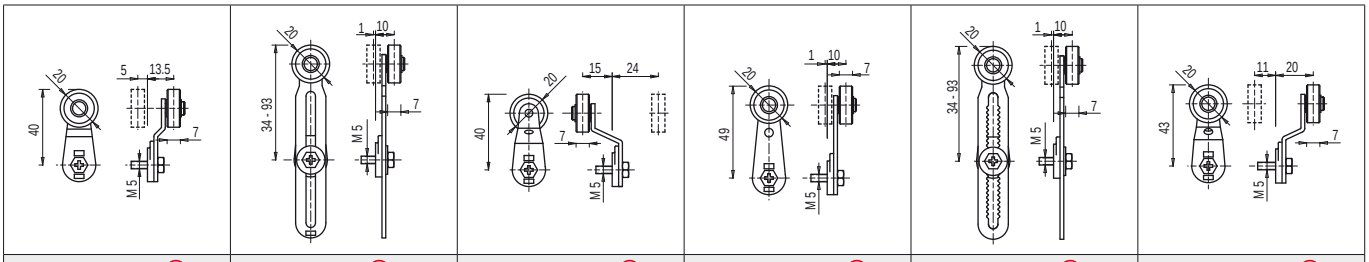
➔ The 2D/3D files are available at **www.pizzato.com**

## Special loose actuators

All measures in the drawings are in mm

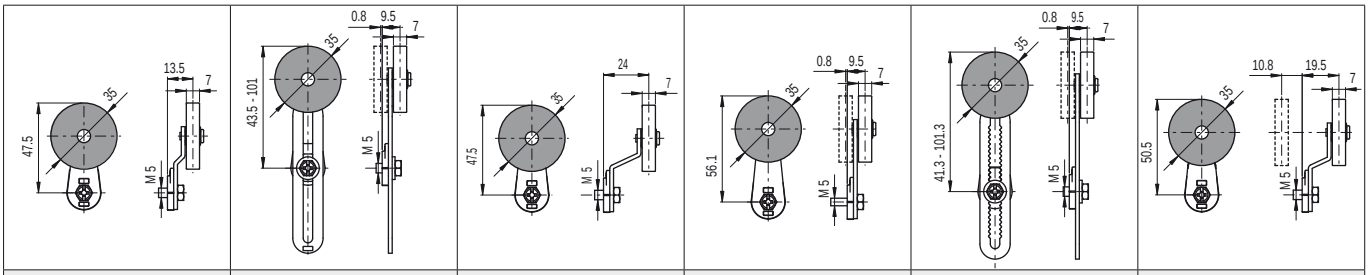
**IMPORTANT:** These loose actuators can be used with items of series FD, FP, FL, FC only.

### Stainless steel rollers, Ø 20 mm



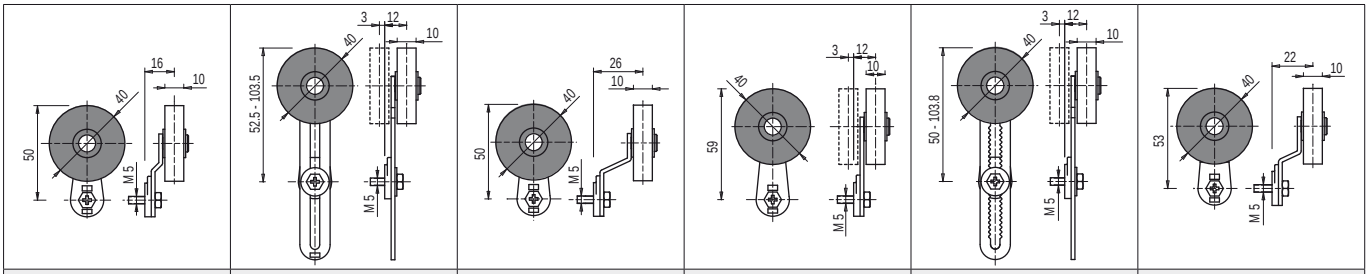
VF L31-R24 | VF L35-R24 (1) (3) | VF L51-R24 | VF L52-R24 | VF L56-R24 (3) | VF L57-R24

### Technopolymer rollers, Ø 35 mm



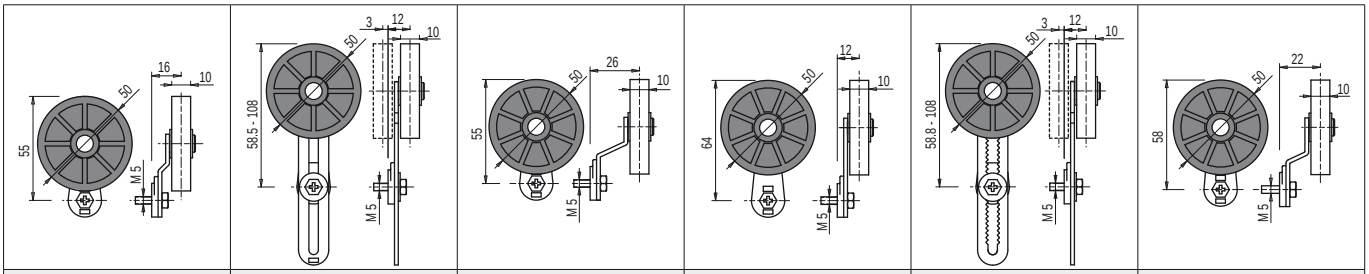
VF L31-R25 (4) | VF L35-R25 (1) (3) | VF L51-R25 (4) | VF L52-R25 | VF L56-R25 (3) | VF L57-R25

### Rubber rollers, Ø 40 mm



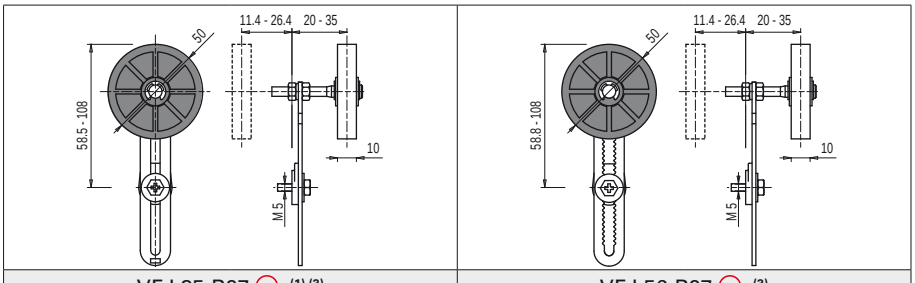
VF L31-R5 (4) | VF L35-R5 (1) (3) | VF L51-R5 (4) | VF L52-R5 | VF L56-R5 (3) | VF L57-R5 (4)

### Rubber rollers, Ø 50 mm



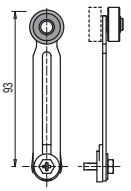
VF L31-R26 (4) | VF L35-R26 (1) (3) | VF L51-R26 (4) | VF L52-R26 (4) | VF L56-R26 (3) | VF L57-R26 (4)

### Protruding rubber rollers, Ø 50 mm



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

- (1) Actuator VF L35 can only be used in safety applications if adjusted to its max. length, as shown in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling switch FC •58-M2 (e.g. FC 358-M2, FC 3358-M2…) with actuator VF L53 will not present the same travel diagrams and actuating forces as switch FC •53-E11M2 (e.g. FC 353-E11M2, FC 3353-E11M2V9…).
- (3) If installed with switch FC •58-M2 (e.g. FC 358-M2, FC 3358-M2…) the actuator could mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be rotated to the inside because it will mechanically interfere with the switch head.



**Accessories** See page 225

➔ The 2D/3D files are available at **www.pizzato.com**