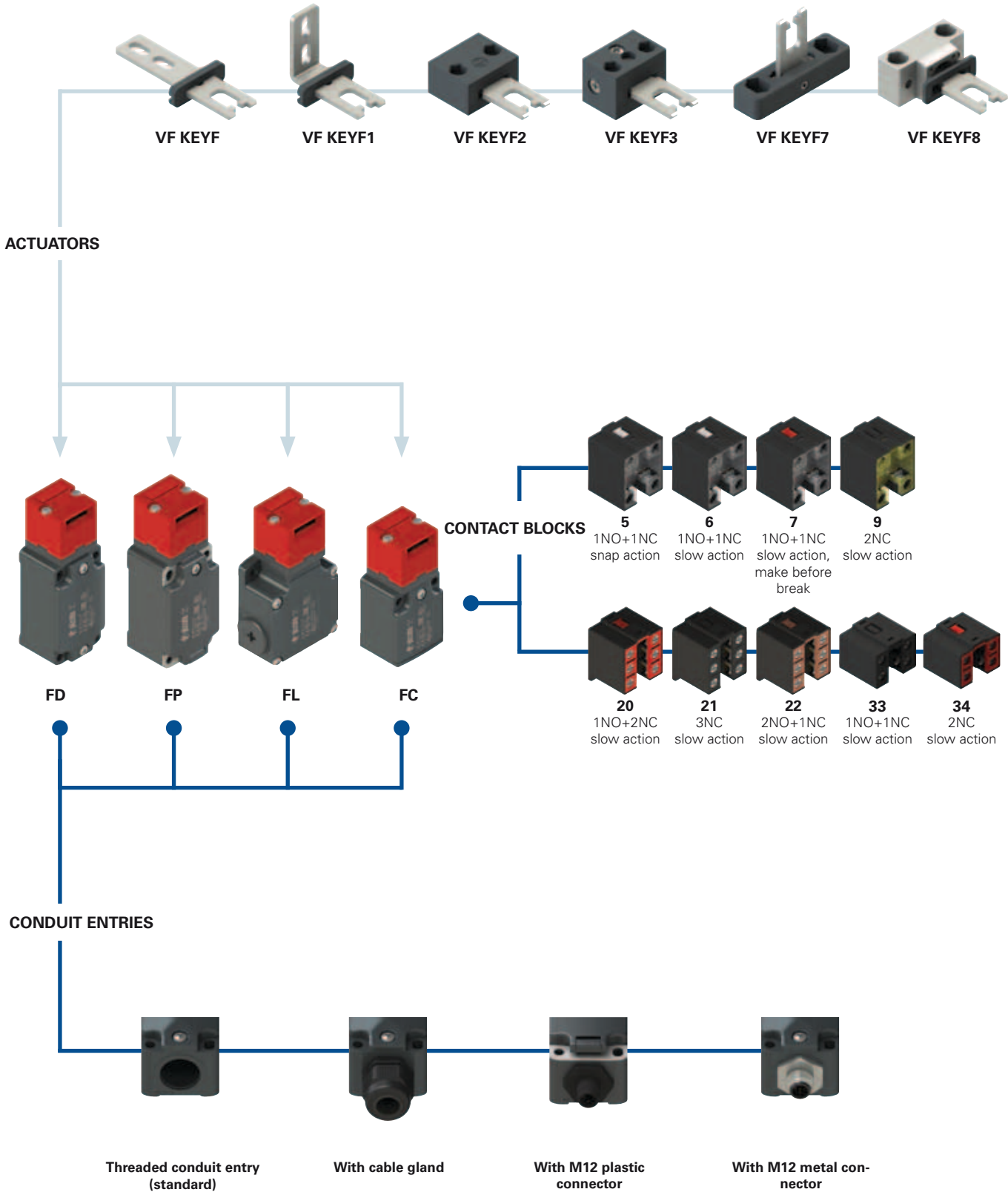


Selection diagram



● product option  
 → accessory sold separately



### 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 693-F1GM2K50T6**

Housing	
<b>FD</b>	metal, one conduit entry
<b>FL</b>	metal, three conduit entries
<b>FP</b>	technopolymer, one conduit entry

Contact block	
<b>5</b>	1NO+1NC, snap action
<b>6</b>	1NO+1NC, slow action
<b>7</b>	1NO+1NC, slow action, make before break
<b>9</b>	2NC, slow action
<b>20</b>	1NO+2NC, slow action
<b>21</b>	3NC, slow action
<b>22</b>	2NO+1NC, slow action
<b>33</b>	1NO+1NC, slow action
<b>34</b>	2NC, slow action

Actuators	
	without actuator (standard)
<b>F</b>	straight actuator VF KEYF
<b>F1</b>	angled actuator VF KEYF1
<b>F2</b>	jointed actuator VF KEYF2
<b>F3</b>	jointed actuator adjustable in two directions VF KEYF3
<b>F7</b>	jointed actuator adjustable in one direction VF KEYF7
<b>F8</b>	universal actuator VF KEYF8

Ambient temperature	
	-25°C ... +80°C (standard)
<b>T6</b>	-40°C ... +80°C

Pre-installed cable glands or connectors	
	no cable gland or connector (standard)
<b>K23</b>	cable gland for cables Ø 6 ... 12 mm
...	.....
<b>K50</b>	M12 metal connector, 5-pole
...	.....

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

Threaded conduit entry	
<b>M2</b>	M20x1.5 (standard)
	PG13.5

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts with 1 µm gold coating
<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact blocks 20, 21, 22, 33, 34)

article options options  
**FC 3393-F1GM2K50T6**

Housing	
<b>FC</b>	metal, one conduit entry

Contact block	
<b>33</b>	1NO+1NC, slow action
<b>34</b>	2NC, slow action

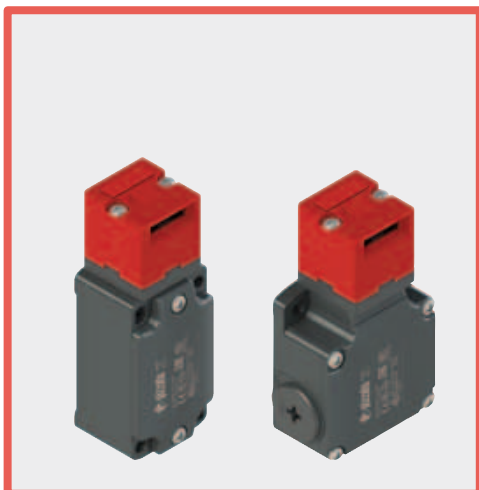
Actuators	
	without actuator (standard)
<b>F</b>	straight actuator VF KEYF
<b>F1</b>	angled actuator VF KEYF1
<b>F2</b>	jointed actuator VF KEYF2
<b>F3</b>	jointed actuator adjustable in two directions VF KEYF3
<b>F7</b>	jointed actuator adjustable in one direction VF KEYF7
<b>F8</b>	universal actuator VF KEYF8

Ambient temperature	
	-25°C ... +80°C (standard)
<b>T6</b>	-40°C ... +80°C

Pre-installed cable glands or connectors	
	no cable gland (standard)
<b>K23</b>	cable gland for cables Ø 6 ... 12 mm
<b>K50</b>	M12 metal connector, 5-pole

Threaded conduit entry	
<b>M2</b>	M20x1.5 (standard)
	PG11

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts with 1 µm gold coating



### Main features

- Metal housing or technopolymer housing, from one to three conduit entries
- Protection degree IP67
- 9 contact blocks available
- 6 stainless steel actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

### Quality marks:



IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2007010305230000 (FD-FL-FC series) 2007010305230014 (FP series)
EAC approval:	RU C-IT.A.35.B.00454

### Technical data

#### Housing

FP series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: □

FD, FL and FC series: metal housing, baked powder coating.

Metal head, baked powder coating.

FD, FP, FC series: one threaded conduit entry: M20x1.5 (standard)

FL series: three threaded conduit entries: M20x1.5 (standard)

Protection degree: IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

#### General data

For safety applications up to:	SIL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1
Mechanical interlock, coded:	type 2 acc. to EN ISO 14119
Coding level:	low acc. to EN ISO 14119
Safety parameter $B_{10D}$ :	2,000,000 for NC contacts
Service life:	20 years
Ambient temperature:	-25°C ... +80°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Tightening torques for installation:	see page 313-324

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

Contact blocks 20, 21, 22, 33, 34:	min. 1 x 0.34 mm <sup>2</sup> (1 x AWG 22)	max. 2 x 1.5 mm <sup>2</sup> (2 x AWG 16)
Contact blocks 5, 6, 7, 9:	min. 1 x 0.5 mm <sup>2</sup> (1 x AWG 20)	max. 2 x 2.5 mm <sup>2</sup> (2 x AWG 14)

#### In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, BG-GS-ET-15, UL 508, CSA 22.2 No.14.

#### Approvals:

IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB14048.5-2001.

#### Compliance with the requirements of:

Machinery Directive 2006/42/EC and EMC Directive 2014/30/EU.

#### Positive contact opening in conformity with standards:

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

⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 313 to page 324.

	Electrical data	Utilization category
without connector	Thermal current ( $I_{th}$ ):	10 A
	Rated insulation voltage ( $U_r$ ):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)
	Rated impulse withstand voltage ( $U_{imp}$ ):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)
with M12 connector, 4 or 5-pole	Thermal current ( $I_{th}$ ):	4 A
	Rated insulation voltage ( $U_r$ ):	250 Vac 300 Vdc
	Protection against short circuits:	type gG fuse 4 A 500 V
with M12 connector, 8-pole	Thermal current ( $I_{th}$ ):	2 A
	Rated insulation voltage ( $U_r$ ):	30 Vac 36 Vdc
	Protection against short circuits:	type gG fuse 2 A 500 V
	Pollution degree:	3
		Alternating current: AC15 (50±60 Hz)
		$U_e$ (V) 250 400 500
		$I_e$ (A) 6 4 1
		Direct current: DC13
		$U_e$ (V) 24 125 250
		$I_e$ (A) 6 1.1 0.4
		Alternating current: AC15 (50±60 Hz)
		$U_e$ (V) 24 120 250
		$I_e$ (A) 4 4 4
		Direct current: DC13
		$U_e$ (V) 24 125 250
		$I_e$ (A) 4 1.1 0.4



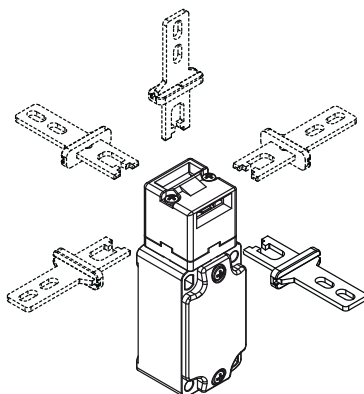
## Description



These safety switches are ideal for controlling gates, sliding doors and other guards which protect dangerous parts of machines without inertia.

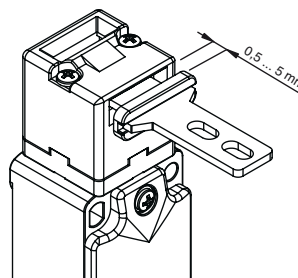
The stainless steel actuator is fastened to the moving part of the guard in such a way that it is separated from the switch each time the guard is opened. A special mechanism ensures that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be used with all types of guards (with hinge as well as sliding and removable types). The possibility to actuate the switch only with a specific actuator guarantees that the machine can be restarted only after the guard has been closed. These switches are made of robust materials with larger dimensions and are designed especially for heavy gates and harsh environments.

## Head with variable orientation



For all switches, the head can be adjusted in 90° steps after removing the two fastening screws. In this way it is possible to actuate the switch from 5 different directions.

## Wide-ranging actuator travel



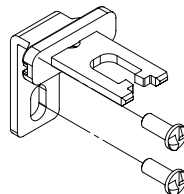
The actuation head of this switch features a wide range of travel. In this way the guard can oscillate along the direction of insertion (4.5 mm) without causing unwanted machine shutdowns. This wide range of travel is available in all actuators in order to ensure maximum device reliability.

## Protection degree IP67

# IP67

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

## Safety screws for actuators



As required by EN ISO 14119, the actuator must be fixed immovably to the door frame. Pan head safety screws with one-way fitting are available for this purpose. With this screw type, the actuators cannot be removed or tampered by using common tools. See accessories on page 310.

## Extended temperature range

# -40°C

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

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

## Laser engraving



All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

## Features approved by IMQ

Rated insulation voltage (U <sub>i</sub> ):	500 Vac 400 Vac (for contact blocks 20, 21, 22, 33, 34)
Conventional free air thermal current (I <sub>th</sub> ):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U <sub>imp</sub> ):	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 (U <sub>e</sub> ):	400 Vac (50 Hz)
Operating current (I <sub>e</sub> ):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X

Positive opening contacts on contact blocks 5, 6, 7, 9, 20, 21, 22, 33, 34

In compliance with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

## Features approved by UL

Utilization categories	Q300 (69 VA, 125-250 Vdc) A600 (720 VA, 120-600 Vac)
Housing features type 1, 4X "indoor use only"; 12, 13	
For all contact blocks use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).	

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

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

## Dimensional drawings

All values in the drawings are in mm

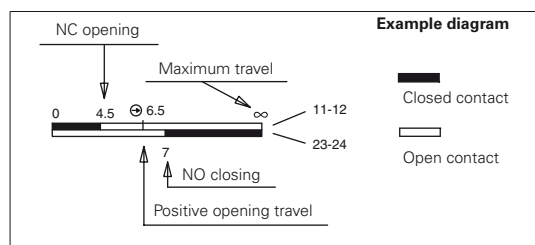
Contact type:  
**R** = snap action  
**L** = slow action  
**LO** = slow action, make before break

Contact block

	Technopolymer housing		Metal housing		Metal housing		Metal housing	
	Without actuator		Without actuator		Without actuator		Without actuator	
5	<b>R</b>	FP 593-M2 ⊕ 1NO+1NC 	FD 593-M2 ⊕ 1NO+1NC 	FL 593-M2 ⊕ 1NO+1NC 				
6	<b>L</b>	FP 693-M2 ⊕ 1NO+1NC 	FD 693-M2 ⊕ 1NO+1NC 	FL 693-M2 ⊕ 1NO+1NC 				
7	<b>LO</b>	FP 793-M2 ⊕ 1NO+1NC 	FD 793-M2 ⊕ 1NO+1NC 	FL 793-M2 ⊕ 1NO+1NC 				
9	<b>L</b>	FP 993-M2 ⊕ 2NC 	FD 993-M2 ⊕ 2NC 	FL 993-M2 ⊕ 2NC 				
20	<b>L</b>	FP 2093-M2 ⊕ 1NO+2NC 	FD 2093-M2 ⊕ 1NO+2NC 	FL 2093-M2 ⊕ 1NO+2NC 				
21	<b>L</b>	FP 2193-M2 ⊕ 3NC 	FD 2193-M2 ⊕ 3NC 	FL 2193-M2 ⊕ 3NC 				
22	<b>L</b>	FP 2293-M2 ⊕ 2NO+1NC 	FD 2293-M2 ⊕ 2NO+1NC 	FL 2293-M2 ⊕ 2NO+1NC 				
33	<b>L</b>	FP 3393-M2 ⊕ 1NO+1NC 	FD 3393-M2 ⊕ 1NO+1NC 	FL 3393-M2 ⊕ 1NO+1NC 	FC 3393-M2 ⊕ 1NO+1NC 			
34	<b>L</b>	FP 3493-M2 ⊕ 2NC 	FD 3493-M2 ⊕ 2NC 	FL 3493-M2 ⊕ 2NC 	FC 3493-M2 ⊕ 2NC 			
Actuating force		10 N (18 N ⊕)	10 N (18 N ⊕)	10 N (18 N ⊕)	10 N (18 N ⊕)			

## How to read travel diagrams

All values in the diagrams are in mm

**IMPORTANT:**

The state of the NC contact refers to the switch with inserted actuator. In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol ⊕. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

## Limits of use

Do not use where dust and dirt may penetrate in any way into the head and deposit there. Especially not where powder, shavings, concrete or chemicals are sprayed. Adhere to the EN ISO 14119 requirements regarding low level of coding for interlocks. Do not use in environments with presence of explosive or flammable gas. In these case use ATEX products (see dedicated Pizzato catalogue).



### Stainless steel actuators

All values in the drawings are in mm

**IMPORTANT:** These actuators can be used only with items of the FD, FP, FL, FC and FS series (e.g. FD 693-M2).  
Low level of coding acc. to EN ISO 14119.

Article	Description
<b>VF KEYF</b>	Straight actuator

Article	Description
<b>VF KEYF1</b>	Angled actuator

Article	Description
<b>VF KEYF2</b>	Jointed actuator

Article	Description
<b>VF KEYF3</b>	Actuator adjustable in two directions

The actuator can flex in four directions for applications where the door alignment is not precise.

Actuator adjustable in two directions for doors with reduced dimensions.

Article	Description
<b>VF KEYF7</b>	Actuator adjustable in one direction

Actuator adjustable in one direction for doors with reduced dimensions.

Article	Description
<b>VF KEYF8</b>	Universal actuator

Actuator adjustable in two dimensions for small doors; can be mounted in various positions.

The fixing block has two pairs of bore holes; it is provided for rotating the working plane of the actuator by 90°.

Body material: zinc alloy.

### Accessories

Article	Description
<b>VF KB1</b>	Actuator entry locking device

Padlockable device to lock the actuator entry in order to prevent the accidental closing of the door behind operators while they are in the danger area.

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

**Accessories** See page 299

→ The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)

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