



# ATEX



**Technical concepts**
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**Position switches FD / FL series**
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Category	Zone	EPL	Approvals
<b>2G</b> <b>M2</b>	<b>1</b> <b>M2</b>	<b>Gb</b> <b>Mb</b>	II 2G Ex ia IICT6 Gb I M2 Ex ia I Mb

 Product code extension  
**-EX7**

ATEX/EPL category				
M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
■	■	-	■	-

**Position switches FM series**
**page 171**


Category	Zone	EPL	Approvals
<b>2G</b> <b>M2</b>	<b>1</b> <b>M2</b>	<b>Gb</b> <b>Mb</b>	II 2G Ex ia IICT6 Gb I M2 Ex ia I Mb

 Product code extension  
**-EX7**

ATEX/EPL category				
M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
■	■	-	■	-

**Position switches FD / FL series**
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Category	Zone	EPL	Approvals
<b>2D</b>	<b>21</b>	<b>Db</b>	II 2D Extb IICT80°C Db

 Product code extension  
**-EX8**

ATEX/EPL category				
M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
-	-	■	-	■

**Prewired position switches FA series**
**page 189**


Category	Zone	EPL	Approvals
<b>3D</b> <b>3G</b>	<b>22</b> <b>2</b>	<b>Dc</b> <b>Gc</b>	II 3D Extc IICT80°C Dc II 3G Ex nC IICT6 Gc

 Product code extension  
**-EX5**

ATEX/EPL category				
M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
-	-	-	■	■

**Position switches FD / FL series**
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Category	Zone	EPL	Approvals
<b>3D</b>	<b>22</b>	<b>Dc</b>	II 3D Extc IICT80°C Dc

 Product code extension  
**-EX4**

ATEX/EPL category				
M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
-	-	-	-	■

**Accessories**
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## ATEX Directive

The ATEX mark ( **A**tmospheres **E**xplosives) refers to two European directives concerning the risk of deflagration in potentially explosive atmospheres:

- ATEX 94/9/EC: concerns the requirements for electrical and non-electrical equipment used in potentially explosive environments. According to this directive the manufacturer has to comply with the provided requirements and mark the articles in conformity with particular categories
- ATEX 99/92/EC: regards the minimum safety and sanitary requirements that the user has to satisfy during the activity in potentially explosive environments.

These directives determine the requirements for the safety and health protection of people, animals and property and carry several procedures for the conformity demonstration of equipment to the directive requirements.

## Classification of potentially explosive atmospheres.

A potentially explosive atmosphere is an atmosphere that could become explosive according to the local conditions of work. Usually it consists in environments where it is present a mixture of air and flammable substances in the form of gas, smog, steams and dusts.

The ATEX 99/92/EC directive defines for two types of explosive atmosphere, depending on the presence in the zone of gases or combustible dusts. Each area exposed to these types of explosive atmospheres is classified in three zones, according to the frequency and duration of the explosive atmosphere. For atmospheres with explosive gas, areas are classified in zones 0, 1 and 2; for atmosphere with explosive dusts in zones 20, 21 and 22:

- **Zone 0/20** : a place where gas or combustible dust is present permanently. Constant danger. Equipment of minimum category 1 is required.
- **Zone 1/21** : a place where gas or combustible dust is likely to occur during normal operation. Potential danger. Equipment of minimum category 2 is required.
- **Zone 2/22** : a place where gas or combustible dust is unlikely to occur or only for a short period. Lower danger. Equipment of minimum category 3 is required.

It's under the responsibility of the final user to choose and classify the different zones and to use suitable equipments.

## Device categories acc. to ATEX directive and IEC standards

ATEX 94/9/CE directive distinguishes equipment between two main groups:

- **Group I**: equipment and systems for mining
- **Group II**: equipment and systems for all other applications

Equipment of the group I is divided in two further categories according to the required protection degree:

- **Category M1**: Equipment designed to assure a very high protection level
- **Category M2**: Equipment designed to assure a high protection level

Equipment of the group II is divided in three further categories according to the required protection degree:

- **Category 1**: Equipment designed to assure a very high protection level (use in zones 0 and 20, 1 and 21, 2 and 22)
- **Category 2**: Equipment designed to assure a high protection level (use in zones 1 and 21, 2 and 22)
- **Category 3**: Equipment designed to assure a normal protection level (use in zones 2 and 22)

The relation between the EPL (Equipment Protection Levels) of the IEC 60079-0 standard, and the categories and applications of the ATEX directive are shown in the table below.

**Table 1 – Classification of the environment and device according to ATEX directive and IEC 60079-0 standard**

Environment characteristics				Equipment characteristics			
Environment of application	Flammable material	Potentially explosive atmosphere	Classification of potentially explosive atmospheres: ZONE	acc. to ATEX 94/9/EC		acc. to IEC 60079-0	
				Required marking of the device: CATEGORY	Required marking of the device: GROUP	EPL	Required protection level
Mining				M1	I	Ma	very high
				M2		Mb	high
Above ground	Gas	It is present continuously, for long periods or frequently	0	1G	II	Ga	very high
		It is likely to occur	1	2G		Gb	high
		It is unlikely to occur or, if it does, is likely to do infrequently and for a short period only	2	3G		Gc	normal
	Dusts	It is present continuously, for long periods or frequently	20	1D		Da	very high
		It is likely to occur	21	2D		Db	high
		It is unlikely to occur or, if it does, is likely to do infrequently and for a short period only	22	3D		Dc	normal



## Protection modes

In order to avoid an explosion caused by the electrical ignition of an explosive atmosphere, it is possible to take different type of precautions:  
 - Isolate the dangerous parts into housing in order to limit the explosion inside itself.  
 - Avoid contact between ignition sources and the potentially explosive atmosphere interposing solid, liquid or gaseous materials.  
 - Take measures in order to limit the generation of dangerous ignition sources, eliminating the possibility of faults or limiting the energy so it's not sufficient to cause the ignition.

For each modality several methods of protection have been developed and standardized, as listed in the following table.

**Table 2 - Protection methods and reference standards**

Protection method	Symbol	Engraving	Zone of utilization GAS	Zone of utilization DUSTS	IEC / EN standards
General requirements	/	/	0, 1, 2	20, 21, 22	IEC 60079-0 EN 60079-0
Oil immersion		Ex o	1.2	/	IEC 60079-6 EN 60079-6
Pressurization		Ex px Ex py Ex pz	1 1 2	21 21 22	IEC 60079-2 EN 60079-2
Powder filling		Ex q	1.2	/	IEC 60079-5 EN 60079-5
Flameproof		Ex d	1.2	/	IEC 60079-1 EN 60079-1
Increased safety		Ex e	1.2	/	IEC 60079-7 EN 60079-7
Intrinsic safety		Ex ia Ex ib Ex ic	0 1 2	20 21 22	IEC 60079-11 EN 60079-11
Encapsulation		Ex ma Ex mb Ex mc	0 1 2	20 21 22	IEC 60079-18 EN 60079-18
Non sparking		Ex nA Ex nC Ex nR	2 2 2	/	IEC 60079-15 EN 60079-15
Protective housing		Ex ta Ex tb Ex tc	/	20 21 22	IEC 60079-31 EN 60079-31
Optical radiation		Ex op	0,1,2	/	IEC 60079-28 EN 60079-28

## Marking examples

### Devices for places with presence of gas

**Ex II 2G Ex ia IIC T6 Gb**

- ① Community marking
- ② Equipment group (see table 1)
- ③ Protection category (see table 1)
- ④ Prefix for safety devices according to the IEC / EN standards
- ⑤ Protection mode (see table 2)
- ⑥ Classification of gases (see table 4)
- ⑦ Temperature class (see table 3)
- ⑧ EPL according to IEC 60079-0 standard (see table 1)

### Devices for places with presence of dusts

**Ex II 3D Ex tc IIIC T80°C Dc**

- ① Community marking
- ② Equipment group (see table 1)
- ③ Protection category (see table 1)
- ④ Prefix for safety devices according to the IEC / EN standards
- ⑤ Protection mode (see table 2)
- ⑥ Classification of dusts (see table 5)
- ⑦ Maximum surface temperature of the equipment
- ⑧ EPL according to IEC 60079-0 standard (see table 1)

## Temperature classes

**Table 3**

Class	T1	T2	T3	T4	T5	T6
Maximum surface temperature of the device	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C

## Classification of gases

**Table 4**  
except standard IEC 505

	I	IIA	IIB	IIC
<b>T1</b>	methane	propane, methane, ethane, benzene, ammoniac, acetic acid, carbon monoxide, methanol, toluene	acrylonitrile	hydrogen
<b>T2</b>		ethanol, amyl acetate, butane	ethylene	acetylene
<b>T3</b>		naphtha, benzene, hexane	hydrogen sulfide	
<b>T4</b>		acetaldehyde	ethyl ether	
<b>T5</b>				
<b>T6</b>				carbon bisulphide

## Classification of dust

**Table 5**

IIIA	IIIB	IIIC
combustible particles	non-conductive powder	conductive powder



### Main features

- Approvals:
  - Category 2G and M2**
- Metal housing, one conduit entry
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings and quality labels:



 **II 2G Ex ia IIC T6 Gb**  
 **I M2 Ex ia I Mb**

### Technical data

#### Housing

Metal housing, baked powder coating  
 One threaded conduit entry:  
 Protection degree:

M20x1.5  
 IP66 according to EN 60529 with  
 cable gland having equal or higher  
 protection degree

#### General data

Ambient temperature: -20°C ... +60°C  
 Max. actuation frequency: 3600 operating cycles<sup>1</sup>/hour  
 Mechanical endurance:  
 F••••-EX• 10 million operating cycles<sup>1</sup>  
 F•••93-EX•, F•••78-EX•, F•••8•-EX•, F•••95-EX• 500.000 operating cycles<sup>1</sup>  
 F•••99-EX•, F•••R2-EX• 250.000 operating cycles<sup>1</sup>  
 Mounting position: any  
 Safety parameters B<sub>10d</sub>(NC contacts):  
 F••••-EX• 20,000,000  
 F•••93-EX•, F•••78-EX•, F•••8•-EX 1,000,000  
 F•••99-EX•, F•••R2-EX• 500,000  
 F•••95-EX• 2,500,000  
 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 20,28:	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 block 5:	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 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, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11.

#### In conformity with the requirements of:

ATEX Directive 94/9/EC  
 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.**

Category	Zone	EPL	Approvals	Product code extension
<b>2G</b>	<b>1</b>	<b>Gb</b>	 <b>II 2G Ex ia IIC T6 Gb</b>	<b>-EX7</b>
<b>M2</b>	<b>M2</b>	<b>Mb</b>	 <b>I M2 Ex ia I Mb</b>	
<b>Electrical data</b>				
Maximum current (I <sub>i</sub> ):			2.1 A	
Maximum voltage (U <sub>i</sub> ):			30 Vdc	
Conditional short circuit current:			1000 A according to EN 60947-5-1	
Protection against short circuits:			fuse 4 A 250 V type gG	
Pollution degree:			3	
 <b>This type of switches must be used only in intrinsic safety circuits in conformity with standard IEC 60079-11, EN 60079-11</b>  <b>For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive</b>				



### Quality marks of the product:



UL approval: E131787  
EAC approval: RU C-IT DM94.B.01024

### Characteristics approved by UL

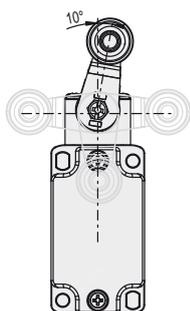
Utilization categories Q300 (69 VA, 125 ... 250 Vdc)  
A600 (720 VA, 120 ... 600 Vac)  
Data of housing type 1, 4X "indoor use only", 12, 13  
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8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

### Adjustable levers

In the switches it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission

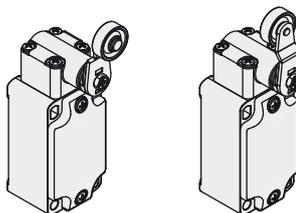


is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

### Overturning levers

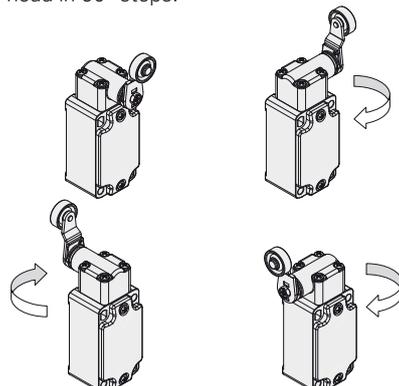
In the switches, the lever can be fastened straight or reversed, maintaining the positive coupling.

This makes it possible to have two different work plans of the lever.



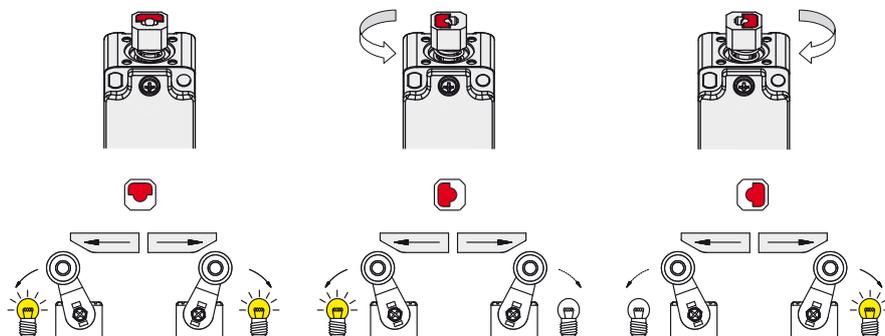
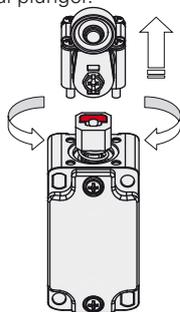
### Orientable heads

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



### 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.



### 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 article  
**FD 502-GM2-EX7**

Housing  
**FD** metal, one conduit entry

Contact blocks  
**5** 1NO+1NC, snap action  
**11** 2NC, snap action  
**12** 2NO, snap action  
**20** 1NO+2NC, slow action  
**21** 3NC, slow action  
**22** 2NO+1NC, slow action

Actuators  
**01** short plunger  
**02** roller lever  
... ..

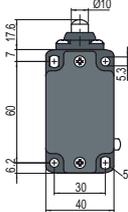
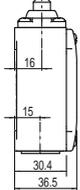
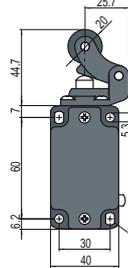
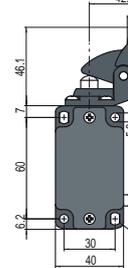
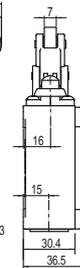
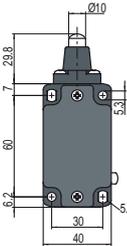
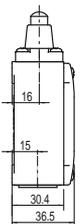
ATEX approval  
**-EX7** Ex II 2G Ex ia IIC T6 Gb  
Ex I M2 Ex ia I Mb

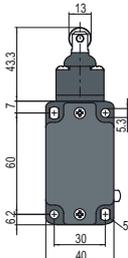
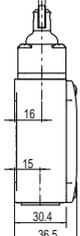
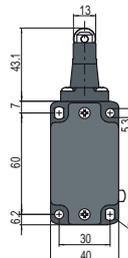
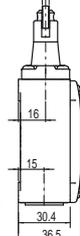
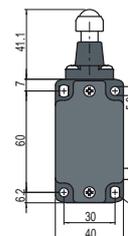
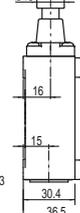
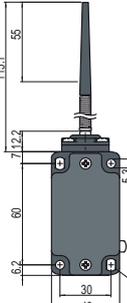
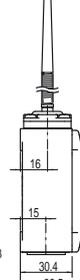
Threaded conduit entry  
**M2** M20x1.5

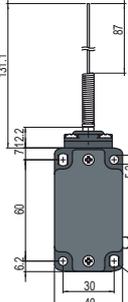
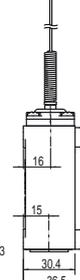
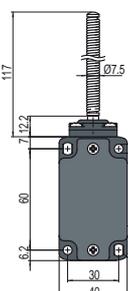
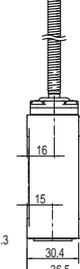
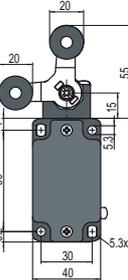
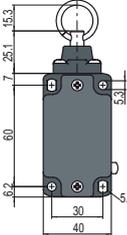
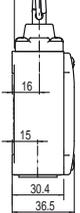
Contact type  
silver contacts (standard)  
**G** silver contacts with 1 µm gold coating

Contact type:

**R** = snap action  
**L** = slow action

		With stainless steel roller on request	With stainless steel roller on request	
 	 	 	 	
Contact blocks				
5 <b>R</b>	FD 501-M2-EX7 $\rightarrow$ 1NO+1NC	FD 502-M2-EX7 $\rightarrow$ 1NO+1NC	FD 505-M2-EX7 $\rightarrow$ 1NO+1NC	FD 511-M2-EX7 $\rightarrow$ 1NO+1NC
20 <b>L</b>	FD 2001-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2002-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2005-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2011-M2-EX7 $\rightarrow$ 1NO+2NC
Max. speed	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s
Min. force	8 N (25 N $\rightarrow$ )	6 N (25 N $\rightarrow$ )	6 N (25 N $\rightarrow$ )	8 N (25 N $\rightarrow$ )
Travel diagrams	page 238 - group 1	page 238 - group 2	page 238 - group 2	page 238 - group 1

	With external rubber gasket		Ball, Ø 12.7 mm, stainless steel	With external rubber gasket
 	 		 	 
Contact blocks				
5 <b>R</b>	FD 515-M2-EX7 $\rightarrow$ 1NO+1NC	FD 516-M2-EX7 $\rightarrow$ 1NO+1NC	FD 519-M2-EX7 $\rightarrow$ 1NO+1NC	FD 520-M2-EX7 1NO+1NC
20 <b>L</b>	FD 2015-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2016-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2019-M2-EX7 $\rightarrow$ 1NO+2NC	FD 2020-M2-EX7 1NO+2NC
Max. speed	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s	1 m/s
Min. force	11 N (25 N $\rightarrow$ )	8 N (25 N $\rightarrow$ )	8 N (25 N $\rightarrow$ )	0.09 Nm
Travel diagrams	page 238 - group 1	page 238 - group 1	page 238 - group 1	page 238 - group 3

	With external rubber gasket	With external rubber gasket	Bistable	Rope switch for signalling
 	 		 	 
Contact blocks				
5 <b>R</b>	FD 521-M2-EX7 1NO+1NC	FD 525-M2-EX7 1NO+1NC	FD 541-M2-EX7 $\rightarrow$ 1NO+1NC	FD 576-M2-EX7 1NO+1NC
20 <b>L</b>	FD 2021-M2-EX7 1NO+2NC	FD 2025-M2-EX7 1NO+2NC		FD 2076-M2-EX7 2NO+1NC
Max. speed	1 m/s	1 m/s	0.5 m/s with cam at 30°	0.5 m/s
Min. force	0.08 Nm	0.14 Nm	0.21 Nm (0.36 Nm $\rightarrow$ )	initial 20 N - final 40 N
Travel diagrams	page 238 - group 3	page 238 - group 3	page 238 - group 4	page 238 - group 6

All measures in the drawings are in mm

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IIC T6 Gb	2G	1	Gb
	 I M2 Ex ia I Mb	M2	M2	Mb

Accessories See page 225

$\rightarrow$  The 2D/3D files are available at [www.pizzato.com](http://www.pizzato.com)



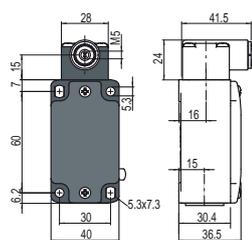
## Position switches with revolving lever without actuator

All measures in the drawings are in mm

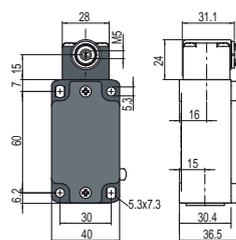
Contact type:

**R** = snap action  
**L** = slow action

Regular head



Compact head

**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.

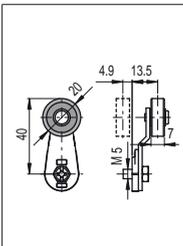
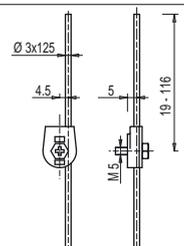
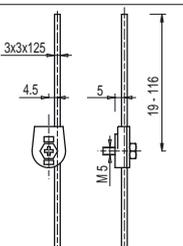
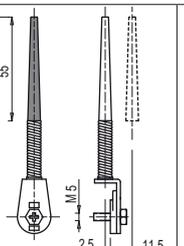
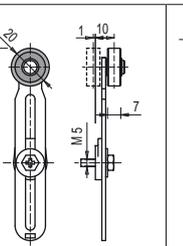
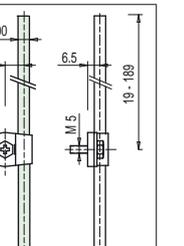
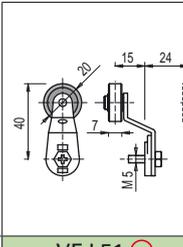
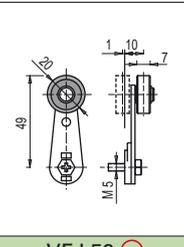
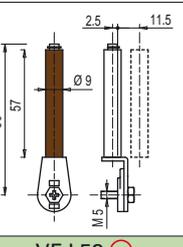
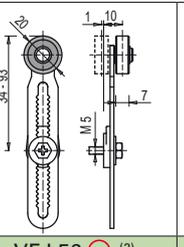
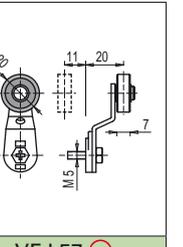
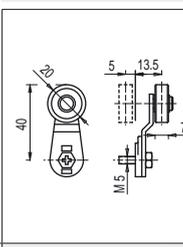
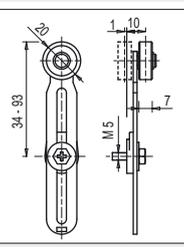
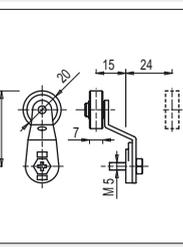
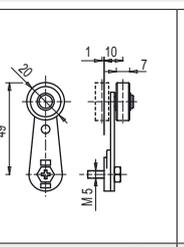
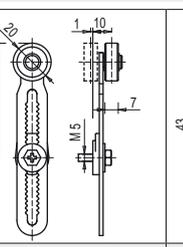
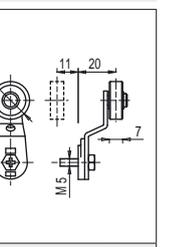
Contact blocks

5	<b>R</b>	FD 538-M2-EX7 	1NO+1NC	FD 558-M2-EX7 	1NO+1NC
20	<b>L</b>	FD 2038-M2-EX7 	1NO+2NC	FD 2058-M2-EX7 	1NO+2NC
Min. force		0,1 Nm (0,25 Nm  )		0,06 Nm (0,25 Nm  )	
Travel diagrams		page 238 - group 4		page 238 - group 4	

## Loose actuators

All measures in the drawings are in mm

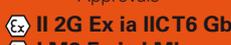
**IMPORTANT:** These loose actuators can be used with items of the FD series only.

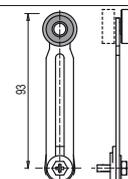
	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod with pointed end	Adjustable actuator with technopolymer roller	Adjustable fiber glass rod
						
Article	<b>VF L31</b> 	<b>VF L32</b> <sup>(2)</sup>	<b>VF L33</b> <sup>(2)</sup>	<b>VF L34</b>	<b>VF L35</b>  <sup>(1) (2)</sup>	<b>VF L36</b> <sup>(2)</sup>
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1 m/s	1.5 m/s (cam at 30°)	1.5 m/s
	Technopolymer roller Ø 20 mm	Technopolymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with technopolymer roller	Technopolymer roller Ø 20 mm	
						
Article	<b>VF L51</b> 	<b>VF L52</b> 	<b>VF L53</b> 	<b>VF L56</b>  <sup>(2)</sup>	<b>VF L57</b> 	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	0.5 m/s	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	
Stainless steel rollers, Ø 20 mm						
						
Article	<b>VF L31-R24</b> 	<b>VF L35-R24</b>  <sup>(1) (2)</sup>	<b>VF L51-R24</b> 	<b>VF L52-R24</b> 	<b>VF L56-R24</b>  <sup>(2)</sup>	<b>VF L57-R24</b> 
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- <sup>(1)</sup> 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.

- <sup>(2)</sup> If installed with switch FD •58-M2-EX7 (e.g. FD 558-M2-EX7, FD 658-M2-EX7...) 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.

Code	Approvals	Category	Zone	EPL
-EX7		2G	1	Gb
		M2	M2	Mb

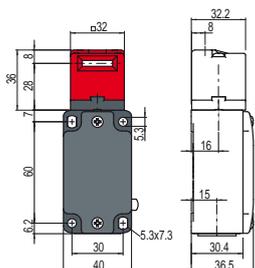
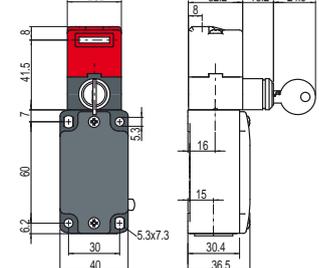
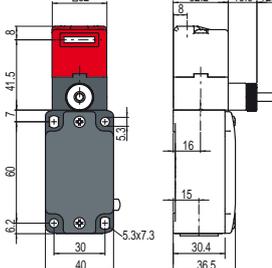
Items with code on **green** background are stock items

Accessories See page 225

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

## Safety switches with separate actuator

All measures in the drawings are in mm

Contact type:  = slow action	Switches with separate actuator	Switches with separate actuator and key release	Switches with manual mechanical delay
	Switches without actuator	Switches without actuator	Switches without actuator
			
Contact blocks			
20 	FD 2093-M2-EX7  1NO+2NC	FD 2099-M2-EX7  1NO+2NC	FD 20R2-M2-EX7  1NO+2NC
28 		FD 2899-M2-EX7  1NO+2NC	
Min. force Travel diagrams Gen. Cat. Safety	10 N (18 N  ) page 21	30 N (40 N  ) page 140	10 N (18 N  ) page 132

## Actuators



VF KEYF

VF KEYF1

VF KEYF2

VF KEYF3

VF KEYF7

VF KEYF8

Straight actuator

Angled actuator

Swivelling actuator

Actuator adjustable in  
two directionsActuator adjustable in  
one direction

Universal actuator

**IMPORTANT:** These actuators can be used with items of the FD series only (e.g. FD 2093-M2-EX7).  
Low level coded actuators according to EN ISO 14119.

## Safety switches for hinges

All measures in the drawings are in mm

Contact type:  = slow action	Switches with separate actuator
Contact blocks	
20 	FD 2095-M2-EX7  1NO+2NC
Min. force Travel diagrams Gen. Cat. Safety	0,15 Nm (0,4 Nm  ) page 75

 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.

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IIC T6 Gb  I M2 Ex ia I Mb	2G M2	1 M2	Gb Mb

Items with code on green background are stock items

Accessories See page 225

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

## Safety rope switch with reset for emergency stops

All measures in the drawings are in mm

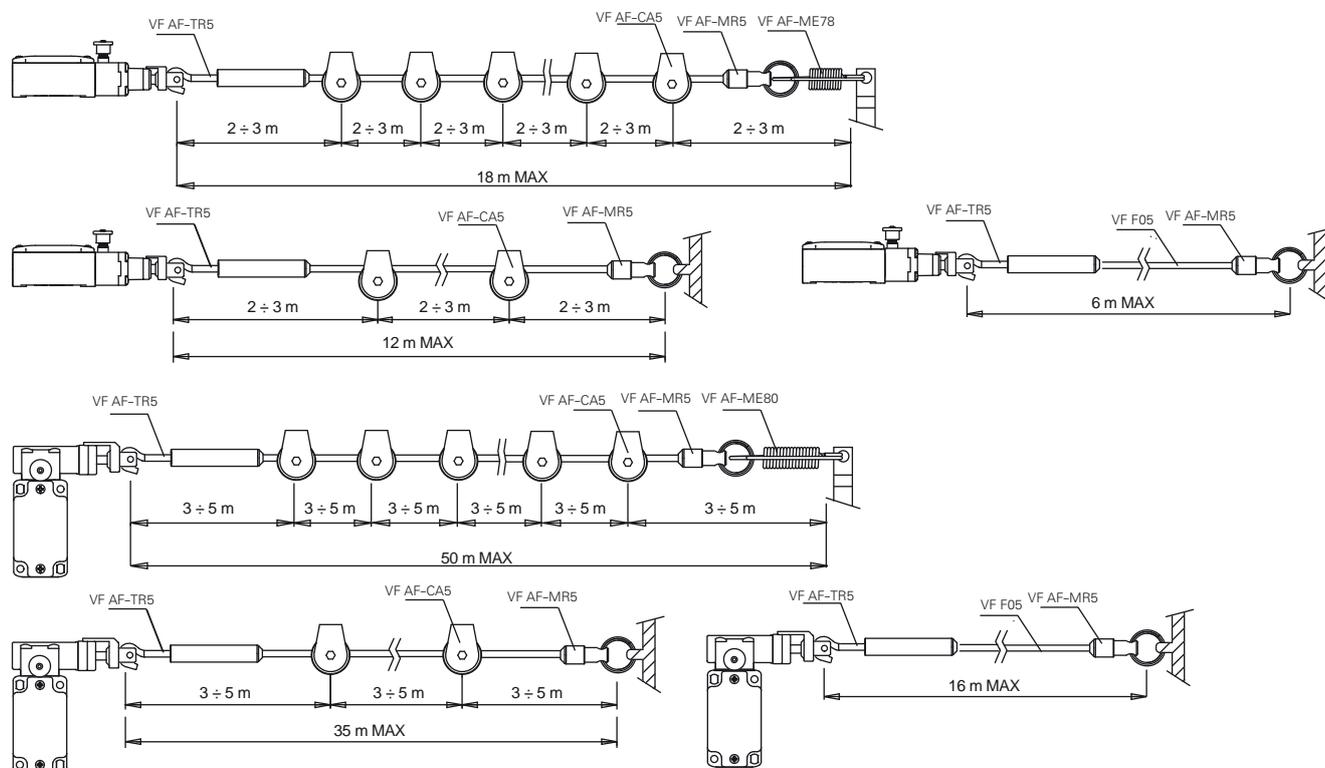
Contact type:	FD 2078-M2-EX7		FD 2083-M2-EX7		FD 2084-M2-EX7	
Contact blocks [L] = slow action						
Contact blocks	20 [L] FD 2078-M2-EX7 $\rightarrow$ 1NO+2NC		FD 2083-M2-EX7 $\rightarrow$ 1NO+2NC		FD 2084-M2-EX7 $\rightarrow$ 1NO+2NC	
Min. force	initial 63 N...final 83 N (90 N $\rightarrow$ )		initial 147 N...final 235 N (250 N $\rightarrow$ )		initial 147 N...final 235 N (250 N $\rightarrow$ )	
Travel diagrams Gen. Cat. Safety	page 171 - group 1		page 171 - group 2		page 171 - group 2	

## Accessories for rope installation

VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR03	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley	Angular pulley, stainless steel

## Application examples and max. rope length

All measures in the drawings are in mm



⚠ 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.

Code	Approvals	Category	Zone	EPL
-EX7	 	2G M2	1 M2	Gb Mb

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

**Accessories** See page 225

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



### Main features

- Approvals:  
**Category 2G and M2**
- Metal housing, three conduit entries
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings and quality labels:



 **II 2G Ex ia IIC T6 Gb**  
 **I M2 Ex ia I Mb**

### Technical data

#### Housing

Metal housing, baked powder coating  
Three threaded conduit entries: M20x1.5  
Protection degree: IP66 according to EN 60529 with cable gland having equal or higher protection degree

#### General data

Ambient temperature: -20°C ... +60°C  
Max. actuation frequency: 3600 operating cycles<sup>1</sup>/hour  
Mechanical endurance:  
F••••-EX• 10 million operating cycles<sup>1</sup>  
F•••93-EX•, F•••78-EX•, F•••8•-EX•, F•••95-EX• 500.000 operating cycles<sup>1</sup>  
Mounting position: any  
Safety parameters B<sub>10d</sub>(NC contacts):  
F••••-EX• 20,000,000  
F•••93-EX•, F•••78-EX•, F•••8•-EX 1,000,000  
F•••95-EX• 2,500,00  
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 block 20:	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 block 5:	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 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, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11.

#### In conformity with the requirements of:

ATEX Directive 94/9/EC  
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.**

Category	Zone	EPL	Approvals	Product code extension
<b>2G</b>	<b>1</b>	<b>Gb</b>	 <b>II 2G Ex ia IIC T6 Gb</b>	<b>-EX7</b>
<b>M2</b>	<b>M2</b>	<b>Mb</b>	 <b>I M2 Ex ia I Mb</b>	
<b>Electrical data</b>				
Maximum current (I <sub>i</sub> ):			2.1 A	
Maximum voltage (U <sub>i</sub> ):			30 Vdc	
Conditional short circuit current:			1000 A according to EN 60947-5-1	
Protection against short circuits:			fuse 4 A 250 V type gG	
Pollution degree:			3	
<p> <b>This type of switches must be used only in intrinsic safety circuits in conformity with standard IEC 60079-11, EN 60079-11</b></p> <p> <b>For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive</b></p>				



### Quality marks of the product:



UL approval: E131787  
EAC approval: RU C-IT DM94.B.01024

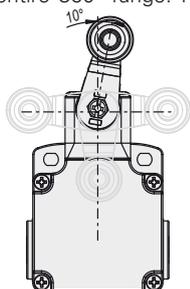
### Characteristics approved by UL

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.

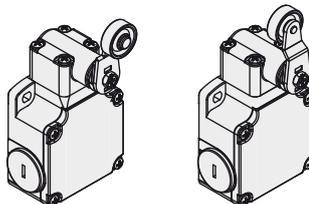
### Adjustable levers

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.



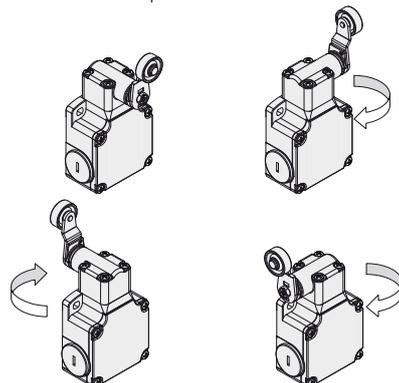
### Overturning levers

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.



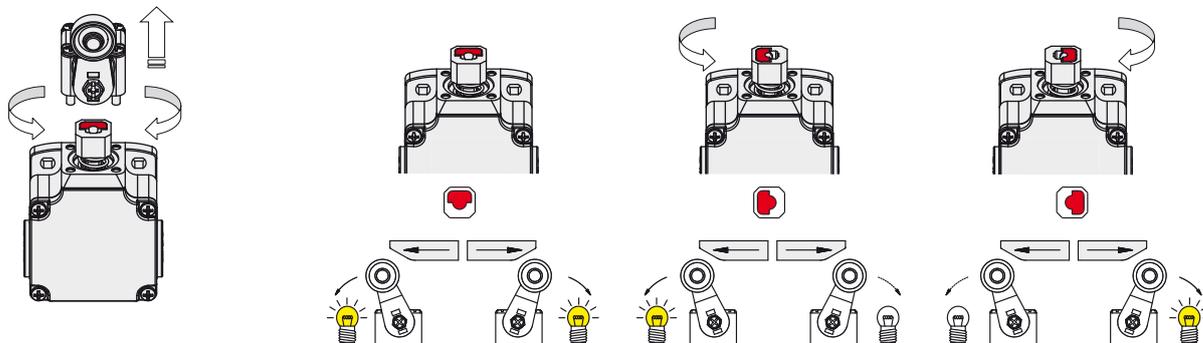
### Orientable heads

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



### 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).



### 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 article  
**FL 502-GM2-EX7**

Housing  
**FL** metal, three conduit entries

Contact blocks  
**5** 1NO+1NC, snap action  
**11** 2NC, snap action  
**12** 2NO, snap action  
**20** 1NO+2NC, slow action  
**21** 3NC, slow action  
**22** 2NO+1NC, slow action

Actuators  
**01** short plunger  
**02** roller lever  
... ..

ATEX approval  
**-EX7** Ex II 2G Ex ia IIC T6 Gb  
Ex I M2 Ex ia I Mb

Threaded conduit entry  
**M2** M20x1.5

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

Contact type:

**R** = snap action  
**L** = slow action

Contact blocks

	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request
5 <b>R</b>	FL 501-M2-EX7 $\rightarrow$ 1NO+1NC	FL 502-M2-EX7 $\rightarrow$ 1NO+1NC	FL 505-M2-EX7 $\rightarrow$ 1NO+1NC
20 <b>L</b>	FL 2001-M2-EX7 $\rightarrow$ 1NO+2NC	FL 2002-M2-EX7 $\rightarrow$ 1NO+2NC	FL 2005-M2-EX7 $\rightarrow$ 1NO+2NC
Max. speed	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Min. force	8 N (25 N $\rightarrow$ )	6 N (25 N $\rightarrow$ )	6 N (25 N $\rightarrow$ )
Travel diagrams	page 238 - group 1	page 238 - group 2	page 238 - group 2

Contact blocks

	With external rubber gasket	Ball, $\text{Ø}$ 12.7 mm, stainless steel	With external rubber gasket
5 <b>R</b>	FL 515-M2-EX7 $\rightarrow$ 1NO+1NC	FL 516-M2-EX7 $\rightarrow$ 1NO+1NC	FL 519-M2-EX7 $\rightarrow$ 1NO+1NC
20 <b>L</b>	FL 2015-M2-EX7 $\rightarrow$ 1NO+2NC	FL 2016-M2-EX7 $\rightarrow$ 1NO+2NC	FL 2019-M2-EX7 $\rightarrow$ 1NO+2NC
Max. speed	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s
Min. force	11 N (25 N $\rightarrow$ )	8 N (25 N $\rightarrow$ )	8 N (25 N $\rightarrow$ )
Travel diagrams	page 238 - group 1	page 238 - group 1	page 238 - group 1

Contact blocks

	With external rubber gasket	With external rubber gasket	Bistable	Rope switch for signalling
5 <b>R</b>	FL 521-M2-EX7 1NO+1NC	FL 525-M2-EX7 1NO+1NC	FL 541-M2-EX7 $\rightarrow$ 1NO+1NC	FL 576-M2-EX7 1NO+1NC
20 <b>L</b>	FL 2021-M2-EX7 1NO+2NC	FL 2025-M2-EX7 1NO+2NC		FL 2076-M2-EX7 2NO+1NC
Max. speed	1 m/s	1 m/s	0.5 m/s with cam at 30°	0.5 m/s
Min. force	0.08 Nm	0.14 Nm	0.21 Nm (0.36 Nm $\rightarrow$ )	initial 20 N - final 40 N
Travel diagrams	page 238 - group 3	page 238 - group 3	page 238 - group 4	page 238 - group 6

All measures in the drawings are in mm

Code	Approvals	Category	Zone	EPL
-EX7	$\text{Ex}$ II 2G Ex ia IIC T6 Gb $\text{Ex}$ I M2 Ex ia I Mb	2G M2	1 M2	Gb Mb

Accessories See page 225

 $\rightarrow$  The 2D/3D files are available at [www.pizzato.com](http://www.pizzato.com)



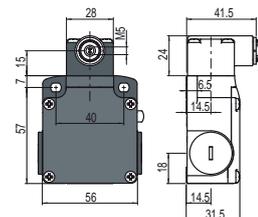
## Position switches with revolving lever without actuator

All measures in the drawings are in mm

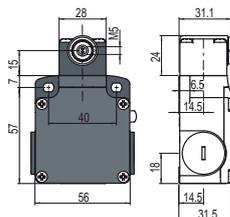
Contact type:

**R** = snap action  
**L** = slow action

Regular head



Compact head

**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.

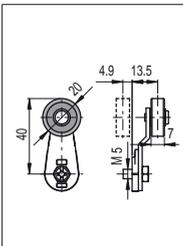
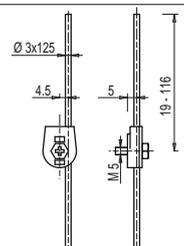
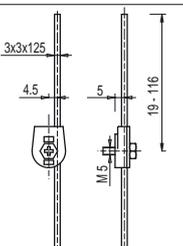
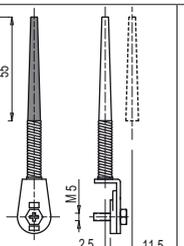
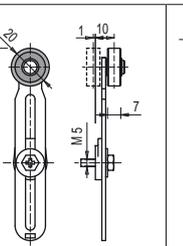
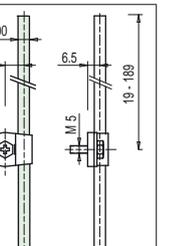
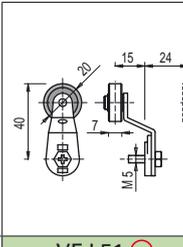
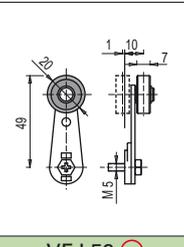
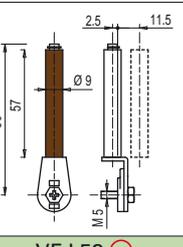
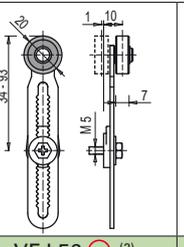
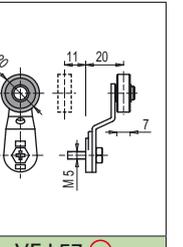
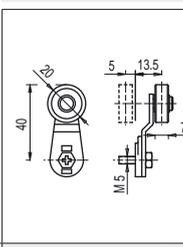
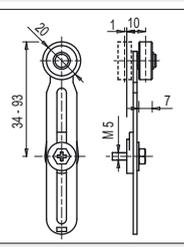
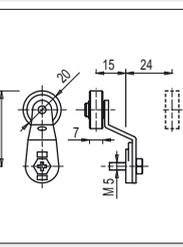
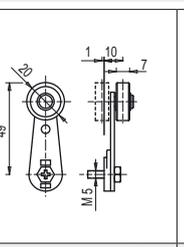
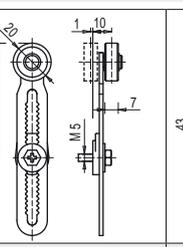
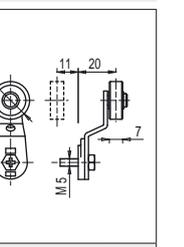
Contact blocks

5	<b>R</b>	<b>FL 538-M2-EX7</b> 	1NO+1NC	<b>FL 558-M2-EX7</b> 	1NO+1NC
20	<b>L</b>	<b>FL 2038-M2-EX7</b> 	1NO+2NC	<b>FL 2058-M2-EX7</b> 	1NO+2NC
Min. force		0,1 Nm (0,25 Nm  )		0,06 Nm (0,25 Nm  )	
Travel diagrams		page 238 - group 4		page 238 - group 4	

## Loose actuators

All measures in the drawings are in mm

**IMPORTANT:** These loose actuators can be used with items of the FL series only.

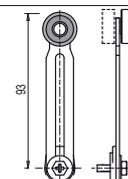
	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod, 3x3x125 mm	Flexible rod with pointed end	Adjustable actuator with technopolymer roller	Adjustable fiber glass rod
						
Article	<b>VF L31</b> 	<b>VF L32</b> <sup>(2)</sup>	<b>VF L33</b> <sup>(2)</sup>	<b>VF L34</b>	<b>VF L35</b>  <sup>(1) (2)</sup>	<b>VF L36</b> <sup>(2)</sup>
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1 m/s	1.5 m/s (cam at 30°)	1.5 m/s
	Technopolymer roller Ø 20 mm	Technopolymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with technopolymer roller	Technopolymer roller Ø 20 mm	
						
Article	<b>VF L51</b> 	<b>VF L52</b> 	<b>VF L53</b> 	<b>VF L56</b>  <sup>(2)</sup>	<b>VF L57</b> 	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	0.5 m/s	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	
Stainless steel rollers, Ø 20 mm						
						
Article	<b>VF L31-R24</b> 	<b>VF L35-R24</b>  <sup>(1) (2)</sup>	<b>VF L51-R24</b> 	<b>VF L52-R24</b> 	<b>VF L56-R24</b>  <sup>(2)</sup>	<b>VF L57-R24</b> 
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- <sup>(1)</sup> 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.

- <sup>(2)</sup> If installed with switch FL •58-M2-EX7 (e.g. FL 558-M2-EX7, FL 658-M2-EX7...) 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.

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IICT6 Gb	2G	1	Gb
	 I M2 Ex ia I Mb	M2	M2	Mb

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

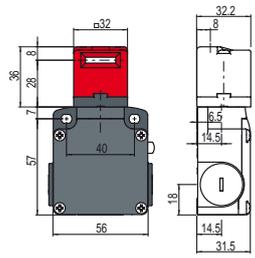
Accessories See page 225

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

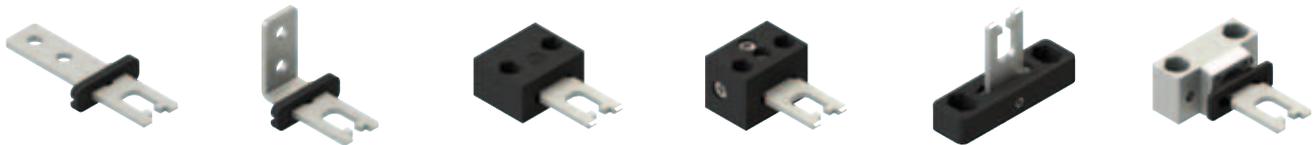
**Safety switches with separate actuator**

All measures in the drawings are in mm

Contact type:  
 L = slow action

Switches with separate actuator	
Switches without actuator	
	
Contact blocks	
20 <input type="checkbox"/> L	<b>FL 2093-M2-EX7</b> 1NO+2NC
Min. force	10 N (18 N  )
Travel diagrams	page 21
Gen. Cat. Safety	

**Actuators**



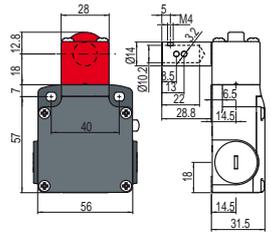
VF KEYF	VF KEYF1	VF KEYF2	VF KEYF3	VF KEYF7	VF KEYF8
Straight actuator	Angled actuator	Swivelling actuator	Actuator adjustable in two directions	Actuator adjustable in one direction	Universal actuator

**IMPORTANT:** These actuators can be used with items of the FL series only (e.g. FL 2093-M2-EX7).  
 Low level coded actuators according to EN ISO 14119.

**Safety switches for hinges**

All measures in the drawings are in mm

Contact type:  
 L = slow action

	
Contact blocks	
20 <input type="checkbox"/> L	<b>FL 2095-M2-EX7</b>  1NO+2NC
Min. force	0,15 Nm (0,4 Nm  )
Travel diagrams	page 75
Gen. Cat. Safety	

 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.

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IIC T6 Gb	2G	1	Gb
	 I M2 Ex ia I Mb	M2	M2	Mb

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

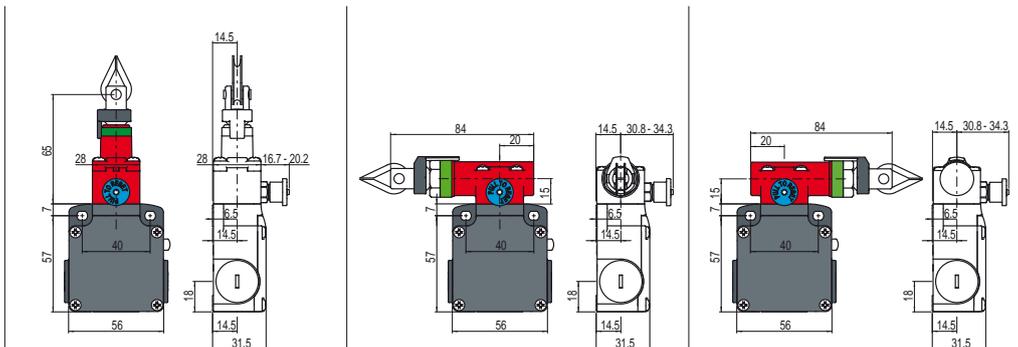
**Accessories** See page 225

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

**Safety rope switch with reset for emergency stops**

All measures in the drawings are in mm

Contact type:

**L** = slow action


Contact blocks

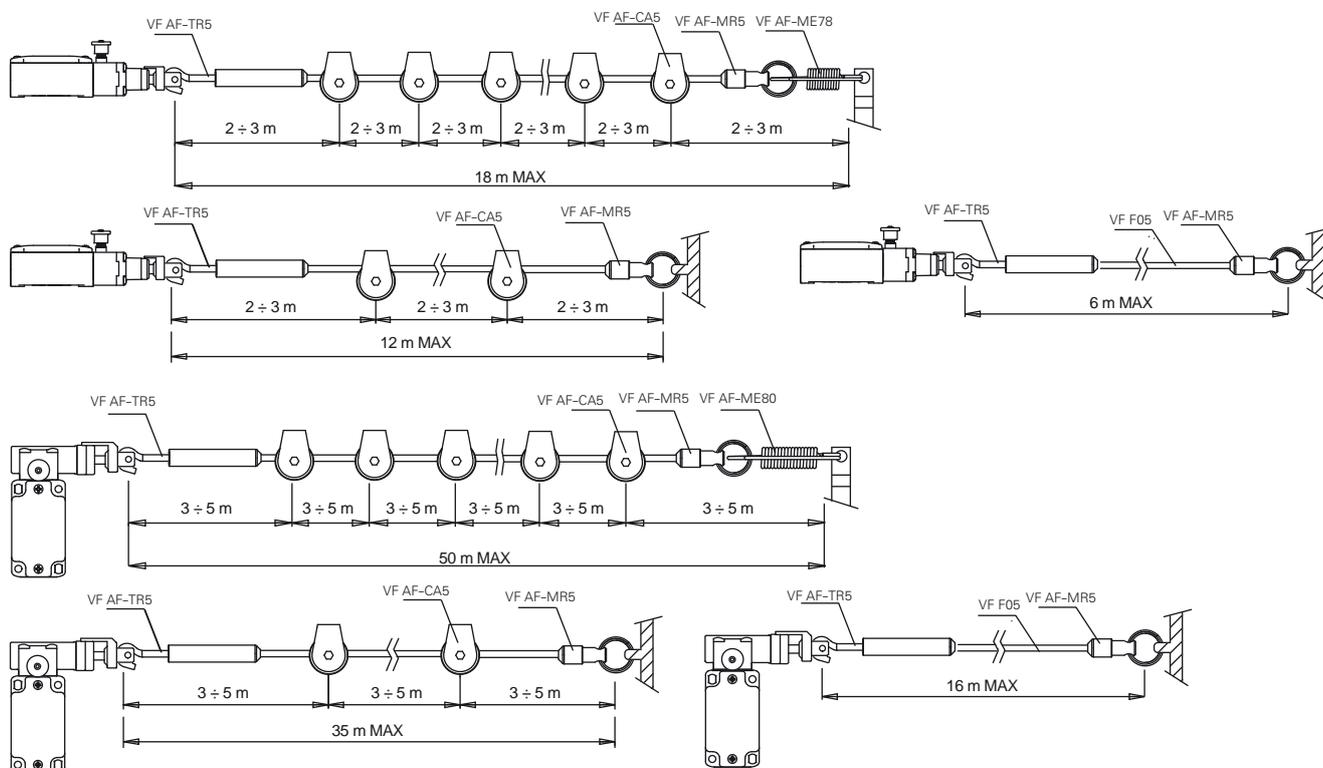
20	<b>L</b>	<b>FL 2078-M2-EX7</b> 1NO+2NC	<b>FL 2083-M2-EX7</b> 1NO+2NC	<b>FL 2084-M2-EX7</b> 1NO+2NC
Min. force		initial 63 N...final 83 N (90 N )	initial 147 N...final 235 N (250 N )	initial 147 N...final 235 N (250 N )
Travel diagrams		page 171 - group 1	page 171 - group 2	page 171 - group 2
Gen. Cat. Safety				

**Accessories for rope installation**


<b>VF AF-TR5</b>	<b>VF AF-TR8</b>	<b>VF AF-MR5</b>	<b>VF AF-ME78</b>	<b>VF AF-ME80</b>	<b>VF F05-100</b>	<b>VF AF-IF1GR03</b>	<b>VF AF-CA5</b>	<b>VF AF-CA10</b>
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley	Angular pulley, stainless steel

**Application examples and max. rope length**

All measures in the drawings are in mm



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.

Code	Approvals	Category	Zone	EPL
<b>-EX7</b>	II 2G Ex ia IIC T6 Gb	<b>2G</b>	<b>1</b>	<b>Gb</b>
	I M2 Ex ia I Mb	<b>M2</b>	<b>M2</b>	<b>Mb</b>

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

**Accessories** See page 225

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



### Main features

- Approvals:  
**Category 2G and M2**
- Metal housing, one conduit entry
- Protection degree IP67
- Versions with gold-plated silver contacts

### ATEX markings and quality labels:



 **II 2G Ex ia IIC T6 Gb**

 **I M2 Ex ia I Mb**

### Technical data

#### Housing

Metal housing, baked powder coating

One threaded conduit entry:

Protection degree:

M20x1.5

IP67 according to EN 60529 with cable gland having equal or higher protection degree

#### General data

Ambient temperature:

-20°C ... +60°C

Max. actuation frequency:

3600 operating cycles<sup>1</sup>/hour

Mechanical endurance:

F • • • • -EX •

10 million operating cycles<sup>1</sup>

F • • • C • -EX •, F • • • 96-EX •

500.000 operating cycles<sup>1</sup>

Mounting position:

any

Safety parameters B<sub>10d</sub>(NC contacts):

F • • • • -EX •

20,000,000

F • • • C • -EX •

1,000,000

F • • • 96-EX •

2,500,000

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 block 20:

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 block 5:

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 conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11.

#### In conformity with the requirements of:

ATEX Directive 94/9/EC

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 240. 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.**

Category	Zone	EPL	Approvals	Product code extension
<b>2G</b>	<b>1</b>	<b>Gb</b>	 <b>II 2G Ex ia IIC T6 Gb</b>	<b>-EX7</b>
<b>M2</b>	<b>M2</b>	<b>Mb</b>	 <b>I M2 Ex ia I Mb</b>	
<b>Electrical data</b>				
Maximum current (I <sub>i</sub> ):			2.1 A	
Maximum voltage (U <sub>i</sub> ):			30 Vdc	
Conditional short circuit current:			1000 A according to EN 60947-5-1	
Protection against short circuits:			fuse 4 A 250 V type gG	
Pollution degree:			3	
 <b>This type of switches must be used only in intrinsic safety circuits in conformity with standard IEC 60079-11, EN 60079-11</b>  <b>For the correct utilization of the switch use cable glands suitable for the zone according to the ATEX directive</b>				

**Quality marks of the product:**


UL approval: E131787  
 EAC approval: RU C-IT DM94.B.01024

**Characteristics approved by UL**

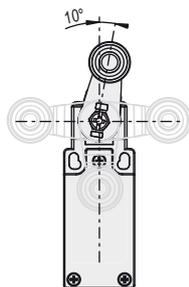
Utilization categories Q300 (69 VA, 125 ... 250 Vdc)  
 A600 (720 VA, 120 ... 600 Vac)  
 Data of housing type 1, 4X "indoor use only", 12, 13  
 For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in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

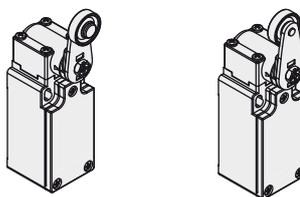
Please contact our technical service for the list of approved products.

**Adjustable levers**

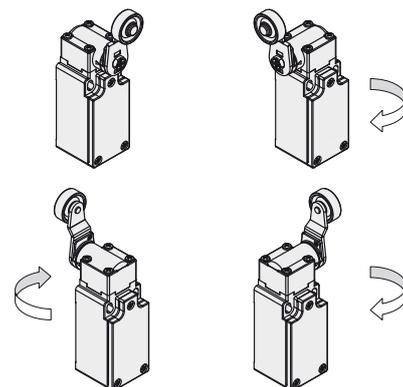
In the switches it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.


**Overturning levers**

In the switches, 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.


**Orientable heads**

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


**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 article  
**FM 502-GM2-EX7**

**Housing**  
**FM** metal, one conduit entry

**Contact blocks**  
**5** 1NO+1NC, snap action  
**11** 2NC, snap action  
**12** 2NO, snap action  
**20** 1NO+2NC, slow action  
**21** 3NC, slow action  
**22** 2NO+1NC, slow action

**Actuators**  
**01** short plunger  
**02** roller lever  
 ... ..

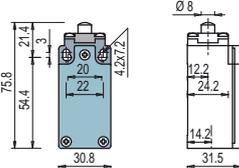
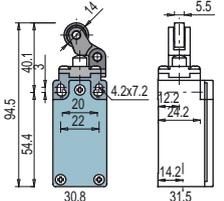
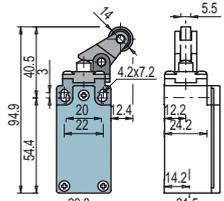
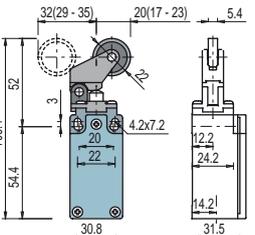
**ATEX approval**  
**-EX7** II 2G Ex ia IIC T6 Gb  
 I M2 Ex ia I Mb

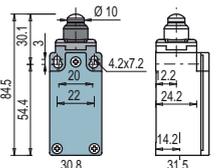
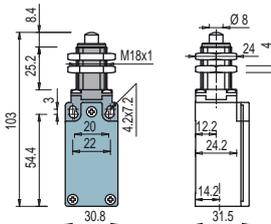
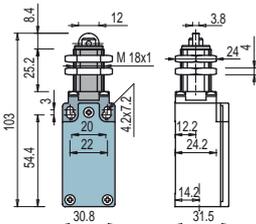
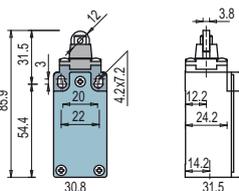
**Threaded conduit entry**  
**M2** M20x1.5

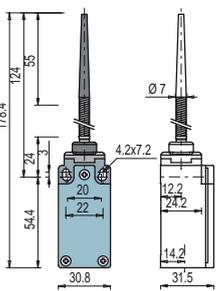
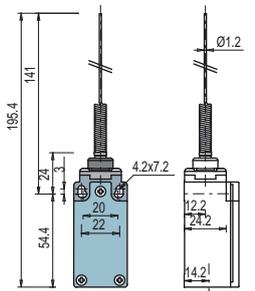
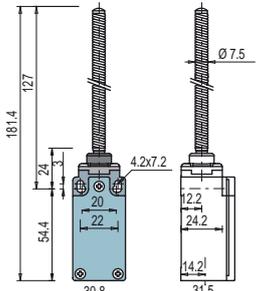
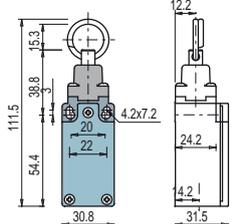
**Contact type**  
 silver contacts (standard)  
**G** silver contacts with 1 µm gold coating

Contact type:

**R** = snap action  
**L** = slow action

		With stainless steel roller on request	With stainless steel roller on request	
Contact blocks				
5 <b>R</b>	<b>FM 501-M2-EX7</b>  1NO+1NC	<b>FM 502-M2-EX7</b>  1NO+1NC	<b>FM 505-M2-EX7</b>  1NO+1NC	<b>FM 507-M2-EX7</b>  1NO+1NC
20 <b>L</b>	<b>FM 2001-M2-EX7</b>  1NO+2NC	<b>FM 2002-M2-EX7</b>  1NO+2NC	<b>FM 2005-M2-EX7</b>  1NO+2NC	<b>FM 2007-M2-EX7</b>  1NO+2NC
Max. speed	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Min. force	8 N (25 N  )	6 N (25 N  )	6 N (25 N  )	4 N (25 N  )
Travel diagrams	page 240 - group 1	page 240 - group 2	page 240 - group 2	page 240 - group 3

	With external rubber gasket			
Contact blocks				
5 <b>R</b>	<b>FM 508-M2-EX7</b>  1NO+1NC	<b>FM 512-M2-EX7</b>  1NO+1NC	<b>FM 513-M2-EX7</b>  1NO+1NC	<b>FM 515-M2R28-EX7</b>  1NO+1NC
20 <b>L</b>	<b>FM 2008-M2-EX7</b>  1NO+2NC	<b>FM 2012-M2-EX7</b>  1NO+2NC	<b>FM 2013-M2-EX7</b>  1NO+2NC	<b>FM 2015-M2R28-EX7</b>  1NO+2NC
Max. speed	0.5 m/s	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Min. force	8 N (25 N  )	8 N (25 N  )	8 N (25 N  )	8 N (25 N  )
Travel diagrams	page 240 - group 1			

	With external rubber gasket	With external rubber gasket	With external rubber gasket	Rope switch for signalling
Contact blocks				
5 <b>R</b>	<b>FM 520-M2-EX7</b> 1NO+1NC	<b>FM 521-M2-EX7</b> 1NO+1NC	<b>FM 525-M2-EX7</b> 1NO+1NC	<b>FM 576-M2-EX7</b> 1NO+1NC
20 <b>L</b>	<b>FM 2020-M2-EX7</b> 1NO+2NC	<b>FM 2021-M2-EX7</b> 1NO+2NC	<b>FM 2025-M2-EX7</b> 1NO+2NC	<b>FM 2076-M2-EX7</b> 2NO+1NC
Max. speed	1 m/s	1 m/s	1 m/s	0.5 m/s
Min. force	0.06 Nm	0.04 Nm	0.11 Nm	initial 20 N - final 40 N
Travel diagrams	page 240 - group 4	page 240 - group 4	page 240 - group 4	page 240 - group 7

All measures in the drawings are in mm

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IIC T6 Gb	2G	1	Gb
	 I M2 Ex ia I Mb	M2	M2	Mb

Accessories See page 225

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

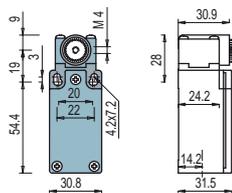


### Position switches with revolving lever without actuator

All measures in the drawings are in mm

Contact type:

- R** = snap action
- L** = slow action



#### 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.

Contact blocks

5	<b>R</b>	<b>FM 538-M2-EX7</b>	1NO+1NC
20	<b>L</b>	<b>FM 2038-M2-EX7</b>	1NO+2NC
Min. force		0,06 Nm (0,25 Nm	
Travel diagrams		page 240 - group 5	

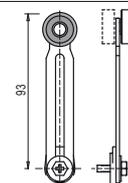
### Loose actuators

All measures in the drawings are in mm

**IMPORTANT:** These loose actuators can be used with items of the FM series only.

	Roller, Ø 18 mm	Roller, Ø 18 mm	Adjustable square rod, 3x3x125 mm	Flexible rod with pointed end	Adjustable round rod Ø 3x125 mm	Technopolymer roller Ø 20 mm	
Article	<b>VF LE30</b>	<b>VF LE31</b>	<b>VF LE33</b>	<b>VF LE34</b>	<b>VF LE50</b>	<b>VF LE51</b>	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1.5 m/s	1.5 m/s (cam at 30°)	
	Technopolymer roller Ø 20 mm	Porcelain roller	Technopolymer roller Ø 20 mm	Adjustable actuator with technopolymer roller	Adjustable safety actuator with technopolymer roller	Technopolymer roller Ø 20 mm	Adjustable fiber glass rod
Article	<b>VF LE52</b>	<b>VF LE53</b>	<b>VF LE54</b>	<b>VF LE55</b> <sup>(1)</sup>	<b>VF LE56</b>	<b>VF LE57</b>	<b>VF LE69</b>
Max. speed	1.5 m/s (cam at 30°)	0.5 ms	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s
Stainless steel rollers, Ø 20 mm							
Article	<b>VF LE31-R24</b>	<b>VF LE51-R24</b>	<b>VF LE52-R24</b>	<b>VF LE54-R24</b>	<b>VF LE55-R24</b> <sup>(1)</sup>	<b>VF LE56-R24</b>	<b>VF LE57-R24</b>
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- <sup>(1)</sup> Actuator VF LE55 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 LE56.



Code	Approvals	Category	Zone	EPL
-EX7	II 2G Ex ia IIC T6 Gb	2G	1	Gb
	I M2 Ex ia I Mb	M2	M2	Mb

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

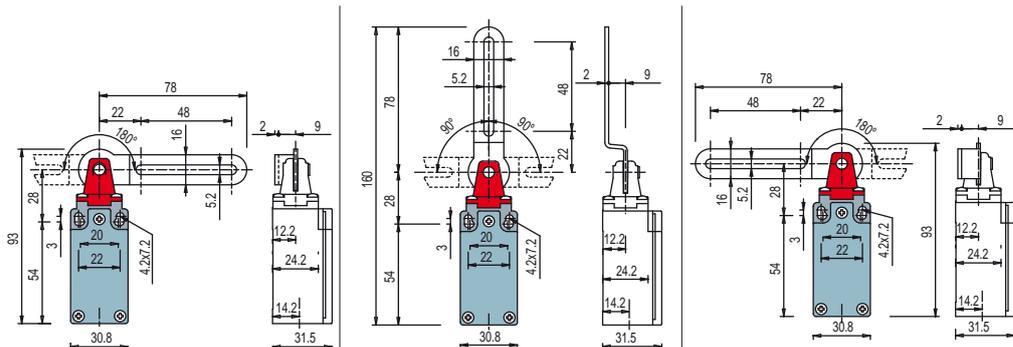
Accessories See page 225

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

**Safety switches with slotted hole lever**

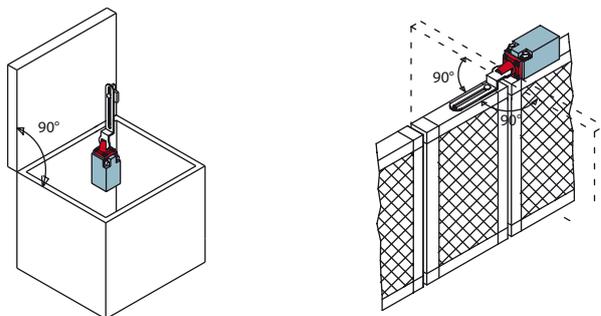
All measures in the drawings are in mm

Contact type:  
 = slow action



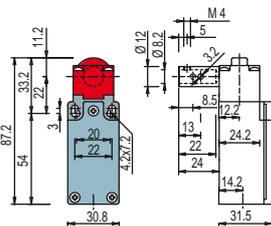
Contact blocks	FM 20C1-M2-EX7  1NO+2NC	FM 20C2-M2-EX7  1NO+2NC	FM 20C3-M2-EX7  1NO+2NC
Min. force	11 N (15 N  )	11 N (15 N  )	11 N (15 N  )
Travel diagrams	page 242 - group 10	page 242 - group 11	page 242 - group 10

**Application examples**



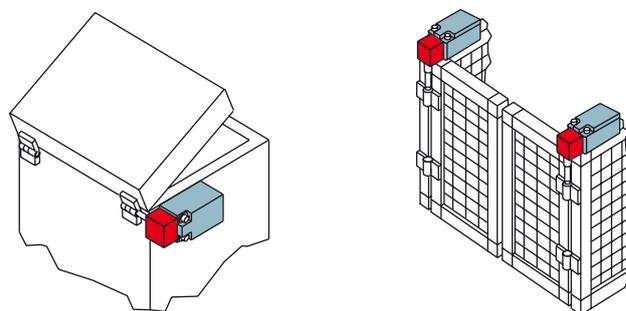
**Safety switches for hinges**

Contact type:  
 = slow action



Contact blocks	FM 2096-M2-EX7  1NO+2NC
Min. force	0,15 Nm (0,4 Nm  )
Travel diagrams	page 242 - group 9

**Application examples**



 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.

Code	Approvals	Category	Zone	EPL
-EX7	 II 2G Ex ia IIC T6 Gb	2G	1	Gb
	 I M2 Ex ia I Mb	M2	M2	Mb

Accessories See page 225

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





### Main features

- Approvals: **2D category**
- Metal housing, one conduit entry
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings and quality labels:



 II 2D Ex tb IIIC T80°C Db

### Technical data

#### Housing

Metal housing, baked powder coating

One threaded conduit entry:

Protection degree:

M20x1.5

IP66 according to EN 60529 with cable gland having equal or higher protection degree

#### General data

Ambient temperature:

-20°C ... +70°C

Max. actuation frequency:

3600 operating cycles<sup>1</sup>/hour

Mechanical endurance:

F••••-EX•

10 million operating cycles<sup>1</sup>

F•••93-EX•, F•••78-EX•, F•••8•-EX•, F•••95-EX•

500.000 operating cycles<sup>1</sup>

F•••99-EX•, F•••R2-EX•

250.000 operating cycles<sup>1</sup>

Mounting position:

any

Safety parameters B<sub>10d</sub>(NC contacts):

F••••-EX•

20,000,000

F•••93-EX•, F•••78-EX•, F•••8•-EX•

1,000,000

F•••99-EX•, F•••R2-EX•

500,000

F•••95-EX•

2,500,00

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 20,28:

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 block 5:

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 conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-31, EN 60079-31.

#### In conformity with the requirements of:

ATEX Directive 94/9/EC

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.**

Category	Zone	EPL	Approvals	Product code extension	Utilization category
2D	21	Db	 II 2D Ex tb IIIC T80°C Db	-EX8	
<b>Electrical data</b>					
Thermal current (I <sub>th</sub> ):		6 A			Alternating current: AC15 (50÷60 Hz)
Rated insulation voltage (U <sub>i</sub> ):		250 Vac/Vdc			U <sub>e</sub> (V) 250
Conditional short circuit current:		1000 A according to EN 60947-5-1			I <sub>e</sub> (A) 6
Protection against short circuits:		type aM fuse 6 A 500 V			Direct current: DC13
Pollution degree:		3			U <sub>e</sub> (V) 24 125 250
					I <sub>e</sub> (A) 6 1.1 0.4
 <b>For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive</b>					



### Quality marks of the product:



UL approval: E131787  
EAC approval: RU C-IT DM94.B.01024

### Characteristics approved by UL

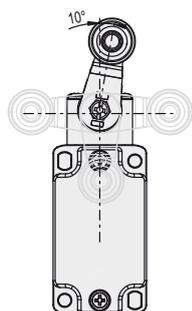
Utilization categories Q300 (69 VA, 125 ... 250 Vdc)  
A600 (720 VA, 120 ... 600 Vac)  
Data of housing type 1, 4X "indoor use only", 12, 13  
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8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

### Adjustable levers

In the switches it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission

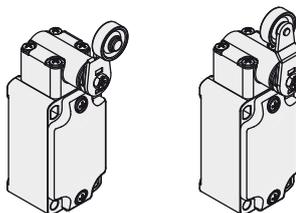


is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

### Overturning levers

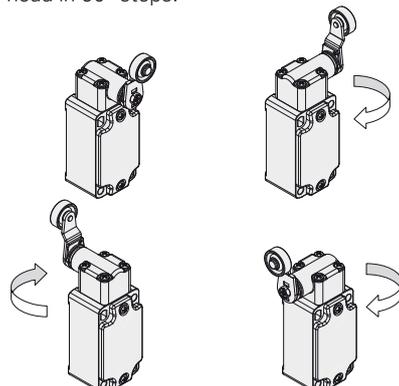
In the switches, the lever can be fastened straight or reversed, maintaining the positive coupling.

This makes it possible to have two different work plans of the lever.



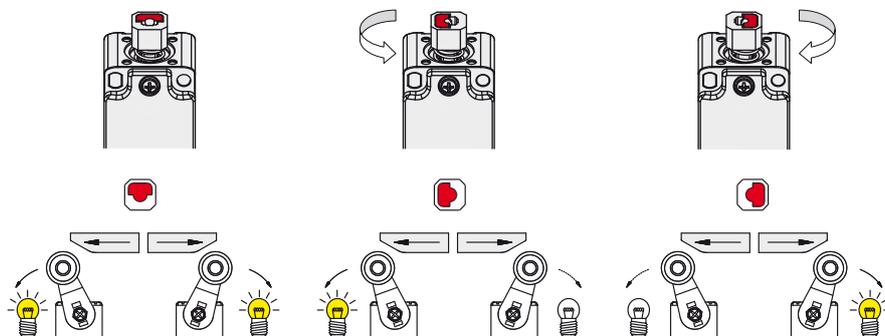
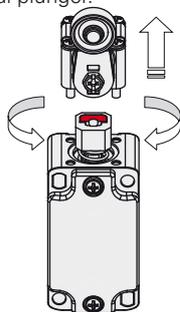
### Orientable heads

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



### 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.



### 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 article  
**FD 502-GM2-EX8**

Housing  
**FD** metal, one conduit entry

Contact blocks  
**5** 1NO+1NC, snap action  
**10** 2NO, slow action  
**11** 2NC, snap action  
**20** 1NO+2NC, slow action  
**21** 3NC, slow action  
**22** 2NO+1NC, slow action

Actuators  
**01** short plunger  
**02** roller lever  
... ..

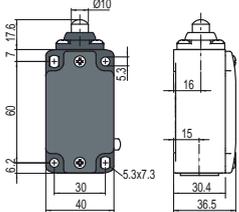
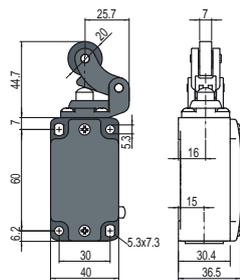
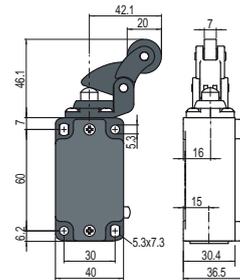
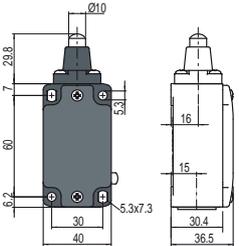
ATEX approval  
**-EX8** II 2D Ex tb IIIC T80°C Db

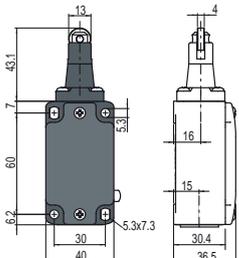
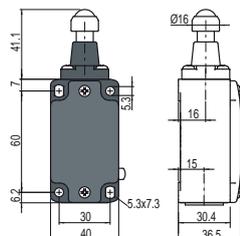
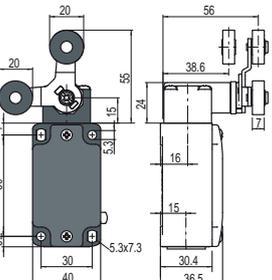
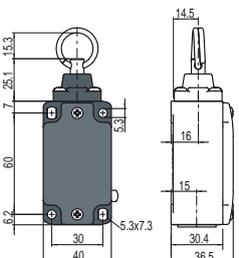
Threaded conduit entry  
**M2** M20x1.5

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

Contact type:

**R** = snap action  
**L** = slow action

		With stainless steel roller on request	With stainless steel roller on request	
				
Contact blocks				
5 <b>R</b>	<b>FD 501-M2-EX8</b> 	<b>FD 502-M2-EX8</b> 	<b>FD 505-M2-EX8</b> 	<b>FD 511-M2-EX8</b> 
20 <b>L</b>	<b>FD 2001-M2-EX8</b> 	<b>FD 2002-M2-EX8</b> 	<b>FD 2005-M2-EX8</b> 	<b>FD 2011-M2-EX8</b> 
Max. speed	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s
Min. force	8 N (25 N 	6 N (25 N 	6 N (25 N 	8 N (25 N 
Travel diagrams	page 238 - group 1	page 238 - group 2	page 238 - group 2	page 238 - group 1

		Ball, Ø 12.7 mm, stainless steel	Bistable	Rope switch for signalling
				
Contact blocks				
5 <b>R</b>	<b>FD 516-M2-EX8</b> 	<b>FD 519-M2-EX8</b> 	<b>FD 541-M2-EX8</b> 	<b>FD 576-M2-EX8</b> 1NO+1NC
20 <b>L</b>	<b>FD 2016-M2-EX8</b> 	<b>FD 2019-M2-EX8</b> 		<b>FD 2076-M2-EX8</b> 1NO+2NC
Max. speed	0.5 m/s with cam at 30°	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s
Min. force	8 N (25 N 	8 N (25 N 	0.21 Nm (0.36 Nm 	initial 20 N - final 40 N
Travel diagrams	page 238 - group 1	page 238 - group 1	page 238 - group 4	page 238 - group 6

All measures in the drawings are in mm

Code	Approvals	Category	Zone	EPL
-EX8 	II 2D Ex tb IIIC T80°C Db	2D	21	Db

Accessories See page 225

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



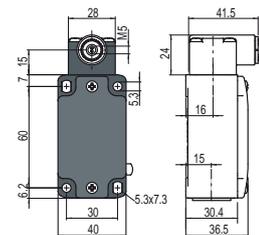
## Position switches with revolving lever without actuator

All measures in the drawings are in mm

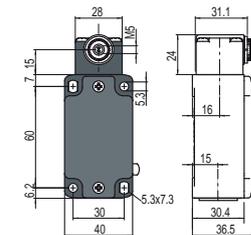
Contact type:

**R** = snap action  
**L** = slow action

Regular head



Compact head

**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.

Contact blocks

5	<b>R</b>	FD 538-M2-EX8	1NO+1NC	FD 558-M2-EX8	1NO+1NC
20	<b>L</b>	FD 2038-M2-EX8	1NO+2NC	FD 2058-M2-EX8	1NO+2NC
Min. force		0,1 Nm (0,25 Nm		0,06 Nm (0,25 Nm	
Travel diagrams		page 238 - group 4		page 238 - group 4	

## Loose actuators

All measures in the drawings are in mm

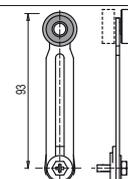
**IMPORTANT:** These loose actuators can be used with items of the FD series only.

	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
Article	VF L31	VF L32 <sup>(2)</sup>	VF L33 <sup>(2)</sup>	VF L34	VF L35	VF L36 <sup>(2)</sup>
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1 m/s	1.5 m/s (cam at 30°)	1.5 m/s
	Technopolymer roller Ø 20 mm	Technopolymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with technopolymer roller	Technopolymer roller Ø 20 mm	
Article	VF L51	VF L52	VF L53	VF L56	VF L57	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	0.5 m/s	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	
Stainless steel rollers, Ø 20 mm						
Article	VF L31-R24	VF L35-R24	VF L51-R24	VF L52-R24	VF L56-R24	VF L57-R24
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- <sup>(1)</sup> 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.

- <sup>(2)</sup> If installed with switch FD •58-M2-EX8 (e.g. FD 558-M2-EX8, FD 658-M2-EX8...) 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.

Code	Approvals	Category	Zone	EPL
-EX8	II 2D Ex tb IIIC T80°C Db	2D	21	Db

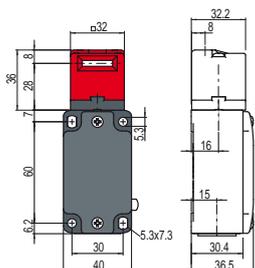
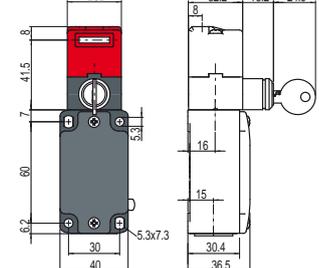
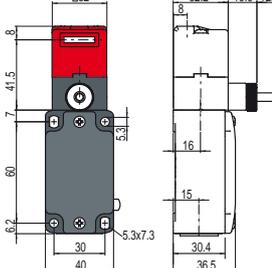
Items with code on **green** background are stock items

Accessories See page 225

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

## Safety switches with separate actuator

All measures in the drawings are in mm

Contact type:  = slow action	Switches with separate actuator	Switches with separate actuator and key release	Switches with manual mechanical delay
	Switches without actuator	Switches without actuator	Switches without actuator
			
Contact blocks			
20 	FD 2093-M2-EX8  1NO+2NC	FD 2099-M2-EX8  1NO+2NC	FD 20R2-M2-EX8  1NO+2NC
28 		FD 2899-M2-EX8  1NO+2NC	
Min. force	10 N (18 N  )	30 N (40 N  )	10 N (18 N  )
Travel diagrams Gen. Cat. Safety	page 21	page 140	page 132

## Actuators



VF KEYF

VF KEYF1

VF KEYF2

VF KEYF3

VF KEYF7

VF KEYF8

Straight actuator

Angled actuator

Swivelling actuator

Actuator adjustable in two directions

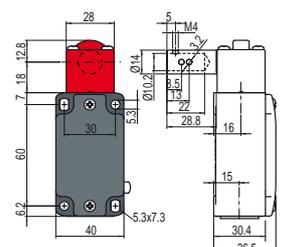
Actuator adjustable in one direction

Universal actuator

**IMPORTANT:** These actuators can be used with items of the FD series only (e.g. FD 2093-M2-EX8).  
Low level coded actuators according to EN ISO 14119.

## Safety switches for hinges

All measures in the drawings are in mm

Contact type:  = slow action	
	
Contact blocks	
20 	FD 2095-M2-EX8  1NO+2NC
Min. force	0,15 Nm (0,4 Nm  )
Travel diagrams Gen. Cat. Safety	page 75

 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.

Code	Approvals	Category	Zone	EPL
-EX8 	II 2D Ex tb IIIC T80°C Db	2D	21	Db

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

Accessories See page 225

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

## Safety rope switch with reset for emergency stops

All measures in the drawings are in mm

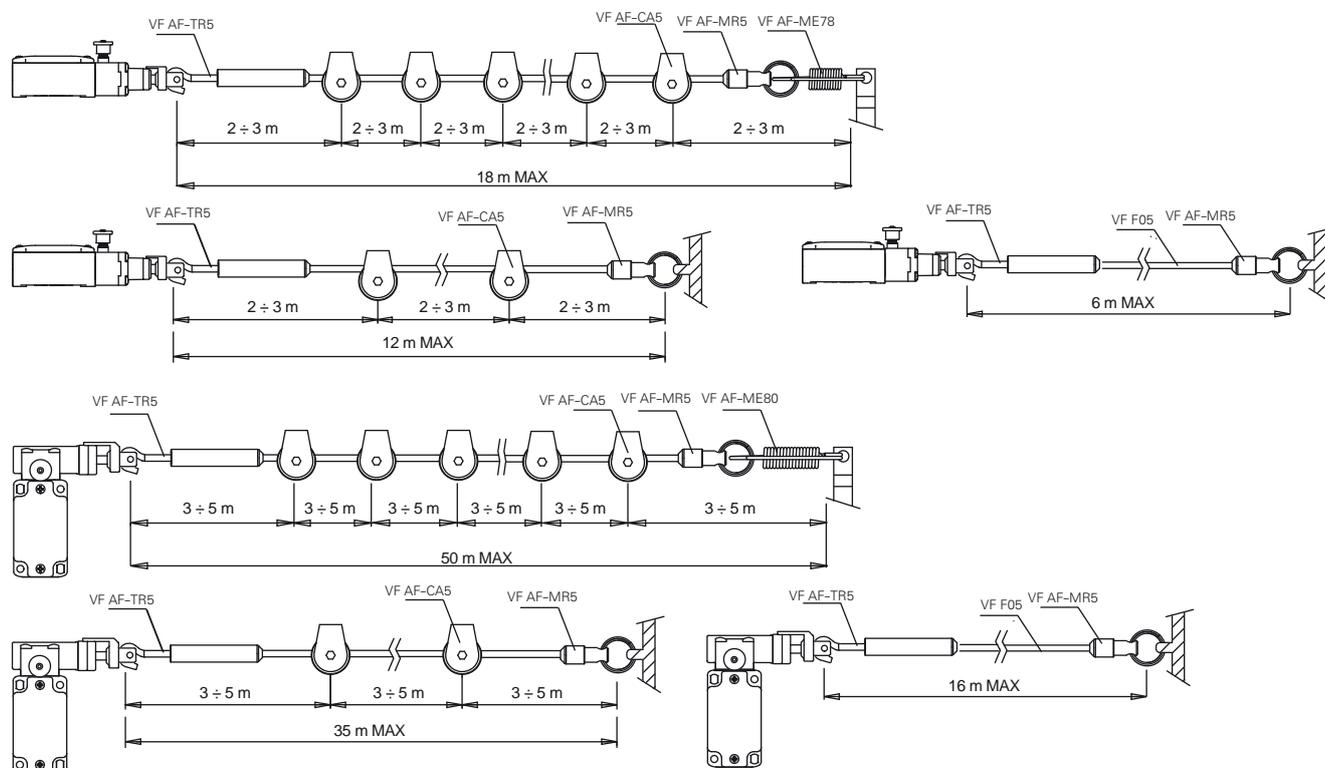
Contact type:			
= slow action			
Contact blocks			
18		FD 1878-M2-EX8	1NO+1NC
20		FD 2078-M2-EX8	1NO+2NC
18		FD 1883-M2-EX8	1NO+1NC
20		FD 2083-M2-EX8	1NO+2NC
18		FD 1884-M2-EX8	1NO+1NC
20		FD 2084-M2-EX8	1NO+2NC
Min. force		initial 63 N...final 83 N (90 N)	
Travel diagrams		page 171 - group 1	
Gen. Cat. Safety		page 171 - group 2	

## Accessories for rope installation

VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR03	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley	Angular pulley, stainless steel

## Application examples and max. rope length

All measures in the drawings are in mm



⚠ 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.

Code	Approvals	Category	Zone	EPL
-EX8		2D	21	Db

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

**Accessories** See page 225

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



### Main features

- Approvals:  
**2D** category
- Metal housing, three conduit entries
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings and quality labels:



 **II 2D Ex tb IIIC T80°C Db**  
certification in progress

### Technical data

#### Housing

Metal housing, baked powder coating	M20x1.5
Three threaded conduit entries:	IP66 according to EN 60529 with cable gland having equal or higher protection degree
Protection degree:	

#### General data

Ambient temperature:	-20°C ... +70°C
Max. actuation frequency:	3600 operating cycles <sup>1</sup> /hour
Mechanical endurance:	
F••••-EX•	10 million operating cycles <sup>1</sup>
F•••93-EX•, F•••78-EX•, F•••8•-EX•, F•••95-EX•	500.000 operating cycles <sup>1</sup>
Mounting position:	any
Safety parameters B <sub>10d</sub> (NC contacts):	
F••••-EX•	20,000,000
F•••93-EX•, F•••78-EX•, F•••8•-EX•	1,000,000
F•••95-EX•	2,500,00
Mechanical interlock, not coded:	type 1 according to EN ISO 14119
Tightening torques for installation:	see pages 235-246
<small>(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.</small>	

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

Contact block 20:	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 block 5:	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 conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-31, EN 60079-31.

#### In conformity with the requirements of:

ATEX Directive 94/9/EC  
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.**

Category	Zone	EPL	Approvals	Product code extension	
<b>2D</b>	<b>21</b>	<b>Db</b>	 <b>II 2D Ex tb IIIC T80°C Db</b>	<b>-EX8</b>	
<b>Electrical data</b>					<b>Utilization category</b>
Thermal current (I <sub>th</sub> ):		6 A		Alternating current: AC15 (50÷60 Hz)	
Rated insulation voltage (U <sub>i</sub> ):		250 Vac/Vdc		U <sub>e</sub> (V) 250	
Conditional short circuit current:		1000 A according to EN 60947-5-1		I <sub>e</sub> (A) 6	
Protection against short circuits:		type aM fuse 6 A 500 V		Direct current: DC13	
Pollution degree:		3		U <sub>e</sub> (V) 24 125 250	
				I <sub>e</sub> (A) 6 1.1 0.4	
 <b>For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive</b>					



### Quality marks of the product:



UL approval: E131787  
EAC approval: RU C-IT DM94.B.01024

### Characteristics approved by UL

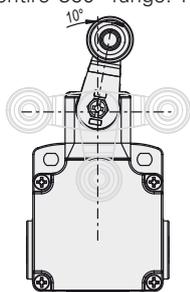
Utilization categories Q300 (69 VA, 125 ... 250 Vdc)  
A600 (720 VA, 120 ... 600 Vac)  
Data of housing type 1, 4X "indoor use only", 12, 13  
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8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

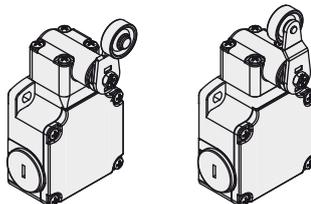
### Adjustable levers

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.



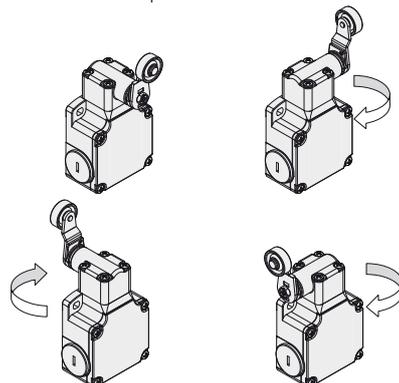
### Overturning levers

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.



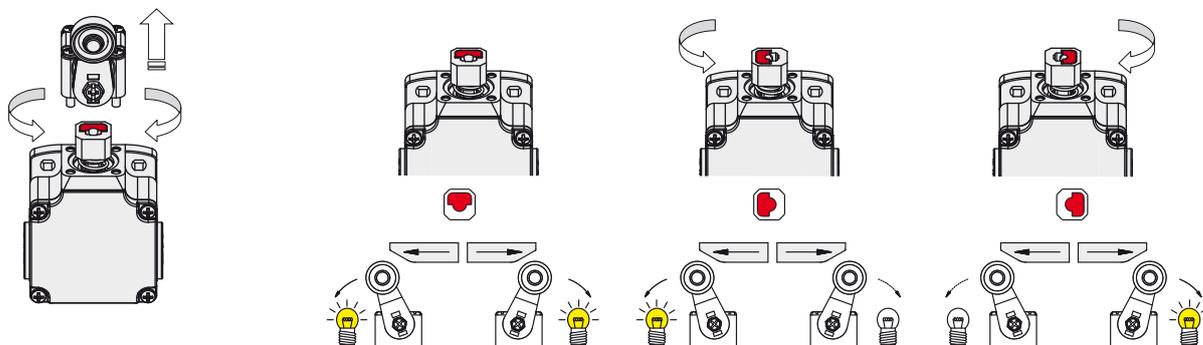
### Orientable heads

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



### 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).



### 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 article  
**FL 502-GM2-EX8**

Housing  
**FL** metal, three conduit entries

Contact blocks  
**5** 1NO+1NC, snap action  
**10** 2NO, slow action  
**11** 2NC, snap action  
**20** 1NO+2NC, slow action  
**21** 3NC, slow action  
**22** 2NO+1NC, slow action

Actuators  
**01** short plunger  
**02** roller lever  
... ..

ATEX approval  
**-EX8** II 2D Ex tb IIIC T80°C Db

Threaded conduit entry  
**M2** M20x1.5

Contact type  
**G** silver contacts with 1 µm gold coating

Contact type:

**R** = snap action  
**L** = slow action

Contact blocks

	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request
5 <b>R</b>	<b>FL 501-M2-EX8</b> → 1NO+1NC	<b>FL 502-M2-EX8</b> → 1NO+1NC	<b>FL 505-M2-EX8</b> → 1NO+1NC
20 <b>L</b>	<b>FL 2001-M2-EX8</b> → 1NO+2NC	<b>FL 2002-M2-EX8</b> → 1NO+2NC	<b>FL 2005-M2-EX8</b> → 1NO+2NC
Max. speed	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Min. force	8 N (25 N →)	6 N (25 N →)	6 N (25 N →)
Travel diagrams	page 238 - group 1	page 238 - group 2	page 238 - group 2

	Ball, Ø 12.7 mm, stainless steel	Bistable	Rope switch for signalling
5 <b>R</b>	<b>FL 516-M2-EX8</b> → 1NO+1NC	<b>FL 519-M2-EX8</b> → 1NO+1NC	<b>FL 576-M2-EX8</b> 1NO+1NC
20 <b>L</b>	<b>FL 2016-M2-EX8</b> → 1NO+2NC	<b>FL 2019-M2-EX8</b> → 1NO+2NC	<b>FL 2076-M2-EX8</b> 1NO+2NC
Max. speed	0.5 m/s with cam at 30°	0.5 m/s	0.5 m/s
Min. force	8 N (25 N →)	8 N (25 N →)	initial 20 N - final 40 N
Travel diagrams	page 238 - group 1	page 238 - group 1	page 238 - group 6

All measures in the drawings are in mm

Code	Approvals	Category	Zone	EPL
-EX8 	II 2D Ex tb IIIC T80°C Db	2D	21	Db

Accessories See page 225

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

	Regular head	Compact head
Contact blocks		
5 <b>R</b>	<b>FL 538-M2-EX8</b> (1NO+1NC)	<b>FL 558-M2-EX8</b> (1NO+1NC)
20 <b>L</b>	<b>FL 2038-M2-EX8</b> (1NO+2NC)	<b>FL 2058-M2-EX8</b> (1NO+2NC)
Min. force	0,1 Nm (0,25 Nm (R))	0,06 Nm (0,25 Nm (R))
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

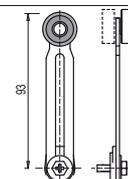
**IMPORTANT:** These loose actuators can be used with items of the FL series only.

	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
Article	<b>VF L31</b> (R)	<b>VF L32</b> (2)	<b>VF L33</b> (2)	<b>VF L34</b>	<b>VF L35</b> (R) (1) (2)	<b>VF L36</b> (2)
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1 m/s	1.5 m/s (cam at 30°)	1.5 m/s
	Technopolymer roller Ø 20 mm	Technopolymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with technopolymer roller	Technopolymer roller Ø 20 mm	
Article	<b>VF L51</b> (R)	<b>VF L52</b> (R)	<b>VF L53</b> (R)	<b>VF L56</b> (R) (2)	<b>VF L57</b> (R)	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	0.5 m/s	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	
	Stainless steel rollers, Ø 20 mm					
Article	<b>VF L31-R24</b> (R)	<b>VF L35-R24</b> (R) (1) (2)	<b>VF L51-R24</b> (R)	<b>VF L52-R24</b> (R)	<b>VF L56-R24</b> (R) (2)	<b>VF L57-R24</b> (R)
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- (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) If installed with switch FL •58-M2-EX8 (e.g. FL 558-M2-EX8, FL 658-M2-EX8...) 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.

Code	Approvals	Category	Zone	EPL
<b>-EX8</b>	<b>II 2D Ex tb IIICT80°C Db</b>	<b>2D</b>	<b>21</b>	<b>Db</b>


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

**Accessories** See page 225

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

## Safety switches with separate actuator

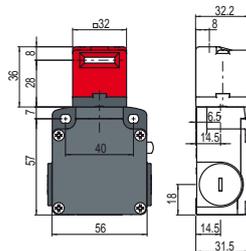
All measures in the drawings are in mm

Contact type:

 = slow action

Switches with separate actuator

Switches without actuator



Contact blocks

20		FL 2093-M2-EX8  1NO+2NC
Min. force		10 N (18 N  )
Travel diagrams		page 21
Gen. Cat. Safety		

## Actuators



VF KEYF

VF KEYF1

VF KEYF2

VF KEYF3

VF KEYF7

VF KEYF8

Straight actuator

Angled actuator

Swivelling actuator

Actuator adjustable in two directions

Actuator adjustable in one direction

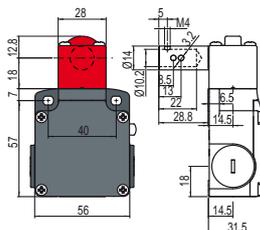
Universal actuator

**IMPORTANT:** These actuators can be used with items of the FL series only (e.g. FL 2093-M2-EX8).  
Low level coded actuators according to EN ISO 14119.

## Safety switches for hinges

All measures in the drawings are in mm

Contact type:

 = slow action

Contact blocks

20		FL 2095-M2-EX8  1NO+2NC
Min. force		0,15 Nm (0,4 Nm  )
Travel diagrams		page 75
Gen. Cat. Safety		

 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.

Code	Approvals	Category	Zone	EPL
-EX8 	II 2D Ex tb IIIC T80°C Db	2D	21	Db

Items with code on green background are stock items

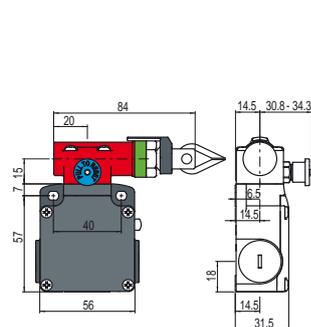
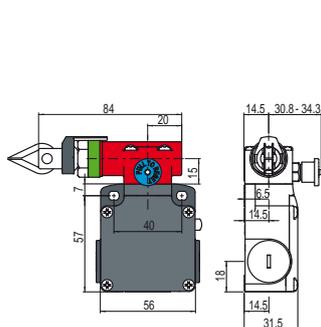
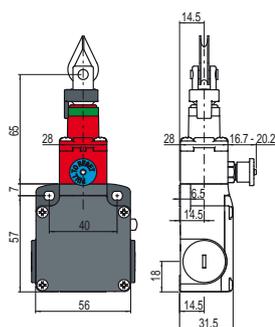
Accessories See page 225

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

## Safety rope switch with reset for emergency stops

All measures in the drawings are in mm

Contact type:

**L** = slow action


Contact blocks

18	<b>L</b>	<b>FL 1878-M2-EX8</b>	➔ 1NO+1NC	<b>FL 1883-M2-EX8</b>	➔ 1NO+1NC	<b>FL 1884-M2-EX8</b>	➔ 1NO+1NC
20	<b>L</b>	<b>FL 2078-M2-EX8</b>	➔ 1NO+2NC	<b>FL 2083-M2-EX8</b>	➔ 1NO+2NC	<b>FL 2084-M2-EX8</b>	➔ 1NO+2NC
Min. force		initial 63 N...final 83 N (90 N ➔)		initial 147 N...final 235 N (250 N ➔)		initial 147 N...final 235 N (250 N ➔)	
Travel diagrams		page 171 - group 1		page 171 - group 2		page 171 - group 2	
Gen. Cat. Safety							

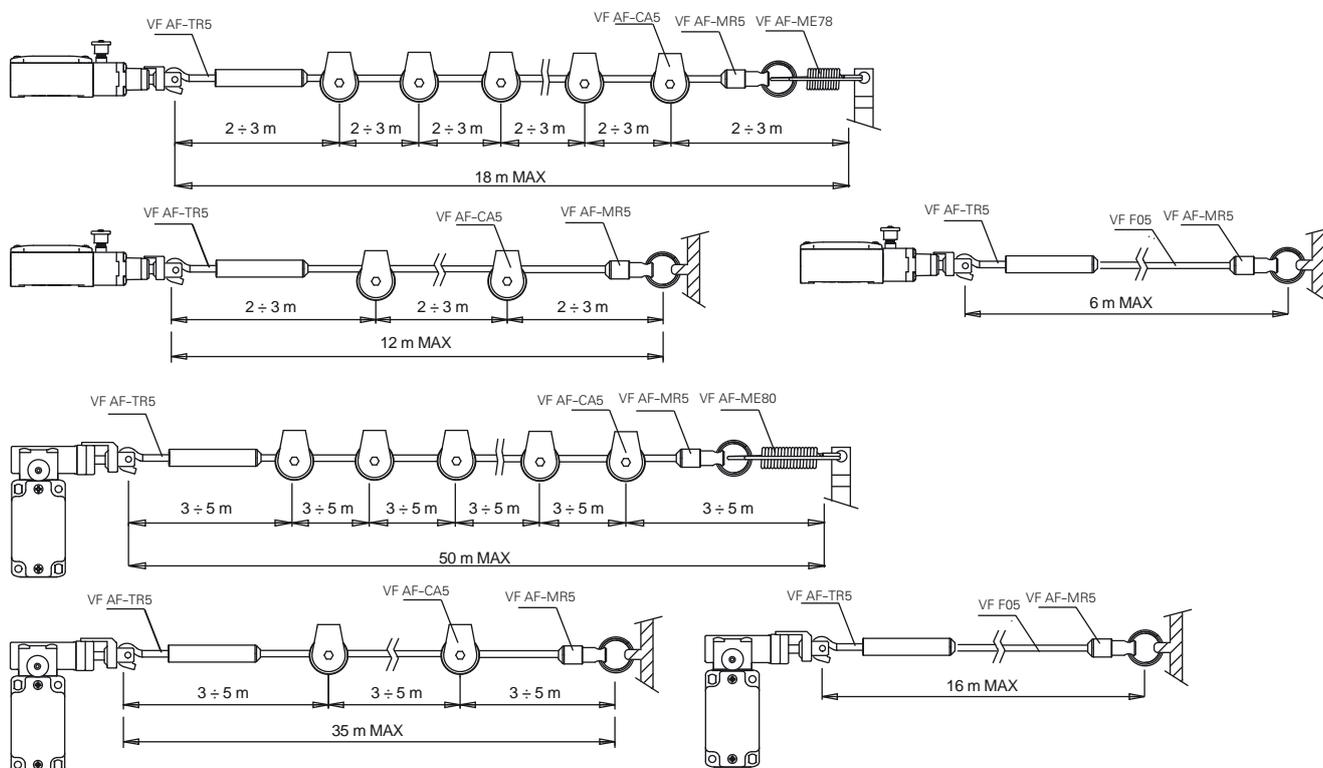
## Accessories for rope installation



<b>VF AF-TR5</b>	<b>VF AF-TR8</b>	<b>VF AF-MR5</b>	<b>VF AF-ME78</b>	<b>VF AF-ME80</b>	<b>VF F05-100</b>	<b>VF AF-IF1GR03</b>	<b>VF AF-CA5</b>	<b>VF AF-CA10</b>
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley	Angular pulley, stainless steel

## Application examples and max. rope length

All measures in the drawings are in mm



⚠ 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.

Code	Approvals	Category	Zone	EPL
<b>-EX8</b>	<b>Ex II 2D Ex tb IIIC T80°C Db</b>	<b>2D</b>	<b>21</b>	<b>Db</b>

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

**Accessories** See page 225

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