



# ATEX



**Technical definitions**
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**FD series position switches**
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Category	Zone	EPL	Approvals	Product code extension	ATEX/EPL category				
					M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
<b>3D</b>	<b>22</b>	<b>Dc</b>	II 3D Ex tc IIIC T80°C Dc	<b>-EX4</b>	-	-	-	-	■
<b>2G</b> <b>M2</b>	<b>1</b> <b>M2</b>	<b>Gb</b> <b>Mb</b>	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb	<b>-EX7</b>	■	■	-	■	-
<b>2D</b>	<b>21</b>	<b>Db</b>	II 2D Ex tb IIIC T80°C Db	<b>-EX8</b>	-	-	■	-	■

**FL series position switches**
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Category	Zone	EPL	Approvals	Product code extension	ATEX/EPL category				
					M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
<b>3D</b>	<b>22</b>	<b>Dc</b>	II 3D Ex tc IIIC T80°C Dc	<b>-EX4</b>	-	-	-	-	■
<b>2G</b> <b>M2</b>	<b>1</b> <b>M2</b>	<b>Gb</b> <b>Mb</b>	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb	<b>-EX7</b>	■	■	-	■	-
<b>2D</b>	<b>21</b>	<b>Db</b>	II 2D Ex tb IIIC T80°C Db	<b>-EX8</b>	-	-	■	-	■

**FM series position switches**
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Category	Zone	EPL	Approvals	Product code extension	ATEX/EPL category				
					M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
<b>2G</b> <b>M2</b>	<b>1</b> <b>M2</b>	<b>Gb</b> <b>Mb</b>	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb	<b>-EX7</b>	■	■	-	■	-

**FA series pre-wired position switches**
**page 179**


Category	Zone	EPL	Approvals	Product code extension	ATEX/EPL category				
					M2/Mb	2G/Gb	2D/Db	3G/Gc	3D/Dc
<b>3D</b> <b>3G</b>	<b>22</b> <b>2</b>	<b>Dc</b> <b>Gc</b>	II 3D Ex tc IIIC T80°C Dc II 3G Ex nC IIC T6 Gc	<b>-EX5</b>	-	-	-	■	■

**Accessories**
**page 183**


## ATEX Directive

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

- ATEX 2014/34/EU: concerns the requirements for electrical and non-electrical equipment for use in potentially explosive environments. According to this directive, the manufacturer has to comply with the provided requirements and mark its articles according to specific categories.
- ATEX 99/92/EC: lays down minimum requirements for the safety and health protection of workers potentially at risk from explosive atmospheres.

These directives define the requirements for the protection of safety and health of persons, domestic animals and property, as well as the conformity assessment procedures to prove that the devices comply with the directives' requirements.

## Classification of potentially explosive atmospheres

A potentially explosive atmosphere is an atmosphere which could become explosive due to local and/or operational conditions. These environments present a mixture with air under atmospheric conditions of flammable substances in the form of in the form of gases, vapours, mists or dusts.

The ATEX 99/92/EC Directive classifies two types of potentially explosive atmospheres, depending on presence of combustible gases or dusts in the zone. These two types of explosive atmospheres are in turn classified in three zones each, according to the frequency and duration of the explosive atmosphere. Areas in atmospheres with explosive gases are classified in zones 0, 1 and 2; whereas in atmospheres with explosive dusts in zones 20, 21 and 22:

- **Zone 0/20:** A place in which the presence of flammable gas or dust is continuously present. Constant danger. It requires at least Category 1 equipment.
- **Zone 1/21:** A place in which the presence of flammable gas or dust is likely to occur in normal operation occasionally. Potential danger. It requires at least Category 2 equipment.
- **Zone 2/22:** A place in which the presence of flammable gas or dust is not likely to occur in normal operation or, if it does occur, will persist for a short period only. Or it occurs due to a failure. Lower danger. It requires at least Category 3 equipment.

The end user has the responsibility to identify and classify the different zones and to install appropriate equipment.

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

According to the ATEX Directive 2014/34/EU equipment is classified into 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 level:

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

Equipment of the group II is further subdivided into three categories according to the required protection level:

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

A comparison between the EPL (Equipment Protection Levels) defined by the IEC 60079-0 standard and the categories and applications of the ATEX Directive are shown in the table below.

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

Environment features				Equipment features				
Field of application	Flammable substance	Potentially explosive atmosphere	Classification of potentially explosive atmospheres: ZONE	acc. to ATEX 2014/34/EU		acc. to IEC 60079-0		Required protection level
				Required marking of the device: CATEGORY	Required marking of the device: GROUP	Group	EPL	
Mining				M1	I	I	Ma	very high
				M2			Mb	high
Surface	Gases	It is present continuously, or for long periods or frequently	0	1G	II	II	Ga	very high
		It is likely to occur	1	2G			Gb	high
		It is not likely to occur but, if it does occur, will persist for a short period only	2	3G			Gc	normal
	Dusts	It is present continuously, or for long periods or frequently	20	1D		III	Da	very high
		It is likely to occur	21	2D			Db	high
		It is not likely to occur but, if it does occur, will persist for a short period only	22	3D			Dc	normal



## Protective measures

To avoid the risk of explosions caused by an electrical trigger in a potentially explosive atmosphere, different protective measures can be taken:

- use of enclosures to encapsulate dangerous part in order to limit explosions to the inside of the housing itself;
- avoid contact between hot spots and the potentially explosive atmosphere by interposing solid, liquid or gaseous bodies;
- take measures to limit the generation of dangerous hot spots, eliminating the possibility of failures or limiting the system power so that it is insufficient to cause the ignition.

Various protective modes have been developed and standardised for each of these modes as listed in the following table:

**Table 2 - Protective measures and applicable standards**

Protective measure	Symbol	Engraving	Zone GAS	Zone DUSTS	IEC / EN standard
General requirements	/	/	0, 1, 2	20, 21, 22	IEC 60079-0 EN 60079-0
Oil immersion		Ex ob Ex oc	1 2	/	IEC 60079-6 EN 60079-6
Pressurized enclosure		Ex pv Ex pxb Ex pyb Ex pzc	1, 2 1 1 2	/ 21 21 22	IEC 60079-2 EN 60079-2
Powder filling		Ex q	1	/	IEC 60079-5 EN 60079-5
Flameproof enclosure		Ex da Ex db Ex dc	0 1 2	/	IEC 60079-1 EN 60079-1
Increased safety		Ex eb Ex ec	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 is Ex op pr Ex op sh	0, 1, 2 1, 2 0, 1, 2	20, 21, 22 21, 22 20, 21, 22	IEC 60079-28 EN 60079-28

## Marking examples

### Devices for places with presence of gas

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

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① EU 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 Type of protection (see table 2)
- ⑥ Classification of gases (see table 4)
- ⑦ Temperature class (see table 3)
- ⑧ EPL acc. to IEC 60079-0 (see table 1)

### Devices for places with presence of dusts

**Ex II 3D Ex tc IIIC T80°C Dc**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① EU 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 Type of protection (see table 2)
- ⑥ Classification of dusts (see table 5)
- ⑦ Maximum surface temperature of the equipment
- ⑧ EPL acc. to IEC 60079-0 (see table 1)

## Temperature classes

**Table 3**

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

## Classification of gases

**Table 4**

excerpt from standard IEC/CENELEC/NEC 505

	I	IIA	IIB	IIC
T1	methane	propane, industrial methane, ethane, benzene, ammoniac, acetic acid, carbon monoxide, methanol, toluene	acrylonitrile	hydrogen
T2		ethanol, amyl acetate, butane	ethylene	acetylene
T3		nafta, benzine, esano	hydrogen sulfide	
T4		acetaldehyde	ethyl ether	
T5				
T6				carbon disulfide

## Classification of dusts

**Table 5**




IIIA	IIIB	IIC
combustible particles	non-conductive powder	conductive powder



### Main features

- ATEX approval.
- Metal housing, one conduit entry
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings:

Product code extension	Quality mark	Certificate type and notified body
-EX4		EU declaration of conformity Pizzato Elettrica S.r.l.
-EX7		EC type examination certificate DEKRA EXAM GmbH
-EX8		EC type examination certificate DEKRA EXAM GmbH

### Technical data

#### Housing

Metal housing, powder-coated	
One threaded conduit entry:	M20x1.5
Protection degree acc. to EN 60529:	IP66 with cable gland of equal or higher protection degree

#### General data

Ambient temperature (-EX7):	-20°C ... +60°C
Ambient temperature (-EX4/-EX8):	-20°C ... +70°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	
FD ●●●●-EX●	10 million operating cycles
FD ●●93-EX●, FD ●●78-EX●, FD ●●8●-EX●, FD ●●95-EX●	500,000 operating cycles
FD ●●99-EX●, FD ●●R2-EX●	250,000 operating cycles
Mounting position:	any
Safety parameters B <sub>10D</sub> (NC contacts):	
FD ●●●●-EX●	20,000,000
FD ●●93-EX●, FD ●●78-EX●, FD ●●8●-EX●	1,000,000
FD ●●99-EX●, FD ●●R2-EX●	500,000
FD ●●95-EX●	2,500,00
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 225
Wire cross-sections and wire stripping lengths:	see page 243

#### Contact blocks available:

2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, 22, 28, 29, 30, 33, 34, 37, 66, 67  
Note: contact blocks 2 and 3 are not available for articles FD ●●●●-EX7

#### In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11, EN 50581.


#### Compliance with the requirements of:

ATEX Directive 2014/34/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

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





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

### Installation for safety applications:

Use only switches marked with the symbol  next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (fault exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 226. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 223 to 236 and in the certificate.**

**⚠ For the correct use of the switch, please use appropriate cable glands suitable for the zone in compliance with the ATEX directive, see Accessories on page 183.**

Product code extension	Category	Zone	EPL	Approvals	Electrical data	Utilization category
-EX4	3D	22	Dc	 II 3D Ex tc IICT80°C Dc	Thermal current (I <sub>th</sub> ): 10 A Rated insulation voltage (U <sub>i</sub> ): 500 Vac 600 Vdc 400 Vac for contact blocks 20, 28 Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 10 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) U <sub>e</sub> (V) 250 400 500 I <sub>e</sub> (A) 6 4 1 Direct current: DC13 U <sub>e</sub> (V) 24 125 250 I <sub>e</sub> (A) 3 0.55 0.3
-EX7	2G M2	1 M2	Gb Mb	 II 2G Ex ia IIC T6 Gb  I M2 Ex ia I Mb	Maximum current (I <sub>i</sub> ): 2.5 A Maximum voltage (U <sub>i</sub> ): 30 Vdc Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type gG fuse 4 A 250 V Pollution degree: 3	<b>⚠ This switch type must be used only in intrinsic safety circuits in compliance with standard IEC 60079-11, EN 60079-11</b>
-EX8	2D	21	Db	 II 2D Ex tb IICT80°C Db	Thermal current (I <sub>th</sub> ): 6 A Rated insulation voltage (U <sub>i</sub> ): 250 Vac/Vdc Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 6 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) U <sub>e</sub> (V) 250 I <sub>e</sub> (A) 6 Direct current: DC13 U <sub>e</sub> (V) 24 125 250 I <sub>e</sub> (A) 3 0.55 0.3



### Quality marks of the product



UL approval: E131787  
EAC approval: RU C-IT.YT03.B.00035/19

### Features approved by UL

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

Environmental Ratings: Types 1, 4X, 12, 13

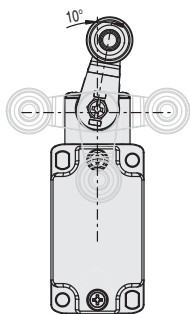
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

For contact blocks 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 14 AWG. Tightening torque for terminal screws of 12 lb in (1.4 Nm).

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

### Adjustable levers

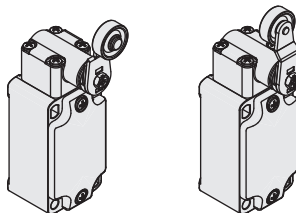
For these switches the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission



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

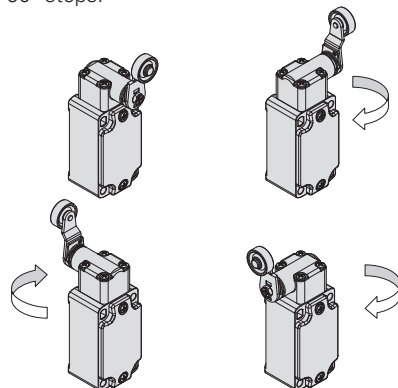
### Reversible levers

With these switches, the lever can be secured in either the normal or reverse position, whereby positive coupling is retained. In this way two different working planes of the lever are possible.



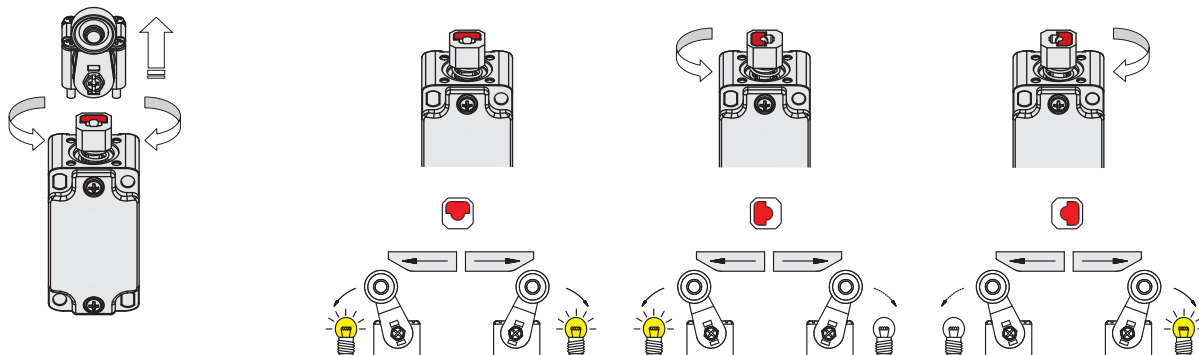
### Head with variable orientation

For all switches the head can be rotated in 90° steps.



### Unidirectional heads

For switches with swivelling lever, the unidirectional operation can be set by removing the four head screws and rotating 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 product code extension  
**FD 502-GM2-EX7**

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

Contact block	
<b>5</b>	1NO+1NC, snap action
<b>6</b>	1NO+1NC, slow action
<b>7</b>	1NO+1NC, slow action, make before break
...	.....

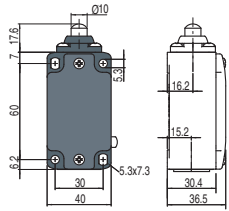
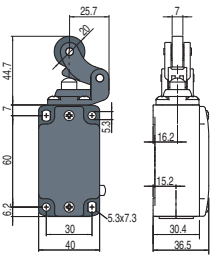
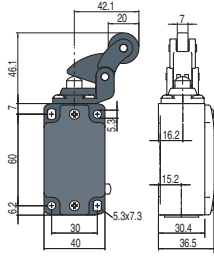
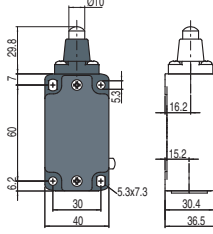
Actuators	
<b>01</b>	short plunger
<b>02</b>	roller lever
...	.....

ATEX approval	
<b>-EX4</b>	II 3D Ex tc IIIC T80°C Dc
<b>-EX7</b>	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb
<b>-EX8</b>	II 2D Ex tb IIIC T80°C Db

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts, 1 µm gold coating
<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact block 2, 20, 21, 22, 28, 29, 30)

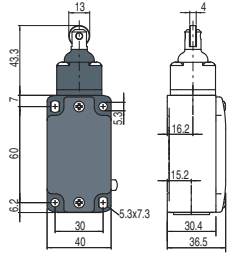
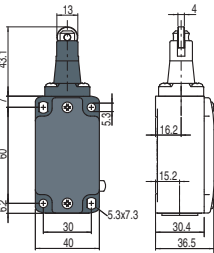
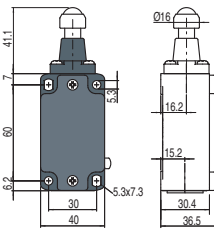
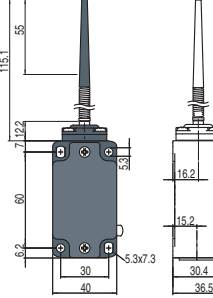
Contact type:

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

Category	Contact block	With stainless steel roller on request		With stainless steel roller on request					
									
3D	2 <b>R</b>	FD 201-M2-EX4	2x(1NO-1NC)	FD 202-M2-EX4	2x(1NO-1NC)	FD 205-M2-EX4	2x(1NO-1NC)	FD 211-M2-EX4	2x(1NO-1NC)
	5 <b>R</b>	FD 501-M2-EX4	1NO+1NC	FD 502-M2-EX4	1NO+1NC	FD 505-M2-EX4	1NO+1NC	FD 511-M2-EX4	1NO+1NC
	6 <b>L</b>	FD 601-M2-EX4	1NO+1NC	FD 602-M2-EX4	1NO+1NC	FD 605-M2-EX4	1NO+1NC	FD 611-M2-EX4	1NO+1NC
	20 <b>L</b>	FD 2001-M2-EX4	1NO+2NC	FD 2002-M2-EX4	1NO+2NC	FD 2005-M2-EX4	1NO+2NC	FD 2011-M2-EX4	1NO+2NC
2G M2	5 <b>R</b>	FD 501-M2-EX7	1NO+1NC	FD 502-M2-EX7	1NO+1NC	FD 505-M2-EX7	1NO+1NC	FD 511-M2-EX7	1NO+1NC
	20 <b>L</b>	FD 2001-M2-EX7	1NO+2NC	FD 2002-M2-EX7	1NO+2NC	FD 2005-M2-EX7	1NO+2NC	FD 2011-M2-EX7	1NO+2NC
2D	5 <b>R</b>	FD 501-M2-EX8	1NO+1NC	FD 502-M2-EX8	1NO+1NC	FD 505-M2-EX8	1NO+1NC	FD 511-M2-EX8	1NO+1NC
	20 <b>L</b>	FD 2001-M2-EX8	1NO+2NC	FD 2002-M2-EX8	1NO+2NC	FD 2005-M2-EX8	1NO+2NC	FD 2011-M2-EX8	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	
Actuating force		8 N (25 N ⊕)		6 N (25 N ⊕)		6 N (25 N ⊕)		8 N (25 N ⊕)	
Travel diagrams		page 226 - group 1		page 226 - group 2		page 226 - group 2		page 226 - group 1	

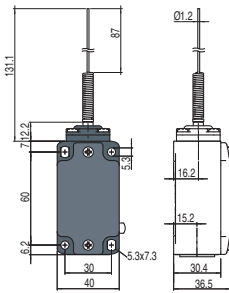
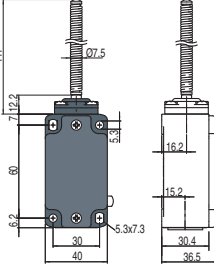
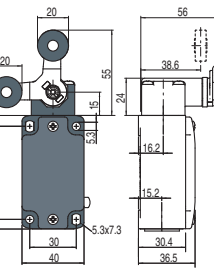
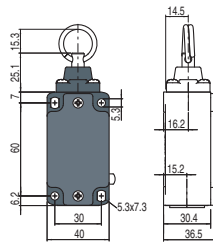
Contact type:

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

Category	Contact block	External gasket		Ball, Ø 12.7 mm, stainless steel		External gasket			
									
3D	2 <b>R</b>	FD 215-M2-EX4	2x(1NO-1NC)	FD 216-M2-EX4	2x(1NO-1NC)	FD 219-M2-EX4	2x(1NO-1NC)	FD 220-M2-EX4	2x(1NO-1NC)
	5 <b>R</b>	FD 515-M2-EX4	1NO+1NC	FD 516-M2-EX4	1NO+1NC	FD 519-M2-EX4	1NO+1NC	FD 520-M2-EX4	1NO+1NC
	6 <b>L</b>	FD 615-M2-EX4	1NO+1NC	FD 616-M2-EX4	1NO+1NC	FD 619-M2-EX4	1NO+1NC	/	/
	20 <b>L</b>	FD 2015-M2-EX4	1NO+2NC	FD 2016-M2-EX4	1NO+2NC	FD 2019-M2-EX4	1NO+2NC	FD 2020-M2-EX4	1NO+2NC
2G M2	5 <b>R</b>	FD 515-M2-EX7	1NO+1NC	FD 516-M2-EX7	1NO+1NC	FD 519-M2-EX7	1NO+1NC	FD 520-M2-EX7	1NO+1NC
	20 <b>L</b>	FD 2015-M2-EX7	1NO+2NC	FD 2016-M2-EX7	1NO+2NC	FD 2019-M2-EX7	1NO+2NC	FD 2020-M2-EX7	1NO+2NC
2D	5 <b>R</b>	/	/	FD 516-M2-EX8	1NO+1NC	FD 519-M2-EX8	1NO+1NC	/	/
	20 <b>L</b>	/	/	FD 2016-M2-EX8	1NO+2NC	FD 2019-M2-EX8	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	
Actuating force		11 N (25 N ⊕)		8 N (25 N ⊕)		8 N (25 N ⊕)		0.09 Nm	
Travel diagrams		page 226 - group 1		page 226 - group 1		page 226 - group 1		page 226 - group 3	

Contact type:

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

Category	Contact block	External gasket		External gasket		Bistable		Rope switch for signalling	
									
3D	2 <b>R</b>	FD 221-M2-EX4	2x(1NO-1NC)	FD 225-M2-EX4	2x(1NO-1NC)	/	/	FD 276-M2-EX4	2x(1NO-1NC)
	5 <b>R</b>	FD 521-M2-EX4	1NO+1NC	FD 525-M2-EX4	1NO+1NC	FD 541-M2-EX4	1NO+1NC	FD 576-M2-EX4	1NO+1NC
	6 <b>L</b>	/	/	/	/	/	/	FD 676-M2-EX4	1NO+1NC
	20 <b>L</b>	FD 2021-M2-EX4	1NO+2NC	FD 2025-M2-EX4	1NO+2NC	/	/	FD 2076-M2-EX4	2NO+1NC
2G M2	5 <b>R</b>	FD 521-M2-EX7	1NO+1NC	FD 525-M2-EX7	1NO+1NC	FD 541-M2-EX7	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
2D	5 <b>R</b>	/	/	/	/	FD 541-M2-EX8	1NO+1NC	FD 576-M2-EX8	1NO+1NC
	20 <b>L</b>	/	/	/	/	/	/	FD 2076-M2-EX8	2NO+1NC
Max. speed		1 m/s		1 m/s		0.5 m/s with cam at 30°		0.5 m/s	
Actuating force		0.08 Nm		0.14 Nm		0.21 Nm (0.36 Nm ⊕)		initial 20 N - final 40 N	
Travel diagrams		page 226 - group 3		page 226 - group 3		page 226 - group 4		page 226 - group 6	

All values in the drawings are in mm

Accessories See page 207

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

## Position switches with swivelling lever without actuator

Contact type:

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

Category	Contact block	Regular head		Compact head	
		28	41.5	28	31.1
3D	2 <b>R</b>	FD 238-M2-EX4	2x(1NO-1NC)	FD 258-M2-EX4	2x(1NO-1NC)
	5 <b>R</b>	FD 538-M2-EX4	1NO+1NC	FD 558-M2-EX4	1NO+1NC
	6 <b>L</b>	FD 638-M2-EX4	1NO+1NC	FD 658-M2-EX4	1NO+1NC
	20 <b>L</b>	FD 2038-M2-EX4	1NO+2NC	FD 2058-M2-EX4	1NO+2NC
2G M2	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
2D	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
Actuating force		0.1 Nm (0.25 Nm $\rightarrow$ )		0.06 Nm (0.25 Nm $\rightarrow$ )	
Travel diagrams		page 226 - group 4		page 226 - group 4	

### IMPORTANT

**For safety applications:** join only switches and actuators marked with symbol  $\rightarrow$  next to the product code.

For more information about safety applications see details on page 223.

## Separate actuators

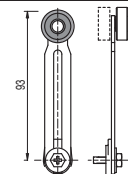
**IMPORTANT:** These separate actuators can be used only with items of the FD series.

	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod, 3x3x125 mm	Spring rod with plastic tip	Adjustable actuator with techno- polymer roller	Adjustable glass fibre rod
Article	VF L31 $\rightarrow$	VF L32 <sup>(2)</sup>	VF L33 <sup>(2)</sup>	VF L34	VF L35 $\rightarrow$ <sup>(1) (2)</sup>	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
Article	VF L51 $\rightarrow$	VF L52 $\rightarrow$	VF L53 $\rightarrow$	VF L56 $\rightarrow$ <sup>(2)</sup>	VF L57 $\rightarrow$	
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 $\rightarrow$	VF L35-R24 $\rightarrow$ <sup>(1) (2)</sup>	VF L51-R24 $\rightarrow$	VF L52-R24 $\rightarrow$	VF L56-R24 $\rightarrow$ <sup>(2)</sup>	VF L57-R24 $\rightarrow$
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 the figure to the right.

If an adjustable lever is required for safety applications, use the VF L56 adjustable safety lever.

- <sup>(2)</sup> If installed with switch FD •58-M2-EX (e.g. FD 558-M2-EX•, FD 658-M2-EX•...) the actuator may hit the housing of the switch upon actuation. This possible interference depends on the fixing position of actuator and switch head.



All values in the drawings are in mm

Accessories See page 207

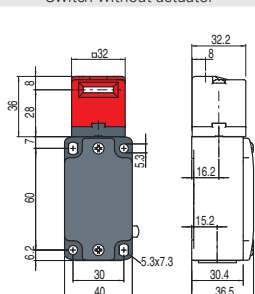
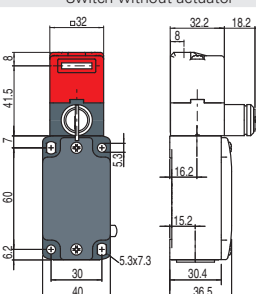
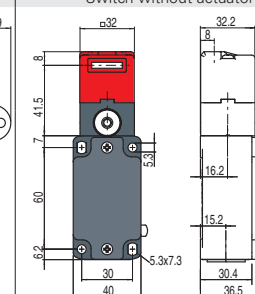


























$\rightarrow$  The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)



## Safety switches with separate actuator

Contact type:

 = slow action

Category	Contact block	Switches with separate actuator	Switches with separate actuator and key release	Switches with manual mechanical delay
		Switch without actuator	Switch without actuator	Switch without actuator
				
3D	6 	FD 693-M2-EX4  1NO+1NC	/	FD 6R2-M2-EX4  1NO+1NC
	18 	/	FD 1899-M2-EX4  1NO+1NC	/
	20 	FD 2093-M2-EX4  1NO+2NC	FD 2099-M2-EX4  1NO+2NC	FD 20R2-M2-EX4  1NO+2NC
	28 	/	FD 2899-M2-EX4  1NO+2NC	/
2G M2	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	/
2D	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	/
Actuating force		10 N (18 N  )	30 N (40 N  )	10 N (18 N  )
Travel diagrams		page 19, General Catalogue Safety	page 104, General Catalogue Safety	page 96, General Catalogue Safety

## Actuators



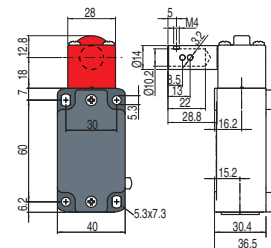









VF KEYF	VF KEYF1	VF KEYF2	VF KEYF3	VF KEYF7	VF KEYF8
Straight actuator	Angled actuator	Swivelling actuator	Actuator adjustable in two directions	Actuator adjustable in one direction	Universal actuator

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

## Safety switches for hinges

Contact type:

 = slow action

Category	Contact block	
		
3D	18 	FD 1895-M2-EX4  1NO+1NC
	20 	FD 2095-M2-EX4  1NO+2NC
2G M2	20 	FD 2095-M2-EX7  1NO+2NC
2D	20 	FD 2095-M2-EX8  1NO+2NC
Actuating force		0.15 Nm (0.4 Nm  )
Travel diagrams		page 73, General Catalogue Safety

## Safety rope switches with reset for emergency stops

Contact type:

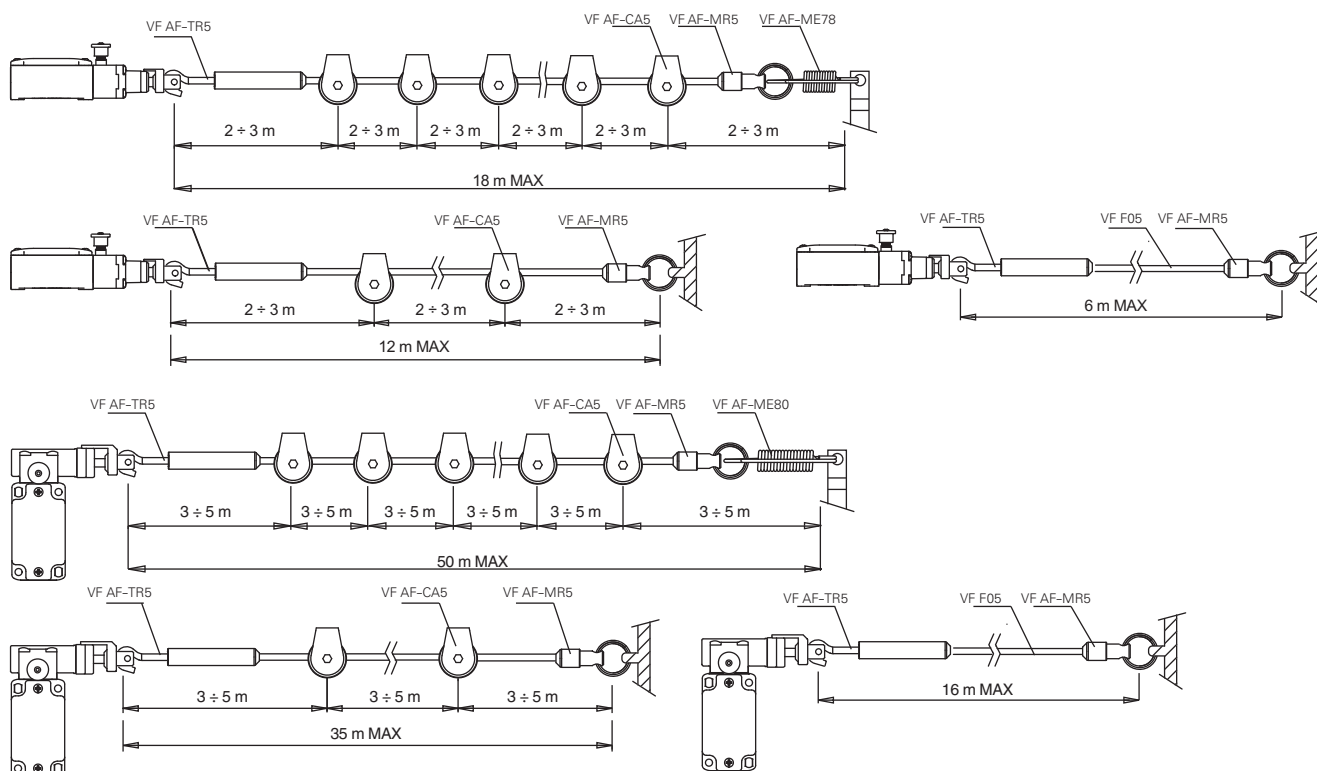
L = slow action

Category	Contact block	Dimensions (mm)	Actuating force	Travel diagrams
3D	18 L		initial 63 N...final 83 N (90 N ⊕)	page 196 - group 1 General Catalogue Safety
	20 L		initial 147 N...final 235 N (250 N ⊕)	
2G M2	20 L		initial 147 N...final 235 N (250 N ⊕)	page 196 - group 2 General Catalogue Safety
	20		initial 147 N...final 235 N (250 N ⊕)	
2D	18 L		initial 147 N...final 235 N (250 N ⊕)	page 196 - group 2 General Catalogue Safety
	20 L		initial 147 N...final 235 N (250 N ⊕)	

## Accessories for rope installation

VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR11	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal heads	Safety spring for transversal heads	Rope coil Ø 5 mm length 100 m	Rope function indicator	Stainless steel pulley	Angular pulley, stainless steel

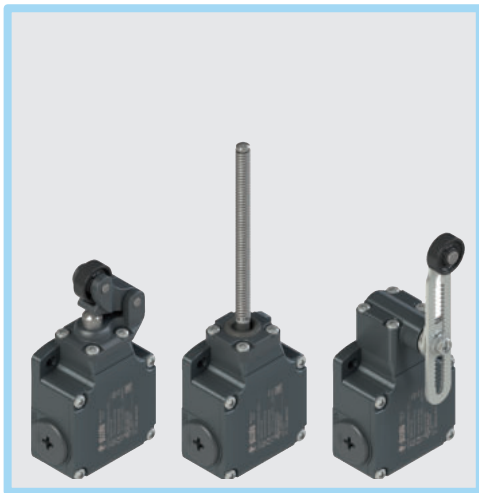
## Application examples and max. rope length



All values in the drawings are in mm

Accessories See page 207




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



### Main features

- ATEX approval
- Metal housing, three conduit entries
- Protection degree IP66
- Versions with gold-plated silver contacts

### ATEX markings:

Product code extension	Quality mark	Certificate type and notified body
-EX4		EU declaration of conformity Pizzato Elettrica S.r.l.
-EX7		EC type examination certificate DEKRA EXAM GmbH
-EX8		EC type examination certificate by DEKRA EXAM GmbH

### Technical data

#### Housing

Metal housing, powder-coated	
Three threaded conduit entries:	M20x1.5
Protection degree acc. to EN 60529:	IP66 with cable gland of equal or higher protection degree

#### General data

Ambient temperature (-EX7):	-20°C ... +60°C
Ambient temperature (-EX4/-EX8):	-20°C ... +70°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	
FL ●●●-EX●	10 million operating cycles
FL ●●93-EX●, FL ●●78-EX●, FL ●●8●-EX●, FL ●●95-EX●	500,000 operating cycles
Mounting position:	any
Safety parameters B <sub>10D</sub> (NC contacts):	
FL ●●●-EX●	20,000,000
FL ●●93-EX●, FL ●●78-EX●, FL ●●8●-EX●	1,000,000
FL ●●95-EX●	2,500,000
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 225
Wire cross-sections and wire stripping lengths:	see page 243

#### Contact blocks available:

2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, 22, 28, 29, 30, 33, 34, 37, 66, 67  
 Note: contact blocks 2 and 3 are not available for articles FL ●●●-EX7

#### In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11, EN 50581.


#### Compliance with the requirements of:

ATEX Directive 2014/34/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

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





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

### Installation for safety applications:

Use only switches marked with the symbol  next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (fault exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 226. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 223 to 236 and in the certificate.**

**⚠ For the correct use of the switch, please use appropriate cable glands suitable for the zone in compliance with the ATEX directive, see Accessories on page 183.**

Product code extension	Category	Zone	EPL	Approvals	Electrical data	Utilization category
-EX4	3D	22	Dc	 II 3D Ex tc IICT80°C Dc	Thermal current (I <sub>th</sub> ): 10 A Rated insulation voltage (U <sub>i</sub> ): 500 Vac 600 Vdc 400 Vac for contact blocks 20, 28 Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 10 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) U <sub>e</sub> (V) 250 400 500 I <sub>e</sub> (A) 6 4 1 Direct current: DC13 U <sub>e</sub> (V) 24 125 250 I <sub>e</sub> (A) 3 0.55 0.3
-EX7	2G M2	1 M2	Gb Mb	 II 2G Ex ia IIC T6 Gb  I M2 Ex ia I Mb <b>⚠ This switch type must be used only in intrinsic safety circuits in compliance with standard IEC 60079-11, EN 60079-11</b>	Maximum current (I <sub>i</sub> ): 2.5 A Maximum voltage (U <sub>i</sub> ): 30 Vdc Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type gG fuse 4 A 250 V Pollution degree: 3	
-EX8	2D	21	Db	 II 2D Ex tb IICT80°C DDb	Thermal current (I <sub>th</sub> ): 6 A Rated insulation voltage (U <sub>i</sub> ): 250 Vac/Vdc Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 6 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) U <sub>e</sub> (V) 250 I <sub>e</sub> (A) 6 Direct current: DC13 U <sub>e</sub> (V) 24 125 250 I <sub>e</sub> (A) 3 0.55 0.3



### Quality marks of the product



UL approval: E131787  
EAC approval: RU C-IT.YT03.B.00035/19

### Features approved by UL

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

Environmental Ratings: Types 1, 4X, 12, 13

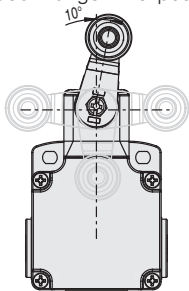
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

For contact blocks 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 14 AWG. Tightening torque for terminal screws of 12 lb in (1.4 Nm).

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

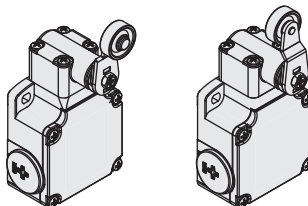
### Adjustable levers

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.



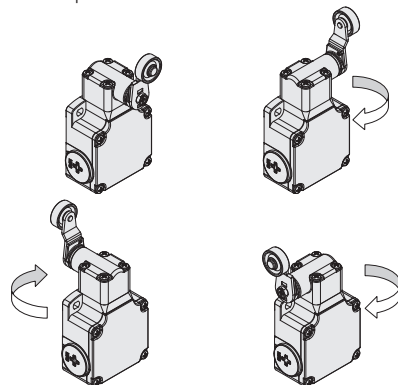
### Reversible levers

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



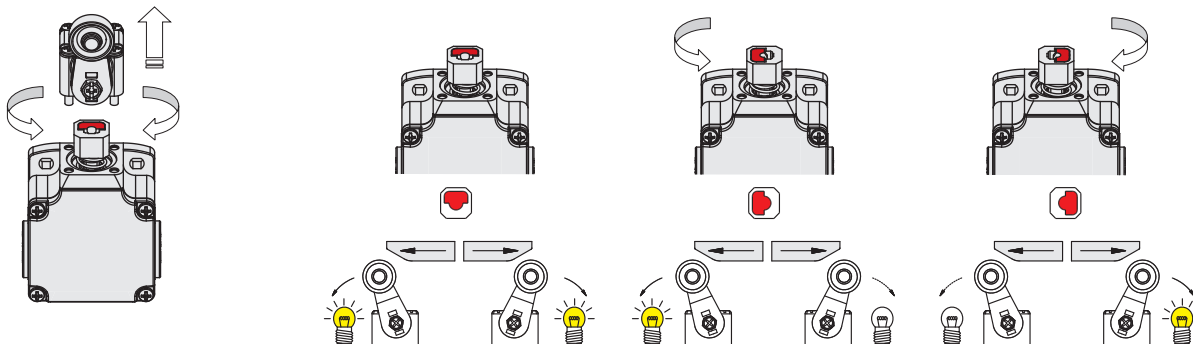
### Head with variable orientation

For all switches the head can be rotated in 90° steps.



### Unidirectional heads

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



### Code structure

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



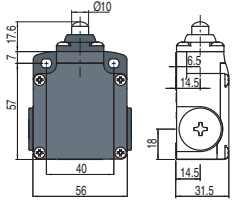
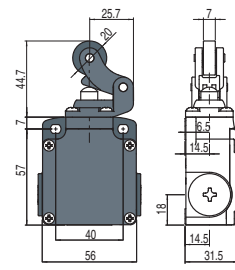
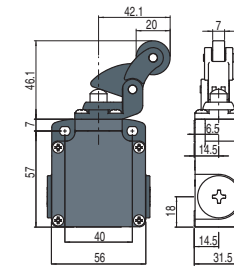
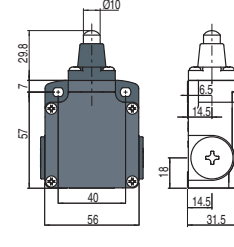












article options product code extension  
**FL 502-GM2-EX7**



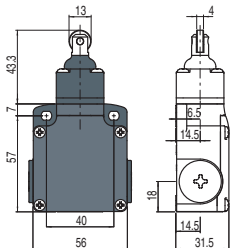
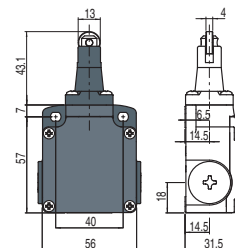
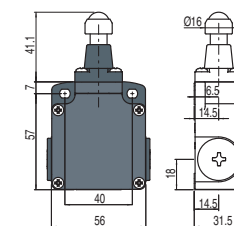
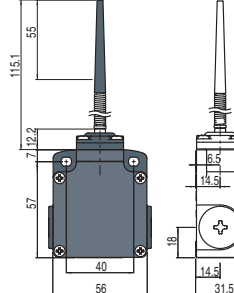











Housing	
FL	metal, three conduit entries
Contact block	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
...	.....



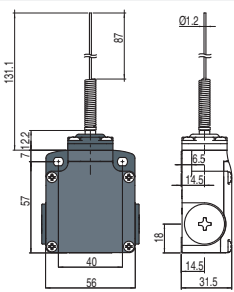
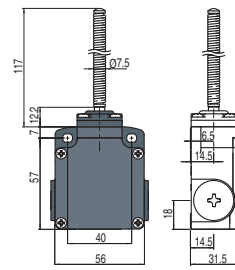
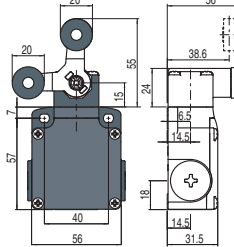
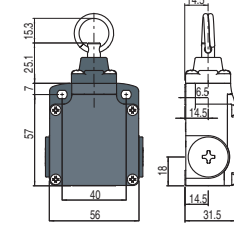









Actuators	
01	short plunger
02	roller lever
...	.....

ATEX approval	
-EX4	Ex II 3D Ex tc IIIC T80°C Dc
-EX7	Ex II 2G Ex ia IICT6 Gb Ex I M2 Ex ia I Mb
-EX8	Ex II 2D Ex tb IIIC T80°C Db

Contact type	
	silver contacts (standard)
G	silver contacts, 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 2, 20, 21, 22, 28, 29, 30)

Contact type:		With stainless steel roller on request		With stainless steel roller on request					
 = snap action  = slow action									
Category	Contact block								
3D	2  FL 201-M2-EX4	2x(1NO-1NC)	FL 202-M2-EX4	2x(1NO-1NC)	FL 205-M2-EX4	2x(1NO-1NC)	FL 211-M2-EX4	2x(1NO-1NC)	
	5  FL 501-M2-EX4	1NO+1NC	FL 502-M2-EX4	1NO+1NC	FL 505-M2-EX4	1NO+1NC	FL 511-M2-EX4	1NO+1NC	
	6  FL 601-M2-EX4	1NO+1NC	FL 602-M2-EX4	1NO+1NC	FL 605-M2-EX4	1NO+1NC	FL 611-M2-EX4	1NO+1NC	
	20  FL 2001-M2-EX4	1NO+2NC	FL 2002-M2-EX4	1NO+2NC	FL 2005-M2-EX4	1NO+2NC	FL 2011-M2-EX4	1NO+2NC	
2G M2	5  FL 501-M2-EX7	1NO+1NC	FL 502-M2-EX7	1NO+1NC	FL 505-M2-EX7	1NO+1NC	FL 511-M2-EX7	1NO+1NC	
	20  FL 2001-M2-EX7	1NO+2NC	FL 2002-M2-EX7	1NO+2NC	FL 2005-M2-EX7	1NO+2NC	FL 2011-M2-EX7	1NO+2NC	
2D	5  FL 501-M2-EX8	1NO+1NC	FL 502-M2-EX8	1NO+1NC	FL 505-M2-EX8	1NO+1NC	FL 511-M2-EX8	1NO+1NC	
	20  FL 2001-M2-EX8	1NO+2NC	FL 2002-M2-EX8	1NO+2NC	FL 2005-M2-EX8	1NO+2NC	FL 2011-M2-EX8	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		
Actuating force		8 N (25 N  )	6 N (25 N  )		6 N (25 N  )		8 N (25 N  )		
Travel diagrams		page 226 - group 1		page 226 - group 2		page 226 - group 2		page 226 - group 1	

Contact type:		External gasket		Ball, Ø 12.7 mm, stainless steel		External gasket			
 = snap action  = slow action									
Category	Contact block								
3D	2  FL 215-M2-EX4	2x(1NO-1NC)	FL 216-M2-EX4	2x(1NO-1NC)	FL 219-M2-EX4	2x(1NO-1NC)	FL 220-M2-EX4	2x(1NO-1NC)	
	5  FL 515-M2-EX4	1NO+1NC	FL 516-M2-EX4	1NO+1NC	FL 519-M2-EX4	1NO+1NC	FL 520-M2-EX4	1NO+1NC	
	6  FL 615-M2-EX4	1NO+1NC	FL 616-M2-EX4	1NO+1NC	FL 619-M2-EX4	1NO+1NC	/	/	
	20  FL 2015-M2-EX4	1NO+2NC	FL 2016-M2-EX4	1NO+2NC	FL 2019-M2-EX4	1NO+2NC	FL 2020-M2-EX4	1NO+2NC	
2G M2	5  FL 515-M2-EX7	1NO+1NC	FL 516-M2-EX7	1NO+1NC	FL 519-M2-EX7	1NO+1NC	FL 520-M2-EX7	1NO+1NC	
	20  FL 2015-M2-EX7	1NO+2NC	FL 2016-M2-EX7	1NO+2NC	FL 2019-M2-EX7	1NO+2NC	FL 2020-M2-EX7	1NO+2NC	
2D	5  /	/	FL 516-M2-EX8	1NO+1NC	FL 519-M2-EX8	1NO+1NC	/	/	
	20  /	/	FL 2016-M2-EX8	1NO+2NC	FL 2019-M2-EX8	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	
Actuating force		11 N (25 N  )		8 N (25 N  )		8 N (25 N  )		0.09 Nm	
Travel diagrams		page 226 - group 1		page 226 - group 1		page 226 - group 1		page 226 - group 3	

Contact type:		External gasket		External gasket		Bistable		Rope switch for signalling	
 = snap action  = slow action									
Category	Contact block								
3D	2  FL 221-M2-EX4	2x(1NO-1NC)	FL 225-M2-EX4	2x(1NO-1NC)	/	/	FL 276-M2-EX4	2x(1NO-1NC)	
	5  FL 521-M2-EX4	1NO+1NC	FL 525-M2-EX4	1NO+1NC	FL 541-M2-EX4	1NO+1NC	FL 576-M2-EX4	1NO+1NC	
	6  /	/	/	/	/	/	FL 676-M2-EX4	1NO+1NC	
	20  FL 2021-M2-EX4	1NO+2NC	FL 2025-M2-EX4	1NO+2NC	/	/	FL 2076-M2-EX4	2NO+1NC	
2G M2	5  FL 521-M2-EX7	1NO+1NC	FL 525-M2-EX7	1NO+1NC	FL 541-M2-EX7	1NO+1NC	FL 576-M2-EX7	1NO+1NC	
	20  FL 2021-M2-EX7	1NO+2NC	FL 2025-M2-EX7	1NO+2NC	/	/	FL 2076-M2-EX7	2NO+1NC	
2D	5  /	/	/	/	FL 541-M2-EX8	1NO+1NC	FL 576-M2-EX8	1NO+1NC	
	20  /	/	/	/	/	/	FL 2076-M2-EX8	2NO+1NC	
Max. speed		1 m/s		1 m/s		0.5 m/s with cam at 30°		0.5 m/s	
Actuating force		0.08 Nm		0.14 Nm		0.21 Nm (0.36 Nm  )		initial 20 N - final 40 N	
Travel diagrams		page 226 - group 3		page 226 - group 3		page 226 - group 4		page 226 - group 6	

All values in the drawings are in mm

Accessories See page 207

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

## Position switches with swivelling lever without actuator

Contact type:

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

Category	Contact block	Regular head		Compact head	
		Dimensions	Dimensions	Dimensions	Dimensions
3D	2 <b>R</b>	FL 238-M2-EX4	2x(1NO-1NC)	FL 258-M2-EX4	2x(1NO-1NC)
	5 <b>R</b>	FL 538-M2-EX4	1NO+1NC	FL 558-M2-EX4	1NO+1NC
	6 <b>L</b>	FL 638-M2-EX4	1NO+1NC	FL 658-M2-EX4	1NO+1NC
	20 <b>L</b>	FL 2038-M2-EX4	1NO+2NC	FL 2058-M2-EX4	1NO+2NC
2G M2	5 <b>R</b>	FL 538-M2-EX7	1NO+1NC	FL 558-M2-EX7	1NO+1NC
	20 <b>L</b>	FL 2038-M2-EX7	1NO+2NC	FL 2058-M2-EX7	1NO+2NC
2D	5 <b>R</b>	FL 538-M2-EX8	1NO+1NC	FL 558-M2-EX8	1NO+1NC
	20 <b>L</b>	FL 2038-M2-EX8	1NO+2NC	FL 2058-M2-EX8	1NO+2NC
Actuating force		0.1 Nm (0.25 Nm $\rightarrow$ )		0.06 Nm (0.25 Nm $\rightarrow$ )	
Travel diagrams		page 226 - group 4		page 226 - group 4	

### IMPORTANT

**For safety applications:** join only switches and actuators marked with symbol  $\rightarrow$  next to the product code.

For more information about safety applications see details on page 223.

## Separate actuators

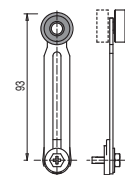
**IMPORTANT:** These separate actuators can be used only with items of the FL series.

	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod, 3x3x125 mm	Spring rod with plastic tip	Adjustable actuator with technopolymer roller	Adjustable glass fibre rod
Article	<b>VF L31</b> $\rightarrow$	<b>VF L32</b> <sup>(2)</sup>	<b>VF L33</b> <sup>(2)</sup>	<b>VF L34</b>	<b>VF L35</b> $\rightarrow$ <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> $\rightarrow$	<b>VF L52</b> $\rightarrow$	<b>VF L53</b> $\rightarrow$	<b>VF L56</b> $\rightarrow$ <sup>(2)</sup>	<b>VF L57</b> $\rightarrow$	
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> $\rightarrow$	<b>VF L35-R24</b> $\rightarrow$ <sup>(1) (2)</sup>	<b>VF L51-R24</b> $\rightarrow$	<b>VF L52-R24</b> $\rightarrow$	<b>VF L56-R24</b> $\rightarrow$ <sup>(2)</sup>	<b>VF L57-R24</b> $\rightarrow$
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 the figure to the right.


If an adjustable lever is required for safety applications, use the VF L56 adjustable safety lever.

- <sup>(2)</sup> If installed with switch FL •58-M2-EX (e.g. FL 558-M2-EX•, FL 658-M2-EX•...) the actuator may hit the housing of the switch upon actuation. This possible interference depends on the fixing position of actuator and switch head.



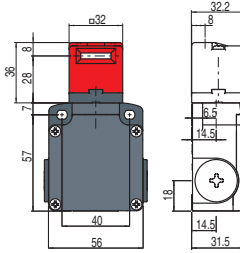
## Safety switches with separate actuator










Contact type:

 = slow action

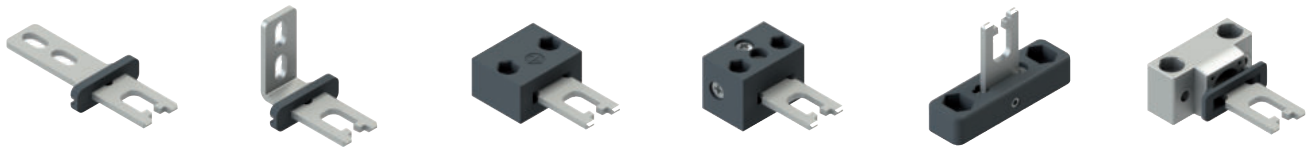
Switches with separate actuator

Switch without actuator



Category	Contact block				
3D	6		FL 693-M2-EX4		1NO+1NC
	20		FL 2093-M2-EX4		1NO+2NC
2G M2	20		FL 2093-M2-EX7		1NO+2NC
2D	20		FL 2093-M2-EX8		1NO+2NC
Actuating force	10 N (18 N  )				
Travel diagrams	page 19, General Catalogue Safety				

## Actuators


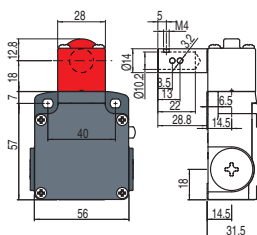











VF KEYF	VF KEYF1	VF KEYF2	VF KEYF3	VF KEYF7	VF KEYF8
Straight actuator	Angled actuator	Swivelling actuator	Actuator adjustable in two directions	Actuator adjustable in one direction	Universal actuator

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

## Safety switches for hinges

Contact type:

 = slow action

Category	Contact block				
3D	18		FL 1895-M2-EX4		1NO+1NC
	20		FL 2095-M2-EX4		1NO+2NC
2G M2	20		FL 2095-M2-EX7		1NO+2NC
2D	20		FL 2095-M2-EX8		1NO+2NC
Actuating force	0.15 Nm (0.4 Nm  )				
Travel diagrams	page 73, General Catalogue Safety				

## Safety rope switches with reset for emergency stops

Contact type:

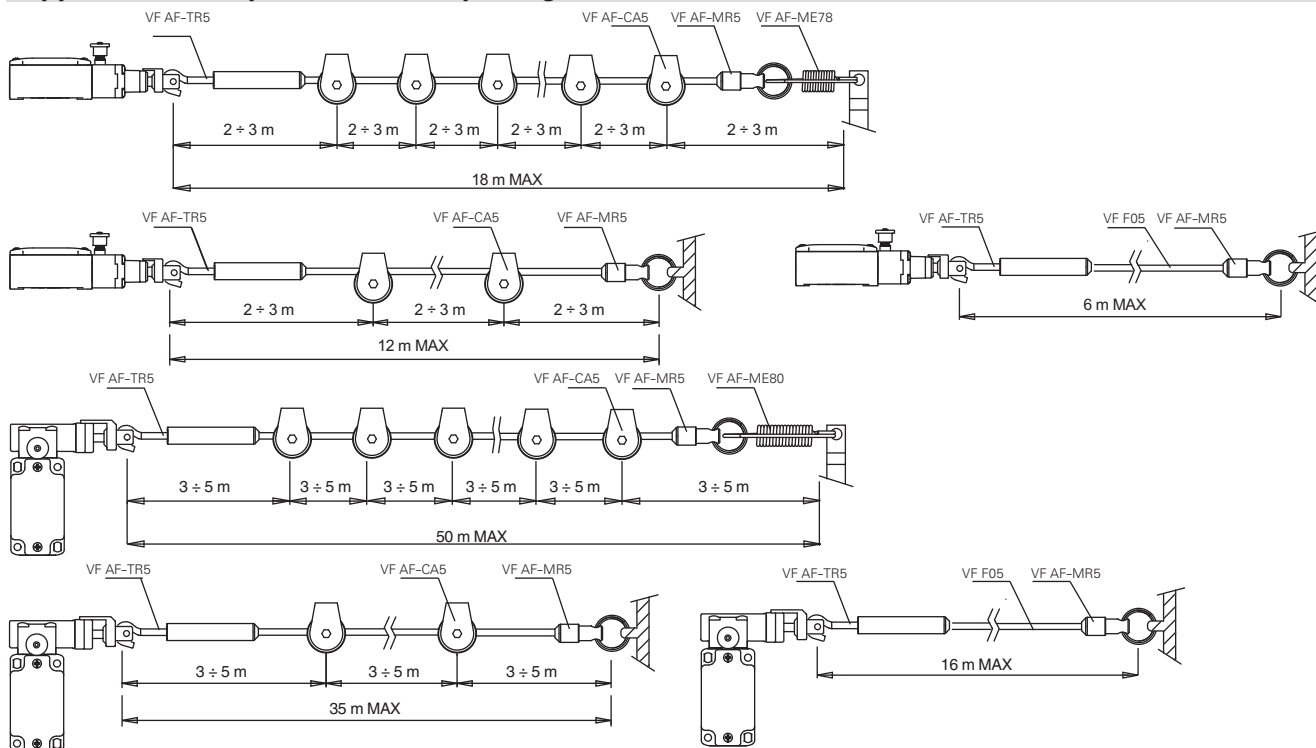
L = slow action

Category	Contact block	Diagram 1	Diagram 2	Diagram 3
3D	18 L 20 L			
		FL 1878-M2-EX4 → 1NO+1NC	FL 1883-M2-EX4 → 1NO+1NC	FL 1884-M2-EX4 → 1NO+1NC
		FL 2078-M2-EX4 → 1NO+2NC	FL 2083-M2-EX4 → 1NO+2NC	FL 2084-M2-EX4 → 1NO+2NC
2G M2	20 L	FL 2078-M2-EX7 → 1NO+2NC	FL 2083-M2-EX7 → 1NO+2NC	FL 2084-M2-EX7 → 1NO+2NC
2D	18 L 20 L	FL 1878-M2-EX8 → 1NO+1NC	FL 1883-M2-EX8 → 1NO+1NC	FL 1884-M2-EX8 → 1NO+1NC
		FL 2078-M2-EX8 → 1NO+2NC	FL 2083-M2-EX8 → 1NO+2NC	FL 2084-M2-EX8 → 1NO+2NC
Actuating 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 196 - group 1 General Catalogue Safety	page 196 - group 2 General Catalogue Safety	page 196 - group 2 General Catalogue Safety

## Accessories for rope installation

VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR11	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal heads	Safety spring for transversal heads	Rope coil Ø 5 mm length 100 m	Rope function indicator.	Stainless steel pulley	Angular pulley, stainless steel

## Application examples and max. rope length

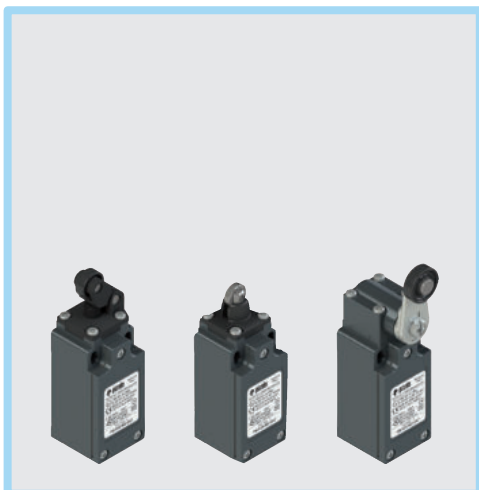


All values in the drawings are in mm

Accessories See page 207

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





### Main features

- ATEX approval
- Metal housing, one conduit entry
- Protection degree IP67
- Versions with gold-plated silver contacts

### ATEX markings:

Product code extension

Quality mark

Certificate type and notified body

**-EX7**EC type examination certificate  
DEKRA EXAM GmbH

### Technical data

#### Housing

Metal housing, powder-coated  
One threaded conduit entry: M20x1.5  
Protection degree acc. to EN 60529: IP67 with cable gland of equal or higher protection degree

#### General data

Ambient temperature: -20°C ... +60°C  
Max. actuation frequency: 3600 operating cycles/hour  
Mechanical endurance:  
FM ●●●●-EX● 10 million operating cycles  
FM ●●C●-EX●, FM ●●96-EX● 500,000 operating cycles  
Mounting position: any  
Safety parameters B<sub>10D</sub> (NC contacts):  
FM ●●●●-EX● 20,000,000  
FM ●●C●-EX● 1,000,000  
FM ●●96-EX● 2,500,000  
Mechanical interlock, not coded: type 1 acc. to EN ISO 14119  
Tightening torques for installation: see page 227  
Wire cross-sections and wire stripping lengths: see page 243

#### Contact blocks available:

5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21, 22, 28, 29, 30, 33, 34, 37, 66, 67

#### In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11, EN 50581.


#### Compliance with the requirements of:

ATEX Directive 2014/34/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

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

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

### Installation for safety applications:

Use only switches marked with the symbol  next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (fault exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 228. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 223 to 236 and in the certificate.**

**⚠ For the correct use of the switch, please use appropriate cable glands suitable for the zone in compliance with the ATEX directive, see Accessories on page 183.**

Product code extension	Category	Zone	EPL	Approvals	⚠ This switch type must be used only in intrinsic safety circuits in compliance with standard IEC 60079-11, EN 60079-11
	2G M2	1 M2	Gb Mb	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb	
<b>-EX7</b>	<b>Electrical data</b>				
	Maximum current (Ii):				2.5 A
	Maximum voltage (Ui):				30 Vdc
	Conditional short circuit current:				1000 A acc. to EN 60947-5-1
	Protection against short circuits:				type gG fuse 4 A 250 V
	Pollution degree:				3

**Quality marks of the product**


UL approval: E131787  
EAC approval: RU C-IT.YT03.B.00035/19

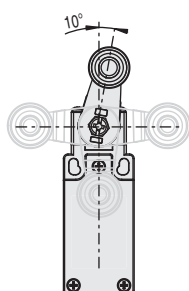
**Features approved by UL**

Electrical Ratings: Q300 pilot duty (69 VA, 125-250 V dc)  
A600 pilot duty (720 VA, 120-600 V ac)  
Environmental Ratings: Types 1, 4X, 12, 13  
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).  
For contact blocks 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 14 AWG. Tightening torque for terminal screws of 12 lb in (1.4 Nm).

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

**Adjustable levers**

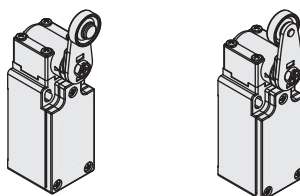
For these switches the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission



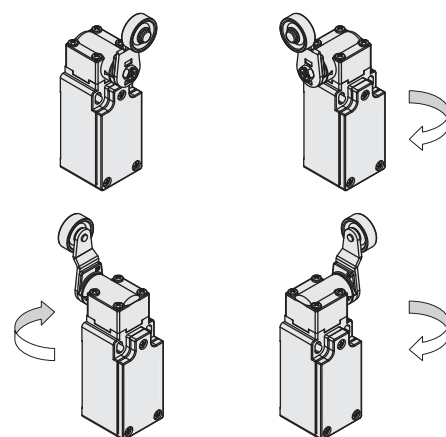
is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

**Reversible levers**

With these switches, the lever can be secured in either the normal or reverse position, whereby positive coupling is retained. In this way two different working planes of the lever are possible.


**Head with variable orientation**

For all switches the head can be rotated 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 product code extension  
**FM 502-GM2-EX7**

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

Contact block	
<b>5</b>	1NO+1NC, snap action
<b>11</b>	2NC, snap action
<b>12</b>	2NO, snap action
<b>20</b>	1NO+2NC, slow action
<b>21</b>	3NC, slow action
<b>22</b>	2NO+1NC, slow action

Actuators	
<b>01</b>	short plunger
<b>02</b>	roller lever
...	.....

ATEX approval	
<b>-EX7</b>	II 2G Ex ia IIC T6 Gb I M2 Ex ia I Mb

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts, 1 µm gold coating
<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact block 20, 21, 22, 28, 29, 30, 33, 34)

Category		Contact block		With stainless steel roller on request		With stainless steel roller on request			
2G M2	5	<b>R</b>	FM 501-M2-EX7	1NO+1NC	FM 502-M2-EX7	1NO+1NC	FM 505-M2-EX7	1NO+1NC	
	20	<b>L</b>	FM 2001-M2-EX7	1NO+2NC	FM 2002-M2-EX7	1NO+2NC	FM 2005-M2-EX7	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°	
Actuating force		8 N (25 N $\rightarrow$ )		6 N (25 N $\rightarrow$ )		6 N (25 N $\rightarrow$ )		4 N (25 N $\rightarrow$ )	
Travel diagrams		page 228 - group 1		page 228 - group 2		page 228 - group 2		page 228 - group 3	

Category		Contact block		External gasket		External gasket		External gasket		
2G M2	5	<b>R</b>	FM 508-M2-EX7	1NO+1NC	FM 512-M2-EX7	1NO+1NC	FM 513-M2-EX7	1NO+1NC	FM 515-M2R28-EX7	1NO+1NC
	20	<b>L</b>	FM 2008-M2-EX7	1NO+2NC	FM 2012-M2-EX7	1NO+2NC	FM 2013-M2-EX7	1NO+2NC	FM 2015-M2R28-EX7	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°		
Actuating force		8 N (25 N $\rightarrow$ )		8 N (25 N $\rightarrow$ )		8 N (25 N $\rightarrow$ )		8 N (25 N $\rightarrow$ )		
Travel diagrams		page 228 - group 1		page 228 - group 1		page 228 - group 1		page 228 - group 1		

Category		Contact block		External gasket		External gasket		External gasket		Rope switch for signalling	
2G M2	5	<b>R</b>	FM 520-M2-EX7	1NO+1NC	FM 521-M2-EX7	1NO+1NC	FM 525-M2-EX7	1NO+1NC	FM 576-M2-EX7	1NO+1NC	
	20	<b>L</b>	FM 2020-M2-EX7	1NO+2NC	FM 2021-M2-EX7	1NO+2NC	FM 2025-M2-EX7	1NO+2NC	FM 2076-M2-EX7	2NO+1NC	
Max. speed		1 m/s		1 m/s		1 m/s		0.5 m/s		initial 20 N - final 40 N	
Actuating force		0.06 Nm		0.04 Nm		0.11 Nm					
Travel diagrams		page 228 - group 4		page 228 - group 4		page 228 - group 4		page 228 - group 4		page 228 - group 7	

## Position switches with swivelling lever without actuator

Contact type:

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

Category	Contact block	Dimensions
2G	5 <b>R</b>	
M2	20 <b>L</b>	
Actuating force	0.06 Nm (0.25 Nm $\rightarrow$ )	
Travel diagrams	page 228 - group 5	

### IMPORTANT

**For safety applications:** join only switches and actuators marked with symbol  $\rightarrow$  next to the product code.

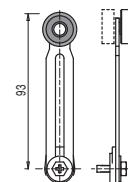
For more information about safety applications see details on page 223.

## Separate actuators

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

	Technopolymer roller Ø 18 mm	Technopolymer roller Ø 18 mm	Adjustable square rod, 3x3x125 mm	Spring rod with plastic tip	Adjustable round rod Ø 3x125 mm	Technopolymer roller Ø 20 mm	
Article	<b>VF LE30</b> $\rightarrow$	<b>VF LE31</b> $\rightarrow$	<b>VF LE33</b>	<b>VF LE34</b>	<b>VF LE50</b>	<b>VF LE51</b> $\rightarrow$	
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 glass fibre rod
Article	<b>VF LE52</b> $\rightarrow$	<b>VF LE53</b> $\rightarrow$	<b>VF LE54</b> $\rightarrow$	<b>VF LE55</b> $\rightarrow$ <sup>(1)</sup>	<b>VF LE56</b> $\rightarrow$	<b>VF LE57</b> $\rightarrow$	<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> $\rightarrow$	<b>VF LE51-R24</b> $\rightarrow$	<b>VF LE52-R24</b> $\rightarrow$	<b>VF LE54-R24</b> $\rightarrow$	<b>VF LE55-R24</b> $\rightarrow$ <sup>(1)</sup>	<b>VF LE56-R24</b> $\rightarrow$	<b>VF LE57-R24</b> $\rightarrow$
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 the figure to the right. If an adjustable lever is required for safety applications, use the VF LE56 adjustable safety lever.



All values in the drawings are in mm

**Accessories** See page 207

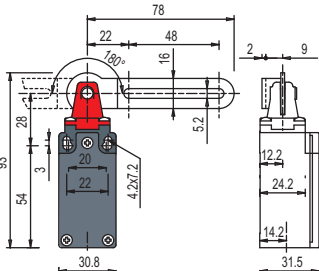
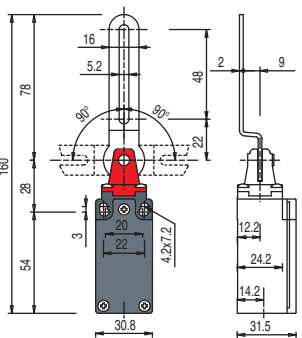
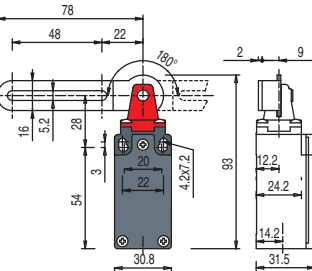






 $\rightarrow$  The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)

**Safety switches with slotted hole lever**

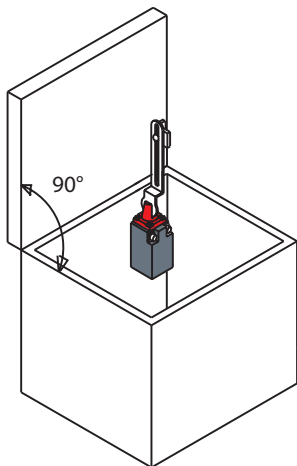
All values in the drawings are in mm

Contact type:

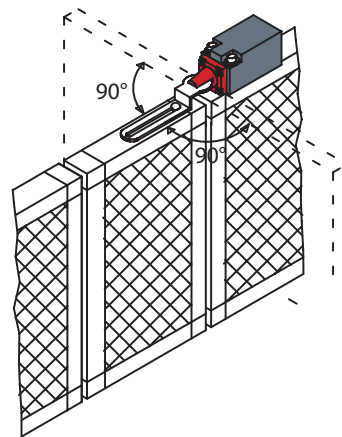
 = slow action

Category	Contact block			
		2G M2 20  FM 20C1-M2-EX7  1NO+2NC	FM 20C2-M2-EX7  1NO+2NC	FM 20C3-M2-EX7  1NO+2NC
Actuating force	11 N (15 N  )		11 N (15 N  )	
Travel diagrams	page 230 - group 10		page 230 - group 11	

**Application examples**



Safety switch with slotted hole lever, mounting inside the safety guard



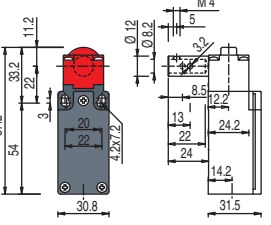



Safety switch with slotted hole lever, mounting on doors with a pivoting range of 180°

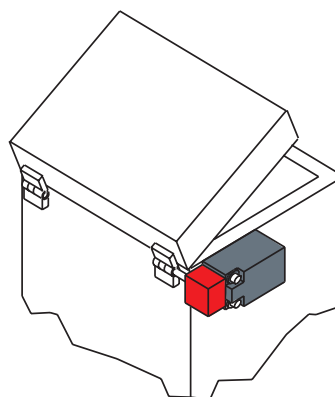
**Safety switches for hinges**

**Application examples**

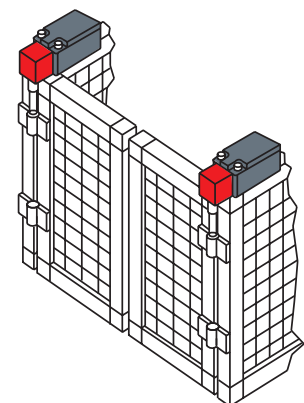
Contact type:

 = slow action

Category	Contact block	
		2G M2 20  FM 2096-M2-EX7  1NO+2NC
Actuating force	0.15 Nm (0.4 Nm  )	
Travel diagrams	page 230 - group 9	



Safety switch for hinges, mounting outside the safety guard



Safety switches for hinges, mounting on double door





### Technical data

#### Housing

Metal housing, powder-coated  
with cable in halogen-free polyurethane, 2 m, other lengths on request  
Protection degree acc. to EN 60529: IP67

#### General data

Ambient temperature: -20°C ... +60°C  
Max. actuation frequency: 3600 operating cycles/hour  
Mechanical endurance: 10 million operating cycles  
Mounting position: any  
Safety parameters  $B_{10D}$  (NC contacts): 20,000,000  
Mechanical interlock, not coded: type 1 acc. to EN ISO 14119  
Tightening torques for installation: see page 231

#### Main features

- ATEX approval
- Metal housing
- Protection degree IP67
- Cable, halogen-free polyurethane

#### In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-31, EN 60079-31, IEC 60079-15, EN 60079-15, EN 50581.

#### ATEX markings:

Product code extension  
Quality mark

Certificate type and notified body

**-EX5**



EU declaration of conformity  
Pizzato Elettrica S.r.l.


#### Compliance with the requirements of:

ATEX Directive 2014/34/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.



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

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

#### Installation for safety applications:

Use only switches marked with the symbol  next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: see "Internal wiring") as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (failure exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 232. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 223 to 236 and in the certificate.**

Category	Zone	EPL	Approvals
3D	22	Dc	 II 3D Ex tc III CT80°C Dc
3G	2	Gc	 II 3G Ex nC IIC T6 Gc

Product code extension  
**-EX5**

**Electrical data**  
Thermal current ( $I_{th}$ ): 10 A  
Rated insulation voltage ( $U_i$ ): 400 Vac/dc  
Conditional short circuit current: 1000 A acc. to EN 60947-5-1  
Protection against short circuits: type aM fuse 10 A 500 V  
Pollution degree: 3

#### Utilization category

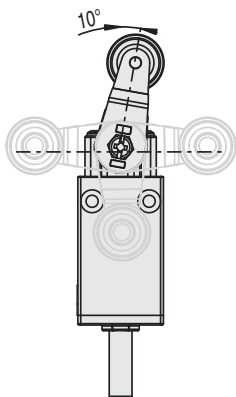
Alternating current: AC15 (50-60 Hz)  

$U_e$ (V)	120	250	400
$I_e$ (A)	6	4	3

 Direct current: DC13  

$U_e$ (V)	24	125	250
$I_e$ (A)	2.5	0.55	0.27

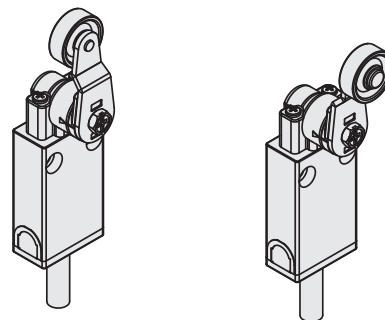
### Adjustable levers



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

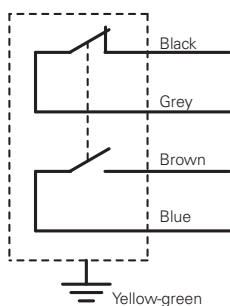
### Reversible levers

With these switches, the lever can be secured in either the normal or reverse position, whereby positive coupling is retained. In this way two different working planes of the lever are possible.



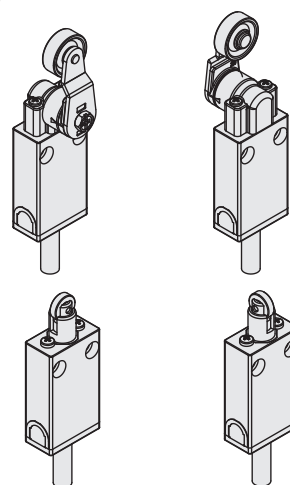
### Internal wiring

1NO+1NC



### Head with variable orientation

Depending on the model, it is possible to rotate the head in 90° or 180° steps.



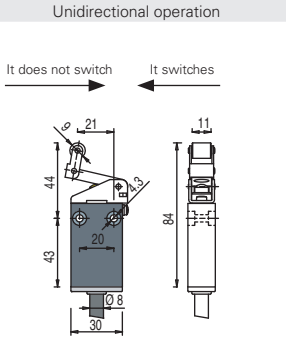
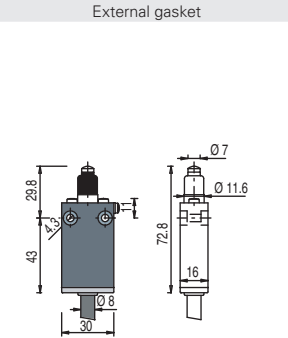
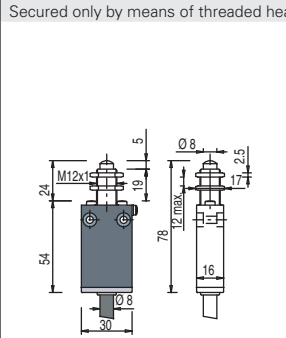
### Code structure Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

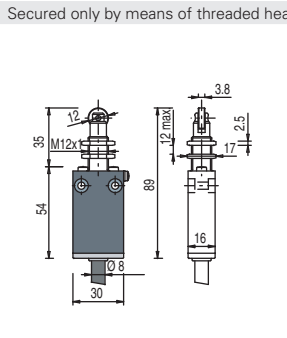
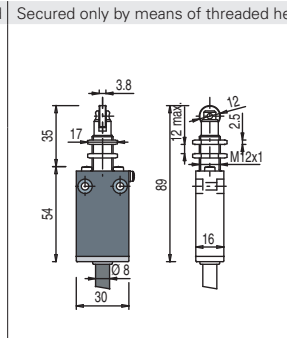
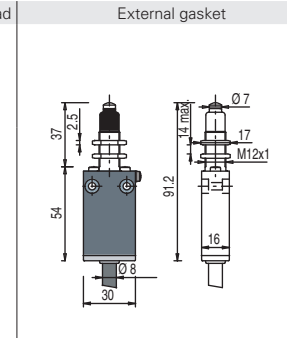
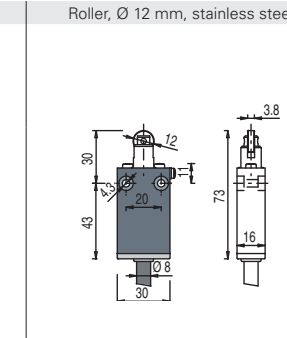
article
options
product code extension  
**FA 4501-2SHG-EX5**

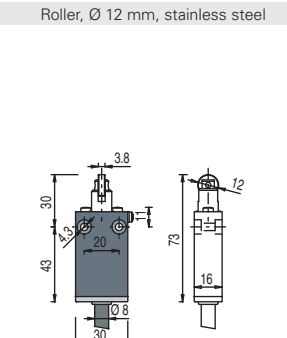
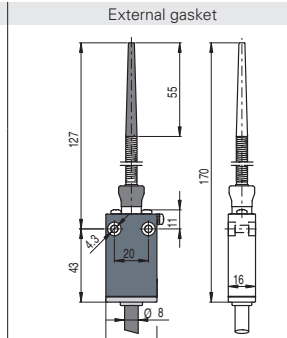
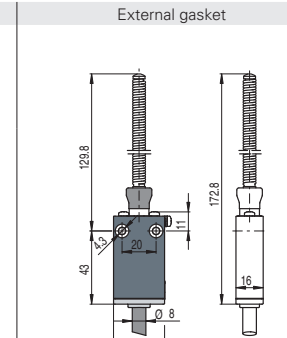
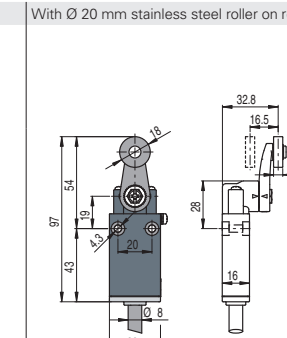
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2"><b>Housing</b></td></tr> <tr><td><b>FA</b></td><td>metal</td></tr> <tr><td colspan="2"><b>Contact block</b></td></tr> <tr><td><b>45</b></td><td>1NO+1NC, snap action</td></tr> <tr><td><b>46</b></td><td>1NO+1NC, slow action</td></tr> <tr><td colspan="2"><b>Actuators</b></td></tr> <tr><td><b>01</b></td><td>short plunger</td></tr> <tr><td><b>02</b></td><td>unidirectional lever</td></tr> <tr><td><b>08</b></td><td>plunger</td></tr> <tr><td>...</td><td>.....</td></tr> <tr><td colspan="2"><b>Connection type</b></td></tr> <tr><td><b>1</b></td><td>cable, length: 1 m</td></tr> <tr><td><b>2</b></td><td>cable length: 2 m</td></tr> <tr><td>...</td><td>.....</td></tr> <tr><td><b>0</b></td><td>cable, length: 10 m</td></tr> </table>	<b>Housing</b>		<b>FA</b>	metal	<b>Contact block</b>		<b>45</b>	1NO+1NC, snap action	<b>46</b>	1NO+1NC, slow action	<b>Actuators</b>		<b>01</b>	short plunger	<b>02</b>	unidirectional lever	<b>08</b>	plunger	...	.....	<b>Connection type</b>		<b>1</b>	cable, length: 1 m	<b>2</b>	cable length: 2 m	...	.....	<b>0</b>	cable, length: 10 m	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2"><b>ATEX approval</b></td></tr> <tr><td><b>-EX5</b></td><td>  II 3D Ex tc IIIC T80°C Dc   II 3G Ex nC IICT6 Gc         </td></tr> <tr><td colspan="2"><b>Contact type</b></td></tr> <tr><td></td><td>silver contacts (standard)</td></tr> <tr><td><b>G</b></td><td>silver contacts, 1 µm gold coating</td></tr> <tr><td colspan="2"><b>Cable type</b></td></tr> <tr><td><b>H</b></td><td>PUR cable, halogen free</td></tr> <tr><td colspan="2"><b>Output direction</b></td></tr> <tr><td><b>S</b></td><td>bottom output</td></tr> </table>	<b>ATEX approval</b>		<b>-EX5</b>	II 3D Ex tc IIIC T80°C Dc II 3G Ex nC IICT6 Gc	<b>Contact type</b>			silver contacts (standard)	<b>G</b>	silver contacts, 1 µm gold coating	<b>Cable type</b>		<b>H</b>	PUR cable, halogen free	<b>Output direction</b>		<b>S</b>	bottom output
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<b>S</b>	bottom output																																																

Other lengths on request



		Unidirectional operation		External gasket		Secured only by means of threaded head	
Contact type: <b>R</b> = snap action <b>L</b> = slow action							
Category	45 <b>R</b>	FA 4501-2SH-EX5	1NO+1NC	FA 4502-2SH-EX5	1NO+1NC	FA 4508-2SH-EX5	1NO+1NC
	46 <b>L</b>	FA 4601-2SH-EX5	1NO+1NC	FA 4602-2SH-EX5	1NO+1NC	FA 4608-2SH-EX5	1NO+1NC
Max. speed		0.5 m/s		0.5 m/s		0.5 m/s	
Actuating force		10 N (25 N $\rightarrow$ )		5 N (25 N $\rightarrow$ )		10 N (25 N $\rightarrow$ )	
Travel diagrams		page 232 - group 1		page 232 - group 2		page 232 - group 1	

		Secured only by means of threaded head		External gasket		Roller, Ø 12 mm, stainless steel			
Contact type: <b>R</b> = snap action <b>L</b> = slow action									
Category	45 <b>R</b>	FA 4511-2SH-EX5	1NO+1NC	FA 4512-2SH-EX5	1NO+1NC	FA 4513-2SH-EX5	1NO+1NC		
	46 <b>L</b>	FA 4611-2SH-EX5	1NO+1NC	FA 4612-2SH-EX5	1NO+1NC	FA 4613-2SH-EX5	1NO+1NC		
Max. speed		0.1 m/s with cam at 30°		0.1 m/s with cam at 30°		0.5 m/s			
Actuating force		10 N (25 N $\rightarrow$ )		10 N (25 N $\rightarrow$ )		10 N (25 N $\rightarrow$ )			
Travel diagrams		page 232 - group 1		page 232 - group 1		page 232 - group 1			

		Roller, Ø 12 mm, stainless steel		External gasket		External gasket		With Ø 20 mm stainless steel roller on request	
Contact type: <b>R</b> = snap action <b>L</b> = slow action									
Category	45 <b>R</b>	FA 4517-2SH-EX5	1NO+1NC	FA 4520-2SH-EX5	1NO+1NC	FA 4525-2SH-EX5	1NO+1NC		
	46 <b>L</b>	FA 4617-2SH-EX5	1NO+1NC	/	/	FA 4530-2SH-EX5	1NO+1NC		
Max. speed		0.1 m/s with cam at 30°		1 m/s		1 m/s			
Actuating force		10 N (25 N $\rightarrow$ )		0.03 Nm		0.06 Nm			
Travel diagrams		page 232 - group 1		page 232 - group 3		page 232 - group 3			

All values in the drawings are in mm

Accessories See page 207

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



Category		Contact block		With stainless steel roller on request	Square rod, 3x3 mm	With stainless steel roller on request	With stainless steel roller on request			
3D 3G	45	R	FA 4531-2SH-EX5	1NO+1NC	FA 4533-2SH-EX5	1NO+1NC	FA 4534-2SH-EX5	1NO+1NC	FA 4540-2SH-EX5	1NO+1NC
	46	L	FA 4631-2SH-EX5	1NO+1NC	FA 4633-2SH-EX5	1NO+1NC	FA 4634-2SH-EX5	1NO+1NC	FA 4640-2SH-EX5	1NO+1NC
Max. speed		1.5 m/s with cam at 30°		1.5 m/s		1.5 m/s		1.5 m/s with cam at 30°		
Actuating force		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm		0.03 Nm		0.03 Nm (0.25 Nm $\rightarrow$ )		
Travel diagrams		page 232 - group 4		page 232 - group 4		page 232 - group 4		page 232 - group 4		

Category		Contact block		Round rod, Ø 3 mm, stainless steel	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request			
3D 3G	45	R	FA 4550-2SH-EX5	1NO+1NC	FA 4551-2SH-EX5	1NO+1NC	FA 4552-2SH-EX5	1NO+1NC	FA 4554-2SH-EX5	1NO+1NC
	46	L	FA 4650-2SH-EX5	1NO+1NC	FA 4651-2SH-EX5	1NO+1NC	FA 4652-2SH-EX5	1NO+1NC	FA 4654-2SH-EX5	1NO+1NC
Max. speed		1.5 m/s		1.5 m/s with cam at 30°		1.5 m/s with cam at 30°		1.5 m/s with cam at 30°		
Actuating force		0.03 Nm		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm (0.25 Nm $\rightarrow$ )		
Travel diagrams		page 232 - group 4		page 232 - group 4		page 232 - group 4		page 232 - group 4		

Category		Contact block		With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request	Glass fibre rod			
3D 3G	45	R	FA 4555-2SH-EX5	1NO+1NC	FA 4556-2SH-EX5	1NO+1NC	FA 4557-2SH-EX5	1NO+1NC	FA 4569-2SH-EX5	1NO+1NC
	46	L	FA 4655-2SH-EX5	1NO+1NC	FA 4656-2SH-EX5	1NO+1NC	FA 4657-2SH-EX5	1NO+1NC	FA 4669-2SH-EX5	1NO+1NC
Max. speed		1.5 m/s with cam at 30°		1.5 m/s with cam at 30°		1.5 m/s with cam at 30°		1.5 m/s		
Actuating force		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm (0.25 Nm $\rightarrow$ )		0.03 Nm		
Travel diagrams		page 232 - group 4		page 232 - group 4		page 232 - group 4		page 232 - group 4		


<sup>(1)</sup> Positive opening only with actuator set to max.

## Accessories

## ATEX cable gland, technopolymer

**Technical data:**

ATEX marking:

 II 2G Ex eb IIC Gb II 1D Ex ta IIIC Da

Body and ring material:

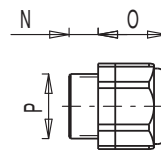
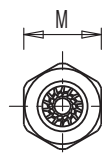
Plastic PA V0 acc. to UL 94

Ambient temperature:

-20 ... +85 °C

Protection degree:

IP68 (≤ 10 bar)




Article	Description	ATEX certificate number	 M	N	O	P
VF PBM20C6P-2GD	M20x1.5 technopolymer cable gland for multipolar cables Ø 6.5 ... 12 mm	IECEX BVS 14.0020X BVS 14 ATEX E 025 X	24	9	24	M20x1.5

## ATEX cable gland, metal

**Technical data:**

ATEX marking:

 II 2G Ex e II II 1D Ex tD A20 IP68

Body and ring material:

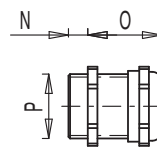
Nickel-plated brass

Ambient temperature:

-20 ... +95 °C

Protection degree:

IP68 (≤ 10 bar)



Article	Description	ATEX certificate number	 M	N	O	P
VF PBM20C6M-2GD	M20x1.5 brass cable gland for multipolar cables Ø 6 ... 12 mm	KEMA 99ATEX6971 X	24	9	24	M20x1.5

