Switches in conformity with **ATEX** directive Ex / **FA** series

Technical data

Housing
Metal housing, baked powder coating
2 m connection cable in polyurethane without halogens, other lengths on request

Protection degree:	IP67 according to EN 60529

General data

Ambient temperature:	-20°C … +60°C
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	10 million operating cycles[1]
Mounting position:	any
Safety parameters B_{10d}(NC contacts):	
F• ••••-EX•	20,000,000
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.

Main features
- Approvals:
  3D and **3G** category
- Metal housing
- Protection degree IP67
- Polyurethane cable without halogens

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-31, EN 60079-31, IEC 60079-15, EN 60079-15.

ATEX markings and quality labels:
CE
Ex **II 3D Ex tc IIIC T80°C Dc**
Ex **II 3G Ex nC IIC T6 Gc**

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: see "internal connections") as stated in **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 241. 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
3D	**22**	**Dc**	Ex **II 3D Ex tc IIIC T80°C Dc**	**-EX5**
3G	**2**	**Gc**	Ex **II 3G Ex nC IIC T6 Gc**	

Electrical data

Thermal current (Ith):	10 A
Rated insulation voltage (Ui):	400 Vac/dc
Conditional short circuit current:	1000 A according to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category
Alternating current: AC15 (50÷60 Hz)

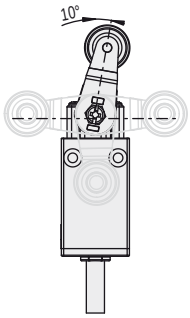
Ue (V)	120	250	400
Ie (A)	6	4	3

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	2.5	0.55	0.27

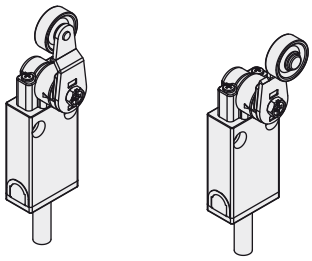
Adjustable levers

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.



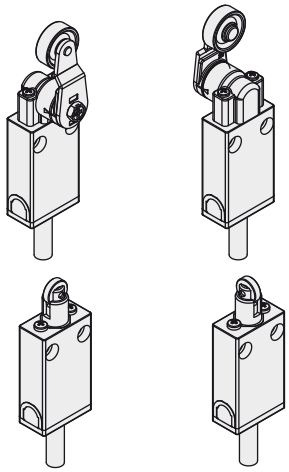
Overturning levers

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.

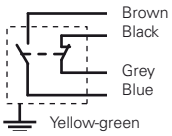


Orientable heads

With some models it is possible to rotate the head in 90° or 180°degree steps.



Internal connections



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

FA 4501-2SH-GEX5

Housing	
FA	metal

Contact blocks	
45	1NO+1NC, snap action
46	1NO+1NC, slow action

Actuators	
01	short plunger
02	unidirectional lever
08	plunger
...	.....

Connection type	
1	cable, length 1 m
2	cable length 2 m
...	.....
0	cable length 10 m

Output direction	
S	output at bottom

Cable type	
H	halogen free polyurethane cable

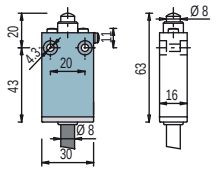
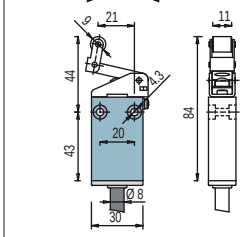
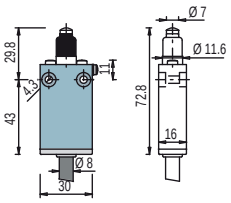
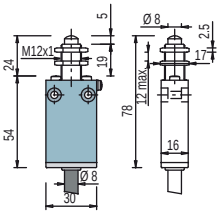
Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating

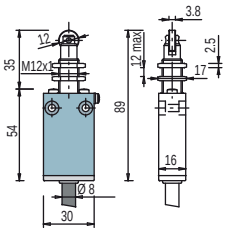
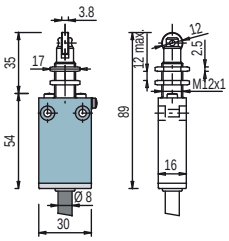
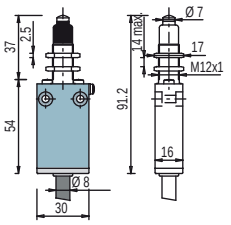
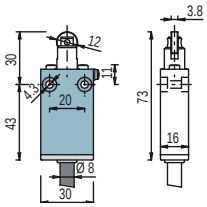
ATEX approval	
-EX5	Ex II 3D Ex tc IIIC T80°C Dc Ex II 3G Ex nC IIC T6 Gc

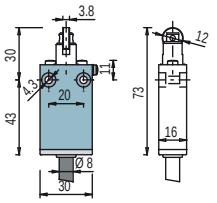
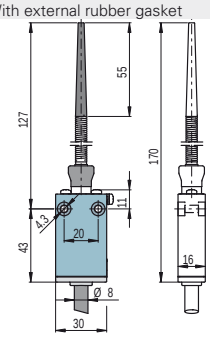
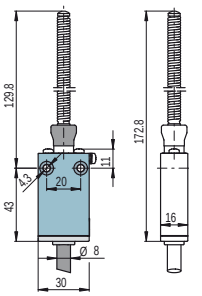
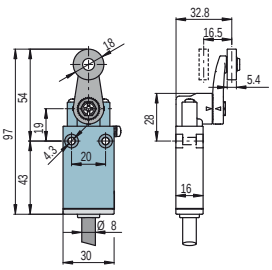
Switches in conformity with **ATEX** directive Ⓔx / **FA** series

Contact type:

R = snap action
L = slow action

		Operation in one direction	With external rubber gasket	Fixed only by threaded head
Contact blocks		It does not switch / It switches 		
45 R	FA 4501-2SH-EX5 → 1NO+1NC	FA 4502-2SH-EX5 → 1NO+1NC	FA 4508-2SH-EX5 → 1NO+1NC	FA 4510-2SH-EX5 → 1NO+1NC
46 L	FA 4601-2SH-EX5 → 1NO+1NC	FA 4602-2SH-EX5 → 1NO+1NC	FA 4608-2SH-EX5 → 1NO+1NC	FA 4610-2SH-EX5 → 1NO+1NC
Max. speed	0.5 m/s	0.5 m/s	0.5 m/s	0.5 m/s
Min. force	10 N (25 N →)	5 N (25 N →)	10 N (25 N →)	10 N (25 N →)
Travel diagrams	page 241 - group 1	page 241 - group 2	page 241 - group 1	page 241 - group 1

	Fixed only by threaded head	Fixed only by threaded head	With external rubber gasket	Roller, Ø 12 mm, stainless steel
Contact blocks				
45 R	FA 4511-2SH-EX5 → 1NO+1NC	FA 4512-2SH-EX5 → 1NO+1NC	FA 4513-2SH-EX5 → 1NO+1NC	FA 4515-2SH-EX5 → 1NO+1NC
46 L	FA 4611-2SH-EX5 → 1NO+1NC	FA 4612-2SH-EX5 → 1NO+1NC	FA 4613-2SH-EX5 → 1NO+1NC	FA 4615-2SH-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	0.1 m/s with cam at 30°
Min. force	10 N (25 N →)	10 N (25 N →)	10 N (25 N →)	10 N (25 N →)
Travel diagrams	page 241 - group 1	page 241 - group 1	page 241 - group 1	page 241 - group 1

	Roller, Ø 12 mm, stainless steel	With external rubber gasket	With external rubber gasket	With Ø 20 mm stainless steel roller on request
Contact blocks				
45 R	FA 4517-2SH-EX5 → 1NO+1NC	FA 4520-2SH-EX5 1NO+1NC	FA 4525-2SH-EX5 1NO+1NC	FA 4530-2SH-EX5 → 1NO+1NC
46 L	FA 4617-2SH-EX5 → 1NO+1NC			FA 4630-2SH-EX5 → 1NO+1NC
Max. speed	0.1 m/s with cam at 30°	1 m/s	1 m/s	1.5 m/s with cam at 30°
Min. force	10 N (25 N →)	0.03 Nm	0.06 Nm	0.03 Nm (0.25 Nm →)
Travel diagrams	page 241 - group 1	page 241 - group 3	page 241 - group 3	page 241 - group 4

Code	Approvals	Category	Zone	EPL
-EX5	Ⓔx II 3D Ex tc IIIC T80°C Dc	3D	22	Dc
	Ⓔx II 3G Ex nC IIC T6 Gc	3G	2	Gc

Accessories See page 225

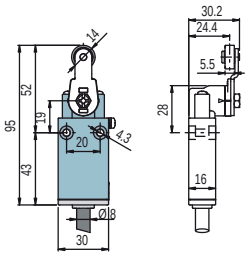
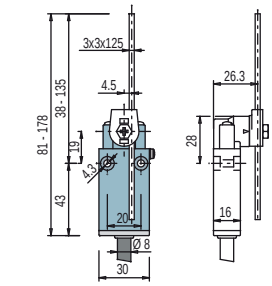
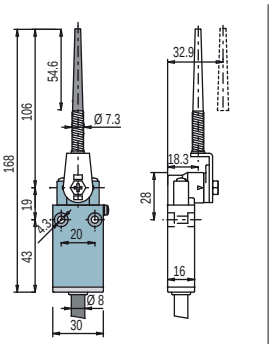
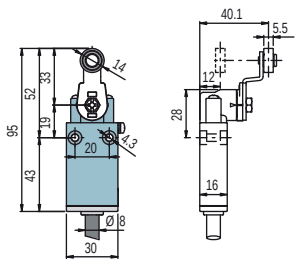
➔ The 2D/3D files are available at **www.pizzato.com**

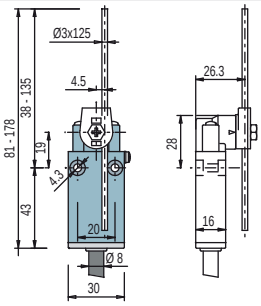
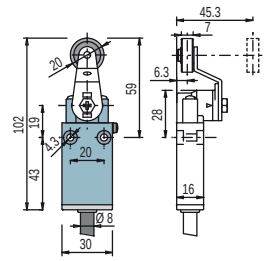
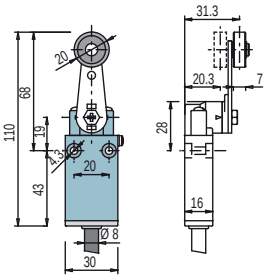
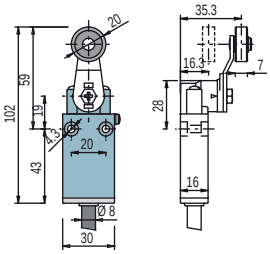
All measures in the drawings are in mm

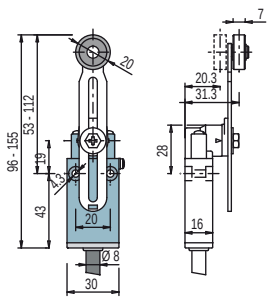
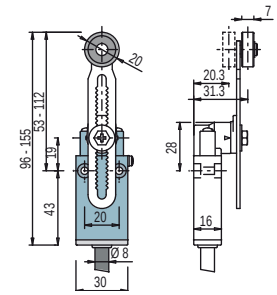
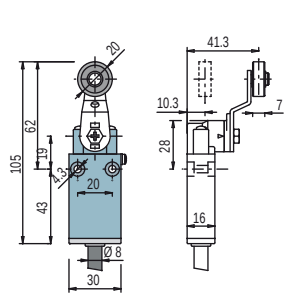
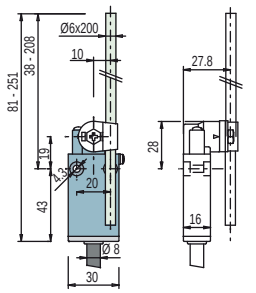
All measures in the drawings are in mm

Contact type:

R = snap action
L = slow action

	With stainless steel roller on request	Square rod, 3x3 mm		With stainless steel roller on request
				
Contact blocks				
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°
Min. force	0.03 Nm (0.25 Nm →)	0.03 Nm	0.03 Nm	0.03 Nm (0.25 Nm →)
Travel diagrams	page 241 - group 4	page 241 - group 4	page 241 - group 4	page 241 - group 4

	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
				
Contact blocks				
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°
Min. force	0.03 Nm	0.03 Nm (0.25 Nm →)	0.03 Nm (0.25 Nm →)	0.03 Nm (0.25 Nm →)
Travel diagrams	page 241 - group 4	page 241 - group 4	page 241 - group 4	page 241 - group 4

	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request	Fiber glass rod
				
Contact blocks				
45 R	FA 4555-2SH-EX5 → (1) 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 → (1) 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
Min. force	0.03 Nm (0.25 Nm →)	0.03 Nm (0.25 Nm →)	0.03 Nm (0.25 Nm →)	0.03 Nm
Travel diagrams	page 241 - group 4	page 241 - group 4	page 241 - group 4	page 241 - group 4

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

Code	Approvals	Category	Zone	EPL
-EX5	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc
	Ex II 3G Ex nC IIC T6 Gc	3G	2	Gc

Accessories See page 225

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

All measures in the drawings are in mm

Switches compliant with **ATEX** directive Ex / **FD** series

Main features

- Approvals:

3D category

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

ATEX markings and quality labels:

CE

Ex **II 3D Ex tc IIIC T80°C Dc**

Technical data

Housing

Metal housing, baked powder coating	
One threaded conduit entry:	M20x1.5
Protection degree:	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[1]/hour
Mechanical endurance:	
F• ••••-EX•	10 million operating cycles[1]
F• ••93-EX•, F• ••78-EX•, F• ••8•-EX•, F• ••95-EX•	500.000 operating cycles[1]
F• ••99-EX•, F• ••R2-EX•	250.000 operating cycles[1]
Mounting position:	any
Safety parameters B_{10d}(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 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)
Contact block 5, 6, 18:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 2.5 mm²	(2 x AWG 14)
Contact block 2:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 1.5 mm²	(2 x AWG 16)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, 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
3D	**22**	**Dc**	Ex **II 3D Ex tc IIIC T80°C Dc**	**-EX4**

Electrical data

Thermal current (Ith):	10 A
Rated insulation voltage (Ui):	500 Vac 600 Vdc
	400 Vac for contact blocks 20, 28
Conditional short circuit current:	1000 A according to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

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

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	6	1.1	0.4

⚠ **For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive**

Quality marks of the product:

UL approval: E131787
EAC approval: RU C-IT ДМ94.В.01024

Characteristics approved by UL

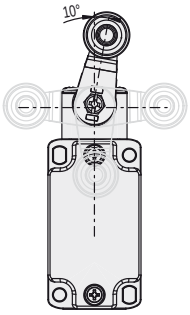
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For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

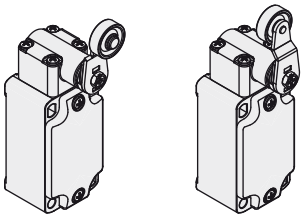
Adjustable levers

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.



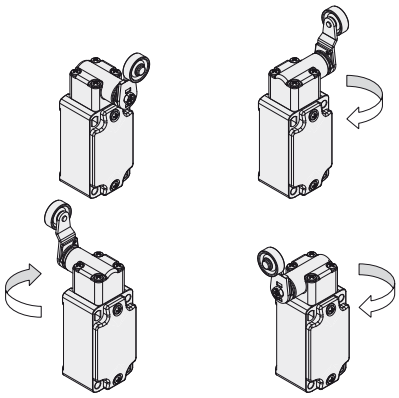
Overturning levers

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.



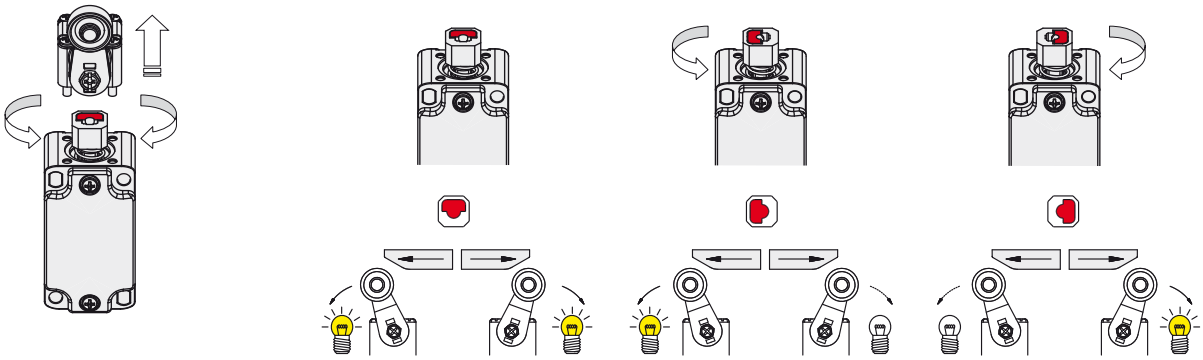
Orientable heads

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-EX4

Housing	
FD	metal, one conduit entry

Contact blocks	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
18	1NO+1NC, slow action
20	1NO+2NC, slow action
2	2x(1NO-1NC), snap action

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

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

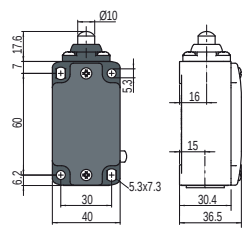
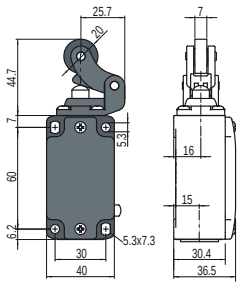
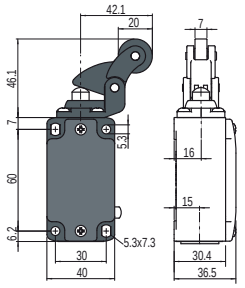
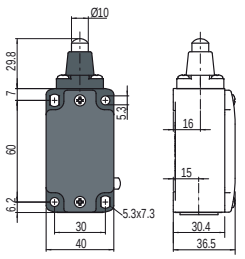
Threaded conduit entry	
M2	M20x1.5

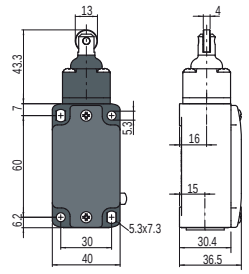
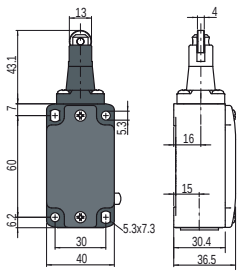
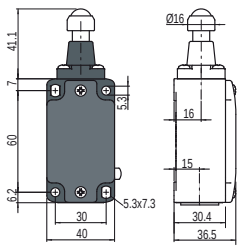
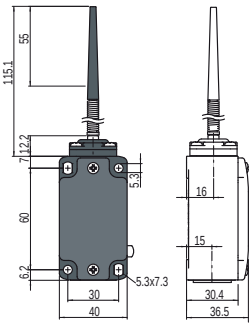
ATEX approval	
-EX4	Ex II 3D Ex tc IIIC T80°C Dc

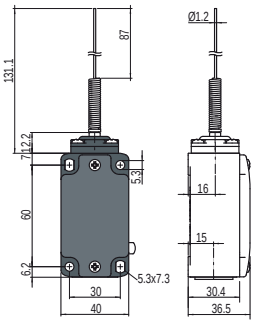
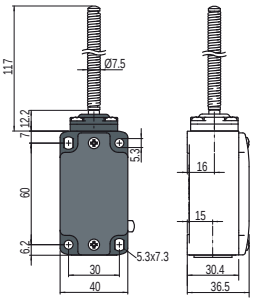
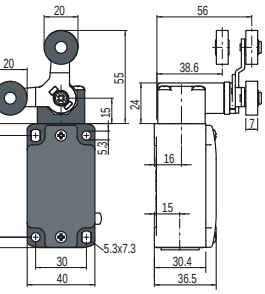
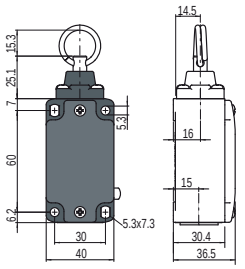
Switches compliant with **ATEX** directive Ex / **FD** series

Contact type:

R = snap action
L = slow action

Contact blocks					
			With stainless steel roller on request 	With stainless steel roller on request 	
5	R	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	L	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	L	FD 2001-M2-EX4 1NO+2NC	FD 2002-M2-EX4 1NO+2NC	FD 2005-M2-EX4 1NO+2NC	FD 2011-M2-EX4 1NO+2NC
2	R	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)
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

Contact blocks		With external rubber gasket 		Ball, Ø 12.7 mm, stainless steel 	With external rubber gasket 
5	R	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	L	FD 615-M2-EX4 1NO+1NC	FD 616-M2-EX4 1NO+1NC	FD 619-M2-EX4 1NO+1NC	
20	L	FD 2015-M2-EX4 1NO+2NC	FD 2016-M2-EX4 1NO+2NC	FD 2019-M2-EX4 1NO+2NC	FD 2020-M2-EX4 1NO+2NC
2	R	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)
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)	8 N (25 N)	8 N (25 N)	0.09 Nm
Travel diagrams		page 238 - group 1	page 238 - group 1	page 238 - group 1	page 238 - group 3

Contact blocks		With external rubber gasket 	With external rubber gasket 	Bistable 	Rope switch for signalling 
5	R	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	L				FD 676-M2-EX4 1NO+1NC
20	L	FD 2021-M2-EX4 1NO+2NC	FD 2025-M2-EX4 1NO+2NC		FD 2076-M2-EX4 2NO+1NC
2	R	FD 221-M2-EX4 2x(1NO-1NC)	FD 225-M2-EX4 2x(1NO-1NC)		FD 276-M2-EX4 2x(1NO-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)	initial 20 N - final 40 N
Travel diagrams		page 238 - group 3	page 238 - group 3	page 238 - group 4	page 238 - group 6

Code	Approvals	Category	Zone	EPL
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

Accessories See page 225

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

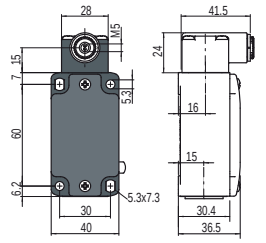
All measures in the drawings are in mm

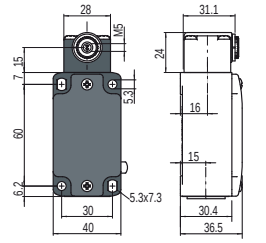
Position switches with revolving lever without actuator

All measures in the drawings are in mm

Contact type:

R = snap action
L = slow action





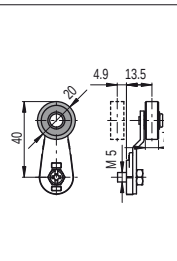
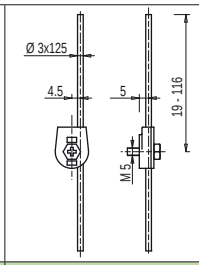
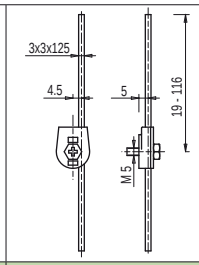
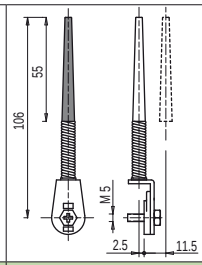
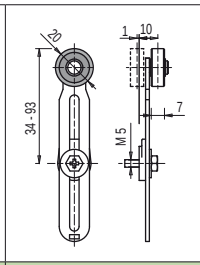
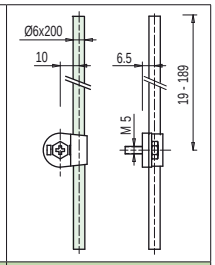
Contact blocks		Regular head		Compact head	
5	R	FD 538-M2-EX4 ⊖	1NO+1NC	FD 558-M2-EX4 ⊖	1NO+1NC
6	L	FD 638-M2-EX4 ⊖	1NO+1NC	FD 658-M2-EX4 ⊖	1NO+1NC
20	L	FD 2038-M2-EX4 ⊖	1NO+2NC	FD 2058-M2-EX4 ⊖	1NO+2NC
2	R	FD 238-M2-EX4	2x(1NO-1NC)	FD 258-M2-EX4	2x(1NO-1NC)
Min. force		0,1 Nm (0,25 Nm ⊖)		0,06 Nm (0,25 Nm ⊖)	
Travel diagrams		page 238 - group 1		page 238 - group 1	

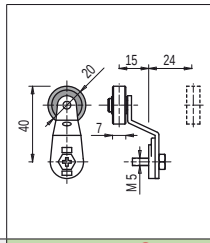
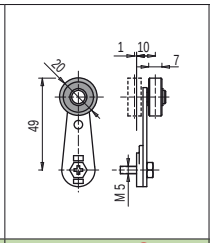
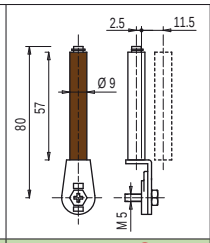
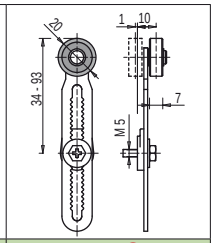
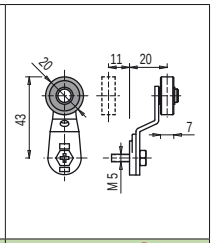
IMPORTANT
For safety applications: join only switches and actuators marked with symbol ⊖ aside the product code.
For more information about safety applications see details on page 235.

Loose actuators

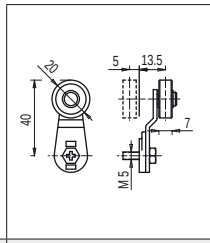
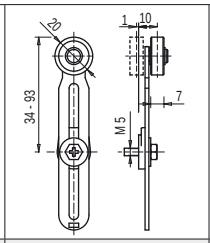
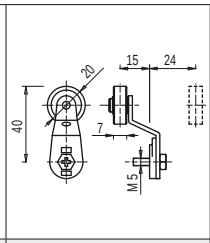
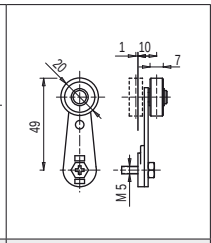
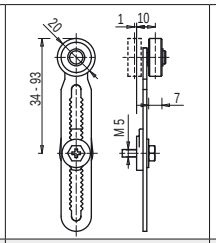
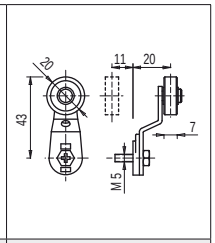
All measures in the drawings are in mm

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

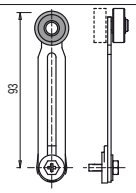
	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod with pointed end	Adjustable actuator with technopolymer roller	Adjustable fiber glass rod
						
Article	VF L31 ⊖	VF L32 (2)	VF L33 (2)	VF L34	VF L35 ⊖ (1) (2)	VF L36 (2)
Max. speed	1.5 m/s (cam 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	VF L51 ⊖	VF L52 ⊖	VF L53 ⊖	VF L56 ⊖ (2)	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 ⊖ (1) (2)	VF L51-R24 ⊖	VF L52-R24 ⊖	VF L56-R24 ⊖ (2)	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°)

- (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 FD •58-M2-EX4 (e.g. FD 558-M2-EX4, FD 658-M2-EX4…) 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
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

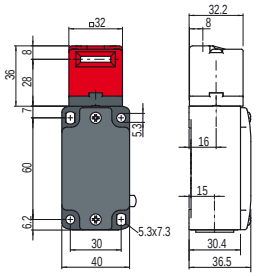
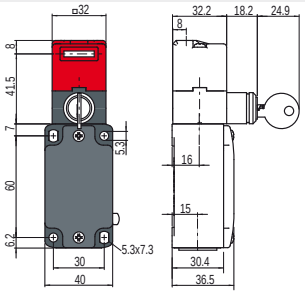
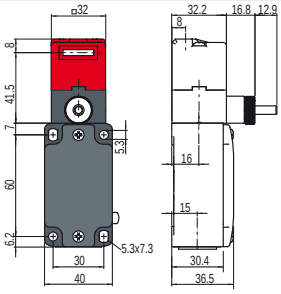
➔ The 2D/3D files are available at **www.pizzato.com**

Safety switches with separate actuator

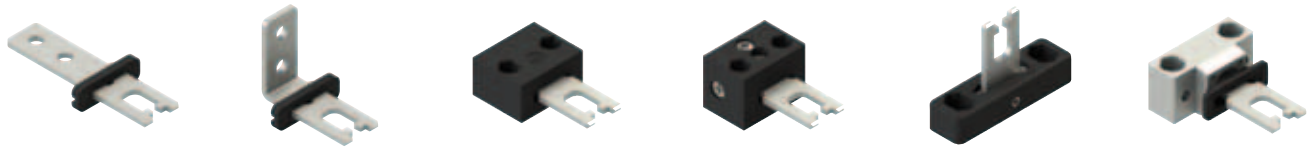
All measures in the drawings are in mm

Contact type:

L = slow action

Contact blocks		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
				
6	L	FD 693-M2-EX4 → 1NO+1NC		FD 6R2-M2-EX4 → 1NO+1NC
18	L		FD 1899-M2-EX4 → 1NO+1NC	
20	L	FD 2093-M2-EX4 → 1NO+2NC	FD 2099-M2-EX4 → 1NO+2NC	FD 20R2-M2-EX4 → 1NO+2NC
28	L		FD 2899-M2-EX4 → 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

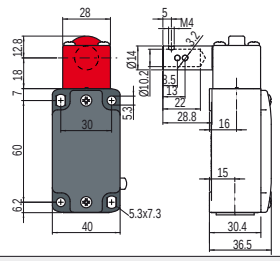
IMPORTANT: These actuators can be used with items of the FD series only (e.g. FD 693-M2-EX4).
Low level coded actuators according to EN ISO 14119.

Safety switches for hinges

All measures in the drawings are in mm

Contact type:

L = slow action

Contact blocks		
		
18	L	FD 1895-M2-EX4 → 1NO+1NC
20	L	FD 2095-M2-EX4 → 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
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

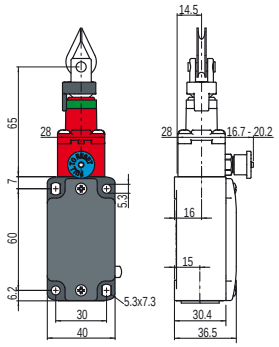
→ The 2D/3D files are available at **www.pizzato.com**

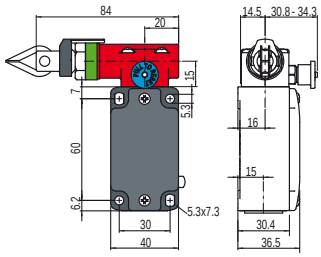
Safety rope switch with reset for emergency stops

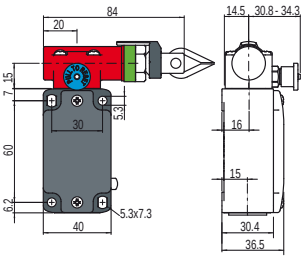
All measures in the drawings are in mm

Contact type:

L = slow action







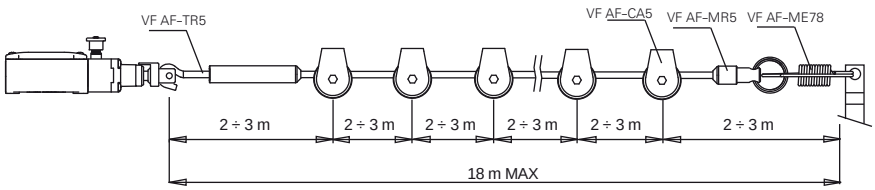
Contact blocks				
18 L	FD 1878-M2-EX4 → 1NO+1NC	FD 1883-M2-EX4 → 1NO+1NC	FD 1884-M2-EX4 → 1NO+1NC
20 L	FD 2078-M2-EX4 → 1NO+2NC	FD 2083-M2-EX4 → 1NO+2NC	FD 2084-M2-EX4 → 1NO+2NC
Min. force	initial 63 N...final 83 N (90 N →)	initial 147 N...final 235 N (250 N →)	initial 147 N...final 235 N (250 N →)
Travel diagrams Gen. Cat. Safety	page 171 - group 1	page 171 - group 2	page 171 - group 2

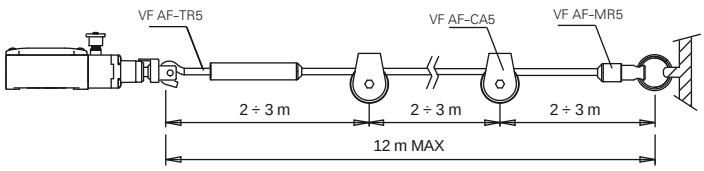
Accessories for rope installation

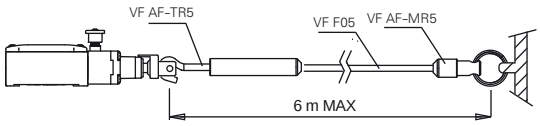
VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR03	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley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

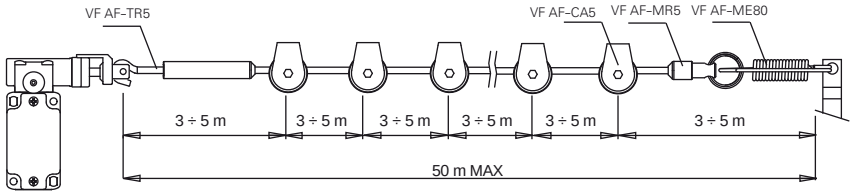
Application examples and max. rope length

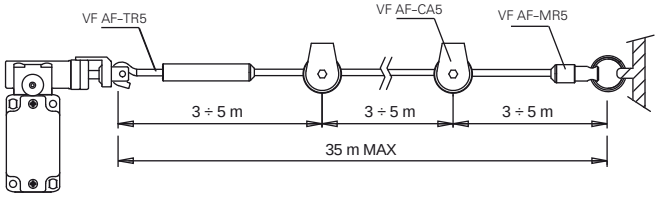
All measures in the drawings are in mm

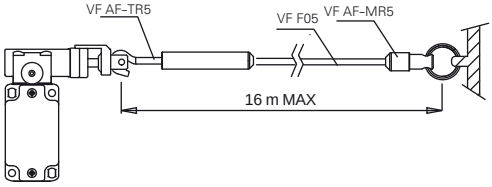












⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.

Code	Approvals	Category	Zone	EPL
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

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

Switches compliant with **ATEX** directive Ex / **FL** series

Main features

- Approvals:
  3D category
- Metal housing, three conduit entries
- Protection degree IP66
- Versions with gold-plated silver contacts

ATEX markings and quality labels:

CE

Ex **II 3D Ex tc IIIC T80°C Dc**

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 … +70°C
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	
F• ••••-EX•	10 million operating cycles[1]
F• ••93-EX•, F• ••78-EX•, F• ••8•-EX•, F• ••95-EX•	500.000 operating cycles[1]
Mounting position:	any
Safety parameters B_{10d}(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 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)
Contact block 5, 6, 18:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 2.5 mm²	(2 x AWG 14)
Contact block 2:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 1.5 mm²	(2 x AWG 16)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, 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
3D	**22**	**Dc**	**Ex II 3D Ex tc IIIC T80°C Dc**	**-EX4**

Electrical data

Thermal current (Ith):	10 A
Rated insulation voltage (Ui):	500 Vac 600 Vdc
	400 Vac for contact blocks 20, 28
Conditional short circuit current:	1000 A according to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50÷60 Hz)

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

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	6	1.1	0.4

⚠ **For the correct utilization of the switch please use cable glands suitable for the zone according to the ATEX directive**

Quality marks of the product:

UL approval: E131787
EAC approval: RU C-IT ДМ94.В.01024

Characteristics approved by UL

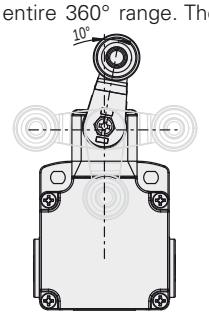
Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductor, rigid or flexible, wire size AWG 12/14. Terminal tightening torque of 7.1 lb in (0.8 Nm).
For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

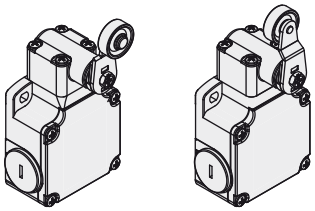
Adjustable levers

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.



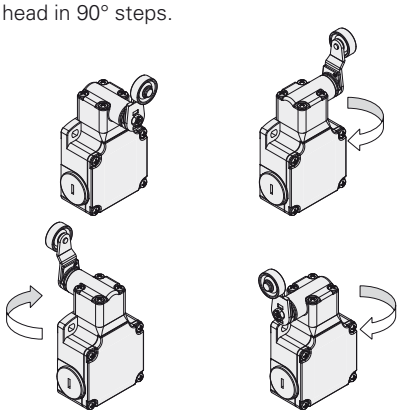
Overturning levers

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.



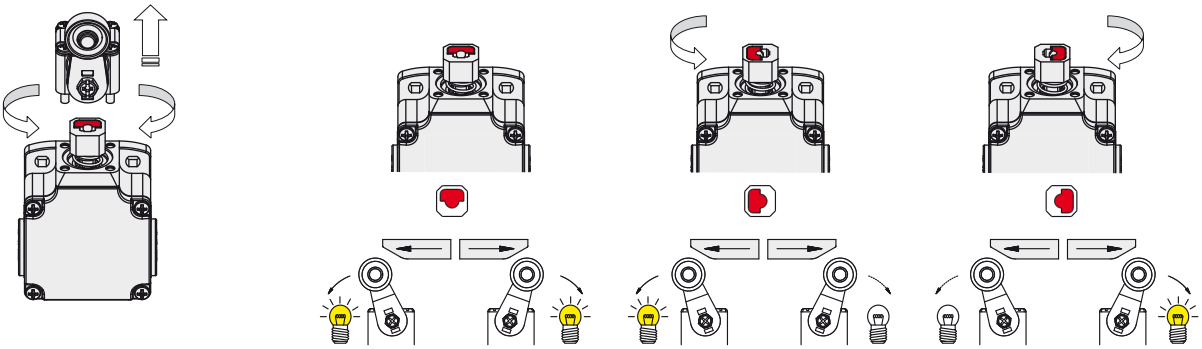
Orientable heads

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-EX4

Housing	
FL	metal, three conduit entries

Contact blocks	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
18	1NO+1NC, slow action
20	1NO+2NC, slow action
2	2x(1NO-1NC), snap action

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

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

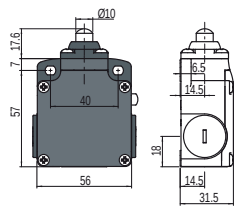
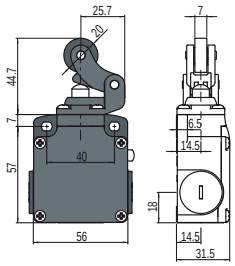
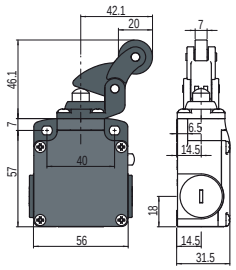
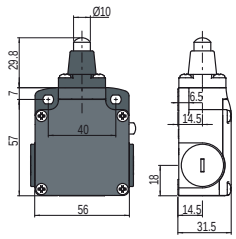
Threaded conduit entry	
M2	M20x1.5

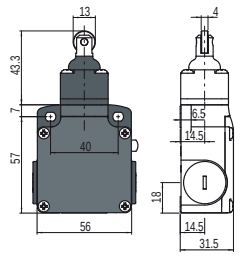
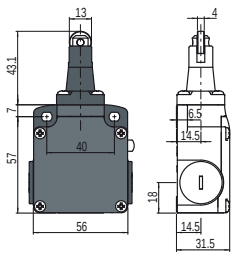
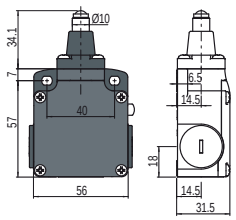
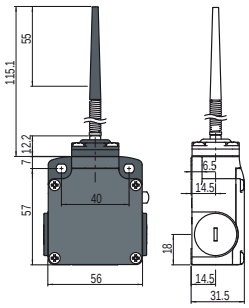
ATEX approval	
-EX4	Ex II 3D Ex tc IIIC T80°C Dc

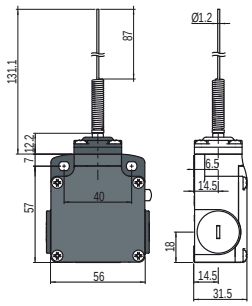
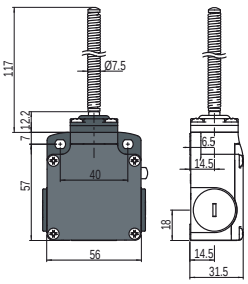
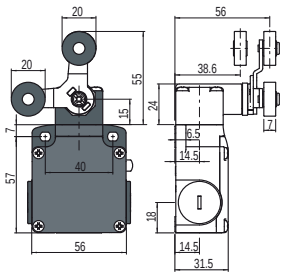
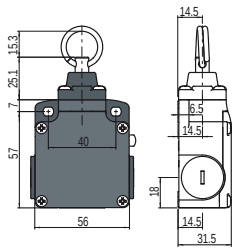
Switches compliant with **ATEX** directive Ex / **FL** series

Contact type:

R = snap action
L = slow action

Contact blocks					
			With stainless steel roller on request 	With stainless steel roller on request 	
5	R	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	L	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	L	FL 2001-M2-EX4 1NO+2NC	FL 2002-M2-EX4 1NO+2NC	FL 2005-M2-EX4 1NO+2NC	FL 2011-M2-EX4 1NO+2NC
2	R	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)
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

Contact blocks					
		With external rubber gasket 		Ball, Ø 12.7 mm, stainless steel 	With external rubber gasket 
5	R	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	L	FL 615-M2-EX4 1NO+1NC	FL 616-M2-EX4 1NO+1NC	FL 619-M2-EX4 1NO+1NC	
20	L	FL 2015-M2-EX4 1NO+2NC	FL 2016-M2-EX4 1NO+2NC	FL 2019-M2-EX4 1NO+2NC	FL 2020-M2-EX4 1NO+2NC
2	R	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)
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)	8 N (25 N)	8 N (25 N)	0.09 Nm
Travel diagrams		page 238 - group 1	page 238 - group 1	page 238 - group 1	page 238 - group 3

Contact blocks					
		With external rubber gasket 	With external rubber gasket 	Bistable 	Rope switch for signalling 
5	R	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	L				FL 676-M2-EX4 1NO+1NC
20	L	FL 2021-M2-EX4 1NO+2NC	FL 2025-M2-EX4 1NO+2NC		FL 2076-M2-EX4 2NO+1NC
2	R	FL 221-M2-EX4 2x(1NO-1NC)	FL 225-M2-EX4 2x(1NO-1NC)		FL 276-M2-EX4 2x(1NO-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)	initial 20 N - final 40 N
Travel diagrams		page 238 - group 3	page 238 - group 3	page 238 - group 4	page 238 - group 6

Code	Approvals	Category	Zone	EPL
-EX4	**Ex II 3D Ex tc IIIC T80°C Dc**	**3D**	**22**	**Dc**

All measures in the drawings are in mm

Accessories See page 225

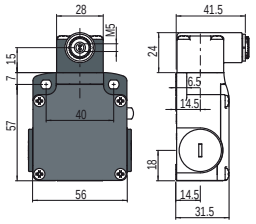
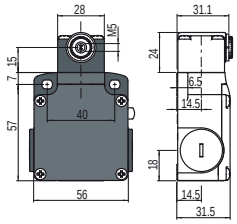
→ The 2D/3D files are available at **www.pizzato.com**

Position switches with revolving lever without actuator

All measures in the drawings are in mm

Contact type:

R = snap action
L = slow action

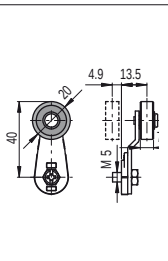
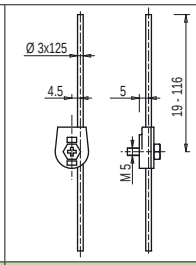
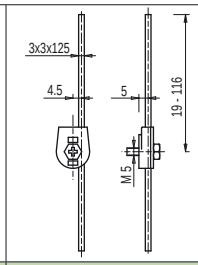
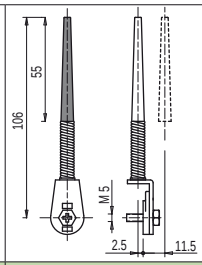
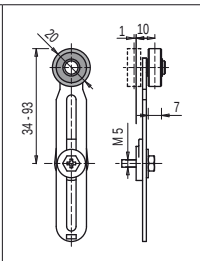
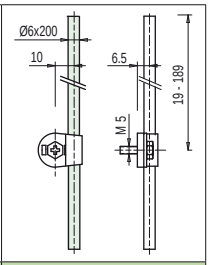
Contact blocks		Regular head	Compact head
			
5	R	FL 538-M2-EX4 ➔ 1NO+1NC	FL 558-M2-EX4 ➔ 1NO+1NC
6	L	FL 638-M2-EX4 ➔ 1NO+1NC	FL 658-M2-EX4 ➔ 1NO+1NC
20	L	FL 2038-M2-EX4 ➔ 1NO+2NC	FL 2058-M2-EX4 ➔ 1NO+2NC
2	R	FL 238-M2-EX4 2x(1NO-1NC)	FL 258-M2-EX4 2x(1NO-1NC)
Min. force		0,1 Nm (0,25 Nm ➔)	0,06 Nm (0,25 Nm ➔)
Travel diagrams		page 238 - group 1	page 238 - group 1

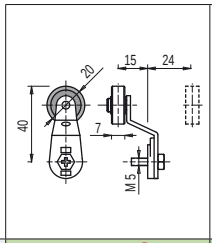
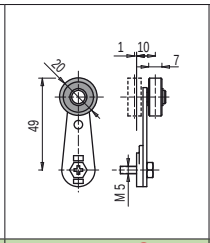
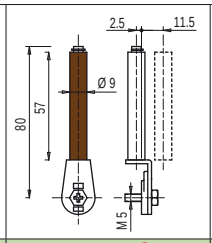
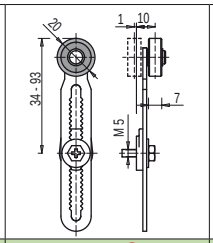
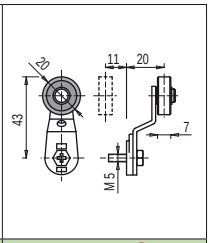
IMPORTANT
For safety applications: join only switches and actuators marked with symbol ➔ aside the product code.
For more information about safety applications see details on page 235.

Loose actuators

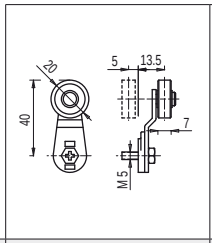
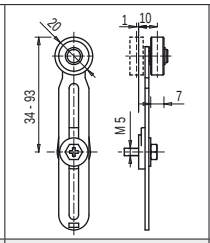
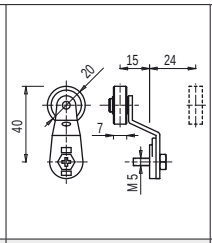
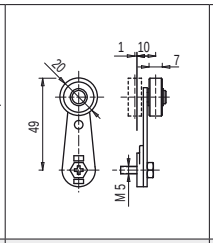
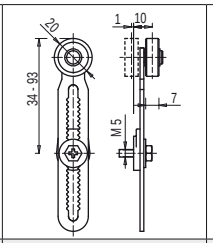
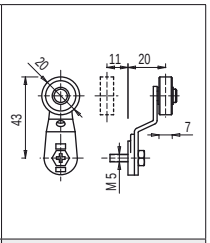
All measures in the drawings are in mm

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

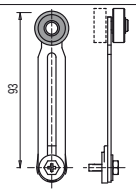
	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod with pointed end	Adjustable actuator with technopolymer roller	Adjustable fiber glass rod
						
Article	VF L31 ➔	VF L32 (2)	VF L33 (2)	VF L34	VF L35 ➔ (1) (2)	VF L36 (2)
Max. speed	1.5 m/s (cam 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	VF L51 ➔	VF L52 ➔	VF L53 ➔	VF L56 ➔ (2)	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 ➔ (1) (2)	VF L51-R24 ➔	VF L52-R24 ➔	VF L56-R24 ➔ (2)	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°)

- (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-EX4 (e.g. FL 558-M2-EX4, FL 658-M2-EX4...) 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
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

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

Safety switches with separate actuator

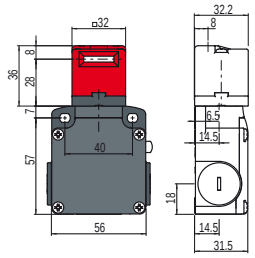
All measures in the drawings are in mm

Contact type:

L = slow action

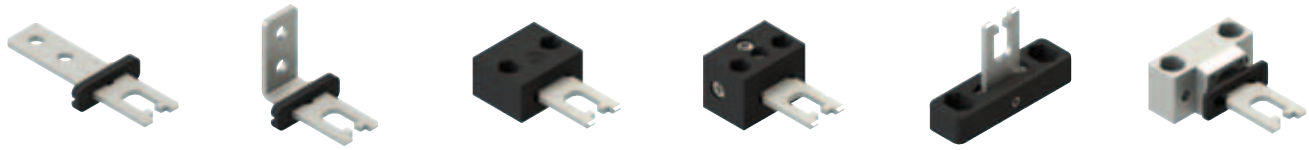
Switches with separate actuator

Switches without actuator



Contact blocks			
6	L	FL 693-M2-EX4	1NO+1NC
20	L	FL 2093-M2-EX4	1NO+2NC
Min. force		10 N (18 N)	
Travel diagrams Gen. Cat. Safety		page 21	

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

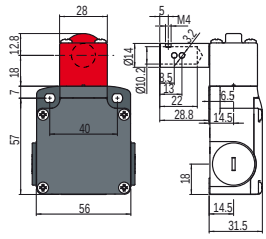
IMPORTANT: These actuators can be used with items of the FL series only (e.g. FL 693-M2-EX4).
Low level coded actuators according to EN ISO 14119.

Safety switches for hinges

All measures in the drawings are in mm

Contact type:

L = slow action



Contact blocks			
18	L	FL 1895-M2-EX4	1NO+1NC
20	L	FL 2095-M2-EX4	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
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

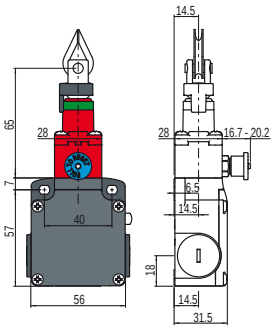
➔ The 2D/3D files are available at **www.pizzato.com**

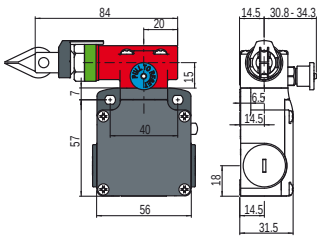
Safety rope switch with reset for emergency stops

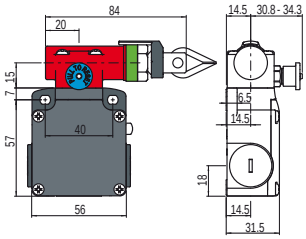
All measures in the drawings are in mm

Contact type:

L = slow action







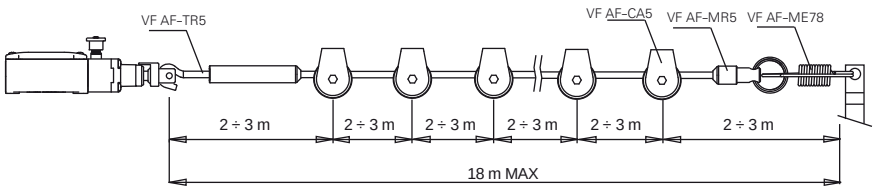
Contact blocks				
18 L	FL 1878-M2-EX4 (→) 1NO+1NC	FL 1883-M2-EX4 (→) 1NO+1NC	FL 1884-M2-EX4 (→) 1NO+1NC
20 L	FL 2078-M2-EX4 (→) 1NO+2NC	FL 2083-M2-EX4 (→) 1NO+2NC	FL 2084-M2-EX4 (→) 1NO+2NC
Min. force	initial 63 N...final 83 N (90 N (→))	initial 147 N...final 235 N (250 N (→))	initial 147 N...final 235 N (250 N (→))
Travel diagrams Gen. Cat. Safety	page 171 - group 1	page 171 - group 2	page 171 - group 2

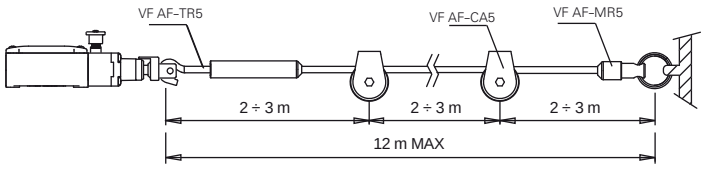
Accessories for rope installation

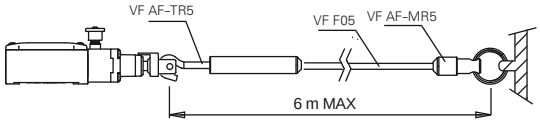
VF AF-TR5	VF AF-TR8	VF AF-MR5	VF AF-ME78	VF AF-ME80	VF F05-100	VF AF-IF1GR03	VF AF-CA5	VF AF-CA10
Adjustable stay bolt	Stay bolt	End clamp	Safety spring for longitudinal head	Safety spring for transversal head	Rope, Ø 5 mm. 100 m rolls	Function indicator for ropes. Text "STOP"	Stainless steel pulley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

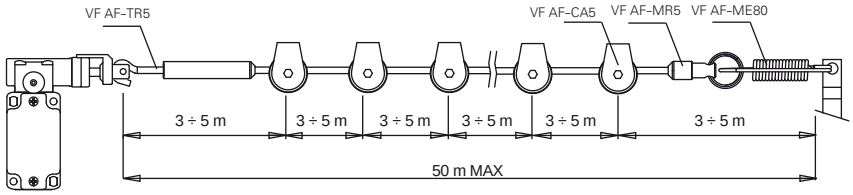
Application examples and max. rope length

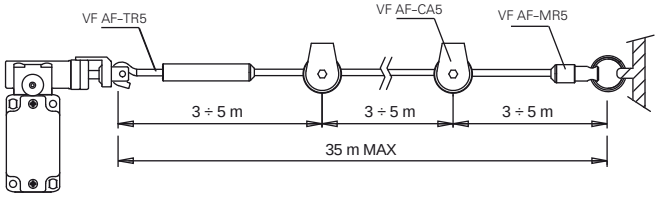
All measures in the drawings are in mm

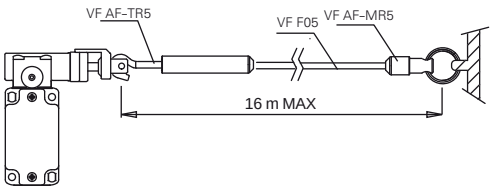












⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.

Code	Approvals	Category	Zone	EPL
-EX4	Ex II 3D Ex tc IIIC T80°C Dc	3D	22	Dc

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

Accessories See page 225

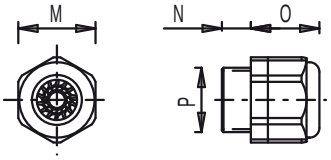
→ The 2D/3D files are available at **www.pizzato.com**

Accessories

ATEX cable gland, technopolymer

Technical data:

ATEX marking:	Ex II 2G 1D Ex and II tD A20 IP68
Body and ring material:	plastic PA V0 according to UL 94
Ambient temperature:	-20 … +95°C
Protection degree:	IP68 (≤ 10 bar)
Tightening torque:	3 … 4 Nm

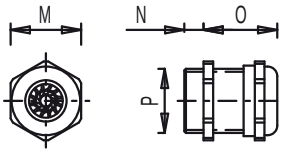


Article	Description	ATEX certificate number	⬡M	N	O	P
VF PBM20C6P-2GD	M20x1.5 cable gland, technopolymer, for multipolar cables from Ø 6.5 to Ø 12 mm	DMT 02 ATEX E 047 X	24	9	24	M20x1.5

ATEX cable gland, metal

Technical data:

ATEX marking:	Ex II 2G Ex and II Ex II 1D Ex tD A20 IP68
Body and ring material:	brass, nickel-plated
Ambient temperature:	-20 … +95°C
Protection degree:	IP68 (≤ 10 bar)
Tightening torque:	3 … 4 Nm



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

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

Accessories See page 225

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

Notes

Position switches for high temperature **FD** series

Main features

- Operating temperature up to +180°C
- Metal housing, one conduit entry
- Protection degree IP67

Technical data

Housing

Metal housing with anticorrosive surface treatment

One threaded conduit entry:	M20 x 1.5
Protection degree:	IP67 according to EN 60529 with cable gland having equal or higher protection degree

General data

Ambient temperature:	-15°C … +180°C for articles FD 2011-M2T2 and FD 2016-M2T2 -25°C … +180°C for article FD 2038-M2T2
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	1 million operating cycles[1]
Mounting position:	any
Safety parameters:	
B_{10d}:	2,000,000 for NC contacts
Mechanical interlock, not coded:	type 1 according to EN ISO 14119
Tightening torques for installation:	see pages 235-246

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

Cable cross section (flexible copper strands)

Contact block 20:	min.	1 x 0.34 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)

In conformity with standards:

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

Markings and quality marks:

CE EAC

EAC approval: RU C-IT ДМ94.В.01024

In conformity with the requirements of:

Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/108/EC.

Positive contact opening in conformity with standards:

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

Installation for safety applications:

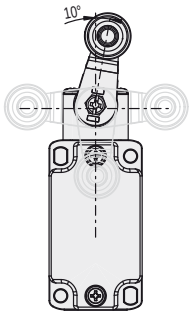
Use only switches marked with the symbol ⊖ aside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 238. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

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

	Electrical data		Utilization category
Ambient temperature +20 °C	Thermal current (Ith):	4 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250
	Rated impulse withstand voltage (U_{imp}):	4 kV	Ie (A) 4 4 4
	Conditional short circuit current:	1000 A according to EN 60947-5-1	Direct current: DC13
	Protection against short circuits:	fuse 4 A 250 V type gG	Ue (V) 24 125 250
	Pollution degree:	3	Ie (A) 4 1.1 0.4
Ambient temperature +180 °C	Thermal current (Ith):	4 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250
	Protection against short circuits:	fuse 4 A 250 V type gG	Ie (A) 4 4 4
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24
			Ie (A) 1

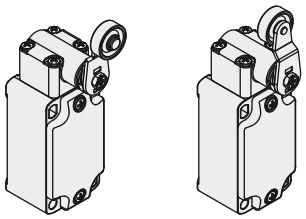
Adjustable levers

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.



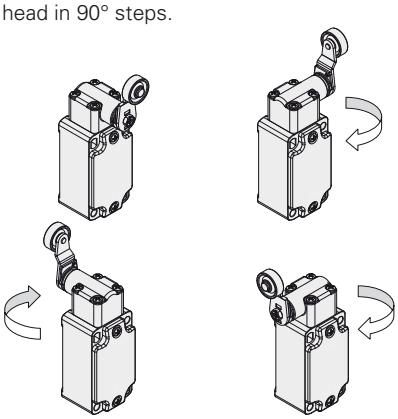
Overturning levers

Negli interruttori a leva girevole è possibile fissare la leva dritta o rovescia mantenendo l'accoppiamento positivo.
In questo modo si possono avere due diversi piani di lavoro della leva.



Orientable heads

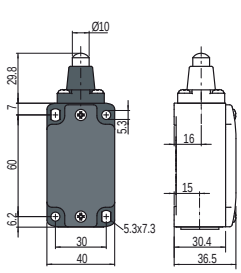
In all switches, it is possible to rotate the head in 90° steps.

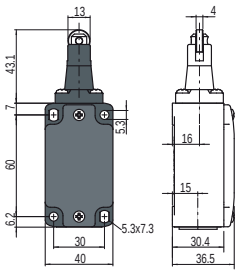


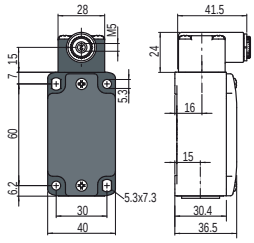
Dimensional drawings

Contact type:

L = slow action







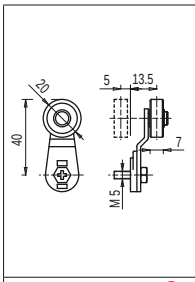
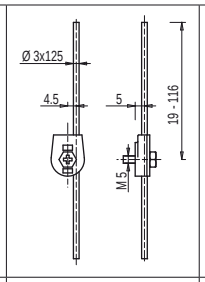
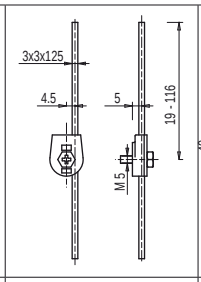
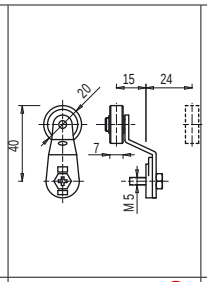
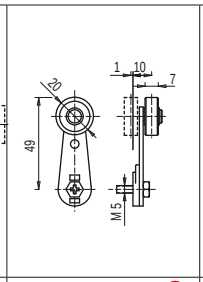
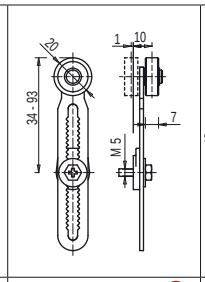
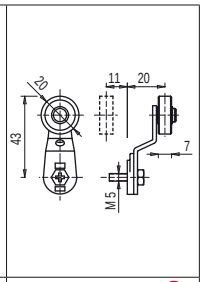
Contact blocks

20 L	FD 2011-M2T2 → 1NO+2NC	FD 2016-M2T2 → 1NO+2NC	FD 2038-M2T2 → 1NO+2NC
Max. speed	page 7/3 - type 4	page 7/3 - type 2	
Min. force	8 N (25 N →)	8 N (25 N →)	0.1 Nm (0.25 Nm →)
Travel diagrams	page 238 - group 1	page 238 - group 1	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.

Special loose actuators

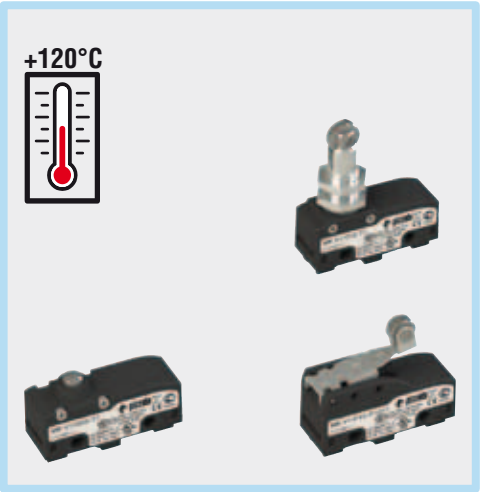
All measures in the drawings are in mm

Stainless steel roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Stainless steel roller Ø 20 mm	Stainless steel roller Ø 20 mm	Adjustable actuator with Ø 20 mm stainless steel rollers	Stainless steel roller Ø 20 mm
						
VF L31-R24T2 →	VF L32-T2	VF L33-T2	VF L51-R24T2 →	VF L52-R24T2 →	VF L56-R24T2 →	VF L57-R24T2 →

Accessories See page 225

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

Microswitch for high temperature **MK** series



Main features

- Operating temperature up to +120°C
- Technopolymer housing
- High reliability contacts
- 4 terminal types available
- 16 actuators available
- Versions with positive opening ⊖
- Versions with gold-plated silver contacts

Markings and quality marks:

CE EAC

EAC approval: RU C-IT ДМ94.В.01024

Technical data

Housing

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

Protection degree:	IP00 (terminals) IP40 (electrical contacts) according to EN 60529

General data

Ambient temperature:	-25°C … +120°C
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	500.000 operating cycles[1]
Safety parameters:	
B_{10d}:	1,000,000 for NC contacts
Tightening torques for installation:	see page 212

(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)

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

In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, IEC 60529, EN 60529, EN 60947-1, IEC 60947-1

In conformity with the requirements of:

Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/CE 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:

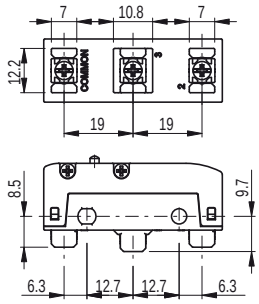
Use only microswitches marked with the symbol ⊖ aside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts) as stated in **standard EN 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel (CAP)** stated aside the article code. Actuate the switch **at least with the positive opening force (FAP)** stated aside the article code.

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

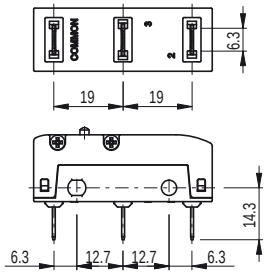
Electrical data			Utilization category
Ambient temperature +20 °C	Thermal current (Ith):	16 A	Alternating current: AC15 (50 … 60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 120 250
	Rated impulse withstand voltage (U_{imp}):	4 kV	Ie (A) 3 2
	Conditional short circuit current:	1000 A according to EN 60947-5-1	Direct current: DC13
	Protection against short circuits:	type gG fuse 16 A 250 V	Ue (V) 24 125
	Pollution degree:	3	Ie (A) 2 0.5
	Dielectric strength	2000 Vac/min.	

Terminals outline dimensions

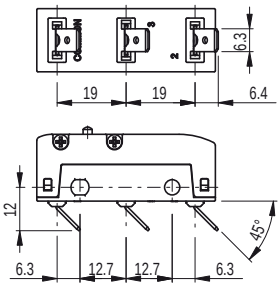
All measures in the drawings are in mm



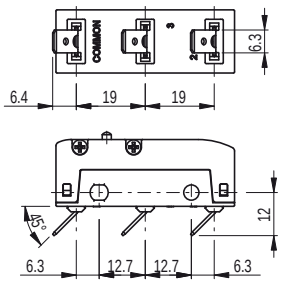
Screw terminals **V** with plate



Vertical faston **H** terminals



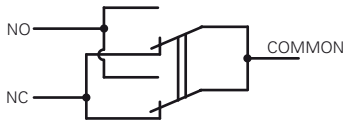
Faston terminals **F**, right bending



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

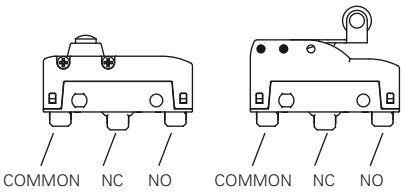
Note: H vertical faston terminals can be bent according to one's installation requirements.
We recommend to bend the faston with an angle not higher than 45° and to carry out this operation no more than 5 times.

Circuit diagram

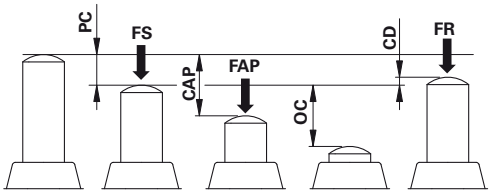


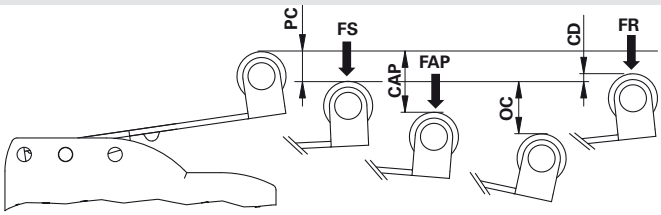
Contacts with single interruption and double contacts

With direct and back direct action (F, D)



Actuation forces and travels





PC pre-travel
CAP positive opening travel
OC over-travel
CD differential travel
FS operating force
FR releasing force
FAP positive opening force

Code structure

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

article | options

MK V11D40-GR16T7

Terminal type	
V	screws with self-lifting plate
H	vertical faston
F	faston, bent 45° to right
G	faston, bent 45° to left (on request)

Contact blocks	
1	1NO+1NC, snap action in deviation

Actuation type	
D	direct action
F	back direct action

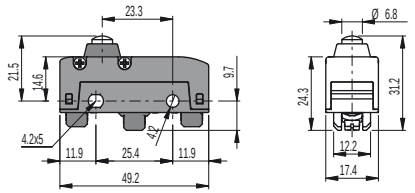
Actuator	
05	low button
06	threaded button
08	threaded button
..	.....

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

Rollers	
	standard roller
R16	metal roller Ø 9.5x4 mm (only for actuators 40, 42 ,45, 59)

Ambient temperature	
T7	-25 °C ... +120 °C

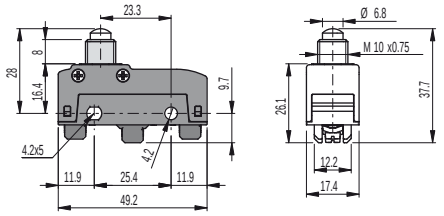
Microswitch for high temperature **MK** series



MK V11D05-T7 1NO+1NC

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

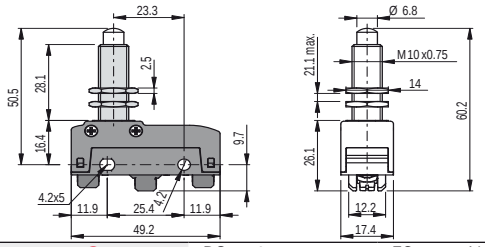
Maximum and Minimum speed page 245 - type 1



MK V11D06-T7 1NO+1NC

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

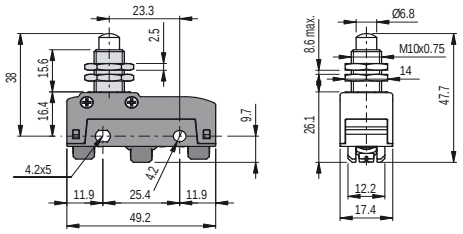
Maximum and Minimum speed page 245 - type 1



MK V11D08-T7 1NO+1NC

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

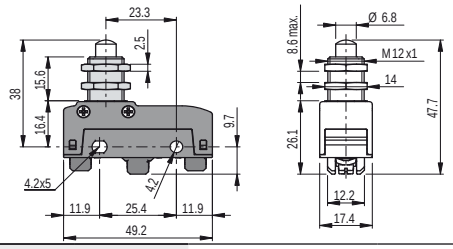
Maximum and Minimum speed page 245 - type 1



MK V11D09-T7 1NO+1NC

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

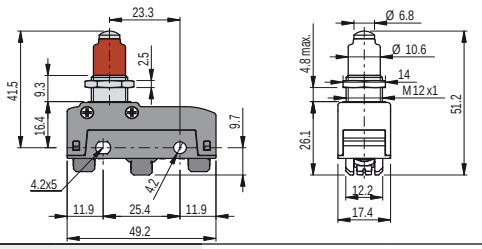
Maximum and Minimum speed page 245 - type 1



MK V11D10-T7 1NO+1NC

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

Maximum and Minimum speed page 245 - type 1

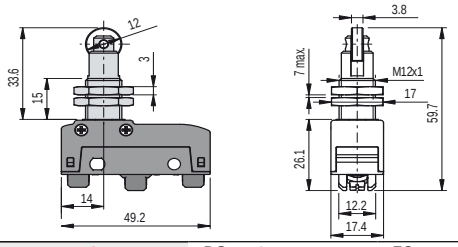


MK V11D12-T7 1NO+1NC

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

Maximum and Minimum speed page 245 - type 1

Fixed only by threaded head

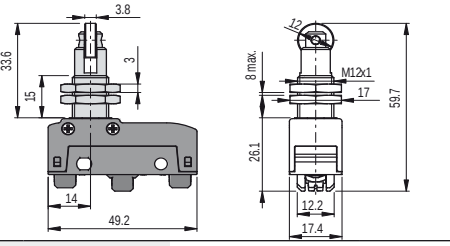


MK V11D15-T7 1NO+1NC

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

Maximum and Minimum speed page 245 - type 2

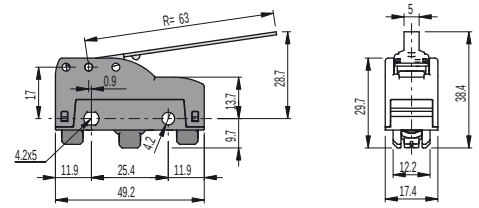
Fixed only by threaded head



MK V11D17-T7 1NO+1NC

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

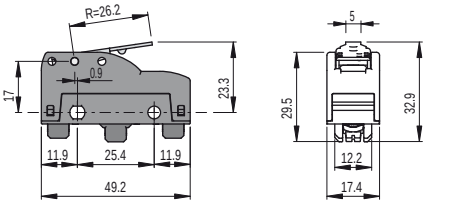
Maximum and Minimum speed page 245 - type 2



MK V11D30-T7 1NO+1NC

PC	9 mm	FS	0,65 N
OC	10 mm	FR	0,5 N
CD	1,1 mm		

Maximum and Minimum speed page 245 - type 3



MK V11D31-T7 1NO+1NC

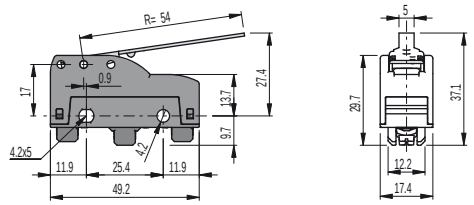
PC	4,54 mm	FS	1,66 N
OC	3,86 mm	FR	1,32 N
CD	0,42 mm		

Maximum and Minimum speed page 245 - type 3

Accessories See page 225

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

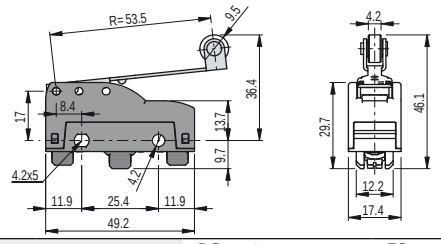
All measures in the drawings are in mm



MK V11D32-T7 1NO+1NC

PC	7,7 mm	FS	0,76 N
OC	8,3 mm	FR	0,58 N
CD	0,9 mm		

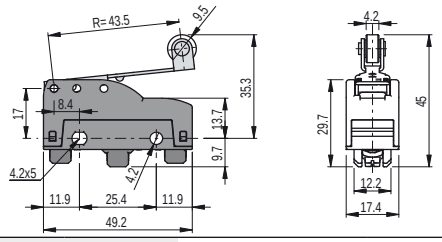
Maximum and Minimum speed page 245 - type 3



MK V11F40-R16T7 1NO+1NC

PC	2,4 mm	FS	0,85 N
OC	10,4 mm	FR	0,65 N
CD	0,25 mm		

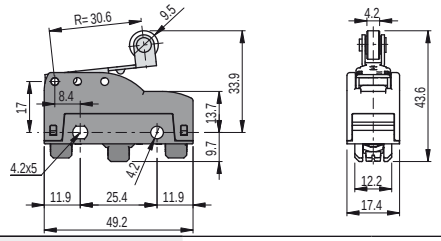
Maximum and Minimum speed page 245 - type 8



MK V11F42-R16T7 1NO+1NC

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

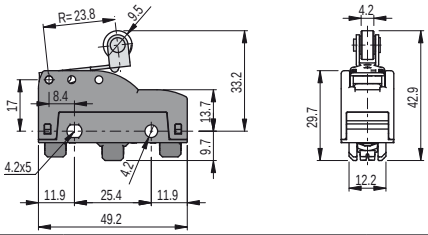
Maximum and Minimum speed page 245 - type 8



MK V11F45-R16T7 1NO+1NC

PC	1,1 mm	FS	1,3 N
OC	6,6 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	6,3 mm		

Maximum and Minimum speed page 245 - type 8

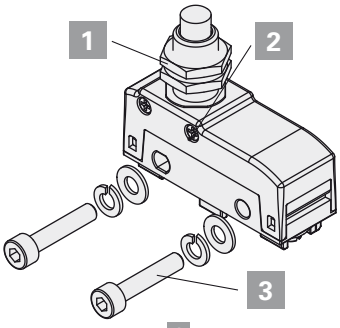


MK V11F59-R16T7 1NO+1NC

PC	0,8 mm	FS	1,7 N
OC	5,2 mm	FR	1,3 N
CD	0,08 mm	FAP	8,9 N
CAP	4,9 mm		

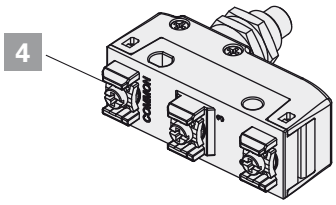
Maximum and Minimum speed page 245 - type 8

Tightening torques



Tighten the nuts 1 with a torque of **2** … **3** Nm.
Tighten the head screws 2 with a torque of **0.4** … **0.5** Nm.
Tighten the M4 screws 3 with a torque of **0.8** … **1.2** Nm, insert washer and spring washer.

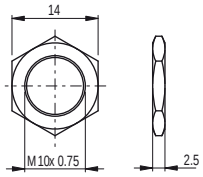
Attention: A tightening torque higher than 1.2 Nm can cause the breaking of the microswitch, only fix on even surfaces.



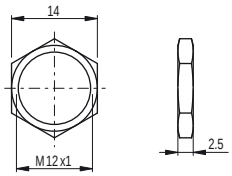
Tighten the terminal screws 4 with a torque of **0.6** … **0.8** Nm.

Accessories

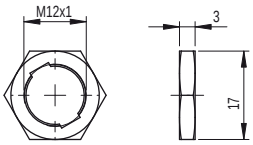
10 pcs. packs



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

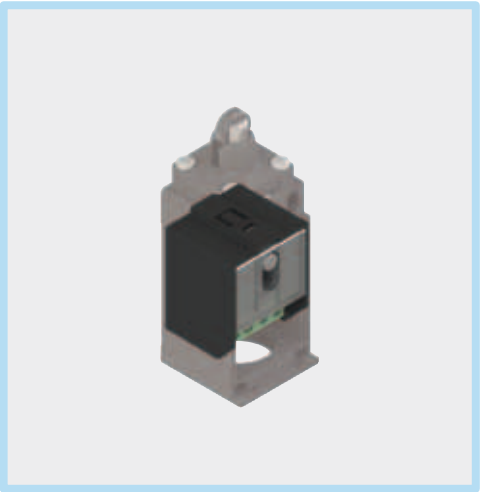


Article	Description
VF AC72	Hexagonal threaded nut for microswitches with actuators D10, D12, D13



Article	Description
AC35	Hexagonal threaded nut notched for microswitches with actuators D15, D16

Electronic contact blocks for position switches



Description

The article E1 is an electronic contact block, designed to replace the traditional mechanical contact block placed inside the position switches of Pizzato Elettrica. The combination between the body and the head of a position switch with this electronic contact block makes a mechatronic device that increases the application range of position switches.

General data

Ambient temperature:	-25°C … +80°C
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	20 million operating cycles[1]
Adjustable operating distance:	0.2 … 2 mm or 2° … 30°
Differential travel:	< 0.1 mm or < 1°
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.

Main features

- Adjustable intervention point
- Output signals without bounces
- Two static outputs 1NO and 1NC
- Reduced actuating force
- Signal LEDs for power supply and switching
- Minimum differential travel

Electrical data

Rated operating voltage (Ue):	10 … 30 Vdc
Rated operating current (Ie):	200 mA
Utilization category:	DC13, 24V 0,2A
Rated insulation voltage (Ui):	30 V
Pollution degree:	3
Conditional short circuit current:	100 A
Voltage drop (Ud):	2 V
Minimum operating current (Im):	0 mA
Current in locked state (Ir):	0.05 mA
Maximum residual ripple:	10%
Current consumption w/o load (Io):	< 10 mA
Load short circuit protection:	yes
Inverse-polarity protection:	yes
Output type:	PNP
Supply LED:	yes
Switching LED:	yes
Protection fuse:	315 mA fast

Markings:

CE EAC

EAC approval: RU C-IT ДМ94.В.01024

In conformity with the requirements of:
Low Voltage Directive 2006/95/EC,
Machinery Directive 2006/42/EC and
EMC Directive 2004/108/EC.

Cable cross section (flexible copper strands)

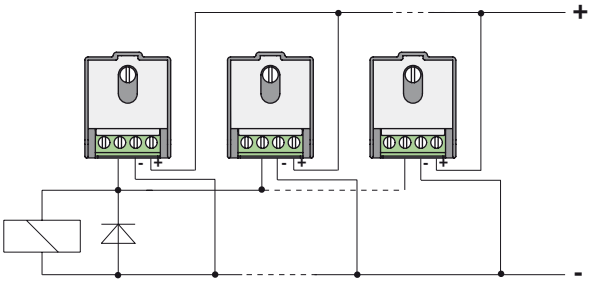
Contact block E1	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	1 x 2.5 mm²	(1 x AWG 14)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60529, EN 60529.

⚠ **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.**

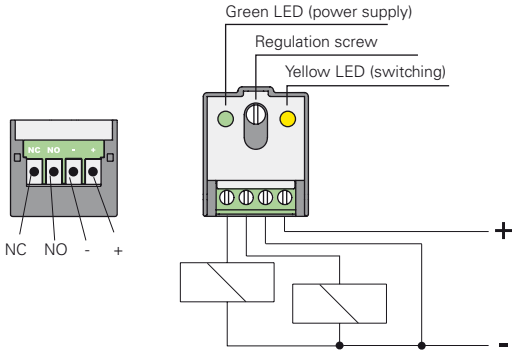
Parallel connection of several units E1 (OR)

The connection of many electronic contact blocks (OR) in parallel does not require any special precaution. With inductive loads (relay) it is advisable to install a protection diode.



Connection diagram

The wiring connection comes through a marked terminal block indicating the function of each pole. There are two signal LEDs: the first one shows power supply presence and the second shows the switching state.



Main features

The contact block E1 consists of a photoelectric sensor that checks the position of the mechanic actuator, with the following features:

1) Feasibility of adjusting the switching point by a screw directly applied on the contact block. The adjusting screw is positioned on the cap of the contact block, in order to offer an easy setting point, without extracting the contact block from the switch body.
2) Differential travel below 0.1 mm, guaranteed over the entire operating temperature range.
3) Reduced actuating force.
4) Two static PNP output, 1NO+1NC, short circuit protected.
5) Exit signal without bounce.
6) Wide range of operating temperatures.
7) Signal LEDs for power supply and switching.

These functionalities allow to resolve the following problems:

1) When interfacing the switches with PLC there are problems because of contacts bouncing or in case of very low voltages.
2) When it is necessary to sense light objects which require a contact block with high sensibility and reduced actuating forces.
3) When it is necessary to sense very small objects which require a very low differential travel.
4) When it is requested to adjust the operating point. The internal LED shows the switching point when you turn the adjusting screw.
5) In cases where the perfectly simultaneous commutation of the two outputs is required.
6) When it is necessary to detect transparent objects, or where the use of normal sensors is not feasible, keeping in mind that special sensors normally have a higher price than this solution.

Series connection of several units E1 (AND)

To connect the units in series (AND), it is necessary to comply with the following conditions:
The electric current of the first unit is the addition of the electric load and the max. load absorbed by the other switches. If we consider the connection of *n* units, the nominal current "*Ie*", results:

$Ie = (200\text{-}20 \times n)$ mA

With *Ie*: rated operating current
n: number of switches connected in series

Example: with 3 switches you can switch maximum 140 mA.

In connected-through state, each switch causes a voltage drop. The load should be suitable to work with a voltage of:

$Uc = Ua - 2 \times n$

With *Uc:* rated operating voltage of the load
Ua: used supply voltage
n: number of switches connected in series

Example: with 3 switches powered at 24 Vdc, the load must be able to work at 18 Vdc.

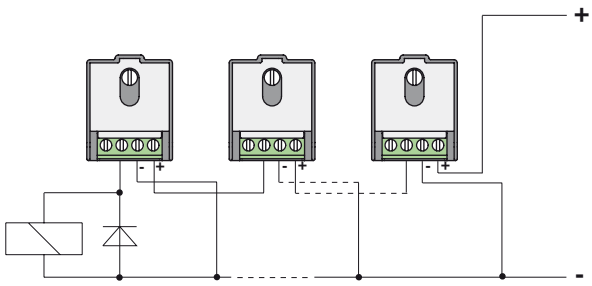
The maximum number of switches that can be connected in series depends on the supply voltage used. In any case, the number should be lower than:

$$n_{max} \leq \frac{Va - 10}{2} + 1$$

With $n_{max:}$ max. number of units connected in series
Va: supply voltage used

Example: with 24 Vdc it is possible to connect a maximum of 7 switches. With 30 Vdc it is possible to connect 11 switches.

With inductive loads (relay) it is advisable to install a protection diode.



Advice for installation

These switches are protected against electric interference of industrial environment. When used under extreme conditions, as for example installed close to high surge voltages (electric motors, welding machines, etc.), it is advisable to adopt the following precautions:

- Exclude or limit the interference from the source.
- Filter the power supply with adequate capacitor
- Separate the power cables from the switch cables.
- Limit the cable length to max. 200 m.

Check the voltage drop along the power supply lines.
When necessary, twist and shield the output wires of the switches or use a suitable twisted and shielded wire with a suitable cross section.

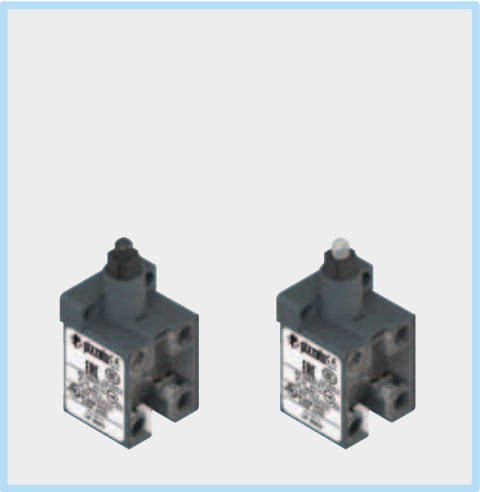
Special loads

The switch is protected against overload and short-circuit, so it is necessary to limit the inrush current of the electric load. Typical examples are capacitors, which require a high current impulse during their load, and incandescence lamps, the electric resistance of which is the tenth part of the hot electric resistance. For the capacitive loads, when necessary, connect a limit resistance in series, whereas for the lamps, when necessary, use a suitable electric resistance of pre-heating.

Utilization limits

- Not suitable for installations for safety applications
- Can only be applied with FD, FP, FL, FR, FM, FX and FZ series position switches.

Position switches for **indoor use**



Main features

- Technopolymer housing
- Protection degree IP20 (terminals), IP40 (contacts)
- 14 contact blocks available
- Actuators with plastic or metal button
- contact block with positive opening ⊖
- For internal use in PA, PX, PC series foot switches

Markings and quality marks:

UL approval:	E131787
CCC approval:	2013010305600704
EAC approval:	RU C-IT ДМ94.B.01024

Technical data

Housing

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

Protection degree:	IP20 (terminals), IP40 (contacts) according to EN 60529

General data

Ambient temperature:	-40°C … +80°C
Safety parameters:	
B_{10d}:	40,000,000 for NC contacts
Max. actuation frequency:	3600 operating cycles[1]/hour
Mechanical endurance:	20 million operating cycles[1]
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s (slow action) 0.01 mm/s (snap action)
Tightening torques screws contact blocks:	0.6 … 0.8 Nm

(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 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 18, 37, 66, 67: min.1 x 0.5 mm² (1 x AWG 20)
max.2 x 2.5 mm² (2 x AWG 14)

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

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

Installation for safety applications:
Use only switches marked with the symbol ⊖ aside the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 60947-5-1, encl. K, par. 2**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

Electrical data

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

Utilization category

Alternating current: AC15 (50÷60 Hz)

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

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	6	1.1	0.4

Characteristics approved by UL

Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Characteristics of the housing: open type
For all contact blocks 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).

In conformity with standard: UL 508, CSA 22.2 N.14

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

Description

Contact blocks with captive screws, finger protection and self-lifting clamping screw plates. With NC contacts with positive opening for safety applications. Fitted with twin bridge contacts, they are particularly suitale for high-reliability applications.
Suitable for the installation inside foot switches series PA, PX and PC.

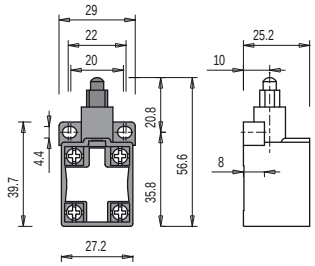
Dimensional drawings

All measures in the drawings are in mm

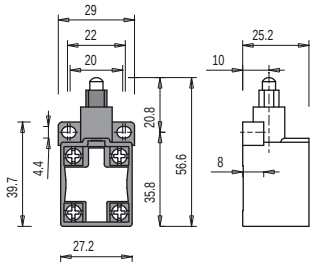
Contact type:

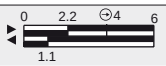
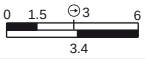
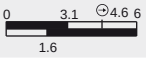
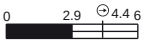
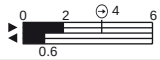
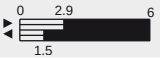
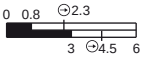
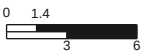
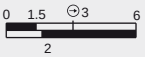
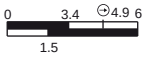
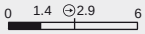
- R = snap action
- L = slow action
- LO = slow action overlapped
- LS = slow action shifted
- LV = slow action shifted and spaced
- LA = slow action closer

Technopolymer button



Metal button



Contact blocks		Technopolymer button		Metal button		Travel diagrams
5	R	VF B501	⊖ 1NO+1NC	VF B502	⊖ 1NO+1NC	
6	L	VF B601	⊖ 1NO+1NC	VF B602	⊖ 1NO+1NC	
7	LO	VF B701	⊖ 1NO+1NC	VF B702	⊖ 1NO+1NC	
9	L	VF B901	⊖ 2NC	VF B902	⊖ 2NC	
10	L	VF B1001	2NO	VF B1002	2NO	
11	R	VF B1101	⊖ 2NC	VF B1102	⊖ 2NC	
12	R	VF B1201	2NO	VF B1202	2NO	
13	LV	VF B1301	⊖ 2NC	VF B1302	⊖ 2NC	
14	LS	VF B1401	⊖ 2NC	VF B1402	⊖ 2NC	
15	LS	VF B1501	2NO	VF B1502	2NO	
18	LA	VF B1801	⊖ 1NO+1NC	VF B1802	⊖ 1NO+1NC	
37	L	VF B3701	⊖ 1NO+1NC	VF B3702	⊖ 1NO+1NC	
66	L	VF B6601	⊖ 1NC	VF B6602	⊖ 1NC	
67	L	VF B6701	1NO	VF B6702	1NO	
Max. speed		0,5 m/s		0,5 m/s		
Min. force		8 N (20 N ⊖)		8 N (20 N ⊖)		

Legend

Closed contact | Open contact | ⊖ Positive opening travel according to IEC 60947-5-1 | ▶ Pushing the switch / ◀ Releasing the switch

Code structure

article — options

VF B501-G

Contact blocks	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, overlapped
9	2NC, slow action
10	2NO, slow action
11	2NC, snap action
12	2NO, snap action
...	.....

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

Actuators	
01	with technopolymer button
02	with metal button

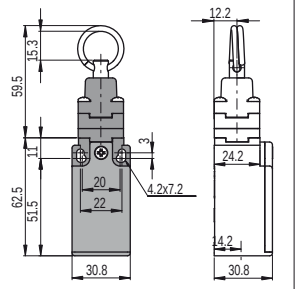
Items with code on **green** background are stock items

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

FR 573-M2 signalling switches with stable contact

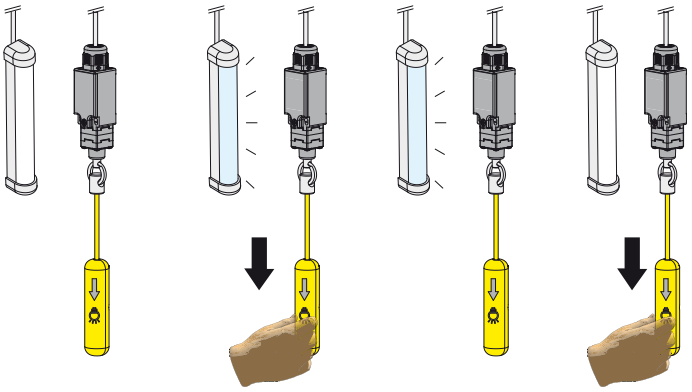
Contact type:

R = snap action



Contact blocks

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



The switch is activated by pulling the connected rope, operates in stable position mode.

This means that the first activation closes the contacts, the following activation opens them, and so on.

Such solution has been specifically studied to be applied in all those situations where a non-stable position switch is generally used to control a step-by-step relay, such as for example devices for switching on/off the inside lights or opening/closing the gates.

Thanks to this stable position function, for example, a first pull of the rope switches on a lighting system, which can later be switched off by means of a subsequent pulling action.

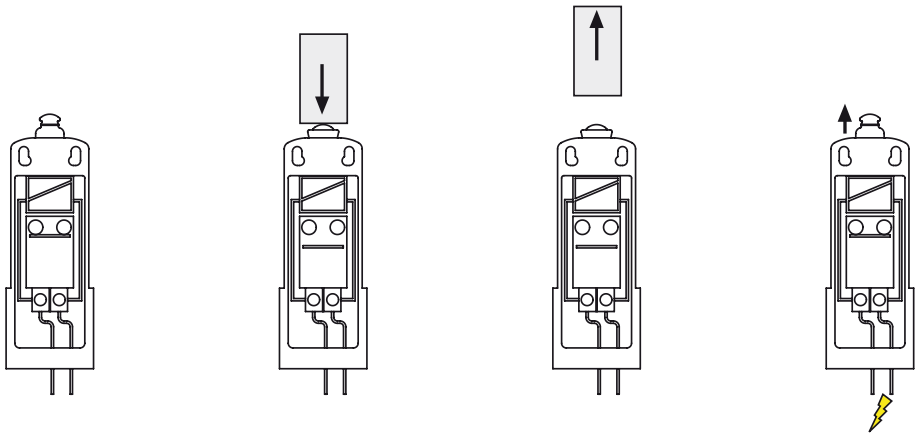
Therefore, the use of the switch on its own makes it unnecessary to have any combined solutions with step-by-step relays and respective wiring, thus remarkably simplifying all installation operations.

For more information, see the Pizzato Elettrica Lifts General Catalogue 2015-2016.

Switches with electrical reset FT series

When the FT series safety switches with reset are operated they remain switched and they reset electrically through the integrated solenoid. Thanks to this feature it's possible to remote reset the switch without being physically near it.
They are available with 3 supply voltages (24 Vdc, 48 Vdc, 230 Vac), with different actuators and they are adapt to many applications, particularly to the lift, the over-speed governor and generally to the safety field. Some items can also be supplied with the manual reset.
Furthermore Pizzato Elettrica has introduces a new adjustment system integrated in the switch: this system, purposely designed for over-speed devices, allows a very sensitive adjustment of the switch position along its vertical axis.
For more information, see the Pizzato Elettrica Lifts General Catalogue 2015-2016.

Working principle

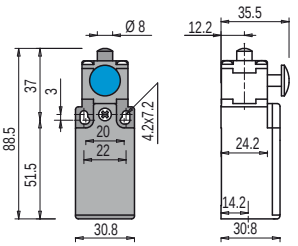


Switch in resting position | Switch activation. Contact opening | Switch release. The contacts remain open | Switch reset by means of electric impulse

Switches for switching cabinets FR 5F1-M2, FR 10F1-M2

Contact type:

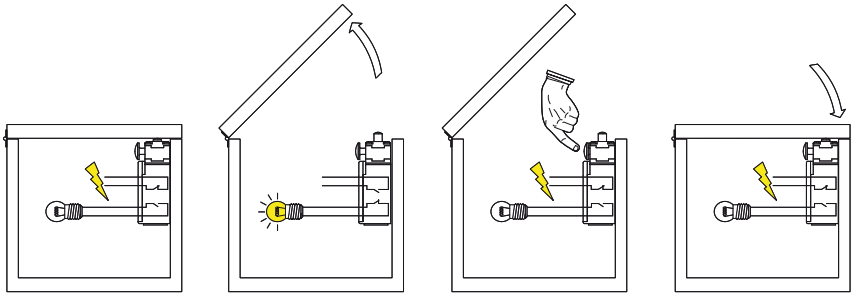
R = snap action
L = slow action



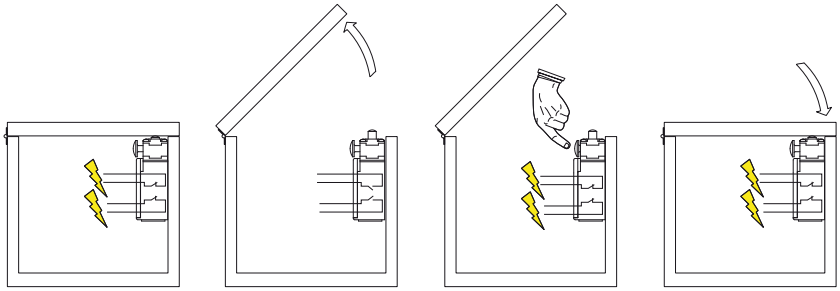
Contact blocks		
5	R	FR 5F1-M2 ⊖ 1NO+1NC
10	L	FR 10F1-M2 2NO
Max. speed		page 239 - type 4
Min. force		8 N (25 N ⊖)
Travel diagrams		page 241 - group 1

Switches FR 5F1-M2 and FR 10F1-M2 can be installed on doors of switching cabinets. They are used to switch on possible signal devices, once the door is open (e.g. three-phase flashing devices, etc.). The operator assigned to the board maintenance may simulate the closing of the door by pushing the blue button. At the end of the maintenance the functionality of the switch will be automatically re-established easily by closing the door of the cabinet.

Working principle FR 5F1-M2



Working principle FR 10F1-M2

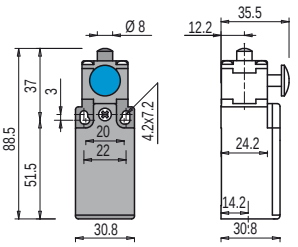


⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 235 to page 246.**

Switches for switching cabinets FR 37F1-M2

Contact type:

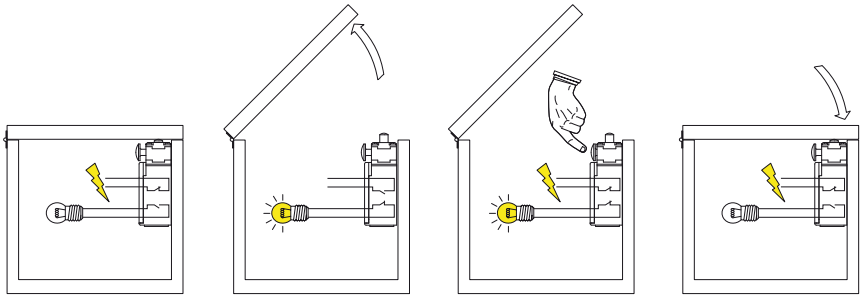
L = slow action



Contact blocks		
37	L	FR 37F1-M2 ⊖ 1NO+1NC
Max. speed		page 239 - type 4
Min. force		8 N (25 N ⊖)
Travel diagrams		page 241 - group 1

The operation of this switch is similar to that of the one described above.
When the button of the switch is pressed, it simulates the door closing operation, therefore the auxiliary circuit is newly supplied with power and the light remains on; it will only go off after the door has been closed.

Working principle FR 37F1-M2



⚠ **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.**

Switches with **stainless steel** external parts

Description

Pizzato Elettrica offers a wide range of products suitable for places where chemical and corrosive agents are used and for aseptic places where particular attention must be paid to cleanliness and hygiene.
The technopolymer housings and external metal parts in stainless steel allow these devices to be used for a variety of applications, ranging from the food and pharmaceutical sectors to the chemical and marine sectors.

Main features:
- Technopolymer housing
- External metallic parts in stainless steel only
- Protection degree IP67 (FR, FX, FK, FW, FP series switches)
- Protection degree IP67 and IP69K (SR, ST, HX series sensors)

Resistance against corrosion.

Substance	Stainless steel	Technopolymer
Acetylene	■	■
Vinegar	■	■
Acetone	■	■
Acetic acid	■	□
Boric acid	■	■
Citric acid	■	■
Hydrochloric acid 100%	□	□
Chromic acid 5%	■	□
Hydrofluoric acid 100%	■	□
Formic acid	■	□
Phosphoric acid (<40%)	◘	■
Lactic acid	■	■
Nitric acid (concentrated)	■	□
Oleic acid	■	■
Sulphuric acid (<10%)	■	◘
Sulphuric acid (10-75%)	□	□
Sulphuric acid (75-100%)	□	□
Stearic acid	■	■
Tartaric acid	◘	■
White water	■	■
Sea water	◘	■
Distilled water	■	■
White spirit	■	■
Ethyl alcohol	■	■
Methyl alcohol	■	■
Liquid ammonia	■	■
Ammonium acetate	■	■
Ammonium carbonate	■	■
Ammonium sulphate	■	■
Leaded petrol	■	■
Unleaded petrol	■	■
Benzol	■	□
Beer	■	■
Butane	■	■
Butanol	■	■
Quicklime	■	■
Calcium chloride	■	■
Calcium hydroxide	■	■
Chloroform	■	■
Aluminium chloride	■	■
Ferrous chloride	□	□
Chromium plate	◘	◘
Diesel	■	■
Ether	■	■
Formaldehyde 100%	■	□
Furfural	■	■
Gelatine	■	■
Glycerine	■	■
Glucose	■	■
Shellac (orange)	■	■
Hydrogen (gas)	■	■
Iodine	□	■
Milk	■	■
Magnesium chloride	□	■
Magnesium hydroxide	■	■
Magnesium sulphate (Epsom salts)	■	■
Mayonnaise	■	■

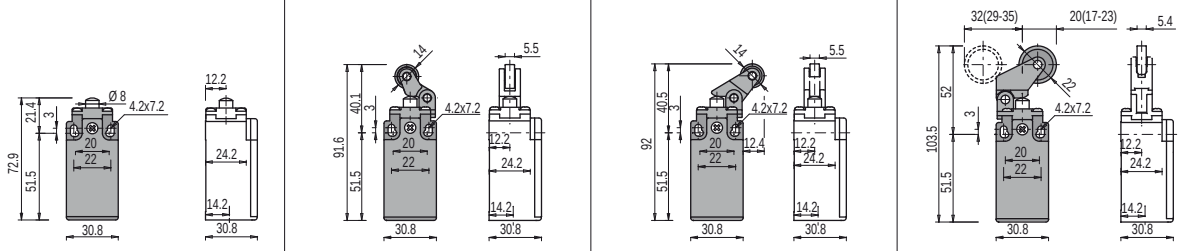
Substance	Stainless steel	Technopolymer
Whisky malt	■	■
Molasses	■	■
Nickel chloride	◘	◘
Aluminium nitrate	■	■
Combustible oils	■	■
Tanning oil	■	-
Linseed oil	■	■
Hydraulic oil (synthetic)	■	■
Hydraulic oil (synthetic)	■	■
Mineral Oil	■	■
Motor Oil	■	■
Transformer oil	■	■
Paraffin	■	■
Potassium chloride	■	■
Potassium hydroxide (caustic potash)	■	◘
Potassium sulphate	■	■
Propane (liquid)	■	■
Copper sulphate >5%	■	□
Liquid soaps	■	■
Chocolate syrup	■	■
Milk whey	■	-
Sodium bicarbonate	■	■
Sodium bisulphate	◘	■
Sodium carbonate	■	■
Sodium chloride	■	■
Sodium hydroxide (80%)	■	◘
Sodium hypochlorite (100%)	□	□
Sodium nitrate	■	■
Sodium sulphate	■	■
Sodium sulphide	□	■
Aluminium sulphate	■	■
Ferrous sulphate	■	■
Calcium hydroxide	□	■
Potassium hydroxide	■	■
Sodium hydroxide	-	■
Tanning solutions	■	■
Photographic solutions	-	■
Fruit juice	■	■
Vegetable juice	■	■
Toluene	■	◘
Transparent (paint)	■	-
Trichloroethylene	■	■
Whisky and wine	■	■
Zinc plate	◘	□
Zinc chloride	■	■
Zinc sulphate	-	■
Sulphur chloride	■	■
Sugar (liquid)	■	■
Sugar beet	■	■

Resistance against corrosion.

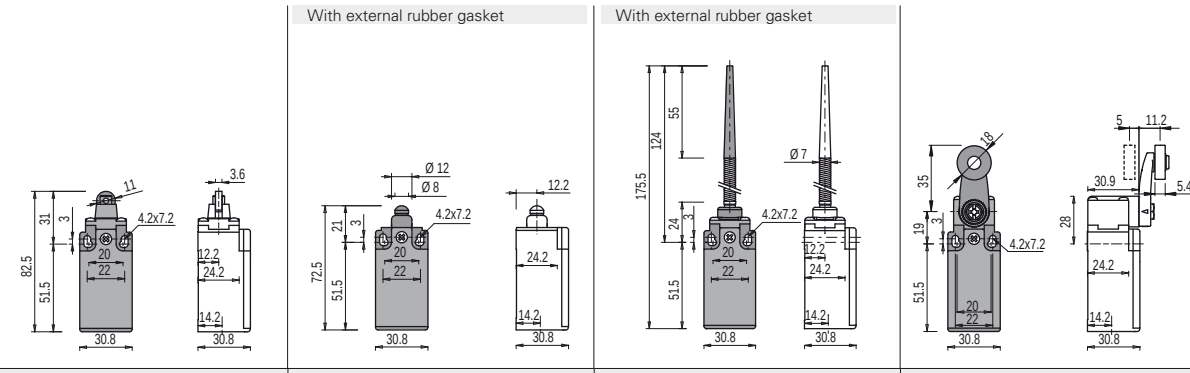
■ No corrosion
◘ Possible corrosion
□ Corrosion
- Data not available

Contact type:

R = snap action
L = slow action



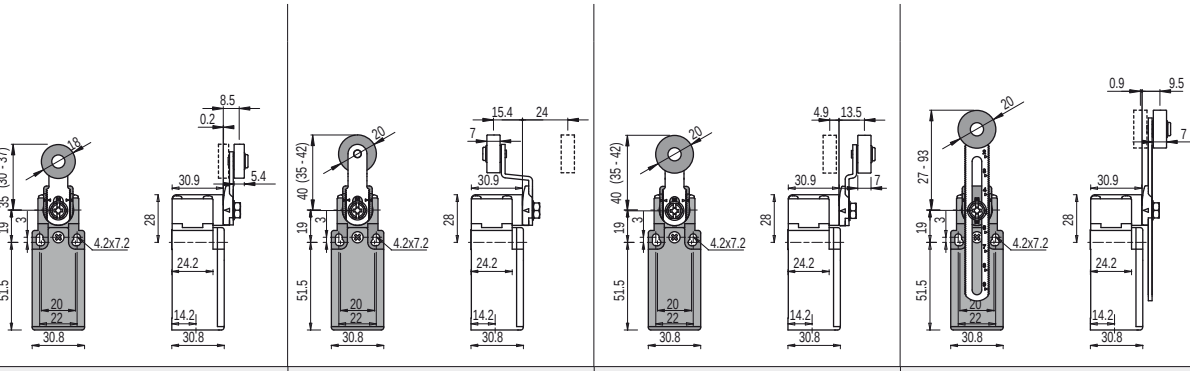
Contact blocks					
5	R	FR 501-XM2 1NO+1NC	FR 502-XM2 1NO+1NC	FR 505-XM2 1NO+1NC	FR 507-XM2 1NO+1NC
6	L	FR 601-XM2 1NO+1NC	FR 602-XM2 1NO+1NC	FR 605-XM2 1NO+1NC	FR 607-XM2 1NO+1NC
9	L	FR 901-XM2 2NC	FR 902-XM2 2NC	FR 905-XM2 2NC	FR 907-XM2 2NC
20	L	FR 2001-XM2 1NO+2NC	FR 2002-XM2 1NO+2NC	FR 2005-XM2 1NO+2NC	FR 2007-XM2 1NO+2NC
2	R	FR 201-XM2 2x(1NO-1NC)	FR 202-XM2 2x(1NO-1NC)	FR 205-XM2 2x(1NO-1NC)	FR 207-XM2 2x(1NO-1NC)
Max. speed		page 239 - type 4	page 239 - type 3	page 239 - type 3	page 239 - type 3
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

With external rubber gasket

Contact blocks					
5	R	FR 515-XM2 1NO+1NC	FR 5A1-XM2 1NO+1NC	FR 520-XM2 1NO+1NC	FR 530-XM2V38 1NO+1NC
6	L	FR 615-XM2 1NO+1NC	FR 6A1-XM2 1NO+1NC		FR 630-XM2V38 1NO+1NC
9	L	FR 915-XM2 2NC	FR 9A1-XM2 2NC		FR 930-XM2V38 2NC
20	L	FR 2015-XM2 1NO+2NC	FR 20A1-XM2 1NO+2NC	FR 2020-XM2 1NO+2NC	FR 2030-XM2V38 1NO+2NC
2	R	FR 215-XM2 2x(1NO-1NC)	FR 2A1-XM2 2x(1NO-1NC)	FR 220-XM2 2x(1NO-1NC)	FR 230-XM2V38 2x(1NO-1NC)
Max. speed		page 239 - type 2	page 239 - type 4	1 m/s	page 239 - type 1
Min. force		8 N (25 N)	6 N (25 N)	0.07 Nm	0.06 Nm (0.25 Nm)
Travel diagrams		page 240 - group 1	page 240 - group 1	page 240 - group 4	page 240 - group 5



Contact blocks					
5	R	FR 531-XM2V38 1NO+1NC	FR 551-XM2V38 1NO+1NC	FR 554-XM2V38 1NO+1NC	FR 556-XM2V38 1NO+1NC
6	L	FR 631-XM2V38 1NO+1NC	FR 651-XM2V38 1NO+1NC	FR 654-XM2V38 1NO+1NC	FR 656-XM2V38 1NO+1NC
9	L	FR 931-XM2V38 2NC	FR 951-XM2V38 2NC	FR 954-XM2V38 2NC	FR 956-XM2V38 2NC
20	L	FR 2031-XM2V38 1NO+2NC	FR 2051-XM2V38 1NO+2NC	FR 2054-XM2V38 1NO+2NC	FR 2056-XM2V38 1NO+2NC
2	R	FR 231-XM2V38 2x(1NO-1NC)	FR 251-XM2V38 2x(1NO-1NC)	FR 254-XM2V38 2x(1NO-1NC)	FR 256-XM2V38 2x(1NO-1NC)
Max. speed		page 239 - type 1	page 239 - type 1	page 239 - type 1	page 239 - type 1
Min. force		0.06 Nm (0.25 Nm)	0.06 Nm (0.25 Nm)	0.06 Nm (0.25 Nm)	0.06 Nm (0.25 Nm)
Travel diagrams		page 240 - group 5	page 240 - group 5	page 240 - group 5	page 240 - group 5

All measures in the drawings are in mm

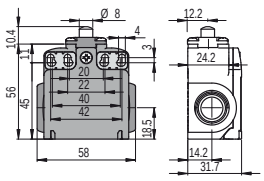
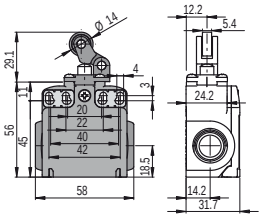
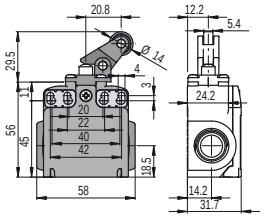
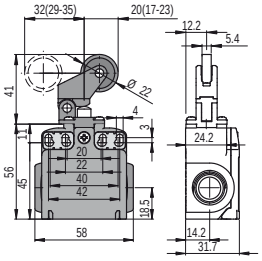
Accessories See page 225

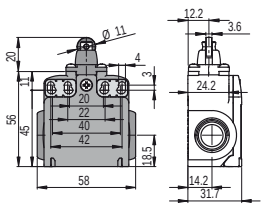
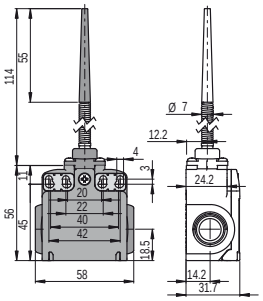
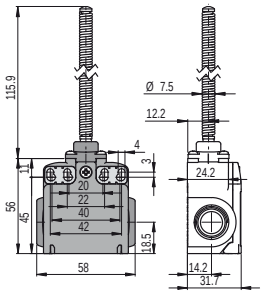
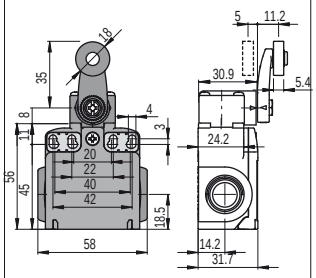
➔ The 2D/3D files are available at **www.pizzato.com**

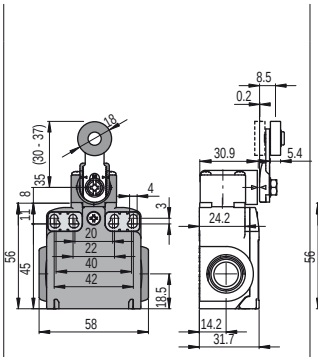
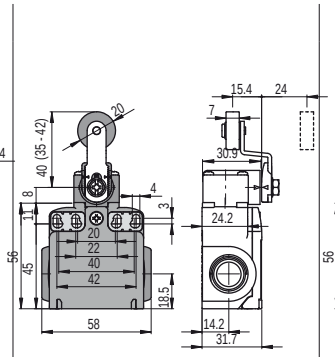
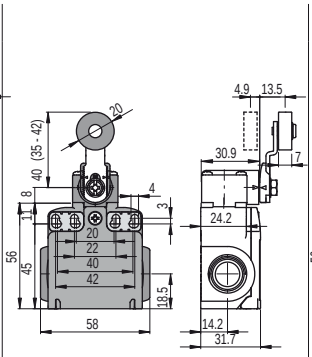
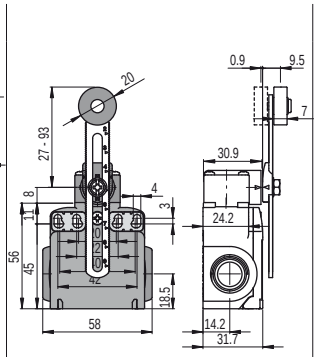
Switches with **stainless steel** external parts

Contact type:

R = snap action
L = slow action

Contact blocks					
					
5	R	FX 501-XM2 → 1NO+1NC	FX 502-XM2 → 1NO+1NC	FX 505-XM2 → 1NO+1NC	FX 507-XM2 → 1NO+1NC
6	L	FX 601-XM2 → 1NO+1NC	FX 602-XM2 → 1NO+1NC	FX 605-XM2 → 1NO+1NC	FX 607-XM2 → 1NO+1NC
9	L	FX 901-XM2 → 2NC	FX 902-XM2 → 2NC	FX 905-XM2 → 2NC	FX 907-XM2 → 2NC
20	L	FX 2001-XM2 → 1NO+2NC	FX 2002-XM2 → 1NO+2NC	FX 2005-XM2 → 1NO+2NC	FX 2007-XM2 → 1NO+2NC
2	R	FX 201-XM2 2x(1NO-1NC)	FX 202-XM2 2x(1NO-1NC)	FX 205-XM2 2x(1NO-1NC)	FX 207-XM2 2x(1NO-1NC)
Max. speed		page 239 - type 4	page 239 - type 3	page 239 - type 3	page 239 - type 3
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

Contact blocks			With external rubber gasket	With external rubber gasket	
					
5	R	FX 515-XM2 → 1NO+1NC	FX 520-XM2 1NO+1NC	FX 525-XM2 1NO+1NC	FX 530-XM2V38 → 1NO+1NC
6	L	FX 615-XM2 → 1NO+1NC			FX 630-XM2V38 → 1NO+1NC
9	L	FX 915-XM2 → 2NC			FX 930-XM2V38 → 2NC
20	L	FX 2015-XM2 → 1NO+2NC	FX 2020-XM2 1NO+2NC	FX 2025-XM2 1NO+2NC	FX 2030-XM2V38 → 1NO+2NC
2	R	FX 215-XM2 2x(1NO-1NC)	FX 220-XM2 2x(1NO-1NC)	FX 225-XM2 2x(1NO-1NC)	FX 230-XM2V38 2x(1NO-1NC)
Max. speed		page 239 - type 2	1 m/s	1 m/s	page 239 - type 1
Min. force		8 N (25 N →)	0.07 Nm	0.12 Nm	0.06 Nm (0.25 Nm →)
Travel diagrams		page 240 - group 1	page 240 - group 4	page 240 - group 4	page 240 - group 5

Contact blocks					
					
5	R	FX 531-XM2V38 → 1NO+1NC	FX 551-XM2V38 → 1NO+1NC	FX 554-XM2V38 → 1NO+1NC	FX 556-XM2V38 → 1NO+1NC
6	L	FX 631-XM2V38 → 1NO+1NC	FX 651-XM2V38 → 1NO+1NC	FX 654-XM2V38 → 1NO+1NC	FX 656-XM2V38 → 1NO+1NC
9	L	FX 931-XM2V38 → 2NC	FX 951-XM2V38 → 2NC	FX 954-XM2V38 → 2NC	FX 956-XM2V38 → 2NC
20	L	FX 2031-XM2V38 → 1NO+2NC	FX 2051-XM2V38 → 1NO+2NC	FX 2054-XM2V38 → 1NO+2NC	FX 2056-XM2V38 → 1NO+2NC
2	R	FX 231-XM2V38 2x(1NO-1NC)	FX 251-XM2V38 2x(1NO-1NC)	FX 254-XM2V38 2x(1NO-1NC)	FX 256-XM2V38 2x(1NO-1NC)
Max. speed		page 239 - type 1	page 239 - type 1	page 239 - type 1	page 239 - type 1
Min. force		0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)
Travel diagrams		page 240 - group 5	page 240 - group 5	page 240 - group 5	page 240 - group 5

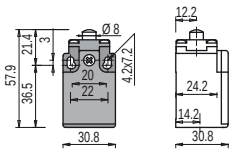
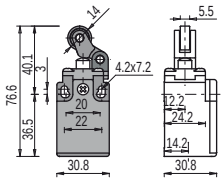
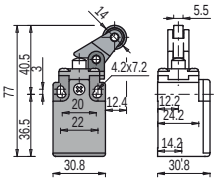
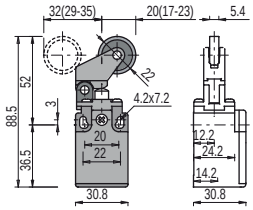
All measures in the drawings are in mm

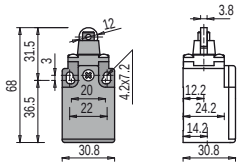
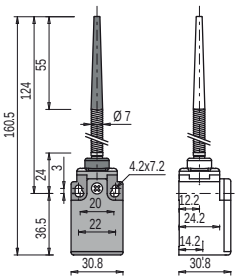
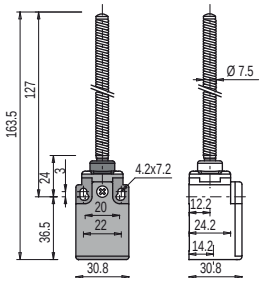
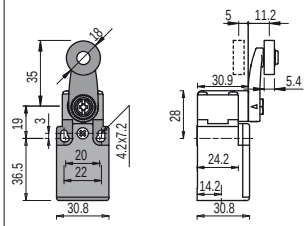
Accessories See page 225

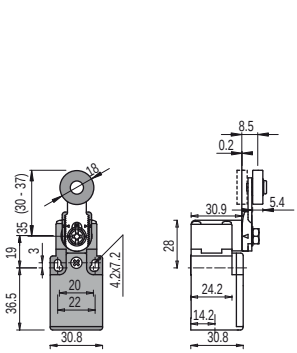
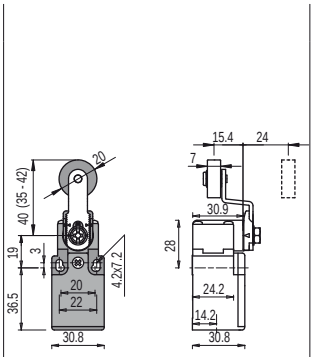
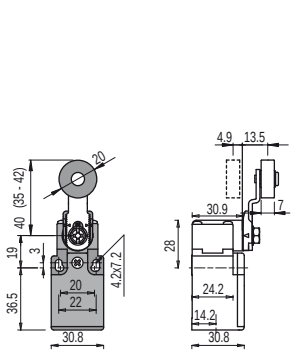
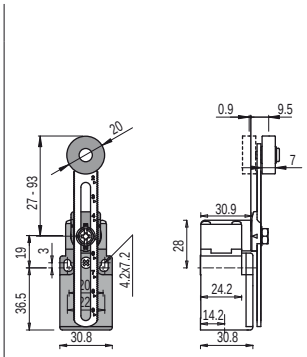
→ The 2D/3D files are available at **www.pizzato.com**

Contact type:

R = snap action
L = slow action

Contact blocks					
					
3	R	FK 301-XM1 1NO+1NC	FK 302-XM1 1NO+1NC	FK 305-XM1 1NO+1NC	FK 307-XM1 1NO+1NC
33	L	FK 3301-XM1 → 1NO+1NC	FK 3302-XM1 → 1NO+1NC	FK 3305-XM1 → 1NO+1NC	FK 3307-XM1 → 1NO+1NC
34	L	FK 3401-XM1 → 2NC	FK 3402-XM1 → 2NC	FK 3405-XM1 → 2NC	FK 3407-XM1 → 2NC
Max. speed		page 239 - type 4	page 239 - type 3	page 239 - type 3	page 239 - type 3
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

Contact blocks			With external rubber gasket	With external rubber gasket	
					
3	R	FK 315-XM1 1NO+1NC	FK 320-XM1 1NO-1NC	FK 325-XM1 1NO-1NC	FK 330-XM1V38 1NO+1NC
33	L	FK 3315-XM1 → 1NO+1NC	FK 3320-XM1 1NO+1NC	FK 3325-XM1 1NO+1NC	FK 3330-XM1V38 → 1NO+1NC
34	L	FK 3415-XM1 → 2NC	FK 3420-XM1 2NC	FK 3425-XM1 2NC	FK 3430-XM1V38 → 2NC
Max. speed		page 239 - type 2	1 m/s	1 m/s	page 239 - type 1
Min. force		8 N (25 N →)	0.05 Nm	0.1 Nm	0.06 Nm (0.25 Nm →)
Travel diagrams		page 240 - group 1	page 240 - group 4	page 240 - group 4	page 240 - group 5

Contact blocks					
					
3	R	FK 331-XM1V38 1NO+1NC	FK 351-XM1V38 1NO+1NC	FK 354-XM1V38 1NO+1NC	FK 356-XM1V38 1NO+1NC
33	L	FK 3331-XM1V38 → 1NO+1NC	FK 3351-XM1V38 → 1NO+1NC	FK 3354-XM1V38 → 1NO+1NC	FK 3356-XM1V38 → 1NO+1NC
34	L	FK 3431-XM1V38 → 2NC	FK 3451-XM1V38 → 2NC	FK 3454-XM1V38 → 2NC	FK 3456-XM1V38 → 2NC
Max. speed		page 239 - type 1	page 239 - type 1	page 239 - type 1	page 239 - type 1
Min. force		0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)	0.06 Nm (0.25 Nm →)
Travel diagrams		page 240 - group 5	page 240 - group 5	page 240 - group 5	page 240 - group 5

All measures in the drawings are in mm

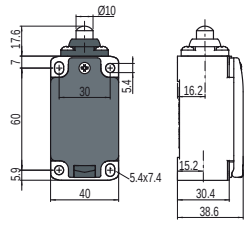
Accessories See page 225

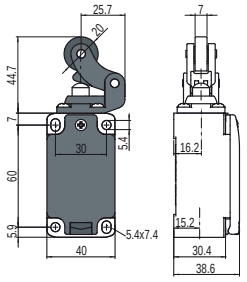
→ The 2D/3D files are available at **www.pizzato.com**

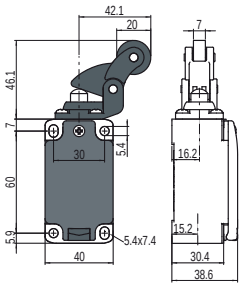
Switches with **stainless steel** external parts

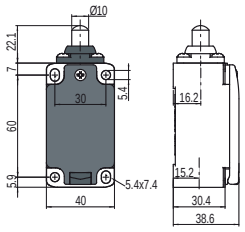
Contact type:

R = snap action
L = slow action

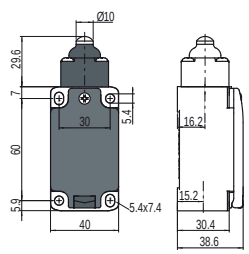


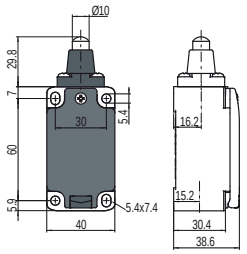


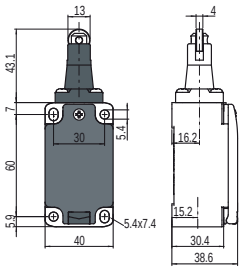




Contact blocks					
5	R	FP 501-XM2 → 1NO+1NC	FP 502-XM2 → 1NO+1NC	FP 505-XM2 → 1NO+1NC	FP 508-XM2 → 1NO+1NC
6	L	FP 601-XM2 → 1NO+1NC	FP 602-XM2 → 1NO+1NC	FP 605-XM2 → 1NO+1NC	FP 608-XM2 → 1NO+1NC
9	L	FP 901-XM2 → 2NC	FP 902-XM2 → 2NC	FP 905-XM2 → 2NC	FP 908-XM2 → 2NC
20	L	FP 2001-XM2 → 1NO+2NC	FP 2002-XM2 → 1NO+2NC	FP 2005-XM2 → 1NO+2NC	FP 2008-XM2 → 1NO+2NC
2	R	FP 201-XM2 2x(1NO-1NC)	FP 202-XM2 2x(1NO-1NC)	FP 205-XM2 2x(1NO-1NC)	FP 208-XM2 2x(1NO-1NC)
Max. speed		page 237 - type 4	page 237 - type 3	page 237 - type 3	page 237 - type 4
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







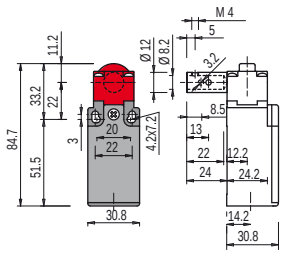
Contact blocks					
5	R	FP 510-XM2 → 1NO+1NC	FP 511-XM2 → 1NO+1NC	FP 516-XM2 → 1NO+1NC	
6	L	FP 610-XM2 → 1NO+1NC	FP 611-XM2 → 1NO+1NC	FP 616-XM2 → 1NO+1NC	
9	L	FP 910-XM2 → 2NC	FP 911-XM2 → 2NC	FP 916-XM2 → 2NC	
20	L	FP 2010-XM2 → 1NO+2NC	FP 2011-XM2 → 1NO+2NC	FP 2016-XM2 → 1NO+2NC	
2	R	FP 210-XM2 2x(1NO-1NC)	FP 211-XM2 2x(1NO-1NC)	FP 216-XM2 2x(1NO-1NC)	
Max. speed		page 237 - type 4	page 237 - type 4	page 237 - type 2	
Min. force		11 N (25 N →)	8 N (25 N →)	8 N (25 N →)	
Travel diagrams		page 238 - group 1	page 238 - group 1	page 238 - group 1	

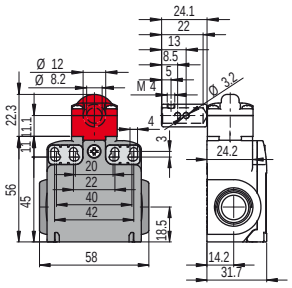
Safety switches for hinges

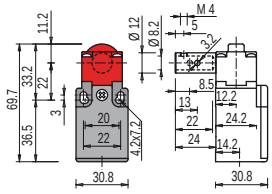
All measures in the drawings are in mm

Contact type:

L = slow action







Contact blocks				
98	L	FR 1896-XM2 → 1NO+1NC	FX 1896-XM2 → 1NO+1NC	
9	L	FR 996-XM2 → 2NC	FX 996-XM2 → 2NC	
20	L	FR 2096-XM2 → 1NO+2NC	FX 2096-XM2 → 1NO+2NC	
33	L			FK 3396-XM1 → 1NO+1NC
34	L			FK 3496-XM1 → 2NC
Min. force		0,15 Nm (0,4 Nm →)	0,15 Nm (0,4 Nm →)	0,15 Nm (0,4 Nm →)
Travel diagrams		page 242 - group 9	page 242 - group 9	page 242 - group 9

⚠ **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.**

Accessories See page 225

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

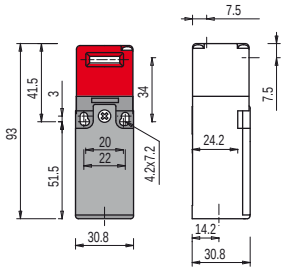
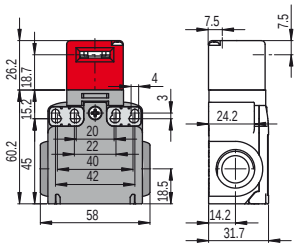
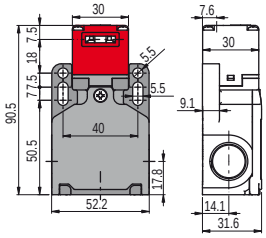
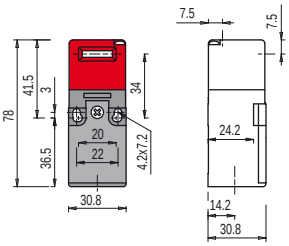
Safety switches with separate actuator

All measures in the drawings are in mm

Contact type:

R = snap action
L = slow action

Contact blocks

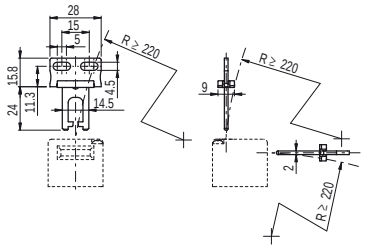
		without actuator	without actuator	without actuator	without actuator
					
6	L	FR 693-XM2 → 1NO+1NC	FX 693-XM2 → 1NO+1NC	FW 692-XM2 → 1NO+1NC	
9	L	FR 993-XM2 → 2NC	FX 993-XM2 → 2NC	FW 992-XM2 → 2NC	
20	L	FR 2093-XM2 → 1NO+2NC	FX 2093-XM2 → 1NO+2NC	FW 2092-XM2 → 1NO+2NC	
33	L				FK 3393-XM1 → 1NO+1NC
34	L				FK 3493-XM1 → 2NC
Min. force		10 N (18 N →)	10 N (18 N →)	10 N (18 N →)	10 N (18 N →)
Travel diagrams		page 242 - group 8	page 242 - group 8	page 242 - group 8	page 242 - group 8

Stainless steel actuators

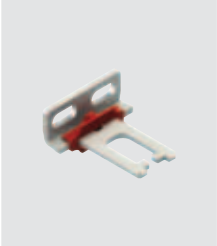
All measures in the drawings are in mm

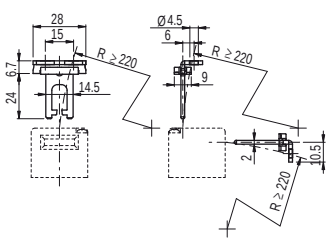
IMPORTANT: These actuators can be used with items of the FR, FX, FK and FW series (e.g. FR 693-XM2).
Low level of coding acc. to EN ISO 14119.

Article	Description
VF KEYD	Straight actuator

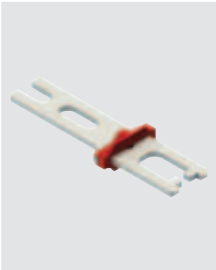


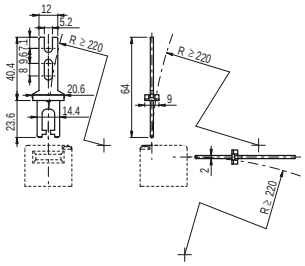
Article	Description
VF KEYD1	Angled actuator



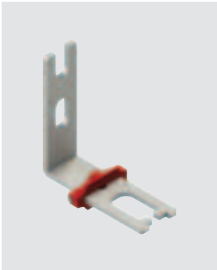


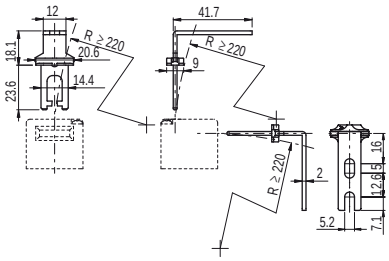
Article	Description
VF KEYD5	Extended actuator



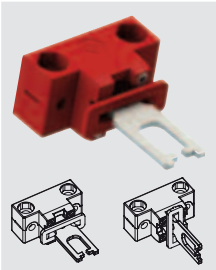


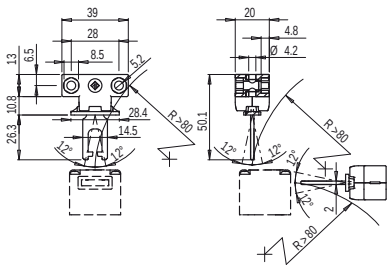
Article	Description
VF KEYD6	Extended angled actuator



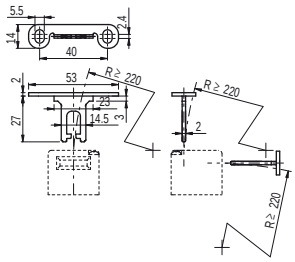


Article	Description
VF KEYD8	Universal actuator

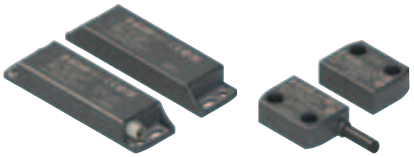




Article	Description
VF KEYD10	Shaped actuator



3 SR series magnetic safety sensors



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Pizzato Elettrica 2015-2016 pages 29/35

4 ST series safety sensors with RFID technology

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Pizzato Elettrica 2015-2016 page 41

5 HX series stainless steel safety switches

See General Safety Catalogue
Pizzato Elettrica 2015-2016 page 61

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

Accessories See page 225

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