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

ATEX markings:

Product code extension	Quality mark	Certificate type and notified body
-EX7	CE 0158	EC type examination certificate DEKRA EXAM Gmbh

Technical data

Housing

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

General data

Ambient temperature:	-20°C ... +60°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	
FM ••••-EX•	10 million operating cycles
FM ••C•-EX•, FM ••96-EX•	500,000 operating cycles
Mounting position:	any
Safety parameters B_{10D} (NC contacts):	
FM ••••-EX•	20,000,000
FM ••C•-EX•	1,000,000
FM ••96-EX•	2,500,000
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 211-222

Cable cross section (flexible copper strands)

Contact blocks 20, 21, 22, 28, 29, 30, 33, 34:	min.	1 x 0.34 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)
Contact blocks 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 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 compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, UL 508, CSA 22.2 No.14, IEC 60079-0, EN 60079-0, IEC 60079-11, EN 60079-11.

Compliance with the requirements of:
ATEX Directive 2014/34/EU and EMC Directive 2014/30/EU

Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the symbol Ⓔ next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (fault exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 216. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 211 to 222 and in the certificate.**

Product code extension **-EX7**

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

⚠ **This switch type must be used only in intrinsic safety circuits in compliance with standard IEC 60079-11, EN 60079-11**

Electrical data

Maximum current (Ii):	2.5 A
Maximum voltage (Ui):	30 Vdc
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type gG fuse 4 A 250 V
Pollution degree:	3

Quality marks of the product

UL approval: E131787
EAC approval: RU C-IT.АД35.В.00454

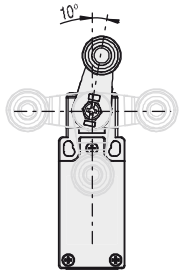
Features approved by UL

Utilization category Q300 (69 VA, 125-250 Vdc)
A600 (720 VA, 120-600 Vac)
Housing features type 1, 4X, 12, 13
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductors, rigid or flexible, wire size 14 AWG. Tightening torque for terminal screws of 12 lb in (1.4 Nm).

In compliance with standard: UL 508, CSA 22.2 No.14
Please contact our technical department for the list of approved products.

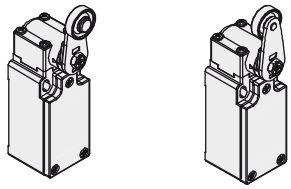
Adjustable levers

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



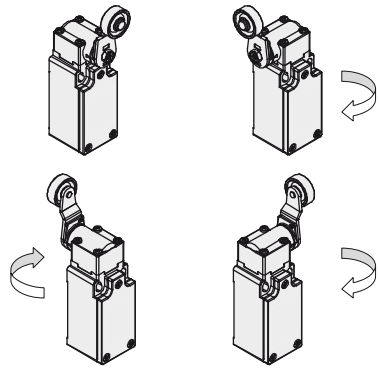
Reversible levers

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



Head with variable orientation

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



Code structure

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

article / options / product code extension

FM 502-GM2-EX7

Housing

FM	metal, one conduit entry

Contact block

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

Actuators

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

ATEX approval

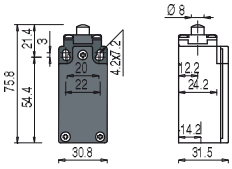
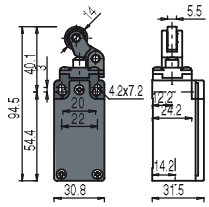
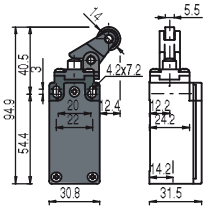
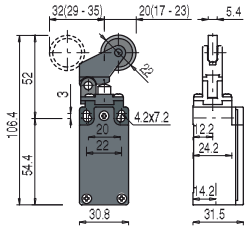
-EX7	Ex II 2G Ex ia IIC T6 Gb Ex I M2 Ex ia I Mb

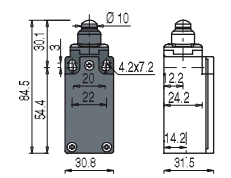
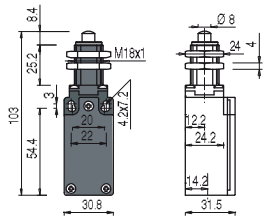
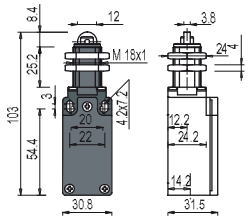
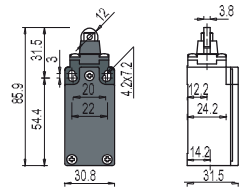
Contact type

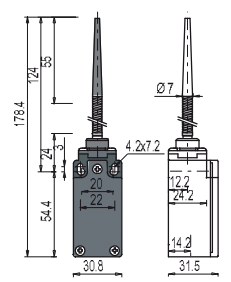
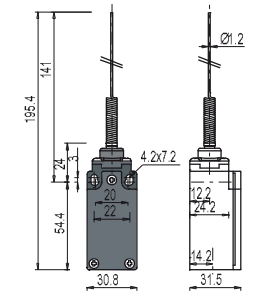
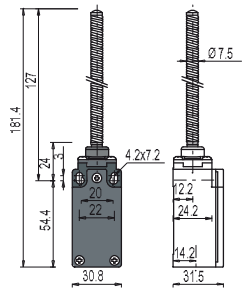
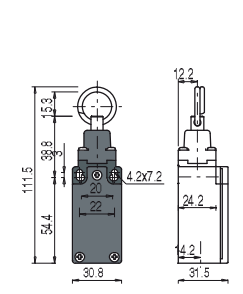
	silver contacts (standard)
G	silver contacts, 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 20, 21, 22, 28, 29, 30, 33, 34)

Switches compliant with **ATEX** directive ⟨Ex⟩ / **FM** series

Contact type:
R = snap action
L = slow action

Category	Contact block					
				With stainless steel roller on request 	With stainless steel roller on request 	
2G M2	5 R		FM 501-M2-EX7 ⊖ 1NO+1NC	FM 502-M2-EX7 ⊖ 1NO+1NC	FM 505-M2-EX7 ⊖ 1NO+1NC	FM 507-M2-EX7 ⊖ 1NO+1NC
	20 L		FM 2001-M2-EX7 ⊖ 1NO+2NC	FM 2002-M2-EX7 ⊖ 1NO+2NC	FM 2005-M2-EX7 ⊖ 1NO+2NC	FM 2007-M2-EX7 ⊖ 1NO+2NC
Max. speed			0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Actuating force			8 N (25 N ⊖)	6 N (25 N ⊖)	6 N (25 N ⊖)	4 N (25 N ⊖)
Travel diagrams			page 216 - group 1	page 216 - group 2	page 216 - group 2	page 216 - group 3

Category	Contact block					
			With external rubber gasket 			
2G M2	5 R		FM 508-M2-EX7 ⊖ 1NO+1NC	FM 512-M2-EX7 ⊖ 1NO+1NC	FM 513-M2-EX7 ⊖ 1NO+1NC	FM 515-M2R28-EX7 ⊖ 1NO+1NC
	20 L		FM 2008-M2-EX7 ⊖ 1NO+2NC	FM 2012-M2-EX7 ⊖ 1NO+2NC	FM 2013-M2-EX7 ⊖ 1NO+2NC	FM 2015-M2R28-EX7 ⊖ 1NO+2NC
Max. speed			0.5 m/s	0.5 m/s	0.5 m/s with cam at 30°	0.5 m/s with cam at 30°
Actuating force			8 N (25 N ⊖)	8 N (25 N ⊖)	8 N (25 N ⊖)	8 N (25 N ⊖)
Travel diagrams			page 216 - group 1	page 216 - group 1	page 216 - group 1	page 216 - group 1

Category	Contact block					
			With external rubber gasket 	With external rubber gasket 	With external rubber gasket 	Rope switch for signalling 
2G M2	5 R		FM 520-M2-EX7 1NO+1NC	FM 521-M2-EX7 1NO+1NC	FM 525-M2-EX7 1NO+1NC	FM 576-M2-EX7 1NO+1NC
	20 L		FM 2020-M2-EX7 1NO+2NC	FM 2021-M2-EX7 1NO+2NC	FM 2025-M2-EX7 1NO+2NC	FM 2076-M2-EX7 2NO+1NC
Max. speed			1 m/s	1 m/s	1 m/s	0.5 m/s
Actuating force			0.06 Nm	0.04 Nm	0.11 Nm	initial 20 N - final 40 N
Travel diagrams			page 216 - group 4	page 216 - group 4	page 216 - group 4	page 216 - group 7

All values in the drawings are in mm

Accessories See page 197

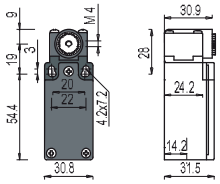
➔ The 2D and 3D files are available at **www.pizzato.com**

Position switches with swivelling lever without actuator

All values in the drawings are in mm

Contact type:
R = snap action
L = slow action

Category	Contact block		
2G M2	5	R	FM 538-M2-EX7 ⊖ 1NO+1NC
	20	L	FM 2038-M2-EX7 ⊖ 1NO+2NC
Actuating force			0,06 Nm (0,25 Nm ⊖)
Travel diagrams			page 216 - group 5

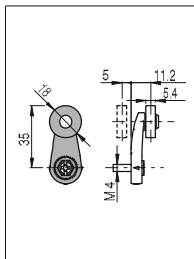
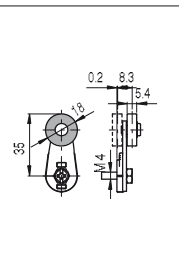
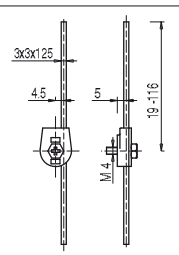
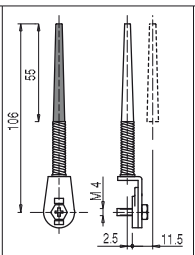
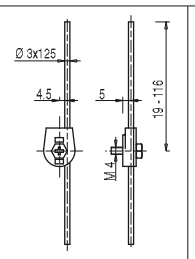
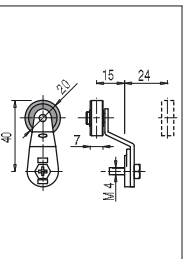


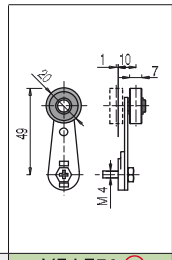
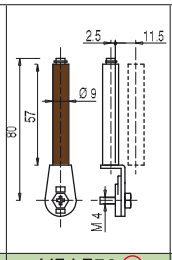
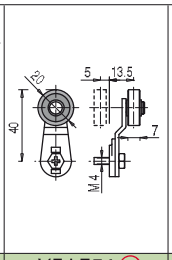
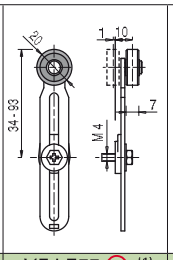
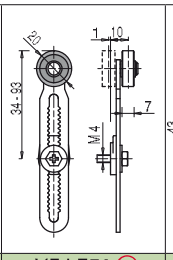
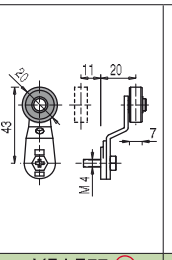
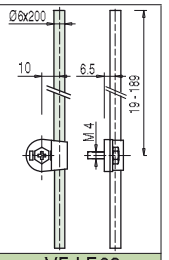
IMPORTANT
For safety applications: join only switches and actuators marked with symbol ⊖ next to the product code.
For more information about safety applications see details on page 211.

Separate actuators

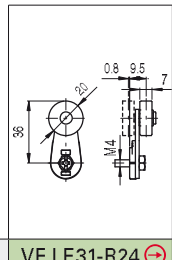
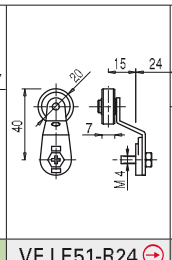
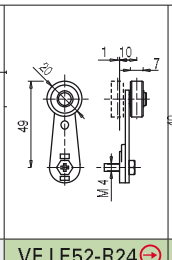
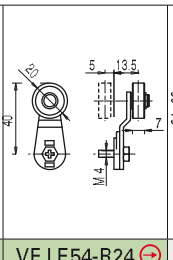
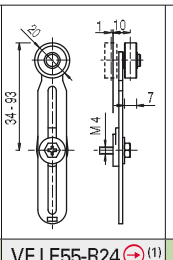
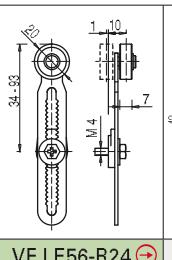
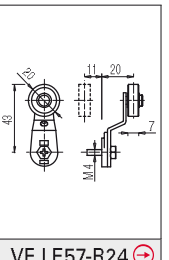
All values in the drawings are in mm

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

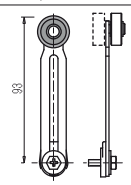
	Roller Ø 18 mm	Roller Ø 18 mm	Adjustable square rod, 3x3x125 mm	Flexible rod with pointed end	Adjustable round rod Ø 3x125 mm	Technopolymer roller Ø 20 mm
						
Article	VF LE30 ⊖	VF LE31 ⊖	VF LE33	VF LE34	VF LE50	VF LE51 ⊖
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s	1.5 m/s	1.5 m/s	1.5 m/s (cam at 30°)

	Technopolymer roller Ø 20 mm	Porcelain roller	Technopolymer roller Ø 20 mm	Adjustable actuator with technopolymer roller	Adjustable safety actuator with techno-polymer roller	Technopolymer roller Ø 20 mm	Adjustable glass fibre rod
							
Article	VF LE52 ⊖	VF LE53 ⊖	VF LE54 ⊖	VF LE55 ⊖ (1)	VF LE56 ⊖	VF LE57 ⊖	VF LE69
Max. speed	1.5 m/s (cam at 30°)	0.5 ms	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s

Stainless steel rollers, Ø 20 mm

							
Article	VF LE31-R24 ⊖	VF LE51-R24 ⊖	VF LE52-R24 ⊖	VF LE54-R24 ⊖	VF LE55-R24 ⊖ (1)	VF LE56-R24 ⊖	VF LE57-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°)	1.5 m/s (cam at 30°)

- (1) Actuator VF LE55 can only be used in safety applications if adjusted to its max. length, as shown in the figure to the right.
If an adjustable lever is required for safety applications, use the VF LE56 adjustable safety lever.



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

Accessories See page 197

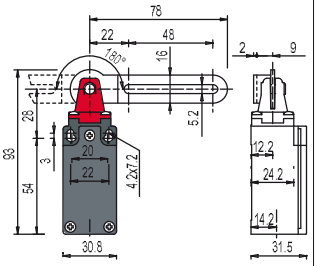
→ The 2D and 3D files are available at **www.pizzato.com**

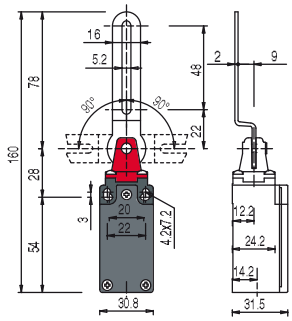
Safety switches with slotted hole lever

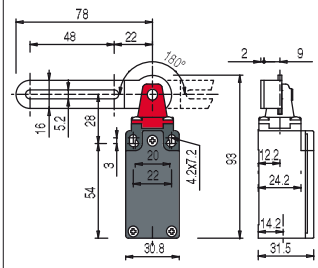
All values in the drawings are in mm

Contact type:
L = slow action

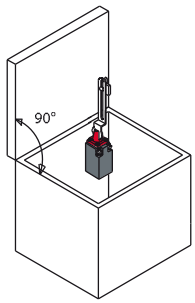
Category	Contact block				
2G M2	20	L	FM 20C1-M2-EX7 ⊖ 1NO+2NC	FM 20C2-M2-EX7 ⊖ 1NO+2NC	FM 20C3-M2-EX7 ⊖ 1NO+2NC
			Actuating force	11 N (15 N ⊖)	11 N (15 N ⊖)	11 N (15 N ⊖)
			Travel diagrams	page 218 - group 10	page 218 - group 11	page 218 - group 10

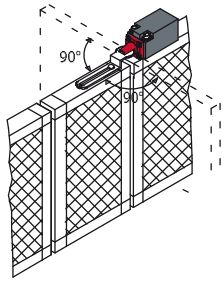






Application examples

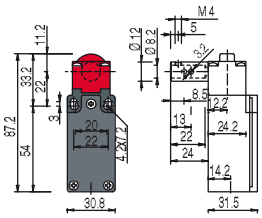




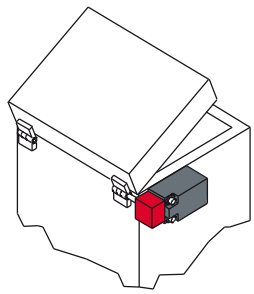
Safety switches for hinges

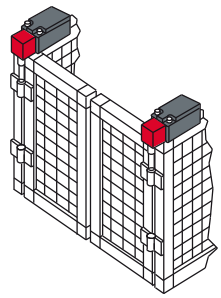
Contact type:
L = slow action

Category	Contact block			
2G M2	20	L	FM 2096-M2-EX7 ⊖ 1NO+2NC
			Actuating force	0,15 Nm (0,4 Nm ⊖)
			Travel diagrams	page 218 - group 9



Application examples





Accessories See page 197

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

Notes

Technical data

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

General data

Ambient temperature:	-20°C ... +60°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	10 million operating cycles
Mounting position:	any
Safety parameters B_{10D} (NC contacts):	20,000,000
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Tightening torques for installation:	see page 211-222

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

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

ATEX markings:

Product code extension	Quality mark	Certificate type and notified body
-EX5	CE	EU declaration of conformity Pizzato Elettrica S.r.l.

Compliance with the requirements of:
ATEX Directive 2014/34/EU and EMC Directive 2014/30/EU
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:
Use only switches marked with the symbol ⊖ next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: see "Internal wiring") as required by **EN ISO 14119, paragraph 5.4** for specific interlock applications and **EN ISO 13849-2 tables D3** (well-tried components) and **D.8** (failure exclusions) for safety applications in general. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 217. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 211 to 222 and in the certificate.**

Product code extension	Category	Zone	EPL	Approvals
-EX5	3D	22	Dc	Ex II 3D Ext c IIIC T80°C Dc
	3G	2	Gc	Ex II 3G Ex nC IIC T6 Gc

Electrical data

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

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

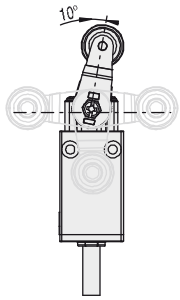
Ue (V)	120	250	400
Ie (A)	6	4	3

Direct current: DC13

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

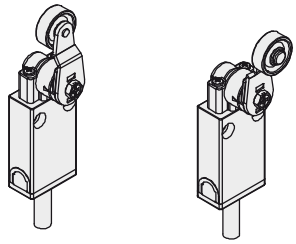
Adjustable levers

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



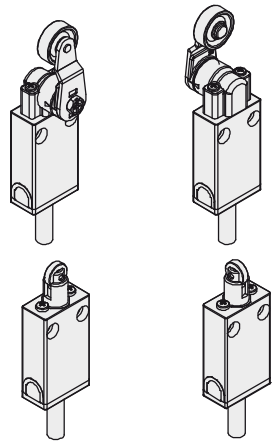
Reversible levers

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

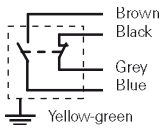


Head with variable orientation

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



Internal wiring



Code structure

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

product code: article | options | extension

FA 4501-2SHG-EX5

Housing

FA	metal

Contact block

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

Other lengths on request

Output direction

S	bottom output

Cable type

H	PUR cable, halogen free

Contact type

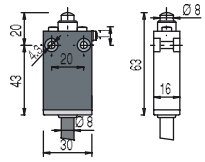
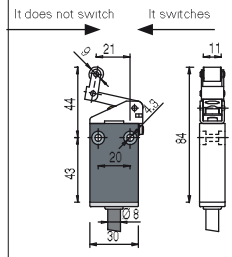
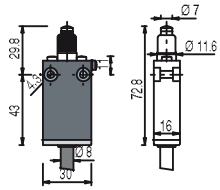
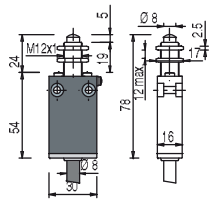
	silver contacts (standard)
G	silver contacts, 1 µm gold coating

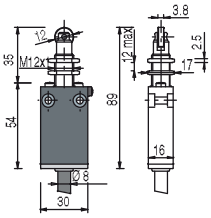
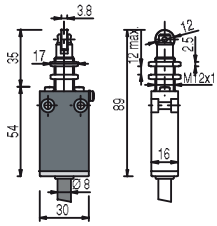
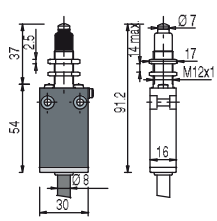
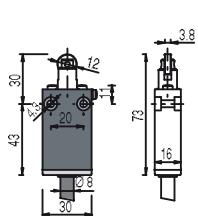
ATEX approval

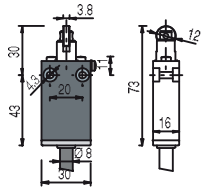
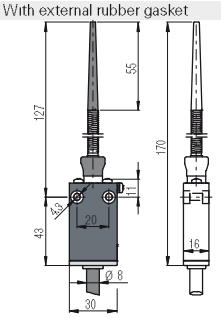
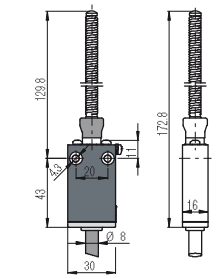
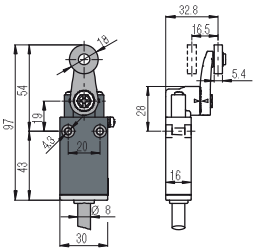
-EX5	Ⓔx II 3D Ex tc IIIC T80°C Dc Ⓔx II 3G Ex nC IIC T6 Gc

Switches compliant with **ATEX** directive ⟨Ex⟩ / **FA** series

Contact type:
R = snap action
L = slow action

Category	Contact block					
				Unidirectional operation It does not switch / It switches 	With external rubber gasket 	Secured only by means of threaded head 
3D 3G	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
Actuating force			10 N (25 N ⟶)	5 N (25 N ⟶)	10 N (25 N ⟶)	10 N (25 N ⟶)
Travel diagrams			page 217 - group 1	page 217 - group 2	page 217 - group 1	page 217 - group 1

Category	Contact block					
			Secured only by means of threaded head 	Secured only by means of threaded head 	With external rubber gasket 	Roller, Ø 12 mm, stainless steel 
3D 3G	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°
Actuating force			10 N (25 N ⟶)	10 N (25 N ⟶)	10 N (25 N ⟶)	10 N (25 N ⟶)
Travel diagrams			page 217 - group 1	page 217 - group 1	page 217 - group 1	page 217 - group 1

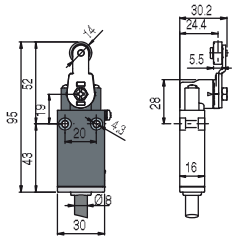
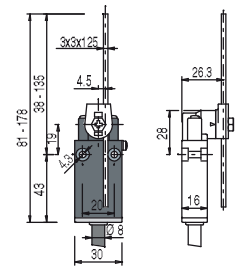
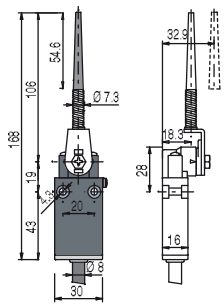
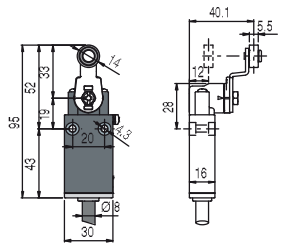
Category	Contact block					
			Roller, Ø 12 mm, stainless steel 	With external rubber gasket 	With external rubber gasket 	With Ø 20 mm stainless steel roller on request 
3D 3G	45 R		FA 4517-2SH-EX5 ⟶ 1NO+1NC	FA 4520-2SH-EX5 1NO+1NC	FA 4525-2SH-EX5 1NO+1NC	FA 4530-2SH-EX5 ⟶ 1NO+1NC
	46 L		FA 4617-2SH-EX5 ⟶ 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°
Actuating force			10 N (25 N ⟶)	0.03 Nm	0.06 Nm	0.03 Nm (0.25 Nm ⟶)
Travel diagrams			page 217 - group 1	page 217 - group 3	page 217 - group 3	page 217 - group 4

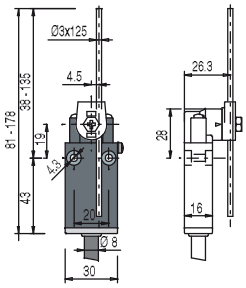
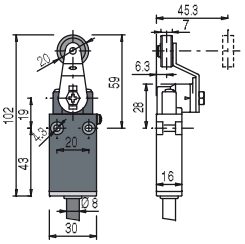
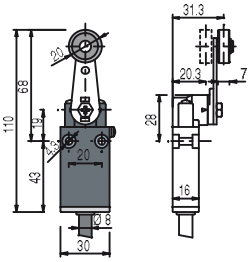
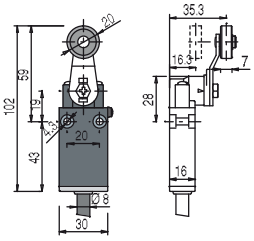
Accessories See page 197

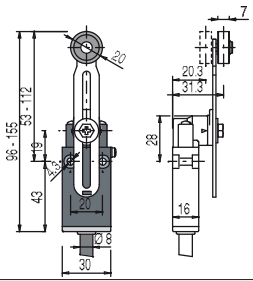
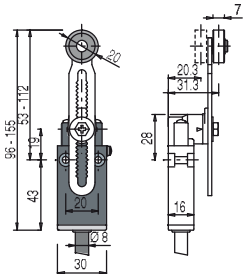
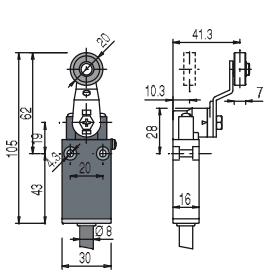
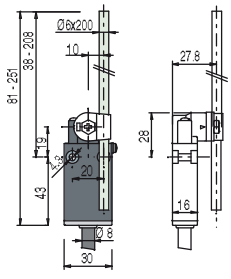
→ The 2D and 3D files are available at **www.pizzato.com**

All values in the drawings are in mm

Contact type:
R = snap action
L = slow action

Category	Contact block		With stainless steel roller on request	Square rod, 3x3 mm		With stainless steel roller on request
						
3D	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
3G	46 L		FA 4631-2SH-EX5 (→) 1NO+1NC	FA 4633-2SH-EX5 1NO+1NC	FA 4634-2SH-EX5 1NO+1NC	FA 4640-2SH-EX5 (→) 1NO+1NC
Max. speed			1.5 m/s with cam at 30°	1.5 m/s	1.5 m/s	1.5 m/s with cam at 30°
Actuating force			0.03 Nm (0.25 Nm (→))	0.03 Nm	0.03 Nm	0.03 Nm (0.25 Nm (→))
Travel diagrams			page 217 - group 4	page 217 - group 4	page 217 - group 4	page 217 - group 4

Category	Contact block		Round rod, Ø 3 mm, stainless steel	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request
						
3D	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
3G	46 L		FA 4650-2SH-EX5 1NO+1NC	FA 4651-2SH-EX5 (→) 1NO+1NC	FA 4652-2SH-EX5 (→) 1NO+1NC	FA 4654-2SH-EX5 (→) 1NO+1NC
Max. speed			1.5 m/s	1.5 m/s with cam at 30°	1.5 m/s with cam at 30°	1.5 m/s with cam at 30°
Actuating force			0.03 Nm	0.03 Nm (0.25 Nm (→))	0.03 Nm (0.25 Nm (→))	0.03 Nm (0.25 Nm (→))
Travel diagrams			page 217 - group 4	page 217 - group 4	page 217 - group 4	page 217 - group 4

Category	Contact block		With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request	Glass fibre rod
						
3D	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
3G	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
Actuating 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 217 - group 4	page 217 - group 4	page 217 - group 4	page 217 - group 4

[1] Positive opening only with actuator set to max.

Accessories See page 197

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

All values in the drawings are in mm

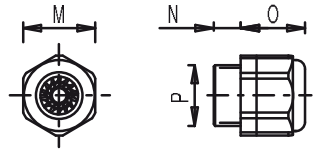
Accessories

All values in the drawings are in mm

ATEX cable gland, technopolymer

Technical data:

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

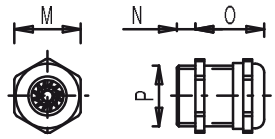


Article	Description	ATEX certificate number	⬡M	N	O	P
VF PBM20C6P-2GD	M20x1.5 technopolymer cable gland for multipolar cables Ø 6.5 … 12 mm	DMT 02 ATEX E 047 X	24	9	24	M20x1.5

ATEX cable gland, metal

Technical data:

ATEX marking:	Ⓔx II 2G Ex e II Ⓔx II 1D Ex tD A20 IP68
Body and ring material:	Nickel-plated brass
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 brass cable gland for multipolar cables Ø 6 … 12 mm	KEMA 99ATEX6971 X	24	9	24	M20x1.5

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

Accessories See page 197

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

Notes