







Main features

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

ATEX markings:

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

Installation for safety applications:

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

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

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

Technical data

Housing

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

General data

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

Contact blocks available:

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

In compliance with standards:





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

Compliance with the requirements of:

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

Positive contact opening in conformity with standards:

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

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



Quality marks of the product



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

Features approved by UL

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

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

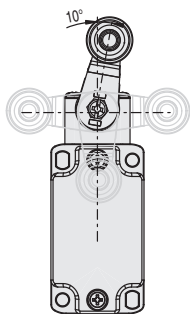
For all contact blocks except 2 and 3 use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

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

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

Adjustable levers

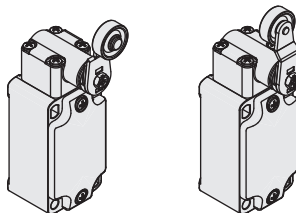
For these switches the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission



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

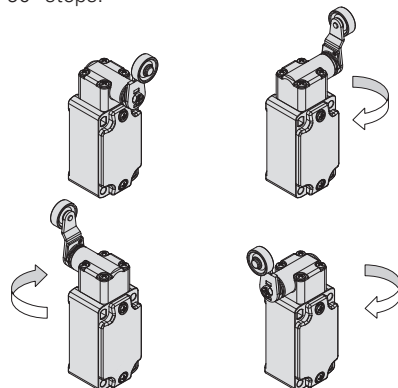
Reversible levers

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



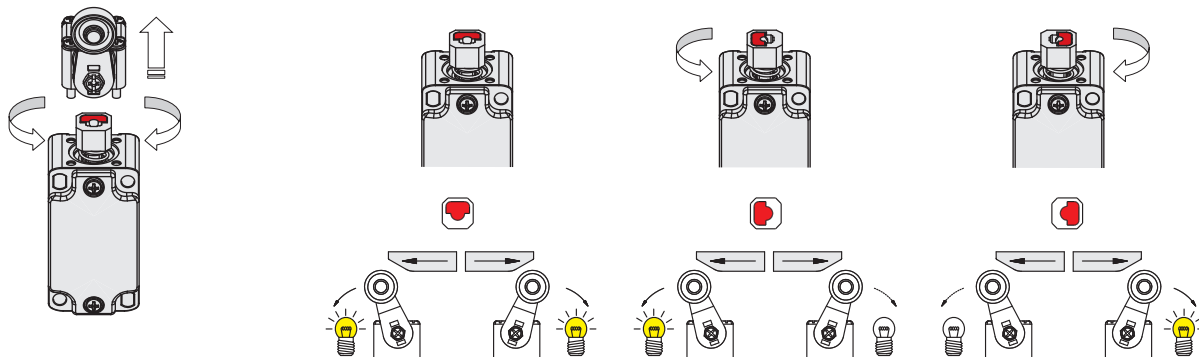
Head with variable orientation

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



Unidirectional heads

For switches with swivelling lever, the unidirectional operation can be set by removing the four head screws and rotating the internal plunger.



Code structure

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

article options product code extension
FD 502-GM2-EX7

Housing	
FD	metal, one conduit entry

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

Actuators	
01	short plunger
02	roller lever
...

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

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

Contact type:
R = snap action
L = slow action

Category	Contact block	With stainless steel roller on request		With stainless steel roller on request		With stainless steel roller on request	
		Diagram 1	Diagram 2	Diagram 1	Diagram 2	Diagram 1	Diagram 2
3D	2 R	FD 201-M2-EX4	2x(1NO-1NC)	FD 202-M2-EX4	2x(1NO-1NC)	FD 205-M2-EX4	2x(1NO-1NC)
	5 R	FD 501-M2-EX4	1NO+1NC	FD 502-M2-EX4	1NO+1NC	FD 505-M2-EX4	1NO+1NC
	6 L	FD 601-M2-EX4	1NO+1NC	FD 602-M2-EX4	1NO+1NC	FD 605-M2-EX4	1NO+1NC
	20 L	FD 2001-M2-EX4	1NO+2NC	FD 2002-M2-EX4	1NO+2NC	FD 2005-M2-EX4	1NO+2NC
2G M2	5 R	FD 501-M2-EX7	1NO+1NC	FD 502-M2-EX7	1NO+1NC	FD 505-M2-EX7	1NO+1NC
	20 L	FD 2001-M2-EX7	1NO+2NC	FD 2002-M2-EX7	1NO+2NC	FD 2005-M2-EX7	1NO+2NC
2D	5 R	FD 501-M2-EX8	1NO+1NC	FD 502-M2-EX8	1NO+1NC	FD 505-M2-EX8	1NO+1NC
	20 L	FD 2001-M2-EX8	1NO+2NC	FD 2002-M2-EX8	1NO+2NC	FD 2005-M2-EX8	1NO+2NC
Max. speed		0.5 m/s		0.5 m/s with cam at 30°		0.5 m/s with cam at 30°	
Actuating force		8 N (25 N ⊕)		6 N (25 N ⊕)		6 N (25 N ⊕)	
Travel diagrams		page 226 - group 1		page 226 - group 2		page 226 - group 2	

Contact type:
R = snap action
L = slow action

Category	Contact block	External gasket		Ball, Ø 12.7 mm, stainless steel		External gasket	
		Diagram 1	Diagram 2	Diagram 1	Diagram 2	Diagram 1	Diagram 2
3D	2 R	FD 215-M2-EX4	2x(1NO-1NC)	FD 216-M2-EX4	2x(1NO-1NC)	FD 219-M2-EX4	2x(1NO-1NC)
	5 R	FD 515-M2-EX4	1NO+1NC	FD 516-M2-EX4	1NO+1NC	FD 519-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
2G M2	5 R	FD 515-M2-EX7	1NO+1NC	FD 516-M2-EX7	1NO+1NC	FD 519-M2-EX7	1NO+1NC
	20 L	FD 2015-M2-EX7	1NO+2NC	FD 2016-M2-EX7	1NO+2NC	FD 2019-M2-EX7	1NO+2NC
2D	5 R	/		FD 516-M2-EX8	1NO+1NC	FD 519-M2-EX8	1NO+1NC
	20 L	/		FD 2016-M2-EX8	1NO+2NC	FD 2019-M2-EX8	1NO+2NC
Max. speed		0.5 m/s with cam at 30°		0.5 m/s with cam at 30°		0.5 m/s	
Actuating force		11 N (25 N ⊕)		8 N (25 N ⊕)		8 N (25 N ⊕)	
Travel diagrams		page 226 - group 1		page 226 - group 1		page 226 - group 1	
						page 226 - group 3	

Contact type:
R = snap action
L = slow action

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

All values in the drawings are in mm

Accessories See page 207

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

Position switches with swivelling lever without actuator

Contact type:

R = snap action
L = slow action

Category	Contact block	Regular head		Compact head	
		28	41.5	28	31.1
3D	2 R	FD 238-M2-EX4	2x(1NO-1NC)	FD 258-M2-EX4	2x(1NO-1NC)
	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
2G M2	5 R	FD 538-M2-EX7	1NO+1NC	FD 558-M2-EX7	1NO+1NC
	20 L	FD 2038-M2-EX7	1NO+2NC	FD 2058-M2-EX7	1NO+2NC
2D	5 R	FD 538-M2-EX8	1NO+1NC	FD 558-M2-EX8	1NO+1NC
	20 L	FD 2038-M2-EX8	1NO+2NC	FD 2058-M2-EX8	1NO+2NC
Actuating force		0.1 Nm (0.25 Nm \rightarrow)		0.06 Nm (0.25 Nm \rightarrow)	
Travel diagrams		page 226 - group 4		page 226 - group 4	

IMPORTANT

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

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

Separate actuators

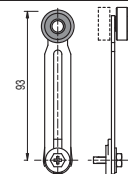
IMPORTANT: These separate actuators can be used only with items of the FD series.

	Technopolymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod, 3x3x125 mm	Spring rod with plastic tip	Adjustable actuator with techno- polymer roller	Adjustable glass fibre rod
Article	VF L31 \rightarrow	VF L32 ⁽²⁾	VF L33 ⁽²⁾	VF L34	VF L35 \rightarrow ^{(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 \rightarrow	VF L52 \rightarrow	VF L53 \rightarrow	VF L56 \rightarrow ⁽²⁾	VF L57 \rightarrow	
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	0.5 m/s	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	
Stainless steel rollers, Ø 20 mm						
Article	VF L31-R24 \rightarrow	VF L35-R24 \rightarrow ^{(1) (2)}	VF L51-R24 \rightarrow	VF L52-R24 \rightarrow	VF L56-R24 \rightarrow ⁽²⁾	VF L57-R24 \rightarrow
Max. speed	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)	1.5 m/s (cam at 30°)

- ⁽¹⁾ Actuator VF L35 can only be used in safety applications if adjusted to its max. length, as shown in the figure to the right.

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

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

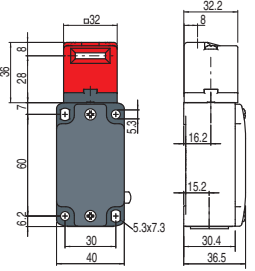
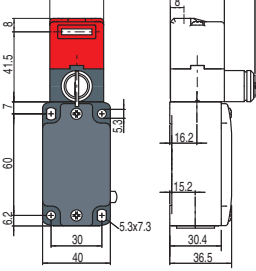
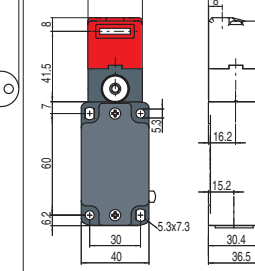




























All values in the drawings are in mm

Accessories See page 207

\rightarrow The 2D and 3D files are available at www.pizzato.com

Safety switches with separate actuator

		Switches with separate actuator		Switches with separate actuator and key release		Switches with manual mechanical delay	
		Switch without actuator		Switch without actuator		Switch without actuator	
Category	Contact block						
3D	6 	FD 693-M2-EX4	 1NO+1NC	/		FD 6R2-M2-EX4	 1NO+1NC
	18 	/		FD 1899-M2-EX4	 1NO+1NC	/	
	20 	FD 2093-M2-EX4	 1NO+2NC	FD 2099-M2-EX4	 1NO+2NC	FD 20R2-M2-EX4	 1NO+2NC
	28 	/		FD 2899-M2-EX4	 1NO+2NC	/	
2G M2	20 	FD 2093-M2-EX7	 1NO+2NC	FD 2099-M2-EX7	 1NO+2NC	FD 20R2-M2-EX7	 1NO+2NC
	28 	/		FD 2899-M2-EX7	 1NO+2NC	/	
2D	20 	FD 2093-M2-EX8	 1NO+2NC	FD 2099-M2-EX8	 1NO+2NC	FD 20R2-M2-EX8	 1NO+2NC
	28 	/		FD 2899-M2-EX8	 1NO+2NC	/	
Actuating force		10 N (18 N )		30 N (40 N )		10 N (18 N )	
Travel diagrams		page 19, General Catalogue Safety		page 104, General Catalogue Safety		page 96, General Catalogue Safety	

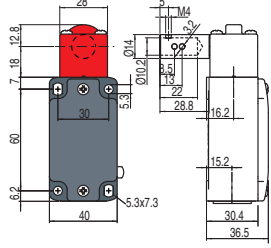









Actuators



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

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

Safety switches for hinges

		Switch without actuator	
Category	Contact block		
3D	18 	FD 1895-M2-EX4	 1NO+1NC
	20 	FD 2095-M2-EX4	 1NO+2NC
2G M2	20 	FD 2095-M2-EX7	 1NO+2NC
2D	20 	FD 2095-M2-EX8	 1NO+2NC
Actuating force		0.15 Nm (0.4 Nm )	
Travel diagrams		page 73, General Catalogue Safety	

Safety rope switches with reset for emergency stops

Contact type:

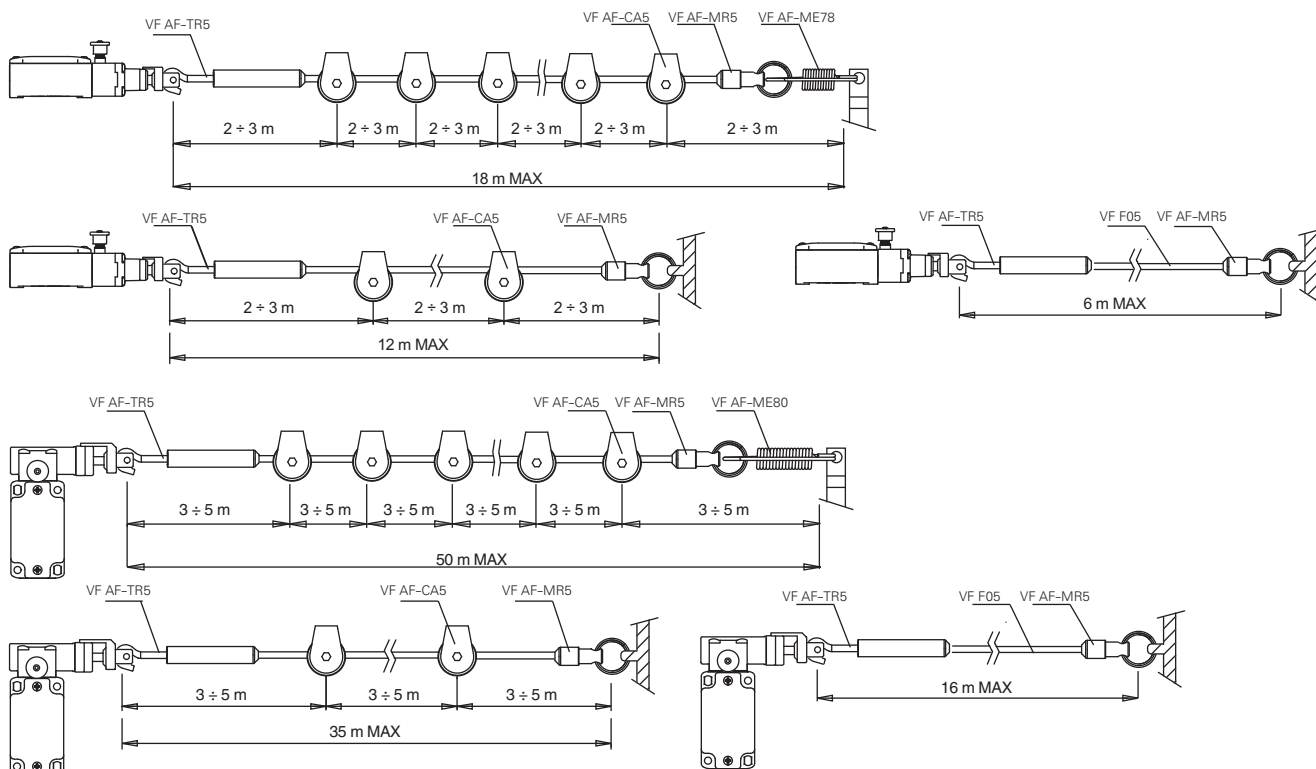
L = slow action

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

Accessories for rope installation

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

Application examples and max. rope length



All values in the drawings are in mm

Accessories See page 207

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