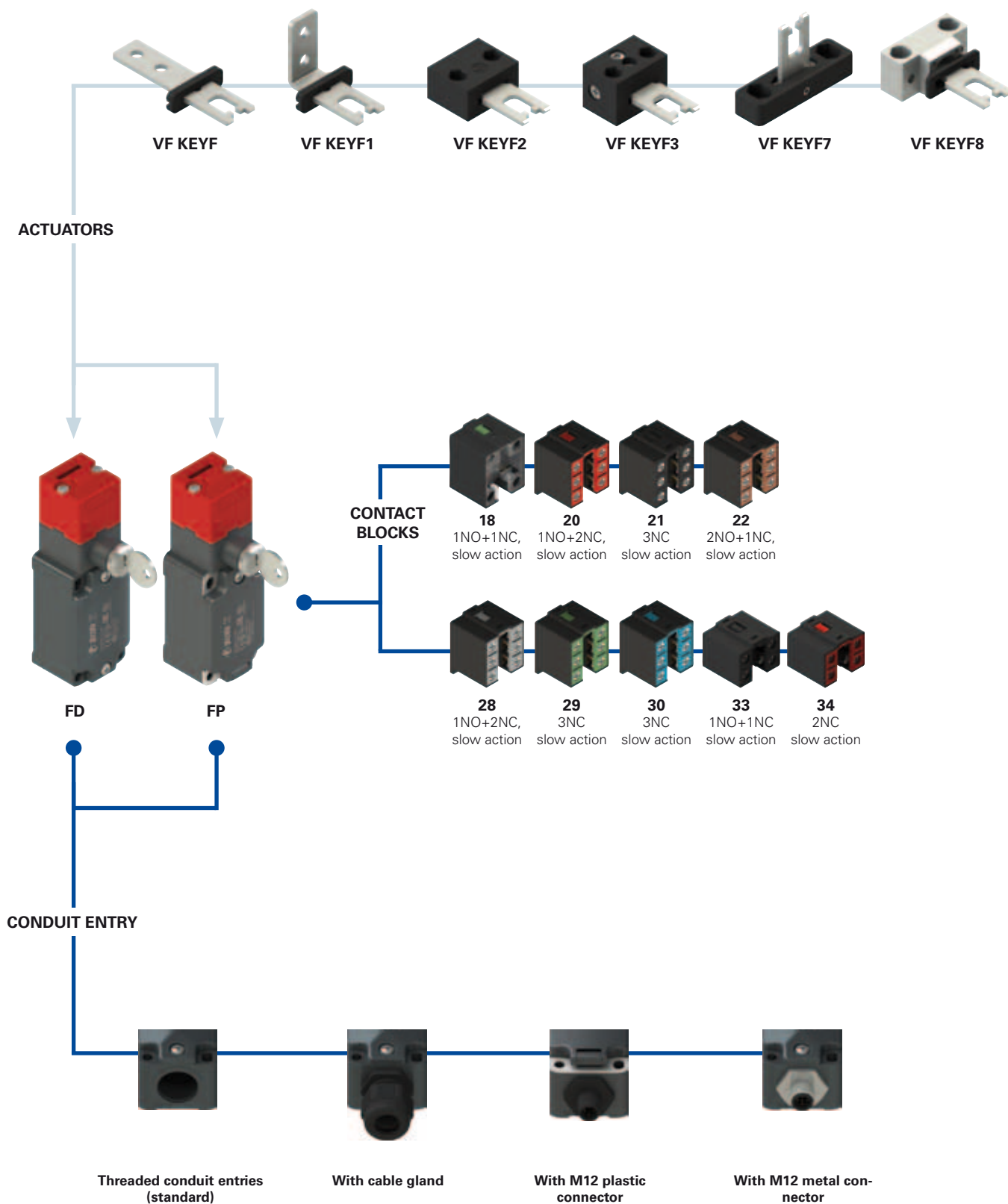


Selection diagram



—●— product option
 —▶— accessory sold separately



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 options
FD 1899-F1GM2K50V200T6

Housing	
FD	metal, one conduit entry
FP	technopolymer, one conduit entry

Ambient temperature	
	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

Contact blocks		
	Contacts activated by the lock	Contact activated by actuator extraction
18	1NO+1NC	
20	1NO+2NC	
21	3NC	
22	2NO+1NC	
28	1NO+1NC	1NC
29	2NC	1NC
30	1NC	2NC
33	1NO+1NC	
34	2NC	

Lock key coding	
	one standard key coding (371)
V200	up to 50 different key codings

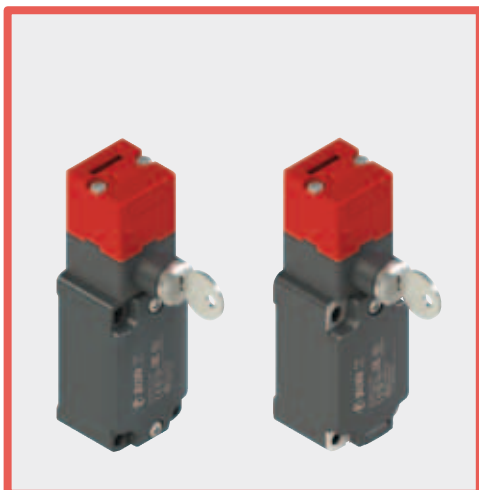
Actuators	
	without actuator (standard)
F	straight actuator VF KEYF
F1	angled actuator VF KEYF1
F2	jointed actuator VF KEYF2
F3	jointed actuator adjustable in two directions VF KEYF3
F7	jointed actuator adjustable in one direction VF KEYF7
F8	universal actuator VF KEYF8

Pre-installed cable glands or connectors	
	without cable gland or connector (standard)
K23	cable gland for cables Ø 6...Ø 12 mm
...
K50	M12 metal connector, 5 poles
...

Please contact our technical service for the complete list of possible combinations.

Threaded conduit entry	
M2	M20x1.5 (standard)
	PG 13.5

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



Main features

- Metal housing or technopolymer housing, one conduit entry
- Protection degree IP67
- 9 contact blocks available
- 6 stainless steel actuators available
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts
- Strong actuator locking (1000 N)
- Release of the actuator by key

Markings and quality marks:



IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2007010305230000 (FD series) 2007010305230014 (FP series)
EAC approval:	RU C-IT ДМ94.В.01024

Technical data

Housing

FP series housing made of glass fiber reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: □

FD series: metal housing, baked powder coating.

Metal head, coated with baked epoxy powder.

One threaded conduit entry:

M20x1.5 (standard)

Protection degree:

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

General data

For safety applications up to:

SIL 3 acc. to EN 62061

PL e acc. to EN ISO 13849-1

Interlock with mechanical lock, coded:

type 2 acc. to EN ISO 14119

Coding level:

Low acc. to EN ISO 14119

Safety parameters:

B_{10d} :

1,000,000 for NC contacts

Service life:

20 years

Ambient temperature:

-25°C ... +80°C

Max. actuation frequency:

3600 operating cycles¹/hour

Mechanical endurance:

500,000 operating cycles¹

Max. actuation speed:

0.5 m/s

Min. actuation speed:

1 mm/s

Maximum force before breakage F_{1max} :

1000 N acc. to EN ISO 14119

Max. holding force F_{Zh} :

770 N according to EN ISO 14119

Max. backlash of the actuator:

4.5 mm

Actuator extraction force:

30 N

Tightening torques for installation:

see pages 297-308

(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, 21, 22, 28, 29, 30, 33, 34:	min.	1 x 0.34 mm ²	(1 x AWG 22)
	max.	2 x 1.5 mm ²	(2 x AWG 16)
Contact block 18:	min.	1 x 0.5 mm ²	(1 x AWG 20)
	max.	2 x 2.5 mm ²	(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, BG-GS-ET-15, UL 508, CSA 22.2 No.14 .

Approvals:

IEC 60947-5-1, UL 508, CSA 22.2 No.14 , GB14048.5-2001.

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.

⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 297 to page 308.

	Electrical data	Utilization category
without connector	Thermal current (I _{th}):	10 A
	Rated insulation voltage (U _i):	500 Vac 600 Vdc 400Vac500Vdc (contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
	Rated impulse withstand voltage (U _{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
	Conditional short circuit current: Protection against short circuits: Pollution degree:	1000 A acc. to EN 60947-5-1 type aM fuse 10 A 500 V 3
		Alternating current: AC15 (50÷60 Hz) U _e (V) 250 400 500 I _e (A) 6 4 1
with M12 connector for 4 and 5 poles	Thermal current (I _{th}):	4 A
	Rated insulation voltage (U _i):	250 Vac 300 Vdc
	Protection against short circuits: Pollution degree:	type gG fuse 4 A 500 V 3
		Alternating current: AC15 (50÷60 Hz) U _e (V) 24 120 250 I _e (A) 4 4 4
		Direct current: DC13 U _e (V) 24 125 250 I _e (A) 6 1.1 0.4
with M12 connector 8 poles	Thermal current (I _{th}):	2 A
	Rated insulation voltage (U _i):	30 Vac 36 Vdc
	Protection against short circuits: Pollution degree:	type gG fuse 2 A 500 V 3
		Alternating current: AC15 (50÷60 Hz) U _e (V) 24 I _e (A) 2
		Direct current: DC13 U _e (V) 24 I _e (A) 2

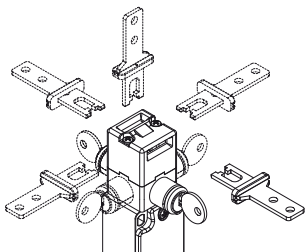
Description



This type of switches **is applied on fences or protections where entrance is allowed to authorized personnel only. They have been studied to control large protected areas where operators may physically enter.** Supplied with a strong lock, the actuator can be removed from the head only after a complete rotation (180°) of the locking key. During the key rotation, electrical contacts are switched, and the actuator will be released only after NC contacts are positively opened. Contacts activated by the key locking device will be reset to the initial position only with inserted actuator and with key in locking position. **It is impossible to rotate the key when the key locking device is unlocked and the actuator is removed (C state).** These switches are considered interlocks with locking in accordance with ISO 14119, and the product is marked on the side with the symbol shown.



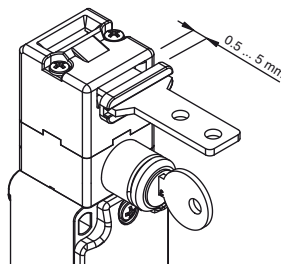
Orientable head and release device



The head can be quickly turned on each of the four sides of the switch by unfastening the two fixing screws.

The auxiliary key release device can be rotated in 90° steps as well. This enables the switch to assume 32 different configurations.

Actuator regulation zone



The head of this switch is equipped with an actuator with a wide range of travel. In this way the guard can oscillate along the direction of insertion (4.5mm) without causing unwanted machine shutdowns. This extensive travel is available in all actuators, in order to ensure maximum device reliability.

Protection degree IP67

IP67

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to IEC 60529.

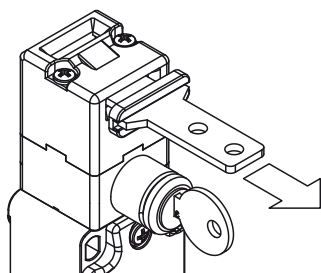
They can therefore be used in all environments where the maximum protection of the housing is required.

Contact blocks



Contact blocks with captive screws, finger protection, twin bridge contacts and double interruption for a higher contact reliability.

Holding force of the unlocked actuator



The inside of each switch features a device which holds the actuator in its closed position. Ideal for all those applications where several doors are unlocked simultaneously, but only one is actually opened. The device keeps all the unlocked doors in their position with a retaining force of 30 N~, stopping any vibrations or gusts of wind from opening them.

Extended temperature range

-40°C

This range of switches is also available in a special version with an ambient operating temperature range of -40°C to +80°C.

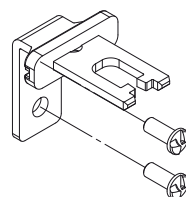
They can be used for applications in cold stores, sterilisers and other devices with low temperature environments. Special materials that have been used to realize these versions, maintain unchanged their features also in these conditions, widening the installation possibilities.

Laser engraving



All devices are indelibly marked with a dedicated laser system that allows the marking to be also suitable for extreme environments. This system that does not use labels, prevents the loss of plate data and the marking is more resistant over time.

Safety screws for actuators



As required by ISO 14119, the actuator must be fixed immovably to the door frame. Pan head safety screws with one-way fitting are available for this purpose. With this screw type, the actuators cannot be removed or tampered with using common tools. See accessories on page 295.

Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 20, 21, 22, 33, 34)
Conventional free air thermal current (Ith): 10 A
Protection against short circuits: type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (for contact blocks 20, 21, 22, 33, 34)
Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening of contacts on contact blocks 18, 20, 21, 22, 28, 29, 30
In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

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

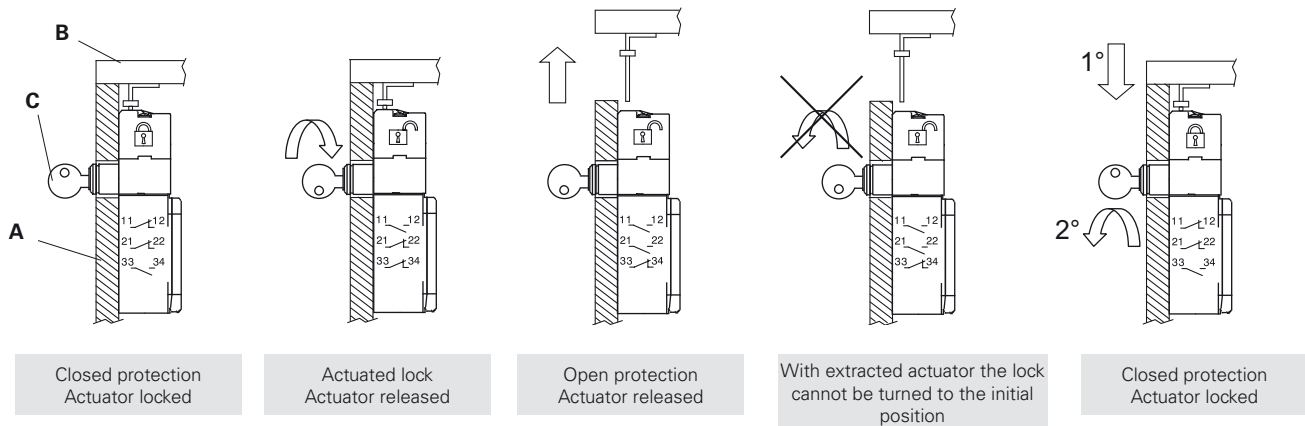
Characteristics approved by UL

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 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 No.14

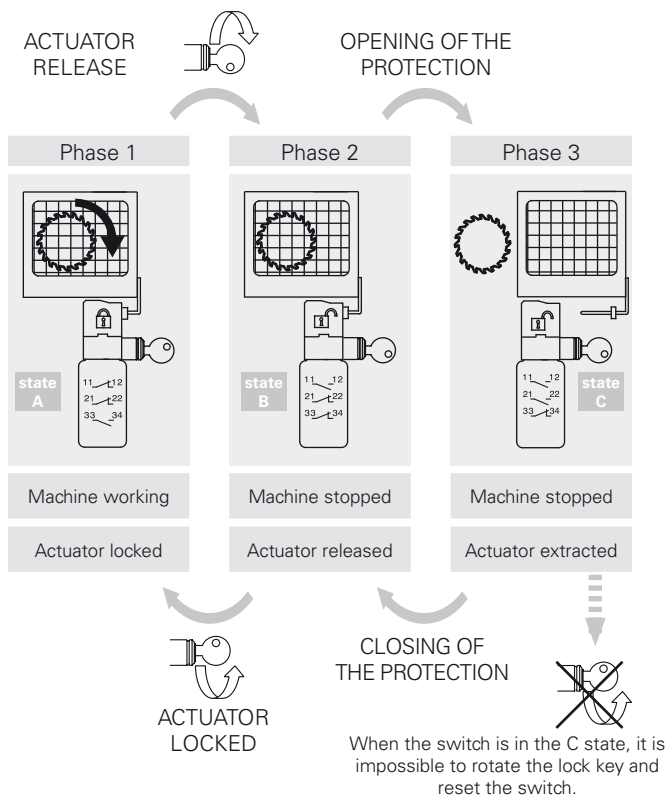
Please contact our technical service for the list of approved products.

Operation

The switch is fixed to the machine body (A), while the stainless steel actuator is fastened to the guard (B). Once installed, the switch will firmly lock the actuator. To remove the actuator, it is necessary to unlock the key locking device rotating the key (C). When the actuator is removed, the key cannot be put into the initial position anymore. In the example is pointed out how it is possible to have contacts moved by the key lock or by the actuator and how it is possible to install the switch inside the machine, keeping externally visible only the release device.



Working cycle steps



Contact positions related to switch states

Operating state	state A	state B	state C
Actuator	Inserted and locked	Inserted and released	Extracted
Lock	Closed	Open	Open

Contact blocks	state A	state B	state C
FD 1899 1NC+1NO controlled by the lock			
FD 2099 2NC+1NO controlled by the lock			
FD 2199 3NC controlled by the lock			
FD 2299 1NC+2NO controlled by the lock			
FD 2899 1NO+1NC controlled by the lock 1NC controlled by the actuator			
FD 2999 2NC controlled by the lock 1NC controlled by the actuator			
FD 3099 1NC controlled by the lock 2NC controlled by the actuator			

The key can be extracted from the lock with blocked or released actuator.

Utilization limits

Do not use where dust and dirt may penetrate in any way into the head and deposit there, in particular where metal dust, concrete or chemicals are spread. Adhere to the ISO 14119 requirements regarding low level of coding for interlocks. Do not use in environments with the presence of explosive or flammable gas. In these cases, use ATEX products (check the specific Pizzato catalogue). Attention! These switches alone are not suitable for applications where operators may physically enter the dangerous area, because an eventual closing of the door behind them could restart the machine operation. In this case the entry locking device VF KB1 shown on page 142 must be used.



Dimensional drawings

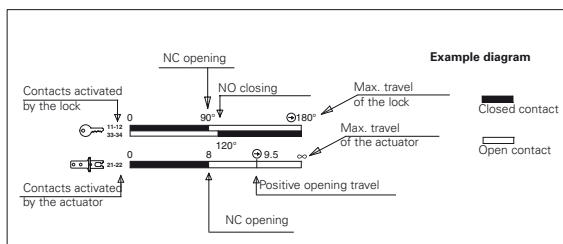
All measures in the drawings are in mm

Contact type: [L] = slow action	Technopolymer housing		Metal housing	
	Without actuator, supplied with two keys		Without actuator, supplied with two keys	
18	[L]	FP 1899-M2 1NO+1NC 	FD 1899-M2 1NO+1NC 	
20	[L]	FP 2099-M2 1NO+2NC 	FD 2099-M2 1NO+2NC 	
21	[L]	FP 2199-M2 3NC 	FD 2199-M2 3NC 	
22	[L]	FP 2299-M2 2NO+1NC 	FD 2299-M2 2NO+1NC 	
28	[L]	FP 2899-M2 1NO+2NC 	FD 2899-M2 1NO+2NC 	
29	[L]	FP 2999-M2 3NC 	FD 2999-M2 3NC 	
30	[L]	FP 3099-M2 3NC 	FD 3099-M2 3NC 	
33	[L]	FP 3399-M2 1NO+1NC 	FD 3399-M2 1NO+1NC 	
34	[L]	FP 3499-M2 2NC 	FD 3499-M2 2NC 	
Min. force		30 N (40 N)	30 N (40 N)	

Legend: With positive opening according to EN 60947-5-1, interlock with lock monitoring in accordance with EN ISO 14119

How to read travel diagrams

All measures in the diagrams are in mm or in degrees



IMPORTANT:

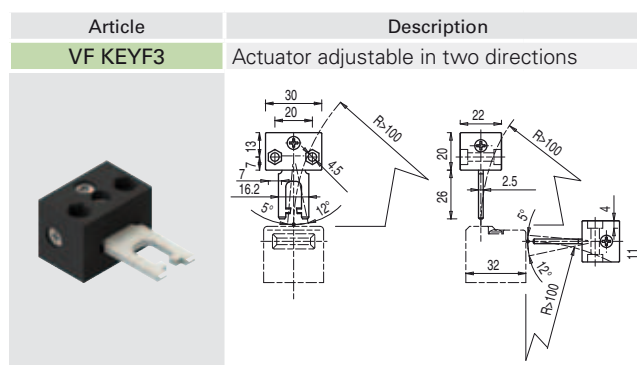
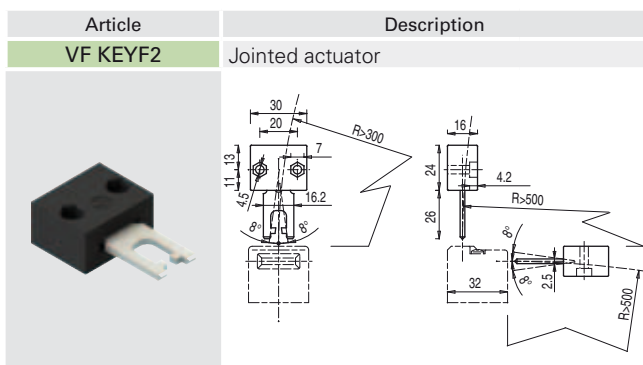
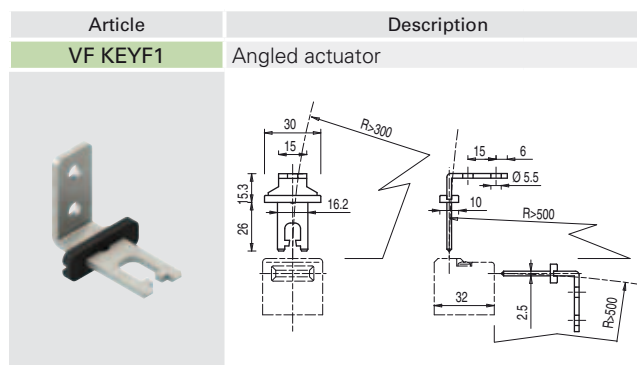
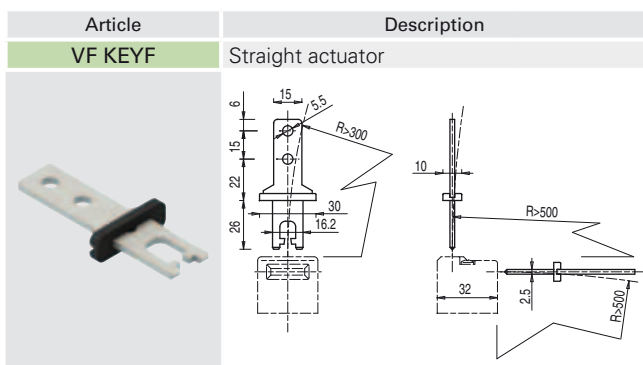
NC contact has to be considered with inserted actuator and lock by the lock. In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol . Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

Accessories See page 287

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

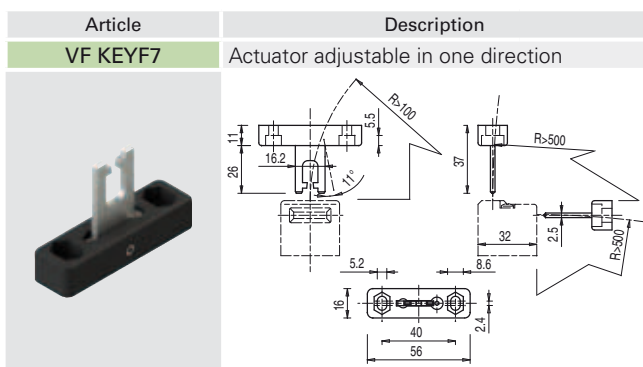
Stainless steel actuators

IMPORTANT: These actuators can be used with items of the FD, FP, FL, FC and FS series only (e.g. FD 1899-M2).
Low level of coding acc. to EN ISO 14119.



The actuator can flex in four directions for applications where the door alignment is not precise.

Actuator adjustable in two directions for doors with reduced dimensions.



Actuator adjustable in one direction for doors with reduced dimensions.



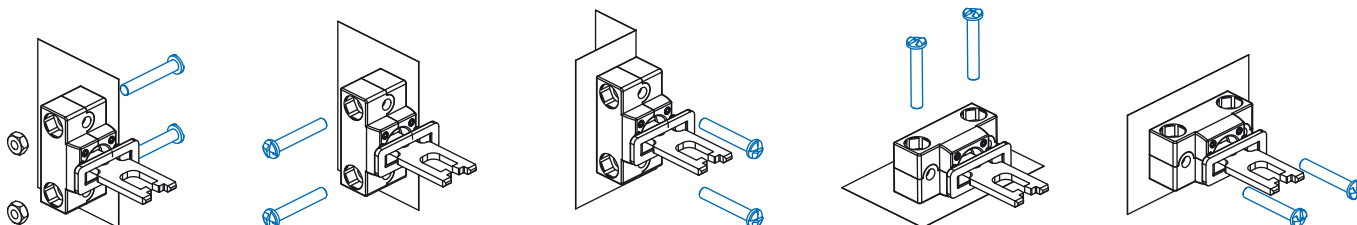
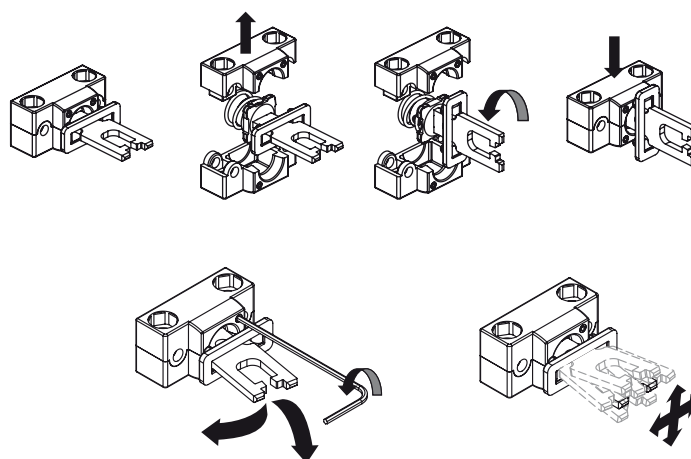
Universal actuator VF KEYF8

IMPORTANT: These actuators can be used with items of the FD, FP, FL, FC and FS series only (e.g. FD 1899-M2).
Low level of coding acc. to EN ISO 14119.

Article	Description
VF KEYF8	Universal actuator

Joined and two directions adjustable actuator for doors with reduced dimensions.

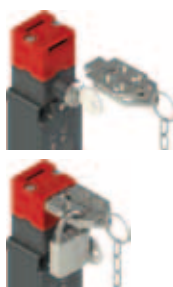
The actuator has two couples of fixing holes and it is possible to rotate by 90° the actuator-working plan.



Accessories

Article	Description
VF KB1	Actuator entry locking device

Padlockable device to lock the actuator entry in order to prevent from the accidental closing of the door behind operators while they are inside the machine.
Hole diameter for padlocks 9 mm.



Article	Description
VF KLA371	Set of two locking keys

Extra copy of the locking keys to be purchased if further keys are needed (standard supply 2 units). The keys of all switches have the same code. Other codes on request.

