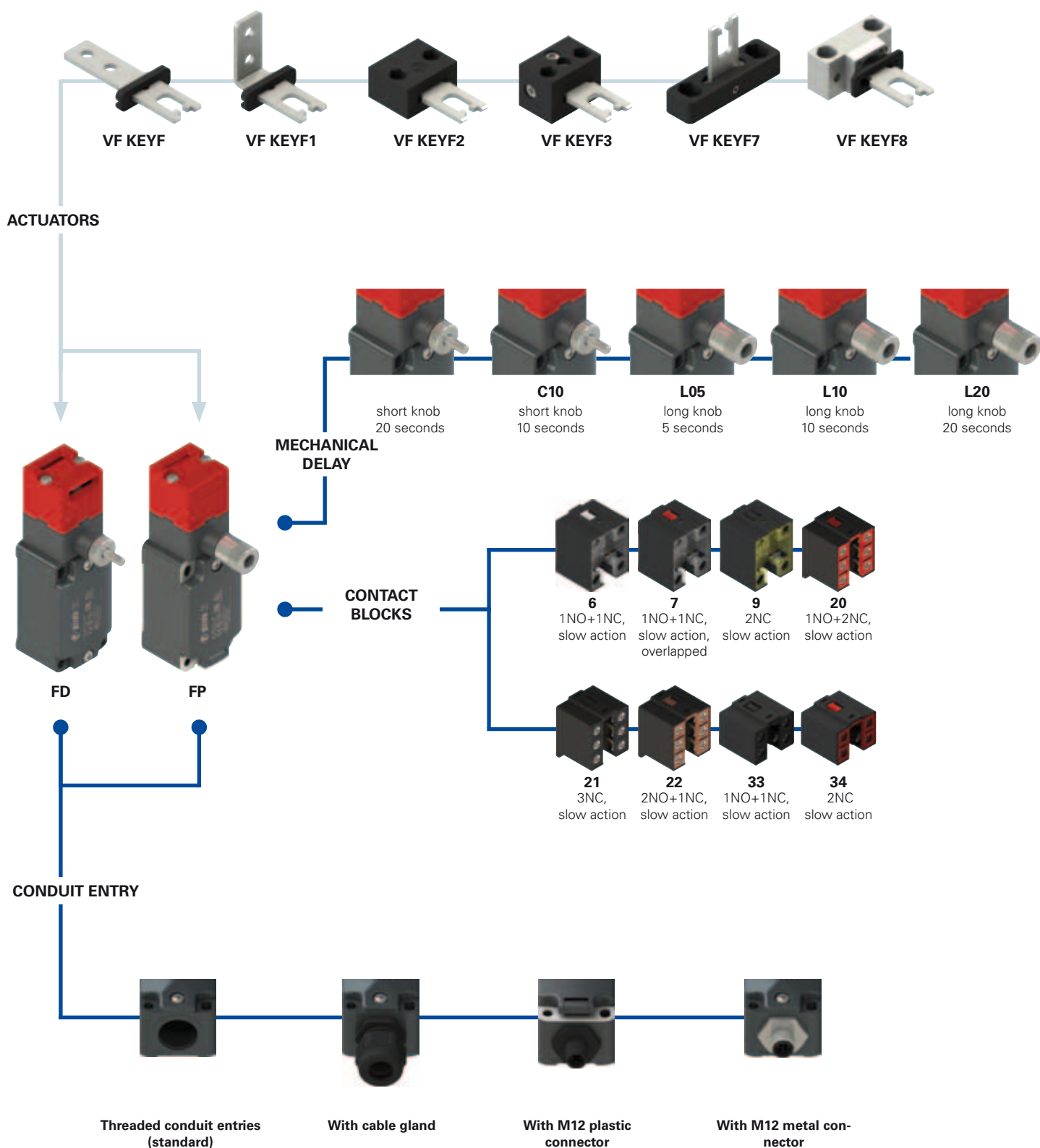


Selection diagram



**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 6R2-L10F1GM2K50T6

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

Contact blocks	
6	1NO+1NC, slow action
7	1NO+1NC, slow action, overlapped
9	2NC, slow action
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action

Mechanical delay	
	short knob, 20 s (standard)
C10	short knob, 10 s
L05	short knob, 5 s
L10	short knob, 10 s
L20	short knob, 20 s

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

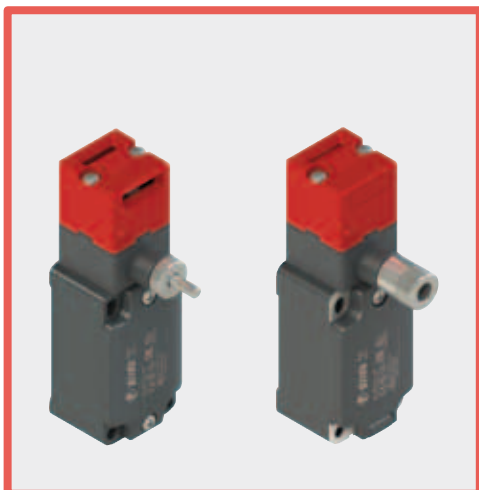
Ambient temperature	
	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

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
- 8 contact blocks available
- 6 stainless steel actuators available
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts
- Strong actuator locking (1000 N)
- Manual actuator unlocking
- Versions with different release delay times

Markings and quality marks:



IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2007010305230000 (FD series) 2007010305230014 (FP series)
EAC approval:	RU C-IT DM94.B.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.
 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
 Version for operation in ambient temperature from -40°C to +80°C on request
 Max. actuation frequency: 360 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
 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, 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 blocks 6, 7, 9:	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	Alternating current: AC15 (50±60 Hz)			
	Rated insulation voltage (U _i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	U _e (V)	250	400	500
	Rated impulse withstand voltage (U _{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	I _e (A)	6	4	1
	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	Direct current: DC13	U _e (V)	24	125

I _e (A)	6	1.1	0.4
--------------------	---	-----	-----

with M12 connector for 4 and 5 poles	Thermal current (I _{th}):	4 A	Alternating current: AC15 (50±60 Hz)			
	Rated insulation voltage (U _i):	250 Vac 300 Vdc	U _e (V)	24	120	250
	Protection against short circuits: Pollution degree:	type gG fuse 4 A 500 V 3	I _e (A)	4	4	4
			Direct current: DC13	U _e (V)	24	125

I _e (A)	4	1.1	0.4
--------------------	---	-----	-----

with M12 connector 8 poles	Thermal current (I _{th}):	2 A	Alternating current: AC15 (50±60 Hz)		
	Rated insulation voltage (U _i):	30 Vac 36 Vdc	U _e (V)	24	
	Protection against short circuits: Pollution degree:	type gG fuse 2 A 500 V 3	I _e (A)	2	
			Direct current: DC13	U _e (V)	24

I _e (A)	2	
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Description

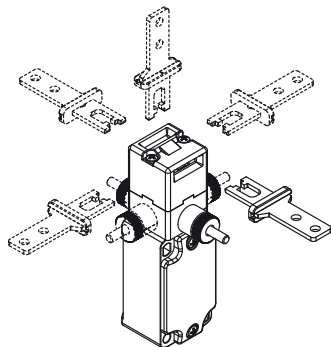


These switches are used on machines where the hazardous conditions remain for a while, even after the machine has been switched off, for example because of mechanical inertia of the pulleys, saw disks, mills. This switch has its ideal application where the guard is not open frequently and the installation of a switch with solenoid would be too expensive.

These switches are considered interlocks with locking in accordance with ISO 14119, and the product is marked on the side with the symbol shown.



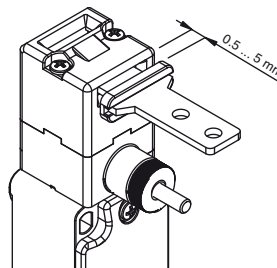
Orientable heads and knobs



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

The mechanical delay 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.

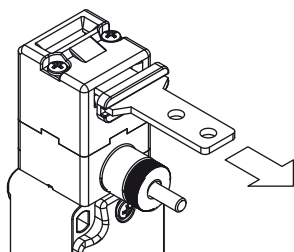
They can therefore be used in all environments where the maximum protection of the housing is required.

Contact blocks



Contact blocks with captive screws, finger protection, twin bridge contacts and double interruption for a higher contact reliability. Available in multiple variants with shifted activation strokes, which can be simultaneous or overlapping, they are suited to a variety of applications.

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.

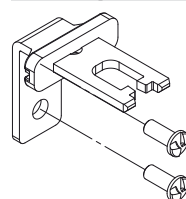
They can be used for applications in cold stores, sterilisers and other devices with low temperature environments. Special materials that have been used to realize these versions, maintain unchanged their features also in these conditions, widening the installation possibilities.

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 EN 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 6, 7, 9, 20, 21, 22, 33, 34

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.

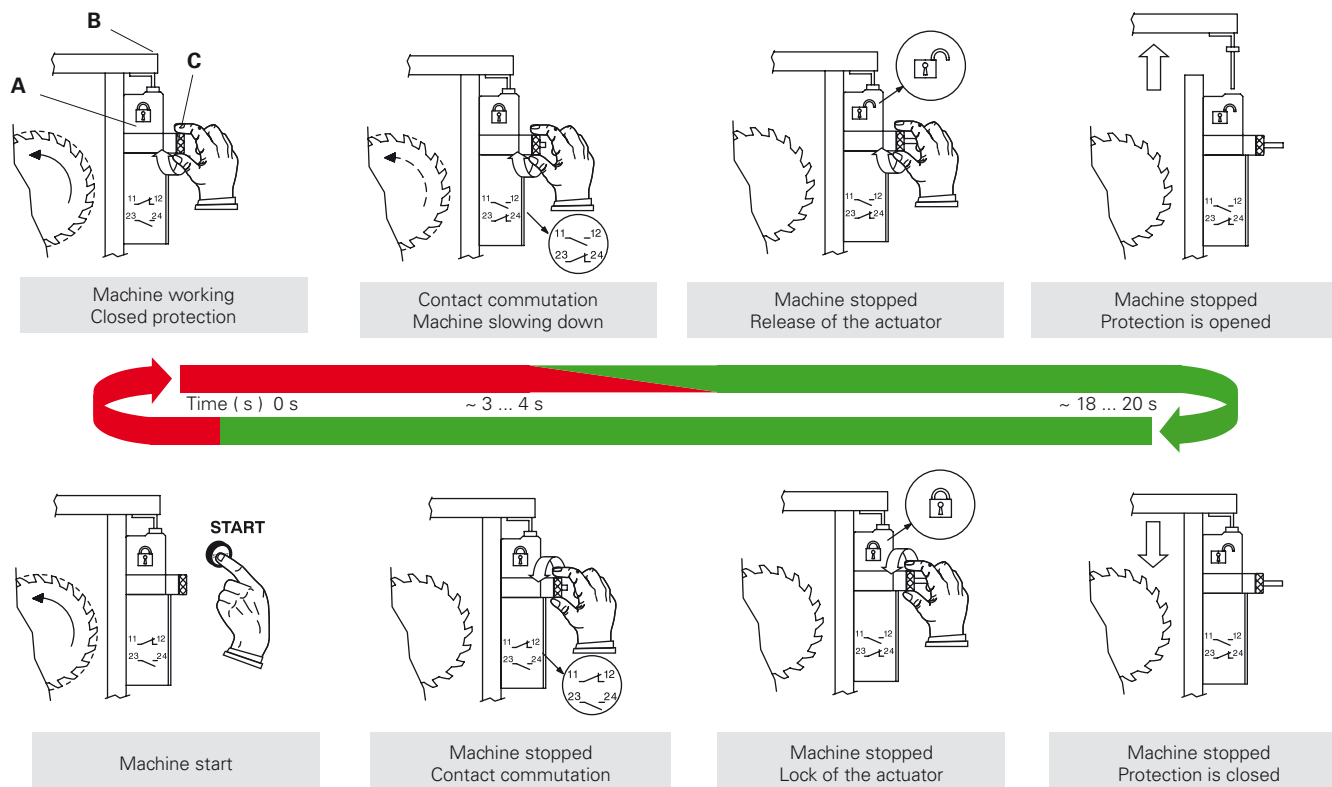
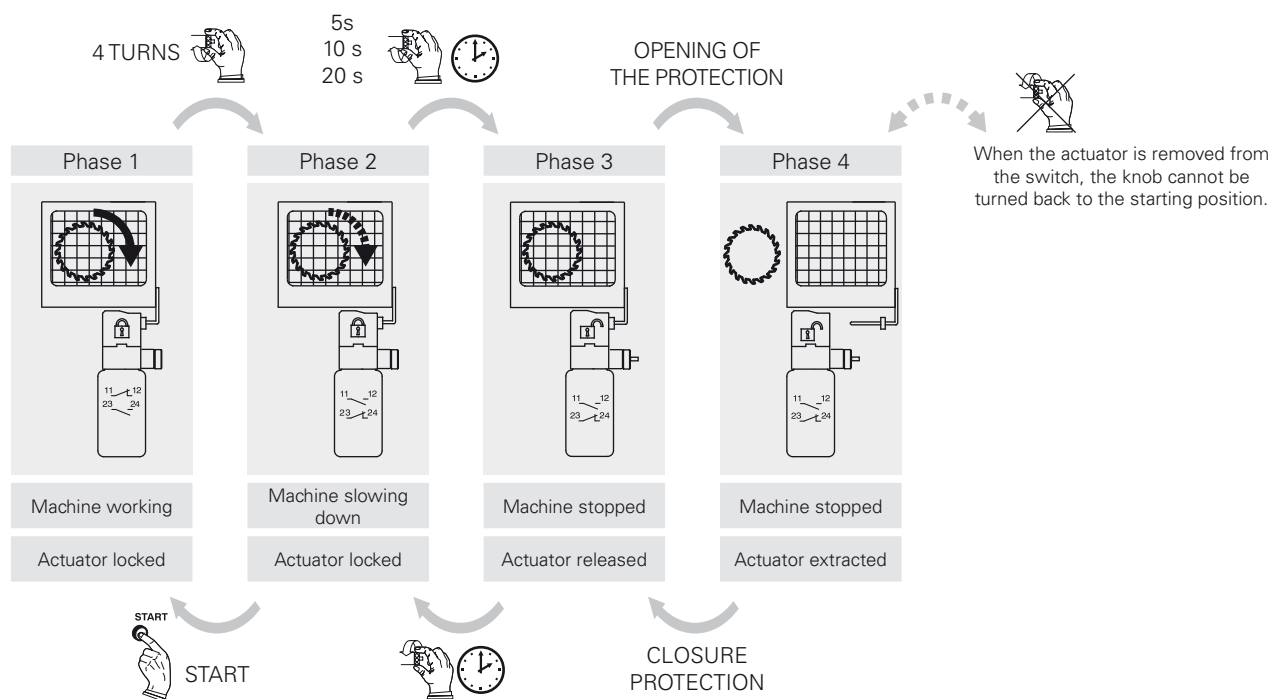
Characteristics approved by UL

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 (FP 6R2-M2F1)

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. In order to remove the actuator, the knob (C) has to be rotated. On the first turns the electrical contacts will positively open, then, after about 20 seconds (or 10 seconds depending on the knob version), the actuator will be released. In order to close the guard, the knob must be rotated in the opposite direction. This switch doesn't need power supply or timer and can be easily installed on old machines without important changes in their electrical circuit. The knob (C) may be supplied in a short (standard) or in a long version.

**Working cycle steps (FD 6R2-M2F1)**



Dimensional drawings

All measures in the drawings are in mm

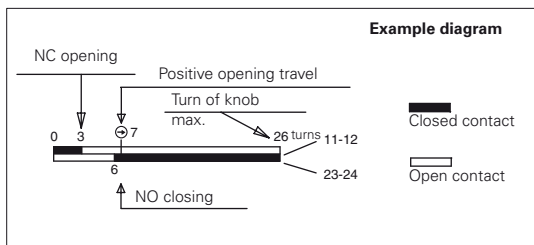
Contact type:	Technopolymer housing		Metal housing		Metal housing	
	Without actuator		Without actuator		Without actuator	
L = slow action LO = slow action overlapped						
Contact blocks						
6	L FP 6R2-M2 1NO+1NC		FD 6R2-M2 1NO+1NC		FD 6R2-L10M2 1NO+1NC	
7	LO FP 7R2-M2 1NO+1NC		FD 7R2-M2 1NO+1NC		FD 7R2-L10M2 1NO+1NC	
9	L FP 9R2-M2 2NC		FD 9R2-M2 2NC		FD 9R2-L10M2 2NC	
20	L FP 20R2-M2 1NO+2NC		FD 20R2-M2 1NO+2NC		FD 20R2-L10M2 1NO+2NC	
21	L FP 21R2-M2 3NC		FD 21R2-M2 3NC		FD 21R2-L10M2 3NC	
22	L FP 22R2-M2 2NO+1NC		FD 22R2-M2 2NO+1NC		FD 22R2-L10M2 2NO+1NC	
33	L FP 33R2-M2 1NO+1NC		FD 33R2-M2 1NO+1NC		FD 33R2-L10M2 1NO+1NC	
34	L FP 34R2-M2 2NC		FD 34R2-M2 2NC		FD 34R2-L10M2 2NC	
Min. force	10 N (18 N)		10 N (18 N)		10 N (18 N)	

All measures in the diagrams are in turns of the knob

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 turns of the knob



IMPORTANT:

NC contact has to be considered with inserted and blocked actuator and with the knob turned anti-clockwise up to the end of the travel. 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.

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 EN 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 134 must be used.

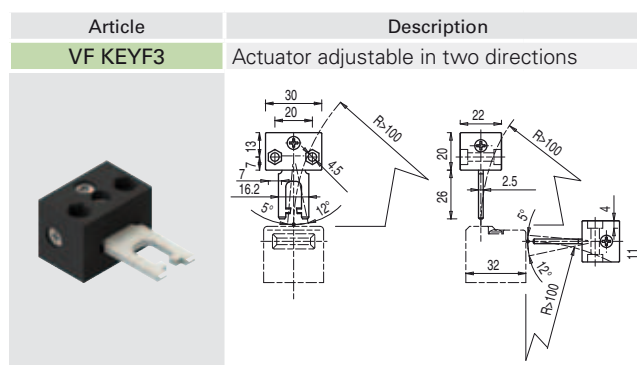
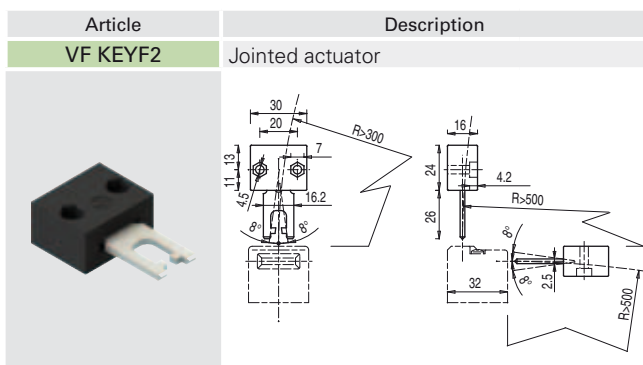
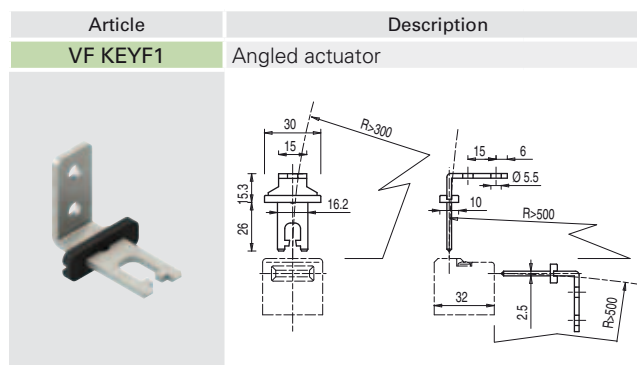
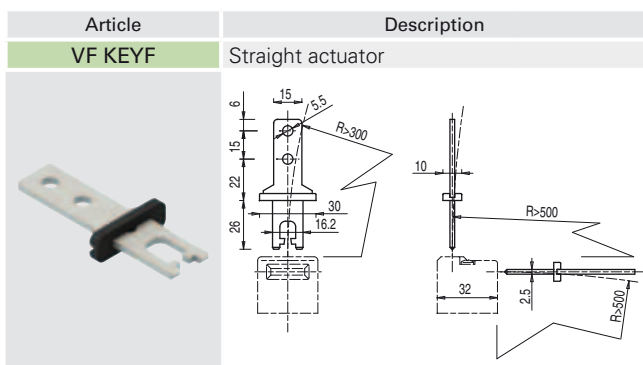
Items with code on **green** background are stock items

Accessories See page 287

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

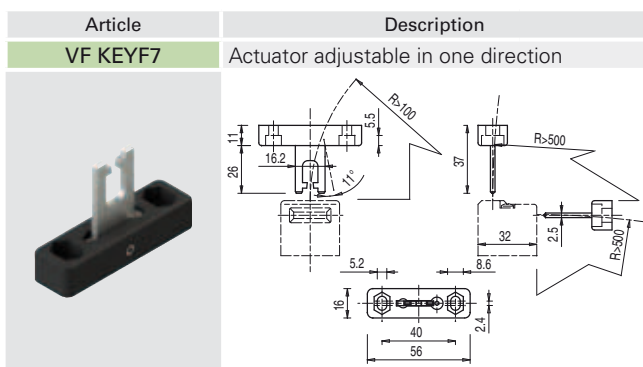
Stainless steel actuators

IMPORTANT: These actuators can be used with items of the FD, FP, FL, FC and FS series only (e.g. FD 6R2-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.



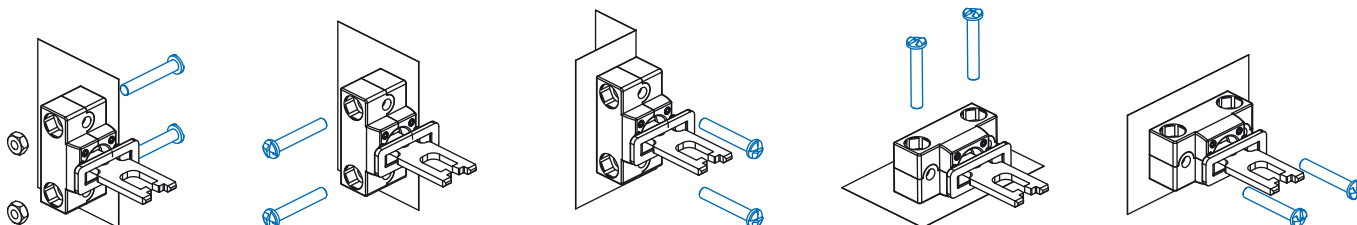
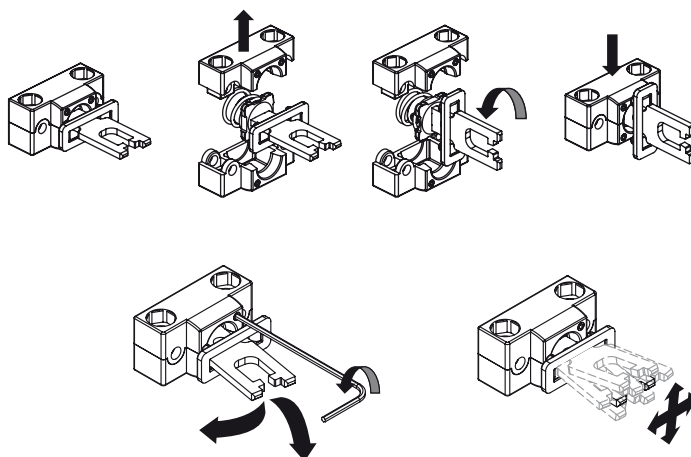
Universal actuator VF KEYF8

IMPORTANT: These actuators can be used with items of the FD, FP, FL, FC and FS series only (e.g. FD 6R2-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.

