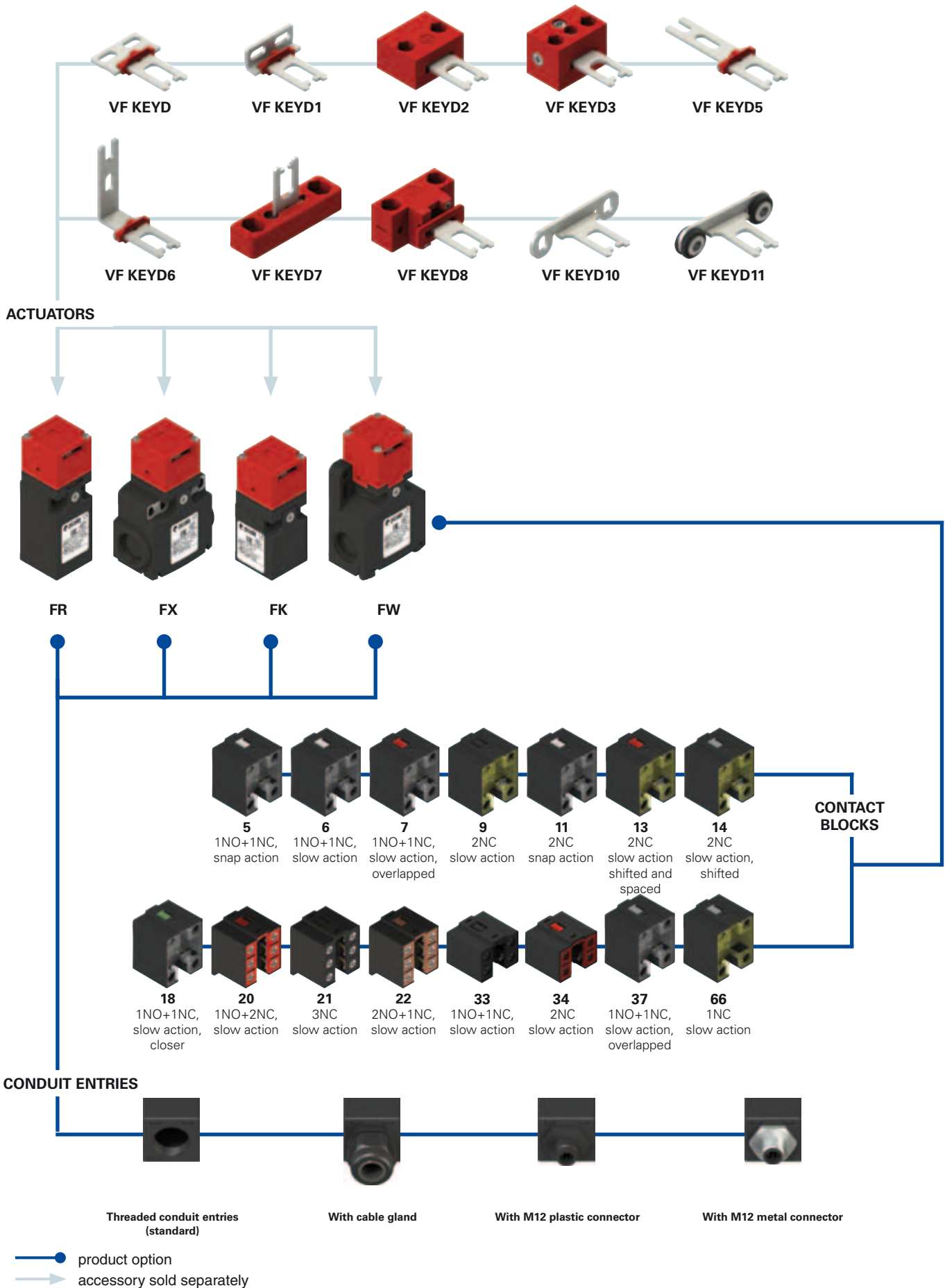


Selection diagram





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
FR 693-E3D1XGM2K70T6

Housing	
FR	technopolymer, one conduit entry
FX	technopolymer, two conduit entries
FW	technopolymer, three conduit entries

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

Contact blocks	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, overlapped
9	2NC, slow action
11	2NC, snap action
13	2NC, slow action, shifted and spaced
14	2NC, slow action, shifted
18	1NO+1NC, slow action, closer
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action
37	1NO+1NC, slow action, overlapped
66	1NC, slow action

Pre-installed cable glands or connectors	
	without cable gland or connector (standard)
K23	cable gland for cables Ø 6...Ø 12 mm
...
K70	M12 plastic connector, 4 poles
...

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

Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5 (FR-FX housing only)
A	PG 11 (FR-FX housing only)

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

External metallic parts	
	zinc-plated steel (standard)
X	stainless steel

Head type	
92	detachable head(FW housing only)
93	non-detachable head(FR, FX and FK housing only)

Actuator extraction force	
	10 N (standard)
E3	30 N

Actuators	
	without actuator (standard)
D	straight actuator VF KEYD
D1	angled actuator VF KEYD1
D2	jointed actuator VF KEYD2
...

article options options
FK 3393-E3D1XGM1K24T6

Housing	
FK	technopolymer, one conduit entry

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

Contact blocks	
33	1NO+1NC, slow action
34	2NC, slow action

Pre-installed cable glands	
	without cable gland (standard)
K24	cable gland for cables Ø 5 ... Ø 10 mm
K28	cable gland for cables Ø 3...Ø 7 mm

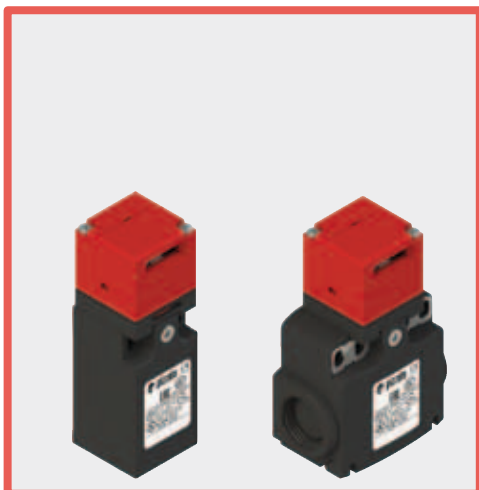
Actuator extraction force	
	10 N (standard)
E3	30 N

Actuators	
	without actuator (standard)
D	straight actuator VF KEYD
D1	angled actuator VF KEYD1
D2	jointed actuator VF KEYD2
...

Threaded conduit entry	
M1	M16x1.5(standard)
	PG 11

External metallic parts	
	zinc-plated steel (standard)
X	stainless steel

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



Main features

- Technopolymer housing, from one to three conduit entries
- Protection degree IP67
- 15 contact blocks available
- 8 stainless steel actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts


Markings and quality marks:



IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2007010305230013 (FR-FX-FK-FW series)
EAC approval:	RU C-IT ДМ94.В.01024

Technical data

Housing

Housing made of glass fiber reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: 

FR series, one threaded conduit entry: M20x1.5 (standard)
 FK series: one threaded conduit entry: M16x1.5 (standard)
 FX series - two knock-out threaded conduit entries: M20x1.5 (standard)
 Three FW series knock-out threaded conduit entries: 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
 type 2 acc. to EN ISO 14119
 Low acc. to EN ISO 14119

Mechanical interlock, coded:
 Coding level:
 Safety parameters:
 B_{10d}: 2,000,000 for NC contacts
 Service life: 20 years
 Ambient temperature: -25°C ... +80°C
 Max. actuation frequency: 3600 operating cycles¹/hour
 Mechanical endurance: 1 million operating cycles¹
 Max. actuation speed: 0.5 m/s
 Min. actuation speed: 1 mm/s
 Actuator extraction force: 10 N (-E3 versions: 30 N)
 Tightening torques for installation: see pages 7/1-7/12
 (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 5, 6, 7, 9, 11, 13, 14, 18, 37, 66:	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.

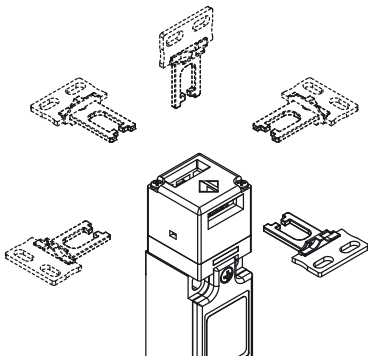
	Electrical data	Utilization category
without connector	Thermal current (I _{th}):	10 A
	Rated insulation voltage (U _i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)
	Rated impulse withstand voltage (U _{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)
	Conditional short circuit current: Protection against short circuits: Pollution degree:	1000 A acc. to EN 60947-5-1 type aM fuse 10 A 500 V 3
with M12 connector 4 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	
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



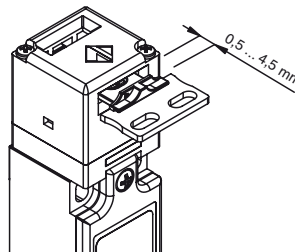
These safety switches are ideal for controlling gates, sliding doors and other guards which protect dangerous parts of machines without inertia. The stainless steel actuator is fastened to the moving part of the guard, so it is removed from the switch on every opening of the guard. The switch mechanism guarantees that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be applied to any kind of protection (with hinge, sliding and removable ones). Besides, the possibility to actuate the switch only with its actuator guarantees that the machine can be restarted only when the guard has been closed.

Orientable heads



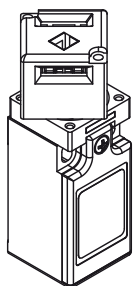
Removing the two fastening screws, in all switches, the head can be rotated in 90° steps. In this way it is possible to actuate the switch from 5 different directions.

Wide-ranging actuator travel



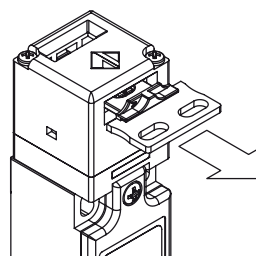
The head of this switch is equipped with an actuator with a wide range of travel. In this way the guard can oscillate along the direction of insertion (4mm) without causing unwanted machine shutdowns. This extensive travel is available in all actuators, in order to ensure maximum device reliability.

Not detachable head



To make head adjustment safer and smoother, these switches are equipped with a special head to body coupling system. This system makes it impossible to remove the head from the device even during adjustment, thus rendering the use of one-way screws unnecessary for locking the head in position once adjustment is complete. This solution is available for the FR, FX and FK series.

Versions with 30 N actuator extraction force



Versions with 30 N actuator holding force instead of the standard 10 N are available.

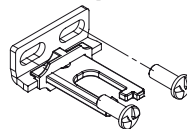
Protection degree IP67

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.

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.

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.

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 5, 6, 7, 9, 11, 13, 14, 18, 20, 21, 22, 33, 34, 66
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

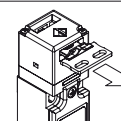
Please contact our technical service for the list of approved products.

Dimensional drawings

All measures in the drawings are in mm

Contact type:	Technopolymer housing		Technopolymer housing		Technopolymer housing		Technopolymer housing						
	Without actuator		Without actuator		Without actuator		Without actuator						
R = snap action L = slow action LO = slow action overlapped LS = slow action shifted LV = slow action shifted and spaced LA = slow action closer													
Contact blocks													
5	R	FR 593-M2	⊕	1NO+1NC	FX 593-M2	⊕	1NO+1NC	FW 592-M2	⊕	1NO+1NC			
6	L	FR 693-M2	⊕	1NO+1NC	FX 693-M2	⊕	1NO+1NC	FW 692-M2	⊕	1NO+1NC			
7	LO	FR 793-M2	⊕	1NO+1NC	FX 793-M2	⊕	1NO+1NC	FW 792-M2	⊕	1NO+1NC			
9	L	FR 993-M2	⊕	2NC	FX 993-M2	⊕	2NC	FW 992-M2	⊕	2NC			
11	R	FR 1193-M2	⊕	2NC	FX 1193-M2	⊕	2NC	FW 1192-M2	⊕	2NC			
13	LV	FR 1393-M2	⊕	2NC	FX 1393-M2	⊕	2NC	FW 1392-M2	⊕	2NC			
14	LS	FR 1493-M2	⊕	2NC	FX 1493-M2	⊕	2NC	FW 1492-M2	⊕	2NC			
18	LA	FR 1893-M2	⊕	1NO+1NC	FX 1893-M2	⊕	1NO+1NC	FW 1892-M2	⊕	1NO+1NC			
20	L	FR 2093-M2	⊕	1NO+2NC	FX 2093-M2	⊕	1NO+2NC	FW 2092-M2	⊕	1NO+2NC			
21	L	FR 2193-M2	⊕	3NC	FX 2193-M2	⊕	3NC	FW 2192-M2	⊕	3NC			
22	L	FR 2293-M2	⊕	2NO+1NC	FX 2293-M2	⊕	2NO+1NC	FW 2292-M2	⊕	2NO+1NC			
33	L	FR 3393-M2	⊕	1NO+1NC	FX 3393-M2	⊕	1NO+1NC	FW 3392-M2	⊕	1NO+1NC	FK 3393-M1	⊕	1NO+1NC
34	L	FR 3493-M2	⊕	2NC	FX 3493-M2	⊕	2NC	FW 3492-M2	⊕	2NC	FK 3493-M1	⊕	2NC
37	LO	FR 3793-M2	⊕	1NO+1NC	FX 3793-M2	⊕	1NO+1NC	FW 3792-M2	⊕	1NO+1NC			
66	L	FR 6693-M2	⊕	1NC	FX 6693-M2	⊕	1NC	FW 6692-M2	⊕	1NC			
Min. force		10 N (18 N ⊕)			10 N (18 N ⊕)			10 N (18 N ⊕)			10 N (18 N ⊕)		
Travel diagrams		page 304 - group 8			page 304 - group 8			page 304 - group 8			page 304 - group 8		

All switches listed above are available in a version with 30N actuator extraction force. To obtain these products, the order code must be changed by adding the extension "-E3", for example FR 693-M2E3.



Min. force 30 N version	30 N (38 N ⊕)	30 N (38 N ⊕)	30 N (38 N ⊕)	30 N (38 N ⊕)
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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).



Stainless steel actuators

All measures in the drawings are in mm

IMPORTANT: These actuators can be used with items of the FR, FX, FK and FW series (e.g. FR 693-M2).
Low level of coding acc. to EN ISO 14119.

Article	Description
VF KEYD	Straight actuator

Article	Description
VF KEYD1	Angled actuator

Article	Description
VF KEYD2	Jointed actuator

Article	Description
VF KEYD3	Actuator adjustable in two directions

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.

Article	Description
VF KEYD5	Extended actuator

Article	Description
VF KEYD6	Extended angled actuator

Article	Description
VF KEYD7	Actuator adjustable in one direction

Actuator adjustable in one direction for doors with reduced dimensions.

Article	Description
VF KEYD8	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.

Article	Description
VF KEYD10	Shaped actuator

Article	Description
VF KEYD11	Shaped actuator