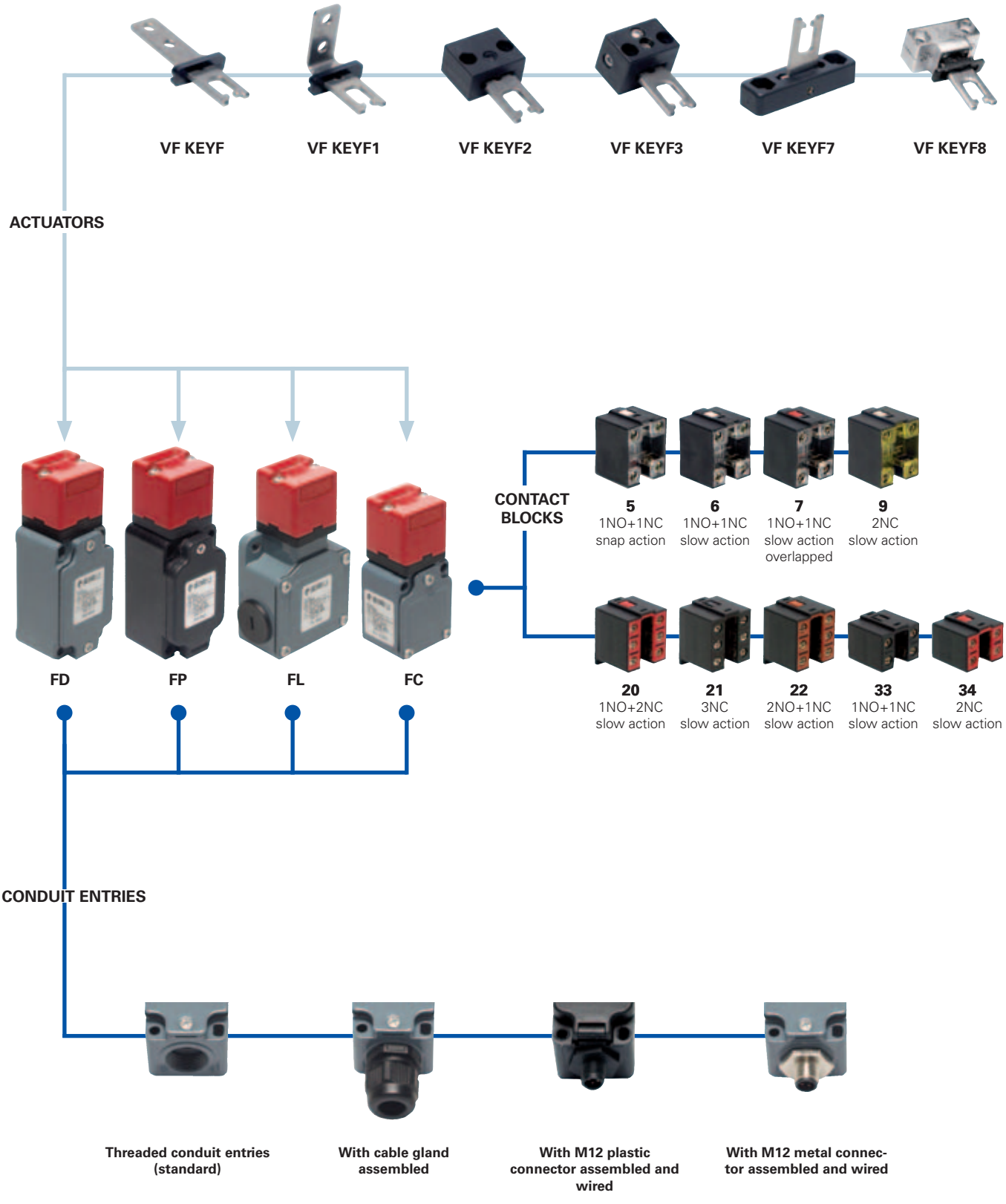
Selection diagram



Code structure

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

article: **FD 693** options: **-F1GM2K50**

Housing	
FD	metal housing, one conduit entry
FL	metal housing, three conduit entries
FP	polymer housing, one conduit entry

Contact blocks	
5	1NO+1NC, snap action
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

Actuators	
	without actuator (standard)
F	with straight actuator
F1	with right-angled actuator
F2	with jointed actuator
F3	with jointed actuator adjustable in two directions
F7	with jointed actuator adjustable in one direction
F8	with universal actuator

Contacts type	
	silver contacts (standard)
G	silver contacts gold plated 1 µm

Threaded conduit entry	
	PG 13,5 (standard)
M2	M20x1,5

Preinstalled cable gland or connectors	
	no cable gland or connector (standard)
K21	with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
...	.....
K50	with 5 poles M12 metal connector
...	.....

For the complete list of all combinations, please contact our technical office.

article: **FC 3393** options: **-F1GM1K22**

Housing	
FC	metal housing, one conduit entry

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

Actuators	
	without actuator (standard)
F	with straight actuator
F1	with right-angled actuator
F2	with jointed actuator
F3	with jointed actuator adjustable in two directions
F7	with jointed actuator adjustable in one direction
F8	with universal actuator

Contacts type	
	silver contacts (standard)
G	silver contacts gold plated 1 µm

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

Preinstalled cable gland	
	no cable gland (standard)
K22	with assembled cable gland suitable for Ø 5 to Ø 10 mm cables range
K26	with assembled cable gland suitable for Ø 3 to Ø 7 mm cables range

Main data

- Metal housing or polymer housing, from one to three conduit entries
- Protection degree IP67
- 9 contact blocks available
- 6 stainless steel actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions

Markings and quality marks:

Approval IMQ:	EG605 (FD-FL-FC series) EG606 (FP series)
Approval UL:	E131787
Approval CCC:	2007010305230000 (FD-FL-FC series) 2007010305230014 (FP series)
Approval EZU:	1010151

Technical data

Housing

Housing type FP made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation ⧈.
Housing type FD, FL and FC made of metal, coated with baked epoxy powder.
FD, FP and FC series one conduit entry
FL series three conduit entries

Protection degree:	IP67 according to EN 60529 (electrical contacts)

General data

Safety parameters:	see page 6/32
Ambient temperature:	from -25°C to +80°C

Version for operation in ambient temperature from -40°C to +80° C on request

Max operating frequency:	3600 operations cycles[1]/hour
Mechanical endurance:	1 million operations cycles[1]
Max actuating speed:	0,5 m/s
Min. actuating speed:	1 mm/s
Driving torque for installation:	see pages 6/1-6/10

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by EN 60947-5-1 standard.

Cross section of the conductors (flexible copper wire)

Contact blocks 20, 21, 22, 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, 9:	min.	1 x 0,5 mm²	(1 x AWG 20)
	max.	2 x 2,5 mm²	(2 x AWG 14)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60204-1, EN 60204-1, EN 1088, EN ISO 12100-1, EN ISO 12100-2, IEC 60529, EN 60529, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013, BG-GS-ET-15.
Approvals:
IEC 60947-5-1, UL 508, GB14048.5-2001

In conformity with requirements requested by:
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and Electromagnetic Compatibility 2004/108/EC.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.

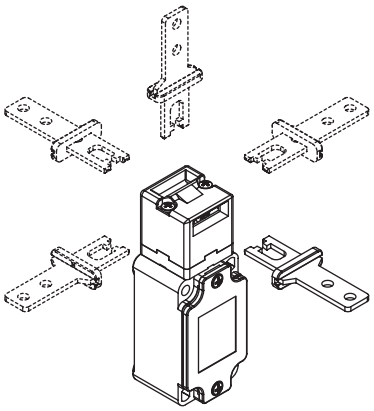
⚠ If not expressly indicated in this chapter, for the right installation and the correct utilization of all articles see requirements indicated from page 6/1 to page 6/10.

	Electrical data		Utilization categories
without connector	Thermal current (Ith):	10 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc for contact blocks 20, 21, 22, 33, 34	Ue (V) 250 400 500 Ie (A) 6 4 1 Direct current: DC13
	Conditional shot circuit current:	1000 A according to EN 60947-5-1	Ue (V) 24 125 250
	Protection against short circuits:	fuse 10 A 500 V type aM	Ie (A) 6 1,1 0,4
	Pollution degree:	3	
with 4 or 5 poles M12 connector	Thermal current (Ith):	4 A	Alternate current: AC15 (50...60 Hz) Ue (V) 24 120 250
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ie (A) 4 4 4
	Protection against short circuits:	fuse 4 A 500 V type gG	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 125 250 Ie (A) 4 1,1 0,4
with 8 poles M12 connector	Thermal current (Ith):	2 A	Alternate current: AC15 (50...60 Hz) Ue (V) 24
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	Ie (A) 2
	Protection against short circuits:	fuse 2 A 500 V type gG	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 Ie (A) 2

Description

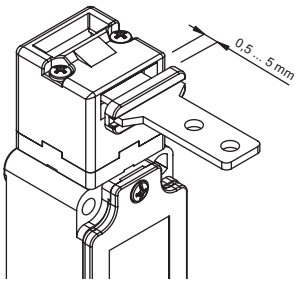
These safety switches are ideal to control gates, sliding doors and other guards protecting dangerous parts of machine.
The stainless steel actuator is fastened to the moving part of the guard, so it is removed from the switch on every opening of the guard. The switch mechanism guarantees that removing 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. Made of rugged materials and with oversized thickness, these switches are designed for the use on heavy guards.

Rotating heads



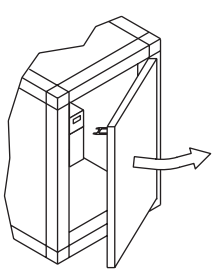
Removing the two fastening screws, in all switches, the head can be rotated in 90° steps.

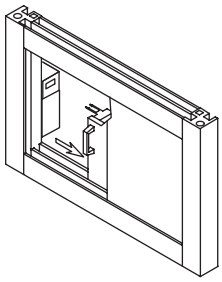
Actuator regulation zone



This switch has a wide backlash of the actuator into the head (4,5 mm) for an easier installation.
With closed door, check that the actuator doesn't knock straight against the head of the switch; it must be in the adjustment zone (0,5…5 mm)

Installation examples





Limits of utilization

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.
Do not use where explosive or inflammable gas is present.
Use Atex products in environments with explosion hazard (see page 2/137)

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 Vac
400 Vac for contact blocks 20, 21, 22, 33, 34
Thermal current (Ith): 10 A
Protection against short circuits: fuse 10 A 500 V type aM
Protection degree: IP67
MV terminals (screw clamps)
Pollution degree 3
Utilization category: AC15
Operation voltage (Ue): 400 Vac (50 Hz)
Operation 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 block 5, 6, 7, 9, 20, 21, 22, 33, 34

In conformity with standards: EN 60947-1, EN 60947-5-1 and subsequent modifications and completions, fundamental requirements of the Low Voltage Directive 2006/95/CE and subsequent modifications and completions.

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

Data type approved by UL

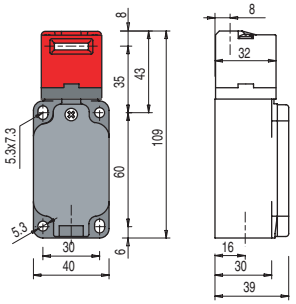
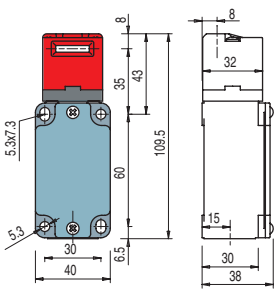
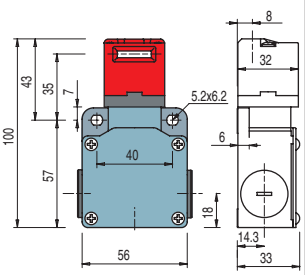
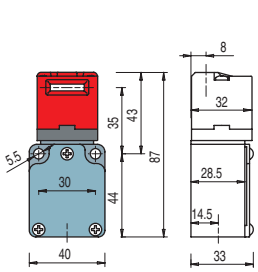
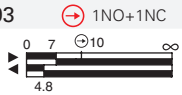
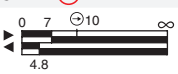
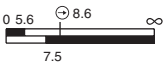
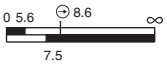
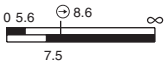
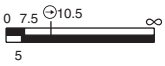
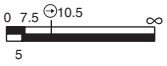
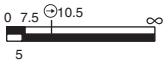
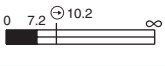
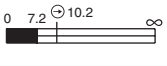
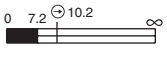
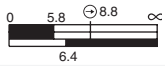
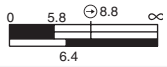
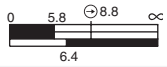
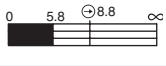
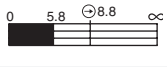
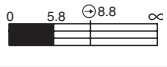
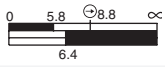
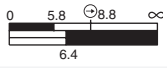
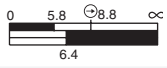
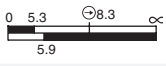
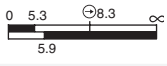
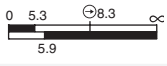
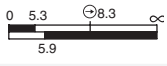
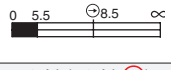
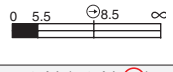
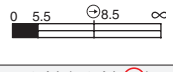
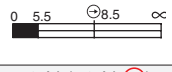
Utilization categories Q300 (69 VA, 125-250 Vdc)
A600 (720 VA, 120-600 Vac)
Data of the housing type 1, 4X "indoor use only", 12, 13
For all contact blocks use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 lb in (0.8 Nm).

In conformity with standard: UL 508

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

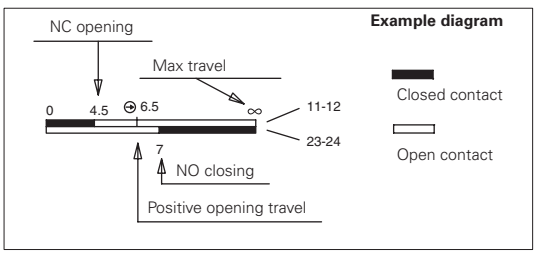
Dimensional drawings

Contacts type:
R = snap action
L = slow action
LO = slow action overlapped

Contact blocks		polymer housing Switch without actuator	metal housing Switch without actuator	metal housing Switch without actuator	metal housing Switch without actuator
					
5	R	FP 593 ⊖ 1NO+1NC	FD 593 ⊖ 1NO+1NC	FL 593 ⊖ 1NO+1NC	
					
6	L	FP 693 ⊖ 1NO+1NC	FD 693 ⊖ 1NO+1NC	FL 693 ⊖ 1NO+1NC	
					
7	LO	FP 793 ⊖ 1NO+1NC	FD 793 ⊖ 1NO+1NC	FL 793 ⊖ 1NO+1NC	
					
9	L	FP 993 ⊖ 2NC	FD 993 ⊖ 2NC	FL 993 ⊖ 2NC	
					
20	L	FP 2093 ⊖ 1NO+2NC	FD 2093 ⊖ 1NO+2NC	FL 2093 ⊖ 1NO+2NC	
					
21	L	FP 2193 ⊖ 3NC	FD 2193 ⊖ 3NC	FL 2193 ⊖ 3NC	
					
22	L	FP 2293 ⊖ 2NO+1NC	FD 2293 ⊖ 2NO+1NC	FL 2293 ⊖ 2NO+1NC	
					
33	L	FP 3393 ⊖ 1NO+1NC	FD 3393 ⊖ 1NO+1NC	FL 3393 ⊖ 1NO+1NC	FC 3393 ⊖ 1NO+1NC
					
34	L	FP 3493 ⊖ 2NC	FD 3493 ⊖ 2NC	FL 3493 ⊖ 2NC	FC 3493 ⊖ 2NC
					
Min. force		10 N (18 N ⊖)	10 N (18 N ⊖)	10 N (18 N ⊖)	10 N (18 N ⊖)

How to read travel diagrams

All measures in the diagrams are in mm



IMPORTANT:
NC contact has to be considered with inserted actuator. **In safety applications** it is necessary to activate the switch **at least up to the positive opening point** indicated in the diagrams with the symbol ⊖. Operate the switch **at least with the positive opening force**, indicated between brackets, below each article, next the value of minimum force.

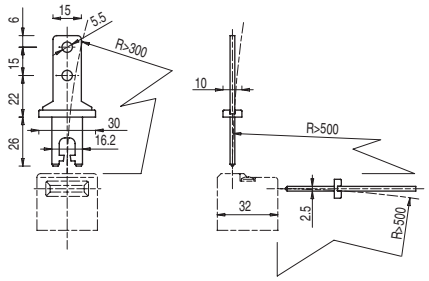
Accessories See page 5/1

All measures in the drawings are in mm

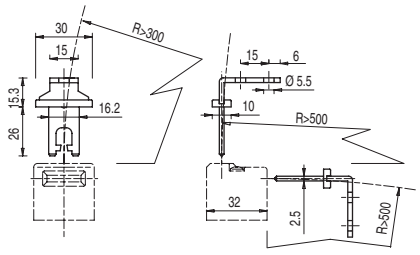
Stainless steel actuators

IMPORTANT: These actuators must be used with FD, FP, FL, FC or FS series only (e.g. FD 693)

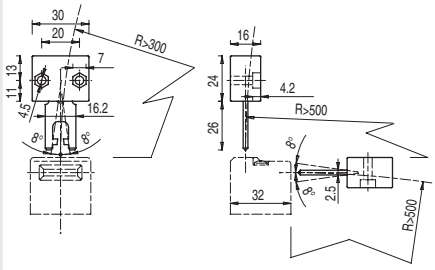
Article	Description
VF KEYF	Straight actuator



Article	Description
VF KEYF1	Right-angled actuator

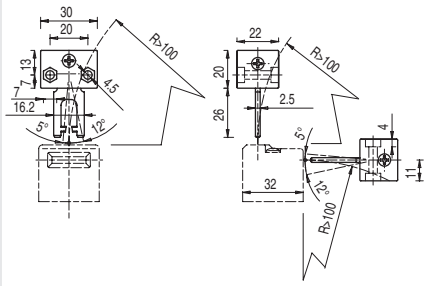


Article	Description
VF KEYF2	Jointed actuator



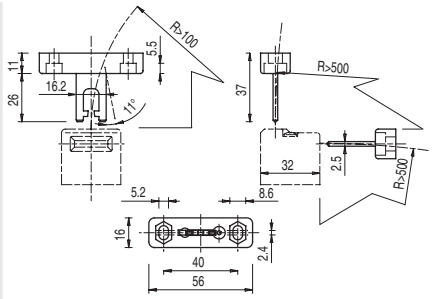
The actuator can flex in four directions for applications where the door alignment is not precise.

Article	Description
VF KEYF3	Jointed actuator adjustable in two directions



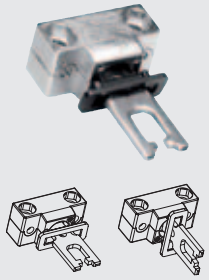
Actuator adjustable in two directions for doors with reduced dimensions.

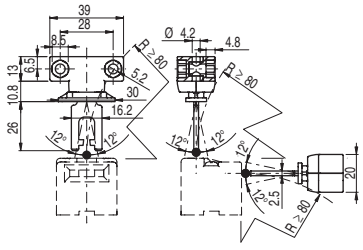
Article	Description
VF KEYF7	Jointed actuator adjustable in one direction



Actuator adjustable in one direction for doors with reduced dimensions.

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 the actuator-working plan (see picture).

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. To be used only with FD, FL, FC and FS series with metal heads.

Items with code on the **green** background are available in stock