

Safety switches with separate actuator



Pat pending

Markings and quality marks:



Approval IMQ:	EG610 (FR series) EG612 (FX series) EG613 (FK series)
Approval UL:	E131787
Approval ECU:	1010151

Complying with the requirements requested by: Low Voltage Directive 73/23/EEC and subsequent modifications and completions, Machinery Directive 98/37/EEC, Electromagnetic Compatibility 89/336/EEC and subsequent modifications and completions.

Positive contact opening complying with the standards: IEC 947-5-1, EN 60947-5-1, CEI EN 60947-5-1, VDE 0660-206.

Description and technical data

Dangerous machine doors are typically protected using safety switches with separate actuators which are adapt to control gates or fences, hinges, removable and sliding doors. The stainless steel actuator is fastened to the movable part of the guard so it is separated from the safety switch when guard opens. The extraction of the actuator guarantees the switch contacts' positive opening. Only the coupling of the switch with its anti-tamper contact blocks, actuators, connectors and other features makes these switches easy to install and adapt to most of applications. The new head design applied on FK series switches allow to rotate the head without separate it from the body of the switch and use only two screws to fix it.

Housing

Made of polymer glass-reinforced, self-extinguishing, shock proof thermo-plastic resin and with double insulation \square

FR and FK series one conduit entry

FX series two conduit entries

Protection degree: IP65 (electrical contacts)

General data

Ambient temperature:	from -25°C to +80°C
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

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by IEC 947-5-1 standard.

Cross section of the conductors (flexible lead wire)

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:	min. 1 x 0,5 mm ² (1 x AWG 20) max. 2 x 2,5 mm ² (2 x AWG 14)

Conforms to the standards:

IEC 947-5-1, IEC 337-1, EN 60947-5-1, CEI EN 60947-5-1, CEI 17-45, IEC 204-1, EN 60204-1, CEI 44-5, EN 1088, EN 292, IEC 529, EN 60529, CEI 70-1, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013, G-GS-ET-15.

Approvals:

IEC 947-5-1, UL 508.

Electrical data

without connectors	Thermal current (I _{th}):	10 A
	Rated insulation voltage (U _i):	500 VAC 600 VDC 400 VAC for contact block 20, 21, 22, 33, 34
	Protection against short circuits:	fuse 10 A 500V type aM
	Pollution degree:	3

with 4 poles M12 connectors	Thermal current (I _{th}):	4 A
	Rated insulation voltage (U _i):	250 VAC 300 VDC
	Protection against short circuits:	fuse 4 A 500 V type Gg
	Pollution degree:	3

with 8 poles M12 connectors	Thermal current (I _{th}):	2 A
	Rated insulation voltage (U _i):	30 VAC 36 VDC
	Protection against short circuits:	fuse 2 A 500 V type Gg
	Pollution degree:	3

Utilization categories

Alternate 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)	6	1,1	0,4

Alternate 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)	4	1,1	0,4

Alternate current: AC15 (50÷60 Hz)			
U _e (V)	24		
I _e (A)	2		
Direct current: DC13			
U _e (V)	24		
I _e (A)	2		

Data type approved by IMQ 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 of the housing: IP65

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: Za, Zb, Za+Za, Y+Y, X+X, Y+Y+X, Y+Y+Y, Y+X+X

Positive opening of contacts on contact block 5, 6, 7, 9, 11, 14, 16, 20, 21, 22, 33, 34

Conforms to the standards: EN60947-1, EN60947-1 A11, EN60947-5-1 and fundamental requirements of the Low Voltage Directive 73/23 EEC and 93/68 EEC.

Please contact our technical service for the list of our type 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

Conforms to the standard: UL 508

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

How to order

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

FR 692-D1GM2K70

Housing

FR	polymer housing, one conduit entry
FX	polymer housing, two conduit entries

Contact blocks

5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action
9	2NC, slow action
20	2NC+1NO, slow action
21	3NC, slow action
22	1NC+2NO, slow action
33	1NO+1NC, slow action
34	2NC, slow action

Actuators

	without actuator
D	with straight actuator
D1	with right-angled actuator
D2	with jointed actuator
D3	with adjustable jointed actuator
D5	with long actuator
D6	with right-angled long actuator
D7	with adjustable jointed actuator

M12 assembled connectors (see chapter 17)

	no connector (standard)
K40	8 poles, metal body, bottom output (only for contact blocks 20, 21, 22 and FR housing)
K41	8 poles, metal body, right output (only for contact blocks 20, 21, 22 and FX housing)
K42	8 poles, metal body, left output (only for contact blocks 20, 21, 22 and FX housing)
K70	4 poles, plastic body, bottom output (only for FR housing)
K71	4 poles, plastic body, right output (only for FX housing)
K72	4 poles, plastic body, left output (only for FX housing)

Threaded conduit entry

	PG 13,5 (standard)
A	PG 11
M1	M16x1,5
M2	M20x1,5
M3	1/2 NPT (only FR housing)

Type of contacts

	silver contacts (standard)
G	silver contacts gold plated (1 µm) (only contact block 5, 6, 7, 16)

13.3

Safety switches with separate actuator

How to order

FK 3393-D1M1

Housing

FK	polymer housing, one conduit entry
-----------	------------------------------------

Contact blocks

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

Threaded conduit entry

	PG 11 (standard)
--	------------------

M1	M16x1,5
-----------	---------

Actuators

	without actuator
D	with straight actuator
D1	with right-angled actuator
D2	with jointed actuator
D3	with adjustable jointed actuator
D5	with long actuator
D6	with right-angled long actuator
D7	with adjustable jointed actuator

Accessories

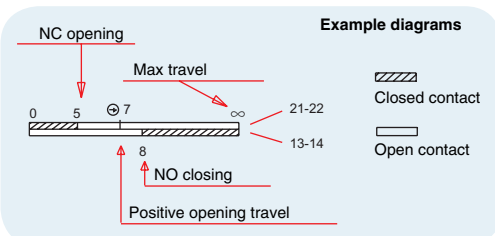
Further accessories: **signal lamps, cable glands, adapters, connectors and protection caps**, please see chapter 16



On request

- Special versions with head oriented to the left, to the right or to the rear.
- Special versions for -40 °C use.
- Custom-made special versions.

How to read travel diagrams (all measure are in mm)



IMPORTANT:

The contact NC is close with actuator inserted. In **safety applications** it is necessary to activate the switch **till the positive opening point**, indicated in the diagrams with the symbol \ominus . Operate the switch **with the positive opening force**, indicated between brackets, below each article, near to the value of minimum forces.

		Polymer housing	Polymer housing	Polymer housing
		Switch without actuator	Switch without actuator	Switch without actuator
Contact blocks				
5	snap action	FR 592 1NO+1NC	FX 592 1NO+1NC	
6	slow action	FR 692 1NO+1NC	FX 692 1NO+1NC	
7	slow action	FR 792 1NO+1NC Overlapped Contacts	FX 792 1NO+1NC Overlapped Contacts	
9	slow action	FR 992 2NC	FX 992 2NC	
20	slow action	FR 2092 2NC+1NO	FX 2092 2NC+1NO	
21	slow action	FR 2192 3NC	FX 2192 3NC	
22	slow action	FR 2292 2NO+1NC	FX 2292 2NO+1NC	
33	slow action	FR 3392 1NO+1NC	FX 3392 1NO+1NC	FK 3393 1NO+1NC
34	slow action	FR 3492 2NC	FX 3492 2NC	FK 3493 2NC
Min. force		10 N (18 N)	10 N (18 N)	10 N (18 N)

Stainless steel actuators

10 pcs packs

Attention! These actuators (red colour) can be used only with products which code start by "FR", "FX" or "FK" (e.g. FR 692)

Article

VF KEYD

Straight actuator



Article

VF KEYD1

Right-angled actuator



Article

VF KEYD2

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



Article

VF KEYD3

Two directions adjustable actuator for reduced dimensions doors.

Safety switches with separate actuator

Stainless steel actuators

📦 10 pcs packs



Article
VF KEYD5
Long actuator



Article
VF KEYD6
Right-angled long actuator

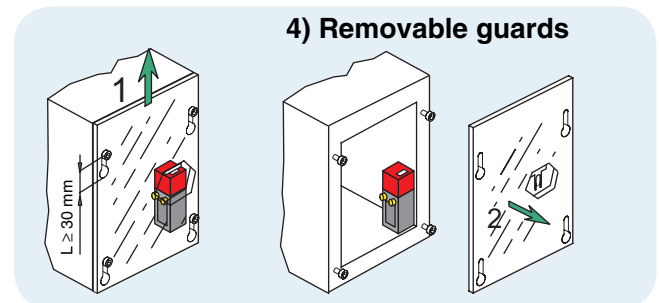
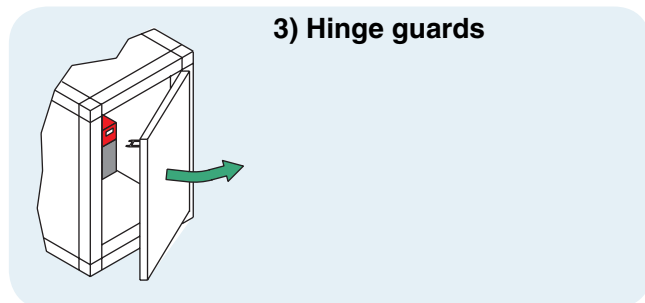
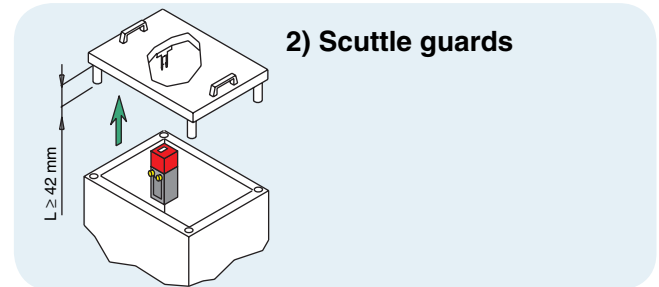
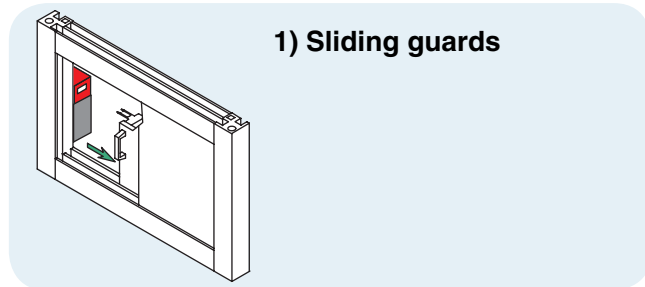


Article
VF KEYD7
One direction adjustable actuator for reduced dimensions doors.

For dimensional drawings see chapter 18

Items with code on **grey** background are available in stock. The quantities near the symbol 📦 indicate the number of pieces in each pack. Only orders for quantities multiple of the packs are accepted.

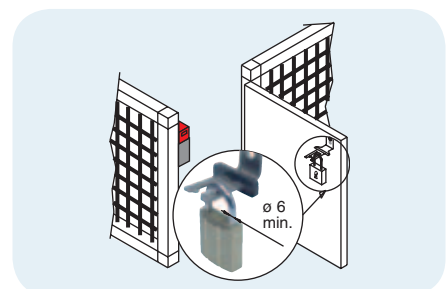
Installation examples



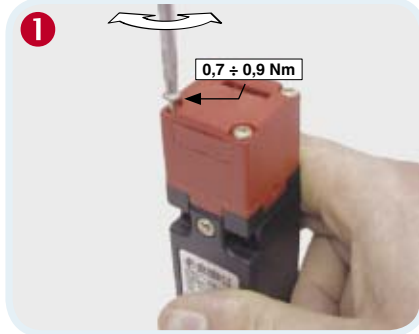
5) Installation on fences

In some cases the switch may protect a gate which allows access to an area large enough for a person to enter. In such cases it is vital that the gate be prevented from accidentally closing while someone is in the hazardous area. The actuators are designed to accept a padlock with a 6 mm minimum lock bar diameter.

As alternative, please see the safety switches with locking key in the chapter 13.2.



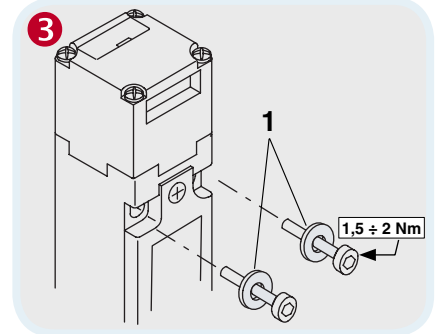
Assembling instructions



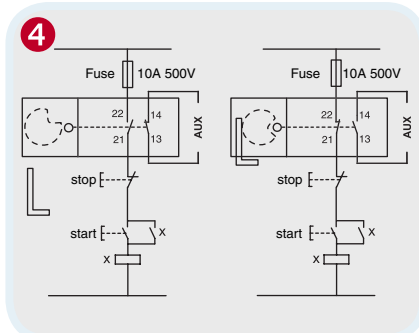
To rotate the head, unscrew the four screws as shown above (two screws for FK series).



The head can be rotated on the four sides of the switch.



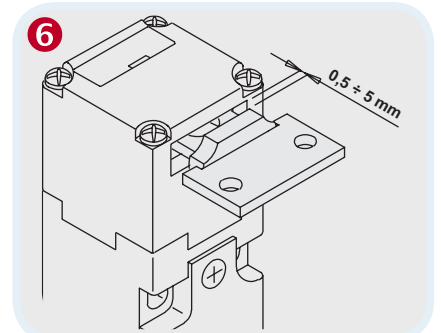
Fix the switch by interposing a washer (1) under the heads of the fastening screws



The safety circuit must be connected to the NC contacts (11-12, 21-22, 31-32) with inserted actuator. The auxiliary contacts (13-14, 23-24, 33-34) are for signalling purposes.



Fasten the actuator to the door of the machine with rivets or one way screws (2).



With closed door, check that the actuator is in the adjustment zone (0,5...5 mm).

Attention!

Check the correct operation of the switch, before you start the machine and then, from time to time. The machine should immediately stop every time the guard is opened.

Instructions

A) Do not use in the following environments: 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.

B) Mechanical stop: do not use the switch as a mechanical stop. The actuator should not knock straight against the head of the switch (see figure on the side).

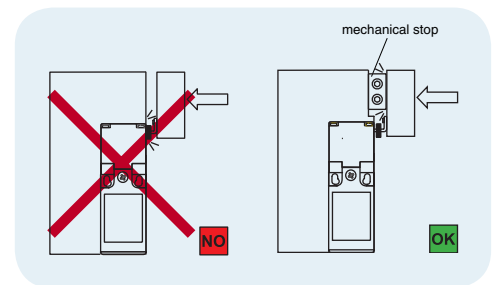
C) Care during the installation and after: Always insert the plug in the slot not used for protection against dust.

D) Care in the use of the actuators:

- Attach the actuators with rivets or one way screws.

- Take care to use only the actuator supplied with the switch or to use one of the following loose actuator:

VF KEYD, VF KEYD1, VF KEYD2, VF KEYD3, VF KEYD5, VF KEYD6, VF KEYD7. If you use any other actuator, the safety of the system is not guaranteed.



13.3