

Safety switches with separate actuator



Description and technical data

These safety switches are ideal to control gates, sliding doors and other guards protecting dangerous parts of machines.

The stainless steel actuator is fastened to the moving part of the guard, so it is removed from the switch on 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 every kind of protection (with hinge, sliding and removable ones). Besides, the possibility to actuate the switch only with that particular 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.

Housing

FP series made of polymer glass-reinforced, self-extinguishing, shock proof thermoplastic resin and with double insulation □

FD, FL and FC series made of metal, coated with baked epoxy powder

FD, FP and FC series one conduit entry

FL series three conduit entries

Protection degree: IP66 (electrical contacts)

Markings and quality marks:



Approval IMQ: EG605 (FD series)
EG606 (FP series)
EG607 (FL series)
EG608 (FC series)
Approval UL: E131787
Approval EZU: 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.

General data

Ambient temperature: from -25°C to +80°C
Max operating frequency: 3600 operations cycles¹/hour
Mechanical endurance: 1 million operations cycles¹
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 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)

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.

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 - 5 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 block 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: IP66

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, EN 60947-1 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

FD 693-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 Contacts
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
F	with straight actuator
F1	with right-angled actuator
F2	with jointed actuator
F3	with adjustable jointed actuator
F7	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)
K41	8 poles, metal body, right output (only for contact blocks 20, 21, 22 and FL housing)
K42	8 poles, metal body, left output (only for contact blocks 20, 21, 22 and FL housing)
K50	5 poles, metal body, bottom output (only for FD - FL housing)
K51	5 poles, metal body, right output (only for FL housing)
K52	5 poles, metal body, left output (only for FL housing)
K70	4 poles, plastic body, bottom output (only for FP housing)

Threaded conduit entry

	PG 13,5 (standard)
M2	M20x1,5

Type of contacts

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

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Safety switches with separate actuator

How to order

FC 3393-F1M1

Housing

FC	metal housing, one conduit entry
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Contact blocks

33	1NO+1NC, slow action
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34	2NC, slow action
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Threaded conduit entry

	PG 11 (standard)
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M1	M16x1,5
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Actuators

	without actuator
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F	with straight actuator
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F1	with right-angled actuator
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F2	with jointed actuator
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F3	with adjustable jointed actuator
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F7	with adjustable jointed actuator
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Accessories

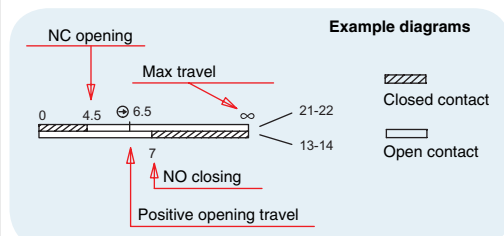
Further accessories: **signal lamps, cable glands, adapters, connectors and protection caps**, please see chapter 16



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 application**, it is necessary to activate the switch **till the positive opening point**, indicated in the diagrams with the symbol ⊕. Operate the switch **with the positive opening force**, indicated between brackets, below each article, near to the value of minimum forces.

		Polymer housing	Metal housing	Metal housing
		Switch without actuator 	Switch without actuator 	Switch without actuator
Contact block				
5	 13 21 14 22 snap action	FP 593 1NO+1NC 	FD 593 1NO+1NC 	FL 593 1NO+1NC
6	 13 21 14 22 slow action	FP 693 1NO+1NC 	FD 693 1NO+1NC 	FL 693 1NO+1NC
7	 13 21 14 22 slow action	FP 793 1NO+1NC Overlapped Contacts 	FD 793 1NO+1NC Overlapped Contacts 	FL 793 1NO+1NC Overlapped Contacts
9	 11 21 12 22 slow action	FP 993 2NC 	FD 993 2NC 	FL 993 2NC
20	 11 21 33 12 22 34 slow action	FP 2093 2NC+1NO 	FD 2093 2NC+1NO 	FL 2093 2NC+1NO
21	 11 21 31 12 22 32 slow action	FP 2193 3NC 	FD 2193 3NC 	FL 2193 3NC
22	 11 23 33 12 24 34 slow action	FP 2293 2NO+1NC 	FD 2293 2NO+1NC 	FL 2293 2NO+1NC
33	 13 21 14 22 slow action	FP 3393 1NO+1NC 	FD 3393 1NO+1NC 	FL 3393 1NO+1NC
34	 11 21 12 22 slow action	FP 3493 2NC 	FD 3493 2NC 	FL 3493 2NC
Min. force		10 N (18 N)	10 N (18 N)	10 N (18 N)

		Metal housing
		Switch without actuator
Contact block		
33	 13 21 14 22 slow action	FC 3393 1NO+1NC
34	 13 21 14 22 slow action	FC 3493 2NC
Min. force		10 N (18 N)

Safety switches with separate actuator

Stainless steel actuators

 **10 pcs packs**

Attention! These actuators (black colour) can be used only with products which code start by "FD", "FP", "FL", "FC" or "FS" (e.g. FD 693)



Article
VF KEYF
Straight actuator



Article
VF KEYF1
Right-angled actuator



Article
VF KEYF2
The actuator can flex in four directions for applications where the door alignment is not precise.




Article
VF KEYF3
Two directions adjustable actuator for reduced dimensions doors.

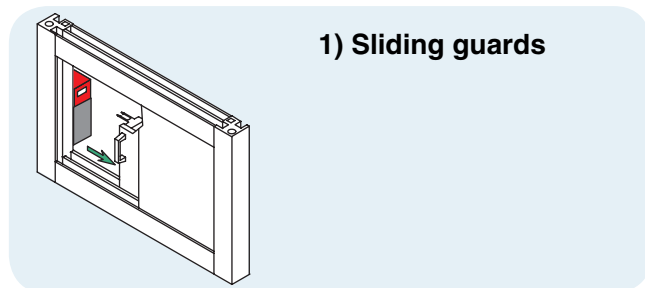


Article
VF KEYF7
One direction adjustable actuator for reduced dimensions doors.

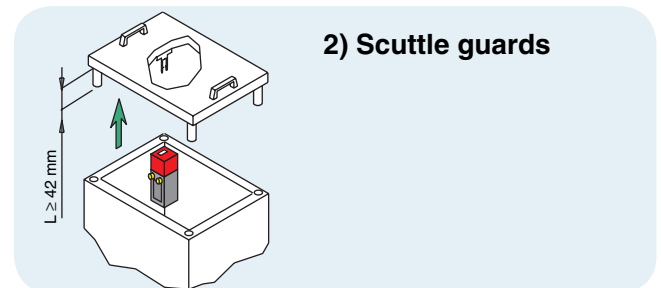
For dimensional drawings see chapter 18

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.

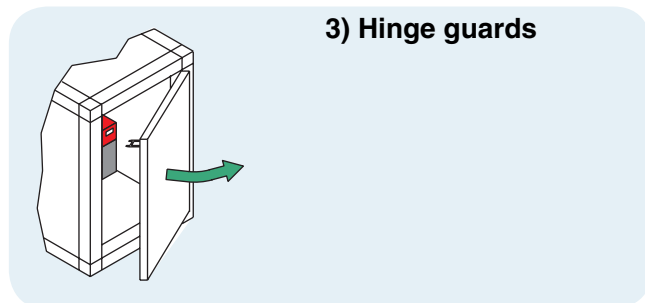
Installation examples



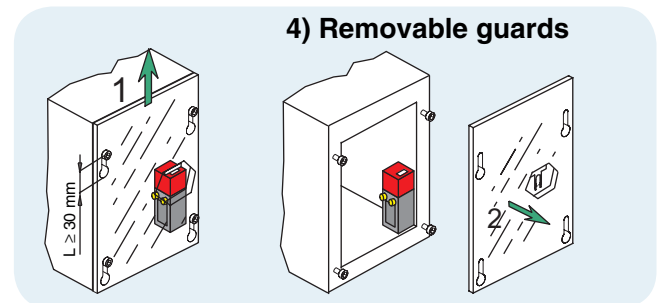
1) Sliding guards



2) Scuttle guards



3) Hinge guards

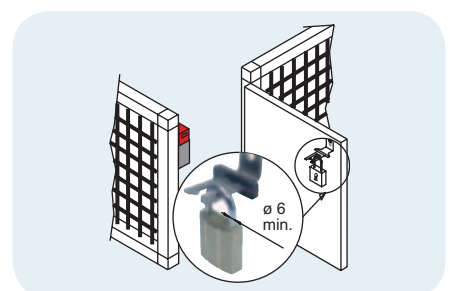


4) Removable guards

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.



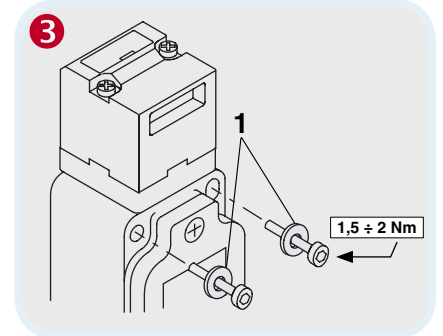
Assembling instructions



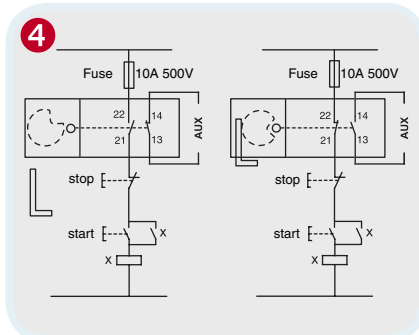
To rotate the head, unscrew the 2 screws as shown above.



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



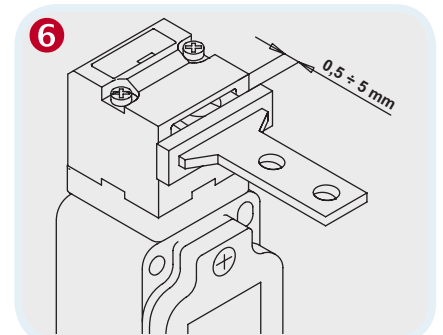
Fix the switch by interposing a washer (1) under the heads of the fastening screws (only series FP)



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).

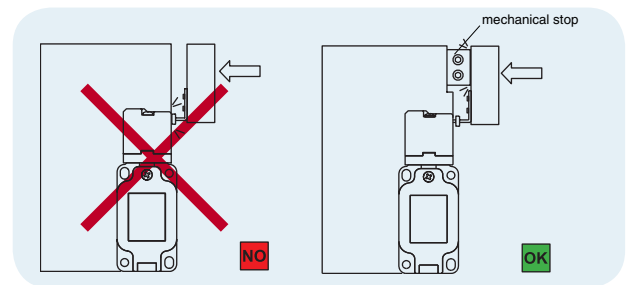
C) Care during the installation and after: Always insert the plug in the slot not used for protection against dust.

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 KEYF, VF KEYF1, VF KEYF2, VF KEYF3, VF KEYF7. If you use any other actuator, the safety of the system is not guaranteed.



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