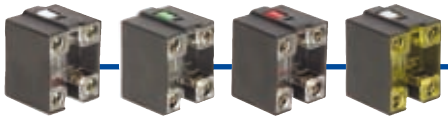
Selection diagram



FR FM FX FZ FK



5 1NO+1NC snap action
18 1NO+1NC slow action
7 1NO+1NC slow action overlapped
9 2NC slow action

CONTACT BLOCKS



20 1NO+2NC slow action
21 3NC slow action
22 2NO+1NC slow action
33 1NO+1NC slow action
34 2NC slow action

CONDUIT ENTRIES



Threaded conduit entries (standard)
With cable gland assembled
With M12 plastic connector assembled and wired
With M12 metal connector assembled and wired

product option
accessory sold separately

Code structure

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

article: **FR 1896** | options: **-XGM2K70**

Housing

FR	polymer housing, one conduit entry
FM	metal housing, one conduit entry
FX	polymer housing, two conduit entries
FZ	metal housing, two conduit entries

Contact blocks

18	1NO+1NC, slow action
5	1NO+1NC, snap 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

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Contacts type

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

Threaded conduit entry

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

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
K40	with M12 metal connector assembled and wired, 8 poles (only for contact blocks 20, 21, 22)
...	.....

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

article: **FK 3396** | options: **-XGM1K22**

Housing

FK	polymer housing, one conduit entry

Contact blocks

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

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Threaded conduit entry

	PG 11 (standard)
M1	M16x1,5

Contacts type

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

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 two conduit entries
- Protection degree IP67
- 9 contact blocks available
- Stainless steel actuator
- M12 assembled connector versions
- Silver contacts gold plated versions
- Stainless steel external parts versions

Markings and quality marks:

Approval IMQ:	EG610 (FR-FX-FK series) EG609 (FM-FZ series)
Approval UL:	E131787
Approval CCC:	2007010305230013 (FR-FX-FK series) 2007010305229998 (FM-FZ series)
Approval EZU:	1010151

Technical data

Housing

Housing type FR, FX and FK made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin ⧈
Housing type FM and FZ made of metal, coated with baked epoxy powder.
FR, FM and FK series one conduit entry
FX and FZ series two conduit entries
Protection degree: IP67

General data

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 of operations cycles[1]
Max actuating speed: 180°/s
Min. actuating speed: 2°/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 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, 7, 9, 18:	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 529, EN 60529, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013.
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 6/8.**

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	Ue (V) 250 400 500
		400 VAC for contact blocks 20, 21, 22, 33, 34	Ie (A) 6 4 1
	Protection against short circuits:	fuse 10 A 500 V type aM	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 125 250
			Ie (A) 6 1,1 0,4
with 4 or 5 poles M12 connector	Thermal current (Ith):	4 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	250 VAC 300 VDC	Ue (V) 24 120 250
	Protection against short circuits:	fuse 4 A 500 V type gG	Ie (A) 4 4 4
	Pollution degree:	3	Direct current: DC13
			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)
	Rated insulation voltage (Ui):	30 VAC 36 VDC	Ue (V) 24
	Protection against short circuits:	fuse 2 A 500 V type gG	Ie (A) 2
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24
			Ie (A) 2

Description

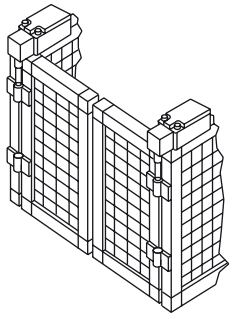
These safety switches have been designed to control gates or guards that protect the hazardous parts of machines. They are very sensitive and positively open the contact block after few rotation degrees, sending the stop signal immediately. The head adjustable in 90° steps allows their installation in four different positions. Available with polymer or metal housing, with protection degree IP67.
Its special shape allows to use this type of switches also in those areas where dust and dirt could block working of normal safety switches with separate actuator.

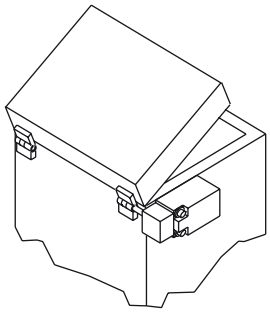
Rotating heads



Removing the four fastening screws, in all switches, it is possible to rotate the head in 90° steps.

Installation examples





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, 7, 9, 18, 20, 21, 22, 33, 34
In conformity with standards: EN60947-1, EN 60947-5-1 and subsequent modifications and completions, fundamental requirements of the Low Voltage Directive 73/23 EEC and subsequent modifications and completions.

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

Data type approved by UL

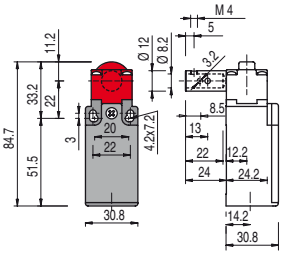
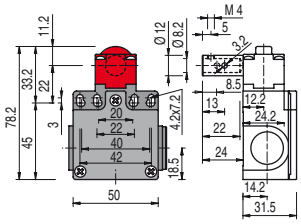
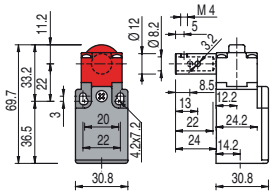
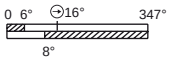
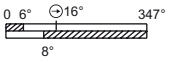
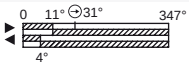
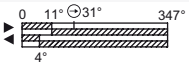
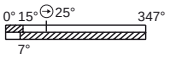
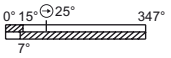
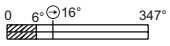
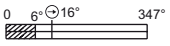
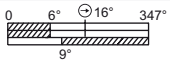
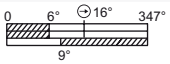
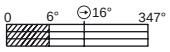
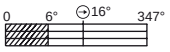
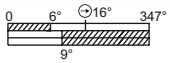
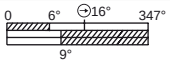
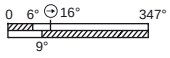
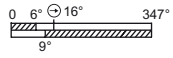
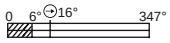
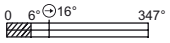
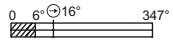
Utilization categories Q300 (69 VA, 125-250 VDC)
A600 (720 VA, 120-600 VAC)
Data of the housing type 1, 4X (indoor use only), 12, 13
In conformity with standard: UL 508
For all contact blocks use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 Lb-In.

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

Dimensional drawings

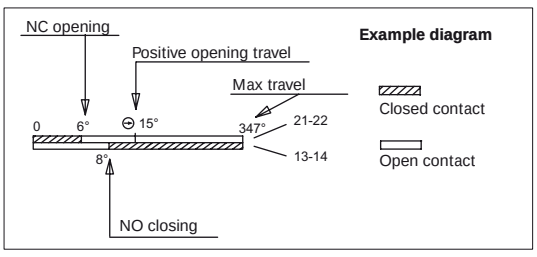
Contacts type:

R = snap action
L = slow action
LO = slow action overlapped

Contact blocks		polymer housing	polymer housing	polymer housing
				
18	L	FR 1896 1NO+1NC 	FX 1896 1NO+1NC 	
5	R	FR 596 1NO+1NC 	FX 596 1NO+1NC 	
7	LO	FR 796 1NO+1NC 	FX 796 1NO+1NC 	
9	L	FR 996 2NC 	FX 996 2NC 	
20	L	FR 2096 1NO+2NC 	FX 2096 1NO+2NC 	
21	L	FR 2196 3NC 	FX 2196 3NC 	
22	L	FR 2296 2NO+1NC 	FX 2296 2NO+1NC 	
33	L	FR 3396 1NO+1NC 	FX 3396 1NO+1NC 	FK 3396 1NO+1NC 
34	L	FR 3496 2NC 	FX 3496 2NC 	FK 3496 2NC 
Min. force		0,15 Nm (0,4 Nm ⊖)	0,15 Nm (0,4 Nm ⊖)	0,15 Nm (0,4 Nm ⊖)

How to read travel diagrams

All measures in the diagrams are in degrees



IMPORTANT:
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.

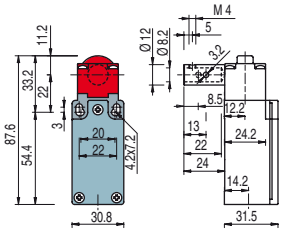
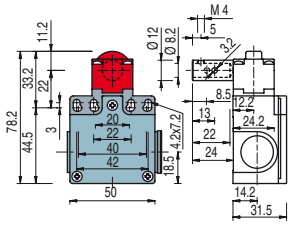
Accessories See page 5/1

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

All measures in the drawings are in mm

Contacts type:

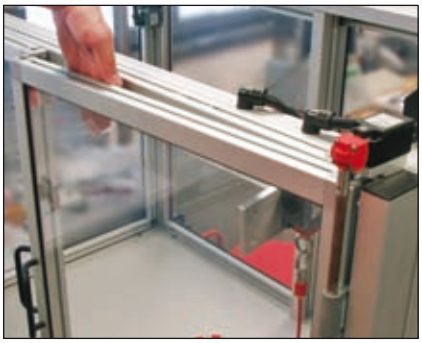
R = snap action
L = slow action
LO = slow action overlapped

Contact blocks		metal housing	metal housing
			
18	L	FM 1896 1NO+1NC	FZ 1896 1NO+1NC
5	R	FM 596 1NO+1NC	FZ 596 1NO+1NC
7	LO	FM 796 1NO+1NC	FZ 796 1NO+1NC
9	L	FM 996 2NC	FZ 996 2NC
20	L	FM 2096 1NO+2NC	FZ 2096 1NO+2NC
21	L	FM 2196 3NC	FZ 2196 3NC
22	L	FM 2296 2NO+1NC	FZ 2296 2NO+1NC
33	L	FM 3396 1NO+1NC	FZ 3396 1NO+1NC
34	L	FM 3496 2NC	FZ 3496 2NC
Min. force		0,15 Nm (0,4 Nm)	0,15 Nm (0,4 Nm)

Regulation of intervention point



Temporary shaft locking (dowel provided).



Verify the operating point according to EN 294, adjust the operating point again if necessary



Switch locking (pin provided).

Accessories See page 5/1

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