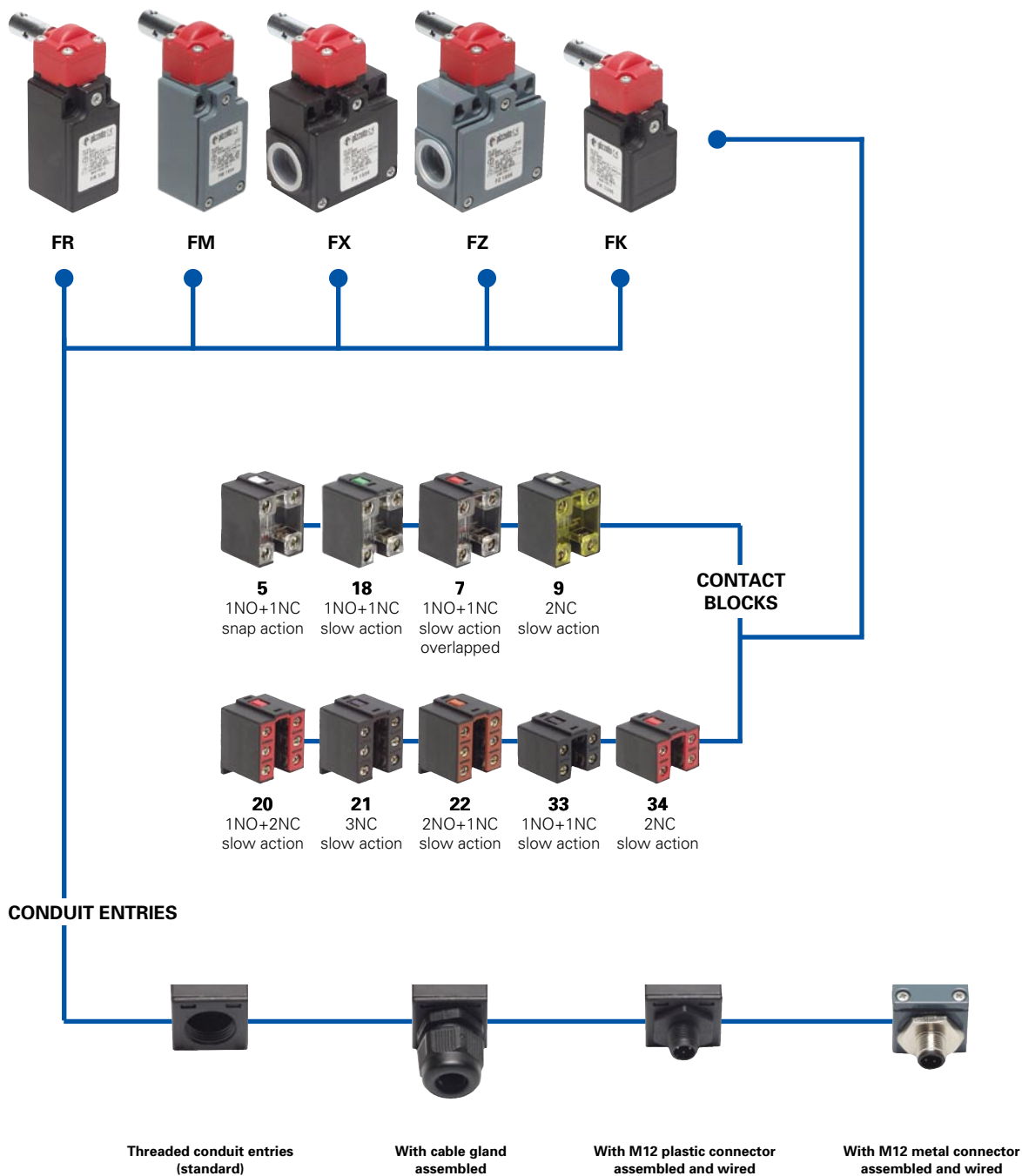


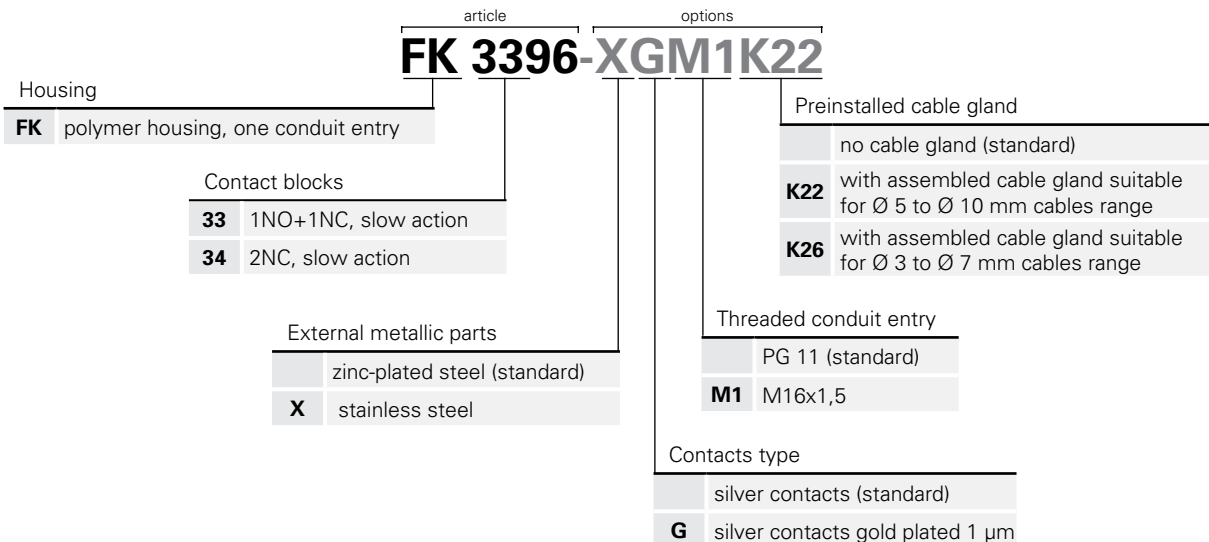
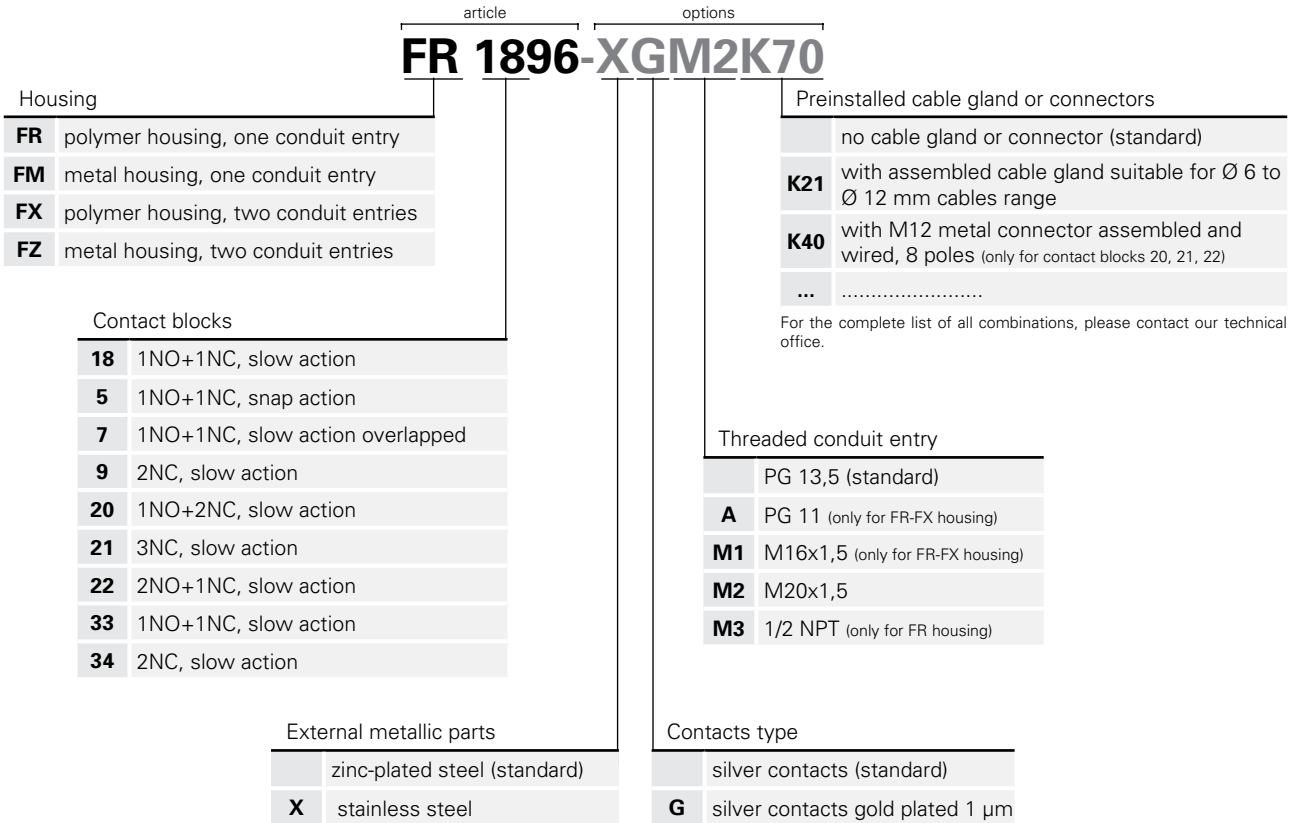
Selection diagram



● 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.





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 ECU:	1010151

Technical data

Housing

Housing type FR, FX and FK made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin \square

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 cycles¹/hour

Mechanical endurance: 1 million of operations cycles¹

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 (I _{th}):	10 A	Alternate current: AC15 (50...60 Hz)			
	Rated insulation voltage (U _i):	500 VAC 600 VDC	U _e (V)	250	400	500
		400 VAC for contact blocks 20, 21, 22, 33, 34	I _e (A)	6	4	1
	Protection against short circuits:	fuse 10 A 500 V type aM	Direct current: DC13			
Pollution degree:	3	U _e (V)	24	125	250	
		I _e (A)	6	1,1	0,4	

with 4 or 5 poles M12 connector	Thermal current (I _{th}):	4 A	Alternate current: AC15 (50...60 Hz)			
	Rated insulation voltage (U _i):	250 VAC 300 VDC	U _e (V)	24	120	250
	Protection against short circuits:	fuse 4 A 500 V type gG	I _e (A)	4	4	4
	Pollution degree:	3	Direct current: DC13			
		U _e (V)	24	125	250	
		I _e (A)	4	1,1	0,4	

with 8 poles M12 connector	Thermal current (I _{th}):	2 A	Alternate current: AC15 (50...60 Hz)		
	Rated insulation voltage (U _i):	30 VAC 36 VDC	U _e (V)	24	
	Protection against short circuits:	fuse 2 A 500 V type gG	I _e (A)	2	
	Pollution degree:	3	Direct current: DC13		
		U _e (V)	24		
		I _e (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.

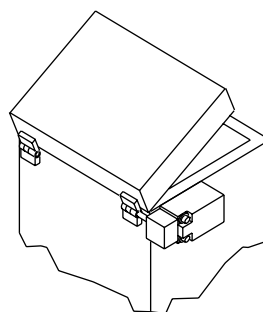
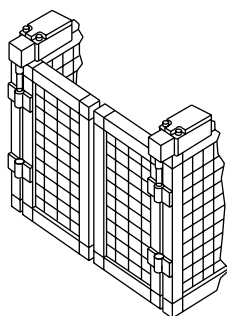
Its special shape allows to use this type of switches also in those areas where dust and dirt could block working of normal safety switches with separate actuator.

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 ECU

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

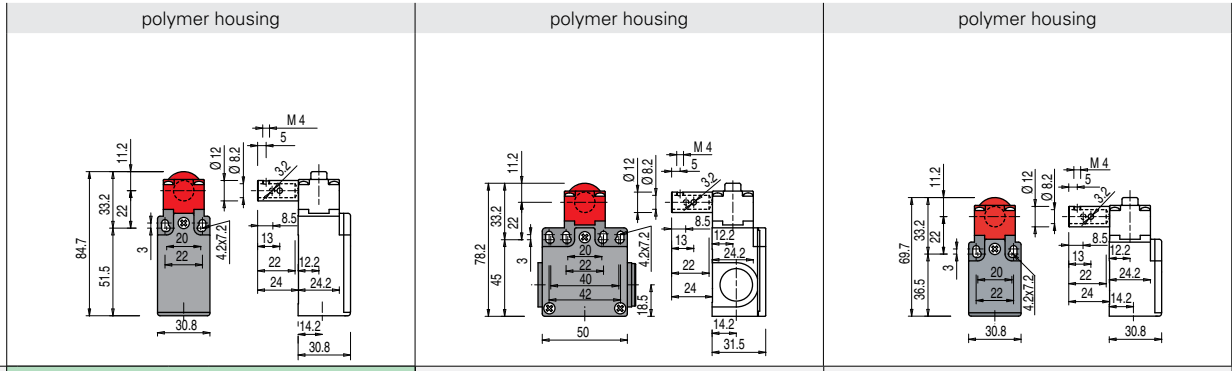
For all contact blocks use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 Lb-In.

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

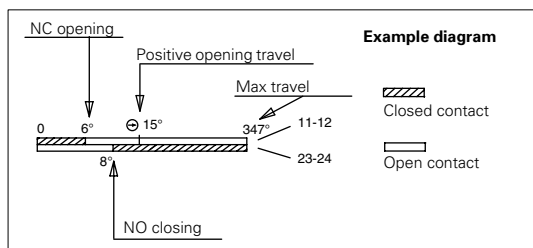


Contact blocks

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

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 \oplus . Operate the switch **at least with the positive opening force**, indicated between brackets, below each article, next the value of minimum force.

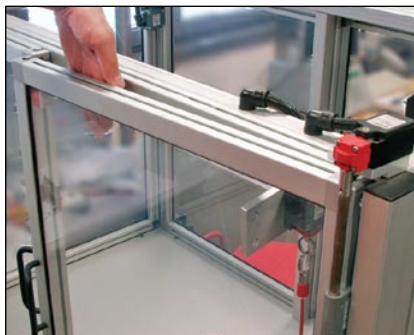
Contacts type:
R = snap action
L = slow action
LO = slow action overlapped

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

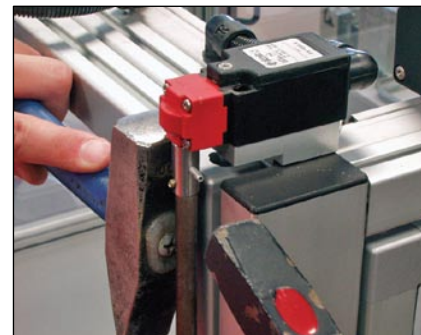
Regulation of intervention point



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