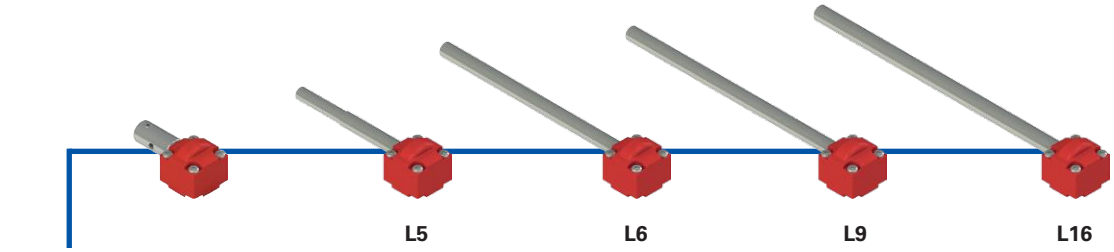
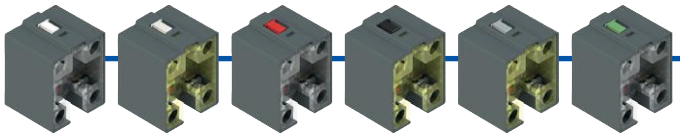
Selection diagram



ACTUATORS



CONTACT BLOCKS



5	6	7	9	14	18
1NO+1NC snap action	1NO+1NC slow action	1NO+1N slow action, make before break	2NC slow action	2NC slow action, shifted	1NO+1NC slow action, close



20	21	22	33	34	66
1NO+2NC slow action	3NC slow action	2NO+1NC slow action	1NO+1NC slow action	2NC slow action	1NC slow action

CONDUIT ENTRIES



Threaded conduit entry FR, FM, FX (standard)	
M2	M20x1.5 (standard)
M1	M16x1.5 (FR-FX housing only)
	PG 13.5
A	PG 11 (FR-FX housing only)

Threaded conduit entry FK (standard)	
M2	M20x1.5 (standard)
	PG 11

With cable gland	
K23	for cables Ø 6 … 12 mm
K27	for cables Ø 3 … 7 mm

With M12 plastic connector	
K45	8-pole, bottom
K70	4-pole, bottom

With M12 metal connector	
K40	8-pole, bottom
K60	4-pole, bottom

Product options

Code structure

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

article | options | options

FR 1896-XGL16M2K70T6

Housing	
FR	technopolymer, one conduit entry
FM	metal, one conduit entry
FX	technopolymer, two conduit entries

Contact block	
5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
9	2NC, slow action
14	2NC, slow action, shifted
18	1NO+1NC, slow action, close
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action
66	1NC, slow action

External metallic parts	
	zinc-plated steel (standard)
X	stainless steel

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact blocks 20, 21, 22, 33, 34)

Actuator design	
	actuator with hole (standard)
L5	Ø8x69 mm, tapered Ø6.9
L6	Ø8x120 mm
L9	Ø8x140 mm
L16	Ø8.7x165 mm, stainless steel

Threaded conduit entry	
M2	M20x1.5 (standard)
M1	M16x1.5 (FR-FX housing only)
	PG 13.5
A	PG 11 (FR-FX housing only)

Pre-installed cable glands or connectors	
	no cable gland or connector (standard)
K23	cable gland for cables Ø 6 … 12 mm
K45	M12 plastic connector, 8-pole
K70	M12 plastic connector, 4-pole
…	…

For the complete list of possible combinations please contact our technical department.

Ambient temperature	
	-25°C … +80°C (standard)
T6	-40°C … +80°C

article | options | options

FK 3396-XGL16M2K24T6

Housing	
FK	technopolymer, one conduit entry

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

External metallic parts	
	zinc-plated steel (standard)
X	stainless steel

Contact type	
	silver contacts (standard)
G	silver contacts with 1 µm gold coating

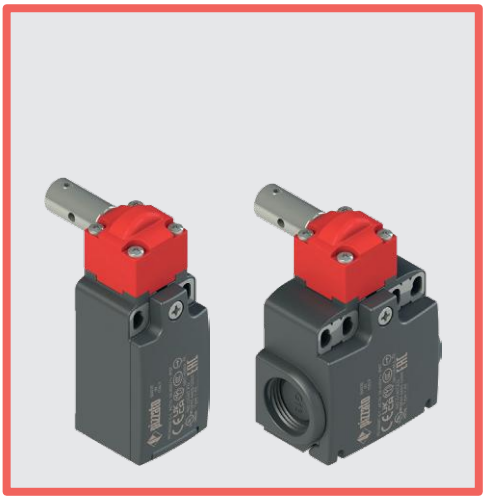
Actuator design	
	actuator with hole (standard)
L5	Ø8x69 mm, tapered Ø6.9
L6	Ø8x120 mm
L9	Ø8x140 mm
L16	Ø8.7x165 mm, stainless steel

Threaded conduit entry	
M2	M20x1.5 (standard)
	PG 11

Pre-installed cable glands or connectors	
	no cable gland or connector (standard)
K24	cable gland for cables Ø 5 … 10°mm
K70	M12 plastic connector, 4-pole

For the complete list of possible combinations please contact our technical department.

Ambient temperature	
	-25°C … +80°C (standard)
T6	-40°C … +80°C



Main features

- Metal housing or technopolymer housing, from one to two conduit entries
- Hinged cover, fixed with single captive screw (FR, FM, FK, FX)
- Metal plates on mounting holes of the housing (FR, FX, FK)
- Protection degrees IP67 and IP69K
- 12 contact blocks available
- Versions with M12 connector
- Versions with gold-plated silver contacts
- Versions with stainless steel external metallic parts

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2024010305656753
EAC approval:	RU Д-IT.PA07.B.37848/24

Technical data

Housing

FR, FX and FK series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation:	⧈
FM series metal housing, baked powder coating.	
FR, FM, FK series: one threaded conduit entry:	M20x1.5 (standard)
FX series: two knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree (FR, FM, FK, FX):	IP67 acc. to EN 60529 (with cable gland of equal or higher protection degree) IP69K acc. to ISO 20653 (cable gland of equal or higher protection degree)

General data

"Maximum SIL" up to:	SIL 3 acc. to EN IEC 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Mechanical interlock, not coded:	type 1 acc. to EN ISO 14119
Safety parameters:	
B_{10D}:	5,000,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	180°/s
Min. actuation speed:	2°/s
Tightening torques for installation:	see page 389
Wire cross-sections and wire stripping lengths:	see page 407

In compliance with standards:
IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN IEC 63000, UL 508, CSA C22.2 No. 14.
Approvals:
EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5

Compliance with the requirements of:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter Utilization requirements from page 385 to page 400.**

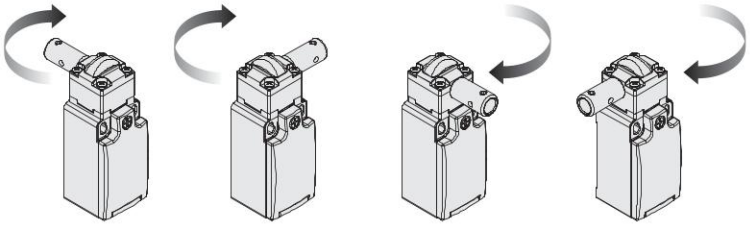
	Electrical data		Utilization category
without connector	Thermal current (I_{th}): Rated insulation voltage (U_i): Rated impulse withstand voltage (U_{imp}): Conditional short circuit current: Protection against short circuits: Pollution degree:	10 A 500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34) 6 kV 4 kV (contact blocks 20, 21, 22, 33, 34) 1000 A acc. to EN 60947-5-1 type aM fuse 10 A 500 V 3	Alternating 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) 3 0.55 0.3
with M12 connector, 4 and 5-pole	Thermal current (I_{th}): Rated insulation voltage (U_i): Protection against short circuits: Pollution degree:	4 A 250 Vac 300 Vdc type gG fuse 4 A 500 V 3	Alternating 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) 3 0.55 0.3
with M12 connector, 8-pole	Thermal current (I_{th}): Rated insulation voltage (U_i): Protection against short circuits: Pollution degree:	2 A 30 Vac 36 Vdc type gG fuse 2 A 500 V 3	Alternating current: AC15 (50÷60 Hz) U_e (V) 24 I_e (A) 2 Direct current: DC13 U_e (V) 24 I_e (A) 2

Description



These safety switches are designed to monitor gates or guards that safeguard dangerous parts of machines without inertia. They are very sensitive, open the contacts after few degrees of rotation and immediately send the stop signal. The head, which can be turned in 90° steps, enables installation in multiple positions. Available with technopolymer or metal housings, with protection degree IP67. The special design allows it to be used even under operating conditions in which dust and dirt could inhibit the operation of normal safety switches with separate actuator.

Heads with variable orientation



For all switches, the head can be adjusted in 90° steps after removing the four fastening screws. This allows you to use the same switch on both right- and left-facing door fronts.

Protection degrees IP67 and IP69K

IP69K
IP67

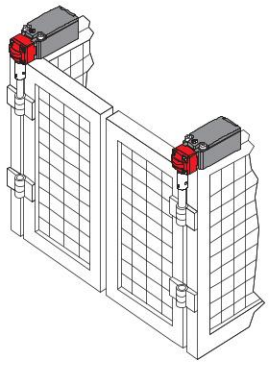
These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing. Due to their special design, these devices are suitable for use in equipment subjected to cleaning with high pressure hot water jets. These devices meet the IP69K test requirements according to ISO 20653 (water jets with 100 bar and 80°C).

Extended temperature range

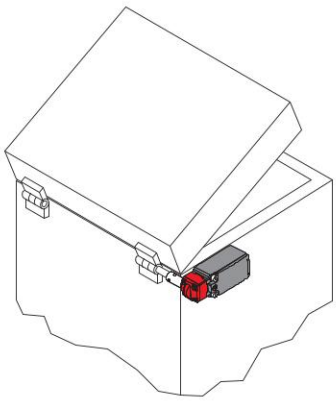
-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.
They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Application examples



Safety switches for hinges, mounting on double door



Safety switch for hinges, mounting outside the safety guard

Adjustable switching point



When installing the device, the contact switching point can be adjusted over the entire 360° range. By fixing the stud screw, it is possible to check the correct setting of the activation angle and quickly and easily adjust it if necessary. Once adjustment is complete, you can render the device tamper-proof against commonly used tools using the supplied lock pin.

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 37, 33, 34)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

Forms of the contact element: Za, Za+Za, X+X, Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X, Y, X.
Positive opening of contacts on contact blocks 5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 33, 34, 37, 38, 39, 66.
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FM, FX, FK: Types 1, 4X, 12, 13

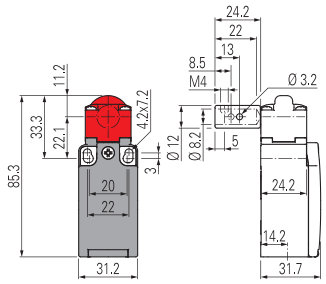
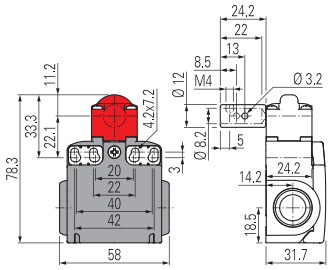
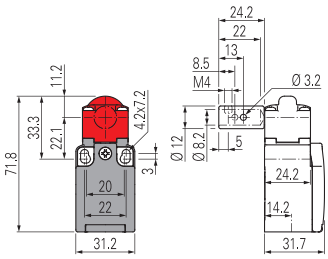
Use 60 or 75 °C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid. The terminal tightening torque of 7.1 lb in (0.8 Nm).

For FR, FX, FK series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

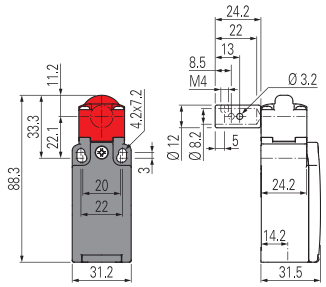
Please contact our technical department for the list of approved products.

Safety switches **for hinges**

Contact type:
R = snap action
L = slow action
LO = slow action, make before break
LS = slow action, shifted

Contact block		Technopolymer housing		Technopolymer housing		Technopolymer housing	
							
5	R	FR 596-M2	1NO+1NC	FX 596-M2	1NO+1NC	/	
6	L	FR 696-M2	1NO+1NC	FX 696-M2	1NO+1NC	/	
7	LO	FR 796-M2	1NO+1NC	FX 796-M2	1NO+1NC	/	
9	L	FR 996-M2	2NC	FX 996-M2	2NC	/	
14	LS	FR 1496-M2	2NC	FX 1496-M2	2NC	/	
18	L	FR 1896-M2	1NO+1NC	FX 1896-M2	1NO+1NC	/	
20	L	FR 2096-M2	1NO+2NC	FX 2096-M2	1NO+2NC	/	
21	L	FR 2196-M2	3NC	FX 2196-M2	3NC	/	
22	L	FR 2296-M2	2NO+1NC	FX 2296-M2	2NO+1NC	/	
33	L	FR 3396-M2	1NO+1NC	FX 3396-M2	1NO+1NC	FK 3396-M2	1NO+1NC
34	L	FR 3496-M2	2NC	FX 3496-M2	2NC	FK 3496-M2	2NC
66	L	FR 6696-M2	1NC	FX 6696-M2	1NC	/	
Actuating force		0.15 Nm (0.4 Nm)		0.15 Nm (0.4 Nm)		0.15 Nm (0.4 Nm)	
Travel diagrams		page 392 - group 9		page 392 - group 9		page 392 - group 9	

Contact type:
R = snap action
L = slow action
LO = slow action, make before break
LS = slow action, shifted

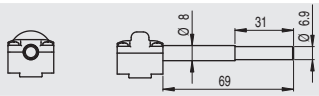
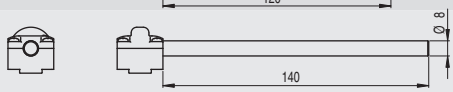
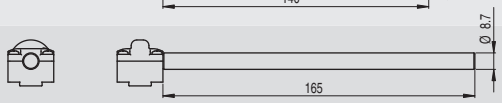
Contact block		Metal housing	
			
5	R	FM 596-M2	1NO+1NC
6	L	FM 696-M2	1NO+1NC
7	LO	FM 796-M2	1NO+1NC
9	L	FM 996-M2	2NC
14	LS	FM 1496-M2	2NC
18	L	FM 1896-M2	1NO+1NC
20	L	FM 2096-M2	1NO+2NC
21	L	FM 2196-M2	3NC
22	L	FM 2296-M2	2NO+1NC
33	L	FM 3396-M2	1NO+1NC
34	L	FM 3496-M2	2NC
66	L	FM 6696-M2	1NC
Actuating force		0.15 Nm (0.4 Nm)	
Travel diagrams		page 392 - group 9	

All values in the drawings are in mm

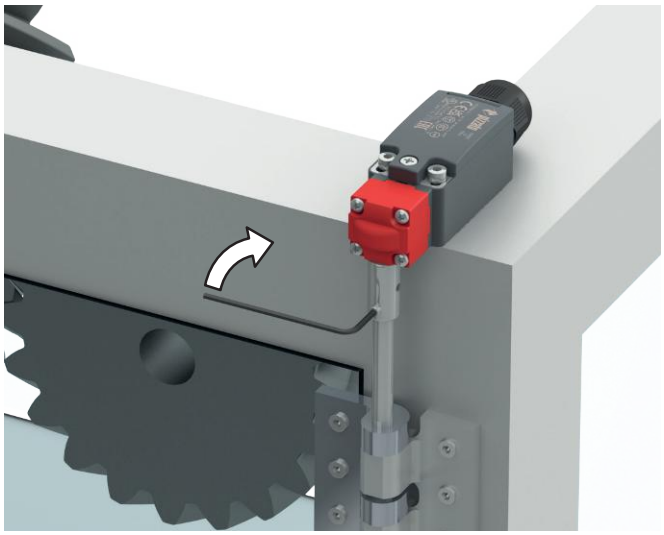
Accessories See page 357

→ The 2D and 3D files are available at **www.pizzato.com**

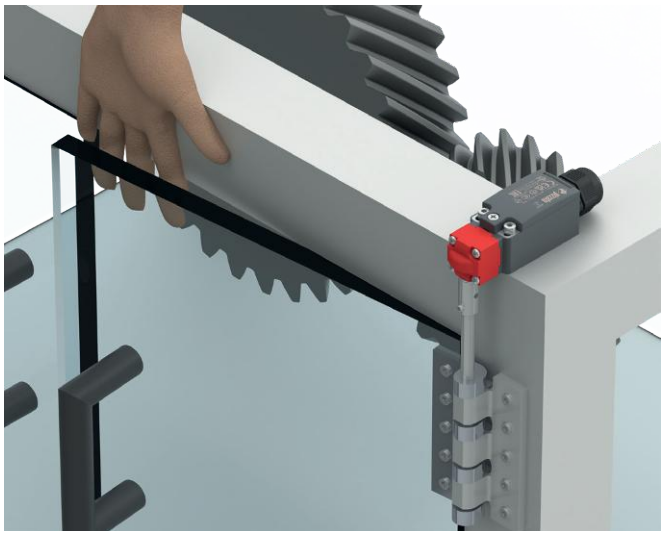
Dimensional drawings for actuators

Option	Drawing
L5	
L6	
L9	
L16	

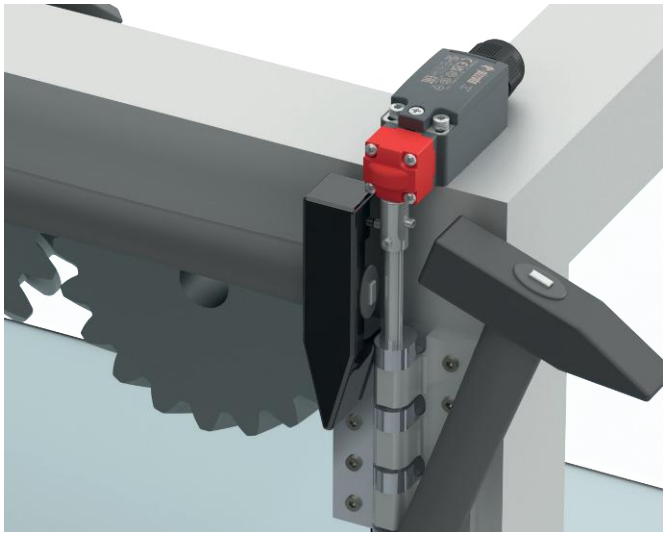
Adjustment of the switching point



Temporary locking of the actuator
(stud screw provided).



Verify the switching point according to EN ISO 13857
and recalibrate if necessary.



Pin the switch (pin is provided).

All values in the drawings are in mm

Accessories See page 357

➔ The 2D and 3D files are available at **www.pizzato.com**