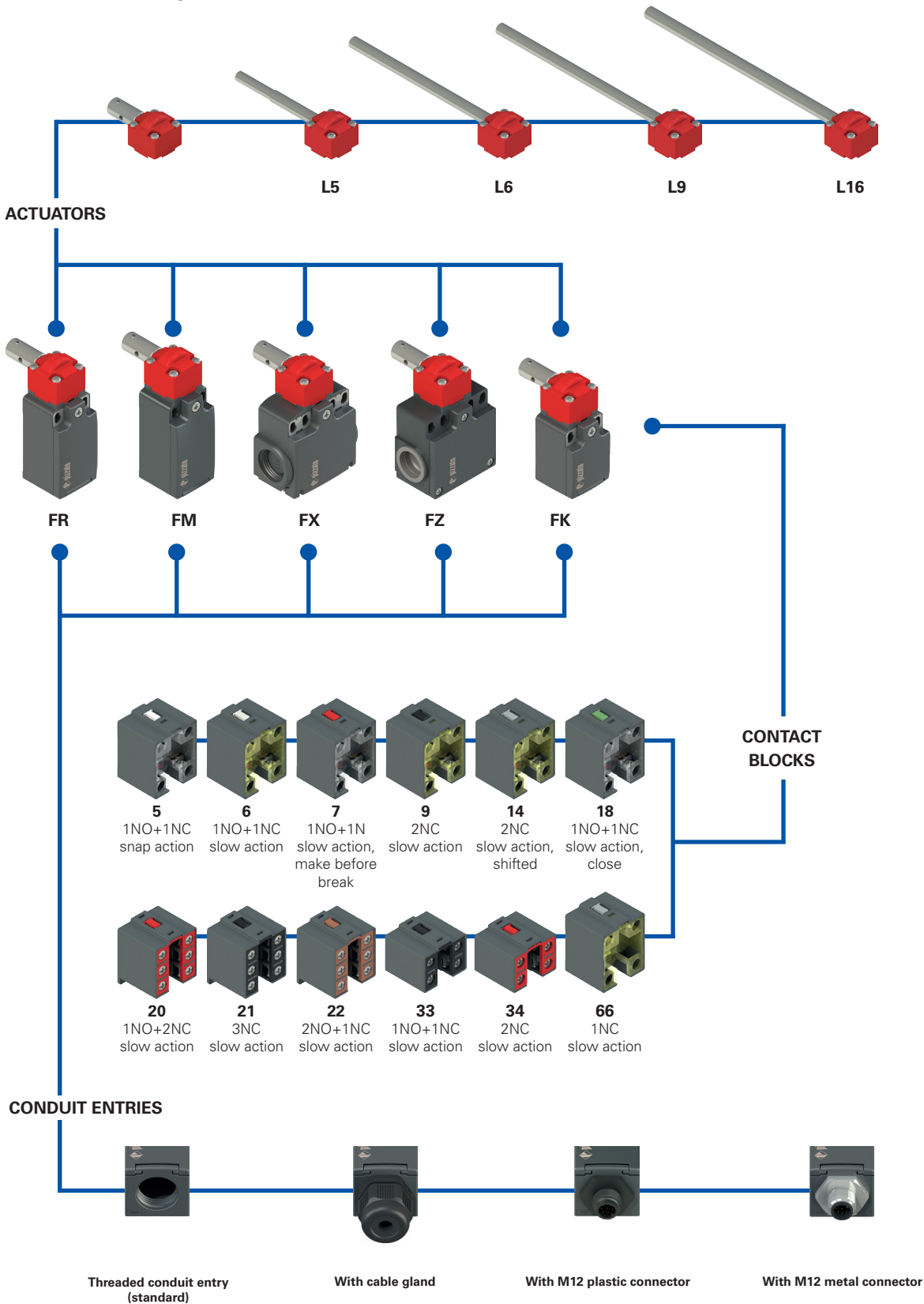


Selection diagram



—●— 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 |
| FZ | metal, two conduit entries |

| Contact blocks | |
|----------------|---|
| 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) |

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

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

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

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

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

article
options
options
FK 3396-XGL16M2K24T6

| Housing | |
|-----------|----------------------------------|
| FK | technopolymer, one conduit entry |

| Contact blocks | |
|----------------|----------------------|
| 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 |

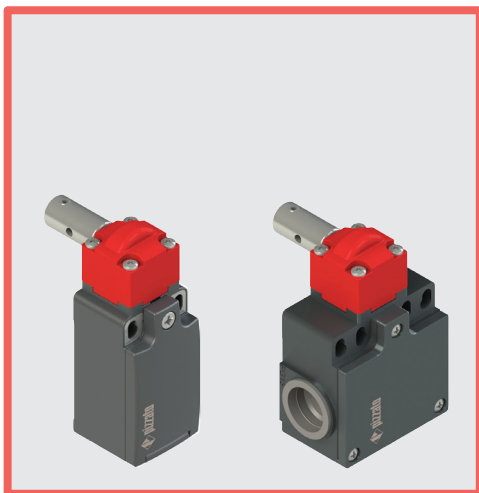
| Ambient temperature | |
|---------------------|----------------------------|
| | -25°C ... +80°C (standard) |
| T6 | -40°C ... +80°C |

| 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.

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

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



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 degree IP 67 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: | 2021000305000101 |
| EAC approval: | RU C-IT.YT03.B.00035/19 |

Technical data

Housing

FR, FX and FK series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: □

FM and FZ series: metal housing, baked powder coating.

FR, FM series: one threaded conduit entry: M20x1.5 (standard)

FK series: one threaded conduit entry: M20x1.5 (standard)

FX series: two knock-out threaded conduit entries: M20x1.5 (standard)

FZ series: two 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 (with cable gland of equal or higher protection degree)

Protection degree FZ: IP67 acc. to EN 60529 (with cable gland of equal or higher protection degree)

General data

SIL (SIL CL) up to: SIL 3 acc. to EN 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 443

Wire cross-sections and wire stripping lengths: see page 461

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 the instructions given on pages 443 to 454.

| | Electrical data | Utilization category |
|----------------------------------|--|--|
| without connector | Thermal current (I_{th}): 10 A Rated insulation voltage (U_i): 500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34) Rated impulse withstand voltage (U_{imp}): 6 kV 4 kV (contact blocks 20, 21, 22, 33, 34) Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 10 A 500 V Pollution degree: 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}): 4 A Rated insulation voltage (U_i): 250 Vac 300 Vdc Protection against short circuits: type gG fuse 4 A 500 V Pollution degree: 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}): 2 A Rated insulation voltage (U_i): 30 Vac 36 Vdc Protection against short circuits: type gG fuse 2 A 500 V Pollution degree: 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 |

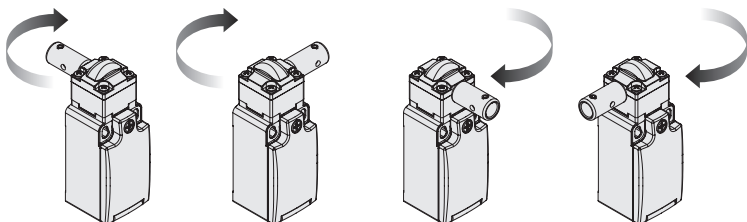


Description



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.

Head 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).

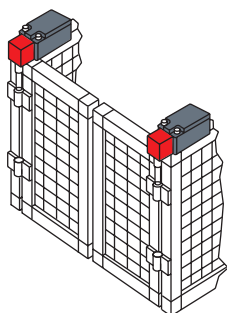
Extended temperature range

-40°C

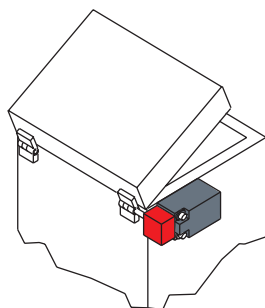
These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

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

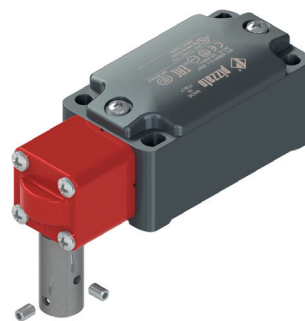


Safety switches for hinges, mounting on double door



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 (Ui): | 500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 37, 33, 34) |
| Conventional free air thermal current (Ith): | 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) | 3 |
| Pollution degree: | 3 |
| Utilization category: | AC15 |
| Operating voltage (Ue): | 400 Vac (50 Hz) |
| Operating current (Ie): | 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.

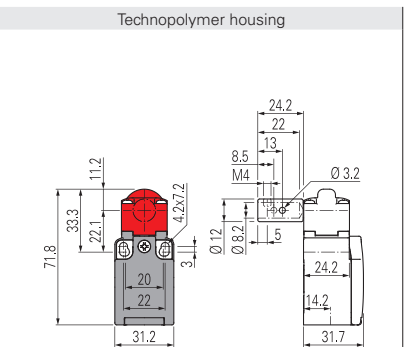
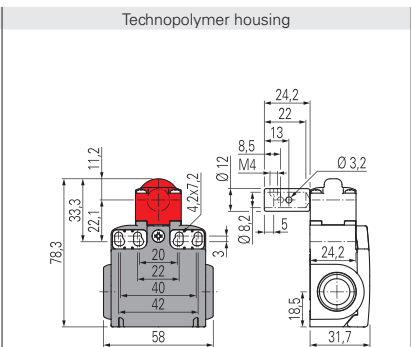
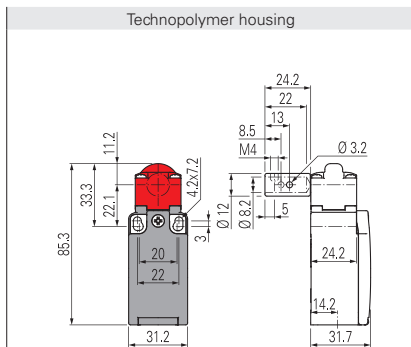
Features approved by UL

| | |
|--|---|
| 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, FZ, 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

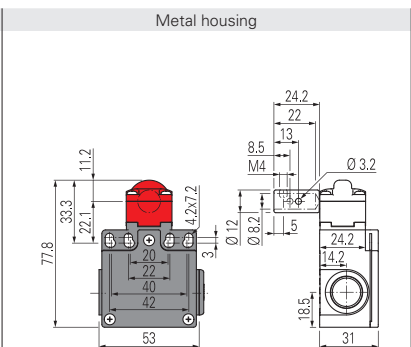
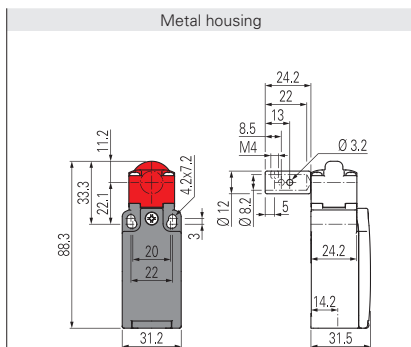
Contact type:
R = snap action
L = slow action
LO = slow action
 make before
 break
LS = slow action
 shifted



Contact blocks

| | | | | | | | | | | | | |
|-----------------|--------------------|------------|---|---------|--------------------|---|---------|----------------------|--------------------|--|--|--|
| 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 446 - group 9 | | | | page 446 - group 9 | | | | page 446 - group 9 | | | |

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



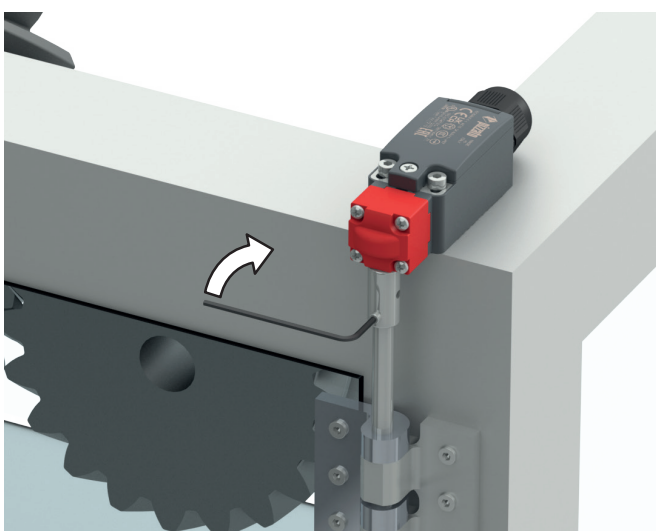
Contact blocks

| | | | | | | | | |
|-----------------|--------------------|------------|---|---------|--------------------|---|---------|--|
| 5 | R | FM 596-M2 | ↻ | 1NO+1NC | FZ 596-M2 | ↻ | 1NO+1NC | |
| 6 | L | FM 696-M2 | ↻ | 1NO+1NC | FZ 696-M2 | ↻ | 1NO+1NC | |
| 7 | LO | FM 796-M2 | ↻ | 1NO+1NC | FZ 796-M2 | ↻ | 1NO+1NC | |
| 9 | L | FM 996-M2 | ↻ | 2NC | FZ 996-M2 | ↻ | 2NC | |
| 14 | LS | FM 1496-M2 | ↻ | 2NC | FZ 1496-M2 | ↻ | 2NC | |
| 18 | L | FM 1896-M2 | ↻ | 1NO+1NC | FZ 1896-M2 | ↻ | 1NO+1NC | |
| 20 | L | FM 2096-M2 | ↻ | 1NO+2NC | FZ 2096-M2 | ↻ | 1NO+2NC | |
| 21 | L | FM 2196-M2 | ↻ | 3NC | FZ 2196-M2 | ↻ | 3NC | |
| 22 | L | FM 2296-M2 | ↻ | 2NO+1NC | FZ 2296-M2 | ↻ | 2NO+1NC | |
| 33 | L | FM 3396-M2 | ↻ | 1NO+1NC | FZ 3396-M2 | ↻ | 1NO+1NC | |
| 34 | L | FM 3496-M2 | ↻ | 2NC | FZ 3496-M2 | ↻ | 2NC | |
| 66 | L | FM 6696-M2 | ↻ | 1NC | FZ 6696-M2 | ↻ | 1NC | |
| Actuating force | 0.15 Nm (0.4 Nm ↻) | | | | 0.15 Nm (0.4 Nm ↻) | | | |
| Travel diagrams | page 446 - group 9 | | | | page 446 - group 9 | | | |

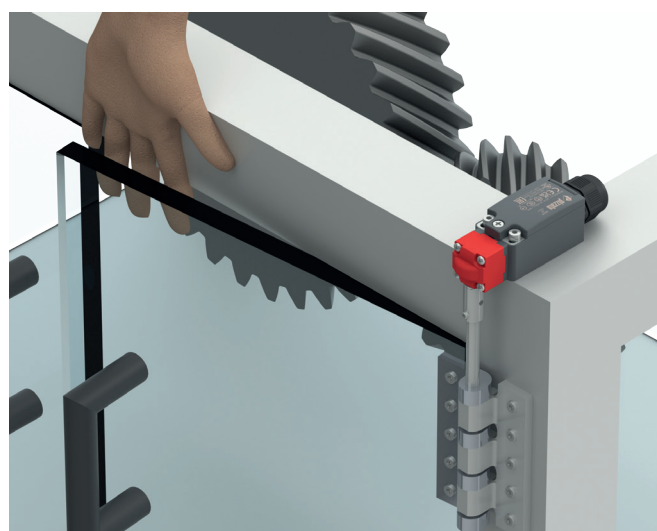
Dimensional drawings for actuators

| Option | Drawing |
|--------|---------|
| L5 | |
| L6 | |
| L9 | |
| L16 | |

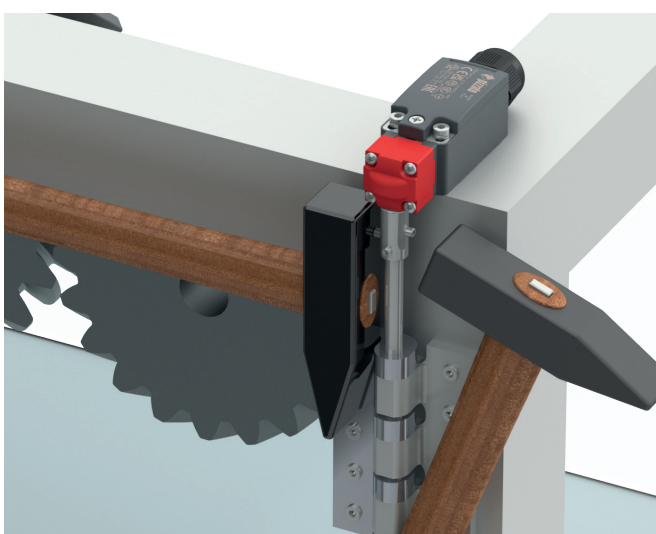
Adjustment of the switching point



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).