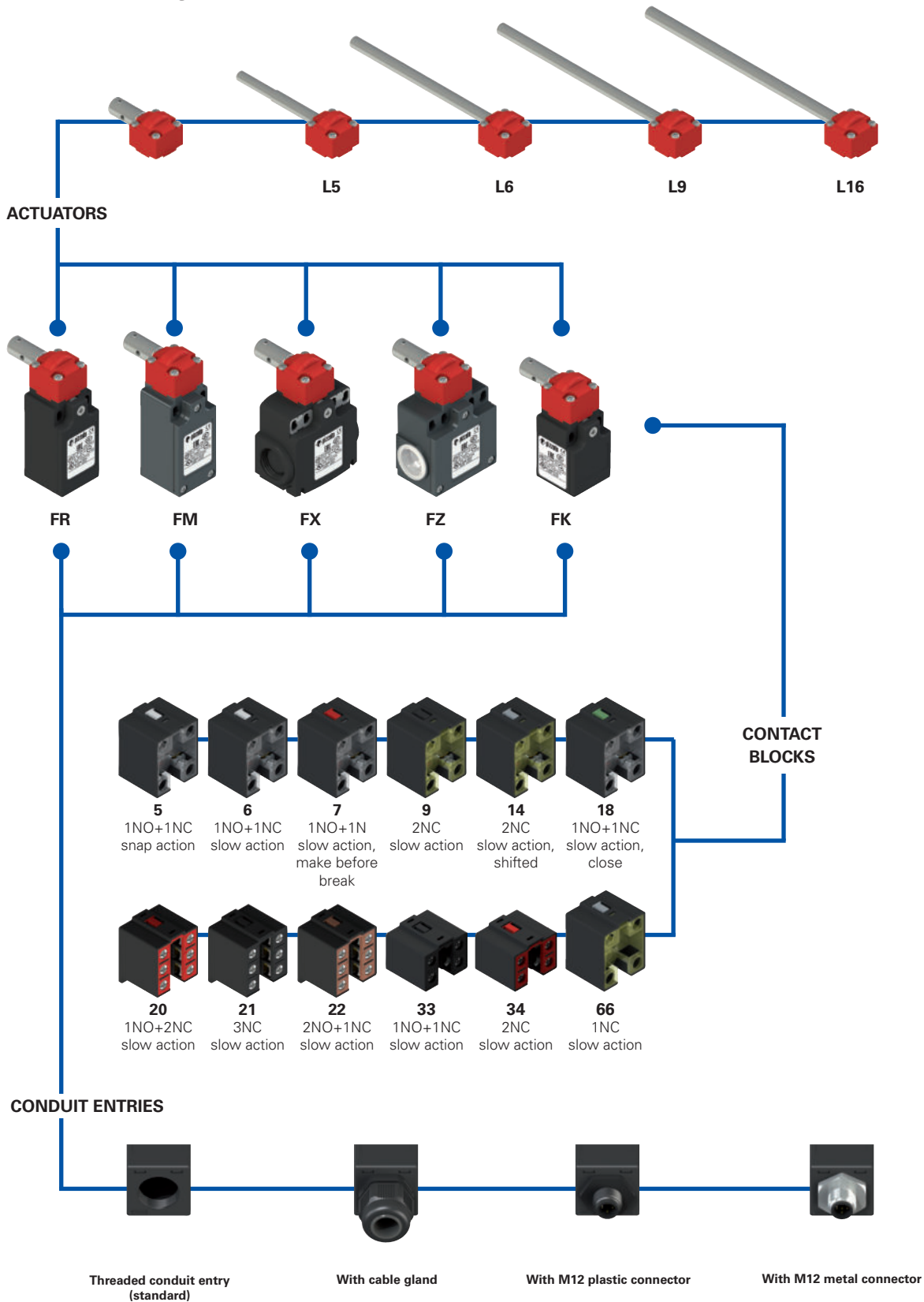


Selection diagram



—●— 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-XGL16M1K24T6

| 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 |

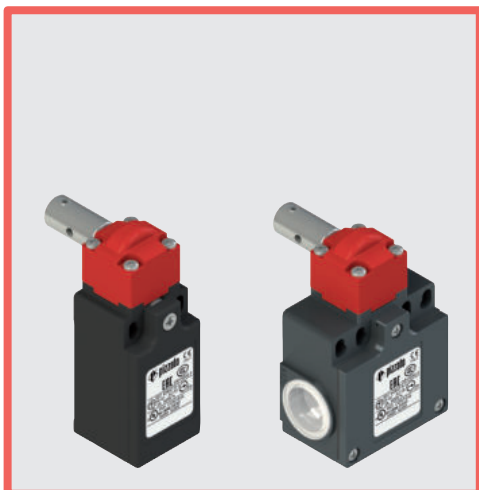
| Contact type | |
|--------------|----------------------------------------|
| | silver contacts (standard) |
| G | silver contacts with 1 µm gold coating |

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

| Pre-installed cable glands | |
|----------------------------|--------------------------------------|
| | no cable gland (standard) |
| K24 | cable gland for cables Ø 5 ... 10 mm |
| K28 | cable gland for cables Ø 3 ... 7 mm |

| Threaded conduit entry | |
|------------------------|--------------------|
| M1 | M16x1.5 (standard) |
| | PG11 |

| 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
- Protection degree IP67
- 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: | 2007010305230013 |
| EAC approval: | RU C-IT.AQ35.B.00454 |

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: M16x1.5 (standard)
 FX series: two knock-out threaded conduit entries: M20x1.5 (standard)
 FZ series: two threaded conduit entries: M20x1.5 (standard)
 Protection degree: 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_{100} : | 5,000,00 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 341 |
| Wire cross-sections and wire stripping lengths: | see page 357 |

In compliance with standards:

IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 50581, UL 508, CSA 22.2 No.14.

Approvals:

EN 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

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 337 to 350.

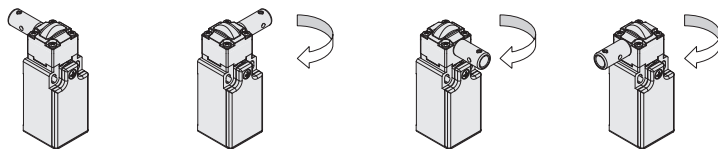
| Electrical data | | Utilization category | | | | |
|----------------------------------|------------------------------------------------|------------------------------------------------------------------------|--------------------------------------|-----|------|-----|
| without connector | Thermal current (I_{th}): | 10 A | Alternating current: AC15 (50±60 Hz) | | | |
| | Rated insulation voltage (U_i): | 500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34) | U_e (V) | 250 | 400 | 500 |
| | Rated impulse withstand voltage (U_{imp}): | 6 kV 4 kV (contact blocks 20, 21, 22, 33, 34) | I_e (A) | 6 | 4 | 1 |
| with M12 connector, 4 and 5-pole | Conditional short circuit current: | 1000 A acc. to EN 60947-5-1 | Direct current: DC13 | | | |
| | Protection against short circuits: | type aM fuse 10 A 500 V | U_e (V) | 24 | 125 | 250 |
| | Pollution degree: | 3 | I_e (A) | 3 | 0.55 | 0.3 |
| with M12 connector, 8-pole | Thermal current (I_{th}): | 4 A | Alternating current: AC15 (50±60 Hz) | | | |
| | Rated insulation voltage (U_i): | 250 Vac 300 Vdc | U_e (V) | 24 | 120 | 250 |
| | Protection against short circuits: | type gG fuse 4 A 500 V | I_e (A) | 4 | 4 | 4 |
| with M12 connector, 8-pole | Conditional short circuit current: | 1000 A acc. to EN 60947-5-1 | Direct current: DC13 | | | |
| | Protection against short circuits: | type gG fuse 2 A 500 V | U_e (V) | 24 | 125 | 250 |
| | Pollution degree: | 3 | I_e (A) | 3 | 0.55 | 0.3 |

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 degree IP67

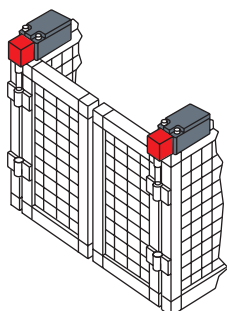
IP67 These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where maximum protection degree of the housing is required.

Extended temperature range

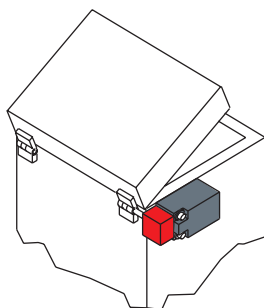
-40°C These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

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 20, 21, 22, 33, 34)

Conventional free air thermal current (I_n): 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, 33, 34)

Protection degree of the housing: IP67

MV terminals (screw terminals): 3

Pollution degree: AC15

Utilization category: 3 A

Operating voltage (U_e): 400 Vac (50 Hz)

Operating current (I_e): 3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X

Positive opening contacts on contact blocks 5, 6, 7, 9, 14, 18, 20, 21, 22, 33, 34, 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)

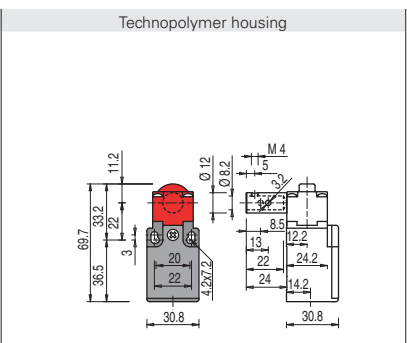
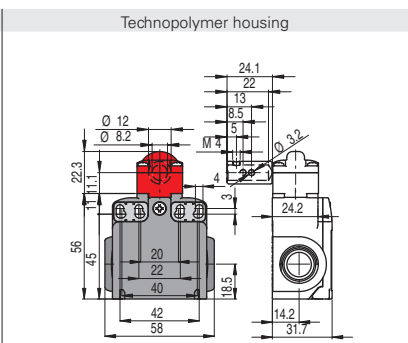
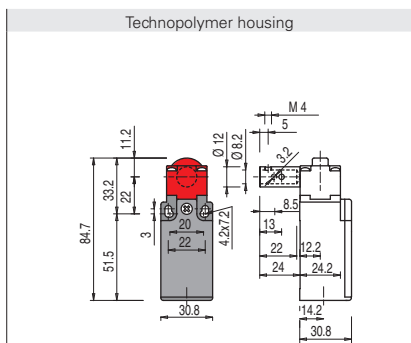
Environmental Ratings: Types 1, 4X, 12, 13

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.

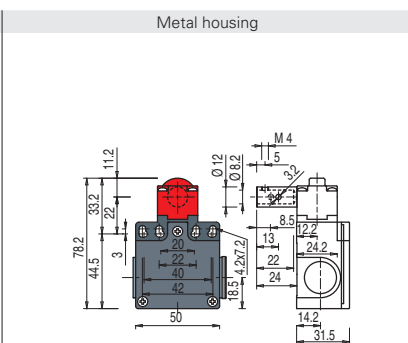
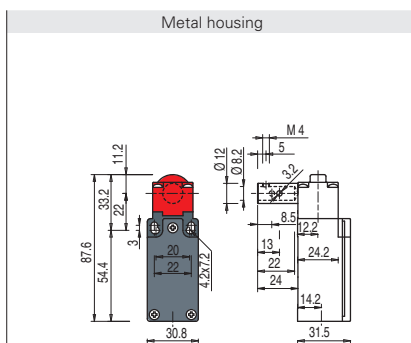
Contact type:
R = snap action
L = slow action
LO = slow action make before break
LS = slow action shifted



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-M1 ↻ 1NO+1NC |
| 34 | L | FR 3496-M2 | ↻ | 2NC | FX 3496-M2 | ↻ | 2NC | FK 3496-M1 ↻ 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 344 - group 9 | | | page 344 - group 9 | | | page 344 - group 9 |

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



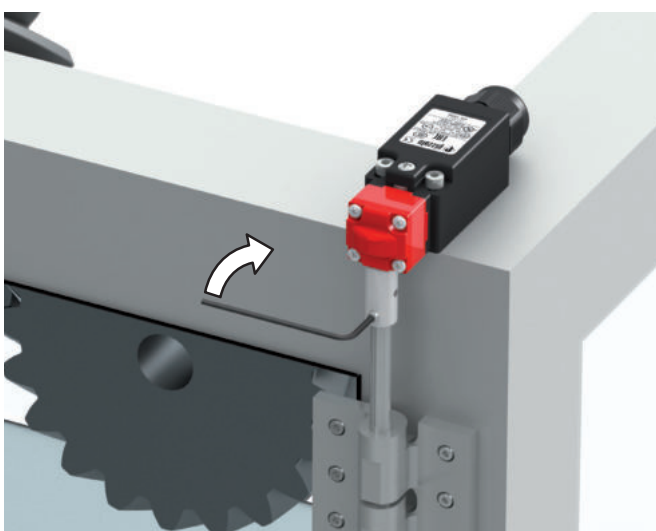
Contact blocks

| | | | | | | | |
|-----------------|-----------|--------------------|---|---------|--------------------|---|---------|
| 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 344 - group 9 | | | page 344 - group 9 | | |

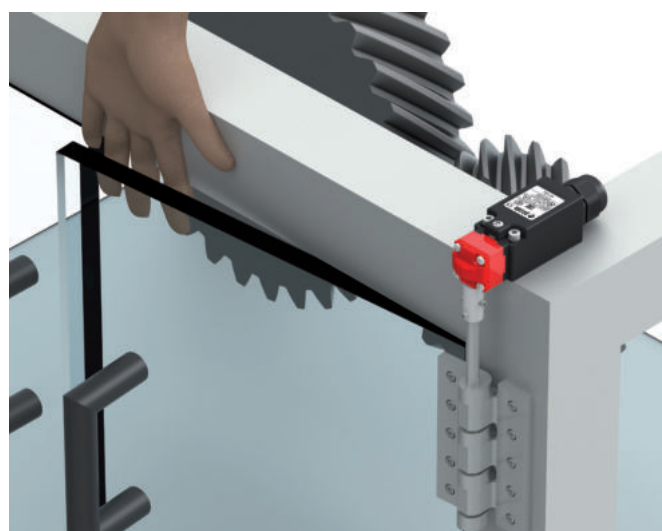
Dimensional drawings for actuators

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

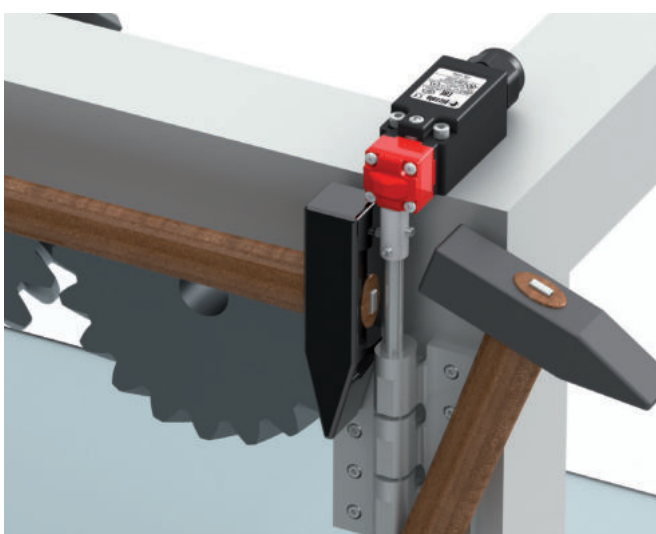
Adjustment of the switching point



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).