Position switches FC series

Selection diagram

ACTUATORS

CONTACT BLOCKS

CONDUIT ENTRY

Threaded conduit entry

| PG 11 (standard) | M1  | M16x1.5 |

With assembled cable gland

| K22 | for Ø 5 to Ø 10 mm cables range |
| K26 | for Ø 3 to Ø 7 mm cables range |

product option
accessory sold separately
Code structure

**Housing**

- **FC** metal housing, one conduit entry

**Contact blocks**

- 3 1NO-1NC, snap action
- 33 1NO+1NC, slow action
- 34 2NC, slow action

**Actuators**

- 01 short plunger
- 02 roller lever
- 05 offset roller lever

**Suffix**

- no suffix (standard)
- 1 with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57
- 2 with Ø 35 mm polymer roller (see special loose actuators on page 2/40)
- 3 with Ø 50 mm rubber roller (see special loose actuators on page 2/40)
- 4 with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/40)

**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

**Threaded conduit entry**

- **PG 11** (standard)
- **M1** M16x1,5

**Contacts type**

- silver contacts (standard)
- **G** silver contacts gold plated 1 µm (contact block 3 excluded)
### Technical data

#### Housing
- Metal housing, coated with baked epoxy powder
- One threaded conduit entry
- Protection degree: IP67 according to EN 60529

#### 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/hour
- Mechanical endurance: 20 million operations cycles
- Assembling position: any
- Driving torque for installation: see pages 6/1-6/10

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by EN 60947-5-1 standard.

#### Cross section of the conductors (flexible copper wire)

<table>
<thead>
<tr>
<th>Contact blocks 33, 34:</th>
<th>Contact block 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>min. 1 x 0,34 mm²</td>
<td>max. 1 x 0,5 mm²</td>
</tr>
<tr>
<td>max. 2 x 1,5 mm²</td>
<td>max. 2 x 1,5 mm²</td>
</tr>
<tr>
<td>(1 x AWG 22)</td>
<td>(1 x AWG 16)</td>
</tr>
</tbody>
</table>

#### Electrical data

| Thermal current (Ith): | 10 A |
| Rated insulation voltage (Uj): | 500 Vac 600 Vdc 400 Vac 500 Vdc |
| for contact blocks 33, 34: | 1000 A according to EN 60947-5-1 fuse 10 A 500 V type aM |
| Protection against short circuits: | 3 |

#### Utilization categories
- Alternate current: AC15 (50...60 Hz)
- Ue (V): 250 400 500
- le (A): 6 4 1
- Direct current: DC13
- Ue (V): 24 125 250
- le (A): 6 1,1 0,4

### Markings and quality marks:
- Approval IMQ: EG605
- Approval UL: E131787
- Approval CCC: 2007010305230000
- Approval EZU: 1010151

### 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 60529, EN 60529, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013.
- Approvals: IEC 60947-5-1, UL 508, GB14048.5-2001

### Installation for safety applications:
Use only switches marked with the symbol  The safety circuit must always be connected with the NC contacts (normally closed contacts: 11-12, 21-22 or 31-32) as stated in the standard EN 60947-5-1, encl. K, par. 2. The switch must be actuated with at least up to the positive opening travel shown in the travels diagrams on page 6/4. The switch must be actuated at least with the positive opening force, shown in brackets, underneath each article, near the value of the min. force.

⚠️ 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 6/10.

### In conformity with requirements requested by:
- Positive contact opening in conformity with standards: IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.
In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston.

Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston.

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.

Overturning levers

It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling. In this way it is possible to obtain two different work plans of the lever.

Rotating heads

In all switches, it is possible to rotate the head in 90° steps.

Data type approved by IMQ, CCC and EZU

- Rated insulation voltage (Ui): 500 Vac
- 400 Vac for contact blocks 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,
- Positive opening of contacts on contact block 33, 34

In conformity with standards: EN 60947-1, EN 60947-5-1 and subsequent modifications and completions, fundamental requirements of the Low Voltage Directive 2006/95/CE and subsequent modifications and completions.

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
- For all contact blocks except 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7.1 lb in (0.8 Nm).
- For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1.4 Nm).

In conformity with standard: UL 508

Please contact our technical service for the list of approved products.
Position switches FC series

<table>
<thead>
<tr>
<th>Contacts type:</th>
<th>Fast action</th>
<th>Slow action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact blocks</td>
<td>FC 301 1NO-1NC</td>
<td>FC 302 1NO-1NC</td>
</tr>
<tr>
<td>FC 3301 1NO+1NC</td>
<td>FC 3302 1NO+1NC</td>
<td>FC 3304 1NO+1NC</td>
</tr>
<tr>
<td>FC 3401 2NC</td>
<td>FC 3402 2NC</td>
<td>FC 3404 2NC</td>
</tr>
<tr>
<td>With stainless steel roller on request:</td>
<td>page 6/3 - type 4</td>
<td>page 6/3 - type 3</td>
</tr>
<tr>
<td>Max speed</td>
<td>6 N (25 N)</td>
<td>4 N (25 N)</td>
</tr>
<tr>
<td>Min. force</td>
<td>page 6/4 - group 1</td>
<td>page 6/4 - group 2</td>
</tr>
<tr>
<td>Travel diagrams</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Contact blocks | FC 308 1NO-1NC | FC 310 1NO-1NC | FC 311 1NO-1NC | FC 315 1NO-1NC |
| FC 3308 1NO+1NC | FC 3310 1NO+1NC | FC 3311 1NO+1NC | FC 3315 1NO+1NC |
| FC 3408 2NC | FC 3410 2NC | FC 3411 2NC | FC 3415 2NC |
| With stainless steel roller on request: | page 6/3 - type 4 | page 6/3 - type 4 | page 6/3 - type 4 | page 6/3 - type 2 |
| Max speed | 6 N (25 N) | 7 N (25 N) | 6 N (25 N) | 7 N (25 N) |
| Min. force | page 6/4 - group 1 | page 6/4 - group 1 | page 6/4 - group 1 | page 6/4 - group 1 |
| Travel diagrams | | | | |

| Contact blocks | FC 316 1NO-1NC | FC 318 1NO-1NC | FC 319 1NO-1NC | FC 320 1NO-1NC |
| FC 3316 1NO+1NC | FC 3318 1NO+1NC | FC 3319 1NO+1NC | FC 3320 1NO+1NC |
| FC 3416 2NC | FC 3418 2NC | FC 3419 2NC | FC 3420 2NC |
| With stainless steel roller on request: | page 6/3 - type 2 | page 6/3 - type 4 | page 6/3 - type 4 | 1 m/s |
| Max speed | 6 N (25 N) | 6 N (25 N) | 6 N (25 N) | 0.07 Nm |
| Min. force | page 6/4 - group 1 | page 6/4 - group 1 | page 6/4 - group 1 | page 6/4 - group 3 |
| Travel diagrams | | | | |

Accessories: See page 5/1
All measures in the drawings are in mm
1. **With external rubber gasket**
   - **Contact blocks**
     - FC 321: 1NO-1NC
     - FC 331: 1NO+1NC
   - **Max speed**: 1 m/s
   - **Min. force**: 0.06 Nm
   - **Travel diagrams**: page 6/4 - group 3

2. **Other rollers available. See page 2/40**
   - **Contact blocks**
     - FC 332: 1NO-1NC
     - FC 333: 1NO+1NC
   - **Max speed**: 1.5 m/s
   - **Min. force**: 0.09 Nm
   - **Travel diagrams**: page 6/4 - group 4

3. **Ø 3 mm stainless steel round rod**
   - **Contact blocks**
     - FC 334: 1NO-1NC
     - FC 335: 1NO+1NC
   - **Max speed**: 1.5 m/s
   - **Min. force**: 0.09 Nm
   - **Travel diagrams**: page 6/4 - group 4

4. **Porcelain roller**
   - **Contact blocks**
     - FC 351: 1NO-1NC
     - FC 352: 1NO+1NC
     - FC 353-E11: 1NO+1NC
   - **Max speed**: 0.5 m/s
   - **Min. force**: 0.05 Nm
   - **Travel diagrams**: page 6/4 - group 4

Items with code on the green background are available in stock.
Position switches FC series

Position switches with revolving lever without actuator

Contact blocks

<table>
<thead>
<tr>
<th>Contact type</th>
<th>Contact blocks</th>
<th>Max speed</th>
<th>Min. force</th>
<th>Travel diagrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>FC 357 1NO-1NC</td>
<td>page 6/3 - type 1</td>
<td>0,09 Nm (0,25 Nm)</td>
<td>page 6/4 - group 1</td>
</tr>
<tr>
<td>L</td>
<td>FC 3376 1NO+1NC</td>
<td>initial 20 N - final 40 N</td>
<td>page 6/4 - group 6</td>
<td></td>
</tr>
</tbody>
</table>

Position switches for signalling

Contact blocks

<table>
<thead>
<tr>
<th>Contact type</th>
<th>Contact blocks</th>
<th>Min. force</th>
<th>Travel diagrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>FC 376 1NO-1NC</td>
<td>0,09 Nm (0,25 Nm)</td>
<td>page 6/4 - group 4</td>
</tr>
<tr>
<td>L</td>
<td>FC 3376 1NO+1NC</td>
<td>initial 20 N - final 40 N</td>
<td>page 6/4 - group 6</td>
</tr>
</tbody>
</table>

IMPORTANT

For safety applications: join only switches and actuators marked with symbol.

For more information about safety applications see page 6/1.

Loose actuators

<table>
<thead>
<tr>
<th>Loose actuators</th>
<th>10 pcs pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymer roller</td>
<td>Ø 20 mm</td>
</tr>
<tr>
<td>Adjustable round rod</td>
<td>Ø 3x125 mm</td>
</tr>
<tr>
<td>Adjustable square rod</td>
<td>3x3x125 mm</td>
</tr>
<tr>
<td>Flexible rod actuator</td>
<td>Flexible rod actuator with polymer roller</td>
</tr>
<tr>
<td>Adjustable fiber glass rod</td>
<td>Adjustable fiber glass rod</td>
</tr>
</tbody>
</table>

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only

Accessories See page 5/1

Items with code on the green background are available in stock
Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

- Only orders for multiple quantities of the packs are accepted.
- (1) Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling the switch FC 58 (e.g. FC 358, FC 3358) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FC 53-E11 (e.g. FC 353-E11, FC 3353-E11V9...).
- (3) If it is installed with switch FC 58 (e.g. FC 358, FC 3358..), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.

Ø 20 mm stainless steel rollers

Ø 35 mm polymer rollers

Ø 40 mm rubber rollers

Ø 50 mm rubber rollers

Ø 50 mm overhanging rubber rollers

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.