Safety switches with manual mechanical delay and separate actuator

Selection diagram

V.F. KEYF  V.F. KEYF1  V.F. KEYF2  V.F. KEYF3  V.F. KEYF7  V.F. KEYF8

ACTUATORS

CONTACT BLOCKS

MECHANICAL DELAY

CONDUIT ENTRY

Threaded conduit entry (standard)
With cable gland assembled
With M12 plastic connector assembled and wired
With M12 metal connector assembled and wired

6 1NO+1NC slow action
7 1NO+1NC slow action overlapped
9 2NC slow action
20 1NO+2NC slow action
21 3NC slow action
22 2NO+1NC slow action
33 1NO+1NC slow action
34 2NC slow action

Short knob 20 sec.
Short knob 10 sec.
Long knob 10 sec.
Long knob 20 sec.

C10  L10  L20

PRODUCT OPTIONS
ACCESSORIES SOLD SEPARATELY

product option
accessory sold separately
**Working cycle (FP 6R2-F1)**

The switch is fixed to the machine body (A), while the stainless steel actuator is fastened to the guard (B). Once installed, the switch will firmly lock the actuator. In order to remove the actuator, the knob (C) has to be rotated. On the first turn the electrical contacts will positively open, then, after about 20 seconds (or 10 seconds depending on the knob version), the actuator will be released. In order to close the guard, the knob must be rotated in the opposite direction. This switch doesn’t need power supply or timer and can be easily installed on old machines without important changes in their electrical circuit. The knob (C) may be supplied in a short (standard) or in a long version.

![Diagram of switch installation and usage](https://example.com/diagram)

**Code structure**

<table>
<thead>
<tr>
<th>Article Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FD 6R2-L10F1GM2K50</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Housing**

- **FD**: metal housing, one conduit entry
- **FP**: polymer housing, one conduit entry

**Contact blocks**

- **6**: 1NO+1NC, slow action
- **7**: 1NO+1NC, slow action overlapped
- **9**: 2NC, slow action
- **20**: 1NO+2NC, slow action
- **21**: 3NC, slow action
- **22**: 2NO+1NC, slow action
- **33**: 1NO+1NC, slow action
- **34**: 2NC, slow action

**Mechanical delay**

- C10: short knob 20 s (standard)
- L10: long knob 10 s
- L20: long knob 20 s

**Actuators**

- F: without actuator (standard)
- F1: with straight actuator
- F2: with right-angled actuator
- F3: with jointed actuator
- F7: with jointed actuator adjustable in one direction
- F8: with universal actuator

**Contacts type**

- G: silver contacts gold plated 1 µm

**Preinstalled cable gland or connectors**

- **K21**: with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
- **K50**: with 5 poles M12 metal connector

**Threaded conduit entry**

- **PG 13,5**: M20x1,5

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

*For the complete list of all combinations, please contact our technical office.*
Technical data

Housing
Housing type FP made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation. 
Housing type FD made of metal, coated with baked epoxy powder. 
FD and FP series one conduit entry 
Protection degree: IP67 according to EN 60529 (electrical contacts)

General data
Safety parameters: see page 6/32
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: 360 operations cycles/hour
Mechanical endurance: 500,000 operations cycles
Max actuating speed: 0,5 m/s
Min. actuating speed: 1 mm/s
Max holding force: 1000 N
Max backlash of the actuator: 4,5 mm
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)
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 6, 7, 9: min. 1 x 0,5 mm² (1 x AWG 20) max. 2 x 2,5 mm² (2 x AWG 14)

In conformity with standards:
Approvals:
IEC 60947-5-1, UL 508, GB14048.5-2001

In conformity with requirements requested by:
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.

Main data
- Metal housing or polymer housing, one conduit entry
- Protection degree IP67
- 8 contact blocks available
- 6 stainless steel actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions
- Strong actuator locking (1000N)
- Manual actuator unlocking
- Versions with different unlocking delay times

Markings and quality marks:
Approval IMQ: EG605 (FD series)
E606 (FP series)
Approval UL: E131787
Approval CCC: 2007010305230000 (FD series)
2007010305230014 (FP series)
Approval EÜZ: 100151

Electrical data

<table>
<thead>
<tr>
<th>Thermal current (Ith):</th>
<th>10 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated insulation voltage (Ue):</td>
<td>500 Vac 600 Vdc</td>
</tr>
<tr>
<td>400 Vac 500 Vdc</td>
<td></td>
</tr>
<tr>
<td>for contact blocks 20, 21, 22, 33, 34</td>
<td></td>
</tr>
<tr>
<td>1000 A according to EN 60947-5-1</td>
<td></td>
</tr>
<tr>
<td>Protection against short circuits: 10 A 500 V type aM</td>
<td></td>
</tr>
<tr>
<td>Pollution degree: 3</td>
<td></td>
</tr>
</tbody>
</table>

Thermal current (Ith): 4 A
Rated insulation voltage (Ue): 250 Vac 300 Vdc
Protection against short circuits: 4 A 500 V type gG
Pollution degree: 3

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

Thermal current (Ith): 4 A
Rated insulation voltage (Ue): 250 Vac 300 Vdc
Protection against short circuits: 4 A 500 V type gG
Pollution degree: 3

Utilization categories
- Alternate current: AC15 (50...60 Hz)
- Ue (V): 24
- Ie (A): 2
- Direct current: DC13
- Ue (V): 24
- Ie (A): 2

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.
Example of working cycle steps with FD 6R2-F1

These switches are used on machines where the hazardous conditions remain for a while, even after the machine has been switched off, for example because of mechanical inertia of the pulleys, saw disks, mills. This switch has its ideal application where the guard is not open frequently and the installation of a switch with solenoid would be too expensive.

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

Data type approved by UL

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+X, Y+X+X, Y+Y+X
Positive opening of contacts on contact block 6, 7, 9, 20, 21, 22, 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.

In conformity with standard: UL 508

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

Data type approved by IMQ, CCC and EZU

Do not use where dust and dirt may penetrate in any way into the head and deposit there, in particular where metal dust, concrete or chemicals are spread.
Do not use where explosive or inflammable gas is present.
Use Atex products in environments with explosion hazard (see page 2/137)

The head can be quickly rotated on each of the 4 sides of the switch by unfastening the two fixing screws. The mechanical delay device can be rotated in 90° steps as well. This enables the switch to assume 32 different configurations.

This switch has a wide backlash of the actuator into the head (4.5 mm) for an easier installation. With closed door, check that the actuator doesn’t knock straight against the head of the switch; it must be in the adjustment zone (0,5...5 mm).

Limits of utilization

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 use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 71 lb in (0.8 Nm).
In conformity with standard: UL 508

Please contact our technical service for the list of approved products.
### Dimensional drawings

<table>
<thead>
<tr>
<th>Contacts type:</th>
<th>polymer housing</th>
<th>metal housing</th>
<th>metal housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slow action</td>
<td>Switch without actuator</td>
<td>Switch without actuator</td>
<td>Switch without actuator</td>
</tr>
<tr>
<td>LO slow action overlapped</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact blocks</th>
<th>FP 6R2</th>
<th>FD 6R2</th>
<th>FD 6R2-L10</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 L</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
</tr>
<tr>
<td>7 L</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
</tr>
<tr>
<td>9 L</td>
<td>2NC</td>
<td>2NC</td>
<td>2NC</td>
</tr>
<tr>
<td>20 L</td>
<td>1NO+2NC</td>
<td>1NO+2NC</td>
<td>1NO+2NC</td>
</tr>
<tr>
<td>21 L</td>
<td>3NC</td>
<td>3NC</td>
<td>3NC</td>
</tr>
<tr>
<td>22 L</td>
<td>2NO+1NC</td>
<td>2NO+1NC</td>
<td>2NO+1NC</td>
</tr>
<tr>
<td>33 L</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
<td>1NO+1NC</td>
</tr>
<tr>
<td>34 L</td>
<td>2NC</td>
<td>2NC</td>
<td>2NC</td>
</tr>
</tbody>
</table>

Min. force: 10 N (18 N)

All measures are in turns of knob

### How to read travel diagrams

**Example diagram**

**NC opening**

**Positive opening travel**

**Turn of knob**

**Closed contact**

**Positive opening force**

**Upset contact**

**ND closing**

**Imporatant:**

The **NC contact** has to be considered with inserted and blocked actuator and with the knob rotated anti-clockwise up to the end of the travel. 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 ◆. Operate the switch at least with the positive opening force, indicated between brackets, below each article, next the value of minimum force.

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**Accessories:** See page 5/1

All measures in the drawings are in mm
## Stainless steel actuators

**IMPORTANT:** These actuators must be used with FD, FP, FL, FC or FS series only (e.g. FD 6R2)

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF</td>
<td>Straight actuator</td>
</tr>
</tbody>
</table>

The actuator can flex in four directions for applications where the door alignment is not precise.

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF1</td>
<td>Right-angled actuator</td>
</tr>
</tbody>
</table>

Actuator adjustable in two directions for doors with reduced dimensions.

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF2</td>
<td>Jointed actuator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF3</td>
<td>Jointed actuator adjustable in two directions</td>
</tr>
</tbody>
</table>

Actuator adjustable in two directions for doors with reduced dimensions.

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF7</td>
<td>Jointed actuator adjustable in one direction</td>
</tr>
</tbody>
</table>

Actuator adjustable in one direction for doors with reduced dimensions.

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KEYF8</td>
<td>Universal actuator</td>
</tr>
</tbody>
</table>

Joined and two directions adjustable actuator for doors with reduced dimensions. The actuator has two couples of fixing holes and it is possible to rotate the actuator-working plan (see picture).

### Accessories

<table>
<thead>
<tr>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF KB1</td>
<td>Actuator entry locking device</td>
</tr>
</tbody>
</table>

Padlockable device to lock the actuator entry in order to prevent from the accidental closing of the door behind operators while they are inside the machine. To be used only with FD, FL, FC and FS series with metal heads.