## Selection diagram

**WITH PLUNGER** DIRECT ACTION

**D05**  **D06**  **D08**  **D09**  **D10**

**D12**
external rubber gasket

**D15**  **D17**  **D18**  **D19**

**WITH LEVER** DIRECT ACTION

**D40**  **D42**  **D45**  **D47**  **D53**  **D59**

**WITH LEVER** INVERTED ACTION

**R40**  **R42**  **R45**  **R47**  **R53**  **R59**

**WITH LEVER** BACK DIRECT ACTION

**F40**  **F42**  **F45**  **F47**  **F53**  **F59**

**ACTUATORS**

**1**
1NO+1NC snap action

**2**
1NO snap action
(on request)

**3**
1NC snap action
(on request)

**TERMINALS**

**V**
screw terminals with
self-lifting plate

**H**
6.3 mm vertical faston

**F**
faston 6.3 mm
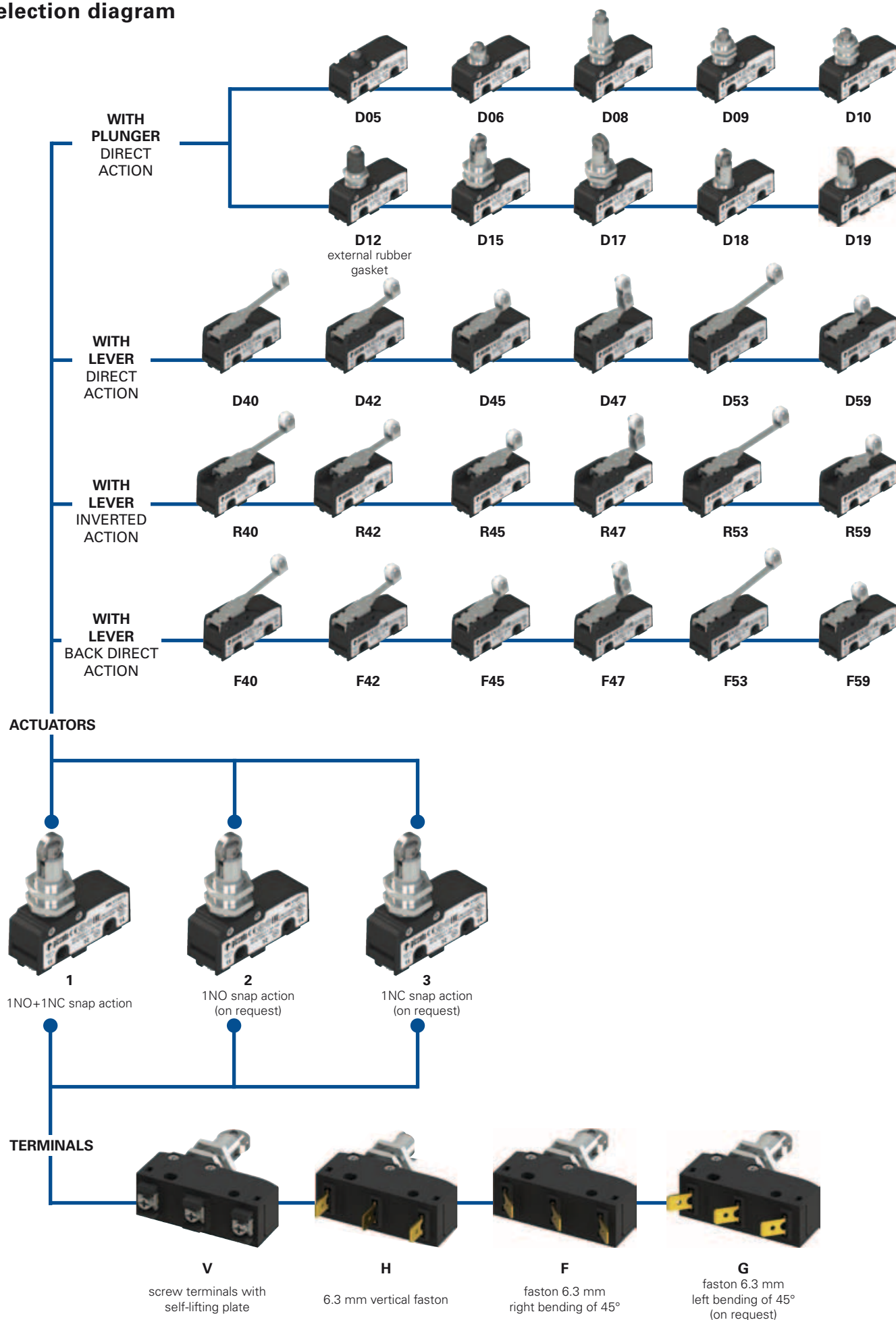right bending of 45°

**G**
faston 6.3 mm
left bending of 45°
(on request)

## 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

# MK **V12D40**-GR16T6

| Terminals type | |
|---|---|
| **V** | screw terminals with self-lifting late |
| **H** | vertical faston terminals |
| **F** | with faston, right bending of 45° |
| **G** | with faston, left bending of 45° (on request) |

| Contact block | |
|---|---|
| **1** | 1NO+1NC, snap action |
| **2** | 1NO, snap action (on request) |
| **3** | 1NC, snap action (on request) |

| Max protection degree | |
|---|---|
| **1** | IP40 (with protection) |
| **2** | IP65 (with protection) |

| Actuation type | |
|---|---|
| **D** | direct action |
| **R** | inverted action |
| **F** | back direct action |

| Ambient temperature | |
|---|---|
| | -25°C ... +85°C (standard) |
| **T6** | -40°C ... +85°C |

| Suffix | |
|---|---|
| | standard |
| **R16** | Ø 9.5x4 mm metal roller (for actuator 40, 42 .45 47, 53, 59) |
| **R10** | Ø 9.8x8.4 mm polymer roller (for actuator 40, 42 .45, 53) |

| Contacts type | |
|---|---|
| | silver contacts (standard) |
| **G** | silver contacts gold plated 1 µm |

| Actuator | |
|---|---|
| **01** | with pin |
| **02** | with pin |
| **03** | with small push button |
| **..** | ................ |

## Technical data

### Housing
Housing made of glass fiber reinforced technopolymer, self-extinguishing and shock-proof.

| Protection degree acc. to EN 60529: | IP00 without terminal cover |
|---|---|
| | IP20 (with terminal cover VF C01, VF C03) |
| | IP40 (with terminal cover VF MKC•1•, VF C02) |
| | IP65 (with terminal cover VF MKC•22 + MK V•2••• or VF MKC•23 + MK H•2•••) |

### General data
| | |
|---|---|
| Ambient temperature: | -25°C … +85°C |
| Max. actuation frequency: | 3600 operating cycles/hour |
| Mechanical endurance: | 10 million operating cycles |
| Safety parameters $B_{10D}$: | 20,000,000 for NC contacts |
| Tightening torques for installation: | see pages 137 |

### Cross section of the conductors (flexible copper wire)
| MK series: | min. | $1 \times 0.34$ mm$^2$ | $(1 \times$ AWG 22) |
|---|---|---|---|
| | max | $2 \times 1.5$ mm$^2$ | $(2 \times$ AWG 16) |

### In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60529, EN 60529, EN 60947-1, IEC 60947-1.
**Approvals:**
UL 508, CSA 22.2 No.14, EN 60947-1, EN 60947-5-1.

### In conformity with requirements requested by:
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU.
**Positive contact opening in conformity with standards:**
IEC 60947-5-1, EN 60947-5-1.

### Main data
- Polymer housing
- Protection degree IP20, IP40 or IP65
- 4 terminal types available
- Versions with positive opening ⊖→
- Silver contacts gold plated versions
- Terminal covers with wire trap cable gland

### Quality marks:

CE ⓂⓎ (UNI) c(UL)us (CCC) EHC

| | |
|---|---|
| IMQ approval: | CA02.05772 |
| UL approval: | E131787 |
| CCC approval: | 2013010305604291 |
| EAC approval: | RU C-IT.АД35.В.00454 |

### 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) as stated in the **standard EN 81-20 par. 5.11.2.2.1**. The switch must be actuated with **at least up to the positive opening travel (FAP)** near the code article. The switch must be actuated **at least with the positive opening force (CAP)**, near the code article.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 131 to 138.**

### Electrical data

| | |
|---|---|
| Thermal current ($I_{th}$): | 16 A |
| Rated insulation voltage ($U_i$): | 250 Vac 300 Vdc |
| Rated impulse withstand voltage ($U_{imp}$): | 4 kV |
| Conditional shot circuit current: | 1000 A according to EN 60947-5-1 |
| Protection against short circuits: | fuse 16 A 250 V type gG |
| Pollution degree: | 3 |
| Dielectric strength | 2000 Vac/min. |

### Utilization categories

Alternate current: AC15 (50 ... 60 Hz)

| $U_e$ (V) | 250 | 120 | |
|---|---|---|---|
| $I_e$ (A) | 4 | 6 | |

Direct current: DC13

| $U_e$ (V) | 24 | 125 | 250 |
|---|---|---|---|
| $I_e$ (A) | 5 | 0.5 | 0.3 |

## Characteristics approved by IMQ and CCC

Rated insulation voltage ($U_i$): 250 Vac
Conventional free air thermal current ($I_{th}$): 16 A
Protection against short circuits: type gG fuse 16 A 250 V
Rated impulse withstand voltage ($U_{imp}$): 4 kV
Conditional short circuit current: 1000 A
Protection degree of the housing: IP00
Terminals: screw terminals/faston
Pollution degree: 3
Utilization category: AC15
Operating voltage ($U_e$): 250 Vac (50 Hz)
Operating current ($I_e$): 5 A
Forms of the contact element: X; Y; C
Positive opening of contacts on contact blocks: 1, 3
In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

## Characteristics approved by UL

| Utilization categories | Q300 (69 VA, 125-250 Vdc) |
|---|---|
| | A300 (720 VA, 120 … 300 Vac) |

In conformity with standard: UL 508, CSA 22.2 No.14

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

## Contact block reliability

The electrical contact on new microswitch has been realized with higher reliability technology, thanks to the double and redundant shape

For high quantity it's possible to supply the microswitch only with the contact NO or NC, in order to minimize purchase costs.
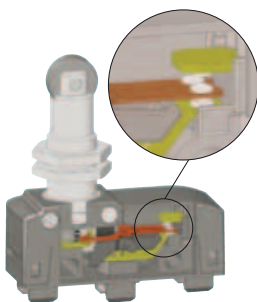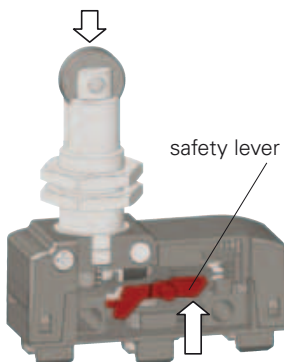
## Protection degree IP65

# IP65

The housing of the new microswitch provides the possibility to seat gaskets in order to seal the device against fine dusts or liquids up to IP65 degree. To obtain the protection degree match the appropriate version of the microswitch IP65 with the IP65 terminal cover.

## Microswitches for safety applications

safety lever

All microswitches that have the symbol beside the code are with positive opening, therefore suitable for safety applications.

These microswitches are provided with a rigid connection between push button and NC contacts, which are opened by force through a strong/sturdy internal safety lever.

The positive opening has been realised in conformity with the standard IEC 60947-5-1, enclosure K, therefore these microswitches are suitable for the installation for people's protection.

## Clamping screw plates for different diameter cables (MK V•)
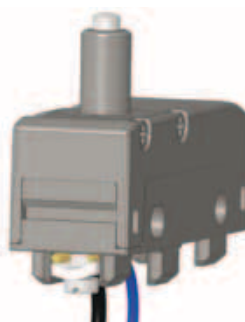
These clamping screw plates have a particular "roofing tile" structure and are connected loosely to the clamping screw. In this way, during the wires fixing, the clamping screw plate is able to suit to cables of different diameter (see picture) and tends to tighten the wires toward the screw instead of permitting them to escape towards the outside.

## According to EN 81-20 and EN 81-50

- Safaty contacts according to EN 60947-5-1, encl. K.
- Protection degree higher than IP4x.
- Mechanical endurance higher than $10^6$ cycles.

## Terminal covers with wire trap cable gland, side by side installable

New terminal covers supplied with wire trap cable gland are provided for the protection degree up to IP65. These terminal covers are snap-in assembled and they have small dimensions in the microswitch profile, it's possible to install them also on microswitches fixed side by side.
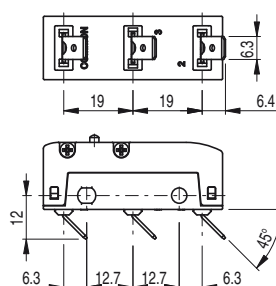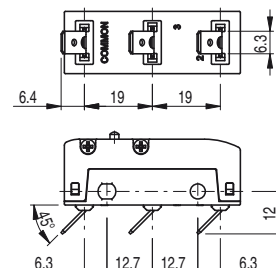See page 62.
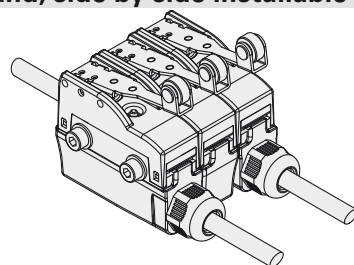
## Terminals outline dimension
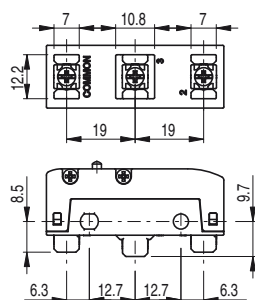
Screw terminals **V** with plate
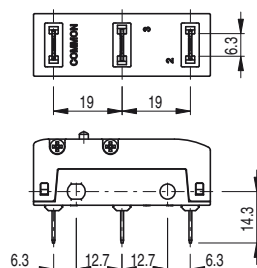
Vertical faston **H** terminals

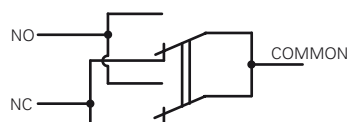faston terminals **F**, right bending

faston terminals **G**, left bending (on request)

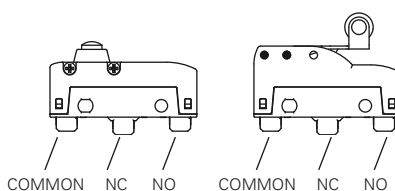Note: H vertical faston terminals can be bent according to one's installation requirements.
We recommend to bend the faston with an angle not higher than 45° and to carry out this operation no more than 5 times.
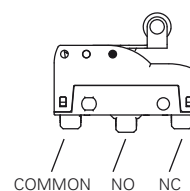
## Wire diagram

NO — NC — COMMON
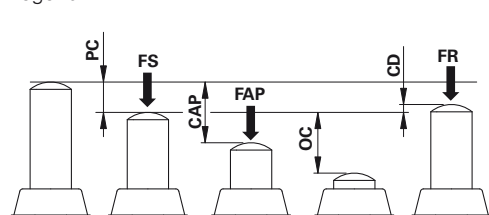
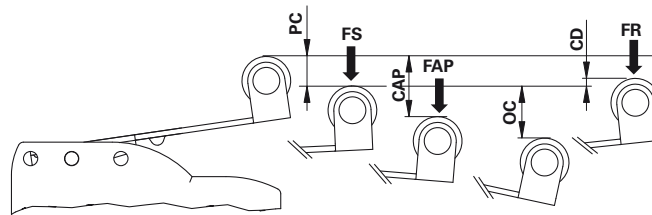Contacts with single interruption and double contacts

With direct and back direct action (F, D)

COMMON   NC   NO          COMMON   NC   NO

With inverted action (R)

COMMON   NO   NC

Legend



| **CD** | differential travel | **OC** | over-travel |
| **PC** | pretravel | **CAP** | positive opening travel |

| **FS** | operating force | **FAP** | positive opening force |
| **FR** | releasing force | | |

## Microswitches with direct action
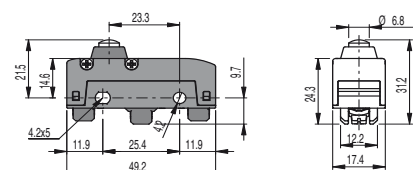


**MK V11D05** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 2 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1
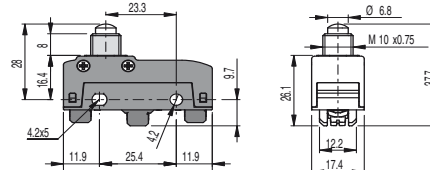


**MK V11D06** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 3 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1
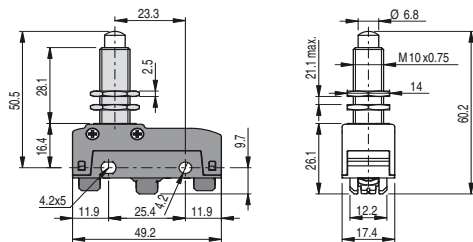


**MK V11D08** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1
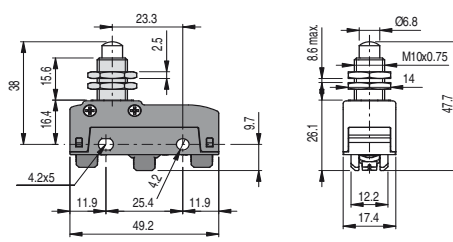


**MK V11D09** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1
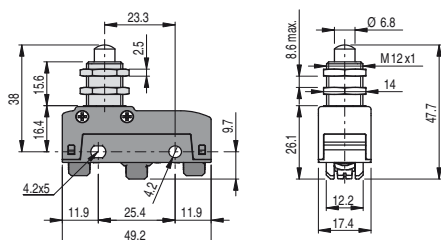


**MK V11D10** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1



**MK V11D12** → 1NO+1NC

| PC | 0,5 mm | FS | 4.5 N |
| OC | 5,5 mm | FR | 3 N . |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 1

Fixed only by threaded head

Fixed only by threaded head
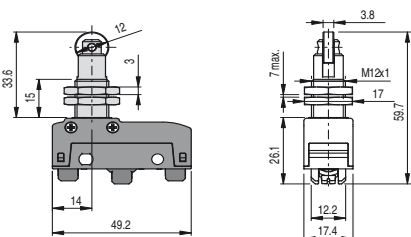


**MK V11D15** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N . |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 2
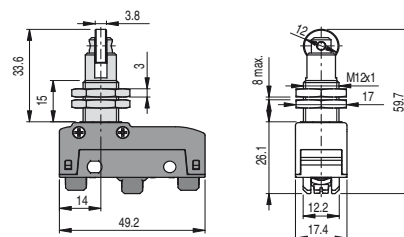


**MK V11D17** → 1NO+1NC

| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 2

Items with code on the **green** background are available in stock

**Accessories** See page 127

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

**MK V11D18** → 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 2

**MK V11D19** → 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 0,5 mm | FS | 4 N |
| OC | 5,5 mm | FR | 3 N |
| CD | 0,05 mm | FAP | 20 N |
| CAP | 2,2 mm | | |

Max and min. speed page 137 - type 2



**MK V11D40** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 8,2 mm | FS | 0,86 N |
| OC | 6,1 mm | FR | 0,66 N |
| CD | 0,8 mm | | |

Max and min. speed page 137 - type 6

**MK V11D42** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 6,5 mm | FS | 1,09 N |
| OC | 4,8 mm | FR | 0,84 N |
| CD | 0,6 mm | | |

Max and min. speed page 137 - type 6

**MK V11D45** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 4,5 mm | FS | 1,66 N |
| OC | 3,2 mm | FR | 1,28 N |
| CD | 0,4 mm | | |

Max and min. speed page 137 - type 6

It switches → ← It does not switch

**MK V11D47** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 4,2 mm | FS | 1,66 N |
| OC | 2,8 mm | FR | 1,28 N |
| CD | 0,4 mm | | |

Max and min. speed page 137 - type 6

**MK V11D53** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 7,7 mm | FS | 0,76 N |
| OC | 7,8 mm | FR | 0,58 N |
| CD | 0,9 mm | | |

Max and min. speed page 137 - type 6

**MK V11D59** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 2,3 mm | FS | 2,3 N |
| OC | 4,5 mm | FR | 1,77 N |
| CD | 0,2 mm | | |

Max and min. speed page 137 - type 6

## Microswitches with inverted action

**MK V11R40** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 2,8 mm | FS | 0,8 N |
| OC | 10,9 mm | FR | 0,5 N |
| CD | 0,45 mm | | |

Max and min. speed page 137 - type 7

**MK V11R42** 1NO+1NC

| | | | |
|---|---|---|---|
| PC | 2,7 mm | FS | 1,2 N |
| OC | 8,4 mm | FR | 1,7 N |
| CD | 0,5 mm | | |

Max and min. speed page 137 - type 7

| MK **V11R45** | 1NO+1NC | PC | 1,5 mm | FS | 1,7 N |
| | | OC | 5,5 mm | FR | 1 N |
| | | CD | 0,3 mm | | |

Max and min. speed page 137 - type 7



| MK **V11R47** | 1NO+1NC | PC | 1,7 mm | FS | 1,7 N |
| | | OC | 5,3 mm | FR | 1 N |
| | | CD | 0,3 mm | | |

Max and min. speed page 137 - type 7



| MK **V11R53** | 1NO+1NC | PC | 3,6 mm | FS | 0,8 N |
| | | OC | 11,2 mm | FR | 0,4 N |
| | | CD | 0,5 mm | | |

Max and min. speed page 137 - type 7



| MK **V11R59** | 1NO+1NC | PC | 1,5 mm | FS | 2,4 N |
| | | OC | 3,9 mm | FR | 1,3 N |
| | | CD | 0,2 mm | | |

Max and min. speed page 137 - type 7

## Microswitches with back direct action



| MK **V11F40** | 1NO+1NC | PC | 2,1 mm | FS | 0,85 N |
| | | OC | 8,3 mm | FR | 0,65 N |
| | | CD | 0,25 mm | | |

Max and min. speed page 137 - type 8



| MK **V11F42** | 1NO+1NC | PC | 1,8 mm | FS | 1 N |
| | | OC | 6,7 mm | FR | 0,7 N |
| | | CD | 0,2 mm | FAP | 4,9 N |
| | | CAP | 9 mm | | |

Max and min. speed page 137 - type 8



| MK **V11F45** | 1NO+1NC | PC | 1,1 mm | FS | 1,5 N |
| | | OC | 4,9 mm | FR | 0,9 N |
| | | CD | 0,1 mm | FAP | 6,9 N |
| | | CAP | 6,3 mm | | |

Max and min. speed page 137 - type 8



| MK **V11F47** | 1NO+1NC | PC | 1,3 mm | FS | 1,6 N |
| | | OC | 4,7 mm | FR | 0,9 N |
| | | CD | 0,1 mm | FAP | 6,9 N |
| | | CAP | 6,3 mm | | |

Max and min. speed page 137 - type 8



| MK **V11F53** | 1NO+1NC | PC | 2,5 mm | FS | 0,7 N |
| | | OC | 9,3 mm | FR | 0,6 N |
| | | CD | 0,3 mm | | |

Max and min. speed page 137 - type 8



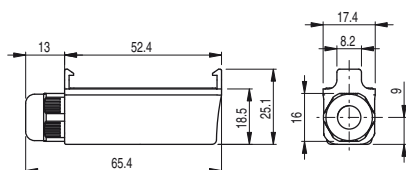| MK **V11F59** | 1NO+1NC | PC | 0,8 mm | FS | 1,9 N |
| | | OC | 4,5 mm | FR | 1,3 N |
| | | CD | 0,08 mm | FAP | 8,9 N |
| | | CAP | 4,9 mm | | |

Max and min. speed page 137 - type 8

Items with code on the **green** background are available in stock

**Accessories** See page 127

➔ The 2D/3D files are available at **www.pizzato.com**
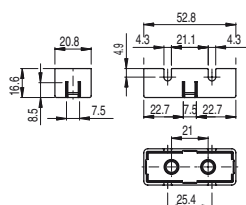
## Protections (terminal covers)

Protective terminal cover for screw terminals snap-in assembled and with wiretrap cable gland. Allows the stacked installation of switches.

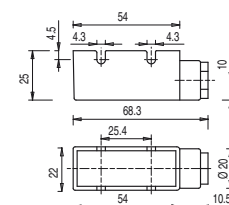| Article | Description | Protection degree |
|---|---|---|
| VF MKCV11 | Protective terminal cover without gasket for multipolar cables from Ø 5 to Ø 7.5 mm | IP40 |
| VF MKCV12 | Protective terminal cover without gasket for multipolar cables from Ø 4 to Ø 7.5 mm | IP40 |
| VF MKCV13 | Protective terminal cover without gasket for multipolar cables from Ø 2 to Ø 5.5 mm | IP40 |
| VF MKCV22 | Protective terminal cover with gasket for multipolar cables from Ø 4 to Ø 7.5 mm | IP65 |
| VF MKCV23 | Protective terminal cover with gasket for multipolar cables from Ø 2 to Ø 5.5 mm | IP65 |
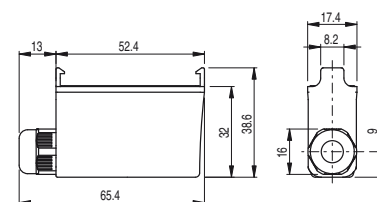


Protective terminal cover for vertical faston terminals with wiretrap cable gland, snap-in attachment. Allows the stacked installation of switches.
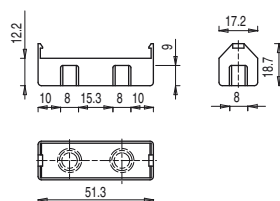
| Article | Description | Protection degree |
|---|---|---|
| VF MKCH11 | Protective terminal cover without gasket for multipolar cables from Ø 5 to Ø 7.5 mm | IP40 |
| VF MKCH12 | Protective terminal cover without gasket for multipolar cables from Ø 4 to Ø 7.5 mm | IP40 |
| VF MKCH13 | Protective terminal cover without gasket for multipolar cables from Ø 2 to Ø 5.5 mm | IP40 |
| VF MKCH22 | Protective terminal cover with gasket for multipolar cables from Ø 4 to Ø 7.5 mm | IP65 |
| VF MKCH23 | Protective terminal cover with gasket for multipolar cables from Ø 2 to Ø 5.5 mm | IP65 |



| Article | Description | Protection degree |
|---|---|---|
| VF C01 | Protective terminal cover for screw terminals | IP20 |



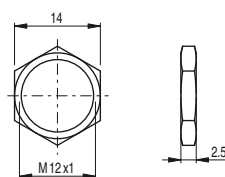| Article | Description | Protection degree |
|---|---|---|
| VF C02 | Protective terminal cover for screw terminals with cable gland PG9 for multipolar cables from Ø 5 to Ø 7 mm | IP40 |



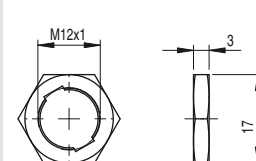| Article | Description | Protection degree |
|---|---|---|
| VF C03 | Protective terminal cover for screw terminals, snap-in attachment. Allows the stacked installation of switches | IP20 |

## Accessories
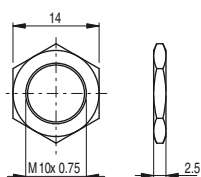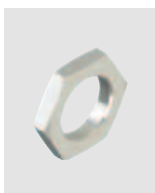
| Article | Description |
|---|---|
| VF AC83 | Hexagonal threaded nut for microswitches with actuators D06, D08, D09 |



| Article | Description |
|---|---|
| VF AC72 | Hexagonal threaded nut for microswitches with actuators D10, D12, D13 |



| Article | Description |
|---|---|
| AC 35 | Hexagonal threaded nut notched for microswitches with actuators D15, D16 |

Items with code on **green** background are stock items

➜ The 2D/3D files are available at **www.pizzato.com**