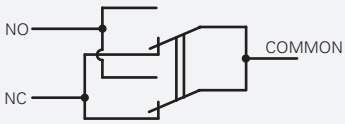
Introduction

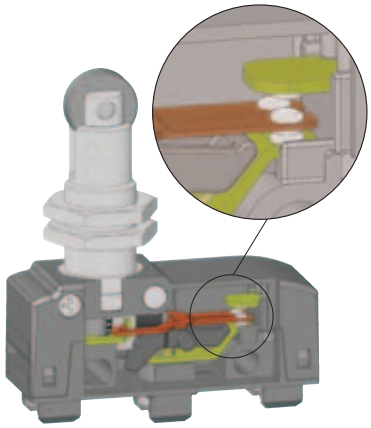
Microswitches of MK series have been developed in order to add new features to traditional and tested microswitches of Pizzato Elettrica (cross-reference at page 6/48). These new products have been designed with shapes and fixing perfectly interchangeable with the previous ones and with various additional functions useful to extend the application field.

The main innovation of this series is the tripping device modern and evolved, with qualitative features higher than solutions present on the market.
The electrical contact on new microswitch has been realized with higher reliability technology, thanks to the double and redundant shape, and has the possibility to carry out operations with positive opening.
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.
Fastening terminals of conductors are more practical and allow the fixing of different diameter cables or the possibility to choose different bends of faston contacts. For high quantity it's possible to supply the microswitch only with the contact NO or NC, in order to minimize purchase costs.

Contact block reliability

In the following table we refer to the typical microswitch contact structure (type A) normally used in the industry, compared with the innovative solution that Pizzato Elettrica uses in new MK series microswitches: movable contact with single interruption and double contacts (type B).
As you can see from the table below, this last structure (type B) offers half of the contact resistance (R) than the simple mobile contact (type A) and a lower probability of failure (fe).
In fact, defined x the probability of a commutation failure of a single interruption, it results that in the type A the failure probability fe=x, in the type B the probability fe= x^2. This means that if in a certain situation the failure probability x is equal, for instance, to 1 x 10^{-4} (1 failed interruption every 10.000), we will have:
- in type A one failed commutation every 10.000
- in type B one failed commutation every 100.000.000

Type	Figure	Description	Contact resistance R	Probability of failure fe
A Common microswitch		Contacts with single interruption	R=Rc	fe=x
B Pizzato microswitch MK series		Contacts with single interruption and double contacts	R=Rc/2	fe ≅ x^2

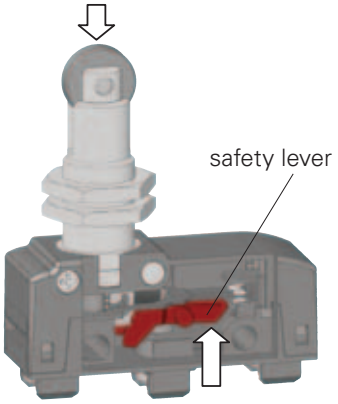


Extended temperature range

-40°C

On request, on new MK series are available the versions with extended temperature range. Differently from standard MK microswitches with temperature range from +85 C° to -25 C°, these special versions can be used in places where the ambient temperature changes from +85 C° to -40 °C.
They can be installed inside cold stores, sterilizers or other equipment with very low ambient temperature. Special materials that have been used to realize these versions, maintain unchanged their features also in these conditions, widening the installation possibilities.

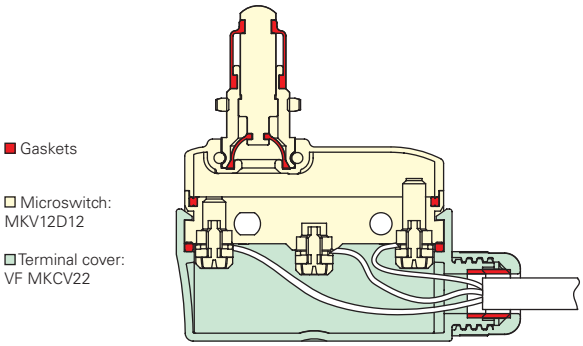
Microswitches for safety applications



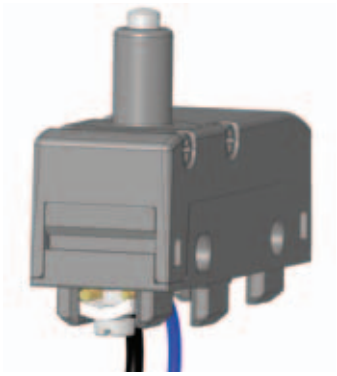
All microswitches that have the symbol ⊖ beside the code are with positive opening, therefore suitable for safety applications.
These microswitches are provided with a rigid connection between push button and NC contacts, which are opened by force through a strong/sturdy internal safety lever.
The positive 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.

Protection degree IP65

By installing microswitches MK ••2••• with terminal covers VF MKC•22 or terminal covers VF MKC•23, it's possible to obtain a microswitch fully dust proof and waterproof.
Thanks to special rubber gaskets anti-oil, we achieve the protection degree IP65.
For application with high presence of dirtiness, are available also versions with double gasket in the push button (internal + external). ex. MK ••2•12 or MK ••2•13.



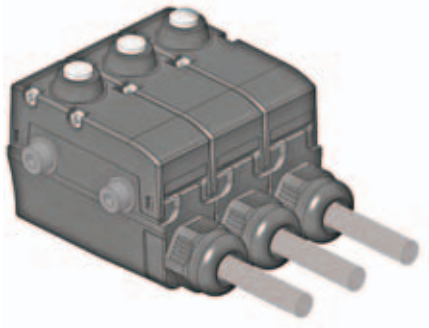
Clamping screw plates for different diameter cables (MK V•)

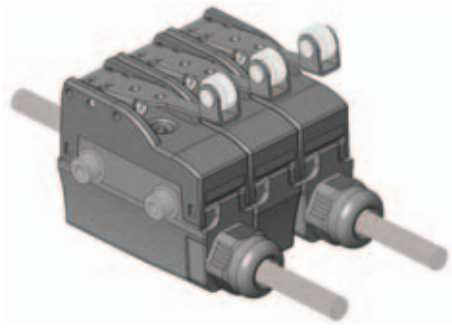


These clamping screw plates have a particular "roofing tile" structure and are connected loosely to the clamping screw. In this way, during the wires fixing, the clamping screw plate is able to suit to cables of different diameter (see picture) and tends to tighten the wires toward the screw instead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

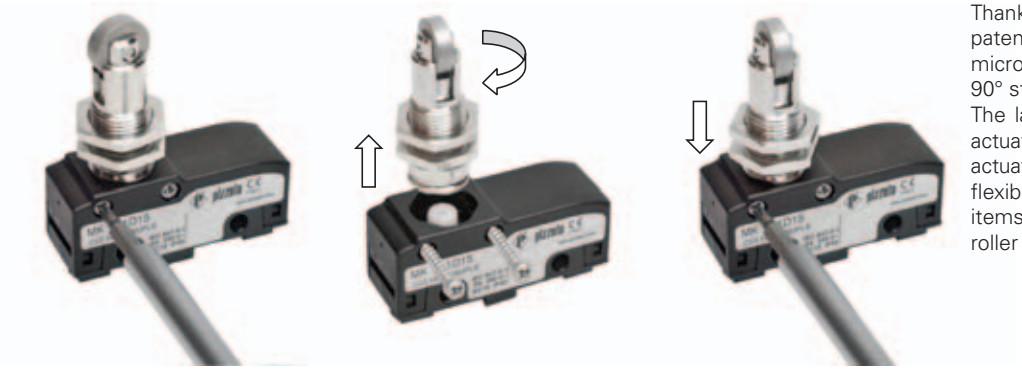
Terminal covers with wire trap cable gland side by side

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 2/136.





Rotating actuators



Thanks to the new lateral fixing system patented, it's possible to rotate the roller of microswitches MK •••15 and MK •••17 in 90° steps.
The lateral fixing allows to disconnect the actuator from the body also when the actuator is already fixed to the racket. The flexibility of the product allows also to unify items on stock for applications that require roller both longitudinal or transversal.

WITH PLUNGER DIRECT ACTION

D01 D02 D03 D04 D05 D06 D08

WITH LEVER DIRECT ACTION

D30 D31 D32 D35 D37 D40 D42

WITH LEVER INVERTED ACTION

R30 R31 R32 R35 R40 R42

WITH LEVER BACK DIRECT ACTION

F30 F31 F32 F35 F40 F42

ACTUATORS

product option

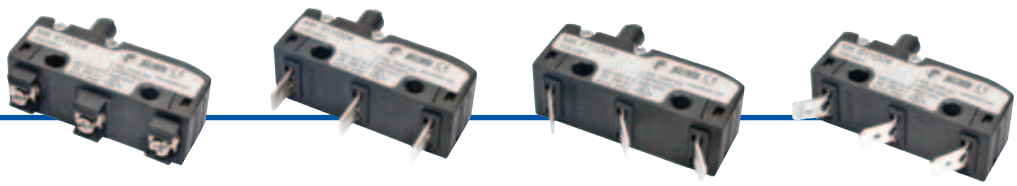
accessory sold separately

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)

D09 D10 D12 external rubber gasket D13 external rubber gasket D15 D17 D18 D19

D45 D46 D47 D53 D59 D49

R45 R46 R47 R53 R59 R60

F45 F46 F47 F53 F59 F49

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

Actuator	
01	with pin
02	with pin
03	with small push button
..	.....

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

Suffix	
	no 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)

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

Main data

- Polymer housing
- High reliability contacts
- Protection degree IP20, IP40 or IP65
- 4 terminal types available
- 47 actuators available
- Versions with positive opening ⊕
- Silver contacts gold plated versions
- Terminal covers with wire trap cable gland
- Mechanically interchangeable with previous products (see cross reference on page 6/48)

Markings and quality marks:

Approval UL: E131787

Technical data

Housing

Made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin.

Protection degree: IP20 (with protection VF C01 - VF C03)
IP40 (with protection VF MKC•1• - VF C02)
IP65 (with protection VF MKC•22 - VF MKC•23)
according to EN 60529

General data

Ambient temperature:	from -25°C to +85°C
Max operating frequency:	3600 operations cycles[1]/hour
Mechanical endurance:	10 million operations cycles[1]
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)

MK series:	min.	1 x 0,34 mm²	(1 x AWG 22)
	max	2 x 1,5 mm²	(2 x AWG 16)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, IEC 60529, EN 60529.
Approvals:
UL 508

In conformity with requirements requested by:
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and Electromagnetic Compatibility 2004/108/EC.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-5-1, VDE 0660-206.

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 60947-5-1, encl. K, par. 2**. 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 the right installation and the correct utilization of all articles see requirements indicated from page 6/1 to page 6/10.

Electrical data

Thermal current (Ith):	16 A
Rated insulation voltage (Ui):	250 Vac 300 Vdc
Conditional shot circuit current:	1000 A according to EN 60947-5-1
Protection against short circuits:	fuse 10 A 500 V type gG
Pollution degree:	3
Dielectric strength	2000 Vac/min.

Utilization categories

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

Ue (V)	250	120
Ie (A)	6	6

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	5	0,6	0,3

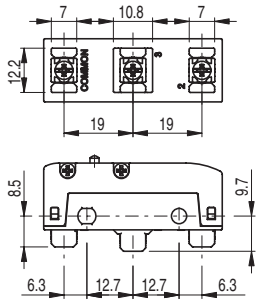
Data type approved by UL

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

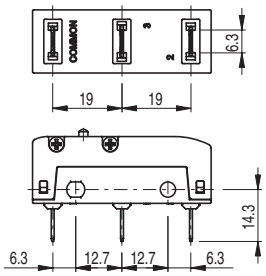
In conformity with standard: UL 508

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

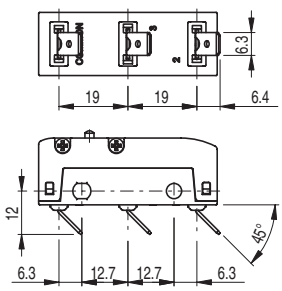
Terminals outline dimension



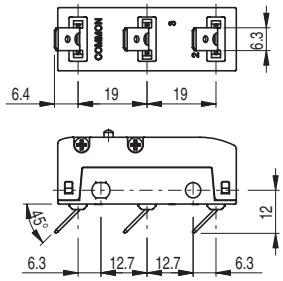
Screw terminals **V** with plate



Vertical faston **H** terminals



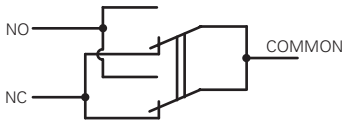
faston terminals **F**, right bending



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

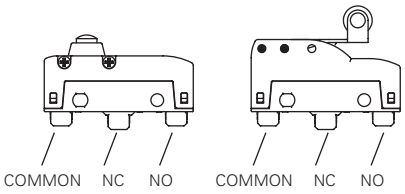
Note: H vertical faston terminals can be bent according to one's installation requirements.
We recommend to bend the faston with an angle not higher than 45° and to carry out this operation no more than 5 times.

Wire diagram

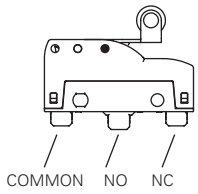


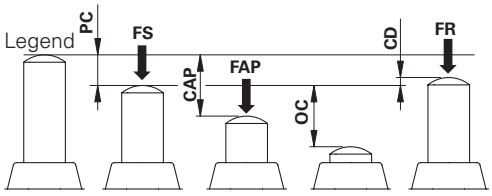
Contacts with single interruption and double contacts

With direct and back direct action (F, D)

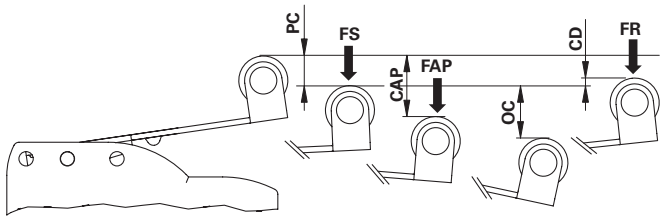


With inverted action (R)





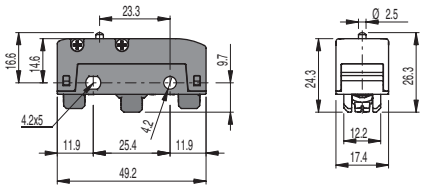
CD differential travel
PC pretravel
OC over-travel
CAP positive opening travel



FS operating force
FR releasing force
FAP positive opening force

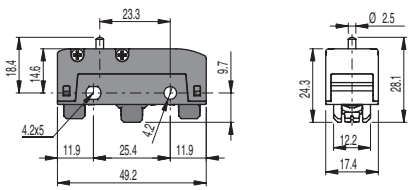
Microswitches with direct action

10 pcs packs



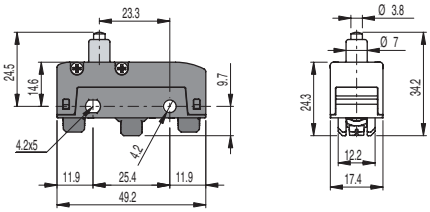
MK V11D01	1NO+1NC	PC	0,5 mm	FS	4 N
		OC	1,5 mm	FR	3 N
		CD	0,05 mm		

Max and min. speed page 6/8 - type 1



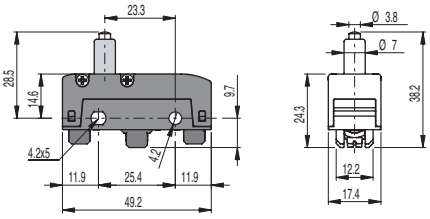
MK V11D02	1NO+1NC	PC	0,5 mm	FS	4 N
		OC	2 mm	FR	3 N
		CD	0,05 mm		

Max and min. speed page 6/8 - type 1



MK V11D03	1NO+1NC	PC	0,5 mm	FS	4 N
		OC	2 mm	FR	3 N
		CD	0,05 mm		

Max and min. speed page 6/8 - type 1

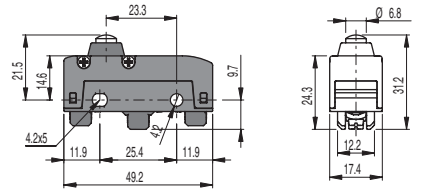


MK V11D04	1NO+1NC	PC	0,5 mm	FS	4 N
		OC	2 mm	FR	3 N
		CD	0,05 mm		

Max and min. speed page 6/8 - type 1

All measures in the drawings are in mm

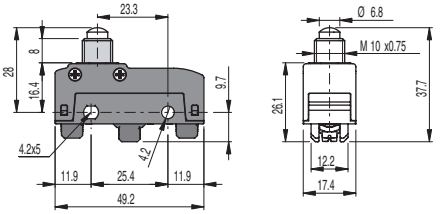
Items with code on the **green** background are available in stock



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		

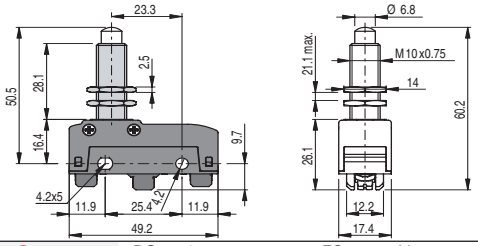
Max and min. speed page 6/8 - type 1



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		

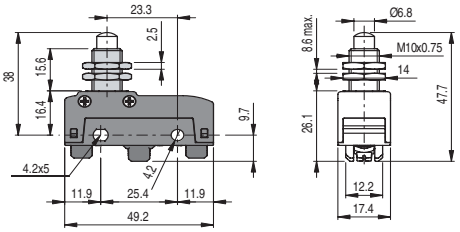
Max and min. speed page 6/8 - type 1



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		

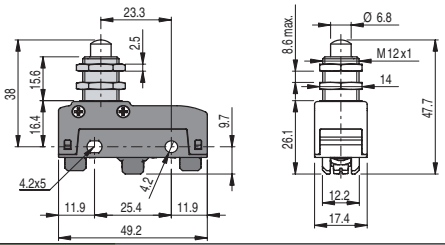
Max and min. speed page 6/8 - type 1



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		

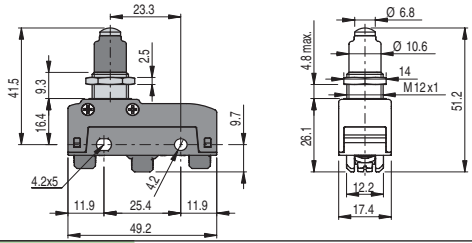
Max and min. speed page 6/8 - type 1



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		

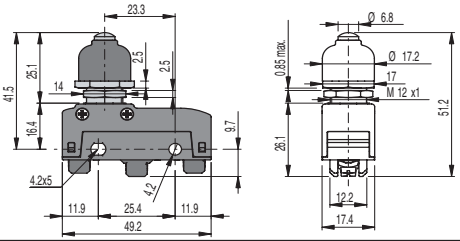
Max and min. speed page 6/8 - type 1



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 6/8 - type 1

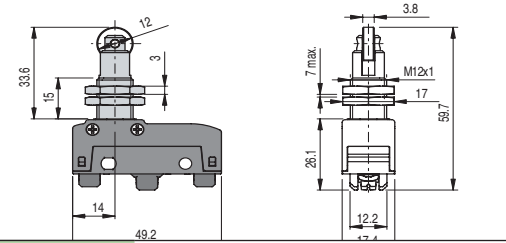


MK V11D13 1NO+1NC

PC	0,6 mm	FS	6 N .
OC	5,4 mm	FR	4 N
CD	0,05 mm	FAP	20 N
CAP	2,2 mm		

Max and min. speed page 6/8 - type 1

Fixed only by threaded head

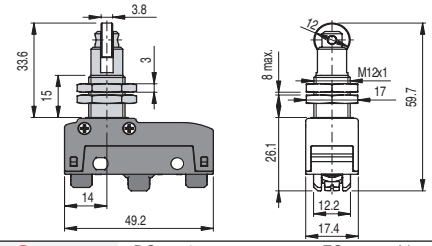


MK V11D15 1NO+1NC

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 6/8 - type 2

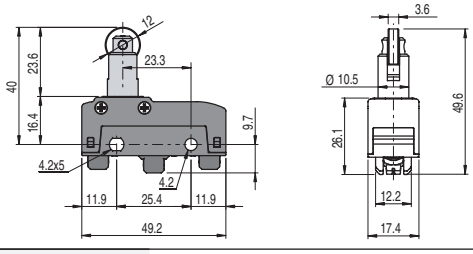
Fixed only by threaded head



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		

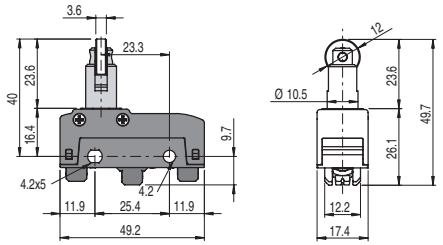
Max and min. speed page 6/8 - type 2



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		

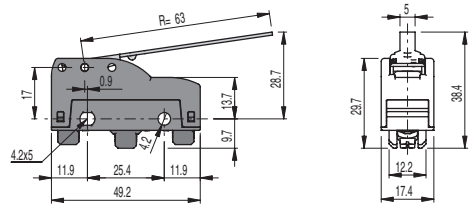
Max and min. speed page 6/8 - type 2



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		

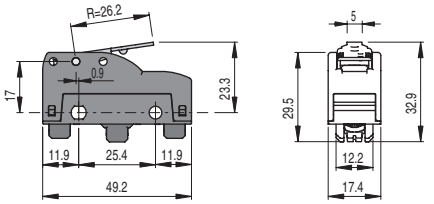
Max and min. speed page 6/8 - type 2



MK V11D30 1NO+1NC

PC	9 mm	FS	0,65 N
OC	10 mm	FR	0,5 N
CD	1,1 mm		

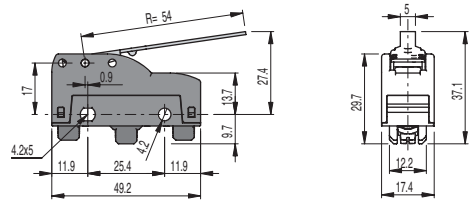
Max and min. speed page 6/8 - type 3



MK V11D31 1NO+1NC

PC	4,54 mm	FS	1,66 N
OC	3,86 mm	FR	1,32 N
CD	0,42 mm		

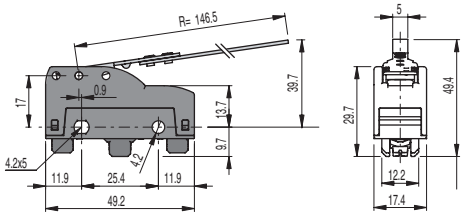
Max and min. speed page 6/8 - type 3



MK V11D32 1NO+1NC

PC	7,7 mm	FS	0,76 N
OC	8,3 mm	FR	0,58 N
CD	0,9 mm		

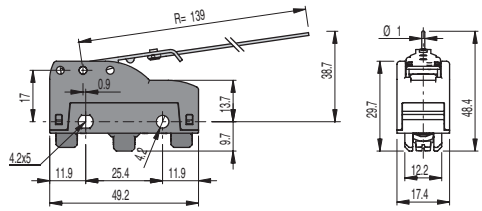
Max and min. speed page 6/8 - type 3



MK V11D35 1NO+1NC

PC	19 mm	FS	0,28 N
OC	16,7 mm	FR	0,22 N
CD	2,5 mm		

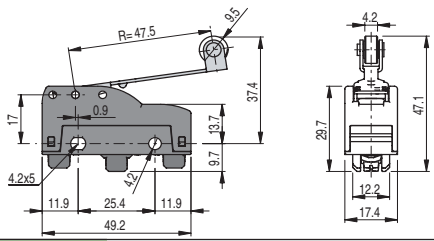
Max and min. speed page 6/8 - type 3



MK V11D37 1NO+1NC

PC	19 mm	FS	0,08 N
OC	9,5 mm	FR	0,04 N
CD	2,3 mm		

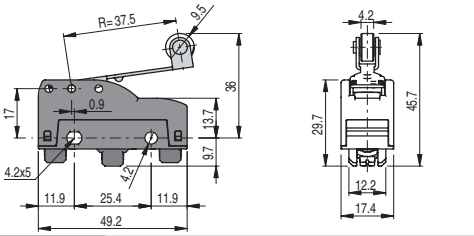
Max and min. speed page 6/8 - type 3



MK V11D40 1NO+1NC

PC	6,7 mm	FS	0,86 N
OC	7,8 mm	FR	0,66 N
CD	0,8 mm		

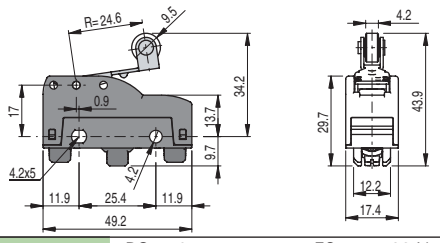
Max and min. speed page 6/8 - type 6



MK V11D42 1NO+1NC

PC	5,3 mm	FS	1,09 N
OC	5,7 mm	FR	0,84 N
CD	0,6 mm		

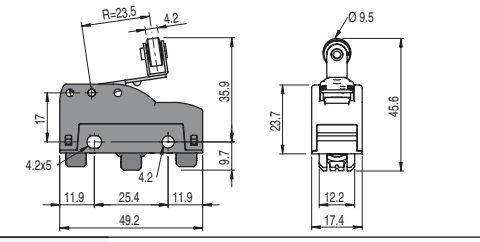
Max and min. speed page 6/8 - type 6



MK V11D45 1NO+1NC

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

Max and min. speed page 6/8 - type 6

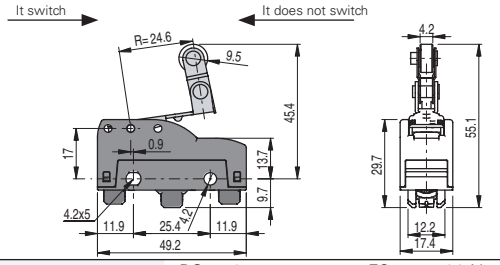


MK V11D46 1NO+1NC

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

Max and min. speed page 6/8 - type 6

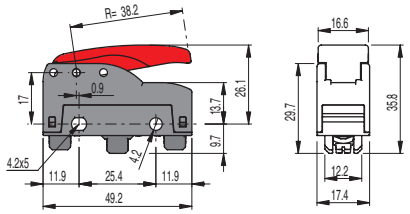
Items with code on the **green** background are available in stock



MK V11D47 1NO+1NC

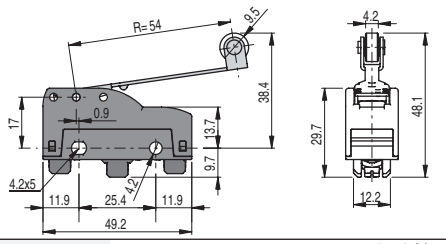
PC	3,5 mm	FS	1,66 N
OC	4 mm	FR	1,28 N
CD	0,4 mm		

Max and min. speed page 6/8 - type 6



MK V11D49 1NO+1NC Hand operated

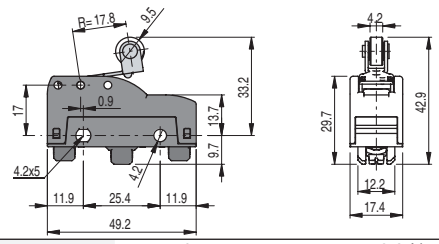
Max and min. speed page 6/8 - type 3



MK V11D53 1NO+1NC

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

Max and min. speed page 6/8 - type 6



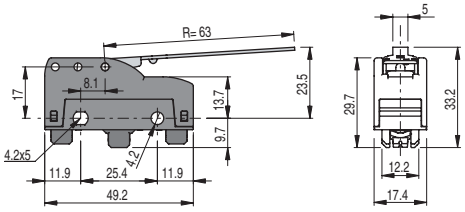
MK V11D59 1NO+1NC

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

Max and min. speed page 6/8 - type 6

Microswitches with inverted action

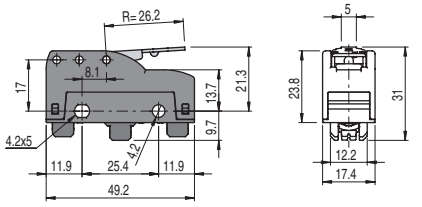
10 pcs packs



MK V11R30 1NO+1NC

PC	4,4 mm	FS	0,6 N
OC	14 mm	FR	0,4 N
CD	1 mm		

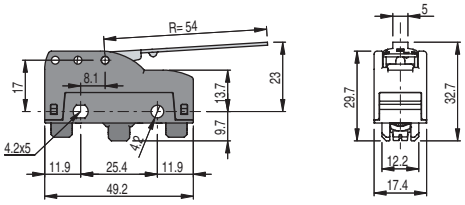
Max and min. speed page 6/8 - type 4



MK V11R31 1NO+1NC

PC	0,7 mm	FS	1,47 N
OC	6,01 mm	FR	0,72 N
CD	0,23 mm		

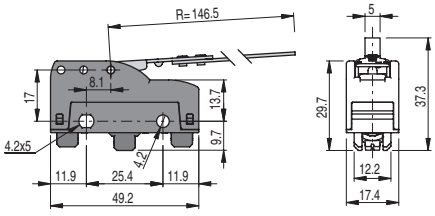
Max and min. speed page 6/8 - type 4



MK V11R32 1NO+1NC

PC	3,7 mm	FS	0,7 N
OC	11,8 mm	FR	0,5 N
CD	0,8 mm		

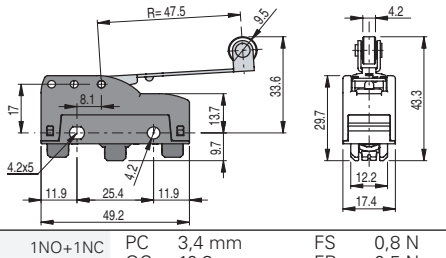
Max and min. speed page 6/8 - type 4



MK V11R35 1NO+1NC

PC	14,3 mm	FS	0,3 N
OC	25,7 mm	FR	0,2 N
CD	3,2 mm		

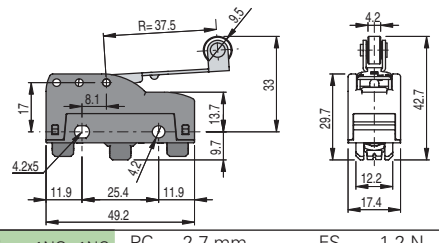
Max and min. speed page 6/8 - type 7



MK V11R40 1NO+1NC

PC	3,4 mm	FS	0,8 N
OC	10,3 mm	FR	0,5 N
CD	0,7 mm		

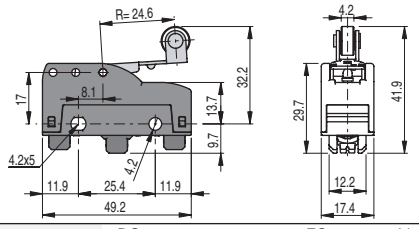
Max and min. speed page 6/8 - type 7



MK V11R42 1NO+1NC

PC	2,7 mm	FS	1,2 N
OC	7,9 mm	FR	1,7 N
CD	0,5 mm		

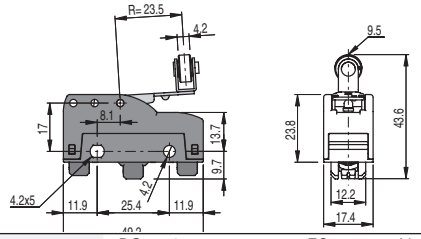
Max and min. speed page 6/8 - type 7



MK V11R45 1NO+1NC

PC	1,5 mm	FS	1,7 N
OC	5,5 mm	FR	1 N
CD	0,3 mm		

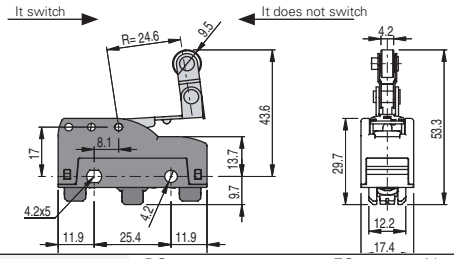
Max and min. speed page 6/8 - type 7



MK V11R46 1NO+1NC

PC	3,5 mm	FS	1,5 N
OC	5,4 mm	FR	1,45 N
CD	0,2 mm		

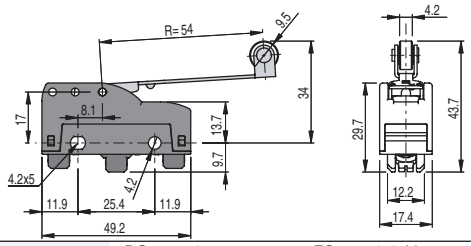
Max and min. speed page 6/8 - type 7



MK V11R47 1NO+1NC

PC	1,7 mm	FS	1,7 N
OC	5,3 mm	FR	1 N
CD	0,3 mm		

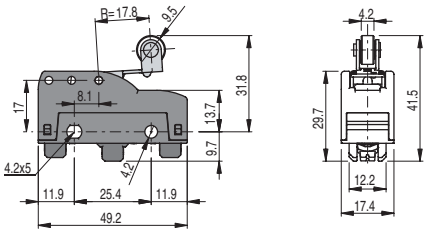
Max and min. speed page 6/8 - type 7



MK V11R53 1NO+1NC

PC	4,3 mm	FS	0,8 N
OC	11,6 mm	FR	0,4 N
CD	0,8 mm		

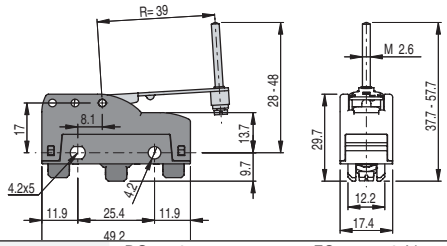
Max and min. speed page 6/8 - type 7



MK V11R59 1NO+1NC

PC	1,5 mm	FS	2,4 N
OC	3,9 mm	FR	1,3 N
CD	0,3 mm		

Max and min. speed page 6/8 - type 7



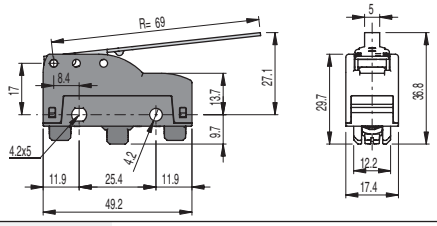
MK V11R60 1NO+1NC

PC	2,7 mm	FS	1,2 N
OC	9,2 mm	FR	0,6 N
CD	0,5 mm		

Max and min. speed page 6/8 - type 4

Microswitches with back direct action

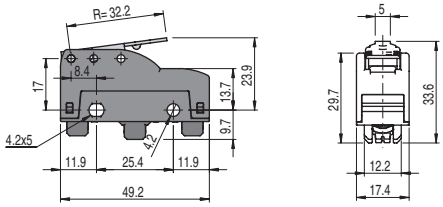
10 pcs packs



MK V11F30 1NO+1NC

PC	2,7 mm	FS	0,6 N
OC	12,9 mm	FR	0,5 N
CD	0,35 mm		

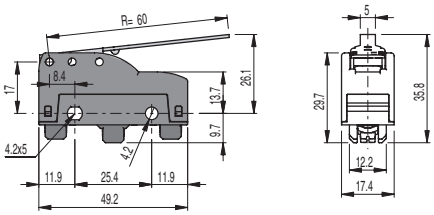
Max and min. speed page 6/8 - type 5



MK V11F31 1NO+1NC

PC	1,63 mm	FS	1,76 N
OC	4,64 mm	FR	1,08 N
CD	0,17 mm	FAP	5,78 N
CAP	5,72 mm		

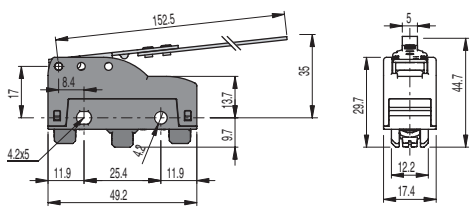
Max and min. speed page 6/8 - type 5



MK V11F32 1NO+1NC

PC	2,5 mm	FS	0,7 N
OC	11,5 mm	FR	0,6 N
CD	0,3 mm		

Max and min. speed page 6/8 - type 5

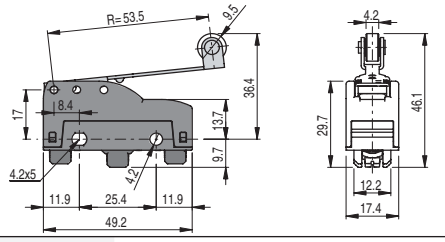


MK V11F35 1NO+1NC

PC	7,5 mm	FS	0,25 N
OC	25,9 mm	FR	0,2 N
CD	1,3 mm		

Max and min. speed page 6/8 - type 5

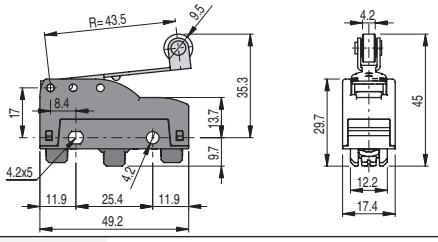
Items with code on the **green** background are available in stock



MK V11F40 1NO+1NC

PC	2,4 mm	FS	0,85 N
OC	10,4 mm	FR	0,65 N
CD	0,25 mm		

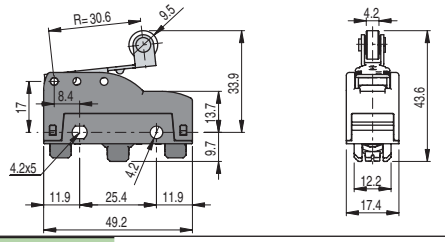
Max and min. speed page 6/8 - type 8



MK V11F42 1NO+1NC

PC	1,6 mm	FS	1 N
OC	8,4 mm	FR	0,7 N
CD	0,2 mm	FAP	4,9 N
CAP	9 mm		

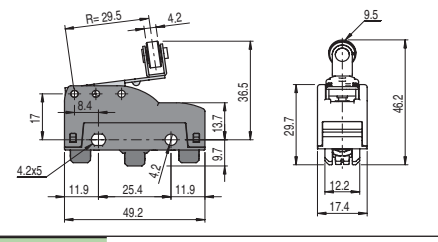
Max and min. speed page 6/8 - type 8



MK V11F45 1NO+1NC

PC	1,1 mm	FS	1,3 N
OC	6,6 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	6,3 mm		

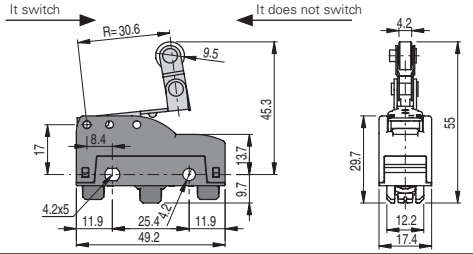
Max and min. speed page 6/8 - type 8



MK V11F46 1NO+1NC

PC	1,1 mm	FS	1,3 N
OC	6,6 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	6,3 mm		

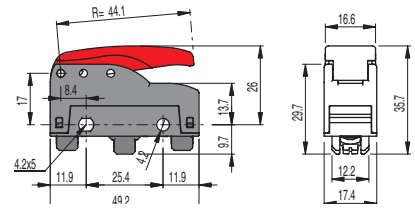
Max and min. speed page 6/8 - type 8



MK V11F47 1NO+1NC

PC	1,1 mm	FS	1,3 N
OC	5,6 mm	FR	0,9 N
CD	0,1 mm	FAP	6,9 N
CAP	6,3 mm		

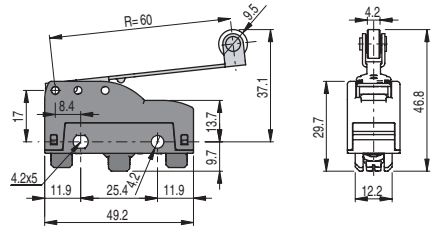
Max and min. speed page 6/8 - type 8



MK V11F49 1NO+1NC

PC	1,5 mm	FS	1 N
OC	7,5 mm	FR	0,7 N
CD	0,2 mm	FAP	4,8 N
CAP	9 mm		

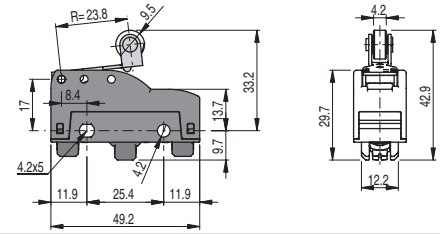
Max and min. speed page 6/8 - type 5



MK V11F53 1NO+1NC

PC	2,5 mm	FS	0,7 N
OC	11,5 mm	FR	0,6 N
CD	0,3 mm		

Max and min. speed page 6/8 - type 8



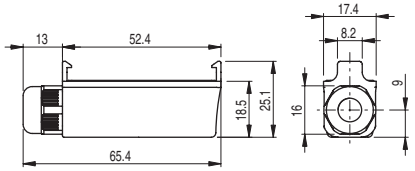
MK V11F59 1NO+1NC

PC	0,8 mm	FS	1,7 N
OC	5,2 mm	FR	1,3 N
CD	0,08 mm	FAP	8,9 N
CAP	4,9 mm		

Max and min. speed page 6/8 - type 8

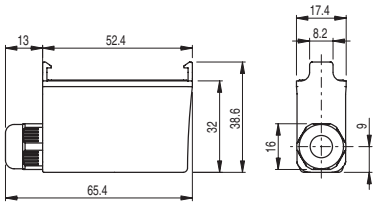
Protections (terminals covers)

10 pcs packs



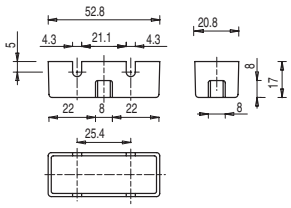
Protection terminal cover for screw terminals snap-in assembled and with wire trap cable gland. It allows the installation of more switches side by side.

Article	Description	Protection degree
VF MKCV11	Protection terminal cover without gasket for multipolar cables from Ø 5 to Ø 7,5 mm	IP40
VF MKCV12	Protection terminal cover without gasket for multipolar cables from Ø 4 to Ø 7,5 mm	IP40
VF MKCV13	Protection terminal cover without gasket for multipolar cables from Ø 2 to Ø 5 mm	IP40
VF MKCV22	Protection terminal cover with gasket for multipolar cables from Ø 4 to Ø 7,5 mm	IP65
VF MKCV23	Protection terminal cover with gasket for multipolar cables from Ø 2 to Ø 5 mm	IP65

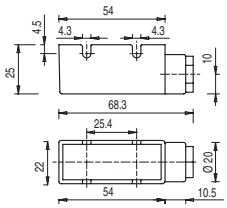


Protection terminal cover for vertical faston terminals snap-in assembled and with wire trap cable gland. It allows the installation of more switches side by side.

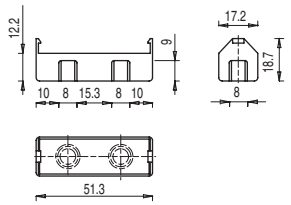
Article	Description	Protection degree
VF MKCH11	Protection terminal cover without gasket for multipolar cables from Ø 5 to Ø 7,5 mm	IP40
VF MKCH12	Protection terminal cover without gasket for multipolar cables from Ø 4 to Ø 7,5 mm	IP40
VF MKCH13	Protection terminal cover without gasket for multipolar cables from Ø 2 to Ø 5 mm	IP40
VF MKCH22	Protection terminal cover with gasket for multipolar cables from Ø 4 to Ø 7,5 mm	IP65
VF MKCH23	Protection terminal cover with gasket for multipolar cables from Ø 2 to Ø 5 mm	IP65



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



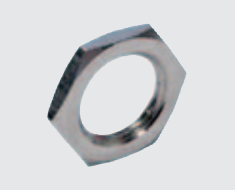
Article	Description	Protection degree
VF C02	Protection terminal cover for screw terminals with cable gland PG9 for multipolar cables from Ø 5 to Ø 7 mm	IP40

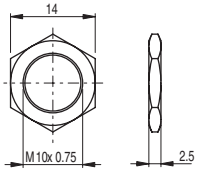


Article	Description	Protection degree
VF C03	Protection terminal cover for screw terminals snap-in assembled. It allows the installation of more switches side by side	IP20

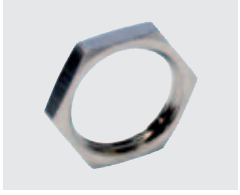
Accessories

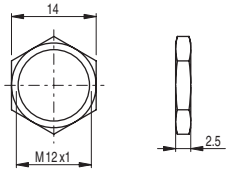
10 pcs packs





Article	Description
VF AC83	Hexagonal threaded nut M10 x 0,75 for microswitches





Article	Description
VF AC72	Hexagonal threaded nut M12 x 1 for microswitches