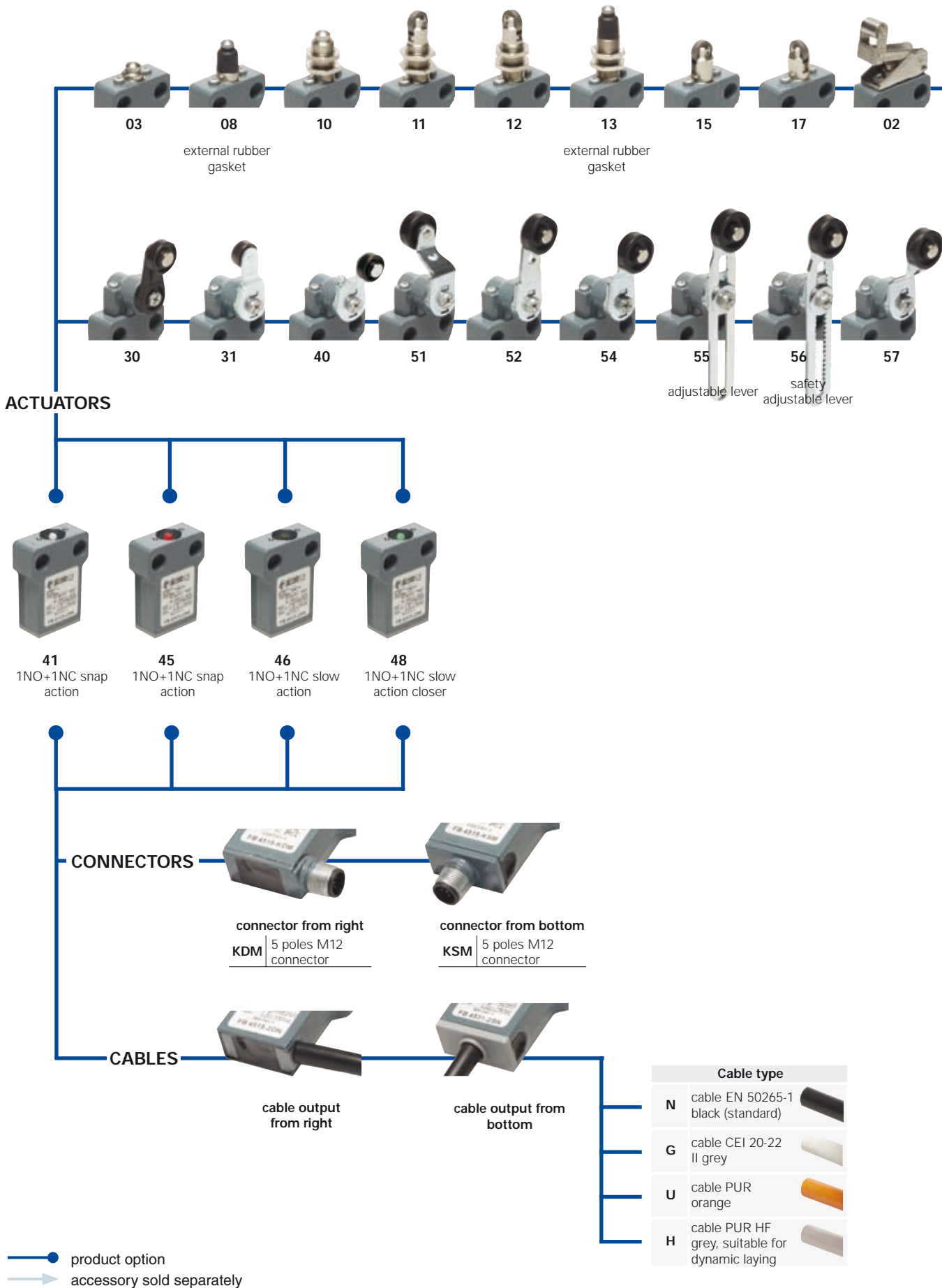
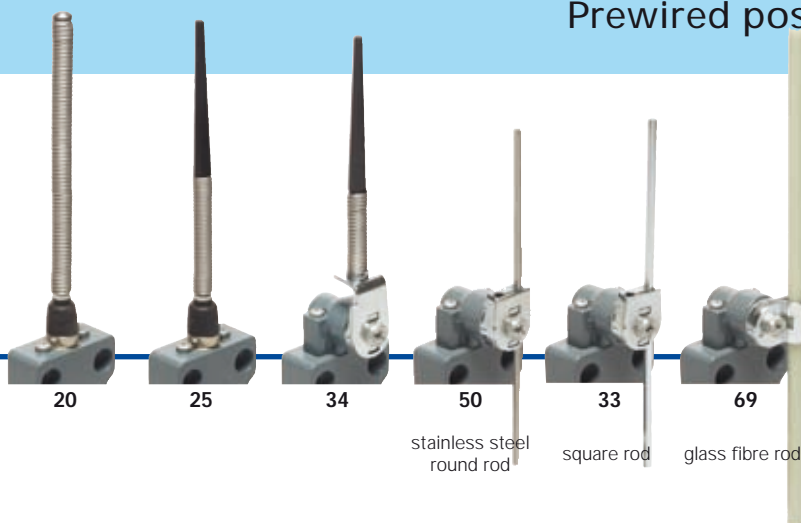


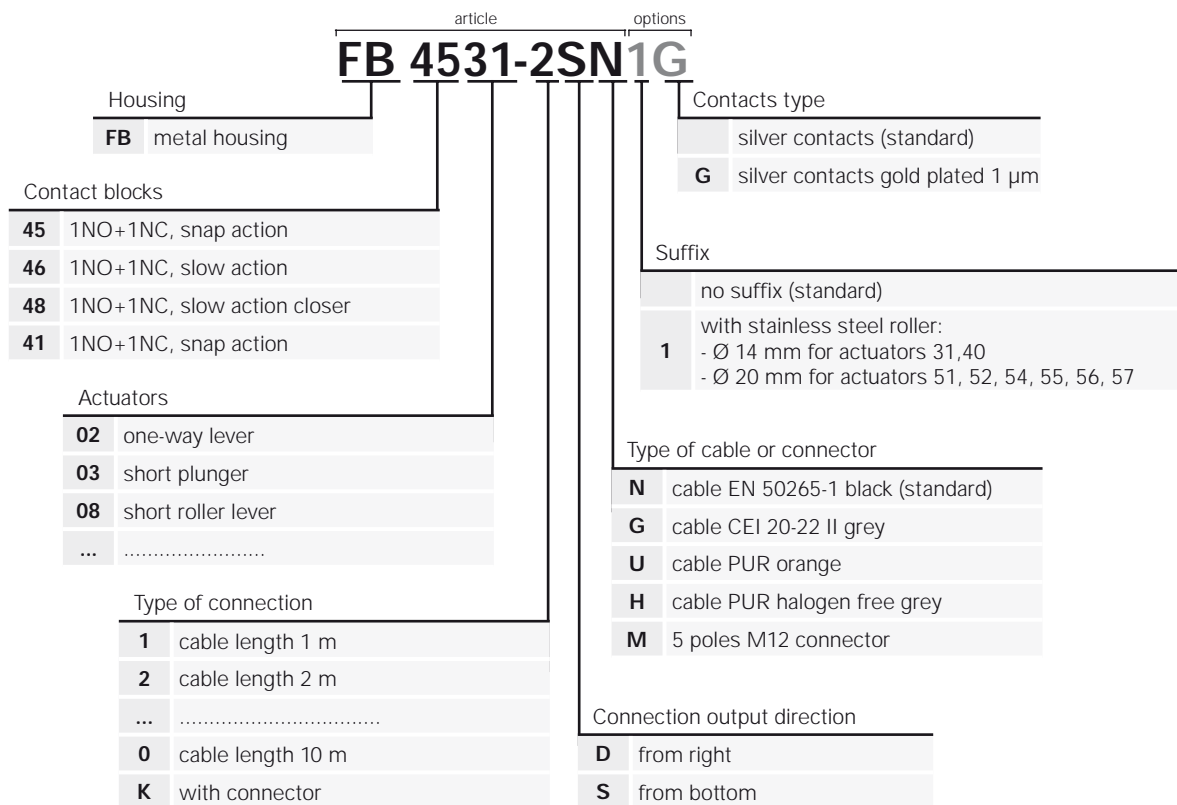
Selection diagram





Code structure

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





Main data

- Metal housing, cable output from right or from bottom
- 4 integrated cable types available
- Versions with M12 connector from right or from bottom suitable for safety applications ☺
- Protection degree IP67
- 4 contact blocks available
- 24 actuators available

Markings and quality marks:



Approval IMQ: EI007
 Approval UL: E131787
 Approval UL: 2007010305230002
 Approval ECU: 1010151

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: see "internal connections" on page 2/110) as stated in the **standard CEI 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 6/8. 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 6/8.

Technical data

Housing

Metal housing, coated with baked epoxy powder
 Version with cable integrated from right with 5x 0.75 mm² wires length 2 m, other lengths on request.

Versions with 5 poles M12 integrated connector suitable for safety applications ☺
 Protection degree: IP67

General data

Ambient temperature: See table on page 2/110
 Max operating frequency: 3600 operations cycles¹/hour
 Mechanical endurance: 20 million operations cycles¹
 Assembling position: any
 Vibrations holding: 20 gn (10...500 Hz) according to IEC 60068-2-6
 Shock holding: 50 gn (11 ms) according to IEC 60068-2-27
 (1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by IEC 947-5-1 standard.

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 529, EN 60529, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013.

Approvals:

IEC 60947-5-1, UL 508, GB14048.5-2001

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, VDE 0660-206.

Electrical data

Utilization categories

	with cable	with 5 poles M12 connector	Utilization categories			
Thermal current (I _{th}):	10 A	4 A	Alternate current: AC15 (50...60 Hz)			
Rated insulation voltage (U _i):	500 VAC 600 VDC	250 VAC 300 VDC	U _e (V)	120	250	400
Protection against short circuits:	fuse 10 A 500 V type aM	fuse 4 A 500 V type gG	I _e (A)	6	4	3
Pollution degree:	3	3	Direct current: DC13			
			U _e (V)	24	125	250
			I _e (A)	2,5	0,55	0,27
			Alternate current: AC15 (50...60 Hz)			
			U _e (V)	120	250	
			I _e (A)	4	4	
			Direct current: DC13			
			U _e (V)	24	125	250
			I _e (A)	2,5	0,55	0,27

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 VAC / 250 VAC (with connector)
 Thermal current (Ith): 10 A / 4 A (with connector)
 Protection against short circuits: fuse 10 A 500 V type aM
 Protection degree: IP67
 MA terminals (seamed clamps)
 Pollution degree 3
 Utilization category: AC15 / DC13 (with connector)
 Operation voltage (Ue): 400 VAC (50 Hz) / 24 VDC (with connector)
 Operation current (Ie): 3 A / 2,5 A (with connector)
 Forms of the contact element: Zb
 Positive opening of contacts on contact block 45, 46, 48
 In conformity with standards: EN60947-1, EN 60947-5-1 and subsequent modifications and completions, fundamental requirements of the Low Voltage Directive 73/23 EEC and subsequent modifications and completions.

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

Data type approved by UL

Utilization categories Q300 (69 VA, 125-250 VDC)
 A600 (720 VA, 120-600 VAC)
 Data of the housing type 4X, 6 (indoor use only)
 In conformity with standard: UL 508

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

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive 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.

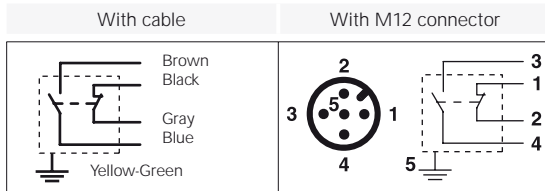


Rotating heads

According to different versions, it is possible to rotate the head in 90° or 180° steps.



Internal connections



5 poles M12 safety connectors

The long experience of Pizzato Elettrica has led to the realization of the first 5-poles connector integrated in a safety switch complying with the requirements of standard IEC 947-5-1. Its high insulation voltage Ui 250 VAC allows to mark it as suitable for safety applications.

Utilization temperatures and approvals

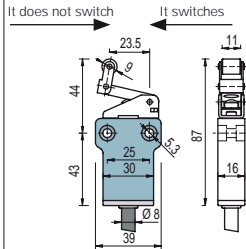
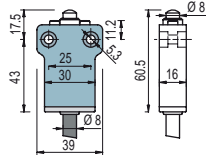
Cable code	Cable features	Switches FB series standard versions								Available on request				Approvals of switches with integrated cable
		Fixed laying cable		Dynamic laying cable		Fixed laying cable		Dynamic laying cable		Tmin	Tmax	Tmin	Tmax	
		Tmin	Tmax	Tmin	Tmax	Tmin	Tmax	Tmin	Tmax					
N	PVC H05VV-F, fixed laying Not spreading the flame EN 50265-2-1	-25 °C	+70 °C	-	-	-	-	-	-	-	-	-	-	CE, IMQ, UL, CCC
G	PVC S05VV-F, fixed laying Not flame-spreading CEI 20-22 II	-25 °C	+70 °C	-	-	-	-	-	-	-	-	-	-	CE
U	Polyurethane H05BQ-F, fixed laying Oil-resistant IEC 60811-2-1	-25 °C	+70 °C	-	-	-35 °C	+80 °C	-	-	-	-	-	-	CE, IMQ, CCC
H	Polyurethane without halogens, dynamic laying Without halogens IEC 60754-1 Oil-resistant IEC 60811-2-1 Self-extinguishing IEC 60332-1, IEC 60332-2 Not flame-spreading IEC 60332-3 Gas emission reduced IEC 61034-1 Copper class 6 (IEC 228)	-25 °C	+80 °C	-25 °C	+80 °C	-35 °C	+80 °C	-35 °C	+80 °C	-35 °C	+80 °C	-35 °C	+80 °C	CE, UL

Connector code	Connector features	Switches FB series standard versions		Available on request		Approvals of switches with integrated connector
		Tmin	Tmax	Tmin	Tmax	
K	5 poles M12 connector	-25 °C	+80 °C	-35 °C	+80 °C	CE, IMQ, UL, CCC

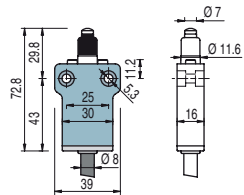
Prewired position switches FB series versions with 2 meter "N" type cable from bottom

Contacts type:

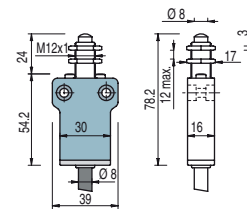
- R = snap action
- L = slow action
- LA = slow action closer



With external rubber gasket



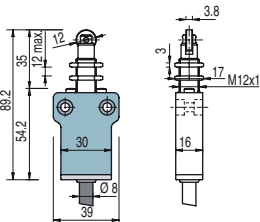
Fixed only by threaded head



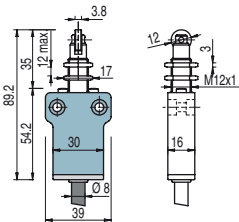
Contact blocks

45	R	FB 4503-2SN	➔	1NO+1NC	FB 4502-2SN	➔	1NO+1NC	FB 4508-2SN	➔	1NO+1NC	FB 4510-2SN	➔	1NO+1NC
46	L	FB 4603-2SN	➔	1NO+1NC	FB 4602-2SN	➔	1NO+1NC	FB 4608-2SN	➔	1NO+1NC	FB 4610-2SN	➔	1NO+1NC
48	LA	FB 4803-2SN	➔	1NO+1NC	FB 4802-2SN	➔	1NO+1NC	FB 4808-2SN	➔	1NO+1NC	FB 4810-2SN	➔	1NO+1NC
41	R	FB 4103-2SN		1NO+1NC	FB 4102-2SN		1NO+1NC	FB 4108-2SN		1NO+1NC	FB 4110-2SN		1NO+1NC
Max speed	page 6/7 - type 4			page 6/7 - type 3			page 6/7 - type 4			page 6/7 - type 4			
Min. force	10 N (25 N ➔)			5 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 2			page 6/8 - group 1			page 6/8 - group 1			

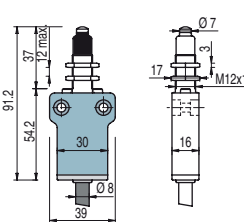
Fixed only by threaded head



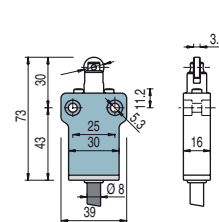
Fixed only by threaded head



With external rubber gasket



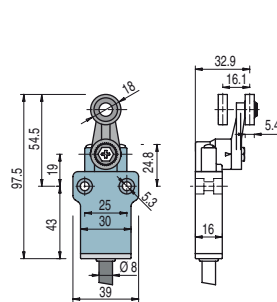
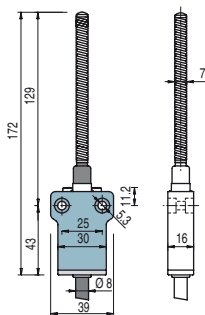
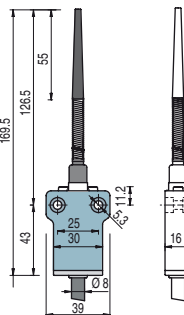
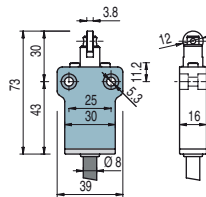
Ø 12 mm stainless steel roller



Contact blocks

45	R	FB 4511-2SN	➔	1NO+1NC	FB 4512-2SN	➔	1NO+1NC	FB 4513-2SN	➔	1NO+1NC	FB 4515-2SN	➔	1NO+1NC
46	L	FB 4611-2SN	➔	1NO+1NC	FB 4612-2SN	➔	1NO+1NC	FB 4613-2SN	➔	1NO+1NC	FB 4615-2SN	➔	1NO+1NC
48	LA	FB 4811-2SN	➔	1NO+1NC	FB 4812-2SN	➔	1NO+1NC	FB 4813-2SN	➔	1NO+1NC	FB 4815-2SN	➔	1NO+1NC
41	R	FB 4111-2SN		1NO+1NC	FB 4112-2SN		1NO+1NC	FB 4113-2SN		1NO+1NC	FB 4115-2SN		1NO+1NC
Max speed	page 6/7 - type 2			page 6/7 - type 2			page 6/7 - type 4			page 6/7 - type 2			
Min. force	10 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 1			page 6/8 - group 1			page 6/8 - group 1			

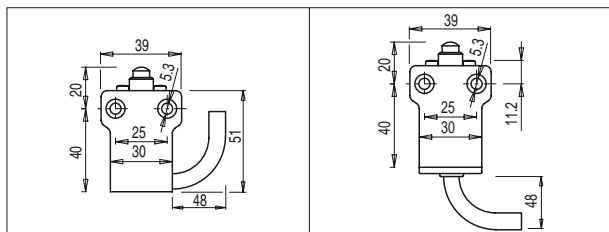
Ø 12 mm stainless steel roller



Contact blocks

45	R	FB 4517-2SN	➔	1NO+1NC	FB 4520-2SN		1NO+1NC	FB 4525-2SN		1NO+1NC	FB 4530-2SN	➔	1NO+1NC
46	L	FB 4617-2SN	➔	1NO+1NC	FB 4820-2SN		1NO+1NC	FB 4825-2SN		1NO+1NC	FB 4630-2SN	➔	1NO+1NC
48	LA	FB 4817-2SN	➔	1NO+1NC	FB 4120-2SN		1NO+1NC	FB 4125-2SN		1NO+1NC	FB 4830-2SN	➔	1NO+1NC
41	R	FB 4117-2SN		1NO+1NC	FB 4120-2SN		1NO+1NC	FB 4125-2SN		1NO+1NC	FB 4130-2SN		1NO+1NC
Max speed	page 6/7 - type 2			1 m/s			1 m/s			page 6/7 - type 1			
Min. force	10 N (25 N ➔)			0,07 Nm			0,07 Nm			0,03 Nm (0,25 Nm ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 3			page 6/8 - group 3			page 6/8 - group 4			

Outline dimensions with cable output from right or from bottom



All measures in the drawings are in mm

Items with code on the green background are available in stock

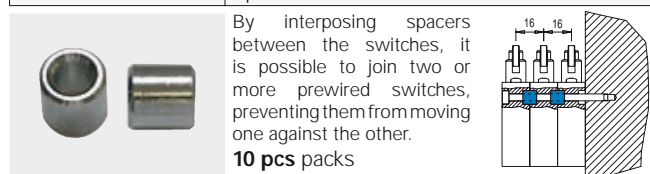
Contacts type: R = snap action L = slow action LA = slow action closer	With stainless steel roller on request 	3x3 mm square rod 		With stainless steel roller on request
Contact blocks				
45 R	FB 4531-2SN (⊕) 1NO+1NC	FB 4533-2SN 1NO+1NC	FB 4534-2SN 1NO+1NC	FB 4540-2SN (⊕) 1NO+1NC
46 L	FB 4631-2SN (⊕) 1NO+1NC	FB 4633-2SN 1NO+1NC	FB 4634-2SN 1NO+1NC	FB 4640-2SN (⊕) 1NO+1NC
48 LA	FB 4831-2SN (⊕) 1NO+1NC	FB 4833-2SN 1NO+1NC	FB 4834-2SN 1NO+1NC	FB 4840-2SN (⊕) 1NO+1NC
41 R	FB 4131-2SN 1NO+1NC	FB 4133-2SN 1NO+1NC	FB 4134-2SN 1NO+1NC	FB 4140-2SN 1NO+1NC
Max speed	page 6/7 - type 1	1,5 m/s	1,5 m/s	page 6/7 - type 1
Min. force	0,03 Nm (0,25 Nm ⊕)	0,03 Nm	0,03 Nm	0,03 Nm (0,25 Nm ⊕)
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

	Ø 3 mm stainless steel round rod 	With stainless steel roller on request 	With stainless steel roller on request 	With stainless steel roller on request
Contact blocks				
45 R	FB 4550-2SN 1NO+1NC	FB 4551-2SN (⊕) 1NO+1NC	FB 4552-2SN (⊕) 1NO+1NC	FB 4554-2SN (⊕) 1NO+1NC
46 L	FB 4650-2SN 1NO+1NC	FB 4651-2SN (⊕) 1NO+1NC	FB 4652-2SN (⊕) 1NO+1NC	FB 4654-2SN (⊕) 1NO+1NC
48 LA	FB 4850-2SN 1NO+1NC	FB 4851-2SN (⊕) 1NO+1NC	FB 4852-2SN (⊕) 1NO+1NC	FB 4854-2SN (⊕) 1NO+1NC
41 R	FB 4150-2SN 1NO+1NC	FB 4151-2SN 1NO+1NC	FB 4152-2SN 1NO+1NC	FB 4154-2SN 1NO+1NC
Max speed	1,5 m/s	page 6/7 - type 1	page 6/7 - type 1	page 6/7 - type 1
Min. force	0,03 Nm	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

	With stainless steel roller on request 	With stainless steel roller on request 	With stainless steel roller on request 	Glass fibre rod
Contact blocks				
45 R	FB 4555-2SN (⊕) (1) 1NO+1NC	FB 4556-2SN (⊕) 1NO+1NC	FB 4557-2SN (⊕) 1NO+1NC	FB 4569-2SN 1NO+1NC
46 L	FB 4655-2SN (⊕) (1) 1NO+1NC	FB 4656-2SN (⊕) 1NO+1NC	FB 4657-2SN (⊕) 1NO+1NC	FB 4669-2SN 1NO+1NC
48 LA	FB 4855-2SN (⊕) (1) 1NO+1NC	FB 4856-2SN (⊕) 1NO+1NC	FB 4857-2SN (⊕) 1NO+1NC	FB 4869-2SN 1NO+1NC
41 R	FB 4155-2SN 1NO+1NC	FB 4156-2SN 1NO+1NC	FB 4157-2SN 1NO+1NC	FB 4169-2SN 1NO+1NC
Max speed	page 6/7 - type 1	page 6/7 - type 1	page 6/7 - type 1	1,5 m/s
Min. force	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

Accessories

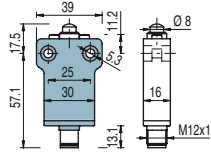
Article	Description
VF D16B	Spacers for FB series



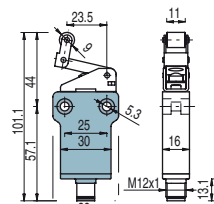
(1) Positive opening only with lever adjusted on the max. See page 2/51

Contacts type:

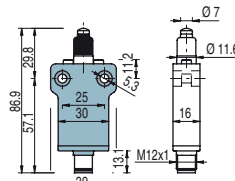
- R = snap action
- L = slow action
- LA = slow action closer



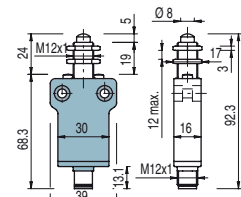
It does not switch It switches



With external rubber gasket



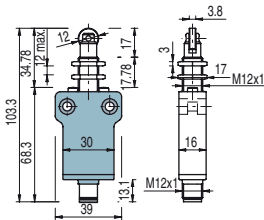
Fixed only by threaded head



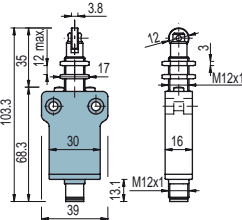
Contact blocks

45	R	FB 4503-KSM	➔	1NO+1NC	FB 4502-KSM	➔	1NO+1NC	FB 4508-KSM	➔	1NO+1NC	FB 4510-KSM	➔	1NO+1NC
46	L	FB 4603-KSM	➔	1NO+1NC	FB 4602-KSM	➔	1NO+1NC	FB 4608-KSM	➔	1NO+1NC	FB 4610-KSM	➔	1NO+1NC
48	LA	FB 4803-KSM	➔	1NO+1NC	FB 4802-KSM	➔	1NO+1NC	FB 4808-KSM	➔	1NO+1NC	FB 4810-KSM	➔	1NO+1NC
41	R	FB 4103-KSM		1NO+1NC	FB 4102-KSM		1NO+1NC	FB 4108-KSM		1NO+1NC	FB 4110-KSM		1NO+1NC
Max speed	page 6/7 - type 4			page 6/7 - type 3			page 6/7 - type 4			page 6/7 - type 4			
Min. force	10 N (25 N ➔)			5 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 2			page 6/8 - group 1			page 6/8 - group 1			

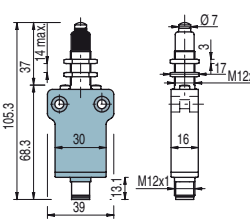
Fixed only by threaded head



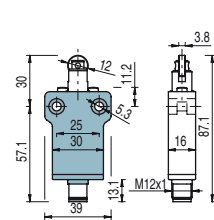
Fixed only by threaded head



With external rubber gasket



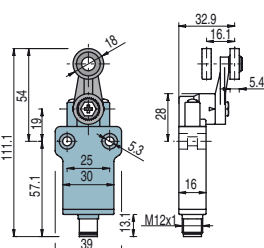
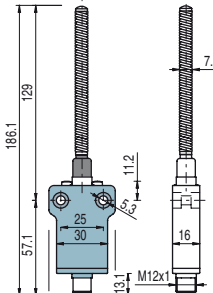
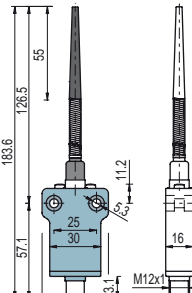
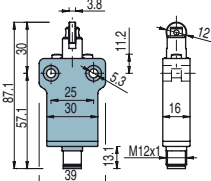
Ø 12 mm stainless steel roller



Contact blocks

45	R	FB 4511-KSM	➔	1NO+1NC	FB 4512-KSM	➔	1NO+1NC	FB 4513-KSM	➔	1NO+1NC	FB 4515-KSM	➔	1NO+1NC
46	L	FB 4611-KSM	➔	1NO+1NC	FB 4612-KSM	➔	1NO+1NC	FB 4613-KSM	➔	1NO+1NC	FB 4615-KSM	➔	1NO+1NC
48	LA	FB 4811-KSM	➔	1NO+1NC	FB 4812-KSM	➔	1NO+1NC	FB 4813-KSM	➔	1NO+1NC	FB 4815-KSM	➔	1NO+1NC
41	R	FB 4111-KSM		1NO+1NC	FB 4112-KSM		1NO+1NC	FB 4113-KSM		1NO+1NC	FB 4115-KSM		1NO+1NC
Max speed	page 6/7 - type 2			page 6/7 - type 2			page 6/7 - type 4			page 6/7 - type 2			
Min. force	10 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			10 N (25 N ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 1			page 6/8 - group 1			page 6/8 - group 1			

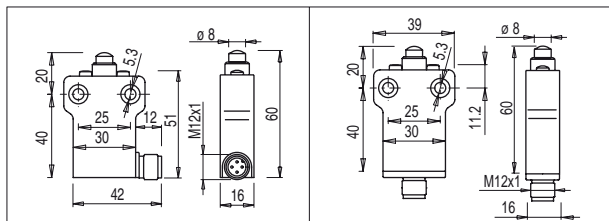
Ø 12 mm stainless steel roller



Contact blocks

45	R	FB 4517-KSM	➔	1NO+1NC	FB 4520-KSM		1NO+1NC	FB 4525-KSM		1NO+1NC	FB 4530-KSM	➔	1NO+1NC
46	L	FB 4617-KSM	➔	1NO+1NC	FB 4820-KSM		1NO+1NC	FB 4825-KSM		1NO+1NC	FB 4630-KSM	➔	1NO+1NC
48	LA	FB 4817-KSM	➔	1NO+1NC	FB 4120-KSM		1NO+1NC	FB 4125-KSM		1NO+1NC	FB 4830-KSM	➔	1NO+1NC
41	R	FB 4117-KSM		1NO+1NC	FB 4120-KSM		1NO+1NC	FB 4125-KSM		1NO+1NC	FB 4130-KSM		1NO+1NC
Max speed	page 6/7 - type 2			1 m/s			1 m/s			page 6/7 - type 1			
Min. force	10 N (25 N ➔)			0,07 Nm			0,07 Nm			0,03 Nm (0,25 Nm ➔)			
Travel diagrams	page 6/8 - group 1			page 6/8 - group 3			page 6/8 - group 3			page 6/8 - group 4			

Outline dimensions with M12 connector output from right e from bottom



Items with code on the green background are available in stock

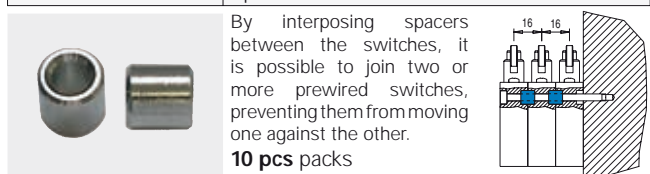
Contacts type: R = snap action L = slow action LA = slow action closer	With stainless steel roller on request 	3x3 mm square rod 		With stainless steel roller on request
Contact blocks	45 R FB 4531-KSM (⊕) 1NO+1NC 46 L FB 4631-KSM (⊕) 1NO+1NC 48 LA FB 4831-KSM (⊕) 1NO+1NC 41 R FB 4131-KSM 1NO+1NC	FB 4533-KSM 1NO+1NC FB 4633-KSM 1NO+1NC FB 4833-KSM 1NO+1NC FB 4133-KSM 1NO+1NC	FB 4534-KSM 1NO+1NC FB 4634-KSM 1NO+1NC FB 4834-KSM 1NO+1NC FB 4134-KSM 1NO+1NC	FB 4540-KSM (⊕) 1NO+1NC FB 4640-KSM (⊕) 1NO+1NC FB 4840-KSM (⊕) 1NO+1NC FB 4140-KSM 1NO+1NC
Max speed	page 6/7 - type 1	1,5 m/s	1,5 m/s	page 6/7 - type 1
Min. force	0,03 Nm (0,25 Nm ⊕)	0,03 Nm	0,03 Nm	0,03 Nm (0,25 Nm ⊕)
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

Ø 3 mm stainless steel round rod 	With stainless steel roller on request 	With stainless steel roller on request 	With stainless steel roller on request 	
Contact blocks	45 R FB 4550-KSM 1NO+1NC 46 L FB 4650-KSM 1NO+1NC 48 LA FB 4850-KSM 1NO+1NC 41 R FB 4150-KSM 1NO+1NC	FB 4551-KSM (⊕) 1NO+1NC FB 4651-KSM (⊕) 1NO+1NC FB 4851-KSM (⊕) 1NO+1NC FB 4151-KSM 1NO+1NC	FB 4552-KSM (⊕) 1NO+1NC FB 4652-KSM (⊕) 1NO+1NC FB 4852-KSM (⊕) 1NO+1NC FB 4152-KSM 1NO+1NC	FB 4554-KSM (⊕) 1NO+1NC FB 4654-KSM (⊕) 1NO+1NC FB 4854-KSM (⊕) 1NO+1NC FB 4154-KSM 1NO+1NC
Max speed	1,5 m/s	page 6/7 - type 1	page 6/7 - type 1	page 6/7 - type 1
Min. force	0,03 Nm	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

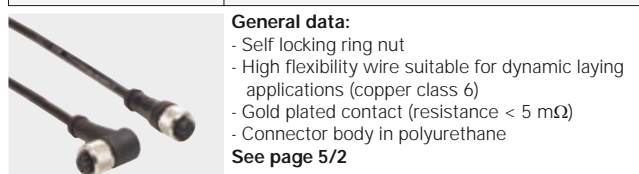
With stainless steel roller on request 	With stainless steel roller on request 	With stainless steel roller on request 	Glass fibre rod 	
Contact blocks	45 R FB 4555-KSM (⊕) (1) 1NO+1NC 46 L FB 4655-KSM (⊕) (1) 1NO+1NC 48 LA FB 4855-KSM (⊕) (1) 1NO+1NC 41 R FB 4155-KSM 1NO+1NC	FB 4556-KSM (⊕) 1NO+1NC FB 4656-KSM (⊕) 1NO+1NC FB 4856-KSM (⊕) 1NO+1NC FB 4156-KSM 1NO+1NC	FB 4557-KSM (⊕) 1NO+1NC FB 4657-KSM (⊕) 1NO+1NC FB 4857-KSM (⊕) 1NO+1NC FB 4157-KSM 1NO+1NC	FB 4569-KSM 1NO+1NC FB 4669-KSM 1NO+1NC FB 4869-KSM 1NO+1NC FB 4169-KSM 1NO+1NC
Max speed	page 6/7 - type 1	page 6/7 - type 1	page 6/7 - type 1	1,5 m/s
Min. force	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm (0,25 Nm ⊕)	0,03 Nm
Travel diagrams	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4	page 6/8 - group 4

Accessories

Article	Description
VF D16B	Spacers for FB series



Article	Description
VF CA...M	Female wired connectors



(1) Positive opening only with lever adjusted on the max. See page 2/51