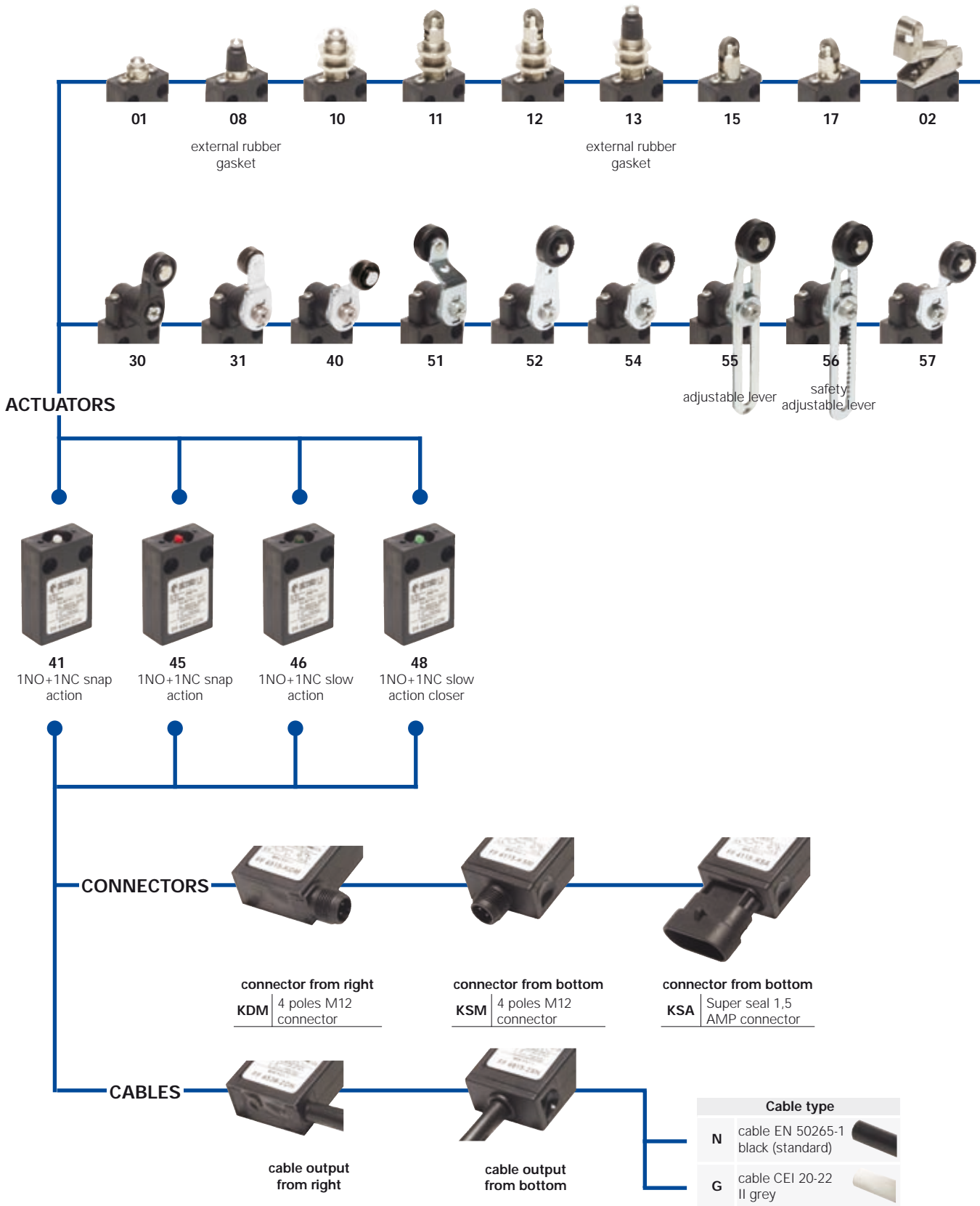
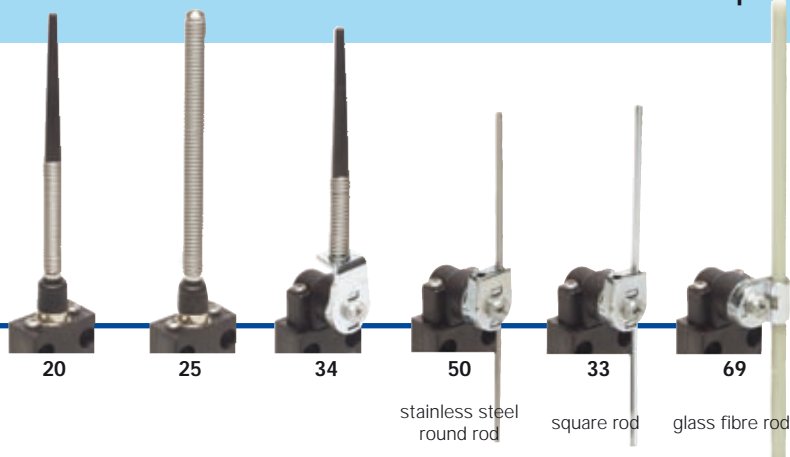


Selection diagram

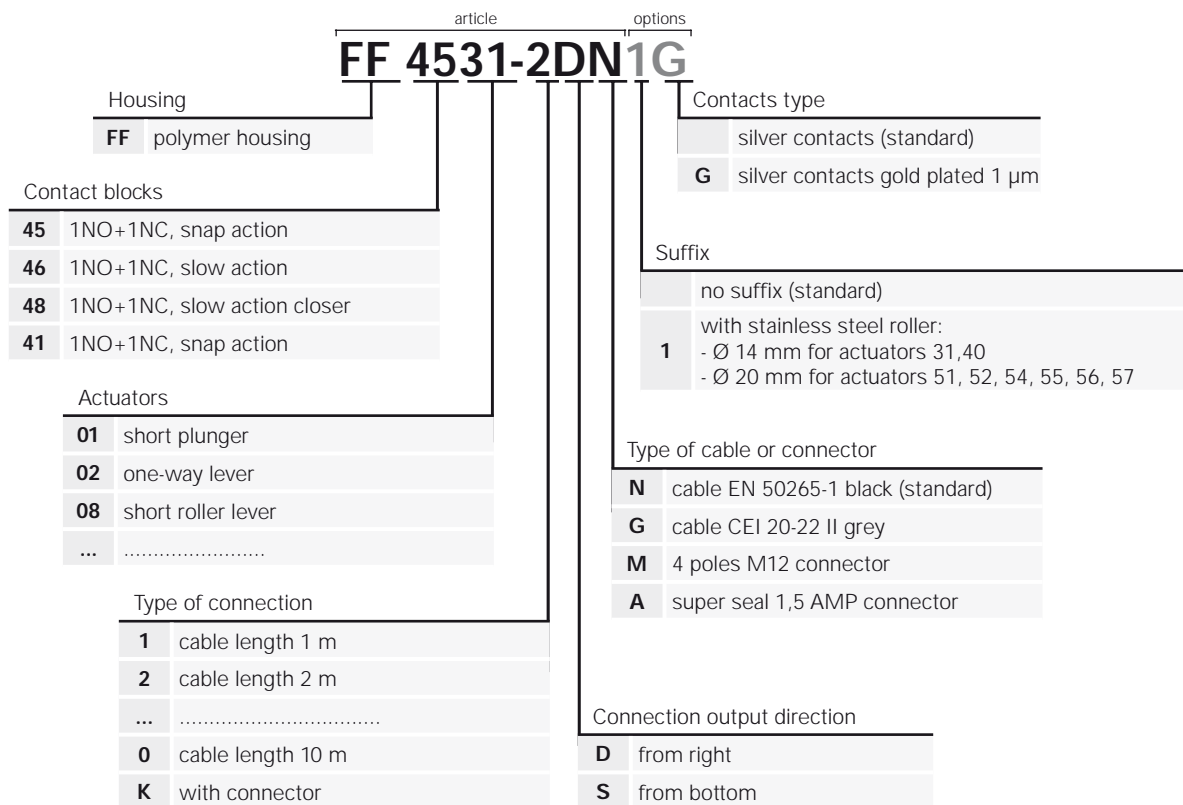


● product option
 → accessory sold separately



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

- Polymer housing, cable output from right or from bottom
- 2 integrated cable types available
- Versions with M12 connector from right or from bottom suitable for safety applications ⊕
- Connector AMP version
- Protection degree IP67
- 4 contact blocks available
- 24 actuators available

Markings and quality marks:



Approval IMQ: CA02.02391
 Approval UL: E131787
 Approval UL: 2007010305230004

Housing

Made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation □

Version with cable integrated with 4x 0.75 mm² wires length 2 m, other lengths on request.

Versions with 4 poles M12 integrated connector suitable for safety applications ⊕
 Protection degree: IP67

General data

Ambient temperature: See table on page 2/118
 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.

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 2/118) 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.

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

Data type approved by IMQ and CCC

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.

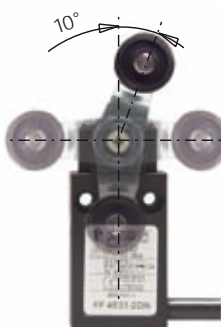
Data type approved by UL

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.



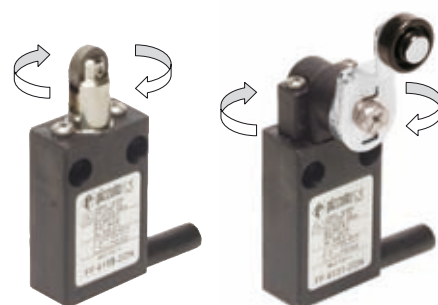
Overturning levers

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.

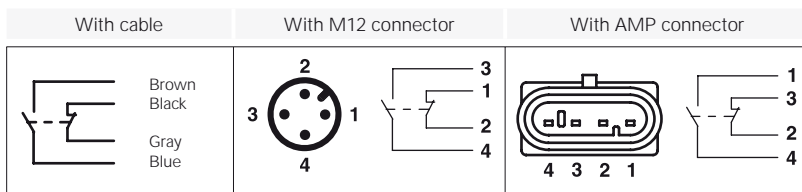


Rotating heads

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



Internal connections



4 poles M12 safety connectors ☺

Pizzato Elettrica manufactures 4 poles connector integrated with a safety switch, complying with 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 FF series standard versions								Available on request				Approvals of switches with integrated cable
		Fixed laying cable		Dynamic laying cable		Fixed laying cable		Dynamic laying cable		Switches FF series extended temperature versions				
		Tmin	Tmax	Tmin	Tmax	Tmin	Tmax	Tmin	Tmax	Tmin	Tmax			
N	PVC H05VV-F, fixed laying cable Not spreading the flame EN 50265-2-1	-25 °C	+70 °C	-	-	-	-	-	-	-	-	-	-	CE, IMQ, UL, CCC
G	PVC S05VV-F, fixed laying cable Not flame-spreading CEI 20-22 II	-25 °C	+70 °C	-	-	-	-	-	-	-	-	-	-	CE

Connector code	Connector features	Switches FF series standard versions		Available on request		Approvals of switches with integrated connector
		Tmin	Tmax	Tmin	Tmax	
KDM-KSM	4 poles M12 connector	-25 °C	+80 °C	-35 °C	+80 °C	CE, IMQ, UL, CCC
KSA	Super seal 1,5 AMP connector	-25 °C	+80 °C	-35 °C	+80 °C	CE

Contacts type:

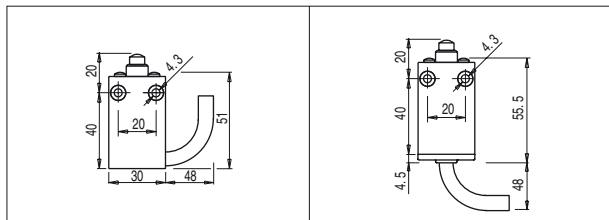
- R = snap action
- L = slow action
- LA = slow action closer

Contact blocks		It does not switch → It switches ←		
45	R FF 4501-2DN	R FF 4502-2DN	R FF 4508-2DN	R FF 4510-2DN
46	L FF 4601-2DN	L FF 4602-2DN	L FF 4608-2DN	L FF 4610-2DN
48	LA FF 4801-2DN	LA FF 4802-2DN	LA FF 4808-2DN	LA FF 4810-2DN
41	R FF 4101-2DN	R FF 4102-2DN	R FF 4108-2DN	R FF 4110-2DN
Max speed	page 6/7 - type 4		page 6/7 - type 4	
Min. force	10 N (25 N ⊕)		10 N (25 N ⊕)	
Travel diagrams	page 6/8 - group 1		page 6/8 - group 1	

Contact blocks				
45	R FF 4511-2DN	R FF 4512-2DN	R FF 4513-2DN	R FF 4515-2DN
46	L FF 4611-2DN	L FF 4612-2DN	L FF 4613-2DN	L FF 4615-2DN
48	LA FF 4811-2DN	LA FF 4812-2DN	LA FF 4813-2DN	LA FF 4815-2DN
41	R FF 4111-2DN	R FF 4112-2DN	R FF 4113-2DN	R FF 4115-2DN
Max speed	page 6/7 - type 2		page 6/7 - type 4	
Min. force	10 N (25 N ⊕)		10 N (25 N ⊕)	
Travel diagrams	page 6/8 - group 1		page 6/8 - group 1	

Contact blocks				
45	R FF 4517-2DN	R FF 4520-2DN	R FF 4525-2DN	R FF 4530-2DN
46	L FF 4617-2DN	L FF 4620-2DN	L FF 4625-2DN	L FF 4630-2DN
48	LA FF 4817-2DN	LA FF 4820-2DN	LA FF 4825-2DN	LA FF 4830-2DN
41	R FF 4117-2DN	R FF 4120-2DN	R FF 4125-2DN	R FF 4130-2DN
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



Items with code on the green background are available in stock

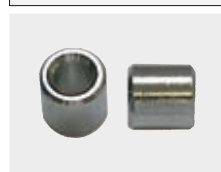
Contacts type:	With stainless steel roller on request	3x3 mm square rod		With stainless steel roller on request
R = snap action L = slow action LA = slow action closer				
Contact blocks 45 R FF 4531-2DN 1NO+1NC 46 L FF 4631-2DN 1NO+1NC 48 LA FF 4831-2DN 1NO+1NC 41 R FF 4131-2DN 1NO+1NC	Contact blocks FF 4533-2DN 1NO+1NC FF 4633-2DN 1NO+1NC FF 4833-2DN 1NO+1NC FF 4133-2DN 1NO+1NC	Contact blocks FF 4534-2DN 1NO+1NC FF 4634-2DN 1NO+1NC FF 4834-2DN 1NO+1NC FF 4134-2DN 1NO+1NC	Contact blocks FF 4540-2DN 1NO+1NC FF 4640-2DN 1NO+1NC FF 4840-2DN 1NO+1NC FF 4140-2DN 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 FF 4550-2DN 1NO+1NC 46 L FF 4650-2DN 1NO+1NC 48 LA FF 4850-2DN 1NO+1NC 41 R FF 4150-2DN 1NO+1NC	Contact blocks FF 4551-2DN 1NO+1NC FF 4651-2DN 1NO+1NC FF 4851-2DN 1NO+1NC FF 4151-2DN 1NO+1NC	Contact blocks FF 4552-2DN 1NO+1NC FF 4652-2DN 1NO+1NC FF 4852-2DN 1NO+1NC FF 4152-2DN 1NO+1NC	Contact blocks FF 4554-2DN 1NO+1NC FF 4654-2DN 1NO+1NC FF 4854-2DN 1NO+1NC FF 4154-2DN 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

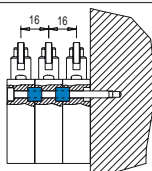
	With stainless steel roller on request	With stainless steel roller on request	With stainless steel roller on request	Glass fibre rod
Contact blocks 45 R FF 4555-2DN 1NO+1NC 46 L FF 4655-2DN 1NO+1NC 48 LA FF 4855-2DN 1NO+1NC 41 R FF 4155-2DN 1NO+1NC	Contact blocks FF 4556-2DN 1NO+1NC FF 4656-2DN 1NO+1NC FF 4856-2DN 1NO+1NC FF 4156-2DN 1NO+1NC	Contact blocks FF 4557-2DN 1NO+1NC FF 4657-2DN 1NO+1NC FF 4857-2DN 1NO+1NC FF 4157-2DN 1NO+1NC	Contact blocks FF 4569-2DN 1NO+1NC FF 4669-2DN 1NO+1NC FF 4869-2DN 1NO+1NC FF 4169-2DN 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 D16	Spacers for FA-FF series



By interposing spacers between the switches, it is possible to join two or more prewired switches, preventing them from moving one against the other. **10 pcs** packs



(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

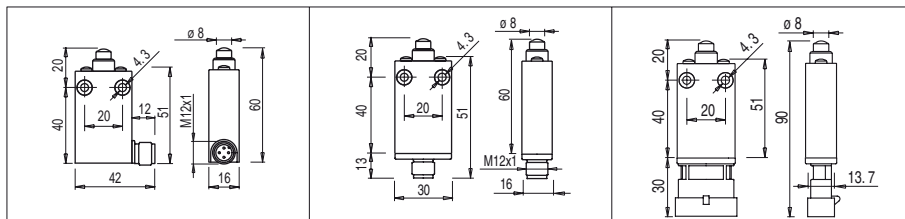
Contact blocks				
45	R FF 4501-KDM	R FF 4502-KDM	R FF 4508-KDM	R FF 4510-KDM
46	L FF 4601-KDM	L FF 4602-KDM	L FF 4608-KDM	L FF 4610-KDM
48	LA FF 4801-KDM	LA FF 4802-KDM	LA FF 4808-KDM	LA FF 4810-KDM
41	R FF 4101-KDM	R FF 4102-KDM	R FF 4108-KDM	R FF 4110-KDM
Max speed	page 6/7 - type 4	page 6/7 - type 3	page 6/7 - type 4	page 6/7 - type 4
Min. force	10 N (25 N \rightarrow)	5 N (25 N \rightarrow)	10 N (25 N \rightarrow)	10 N (25 N \rightarrow)
Travel diagrams	page 6/8 - group 1	page 6/8 - group 2	page 6/8 - group 1	page 6/8 - group 1

Contact blocks				
45	R FF 4511-KDM	R FF 4512-KDM	R FF 4513-KDM	R FF 4515-KDM
46	L FF 4611-KDM	L FF 4612-KDM	L FF 4613-KDM	L FF 4615-KDM
48	LA FF 4811-KDM	LA FF 4812-KDM	LA FF 4813-KDM	LA FF 4815-KDM
41	R FF 4111-KDM	R FF 4112-KDM	R FF 4113-KDM	R FF 4115-KDM
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 \rightarrow)	10 N (25 N \rightarrow)	10 N (25 N \rightarrow)	10 N (25 N \rightarrow)
Travel diagrams	page 6/8 - group 1	page 6/8 - group 1	page 6/8 - group 1	page 6/8 - group 1

Contact blocks				
45	R FF 4517-KDM	R FF 4520-KDM	R FF 4525-KDM	R FF 4530-KDM
46	L FF 4617-KDM	L FF 4620-KDM	L FF 4625-KDM	L FF 4630-KDM
48	LA FF 4817-KDM	LA FF 4820-KDM	LA FF 4825-KDM	LA FF 4830-KDM
41	R FF 4117-KDM	R FF 4120-KDM	R FF 4125-KDM	R FF 4130-KDM
Max speed	page 6/7 - type 2	1 m/s	1 m/s	page 6/7 - type 1
Min. force	10 N (25 N \rightarrow)	0,07 Nm	0,07 Nm	0,03 Nm (0,25 N \rightarrow)
Travel diagrams	page 6/8 - group 1	page 6/8 - group 3	page 6/8 - group 3	page 6/8 - group 4




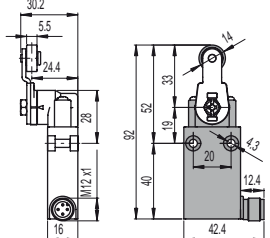
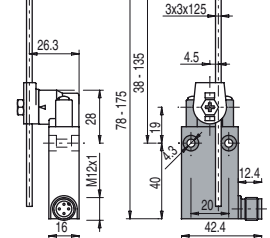
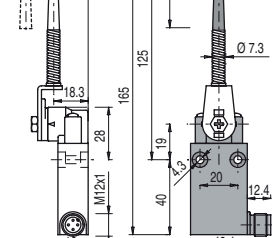
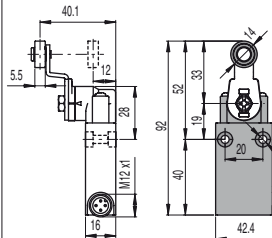












Outline dimensions with M12 connector output from right or from bottom




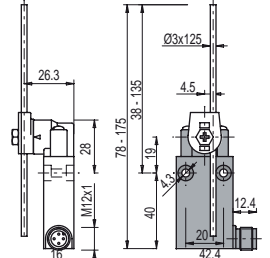
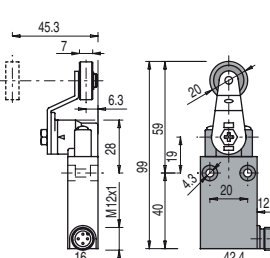
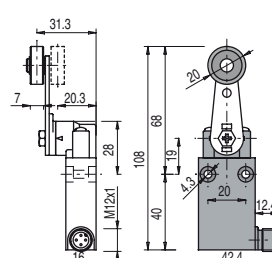
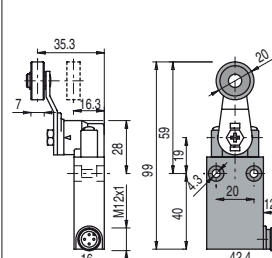
















Outline dim. with AMP connector




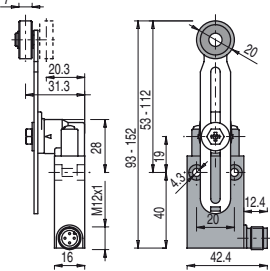
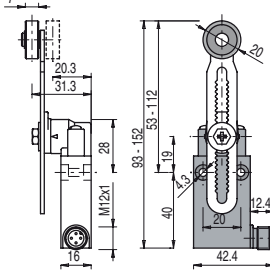
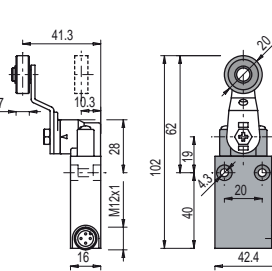
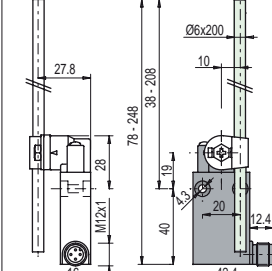


















Items with code on the green background are available in stock

Attention! All measures in the drawings are in mm


Contacts type:	With stainless steel roller on request		3x3 mm square rod		With stainless steel roller on request	
	 = snap action	 = slow action	 = slow action closer			
Contact blocks						
45 	FF 4531-KDM  1NO+1NC	FF 4533-KDM 1NO+1NC	FF 4534-KDM 1NO+1NC	FF 4540-KDM  1NO+1NC		
46 	FF 4631-KDM  1NO+1NC	FF 4633-KDM 1NO+1NC	FF 4634-KDM 1NO+1NC	FF 4640-KDM  1NO+1NC		
48 	FF 4831-KDM  1NO+1NC	FF 4833-KDM 1NO+1NC	FF 4834-KDM 1NO+1NC	FF 4840-KDM  1NO+1NC		
41 	FF 4131-KDM 1NO+1NC	FF 4133-KDM 1NO+1NC	FF 4134-KDM 1NO+1NC	FF 4140-KDM 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

Contacts type:	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 	FF 4550-KDM 1NO+1NC	FF 4551-KDM  1NO+1NC	FF 4552-KDM  1NO+1NC	FF 4554-KDM  1NO+1NC				
46 	FF 4650-KDM 1NO+1NC	FF 4651-KDM  1NO+1NC	FF 4652-KDM  1NO+1NC	FF 4654-KDM  1NO+1NC				
48 	FF 4850-KDM 1NO+1NC	FF 4851-KDM  1NO+1NC	FF 4852-KDM  1NO+1NC	FF 4854-KDM  1NO+1NC				
41 	FF 4150-KDM 1NO+1NC	FF 4151-KDM 1NO+1NC	FF 4152-KDM 1NO+1NC	FF 4154-KDM 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		

Contacts type:	With stainless steel roller on request		With stainless steel roller on request		With stainless steel roller on request		Glass fibre rod	
								
Contact blocks								
45 	FF 4555-KDM  ⁽¹⁾ 1NO+1NC	FF 4556-KDM  1NO+1NC	FF 4557-KDM  1NO+1NC	FF 4569-KDM 1NO+1NC				
46 	FF 4655-KDM  ⁽¹⁾ 1NO+1NC	FF 4656-KDM  1NO+1NC	FF 4657-KDM  1NO+1NC	FF 4669-KDM 1NO+1NC				
48 	FF 4855-KDM  ⁽¹⁾ 1NO+1NC	FF 4856-KDM  1NO+1NC	FF 4857-KDM  1NO+1NC	FF 4869-KDM 1NO+1NC				
41 	FF 4155-KDM 1NO+1NC	FF 4156-KDM 1NO+1NC	FF 4157-KDM 1NO+1NC	FF 4169-KDM 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		

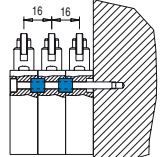
Accessories

Article	Description
VF D16	Spacers for FA-FF series




By interposing spacers between the switches, it is possible to join two or more prewired switches, preventing them from moving one against the other.

10 pcs packs



Article	Description
VF CA...M	Female wired connectors



General data:

- Self locking ring nut
- High flexibility wire suitable for dynamic laying applications (copper class 6)
- Gold plated contact (resistance < 5 mΩ)
- Connector body in polyurethane

See page 5/2

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

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