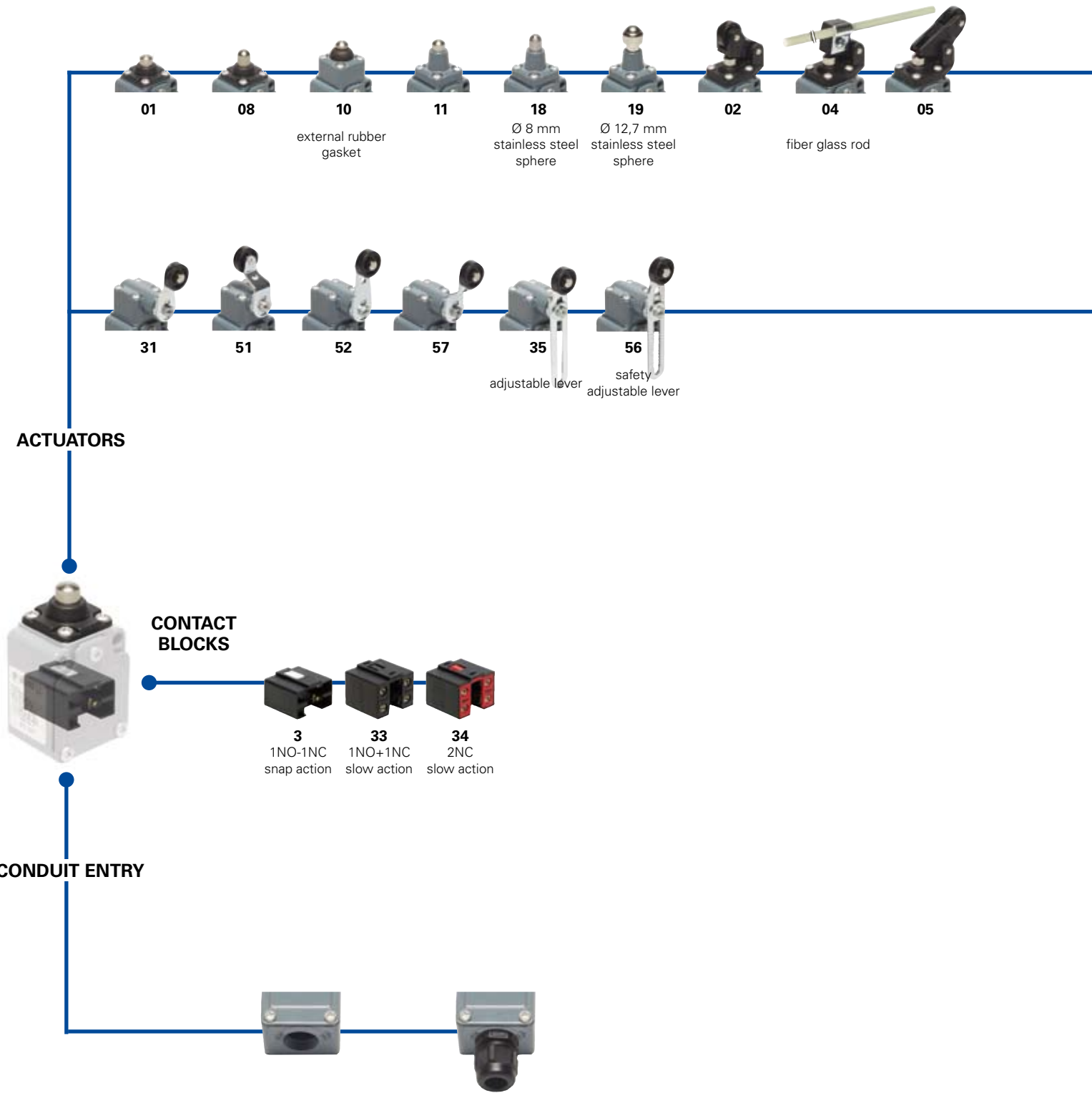


Selection diagram



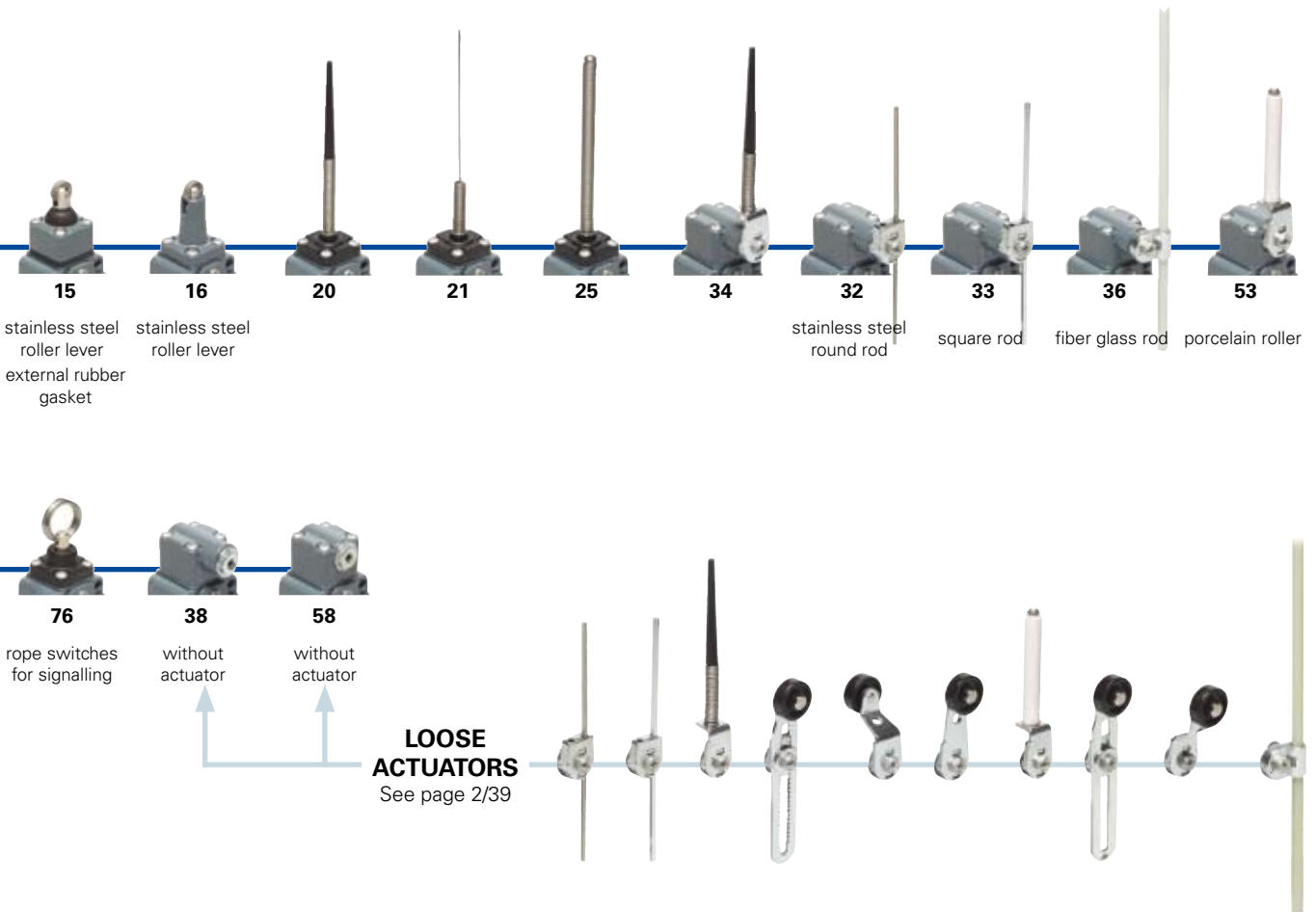
Threaded conduit entry

	PG 11 (standard)
M1	M16x1,5

With assembled cable gland

PG 11	K22	for Ø 5 to Ø 10 mm cables range
	K26	for Ø 3 to Ø 7 mm cables range
M16x1,5	K24	for Ø 5 to Ø 10 mm cables range
	K28	for Ø 3 to Ø 7 mm cables range

—●— 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.

article		options	
FC 302		-1GM1K22	
Housing	FC metal housing, one conduit entry	Preinstalled cable gland	no cable gland (standard)
Contact blocks	3 1NO-1NC, snap action	K22	with assembled cable gland suitable for Ø 5 to Ø 10 mm cables range
	33 1NO+1NC, slow action	K26	with assembled cable gland suitable for Ø 3 to Ø 7 mm cables range
	34 2NC, slow action	Threaded conduit entry	PG 11 (standard)
Actuators	01 short plunger	M1	M16x1,5
	02 roller lever	Contacts type	silver contacts (standard)
	05 offset roller lever	G	silver contacts gold plated 1 µm (contact block 3 excluded)
		
Suffix	no suffix (standard)		
	1 with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57,		
	2 with Ø 35 mm polymer roller (see special loose actuators on page 2/40)		
	3 with Ø 50 mm rubber roller (see special loose actuators on page 2/40)		
	4 with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/40)		



Main data

- Metal housing, one conduit entry
- Protection degree IP67
- 3 contact blocks available
- 26 actuators available
- Silver contacts gold plated versions

Technical data

Housing

Metal housing, coated with baked epoxy powder

One threaded conduit entry

Protection degree: IP67 according to EN 60529

General data

Ambient temperature: from -25°C to +80°C

Version for operation in ambient temperature from -40°C to +80°C on request

Max actuation frequency: 3600 operations cycles¹/hour

Mechanical endurance: 20 million operations cycles¹

Assembling position: any

Driving torque for installation: see pages 7/1-7/10

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by EN 60947-5-1 standard.

Cross section of the conductors (flexible copper wire)

Contact blocks 33, 34: min. 1 x 0,34 mm² (1 x AWG 22)

max. 2 x 1,5 mm² (2 x AWG 16)

Contact block 3: min. 1 x 0,5 mm² (1 x AWG 20)

max. 2 x 1,5 mm² (2 x AWG 16)

In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN 1088, EN ISO 12100-1, EN ISO 12100-2, IEC 60529, EN 60529, NFC 63-140, VDE 0660-200, VDE 0113.

Approvals:

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

Markings and quality marks:



Approval IMQ: EG605
 Approval UL: E131787
 Approval CCC: 2007010305230000
 Approval EZU: 1010151

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: 11-12, 21-22 or 31-32) 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** shown in the travels diagrams on page 7/4. 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 7/1 to page 7/10.

Electrical data

Utilization categories

without connector	Thermal current (I _{th}):	10 A	Alternate current: AC15 (50...60 Hz)			
	Rated insulation voltage (U _i):	500 Vac 600 Vdc	U _e (V)	250	400	500
		400 Vac 500 Vdc (contact blocks 33, 34)	I _e (A)	6	4	1
	Rated impulse withstand voltage (U _{imp}):	6 kV	Direct current: DC13			
		4 kV (contact blocks 33, 34)	U _e (V)	24	125	250
	Conditional short circuit current:	1000 A according to EN 60947-5-1	I _e (A)	6	1,1	0,4
Protection against short circuits:	fuse 10 A 500 V type aM					
Pollution degree:	3					

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (U_i): 500 Vac
400 Vac (for contact blocks 33, 34)

Thermal current (I_{th}): 10 A

Protection against short circuits: fuse 10 A 500 V type aM

Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (for contact blocks 33, 34)

Protection degree: IP67

MV terminals (screw clamps)

Pollution degree 3

Utilization category: AC15

Operation voltage (U_e): 400 Vac (50 Hz)

Operation current (I_e): 3 A

Forms of the contact element: Zb, Y+Y,

Positive opening of contacts on contact block 33, 34

In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/CE.

Please contact our technical service for the list of 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 1, 4X "indoor use only", 12, 13

For all contact blocks except 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 lb in (0,8 Nm).

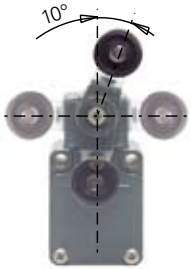
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1,4 Nm).

In conformity with standard: UL 508

Please contact our technical service for the list of 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 movement 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.



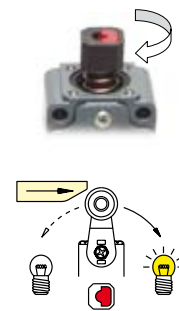
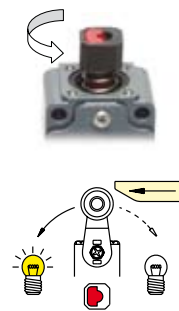
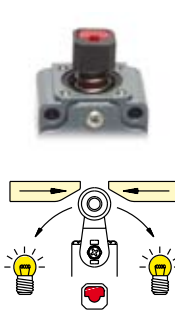
Rotating heads

In all switches, it is possible to rotate the head in 90° steps.



Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston.



Position switches FC series

Contacts type:

- R** = snap action
- L** = slow action

Contact blocks

		With stainless steel roller on request 		With stainless steel roller on request
3	R FC 301 1NO-1NC	FC 302 1NO-1NC	FC 304 1NO-1NC	FC 305 1NO-1NC
33	L FC 3301 1NO+1NC	FC 3302 1NO+1NC	FC 3304 1NO+1NC	FC 3305 1NO+1NC
34	L FC 3401 2NC	FC 3402 2NC	FC 3404 2NC	FC 3405 2NC
Max speed	page 7/3 - type 4	page 7/3 - type 3	0,5 m/s	page 7/3 - type 3
Min. force	6 N (25 N ⊕)	4 N (25 N ⊕)	0,17 Nm	4 N (25 N ⊕)
Travel diagrams	page 7/4 - group 1	page 7/4 - group 2	page 7/4 - group 1	page 7/4 - group 2

Contact blocks

		With external rubber gasket 		With external rubber gasket
3	R FC 308 1NO-1NC	FC 310 1NO-1NC	FC 311 1NO-1NC	FC 315 1NO-1NC
33	L FC 3308 1NO+1NC	FC 3310 1NO+1NC	FC 3311 1NO+1NC	FC 3315 1NO+1NC
34	L FC 3408 2NC	FC 3410 2NC	FC 3411 2NC	FC 3415 2NC
Max speed	page 7/3 - type 4	page 7/3 - type 4	page 7/3 - type 4	page 7/3 - type 2
Min. force	6 N (25 N ⊕)	7 N (25 N ⊕)	6 N (25 N ⊕)	7 N (25 N ⊕)
Travel diagrams	page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1

Contact blocks

		Ø 8 mm stainless steel sphere 	Ø 12,7 mm stainless steel sphere 	With external rubber gasket
3	R FC 316 1NO-1NC	FC 318 1NO-1NC	FC 319 1NO-1NC	FC 320 1NO-1NC
33	L FC 3316 1NO+1NC	FC 3318 1NO+1NC	FC 3319 1NO+1NC	FC 3320 1NO+1NC
34	L FC 3416 2NC	FC 3418 2NC	FC 3419 2NC	FC 3420 2NC
Max speed	page 7/3 - type 2	page 7/3 - type 4	page 7/3 - type 4	1 m/s
Min. force	6 N (25 N ⊕)	6 N (25 N ⊕)	6 N (25 N ⊕)	0,07 Nm
Travel diagrams	page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 3

Accessories See page 6/1

All measures in the drawings are in mm

Contacts type: R = snap action L = slow action	With external rubber gasket	With external rubber gasket	Other rollers available. See page 2/40	Ø 3 mm stainless steel round rod
Contact blocks 3 R FC 321 1NO-1NC 33 L FC 3321 1NO+1NC 34 L FC 3421 2NC	Contact blocks FC 325 1NO-1NC FC 3325 1NO+1NC FC 3425 2NC	Contact blocks FC 331 1NO-1NC FC 3331 1NO+1NC FC 3431 2NC	Contact blocks FC 332 1NO-1NC FC 3332 1NO+1NC FC 3432 2NC	
Max speed	1 m/s	1 m/s	page 7/3 - type 1	1,5 m/s
Min. force	0,06 Nm	0,1 Nm	0,09 Nm (0,25 Nm ⊕)	0,09 Nm
Travel diagrams	page 7/4 - group 3	page 7/4 - group 3	page 7/4 - group 4	page 7/4 - group 4

Contacts type: R = snap action L = slow action	3x3 mm square rod	Other rollers available. See page 2/40	Fiber glass rod
Contact blocks 3 R FC 333 1NO-1NC 33 L FC 3333 1NO+1NC 34 L FC 3433 2NC	Contact blocks FC 334 1NO-1NC FC 3334 1NO+1NC FC 3434 2NC	Contact blocks FC 335 1NO-1NC FC 3335 (1) 1NO+1NC FC 3435 (1) 2NC	Contact blocks FC 336 1NO-1NC FC 3336 1NO+1NC FC 3436 2NC
Max speed	1,5 m/s	1 m/s	1,5 m/s
Min. force	0,09 Nm	0,09 Nm	0,09 Nm
Travel diagrams	page 7/4 - group 4	page 7/4 - group 4	page 7/4 - group 4

Contacts type: R = snap action L = slow action	Other rollers available. See page 2/40	Other rollers available. See page 2/40	Porcelain roller	Other rollers available. See page 2/40
Contact blocks 3 R FC 351 1NO-1NC 33 L FC 3351 ⊕ 1NO+1NC 34 L FC 3451 ⊕ 2NC	Contact blocks FC 352 1NO-1NC FC 3352 ⊕ 1NO+1NC FC 3452 ⊕ 2NC	Contact blocks FC 353-E11 1NO-1NC FC 3353-E11V9 ⊕ 1NO+1NC FC 3453-E11V9 ⊕ 2NC	Contact blocks FC 356 1NO-1NC FC 3356 ⊕ 1NO+1NC FC 3456 ⊕ 2NC	
Max speed	page 7/3 - type 1	page 7/3 - type 1	0,5 m/s	page 7/3 - type 1
Min. force	0,05 Nm (0,25 Nm ⊕)	0,05 Nm (0,25 Nm ⊕)	0,02 Nm (0,25 Nm ⊕)	0,09 Nm (0,25 Nm ⊕)
Travel diagrams	page 7/4 - group 4	page 7/4 - group 4	page 7/4 - group 5	page 7/4 - group 4

Items with code on the green background are available in stock

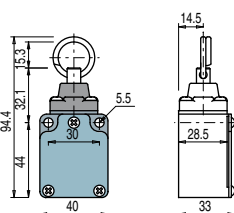
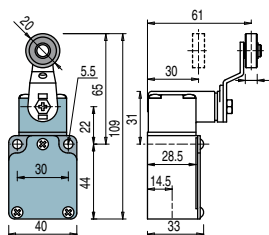
(1) Positive opening only with lever adjusted on the max. See page 2/39.
General Catalog 2011-2012

Contacts type:

R = snap action
L = slow action

Other rollers available. See page 2/40

Rope switches for signalling



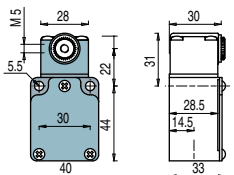
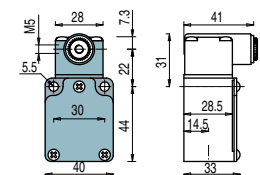
Contact blocks

3	R	FC 357	1NO-1NC	FC 376	1NO-1NC
33	L	FC 3357	1NO+1NC	FC 3376	1NO+1NC
34	L	FC 3457	2NC	FC 3476	2NC
Max speed		page 7/3 - type 1		0,5 m/s	
Min. force		0,09 Nm (0,25 Nm)		initial 20 N - final 40 N	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 6	

Position switches with revolving lever without actuator

Regular head

Compact head



IMPORTANT

For safety applications: join only switches and actuators marked with symbol ⊕.

For more information about safety applications see page 7/1.

Contact blocks

3	R	FC 338	1NO-1NC	FC 358	1NO-1NC
33	L	FC 3338	1NO+1NC	FC 3358	1NO+1NC
34	L	FC 3438	2NC	FC 3458	2NC
Min. force		0,09 Nm (0,25 Nm)		0,05 Nm (0,25 Nm)	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4	

Loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Polymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod actuator	Adjustable actuator with polymer roller	Adjustable fiber glass rod
VF L31 ⊕	VF L32 (3)	VF L33 (3)	VF L34	VF L35 ⊕ (1) (3)	VF L36 (3)
Polymer roller Ø 20 mm	Polymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with polymer roller	Polymer roller Ø 20 mm	
VF L51 ⊕	VF L52 ⊕	VF L53 ⊕ (2)	VF L56 ⊕ (3)	VF L57 ⊕	

Accessories See page 6/1

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

Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Ø 20 mm stainless steel rollers

VF L31-1 (1)	VF L35-1 (1) (3)	VF L51-1 (1)	VF L52-1 (1)	VF L56-1 (3)	VF L57-1 (1)

Ø 35 mm polymer rollers

VF L31-2 (4)	VF L35-2 (1) (3)	VF L51-2 (4)	VF L52-2 (1)	VF L56-2 (3)	VF L57-2 (1)

Ø 40 mm rubber rollers

VF L31-R5 (4)	VF L35-R5 (1) (3)	VF L51-R5 (4)	VF L52-R5 (1)	VF L56-R5 (3)	VF L57-R5 (4)

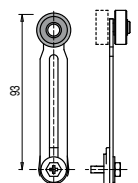
Ø 50 mm rubber rollers

VF L31-3 (4)	VF L35-3 (1) (3)	VF L51-3 (4)	VF L52-3 (4)	VF L56-3 (3)	VF L57-3 (4)

Ø 50 mm overhanging rubber rollers

VF L35-4 (1) (3)	VF L56-4 (3)

- Only orders for multiple quantities of the packs are accepted.
- (1) Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling the switch FC •58 (e.g. FC 358, FC 3358) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FC •53-E11 (e.g. FC 353-E11, FC 3353-E11V9...).
- (3) If it is installed with switch FC •58 (e.g. FC 358, FC 3358...), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.



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