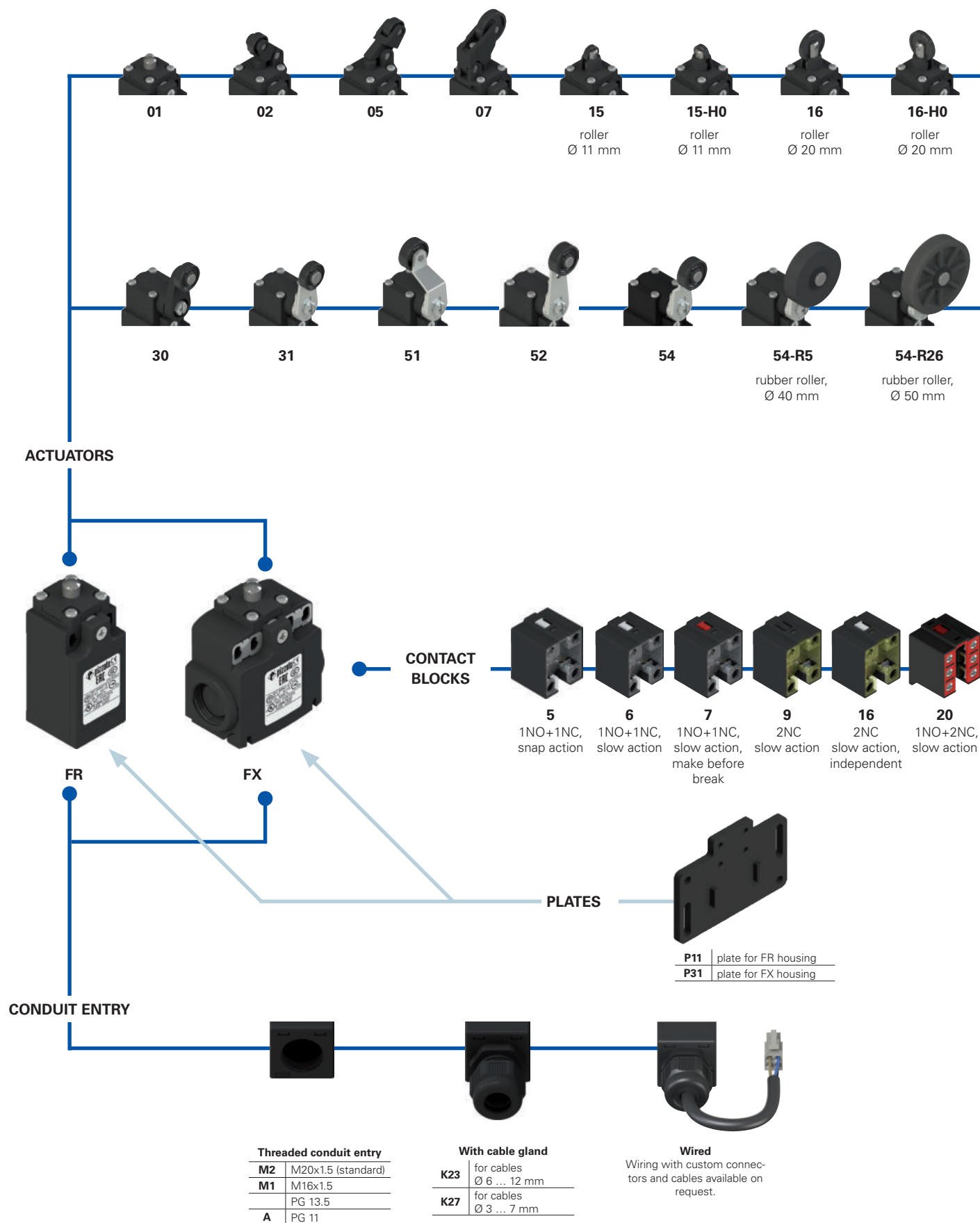
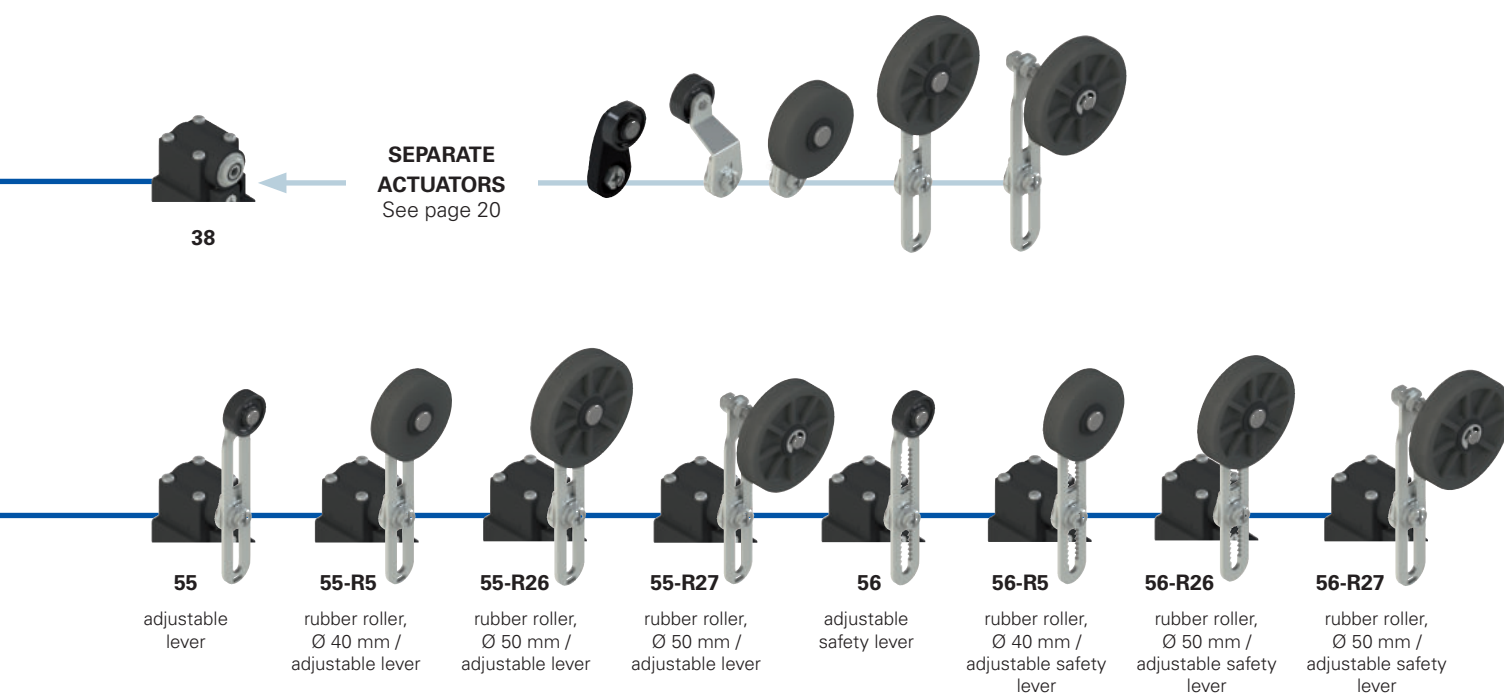


Selection diagram





Code structure

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

article option options
FR 655-GM2K23P11R26T6

Housing

FR technopolymer, one conduit entry

FX technopolymer, two conduit entries

Contact blocks

5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
9	2NC, slow action
16	2NC, slow action, independent
20	1NO+2NC, slow action

Actuators

01	short plunger
02	roller lever
05	angled lever with roller
...	

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact block 20)

Ambient temperature

	-25°C ... +80°C (standard)
T6	-40°C ... +80°C

Rollers

	standard roller
R5	rubber roller, Ø 40 mm
R26	rubber roller, Ø 50 mm
R27	rubber roller, protruding, Ø 50 mm

Fixing plates

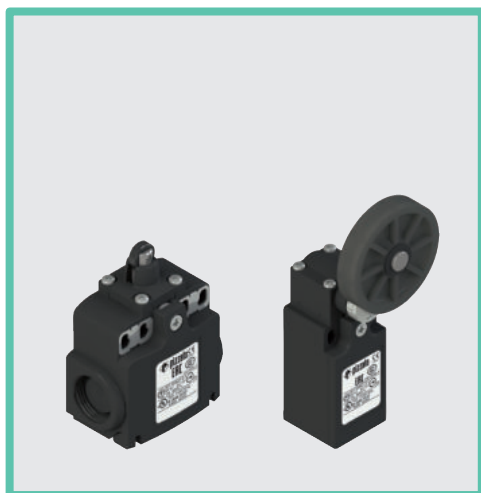
	without plate (standard)
P11	with VF SFP1 plate for FR housing
P31	with VF SFP3 plate for FX housing

Threaded conduit entry

M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5
A	PG 11

Pre-installed cable glands

K23	for cables Ø 6 ... 12 mm
K27	for cables Ø 3 ... 7 mm



Main features

- Technopolymer housing, from one to two conduit entries
- Protection degree IP67
- Wired versions
- Versions with gold-plated silver contacts

Quality marks:



IMO approval:	EG610
UL approval:	E131787
CCC approval:	2007010305230013
EAC approval:	RU C-IT.YT03.B.00035/19

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: 

FR series, one conduit entry: M20x1.5 (standard)

FX series, two knock-out threaded conduit entries: M20x1.5 (standard)

Protection degree acc. to EN 60529: IP67 with cable gland of equal or higher protection degree

General data

Ambient temperature: -25°C ... +80°C (standard)
-40°C ... +80°C (T6 option)

Max. operating frequency: 3600 operating cycles/hour

Mechanical endurance: 20 million operating cycles

Mounting position: any

Safety parameter B_{10D}: 40,000,000 for NC contacts

Mechanical interlock, not coded: type 1 acc. to EN ISO 14119

Tightening torques for installation: see page 141

Wire cross-sections and wire stripping lengths: see page 153

In compliance with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50047, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN IEC 63000, EN 81-20, EN 81-50, UL 508, CSA 22.2 No.14

Approvals:

IEC 60947-5-1, UL 508, CSA 22.2 No.14, GB/T14048.5-2017.

Compliance with the requirements of:

Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, Lift Directive 2014/33/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

Installation for safety applications:

Use only switches marked with the symbol  next to the product code. Always connect the safety circuit to the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in **standard EN 81-20 par. 5.11.2.2.1**. Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams on page 142. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

 **If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 139 to 146.**

Electrical data		Utilization category		
Thermal current (I _{th}):	10 A	Alternating 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 block 20)	I _e (A)	6	4 1
Rated impulse withstand voltage (U _{imp}):	6 kV	Direct current: DC13		
	4 kV (contact block 20)	U _e (V)	24	125 250
Conditional short circuit current:	1000 A acc. to EN 60947-5-1	I _e (A)	3	0.55 0.3
Protection against short circuits:	type aM fuse 10 A 500 V			
Pollution degree:	3			

Features approved by IMO

Rated insulation voltage (U _i):	500 Vac 400 Vac (for contact block 20)
Conventional free air thermal current (I _{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U _{imp}):	6 kV 4 kV (for contact block 20)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U _e):	400 Vac (50 Hz)
Operating current (I _e):	3 A
Forms of the contact element:	Zb, Y+Y, Y+Y+X
Positive opening contacts on contact blocks	5, 6, 7, 9, 16, 20
In compliance with standards:	EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU

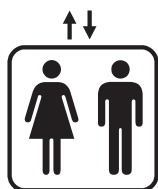
Please contact our technical department for the list of approved products.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13
For all contact blocks use 60 or 75°C copper (Cu) conductors, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).	
The hub is to be connected to the conduit before the hub is connected to the enclosure.	

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

Compliant with EN 81-20 and EN 81-50



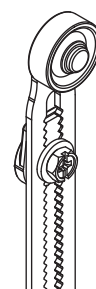
- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10⁶ cycles.

Protection degree IP67

IP67

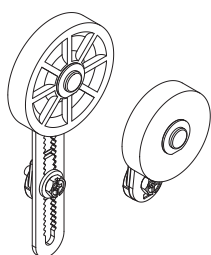
All switches of these series have protection degree IP67.

Adjustable safety lever



The adjustable lever code 56 (and variants) is provided with a notching that prevents the sliding also in case the fastening screw becomes loose.

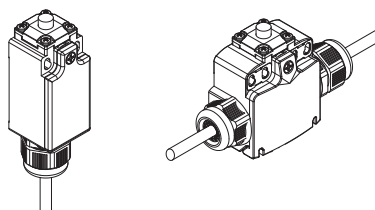
Rubber rollers



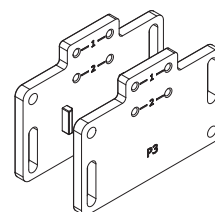
Various actuators are available with rubber rollers. Customers can therefore use the most suitable product for the speed of their particular lift, to reduce cabin noise to a minimum.

Cable outlets

Switches available with cable outlets in various directions, for use in the most confined of spaces.



Adapter plates

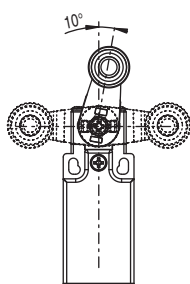


Fixing plate with large slotted holes for switching point adjustment. Developed for backwards compatibility with previous products.

Each plate is provided with two pairs of mounting holes, one for standard switches and one for switches with reset device. The actuator thus always has the same actuating point.

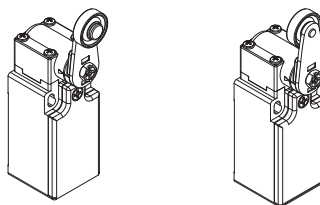
Adjustable levers

For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 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.



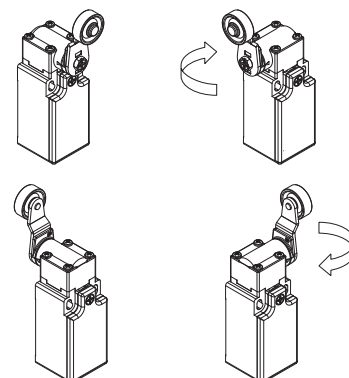
Reversible levers

For switches with swivelling lever, the lever can be fastened on straight or reverse side maintaining the positive coupling. In this way two different working planes of the lever are possible.



Head with variable orientation

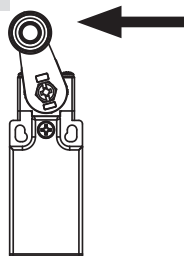
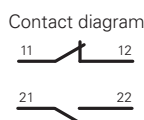
The head of all switches is adjustable in 90° steps.



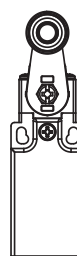
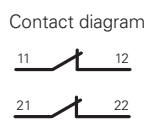
Operation of contact block 16 with independent contacts

The contact block 16 is provided with two NC contacts, **both with positive opening**, that can be independently switched depending on the lever turning direction.

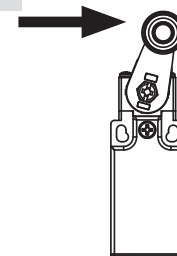
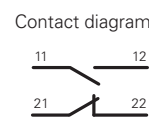
Lever turned to left



Lever not actuated



Lever turned to right



Extended temperature range

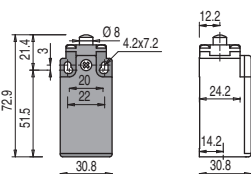
-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from +80°C up to -40°C.

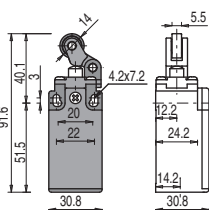
They can therefore be used for applications in cold stores, sterilisers, and other equipment operated in very low-temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Contact type:

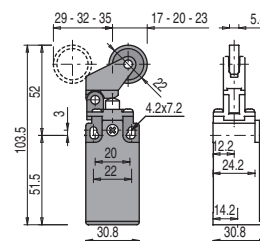
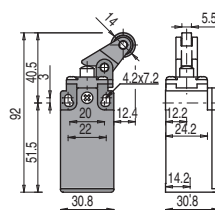
- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



With stainless steel roller on request



With stainless steel roller on request

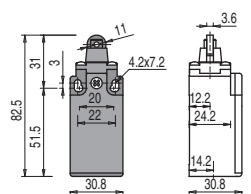


Contact blocks

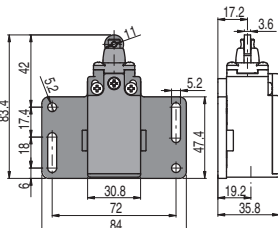
5	R	FR 501-M2	➔	1NO+1NC	FR 502-M2	➔	1NO+1NC	FR 505-M2	➔	1NO+1NC	FR 507-M2	➔	1NO+1NC
6	L	FR 601-M2	➔	1NO+1NC	FR 602-M2	➔	1NO+1NC	FR 605-M2	➔	1NO+1NC	FR 607-M2	➔	1NO+1NC
7	LO	FR 701-M2	➔	1NO+1NC	FR 702-M2	➔	1NO+1NC	FR 705-M2	➔	1NO+1NC	FR 707-M2	➔	1NO+1NC
9	L	FR 901-M2	➔	2NC	FR 902-M2	➔	2NC	FR 905-M2	➔	2NC	FR 907-M2	➔	2NC
16	LI	/		/	/		/	/		/	/		/
20	L	FR 2001-M2	➔	1NO+2NC	FR 2002-M2	➔	1NO+2NC	FR 2005-M2	➔	1NO+2NC	FR 2007-M2	➔	1NO+2NC
Max. speed		page 141 - type 4			page 141 - type 3			page 141 - type 3			page 141 - type 3		
Actuating force		8 N (25 N ➔)			6 N (25 N ➔)			6 N (25 N ➔)			4 N (25 N ➔)		
Travel diagrams		page 142 - group 1a			page 142 - group 2a			page 142 - group 2a			page 142 - group 3a		

Contact type:

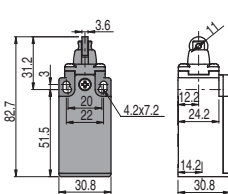
- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



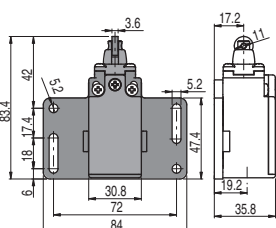
With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request

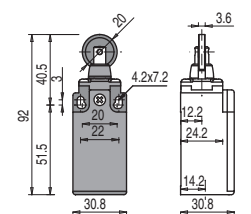


Contact blocks

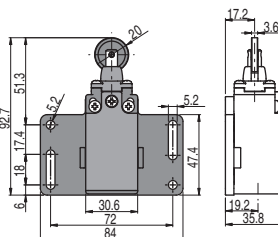
5	R	FR 515-M2	➔	1NO+1NC	FR 515-M2P11	➔	1NO+1NC	FR 515-H0M2	➔	1NO+1NC	FR 515-H0M2P11	➔	1NO+1NC
6	L	FR 615-M2	➔	1NO+1NC	FR 615-M2P11	➔	1NO+1NC	FR 615-H0M2	➔	1NO+1NC	FR 615-H0M2P11	➔	1NO+1NC
7	LO	FR 715-M2	➔	1NO+1NC	FR 715-M2P11	➔	1NO+1NC	FR 715-H0M2	➔	1NO+1NC	FR 715-H0M2P11	➔	1NO+1NC
9	L	FR 915-M2	➔	2NC	FR 915-M2P11	➔	2NC	FR 915-H0M2	➔	2NC	FR 915-H0M2P11	➔	2NC
16	LI	/		/	/		/	/		/	/		/
20	L	FR 2015-M2	➔	1NO+2NC	FR 2015-M2P11	➔	1NO+2NC	FR 2015-H0M2	➔	1NO+2NC	FR 2015-H0M2P11	➔	1NO+2NC
Max. speed		page 141 - type 2			page 141 - type 2			page 141 - type 2			page 141 - type 2		
Actuating force		8 N (25 N ➔)			8 N (25 N ➔)			8 N (25 N ➔)			8 N (25 N ➔)		
Travel diagrams		page 142 - group 1a			page 142 - group 1a			page 142 - group 1a			page 142 - group 1a		

Contact type:

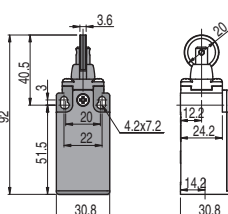
- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



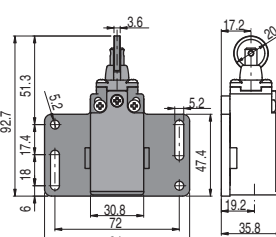
With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request



With Ø 12 mm stainless steel roller on request



Contact blocks

5	R	FR 516-M2	➔	1NO+1NC	FR 516-M2P11	➔	1NO+1NC	FR 516-H0M2	➔	1NO+1NC	FR 516-H0M2P11	➔	1NO+1NC
6	L	FR 616-M2	➔	1NO+1NC	FR 616-M2P11	➔	1NO+1NC	FR 616-H0M2	➔	1NO+1NC	FR 616-H0M2P11	➔	1NO+1NC
7	LO	FR 716-M2	➔	1NO+1NC	FR 716-M2P11	➔	1NO+1NC	FR 716-H0M2	➔	1NO+1NC	FR 716-H0M2P11	➔	1NO+1NC
9	L	FR 916-M2	➔	2NC	FR 916-M2P11	➔	2NC	FR 916-H0M2	➔	2NC	FR 916-H0M2P11	➔	2NC
16	LI	/		/	/		/	/		/	/		/
20	L	FR 2016-M2	➔	1NO+2NC	FR 2016-M2P11	➔	1NO+2NC	FR 2016-H0M2	➔	1NO+2NC	FR 2016-H0M2P11	➔	1NO+2NC
Max. speed		page 141 - type 2			page 141 - type 2			page 141 - type 2			page 141 - type 2		
Actuating force		8 N (25 N ➔)			8 N (25 N ➔)			8 N (25 N ➔)			8 N (25 N ➔)		
Travel diagrams		page 142 - group 1a			page 142 - group 1a			page 142 - group 1a			page 142 - group 1a		

All values in the drawings are in mm

Accessories See page 135

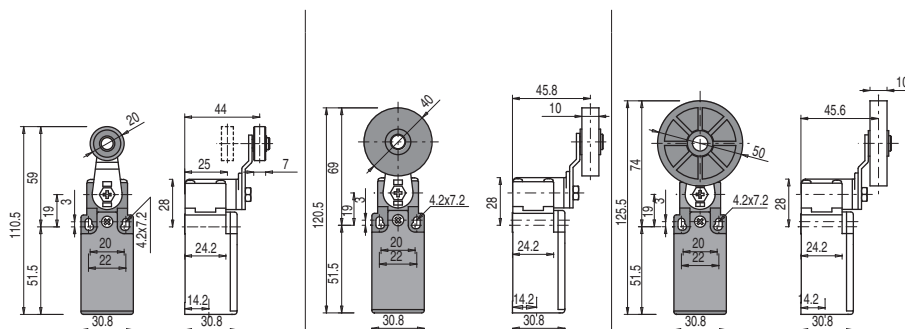
➔ The 2D and 3D files are available at www.pizzato.com

Contact type:		With Ø 20 mm stainless steel roller on request		Other rollers available. See page 20		Other rollers available. See page 20		Other rollers available. See page 20	
R = snap action L = slow action LO = slow action, make before break LI = slow action, independent									
Contact blocks									
5	R	FR 530-M2	➔ 1NO+1NC	FR 531-M2	➔ 1NO+1NC	FR 551-M2	➔ 1NO+1NC	FR 552-M2	➔ 1NO+1NC
6	L	FR 630-M2	➔ 1NO+1NC	FR 631-M2	➔ 1NO+1NC	FR 651-M2	➔ 1NO+1NC	FR 652-M2	➔ 1NO+1NC
7	LO	FR 730-M2	➔ 1NO+1NC	FR 731-M2	➔ 1NO+1NC	FR 751-M2	➔ 1NO+1NC	FR 752-M2	➔ 1NO+1NC
9	L	FR 930-M2	➔ 2NC	FR 931-M2	➔ 2NC	FR 951-M2	➔ 2NC	FR 952-M2	➔ 2NC
16	LI	FR 1630-M2	➔ 2NC	FR 1631-M2	➔ 2NC	FR 1651-M2	➔ 2NC	FR 1652-M2	➔ 2NC
20	L	FR 2030-M2	➔ 1NO+2NC	FR 2031-M2	➔ 1NO+2NC	FR 2051-M2	➔ 1NO+2NC	FR 2052-M2	➔ 1NO+2NC
Max. speed		page 141 - type 1		page 141 - type 1		page 141 - type 1		page 141 - type 1	
Actuating force		0.06 Nm (0.25 Nm ➔)		0.06 Nm (0.25 Nm ➔)		0.06 Nm (0.25 Nm ➔)		0.06 Nm (0.25 Nm ➔)	
Travel diagrams		page 142 - group 4a		page 142 - group 4a		page 142 - group 4a		page 142 - group 4a	

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

Contact type:

- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

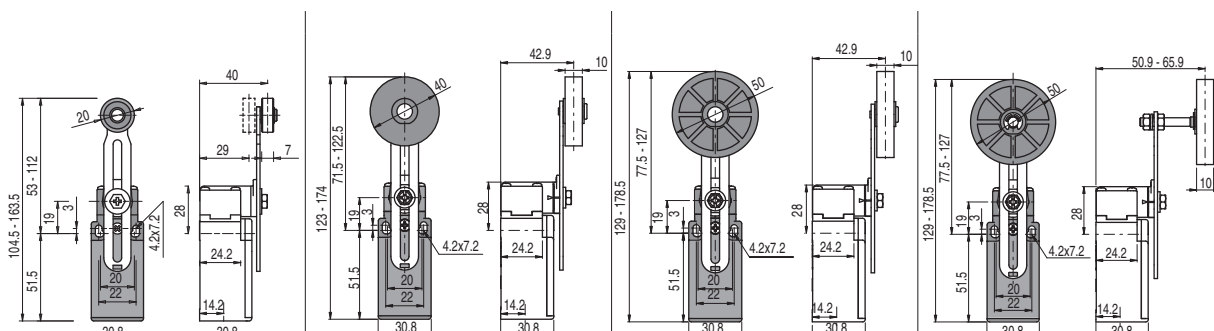


Contact blocks

5	R	FR 554-M2	➔	1NO+1NC	FR 554-M2R5	➔	1NO+1NC	FR 554-M2R26	➔	1NO+1NC
6	L	FR 654-M2	➔	1NO+1NC	FR 654-M2R5	➔	1NO+1NC	FR 654-M2R26	➔	1NO+1NC
7	LO	FR 754-M2	➔	1NO+1NC	FR 754-M2R5	➔	1NO+1NC	FR 754-M2R26	➔	1NO+1NC
9	L	FR 954-M2	➔	2NC	FR 954-M2R5	➔	2NC	FR 954-M2R26	➔	2NC
16	LI	FR 1654-M2	➔	2NC	FR 1654-M2R5	➔	2NC	FR 1654-M2R26	➔	2NC
20	L	FR 2054-M2	➔	1NO+2NC	FR 2054-M2R5	➔	1NO+2NC	FR 2054-M2R26	➔	1NO+2NC
Max. speed		page 141 - type 1				page 141 - type 1				
Actuating force		0.06 Nm (0.25 Nm ➔)				0.06 Nm (0.25 Nm ➔)				
Travel diagrams		page 142 - group 4a				page 142 - group 4a				

Contact type:

- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent

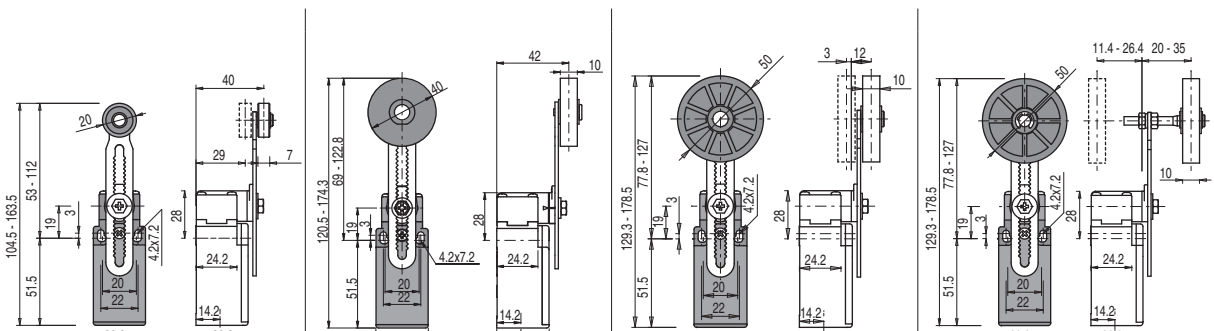


Contact blocks

5	R	FR 555-M2		⁽¹⁾ 1NO+1NC	FR 555-M2R5		⁽¹⁾ 1NO+1NC	FR 555-M2R26		⁽¹⁾ 1NO+1NC	FR 555-M2R27		⁽¹⁾ 1NO+1NC
6	L	FR 655-M2		⁽¹⁾ 1NO+1NC	FR 655-M2R5		⁽¹⁾ 1NO+1NC	FR 655-M2R26		⁽¹⁾ 1NO+1NC	FR 655-M2R27		⁽¹⁾ 1NO+1NC
7	LO	FR 755-M2		⁽¹⁾ 1NO+1NC	FR 755-M2R5		⁽¹⁾ 1NO+1NC	FR 755-M2R26		⁽¹⁾ 1NO+1NC	FR 755-M2R27		⁽¹⁾ 1NO+1NC
9	L	FR 955-M2		⁽¹⁾ 2NC	FR 955-M2R5		⁽¹⁾ 2NC	FR 955-M2R26		⁽¹⁾ 2NC	FR 955-M2R27		⁽¹⁾ 2NC
16	LI	FR 1655-M2		⁽¹⁾ 2NC	FR 1655-M2R5		⁽¹⁾ 2NC	FR 1655-M2R26		⁽¹⁾ 2NC	FR 1655-M2R27		⁽¹⁾ 2NC
20	L	FR 2055-M2		⁽¹⁾ 1NO+2NC	FR 2055-M2R5		⁽¹⁾ 1NO+2NC	FR 2055-M2R26		⁽¹⁾ 1NO+2NC	FR 2055-M2R27		⁽¹⁾ 1NO+2NC
Max. speed		page 141 - type 1				page 141 - type 1				page 141 - type 1			
Actuating force		0.06 Nm (0.25 Nm )				0.06 Nm (0.25 Nm )				0.06 Nm (0.25 Nm )			
Travel diagrams		page 142 - group 4a				page 142 - group 4a				page 142 - group 4a			

Contact type:

- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



Contact blocks

5	R	FR 556-M2	➔	1NO+1NC	FR 556-M2R5	➔	1NO+1NC	FR 556-M2R26	➔	1NO+1NC	FR 556-M2R27	➔	1NO+1NC
6	L	FR 656-M2	➔	1NO+1NC	FR 656-M2R5	➔	1NO+1NC	FR 656-M2R26	➔	1NO+1NC	FR 656-M2R27	➔	1NO+1NC
7	LO	FR 756-M2	➔	1NO+1NC	FR 756-M2R5	➔	1NO+1NC	FR 756-M2R26	➔	1NO+1NC	FR 756-M2R27	➔	1NO+1NC
9	L	FR 956-M2	➔	2NC	FR 956-M2R5	➔	2NC	FR 956-M2R26	➔	2NC	FR 956-M2R27	➔	2NC
16	LI	FR 1656-M2	➔	2NC	FR 1656-M2R5	➔	2NC	FR 1656-M2R26	➔	2NC	FR 1656-M2R27	➔	2NC
20	L	FR 2056-M2	➔	1NO+2NC	FR 2056-M2R5	➔	1NO+2NC	FR 2056-M2R26	➔	1NO+2NC	FR 2056-M2R27	➔	1NO+2NC
Max. speed		page 141 - type 1				page 141 - type 1				page 141 - type 1			
Actuating force		0.06 Nm (0.25 Nm ➔)				0.06 Nm (0.25 Nm ➔)				0.06 Nm (0.25 Nm ➔)			
Travel diagrams		page 142 - group 4a				page 142 - group 4a				page 142 - group 4a			

⁽¹⁾ Positive opening only with actuator set to max.

All values in the drawings are in mm

Accessories See page 135

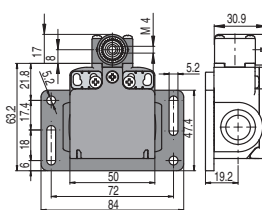
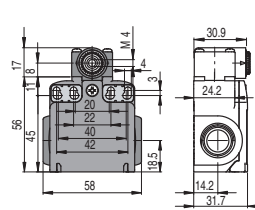
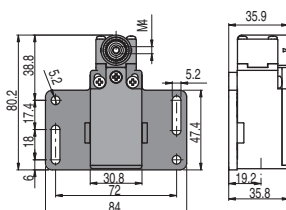
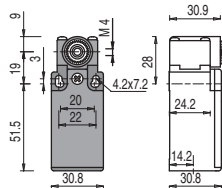
➔ The 2D and 3D files are available at www.pizzato.com



Position switches with swivelling lever without actuator

Contact type:

- R** = snap action
L = slow action
LO = slow action, make before break
LI = slow action, independent



Contact blocks

5	R	FR 538-M2	➔	1NO+1NC	FR 538-M2P11	➔	1NO+1NC	FX 538-M2	➔	1NO+1NC	FX 538-M2P31	➔	1NO+1NC
6	L	FR 638-M2	➔	1NO+1NC	FR 638-M2P11	➔	1NO+1NC	FX 638-M2	➔	1NO+1NC	FX 638-M2P31	➔	1NO+1NC
7	LO	FR 738-M2	➔	1NO+1NC	FR 738-M2P11	➔	1NO+1NC	FX 738-M2	➔	1NO+1NC	FX 738-M2P31	➔	1NO+1NC
9	L	FR 938-M2	➔	2NC	FR 938-M2P11	➔	2NC	FX 938-M2	➔	2NC	FX 938-M2P31	➔	2NC
16	LI	FR 1638-M2	➔	2NC	FR 1638-M2P11	➔	2NC	FX 1638-M2	➔	2NC	FX 1638-M2P31	➔	2NC
20	L	FR 2038-M2	➔	1NO+2NC	FR 2038-M2P11	➔	1NO+2NC	FX 2038-M2	➔	1NO+2NC	FX 2038-M2P31	➔	1NO+2NC
Actuating force		0.06 Nm (0.25 Nm ➔)			0.06 Nm (0.25 Nm ➔)			0.06 Nm (0.25 Nm ➔)			0.06 Nm (0.25 Nm ➔)		
Travel diagrams		page 142 - group 4a			page 142 - group 4a			page 142 - group 4a			page 142 - group 4a		

IMPORTANT

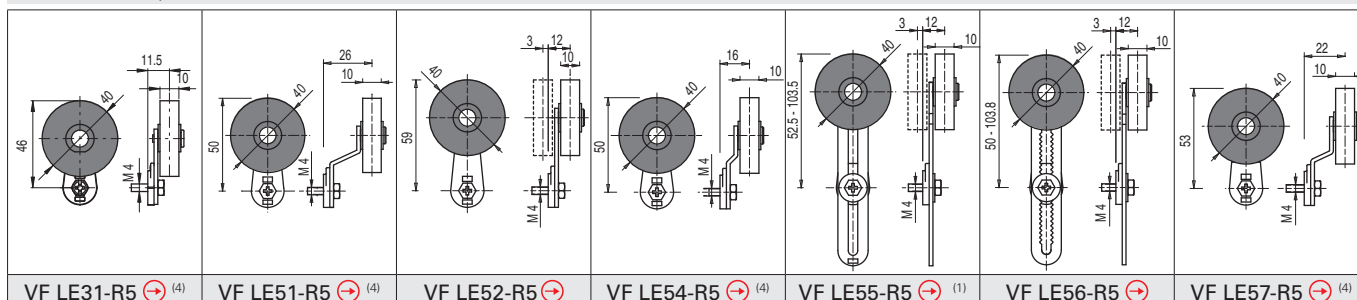
For safety applications: join only switches and actuators marked with symbol ➔ next to the product code.

For more information about safety applications see details on page 139.

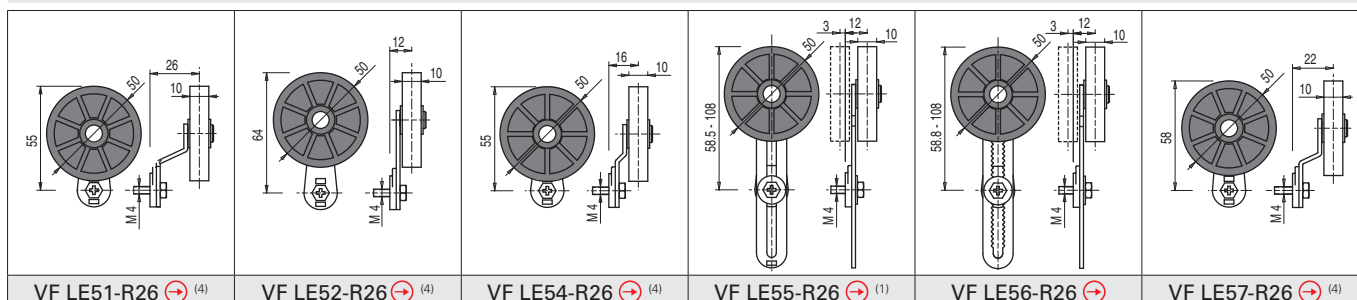
Special separate actuators

IMPORTANT: These separate actuators can be used only with items of the FR, FX series.

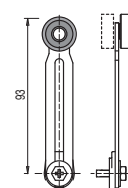
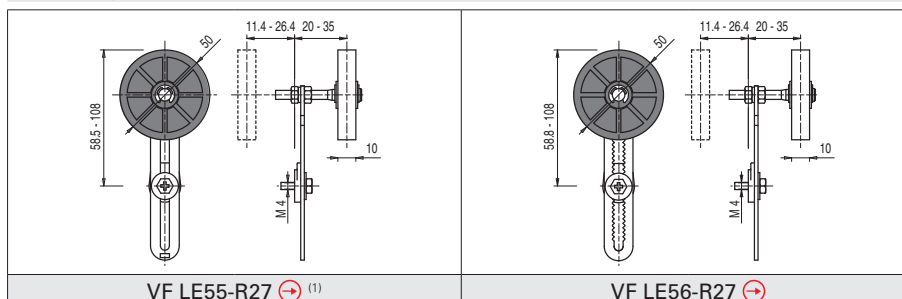
Rubber rollers, Ø 40 mm



Rubber rollers, Ø 50 mm



Protruding rubber rollers, Ø 50 mm



- ⁽¹⁾ Actuator VF LE55 can only be used in safety applications if adjusted to its max. length, as shown in the figure to the right.

If an adjustable lever is required for safety applications, use the VF LE56 adjustable safety lever.

- ⁽⁴⁾ The actuator cannot be rotated to the inside because it will hit the switch head upon actuation.

All values in the drawings are in mm

Accessories See page 135

➔ The 2D and 3D files are available at www.pizzato.com