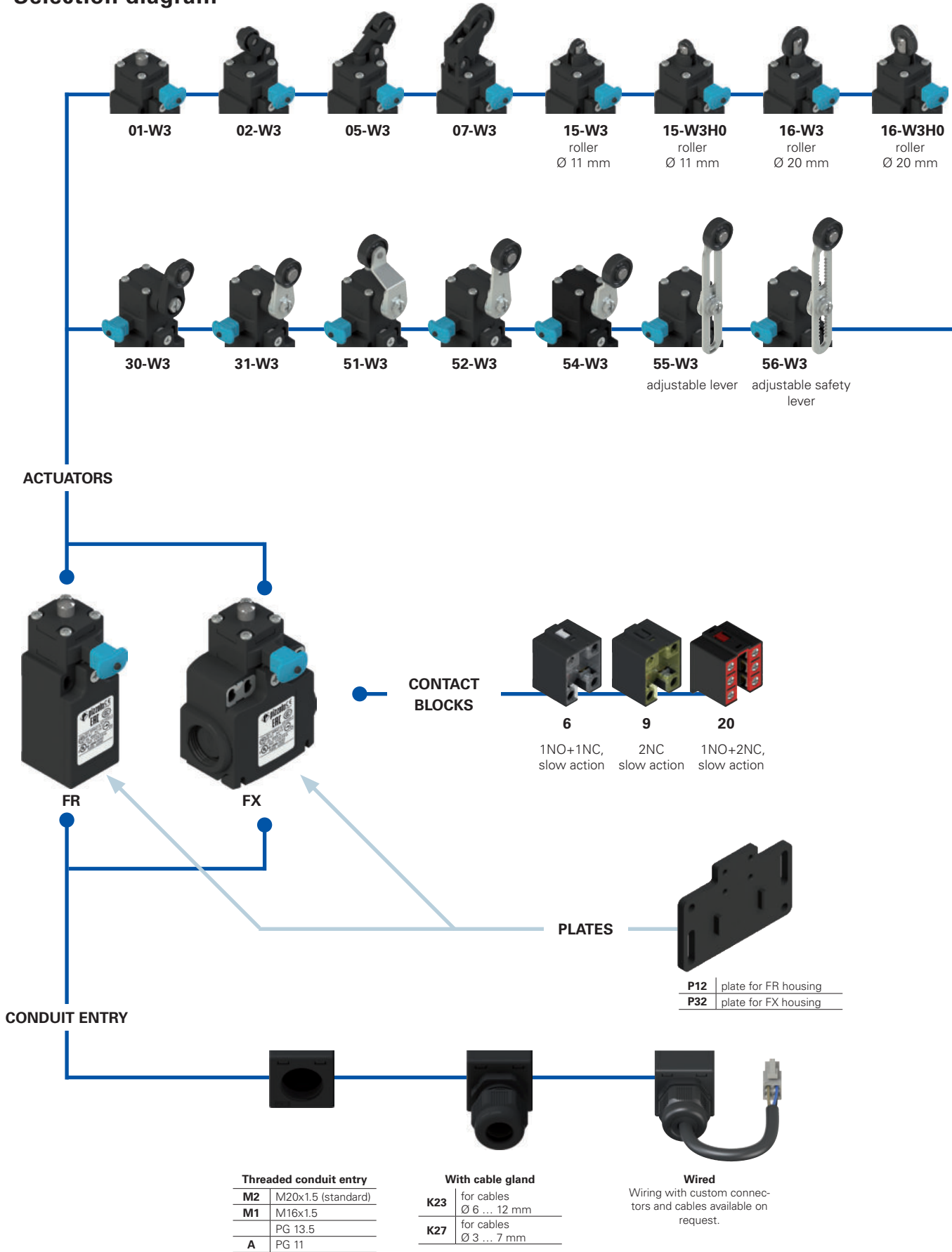


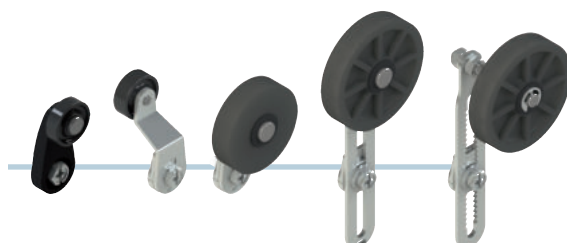
Selection diagram



● product options  
➔ sold separately as accessory



**SEPARATE ACTUATORS**  
See page 36



### 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-W3GM2K23P12R26T6**

Housing	
<b>FR</b>	technopolymer, one conduit entry
<b>FX</b>	technopolymer, two conduit entries

Contact blocks	
<b>6</b>	1NO+1NC, slow action
<b>9</b>	2NC, slow action
<b>20</b>	1NO+2NC, slow action

Actuators	
<b>01</b>	short plunger
<b>02</b>	roller lever
<b>05</b>	angled lever with roller
...	.....

Engagement reset	
<b>W3</b>	simultaneous reset (standard)
<b>W4</b>	simultaneous reset with increased force

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts with 1 µm gold coating
<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact block 20)

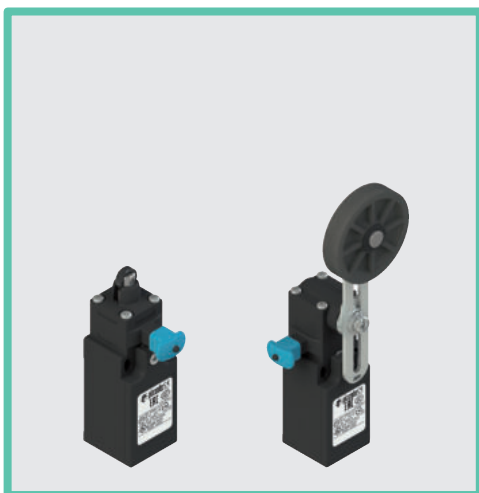
Threaded conduit entry	
<b>M2</b>	M20x1.5 (standard)
<b>M1</b>	M16x1.5
	PG 13.5
<b>A</b>	PG 11

Ambient temperature	
	-25°C ... +80°C (standard)
<b>T6</b>	-40°C ... +80°C

Rollers	
	standard roller
<b>R5</b>	rubber roller, Ø 40 mm
<b>R26</b>	rubber roller, Ø 50 mm
<b>R27</b>	rubber roller, protruding, Ø 50 mm

Fixing plates	
	without plate (standard)
<b>P12</b>	with VF SFP1 plate for FR housing
<b>P32</b>	with VF SFP3 plate for FX housing

Pre-installed cable glands	
<b>K23</b>	for cables Ø 6 ... 12 mm
<b>K27</b>	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:



IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
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 <sub>10D</sub> :	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 <sub>th</sub> ):	10 A	Alternating current: AC15 (50÷60 Hz)
Rated insulation voltage (U <sub>i</sub> ):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact block 20)	
Rated impulse withstand voltage (U <sub>imp</sub> ):	6 kV 4 kV (contact block 20)	U <sub>e</sub> (V) 250 400 500 I <sub>e</sub> (A) 6 4 1
Conditional short circuit current:	1000 A acc. to EN 60947-5-1	Direct current: DC13
Protection against short circuits:	type aM fuse 10 A 500 V	U <sub>e</sub> (V) 24 125 250 I <sub>e</sub> (A) 3 0.55 0.3
Pollution degree:	3	

### Features approved by IMQ

Rated insulation voltage (U <sub>i</sub> ):	500 Vac 400 Vac (for contact block 20)
Conventional free air thermal current (I <sub>th</sub> ):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U <sub>imp</sub> ):	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 <sub>e</sub> ):	400 Vac (50 Hz)
Operating current (I <sub>e</sub> ):	3 A
Forms of the contact element:	Zb, Y+Y, Y+Y+X
Positive opening of contacts on contact blocks 6, 9, 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.

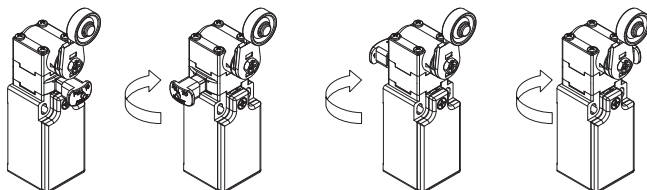
### Features approved by UL

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.

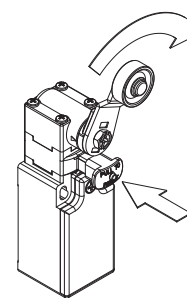
### Orientation of reset device adjustable

The reset device can be turned independently of the above actuator, making positioning of the product incredibly flexible. Extracting the blue button resets the device – as laid down in the standards – to prevent unintentional reset.



### W3 simultaneous reset

Pizzato Elettrica has developed and patented an innovative reset device. This device ensures that, when the switch is activated, the electrical contacts trip and the reset system latches simultaneously. As a result, snap action contact blocks are no longer required, and furthermore, problems resulting from delays between the reset button latching and contacts opening are avoided.



### Compliant with EN 81-20 and EN 81-50



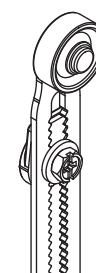
- Safety contacts in compliance with EN 60947-5-1, annex K.
- Protection degree higher than IP4x.
- Mechanical service life > 10<sup>6</sup> cycles.

### Protection degree IP67

# IP67

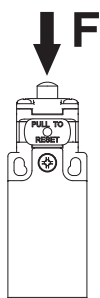
All switches of these series have protection degree IP67.

### 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.

### Increased actuating force

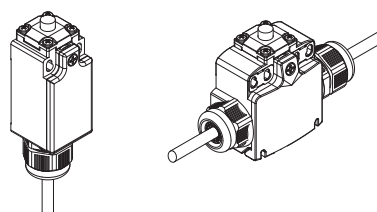


The switch can be delivered with increased actuating force (option W4). Ideal for vibration applications.

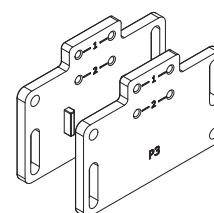
Actuators	Force
01, 14, 15, 16	7 N
02, 05	6 N
07	3.5 N
30 ... 56	0.08 Nm

### Cable outlets

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



### Adapter plates

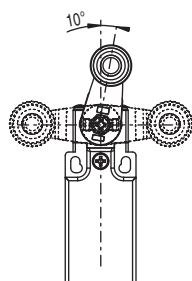


Fixing plate with large slotted holes for switching point adjustment. Developed for backwards compatibility with previous products.

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

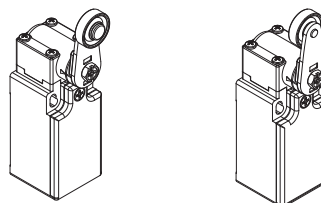
For switches with swivelling lever, the lever can be adjusted in 10° steps over the entire 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



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.

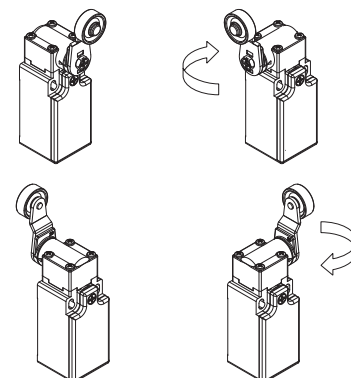
### Reversible levers

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.



### Extended temperature range

# -40°C

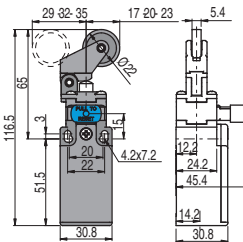
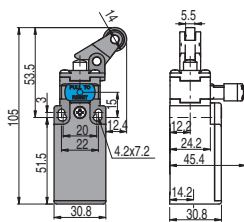
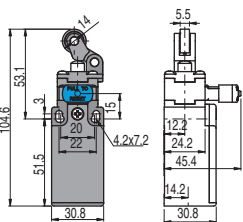
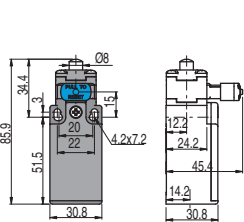
These devices are also available in a special version suitable for an ambient operating temperature range from +80°C up to -40°C.

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.

# Switches with manual reset

Contact type:

**L** = slow action

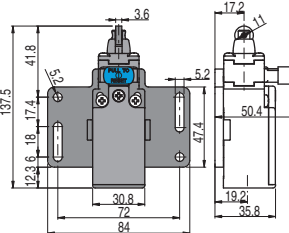
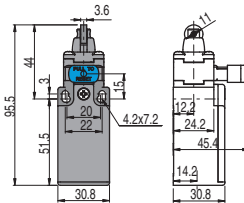
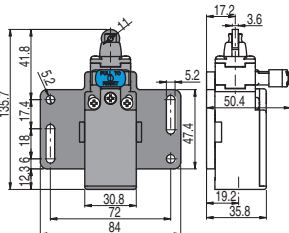
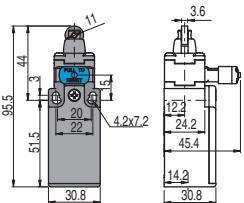


Contact blocks

6	<b>L</b>	FR 601-W3M2	⊕	1NO+1NC	FR 602-W3M2	⊕	1NO+1NC	FR 605-W3M2	⊕	1NO+1NC	FR 607-W3M2	⊕	1NO+1NC
9	<b>L</b>	FR 901-W3M2	⊕	2NC	FR 902-W3M2	⊕	2NC	FR 905-W3M2	⊕	2NC	FR 907-W3M2	⊕	2NC
20	<b>L</b>	FR 2001-W3M2	⊕	1NO+2NC	FR 2002-W3M2	⊕	1NO+2NC	FR 2005-W3M2	⊕	1NO+2NC	FR 2007-W3M2	⊕	1NO+2NC
Max. speed		page 141 - type 4		page 141 - type 3		page 141 - type 3		page 141 - type 3		page 141 - type 3			
Actuating force		4.5 N (25 N ⊕)		4 N (25 N ⊕)		4 N (25 N ⊕)		4 N (25 N ⊕)		2.5 N (25 N ⊕)			
Travel diagrams		page 142 - group 1c		page 142 - group 2c		page 142 - group 2c		page 142 - group 2c		page 142 - group 3c			

Contact type:

**L** = slow action

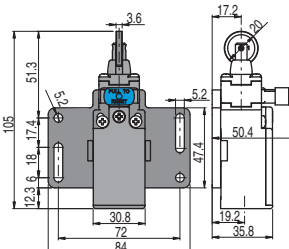
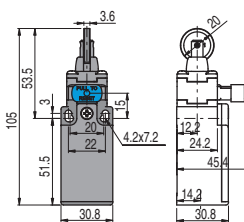
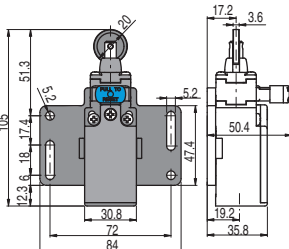
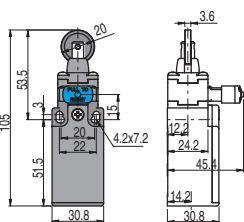


Contact blocks

6	<b>L</b>	FR 615-W3M2	⊕	1NO+1NC	FR 615-W3M2P12	⊕	1NO+1NC	FR 615-W3H0M2	⊕	1NO+1NC	FR 615-W3H0M2P12	⊕	1NO+1NC
9	<b>L</b>	FR 915-W3M2	⊕	2NC	FR 915-W3M2P12	⊕	2NC	FR 915-W3H0M2	⊕	2NC	FR 915-W3H0M2P12	⊕	2NC
20	<b>L</b>	FR 2015-W3M2	⊕	1NO+2NC	FR 2015-W3M2P12	⊕	1NO+2NC	FR 2015-W3H0M2	⊕	1NO+2NC	FR 2015-W3H0M2P12	⊕	1NO+2NC
Max. speed		page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2			
Actuating force		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)			
Travel diagrams		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c			

Contact type:

**L** = slow action



Contact blocks

6	<b>L</b>	FR 616-W3M2	⊕	1NO+1NC	FR 616-W3M2P12	⊕	1NO+1NC	FR 616-W3H0M2	⊕	1NO+1NC	FR 616-W3H0M2P12	⊕	1NO+1NC
9	<b>L</b>	FR 916-W3M2	⊕	2NC	FR 916-W3M2P12	⊕	2NC	FR 916-W3H0M2	⊕	2NC	FR 916-W3H0M2P12	⊕	2NC
20	<b>L</b>	FR 2016-W3M2	⊕	1NO+2NC	FR 2016-W3M2P12	⊕	1NO+2NC	FR 2016-W3H0M2	⊕	1NO+2NC	FR 2016-W3H0M2P12	⊕	1NO+2NC
Max. speed		page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2			
Actuating force		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)		4.5 N (25 N ⊕)			
Travel diagrams		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c			

All values in the drawings are in mm

Accessories See page 135

→ The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)



Contact type:	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		With Ø 12 mm stainless steel roller on request	
<b>L</b> = slow action								
Contact blocks								
6 <b>L</b>	FX 615-W3M2	➔ 1NO+1NC	FX 615-W3M2P32	➔ 1NO+1NC	FX 615-W3H0M2	➔ 1NO+1NC	FX 615-W3H0M2P32	➔ 1NO+1NC
9 <b>L</b>	FX 915-W3M2	➔ 2NC	FX 915-W3M2P32	➔ 2NC	FX 915-W3H0M2	➔ 2NC	FX 915-W3H0M2P32	➔ 2NC
20 <b>L</b>	FX 2015-W3M2	➔ 1NO+2NC	FX 2015-W3M2P32	➔ 1NO+2NC	FX 2015-W3H0M2	➔ 1NO+2NC	FX 2015-W3H0M2P32	➔ 1NO+2NC
Max. speed	page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2	
Actuating force	4.5 N (25 N ➔)		4.5 N (25 N ➔)		4.5 N (25 N ➔)		4.5 N (25 N ➔)	
Travel diagrams	page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c	

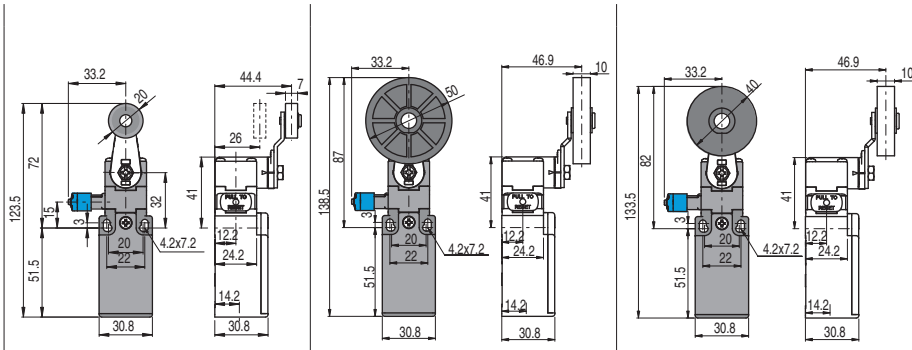
Contact type:	With Ø 20 mm stainless steel roller on request		Other rollers available. See page 36		Other rollers available. See page 36		Other rollers available. See page 36	
<b>L</b> = slow action								
Contact blocks								
6 <b>L</b>	FX 616-W3M2	➔ 1NO+1NC	FX 616-W3M2P32	➔ 1NO+1NC	FX 616-W3H0M2	➔ 1NO+1NC	FX 616-W3H0M2P32	➔ 1NO+1NC
9 <b>L</b>	FX 916-W3M2	➔ 2NC	FX 916-W3M2P32	➔ 2NC	FX 916-W3H0M2	➔ 2NC	FX 916-W3H0M2P32	➔ 2NC
20 <b>L</b>	FX 2016-W3M2	➔ 1NO+2NC	FX 2016-W3M2P32	➔ 1NO+2NC	FX 2016-W3H0M2	➔ 1NO+2NC	FX 2016-W3H0M2P32	➔ 1NO+2NC
Max. speed	page 141 - type 2		page 141 - type 2		page 141 - type 2		page 141 - type 2	
Actuating force	4.5 N (25 N ➔)		4.5 N (25 N ➔)		4.5 N (25 N ➔)		4.5 N (25 N ➔)	
Travel diagrams	page 142 - group 1c		page 142 - group 1c		page 142 - group 1c		page 142 - group 1c	

Contact type:	With Ø 20 mm stainless steel roller on request		Other rollers available. See page 36		Other rollers available. See page 36		Other rollers available. See page 36	
<b>L</b> = slow action								
Contact blocks								
6 <b>L</b>	FR 630-W3M2	➔ 1NO+1NC	FR 631-W3M2	➔ 1NO+1NC	FR 651-W3M2	➔ 1NO+1NC	FR 652-W3M2	➔ 1NO+1NC
9 <b>L</b>	FR 930-W3M2	➔ 2NC	FR 931-W3M2	➔ 2NC	FR 951-W3M2	➔ 2NC	FR 952-W3M2	➔ 2NC
20 <b>L</b>	FR 2030-W3M2	➔ 1NO+2NC	FR 2031-W3M2	➔ 1NO+2NC	FR 2051-W3M2	➔ 1NO+2NC	FR 2052-W3M2	➔ 1NO+2NC
Max. speed	page 141 - type 1		page 141 - type 1		page 141 - type 1		page 141 - type 1	
Actuating force	0.07 Nm (0.25 Nm ➔)		0.07 Nm (0.25 Nm ➔)		0.07 Nm (0.25 Nm ➔)		0.07 Nm (0.25 Nm ➔)	
Travel diagrams	page 142 - group 4c		page 142 - group 4c		page 142 - group 4c		page 142 - group 4c	

# Switches with manual reset

Contact type:

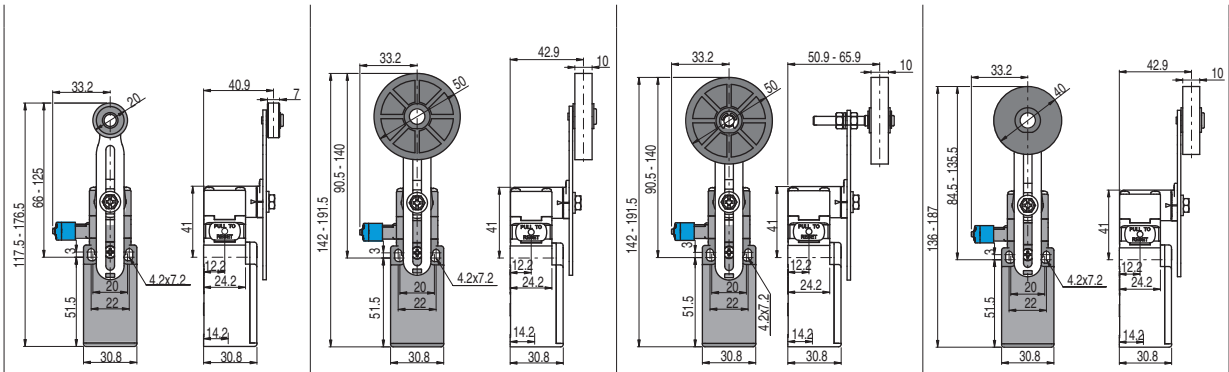
**L** = slow action



Contact blocks			
6	<b>L</b>	FR 654-W3M2	⊕ 1NO+1NC
9	<b>L</b>	FR 954-W3M2	⊕ 2NC
20	<b>L</b>	FR 2054-W3M2	⊕ 1NO+2NC
6	<b>L</b>	FR 654-W3M2R26	⊕ 1NO+1NC
9	<b>L</b>	FR 954-W3M2R26	⊕ 2NC
20	<b>L</b>	FR 2054-W3M2R26	⊕ 1NO+2NC
6	<b>L</b>	FR 654-W3M2R5	⊕ 1NO+1NC
9	<b>L</b>	FR 954-W3M2R5	⊕ 2NC
20	<b>L</b>	FR 2054-W3M2R5	⊕ 1NO+2NC
Max. speed		page 141 - type 1	
Actuating force		0.07 Nm (0.25 Nm ⊕)	
Travel diagrams		page 142 - group 4c	

Contact type:

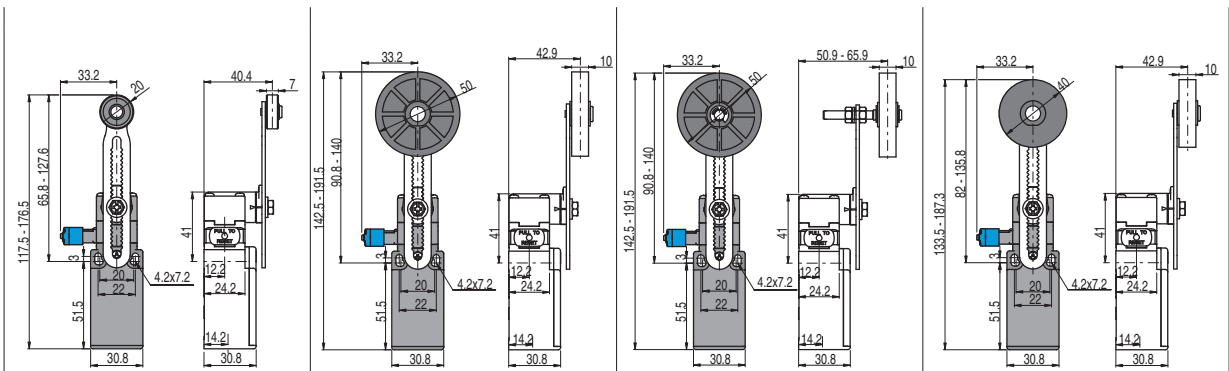
**L** = slow action



Contact blocks				
6	<b>L</b>	FR 655-W3M2	⊕ <sup>(1)</sup> 1NO+1NC	
9	<b>L</b>	FR 955-W3M2	⊕ <sup>(1)</sup> 2NC	
20	<b>L</b>	FR 2055-W3M2	⊕ <sup>(1)</sup> 1NO+2NC	
6	<b>L</b>	FR 655-W3M2R26	⊕ <sup>(1)</sup> 1NO+1NC	
9	<b>L</b>	FR 955-W3M2R26	⊕ <sup>(1)</sup> 2NC	
20	<b>L</b>	FR 2055-W3M2R26	⊕ <sup>(1)</sup> 1NO+2NC	
6	<b>L</b>	FR 655-W3M2R27	⊕ <sup>(1)</sup> 1NO+1NC	
9	<b>L</b>	FR 955-W3M2R27	⊕ <sup>(1)</sup> 2NC	
20	<b>L</b>	FR 2055-W3M2R27	⊕ <sup>(1)</sup> 1NO+2NC	
6	<b>L</b>	FR 655-W3M2R5	⊕ <sup>(1)</sup> 1NO+1NC	
9	<b>L</b>	FR 955-W3M2R5	⊕ <sup>(1)</sup> 2NC	
20	<b>L</b>	FR 2055-W3M2R5	⊕ <sup>(1)</sup> 1NO+2NC	
Max. speed		page 141 - type 1		
Actuating force		0.07 Nm (0.25 Nm ⊕)		
Travel diagrams		page 142 - group 4c		

Contact type:

**L** = slow action



Contact blocks				
6	<b>L</b>	FR 656-W3M2	⊕ 1NO+1NC	
9	<b>L</b>	FR 956-W3M2	⊕ 2NC	
20	<b>L</b>	FR 2056-W3M2	⊕ 1NO+2NC	
6	<b>L</b>	FR 656-W3M2R26	⊕ 1NO+1NC	
9	<b>L</b>	FR 956-W3M2R26	⊕ 2NC	
20	<b>L</b>	FR 2056-W3M2R26	⊕ 1NO+2NC	
6	<b>L</b>	FR 656-W3M2R27	⊕ 1NO+1NC	
9	<b>L</b>	FR 956-W3M2R27	⊕ 2NC	
20	<b>L</b>	FR 2056-W3M2R27	⊕ 1NO+2NC	
6	<b>L</b>	FR 656-W3M2R5	⊕ 1NO+1NC	
9	<b>L</b>	FR 956-W3M2R5	⊕ 2NC	
20	<b>L</b>	FR 2056-W3M2R5	⊕ 1NO+2NC	
Max. speed		page 141 - type 1		
Actuating force		0.07 Nm (0.25 Nm ⊕)		
Travel diagrams		page 142 - group 4c		

<sup>(1)</sup> Positive opening only with actuator set to max.

All values in the drawings are in mm

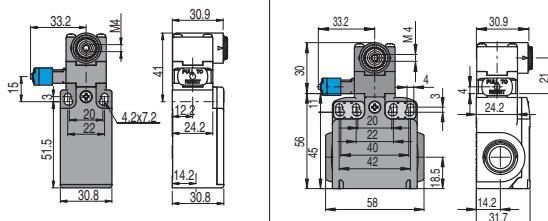
Accessories See page 135

→ The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)

## Position switches with reset device for swivelling lever, without actuator

Contact type:

L = slow action



### IMPORTANT

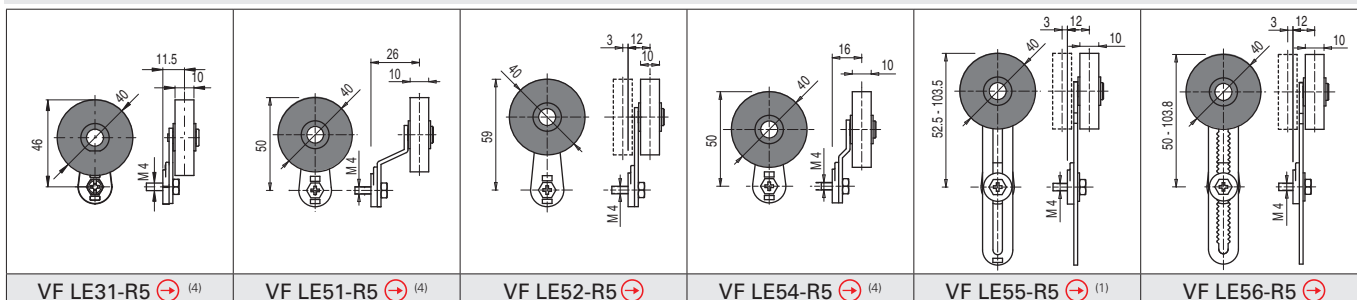
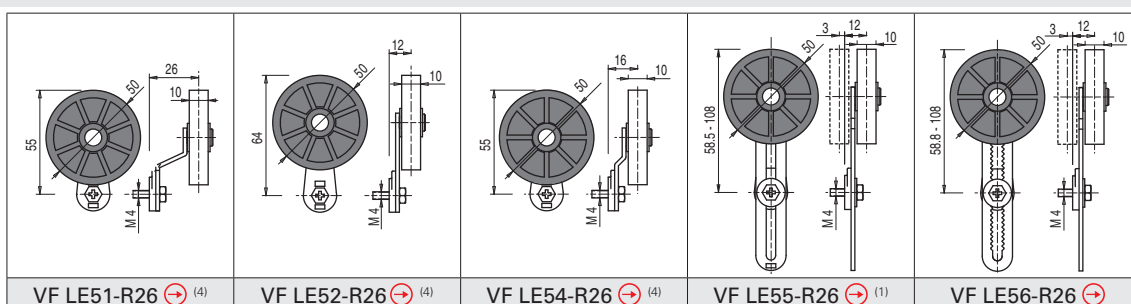
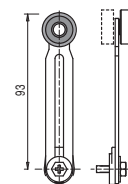
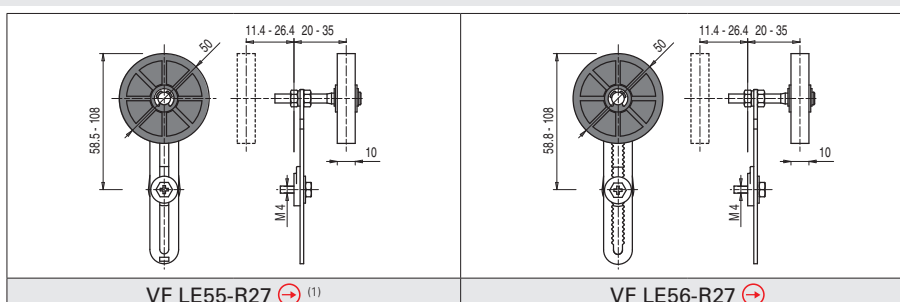
**For safety applications:** join only switches and actuators marked with symbol  $\ominus$  next to the product code. For more information about safety applications see details on page 139.

Contact blocks

6	L	FR 638-W3M2	$\ominus$	1NO+1NC	FX 638-W3M2	$\ominus$	1NO+1NC
9	L	FR 938-W3M2	$\ominus$	2NC	FX 938-W3M2	$\ominus$	2NC
20	L	FR 2038-W3M2	$\ominus$	1NO+2NC	FX 2038-W3M2	$\ominus$	1NO+2NC
Actuating force		0.07 Nm (0.25 Nm $\ominus$ )		0.07 Nm (0.25 Nm $\ominus$ )			
Travel diagrams		page 142 - group 4c		page 142 - group 4c			

## Special separate actuators

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

 Rubber rollers,  $\varnothing$  40 mm

 Rubber rollers,  $\varnothing$  50 mm

 Protruding rubber rollers,  $\varnothing$  50 mm


- (1) Lever 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](http://www.pizzato.com)