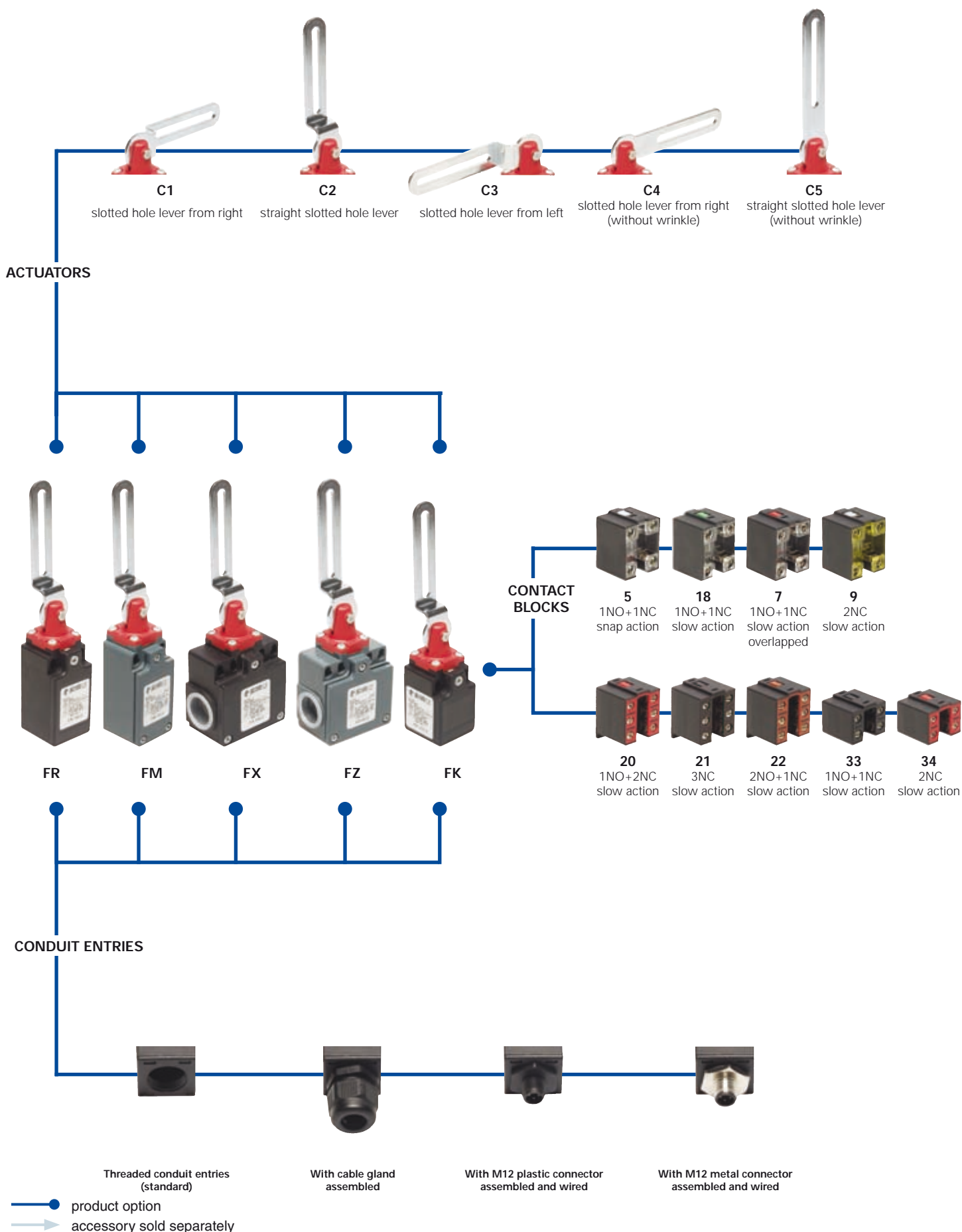


Selection diagram



article options
FR 18C1-GM2K70

Housing		Preinstalled cable gland or connectors	
FR	polymer housing, one conduit entry		no cable gland or connector (standard)
FM	metal housing, one conduit entry	K21	with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
FX	polymer housing, two conduit entries	K40	with M12 metal connector assembled and wired, 8 poles (only for contact blocks 20, 21, 22)
FZ	metal housing, two conduit entries
Contact blocks		For the complete list of all combinations, please contact our technical office.	
18	1NO+1NC, slow action	Threaded conduit entry	
5	1NO+1NC, snap action		PG 13,5 (standard)
7	1NO+1NC, slow action overlapped	A	PG 11 (only for FR-FX housing)
9	2NC, slow action	M1	M16x1,5 (only for FR-FX housing)
20	1NO+2NC, slow action	M2	M20x1,5
21	3NC, slow action	M3	1/2 NPT (only for FR housing)
22	2NO+1NC, slow action	Contacts type	
33	1NO+1NC, slow action		silver contacts (standard)
34	2NC, slow action	G	silver contacts gold plated 1 µm
Head type			
C1	slotted hole lever from right		
C2	straight slotted hole lever		
C3	slotted hole lever from left		
C4	slotted hole lever from right (without wrinkle)		
C5	slotted hole lever from left (without wrinkle)		

article options
FK 33C1-GM1K22

Housing		Preinstalled cable gland	
FK	polymer housing, one conduit entry		no cable gland (standard)
Contact blocks		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	
Head type			PG 11 (standard)
C1	slotted hole lever from right	M1	M16x1,5
C2	straight slotted hole lever	Contacts type	
C3	slotted hole lever from left		silver contacts (standard)
C4	slotted hole lever from right (without wrinkle)	G	silver contacts gold plated 1 µm
C5	slotted hole lever from left (without wrinkle)		



Main data

- Metal housing or polymer housing, from one to two conduit entries
- Protection degree IP67
- 9 contact blocks available
- M12 assembled connector versions
- Silver contacts gold plated versions

Markings and quality marks:



Approval IMQ:	EG610 (FR-FX-FK series) EG609 (FM-FZ series)
Approval UL:	E131787
Approval CCC:	2007010305230013 (FR-FX-FK series) 2007010305229998 (FM-FZ series)
Approval ECU:	1010151

Technical data

Housing

Housing type FR, FX and FK made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin \square

Housing type FM and FZ made of metal, coated with baked epoxy powder.

FR, FM and FK series one conduit entry

FX and FZ series two conduit entries

Protection degree: IP67

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 operating frequency: 3600 operations cycles¹/hour

Mechanical endurance: 1 million of operations cycles¹

Max actuating speed: 180°/s

Min. actuating speed: 2°/s

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by IEC 947-5-1 standard.

Cross section of the conductors (flexible copper wire)

Contact blocks 20, 21, 22, 33, 34:	min.	1 x 0,34 mm ²	(1 x AWG 22)
	max.	2 x 1,5 mm ²	(2 x AWG 16)
Contact blocks 5, 7, 9, 18:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)

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.

⚠ 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

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 for contact blocks 20, 21, 22, 33, 34	I _e (A) 6 4 1
	Protection against short circuits:	fuse 10 A 500 V type aM	Direct current: DC13
	Pollution degree:	3	U _e (V) 24 125 250
			I _e (A) 6 1,1 0,4
with 4 or 5 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) 24 120 250
	Protection against short circuits:	fuse 4 A 500 V type gG	I _e (A) 4 4 4
	Pollution degree:	3	Direct current: DC13
			U _e (V) 24 125 250
			I _e (A) 4 1,1 0,4
with 8 poles M12 connector	Thermal current (I _{th}):	2 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (U _i):	30 VAC 36 VDC	U _e (V) 24
	Protection against short circuits:	fuse 2 A 500 V type gG	I _e (A) 2
	Pollution degree:	3	Direct current: DC13
			U _e (V) 24
			I _e (A) 2

Description

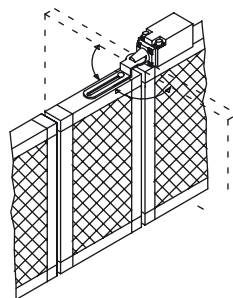
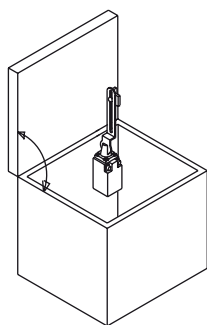
These safety switches are used to control gates or doors with hinge protecting hazardous parts of machines. Easy to install, they do not need the interaction with the hinge of the guard. Very sensitive, they positively open the contacts after few rotation degrees, sending the stop signal immediately.

Rotating heads



Removing the four fastening screws, in all switches, it is possible to rotate the head in 90° steps.

Installation examples



Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 VAC
400 VAC for contact blocks 20, 21, 22, 33, 34

Thermal current (Ith): 10 A

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

Protection degree: IP67

MV terminals (screw clamps)

Pollution degree 3

Utilization category: AC15

Operation voltage (Ue): 400 VAC (50 Hz)

Operation current (Ie): 3 A

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

Positive opening of contacts on contact block 5, 7, 9, 18, 20, 21, 22, 33, 34

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 1, 4X (indoor use only), 12, 13

In conformity with standard: UL 508

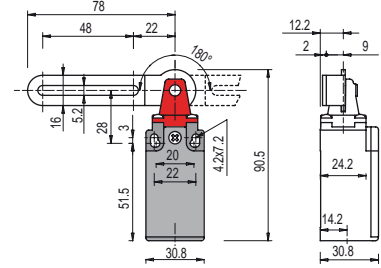
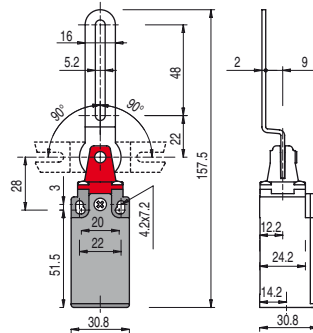
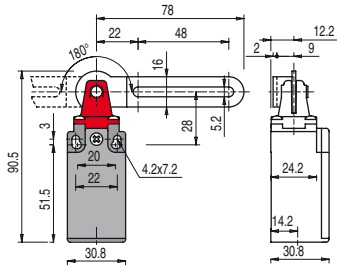
For all contact blocks use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 Lb-In.

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

Dimensional drawings

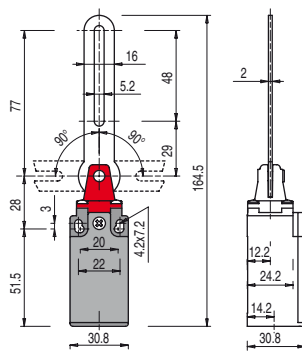
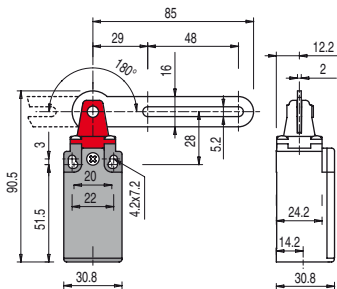
Contacts type:

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



Contact blocks

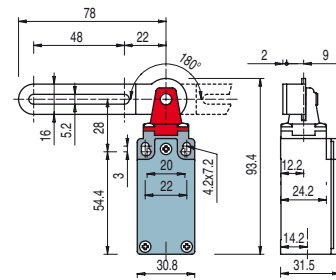
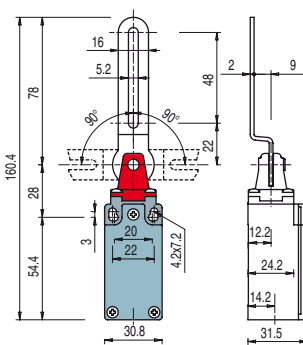
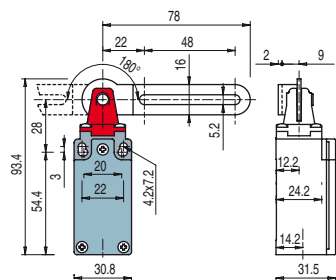
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5	R	FR 5C1	⊕	1NO+1NC	FR 5C2	⊕	1NO+1NC	FR 5C3	⊕	1NO+1NC
7	LO	FR 7C1	⊕	1NO+1NC	FR 7C2	⊕	1NO+1NC	FR 7C3	⊕	1NO+1NC
9	L	FR 9C1	⊕	2NC	FR 9C2	⊕	2NC	FR 9C3	⊕	2NC
20	L	FR 20C1	⊕	1NO+2NC	FR 20C2	⊕	1NO+2NC	FR 20C3	⊕	1NO+2NC
21	L	FR 21C1	⊕	3NC	FR 21C2	⊕	3NC	FR 21C3	⊕	3NC
22	L	FR 22C1	⊕	2NO+1NC	FR 22C2	⊕	2NO+1NC	FR 22C3	⊕	2NO+1NC
33	L	FR 33C1	⊕	1NO+1NC	FR 33C2	⊕	1NO+1NC	FR 33C3	⊕	1NO+1NC
34	L	FR 34C1	⊕	2NC	FR 34C2	⊕	2NC	FR 34C3	⊕	2NC
Min. force		0,11 Nm (0,15 Nm ⊕)		0,11 Nm (0,15 Nm ⊕)		0,11 Nm (0,15 Nm ⊕)				
Travel diagrams		page 4/46 - group 1		page 4/46 - group 2		page 4/46 - group 2		page 4/46 - group 1		



Contact blocks

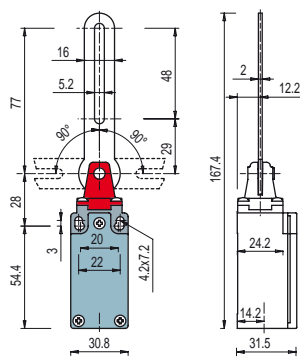
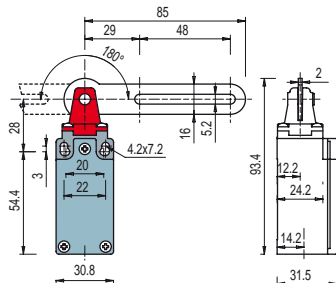
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5	R	FR 5C4	⊕	1NO+1NC	FR 5C5	⊕	1NO+1NC			
7	LO	FR 7C4	⊕	1NO+1NC	FR 7C5	⊕	1NO+1NC			
9	L	FR 9C4	⊕	2NC	FR 9C5	⊕	2NC			
20	L	FR 20C4	⊕	1NO+2NC	FR 20C5	⊕	1NO+2NC			
21	L	FR 21C4	⊕	3NC	FR 21C5	⊕	3NC			
22	L	FR 22C4	⊕	2NO+1NC	FR 22C5	⊕	2NO+1NC			
33	L	FR 33C4	⊕	1NO+1NC	FR 33C5	⊕	1NO+1NC			
34	L	FR 34C4	⊕	2NC	FR 34C5	⊕	2NC			
Min. force		0,11 Nm (0,15 Nm ⊕)		0,11 Nm (0,15 Nm ⊕)						
Travel diagrams		page 4/46 - group 1		page 4/46 - group 2						

Contacts type:
R = snap action
L = slow action
LO = slow action overlapped



Contact blocks

18	L	FM 18C1	⊕	1NO+1NC	FM 18C2	⊕	1NO+1NC	FM 18C3	⊕	1NO+1NC
5	R	FM 5C1	⊕	1NO+1NC	FM 5C2	⊕	1NO+1NC	FM 5C3	⊕	1NO+1NC
7	LO	FM 7C1	⊕	1NO+1NC	FM 7C2	⊕	1NO+1NC	FM 7C3	⊕	1NO+1NC
9	L	FM 9C1	⊕	2NC	FM 9C2	⊕	2NC	FM 9C3	⊕	2NC
20	L	FM 20C1	⊕	1NO+2NC	FM 20C2	⊕	1NO+2NC	FM 20C3	⊕	1NO+2NC
21	L	FM 21C1	⊕	3NC	FM 21C2	⊕	3NC	FM 21C3	⊕	3NC
22	L	FM 22C1	⊕	2NO+1NC	FM 22C2	⊕	2NO+1NC	FM 22C3	⊕	2NO+1NC
33	L	FM 33C1	⊕	1NO+1NC	FM 33C2	⊕	1NO+1NC	FM 33C3	⊕	1NO+1NC
34	L	FM 34C1	⊕	2NC	FM 34C2	⊕	2NC	FM 34C3	⊕	2NC
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)		
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2			page 4/46 - group 1		

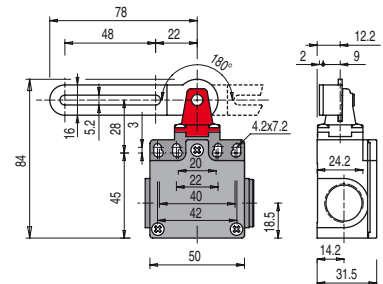
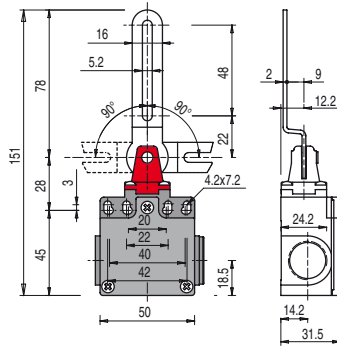
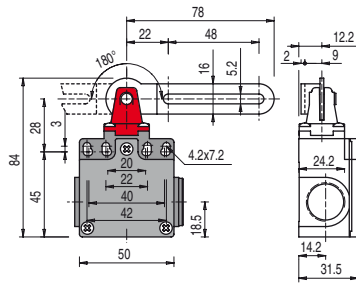


Contact blocks

18	L	FM 18C4	⊕	1NO+1NC	FM 18C5	⊕	1NO+1NC			
5	R	FM 5C4	⊕	1NO+1NC	FM 5C5	⊕	1NO+1NC			
7	LO	FM 7C4	⊕	1NO+1NC	FM 7C5	⊕	1NO+1NC			
9	L	FM 9C4	⊕	2NC	FM 9C5	⊕	2NC			
20	L	FM 20C4	⊕	1NO+2NC	FM 20C5	⊕	1NO+2NC			
21	L	FM 21C4	⊕	3NC	FM 21C5	⊕	3NC			
22	L	FM 22C4	⊕	2NO+1NC	FM 22C5	⊕	2NO+1NC			
33	L	FM 33C4	⊕	1NO+1NC	FM 33C5	⊕	1NO+1NC			
34	L	FM 34C4	⊕	2NC	FM 34C5	⊕	2NC			
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)					
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2					

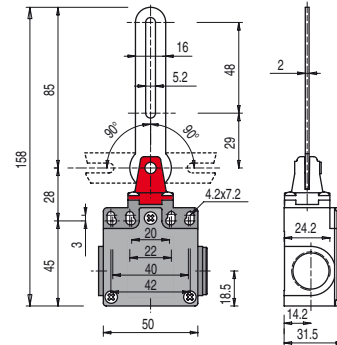
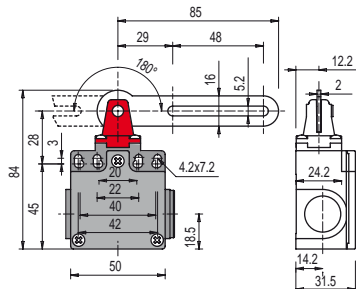
Contacts type:

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



Contact blocks

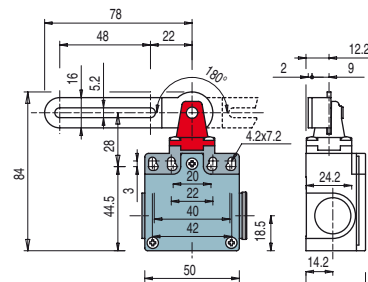
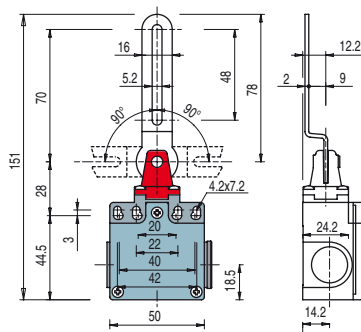
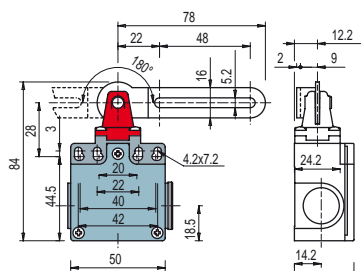
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5	R	FX 5C1	⊕	1NO+1NC	FX 5C2	⊕	1NO+1NC	FX 5C3	⊕	1NO+1NC
7	LO	FX 7C1	⊕	1NO+1NC	FX 7C2	⊕	1NO+1NC	FX 7C3	⊕	1NO+1NC
9	L	FX 9C1	⊕	2NC	FX 9C2	⊕	2NC	FX 9C3	⊕	2NC
20	L	FX 20C1	⊕	1NO+2NC	FX 20C2	⊕	1NO+2NC	FX 20C3	⊕	1NO+2NC
21	L	FX 21C1	⊕	3NC	FX 21C2	⊕	3NC	FX 21C3	⊕	3NC
22	L	FX 22C1	⊕	2NO+1NC	FX 22C2	⊕	2NO+1NC	FX 22C3	⊕	2NO+1NC
33	L	FX 33C1	⊕	1NO+1NC	FX 33C2	⊕	1NO+1NC	FX 33C3	⊕	1NO+1NC
34	L	FX 34C1	⊕	2NC	FX 34C2	⊕	2NC	FX 34C3	⊕	2NC
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)		
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2			page 4/46 - group 1		



Contact blocks

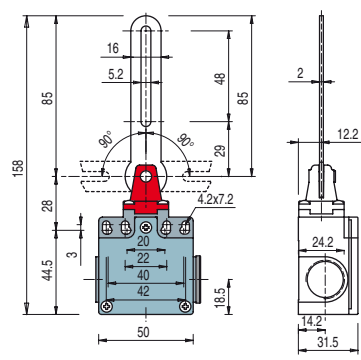
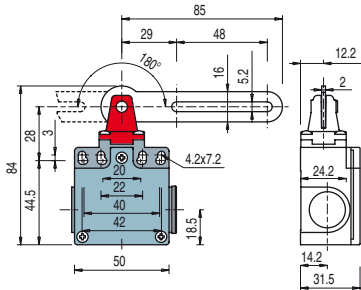
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5	R	FX 5C4	⊕	1NO+1NC	FX 5C5	⊕	1NO+1NC			
7	LO	FX 7C4	⊕	1NO+1NC	FX 7C5	⊕	1NO+1NC			
9	L	FX 9C4	⊕	2NC	FX 9C5	⊕	2NC			
20	L	FX 20C4	⊕	1NO+2NC	FX 20C5	⊕	1NO+2NC			
21	L	FX 21C4	⊕	3NC	FX 21C5	⊕	3NC			
22	L	FX 22C4	⊕	2NO+1NC	FX 22C5	⊕	2NO+1NC			
33	L	FX 33C4	⊕	1NO+1NC	FX 33C5	⊕	1NO+1NC			
34	L	FX 34C4	⊕	2NC	FX 34C5	⊕	2NC			
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)					
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2					

Contacts type:
R = snap action
L = slow action
LO = slow action overlapped



Contact blocks

18	L	FZ 18C1	⊕	1NO+1NC	FZ 18C2	⊕	1NO+1NC	FZ 18C3	⊕	1NO+1NC
5	R	FZ 5C1	⊕	1NO+1NC	FZ 5C2	⊕	1NO+1NC	FZ 5C3	⊕	1NO+1NC
7	LO	FZ 7C1	⊕	1NO+1NC	FZ 7C2	⊕	1NO+1NC	FZ 7C3	⊕	1NO+1NC
9	L	FZ 9C1	⊕	2NC	FZ 9C2	⊕	2NC	FZ 9C3	⊕	2NC
20	L	FZ 20C1	⊕	1NO+2NC	FZ 20C2	⊕	1NO+2NC	FZ 20C3	⊕	1NO+2NC
21	L	FZ 21C1	⊕	3NC	FZ 21C2	⊕	3NC	FZ 21C3	⊕	3NC
22	L	FZ 22C1	⊕	2NO+1NC	FZ 22C2	⊕	2NO+1NC	FZ 22C3	⊕	2NO+1NC
33	L	FZ 33C1	⊕	1NO+1NC	FZ 33C2	⊕	1NO+1NC	FZ 33C3	⊕	1NO+1NC
34	L	FZ 34C1	⊕	2NC	FZ 34C2	⊕	2NC	FZ 34C3	⊕	2NC
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)		
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2			page 4/46 - group 1		

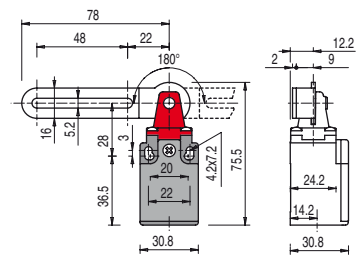
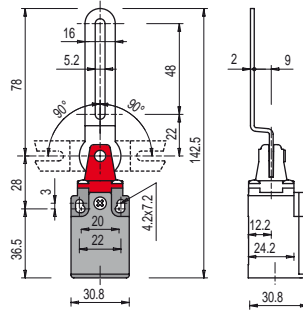
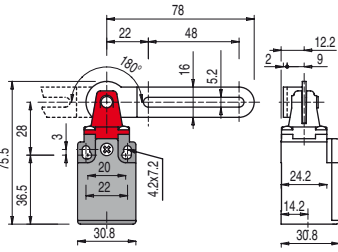


Contact blocks

18	L	FZ 18C4	⊕	1NO+1NC	FZ 18C5	⊕	1NO+1NC			
5	R	FZ 5C4	⊕	1NO+1NC	FZ 5C5	⊕	1NO+1NC			
7	LO	FZ 7C4	⊕	1NO+1NC	FZ 7C5	⊕	1NO+1NC			
9	L	FZ 9C4	⊕	2NC	FZ 9C5	⊕	2NC			
20	L	FZ 20C4	⊕	1NO+2NC	FZ 20C5	⊕	1NO+2NC			
21	L	FZ 21C4	⊕	3NC	FZ 21C5	⊕	3NC			
22	L	FZ 22C4	⊕	2NO+1NC	FZ 22C5	⊕	2NO+1NC			
33	L	FZ 33C4	⊕	1NO+1NC	FZ 33C5	⊕	1NO+1NC			
34	L	FZ 34C4	⊕	2NC	FZ 34C5	⊕	2NC			
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)					
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2					

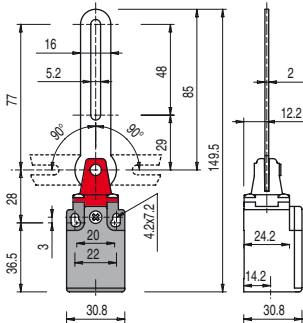
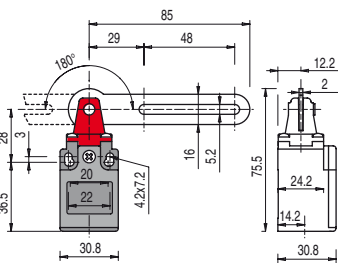
Contacts type:

- R = snap action
- L = slow action



Contact blocks

33	L	FK 33C1	⊕	1NO+1NC	FK 33C2	⊕	1NO+1NC	FK 33C3	⊕	1NO+1NC
34	L	FK 34C1	⊕	2NC	FK 34C2	⊕	2NC	FK 34C3	⊕	2NC
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)		
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2			page 4/46 - group 1		

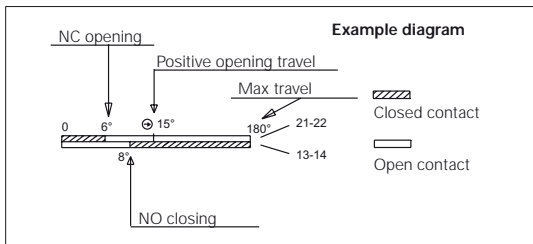


Contact blocks

33	L	FK 33C4	⊕	1NO+1NC	FK 33C5	⊕	1NO+1NC			
34	L	FK 34C4	⊕	2NC	FK 34C5	⊕	2NC			
Min. force		0,11 Nm (0,15 Nm ⊕)			0,11 Nm (0,15 Nm ⊕)					
Travel diagrams		page 4/46 - group 1			page 4/46 - group 2					

How to read travel diagrams

All measures in the diagrams are in degrees



Travel diagrams table

Contact blocks	Group 1	Group 2
18 1NO+1NC 13 21 14 22	0° 5° ⊖13° 180° 8°	90° 13° ⊖5° 0° 5° ⊖13° 90° 8° 8°
5 1NO+1NC 13 21 14 22	0 10° ⊖25° 180° 3°	90° ⊖25° 10° 0 10° ⊖25° 90° 3° 3°
7 1NO+1NC 11 21 12 22	0 15° ⊖23° 180° 6°	90° 15° 0° 15° 90° 23° ⊖6° 6° ⊖23°
9 2NC 13 21 14 22	0 15° ⊖23° 180°	90° ⊖23° 0° ⊖23° 90° 15° 15°
20 1NO+2NC 11 21 33 12 22 34	0 5° ⊖13° 180° 8°	90° 13° ⊖5° 0° 5° ⊖13° 90° 8° 8°
21 3NC 11 21 31 12 22 32	0 5° ⊖13° 180°	90° 13° ⊖5° 0° 5° ⊖13° 90°
22 2NO+1NC 11 23 33 12 24 34	0 5° ⊖13° 180° 8°	90° 13° ⊖5° 0° 5° ⊖13° 90° 8° 8°
33 1NC+1NO 13 21 14 22	0 5° ⊖13° 180° 8°	90° 13° ⊖5° 0° 5° ⊖13° 90° 8° 8°
34 2NC 11 21 12 22	0 5° ⊖13° 180°	90° 5° 0° 5° 90° 13° ⊖13°

IMPORTANT:

In safety applications it is necessary to activate the switch **at least up to the positive opening point** indicated in the diagrams with the symbol ⊕. Operate the switch **at least with the positive opening force**, indicated between brackets, below each article, next the value of minimum force.