Safety hinge switches **HP-HC** series

Application field

Pizzato Elettrica widens its own range of products making a new series of safety switches hinge-shaped, where safety and style are melted in one single product.
The switch is completely integrated in the mechanical hinge, to result practically invisible to an inexpert eye. This guarantees a higher safety because a switch hard to identify is consequently also more difficult to defeat. The assembly without visible screws and the pleasant line, make the switch perfectly integrated also with guards of modern design machinery.
In order to complete the offer complementary hinges with purely mechanics functions are available.

Operating point regulation

The switches operating point can be regulated through a simple Phillips screwdriver. The operating point regulation allows the setting possibility (up to 4°) for large guards. After the setting, it's always necessary to close the hole through the suitable supplied safety seal plug.

Variations of the activation base angle

New versions with the switch activation angle equal to a multiple of 15° (e.g. 45° or 90°) are available on request. The different activation angle does not invalidate the possibility to adjust the operating point through the switch adjusting screws. The variation of the operating angle does not alter the switch maximum mechanical travel.

M12 integrated connector version

Versions with connection from the top or the bottom are available with M12 integrated connector. The application of versions with connector allows a faster wiring when it's necessary to move guards from test line to final user.

Opening angle up to 180°

The mechanical design of the switch allows the application also onto protections up to 180° opening angle.

Protection degree IP67 and IP69K

IP69K
IP67

The HP series switches by Pizzato Elettrica, besides having an IP67 protection degree, have passed the test proving their IP69K protection degree according to the prescriptions established by the DIN 40050 standard.Therefore they are suitable for use in machineries subjected to intense washing with high pressure and high temperature water jets and for any condition or environment where a particular attention for cleanness and hygiene is required, such as in food or pharmaceutical industry.

Versions for glass or polycarbonate doors

It's available a variation of the switch shape specifically designed for glass and polycarbonate doors without frame. The wider supporting arm and the spaced fixing points facilitate the installation and prevent the cracking caused by holes too near the guard edge.
However, it is necessary to verify that the door mechanical stop is not performed by the switch.

Cable with connector from back

This cable and M12 connector from back is the best combination between aesthetics and connection ease. When machineries have to be assembled by the final customer, this solution allows to hide the wiring and at the same time to easily connect or disconnect it from inside the machinery.

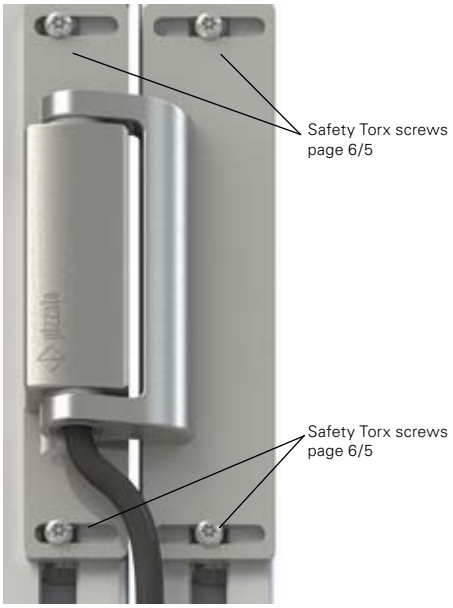
Additional hinges

To complete the installation, different additional hinge are available to be used in different combinations based on the guard weight.
These hinges keep the same aesthetics and without the electrical part their price is lower.

Application examples

- Switch without supports
- Rear fixing
- Cable output from back

- Switch with angular supports for profiles with slots
- Fixing through internal screws
- Connector output from bottom



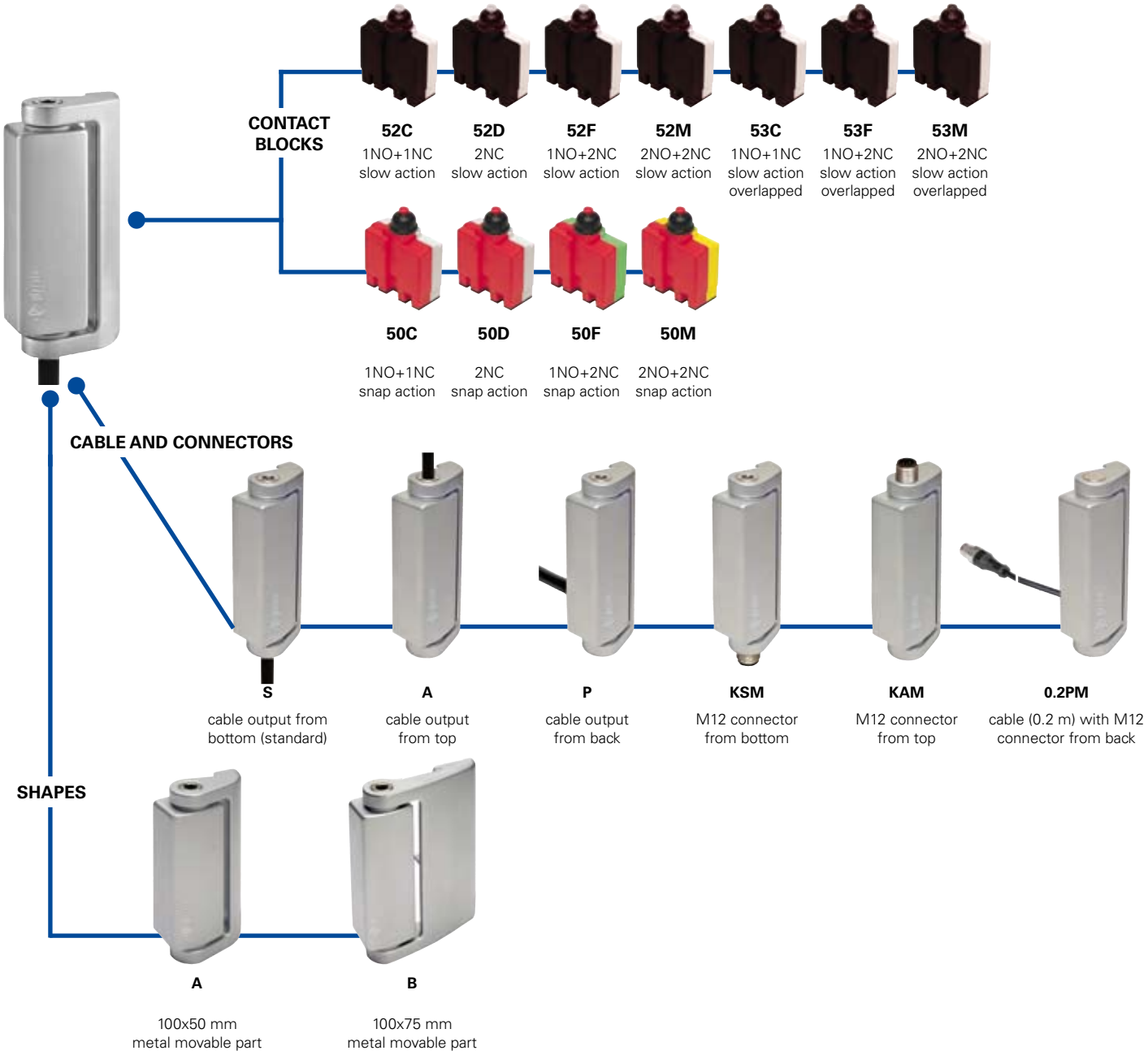
- Switch with plane supports for profiles with slots
- Fixing through front screws
- Cable output from bottom

Closed door

Open door

- Direct fixing to the polycarbonate plate
- Switch without supports
- Fixing with internal screws
- Output with connector from back

Selection diagram



COMPLEMENTARY HINGES

product option

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

HP AA052C-2SNGH15

Movable part	
A	100x50 metal movable part
B	100x75 metal movable part

Contact block	
52C	1NO+1NC, slow action
52D	2NC, slow action
52F	1NO+2NC, slow action
52M	2NO+2NC, slow action
53C	1NO+1NC, slow action overlapped
53F	1NO+2NC, slow action overlapped
53M	2NO+2NC, slow action overlapped
50C	1NO+1NC, snap action
50D	2NC, snap action
50F	1NO+2NC, snap action
50M	2NO+2NC, snap action

The versions with snap-action contact blocks are recommended for doors having a radius not greater than 600 mm.

Type of connection	
0.2	cable length 0.2 m
...	.....
2	cable length 2 m (standard)
...	.....
10	cable length 10 m
K	with integrated connector

Connection output direction and movable part	
S	movable part on the right and output from bottom
P	movable part on the right and output from back
A	movable part on the right and output from top
Q	movable part on the left and output from back

Type of cable	
N	cable PVC IEC 60332-1 black (standard)
G	cable CEI 20-22 II grey
H	cable PUR halogen free grey
R	cable for railway sector (EN 50306-4)
M	M12 connector

Contacts Type	
	silver contacts (standard)
G	silver contacts gold plated 1 µm

Activation angle	
	0° activation angle (standard)
H15	15° activation angle
H30	30° activation angle
H45	45° activation angle
H60	60° activation angle
H75	75° activation angle
H90	90° activation angle

HC AA

Complementary hinges (H x L)	
HC AA	100.6 x 49 mm
HC AB	100.6 x 79 mm
HC LL	65 x 44.5 mm

Safety hinge switches **HP-HC** series

Main data

- Metal housing, cable output from top, bottom or back
- 4 integrated cable types available
- Versions with M12 connector
- Protection degree IP67 and IP69K
- 9 contact blocks with positive opening ⊕
- Complementary hinges without contacts

Markings and quality marks:

Approval IMQ: CA02.03746
Approval UL: E131787
Approval GOST: POCC IT.AB24.B04512

Technical data

Housing
Metal housing, coated with baked epoxy powder
cable integrated length 2 m, other lengths on request.
Versions with M12 5 or 8 poles integrated connector
Protection degree: IP67 according to EN 60529
IP69K according to DIN 40050
(Protect the cables from direct high-pressure and high-temperature jets)

General data

For safety applications up to SIL 3 / PL e	
Safety parameters:	see page 7/34
Ambient temperature:	See table on page 4/40
Max actuation frequency:	1200 operations cycles[1]/hour
Mechanical endurance:	1 million operations cycles[1]
Max actuating speed:	90°/s
Min. actuating speed:	2°/s
Assembling position:	any
Max axial charge:	1500 N (HP AA) / 750 N (HP AB)
Max radial charge:	1000 N (HP AA) / 500 N (HP AB)
M5 screws max driving torque:	3 ... 5 Nm

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

Electrical data

Rated impulse withstand voltage U_{imp}:	4 kV
Conditional shot circuit current:	1000 A according to EN 60947-5-1
Pollution degree:	3

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 529, EN 60529, DIN 40050.
Approvals:
IEC 60947-5-1, UL 508.

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 on page 7/2.

⚠ Attention: switch off the circuit voltage before disconnecting the connector from the switch. The connector is not suitable for sectioning of electrical loads. According to EN 60204-1, versions with 8 poles M12 connector can be used only in circuits PELV.

Data type approved by IMQ

Rated insulation voltage (Ui):	250 Vac
Thermal current (Ith):	10 A (1-2 contacts) / 6 A (2-3 contacts)
	4 A (4 contacts or 5 poles M12 connector)
Protection against short circuits (fuse):	10 A (1-2 contacts) / 6 A (2-3 contacts)
	4 A (4 contacts or 5 poles M12 connector) type gG
Rated impulse withstand voltage (U_{imp}):	4 kV
Protection degree:	IP67
MA terminals (seamed clamps)	
Pollution degree:	3
Utilization category:	AC15 / DC13 (with connector)
Operation voltage (Ue):	250 Vac (50 Hz) / 24 Vdc (with connector)
Operation current (Ie):	3 A / 2 A (with connector)

Forms of the contact element: X, Y, X+Y, X+X, Y+Y, Y+Y+X, X+X+Y, X+X+Y+Y
Positive opening of contacts on contact block 50A, 50C, 50D, 50F, 50G, 50M, 51A, 51C, 51D, 51F, 51G, 51M, 52A, 52C, 52D, 52F, 52G, 52M, 53A, 53C, 53D, 53F, 53G, 53M

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: R300 pilot duty (28 VA, 125-250 Vdc)
B300 pilot duty (360 VA, 120-240 Vac) (1-2-3 cont.)
C300 pilot duty (180 VA, 120-240 Vac) (4 cont.)

Data of the housing type 1, 4X "indoor use only", 12
Data of the housing with 1-2-contact versions with N-type cable type 1, 4X "indoor use only"

In conformity with standard: UL 508

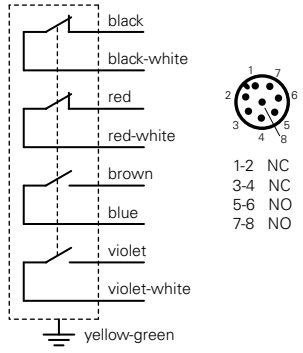
Please contact our technical service for the list of approved products.

Utilization temperatures and electrical data

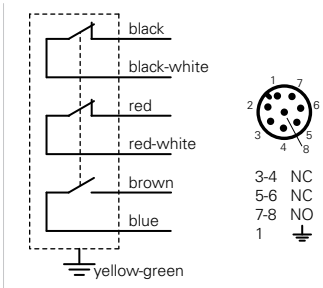
			output with cable								output with connector M12	
			2 contacts versions				3 contacts versions		4 contacts versions		2 contacts versions	3/4 contacts versions
			Cable type N 5x0,75 mm², Sheath PVC H05VV-F, Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 Min. bend radius: 72 mm Copper class 5 IEC 60228	Cable type G 5x0,75 mm², Sheath PVC S05VV-F, Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 IEC 60332-3 CEI 20-22 II Min. bend radius: 72 mm Copper class 5 IEC 60228	Cable type H 5x0,75 mm², Max Speed 100 m/min Max Acceleration 2 m/s² Sheath PUR HALOGEN FREE Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 Min. bend radius: 70 mm Without halogens Oil-resistant IEC 60811-2-1 Copper class 6 IEC 60228	Cable type R 5x0,5mm² Cable for railway applications EN50306-4 1E-300V-5x0,5 mm² MM-90 According to: EN 50306-4 EN 45555 Not flame-spreading: IEC 60332-1 EN 50305 EN 50306-1 Min. bend radius: 60 mm Copper class 5 IEC 60228	Cable type N 7x0,5 mm² Sheath PVC H05VV-F, Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 Min. bend radius 108 mm Copper class 5 IEC 60228	Cable type H 7x0,5 mm², Max Speed 300 m/min Max Acceleration 25 m/s² Sheath PUR HALOGEN FREE Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 Min. bend radius: 108 mm Without halogens Oil-resistant IEC 60811-2-1 Copper class 6 IEC 60228	Cable type N 9x0,34 mm² Sheath PVC H05VV-F, Not flame-spreading IEC 60332-1-2 IEC 60332-1-3 Min. bend radius: 94 mm Copper class 5 IEC 60228	Cable type R 9x0,5mm² Cable for railway applications EN50306-4 1P-300V-9x0,5 mm² MM-90 According to: EN 50306-4 EN 45555 Not flame-spreading: IEC 60332-1 EN 50305 EN 50306-1 Min. bend radius: 60 mm Copper class 5 IEC 60228	5 poles M12 connector	8 poles M12 connector
Utilization temperatures Standard	Fixed laying cable		-25°C ... +70°C	-25°C ... +70°C	-25°C ... +80°C	-25°C +80°C	-25°C ... +80°C	-25°C ... +80°C	-25°C ... +80°C	-25°C +80°C		
	Flexible laying cable		+5°C ... +70°C	+5°C ... +70°C	-25°C ... +80°C	-25°C +80°C	-5°C ... +80°C	-25°C ... +80°C	-5°C ... +80°C	-25°C +80°C	-25°C ... +80°C	
	Dynamic laying cable		/	/	-25°C ... +80°C	/	/	-25°C ... +80°C	/	/		
Utilization temperatures Extended -T6	Fixed laying cable		/	/	-40°C ... +80°C	-40°C ... +80°C	/	-40°C ... +80°C	/	-40°C +80°C		
	Flexible laying cable		/	/	-40°C ... +80°C	-40°C ... +80°C	/	-30°C ... +80°C	/	-40°C +80°C	-40°C ... +80°C	
	Dynamic laying cable		/	/	-40°C ... +80°C	/	/	-30°C ... +80°C	/	/		
Electrical data	Thermal current Ith		10 A	10 A	10 A	6 A	6 A	6 A	3 A	4 A	4 A	2 A
	Rated insulation Voltage Ui		250 Vac	250 Vac	250 Vac	250 Vac	250 Vac	250 Vac	250 Vac	250 Vac	250 Vac 300 Vdc	30 Vac 36 Vdc
	Protection against short circuits (fuse)		10 A 500 V type gG	10 A 500 V type gG	10 A 500 V type gG	6 A 500 V type gG	6 A 500 V type gG	6 A 500 V type gG	3 A 500 V type gG	4 A 500 V type gG	4 A 500 V type gG	2 A 500V type gG
	Utilization categories DC13	24 V	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A	2 A
		125 V	0,4 A	0,4 A	0,4 A	0,4 A	0,4 A	0,4 A	0,4 A	0,4 A	0,4 A	/
		250 V	0,3 A	0,3 A	0,3 A	0,3 A	0,3 A	0,3 A	0,3 A	0,3 A	0,3 A	/
	Utilization categories AC15	24 V	4 A	4 A	4 A	4 A	4 A	4 A	3 A	4 A	4 A	2 A
		120 V	4 A	4 A	4 A	4 A	4 A	4 A	3 A	4 A	4 A	/
		250 V	4 A	4 A	4 A	4 A	4 A	4 A	3 A	4 A	4 A	/
Approvals of switches with integrated cable			CE cULus IMQ	CE	CE cULus IMQ	CE IMQ	CE cULus IMQ	CE cULus IMQ	CE cULus IMQ	CE IMQ	CE cULus IMQ	CE cULus

Internal connections

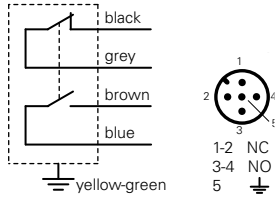
2NO+2NC



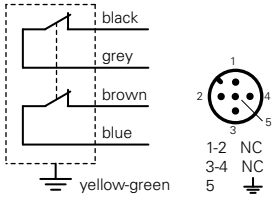
1NO+2NC



1NO+1NC



2NC



Dimensional drawings

Contacts Type:

L = slow action
LO = slow action overlapped

Contact blocks		2 m cable from bottom	2 m cable from top	2 m cable from back
52C	L	HP AA052C-2SN → 1NO+1NC	HP AA052C-2AN → 1NO+1NC	HP AA052C-2PN → 1NO+1NC
52D	L	HP AA052D-2SN → 2NC	HP AA052D-2AN → 2NC	HP AA052D-2PN → 2NC
52F	L	HP AA052F-2SN → 1NO+2NC	HP AA052F-2AN → 1NO+2NC	HP AA052F-2PN → 1NO+2NC
52M	L	HP AA052M-2SN → 2NO+2NC	HP AA052M-2AN → 2NO+2NC	HP AA052M-2PN → 2NO+2NC
53C	LO	HP AA053C-2SN → 1NO+1NC	HP AA053C-2AN → 1NO+1NC	HP AA053C-2PN → 1NO+1NC
53F	LO	HP AA053F-2SN → 1NO+2NC	HP AA053F-2AN → 1NO+2NC	HP AA053F-2PN → 1NO+2NC
53M	LO	HP AA053M-2SN → 2NO+2NC	HP AA053M-2AN → 2NO+2NC	HP AA053M-2PN → 2NO+2NC
Min. force		0,3 Nm (0,65 Nm →)	0,3 Nm (0,65 Nm →)	0,3 Nm (0,65 Nm →)
Travel diagrams		page 4/43 - group 1	page 4/43 - group 1	page 4/43 - group 1

Contacts Type:

L = slow action
LO = slow action overlapped

Contact blocks		M12 connector from bottom	M12 connector from top	0,2 m cable and M12 connector from back
52C	L	HP AA052C-KSM → 1NO+1NC	HP AA052C-KAM → 1NO+1NC	HP AA052C-0.2PM → 1NO+1NC
52D	L	HP AA052D-KSM → 2NC	HP AA052D-KAM → 2NC	HP AA052D-0.2PM → 2NC
52F	L	HP AA052F-KSM → 1NO+2NC	HP AA052F-KAM → 1NO+2NC	HP AA052F-0.2PM → 1NO+2NC
52M	L	HP AA052M-KSM → 2NO+2NC	HP AA052M-KAM → 2NO+2NC	HP AA052M-0.2PM → 2NO+2NC
53C	LO	HP AA053C-KSM → 1NO+1NC	HP AA053C-KAM → 1NO+1NC	HP AA053C-0.2PM → 1NO+1NC
53F	LO	HP AA053F-KSM → 1NO+2NC	HP AA053F-KAM → 1NO+2NC	HP AA053F-0.2PM → 1NO+2NC
53M	LO	HP AA053M-KSM → 2NO+2NC	HP AA053M-KAM → 2NO+2NC	HP AA053M-0.2PM → 2NO+2NC
Min. force		0,3 Nm (0,65 Nm →)	0,3 Nm (0,65 Nm →)	0,3 Nm (0,65 Nm →)
Travel diagrams		page 4/43 - group 1	page 4/43 - group 1	page 4/43 - group 1

Attention! The safety hinge switch can be combined together exclusively with one or more Pizzato Elettrica hinges (series HP or HC). The use of whichever other hinge does not guarantee the right working of the safety device.

Accessories See page 6/1

All measures in the drawings are in mm

Versions for glass or polycarbonate doors - Dimensional drawings

Contacts Type:

L = slow action
LO = slow action overlapped

Contact blocks

		2 m cable from bottom		2 m cable from top		2 m cable from back	
52C	L	HP AB052C-2SN	1NO+1NC	HP AB052C-2AN	1NO+1NC	HP AB052C-2PN	1NO+1NC
52D	L	HP AB052D-2SN	2NC	HP AB052D-2AN	2NC	HP AB052D-2PN	2NC
52F	L	HP AB052F-2SN	1NO+2NC	HP AB052F-2AN	1NO+2NC	HP AB052F-2PN	1NO+2NC
52M	L	HP AB052M-2SN	2NO+2NC	HP AB052M-2AN	2NO+2NC	HP AB052M-2PN	2NO+2NC
53C	LO	HP AB053C-2SN	1NO+1NC	HP AB053C-2AN	1NO+1NC	HP AB053C-2PN	1NO+1NC
53F	LO	HP AB053F-2SN	1NO+2NC	HP AB053F-2AN	1NO+2NC	HP AB053F-2PN	1NO+2NC
53M	LO	HP AB053M-2SN	2NO+2NC	HP AB053M-2AN	2NO+2NC	HP AB053M-2PN	2NO+2NC
Min. force		0,3 Nm (0,65 Nm →)		0,3 Nm (0,65 Nm →)		0,3 Nm (0,65 Nm →)	
Travel diagrams		page 4/43 - group 1		page 4/43 - group 1		page 4/43 - group 1	

Contacts Type:

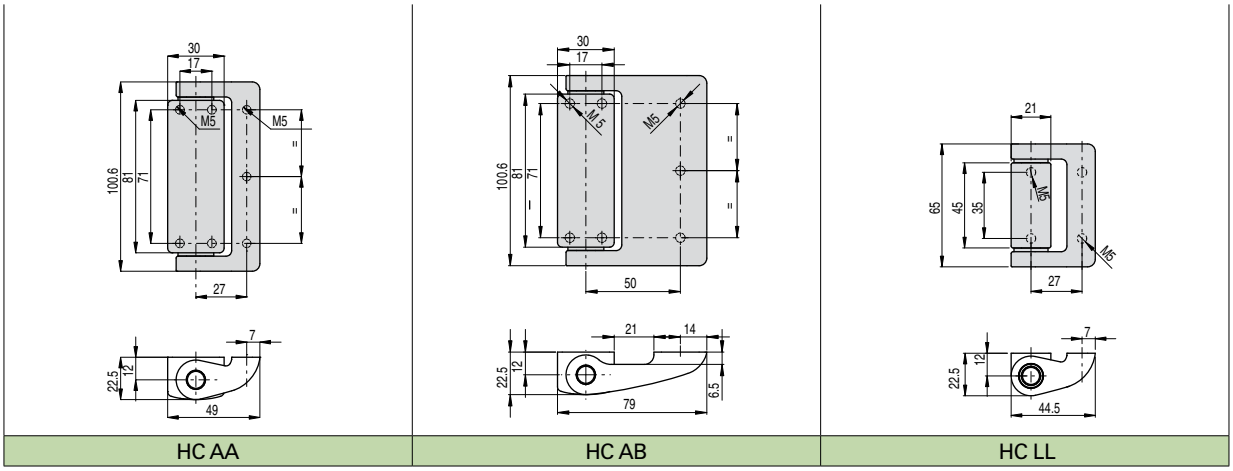
L = slow action
LO = slow action overlapped

Contact blocks

		M12 connector from bottom		M12 connector from top		0,2 m cable and M12 connector from back	
52C	L	HP AB052C-KSM	1NO+1NC	HP AB052C-KAM	1NO+1NC	HP AB052C-0.2PM	1NO+1NC
52D	L	HP AB052D-KSM	2NC	HP AB052D-KAM	2NC	HP AB052D-0.2PM	2NC
52F	L	HP AB052F-KSM	1NO+2NC	HP AB052F-KAM	1NO+2NC	HP AB052F-0.2PM	1NO+2NC
52M	L	HP AB052M-KSM	2NO+2NC	HP AB052M-KAM	2NO+2NC	HP AB052M-0.2PM	2NO+2NC
53C	LO	HP AB053C-KSM	1NO+1NC	HP AB053C-KAM	1NO+1NC	HP AB053C-0.2PM	1NO+1NC
53F	LO	HP AB053F-KSM	1NO+2NC	HP AB053F-KAM	1NO+2NC	HP AB053F-0.2PM	1NO+2NC
53M	LO	HP AB053M-KSM	2NO+2NC	HP AB053M-KAM	2NO+2NC	HP AB053M-0.2PM	2NO+2NC
Min. force		0,3 Nm (0,65 Nm →)		0,3 Nm (0,65 Nm →)		0,3 Nm (0,65 Nm →)	
Travel diagrams		page 4/43 - group 1		page 4/43 - group 1		page 4/43 - group 1	

Attention! The safety hinge switch can be combined together exclusively with one or more Pizzato Elettrica hinges (series HP or HC). The use of whichever other hinge does not guarantee the right working of the safety device.

Complementary hinges



HC AA	HC AB	HC LL

Travel diagrams

All measures in the diagrams are in degrees

Contact blocks		Group 1
52C	1NO+1NC	0 3° 7° 180° 5°
52D	2NC	0 3° 7° 180°
52F	1NO+2NC	0 3° 7° 180° 5°
52M	2NO+2NC	0 3° 7° 180° 5°

Contact blocks		Group 1
53C	1NO+1NC	0 3° 7° 180° 1°
53F	1NO+2NC	0 3° 7° 180° 1°
53M	2NO+2NC	0 3° 7° 180° 1°

The diagrams here illustrated refer to pre-adjusted hinges.Hinges are not supplied pre-adjusted (max. pre-adjustment: 4°).

Contact blocks		Group 1
50C	1NO+1NC	0 4° 8° 180° 1.5°
50D	2NC	0 4° 8° 180° 1.5°
50F	1NO+2NC	0 4° 8° 180° 1.5°
50M	2NO+2NC	0 4° 8° 180° 1.5°

Accessories

Article	Description
VF AC7032	Protection plug of regulation

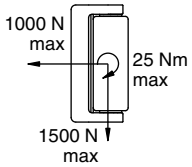
The plug is supplied with every hinge and must always be inserted after the operating point regulation.
In case of loss or damage, the plug can be ordered separately.

Legend

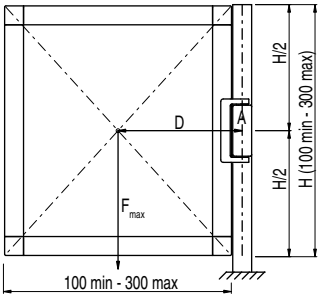
- Closed contact
- Opened contact
- Positive opening travel
- Pushing the switch / Releasing the switch

Max forces and charges HP AA

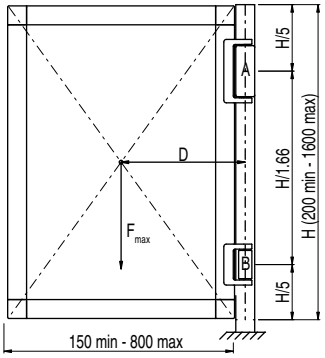
Admitted max charges independently from utilization conditions.



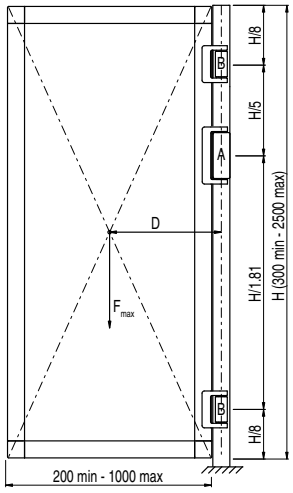
Doors with one safety hinge
F_{max} (N)=25.000/D (mm)



Doors with one safety hinge and one additional hinge
F_{max}(N)=200.000/D (mm)



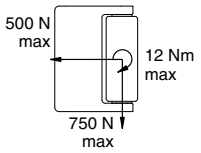
Doors with one safety hinge and two additional hinges
F_{max} (N)=250.000/D (mm)



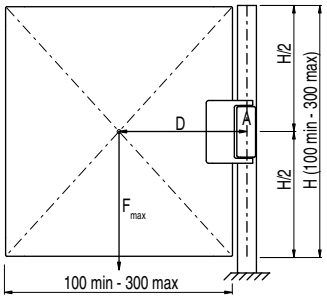
Legend:
F_{max} Force exercised by the door weight (N)
D Distance from the door barycentre to the hinge axis (mm))
A Safety hinge
B Additional hinge
All measurements are in mm expressed.

Max forces and charges HP AB

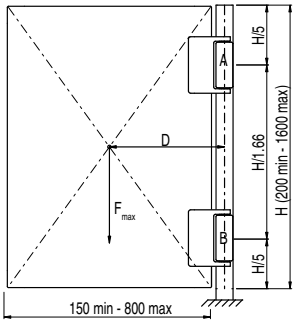
Admitted max charges independently from utilization conditions.



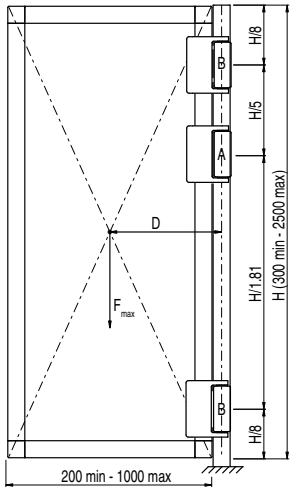
Doors with one safety hinge
F_{max} (N)=12.500/D (mm)



Doors with one safety hinge and one additional hinge
F_{max} (N)=100.000/D (mm)



Doors with one safety hinge and two additional hinges
F_{max} (N)=200.000/D (mm)



Legend:

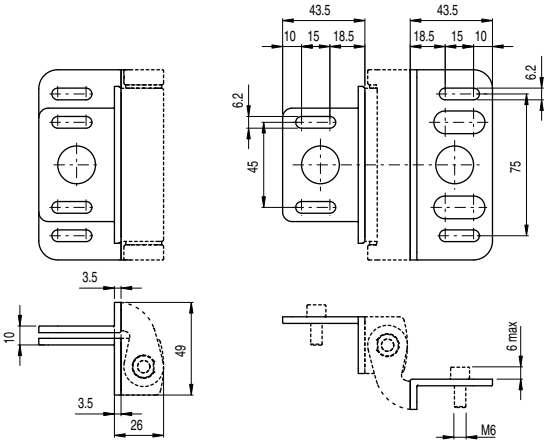
F_{max}	Force exercised by the door weight (N)
D	Distance from the door barycentre to the hinge axis (mm))
A	Safety hinge
B	Additional hinge

All measurements are in mm expressed.

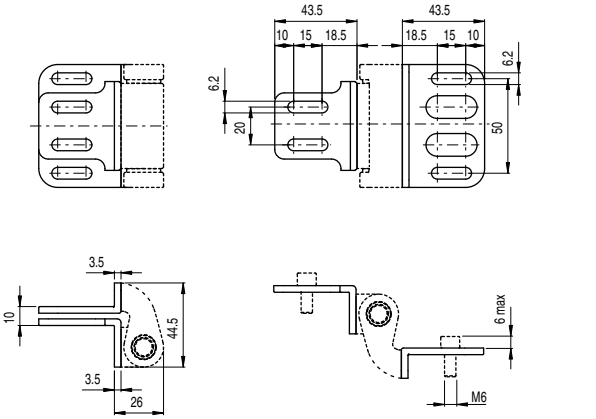
Fixing plates

Fixing screw for profile not supplied on issue.

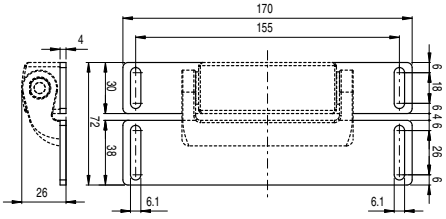
Article	Description
VF SFH1-C	Couple of angular supports for HP AA and HC AA supplied with fixing screws for switch



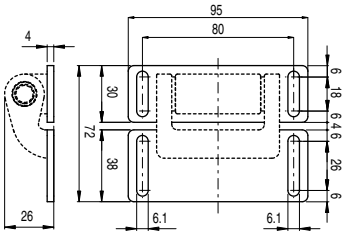
Article	Description
VF SFH2-C	Couple of angular supports for HC LL supplied with fixing screws for switch



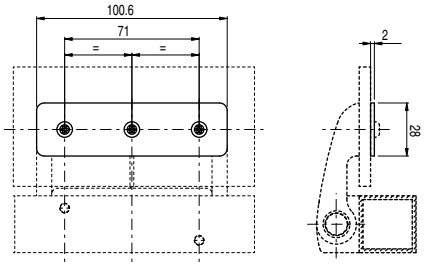
Article	Description
VF SFH3-C	Couple of plane supports for HP AA and HC AA supplied with fixing screws for switch



Article	Description
VF SFH4-C	Couple of plane supports for HC LL supplied with fixing screws for switch



Article	Description
VF SFH7	HP AB series mobile part covering in stainless steel



Accessories See page 6/1

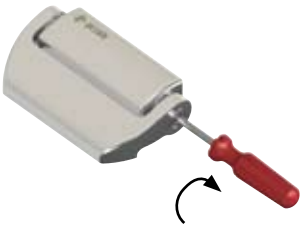
Items with code on the **green** background are available in stock

Safety hinge switches **HX** series

Application field

Pizzato Elettrica widens its own range of products making a new series of safety switches hinge-shaped HX series, where safety and style are melted in one single product.
The switch is completely integrated in the mechanical hinge, to result practically invisible to an inexpert eye. This guarantees a higher safety because a switch hard to identify is consequently also more difficult to defeat. The assembly without visible screws and the pleasant line, make the switch perfectly integrated also with guards of modern design machinery.
The hinge-shaped safety switches of the HX series, being made of stainless steel, can be used in any aseptic environment where particular attention is required for cleanliness and hygiene, therefore they are suitable for various applications ranging from the food to the pharmaceutical sectors, as well as the chemical or marine sector.

Operating point regulation



The switches operating point can be regulated through a flat-blade screwdriver. The operating point regulation allows the setting possibility for large guards. After the setting, it's always necessary to close the hole through the suitable supplied safety seal plug.

Variations of the activation base angle

Versions with the switch activation angle equal to a multiple of 15° (e.g. 45° or 90°) are available on request.
The different activation angle does not exclude the possibility of finely adjusting the operating point by means of the adjustment screw found in the switch. Any change in the base operating angle does not alter the maximum mechanical switch travel.

Cable with connector from the back

The version with a rear cable and M12 connector is used to obtain the best combination between aesthetics and connection ease. This solution makes it possible to hide the wiring and, at the same time, easily connect or disconnect it from inside the machinery.

Opening angle up to 180°

The mechanical design of the switch allows the application also onto protections up to 180° opening angle.

Protection degree IP67 and IP69K

IP69K
IP67

The HX series switches by Pizzato Elettrica, besides having an IP67 protection degree, have passed the test proving their IP69K protection degree according to the prescriptions established by the DIN 40050 standard.Therefore they are suitable for use in machineries subjected to intense washing with high pressure and high temperature water jets and for any condition or environment where a particular attention for cleanness and hygiene is required, such as in food or pharmaceutical industry.

Additional hinges

To complete installation, various types of additional hinges are available, varying in numbers depending on the protection guard weight. These hinges keep the same aesthetics and mechanical structure but, having no electrical part, they cost less.

Materials

AISI
316L

With this new series in AISI316L stainless steel, Pizzato Elettrica offers a range of devices suitable for any environment where chemical and corrosive agents are found or for aseptic environment where particular attention is required for cleanliness and hygiene. Accurate surface finish makes it possible for these devices to be used in various applications ranging from the food to the pharmaceutical sectors, as well as the chemical or marine sector.

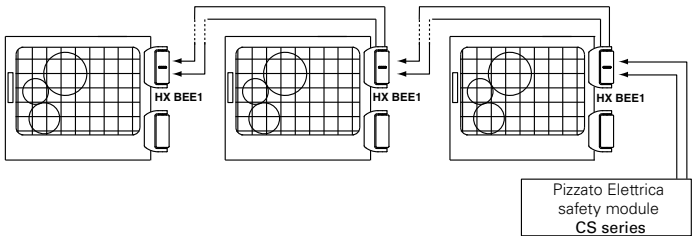
Laser marking

Pizzato Elettrica has introduced a new laser marking for switches of the HX series. Thanks to this new system which excludes the use of labels, markings on the products are indelible.
Furthermore, in case of machineries subjected to intense high pressure water jets, there is no risk of labels detaching from the product.

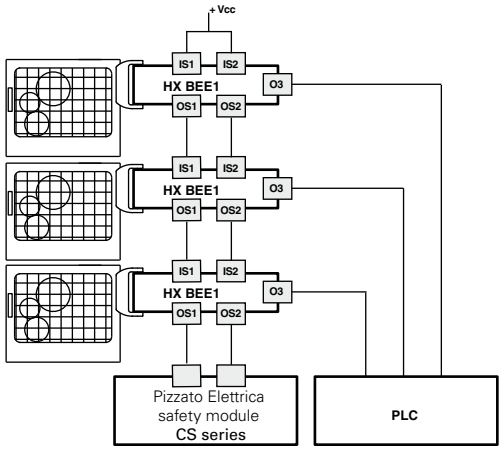
Version with electronic contacts (PL e / SIL 3)

The redundant internal structure of the HX hinged safety switch meets the characteristics required by the EN ISO 13489-1 and IEC 62061 standards, therefore the actual switch can be classified as a device of category 4, PL e and SIL 3.

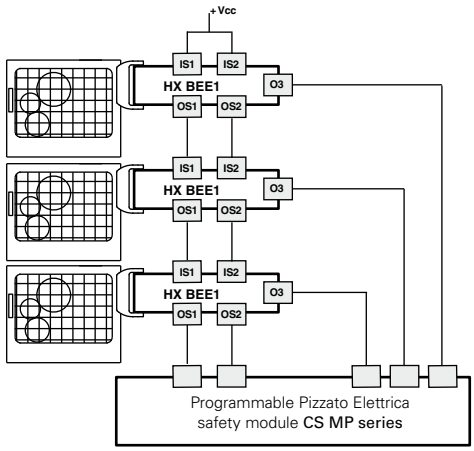
Its high diagnostic cover and high MTTF for each single channel make it possible for the HX switch not to lose its safety function even in the case of one single anomaly.



These are the reason why the switch can be used in series, while maintaining the PL e safety level, as long as it is connected to an appropriate module which controls its correct operation.



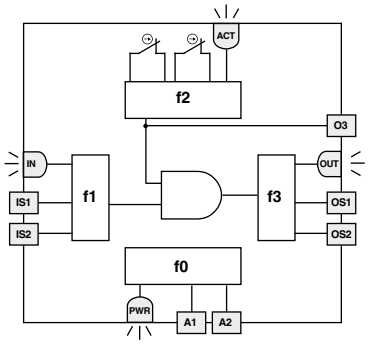
Possible connection in series of several switches in order to simplify the safety system wiring, after evaluating the outputs from the last switch in the chain by means of a Pizzato Elettrica safety module (table for safety modules to be combined). Each HX switch is provided with a signalling output, which is activated when the respective guard is closed. This piece of information can be managed by a PLC, depending on the specific requirements of the system installed.



Possible connection in series of several switches in order to simplify the safety system wiring, after evaluating the outputs from the last switch in the chain by means of a safety module from Pizzato Elettrica CS MP series, which allows management of both safety and signalling functions.

Switch	Compatible safety modules	Safety module output contacts		
		Safety instantaneous contacts	Safety delayed contacts	Signaling contacts
HX BEE1-•••	CS AR-05••••	3NO	/	1NC
	CS AR-06••••	3NO	/	1NC
	CS AR-08••••	2NO	/	/
	CS AT-0•••••	2NO	2NO	1NO
	CS AT-1•••••	3NO	2NO	/
	CS MP••••••	see page 5/63		

Internal diagram

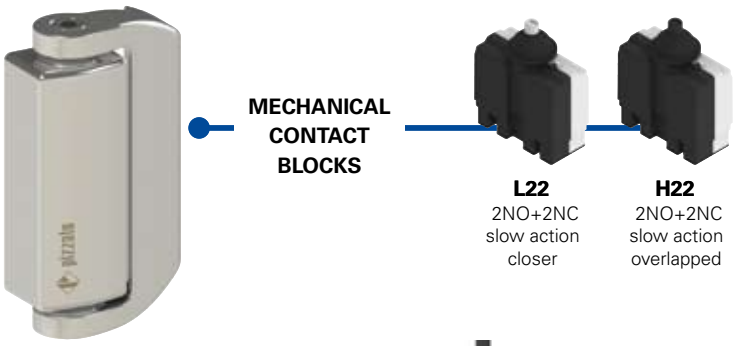


The side scheme shows the 4 logical functions interacting inside the switch.
F0 function has the fundamental task to control the sensor's power supply and the internal tests which the sensor cyclically undergoes.
F1 function has the task to control the status of the sensor's inputs, while F2 checks the actuator's presence within the activation zone limits.
F3 function has the task to enable the safety outputs and check their possible failure or short circuit. The macro-function, which controls the above mentioned functions, enables the safety outputs only in presence of active inputs with the actuator within the safe zone limits.

4 status-indicator LEDs

The version with electronic contacts in the HX series is provided with 4 LEDs which make it possible to quickly identify the status it is found in. Each LED is assigned a specific signalling function which makes it possible to immediately identify any wiring errors, circuit breaks or internal faults in the device. The status of each function is displayed by the corresponding LED (PWR, OUT, IN, ACT,), so that the switch condition becomes immediately evident to the operator. This avoids the need to decode troublesome blinking sequences in order to identify specific system faults.

Selection diagram



MECHANICAL CONTACT BLOCKS

L22
2NO+2NC
slow action
closer

H22
2NO+2NC
slow action
overlapped

CABLE AND CONNECTORS

•SN
cable output from bottom (standard)

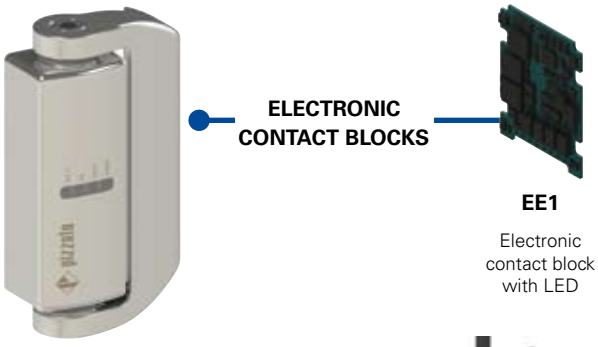
•AN
cable output from top

•PN
cable output from back

KSM
M12 connector from bottom

KAM
M12 connector from top

0.2PM
cable (0.2 m) with M12 connector from back



ELECTRONIC CONTACT BLOCKS

EE1

Electronic contact block with LED

CABLE AND CONNECTORS

•SN
cable output from bottom (standard)

•AN
cable output from top

•PN
cable output from back

KSM
M12 connector from bottom

KAM
M12 connector from top

0.2PM
cable (0.2 m) with M12 connector from back

COMPLEMENTARY HINGES

HX CB

product option

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

HX BL22-2PNGH15

Body and movable part dimensions	
B	126x76x31 mm

Contact block	
L22	2NO+2NC, slow action closer
H22	2NO+2NC, slow action overlapped
EE1	electronic contact block with LED 2 safety outputs PNP 1 auxiliary output PNP 2 safety inputs PNP

Type of connection	
0.2	cable length 0.2 m
...	.....
2	cable length 2 m (standard)
...	.....
10	cable length 10 m
K	with integrated connector

Other lengths on request.

Activation angle	
	0° activation angle (standard)
H15	15° activation angle
H30	30° activation angle
H45	45° activation angle
H60	60° activation angle
H75	75° activation angle
H90	90° activation angle

Contacts type	
	silver contacts (standard)
G	silver contacts gold plated 1 µm

Type of cable	
N	cable PVC IEC 60332-1 black (standard)
M	cable with M12 connector

Connection output direction and movable part	
S	movable part on the right and output from bottom
P	movable part on the right and output from back
A	movable part on the right and output from top
Q	movable part on the left and output from back

HX CB

Complementary hinges	
CB	126x76x31 mm movable part on the right
CD	126x76x31 mm movable part on the left

Main data

- AISI 316L stainless steel housing
- Protection degree IP67 and IP69K
- Electronic contact block with LED
- Two mechanical contact blocks with positive opening ⊖
- Complementary hinges without contacts

In conformity with requirements requested by:
Low Voltage Directive 2006/95/EC,
Machinery Directive 2006/42/EC
Electromagnetic Compatibility 2004/108/EC
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.

In conformity with requirements requested by:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN 1088, ISO 14119, EN ISO 12100-1, EN ISO 12100-2, IEC 60529, EN 60529, DIN 40050, IEC 61508-1, IEC 61508-2, IEC 61508-3, EN ISO 13849-1, EN ISO 13849-2, EN 62061 , EN 61326-1, EN 61326-3-1, EN 61326-3-2

Markings and quality marks:

CE PCT

UL approvals pending
TÜV approvals pending
Approval GOST: POCC IT.AB24.B04512

Technical data

Housing
Metal housing, polished in AISI 316L stainless steel
Version with integrated cable length 2 m, other lengths on request.
Versions with M12 connector
Versions with M12 connector with cable length 0.2 m

Protection degree:	IP67 according to EN 60529 IP69K according to DIN 40050 (Protect the cables from direct high-pressure and high-temperature jets)

General data
For safety applications up to SIL 3 / PL e

Safety parameters:	see page 7/34
Ambient temperature:	see table on page 4/50
Max actuation frequency:	600 operations cycles[1]/hour
Mechanical endurance:	1 million operations cycles[1]
Max actuating speed:	90°/s
Min. actuating speed:	2°/s
Assembling position:	any
Max axial charge:	2000 N
Max radial charge:	2000 N
M6 screws max driving torque:	10 ... 12 Nm

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

Electrical data (L22 - H22 mechanical contact blocks)

Rated impulse withstand voltage Uimp:	4 kV
Conditional shot circuit current:	1000 A according to EN 60947-5-1
Pollution degree:	3

Electrical data (EE1 electronic contact block)

Rated operational voltage Ue:	24 Vdc -15%...+10%
Rated operational current Ie:	0.25 A
Minimum working current:	0.5 mA
Maximum switchable load:	6 W
Voltage absorption (Ue):	< 1W
Rated impulse withstand voltage Uimp:	1.5 kV
Restorable internal protection fuse:	0.75 A
Overvoltage category:	III
Inputs IS1/IS2	
Rated operational voltage Ue:	24 Vdc
Absorbed rated current:	5 mA
Safety outputs OS1/OS2	
Rated operational voltage Ue:	24 Vdc
Type of output:	PNP
Maximum current for output Ie:	0.25 A
Short-circuit detection:	Yes
Protection against overcurrent:	Yes
Time of deactivation impulses on safe outputs:	< 300 us
Capacity admitted between output and output:	< 200 nF
Capacity admitted between output and earth:	< 200 nF
Auxiliary output O3	
Rated operational voltage Ue:	24 Vdc
Type of output:	PNP
Maximum current for output Ie:	0.1 A
Short-circuit detection:	No
Protection against overcurrent:	Yes

⚠ **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 7/12.**

⚠ **Attention: switch off the circuit voltage before disconnecting the connector from the switch. The connector is not suitable for sectioning of electrical loads. According to EN 60204-1, versions with 8 poles M12 connector can be used only in circuits PELV.**

Working temperatures and electrical data for L22 / H22 mechanical contact blocks

			Cable type N 9x0,34 mm²	8 poles M12 connector
Utilization temperatures	Fixed laying cable		-25°C ... +80°C	-25°C ... +80°C
	Flexible laying cable		-5°C ... +80°C	-5°C ... +80°C
	Dynamic laying cable		/	/
Electrical data	Thermal current Ith		3 A	2 A
	Rated insulation voltage Ui		250 Vac	30 Vac 36 Vdc
	Protection against short circuits (fuse)		3 A 500 V type gG	2 A 500V type gG
	Utilization categories DC13	24 V	2 A	2 A
		125 V	0,4 A	/
		250 V	0,3 A	/
	Utilization categories AC15	24 V	3 A	2 A
		120 V	3 A	/
		250 V	3 A	/

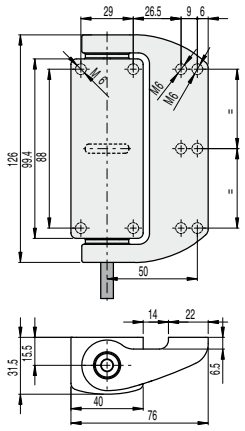
Working temperatures and electrical data for EE1 electronic contact block

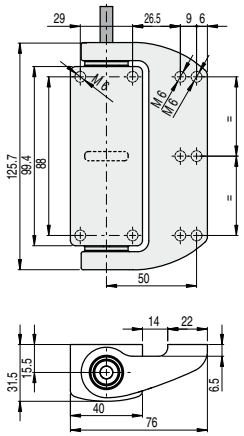
			Cable type N 8x0,34 mm²	8 poles M12 connector
Utilization temperatures	Fixed laying cable		-25°C ... +70°C	-25°C ... +70°C
	Flexible laying cable		-5°C ... +70°C	-5°C ... +70°C
	Dynamic laying cable		/	/
Electrical data	Thermal current Ith		0,25 A	0,25 A
	Rated insulation voltage Ui		32 Vdc	32 Vdc
	Protection against short circuits (fuse)		1 A	1 A
	Utilization categories DC12	24 V	0,25 A	0,25 A

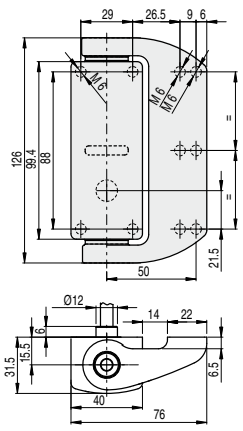
Dimensional drawings

Contacts type:

LO = slow action overlapped
LA = slow action closer
= electronic PNP



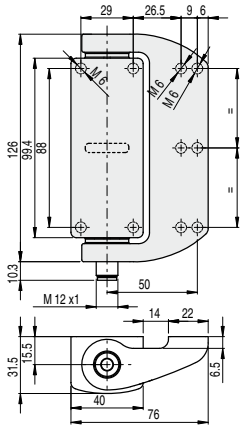


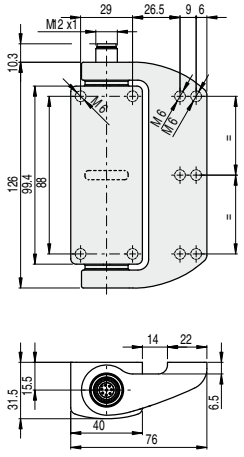


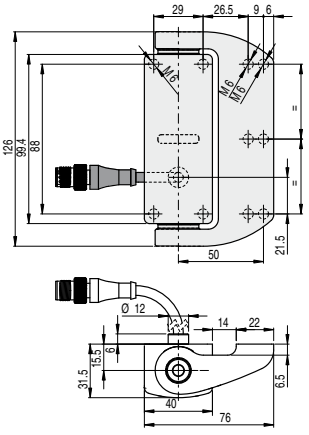
Contact blocks		2 m cable from bottom		2 m cable from top		2 m cable from back	
L22	LA	HX BL22-2SN	2NO+2NC	HX BL22-2AN	2NO+2NC	HX BL22-2PN	2NO+2NC
H22	LO	HX BH22-2SN	2NO+2NC	HX BH22-2AN	2NO+2NC	HX BH22-2PN	2NO+2NC
EE1		HX BEE1-2SN	PNP	HX BEE1-2AN	PNP	HX BEE1-2PN	PNP
Min. force		0,3 Nm (0,65 Nm)		0,3 Nm (0,65 Nm)		0,3 Nm (0,65 Nm)	

Contacts type:

LO = slow action overlapped
LA = slow action closer
= electronic PNP







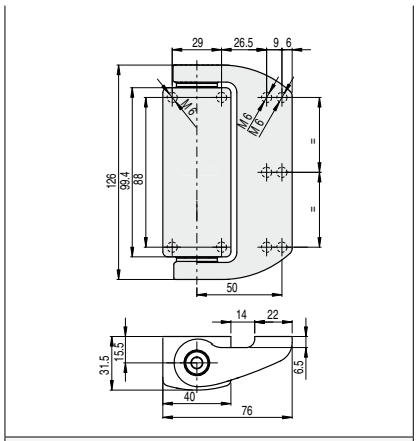
Contact blocks		M12 connector from bottom		M12 connector from top		0,2 m cable and M12 connector from back	
L22	LA	HX BL22-KSM	2NO+2NC	HX BL22-KAM	2NO+2NC	HX BL22-0.2PM	2NO+2NC
H22	LO	HX BH22-KSM	2NO+2NC	HX BH22-KAM	2NO+2NC	HX BH22-0.2PM	2NO+2NC
EE1		HX BEE1-KSM	PNP	HX BEE1-KAM	PNP	HX BEE1-0.2PM	PNP
Min. force		0,3 Nm (0,65 Nm)		0,3 Nm (0,65 Nm)		0,3 Nm (0,65 Nm)	

Accessories See page 6/1

To purchase a product with a movable part on the left replace letter P with letter Q in the codes mentioned above.
Example: HX BL22-2**P**N → HX BL22-2**Q**N

All measures in the drawings are in mm

Complementary hinges



HX CB

Internal connections

L22 / H22 mechanical contact blocks
Version with cable or M12 connector

connections	cable color	pin
NC	black	1
	black-white	2
NC	red	3
	red-white	4
NO	brown	5
	blue	6
NO	violet	7
	violet-white	8
⏚	yellow-green	/

EE1 electronic contact block
Version with cable or M12 connector

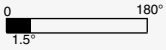
connections	cable color	pin
A1	brown	1
IS1	red	2
A2	blue	3
OS1	red/white	4
O3	black	5
IS2	purple	6
OS2	black/white	7
not connected	purple/white	8

Legend

A1-A2	power supply
IS1-IS2	safety inputs
OS1-OS2	safety outputs
O3	auxiliary output

Travel diagrams

All measures in the diagrams are in degrees

Contact blocks	Group 1
L22 2NO+2NC	
H22 2NO+2NC	
EE1 PNP	

The contact operating point indicated in the stroke diagrams can be adjusted to ± 1°.

Legend

Contact closed /
OS1, OS2, O3 outputs active

Contact open /
OS1, OS2, O3 outputs not active

⊖ Positive opening stroke

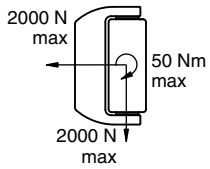
Accessories

Article	Description
VF AC7032	Protection plug of regulation screw
	The plug is supplied with every hinge and must always be inserted after the operating point regulation. In case of loss or damage, the plug can be ordered separately.

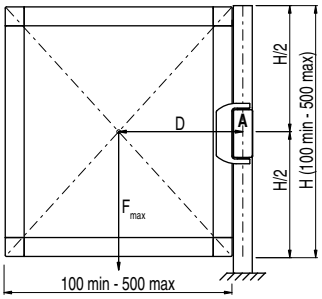
Article	Description
VF CA••••M	Female wired connectors
	**General data:** - Self locking ring nut - High flexibility wire suitable for dynamic laying applications (copper class 6) - Gold plated contact (resistance < 5 mΩ) - Connector body in polyurethane **See page 6/2**

Max forces and charges HX

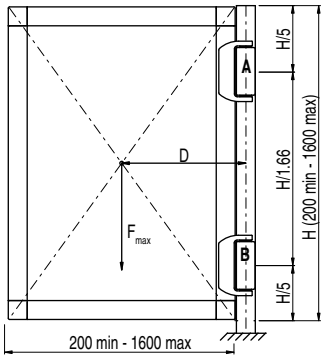
Admitted max charges independently from utilization conditions.



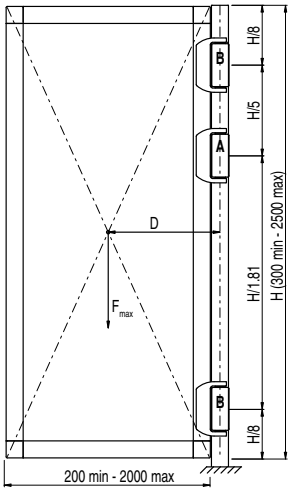
Doors with one safety hinge
F_{max} (N)=50.000/D (mm)



Doors with one safety hinge and one additional hinge
F_{max} (N)=400.000/D (mm)



Doors with one safety hinge and two additional hinges
F_{max} (N)=500.000/D (mm)

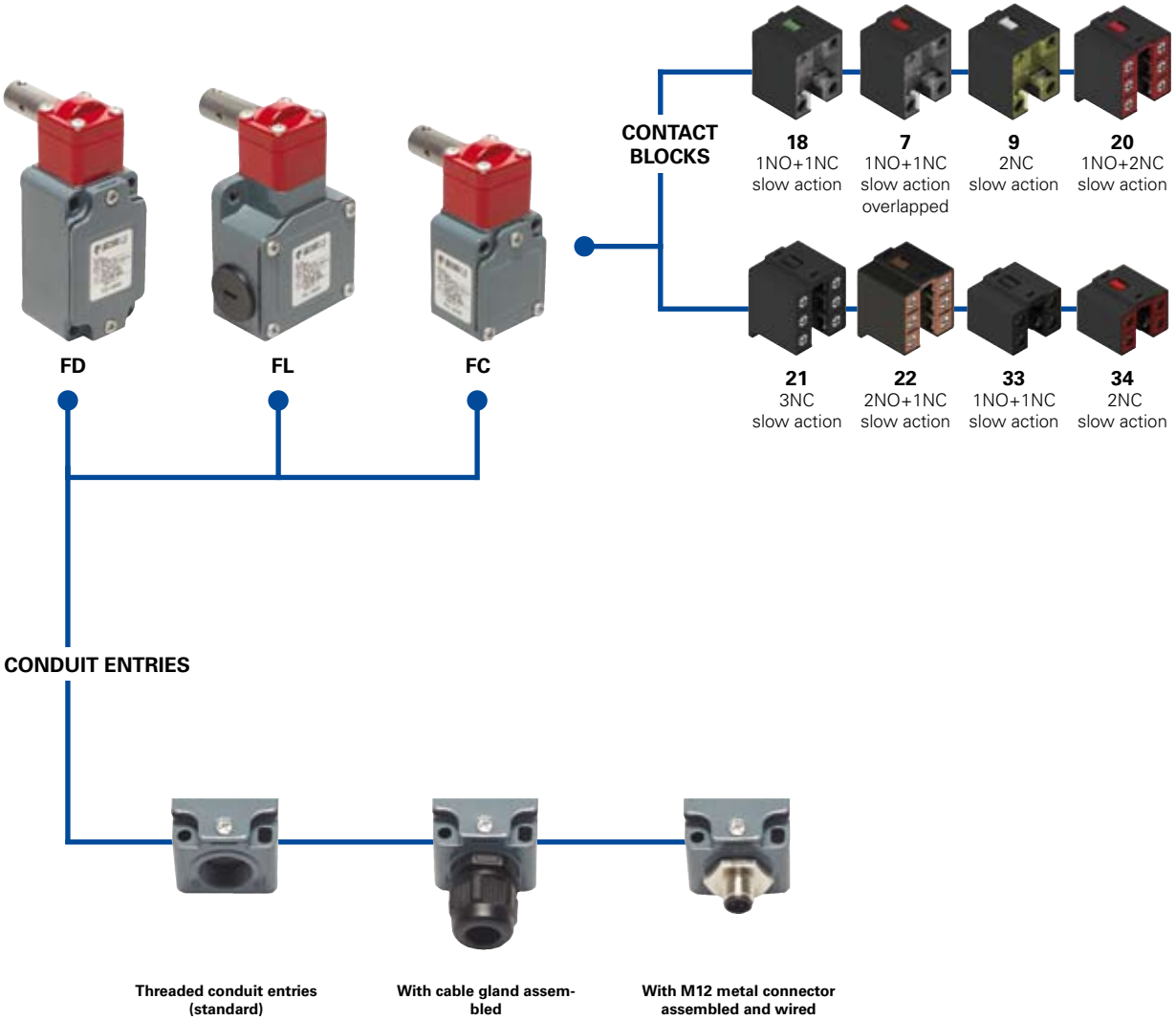


Legend:

F_{max}	Force exercised by the door weight (N)
D	Distance from the door barycentre to the hinge axis (mm))
A	Safety hinge
B	Additional hinge

All measurements are in mm expressed.

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.

article: **FD 1895** options: **-GM2K50**

Housing	
FD	metal housing, one conduit entry
FL	metal housing, three conduit entries

Contact blocks	
18	1NO+1NC, slow action
7	1NO+1NC, slow action overlapped
9	2NC, slow action
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action

Contacts type	
	silver contacts (standard)
G	silver contacts gold plated 1 µm

Threaded conduit entry	
	PG 13,5 (standard)
M2	M20x1,5

Preinstalled cable gland or connectors	
	no cable gland or connector (standard)
K21	with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
...	.....
K50	with assembled 5 poles M12 metal connector
...	.....

For the complete list of all combinations, please contact our technical office.

article: **FC 3395** options: **-M1K22**

Housing	
FC	metal housing, one conduit entry

Contact blocks	
33	1NO+1NC, slow action
34	2NC, slow action

Preinstalled cable gland	
	no cable gland (standard)
K22	with assembled cable gland suitable for Ø 5 to Ø 10 mm cables range
K26	with assembled cable gland suitable for Ø 3 to Ø 7 mm cables range

Threaded conduit entry	
	PG 11 (standard)
M1	M16x1,5

Safety switches **for hinged doors**

Main data

- Metal housing, from one to three conduit entries
- Protection degree IP67
- 8 contact blocks available
- Stainless steel actuator
- M12 assembled connector versions
- Silver contacts gold plated versions

Technical data

Housing

Housing type FD, FL and FC made of metal, coated with baked epoxy powder. Stainless steel actuator.
FD, FC series one conduit entry
FL series three conduit entries

Protection degree:	IP67 according to EN 60529 with cable gland having equal or higher protection degree

General data

For safety applications up to SIL 3 / PL e

Safety parameters:	see page 7/34
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 cycles[1]/hour
Mechanical endurance:	1 million of operations cycles[1]
Max actuating speed:	180°/s
Min. actuating speed:	2°/s
Driving torque for installation:	see pages 7/1-7/12

(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 20, 21, 22, 33, 34:	min.	1 x 0,34 mm²	(1 x AWG 22)
	max.	2 x 1,5 mm²	(2 x AWG 16)
Contact blocks 7, 9, 18:	min.	1 x 0,5 mm²	(1 x AWG 20)
	max.	2 x 2,5 mm²	(2 x AWG 14)

Markings and quality marks:

Approval IMQ:	EG605 (FD-FL-FC series)
Approval UL:	E131787
Approval CCC:	2007010305230000 (FD-FL-FC series)
Approval EZU:	1010151
Approval GOST:	POCC IT.AB24.B04512

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.

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 7/1 to page 7/12.

	Electrical data		Utilization categories
without connector	Thermal current (Ith):	10 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	Ue (V) 250 400 500 Ie (A) 6 4 1
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	Direct current: DC13
	Conditional shot circuit current:	1000 A according to EN 60947-5-1	Ue (V) 24 125 250
	Protection against short circuits:	fuse 10 A 500 V type aM	Ie (A) 6 1,1 0,4
	Pollution degree:	3	
with 5 poles M12 connector	Thermal current (Ith):	4 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250
	Protection against short circuits:	fuse 4 A 500 V type gG	Ie (A) 4 4 4
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24 125 250
			Ie (A) 4 1,1 0,4
with 8 poles M12 connector	Thermal current (Ith):	2 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	Ue (V) 24
	Protection against short circuits:	fuse 2 A 500 V type gG	Ie (A) 2
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24
			Ie (A) 2

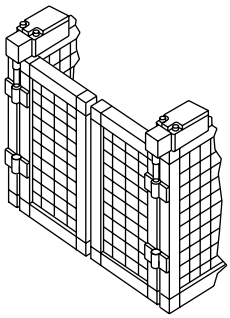
Description

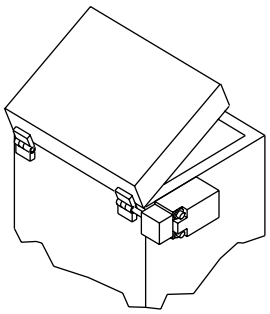
These safety switches have been designed to control gates or guards which protect against hazardous parts of the machines. They are very sensitive and positively open the contacts after few degrees of rotation, sending an immediate stop signal. The head may rotate in 90° steps, allowing its installation in a great variety of positions.
The metal housing and the stainless steel actuator allow this switch to be used even in hard environments where sedimented powder or dirty could block working of safety switches with separated actuator.

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
Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (for contact blocks 20, 21, 22, 33, 34)
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 7, 9, 18, 20, 21, 22, 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 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).

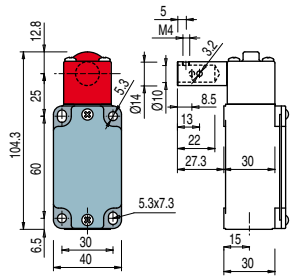
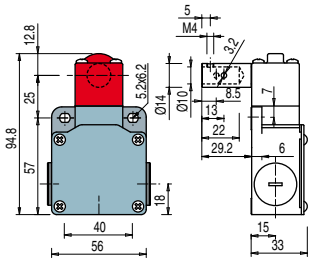
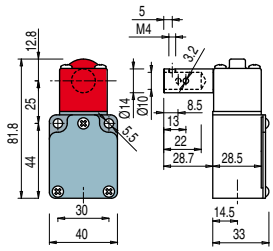
In conformity with standard: UL 508

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

Dimensional drawings

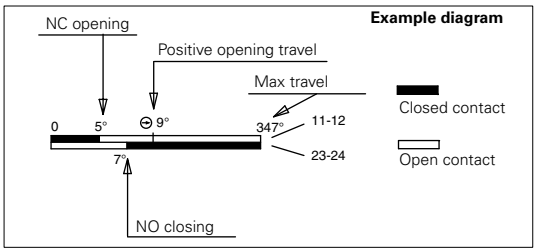
Contacts type:

L = slow action
LO = slow action overlapped

Contact blocks		Metal housing Stainless steel actuator	Metal housing Stainless steel actuator	Metal housing Stainless steel actuator
				
18	L	FD 1895 1NO+1NC	FL 1895 1NO+1NC	
7	LO	FD 795 1NO+1NC	FL 795 1NO+1NC	
9	L	FD 995 2NC	FL 995 2NC	
20	L	FD 2095 1NO+2NC	FL 2095 1NO+2NC	
21	L	FD 2195 3NC	FL 2195 3NC	
22	L	FD 2295 2NO+1NC	FL 2295 2NO+1NC	
33	L	FD 3395 1NO+1NC	FL 3395 1NO+1NC	FC 3395 1NO+1NC
34	L	FD 3495 2NC	FL 3495 2NC	FC 3495 2NC
Min. force		0,15 Nm (0,4 Nm ⊕)	0,15 Nm (0,4 Nm ⊕)	0,15 Nm (0,4 Nm ⊕)

How to read travel diagrams

All measures in the diagrams are in degrees



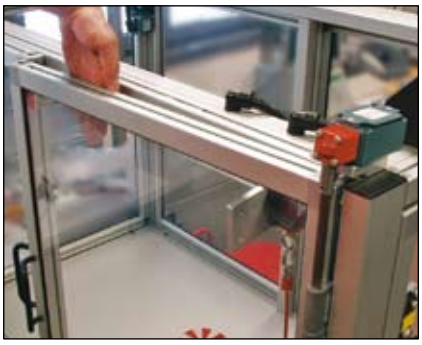
IMPORTANT:
In safety applications it is necessary to activate the switch **at least up to the positive opening point** indicated in the diagrams with the symbol ⊕. Operate the switch **at least with the positive opening force**, indicated between brackets, below each article, next the value of minimum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

Accessories See page 6/1

All measures in the drawings are in mm

Regulation of intervention point

Temporary shaft locking (dowel provided).



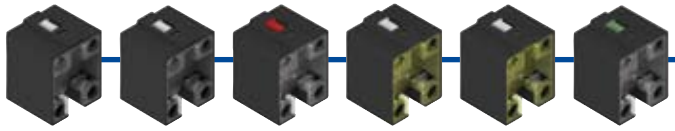
Verify the operating point according to EN 294, adjust the operating point again if necessary.

Switch locking (pin provided).

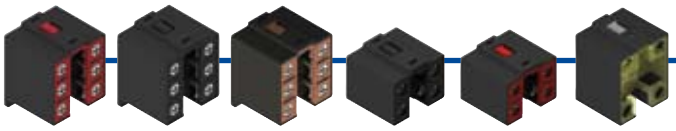
Selection diagram

FR FM FX FZ FK

CONTACT BLOCKS



5 1NO+1NC snap action
6 1NO+1NC slow action
7 1NO+1NC slow action overlapped
9 2NC slow action
14 2NC slow action shifted
18 1NO+1NC slow action closer



20 1NO+2NC slow action
21 3NC slow action
22 2NO+1NC slow action
33 1NO+1NC slow action
34 2NC slow action
66 1NC slow action

CONDUIT ENTRIES

Threaded conduit entries (standard)
With cable gland assembled
With M12 plastic connector assembled and wired
With M12 metal connector assembled and wired

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

FR 1896-XGM2K70

Housing

FR	polymer housing, one conduit entry
FM	metal housing, one conduit entry
FX	polymer housing, two conduit entries
FZ	metal housing, two conduit entries

Contact blocks

5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action overlapped
9	2NC, slow action
14	2NC, slow action shifted
18	1NO+1NC, slow action closer
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action
66	1NC, slow action

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Contacts type

	silver contacts (standard)
G	silver contacts gold plated 1 µm

Threaded conduit entry

	PG 13,5 (standard)
A	PG 11 (only for FR-FX housing)
M1	M16x1,5 (only for FR-FX housing)
M2	M20x1,5

Preinstalled cable gland or connectors

	no cable gland or connector (standard)
K21	with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
...	.....
K70	with assembled 4 poles M12 plastic connector
...	.....

For the complete list of all combinations, please contact our technical office.

article | options

FK 3396-XGM1K22

Housing

FK	polymer housing, one conduit entry

Contact blocks

33	1NO+1NC, slow action
34	2NC, slow action

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Threaded conduit entry

	PG 11 (standard)
M1	M16x1,5

Contacts type

	silver contacts (standard)
G	silver contacts gold plated 1 µm

Preinstalled cable gland

	no cable gland (standard)
K22	with assembled cable gland suitable for Ø 5 to Ø 10 mm cables range
K26	with assembled cable gland suitable for Ø 3 to Ø 7 mm cables range

Safety switches **for hinged doors**

Main data

- Metal housing or polymer housing, from one to two conduit entries
- Protection degree IP67
- 12 contact blocks available
- Stainless steel actuator
- M12 assembled connector versions
- Silver contacts gold plated versions
- Stainless steel external parts 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 EZU:	1010151
Approval GOST:	POCC IT.AB24.B04512

Technical data

Housing

Housing type FR, FX and FK made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin ⧈
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 according to EN 60529 with cable gland having equal or higher protection degree

General data

For safety applications up to SIL 3 / PL e

Safety parameters:	see page 7/34
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 cycles[1]/hour
Mechanical endurance:	1 million of operations cycles[1]
Max actuating speed:	180°/s
Min. actuating speed:	2°/s
Driving torque for installation:	see pages 7/1-7/12

(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 20, 21, 22, 33, 34:	min.	1 x 0,34 mm²	(1 x AWG 22)
	max.	2 x 1,5 mm²	(2 x AWG 16)
Contact blocks 5, 6, 7, 9, 14, 18, 66:	min.	1 x 0,5 mm²	(1 x AWG 20)
	max.	2 x 2,5 mm²	(2 x AWG 14)

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.

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 7/1 to page 7/12.

	Electrical data		Utilization categories
without connector	Thermal current (Ith):	10 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	Ue (V) 250 400 500 Ie (A) 6 4 1
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	Direct current: DC13
	Conditional shot circuit current:	1000 A according to EN 60947-5-1	Ue (V) 24 125 250
	Protection against short circuits:	fuse 10 A 500 V type aM	Ie (A) 6 1,1 0,4
	Pollution degree:	3	
with 4 or 5 poles M12 connector	Thermal current (Ith):	4 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250
	Protection against short circuits:	fuse 4 A 500 V type gG	Ie (A) 4 4 4
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24 125 250
			Ie (A) 4 1,1 0,4
with 8 poles M12 connector	Thermal current (Ith):	2 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	Ue (V) 24
	Protection against short circuits:	fuse 2 A 500 V type gG	Ie (A) 2
	Pollution degree:	3	Direct current: DC13
			Ue (V) 24
			Ie (A) 2

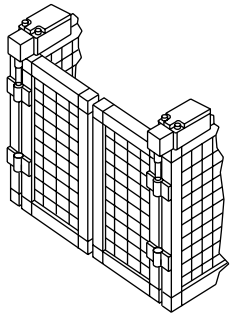
Description

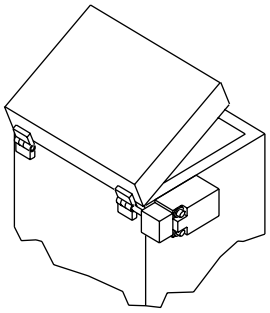
These safety switches have been designed to control gates or guards that protect the hazardous parts of machines. They are very sensitive and positively open the contact block after few rotation degrees, sending the stop signal immediately. The head adjustable in 90° steps allows their installation in four different positions. Available with polymer or metal housing, with protection degree IP67.
Its special shape allows to use this type of switches also in those areas where dust and dirt could block working of normal safety switches with separate actuator.

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
Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (for contact blocks 20, 21, 22, 33, 34)
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, 6, 7, 9, 14, 18, 20, 21, 22, 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 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).

In conformity with standard: UL 508

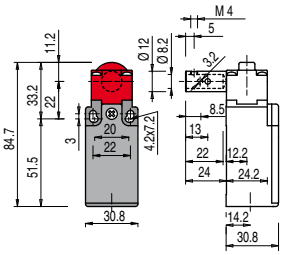
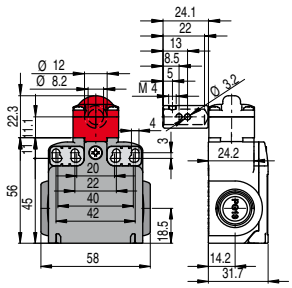
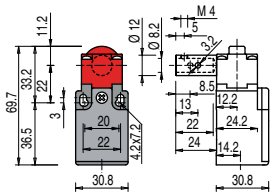
Please contact our technical service for the list of approved products.

Safety switches **for hinged doors**

Dimensional drawings

Contacts type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted

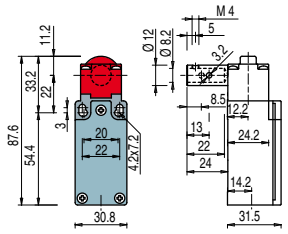
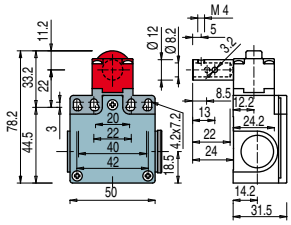
Contact blocks		Polymer housing		Polymer housing		Polymer housing	
							
5	R	FR 596	1NO+1NC	FX 596	1NO+1NC		
6	L	FR 696	1NO+1NC	FX 696	1NO+1NC		
7	LO	FR 796	1NO+1NC	FX 796	1NO+1NC		
9	L	FR 996	2NC	FX 996	2NC		
14	LS	FR 1496	2NC	FX 1496	2NC		
18	L	FR 1896	1NO+1NC	FX 1896	1NO+1NC		
20	L	FR 2096	1NO+2NC	FX 2096	1NO+2NC		
21	L	FR 2196	3NC	FX 2196	3NC		
22	L	FR 2296	2NO+1NC	FX 2296	2NO+1NC		
33	L	FR 3396	1NO+1NC	FX 3396	1NO+1NC	FK 3396	1NO+1NC
34	L	FR 3496	2NC	FX 3496	2NC	FK 3496	2NC
66	L	FR 6696	1NC	FX 6696	1NC		
Min. force		0,15 Nm (0,4 Nm →)		0,15 Nm (0,4 Nm →)		0,15 Nm (0,4 Nm →)	
Travel diagrams		page 7/8 - group 9		page 7/8 - group 9		page 7/8 - group 9	

Accessories See page 6/1

All measures in the drawings are in mm

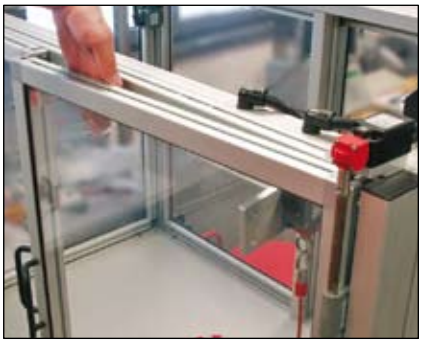
Contacts type:

R = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted

Contact blocks		Metal housing		Metal housing	
					
5	R	FM 596	1NO+1NC	FZ 596	1NO+1NC
6	L	FM 696	1NO+1NC	FZ 696	1NO+1NC
7	LO	FM 796	1NO+1NC	FZ 796	1NO+1NC
9	L	FM 996	2NC	FZ 996	2NC
14	LS	FM 1496	2NC	FZ 1496	2NC
18	L	FM 1896	1NO+1NC	FZ 1896	1NO+1NC
20	L	FM 2096	1NO+2NC	FZ 2096	1NO+2NC
21	L	FM 2196	3NC	FZ 2196	3NC
22	L	FM 2296	2NO+1NC	FZ 2296	2NO+1NC
33	L	FM 3396	1NO+1NC	FZ 3396	1NO+1NC
34	L	FM 3496	2NC	FZ 3496	2NC
66	L	FM 6696	1NC	FZ 6696	1NC
Min. force		0,15 Nm (0,4 Nm ⊖)		0,15 Nm (0,4 Nm ⊖)	
Travel diagrams		page 7/8 - group 9		page 7/8 - group 9	

Regulation of intervention point

Temporary shaft locking (dowel provided).

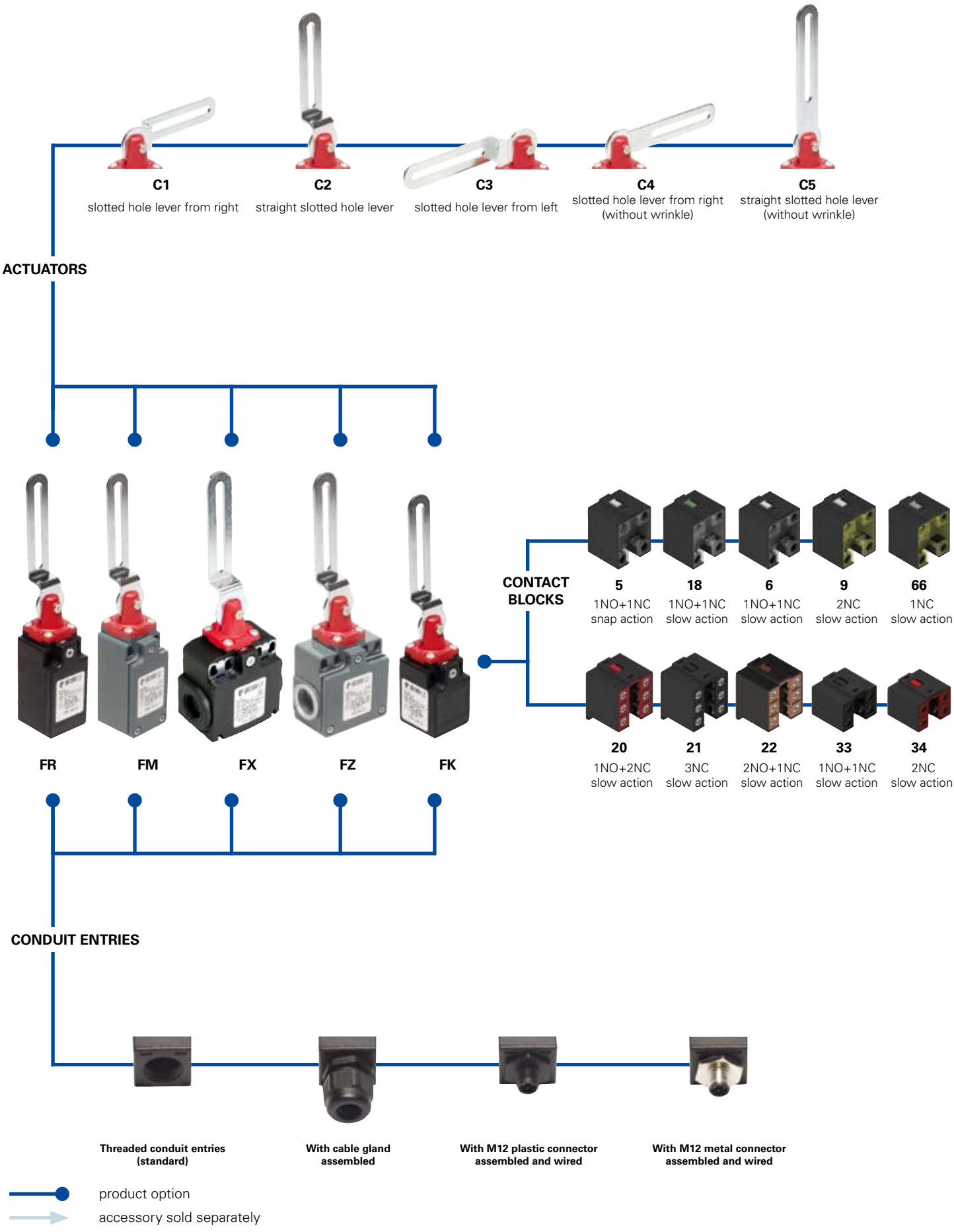


Verify the operating point according to EN 294, adjust the operating point again if necessary.

Switch locking (pin provided).

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

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: **FR 18C1** options: **-GM2K70**

Housing

FR	polymer housing, one conduit entry
FM	metal housing, one conduit entry
FX	polymer housing, two conduit entries
FZ	metal housing, two conduit entries

Contact blocks

18	1NO+1NC, slow action
5	1NO+1NC, snap action
6	1NO+1NC, slow action
9	2NC, slow action
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action
66	1NC, slow action

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	straight slotted hole lever (without wrinkle)

Preinstalled cable gland or connectors

	no cable gland or connector (standard)
K21	with assembled cable gland suitable for Ø 6 to Ø 12 mm cables range
...	.....
K70	with assembled 4 poles M12 plastic connector
...	.....

For the complete list of all combinations, please contact our technical office.

Threaded conduit entry

	PG 13,5 (standard)
A	PG 11 (only for FR-FX housing)
M1	M16x1,5 (only for FR-FX housing)
M2	M20x1,5

Contacts type

	silver contacts (standard)
G	silver contacts gold plated 1 µm

article: **FK 33C1** options: **-GM1K22**

Housing

FK	polymer housing, one conduit entry

Contact blocks

33	1NO+1NC, slow action
34	2NC, slow action

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	straight slotted hole lever (without wrinkle)

Preinstalled cable gland

	no cable gland (standard)
K22	with assembled cable gland suitable for Ø 5 to Ø 10 mm cables range
K26	with assembled cable gland suitable for Ø 3 to Ø 7 mm cables range

Threaded conduit entry

	PG 11 (standard)
M1	M16x1,5

Contacts type

	silver contacts (standard)
G	silver contacts gold plated 1 µm

Safety switches **with slotted hole lever**

Main data

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

Technical data

Housing

Housing type FR, FX and FK made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin ▣
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 according to EN 60529 with cable gland having equal or higher protection degree

General data

For safety applications up to SIL 3 / PL e

Safety parameters:	see page 7/34
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 cycles[1]/hour
Mechanical endurance:	1 million of operations cycles[1]
Max actuating speed:	180°/s
Min. actuating speed:	2°/s
Driving torque for installation:	see pages 7/1-7/12

(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 20, 21, 22, 33, 34:	min.	1 x 0,34 mm²	(1 x AWG 22)
	max.	2 x 1,5 mm²	(2 x AWG 16)
Contact blocks 5, 7, 9, 18:	min.	1 x 0,5 mm²	(1 x AWG 20)
	max.	2 x 2,5 mm²	(2 x AWG 14)

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 EZU:	1010151
Approval GOST:	POCC IT.AB24.B04512

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.

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.

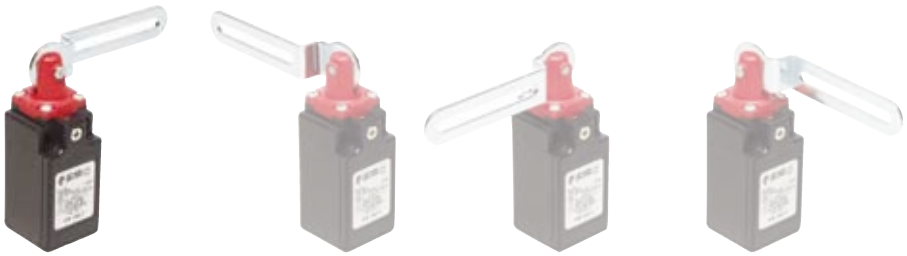
⚠ If not expressly indicated in this chapter, for the right installation and the correct utilization of all articles see requirements indicated from page 7/1 to page 7/12.

Electrical data			Utilization categories
without connector	Thermal current (Ith):	10 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	Ue (V) 250 400 500 Ie (A) 6 4 1
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	Direct current: DC13
	Conditional shot circuit current:	1000 A according to EN 60947-5-1	Ue (V) 24 125 250 Ie (A) 6 1,1 0,4
	Protection against short circuits:	fuse 10 A 500 V type aM	
	Pollution degree:	3	
with 4 or 5 poles M12 connector	Thermal current (Ith):	4 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250 Ie (A) 4 4 4
	Protection against short circuits:	fuse 4 A 500 V type gG	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 125 250 Ie (A) 4 1,1 0,4
with 8 poles M12 connector	Thermal current (Ith):	2 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	Ue (V) 24 Ie (A) 2
	Protection against short circuits:	fuse 2 A 500 V type gG	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 Ie (A) 2

Description

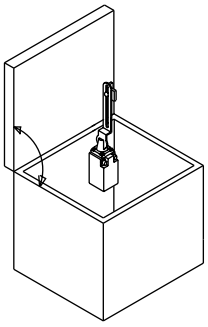
These safety switches are used to control gates or doors with hinge protecting hazardous parts of machines. Easy to install, they do not need the interaction with the hinge of the guard. Very sensitive, they positively open the contacts after few rotation degrees, sending the stop signal immediately.

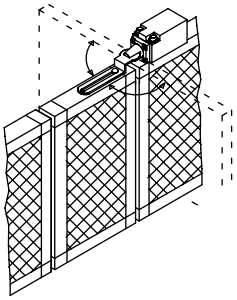
Rotating heads



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
Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (for contact blocks 20, 21, 22, 33, 34)
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: 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 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).

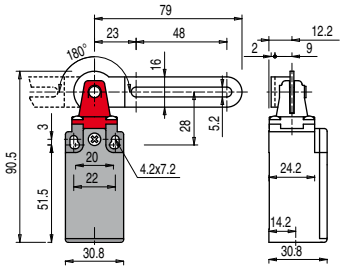
In conformity with standard: UL 508

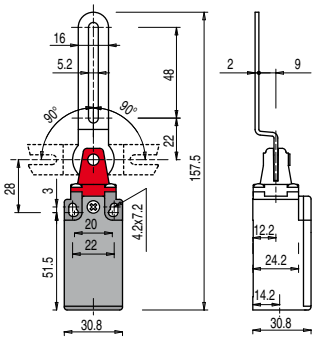
Please contact our technical service for the list of approved products.

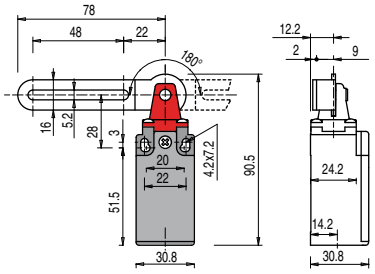
Dimensional drawings

Contacts type:

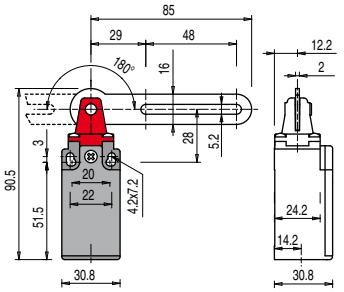
R = snap action
L = slow action
LA = slow action closer

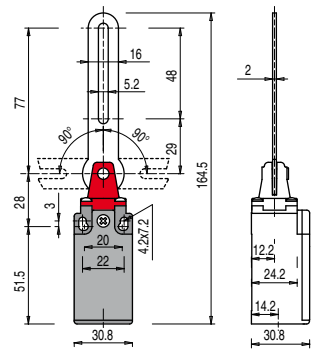






Contact blocks								
5	R	FR 5C1	1NO+1NC		FR 5C2	1NO+1NC		FR 5C3	1NO+1NC
6	L	FR 6C1	1NO+1NC		FR 6C2	1NO+1NC		FR 6C3	1NO+1NC
9	L	FR 9C1	2NC		FR 9C2	2NC		FR 9C3	2NC
18	LA	FR 18C1	1NO+1NC		FR 18C2	1NO+1NC		FR 18C3	1NO+1NC
20	L	FR 20C1	1NO+2NC		FR 20C2	1NO+2NC		FR 20C3	1NO+2NC
21	L	FR 21C1	3NC		FR 21C2	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
66	L	FR 66C1	1NC		FR 66C2	1NC		FR 66C3	1NC
Min. force		0,11 Nm (0,15 Nm ⊖)			0,11 Nm (0,15 Nm ⊖)			0,11 Nm (0,15 Nm ⊖)	
Travel diagrams		page 7/8 - group 10			page 7/8 - group 11			page 7/8 - group 10	





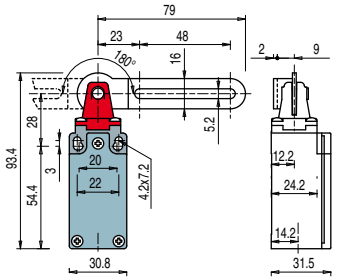
Contact blocks								
5	R	FR 5C4	1NO+1NC		FR 5C5	1NO+1NC		
6	L	FR 6C4	1NO+1NC		FR 6C5	1NO+1NC		
9	L	FR 9C4	2NC		FR 9C5	2NC		
18	LA	FR 18C4	1NO+1NC		FR 18C5	1NO+1NC		
20	L	FR 20C4	1NO+2NC		FR 20C5	1NO+2NC		
21	L	FR 21C4	3NC		FR 21C5	3NC		
22	L	FR 22C4	2NO+1NC		FR 22C5	2NO+1NC		
33	L	FR 33C4	1NO+1NC		FR 33C5	1NO+1NC		
34	L	FR 34C4	2NC		FR 34C5	2NC		
66	L	FR 66C4	1NC		FR 66C5	1NC		
Min. force		0,11 Nm (0,15 Nm ⊖)			0,11 Nm (0,15 Nm ⊖)			
Travel diagrams		page 7/8 - group 10			page 7/8 - group 11			

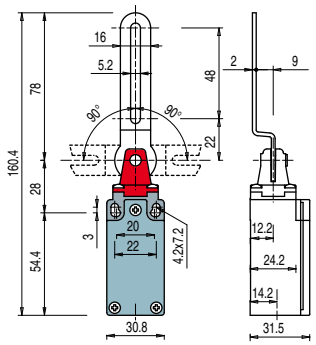
Accessories See page 6/1

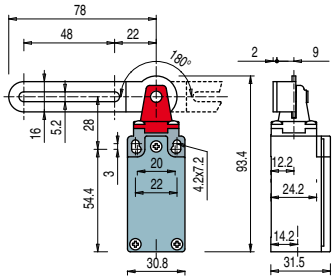
All measures in the drawings are in mm

Contacts type:

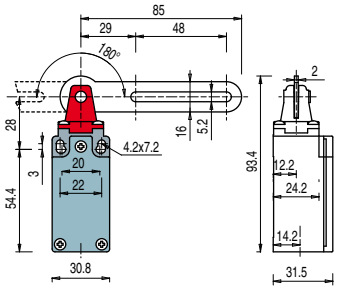
R = snap action
L = slow action
LA = slow action closer

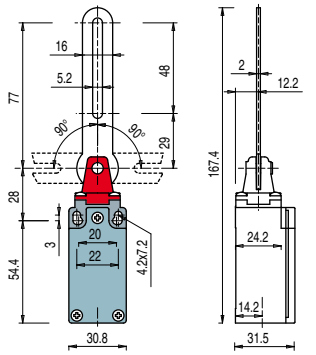






Contact blocks							
5	R	FM 5C1	1NO+1NC	FM 5C2	1NO+1NC	FM 5C3	1NO+1NC
6	L	FM 6C1	1NO+1NC	FM 6C2	1NO+1NC	FM 6C3	1NO+1NC
9	L	FM 9C1	2NC	FM 9C2	2NC	FM 9C3	2NC
18	LA	FM 18C1	1NO+1NC	FM 18C2	1NO+1NC	FM 18C3	1NO+1NC
20	L	FM 20C1	1NO+2NC	FM 20C2	1NO+2NC	FM 20C3	1NO+2NC
21	L	FM 21C1	3NC	FM 21C2	3NC	FM 21C3	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
66	L	FM 66C1	1NC	FM 66C2	1NC	FM 66C3	1NC
Min. force		0,11 Nm (0,15 Nm)		0,11 Nm (0,15 Nm)		0,11 Nm (0,15 Nm)	
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11		page 7/8 - group 10	



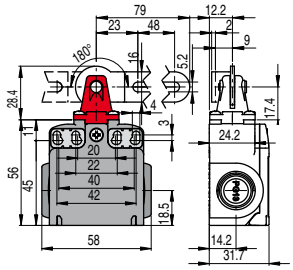


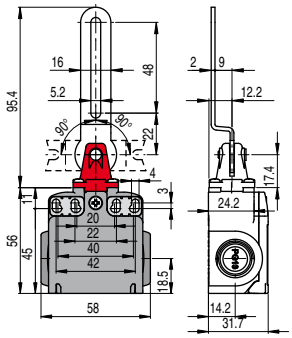
Contact blocks							
5	R	FM 5C4	1NO+1NC	FM 5C5	1NO+1NC		
6	L	FM 6C4	1NO+1NC	FM 6C5	1NO+1NC		
9	L	FM 9C4	2NC	FM 9C5	2NC		
18	LA	FM 18C4	1NO+1NC	FM 18C5	1NO+1NC		
20	L	FM 20C4	1NO+2NC	FM 20C5	1NO+2NC		
21	L	FM 21C4	3NC	FM 21C5	3NC		
22	L	FM 22C4	2NO+1NC	FM 22C5	2NO+1NC		
33	L	FM 33C4	1NO+1NC	FM 33C5	1NO+1NC		
34	L	FM 34C4	2NC	FM 34C5	2NC		
66	L	FM 66C4	1NC	FM 66C5	1NC		
Min. force		0,11 Nm (0,15 Nm)		0,11 Nm (0,15 Nm)			
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11			

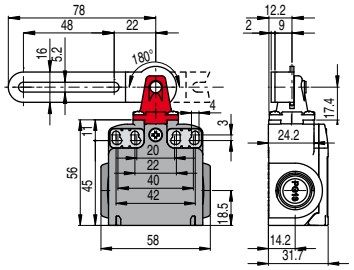
Safety switches **with slotted hole lever**

Contacts type:

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

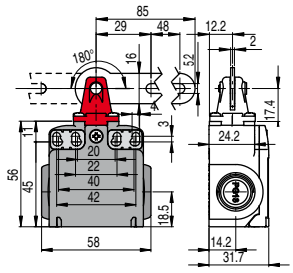


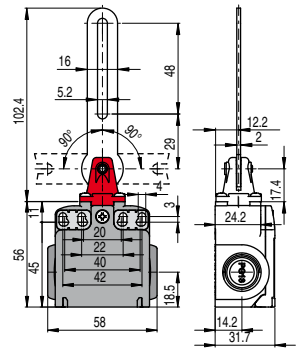




Contact blocks

5	R	FX 5C1	1NO+1NC	FX 5C2	1NO+1NC	FX 5C3	1NO+1NC
6	L	FX 6C1	1NO+1NC	FX 6C2	1NO+1NC	FX 6C3	1NO+1NC
9	L	FX 9C1	2NC	FX 9C2	2NC	FX 9C3	2NC
18	LA	FX 18C1	1NO+1NC	FX 18C2	1NO+1NC	FX 18C3	1NO+1NC
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
66	L	FX 66C1	1NC	FX 66C2	1NC	FX 66C3	1NC
Min. force		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)	
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11		page 7/8 - group 10	





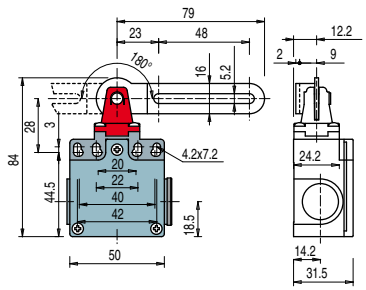
Contact blocks

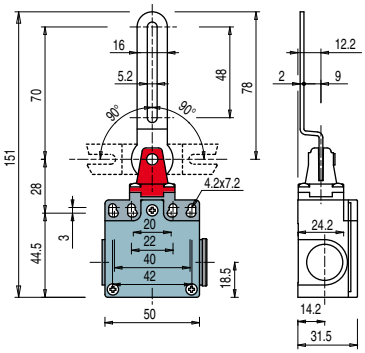
5	R	FX 5C4	1NO+1NC	FX 5C5	1NO+1NC		
6	L	FX 6C4	1NO+1NC	FX 6C5	1NO+1NC		
9	L	FX 9C4	2NC	FX 9C5	2NC		
18	LA	FX 18C4	1NO+1NC	FX 18C5	1NO+1NC		
20	L	FX 20C4	1NO+2NC	FX 20C5	1NO+2NC		
21	L	FX 21C4	3NC	FX 21C5	3NC		
22	L	FX 22C4	2NO+1NC	FX 22C5	2NO+1NC		
33	L	FX 33C4	1NO+1NC	FX 33C5	1NO+1NC		
34	L	FX 34C4	2NC	FX 34C5	2NC		
66	L	FX 66C4	1NC	FX 66C5	1NC		
Min. force		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)			
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11			

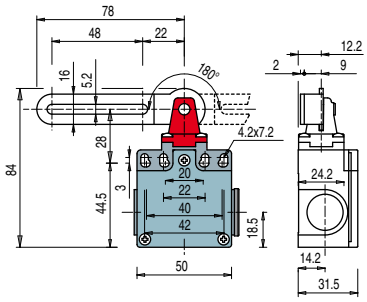
Accessories See page 6/1

Contacts type:

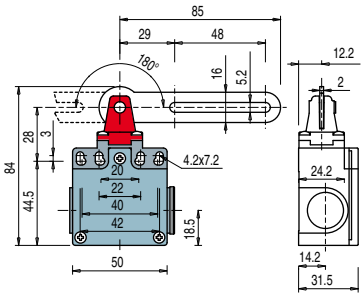
R = snap action
L = slow action
LA = slow action closer

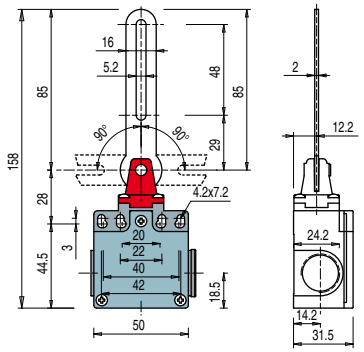






Contact blocks							
5	R	FZ 5C1	1NO+1NC	FZ 5C2	1NO+1NC	FZ 5C3	1NO+1NC
6	L	FZ 6C1	1NO+1NC	FZ 6C2	1NO+1NC	FZ 6C3	1NO+1NC
9	L	FZ 9C1	2NC	FZ 9C2	2NC	FZ 9C3	2NC
18	LA	FZ 18C1	1NO+1NC	FZ 18C2	1NO+1NC	FZ 18C3	1NO+1NC
20	L	FZ 20C1	1NO+2NC	FZ 20C2	1NO+2NC	FZ 20C3	1NO+2NC
21	L	FZ 21C1	3NC	FZ 21C2	3NC	FZ 21C3	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
66	L	FZ 66C1	1NC	FZ 66C2	1NC	FZ 66C3	1NC
Min. force		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)	
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11		page 7/8 - group 10	





Contact blocks							
5	R	FZ 5C4	1NO+1NC	FZ 5C5	1NO+1NC		
6	L	FZ 6C4	1NO+1NC	FZ 6C5	1NO+1NC		
9	L	FZ 9C4	2NC	FZ 9C5	2NC		
18	LA	FZ 18C4	1NO+1NC	FZ 18C5	1NO+1NC		
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		
66	L	FZ 66C4	1NC	FZ 66C5	1NC		
Min. force		0,11 Nm (0,15 Nm ⊖)		0,11 Nm (0,15 Nm ⊖)			
Travel diagrams		page 7/8 - group 10		page 7/8 - group 11			

Safety switches **with slotted hole lever**

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 7/8 - group 10	page 7/8 - group 11	page 7/8 - group 10

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 7/8 - group 10	page 7/8 - group 11	

Accessories See page 6/1

Notes

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