

Hinge operating safety switches



Description and technical data

These safety switches have been designed to control gates or guards to protect against hazardous parts of the machines. They are very sensible 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 four different positions.

The housing metal made and the stainless steel actuator allows this switch to be used even in hard environments where sedimented powder or dirty could block working of safety switches with separated actuator.

Housing

FD, FL and FC series made of metal, coated with baked epoxy powder. Stainless steel actuator.

FD and FC series one conduit entry

FL series three conduit entries

Protection degree: IP66

Markings and quality marks:



Approval IMQ: EG605 (FD series)
EG607 (FL series)
EG608 (FC series)
Approval UL: E131787
Approval EZU: 1010151

General data

Ambient temperature: from -25°C to +80°C
Max operating frequency: 3600 operations cycles¹/hour
Mechanical endurance: 1 million 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.

Complying with the requirements requested by: Low Voltage Directive 73/23/EEC and subsequent modifications and completions, Machinery Directive 98/37/EEC, Electromagnetic Compatibility 89/336/EEC and subsequent modifications and completions.

Positive contact opening complying with the standards: IEC 947-5-1, EN 60947-5-1, CEI EN 60947-5-1, VDE 0660-206.

Cross section of the conductors (flexible lead 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)

Conforms to the standards:

IEC 947-5-1, IEC 337-1, EN 60947-5-1, CEI EN 60947-5-1, CEI 17-45, IEC 204-1, EN 60204-1, CEI 44-5, EN 1088, EN 292, IEC 529, EN 60529, CEI 70-1, NFC 63-140, VDE 0660-200, VDE 0113, CENELEC EN 50013, BG-GS-ET-15.

Approvals:

IEC 947-5-1, UL 508.

Electrical data

without connectors
Thermal current (I_{th}): 10 A
Rated insulation voltage (U_i): 500 VAC 600 VDC
400 VAC for contact block 20, 21, 22, 33, 34
Protection against short circuits: fuse 10 A 500V type aM
Pollution degree: 3

with 5 poles
M12 connectors
Thermal current (I_{th}): 4 A
Rated insulation voltage (U_i): 250 VAC 300 VDC
Protection against short circuits: fuse 4 A 500 V type Gg
Pollution degree: 3

with 8 poles
M12 connectors
Thermal current (I_{th}): 2 A
Rated insulation voltage (U_i): 30 VAC 36 VDC
Protection against short circuits: fuse 2 A 500 V type Gg
Pollution degree: 3

Utilization categories

Alternate current: AC15 (50÷60 Hz)
U_e (V) 250 400 500
I_e (A) 6 4 1
Direct current: DC13
U_e (V) 24 125 250
I_e (A) 6 1,1 0,4

Alternate current: AC15 (50÷60 Hz)
U_e (V) 24 120 250
I_e (A) 4 4 4
Direct current: DC13
U_e (V) 24 125 250
I_e (A) 4 1,1 0,4

Alternate current: AC15 (50÷60 Hz)
U_e (V) 24
I_e (A) 2
Direct current: DC13
U_e (V) 24
I_e (A) 2

Data type approved by IMQ and EZU

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

Thermal current (Ith): 10 A

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

Protection degree of the housing: IP66

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: Za, Zb, Za+Za, Y+Y, X+X, Y+Y+X, Y+Y+Y, Y+X+X

Positive opening of contacts on contact block 5, 6, 7, 9, 11, 14, 16, 20, 21, 22, 33, 34

Conforms to the standards: EN60947-1, EN 60947-1 A11, EN60947-5-1 and fundamental requirements of the Low Voltage Directive 73/23 EEC and 93/68 EEC.

Please contact our technical service for the list of our 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

Conforms to the standard: UL 508

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

How to order

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

FD 1895-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 Contacts
9	2NC, slow action	
20	2NC+1NO, slow action	
21	3NC, slow action	
22	1NC+2NO, slow action	
33	1NO+1NC, slow action	
34	2NC, slow action	

Type of contacts

	silver contacts (standard)
G	silver contacts gold plated (1 µm) (only contact block 7, 18)

M12 assembled connectors (see chapter 17)

	no connector (standard)
K40	8 poles, metal body, bottom output (only for contact blocks 20, 21, 22)
K41	8 poles, metal body, right output (only for contact blocks 20, 21, 22 and FL housing)
K42	8 poles, metal body, left output (only for contact blocks 20, 21, 22 and FL housing)
K50	5 poles, metal body, bottom output
K51	5 poles, metal body, right output (only for FL housing)
K52	5 poles, metal body, left output (only for FL housing)

Threaded conduit entry

	PG 13,5 (standard)
M2	M20x1,5

13.6

Hinge operating safety switches

How to order

FC 3395-M1

Housing

FC	metal housing, one conduit entry
-----------	----------------------------------

Threaded conduit entry

	PG 11 (standard)
--	------------------

Contact blocks

33	1NO+1NC, slow action
-----------	----------------------

34	2NC, slow action
-----------	------------------

M1	M16x1,5
-----------	---------

Accessories

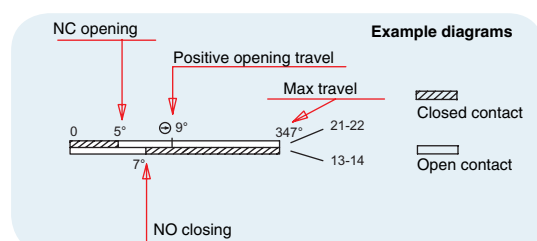
Further accessories: **signal lamps, cable glands, adapters, connectors and protection caps**, please see chapter 16



On request

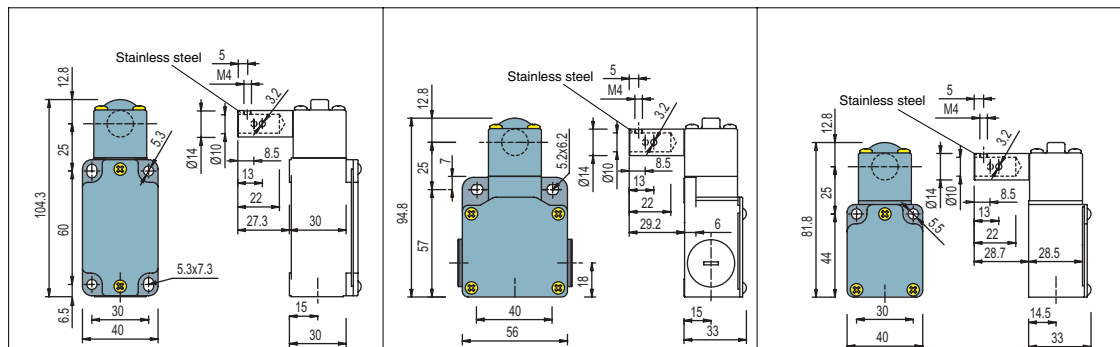
- Special versions with head oriented to the left, to the right or to the rear.
- Special versions for -40 °C use.
- Custom-made special versions.

How to read travel diagrams (all measure are in degree)



IMPORTANT:

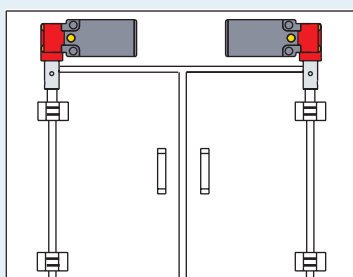
In **safety applications** it is necessary to activate the switch **till the positive opening point**, indicated in the diagrams with the symbol ⊖. Operate the switch **with the positive opening force**, indicated between brackets, below each article, near to the value of minimum forces.



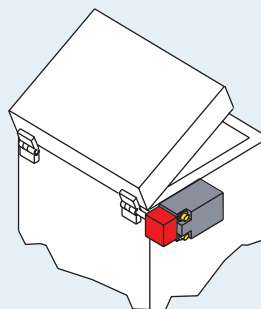
Contact blocks

18		FD 1895 → 1NO+1NC 	FL 1895 → 1NO+1NC 	
7		FD 795 → 1NO+1NC Overlapped Contacts 	FL 795 → 1NO+1NC Overlapped Contacts 	
9		FD 995 → 2NC 	FL 995 → 2NC 	
20		FD 2095 → 2NC+1NO 	FL 2095 → 2NC+1NO 	
21		FD 2195 → 3NC 	FL 2195 → 3NC 	
22		FD 2295 → 2NO+1NC 	FL 2295 → 2NO+1NC 	
33		FD 3395 → 1NO+1NC 	FL 3395 → 1NO+1NC 	FC 3395 → 1NO+1NC
34		FD 3495 → 2NC 	FL 3495 → 2NC 	FC 3495 → 2NC
Min force		15 Ncm (40 Ncm)	15 Ncm (40 Ncm)	15 Ncm (40 Ncm)

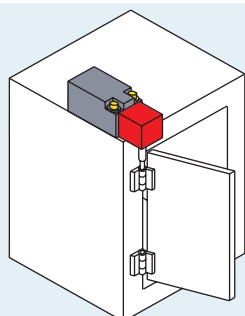
Application examples



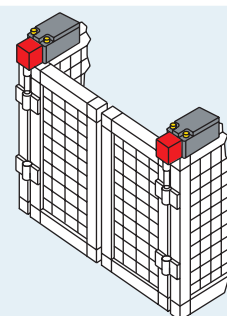
1) Hinge guards on the right and on the left



2) Scuttle guards



3) Hinge guards



4) Installation on fences

Hinge operating safety switches

Assembling instructions



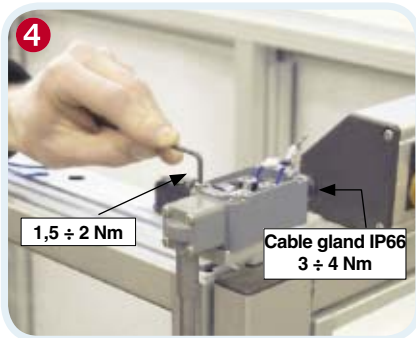
1 Drill the hinge and the shaft.



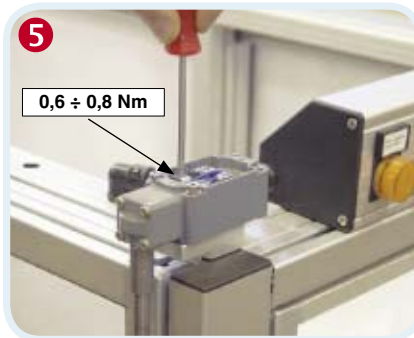
2 Lock by a plug pin the hinge to the shaft.



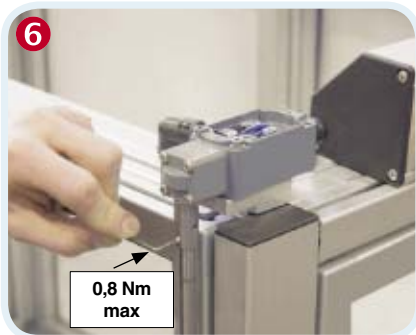
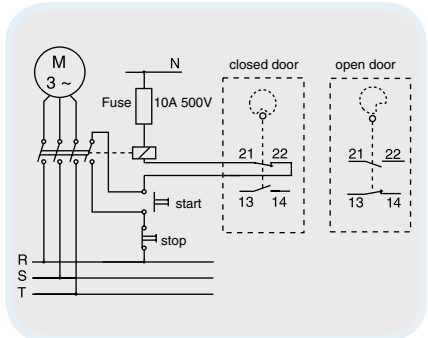
3 Insert the switch into the shaft.



4 Fix the switch on the machine frame



5 The safety circuit must be connected to the contacts 11-12, 21-22, 31-32.
The auxiliary contacts 13-14, 23-24, 33-34 are for signalling purpose.



6 Lock temporarily the switch to the shaft (dowel supplied).



7 Check the operation point according to EN 294, if necessary adjust the operation point again (see fig. 6).



8 Drill the hinge shaft through one of the two holes in the shaft of the switch.



9 Lock by a plug pin the switch (plug pin supplied).



10 Close the cover.

Attention!

Check the correct operation of the switch before the first start of the machine and periodically according to maintenance programs. Verify that on every opening of the guard, the machine stop immediately. Besides, with open guard (any position) must be impossible to start the machine.

