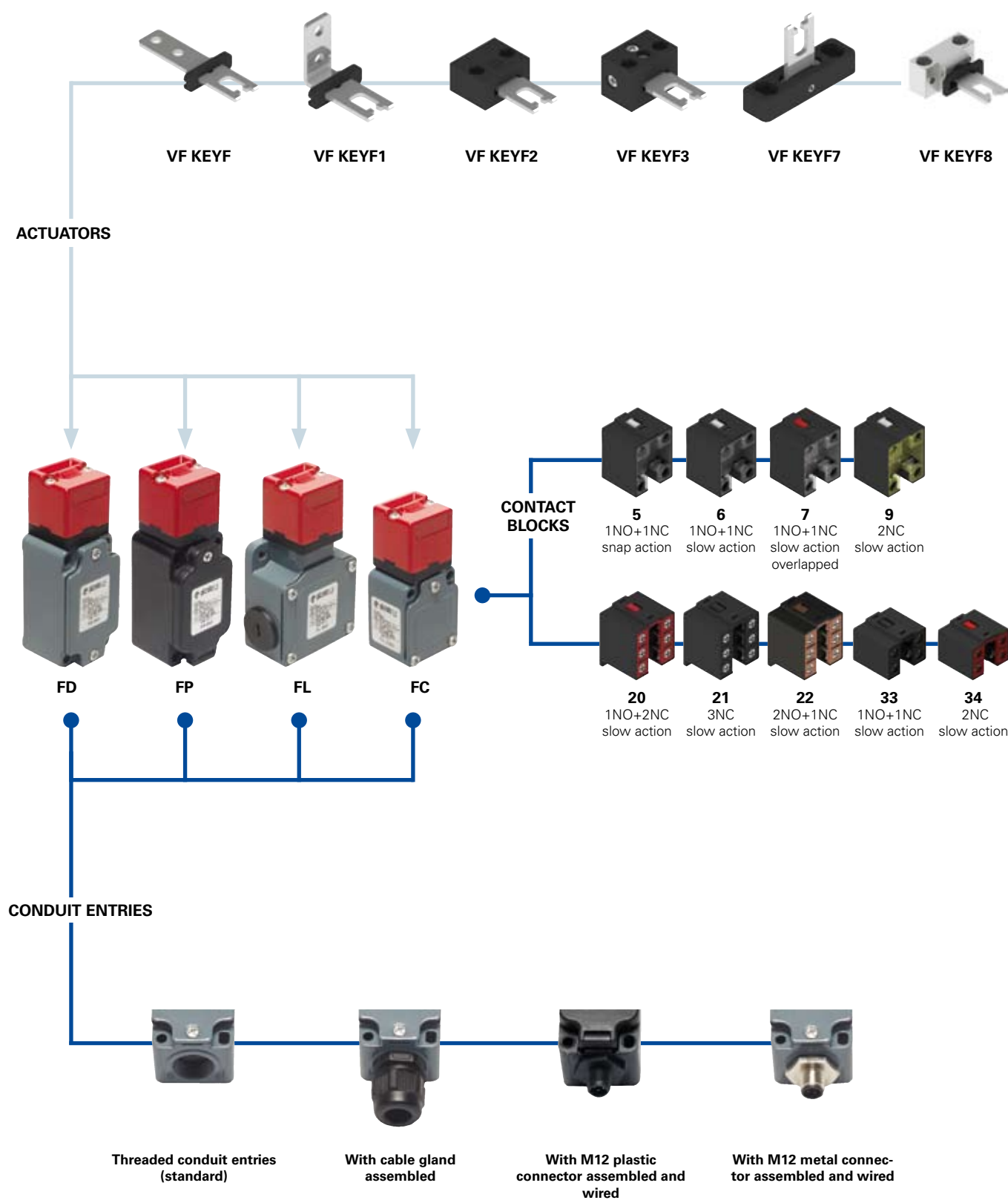


Selection diagram

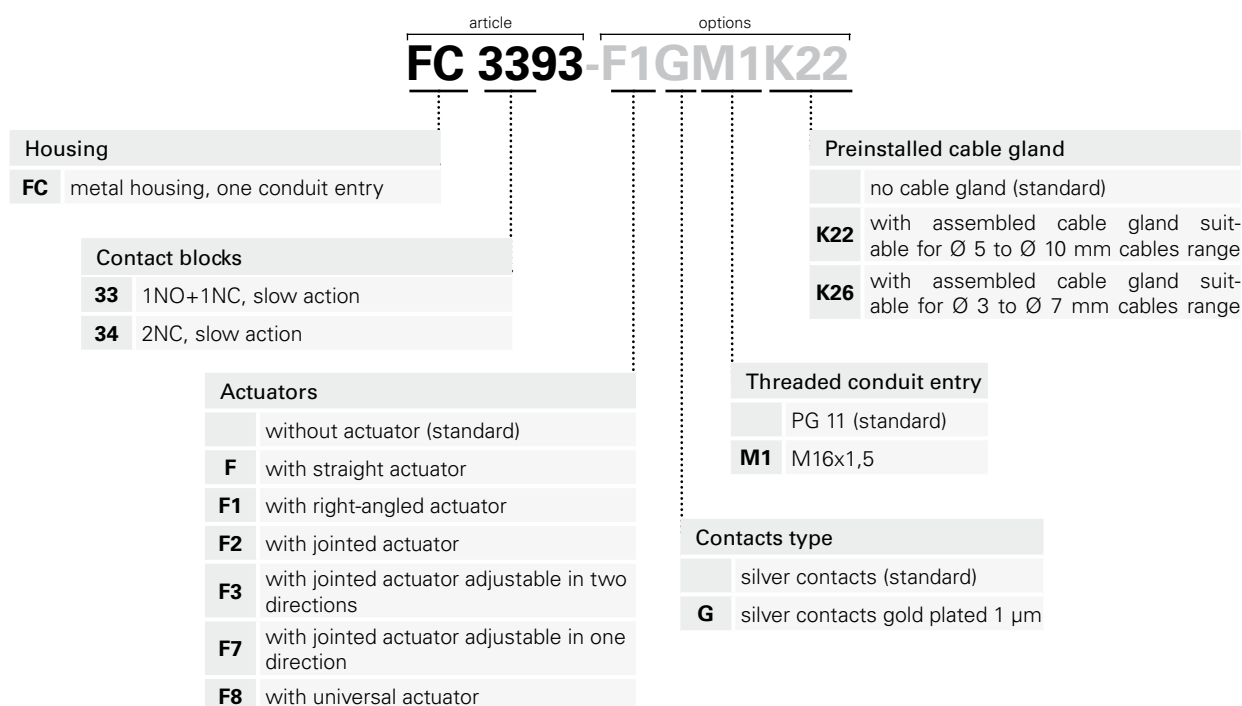
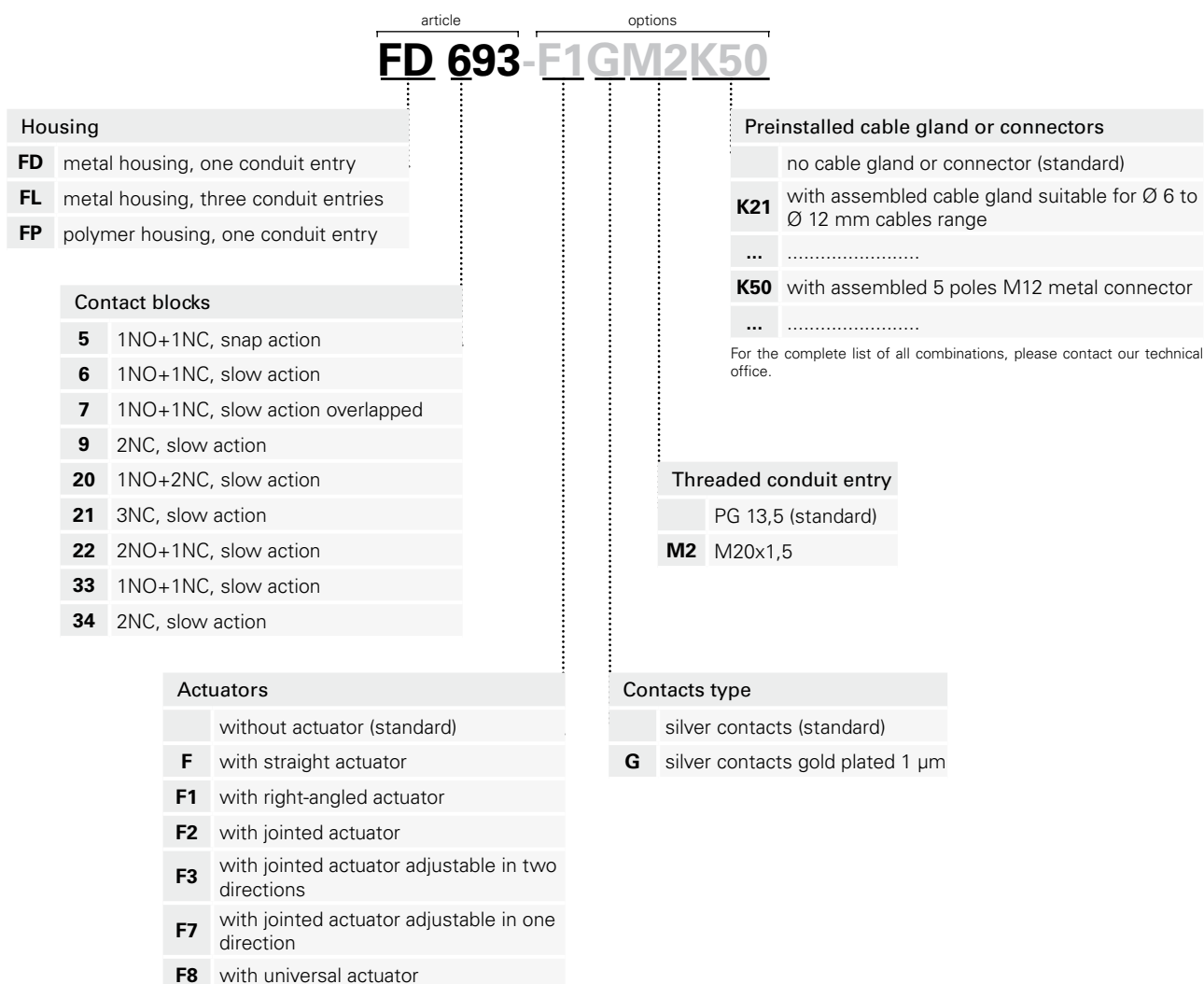


—●— product option
—▶— accessory sold separately



Code structure

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





Main data

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

Markings and quality marks:



Approval IMQ:	EG605 (FD-FLFC series) EG606 (FP series)
Approval UL:	E131787
Approval CCC:	2007010305230000 (FD-FLFC series) 2007010305230014 (FP series)
Approval ECU:	1010151
Approval GOST:	POCC IT.AB24.B04512

Technical data

Housing

Housing type FP made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation □

Housing type FD, FL and FC made of metal, coated with baked epoxy powder.

FD, FP and 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 (electrical contacts)

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 cycles¹/hour

Mechanical endurance:

1 million operations cycles¹

Max actuating speed:

0,5 m/s

Min. actuating speed:

1 mm/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 mm ²	(1 x AWG 22)
	max.	2 x 1,5 mm ²	(2 x AWG 16)
Contact blocks 5, 6, 7, 9:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)

In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, 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, BG-GS-ET-15.

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.

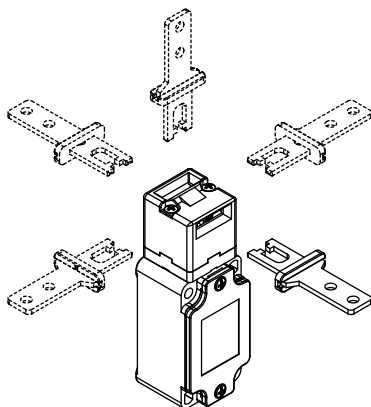
⚠ If not expressly indicated in this chapter, for the right installation and the correct utilization of all articles see requirements indicated from page 7/1 to page 7/12.

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

Description

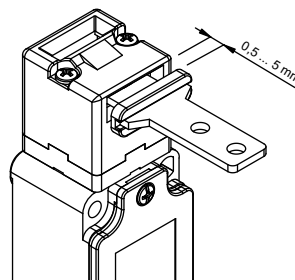
These safety switches are ideal to control gates, sliding doors and other guards protecting dangerous parts of machine. The stainless steel actuator is fastened to the moving part of the guard, so it is removed from the switch on every opening of the guard. The switch mechanism guarantees that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be applied to any kind of protection (with hinge, sliding and removable ones). Besides, the possibility to actuate the switch only with its actuator guarantees that the machine can be restarted only when the guard has been closed. Made of rugged materials and with oversized thickness, these switches are designed for the use on heavy guards.

Rotating heads



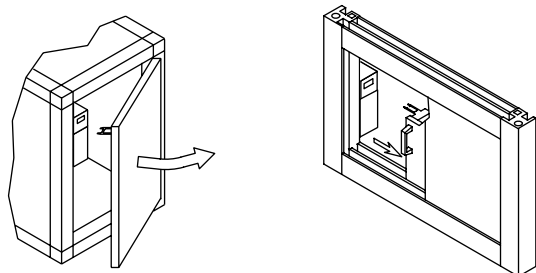
Removing the two fastening screws, in all switches, the head can be rotated in 90° steps.

Actuator regulation zone

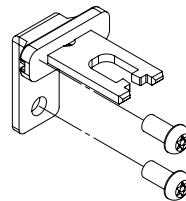


This switch has a wide backlash of the actuator into the head (4,5 mm) for an easier installation. With closed door, check that the actuator doesn't knock straight against the head of the switch; it must be in the adjustment zone (0,5...5 mm)

Installation examples



Safety screws for actuators



These new screws have tamper-resistant Torx buttonheads. Devices fixed with this kind of screws cannot be removed or tampered by common tools. See Accessories page 6/5.

Limits of utilization

Do not use where dust and dirt may penetrate in any way into the head and deposit there, in particular where metal dust, concrete or chemicals are spread.
Do not use where explosive or inflammable gas is present.
Use Atex products in environments with explosion hazard (see page 2/137).

Data type approved by IMQ, CCC and ECU

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, 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:

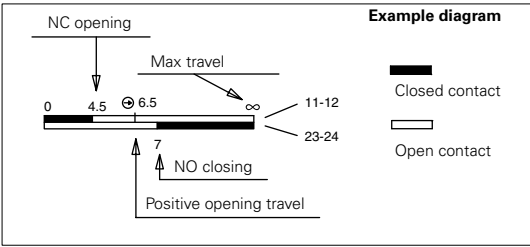
- R = snap action
- L = slow action
- LO = slow action overlapped

Contact blocks

	Polymer housing	Metal housing	Metal housing	Metal housing
	Switch without actuator	Switch without actuator	Switch without actuator	Switch without actuator
5	R FP 593 1NO+1NC	FD 593 1NO+1NC	FL 593 1NO+1NC	
6	L FP 693 1NO+1NC	FD 693 1NO+1NC	FL 693 1NO+1NC	
7	LO FP 793 1NO+1NC	FD 793 1NO+1NC	FL 793 1NO+1NC	
9	L FP 993 2NC	FD 993 2NC	FL 993 2NC	
20	L FP 2093 1NO+2NC	FD 2093 1NO+2NC	FL 2093 1NO+2NC	
21	L FP 2193 3NC	FD 2193 3NC	FL 2193 3NC	
22	L FP 2293 2NO+1NC	FD 2293 2NO+1NC	FL 2293 2NO+1NC	
33	L FP 3393 1NO+1NC	FD 3393 1NO+1NC	FL 3393 1NO+1NC	FC 3393 1NO+1NC
34	L FP 3493 2NC	FD 3493 2NC	FL 3493 2NC	FC 3493 2NC
Min. force	10 N (18 N)	10 N (18 N)	10 N (18 N)	10 N (18 N)

How to read travel diagrams

All measures in the diagrams are in mm

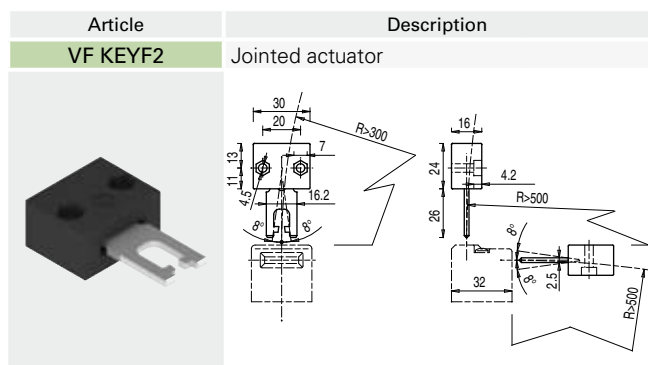
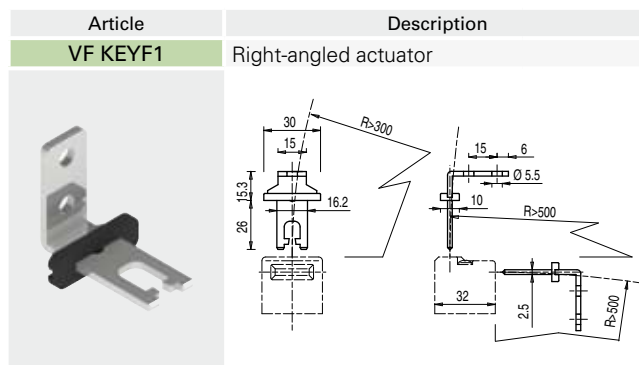
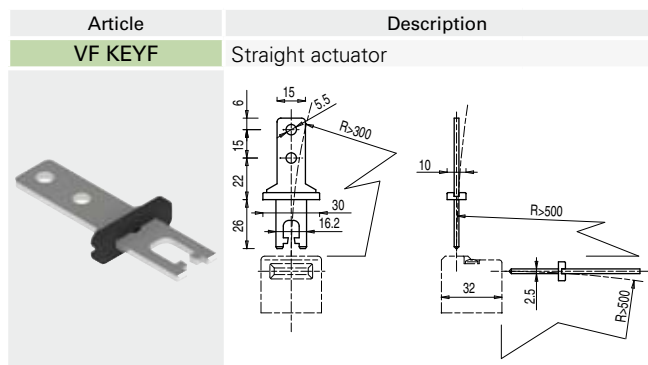


IMPORTANT:
NC contact has to be considered with inserted actuator. In safety applications it is necessary to activate the switch **at least up to the positive opening point** indicated in the diagrams with the symbol ⊕. Operate the switch **at least with the positive opening force**, indicated between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

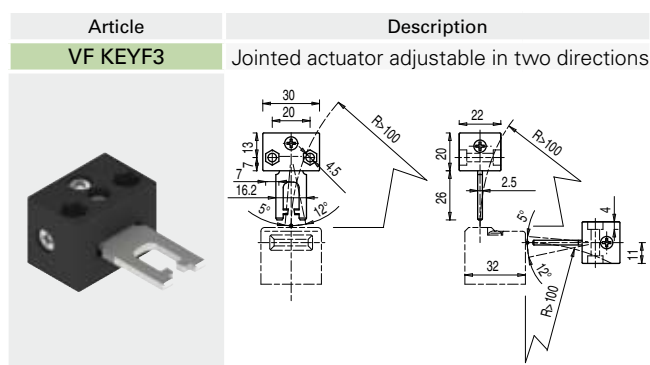


Stainless steel actuators

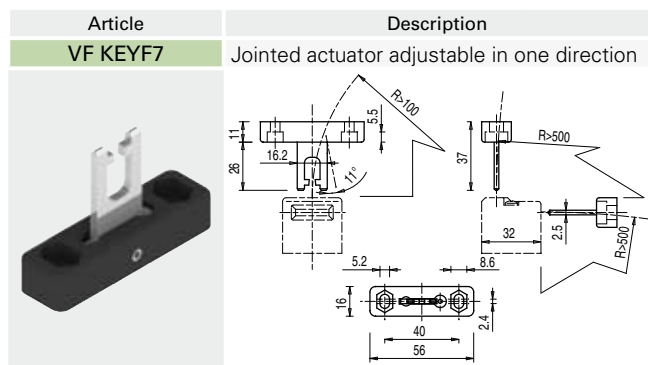
IMPORTANT: These actuators must be used with FD, FP, FL, FC or FS series only (e.g. FD 693).



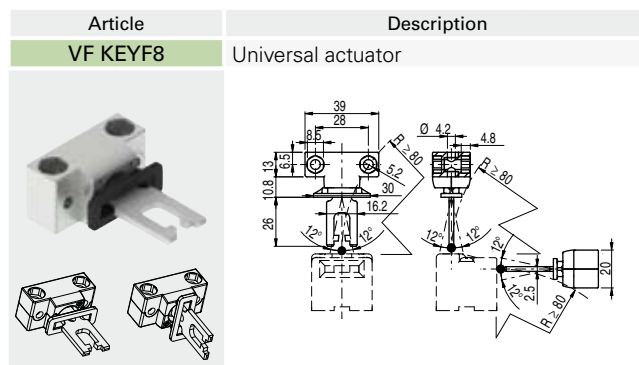
The actuator can flex in four directions for applications where the door alignment is not precise.



Actuator adjustable in two directions for doors with reduced dimensions.

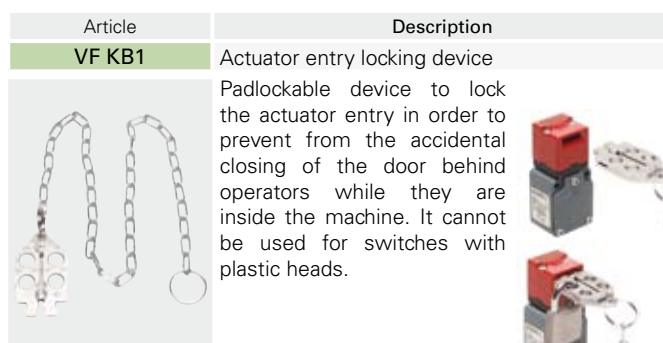


Actuator adjustable in one direction for doors with reduced dimensions.

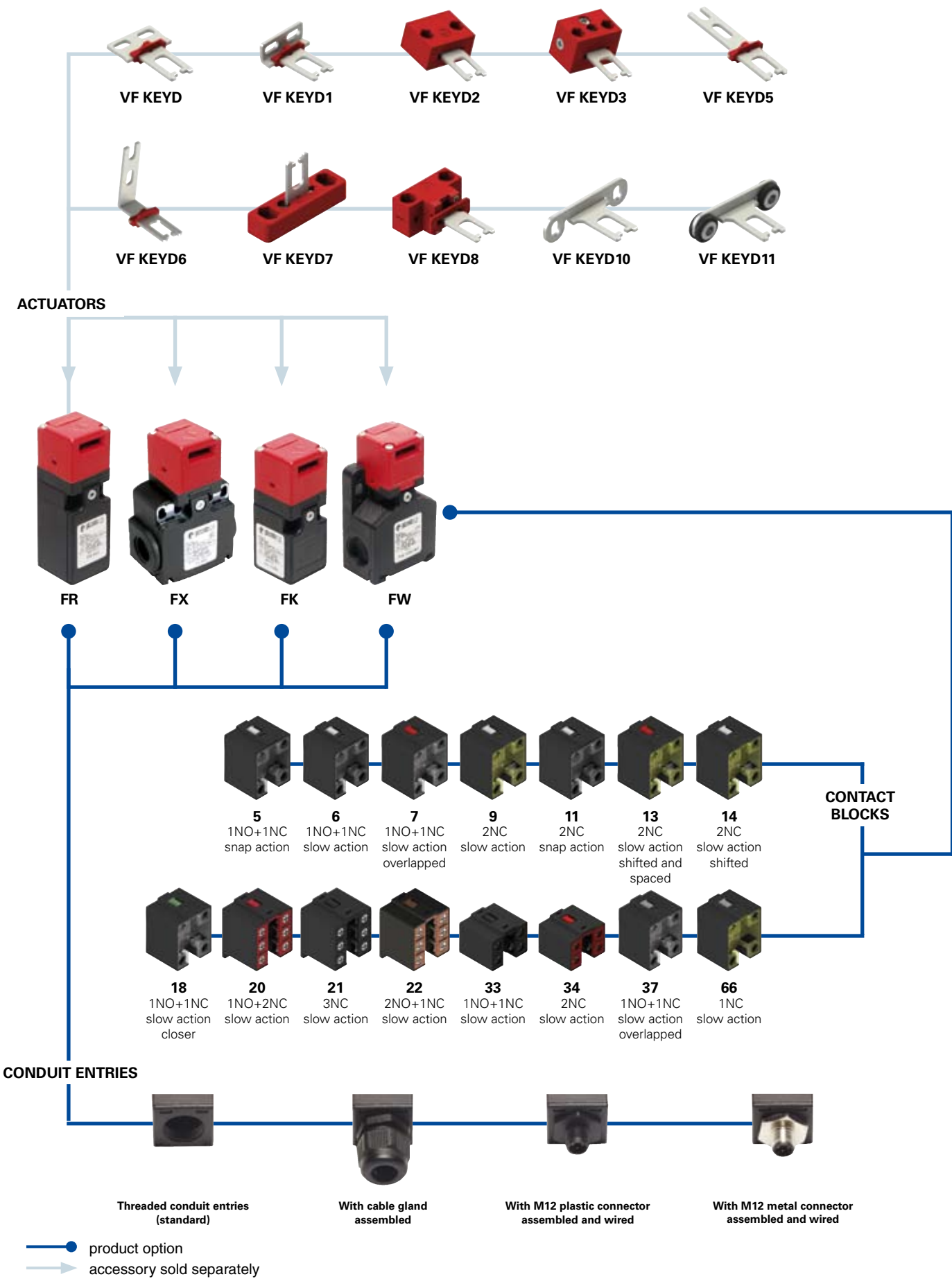


Joined and two directions adjustable actuator for doors with reduced dimensions.
The actuator has two couples of fixing holes and it is possible to rotate by 90° the actuator-working plan.

Accessories



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 options
FR 693-E3D1XGM2K70

Housing

FR	polymer housing, one conduit entry
FX	polymer housing, two conduit entries
FW	polymer housing, three conduit entries

Contact blocks

5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action overlapped
9	2NC, slow action
11	2NC, snap action
13	2NC, slow action shifted and spaced
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
37	1NO+1NC, slow action overlapped
66	1NC, slow action

Head type

92	detachable head (only for FW housing)
93	not detachable head (only for FR-FX-FK housing)

Actuator extraction force

	10 N (standard)
E3	30 N

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

Contacts type

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

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Actuators

	without actuator (standard)
D	with straight actuator
D1	with right-angled actuator
D2	with jointed actuator
...

article options
FK 3393-E3D1XGM1K22

Housing

FK	polymer housing, one conduit entry
-----------	------------------------------------

Contact blocks

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

Actuator extraction force

	10 N (standard)
E3	30 N

Actuators

	without actuator (standard)
D	with straight actuator
D1	with right-angled actuator
D2	with jointed actuator
...

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

External metallic parts

	zinc-plated steel (standard)
X	stainless steel



Main data

- Polymer housing, from one to three conduit entries
- Protection degree IP67
- 15 contact blocks available
- 8 stainless steel actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions


Markings and quality marks:



Approval IMQ: EG610
Approval UL: E131787
Approval CCC: 2007010305230013
(FR-FX-FK series)
Approval EZU: 1010151
Approval GOST: POCC IT.AB24.B04512

Technical data

Housing

Made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation 
FR and FK series one conduit entry
FX series two conduit entries
FW series three knock out conduit entries
Protection degree:

IP67 according to EN 60529 with cable gland having equal or higher protection degree (electrical contacts)

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 cycles¹/hour
Mechanical endurance: 1 million of operations cycles¹
Max actuating speed: 0,5 m/s
Min. actuating speed: 1 mm/s
Actuator extraction force: 10 N (30 N -E3 version)
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 mm ²	(1 x AWG 22)
	max.	2 x 1,5 mm ²	(2 x AWG 16)
Contact blocks 5, 6, 7, 9,11, 13, 14, 18, 37, 66:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)

In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, 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, BG-GS-ET-15.

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.

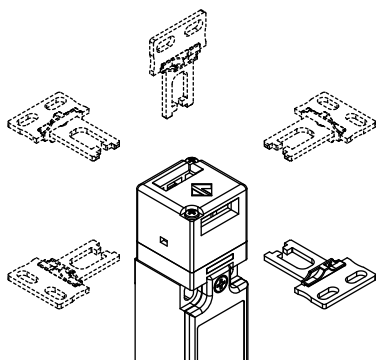
 If not expressly indicated in this chapter, for the right installation and the correct utilization of all articles see requirements indicated from page 7/1 to page 7/12.

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	Ue (V)	250	400	500
		400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	Ie (A)	6	4	1
	Rated impulse withstand voltage (U _{imp}):	6 kV	Direct current: DC13			
		4 kV (contact blocks 20, 21, 22, 33, 34)	Ue (V)	24	125	250
with 4 poles M12 connector	Conditional short circuit current:	1000 A according to EN 60947-5-1	Ie (A)	6	1,1	0,4
	Protection against short circuits:	fuse 10 A 500 V type aM	Alternate current: AC15 (50...60 Hz)			
	Pollution degree:	3	Ue (V)	24	120	250
	Thermal current (Ith):	4 A	Ie (A)	4	4	4
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Direct current: DC13			
with 8 poles M12 connector	Protection against short circuits:	fuse 4 A 500 V type gG	Ue (V)	24	125	250
	Pollution degree:	3	Ie (A)	4	1,1	0,4
	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

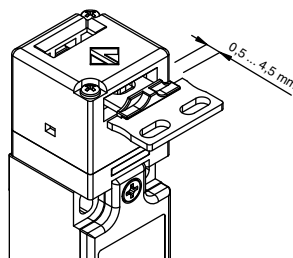
These safety switches are ideal to control gates, sliding doors and other guards protecting dangerous parts of machine. The stainless steel actuator is fastened to the moving part of the guard, so it is removed from the switch on every opening of the guard. The switch mechanism guarantees that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be applied to any kind of protection (with hinge, sliding and removable ones). Besides, the possibility to actuate the switch only with its actuator guarantees that the machine can be restarted only when the guard has been closed. All products (except FW series) are equipped with a particular mechanical hooking that does not allow the separation of the head from the body during its positioning.

Rotating heads



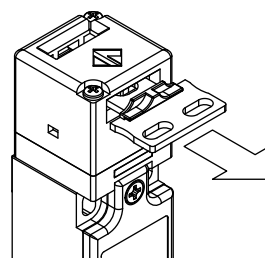
Removing the two fastening screws, in all switches, the head can be rotated in 90° steps.

Actuator regulation zone



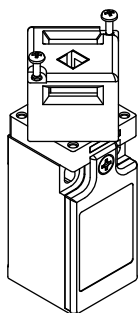
This switch has a wide backlash of the actuator into the head (4 mm) for an easier installation. With closed door, check that the actuator doesn't knock straight against the head of the switch; it must be in the adjustment zone (0,5...4,5 mm)

Versions with 30 N actuator extraction force



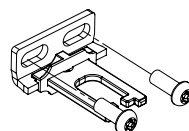
Versions with 30 N actuator holding force instead of the standard 10 N are available.

Not detachable head



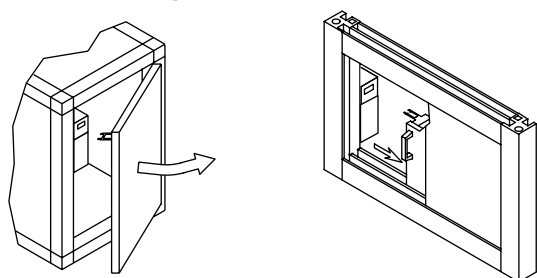
The action head type "93" is completely interchangeable and compatible with previous head type "92", but it has the advantage to be not detachable from the switch body even if it is always adjustable in 90° steps (Pizzato Elettrica patent). The new head is safer because it cannot be ruined during installation. The head fixing screws have been reduced to only two (instead of the previous four) and so the rotation operation will be quicker and cheaper.

Safety screws for actuators



These new screws have tamper-resistant Torx buttonheads. Devices fixed with this kind of screws cannot be removed or tampered by common tools. See accessories page 6/5.

Installation examples



Limits of utilization

Do not use where dust and dirt may penetrate in any way into the head and deposit there, in particular where metal dust, concrete or chemicals are spread.
Do not use where explosive or inflammable gas is present.
Use Atex products in environments with explosion hazard (see page 2/137).

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, 11, 13, 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.

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.

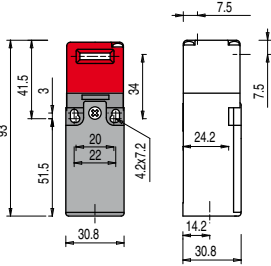
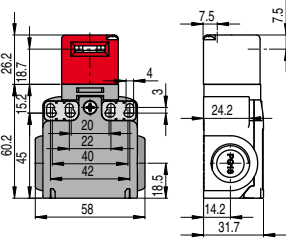
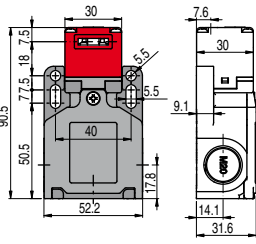
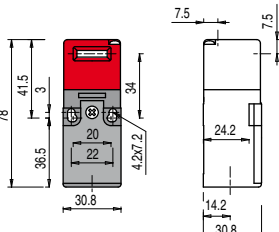



















































Please contact our technical service for the list of approved products.

Dimensional drawings

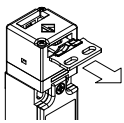
Contacts type:





- R** = snap action
- L** = slow action
- LO** = slow action overlapped
- LS** = slow action shifted
- LV** = slow action shifted and spaced
- LA** = slow action closer

Contact blocks

	Polymer housing without actuator	Polymer housing without actuator	Polymer housing without actuator conduit entries thread M20x1,5	Polymer housing without actuator
				
5	FR 593 	FX 593 	FW 592-M2 	
6	FR 693 	FX 693 	FW 692-M2 	
7	FR 793 	FX 793 	FW 792-M2 	
9	FR 993 	FX 993 	FW 992-M2 	
11	FR 1193 	FX 1193 	FW 1192-M2 	
13	FR 1393 	FX 1393 	FW 1392-M2 	
14	FR 1493 	FX 1493 	FW 1492-M2 	
18	FR 1893 	FX 1893 	FW 1892-M2 	
20	FR 2093 	FX 2093 	FW 2092-M2 	
21	FR 2193 	FX 2193 	FW 2192-M2 	
22	FR 2293 	FX 2293 	FW 2292-M2 	
33	FR 3393 	FX 3393 	FW 3392-M2 	FK 3393 
34	FR 3493 	FX 3493 	FW 3492-M2 	FK 3493 
37	FR 3793 	FX 3793 	FW 3792-M2 	
66	FR 6693 	FX 6693 	FW 6692-M2 	
Min. force	10 N (18 N 	10 N (18 N 	10 N (18 N 	10 N (18 N 
Travel diagrams	page 7/8 - group 8	page 7/8 - group 8	page 7/8 - group 8	page 7/8 - group 8

All switches listed above are available in the version with 30N actuator extraction force. To obtain these products, the order code has to be changed adding the extension "-E3", for example FR 693-E3.



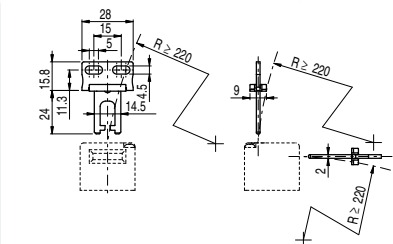
Min. force 30 N version	30 N (38 N 	30 N (38 N 	30 N (38 N 	30 N (38 N 
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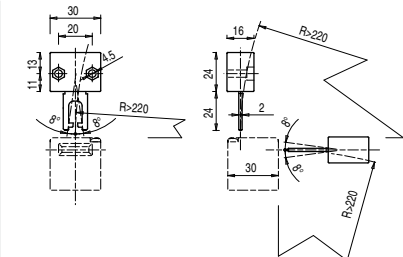
Actuators stainless steel

IMPORTANT: These actuators must be used with FR, FX, FK and FW (e.g. FR 693).

Article	Description
VF KEYD	Straight actuator

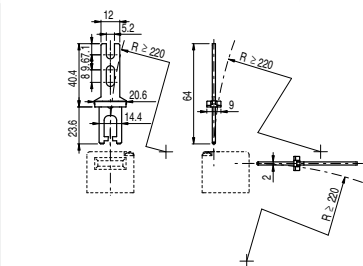


Article	Description
VF KEYD2	Jointed actuator

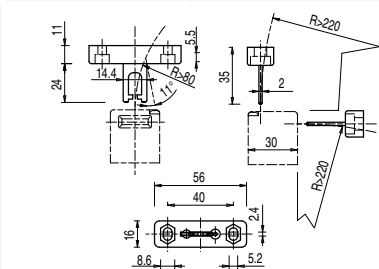


The actuator can flex in four directions for applications where the door alignment is not precise.

Article	Description
VF KEYD5	Long actuator

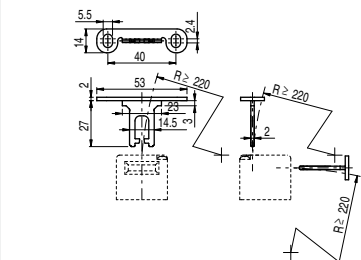


Article	Description
VF KEYD7	Jointed actuator adjustable in one direction

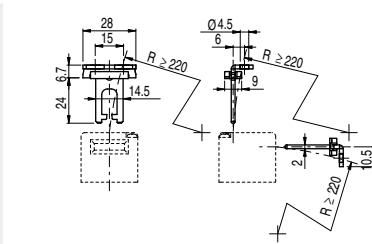


Actuator adjustable in one direction for doors with reduced dimensions.

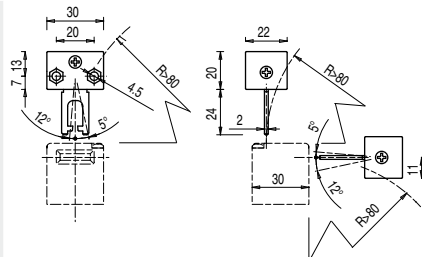
Article	Description
VF KEYD10	Shaped actuator



Article	Description
VF KEYD1	Right-angled actuator

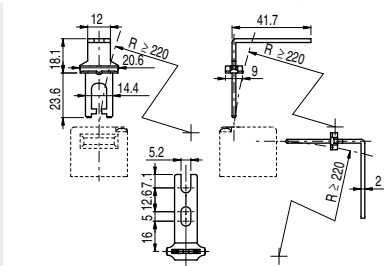


Article	Description
VF KEYD3	Jointed actuator adjustable in two directions

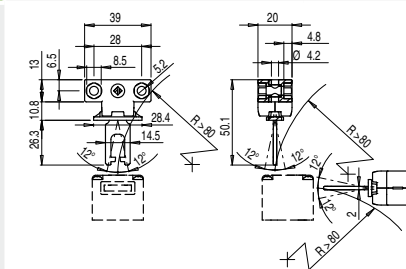
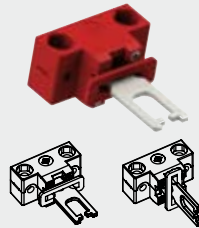


Actuator adjustable in two directions for doors with reduced dimensions.

Article	Description
VF KEYD6	Right-angled long actuator



Article	Description
VF KEYD8	Universal actuator



Joined and two directions adjustable actuator for doors with reduced dimensions.

The actuator has two couples of fixing holes and it is possible to rotate by 90° the actuator-working plan.

Article	Description
VF KEYD11	Shaped actuator

