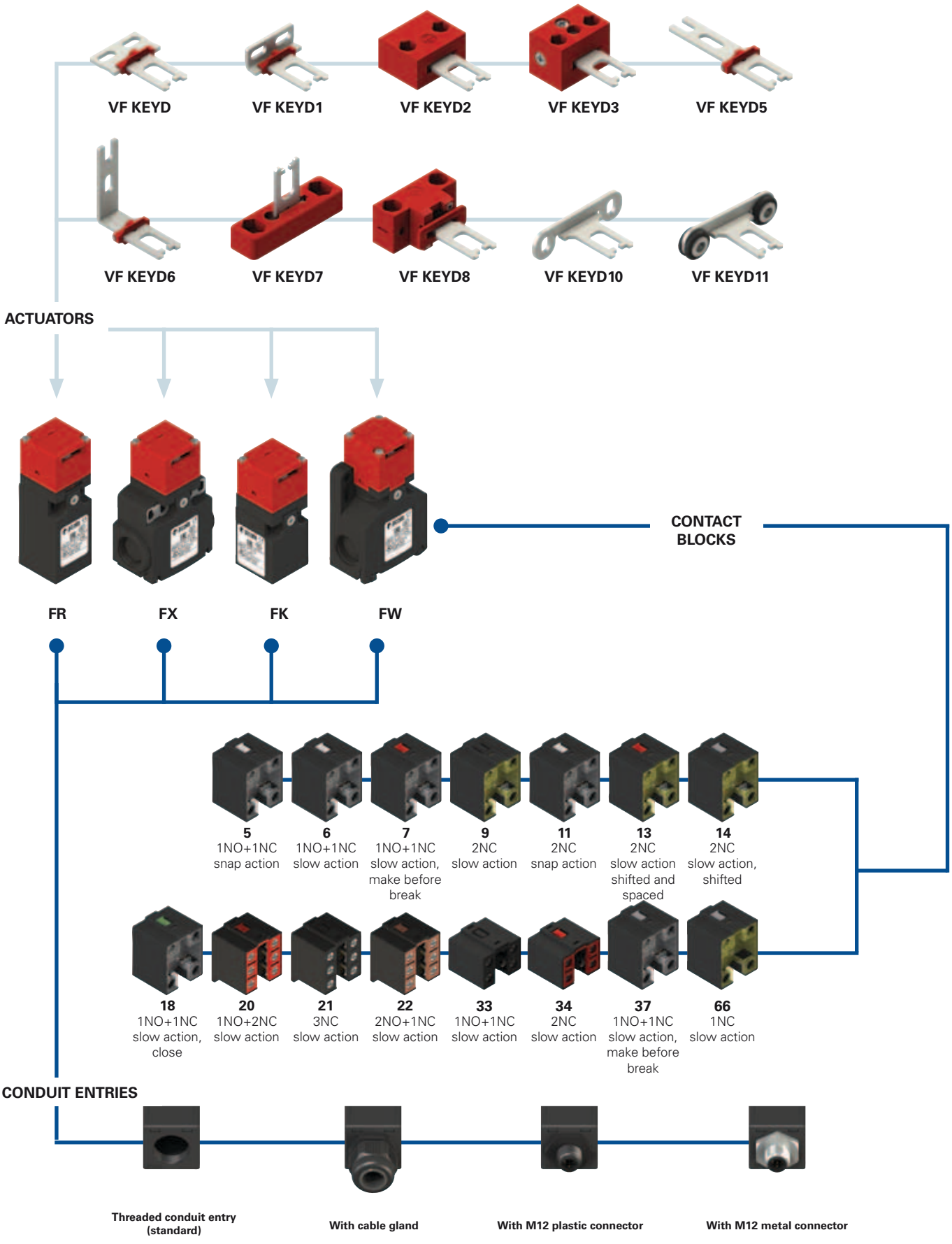
Selection diagram



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 | options

FR 693-E3D1XGM2K70T6

Housing

FR	technopolymer, one conduit entry
FX	technopolymer, two conduit entries
FW	technopolymer, three conduit entries

Ambient temperature

	-25°C … +80°C (standard)
T6	-40°C … +80°C

Pre-installed cable glands or connectors

	no cable gland or connector (standard)
K23	cable gland for cables Ø 6 … 12 mm
…	……
K70	M12 plastic connector, 4-pole
…	……

For the complete list of possible combinations please contact our technical department.

Contact block

5	1NO+1NC, snap action
6	1NO+1NC, slow action
7	1NO+1NC, slow action, make before break
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, close
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, make before break
66	1NC, slow action

Threaded conduit entry

M2	M20x1.5 (standard)
M1	M16x1.5
	PG 13.5 (FR-FX housing only)
A	PG 11 (FR-FX housing only)

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts, 2.5 µm gold coating (not for contact blocks 20, 21, 22, 33, 34)

Head type

92	detachable head (FW housing only)
93	non-detachable head (FR, FX and FK housing only)

External metallic parts

	zinc-plated steel (standard)
X	stainless steel

Actuator extraction force

	10 N (standard)
E3	30 N

Actuators

	without actuator (standard)
D	straight actuator VF KEYD
D1	angled actuator VF KEYD1
D2	jointed actuator VF KEYD2
…	……

article | options | options

FK 3393-E3D1XGM1K24T6

Housing

FK	technopolymer, one conduit entry

Ambient temperature

	-25°C … +80°C (standard)
T6	-40°C … +80°C

Contact block

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

Pre-installed cable glands

	no cable gland (standard)
K24	cable gland for cables Ø 10 … 5 mm
K28	cable gland for cables Ø 3 … 7°mm

Actuator extraction force

	10 N (standard)
E3	30 N

Threaded conduit entry

M1	M16x1.5(standard)
	PG 11

Actuators

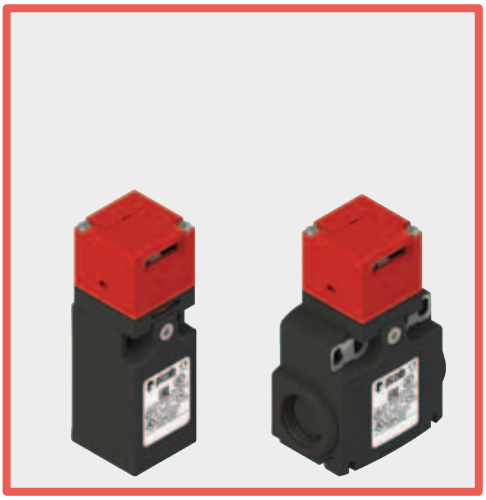
	without actuator (standard)
D	straight actuator VF KEYD
D1	angled actuator VF KEYD1
D2	jointed actuator VF KEYD2
…	……

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating

External metallic parts

	zinc-plated steel (standard)
X	stainless steel



Main features

- Technopolymer housing, from one to three conduit entries
- Protection degree IP67
- 15 contact blocks available
- 8 stainless steel actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2007010305230013 (FR-FX-FK-FW series)
EAC approval:	RU C-IT.АД35.B.00454

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

FR series, one conduit entry:	M20x1.5 (standard)
FK series: one threaded conduit entry:	M16x1.5 (standard)
FX series: two knock-out threaded conduit entries:	M20x1.5 (standard)
FW series - three knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

General data

For safety applications up to:	SIL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1
Mechanical interlock, coded:	type 2 acc. to EN ISO 14119
Coding level:	low acc. to EN ISO 14119
Safety parameter B_{10D}:	2,000,000 for NC contacts
Service life:	20 years
Ambient temperature:	-25°C … +80°C
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Actuator extraction force	10 N (-E3 versions: 30 N)
Tightening torques for installation:	see page 313-324

Cable cross section (flexible copper strands)

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, 9.11, 13, 14, 18, 37, 66:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 2.5 mm²	(2 x AWG 14)

In compliance with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, BG-GS-ET-15, UL 508, CSA 22.2 No.14
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14 GB14048.5-2001.

Compliance with the requirements of:
Machinery Directive 2006/42/EC and EMC Directive 2014/30/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 313 to page 324.**

Electrical data

without connector	Thermal current (I_{th}):	10 A
	Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)
	Conditional short circuit current:	1000 A acc. to EN 60947-5-1
	Protection against short circuits:	type aM fuse 10 A 500 V
	Pollution degree:	3
with M12 connector, 4-pole	Thermal current (I_{th}):	4 A
	Rated insulation voltage (U_i):	250 Vac 300 Vdc
	Protection against short circuits:	type gG fuse 4 A 500 V
	Pollution degree:	3
with M12 connector, 8-pole	Thermal current (I_{th}):	2 A
	Rated insulation voltage (U_i):	30 Vac 36 Vdc
	Protection against short circuits:	type gG fuse 2 A 500 V
	Pollution degree:	3

Utilization category

Alternating 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

Alternating 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

Alternating current: AC15 (50÷60 Hz)

U_e (V)	24
I_e (A)	2

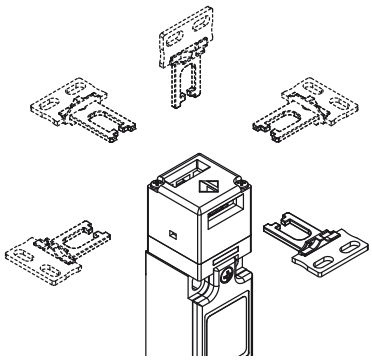
Direct current: DC13

U_e (V)	24
I_e (A)	2

Description

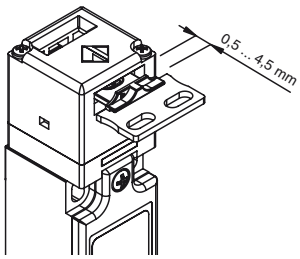
These safety switches are ideal for controlling gates, sliding doors and other guards which protect dangerous parts of machines without inertia. The stainless steel actuator is fastened to the moving part of the guard in such a way that it is separated from the switch each time the guard is opened. A special mechanism ensures that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be used with all types of guards (with hinge as well as sliding and removable types). The possibility to actuate the switch only with a specific actuator guarantees that the machine can be restarted only after the guard has been closed.

Head with variable orientation



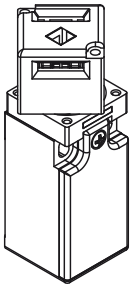
For all switches, the head can be adjusted in 90° steps after removing the two fastening screws. In this way it is possible to actuate the switch from 5 different directions.

Wide-ranging actuator travel



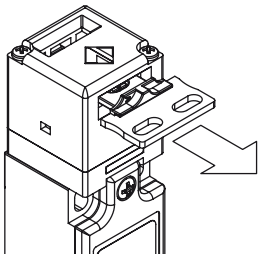
The actuation head of this switch features a wide range of travel. In this way the guard can oscillate along the direction of insertion (4 mm) without causing unwanted machine shutdowns. This wide range of travel is available in all actuators in order to ensure maximum device reliability.

Not detachable head



To make head adjustment safer and smoother, these switches are equipped with a special head to body coupling system. This system makes it impossible to remove the head from the device even during adjustment, thus rendering the use of one-way screws unnecessary for locking the head in position once adjustment is complete. This solution is available for the FR, FX and FK series.

Versions with 30 N actuator extraction force



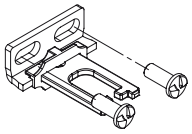
Versions with 30 N actuator holding force instead of the standard 10 N are available.

Protection degree IP67

IP67

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where maximum protection degree of the housing is required.

Safety screws for actuators



As required by EN ISO 14119, the actuator must be fixed immovably to the door frame. Pan head safety screws with one-way fitting are available for this purpose. With this screw type, the actuators cannot be removed or tampered by using common tools. See accessories on page 310.

Extended temperature range

-40°C

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

They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Features approved by IMQ

Rated insulation voltage (U_i):	500 Vac 400 Vac (for contact blocks 20, 21, 22, 33, 34)
Conventional free air thermal current (I_{th}):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact blocks 20, 21, 22, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U_e):	400 Vac (50 Hz)
Operating current (I_e):	3 A

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

Positive opening contacts on contact blocks 5, 6, 7, 9,11, 13, 14, 18, 20, 21, 22, 33, 34, 66

In compliance with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

Features approved by UL

Utilization categories	Q300 (69 VA, 125-250 Vdc) A600 (720 VA, 120-600 Vac)

Housing features type 1, 4X "indoor use only", 12, 13

For all contact blocks use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size 12, 14 AWG. Tightening torque for terminal screws of 7.1 lb in (0.8 Nm).

In compliance with standard: UL 508, CSA 22.2 No.14

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

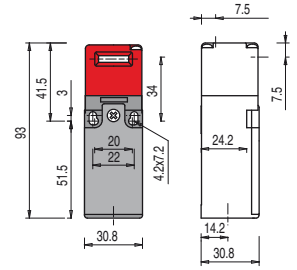
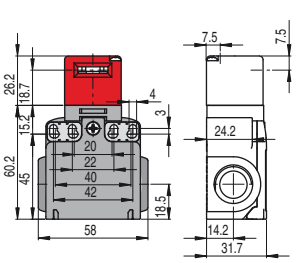
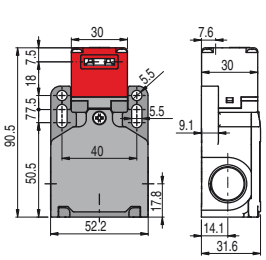
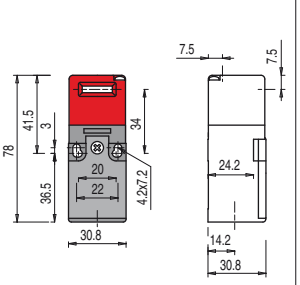
Dimensional drawings

All values in the drawings are in mm

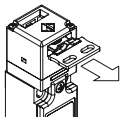
Contact type:

R = snap action
L = slow action
LO = slow action make before break
LS = slow action shifted
LV = slow action shifted and spaced
LA = slow action close

Contact block

		Technopolymer housing Without actuator	Technopolymer housing Without actuator	Technopolymer housing Without actuator	Technopolymer housing Without actuator
					
5	R	FR 593-M2 → 1NO+1NC	FX 593-M2 → 1NO+1NC	FW 592-M2 → 1NO+1NC	
6	L	FR 693-M2 → 1NO+1NC	FX 693-M2 → 1NO+1NC	FW 692-M2 → 1NO+1NC	
7	LO	FR 793-M2 → 1NO+1NC	FX 793-M2 → 1NO+1NC	FW 792-M2 → 1NO+1NC	
9	L	FR 993-M2 → 2NC	FX 993-M2 → 2NC	FW 992-M2 → 2NC	
11	R	FR 1193-M2 → 2NC	FX 1193-M2 → 2NC	FW 1192-M2 → 2NC	
13	LV	FR 1393-M2 → 2NC	FX 1393-M2 → 2NC	FW 1392-M2 → 2NC	
14	LS	FR 1493-M2 → 2NC	FX 1493-M2 → 2NC	FW 1492-M2 → 2NC	
18	LA	FR 1893-M2 → 1NO+1NC	FX 1893-M2 → 1NO+1NC	FW 1892-M2 → 1NO+1NC	
20	L	FR 2093-M2 → 1NO+2NC	FX 2093-M2 → 1NO+2NC	FW 2092-M2 → 1NO+2NC	
21	L	FR 2193-M2 → 3NC	FX 2193-M2 → 3NC	FW 2192-M2 → 3NC	
22	L	FR 2293-M2 → 2NO+1NC	FX 2293-M2 → 2NO+1NC	FW 2292-M2 → 2NO+1NC	
33	L	FR 3393-M2 → 1NO+1NC	FX 3393-M2 → 1NO+1NC	FW 3392-M2 → 1NO+1NC	FK 3393-M1 → 1NO+1NC
34	L	FR 3493-M2 → 2NC	FX 3493-M2 → 2NC	FW 3492-M2 → 2NC	FK 3493-M1 → 2NC
37	LO	FR 3793-M2 → 1NO+1NC	FX 3793-M2 → 1NO+1NC	FW 3792-M2 → 1NO+1NC	
66	L	FR 6693-M2 → 1NC	FX 6693-M2 → 1NC	FW 6692-M2 → 1NC	
Actuating force		10 N (18 N →)	10 N (18 N →)	10 N (18 N →)	10 N (18 N →)
Travel diagrams		page 318 - group 8	page 318 - group 8	page 318 - group 8	page 318 - group 8

All switches listed above are available in a version with 30 N actuator extraction force. To obtain these products, the order code must be changed by adding the extension "E3", for example FR 693-M2E3.



Actuator extraction force: 30 N	30 N (38 N →)	30 N (38 N →)	30 N (38 N →)	30 N (38 N →)

Limits of use

Do not use where dust and dirt may penetrate in any way into the head and deposit there. Especially not where powder, shavings, concrete or chemicals are sprayed. Adhere to the EN ISO 14119 requirements regarding low level of coding for interlocks. Do not use in environments with presence of explosive or flammable gas. In these case use ATEX products (see dedicated Pizzato catalogue).

Items with code on **green** background are stock items

Accessories See page 299

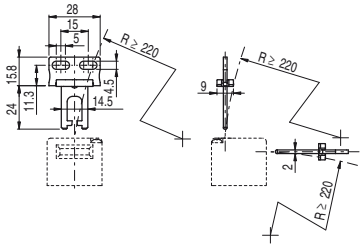
→ The 2D and 3D files are available at **www.pizzato.com**

Stainless steel actuators

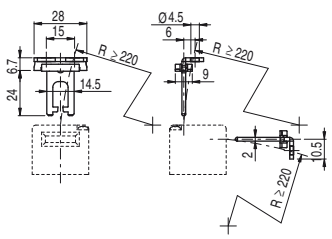
All values in the drawings are in mm

IMPORTANT: These actuators can only be used with items of the FR, FX, FK and FW series (e.g. FR 693-M2).
Low level of coding acc. to EN ISO 14119.

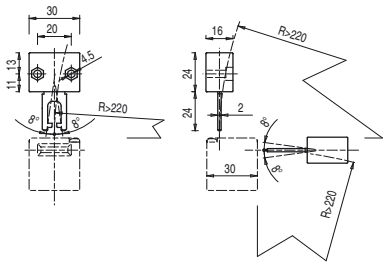
Article	Description
VF KEYD	Straight actuator



Article	Description
VF KEYD1	Angled actuator

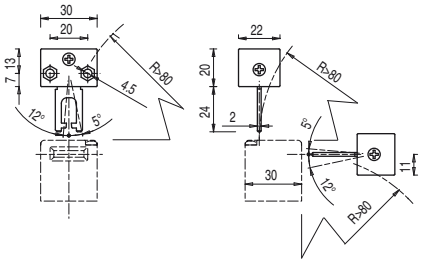


Article	Description
VF KEYD2	Jointed actuator



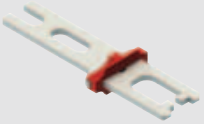
The actuator can flex in four directions for applications where the door alignment is not precise.

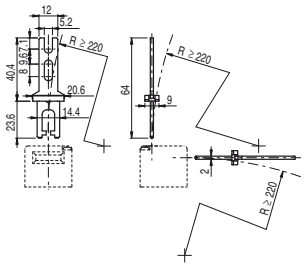
Article	Description
VF KEYD3	Actuator adjustable in two directions



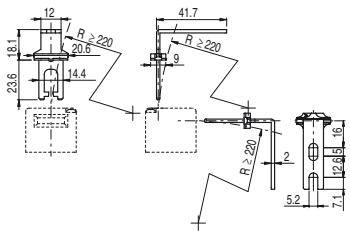
Actuator adjustable in two directions for doors with reduced dimensions.

Article	Description
VF KEYD5	Extended actuator

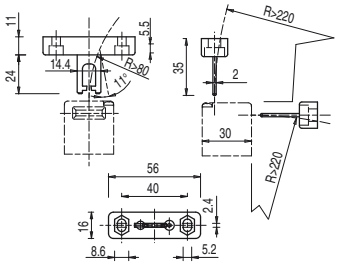




Article	Description
VF KEYD6	Extended actuator, angled

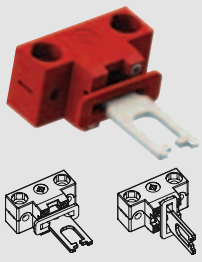


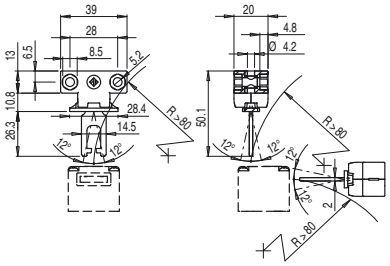
Article	Description
VF KEYD7	Actuator adjustable in one direction



Actuator adjustable in one direction for doors with reduced dimensions.

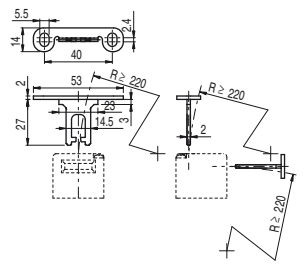
Article	Description
VF KEYD8	Universal actuator





Actuator adjustable in two dimensions for small doors; can be mounted in various positions.
The fixing block has two pairs of bore holes; it is provided for rotating the working plane of the actuator by 90°.

Article	Description
VF KEYD10	Profiled actuator



Article	Description
VF KEYD11	Profiled actuator