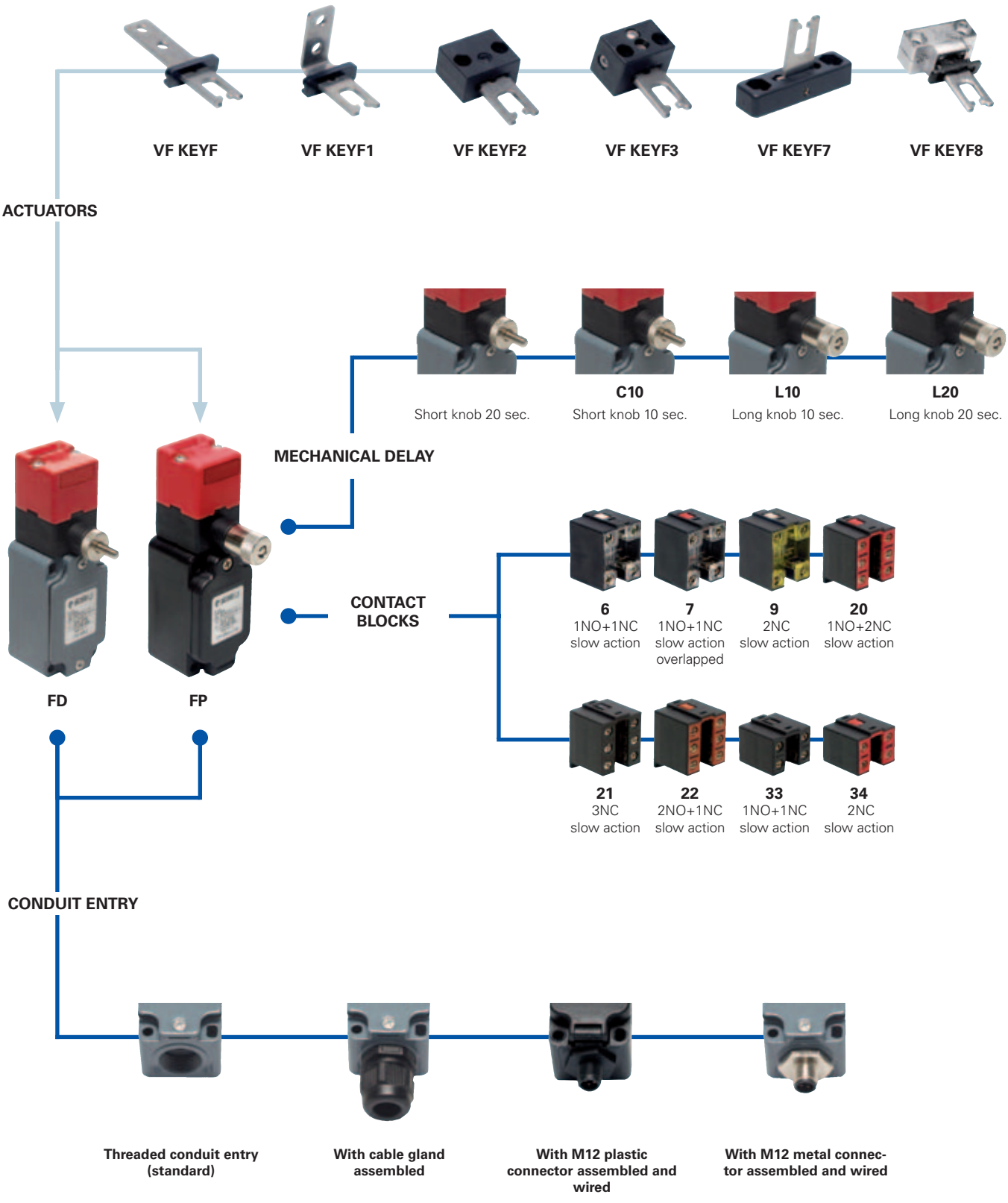
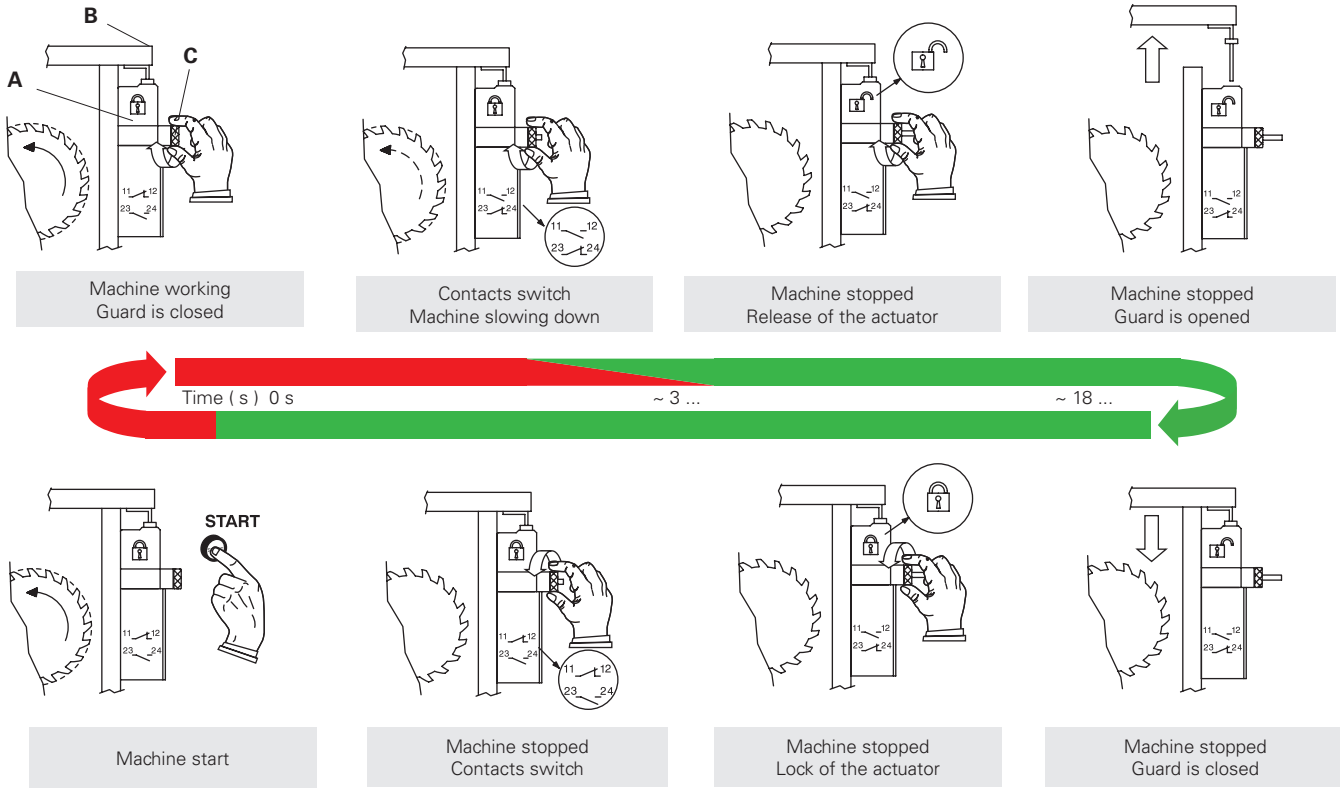
Selection diagram



product option
accessory sold separately

Working cycle (FP 6R2-F1)

The switch is fixed to the machine body (A), while the stainless steel actuator is fastened to the guard (B). Once installed, the switch will firmly lock the actuator. In order to remove the actuator, the knob (C) has to be rotated. On the first turns the electrical contacts will positively open, then, after about 20 seconds (or 10 seconds depending on the knob version), the actuator will be released. In order to close the guard, the knob must be rotated in the opposite direction. This switch doesn't need power supply or timer and can be easily installed on old machines without important changes in their electrical circuit. The knob (C) may be supplied in a short (standard) or in a long version.



Machine working
Guard is closed

Contacts switch
Machine slowing down

Machine stopped
Release of the actuator

Machine stopped
Guard is opened

Machine start

Machine stopped
Contacts switch

Machine stopped
Lock of the actuator

Machine stopped
Guard is closed

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

FD 6R2-L10F1GM2K50

Housing	
FD	metal housing, one conduit entry
FP	polymer housing, one conduit entry

Contact blocks	
6	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

Mechanical delay	
	short knob 20 s (standard)
C10	short knob 10 s
L10	long knob 10 s
L20	long knob 20 s

Actuators	
	without actuator (standard)
F	with straight actuator
F1	with right-angled actuator
F2	with jointed actuator
F3	with jointed actuator adjustable in two directions
F7	with jointed actuator adjustable in one direction
F8	with universal actuator

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 5 poles M12 metal connector
...	.....

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

Patented

Main data

- Metal housing or polymer housing, one conduit entry
- Protection degree IP67
- 8 contact blocks available
- 6 stainless steel actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions
- Strong actuator locking (1000N)
- Manual actuator unlocking
- Versions with different unlocking delay times

Markings and quality marks:

Approval IMQ:	EG605 (FD series) EG606 (FP series)
Approval UL:	E131787
Approval CCC:	2007010305230000 (FD series) 2007010305230014 (FP series)
Approval EZU:	1010151

Technical data

Housing

Housing type FP made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation ⧈
Housing type FD made of metal, coated with baked epoxy powder.
FD and FP series one conduit entry

Protection degree:	IP67 according to EN 60529 (electrical contacts)

General data

Safety parameters:	see page 6/32
Ambient temperature:	from -25°C to +80°C

Version for operation in ambient temperature from -40°C to +80° C on request

Max operating frequency:	360 operations cycles[1]/hour
Mechanical endurance:	500.000 operations cycles[1]
Max actuating speed:	0,5 m/s
Min. actuating speed:	1 mm/s
Max holding force:	1000 N
Max backlash of the actuator:	4,5 mm
Driving torque for installation:	see pages 6/1-6/10

(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 6, 7, 9:	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, 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, CENELEC EN 50013, BG-GS-ET-15.
Approvals:
IEC 60947-5-1, UL 508, GB14048.5-2001

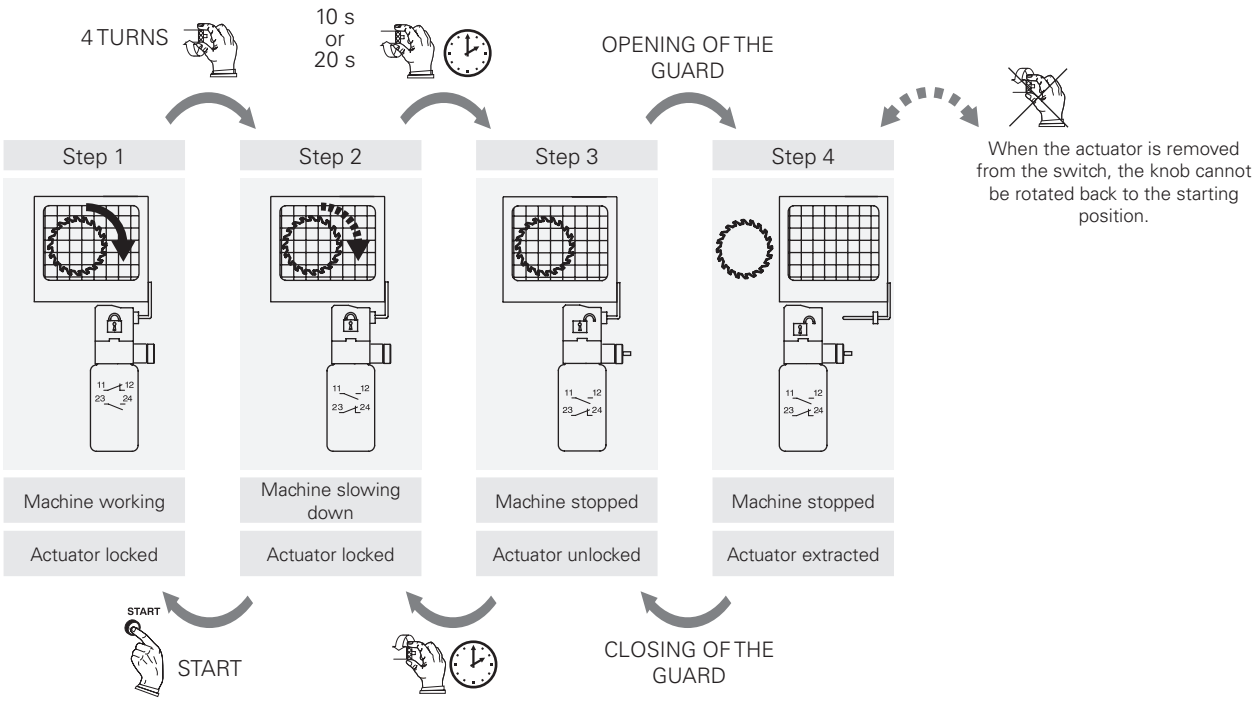
In conformity with requirements requested by:
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and Electromagnetic Compatibility 2004/108/EC.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1, VDE 0660-206.

⚠ **If not expressly indicated in this chapter, for the right installation and the correct utilization of all articles see requirements indicated from page 6/1 to page 6/10.**

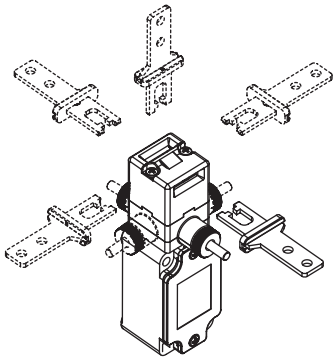
Electrical data			**Utilization categories**
without connector	Thermal current (Ith):	10 A	Alternate current: AC15 (50...60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc for contact blocks 20, 21, 22, 33, 34	Ue (V) 250 400 500 Ie (A) 6 4 1 Direct current: DC13
	Conditional shot 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) Ue (V) 24 120 250
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	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) Ue (V) 24
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	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

Example of working cycle steps with FD 6R2-F1

These switches are used on machines where the hazardous conditions remain for a while, even after the machine has been switched off, for example because of mechanical inertia of the pulleys, saw disks, mills. This switch has its ideal application where the guard is not open frequently and the installation of a switch with solenoid would be too expensive.

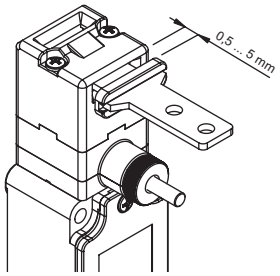


Rotating heads and knobs



The head can be quickly rotated on each of the 4 sides of the switch by unfastening the two fixing screws. The mechanical delay device can be rotated in 90° steps as well. This enables the switch to assume 32 different configurations.

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).

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
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 6, 7, 9, 20, 21, 22, 33, 34
In conformity with standards: EN 60947-1, EN 60947-5-1 and subsequent modifications and completions, fundamental requirements of the Low Voltage Directive 2006/95/CE and subsequent modifications and completions.

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).

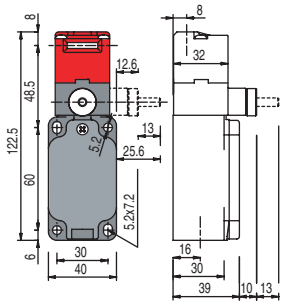
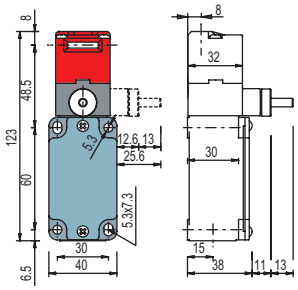
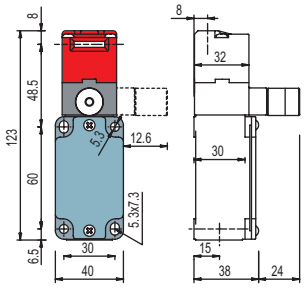
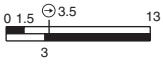
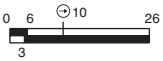
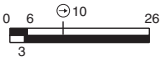
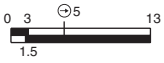
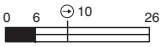
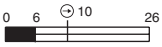
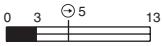
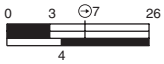
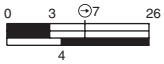
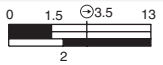
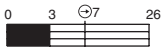
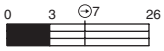
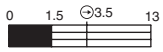
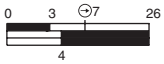
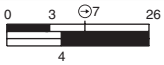
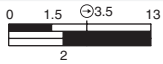
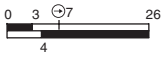
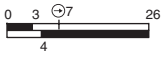
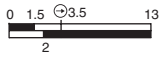
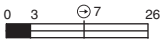
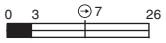
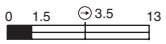
In conformity with standard: UL 508

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

Dimensional drawings

Contacts type:

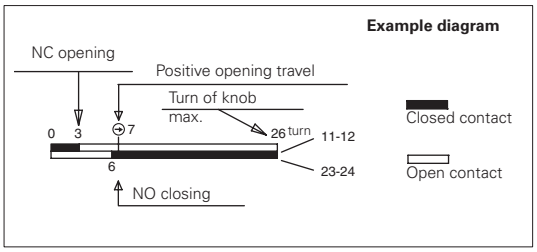
L = slow action
LO = slow action overlapped

Contact blocks		polymer housing Switch without actuator	metal housing Switch without actuator	metal housing Switch without actuator
				
6	L	FP 6R2 → 1NO+1NC	FD 6R2 → 1NO+1NC	FD 6R2-L10 → 1NO+1NC
				
7	LO	FP 7R2 → 1NO+1NC	FD 7R2 → 1NO+1NC	FD 7R2-L10 → 1NO+1NC
				
9	L	FP 9R2 → 2NC	FD 9R2 → 2NC	FD 9R2-L10 → 2NC
				
20	L	FP 20R2 → 1NO+2NC	FD 20R2 → 1NO+2NC	FD 20R2-L10 → 1NO+2NC
				
21	L	FP 21R2 → 3NC	FD 21R2 → 3NC	FD 21R2-L10 → 3NC
				
22	L	FP 22R2 → 2NO+1NC	FD 22R2 → 2NO+1NC	FD 22R2-L10 → 2NO+1NC
				
33	L	FP 33R2 → 1NO+1NC	FD 33R2 → 1NO+1NC	FD 33R2-L10 → 1NO+1NC
				
34	L	FP 34R2 → 2NC	FD 34R2 → 2NC	FD 34R2-L10 → 2NC
				
Min. force		10 N (18 N →)	10 N (18 N →)	10 N (18 N →)

All measures are in turns of knob

How to read travel diagrams

All measures are in turns of knob



IMPORTANT:
NC contact has to be considered with inserted and blocked actuator and with the knob rotated anti-clockwise up to the end of the travel. **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.

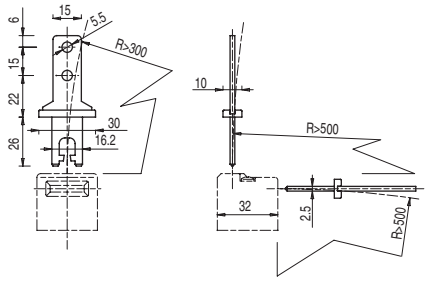
Accessories See page 5/1

All measures in the drawings are in mm

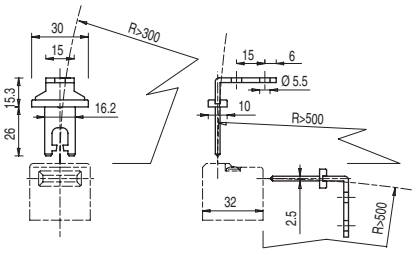
Stainless steel actuators

IMPORTANT: These actuators must be used with FD, FP, FL, FC or FS series only (e.g. FD 6R2)

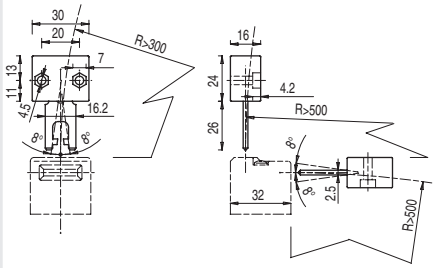
Article	Description
VF KEYF	Straight actuator



Article	Description
VF KEYF1	Right-angled actuator

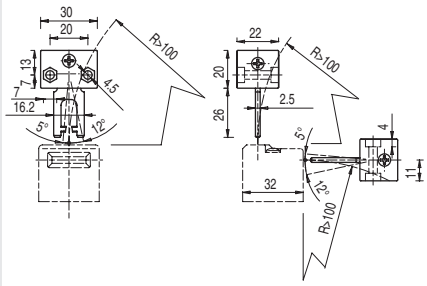


Article	Description
VF KEYF2	Jointed actuator



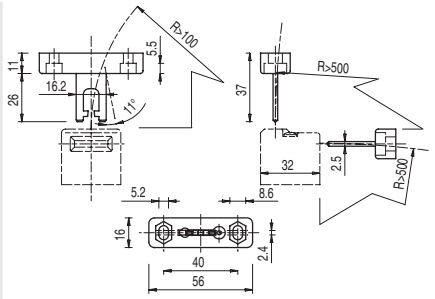
The actuator can flex in four directions for applications where the door alignment is not precise

Article	Description
VF KEYF3	Jointed actuator adjustable in two directions



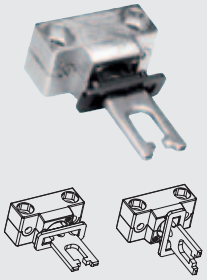
Actuator adjustable in two directions for doors with reduced dimensions.

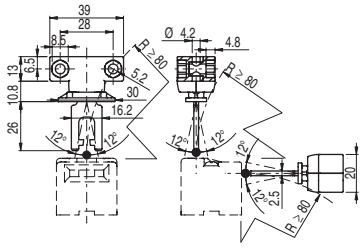
Article	Description
VF KEYF7	Jointed actuator adjustable in one direction



Actuator adjustable in one direction for doors with reduced dimensions.

Article	Description
VF KEYF8	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 the actuator-working plan (see picture).

Accessories

Article	Description
VF KB1	Actuator entry locking device

Padlockable device to lock the actuator entry in order to prevent from the accidental closing of the door behind operators while they are inside the machine. To be used only with FD, FL, FC and FS series with metal heads.

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