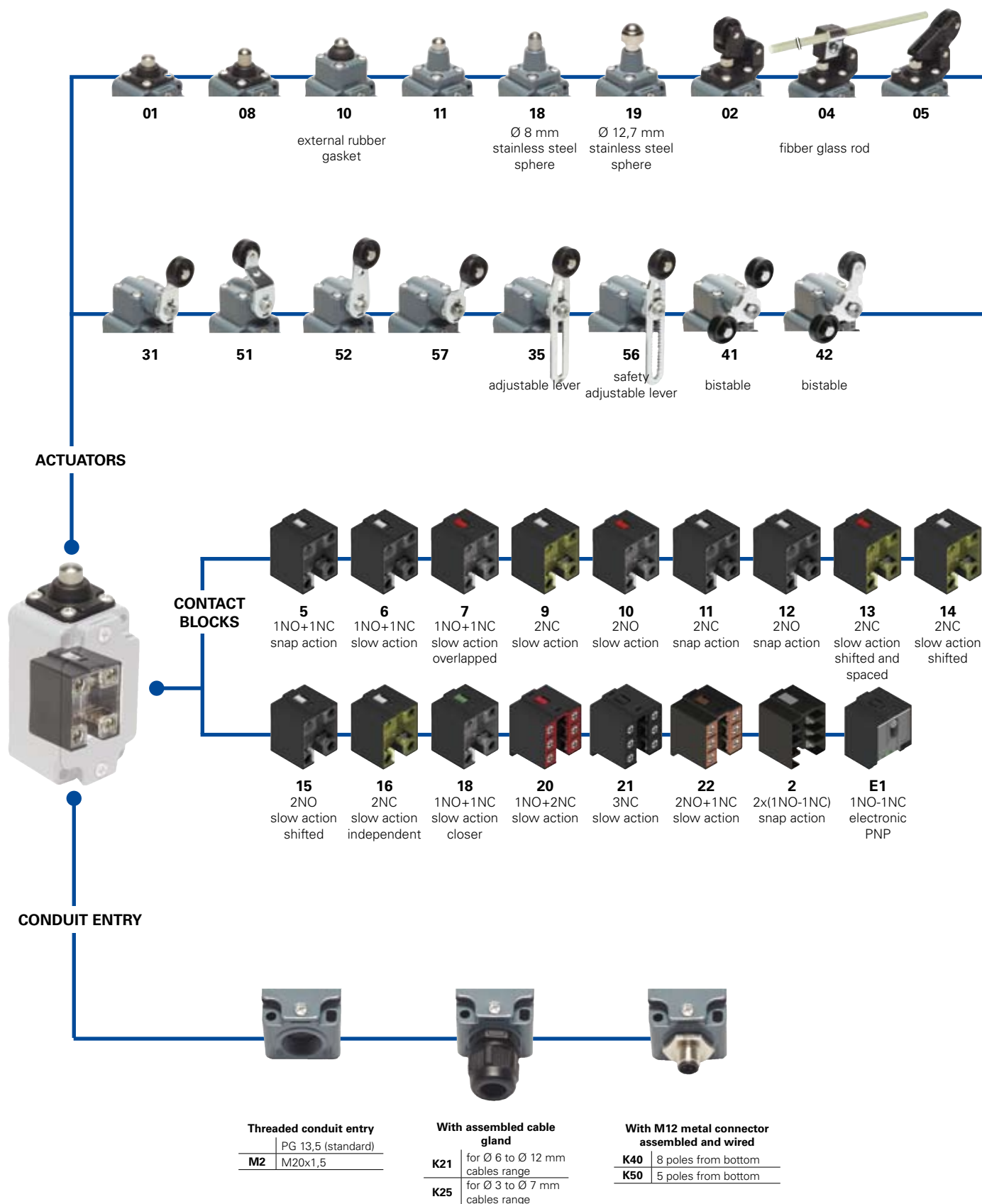
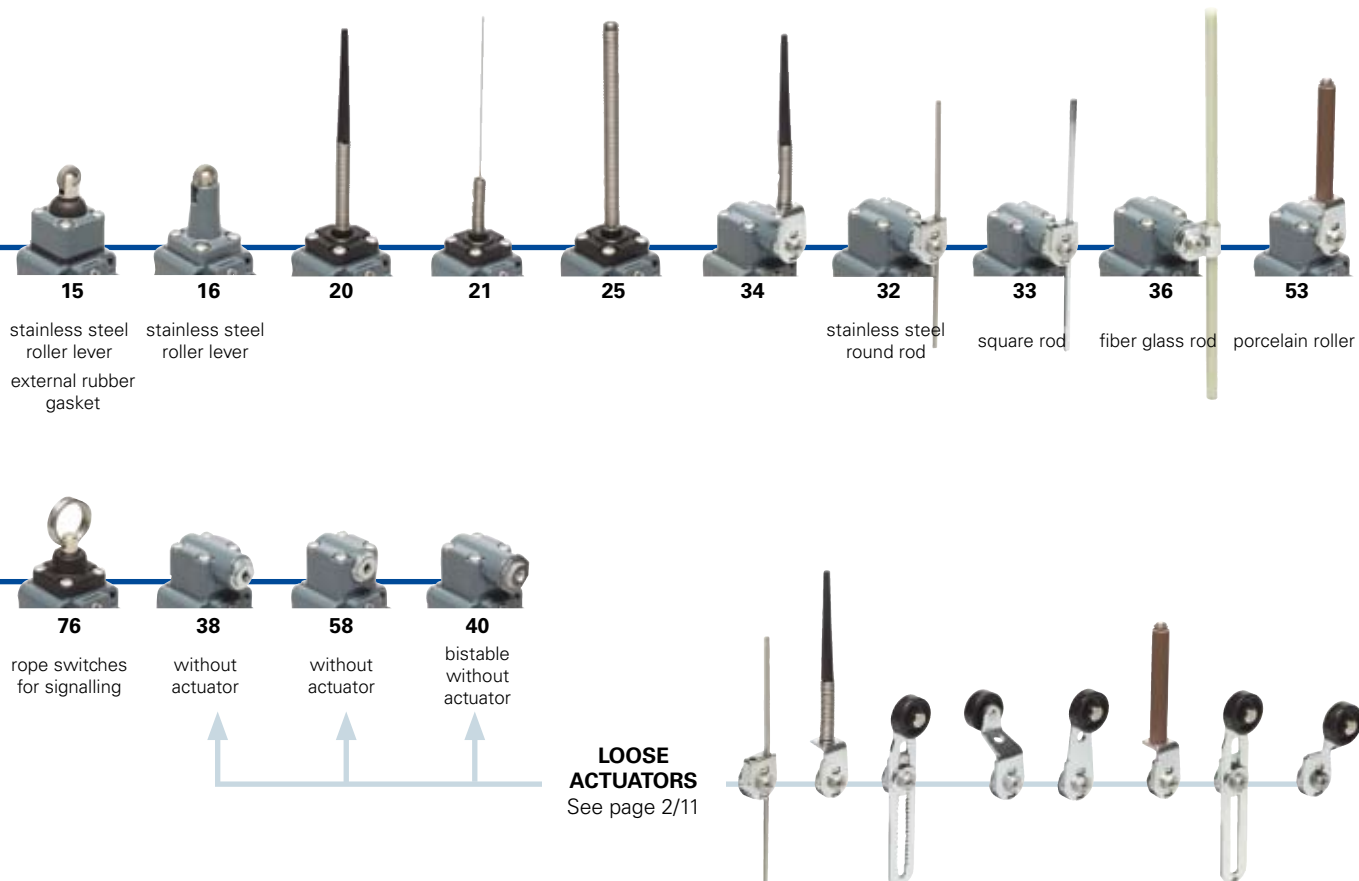


Selection diagram



—●— 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		options	
FD 502		1GM2K50	
Housing FD metal housing, one conduit entry		Preinstalled cable gland or connectors no cable gland or connector (standard) K21 assembled cable gland (see conduit entry page 2/3) ... K50 5 poles M12 assembled metal connector (see conduit entry page 2/3) ... For the complete list of all combinations, please contact our technical office.	
Contact blocks 5 1NO+1NC, snap action 6 1NO+1NC, slow action 7 1NO+1NC, slow action overlapped ...		Threaded conduit entry PG 13,5 (standard) M2 M20x1,5	
Actuators 01 short plunger 02 roller lever 05 offset roller lever ...		Contacts type silver contacts (standard) G silver contacts gold plated 1 µm (contact block 2 excluded)	
Suffix no suffix (standard) 1 with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57, 41, 42 2 with Ø 35 mm polymer roller (see special loose actuators on page 2/12) 3 with Ø 50 mm rubber roller (see special loose actuators on page 2/12) 4 with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/12)			



Main data

- Metal housing, one conduit entry
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions

Technical data

Housing

Metal housing, coated with baked epoxy powder

One threaded conduit entry

Protection degree:

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

General data

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: 20 million operations cycles¹

Assembling position: any

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, 10, 11, 12, 13, 14, 15, 16, 18:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)
Contact block 2:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 1,5 mm ²	(2 x AWG 16)

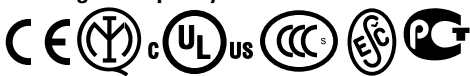
In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, 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.

Markings and quality marks:



Approval IMQ:	EG605
Approval UL:	E131787
Approval CCC:	2007010305230000
Approval ECU:	1010151
Approval GOST:	POCC ITAB24.B04512

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.

Installation for safety applications:

Use only switches marked with the symbol ⊕. The safety circuit must always be connected with the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in the **standard EN 60947-5-1, encl. K, par. 2**. The switch must be actuated with **at least up to the positive opening travel** shown in the travels diagrams on page 7/4. The switch must be actuated **at least with the positive opening force**, shown in brackets, underneath each article, near the value of the min. force.

⚠ 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
		400Vac500Vdc(contact blocks 2, 11, 12, 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 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
			I _e (A)	4	4	4
			Direct current: DC13			
with 8 poles M12 connector	Thermal current (I _{th}):	4 A	U _e (V)	24	125	250
	Rated insulation voltage (U _i):	250 Vac 300 Vdc	I _e (A)	4	1,1	0,4
	Protection against short circuits:	fuse 4 A 500 V type gG	Alternate current: AC15 (50...60 Hz)			
	Pollution degree:	3	U _e (V)	24	120	250
			I _e (A)	4	4	4
with 8 poles M12 connector	Thermal current (I _{th}):	2 A	Direct current: DC13			
	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				

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 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: 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, 13, 14, 16, 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 except 2 and 3 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).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1,4 Nm).

In conformity with standard: UL 508

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

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



Overturning levers

It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling.
In this way it is possible to obtain two different work plans of the lever.



Rotating heads

In all switches, it is possible to rotate the head in 90° steps.

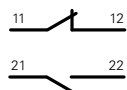


Working operation of contact block 16 with independent contacts

The contact block 16 has two NC contacts, **both with positive opening** activated independently according to the lever turning direction.

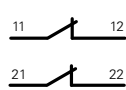
Lever turned to left

Contacts diagram



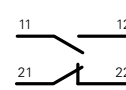
Lever not turned

Contacts diagram



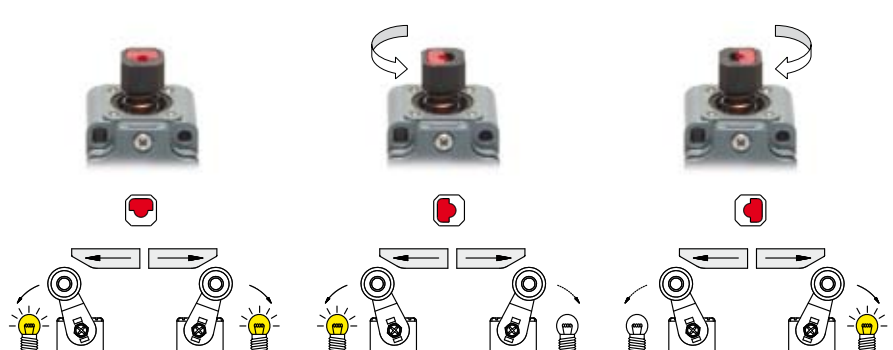
Lever turned to right

Contacts diagram



Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston (contact block 16 excluded).

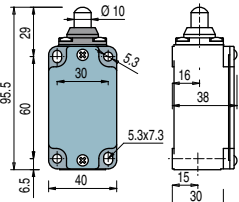
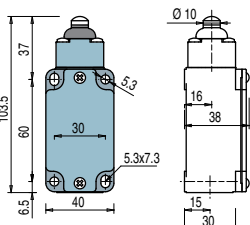
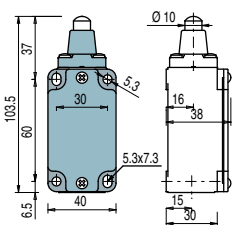
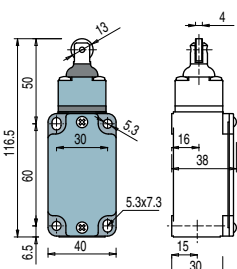


Contacts type:

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

Contact blocks

5	R	FD 501	➔ 1NO+1NC	FD 502	➔ 1NO+1NC	FD 504	1NO+1NC	FD 505	➔ 1NO+1NC
6	L	FD 601	➔ 1NO+1NC	FD 602	➔ 1NO+1NC	FD 604	1NO+1NC	FD 605	➔ 1NO+1NC
7	LO	FD 701	➔ 1NO+1NC	FD 702	➔ 1NO+1NC	FD 704	1NO+1NC	FD 705	➔ 1NO+1NC
9	L	FD 901	➔ 2NC	FD 902	➔ 2NC	FD 904	2NC	FD 905	➔ 2NC
10	L	FD 1001	2NO	FD 1002	2NO	FD 1004	2NO	FD 1005	2NO
11	R	FD 1101	➔ 2NC	FD 1102	➔ 2NC	FD 1104	2NC	FD 1105	➔ 2NC
12	R	FD 1201	2NO	FD 1202	2NO	FD 1204	2NO	FD 1205	2NO
13	LV	FD 1301	➔ 2NC	FD 1302	➔ 2NC	FD 1304	2NC	FD 1305	➔ 2NC
14	LS	FD 1401	➔ 2NC	FD 1402	➔ 2NC	FD 1404	2NC	FD 1405	➔ 2NC
15	LS	FD 1501	2NO	FD 1502	2NO	FD 1504	2NO	FD 1505	2NO
18	LA	FD 1801	➔ 1NO+1NC	FD 1802	➔ 1NO+1NC	FD 1804	1NO+1NC	FD 1805	➔ 1NO+1NC
20	L	FD 2001	➔ 1NO+2NC	FD 2002	➔ 1NO+2NC	FD 2004	1NO+2NC	FD 2005	➔ 1NO+2NC
21	L	FD 2101	➔ 3NC	FD 2102	➔ 3NC	FD 2104	3NC	FD 2105	➔ 3NC
22	L	FD 2201	➔ 2NO+1NC	FD 2202	➔ 2NO+1NC	FD 2204	2NO+1NC	FD 2205	➔ 2NO+1NC
2	R	FD 201	2x(1NO-1NC)	FD 202	2x(1NO-1NC)	FD 204	2x(1NO-1NC)	FD 205	2x(1NO-1NC)
E1		FD E101	1NO-1NC	FD E102	1NO-1NC	FD E104	1NO-1NC	FD E105	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 3		0,5 m/s		page 7/3 - type 3	
Min. force		8 N (25 N ➔)		6 N (25 N ➔)		0,17 Nm		6 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 2		page 7/4 - group 1		page 7/4 - group 2	

				With external rubber gasket				With external rubber gasket	
									
Contact blocks									
5	R	FD 508	➔ 1NO+1NC	FD 510	➔ 1NO+1NC	FD 511	➔ 1NO+1NC	FD 515	➔ 1NO+1NC
6	L	FD 608	➔ 1NO+1NC	FD 610	➔ 1NO+1NC	FD 611	➔ 1NO+1NC	FD 615	➔ 1NO+1NC
7	LO	FD 708	➔ 1NO+1NC	FD 710	➔ 1NO+1NC	FD 711	➔ 1NO+1NC	FD 715	➔ 1NO+1NC
9	L	FD 908	➔ 2NC	FD 910	➔ 2NC	FD 911	➔ 2NC	FD 915	➔ 2NC
10	L	FD 1008	2NO	FD 1010	2NO	FD 1011	2NO	FD 1015	2NO
11	R	FD 1108	➔ 2NC	FD 1110	➔ 2NC	FD 1111	➔ 2NC	FD 1115	➔ 2NC
12	R	FD 1208	2NO	FD 1210	2NO	FD 1211	2NO	FD 1215	2NO
13	LV	FD 1308	➔ 2NC	FD 1310	➔ 2NC	FD 1311	➔ 2NC	FD 1315	➔ 2NC
14	LS	FD 1408	➔ 2NC	FD 1410	➔ 2NC	FD 1411	➔ 2NC	FD 1415	➔ 2NC
15	LS	FD 1508	2NO	FD 1510	2NO	FD 1511	2NO	FD 1515	2NO
18	LA	FD 1808	➔ 1NO+1NC	FD 1810	➔ 1NO+1NC	FD 1811	➔ 1NO+1NC	FD 1815	➔ 1NO+1NC
20	L	FD 2008	➔ 1NO+2NC	FD 2010	➔ 1NO+2NC	FD 2011	➔ 1NO+2NC	FD 2015	➔ 1NO+2NC
21	L	FD 2108	➔ 3NC	FD 2110	➔ 3NC	FD 2111	➔ 3NC	FD 2115	➔ 3NC
22	L	FD 2208	➔ 2NO+1NC	FD 2210	➔ 2NO+1NC	FD 2211	➔ 2NO+1NC	FD 2215	➔ 2NO+1NC
2	R	FD 208	2x(1NO-1NC)	FD 210	2x(1NO-1NC)	FD 211	2x(1NO-1NC)	FD 215	2x(1NO-1NC)
E1		FD E108	1NO-1NC	FD E110	1NO-1NC	FD E111	1NO-1NC	FD E115	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 2	
Min. force		8 N (25 N ➔)		11 N (25 N ➔)		8 N (25 N ➔)		11 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1	

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
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
⚡ = electronic PNP

Contact blocks

	Ø 8 mm stainless steel sphere	Ø 12,7 mm stainless steel sphere	With external rubber gasket
5 R	FD 516 → 1NO+1NC	FD 518 → 1NO+1NC	FD 519 → 1NO+1NC
6 L	FD 616 → 1NO+1NC	FD 618 → 1NO+1NC	FD 619 → 1NO+1NC
7 LO	FD 716 → 1NO+1NC	FD 718 → 1NO+1NC	FD 719 → 1NO+1NC
9 L	FD 916 → 2NC	FD 918 → 2NC	FD 919 → 2NC
10 L	FD 1016 2NO	FD 1018 2NO	FD 1019 2NO
11 R	FD 1116 → 2NC	FD 1118 → 2NC	FD 1119 → 2NC
12 R	FD 1216 2NO	FD 1218 2NO	FD 1219 2NO
13 LV	FD 1316 → 2NC	FD 1318 → 2NC	FD 1319 → 2NC
14 LS	FD 1416 → 2NC	FD 1418 → 2NC	FD 1419 → 2NC
15 LS	FD 1516 2NO	FD 1518 2NO	FD 1519 2NO
18 LA	FD 1816 → 1NO+1NC	FD 1818 → 1NO+1NC	FD 1819 → 1NO+1NC
20 L	FD 2016 → 1NO+2NC	FD 2018 → 1NO+2NC	FD 2019 → 1NO+2NC
21 L	FD 2116 → 3NC	FD 2118 → 3NC	FD 2119 → 3NC
22 L	FD 2216 → 2NO+1NC	FD 2218 → 2NO+1NC	FD 2219 → 2NO+1NC
2 R	FD 216 2x(1NO-1NC)	FD 218 2x(1NO-1NC)	FD 219 2x(1NO-1NC)
E1 ⚡	FD E116 1NO-1NC	FD E118 1NO-1NC	FD E119 1NO-1NC
Max speed	page 7/3 - type 2	page 7/3 - type 4	page 7/3 - type 4
Min. force	8 N (25 N →)	8 N (25 N →)	8 N (25 N →)
Travel diagrams	page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1

Contact blocks

	With external rubber gasket	With external rubber gasket	Other rollers available. See page 2/12	Ø 3 mm stainless steel round rod
5 R	FD 521 1NO+1NC	FD 525 1NO+1NC	FD 531 → 1NO+1NC	FD 532 1NO+1NC
6 L			FD 631 → 1NO+1NC	FD 632 1NO+1NC
7 LO			FD 731 → 1NO+1NC	FD 732 1NO+1NC
9 L			FD 931 → 2NC	FD 932 2NC
10 L	FD 1021 2NO	FD 1025 2NO	FD 1031 2NO	FD 1032 2NO
11 R			FD 1131 → 2NC	FD 1132 2NC
12 R			FD 1231 2NO	FD 1232 2NO
13 LV			FD 1331 → 2NC	FD 1332 2NC
14 LS			FD 1431 → 2NC	FD 1432 2NC
15 LS			FD 1531 2NO	FD 1532 2NO
16 LI			FD 1631 → 2NC	FD 1632 2NC
18 LA	FD 1821 1NO+1NC	FD 1825 1NO+1NC	FD 1831 → 1NO+1NC	FD 1832 1NO+1NC
20 L	FD 2021 1NO+2NC	FD 2025 1NO+2NC	FD 2031 → 1NO+2NC	FD 2032 1NO+2NC
21 L	FD 2121 3NC	FD 2125 3NC	FD 2131 → 3NC	FD 2132 3NC
22 L	FD 2221 2NO+1NC	FD 2225 2NO+1NC	FD 2231 → 2NO+1NC	FD 2232 2NO+1NC
2 R	FD 221 2x(1NO-1NC)	FD 225 2x(1NO-1NC)	FD 231 2x(1NO-1NC)	FD 232 2x(1NO-1NC)
E1 ⚡	FD E121 1NO-1NC	FD E125 1NO-1NC	FD E131 1NO-1NC	FD E132 1NO-1NC
Max speed	1 m/s	1 m/s	page 7/3 - type 1	1,5 m/s
Min. force	0,08 Nm	0,14 Nm	0,1 Nm (0,25 Nm →)	0,1 Nm
Travel diagrams	page 7/4 - group 3	page 7/4 - group 3	page 7/4 - group 4	page 7/4 - group 4

Items with code on the green background are available in stock

Contacts type:

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

Contact blocks

5	R	FD 533	1NO+1NC	FD 534	1NO+1NC	FD 535	 (1) 1NO+1NC	FD 536	1NO+1NC
6	L	FD 633	1NO+1NC	FD 634	1NO+1NC	FD 635	 (1) 1NO+1NC	FD 636	1NO+1NC
7	LO	FD 733	1NO+1NC	FD 734	1NO+1NC	FD 735	 (1) 1NO+1NC	FD 736	1NO+1NC
9	L	FD 933	2NC	FD 934	2NC	FD 935	 (1) 2NC	FD 936	2NC
10	L	FD 1033	2NO	FD 1034	2NO	FD 1035	2NO	FD 1036	2NO
11	R	FD 1133	2NC	FD 1134	2NC	FD 1135	 (1) 2NC	FD 1136	2NC
12	R	FD 1233	2NO	FD 1234	2NO	FD 1235	2NO	FD 1236	2NO
13	LV	FD 1333	2NC	FD 1334	2NC	FD 1335	 (1) 2NC	FD 1336	2NC
14	LS	FD 1433	2NC	FD 1434	2NC	FD 1435	 (1) 2NC	FD 1436	2NC
15	LS	FD 1533	2NO	FD 1534	2NO	FD 1535	2NO	FD 1536	2NO
16	LI	FD 1633	2NC	FD 1634	2NC	FD 1635	 (1) 2NC	FD 1636	2NC
18	LA	FD 1833	1NO+1NC	FD 1834	1NO+1NC	FD 1835	 (1) 1NO+1NC	FD 1836	1NO+1NC
20	L	FD 2033	1NO+2NC	FD 2034	1NO+2NC	FD 2035	 (1) 1NO+2NC	FD 2036	1NO+2NC
21	L	FD 2133	3NC	FD 2134	3NC	FD 2135	 (1) 3NC	FD 2136	3NC
22	L	FD 2233	2NO+1NC	FD 2234	2NO+1NC	FD 2235	 (1) 2NO+1NC	FD 2236	2NO+1NC
2	R	FD 233	2x(1NO-1NC)	FD 234	2x(1NO-1NC)	FD 235	2x(1NO-1NC)	FD 236	2x(1NO-1NC)
E1		FD E133	1NO-1NC	FD E134	1NO-1NC	FD E135	1NO-1NC	FD E136	1NO-1NC
Max speed		1,5 m/s		1 m/s		page 7/3 - type 1		1,5 m/s	
Min. force		0,1 Nm		0,1 Nm		0,1 Nm (0,25 Nm )		0,1 Nm	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 4	

Contact blocks

5	R	FD 551	 1NO+1NC	FD 552	 1NO+1NC	FD 553-E11V9	 1NO+1NC	FD 556	 1NO+1NC
6	L	FD 651	 1NO+1NC	FD 652	 1NO+1NC	FD 653-E11V9	 1NO+1NC	FD 656	 1NO+1NC
7	LO	FD 751	 1NO+1NC	FD 752	 1NO+1NC	FD 753-E11V9	 1NO+1NC	FD 756	 1NO+1NC
9	L	FD 951	 2NC	FD 952	 2NC	FD 953-E11V9	 2NC	FD 956	 2NC
10	L	FD 1051	2NO	FD 1052	2NO	FD 1053-E11V9	2NO	FD 1056	2NO
11	R	FD 1151	 2NC	FD 1152	 2NC	FD 1253-E11V9	2NO	FD 1156	 2NC
12	R	FD 1251	2NO	FD 1252	2NO	FD 1353-E11V9	 2NC	FD 1256	2NO
13	LV	FD 1351	 2NC	FD 1352	 2NC	FD 1453-E11V9	 2NC	FD 1356	 2NC
14	LS	FD 1451	 2NC	FD 1452	 2NC	FD 1553-E11V9	2NO	FD 1456	 2NC
15	LS	FD 1551	2NO	FD 1552	2NO	FD 1853-E11V9	 1NO+1NC	FD 1556	2NO
16	LI					FD 2053-E11V9	 1NO+2NC	FD 1656	 2NC
18	LA	FD 1851	 1NO+1NC	FD 1852	 1NO+1NC	FD 2153-E11V9	 3NC	FD 1856	 1NO+1NC
20	L	FD 2051	 1NO+2NC	FD 2052	 1NO+2NC	FD 2253-E11V9	 2NO+1NC	FD 2056	 1NO+2NC
21	L	FD 2151	 3NC	FD 2152	 3NC	FD 253-E11	2x(1NO-1NC)	FD 2156	 3NC
22	L	FD 2251	 2NO+1NC	FD 2252	 2NO+1NC	FD E153-E11V9	1NO-1NC	FD 2256	 2NO+1NC
2	R	FD 251	2x(1NO-1NC)	FD 252	2x(1NO-1NC)			FD 256	2x(1NO-1NC)
E1		FD E151	1NO-1NC	FD E152	1NO-1NC			FD E156	1NO-1NC
Max speed		page 7/3 - type 1		page 7/3 - type 1		0,5 m/s		page 7/3 - type 1	
Min. force		0,06 Nm (0,25 Nm )		0,06 Nm (0,25 Nm )		0,03 Nm (0,25 Nm )		0,1 Nm (0,25 Nm )	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 5		page 7/4 - group 4	

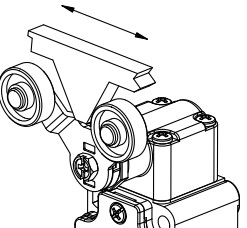
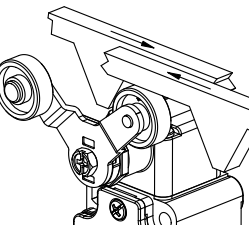
Accessories See page 6/1

(1) Positive opening only with lever adjusted on the max. See page 2/11.

Contacts type:

- R** = snap action
- L** = slow action
- LO** = slow action overlapped
- LS** = slow action shifted
- LV** = slow action shifted and spaced
- LI** = slow action independent
- LA** = slow action closer
- A** = electronic PNP

Contact blocks

5	R	FD 557	➔ 1NO+1NC	FD 541	➔ 1NO+1NC	FD 542	➔ 1NO+1NC	FD 576	1NO+1NC
6	L	FD 657	➔ 1NO+1NC	Bistable switch with single track lyra lever  0 45° 65° 80° 90° 25° S S = mechanical snap point positive opening with 21-22 contact only	Bistable switch with double track lyra lever  0 45° 65° 80° 90° 25° S S = mechanical snap point positive opening with 21-22 contact only	FD 676	1NO+1NC	0,5 m/s initial 20 N - final 40 N page 7/4 - group 6	
7	LO	FD 757	➔ 1NO+1NC			FD 776	1NO+1NC		
9	L	FD 957	➔ 2NC			FD 976	2NO		
10	L	FD 1057	2NO			FD 1076	2NC		
11	R	FD 1157	➔ 2NC			FD 1176	2NO		
12	R	FD 1257	2NO			FD 1276	2NC		
13	LV	FD 1357	➔ 2NC			FD 1376	2NO		
14	LS	FD 1457	➔ 2NC			FD 1476	2NO		
15	LS	FD 1557	2NO			FD 1576	2NC		
16	LI	FD 1657	➔ 2NC			FD 1876	1NO+1NC		
18	LA	FD 1857	➔ 1NO+1NC			FD 2076	2NO+1NC		
20	L	FD 2057	➔ 1NO+2NC			FD 2176	3NC		
21	L	FD 2157	➔ 3NC	FD 2276	1NO+2NC				
22	L	FD 2257	➔ 2NO+1NC	FD 276	2x(1NO-1NC)				
2	R	FD 257	2x(1NO-1NC)						
E1	A	FD E157	1NO-1NC						
Max speed		page 7/3 - type 1		0,5 m/s with 30° cam		0,5 m/s with 30° cam		0,5 m/s	
Min. force		0,1 Nm (0,25 Nm ➔)		0,21 Nm (0,36 Nm ➔)		0,21 Nm (0,36 Nm ➔)		initial 20 N - final 40 N	
Travel diagrams		page 7/4 - group 4							

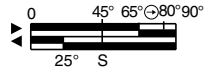
Items with code on the **green** background are available in stock

Position switches with revolving lever without actuator

Contacts type:

- R** = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
A = electronic PNP

Contact blocks

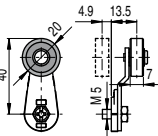
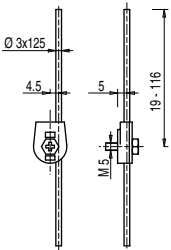
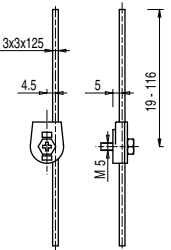
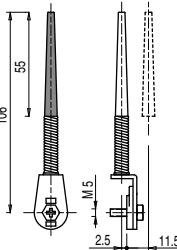
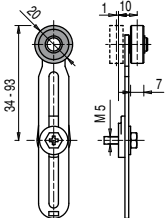
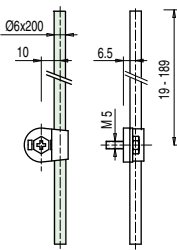
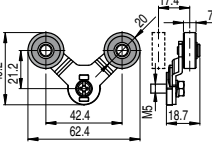
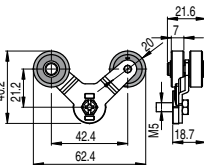
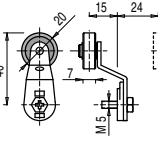
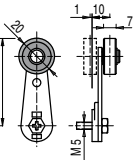
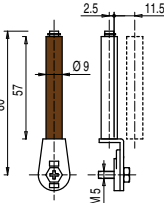
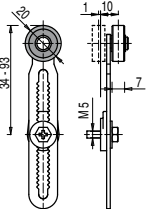
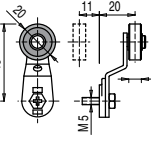
	Regular head	Compact head	
5 R	FD 538 → 1NO+1NC	FD 558 → 1NO+1NC	FD 540 → 1NO+1NC
6 L	FD 638 → 1NO+1NC	FD 658 → 1NO+1NC	Bistable switch  S = mechanical snap point positive opening with 21-22 contact only
7 LO	FD 738 → 1NO+1NC	FD 758 → 1NO+1NC	
9 L	FD 938 → 2NC	FD 958 → 2NC	
10 L	FD 1038 2NO	FD 1058 2NO	
11 R	FD 1138 → 2NC	FD 1158 → 2NC	
12 R	FD 1238 2NO	FD 1258 2NO	
13 LV	FD 1338 → 2NC	FD 1358 → 2NC	
14 LS	FD 1438 → 2NC	FD 1458 → 2NC	
15 LS	FD 1538 2NO	FD 1558 2NO	
16 LI	FD 1638 → 2NC		
18 LA	FD 1838 → 1NO+1NC	FD 1858 → 1NO+1NC	
20 L	FD 2038 → 1NO+2NC	FD 2058 → 1NO+2NC	
21 L	FD 2138 → 3NC	FD 2158 → 3NC	
22 L	FD 2238 → 2NO+1NC	FD 2258 → 2NO+1NC	
2 R	FD 238 2x(1NO-1NC)	FD 258 2x(1NO-1NC)	
E1 A	FD E138 1NO-1NC	FD E158 1NO-1NC	
Min. force	0,1 Nm (0,25 Nm →)	0,06 Nm (0,25 Nm →)	0,5 m/s with 30° cam
Travel diagrams	page 7/4 - group 4	page 7/4 - group 4	0,21 Nm (0,36 Nm →)

IMPORTANT

For safety applications: join only switches and actuators marked with symbol ⊕.
 For more information about safety applications see page 7/1.

Loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Polymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod actuator	Adjustable actuator with polymer roller	Adjustable fiber glass rod	
						
VF L31 →	VF L32 (3)	VF L33 (3)	VF L34	VF L35 → (1) (3)	VF L36 (3)	
Single track lyra actuator	Double tracks lyra actuator	Polymer roller Ø 20 mm	Polymer roller Ø 20 mm	Porcelain roller	Adjustable safety actua- tor with polymer roller	Polymer roller Ø 20 mm
						
VF L41 →	VF L42 →	VF L51 →	VF L52 →	VF L53 → (2)	VF L56 → (3)	VF L57 →

- Only orders for multiple quantities of the packs are accepted.

- ⁽¹⁾ Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.

- ⁽²⁾ The position switch obtained by assembling the switch FD •58 (e.g. FD 558, FD 658) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FD •53-E11V9 (e.g. FD 553-E11V9, FD 653-E11V9...).

- ⁽³⁾ If it is installed with switch FD •58 (e.g. FD 558, FD 658...), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.

- ⁽⁴⁾ The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.

Accessories See page 6/1

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

Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Ø 20 mm stainless steel rollers

VF L31-1 (1)	VF L35-1 (1) (3)	VF L51-1 (1)	VF L52-1 (1)	VF L56-1 (3)	VF L57-1 (1)

Ø 35 mm polymer rollers

VF L31-2 (4)	VF L35-2 (1) (3)	VF L51-2 (4)	VF L52-2 (1)	VF L56-2 (3)	VF L57-2 (1)

Ø 40 mm rubber rollers

VF L31-R5 (4)	VF L35-R5 (1) (3)	VF L51-R5 (4)	VF L52-R5 (1)	VF L56-R5 (3)	VF L57-R5 (4)

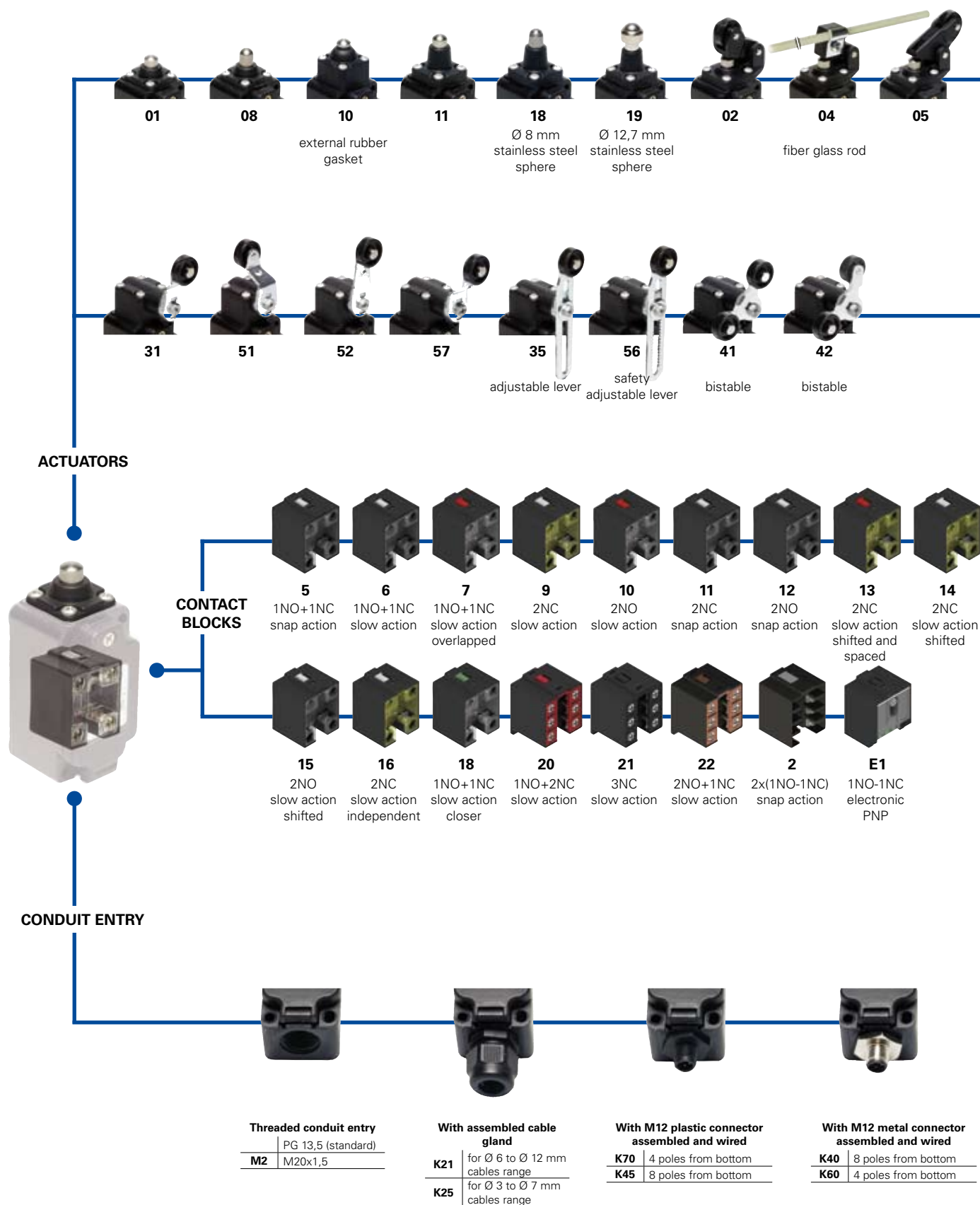
Ø 50 mm rubber rollers

VF L31-3 (4)	VF L35-3 (1) (3)	VF L51-3 (4)	VF L52-3 (4)	VF L56-3 (3)	VF L57-3 (4)

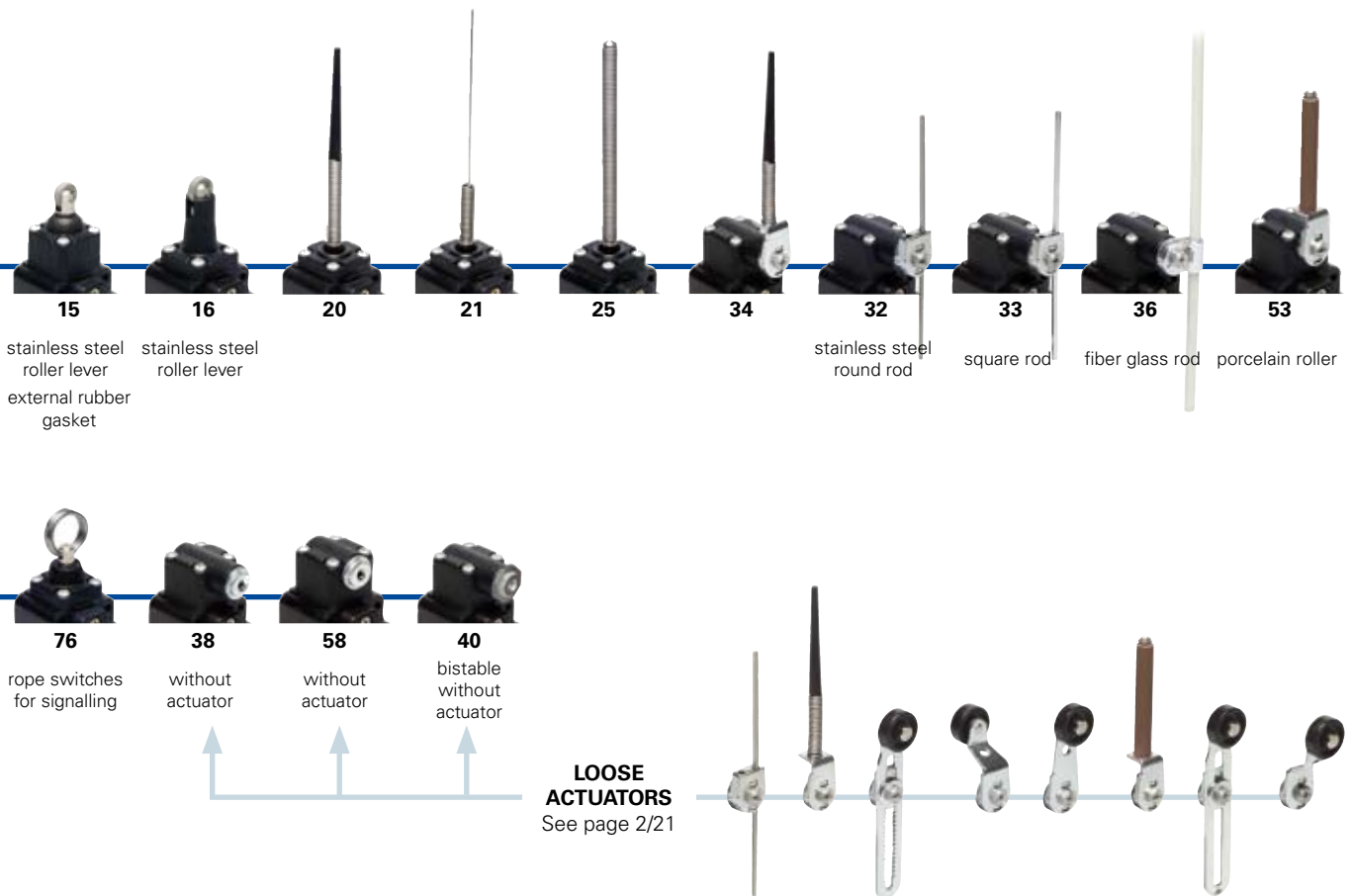
Ø 50 mm overhanging rubber rollers

VF L35-4 (1) (3)	VF L56-4 (3)

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		options	
FP 502		-1GM2K70	
Housing FP polymer housing, one conduit entry		Preinstalled cable gland or connectors no cable gland or connector (standard) K21 assembled cable gland (see conduit entry page 2/13) ... K70 4 poles M12 assembled plastic connector (see conduit entry page 2/13) ...	
Contact blocks 5 1NO+1NC, snap action 6 1NO+1NC, slow action 7 1NO+1NC, slow action overlapped ...		Threaded conduit entry PG 13,5 (standard) M2 M20x1,5	
Actuators 01 short plunger 02 roller lever 05 offset roller lever ...		Contacts type silver contacts (standard) G silver contacts gold plated 1 µm (contact block 2 excluded)	
Suffix no suffix (standard) 1 with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57 2 with Ø 35 mm polymer roller (see special loose actuators on page 2/22) 3 with Ø 50 mm rubber roller (see special loose actuators on page 2/22) 4 with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/22)			



Main data

- Polymer housing, one conduit entry
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions

Technical data

Housing

Made of glass-reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation 

One threaded conduit entry

Protection degree:

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

General data

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:

20 million operations cycles¹

Assembling position:

any

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, 10, 11, 12, 13, 14, 15, 16, 18:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)
Contact block 2:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 1,5 mm ²	(2 x AWG 16)

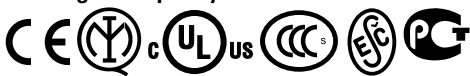
In conformity with standards:

IEC 60947-5-1, EN 60947-5-1, EN 60947-1, EN 50041, 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.

Markings and quality marks:



Approval IMQ:	EG606
Approval UL:	E131787
Approval CCC:	2007010305230014
Approval ECU:	1010151
Approval GOST:	POCC ITAB24.B04512

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.

Installation for safety applications:

Use only switches marked with the symbol . The safety circuit must always be connected with the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in the **standard EN 60947-5-1, encl. K, par. 2**. The switch must be actuated with **at least up to the positive opening travel** shown in the travels diagrams on page 7/4. The switch must be actuated **at least with the positive opening force**, shown in brackets, underneath each article, near the value of the min. force.

 **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
		400Vac500Vdc(contact blocks 2, 11, 12, 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 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
			I _e (A)	4	4	4
			Direct current: DC13			
with 8 poles M12 connector	Thermal current (I _{th}):	4 A	U _e (V)	24	125	250
	Rated insulation voltage (U _i):	250 Vac 300 Vdc	I _e (A)	4	1,1	0,4
	Protection against short circuits:	fuse 4 A 500 V type gG	Alternate current: AC15 (50...60 Hz)			
	Pollution degree:	3	U _e (V)	24		
			I _e (A)	2		

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 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: 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, 13, 14, 16, 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 except 2 and 3 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).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1,4 Nm).

In conformity with standard: UL 508

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

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



Overturning levers

It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling.

In this way it is possible to obtain two different work plans of the lever.



Rotating heads

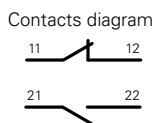
In all switches, it is possible to rotate the head in 90° steps.



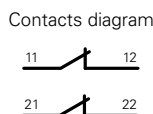
Working operation of contact block 16 with independent contacts

The contact block 16 has two NC contacts, **both with positive opening** activated independently according to the lever turning direction.

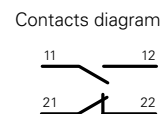
Lever turned to left



Lever not turned

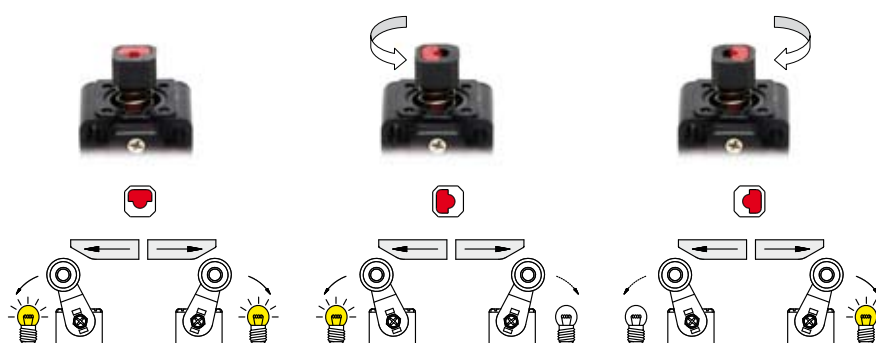


Lever turned to right



Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston (contact block 16 excluded).



Contacts type:

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

Contact blocks

5	R	FP 501	➔ 1NO+1NC	FP 502	➔ 1NO+1NC	FP 504	1NO+1NC	FP 505	➔ 1NO+1NC
6	L	FP 601	➔ 1NO+1NC	FP 602	➔ 1NO+1NC	FP 604	1NO+1NC	FP 605	➔ 1NO+1NC
7	LO	FP 701	➔ 1NO+1NC	FP 702	➔ 1NO+1NC	FP 704	1NO+1NC	FP 705	➔ 1NO+1NC
9	L	FP 901	➔ 2NC	FP 902	➔ 2NC	FP 904	2NC	FP 905	➔ 2NC
10	L	FP 1001	2NO	FP 1002	2NO	FP 1004	2NO	FP 1005	2NO
11	R	FP 1101	➔ 2NC	FP 1102	➔ 2NC	FP 1104	2NC	FP 1105	➔ 2NC
12	R	FP 1201	2NO	FP 1202	2NO	FP 1204	2NO	FP 1205	2NO
13	LV	FP 1301	➔ 2NC	FP 1302	➔ 2NC	FP 1304	2NC	FP 1305	➔ 2NC
14	LS	FP 1401	➔ 2NC	FP 1402	➔ 2NC	FP 1404	2NC	FP 1405	➔ 2NC
15	LS	FP 1501	2NO	FP 1502	2NO	FP 1504	2NO	FP 1505	2NO
18	LA	FP 1801	➔ 1NO+1NC	FP 1802	➔ 1NO+1NC	FP 1804	1NO+1NC	FP 1805	➔ 1NO+1NC
20	L	FP 2001	➔ 1NO+2NC	FP 2002	➔ 1NO+2NC	FP 2004	1NO+2NC	FP 2005	➔ 1NO+2NC
21	L	FP 2101	➔ 3NC	FP 2102	➔ 3NC	FP 2104	3NC	FP 2105	➔ 3NC
22	L	FP 2201	➔ 2NO+1NC	FP 2202	➔ 2NO+1NC	FP 2204	2NO+1NC	FP 2205	➔ 2NO+1NC
2	R	FP 201	2x(1NO-1NC)	FP 202	2x(1NO-1NC)	FP 204	2x(1NO-1NC)	FP 205	2x(1NO-1NC)
E1		FP E101	1NO-1NC	FP E102	1NO-1NC	FP E104	1NO-1NC	FP E105	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 3		0,5 m/s		page 7/3 - type 3	
Min. force		8 N (25 N ➔)		6 N (25 N ➔)		0,17 Nm		6 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 2		page 7/4 - group 1		page 7/4 - group 2	

Contact blocks

5	R	FP 508	➔ 1NO+1NC	FP 510	➔ 1NO+1NC	FP 511	➔ 1NO+1NC	FP 515	➔ 1NO+1NC
6	L	FP 608	➔ 1NO+1NC	FP 610	➔ 1NO+1NC	FP 611	➔ 1NO+1NC	FP 615	➔ 1NO+1NC
7	LO	FP 708	➔ 1NO+1NC	FP 710	➔ 1NO+1NC	FP 711	➔ 1NO+1NC	FP 715	➔ 1NO+1NC
9	L	FP 908	➔ 2NC	FP 910	➔ 2NC	FP 911	➔ 2NC	FP 915	➔ 2NC
10	L	FP 1008	2NO	FP 1010	2NO	FP 1011	2NO	FP 1015	2NO
11	R	FP 1108	➔ 2NC	FP 1110	➔ 2NC	FP 1111	➔ 2NC	FP 1115	➔ 2NC
12	R	FP 1208	2NO	FP 1210	2NO	FP 1211	2NO	FP 1215	2NO
13	LV	FP 1308	➔ 2NC	FP 1310	➔ 2NC	FP 1311	➔ 2NC	FP 1315	➔ 2NC
14	LS	FP 1408	➔ 2NC	FP 1410	➔ 2NC	FP 1411	➔ 2NC	FP 1415	➔ 2NC
15	LS	FP 1508	2NO	FP 1510	2NO	FP 1511	2NO	FP 1515	2NO
18	LA	FP 1808	➔ 1NO+1NC	FP 1810	➔ 1NO+1NC	FP 1811	➔ 1NO+1NC	FP 1815	➔ 1NO+1NC
20	L	FP 2008	➔ 1NO+2NC	FP 2010	➔ 1NO+2NC	FP 2011	➔ 1NO+2NC	FP 2015	➔ 1NO+2NC
21	L	FP 2108	➔ 3NC	FP 2110	➔ 3NC	FP 2111	➔ 3NC	FP 2115	➔ 3NC
22	L	FP 2208	➔ 2NO+1NC	FP 2210	➔ 2NO+1NC	FP 2211	➔ 2NO+1NC	FP 2215	➔ 2NO+1NC
2	R	FP 208	2x(1NO-1NC)	FP 210	2x(1NO-1NC)	FP 211	2x(1NO-1NC)	FP 215	2x(1NO-1NC)
E1		FP E108	1NO-1NC	FP E110	1NO-1NC	FP E111	1NO-1NC	FP E115	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 2	
Min. force		8 N (25 N ➔)		11 N (25 N ➔)		8 N (25 N ➔)		11 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1	



Contacts type:

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

Contact blocks

		Ø 8 mm stainless steel sphere	Ø 12,7 mm stainless steel sphere	With external rubber gasket
5	R	FP 516 → 1NO+1NC	FP 518 → 1NO+1NC	FP 519 → 1NO+1NC
6	L	FP 616 → 1NO+1NC	FP 618 → 1NO+1NC	FP 619 → 1NO+1NC
7	LO	FP 716 → 1NO+1NC	FP 718 → 1NO+1NC	FP 719 → 1NO+1NC
9	L	FP 916 → 2NC	FP 918 → 2NC	FP 919 → 2NC
10	L	FP 1016 2NO	FP 1018 2NO	FP 1019 2NO
11	R	FP 1116 → 2NC	FP 1118 → 2NC	FP 1119 → 2NC
12	R	FP 1216 2NO	FP 1218 2NO	FP 1219 2NO
13	LV	FP 1316 → 2NC	FP 1318 → 2NC	FP 1319 → 2NC
14	LS	FP 1416 → 2NC	FP 1418 → 2NC	FP 1419 → 2NC
15	LS	FP 1516 2NO	FP 1518 2NO	FP 1519 2NO
18	LA	FP 1816 → 1NO+1NC	FP 1818 → 1NO+1NC	FP 1819 → 1NO+1NC
20	L	FP 2016 → 1NO+2NC	FP 2018 → 1NO+2NC	FP 2019 → 1NO+2NC
21	L	FP 2116 → 3NC	FP 2118 → 3NC	FP 2119 → 3NC
22	L	FP 2216 → 2NO+1NC	FP 2218 → 2NO+1NC	FP 2219 → 2NO+1NC
2	R	FP 216 2x(1NO-1NC)	FP 218 2x(1NO-1NC)	FP 219 2x(1NO-1NC)
E1		FP E116 1NO-1NC	FP E118 1NO-1NC	FP E119 1NO-1NC
Max speed		page 7/3 - type 2	page 7/3 - type 4	page 7/3 - type 4
Min. force		8 N (25 N →)	8 N (25 N →)	8 N (25 N →)
Travel diagrams		page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1

	With external rubber gasket	With external rubber gasket	Other rollers available. See page 2/22	Ø 3 mm stainless steel round rod
5	R	FP 521 1NO+1NC	FP 525 1NO+1NC	FP 531 → 1NO+1NC
6	L			FP 631 → 1NO+1NC
7	LO			FP 731 → 1NO+1NC
9	L			FP 931 → 2NC
10	L	FP 1021 2NO	FP 1025 2NO	FP 1031 2NO
11	R			FP 1131 → 2NC
12	R			FP 1231 2NO
13	LV			FP 1331 → 2NC
14	LS			FP 1431 → 2NC
15	LS			FP 1531 2NO
16	LI			FP 1631 → 2NC
18	LA	FP 1821 1NO+1NC	FP 1825 1NO+1NC	FP 1831 → 1NO+1NC
20	L	FP 2021 1NO+2NC	FP 2025 1NO+2NC	FP 2031 → 1NO+2NC
21	L	FP 2121 3NC	FP 2125 3NC	FP 2131 → 3NC
22	L	FP 2221 2NO+1NC	FP 2225 2NO+1NC	FP 2231 → 2NO+1NC
2	R	FP 221 2x(1NO-1NC)	FP 225 2x(1NO-1NC)	FP 231 2x(1NO-1NC)
E1		FP E121 1NO-1NC	FP E125 1NO-1NC	FP E131 1NO-1NC
Max speed		1 m/s	1 m/s	page 7/3 - type 1
Min. force		0,08 Nm	0,14 Nm	0,1 Nm (0,25 Nm →)
Travel diagrams		page 7/4 - group 3	page 7/4 - group 3	page 7/4 - group 4

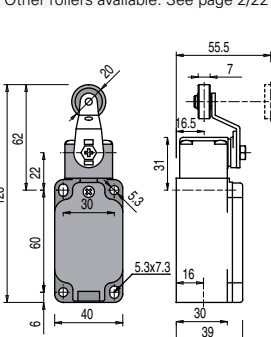
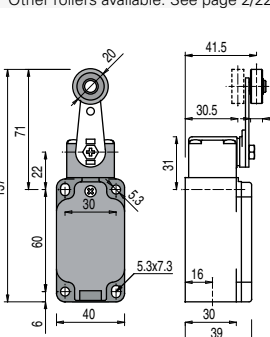
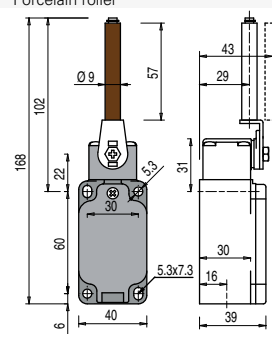
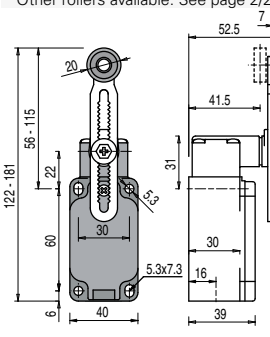
Items with code on the green background are available in stock

Contacts type:

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

Contact blocks

3x3 mm square rod			Other rollers available. See page 2/22			Fiber glass rod					
Contacts type: R = snap action L = slow action LO = slow action overlapped LS = slow action shifted LV = slow action shifted and spaced LI = slow action independent LA = slow action closer = electronic PNP Contact blocks											
5	R	FP 533 1NO+1NC	FP 534 1NO+1NC	FP 535 ⁽¹⁾ 1NO+1NC	FP 536 1NO+1NC						
6	L	FP 633 1NO+1NC	FP 634 1NO+1NC	FP 635 ⁽¹⁾ 1NO+1NC	FP 636 1NO+1NC						
7	LO	FP 733 1NO+1NC	FP 734 1NO+1NC	FP 735 ⁽¹⁾ 1NO+1NC	FP 736 1NO+1NC						
9	L	FP 933 2NC	FP 934 2NC	FP 935 ⁽¹⁾ 2NC	FP 936 2NC						
10	L	FP 1033 2NO	FP 1034 2NO	FP 1035 2NO	FP 1036 2NO						
11	R	FP 1133 2NC	FP 1134 2NC	FP 1135 ⁽¹⁾ 2NC	FP 1136 2NC						
12	R	FP 1233 2NO	FP 1234 2NO	FP 1235 2NO	FP 1236 2NO						
13	LV	FP 1333 2NC	FP 1334 2NC	FP 1335 ⁽¹⁾ 2NC	FP 1336 2NC						
14	LS	FP 1433 2NC	FP 1434 2NC	FP 1435 ⁽¹⁾ 2NC	FP 1436 2NC						
15	LS	FP 1533 2NO	FP 1534 2NO	FP 1535 2NO	FP 1536 2NO						
16	LI	FP 1633 2NC	FP 1634 2NC	FP 1635 ⁽¹⁾ 2NC	FP 1636 2NC						
18	LA	FP 1833 1NO+1NC	FP 1834 1NO+1NC	FP 1835 ⁽¹⁾ 1NO+1NC	FP 1836 1NO+1NC						
20	L	FP 2033 1NO+2NC	FP 2034 1NO+2NC	FP 2035 ⁽¹⁾ 1NO+2NC	FP 2036 1NO+2NC						
21	L	FP 2133 3NC	FP 2134 3NC	FP 2135 ⁽¹⁾ 3NC	FP 2136 3NC						
22	L	FP 2233 2NO+1NC	FP 2234 2NO+1NC	FP 2235 ⁽¹⁾ 2NO+1NC	FP 2236 2NO+1NC						
2	R	FP 233 2x(1NO-1NC)	FP 234 2x(1NO-1NC)	FP 235 2x(1NO-1NC)	FP 236 2x(1NO-1NC)						
E1		FP E133 1NO-1NC	FP E134 1NO-1NC	FP E135 1NO-1NC	FP E136 1NO-1NC						
Max speed	1,5 m/s		1 m/s		page 7/3 - type 1	1,5 m/s					
Min. force	0,1 Nm		0,1 Nm		0,1 Nm (0,25 Nm)	0,1 Nm					
Travel diagrams	page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 4	page 7/4 - group 4					

Other rollers available. See page 2/22			Other rollers available. See page 2/22			Porcelain roller			Other rollers available. See page 2/22		
											
5	R	FP 551  1NO+1NC	FP 552  1NO+1NC	FP 553-E11V9  1NO+1NC	FP 556  1NO+1NC						
6	L	FP 651  1NO+1NC	FP 652  1NO+1NC	FP 653-E11V9  1NO+1NC	FP 656  1NO+1NC						
7	LO	FP 751  1NO+1NC	FP 752  1NO+1NC	FP 753-E11V9  1NO+1NC	FP 756  1NO+1NC						
9	L	FP 951  2NC	FP 952  2NC	FP 953-E11V9  2NC	FP 956  2NC						
10	L	FP 1051 2NO	FP 1052 2NO	FP 1053-E11V9 2NO	FP 1056 2NO						
11	R	FP 1151  2NC	FP 1152  2NC	FP 1253-E11V9 2NO	FP 1156  2NC						
12	R	FP 1251 2NO	FP 1252 2NO	FP 1353-E11V9  2NC	FP 1256 2NO						
13	LV	FP 1351  2NC	FP 1352  2NC	FP 1453-E11V9  2NC	FP 1356  2NC						
14	LS	FP 1451  2NC	FP 1452  2NC	FP 1553-E11V9 2NO	FP 1456  2NC						
15	LS	FP 1551 2NO	FP 1552 2NO	FP 1853-E11V9  1NO+1NC	FP 1556 2NO						
16	LI			FP 2053-E11V9  1NO+2NC	FP 1656  2NC						
18	LA	FP 1851  1NO+1NC	FP 1852  1NO+1NC	FP 2153-E11V9  3NC	FP 1856  1NO+1NC						
20	L	FP 2051  1NO+2NC	FP 2052  1NO+2NC	FP 2253-E11V9  2NO+1NC	FP 2056  1NO+2NC						
21	L	FP 2151  3NC	FP 2152  3NC	FP 253-E11 2x(1NO-1NC)	FP 2156  3NC						
22	L	FP 2251  2NO+1NC	FP 2252  2NO+1NC	FP E153-E11V9 1NO-1NC	FP 2256  2NO+1NC						
2	R	FP 251 2x(1NO-1NC)	FP 252 2x(1NO-1NC)		FP 256 2x(1NO-1NC)						
E1		FP E151 1NO-1NC	FP E152 1NO-1NC		FP E156 1NO-1NC						
Max speed	page 7/3 - type 1		page 7/3 - type 1		0,5 m/s	page 7/3 - type 1					
Min. force	0,06 Nm (0,25 Nm )		0,06 Nm (0,25 Nm )		0,0. Nm (0,25 Nm )	0,1 Nm (0,25 Nm )					
Travel diagrams	page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 5	page 7/4 - group 4					

Accessories See page 6/1

⁽¹⁾ Positive opening only with lever adjusted on the max. See page 2/21.

Contacts type:

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

Contact blocks

		Other rollers available. See page 2/22	With stainless steel rollers on request	With stainless steel rollers on request	Rope switches for signalling
5	R	FP 557 1NO+1NC	FP 541 1NO+1NC	FP 542 1NO+1NC	FP 576 1NO+1NC
6	L	FP 657 1NO+1NC	Bistable switch with single track lyra lever S = mechanical snap point positive opening with 21-22 contact only	Bistable switch with double track lyra lever S = mechanical snap point positive opening with 21-22 contact only	FP 676 1NO+1NC
7	LO	FP 757 1NO+1NC			FP 776 1NO+1NC
9	L	FP 957 2NC			FP 976 2NO
10	L	FP 1057 2NO			FP 1076 2NC
11	R	FP 1157 2NC			FP 1176 2NO
12	R	FP 1257 2NO			FP 1276 2NC
13	LV	FP 1357 2NC			FP 1376 2NO
14	LS	FP 1457 2NC			FP 1476 2NO
15	LS	FP 1557 2NO			FP 1576 2NC
16	LI	FP 1657 2NC			FP 1876 1NO+1NC
18	LA	FP 1857 1NO+1NC			FP 2076 2NO+1NC
20	L	FP 2057 1NO+2NC			FP 2176 3NO
21	L	FP 2157 3NC			FP 2276 1NO+2NC
22	L	FP 2257 2NO+1NC			FP 276 2x(1NO-1NC)
2	R	FP 257 2x(1NO-1NC)			
E1		FP E157 1NO-1NC			
Max speed		page 7/3 - type 1	0,5 m/s with 30° cam	0,5 m/s with 30° cam	0,5 m/s
Min. force		0,1 Nm (0,25 Nm)	0,21 Nm (0,36 Nm)	0,21 Nm (0,36 Nm)	initial 20 N - final 40 N
Travel diagrams		page 7/4 - group 4			page 7/4 - group 6

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

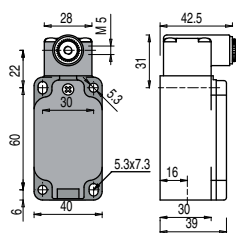
Position switches with revolving lever without actuator

Contacts type:

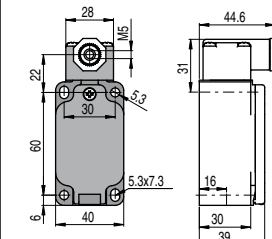
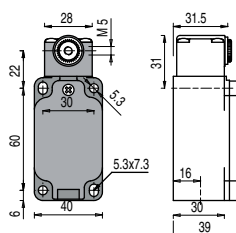
- R** = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
 = electronic PNP

Contact blocks

Regular head

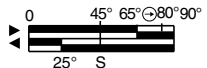


Compact head



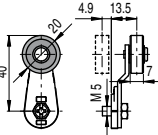
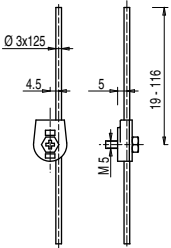
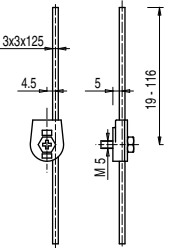
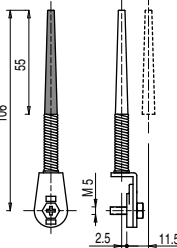
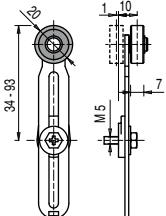
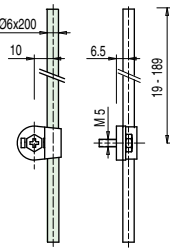
IMPORTANT

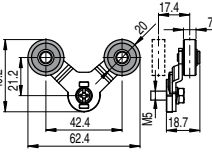
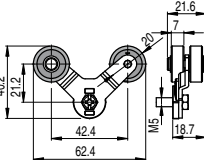
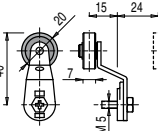
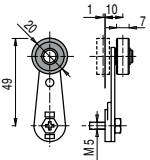
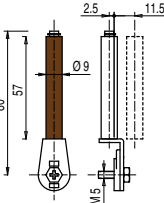
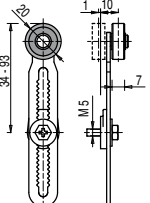
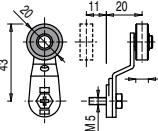
For safety applications: join only switches and actuators marked with symbol . For more information about safety applications see page 7/1.

5	R	FP 538	 1NO+1NC	FP 558	 1NO+1NC	FP 540	 1NO+1NC
6	L	FP 638	 1NO+1NC	FP 658	 1NO+1NC	Bistable switch  S = mechanical snap point positive opening with 21-22 contact only	
7	LO	FP 738	 1NO+1NC	FP 758	 1NO+1NC		
9	L	FP 938	 2NC	FP 958	 2NC		
10	L	FP 1038	2NO	FP 1058	2NO		
11	R	FP 1138	 2NC	FP 1158	 2NC		
12	R	FP 1238	2NO	FP 1258	2NO		
13	LV	FP 1338	 2NC	FP 1358	 2NC		
14	LS	FP 1438	 2NC	FP 1458	 2NC		
15	LS	FP 1538	2NO	FP 1558	2NO		
16	LI	FP 1638	 2NC				
18	LA	FP 1838	 1NO+1NC	FP 1858	 1NO+1NC		
20	L	FP 2038	 1NO+2NC	FP 2058	 1NO+2NC		
21	L	FP 2138	 3NC	FP 2158	 3NC		
22	L	FP 2238	 2NO+1NC	FP 2258	 2NO+1NC		
2	R	FP 238	2x(1NO-1NC)	FP 258	2x(1NO-1NC)		
E1		FP E138	1NO+1NC	FP E158	1NO+1NC		
Min. force		0,1 Nm (0,25 Nm )		0,06 Nm (0,25 Nm )		0,5 m/s with 30° cam	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4		0,21 Nm (0,36 Nm )	

Loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Polymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod actuator	Adjustable actuator with polymer roller	Adjustable fiber glass rod
					
VF L31 ➡	VF L32 (3)	VF L33 (3)	VF L34	VF L35 ➡ (1) (3)	VF L36 (3)

Single track lyra actuator	Double tracks lyra actuator	Polymer roller Ø 20 mm	Polymer roller Ø 20 mm	Porcelain roller	Adjustable safety actua- tor with polymer roller	Polymer roller Ø 20 mm
						
VF L41 ➡	VF L42 ➡	VF L51 ➡	VF L52 ➡	VF L53 ➡ (2)	VF L56 ➡ (3)	VF L57 ➡

- Only orders for multiple quantities of the packs are accepted.

- ⁽¹⁾ Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.

- ⁽²⁾ The position switch obtained by assembling the switch FP •58 (e.g. FP 558, FP 658) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FP •53-E11V9 (e.g. FP 553-E11V9, FP 653-E11V9...).

- ⁽³⁾ If it is installed with switch FP •58 (e.g. FP 558, FP 658...), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.

- ⁽⁴⁾ The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.

Accessories See page 6/1

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

Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Ø 20 mm stainless steel rollers

VF L31-1 (1)	VF L35-1 (1) (3)	VF L51-1 (1)	VF L52-1 (1)	VF L56-1 (3)	VF L57-1 (1)

Ø 35 mm polymer rollers

VF L31-2 (4)	VF L35-2 (1) (3)	VF L51-2 (4)	VF L52-2 (1)	VF L56-2 (3)	VF L57-2 (1)

Ø 40 mm rubber rollers

VF L31-R5 (4)	VF L35-R5 (1) (3)	VF L51-R5 (4)	VF L52-R5 (1)	VF L56-R5 (3)	VF L57-R5 (4)

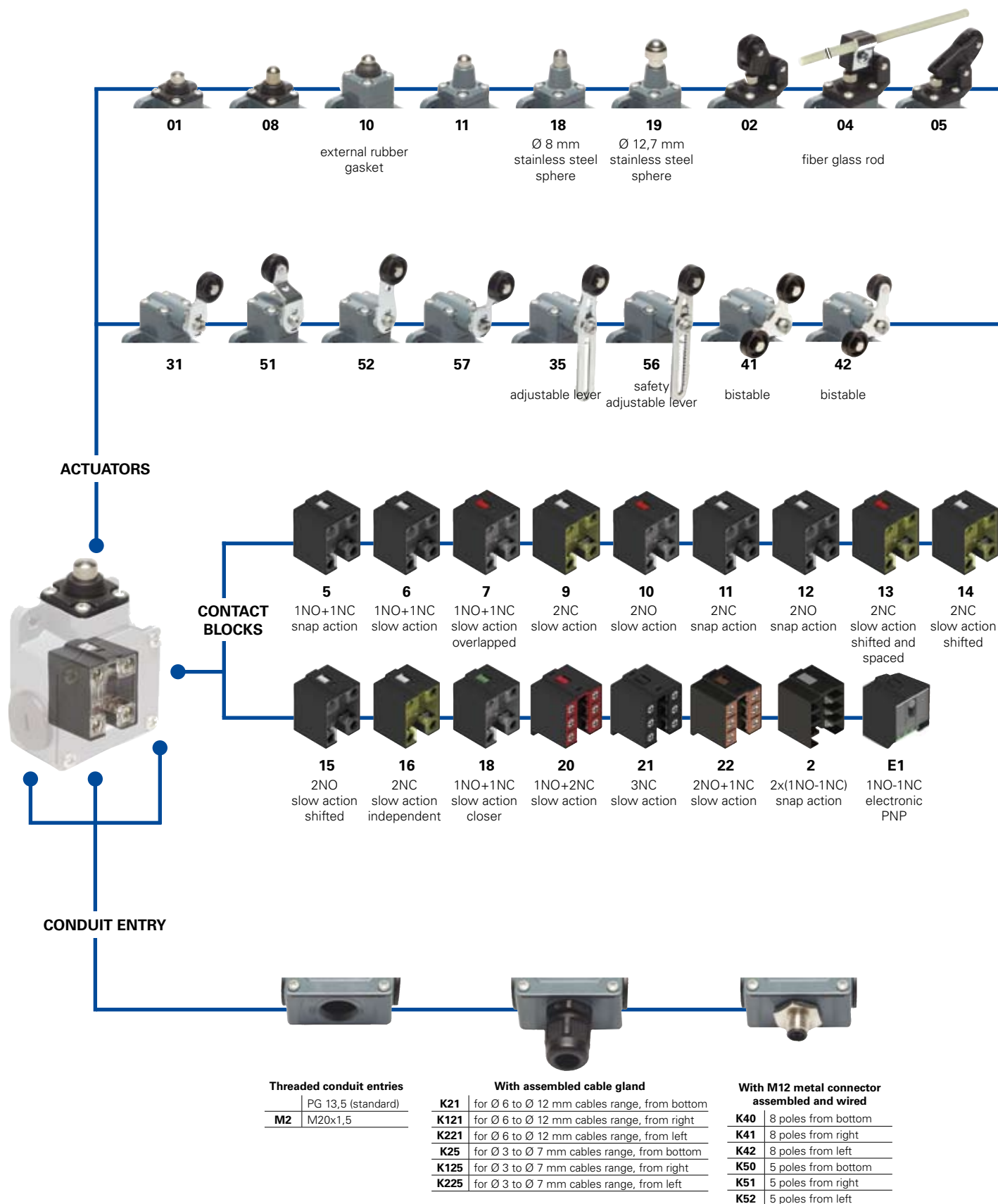
Ø 50 mm rubber rollers

VF L31-3 (4)	VF L35-3 (1) (3)	VF L51-3 (4)	VF L52-3 (4)	VF L56-3 (3)	VF L57-3 (4)

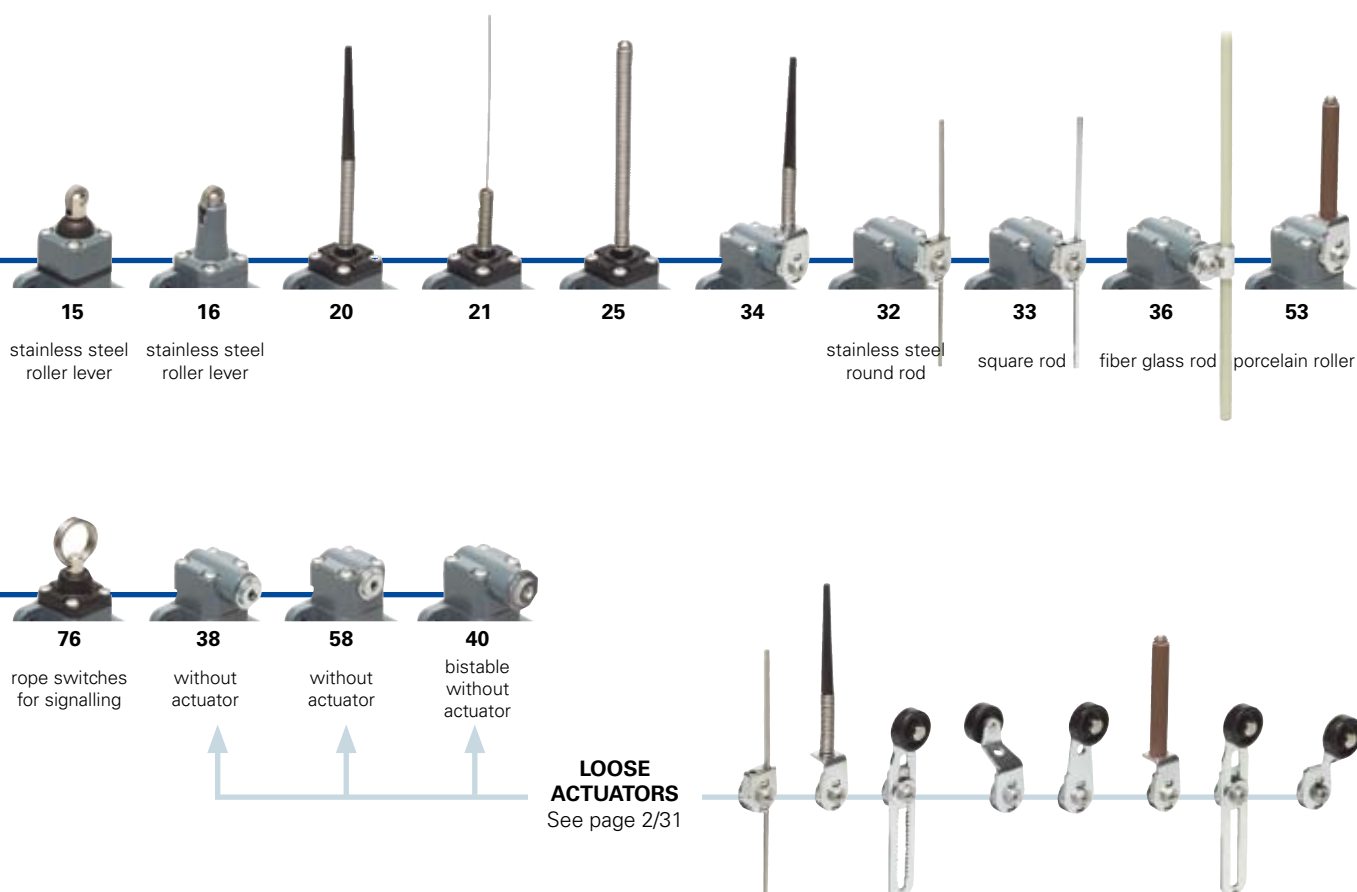
Ø 50 mm overhanging rubber rollers

VF L35-4 (1) (3)	VF L56-4 (3)

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		options	
FL 502		-1GM2K50	
Housing		Preinstalled cable gland or connectors	
FL	metal housing, three conduit entries		no cable gland or connector (standard)
Contact blocks		K21	assembled cable gland (see conduit entry page 2/23)
5	1NO+1NC, snap action	...	...
6	1NO+1NC, slow action	K50	5 poles M12 assembled metal connector (see conduit entry page 2/23)
7	1NO+1NC, slow action overlapped	...	...
...	...	For the complete list of all combinations, please contact our technical office.	
Actuators		Threaded conduit entries	
01	short plunger		PG 13,5 (standard)
02	roller lever	M2	M20x1,5
05	offset roller lever	Contacts type	
...	...		silver contacts (standard)
Suffix		G	silver contacts gold plated 1 µm (contact block 2 excluded)
	no suffix (standard)		
1	with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57, 41, 42		
2	with Ø 35 mm polymer roller (see special loose actuators on page 2/32)		
3	with Ø 50 mm rubber roller (see special loose actuators on page 2/32)		
4	with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/32)		



Main data

- Metal housing, three conduit entries
- Protection degree IP67
- 17 contact blocks available
- 28 actuators available
- M12 assembled connector versions
- Silver contacts gold plated versions

Technical data

Housing

Metal housing, coated with baked epoxy powder
Three conduit entries
Protection degree:

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

General data

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: 20 million operations cycles¹
Assembling position: any
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, 10, 11, 12, 13, 14, 15, 16, 18:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 2,5 mm ²	(2 x AWG 14)
Contact block 2:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 1,5 mm ²	(2 x AWG 16)

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.

Markings and quality marks:



Approval IMQ: EG605
Approval UL: E131787
Approval CCC: 2007010305230000
Approval ECU: 1010151
Approval GOST: POCC ITAB24.B04512

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.

Installation for safety applications:

Use only switches marked with the symbol The safety circuit must always be connected with the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in the **standard EN 60947-5-1, encl. K, par. 2**. The switch must be actuated with **at least up to the positive opening travel** shown in the travels diagrams on page 7/4. The switch must be actuated **at least with the positive opening force**, shown in brackets, underneath each article, near the value of the min. force.

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
		400Vac500Vdc(contact blocks 2, 11, 12, 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 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
			I _e (A)	4	4	4
			Direct current: DC13			
with 8 poles M12 connector	Thermal current (I _{th}):	4 A	U _e (V)	24	125	250
	Rated insulation voltage (U _i):	250 Vac 300 Vdc	I _e (A)	4	1,1	0,4
	Protection against short circuits:	fuse 4 A 500 V type gG	Alternate current: AC15 (50...60 Hz)			
	Pollution degree:	3	U _e (V)	24		
			I _e (A)	2		

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 2, 11, 12, 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: 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, 13, 14, 16, 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 except 2 and 3 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).

For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1,4 Nm).

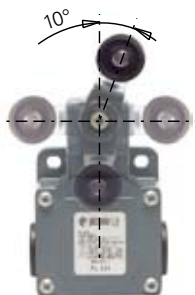
In conformity with standard: UL 508

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

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement

transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



Overturning levers

It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling.

In this way it is possible to obtain two different work plans of the lever.



Rotating heads

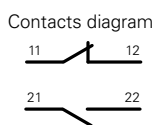
In all switches, it is possible to rotate the head in 90° steps.



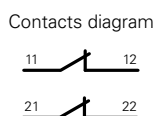
Working operation of contact block 16 with independent contacts

The contact block 16 has two NC contacts, **both with positive opening** activated independently according to the lever turning direction.

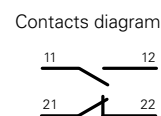
Lever turned to left



Lever not turned

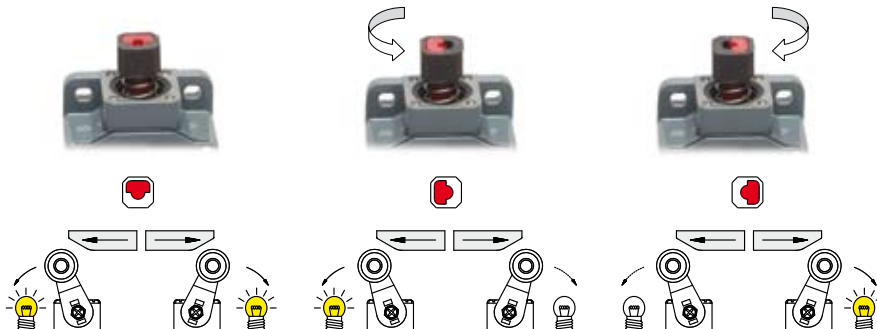


Lever turned to right



Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston (contact block 16 excluded).

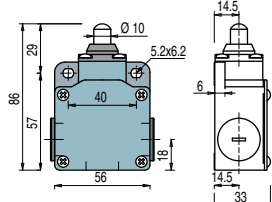
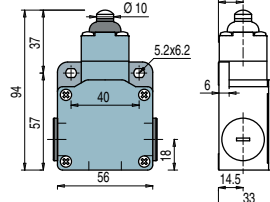
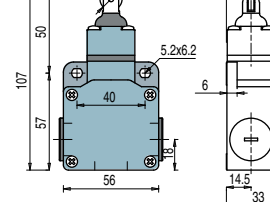


Contacts type:

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

Contact blocks

5	R	FL 501	➔ 1NO+1NC	FL 502	➔ 1NO+1NC	FL 504	1NO+1NC	FL 505	➔ 1NO+1NC
6	L	FL 601	➔ 1NO+1NC	FL 602	➔ 1NO+1NC	FL 604	1NO+1NC	FL 605	➔ 1NO+1NC
7	LO	FL 701	➔ 1NO+1NC	FL 702	➔ 1NO+1NC	FL 704	1NO+1NC	FL 705	➔ 1NO+1NC
9	L	FL 901	➔ 2NC	FL 902	➔ 2NC	FL 904	2NC	FL 905	➔ 2NC
10	L	FL 1001	2NO	FL 1002	2NO	FL 1004	2NO	FL 1005	2NO
11	R	FL 1101	➔ 2NC	FL 1102	➔ 2NC	FL 1104	2NC	FL 1105	➔ 2NC
12	R	FL 1201	2NO	FL 1202	2NO	FL 1204	2NO	FL 1205	2NO
13	LV	FL 1301	➔ 2NC	FL 1302	➔ 2NC	FL 1304	2NC	FL 1305	➔ 2NC
14	LS	FL 1401	➔ 2NC	FL 1402	➔ 2NC	FL 1404	2NC	FL 1405	➔ 2NC
15	LS	FL 1501	2NO	FL 1502	2NO	FL 1504	2NO	FL 1505	2NO
18	LA	FL 1801	➔ 1NO+1NC	FL 1802	➔ 1NO+1NC	FL 1804	1NO+1NC	FL 1805	➔ 1NO+1NC
20	L	FL 2001	➔ 1NO+2NC	FL 2002	➔ 1NO+2NC	FL 2004	1NO+2NC	FL 2005	➔ 1NO+2NC
21	L	FL 2101	➔ 3NC	FL 2102	➔ 3NC	FL 2104	3NC	FL 2105	➔ 3NC
22	L	FL 2201	➔ 2NO+1NC	FL 2202	➔ 2NO+1NC	FL 2204	2NO+1NC	FL 2205	➔ 2NO+1NC
2	R	FL 201	2x(1NO-1NC)	FL 202	2x(1NO-1NC)	FL 204	2x(1NO-1NC)	FL 205	2x(1NO-1NC)
E1		FL E101	1NO-1NC	FL E102	1NO-1NC	FL E104	1NO-1NC	FL E105	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 3		0,5 m/s		page 7/3 - type 3	
Min. force		8 N (25 N ➔)		6 N (25 N ➔)		0,17 Nm		6 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 2		page 7/4 - group 1		page 7/4 - group 2	

				With external rubber gasket				With external rubber gasket	
Contact blocks									
5	R	FL 508	➔ 1NO+1NC	FL 510	➔ 1NO+1NC	FL 511	➔ 1NO+1NC	FL 515	➔ 1NO+1NC
6	L	FL 608	➔ 1NO+1NC	FL 610	➔ 1NO+1NC	FL 611	➔ 1NO+1NC	FL 615	➔ 1NO+1NC
7	LO	FL 708	➔ 1NO+1NC	FL 710	➔ 1NO+1NC	FL 711	➔ 1NO+1NC	FL 715	➔ 1NO+1NC
9	L	FL 908	➔ 2NC	FL 910	➔ 2NC	FL 911	➔ 2NC	FL 915	➔ 2NC
10	L	FL 1008	2NO	FL 1010	2NO	FL 1011	2NO	FL 1015	2NO
11	R	FL 1108	➔ 2NC	FL 1110	➔ 2NC	FL 1111	➔ 2NC	FL 1115	➔ 2NC
12	R	FL 1208	2NO	FL 1210	2NO	FL 1211	2NO	FL 1215	2NO
13	LV	FL 1308	➔ 2NC	FL 1310	➔ 2NC	FL 1311	➔ 2NC	FL 1315	➔ 2NC
14	LS	FL 1408	➔ 2NC	FL 1410	➔ 2NC	FL 1411	➔ 2NC	FL 1415	➔ 2NC
15	LS	FL 1508	2NO	FL 1510	2NO	FL 1511	2NO	FL 1515	2NO
18	LA	FL 1808	➔ 1NO+1NC	FL 1810	➔ 1NO+1NC	FL 1811	➔ 1NO+1NC	FL 1815	➔ 1NO+1NC
20	L	FL 2008	➔ 1NO+2NC	FL 2010	➔ 1NO+2NC	FL 2011	➔ 1NO+2NC	FL 2015	➔ 1NO+2NC
21	L	FL 2108	➔ 3NC	FL 2110	➔ 3NC	FL 2111	➔ 3NC	FL 2115	➔ 3NC
22	L	FL 2208	➔ 2NO+1NC	FL 2210	➔ 2NO+1NC	FL 2211	➔ 2NO+1NC	FL 2215	➔ 2NO+1NC
2	R	FL 208	2x(1NO-1NC)	FL 210	2x(1NO-1NC)	FL 211	2x(1NO-1NC)	FL 215	2x(1NO-1NC)
E1		FL E108	1NO-1NC	FL E110	1NO-1NC	FL E111	1NO-1NC	FL E115	1NO-1NC
Max speed		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 2	
Min. force		8 N (25 N ➔)		11 N (25 N ➔)		8 N (25 N ➔)		11 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1	

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
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
 = electronic PNP

Contact blocks

		Ø 8 mm stainless steel sphere	Ø 12,7 mm stainless steel sphere	With external rubber gasket
5	R	FL 516 → 1NO+1NC	FL 518 → 1NO+1NC	FL 519 → 1NO+1NC
6	L	FL 616 → 1NO+1NC	FL 618 → 1NO+1NC	FL 619 → 1NO+1NC
7	LO	FL 716 → 1NO+1NC	FL 718 → 1NO+1NC	FL 719 → 1NO+1NC
9	L	FL 916 → 2NC	FL 918 → 2NC	FL 919 → 2NC
10	L	FL 1016 2NO	FL 1018 2NO	FL 1019 2NO
11	R	FL 1116 → 2NC	FL 1118 → 2NC	FL 1119 → 2NC
12	R	FL 1216 2NO	FL 1218 2NO	FL 1219 2NO
13	LV	FL 1316 → 2NC	FL 1318 → 2NC	FL 1319 → 2NC
14	LS	FL 1416 → 2NC	FL 1418 → 2NC	FL 1419 → 2NC
15	LS	FL 1516 2NO	FL 1518 2NO	FL 1519 2NO
18	LA	FL 1816 → 1NO+1NC	FL 1818 → 1NO+1NC	FL 1819 → 1NO+1NC
20	L	FL 2016 → 1NO+2NC	FL 2018 → 1NO+2NC	FL 2019 → 1NO+2NC
21	L	FL 2116 → 3NC	FL 2118 → 3NC	FL 2119 → 3NC
22	L	FL 2216 → 2NO+1NC	FL 2218 → 2NO+1NC	FL 2219 → 2NO+1NC
2	R	FL 216 2x(1NO-1NC)	FL 218 2x(1NO-1NC)	FL 219 2x(1NO-1NC)
E1		FL E116 1NO-1NC	FL E118 1NO-1NC	FL E119 1NO-1NC
Max speed		page 7/3 - type 2	page 7/3 - type 4	page 7/3 - type 4
Min. force		8 N (25 N →)	8 N (25 N →)	8 N (25 N →)
Travel diagrams		page 7/4 - group 1	page 7/4 - group 1	page 7/4 - group 1

Contact blocks

	With external rubber gasket	With external rubber gasket	Other rollers available. See page 2/32	Ø 3 mm stainless steel round rod
5	R	FL 521 1NO+1NC	FL 525 1NO+1NC	FL 531 → 1NO+1NC
6	L			FL 631 → 1NO+1NC
7	LO			FL 731 → 1NO+1NC
9	L			FL 931 → 2NC
10	L	FL 1021 2NO	FL 1025 2NO	FL 1031 2NO
11	R			FL 1131 → 2NC
12	R			FL 1231 2NO
13	LV			FL 1331 → 2NC
14	LS			FL 1431 → 2NC
15	LS			FL 1531 2NO
16	LI			FL 1631 → 2NC
18	LA	FL 1821 1NO+1NC	FL 1825 1NO+1NC	FL 1831 → 1NO+1NC
20	L	FL 2021 1NO+2NC	FL 2025 1NO+2NC	FL 2031 → 1NO+2NC
21	L	FL 2121 3NC	FL 2125 3NC	FL 2131 → 3NC
22	L	FL 2221 2NO+1NC	FL 2225 2NO+1NC	FL 2231 → 2NO+1NC
2	R	FL 221 2x(1NO-1NC)	FL 225 2x(1NO-1NC)	FL 231 2x(1NO-1NC)
E1		FL E121 1NO-1NC	FL E125 1NO-1NC	FL E131 1NO-1NC
Max speed		1 m/s	1 m/s	page 7/3 - type 1
Min. force		0,08 Nm	0,14 Nm	0,1 Nm (0,25 Nm →)
Travel diagrams		page 7/4 - group 3	page 7/4 - group 3	page 7/4 - group 4

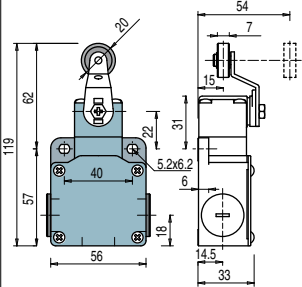
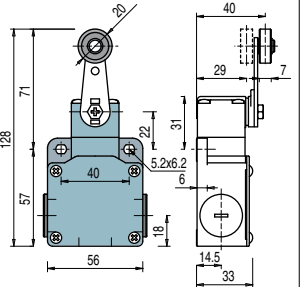
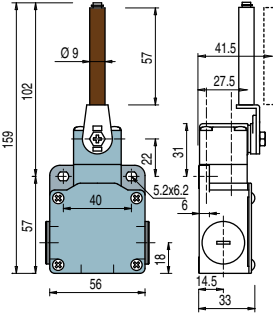
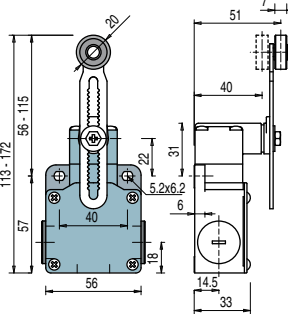
Items with code on the green background are available in stock

Contacts type:

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

Contact blocks

5	R	FL 533	1NO+1NC	FL 534	1NO+1NC	FL 535	(1) 1NO+1NC	FL 536	1NO+1NC
6	L	FL 633	1NO+1NC	FL 634	1NO+1NC	FL 635	(1) 1NO+1NC	FL 636	1NO+1NC
7	LO	FL 733	1NO+1NC	FL 734	1NO+1NC	FL 735	(1) 1NO+1NC	FL 736	1NO+1NC
9	L	FL 933	2NC	FL 934	2NC	FL 935	(1) 2NC	FL 936	2NC
10	L	FL 1033	2NO	FL 1034	2NO	FL 1035	2NO	FL 1036	2NO
11	R	FL 1133	2NC	FL 1134	2NC	FL 1135	(1) 2NC	FL 1136	2NC
12	R	FL 1233	2NO	FL 1234	2NO	FL 1235	2NO	FL 1236	2NO
13	LV	FL 1333	2NC	FL 1334	2NC	FL 1335	(1) 2NC	FL 1336	2NC
14	LS	FL 1433	2NC	FL 1434	2NC	FL 1435	(1) 2NC	FL 1436	2NC
15	LS	FL 1533	2NO	FL 1534	2NO	FL 1535	2NO	FL 1536	2NO
16	LI	FL 1633	2NC	FL 1634	2NC	FL 1635	(1) 2NC	FL 1636	2NC
18	LA	FL 1833	1NO+1NC	FL 1834	1NO+1NC	FL 1835	(1) 1NO+1NC	FL 1836	1NO+1NC
20	L	FL 2033	1NO+2NC	FL 2034	1NO+2NC	FL 2035	(1) 1NO+2NC	FL 2036	1NO+2NC
21	L	FL 2133	3NC	FL 2134	3NC	FL 2135	(1) 3NC	FL 2136	3NC
22	L	FL 2233	2NO+1NC	FL 2234	2NO+1NC	FL 2235	(1) 2NO+1NC	FL 2236	2NO+1NC
2	R	FL 233	2x(1NO-1NC)	FL 234	2x(1NO-1NC)	FL 235	2x(1NO-1NC)	FL 236	2x(1NO-1NC)
E1		FL E133	1NO-1NC	FL E134	1NO-1NC	FL E135	1NO-1NC	FL E136	1NO-1NC
Max speed		1,5 m/s		1 m/s		page 7/3 - type 1		1,5 m/s	
Min. force		0,1 Nm		0,1 Nm		0,1 Nm (0,25 Nm)		0,1 Nm	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 4		page 7/4 - group 4	

Other rollers available. See page 2/32			Other rollers available. See page 2/32			Porcelain roller			Other rollers available. See page 2/32		
											
Contact blocks											
5	R	FL 551	➔ 1NO+1NC	FL 552	➔ 1NO+1NC	FL 553-E11V9	➔ 1NO+1NC	FL 556	➔ 1NO+1NC		
6	L	FL 651	➔ 1NO+1NC	FL 652	➔ 1NO+1NC	FL 653-E11V9	➔ 1NO+1NC	FL 656	➔ 1NO+1NC		
7	LO	FL 751	➔ 1NO+1NC	FL 752	➔ 1NO+1NC	FL 753-E11V9	➔ 1NO+1NC	FL 756	➔ 1NO+1NC		
9	L	FL 951	➔ 2NC	FL 952	➔ 2NC	FL 953-E11V9	➔ 2NC	FL 956	➔ 2NC		
10	L	FL 1051	2NO	FL 1052	2NO	FL 1053-E11V9	2NO	FL 1056	2NO		
11	R	FL 1151	➔ 2NC	FL 1152	➔ 2NC			FL 1156	➔ 2NC		
12	R	FL 1251	2NO	FL 1252	2NO	FL 1253-E11V9	2NO	FL 1256	2NO		
13	LV	FL 1351	➔ 2NC	FL 1352	➔ 2NC	FL 1353-E11V9	➔ 2NC	FL 1356	➔ 2NC		
14	LS	FL 1451	➔ 2NC	FL 1452	➔ 2NC	FL 1453-E11V9	➔ 2NC	FL 1456	➔ 2NC		
15	LS	FL 1551	2NO	FL 1552	2NO	FL 1553-E11V9	2NO	FL 1556	2NO		
16	LI							FL 1656	➔ 2NC		
18	LA	FL 1851	➔ 1NO+1NC	FL 1852	➔ 1NO+1NC	FL 1853-E11V9	➔ 1NO+1NC	FL 1856	➔ 1NO+1NC		
20	L	FL 2051	➔ 1NO+2NC	FL 2052	➔ 1NO+2NC	FL 2053-E11V9	➔ 1NO+2NC	FL 2056	➔ 1NO+2NC		
21	L	FL 2151	➔ 3NC	FL 2152	➔ 3NC	FL 2153-E11V9	➔ 3NC	FL 2156	➔ 3NC		
22	L	FL 2251	➔ 2NO+1NC	FL 2252	➔ 2NO+1NC	FL 2253-E11V9	➔ 2NO+1NC	FL 2256	➔ 2NO+1NC		
2	R	FL 251	2x(1NO-1NC)	FL 252	2x(1NO-1NC)	FL 253-E11	2x(1NO-1NC)	FL 256	2x(1NO-1NC)		
E1		FL E151	1NO-1NC	FL E152	1NO-1NC	FL E153-E11V9	1NO-1NC	FL E156	1NO-1NC		
Max speed			page 7/3 - type 1			0,5 m/s			page 7/3 - type 1		
Min. force			0,06 Nm (0,25 Nm ➔)			0,03 Nm (0,25 Nm ➔)			0,1 Nm (0,25 Nm ➔)		
Travel diagrams			page 7/4 - group 4			page 7/4 - group 5			page 7/4 - group 4		

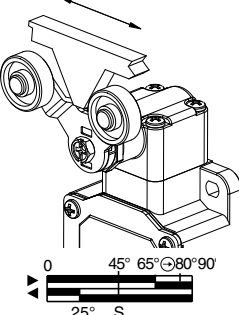
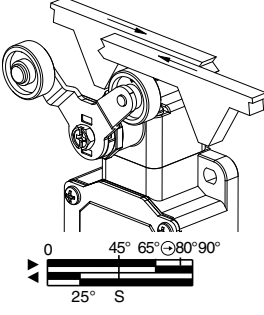
Accessories See page 6/1

⁽¹⁾ Positive opening only with lever adjusted on the max. See page 2/31.

Contacts type:

- R** = snap action
- L** = slow action
- LO** = slow action overlapped
- LS** = slow action shifted
- LV** = slow action shifted and spaced
- LI** = slow action independent
- LA** = slow action closer
- A** = electronic PNP

Contact blocks

		Other rollers available. See page 2/32	With stainless steel rollers on request	With stainless steel rollers on request	Rope switches for signalling
5	R	FL 557 → 1NO+1NC	FL 541 → 1NO+1NC	FL 542 → 1NO+1NC	FL 576 1NO+1NC
6	L	FL 657 → 1NO+1NC	Bistable switch with single track lyra lever	Bistable switch with double track lyra lever	FL 676 1NO+1NC
7	LO	FL 757 → 1NO+1NC			FL 776 1NO+1NC
9	L	FL 957 → 2NC			FL 976 2NO
10	L	FL 1057 2NO			FL 1076 2NC
11	R	FL 1157 → 2NC			FL 1176 2NO
12	R	FL 1257 2NO			FL 1276 2NC
13	LV	FL 1357 → 2NC			FL 1376 2NO
14	LS	FL 1457 → 2NC			FL 1476 2NO
15	LS	FL 1557 2NO			FL 1576 2NC
16	LI	FL 1657 → 2NC			
18	LA	FL 1857 → 1NO+1NC			FL 1876 1NO+1NC
20	L	FL 2057 → 1NO+2NC			FL 2076 2NO+1NC
21	L	FL 2157 → 3NC			FL 2176 3NO
22	L	FL 2257 → 2NO+1NC			FL 2276 1NO+2NC
2	R	FL 257 2x(1NO-1NC)			FL 276 2x(1NO-1NC)
E1	A	FL E157 1NO-1NC			
Max speed		page 7/3 - type 1	0,5 m/s with 30° cam	0,5 m/s with 30° cam	0,5 m/s
Min. force		0,1 Nm (0,25 Nm →)	0,21 Nm (0,36 Nm →)	0,21 Nm (0,36 Nm →)	initial 20 N - final 40 N
Travel diagrams		page 7/4 - group 4			page 7/4 - group 6

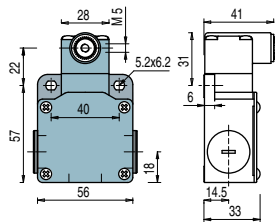
Position switches with revolving lever without actuator

Contacts type:

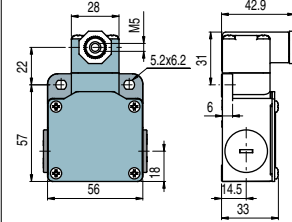
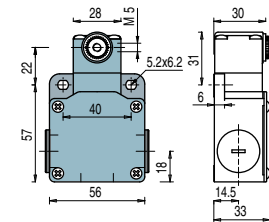
- R** = snap action
L = slow action
LO = slow action overlapped
LS = slow action shifted
LV = slow action shifted and spaced
LI = slow action independent
LA = slow action closer
 = electronic PNP

Contact blocks

Regular head

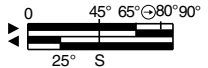


Compact head



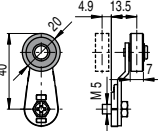
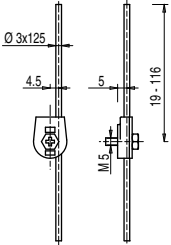
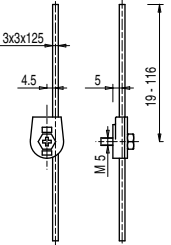
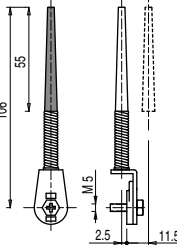
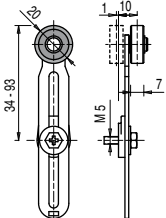
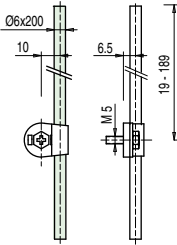
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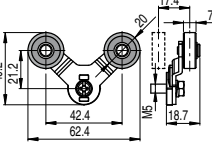
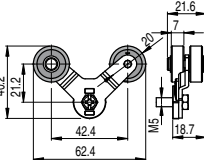
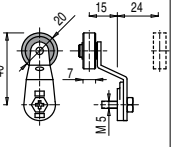
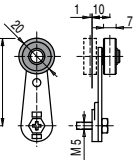
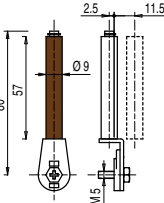
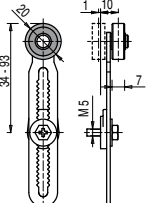
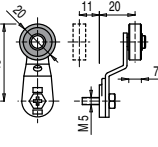
For safety applications: join only switches and actuators marked with symbol . For more information about safety applications see page 7/1.

5	R	FL 538	 1NO+1NC	FL 558	 1NO+1NC	FL 540	 1NO+1NC
6	L	FL 638	 1NO+1NC	FL 658	 1NO+1NC	Bistable switch  S = mechanical snap point positive opening with 21-22 contact only	
7	LO	FL 738	 1NO+1NC	FL 758	 1NO+1NC		
9	L	FL 938	 2NC	FL 958	 2NC		
10	L	FL 1038	2NO	FL 1058	2NO		
11	R	FL 1138	 2NC	FL 1158	 2NC		
12	R	FL 1238	2NO	FL 1258	2NO		
13	LV	FL 1338	 2NC	FL 1358	 2NC		
14	LS	FL 1438	 2NC	FL 1458	 2NC		
15	LS	FL 1538	2NO	FL 1558	2NO		
16	LI	FL 1638	 2NC				
18	LA	FL 1838	 1NO+1NC	FL 1858	 1NO+1NC		
20	L	FL 2038	 1NO+2NC	FL 2058	 1NO+2NC		
21	L	FL 2138	 3NC	FL 2158	 3NC		
22	L	FL 2238	 2NO+1NC	FL 2258	 2NO+1NC		
2	R	FL 238	2x(1NO-1NC)	FL 258	2x(1NO-1NC)		
E1		FL E138	1NO-1NC	FL E158	1NO-1NC		
Min. force		0,1 Nm (0,25 Nm )		0,06 Nm (0,25 Nm )			
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4		0,5 m/s with 30° cam 0,21 Nm (0,36 Nm )	

Loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Polymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod actuator	Adjustable actuator with polymer roller	Adjustable fiber glass rod
					
VF L31 →	VF L32 (3)	VF L33 (3)	VF L34	VF L35 → (1) (3)	VF L36 (3)

Single track lyra actuator	Double tracks lyra actuator	Polymer roller Ø 20 mm	Polymer roller Ø 20 mm	Porcelain roller	Adjustable safety actua- tor with polymer roller	Polymer roller Ø 20 mm
						
VF L41 →	VF L42 →	VF L51 →	VF L52 →	VF L53 → (2)	VF L56 → (3)	VF L57 →

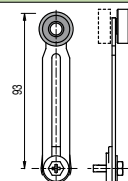
- Only orders for multiple quantities of the packs are accepted.

- ⁽¹⁾ Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.

- ⁽²⁾ The position switch obtained by assembling the switch FL •58 (e.g. FL 558, FL 658) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FL •53-E11V9 (e.g. FL 553-E11V9, FL 653-E11V9...).

- ⁽³⁾ If it is installed with switch FL •58 (e.g. FL 558, FL 658...), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.

- ⁽⁴⁾ The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.



Accessories See page 6/1

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

Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Ø 20 mm stainless steel rollers

VF L31-1 (1)	VF L35-1 (1) (3)	VF L51-1 (1)	VF L52-1 (1)	VF L56-1 (3)	VF L57-1 (1)

Ø 35 mm polymer rollers

VF L31-2 (4)	VF L35-2 (1) (3)	VF L51-2 (4)	VF L52-2 (1)	VF L56-2 (3)	VF L57-2 (1)

Ø 40 mm rubber rollers

VF L31-R5 (4)	VF L35-R5 (1) (3)	VF L51-R5 (4)	VF L52-R5 (1)	VF L56-R5 (3)	VF L57-R5 (4)

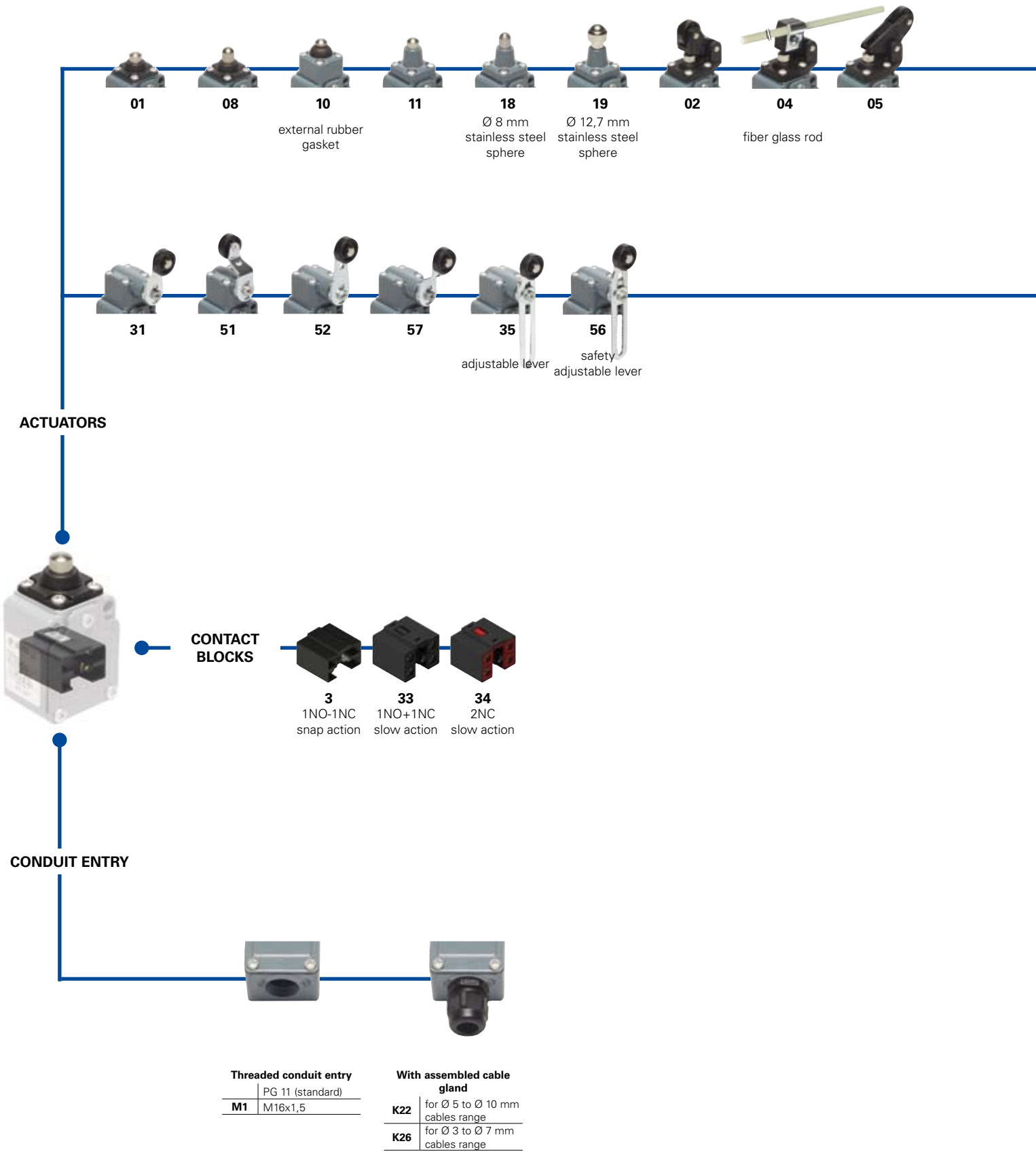
Ø 50 mm rubber rollers

VF L31-3 (4)	VF L35-3 (1) (3)	VF L51-3 (4)	VF L52-3 (4)	VF L56-3 (3)	VF L57-3 (4)

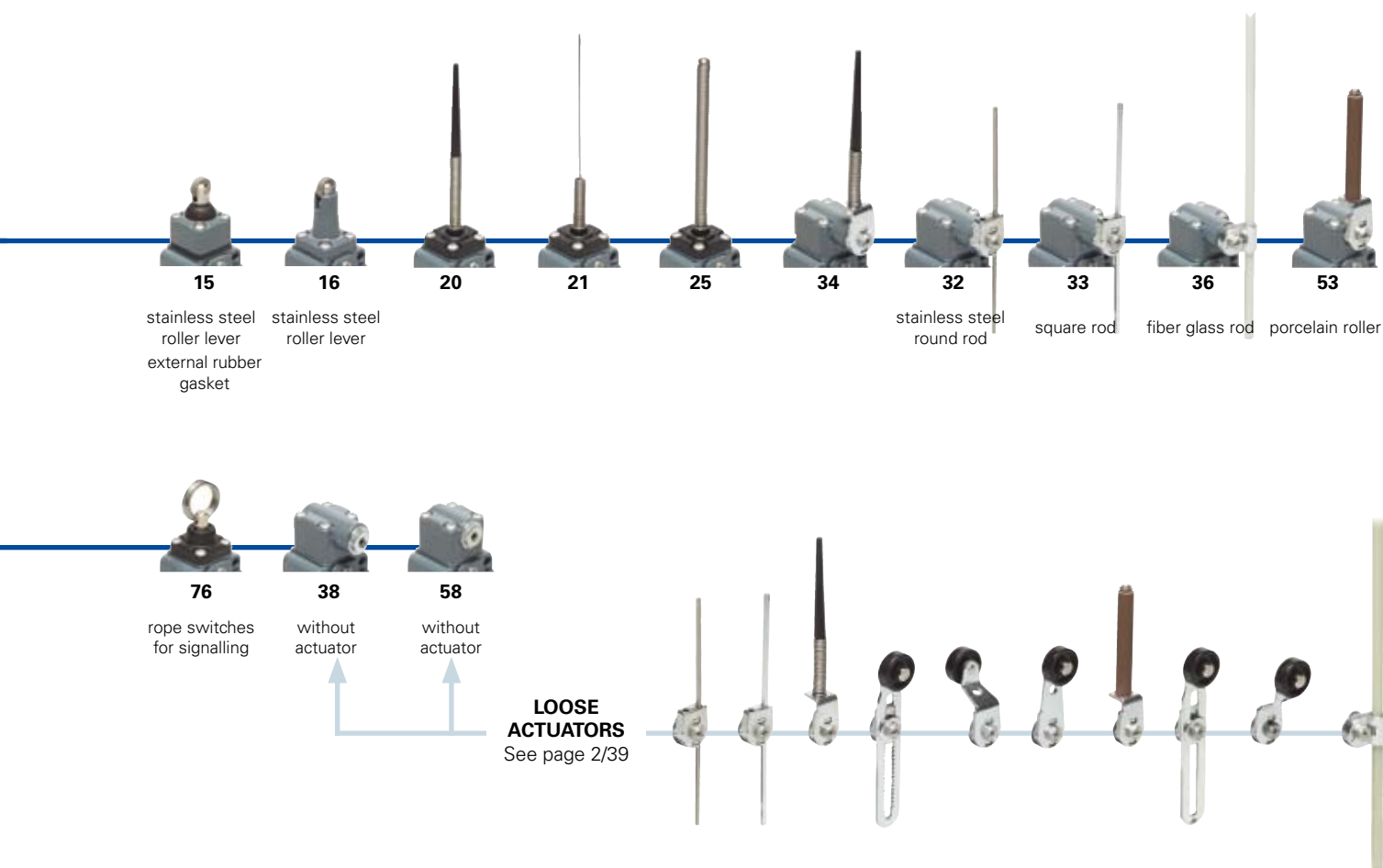
Ø 50 mm overhanging rubber rollers

VF L35-4 (1) (3)	VF L56-4 (3)

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		options	
FC 302		-1GM1K22	
Housing		Preinstalled cable gland	
FC metal housing, one conduit entry			no cable gland (standard)
Contact blocks		K22	assembled cable gland (see conduit entry page 2/33)
3	1NO-1NC, snap action	K26	assembled cable gland (see conduit entry page 2/33)
33	1NO+1NC, slow action		
34	2NC, slow action	Threaded conduit entry	
Actuators			PG 11 (standard)
01	short plunger	M1	M16x1,5
02	roller lever	Contacts type	
05	offset roller lever		silver contacts (standard)
...		G	silver contacts gold plated 1 µm (contact block 3 excluded)
Suffix			
	no suffix (standard)		
1	with Ø 20 mm stainless steel roller for actuators 02, 05, 31, 35, 51, 52, 56, 57,		
2	with Ø 35 mm polymer roller (see special loose actuators on page 2/40)		
3	with Ø 50 mm rubber roller (see special loose actuators on page 2/40)		
4	with Ø 50 mm overhanging rubber roller (see special loose actuators on page 2/40)		



- Main data**
- Metal housing, one conduit entry
 - Protection degree IP67
 - 3 contact blocks available
 - 26 actuators available
 - Silver contacts gold plated versions

Technical data

Housing
Metal housing, coated with baked epoxy powder
One threaded conduit entry
Protection degree: IP67 according to EN 60529 with cable gland having equal or higher protection degree

General data
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: 20 million operations cycles¹
Assembling position: any
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 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 block 3:	min.	1 x 0,5 mm ²	(1 x AWG 20)
	max.	2 x 1,5 mm ²	(2 x AWG 16)

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.

Markings and quality marks:



Approval IMQ: EG605
Approval UL: E131787
Approval CCC: 2007010305230000
Approval ECU: 1010151
Approval GOST: POCC ITAB24.B04512

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.

Installation for safety applications:
Use only switches marked with the symbol . The safety circuit must always be connected with the **NC contacts** (normally closed contacts: 11-12, 21-22 or 31-32) as stated in the **standard EN 60947-5-1, encl. K, par. 2**. The switch must be actuated with **at least up to the positive opening travel** shown in the travels diagrams on page 7/4. The switch must be actuated **at least with the positive opening force**, shown in brackets, underneath each article, near the value of the min. force.

 **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			
	Rated insulation voltage (Ui):	500 Vac 600 Vdc			
		400 Vac 500 Vdc (contact blocks 33, 34)			
	Rated impulse withstand voltage (U _{imp}):	6 kV			
		4 kV (contact blocks 33, 34)			
	Conditional short circuit current:	1000 A according to EN 60947-5-1			
Protection against short circuits:		fuse 10 A 500 V type aM			
Pollution degree:		3			
		Alternate current: AC15 (50...60 Hz)			
		Ue (V)	250	400	500
		Ie (A)	6	4	1
		Direct current: DC13			
		Ue (V)	24	125	250
		Ie (A)	6	1,1	0,4

Data type approved by IMQ, CCC and EZU

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 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 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,
Positive opening of contacts on contact block 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)

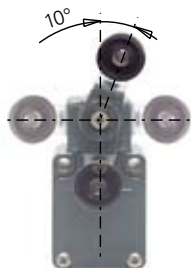
Data of the housing type 1, 4X "indoor use only", 12, 13
For all contact blocks except 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 12-14 AWG. Terminal tightening torque of 7,1 lb in (0,8 Nm).
For contact blocks 2 and 3 use 60 or 75 °C copper (Cu) conductor and wire size No. 14 AWG. Terminal tightening torque of 12 lb in (1,4 Nm).

In conformity with standard: UL 508

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

Adjustable levers

In switches with revolving lever it is possible to adjust the lever with 10° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft as prescribed for safety applications by the German standard BG-GS-ET-15.



Overturning levers

It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling.
In this way it is possible to obtain two different work plans of the lever.



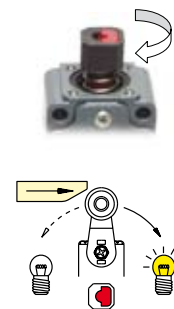
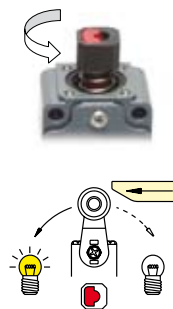
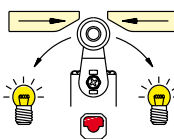
Rotating heads

In all switches, it is possible to rotate the head in 90° steps.



Unidirectional heads

In the switches with revolving lever, it is possible to select the directional operation by removing the four screws of the head and revolving the internal piston.



Contacts type:

R = snap action
L = slow action

Contact blocks

3	R	FC 301	1NO-1NC	FC 302	1NO-1NC	FC 304	1NO-1NC	FC 305	1NO-1NC
33	L	FC 3301	➔ 1NO+1NC	FC 3302	➔ 1NO+1NC	FC 3304	1NO+1NC	FC 3305	➔ 1NO+1NC
34	L	FC 3401	➔ 2NC	FC 3402	➔ 2NC	FC 3404	2NC	FC 3405	➔ 2NC
Max speed		page 7/3 - type 4		page 7/3 - type 3		0,5 m/s		page 7/3 - type 3	
Min. force		6 N (25 N ➔)		4 N (25 N ➔)		0,17 Nm		4 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 2		page 7/4 - group 1		page 7/4 - group 2	

Contact blocks

3	R	FC 308	1NO-1NC	FC 310	1NO-1NC	FC 311	1NO-1NC	FC 315	1NO-1NC
33	L	FC 3308	➔ 1NO+1NC	FC 3310	➔ 1NO+1NC	FC 3311	➔ 1NO+1NC	FC 3315	➔ 1NO+1NC
34	L	FC 3408	➔ 2NC	FC 3410	➔ 2NC	FC 3411	➔ 2NC	FC 3415	➔ 2NC
Max speed		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 4		page 7/3 - type 2	
Min. force		6 N (25 N ➔)		7 N (25 N ➔)		6 N (25 N ➔)		7 N (25 N ➔)	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1	

Contact blocks

3	R	FC 316	1NO-1NC	FC 318	1NO-1NC	FC 319	1NO-1NC	FC 320	1NO-1NC
33	L	FC 3316	➔ 1NO+1NC	FC 3318	➔ 1NO+1NC	FC 3319	➔ 1NO+1NC	FC 3320	1NO+1NC
34	L	FC 3416	➔ 2NC	FC 3418	➔ 2NC	FC 3419	➔ 2NC	FC 3420	2NC
Max speed		page 7/3 - type 2		page 7/3 - type 4		page 7/3 - type 4		1 m/s	
Min. force		6 N (25 N ➔)		6 N (25 N ➔)		6 N (25 N ➔)		0,07 Nm	
Travel diagrams		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 1		page 7/4 - group 3	

Contacts type:		With external rubber gasket	With external rubber gasket	Other rollers available. See page 2/40	Ø 3 mm stainless steel round rod
R = snap action L = slow action					
Contact blocks					
3	R	FC 321	1NO-1NC	FC 331	1NO-1NC
33	L	FC 3321	1NO+1NC	FC 3331	1NO+1NC
34	L	FC 3421	2NC	FC 3431	2NC
Max speed		1 m/s	1 m/s	page 7/3 - type 1	1,5 m/s
Min. force		0,06 Nm	0,1 Nm	0,09 Nm (0,25 Nm $\rightarrow$)	0,09 Nm
Travel diagrams		page 7/4 - group 3	page 7/4 - group 3	page 7/4 - group 4	page 7/4 - group 4

		3x3 mm square rod		Other rollers available. See page 2/40	Fiber glass rod
Contact blocks					
3	R	FC 333	1NO-1NC	FC 335	1NO-1NC
33	L	FC 3333	1NO+1NC	FC 3335	1NO+1NC
34	L	FC 3433	2NC	FC 3435	2NC
Max speed		1,5 m/s	1 m/s	page 7/3 - type 1	1,5 m/s
Min. force		0,09 Nm	0,09 Nm	0,09 Nm (0,25 Nm)	0,09 Nm
Travel diagrams		page 7/4 - group 4	page 7/4 - group 4	page 7/4 - group 4	page 7/4 - group 4

		Other rollers available. See page 2/40	Other rollers available. See page 2/40	Porcelain roller	Other rollers available. See page 2/40
Contact blocks					
3	R	FC 351	1NO-1NC	FC 353-E11	1NO-1NC
33	L	FC 3351	1NO+1NC	FC 3353-E11V9	1NO+1NC
34	L	FC 3451	2NC	FC 3453-E11V9	2NC
Max speed		page 7/3 - type 1	page 7/3 - type 1	0,5 m/s	page 7/3 - type 1
Min. force		0,05 Nm (0,25 Nm $\rightarrow$)	0,05 Nm (0,25 Nm $\rightarrow$)	0,02 Nm (0,25 Nm $\rightarrow$)	0,09 Nm (0,25 Nm $\rightarrow$)
Travel diagrams		page 7/4 - group 4	page 7/4 - group 4	page 7/4 - group 5	page 7/4 - group 4

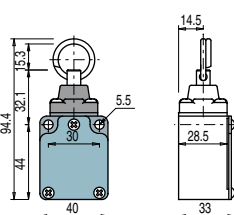
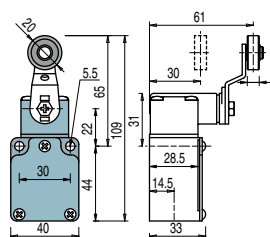
Items with code on the **green** background are available in stock

Contacts type:

R = snap action
L = slow action

Other rollers available. See page 2/40

Rope switches for signalling



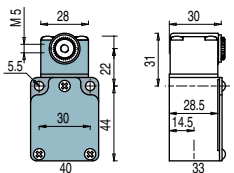
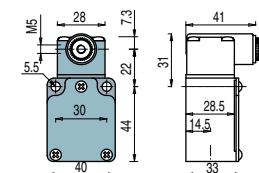
Contact blocks

3	R	FC 357	1NO-1NC	FC 376	1NO-1NC
33	L	FC 3357	1NO+1NC	FC 3376	1NO+1NC
34	L	FC 3457	2NC	FC 3476	2NC
Max speed		page 7/3 - type 1		0,5 m/s	
Min. force		0,09 Nm (0,25 Nm)		initial 20 N - final 40 N	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 6	

Position switches with revolving lever without actuator

Regular head

Compact head



Contact blocks

3	R	FC 338	1NO-1NC	FC 358	1NO-1NC
33	L	FC 3338	1NO+1NC	FC 3358	1NO+1NC
34	L	FC 3438	2NC	FC 3458	2NC
Min. force		0,09 Nm (0,25 Nm)		0,05 Nm (0,25 Nm)	
Travel diagrams		page 7/4 - group 4		page 7/4 - group 4	

IMPORTANT

For safety applications: join only switches and actuators marked with symbol $\ominus$.

For more information about safety applications see page 7/1.

Loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Polymer roller Ø 20 mm	Adjustable round rod Ø 3x125 mm	Adjustable square rod 3x3x125 mm	Flexible rod actuator	Adjustable actuator with polymer roller	Adjustable fiber glass rod
VF L31 $\ominus$	VF L32 $\ominus$ (3)	VF L33 $\ominus$ (3)	VF L34	VF L35 $\ominus$ (1) (3)	VF L36 $\ominus$ (3)
Polymer roller Ø 20 mm	Polymer roller Ø 20 mm	Porcelain roller	Adjustable safety actuator with polymer roller	Polymer roller Ø 20 mm	
VF L51 $\ominus$	VF L52 $\ominus$	VF L53 $\ominus$ (2)	VF L56 $\ominus$ (3)	VF L57 $\ominus$	

Accessories See page 6/1

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

Special loose actuators

IMPORTANT: These loose actuators can be used with items of series FD, FP, FL, FC only.

Ø 20 mm stainless steel rollers

VF L31-1 (1)	VF L35-1 (1) (3)	VF L51-1 (1)	VF L52-1 (1)	VF L56-1 (3)	VF L57-1 (1)

Ø 35 mm polymer rollers

VF L31-2 (4)	VF L35-2 (1) (3)	VF L51-2 (4)	VF L52-2 (1)	VF L56-2 (3)	VF L57-2 (1)

Ø 40 mm rubber rollers

VF L31-R5 (4)	VF L35-R5 (1) (3)	VF L51-R5 (4)	VF L52-R5 (1)	VF L56-R5 (3)	VF L57-R5 (4)

Ø 50 mm rubber rollers

VF L31-3 (4)	VF L35-3 (1) (3)	VF L51-3 (4)	VF L52-3 (4)	VF L56-3 (3)	VF L57-3 (4)

Ø 50 mm overhanging rubber rollers

VF L35-4 (1) (3)	VF L56-4 (3)

- Only orders for multiple quantities of the packs are accepted.
- (1) Actuator VF L35 suits to safety applications only if adjusted to its max length, as you can see in figure beside. If you need an adjustable lever for safety applications, use the adjustable safety lever VF L56.
- (2) The position switch obtained by assembling the switch FC •58 (e.g. FC 358, FC 3358) with the actuator VF L53 will not present the same travel diagrams and actuating forces as the position switch FC •53-E11 (e.g. FC 353-E11, FC 3353-E11V9...).
- (3) If it is installed with switch FC •58 (e.g. FC 358, FC 3358...), the actuator can mechanically interfere with the housing of the switch. The interference could happen or not according to the actuator and the head fixing position.
- (4) The actuator cannot be oriented to inside direction because it will mechanically interfere with the switch head.

