

Предохранительные тросовые выключатели со сбросом для аварийной остановки

Технические характеристики

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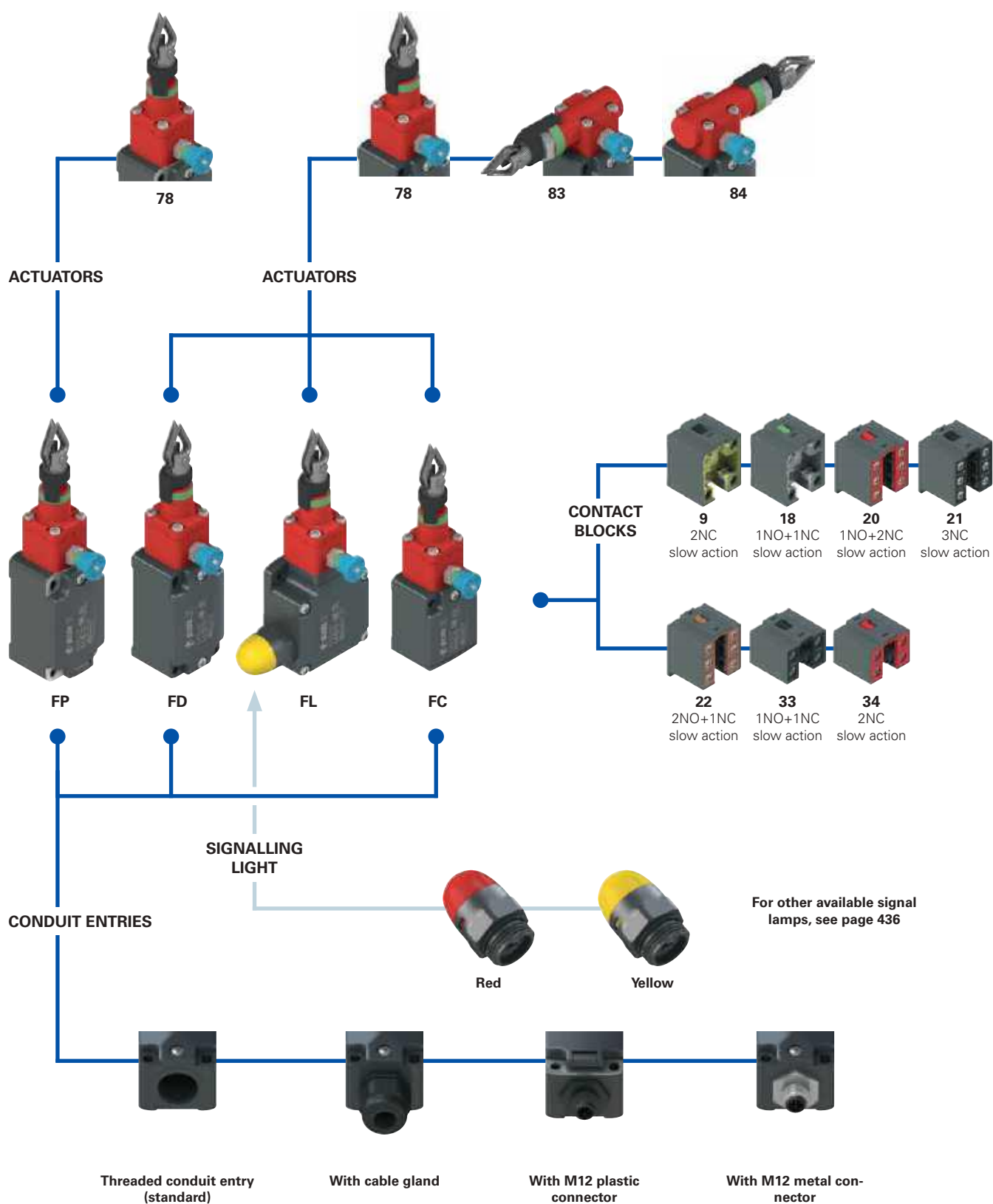
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Selection diagram



—●— Product options
 —→— Sold separately as accessory

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

article options options
FD 1878-E7GM2K50T6

Housing

FD	metal, one conduit entry
FL	metal, three conduit entries
FP	technopolymer, one conduit entry

Ambient temperature

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

Contact blocks

9	2NC, slow action
18	1NO+1NC, slow action
20	1NO+2NC, slow action
21	3NC, slow action
22	2NO+1NC, slow action
33	1NO+1NC, slow action
34	2NC, slow action

Pre-installed cable glands or connectors

	no cable gland or connector (standard)
K23	cable gland for cables Ø 6 ... 12 mm
...	...
K50	M12 metal connector, 5-pole
...	...

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

Actuating head

78	longitudinal head
83	left transversal head (FD-FL housing only)
84	right transversal head (FD-FL housing only)

Threaded conduit entry

M2	M20x1.5 (standard)
	PG 13.5

Actuating force

	standard
E7	initial 20 N...final 40 N (only head 78)
E9	initial 13 N...final 75 N (only head 83-84)

Contact type

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

article options options
FC 3378-E7GM2K50T6

Housing

FC	metal, one conduit entry
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Ambient temperature

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

Contact blocks

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

Pre-installed cable glands or connectors

	no cable gland (standard)
K23	cable gland for cables Ø 6 ... 12 mm
K50	M12 metal connector, 5-pole

Actuating head

78	longitudinal head
83	left transversal head
84	right transversal head

Threaded conduit entry

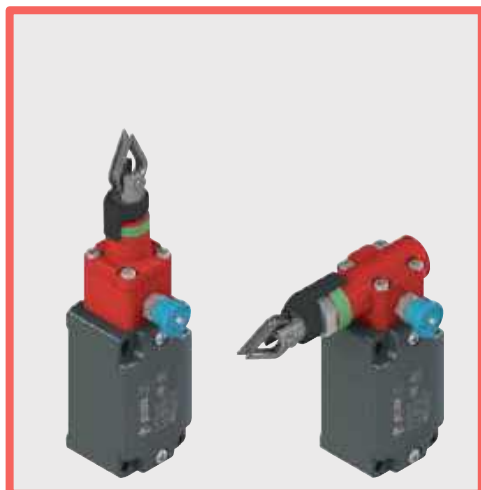
M2	M20x1.5 (standard)
	PG 11

Actuating force

	standard
E7	initial 20 N...final 40 N (only head 78)
E9	initial 13 N...final 75 N (only head 83-84)

Contact type

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



Main features

- Metal or plastic housing, from one to three conduit entries
- Protection degree IP67
- In compliance with EN ISO 13850
- 7 contact blocks available
- Versions with vertical or horizontal actuation
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts

Quality marks:



IMQ approval: EG605
 UL approval: E131787
 CCC approval: 2021000305000099
 EAC approval: RU C-IT.YT03.B.00035/19

Technical data

Housing

FP series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: 
 FD, FL and FC series: metal housing, baked powder coating.
 FD, FP, FC series: one threaded conduit entry: M20x1.5 (standard)
 FL series: three threaded conduit entries: M20x1.5 (standard)
 Protection degree: IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

General data

SIL (SIL CL) up to: SIL 3 acc. to EN 62061
 Performance Level (PL) up to: PL e acc. to EN ISO 13849-1
 Safety parameters:
 B_{10D} : 200,000 for NC contacts
 Mission time: 20 years
 Ambient temperature: -25°C ... +80°C (standard)
 -40°C ... +80°C (T6 option)
 Max. actuation frequency: 1 cycle / 6 s
 Mechanical endurance: 100,000 operating cycles
 Max. actuation speed: 0.5 m/s
 Min. actuation speed: 1 mm/s
 Tightening torques for installation: see page 441
 Wire cross-sections and wire stripping lengths: see page 461

In compliance with standards:

IEC 60947-5-1, IEC 60947-5-5, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN ISO 13850, EN IEC 63000, UL 508, CSA C22.2 No. 14.

Approvals:

EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5

Compliance with the requirements of:

Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

Positive contact opening in conformity with standards:

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

⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 443 to 454.

Electrical data		Utilization category			
without connector	Thermal current (I_{th}):	10 A	Alternating current: AC15 (50÷60 Hz)		
	Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	U_e (V)	250	400 500
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	I_e (A)	6	4 1
	Conditional short circuit current:	1000 A acc. to EN 60947-5-1	Direct current: DC13		
	Protection against short circuits:	type aM fuse 10 A 500 V	U_e (V)	24	125 250
with M12 connector, 4 and 5-pole	Pollution degree:	3	I_e (A)	3	0.55 0.3
	Thermal current (I_{th}):	4 A	Alternating current: AC15 (50÷60 Hz)		
	Rated insulation voltage (U_i):	250 Vac 300 Vdc	U_e (V)	24	120 250
	Protection against short circuits:	type gG fuse 4 A 500 V	I_e (A)	4	4 4
	Pollution degree:	3	Direct current: DC13		
with M12 connector, 8-pole	Thermal current (I_{th}):	2 A	U_e (V)	24	
	Rated insulation voltage (U_i):	30 Vac 36 Vdc	I_e (A)	2	
	Protection against short circuits:	type gG fuse 2 A 500 V	Direct current: DC13		
	Pollution degree:	3	U_e (V)	24	
			I_e (A)	2	

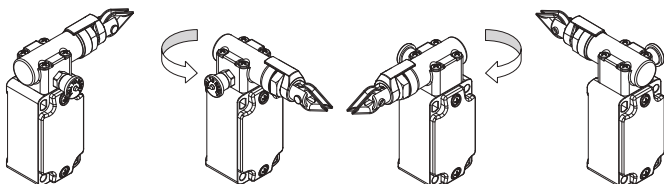


Description



These rope-operated safety switches are installed on machines or conveyor belts and allow the machine to be brought to an emergency stop from any point and with any pull on the rope. This means significant cost savings for medium and large machines, since multiple emergency-stop buttons can be replaced with a single switch. They are equipped with a self-control function that constantly checks the correct function and signals a possible loosening or breaking of the rope through the opening of the contacts. These safety switches keep the contacts open after activation until the reset is performed, even if the rope is released.

Head with variable orientation



For all switches, the head can be adjusted in 90° steps after removing the four fastening screws.

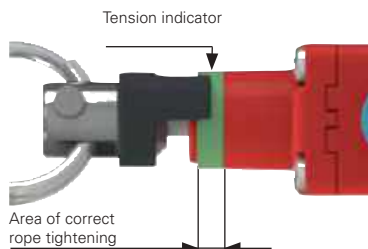
Extended temperature range

-40°C

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

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

Indicator for rope adjustment



All switches are provided with a green ring that shows the area of the correct tightening of the rope. The installer has only to tighten the rope until the black indicator will be in the middle of the green area. With this setting, the switch can be reset by pulling the blue knob to close the electrical safety contacts.

If the tension (or loosening) on the rope is so high that the black indicator exits the green area, the electrical safety contacts will open and the reset device will trigger.

Laser engraving

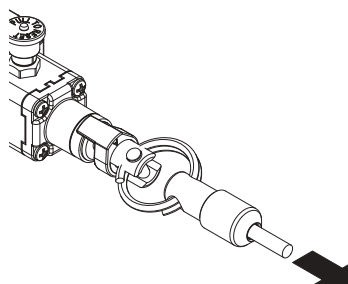


All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

Protection degree IP67

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

Reduced actuating force



These switches can be supplied with reduced hardness internal springs on request. The force required to actuate the switch can thereby be reduced without changing the actuating path of the electrical contacts. This is particularly advantageous for smaller spans, but must, however, always make use of rope pulleys.

Indicator for the state of the reset



If the tension indicator is in the green area, the electrical safety contacts can be closed by pulling the blue knob. The reset status can be identified quickly by the green ring under the blue knob.

Features approved by IMQ

Rated insulation voltage (Ui):	500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 33, 34, 37)
Conventional free air thermal current (Ith):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U _{imp}):	6 kV 4 kV (for contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U _e):	400 Vac (50 Hz)
Operating current (I _e):	3 A
Forms of the contact element:	Za, Za+Za, X+X, Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X, Y, X.
Positive opening of contacts on contact blocks:	5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 33, 34, 37, 38, 39, 66.
In compliance with standards:	EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

Features approved by UL

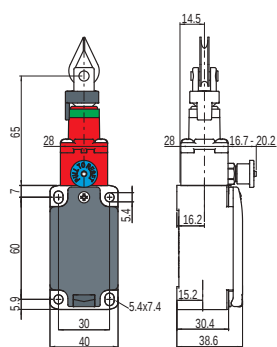
Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13
Use 60 or 75°C copper (Cu) conductor and wire size range:	12, 14 AWG, stranded or solid.
The terminal tightening torque of:	7.1 lb in (0.8 Nm).
For FP series: the hub is to be connected to the conduit before the hub is connected to the enclosure.	

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

Contact type:

L = slow action

Technopolymer housing



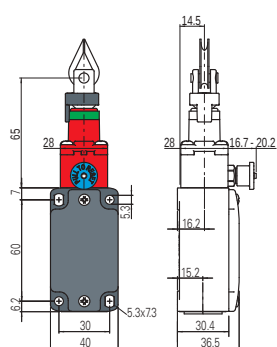
Contact blocks

9	L	FP 978-M2	→	2NC
18	L	FP 1878-M2	→	1NO+1NC
20	L	FP 2078-M2	→	1NO+2NC
21	L	FP 2178-M2	→	3NC
22	L	FP 2278-M2	→	2NO+1NC
33	L	FP 3378-M2	→	1NO+1NC
34	L	FP 3478-M2	→	2NC
Actuating force		Initial 63 N ... final 83 N (90 N →)		
Travel diagrams		Page 256 - group 1		

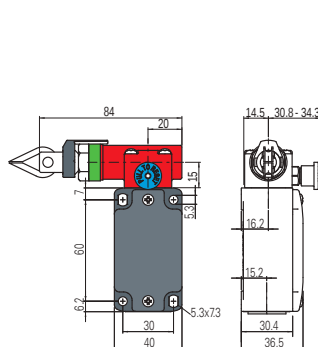
Contact type:

L = slow action

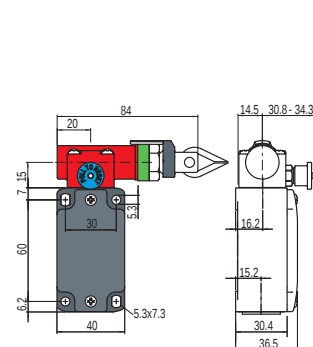
Metal housing



Metal housing



Metal housing



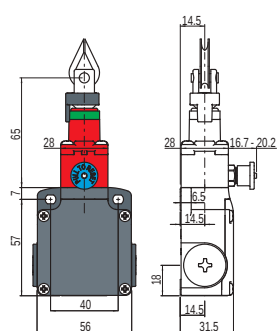
Contact blocks

9	L	FD 978-M2	→	2NC	FD 983-M2	→	2NC	FD 984-M2	→	2NC
18	L	FD 1878-M2	→	1NO+1NC	FD 1883-M2	→	1NO+1NC	FD 1884-M2	→	1NO+1NC
20	L	FD 2078-M2	→	1NO+2NC	FD 2083-M2	→	1NO+2NC	FD 2084-M2	→	1NO+2NC
21	L	FD 2178-M2	→	3NC	FD 2183-M2	→	3NC	FD 2184-M2	→	3NC
22	L	FD 2278-M2	→	2NO+1NC	FD 2283-M2	→	2NO+1NC	FD 2284-M2	→	2NO+1NC
33	L	FD 3378-M2	→	1NO+1NC	FD 3383-M2	→	1NO+1NC	FD 3384-M2	→	1NO+1NC
34	L	FD 3478-M2	→	2NC	FD 3483-M2	→	2NC	FD 3484-M2	→	2NC
Actuating force		Initial 63 N ... final 83 N (90 N →)			Initial 147 N ... final 235 N (250 N →)			Initial 147 N ... final 235 N (250 N →)		
Travel diagrams		Page 256 - group 1			Page 256 - group 2			Page 256 - group 2		

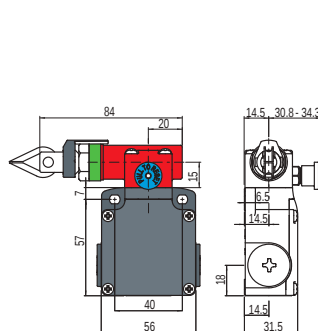
Contact type:

L = slow action

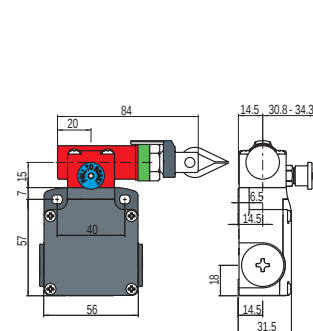
Metal housing



Metal housing



Metal housing



Contact blocks

9	L	FL 978-M2	→	2NC	FL 983-M2	→	2NC	FL 984-M2	→	2NC
18	L	FL 1878-M2	→	1NO+1NC	FL 1883-M2	→	1NO+1NC	FL 1884-M2	→	1NO+1NC
20	L	FL 2078-M2	→	1NO+2NC	FL 2083-M2	→	1NO+2NC	FL 2084-M2	→	1NO+2NC
21	L	FL 2178-M2	→	3NC	FL 2183-M2	→	3NC	FL 2184-M2	→	3NC
22	L	FL 2278-M2	→	2NO+1NC	FL 2283-M2	→	2NO+1NC	FL 2284-M2	→	2NO+1NC
33	L	FL 3378-M2	→	1NO+1NC	FL 3383-M2	→	1NO+1NC	FL 3384-M2	→	1NO+1NC
34	L	FL 3478-M2	→	2NC	FL 3483-M2	→	2NC	FL 3484-M2	→	2NC
Actuating force		Initial 63 N ... final 83 N (90 N →)			Initial 147 N ... final 235 N (250 N →)			Initial 147 N ... final 235 N (250 N →)		
Travel diagrams		Page 256 - group 1			Page 256 - group 2			Page 256 - group 2		

All values in the drawings are in mm

Accessories See page 419

→ The 2D and 3D files are available at



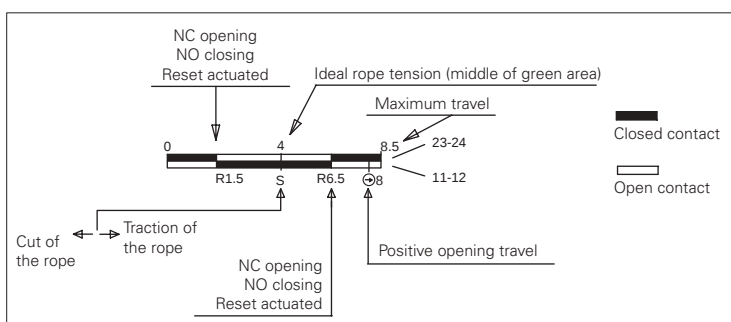
Contact type:

= slow action

Contact blocks

	Metal housing	Metal housing	Metal housing
33	FC 3378-M2	FC 3383-M2	FC 3384-M2
34	FC 3478-M2	FC 3483-M2	FC 3484-M2
Actuating force	Initial 63 N ... final 83 N (90 N)	Initial 147 N ... final 235 N (250 N)	Initial 147 N ... final 235 N (250 N)
Travel diagrams	Page 256 - group 1	Page 256 - group 2	Page 256 - group 2

How to read travel diagrams



Travel diagrams table

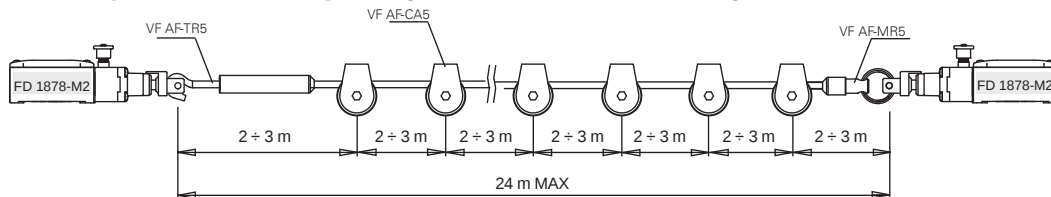
Contact blocks	Group 1	Group 2
9 2NC		
18 1NO+1NC		
20 1NO+2NC		
21 3NC		
22 2NO+1NC		
33 1NC+1NO		
34 2NC		

IMPORTANT:

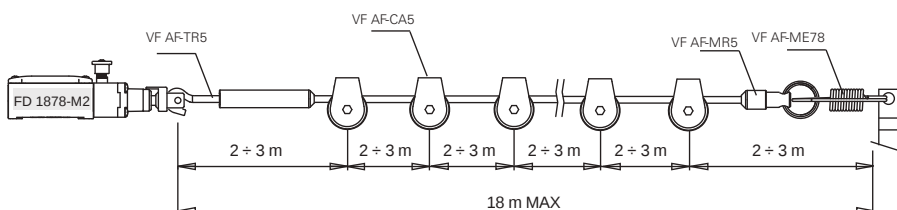
In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol . Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

Application examples and max. rope length for switches with longitudinal head

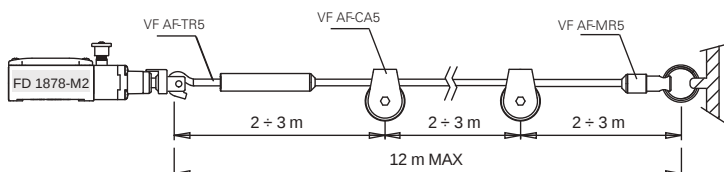
Example A



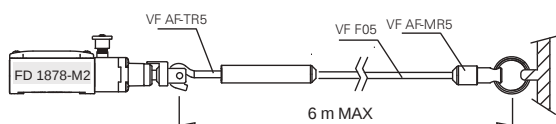
Example B



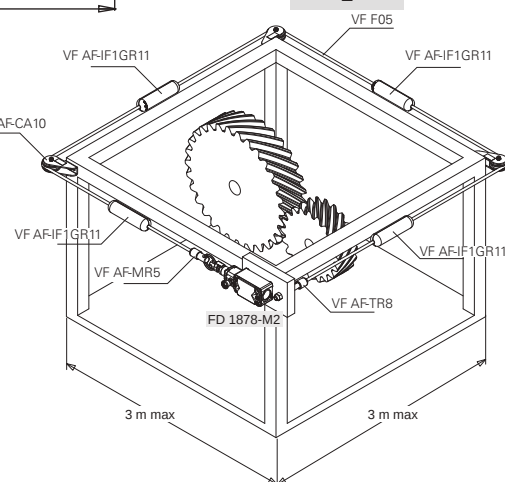
Example C



Example D

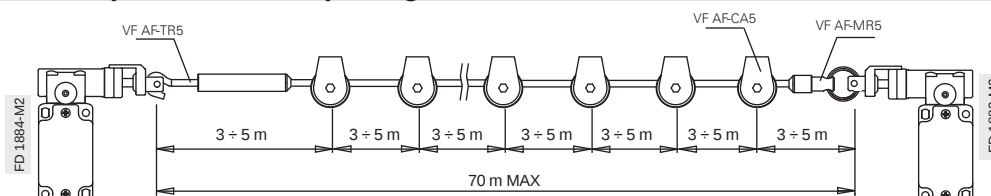


Example E

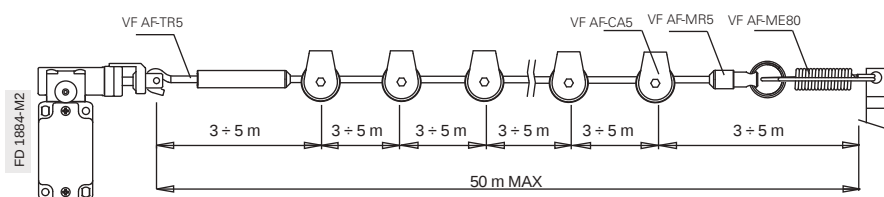


Application examples and max. rope length for switches with transversal head

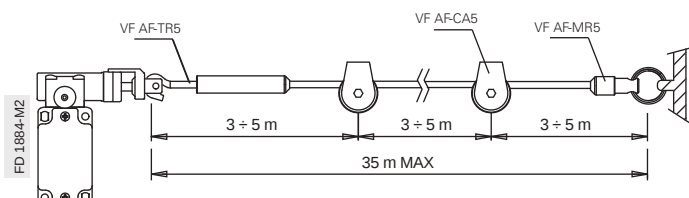
Example F



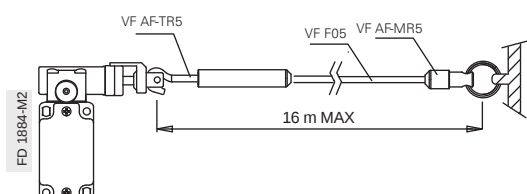
Example G



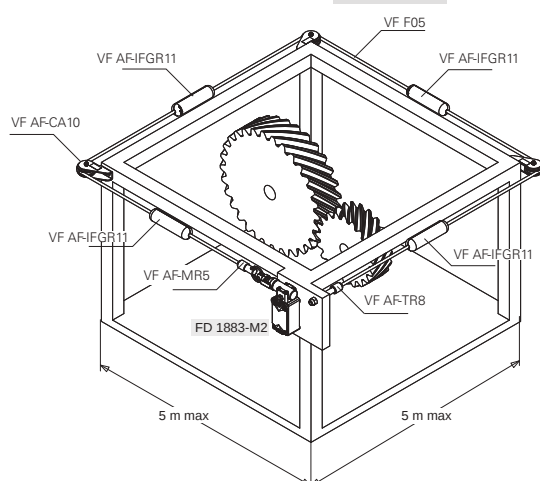
Example H



Example I

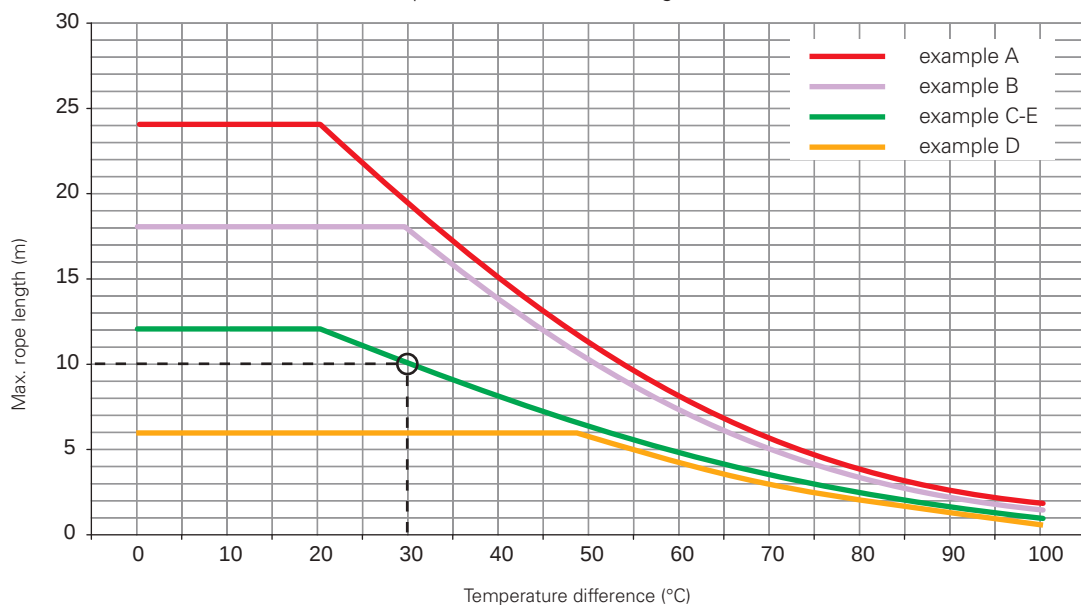


Example J



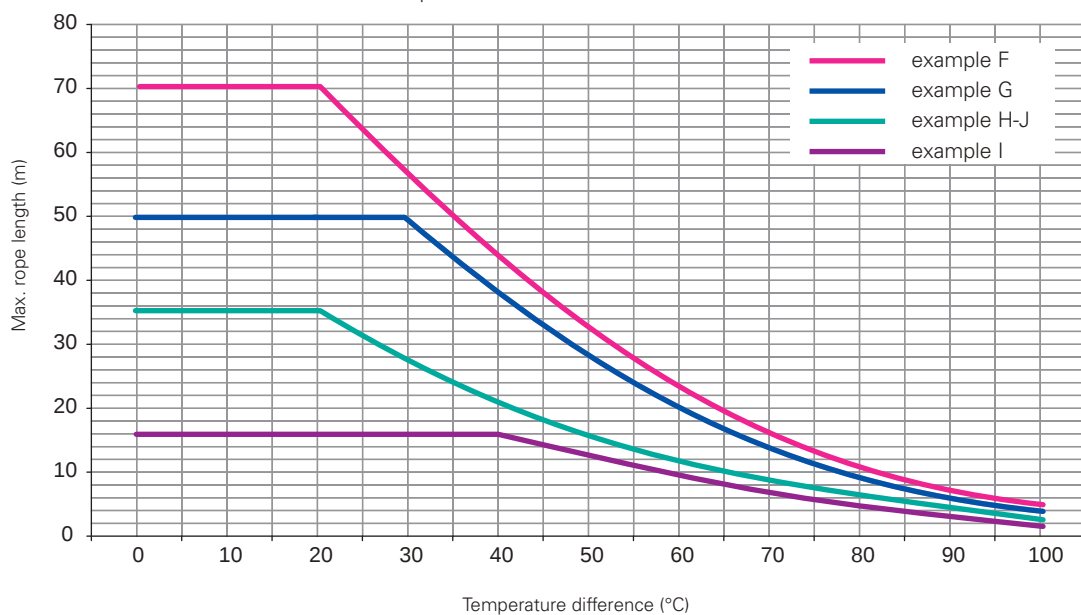
Maximum spans

Maximum spans for switches with longitudinal head



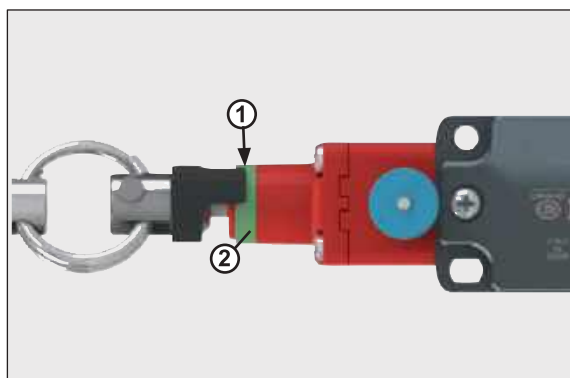
The max. recommended spans are indicated in the diagram as a function of the temperature fluctuations (temperature differences) to which the switch may be exposed at the point of use. For instance, with installation of type C and a temperature difference of 30°C, the max. recommended rope length is 10 metres.

Maximum spans for switches with transversal head

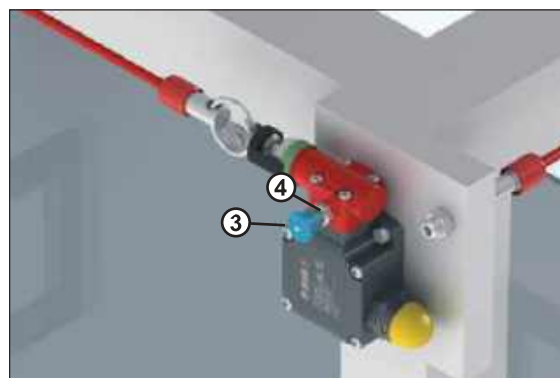


Important: The above data are guaranteed only using original rope and accessories. See page 267.

Adjustment of the switching point



Tighten the rope connected to the switch, until the end of the indicator (1) reaches about the middle of the green ring (2).



Pull the knob (3) in order to close the safety contacts inside the switch. Below the knob a green ring (4) will be disclosed.

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