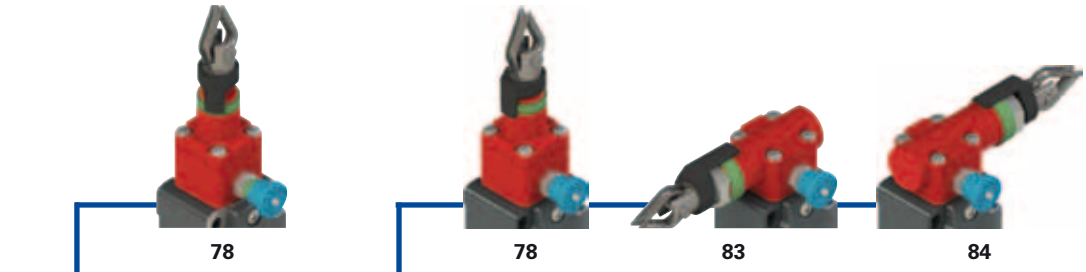
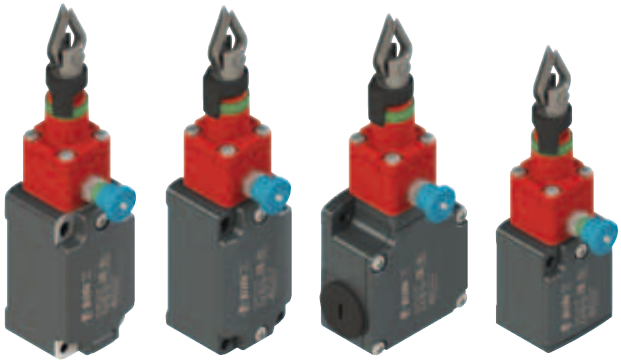
Selection diagram

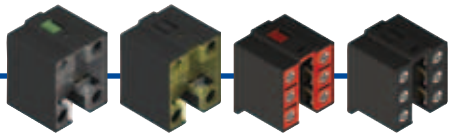


ACTUATORS

ACTUATORS



CONTACT BLOCKS

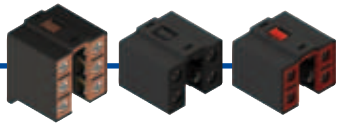


18 1NO+1NC, slow action

9 2NC slow action

20 1NO+2NC, slow action

21 3NC slow action



22 2NO+1NC, slow action

33 1NO+1NC, slow action

34 2NC slow action

CONDUIT ENTRIES

Threaded conduit entries (standard)

With cable gland

With M12 plastic connector

With M12 metal connector

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 | options

FD 1878-E7GM2K50T6

Housing

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

Contact blocks

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

Actuating head

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

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

Threaded conduit entry

M2	M20x1.5 (standard)
	PG 13.5

Pre-installed cable glands or connectors

	without cable gland or connector (standard)
K23	cable gland for cables Ø 6…Ø 12 mm
...	.....
K50	M12 metal connector, 5 poles
...	.....

Please contact our technical service for the complete list of possible combinations.

Ambient temperature

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

article | options | options

FC 3378-E7GM2K50T6

Housing

FC	metal, one conduit entry

Contact blocks

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

Actuating head

78	longitudinal head
83	left transversal head
84	right transversal head

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

Threaded conduit entry

M2	M20x1.5 (standard)
	PG 11

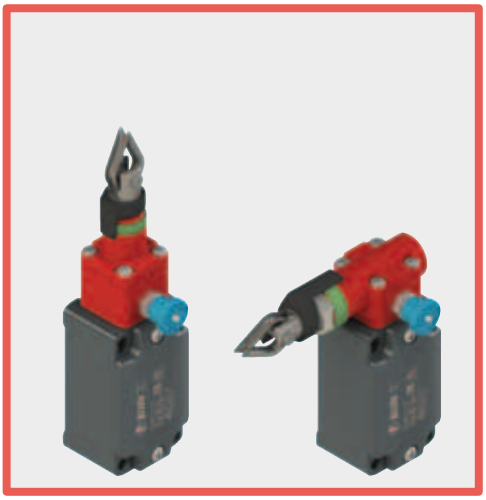
Pre-installed cable glands or connectors

	without cable gland (standard)
K23	cable gland for cables Ø 6…Ø 12 mm
K50	M12 metal connector, 5 poles

Ambient temperature

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

Safety **rope switch with reset** for emergency stop



Main features

- Metal or plastic housing, from one to three conduit entries
- Protection degree IP67
- In conformity 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

Markings and quality marks:

IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2007010305230000 (FD-FL-FC series) 2007010305230014 (FP series)
EAC approval:	RU C-IT ДМ94.B.01024

Technical data

Housing

FP series housing made of glass fiber 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

For safety applications up to:	SIL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1
Safety parameters:	
B_{10d}:	2,000,000 for NC contacts
Service life:	20 years
Ambient temperature:	-25°C … +80°C
Max. actuation frequency:	1 cycle / 6 s
Mechanical endurance:	1 million operating cycles[1]
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Tightening torques for installation:	see pages 297-308

(1) One operation cycle means two movements, one to close and one to open contacts, as defined in EN 60947-5-1.

Max. cable cross section (flexible copper strands)

Contact blocks 20, 21, 22, 33, 34:	min.	1 x 0.34 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)
Contact blocks 18, 9:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 2.5 mm²	(2 x AWG 14)

In conformity with standards:
IEC 60947-5-1, EN 60947-5-1, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN 60529, EN ISO 13850, EN 418, UL 508, CSA 22.2 No.14 .
Approvals:
IEC 60947-5-1, UL 508, CSA 22.2 No.14 , GB14048.5-2001.

In conformity with the requirements of:
Low Voltage Directive 2006/95/EC, Machinery Directive 2006/42/EC and EMC Directive 2004/122/EC.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

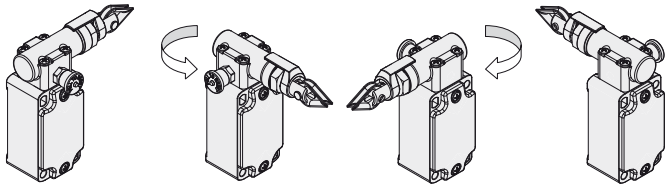
⚠ **If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 297 to page 308.**

	Electrical data		Utilization category
without connector	Thermal current (Ith):	10 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	Ue (V) 250 400 500 Ie (A) 6 4 1
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	Direct current: DC13
	Conditional short circuit current:	1000 A acc. to EN 60947-5-1	Ue (V) 24 125 250 Ie (A) 6 1.1 0.4
	Protection against short circuits:	type aM fuse 10 A 500 V	
	Pollution degree:	3	
with M12 connector 4 and 5 poles	Thermal current (Ith):	4 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (Ui):	250 Vac 300 Vdc	Ue (V) 24 120 250 Ie (A) 4 4 4
	Protection against short circuits:	type gG fuse 4 A 500 V	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 125 250 Ie (A) 4 1.1 0.4
with M12 connector 8 poles	Thermal current (Ith):	2 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (Ui):	30 Vac 36 Vdc	Ue (V) 24 Ie (A) 2
	Protection against short circuits:	type gG fuse 2 A 500 V	Direct current: DC13
	Pollution degree:	3	Ue (V) 24 Ie (A) 2

Description

These rope operated safety switches are installed on machines or conveyor belts, to activate the emergency stop of the machine on every hand intervention on the rope, from any point. They allow cost savings on machines of medium-large size, where normally many emergency stop push buttons can be replaced by one single switch. Provided with **self-control function**, they constantly check their correct operation, signalling with the opening of the contacts an eventual loosening or breaking of the rope. These safety switches keep the contacts open after their activation, even if the rope is left free, until they are reset.

Orientable heads



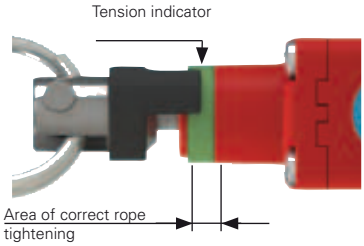
Removing the four fastening screws, in all switches, it is possible to rotate the head in 90° steps.

Extended temperature range

-40°C

This range of switches is also available in a special version with an ambient operating temperature range of -40°C to +80°C.
They can be used for applications in cold stores, sterilisers and other devices with low temperature environments. Special materials that have been used to realize these versions, maintain unchanged their features also in these conditions, widening the installation possibilities.

Adjustment point indicator of the rope



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. In this position it is possible to reset the switch, pulling the blue button, and to close the electrical safety contacts.
If a traction (or loosening) of the rope it is high enough to permit the black indicator to go outside the correct tension area, the safety contacts are opened and the reset device is triggered.

Laser engraving

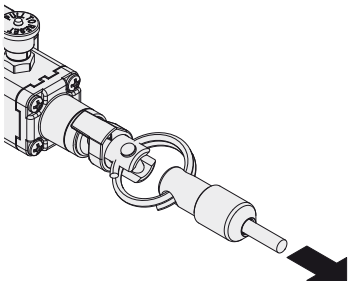
All devices are indelibly marked with a dedicated laser system that allows the marking to be also suitable for extreme environments. This system that does not use labels, prevents the loss of plate data and the marking is more resistant over time.

Protection degree IP67

IP67

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

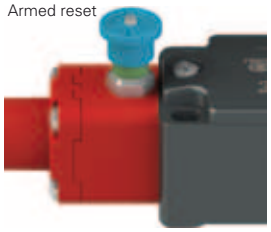
Reduced actuating force



These switches can be supplied with reduced hardness internal springs on request. This makes it possible to reduce the physical effort required to actuate the switch, whilst maintaining the actuating stroke of the electrical contacts unchanged. Particularly suitable for spans of reduced dimensions, they must always be matched to the suspension of the rope pulley.

Indicator for the state of the reset

Armed reset



Released reset

If the rope stretching indicator is in the correct operation area, it is possible to close the electric safety contacts pulling the blue reset button. The green ring signal allows to know the reset condition quickly.

Characteristics approved by IMQ

Rated insulation voltage (Ui): 500 Vac
400 Vac (for contact blocks 20, 21, 22, 33, 34)
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, 33, 34)
Protection degree of the housing: IP67
MV terminals (screw terminals)
Pollution degree 3
Utilization category: AC15
Operating voltage (Ue): 400 Vac (50 Hz)
Operating current (Ie): 3 A
Forms of the contact element: Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening of contacts on contact blocks 18, 9, 20, 21, 22, 33, 34

In conformity with standards: EN 60947-1, EN 60947-5-1+ A1:2009, fundamental requirements of the Low Voltage Directive 2006/95/EC.

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

Characteristics approved by UL

Utilization categories Q300 (69 VA, 125 … 250 Vdc)
A600 (720 VA, 120 … 600 Vac)
Data of housing type 1, 4X "indoor use only", 12, 13
For all contact blocks use 60 or 75 °C copper (Cu) conductor, rigid or flexible, wire size AWG 12-14. Terminal tightening torque of 7.1 lb in (0.8 Nm).

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

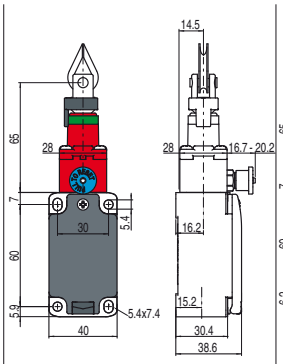
Please contact our technical service for the list of approved products.

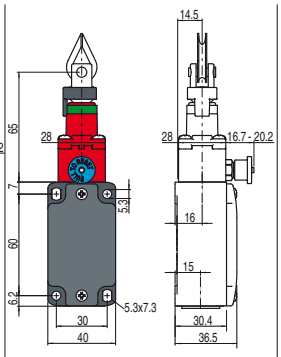
Dimensional drawings

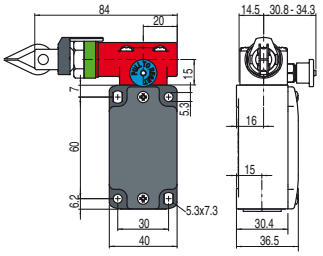
All measures in the drawings are in mm

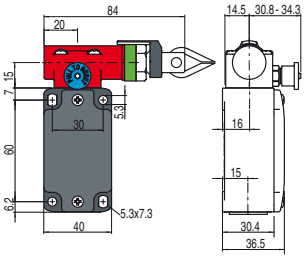
Contact type:

L = slow action



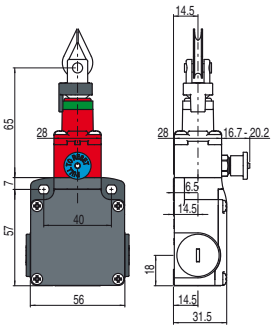


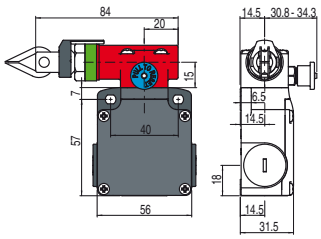


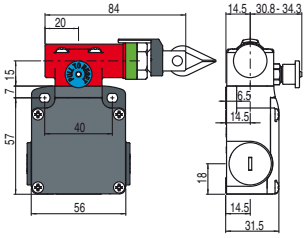


Contact blocks

18	L	FP 1878-M2 → 1NO+1NC	FD 1878-M2 → 1NO+1NC	FD 1883-M2 → 1NO+1NC	FD 1884-M2 → 1NO+1NC
9	L	FP 978-M2 → 2NC	FD 978-M2 → 2NC	FD 983-M2 → 2NC	FD 984-M2 → 2NC
20	L	FP 2078-M2 → 1NO+2NC	FD 2078-M2 → 1NO+2NC	FD 2083-M2 → 1NO+2NC	FD 2084-M2 → 1NO+2NC
21	L	FP 2178-M2 → 3NC	FD 2178-M2 → 3NC	FD 2183-M2 → 3NC	FD 2184-M2 → 3NC
22	L	FP 2278-M2 → 2NO+1NC	FD 2278-M2 → 2NO+1NC	FD 2283-M2 → 2NO+1NC	FD 2284-M2 → 2NO+1NC
33	L	FP 3378-M2 → 1NO+1NC	FD 3378-M2 → 1NO+1NC	FD 3383-M2 → 1NO+1NC	FD 3384-M2 → 1NO+1NC
34	L	FP 3478-M2 → 2NC	FD 3478-M2 → 2NC	FD 3483-M2 → 2NC	FD 3484-M2 → 2NC
Min. force		Initial 63 N...final 83 N (90 N →)	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 164 - group 1	page 164 - group 1	page 164 - group 2	page 164 - group 2







Contact blocks

18	L	FL 1878-M2 → 1NO+1NC	FL 1883-M2 → 1NO+1NC	FL 1884-M2 → 1NO+1NC
9	L	FL 978-M2 → 2NC	FL 983-M2 → 2NC	FL 984-M2 → 2NC
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
Min. 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 164 - group 1	page 164 - group 2	page 164 - group 2

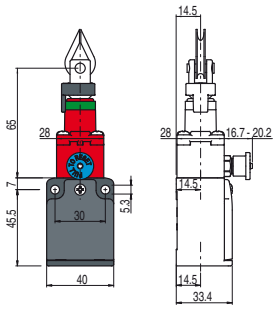
Items with code on **green** background are stock items

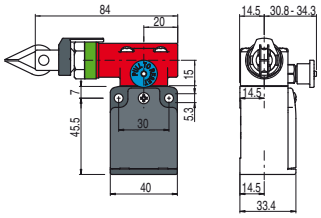
Accessories See page 287

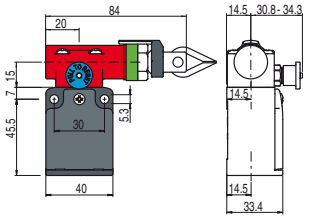
→ The 2D and 3D files are available at **www.pizzato.com**

Contact type:

L = slow action



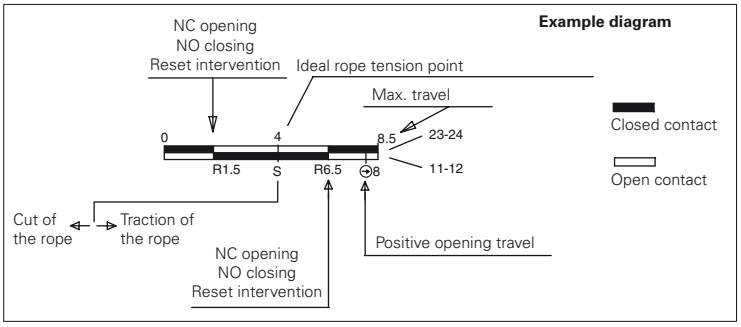




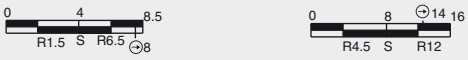
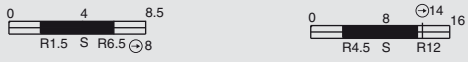
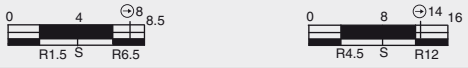
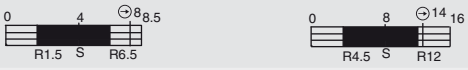
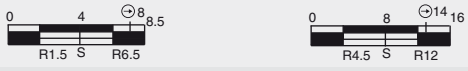
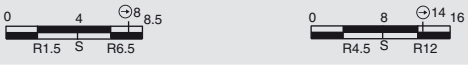
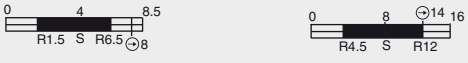
Contact blocks				
33 L	FC 3378-M2 → 1NO+1NC	FC 3383-M2 → 1NO+1NC	FC 3384-M2 → 1NO+1NC
34 L	FC 3478-M2 → 2NC	FC 3483-M2 → 2NC	FC 3484-M2 → 2NC
Min. force	Initial 63 N...final 83 N (90 N →)	Initial 147 N...final 235 N (250 N →)	Initial 147 N...final 235 N (250 N →)
Travel diagrams	page 164 - group 1	page 164 - group 2	page 164 - group 2

How to read travel diagrams

All measures in the diagrams are in mm



Travel diagrams table

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

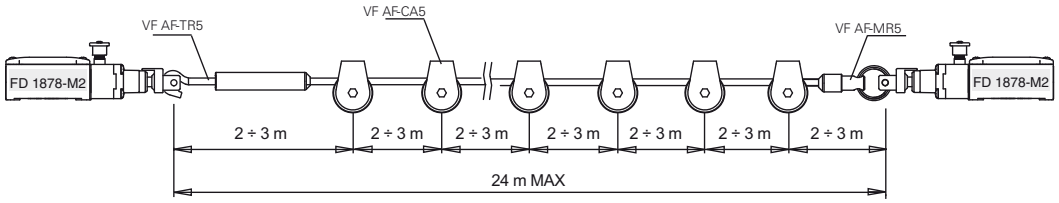
IMPORTANT:
In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol →. Operate the switch **at least with the positive opening force**, indicated between brackets below each article, aside the minimum force value.

Accessories See page 287

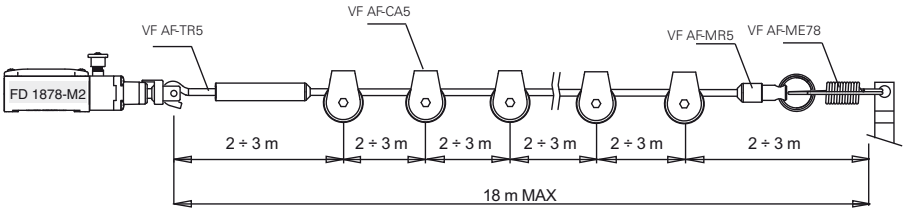
→ The 2D and 3D files are available at **www.pizzato.com**

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

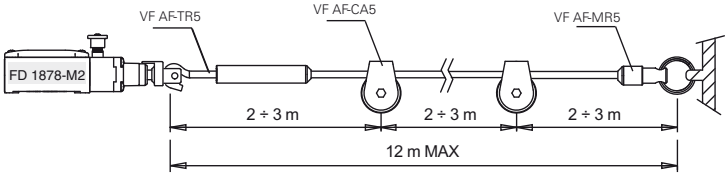
Example A



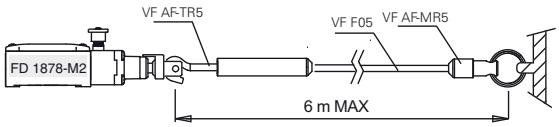
Example B



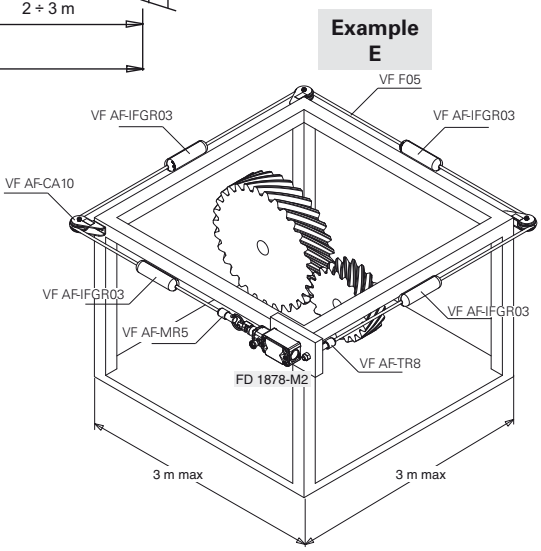
Example C



Example D

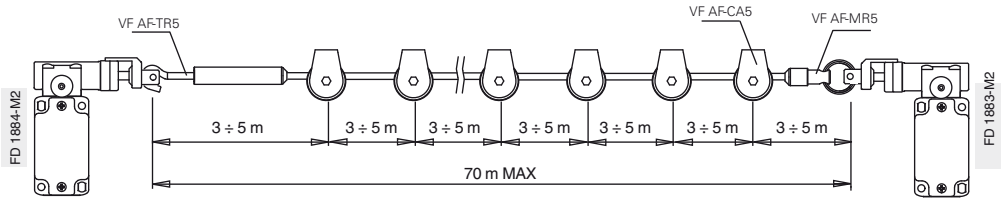


Example E

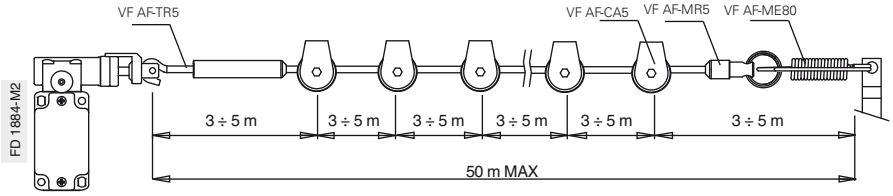


Application examples and max. rope length for switches with transversal head

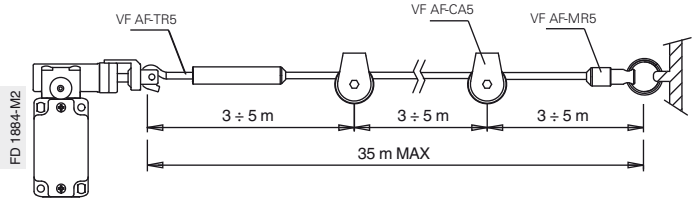
Example F



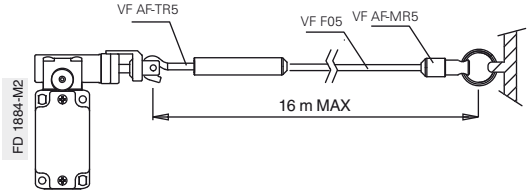
Example G



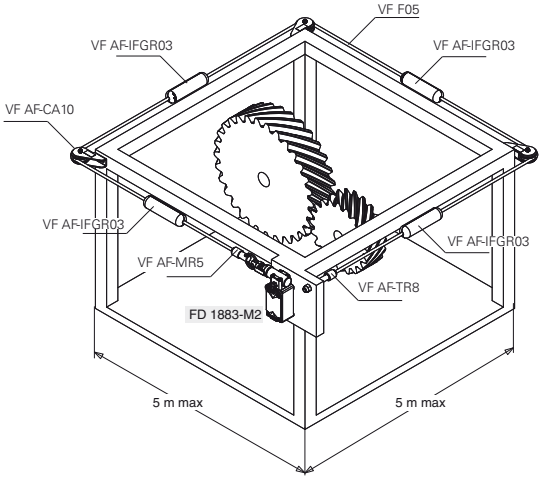
Example H



Example I

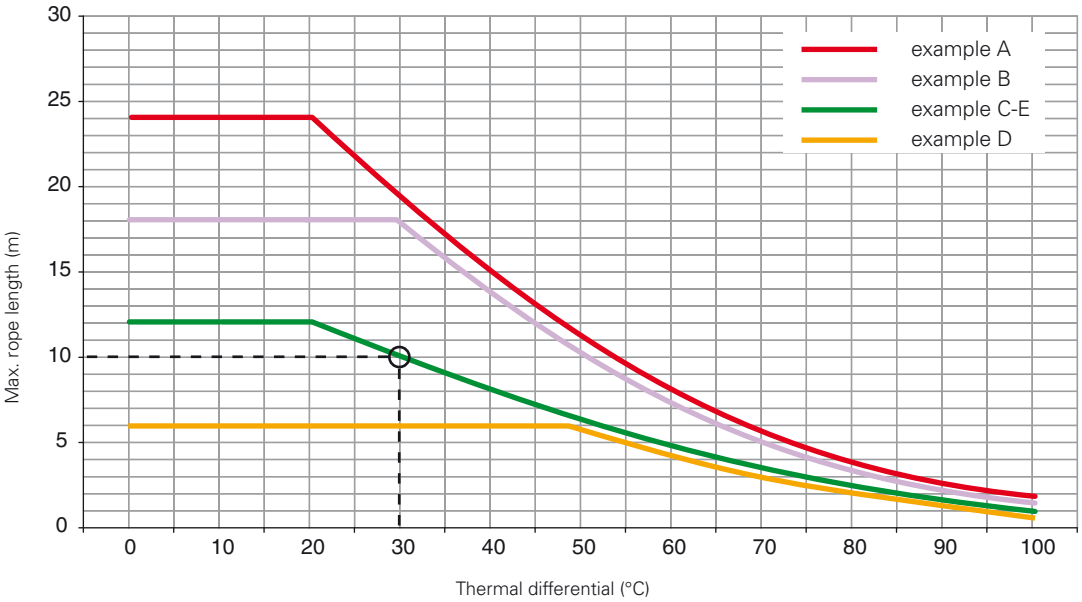


Example J



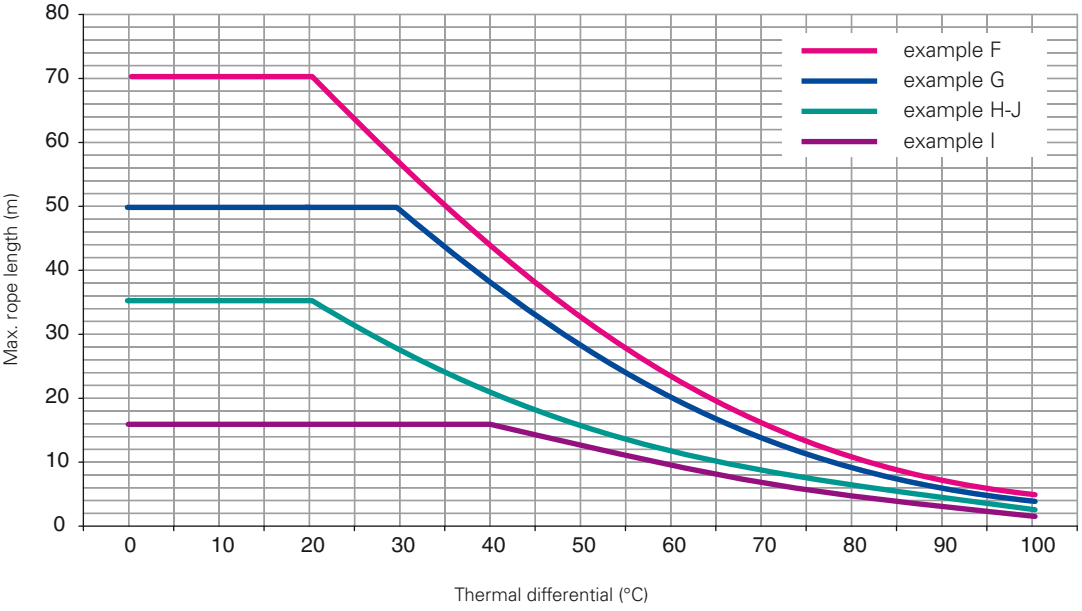
Max. rope length

Max. rope length for switches with longitudinal head



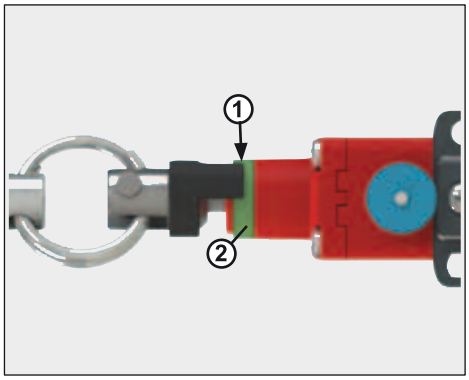
In the diagram, the suggested max. rope lengths with regard to changes of temperature (thermal differential) to which the switch is expected to be exposed in the working area are indicated. For instance, for an installation acc. to example C which expects a thermal differential of 30°C, a max. rope length of 10 meters is suggested.

Max. rope length for switches with transversal head

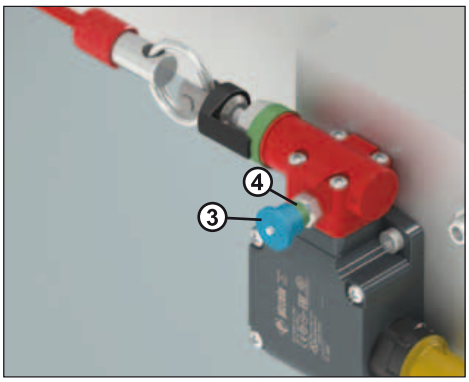


Important: The above data are guaranteed only using original rope and accessories. See page 175.

Adjustment of the operating 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.