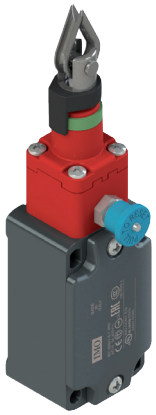
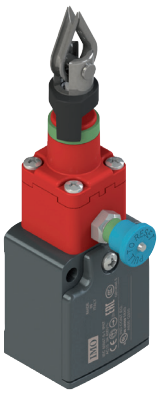
LD-LP-LL-LC Rope Safety Switches

with reset for emergency stop

- Metal or polymer housing, from one or three conduit entries
- Protection degree IP67
- In conformity with EN ISO 13850
- 7 contact blocks available
- Transverse head or longitudinal head versions
- M12 assembled connector versions

CE





Options & Ordering Codes

Note: The feasibility of a code number does not mean the effective availability of a product

LD	C18	RRS	–	J7	G	20	X50	H6

Housing

metal housing, one conduit entry	LD
metal housing, three conduit entries	LL
polymer housing, one conduit entry	LP

Contact Blocks

1NO+1NC, slow action	C18
2NC, slow action	C9
1NO+2NC, slow action	C20
3NC, slow action	C21
2NO+1NC, slow action	C22
1NO+1NC, slow action	C33
2NC, slow action	C34

Actuating Head

longitudinal head	RRS
left transverse head (LD & LL housing only)	RRL
right transverse head (LD & LL housing only)	RRR

Actuating Force

	standard
J7	initial 20N...final 40N (only for head RRS)
J9	initial 13N...final 75N (only for heads RRL & RRR)

Contact Type

	silver contacts (standard)
G	silver contacts gold plated 1 μm

Threaded Conduit Entry

	PG 13.5 (standard)
20	M20 x 1.5

Preinstalled Cable Glands or Connectors

	no cable gland or connector (standard)
X21	with assembled cable gland suitable for Ø 6 to Ø 12mm cable ranges
X50	5 pole M12 assembled metal connector
X70	4 pole M12 assembled plastic connector

Temperature

	standard
H6	-40°C to +80°C

LC	C33	RRS	–	J7	G	16	X22

Housing

metal housing, one conduit entry	LC

Contact Blocks

1NO+1NC, slow action	C33
2NC, slow action	C34

Actuating Head (as above)

Actuating Force (as above)

Contact Type (as above)

Threaded Conduit Entry

	PG 11 (standard)
16	M16 x 1.5

Preinstalled Cable Glands or Connectors

	no cable gland or connector (standard)
X22	with assembled cable gland suitable for Ø 5 to Ø 10mm cable ranges
X26	with assembled cable gland suitable for Ø 3 to Ø 7mm cable ranges

Specifications

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

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

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 .

Housing

LP series housing made of glass fiber reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈

LD, LL and LC series: metal housing, baked powder coating.

LD, LP, LC series: one threaded conduit entry:	PG13.5 (standard)
LL series: three threaded conduit entries:	PG13.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

In conformity with requirements requested by

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.

Max cable cross section (flexible copper wire)

Contact blocks C20, C21, C22, C33, C34:	min.	1 x 0.34 mm²	(1 x AWG 22)
	max.	2 x 1.5 mm²	(2 x AWG 16)
Contact blocks C18, C9:	min.	1 x 0.5 mm²	(1 x AWG 20)
	max.	2 x 2.5 mm²	(2 x AWG 14)

Electrical data

without connector

Thermal current (Ith):	10 A
Rated insulation voltage (Ui):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks C20, C21, C22, C33, C34)
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks C20, C21, C22, C33, C34)
Conditional short circuit current:	1000 A acc. to EN 60947-5-1
Protection against short circuits:	type aM fuse 10 A 500 V
Pollution degree:	3

Utilization category

Alternating 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

with M12 connector 4 and 5 poles

Thermal current (Ith):	4 A
Rated insulation voltage (Ui):	250 Vac 300 Vdc
Protection against short circuits:	type gG fuse 4 A 500 V
Pollution degree:	3

Utilization category

Alternating current: AC15 (50/60 Hz)

Ue (V)	24	120	250
Ie (A)	4	4	4

Direct current: DC13

Ue (V)	24	125	250
Ie (A)	4	1.1	0.4

with M12 connector 8 poles

Thermal current (Ith):	2 A
Rated insulation voltage (Ui):	30 Vac 36 Vdc
Protection against short circuits:	type gG fuse 2 A 500 V
Pollution degree:	3

Utilization category

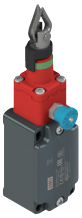
Alternating current: AC15 (50/60 Hz)

Ue (V)	24
Ie (A)	2

Direct current: DC13

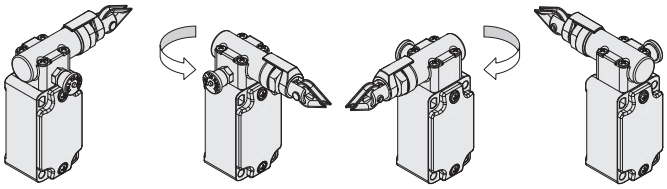
Ue (V)	24
Ie (A)	2

Description



These rope operated safety switches can be installed on machines or conveyor belts and are used to activate the emergency stop of the machine on intervention with the rope, at any point. They allow for cost savings on machines of medium-large size, where normally numerous emergency stop push buttons can be replaced by one single rope switch. Provided with a self-control function, when fitted properly they constantly check for correct operation, signalling with the opening of the contacts with a manual intervention (emergency stop activation) of an eventual pull, loosening or breaking of the rope. After activation the contacts remain open, until they are reset.

Orientable heads



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

Laser engraving

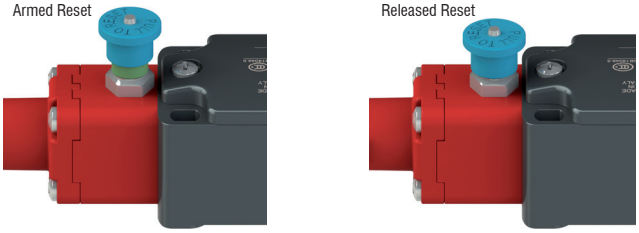
The markings of all devices are LASER printed on to the unit. As the markings are directly printed they are less likely to be rubbed off and do not fall off as found with some attached labels, making them suitable for extreme environments.

Protection degree IP67

IP67

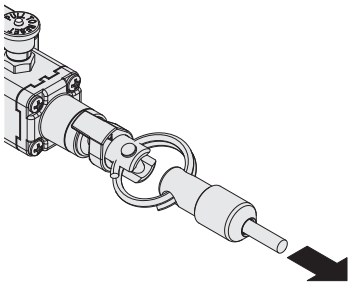
These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to IEC 60529.

Indicator for the state of the reset



If the rope tensioning indicator is in the correct area, within the green band, the unit can be reset by pulling the blue button to close the safety contacts. The state of the switch can be quickly checked by observing the tension indicator's position with respect to the green band, and the blue button in the Released Reset/Armed Reset state.

Reduced actuating force



These switches can be supplied with a spring requiring less tension for movement hence reducing the effort needed to actuate the switch, while, maintaining the correct actuation of the electrical contacts.

Adjustment point indicator of the rope

All switches are provided with a green band, this green band area is for setting the correct tensioning of the rope. The installer has to tension the rope until the black indicator is set to the middle of this green band.

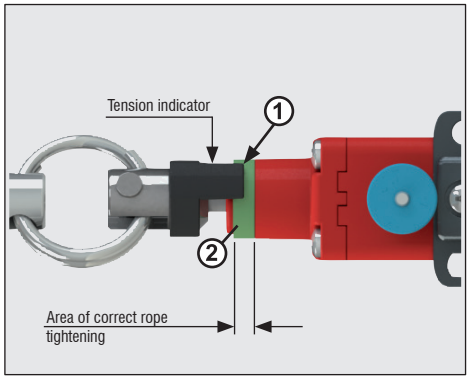
When set, a pull or loosing of the rope allows the black indictor to travel to the outside of the correct tension area (green band), at this point the safety contacts are opened and the reset device is triggered.

Extended temperature range

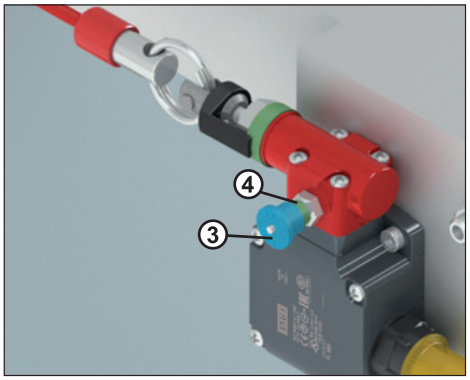
-40°C

This switch range is also available in a special version with an ambient operating temperature range of -40°C to +80°C for low temperature environments such as cold stores and sterilisers.

Adjustment of the operating point

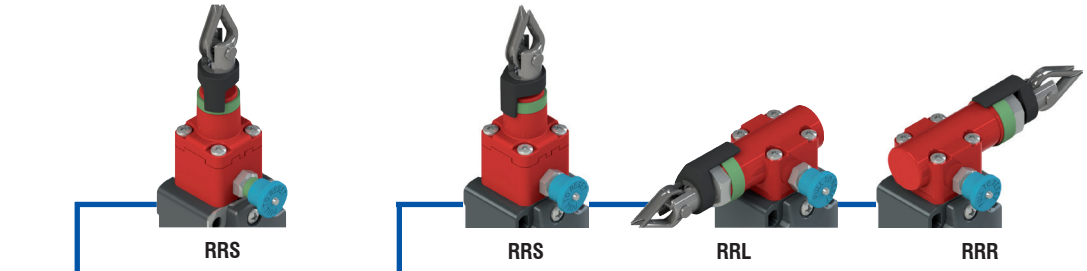


Tighten the rope connected to the switch, until the end of the indicator (1) reaches about the middle of the green ring (2).



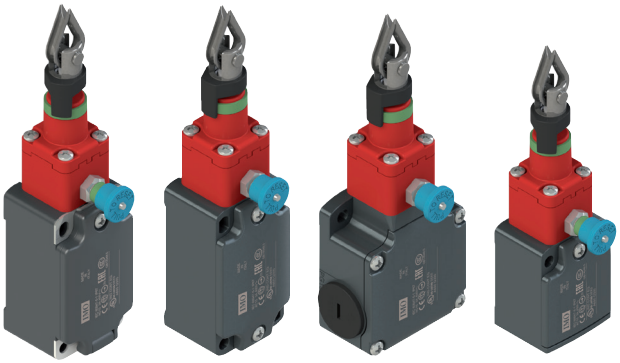
Pull the knob (3) in order to close the safety contacts inside the switch. A green band (4) will be exposed to indicate the Armed reset condition.

Selection diagram

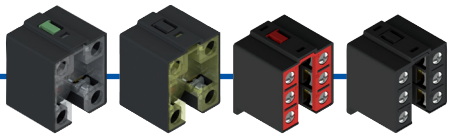


ACTUATORS

ACTUATORS



CONTACT BLOCKS

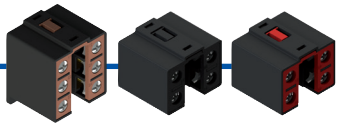


C18 1NO+1NC, slow action

C9 2NC slow action

C20 1NO+2NC, slow action

C21 3NC slow action



C22 2NO+1NC, slow action

C33 1NO+1NC, slow action

C34 2NC slow action

CONDUIT ENTRIES

Threaded conduit entries (standard)

With cable gland

With M12 plastic connector

With M12 metal connector

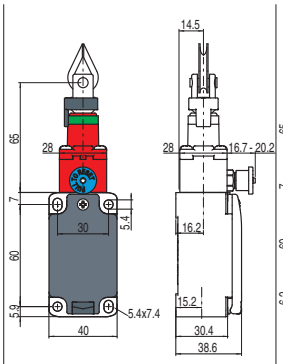
Product option

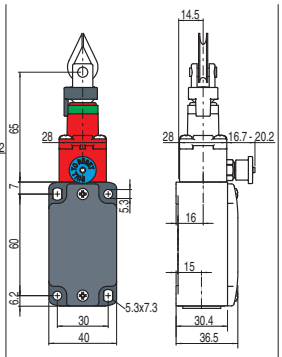
Dimensional drawings

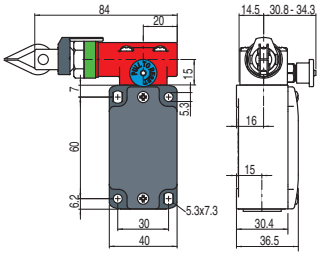
All measures in the drawings are in mm

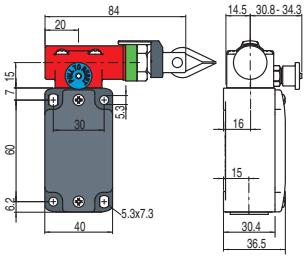
Contact type:

L = slow action



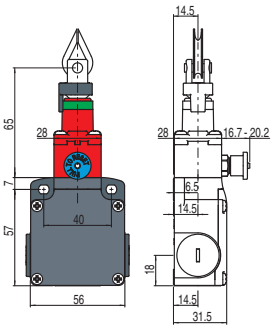


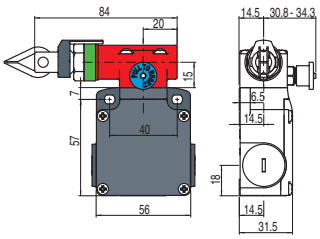


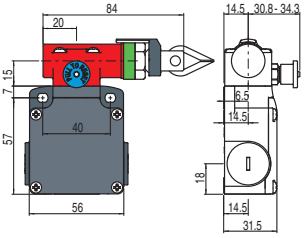


Contact blocks

C18	L	LPC18RRS	→	1NO+1NC	LDC18RRS	→	1NO+1NC	LDC18RRL	→	1NO+1NC	LDC18RRR	→	1NO+1NC
C9	L	LPC9RRS	→	2NC	LDC9RRS	→	2NC	LDC9RRL	→	2NC	LDC9RRR	→	2NC
C20	L	LPC20RRS	→	1NO+2NC	LDC20RRS	→	1NO+2NC	LDC20RRL	→	1NO+2NC	LDC20RRR	→	1NO+2NC
C21	L	LPC21RRS	→	3NC	LDC21RRS	→	3NC	LDC21RRL	→	3NC	LDC21RRR	→	3NC
C22	L	LPC22RRS	→	2NO+1NC	LDC22RRS	→	2NO+1NC	LDC22RRL	→	2NO+1NC	LDC22RRR	→	2NO+1NC
C33	L	LPC33RRS	→	1NO+1NC	LDC33RRS	→	1NO+1NC	LDC33RRL	→	1NO+1NC	LDC33RRR	→	1NO+1NC
C34	L	LPC34RRS	→	2NC	LDC34RRS	→	2NC	LDC34RRL	→	2NC	LDC34RRR	→	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		group 1			group 1			group 2			group 2		





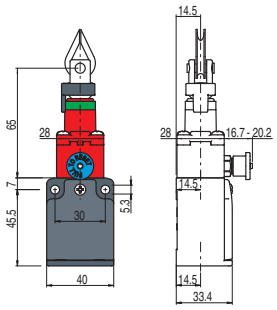


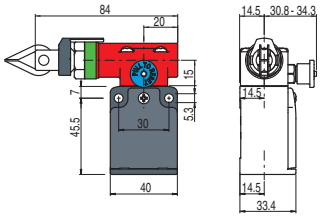
Contact blocks

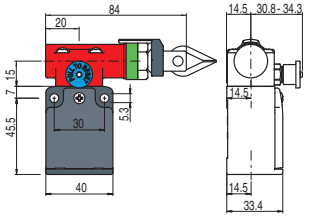
C18	L	LLC18RRS	→	1NO+1NC	LLC18RRL	→	1NO+1NC	LLC18RRR	→	1NO+1NC	
C9	L	LLC9RRS	→	2NC	LLC9RRL	→	2NC	LLC9RRR	→	2NC	
C20	L	LLC20RRS	→	1NO+2NC	LLC20RRL	→	1NO+2NC	LLC20RRR	→	1NO+2NC	
C21	L	LLC21RRS	→	3NC	LLC21RRL	→	3NC	LLC21RRR	→	3NC	
C22	L	LLC22RRS	→	2NO+1NC	LLC22RRL	→	2NO+1NC	LLC22RRR	→	2NO+1NC	
C33	L	LLC33RRS	→	1NO+1NC	LLC33RRL	→	1NO+1NC	LLC33RRR	→	1NO+1NC	
C34	L	LLC34RRS	→	2NC	LLC34RRL	→	2NC	LLC34RRR	→	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		group 1			group 2			group 2			

Contact type:

L = slow action



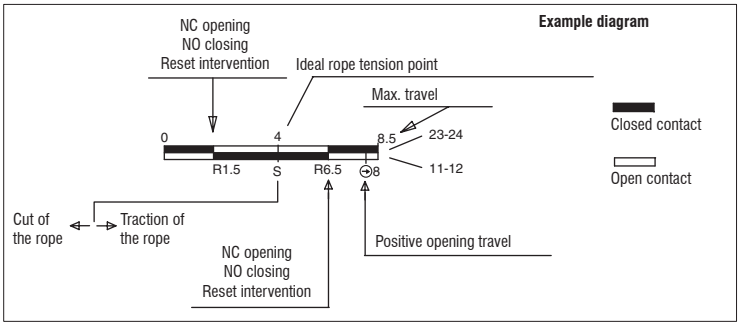




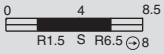
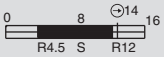
Contact blocks						
C33	L	LCC33RRS	⊖	1NO+1NC	LCC33RRL ⊖ 1NO+1NC	LCC33RRR ⊖ 1NO+1NC
C34	L	LCC34RRS	⊖	2NC	LCC34RRL ⊖ 2NC	LCC34RRR ⊖ 2NC
Min. force		Initial 63 N...final 83 N (90 N ⊖)			Initial 147 N…final 235 N (250 N ⊖)	Initial 147 N…final 235 N (250 N ⊖)
Travel diagrams		group 1			group 2	group 2

How to read travel diagrams

All measures in the diagrams are in mm



Travel diagrams table

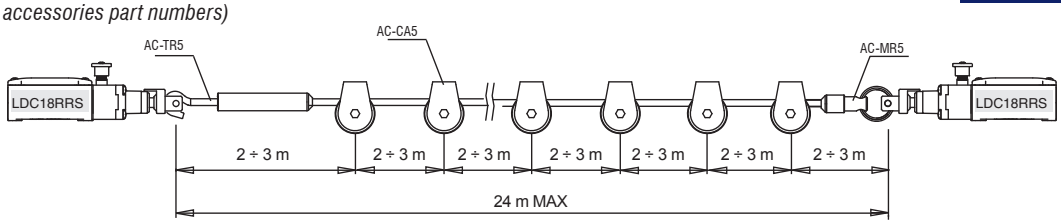
Contact blocks		Group 1	Group 2
C18 1NO+1NC			
C9 2NC			
C20 1NO+2NC			
C21 3NC			
C22 2NO+1NC			
C33 1NC+1NO			
C34 2NC			

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.

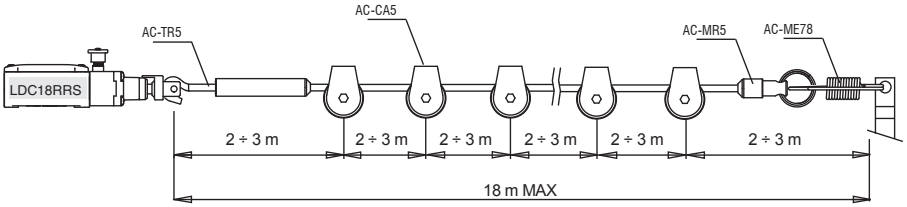
Application examples and max. rope length for switches with longitudinal head

(showing IMO accessories part numbers)

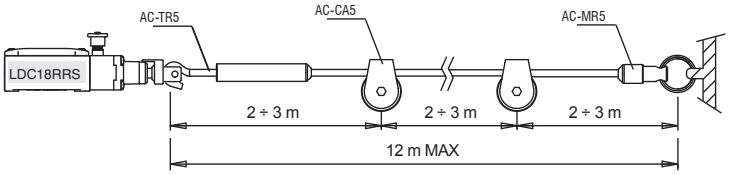
Example A



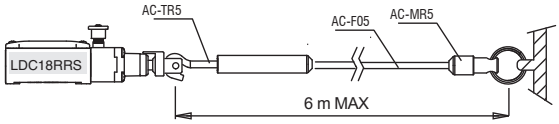
Example B



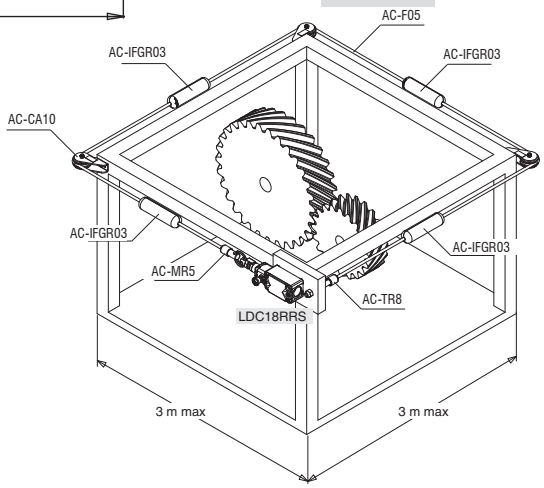
Example C



Example D



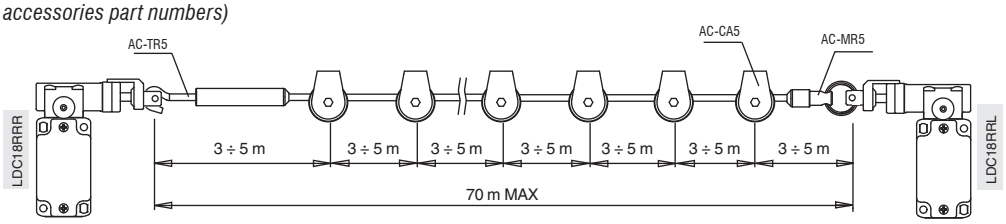
Example E



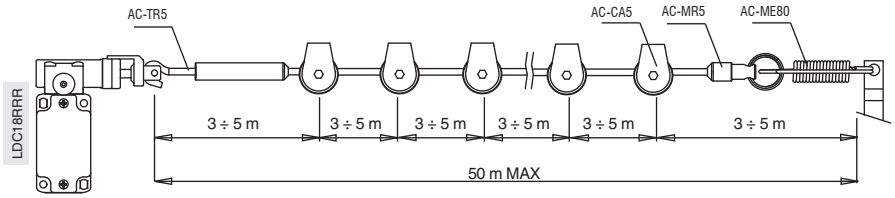
Application examples and max. rope length for switches with transversal head

(showing IMO accessories part numbers)

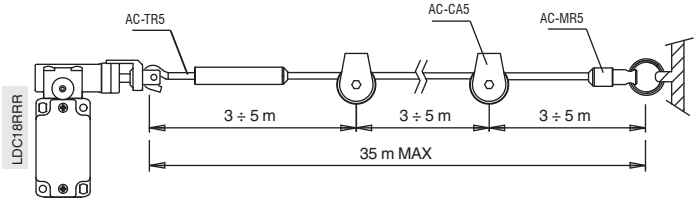
Example F



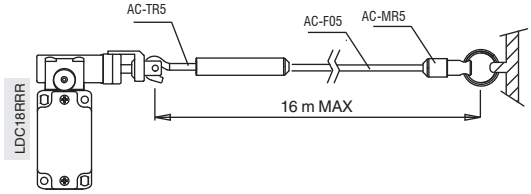
Example G



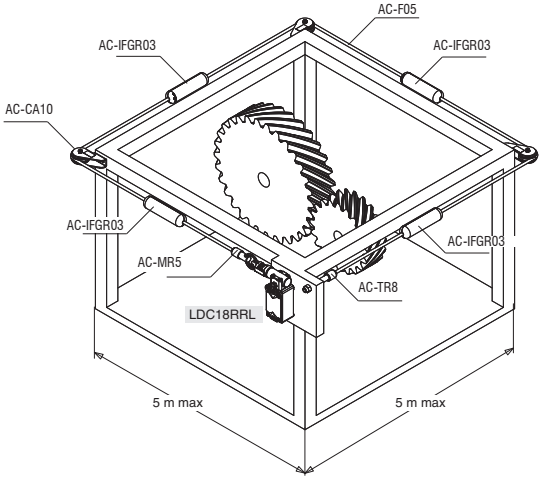
Example H



Example I

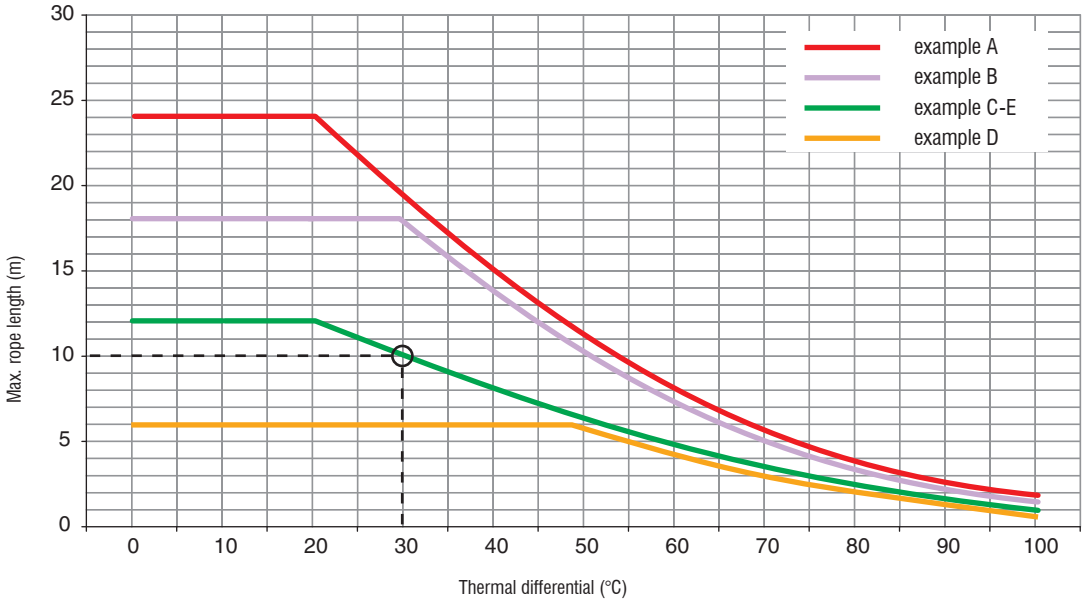


Example J



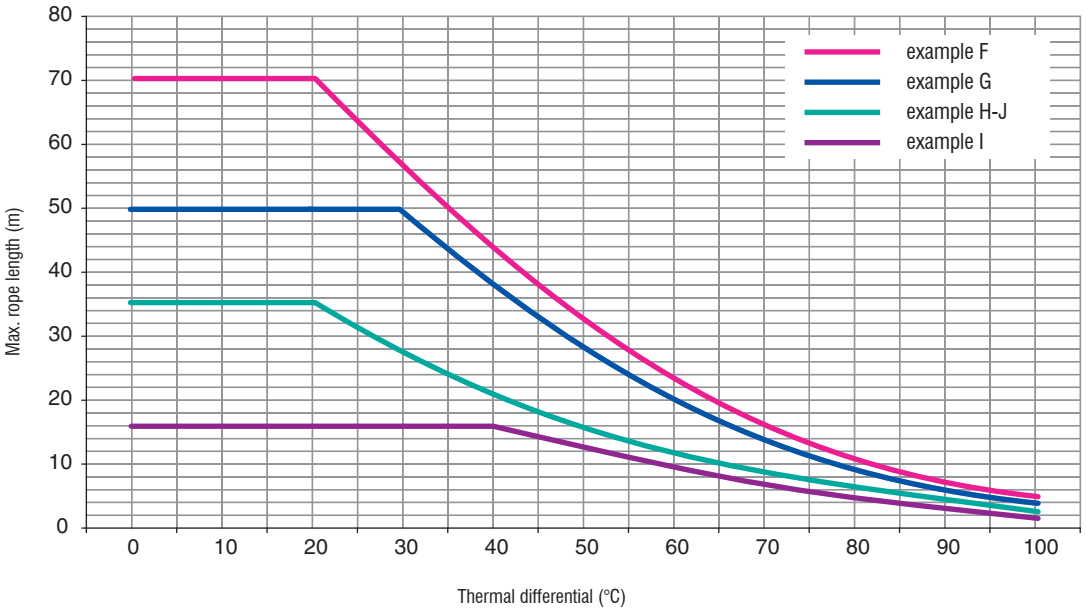
Max. rope length

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 transverse head



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