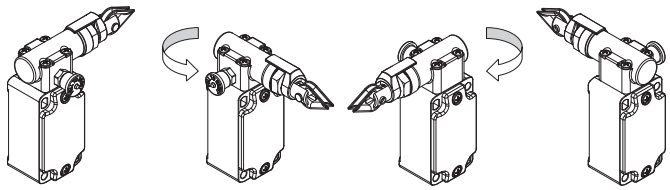
Description

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.

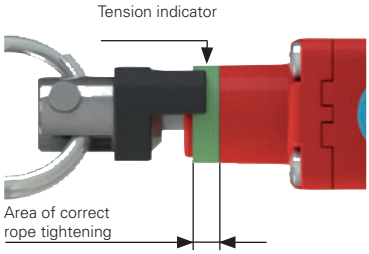
Extended temperature range

-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

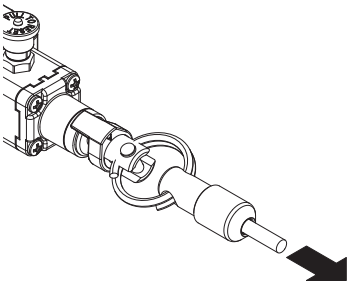
All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

Protection degree IP67

IP67

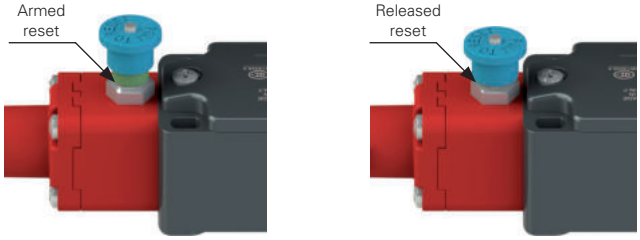
These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing.

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 (Ue):	400 Vac (50 Hz)
Operating current (Ie):	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).

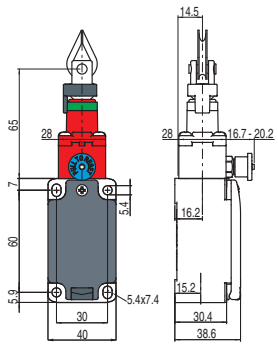
For FP series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

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

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

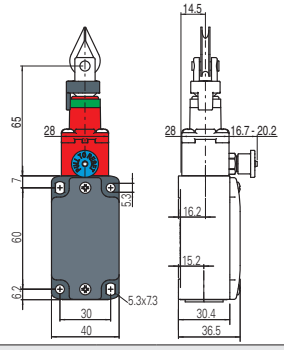
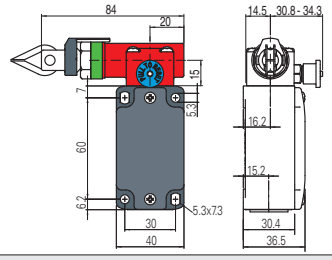
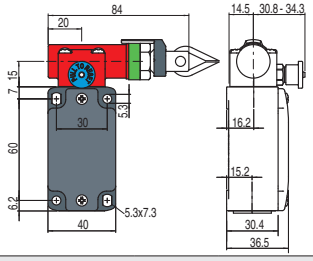
Contact type:
L = slow action

Contact blocks

		Technopolymer housing		
				
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		

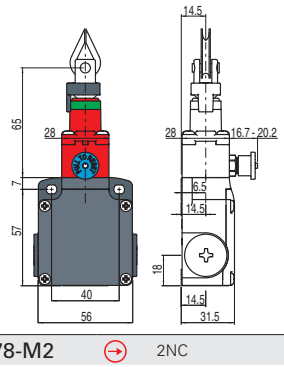
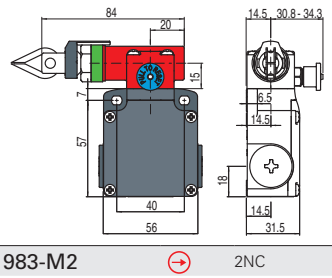
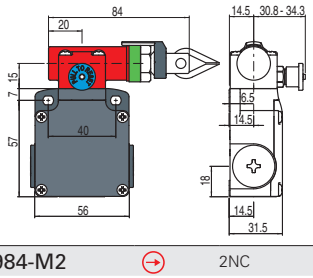
Contact type:
L = slow action

Contact blocks

		Metal housing			Metal housing			Metal housing		
										
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

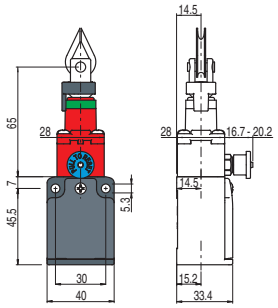
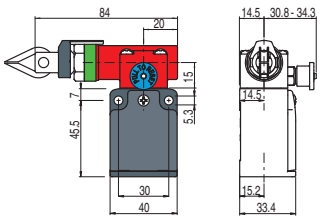
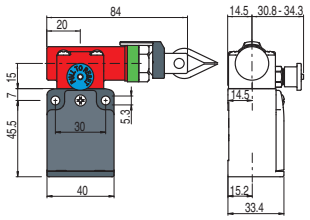
Contact blocks

		Metal housing			Metal housing			Metal housing		
										
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		

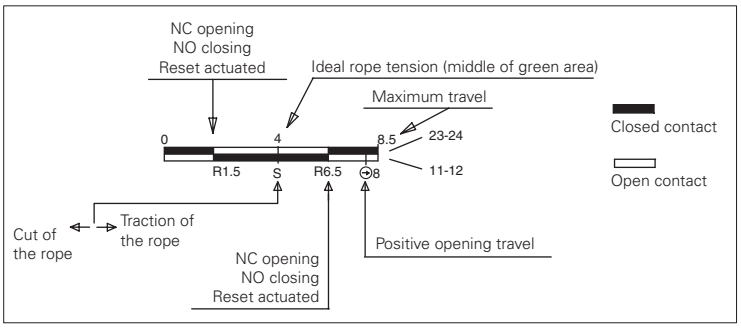
All values in the drawings are in mm

Accessories See page 419

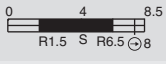
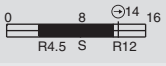
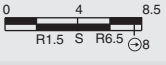
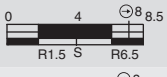
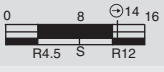
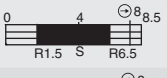
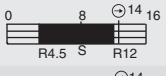
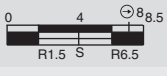
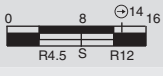
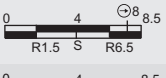
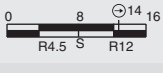
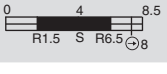
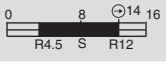
→ The 2D and 3D files are available at **www.pizzato.com**

Contact type: L = slow action	Contact blocks		Metal housing	Metal housing	Metal housing
					
L	33	FC 3378-M2	1NO+1NC	FC 3383-M2	1NO+1NC	FC 3384-M2	1NO+1NC
L	34	FC 3478-M2	2NC	FC 3483-M2	2NC	FC 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	

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.

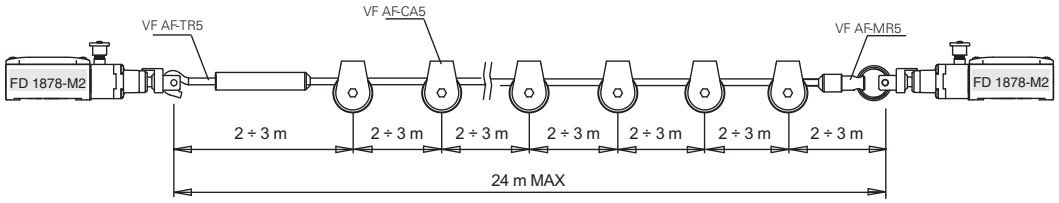
All values in the drawings are in mm

Accessories See page 419

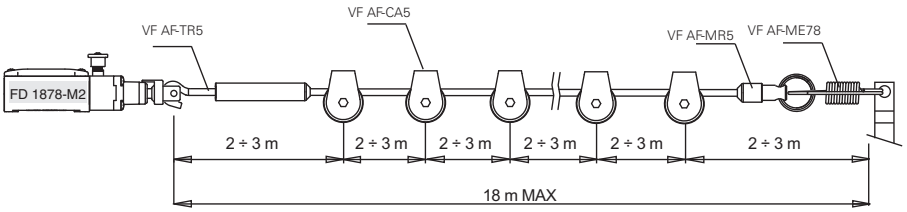
➔ The 2D and 3D files are available at **www.pizzato.com**

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

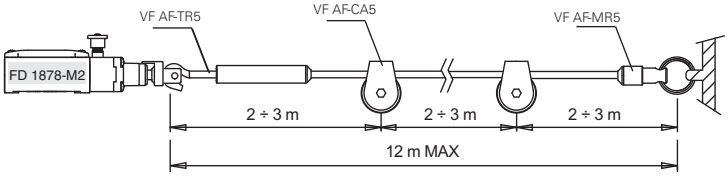
Example A



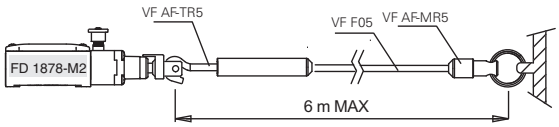
Example B



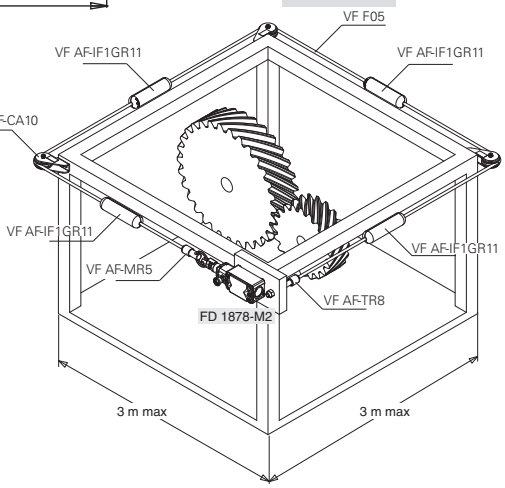
Example C



Example D

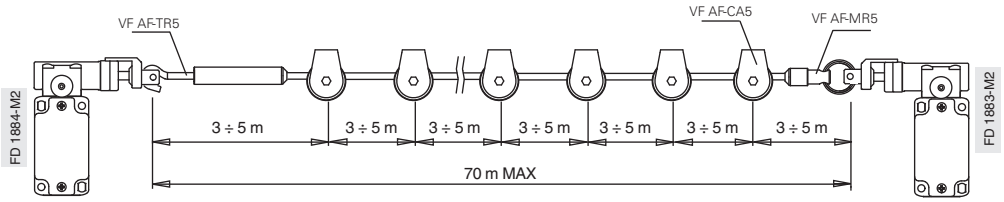


Example E

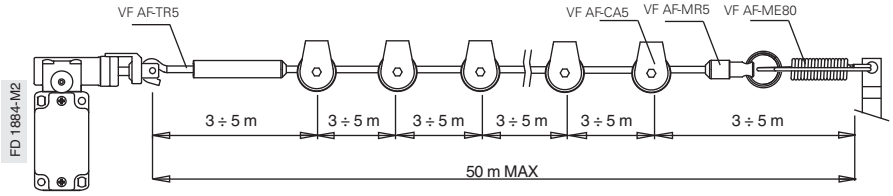


Application examples and max. rope length for switches with transversal head

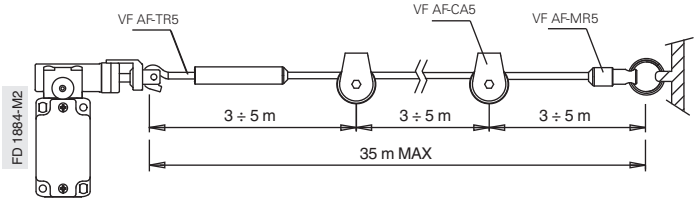
Example F



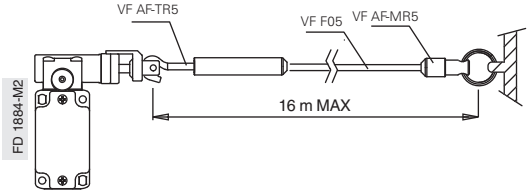
Example G



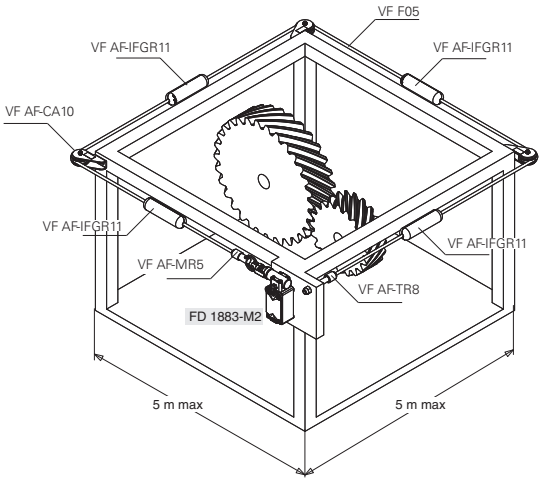
Example H



Example I

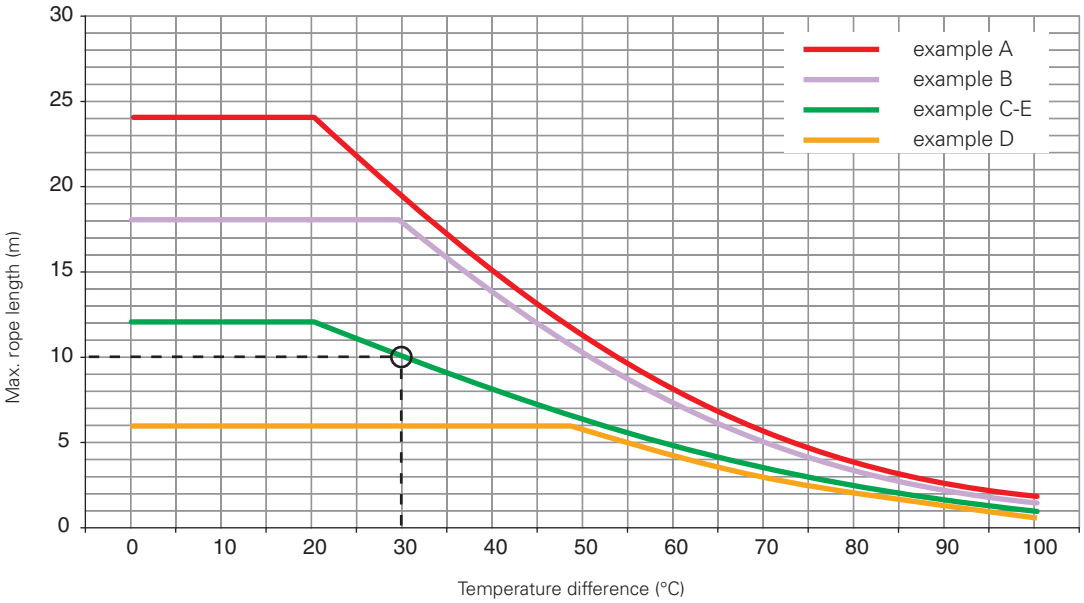


Example J



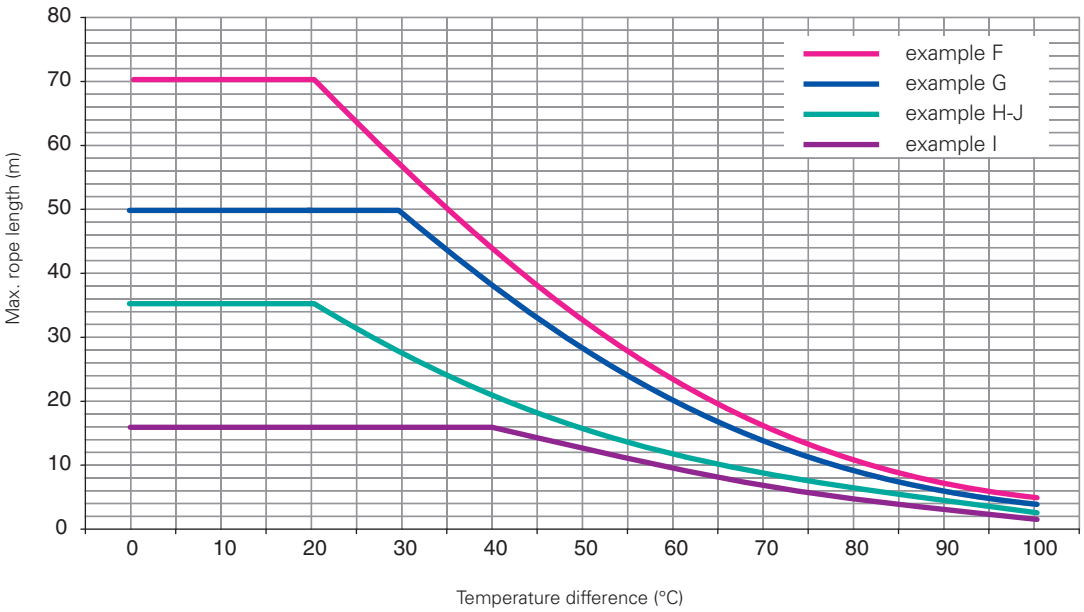
Maximum spans

Maximum spans for switches with longitudinal head



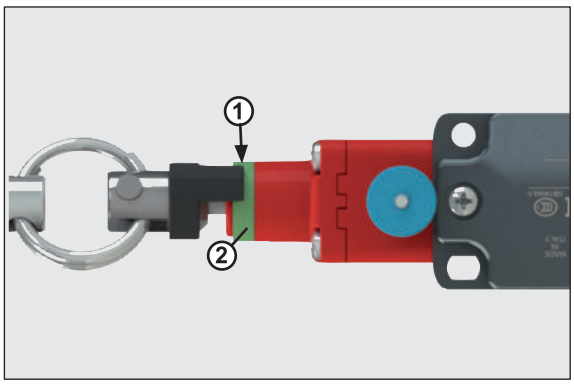
The max. recommended spans are indicated in the diagram as a function of the temperature fluctuations (temperature differences) to which the switch may be exposed at the point of use. For instance, with installation of type C and a temperature difference of 30°C, the max. recommended rope length is 10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

Maximum spans for switches with transversal head

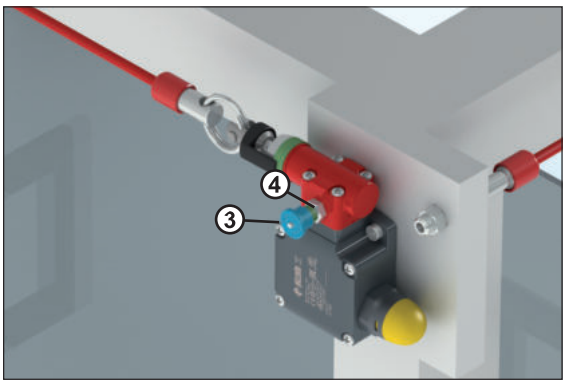


Important: The above data are guaranteed only using original rope and accessories. See page 267.

Adjustment of the switching point

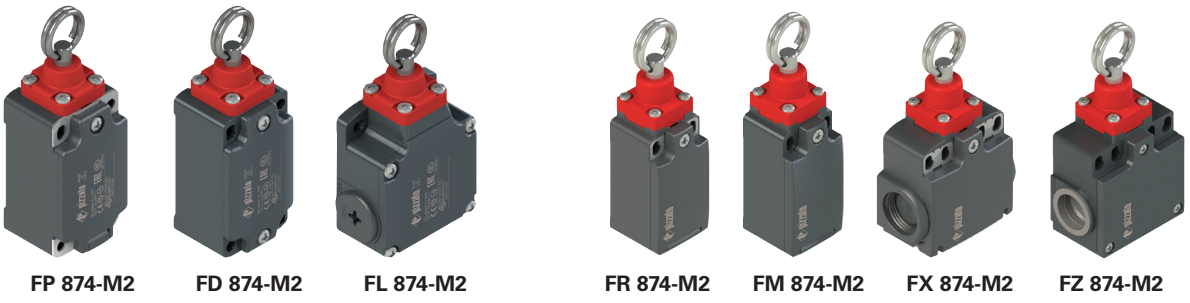


Tighten the rope connected to the switch, until the end of the indicator (1) reaches about the middle of the green ring (2).



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

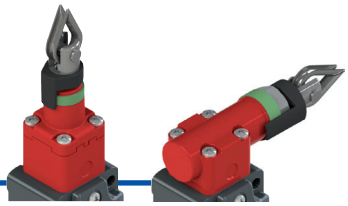
Selection diagram



FP 874-M2 | FD 874-M2 | FL 874-M2 | FR 874-M2 | FM 874-M2 | FX 874-M2 | FZ 874-M2

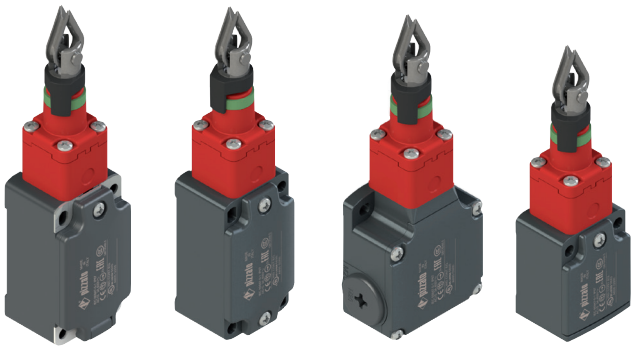
79

ACTUATORS



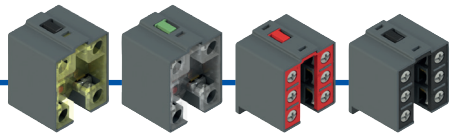
79 | 80

ACTUATORS



FP | FD | FL | FC

CONTACT BLOCKS

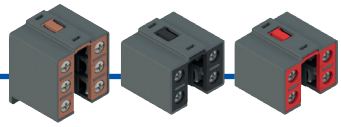


9 2NC slow action

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

CONDUIT ENTRIES

Threaded conduit entry (standard)

With cable gland

With M12 plastic connector

With M12 metal connector

Product options

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 1879-E7GM2K50T6

Housing

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

Contact block

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

Actuating head

79	longitudinal head
80	transversal head (FD-FL housing only)

Actuating force

	standard
E7	initial 20 N...final 40 N (only head 79)
E9	initial 13 N...final 75 N (only head 80)

Ambient temperature

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

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.

Threaded conduit entry

M2	M20x1.5 (standard)
	PG 13.5

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 3379-E7GM2K50T6

Housing

FC	metal, one conduit entry

Contact blocks

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

Actuating head

79	longitudinal head
80	transversal head

Actuating force

	standard
E7	initial 20 N...final 40 N (only head 79)
E9	initial 13 N...final 75 N (only head 80)

Pre-installed cable glands

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

Threaded conduit entry

M2	M20x1.5 (standard)
	PG 11

Ambient temperature

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

Contact type

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

article | options | options

FD 874-E7GM2K50T6

Housing

FD	metal, one conduit entry
FL	metal, three conduit entries
FP	technopolymer, one conduit entry
FR	technopolymer, one conduit entry
FM	metal, one conduit entry
FX	technopolymer, two conduit entries
FZ	metal, two conduit entries

Actuating force

	standard
E7	initial 20 N...final 40 N

Contact type

	silver contacts (standard)
G	silver contacts with 1 µm gold coating
G1	silver contacts with 2.5 µm gold coating

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.

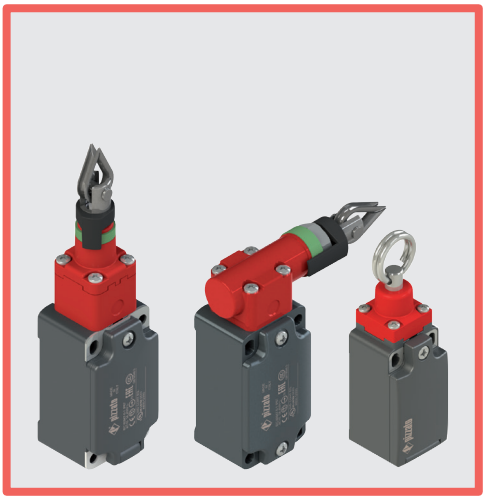
Threaded conduit entry

M2	M20x1.5 (standard)
M1	M16x1.5 (FR-FX housing only)
	PG 13.5
A	PG 11 (FR-FX housing only)

Ambient temperature

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

Safety **rope switch without reset** for simple stop



Main features

- Metal or plastic housing, from one to three conduit entries
- Protection degree IP67
- 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 (FD-FL-FP-FC series) EG610 (FR-FX-FM-FZ series)
UL approval:	E131787
CCC approval:	2021000305000099 (FD-FP-FL-FC series) 2021000305000101 (FR-FX-FM-FZ series)
EAC approval:	RU C-IT.УТ03.B.00035/19

Technical data

Housing

FP, FR, FX series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈
FD, FL, FC, FM, FZ series: metal housing, baked powder coating.

FD, FP, FC, FR, FM series: one threaded conduit entry:	M20x1.5 (standard)
FX series: two knock-out threaded conduit entries:	M20x1.5 (standard)
FZ series: two threaded conduit entries:	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 pages 441 and 443
Wire cross-sections and wire stripping lengths:	see page 461

In compliance with standards:
IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, 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:
Low Voltage Directive 2014/35/EU, 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.

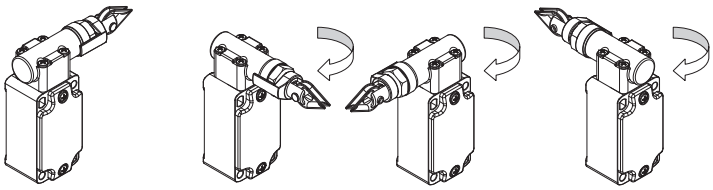
⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 443 to 454.

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

Description

These rope-operated safety switches are installed on machines or conveyor belts and facilitate the simple shut-down of the machine from any point and with any pull on the rope.
Provided with self-control function, they allow the constant monitoring of correct functioning, signalling with the opening of the contacts an eventual loosening or breaking of the rope.

Head with variable orientation



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

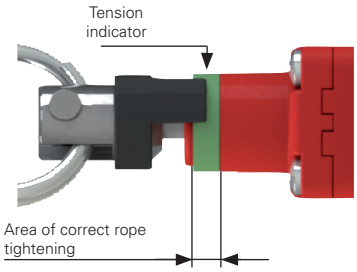
Protection degree IP67

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.

Extended temperature range

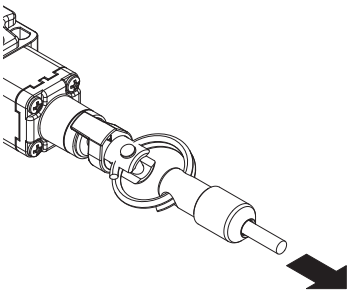
-40°C These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.
They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Indicator for rope adjustment



The switches (head 79 and 80) 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. 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.

Actuating forces



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.

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 (Ue):	400 Vac (50 Hz)
Operating current (Ie):	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:	FR: Types 1, 4X FD, FP, FC, FM, FX. FZ, FL: Types 1, 4X, 12, 13

Use 60 or 75°C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid.

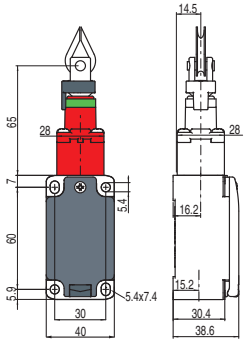
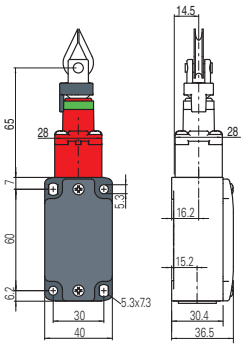
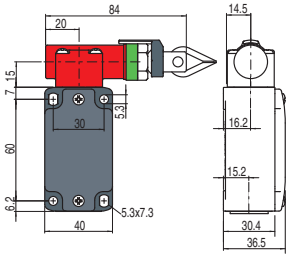
The terminal tightening torque of 7.1 lb in (0.8 Nm).

For FR, FP, FX series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

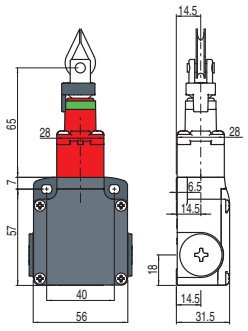
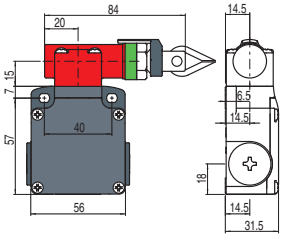
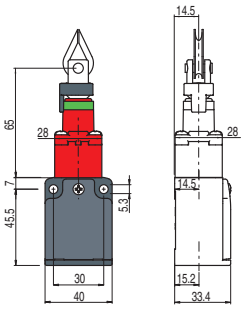
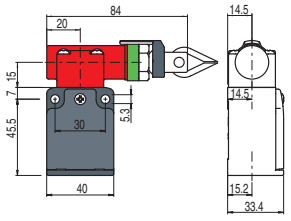
Please contact our technical department for the list of approved products.

Safety **rope switch without reset** for simple stop

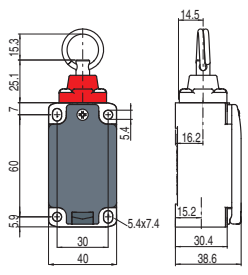
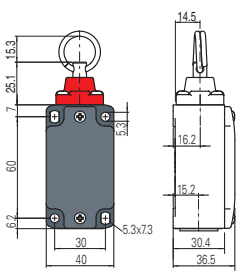
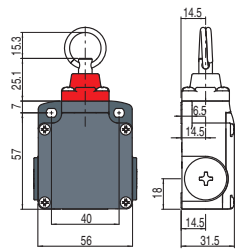
Contact type:
L = slow action

Contact block		Technopolymer housing		Metal housing		Metal housing	
							
9	L	FP 979-M2	2NC	FD 979-M2	2NC	FD 980-M2	2NC
18	L	FP 1879-M2	1NO+1NC	FD 1879-M2	1NO+1NC	FD 1880-M2	1NO+1NC
20	L	FP 2079-M2	1NO+2NC	FD 2079-M2	1NO+2NC	FD 2080-M2	1NO+2NC
21	L	FP 2179-M2	3NC	FD 2179-M2	3NC	FD 2180-M2	3NC
22	L	FP 2279-M2	2NO+1NC	FD 2279-M2	2NO+1NC	FD 2280-M2	2NO+1NC
33	L	FP 3379-M2	1NO+1NC	FD 3379-M2	1NO+1NC	FD 3380-M2	1NO+1NC
34	L	FP 3479-M2	2NC	FD 3479-M2	2NC	FD 3480-M2	2NC
Actuating 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)	
Travel diagrams		Page 264 - group 1		Page 264 - group 1		Page 264 - group 2	

Contact type:
L = slow action

Contact block		Metal housing		Metal housing		Metal housing		Metal housing	
									
9	L	FL 979-M2	2NC	FL 980-M2	2NC	/		/	
18	L	FL 1879-M2	1NO+1NC	FL 1880-M2	1NO+1NC	/		/	
20	L	FL 2079-M2	1NO+2NC	FL 2080-M2	1NO+2NC	/		/	
21	L	FL 2179-M2	3NC	FL 2180-M2	3NC	/		/	
22	L	FL 2279-M2	2NO+1NC	FL 2280-M2	2NO+1NC	/		/	
33	L	FL 3379-M2	1NO+1NC	FL 3380-M2	1NO+1NC	FC 3379-M2	1NO+1NC	FC 3380-M2	1NO+1NC
34	L	FL 3479-M2	2NC	FL 3480-M2	2NC	FC 3479-M2	2NC	FC 3480-M2	2NC
Actuating force		Initial 63 N…final 83 N (90 N)		Initial 147 N…final 235 N (250 N)		Initial 63 N…final 83 N (90 N)		Initial 147 N…final 235 N (250 N)	
Travel diagrams		Page 264 - group 1		Page 264 - group 2		Page 264 - group 1		Page 264 - group 2	

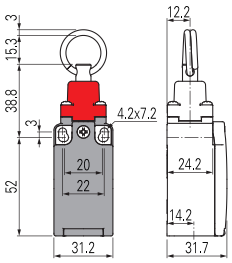
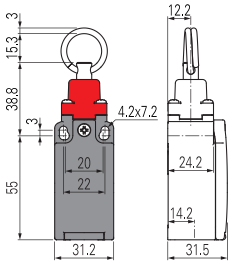
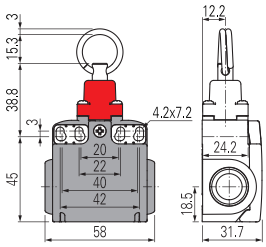
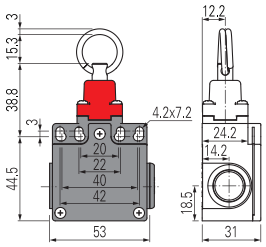
Contact type:
L = slow action

Contact block		Technopolymer housing		Metal housing		Metal housing	
							
8	L	FP 874-M2	1NC	FD 874-M2	1NC	FL 874-M2	1NC
Actuating force		Initial 63 N…final 83 N (90 N)		Initial 63 N…final 83 N (90 N)		Initial 63 N…final 83 N (90 N)	
Travel diagrams		Page 264 - group 3		Page 264 - group 3		Page 264 - group 3	

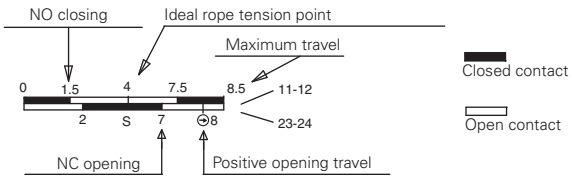
All values in the drawings are in mm

Accessories See page 419

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

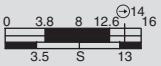
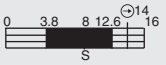
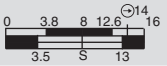
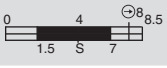
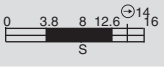
Contact type: L = slow action	Technopolymer housing	Metal housing	Technopolymer housing	Metal housing
				
Contact blocks				
8 L	FR 874-M2 → 1NC	FM 874-M2 → 1NC	FX 874-M2 → 1NC	FZ 874-M2 → 1NC
Actuating force	Initial 63 N…final 83 N (90 N →)	Initial 63 N…final 83 N (90 N →)	Initial 63 N…final 83 N (90 N →)	Initial 63 N…final 83 N (90 N →)
Travel diagrams	Page 264 - group 3	Page 264 - group 3	Page 264 - group 3	Page 264 - group 3

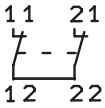
How to read travel diagrams



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.

Travel diagrams table

Contact block		Group 1	Group 2	Group 3
8 1NC				
9 2NC				
18 1NO+1NC				
20 1NO+2NC				
21 3NC				
22 2NO+1NC				
33 1NC+1NO				
34 2NC				



In the rest position (with rope correctly tightened) the two contacts of **contact block 8** are both closed and are activated respectively by tightening or loosening the rope. In order to use this contact block for safety applications it is necessary to connect the two contacts in series. For this reason, in the wiring diagrams the **contact block 8** is indicated as 1NC, whereas in travel diagrams both contacts are indicated.

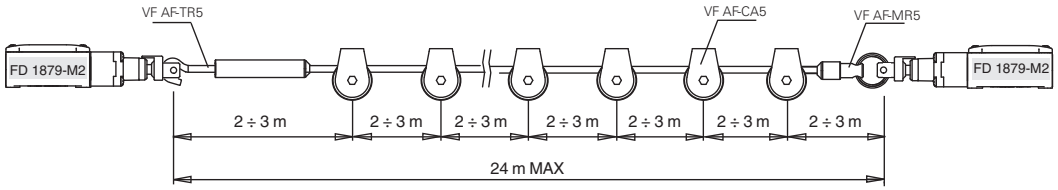
All values in the drawings are in mm

Accessories See page 419

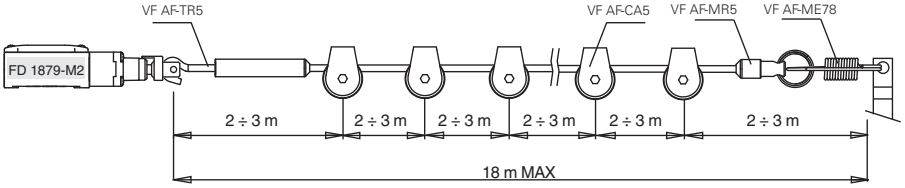
→ The 2D and 3D files are available at **www.pizzato.com**

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

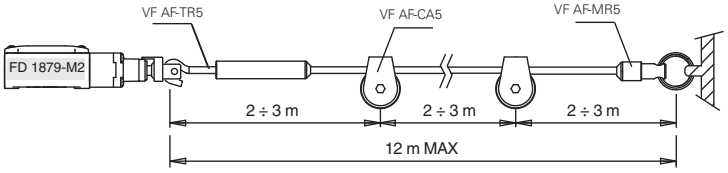
Example A



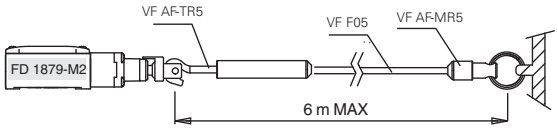
Example B



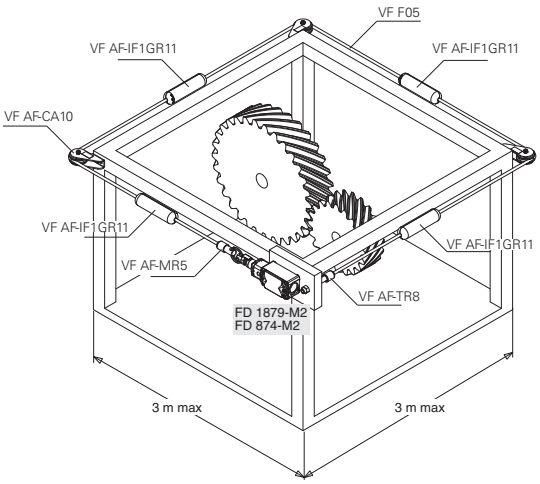
Example C



Example D

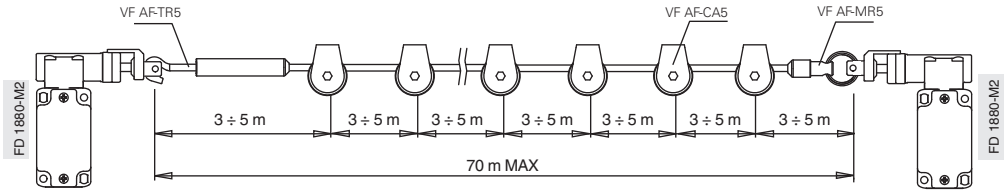


Example E

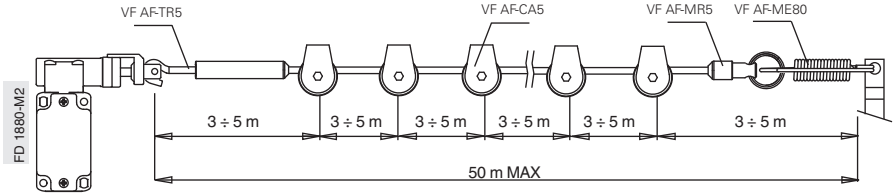


Application examples and max. rope length for switches with transversal head

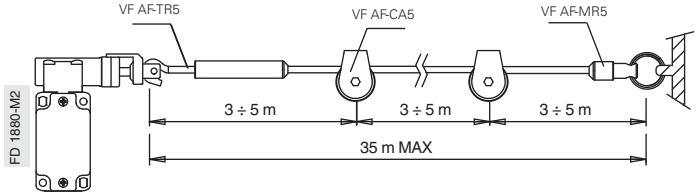
Example F



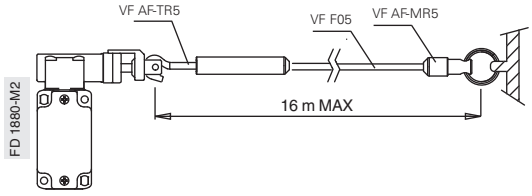
Example G



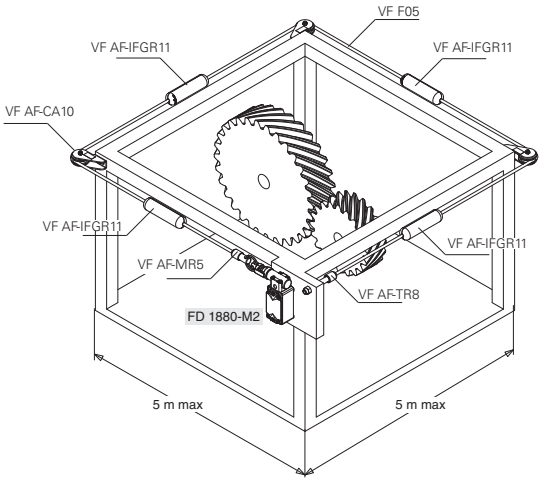
Example H



Example I

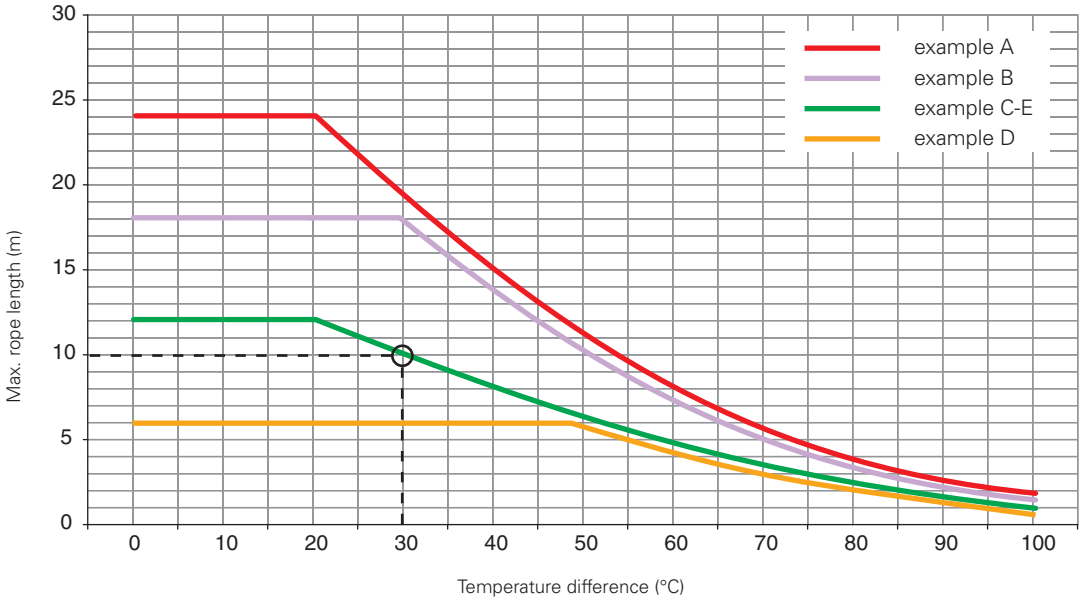


Example J

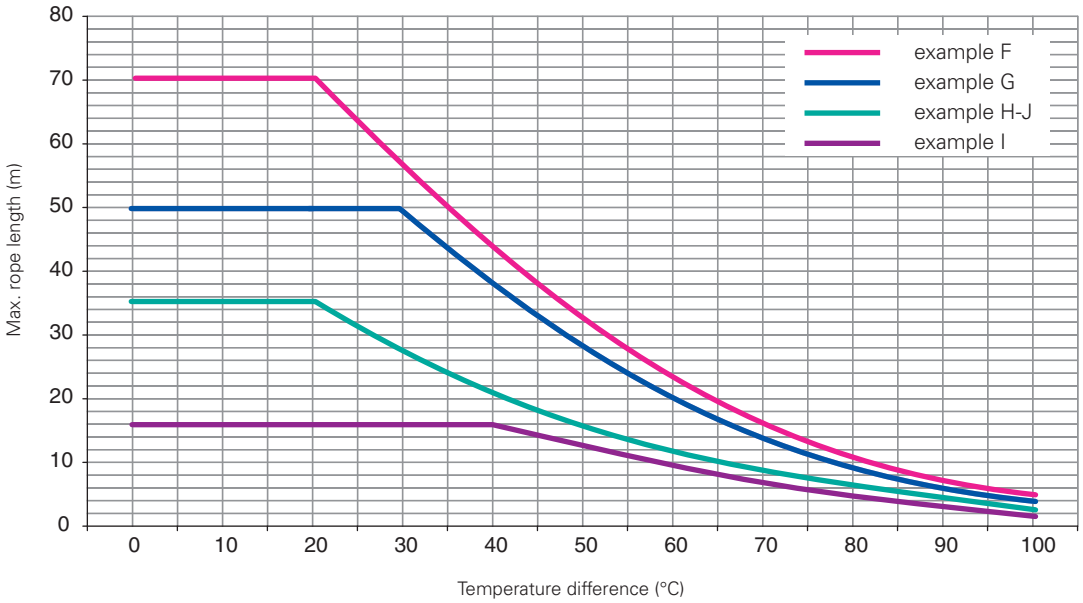


Maximum spans

Maximum spans for switches with longitudinal head



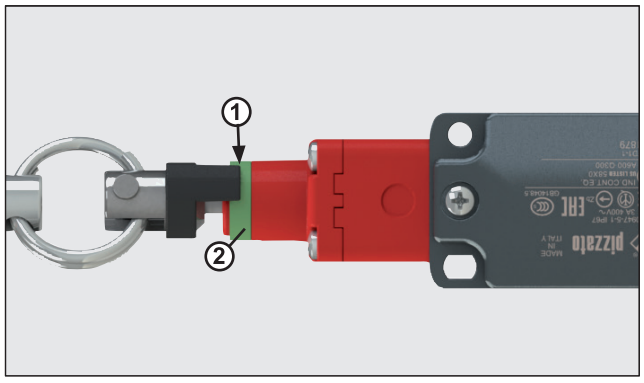
Maximum spans for switches with transversal head



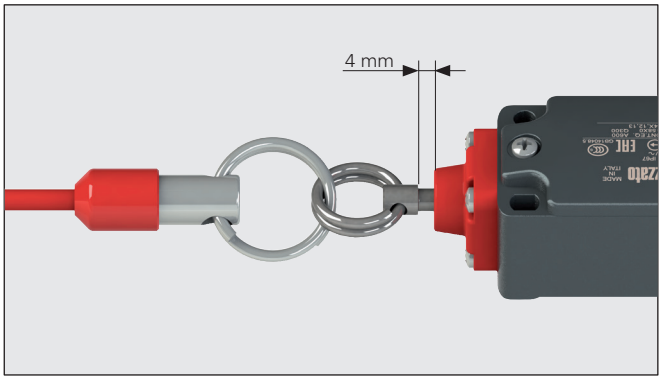
The max. recommended spans are indicated in the diagram as a function of the temperature fluctuations (temperature differences) to which the switch may be exposed at the point of use. For instance, with installation of type C and a temperature difference of 30°C, the max. recommended rope length is 10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

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

Adjustment of the switching point



For switches with head 79 and 80: Tighten the rope connected to the switch, until the end of the indicator (1) reaches about the middle of the green ring (2).

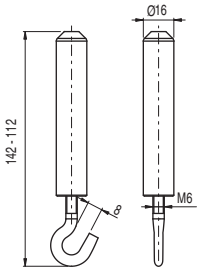


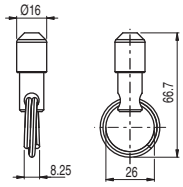
For switches with head 74: Tighten the rope connected to the switch until the thimble will be at about 4 mm from the head.

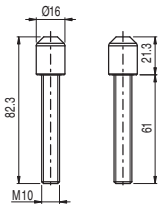
Accessories for **rope** safety switches

Accessories for rope installation - FAST line

Article	Description	Article	Description	Article	Description
VF AF-TR5	Adjustable stay bolt	VF AF-MR5	End clamp	VF AF-TR8	Stay bolt

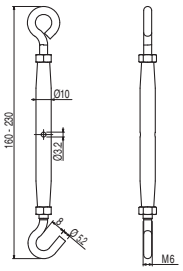


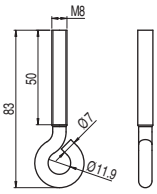




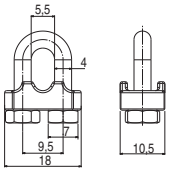
Accessories for rope installation

Article	Description	Article	Description	Article	Description	Article	Description
VF AF-TR2X	Adjustable stay bolt in stainless steel	VF T870	Stay bolt	VF M870	Terminal	VF C870	Jumper

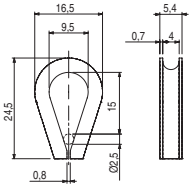




Packs of **10 pcs.**



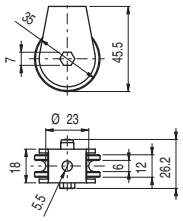
Packs of **10 pcs.**

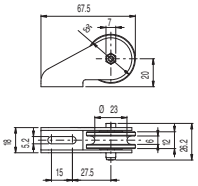


Packs of **10 pcs.**

Pulleys

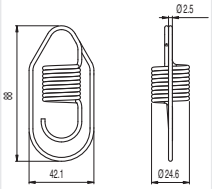
Article	Description	Article	Description
VF AF-CA5	Stainless steel pulley	VF AF-CA10	Angular pulley, stainless steel



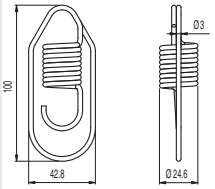


Safety springs

Article	Description	Article	Description
VF AF-ME78	Safety spring in stainless steel	VF AF-ME80	Safety spring in stainless steel



For switches with longitudinal head



For switches with transversal head

All values in the drawings are in mm

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

LED signalling lights

Article	Description
VF SL1A2PA1	White, 24 Vac/dc
VF SL1A3PA1	Red, 24 Vac/dc
VF SL1A4PA1	Green, 24 Vac/dc
VF SL1A5PA1	Yellow, 24 Vac/dc

These LED signalling lights are used for signalling that an electric contact has changed its state inside the switch. They can be installed on switches by screwing them on one of the conduit entries not used for electric cables. For details see page 436.

Function indicators

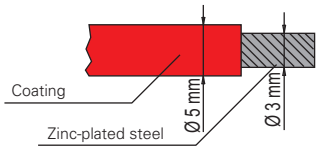
Article	Engraving	Language	Notes
VF AF-IF1GR00			
VF AF-IF1GR01	STOP EMERGENZA	ita	
VF AF-IF1GR02	EMERGENCY STOP	eng	
VF AF-IF1GR03	STOP	eng	
VF AF-IF1GR04	NOT - AUS	deu	
VF AF-IF1GR05	ARRET D'URGENCE	fra	
VF AF-IF1GR06	PARADA DE EMERGENCIA	esp	
VF AF-IF1GR07	NODSTOP	dan	
VF AF-IF1GR08	STOP	eng	
VF AF-IF1GR11			In compliance with EN ISO 13850

Rope function indicators in conformity with standard EN ISO 13850.

Ropes and further accessories

Article	Description	Weight (Kg)
VF F05-100	100 m of rope on spool	5.1
VF F05-035	35 m of rope on spool	1.8
VF F05-020	20 m of rope, loose	1.0
VF F05-010	10 m of rope, loose	0.5

Zinc-plated steel rope coated with red plastic covering, 5 mm diameter.



The rope is robust and has long-lasting protection against mechanical damage and corrosion.

Article	Description
VF F05-400	Rope

400 m spool of zinc-plated steel rope coated with red plastic covering, 5 mm diameter.

Weight 20.5 Kg.

Article	Description
VF F05-500B	Rope

500 m spool of zinc-plated steel rope coated with white plastic covering, 5 mm diameter.

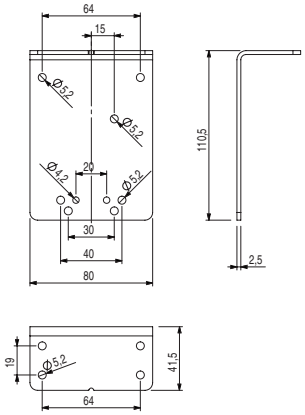
Weight 25.6 Kg.

Article	Description
VF SB400	Rope dispenser

Rope dispenser for 400 m and 500 m spools. This rope dispenser makes it easy to unroll the rope without tangles.

Article	Description
VF SFP2	Ceiling fixing plate

Metal fixing plate, for fixing rope switches on the ceiling.
The plate is provided with bore holes for fasting switches of the series. It is supplied without screws.



All values in the drawings are in mm

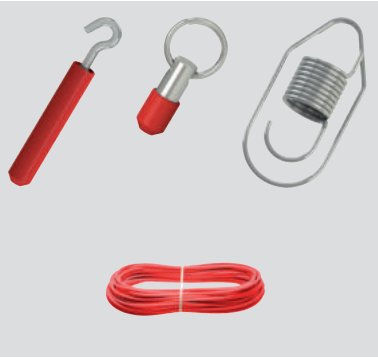
➔ The 2D and 3D files are available at **www.pizzato.com**

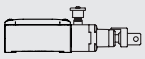
Accessory sets for rope installation - FAST line

Practical installation set containing stay bolts and rope in the same package.

Article	Set content	
VF AF-KT10M0	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-010	10 m
VF AF-KT20M0	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-020	20 m
VF AF-KT35M0	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-035	35 m

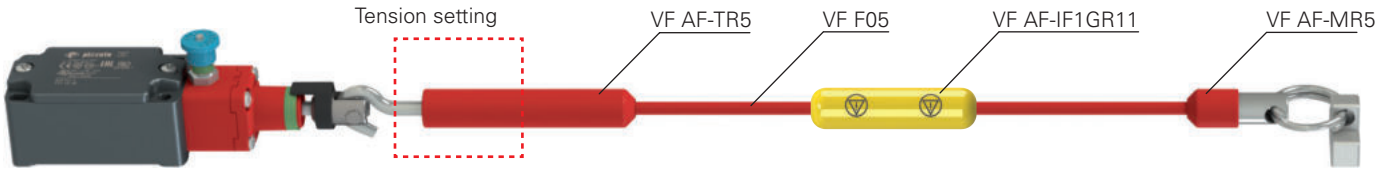
Article	Set content	
VF AF-KM10R0	1x VF AF-MR5 1x VF AF-TR8 1x VF F05-010	10 m
VF AF-KM20R0	1x VF AF-MR5 1x VF AF-TR8 1x VF F05-020	20 m
VF AF-KM35R0	1x VF AF-MR5 1x VF AF-TR8 1x VF F05-035	35 m



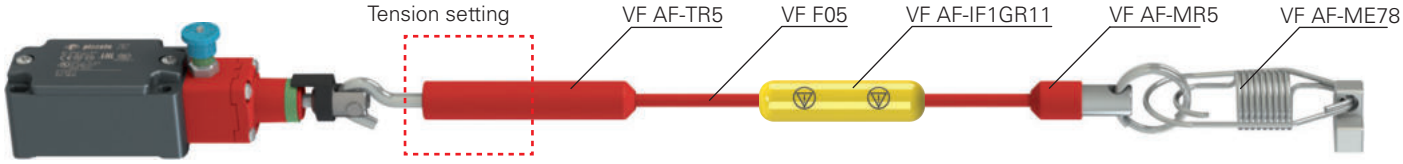
Article	Set content	
VF AF-KT10M7	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-010 1x VF AF-ME78	 10 m For switches 78-79 with longitudinal heads only
VF AF-KT20M8	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-020 1x VF AF-ME80	 20 m For switches 80-83-84 with transversal heads only
VF AF-KT35M8	1x VF AF-TR5 1x VF AF-MR5 1x VF F05-035 1x VF AF-ME80	 35 m For switches 80-83-84 with transversal heads only

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

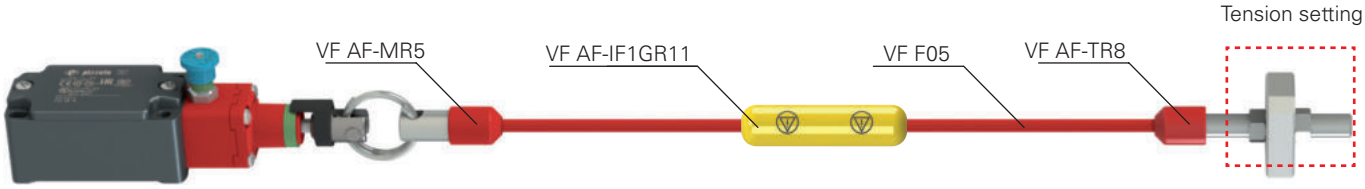
Combination examples



This combination of accessories is suitable for medium rope lengths, where the two rope ends are far away from each other.

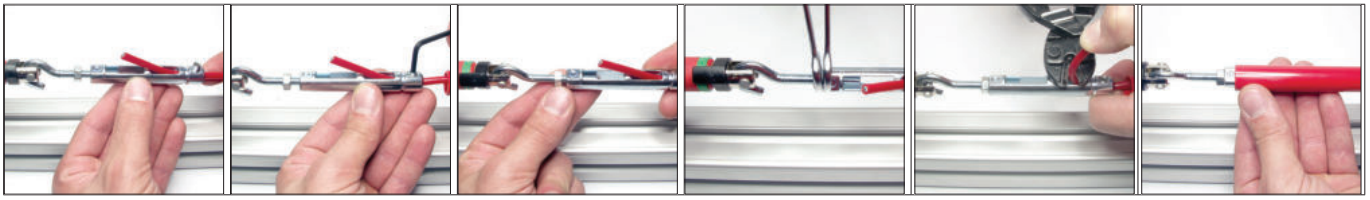


This combination of accessories is suitable for medium-high rope lengths (thanks to VF AF-ME78 safety spring) and where the two rope ends are far away from each other.



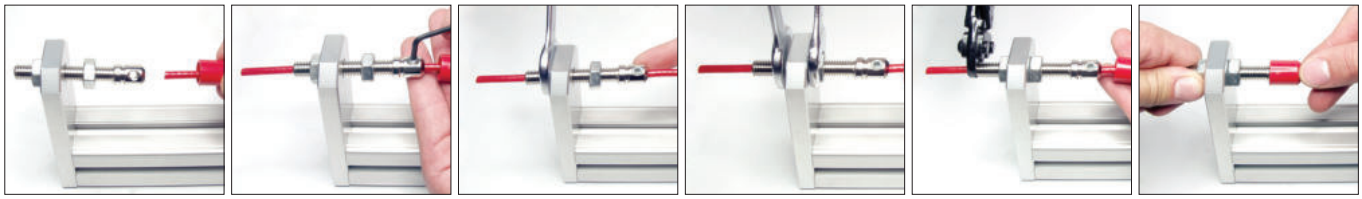
This combination of accessories is suitable for medium rope lengths or where the two rope ends are close to each other.

A Installation of adjustable stay bolt VF AF-TR5



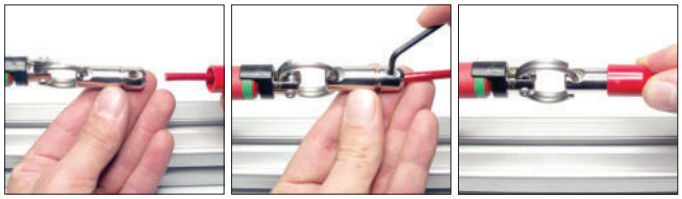
Rope insertion | Rope fixing | Rope tightening | Stay bolt blocking | Cutting of the rope in excess | Stay bolt covering

B Installation of adjustable stay bolt VF AF-TR8



Rope insertion | Rope fixing | Rope tightening | Stay bolt blocking | Cutting of the rope in excess | Stay bolt covering

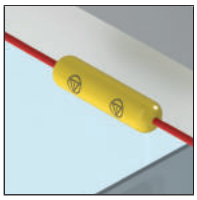
C Installation of end clamp VF AF-MR5



Rope insertion | Rope fixing | Clamp covering

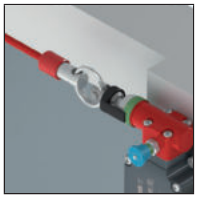
Application example: possibility of emergency stop along the whole perimeter of the machine with rope supported by angular pulleys

Angular pulley
Article: VF AF-CA10



Function indicator
Article: VF AF-IF1GR11

Safety module
Example: CS AR-20V024



End clamp
Article: VF AF-MR5

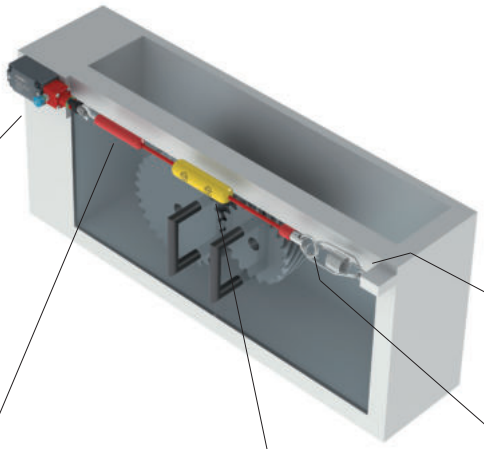
Safety rope switch

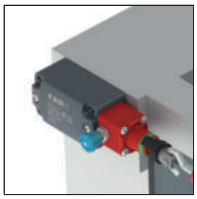
Article: FL 1883-M2

Stay bolt
Article: VF AF-TR8

Signalling light
Article: VF SL1A5PA1

Application example: availability of emergency stop along the frontal section of the machine

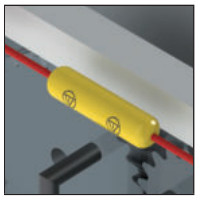




Safety rope switch

Article: FD 1878-M2

Adjustable stay bolt
Article: VF AF-TR5



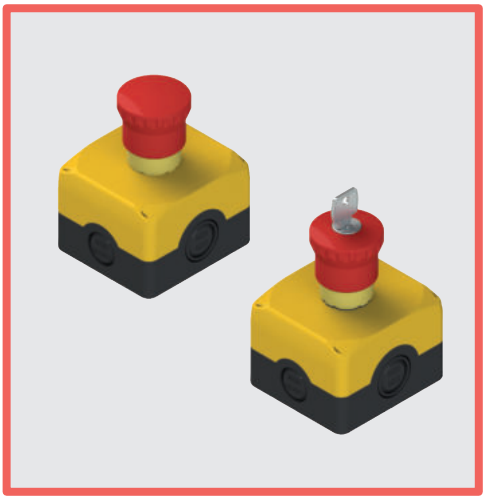
Function indicator
Article:
VF AF-IF1GR11

End clamp
Article: VF AF-MR5

Safety spring
Article: VF AF-ME78

Any information or application example, connection diagrams included, described in this document are to be intended as purely descriptive.
The choice and application of the products in conformity with the standards, in order to avoid damage to persons or goods, is the user's responsibility.

Notes



Main features
- Protection degrees IP67 and IP69K
- Stainless steel captive screws
- 4 side cable entries
- Screw caps included in the scope of supply

Quality marks:

EAC approval: RU C-IT.УТ03.B.00035/19

Technical data

Housing

Material:	Self-extinguishing shock-proof polycarbonate with double insulation, UV-resistant and glass fibre reinforced, high shock resistance.
Material of the screws:	Stainless steel
Conduit entries:	4x knock-out side entries: N°2 M20 - 1/2 NPT, N°2 M20 - 1/2NPT - M25 2x M16 knock-out base entries
Emergency stop button	
Mechanical endurance:	300,000 operating cycles
Max. actuation frequency:	3600 operating cycles/hour
Actuation travel:	4 mm (NO contact), 4 mm (NC contact)
Actuating force:	25 N
Actuating force at limit of travel:	Push-pull 18.5 N (without contacts) Rotary release, 35 N (without contacts)
Maximum travel:	9 mm
Tightening torque of the fixing ring:	2 … 2.5 Nm

General data

Protection degree:	IP67 acc. to EN 60529 (with cable gland of equal or higher protection degree) IP69K acc. to ISO 20653 (only for versions without luminous disc)
Ambient temperature:	-25°C … +80°C
Tightening torque of the cover screws:	1 … 1.4 Nm
Utilization requirements:	see page 169 of the General Catalogue HMI 2023-2024

In compliance with standards:
IEC 60947-1, IEC 60947-5-1, IEC 60204-1, EN 60947-1, EN 60947-5-1, EN 60204-1, EN IEC 63000, EN ISO 13850, UL 508, CSA C22.2 No. 14.

Compliance with the requirements of:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

General data

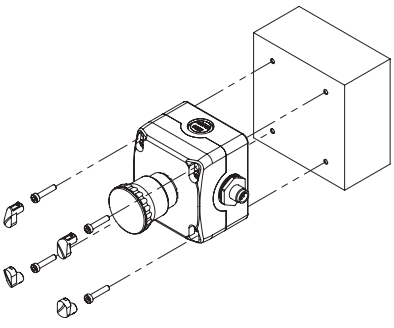
Protection degrees IP67 and IP69K

IP69K
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. Due to their special design, these devices are suitable for use in equipment subjected to cleaning with high pressure hot water jets. These devices meet the IP69K test requirements according to ISO 20653 (water jets with 100 bar and 80°C).

Fixing of EROUND housings

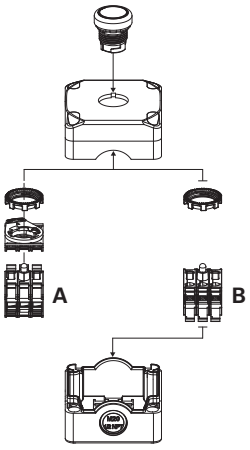
The housings of the EROUND line by Pizzato Elettrica have 4 additional holes on the cover. The holes enable wall fixing from the outside by means of insertion of the screws, without the need to open the cover to access the holes.



The wall fixing screws and the ones for closing the housing cover can be sealed with 4 caps (supplied with the housing). The caps not only give the housing a more pleasant look, but they also prevent the accumulation of dirt inside the recesses of the screws besides making tampering more difficult.

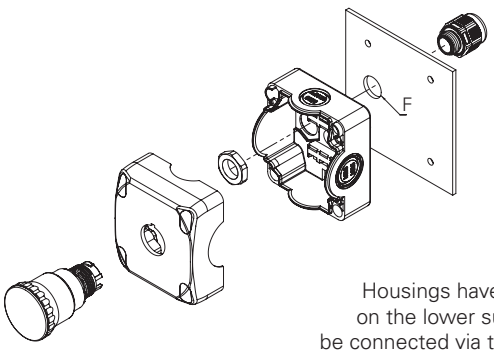
The external fixing of the housings is particularly valuable for already wired housings, since this simplifies the whole installation: you can simply fix the housing and connect the connector that, thanks to the presence of cable entries on the four sides of the housing, can be oriented in the preferred direction.

One housing, two solutions



The housing can fit up to 3 contact blocks/LED units (E2 CP, E2 LP) for panel mounting by means of a mounting adapter (A) or up to 3 contact blocks/LED units (E2 CF, E2 LF) for base mounting directly on the bottom of the housing (B).

Wiring through the lower surface



cable gland	F
M16	Ø 25
M20	Ø 28

Housings have 2 conduit entries on the lower surface. Cables can be connected via this surface, hiding them from view.

Complete housing units with emergency stop buttons



Housing cover colour	Actuator design and colour	Contacts pos. 2	Contacts pos. 3	Contacts pos. 1	Emergency stop button Push-Pull	Emergency stop button rotary release	Emergency stop button, key release
yellow RAL 1003	red	-	1NC	-	**ES AC31004** ES 31001 + E2 1PEPZ4531 + E2 CF01G2V1	**ES AC31003** ES 31001 + E2 1PERZ4531 + E2 CF01G2V1	**ES AC31022** ES 31001+ E2 1PEBZ4531 + E2 CF01G2V1
yellow RAL 1003	red	-	1NC SELF-MONITORED	-	**ES AC31081** ES 31001 + E2 1PEPZ4531 + E2 CF01S2V1	**ES AC31082** ES 31001 + E2 1PERZ4531 + E2 CF01S2V1	**ES AC31083** ES 31001+ E2 1PEBZ4531 + E2 CF01S2V1
yellow RAL 1003	red	1NC	-	1NC	**ES AC31009** ES 31001 + E2 1PEPZ4531 + E2 CF01G2V1 + E2 CF01G2V1	**ES AC31005** ES 31001 + E2 1PERZ4531 + E2 CF01G2V1 + E2 CF01G2V1	**ES AC31023** ES 31001+ E2 1PEBZ4531 + E2 CF01G2V1 + E2 CF01G2V1
yellow RAL 1003	red	1NC	-	1NO	**ES AC31010** ES 31001 + E2 1PEPZ4531 + E2 CF01G2V1 + E2 CF10G2V1	**ES AC31006** ES 31001 + E2 1PERZ4531 + E2 CF01G2V1 + E2 CF10G2V1	**ES AC31011** ES 31001+ E2 1PEBZ4531 + E2 CF01G2V1 + E2 CF10G2V1
yellow RAL 1003	red	1NC	1NC	1NO	**ES AC31146** ES 31001 + E2 1PEPZ4531 + E2 CF01G2V1 + E2 CF01G2V1 + E2 CF10G2V1	**ES AC31021** ES 31001 + E2 1PERZ4531 + E2 CF01G2V1 + E2 CF01G2V1 + E2 CF10G2V1	**ES AC31024** ES 31001+ E2 1PEBZ4531 + E2 CF01G2V1 + E2 CF01G2V1 + E2 CF10G2V1

Other combinations on request.
The standard colour of the base for the codes mentioned above is RAL 9005.
➔ For properties of contact blocks, see the General Catalogue HMI



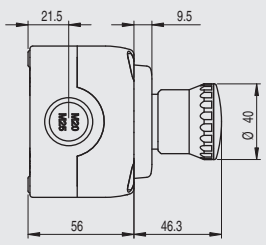
Housing cover colour	Actuator design and colour	Contacts pos. 2	Contacts pos. 3	Contacts pos. 1	Emergency stop button Push-Pull Yellow luminous disc, flashing Ø 60 mm, 24 Vac/dc	Emergency stop button rotary release Yellow luminous disc, flashing Ø 60 mm, 24 Vac/dc	Emergency stop button, key release Yellow luminous disc, flashing Ø 60 mm, 24 Vac/dc
grey RAL 7035	red	1NO	1NC	CONNECTION BLOCK	**ES AC31430** ES 31000 + E2 1PEPZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01G2V1 + VE BC2PV1	**ES AC31433** ES 31000 + E2 1PERZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01G2V1 + VE BC2PV1	**ES AC31436** ES 31000 + E2 1PEBZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01G2V1 + VE BC2PV1
grey RAL 7035	red	1NO	1NC SELF-MONITORED	CONNECTION BLOCK	**ES AC31431** ES 31000 + E2 1PEPZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01S2V1 + VE BC2PV1	**ES AC31434** ES 31000 + E2 1PERZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01S2V1 + VE BC2PV1	**ES AC31437** ES 31000 + E2 1PEBZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP01S2V1 + VE BC2PV1
grey RAL 7035	red	1NO	2NC	CONNECTION BLOCK	**ES AC31432** ES 31000 + E2 1PEPZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP02G2V1 + VE BC2PV1	**ES AC31435** ES 31000 + E2 1PERZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP02G2V1 + VE BC2PV1	**ES AC31438** ES 31000 + E2 1PEBZ4531 + VE DL1A5L13 + E2 CP10G2V1 + E2 CP02G2V1 + VE BC2PV1

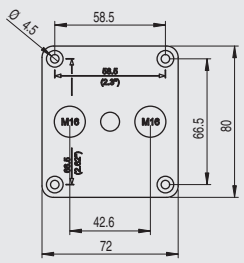
Other combinations on request.
The standard colour of the base for the codes mentioned above is RAL 9005.
➔ For the properties of contact blocks and luminous discs, please see the General Catalogue HMI.

Spare caps

Article		Description
	VE TS35RA1	4 spare caps for ES series housing cover. Colour: yellow
	VE TS39RA1	4 spare caps for ES series housing cover. Colour: grey

Dimensions



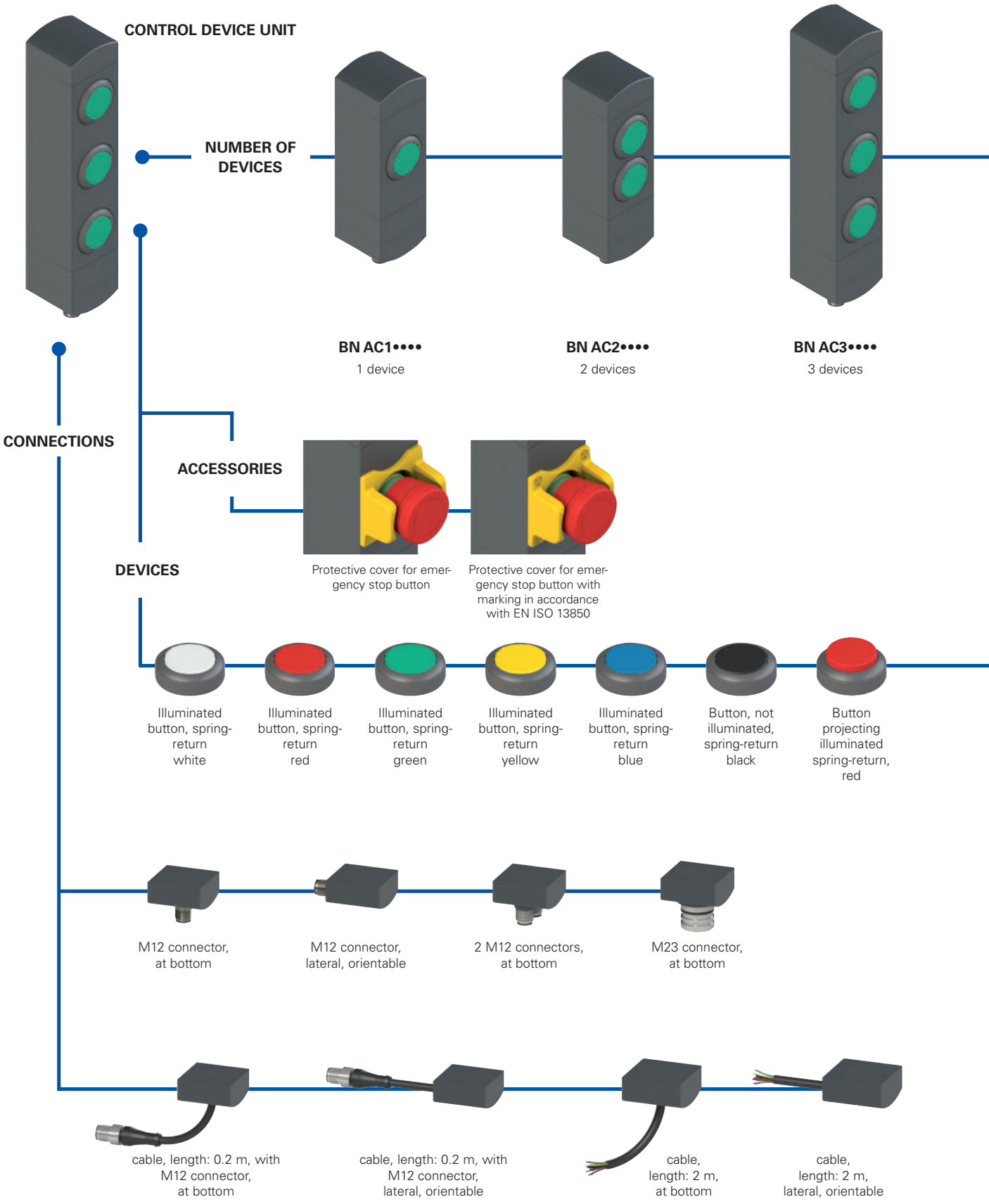


All values in the drawings are in mm

Accessories See page 419

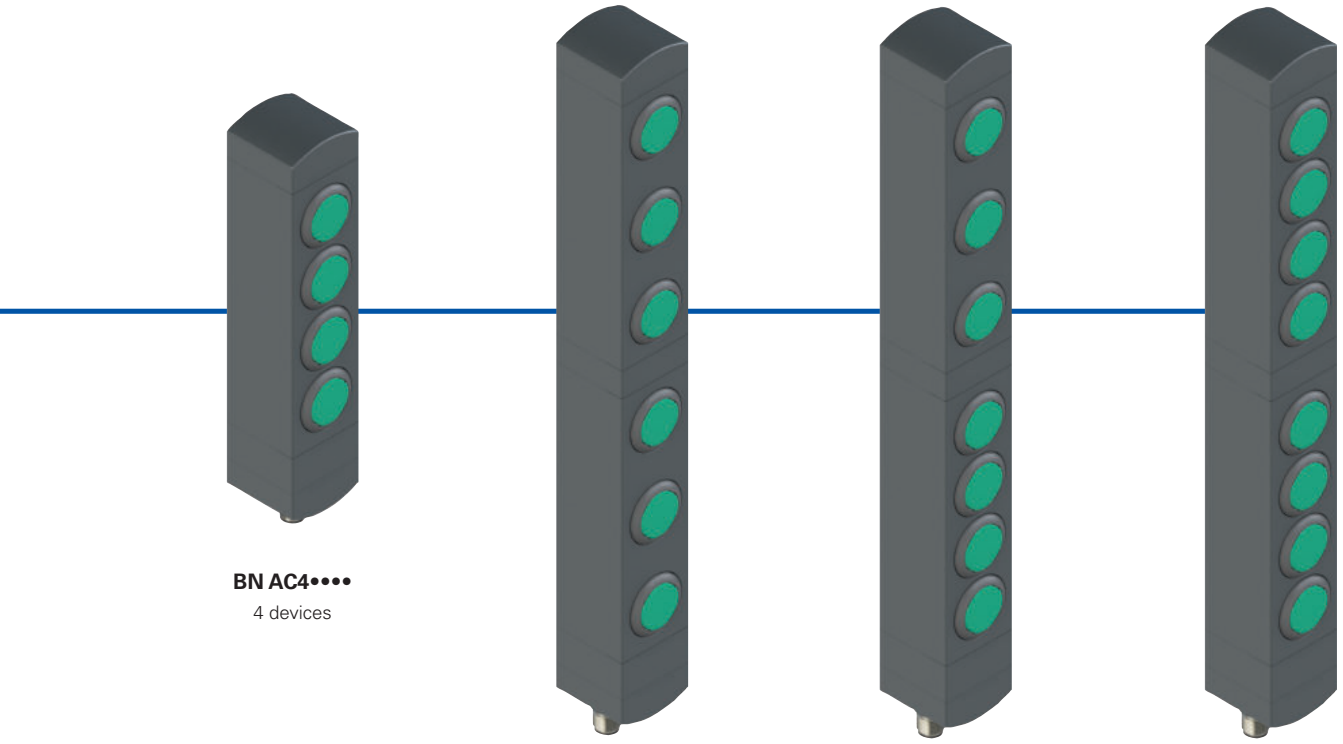
➔ The 2D and 3D files are available at **www.pizzato.com**

Selection diagram



product option

Sold separately as accessory



BN AC4••••
4 devices

BN AC6••••
6 devices

BN AC7••••
7 devices

BN AC8••••
8 devices

Indicator light, white

Indicator light, red

Indicator light, green

Selector switch with handle, illuminated 2 or 3 positions

Key selector switch, 2 or 3 positions

Closing cap

Emergency stop button with rotary release

Emergency stop button with push-pull release

Simple stop button with rotary release

Code structure

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

BN AC3ZA01

Number of devices	
1	1 device
2	2 devices
3	3 devices
4	4 devices
6	6 devices
7	7 devices
8	8 devices

Button configuration	
A01	A01 configuration
A02	A02 configuration
A03	A03 configuration
...	other configurations on request

Main features

- Modular control device unit for 1 to 8 devices
- Rotatable fixing position
- Flush-mounted control devices
- Compact dimensions, minimal housing width
- Numerous control devices available

Quality marks:

UL approval: E131787

Features approved by UL

Electrical ratings: 24 Vdc Class 2, 0,1 A
Model BN with base module dimensions 40 mm by 38.5 mm by 145.5 mm:
Input Supplied by 24 Vdc, Class 2 Source or limited voltage limited energy, 0,096 A max. (Maximum eight leds).
Output 24 Vac/dc "Class 2" 0.25 A Pilot Duty (Maximum eight Actuators, with maximum twelve contacts, NO or NC or both) or 0.18 A Pilot Duty (Maximum eight Actuators, with maximum sixteen contacts, NO or NC or both)
Model BN with base module dimensions 40 mm by 38.5 mm by 82.1 mm:
Input Supplied by 24 Vdc, Class 2 Source or limited voltage limited energy, 0,048 A max. (Maximum four leds).
Output 24 Vac/dc "Class 2" 0.25 A Pilot Duty (Maximum four Actuators, with maximum eight contacts, NO or NC or both) or 0.18 A Pilot Duty (Maximum four Actuators, with maximum eight contacts, NO or NC or both)
Environmental ratings: Type 1

Technical data

Housing made of glass fibre reinforced technopolymer, self-extinguishing and shock-proof.
Versions with integrated cable 12 x 0.14 mm², length 2 m, other lengths from 0.5 m to 10 m on request.
Versions with integrated M23 or M12 stainless steel connector.
Versions with 2 integrated M12 stainless steel connectors.
Versions with 0.2 m cable and M12 connector, other lengths from 0.1 … 3 m on request.

Protection degree:	IP65 acc. to EN 60529

General data

Ambient temperature:	-25°C … +70°C
Fixing screws for the housing:	2xM5, tightening torque 3 Nm
Fixing screws for turnable modules:	Tightening torque of 0.8 … 1.2 Nm
Mechanical endurance:	
Spring-return button:	1 million operating cycles
Emergency stop button:	50,000 operating cycles
Selector switch:	300,000 operating cycles
Key selector switch:	50,000 operating cycles 30,000 operating cycles including removal of the key
Safety parameter B_{10D}:	100,000 (emergency stop button)

Actuating force:		
Spring-return button:	4 N min	100 N max.
Emergency stop button:	20 N min	100 N max.
Selector switch:	0.1 Nm min	1.5 Nm max.
Key selector switch:	0.1 Nm min	1.3 Nm max.

Electrical data of the devices

Rated operating voltage U_e:	24 Vdc ±10% SELV/PELV
Thermal current I_{th}:	1 A
Rated insulation voltage U_i:	32 Vac/dc
Rated impulse withstand voltage U_{imp}:	1.5 kV
Material of the contacts:	silver contacts
Contact type:	Self-cleaning contacts with double interruption
Utilization category of the contact block:	DC-13; U_e = 24 V, I_e = 0.55 A
LED supply voltage:	24 Vdc ±15%
Single LED supply current:	12 mA

M12 connector electrical data

Max. operating voltage:	32 Vac/dc
Max. operating current:	1.5 A max.

M23 connector electrical data

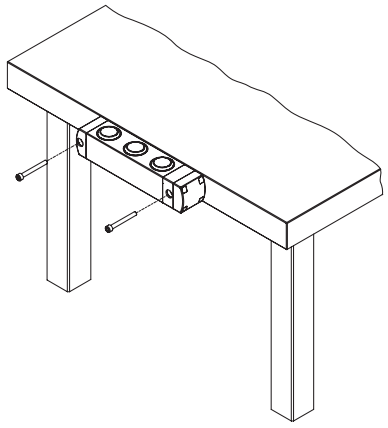
Max. operating voltage:	32 Vac/dc
Max. operating current:	3 A max.

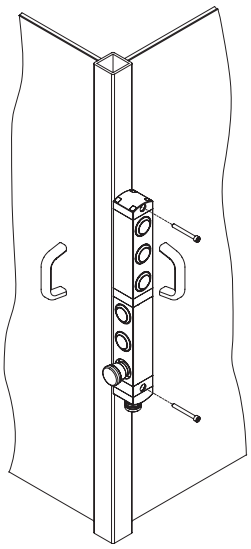
In compliance with standards:
IEC 60947-5-1, IEC 60947-5-5, EN ISO 13850, UL 508, CSA C22.2 No. 14.

Compliance with the requirements of:
Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

⚠ **Installation for safety applications:**
Always connect the safety circuit to the NC contacts (normally closed contacts) as stated in standard EN 60947-5-1.

Actuation of the control devices from various directions



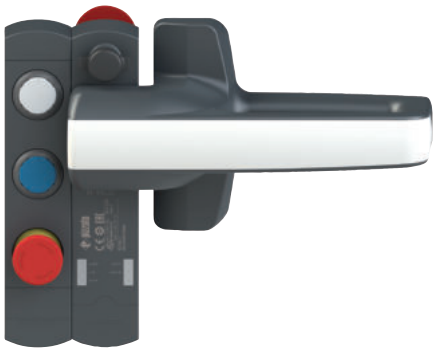


Thanks to the design with turnable modules, the control device units of the BN series offer the user many different options for fixing to the machine.
The orientation of the control devices can be selected independent of the fastening.
With the configurations for 6, 7 and 8 devices, the upper and lower part can be oriented independent of one another. This is especially useful if it should be possible to achieve a command state from two different sides of the machine. In these cases, a single device and single wiring harness can be used, thereby saving time and money.

General data

The new modular control device units of the BN series from Pizzato Elettrica can be combined perfectly with the RFID safety switches with lock of the NS series. Machine manufacturers who already use these products thereby have the possibility to attach a control device unit directly next to the safety switch that is identical in shape and dimensions.
The control device units of the BN series are available in configurations with 1 to 8 devices.
The unique design with individually turnable modules allows the user to select from a number of combinations. He receives a very versatile product that is immediately ready for use.

Compatibility with NS series switches

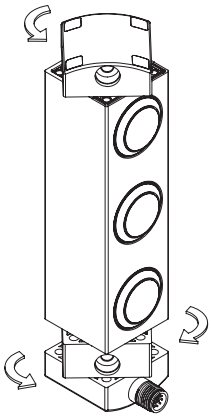


The control device units of the BN series have the same dimensions as the RFID safety switches with lock of the NS series. When mounted directly to the side of the switch, one obtains an integrated safety device whose components are made of the same material and have identical dimensions.

Minimal dimensions

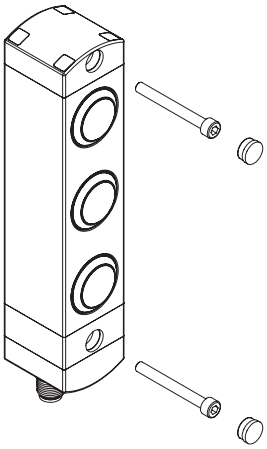
One special feature of the control device units of the BN series is the slim thickness of just 40 mm.
The control devices are embedded in the housing of the unit and protrude only slightly out of the front.
This protects the control devices from unintended impacts, thereby increasing the service life of the devices and, at the same time, giving the devices an attractive design, making them predestined for use on modern machines in which this aspect is also given special consideration.

Turnable and non-detachable modules



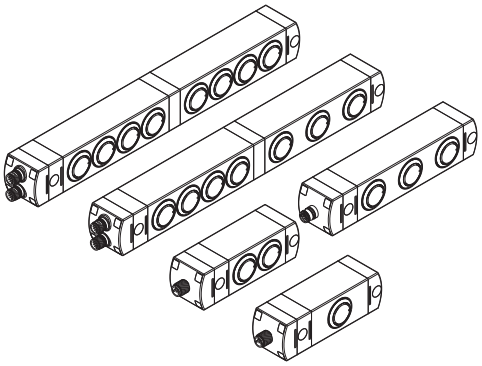
During installation, the fixing modules can be turned on the top and bottom of the device to enable variable orientation of the control devices.
Operation is very simple: after loosening the fixing screws, the device body can be turned in steps of 90° and fixed in the desired position. Another advantage for the installer is that the fixing modules cannot be detached from the device body. Disassembly of the individual parts is not necessary and there is no risk of losing parts or reassembling incorrectly.

Protection against tampering



Each control device unit of the BN series is supplied complete with snap-on protection caps to be applied on the holes of the fixing screws. Not only do the caps prevent deposits of dirt from accumulating and simplify cleaning, they also prevent access to the fixing screws of the device, thereby offering increased protection against tampering.

Individually and freely configurable



The control device unit is available in various configurations: for standard applications there are configurations with 1 to 4 devices, while configurations with 6, 7 or 8 devices are available for more complex applications that allow a larger number of control and signalling devices to be attached at the same location for the user.

Laser markable lenses

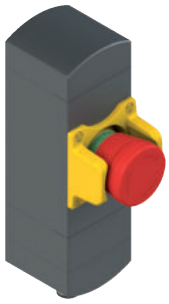
With all product configurations, a number of devices can be installed that can also be illuminated via LEDs integrated in the device.
The buttons are equipped with lenses that can be marked by laser for a resistant, indelible engraving. This allows you to customize the lenses with a wide range of text and symbols. For a complete list of available engravings, please refer to the tables on pp. 165-168.

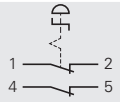
Protection guard for emergency stop button

The mushroom-shaped emergency stop button can be combined with a yellow protection guard that serves to protect the device from shocks. The protection guard can also be provided with a laser marking in accordance with EN ISO 13850.

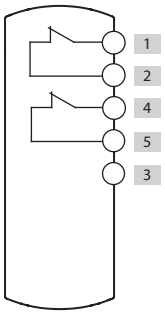
Examples of available configurations

BN AC1ZA12

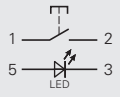


	Description	Colour	Diagram
Device 1	Emergency stop button with rotary release 2NC, with laser-marked protection guard	red	
Connector	M12, 5-pole at bottom	/	

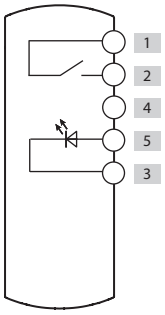
Connections



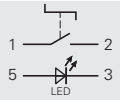
BN AC1ZA02

	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	
Connector	M12, 5-pole, at bottom	/	

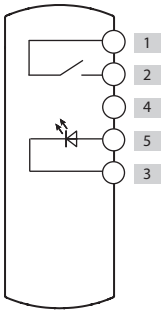
Connections



BN AC1ZA03

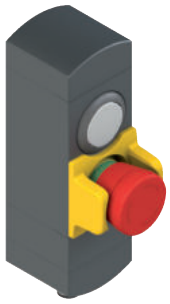
	Description	Colour	Diagram
Device 1	Illuminated selector switch with handle with two positions 1NO	black	
Connector	M12, 5-pole, at bottom	/	

Connections



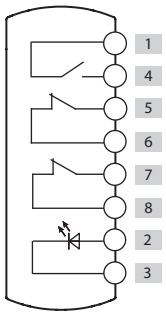
For pin assignments of the connectors, see page 156

BN AC2ZA26

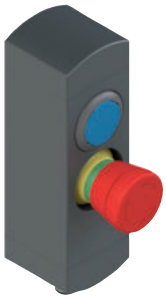


	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 2 3 LED
Device 2	Emergency stop button with rotary release 2NC, with protection guard	red	5 6 7 8
Connector	M12, 8-pole, at bottom	/	

Connections

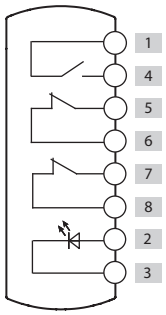


BN AC2ZA02



	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	blue	1 4 2 3 LED
Device 2	Emergency stop button with rotary release 2NC	red	5 6 7 8
Connector	M12, 8-pole, at bottom	/	

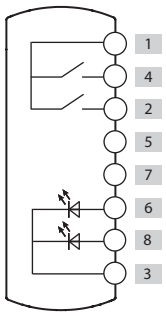
Connections



BN AC2ZA03

	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 6 3 LED
Device 2	Illuminated button, spring-return 1NO	blue	1 2 8 3 LED
Connector	M12, 8-pole, at bottom	/	

Connections

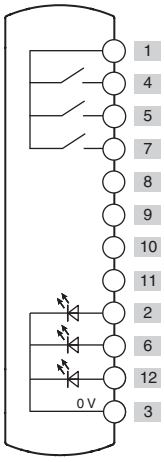


For pin assignments of the connectors, see page 156

BN AC3ZA01

	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 2 3 LED
Device 2	Illuminated button, spring-return 1NO	blue	1 5 6 3 LED
Device 3	Illuminated button, spring-return 1NO	yellow	1 7 12 3 LED
Connector	M12, 12-pole, at bottom	/	

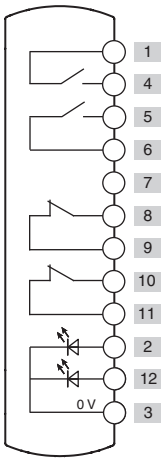
Connections



BN AC3ZB59

	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 2 3 LED
Device 2	Illuminated button, spring-return 1NO	blue	5 6 12 3 LED
Device 3	Emergency stop button with rotary release 2NC, with laser-marked protection guard	red	8 9 10 11
Connector	M12, 12-pole, at bottom	/	

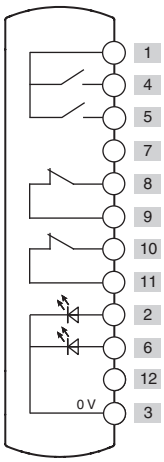
Connections



BN AC3ZA03

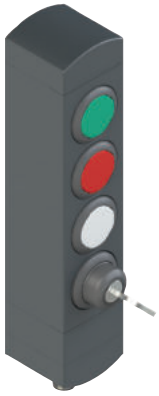
	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 2 3 LED
Device 2	Illuminated button, spring-return 1NO	yellow	1 5 6 3 LED
Device 3	Emergency stop button with rotary release 2NC	red	8 9 10 11
Connector	M12, 12-pole, at bottom	/	

Connections



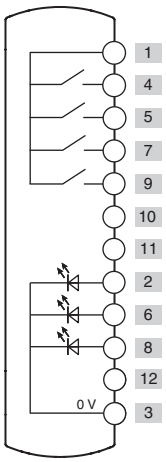
For pin assignments of the connectors, see page 156

BN AC4ZA01



	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	green	1 4 / 2 3 LED
Device 2	Illuminated button, spring-return 1NO	red	1 5 / 6 3 LED
Device 3	Illuminated button, spring-return 1NO	white	1 7 / 8 3 LED
Device 4	Two-position key selector switch 1NO	black	1 9
Connector	M12, 12-pole, at bottom	/	

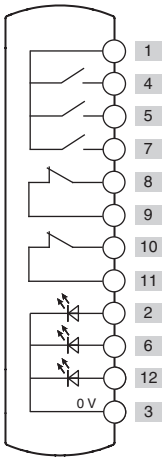
Connections



BN AC4ZB19

	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 / 2 3 LED
Device 2	Illuminated button, spring-return 1NO	blue	1 5 / 6 3 LED
Device 3	Illuminated button, spring-return 1NO	yellow	1 7 / 12 3 LED
Device 4	Emergency stop button with rotary release 2NC, with protection guard	red	8 9 / 10 11
Connector	M12, 12-pole, at bottom	/	

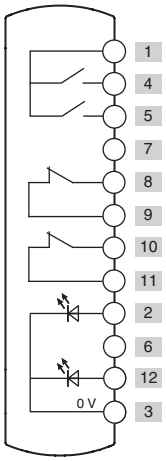
Connections



BN AC4ZA03

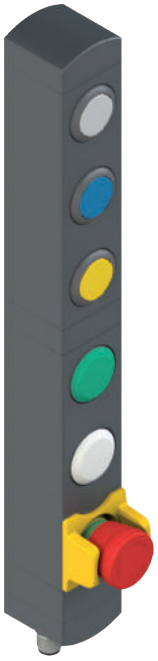
	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	1 4 / 2 3 LED
Device 2	Spring-return button 1NO	black	1 5
Device 3	Indicator light	green	12 3 LED
Device 4	Emergency stop button with rotary release 2NC	red	8 9 / 10 11
Connector	M23, 12-pole, at bottom	/	

Connections



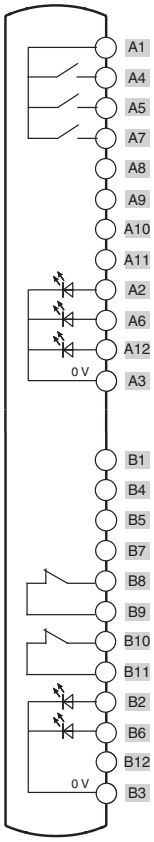
For pin assignments of the connectors, see page 156

BN AC6ZA40

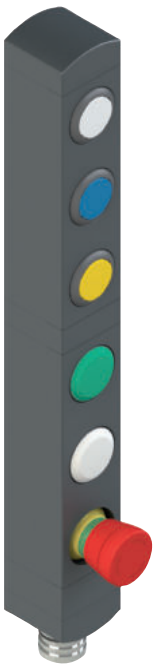


	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	A1 — A4, A2 — A3, LED
Device 2	Illuminated button, spring-return 1NO	blue	A1 — A5, A6 — A3, LED
Device 3	Illuminated button, spring-return 1NO	yellow	A1 — A7, A12 — A3, LED
Device 4	Indicator light	green	B2 — B3, LED
Device 5	Indicator light	white	B6 — B3, LED
Device 6	Emergency stop button with rotary release 2NC, with protection guard	red	B8 — B9, B10 — B11
Connector	Two M12, 12-pole, at bottom	/	A, B

Connections

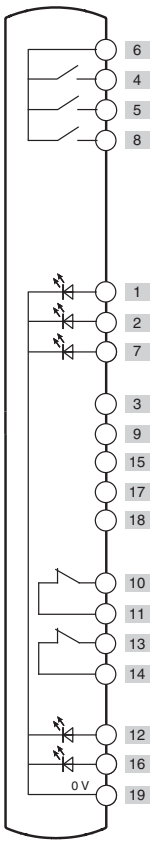


BN AC6ZA02



	Description	Colour	Diagram
Device 1	Illuminated button, spring-return 1NO	white	6 — 4, 1 — 19, LED
Device 2	Illuminated button, spring-return 1NO	blue	6 — 5, 2 — 19, LED
Device 3	Illuminated button, spring-return 1NO	yellow	6 — 8, 7 — 19, LED
Device 4	Indicator light	green	12 — 19, LED
Device 5	Indicator light	white	16 — 19, LED
Device 6	Emergency stop button with rotary release 2NC	red	10 — 11, 13 — 14
Connector	M23, 19-pole, at bottom	/	

Connections

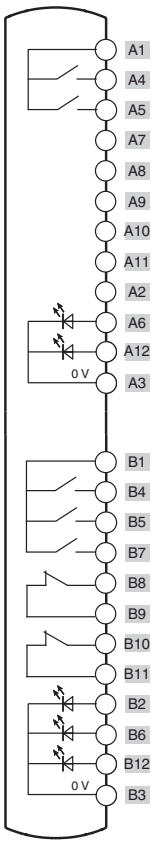


For pin assignments of the connectors, see page 156

BN AC7ZA07

	Description	Colour	Diagram
Device 1	Two-position key selector switch 1NO	black	A1 — A4
Device 2	Illuminated selector switch with handle with two positions 1NO	black	A1 — A5; A6 — A3 (LED)
Device 3	Indicator light	green	A12 — A3 (LED)
Device 4	Illuminated button, spring-return 1NO	white	B1 — B4; B2 — B3 (LED)
Device 5	Illuminated button, spring-return 1NO	blue	B1 — B5; B6 — B3 (LED)
Device 6	Illuminated button, spring-return 1NO	yellow	B1 — B7; B12 — B3 (LED)
Device 7	Emergency stop button with rotary release 2NC, with protection guard	red	B8 — B9; B10 — B11
Connector	Two M12, 12-pole, at bottom	/	A B

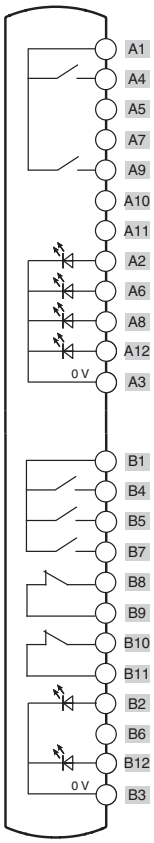
Connections



BN AC8ZA01

	Description	Colour	Diagram
Device 1	Illuminated selector switch with handle with two positions 1NO	black	A1 — A4; A2 — A3 (LED)
Device 2	Indicator light	red	A6 — A3 (LED)
Device 3	Indicator light	green	A8 — A3 (LED)
Device 4	Illuminated button, spring-return 1NO	yellow	A1 — A9; A12 — A3 (LED)
Device 5	Illuminated button, spring-return 1NO	white	B1 — B4; B2 — B3 (LED)
Device 6	Spring-return button 1NO	black	B1 — B5
Device 7	Illuminated button, spring-return 1NO	blue	B1 — B7; B12 — B3 (LED)
Device 8	Emergency stop button with rotary release 2NC	red	B8 — B9; B10 — B11
Connector	Two M12, 12-pole, at bottom	/	A B

Connections



For pin assignments of the connectors, see page 156

Spare devices available

	Description	Colour	Article	Combinable with contacts (1)	Protrusion (x) mm
	Illuminated button, spring-return	White Red Green Yellow Blue	VN NG-AC27121 VN NG-AC27123 VN NG-AC27124 VN NG-AC27125 VN NG-AC27126	1NO (1NC) (2NO) (1NO+1NC)	3
	Non-illuminated button, spring-return	Black	VN NG-AC27122	1NO (1NC) (2NO) (1NO+1NC)	3
	Non-laser-markable, illuminated, projecting push button(2)	Red	VN NG-AC26018	1NO (1NC) (2NO) (1NO+1NC)	6,1
	Indicator light	Red Yellow Green Blue White	VN NG-AC26060 VN NG-AC26061 VN NG-AC26062 VN NG-AC26063 VN NG-AC26064	/	2,7
	Emergency stop button acc. to. EN ISO 13850 Rotary release Push-pull release	 Red Red	 VN NG-AC26052 VN NG-AC26055	2NC	26,4
	EN ISO 13850-compliant emergency pushbutton for 2NC+1NO pulse contacts (3) Rotary release	 Red	 VN NG-AC26056	2NC + 1NO pulse	26,4
	Illuminated emergency stop button acc. to. EN ISO 13850 Rotary release Push-pull release	 Red Red	 VN NG-AC26051 VN NG-AC26054	2NC	26,4
	Simple stop button Rotary release Push-pull release	 Black Black	 VN NG-AC26053 VN NG-AC26057	2NC	26,4
	Illuminated selector switch with handle with 2 or 3 positions and transparent lens for LED 	 Black Black Black Black	 VN NG-AC26033 VN NG-AC26030 VN NG-AC26034 VN NG-AC26031	1NO (1NC) (2NO) (1NO+1NC)	16,8
	Key selector switch, 2 or 3 positions 	 Black Black Black	 VN NG-AC26043 VN NG-AC26040 VN NG-AC26041	1NO (1NC) (2NO) (1NO+1NC)	39 (a) 14 (b)
	Closing cap	Black	VN NG-AC26020	/	2,7
	Fixing key	Black	VN NG-AC26080	/	/

Legend: Maintained Spring-return Key extraction position (a) with key (b) without key

(1) The contacts in brackets are on request. Contact our technical department to verify the effective feasibility of the control panel with the chosen combination of control devices.
(2) The projecting buttons are not laser markable.
(3) The pulse NO contact is activated only when the emergency button reaches the bottom of the stroke. The NO contact signal should be detected by analyzing the rising edge.

To order buttons with marking:
add the marking code indicated in the tables on pp. 165-168 to the article codes.
Example: Black spring-return button with "O" engraving.
VN NG-AC27122 → VN NG-AC27122-L1

Technical data of the control devices

General data

Protection degree:	IP65 acc. to EN 60529
Mechanical endurance:	
Spring-return button:	1 million operating cycles
Emergency stop button:	50,000 operating cycles
Selector switch:	300,000 operating cycles
Key selector switch:	50,000 operating cycles 30,000 operating cycles including removal of the key
Safety parameter B_{10D}:	100,000 (emergency stop button)

Actuating force

Spring-return button:	4 N min	100 N max.
Emergency stop button:	20 N min	100 N max.
Selector switch:	0.1 Nm min	1.5 Nm max.
Key selector switch:	0.1 Nm min	1.3 Nm max.

Contact blocks of the control devices

Material of the contacts:	silver contacts
Contact type:	Self-cleaning contacts with double interruption

Electrical data:

Thermal current I_{th}:	1 A
Rated insulation voltage U_i:	32 Vac/dc
Rated impulse withstand voltage U_{imp}:	1.5 kV
LED supply voltage:	24 Vdc ± 15%
LED supply current:	10 mA per LED

Utilization category of the contact block:

Direct current: DC13

U_e (V)	24
I_e (A)	0.55

Signalling contact with spring return:

Direct current: DC13

U_e (V)	24
I_e (mA)	10

In compliance with standards:

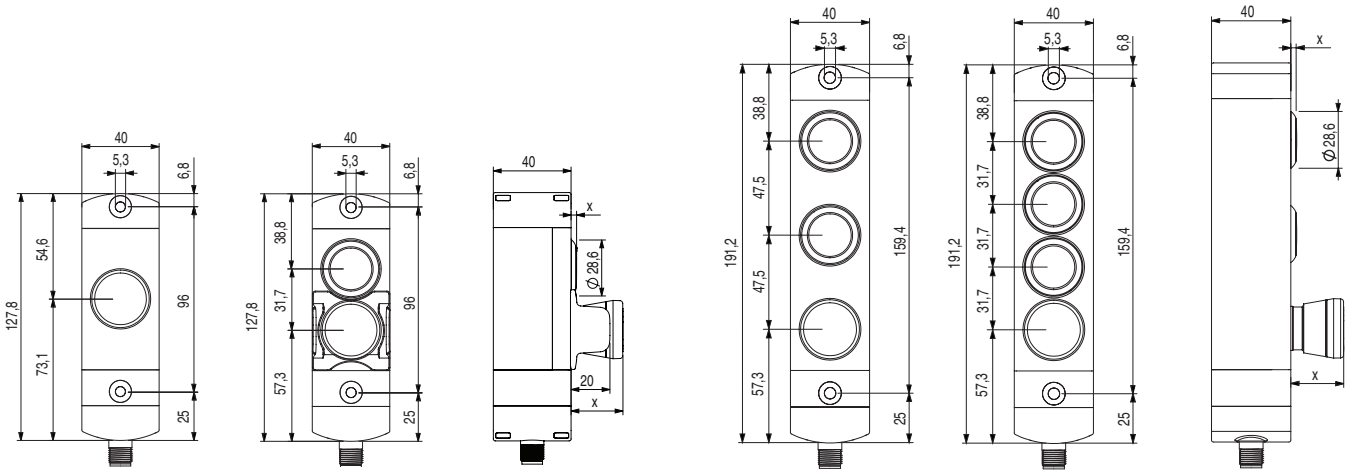
IEC 60947-5-1, IEC 60947-5-5, EN ISO 13850

⚠ Installation for safety applications:

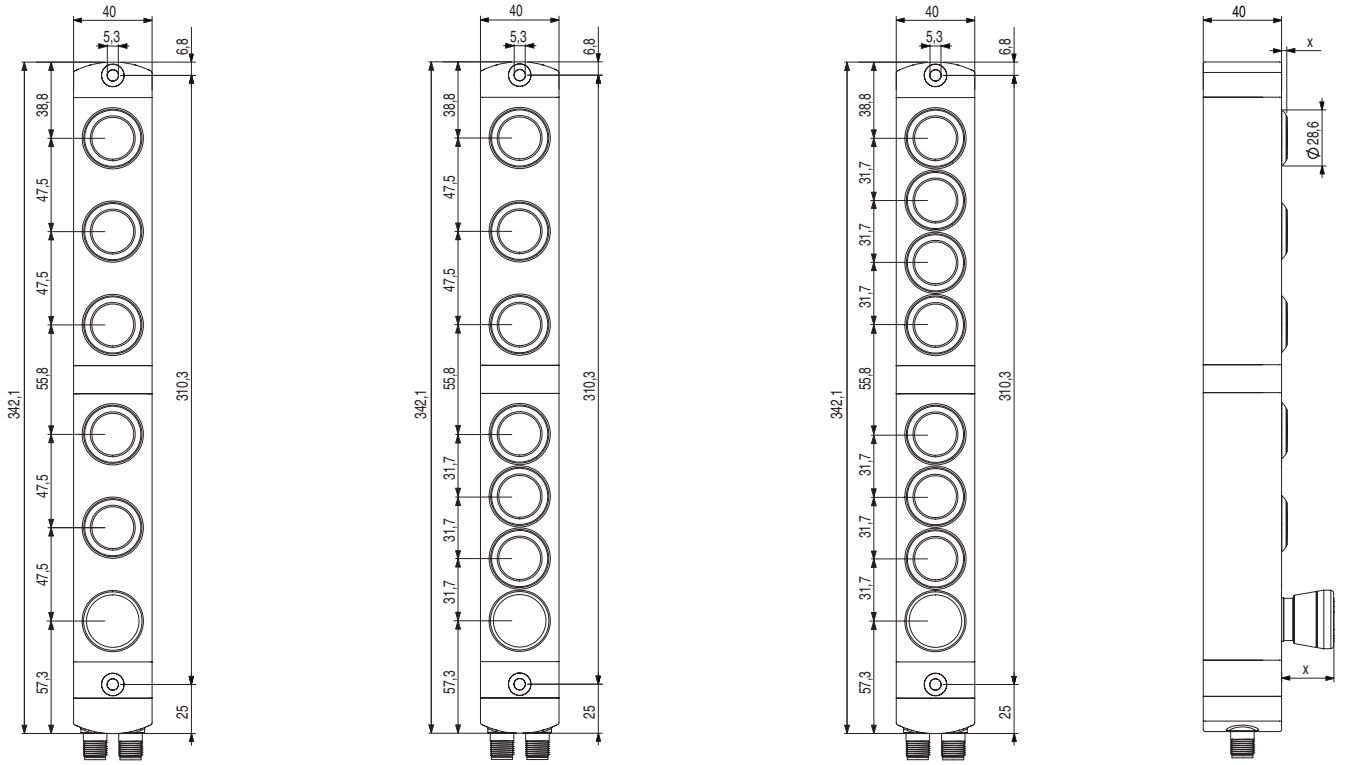
Always connect the safety circuit to the **NC contacts** (normally closed contacts) as stated in standard EN 60947-5-1.

Dimensional drawings

BN AC1•••• | BN AC2•••• | BN AC3•••• | BN AC4••••

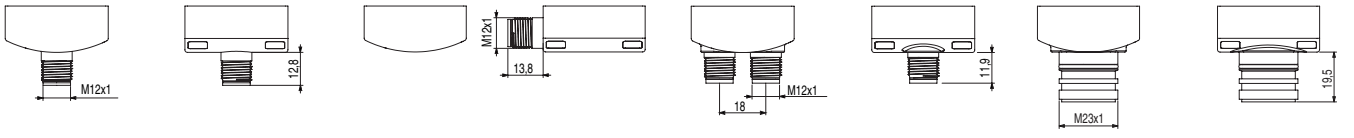


BN AC6•••• | BN AC7•••• | BN AC8••••



Output type

M12 connector, at bottom	M12 connector, lateral	Two M12 connectors, at bottom	M23 connector, at bottom

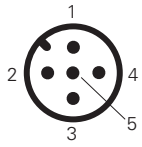


All values in the drawings are in mm

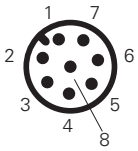
→ The 2D and 3D files are available at **www.pizzato.com**

Electrical connections

M12 connector, 5-pole



M12 connector, 8-pole

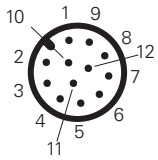


Cable

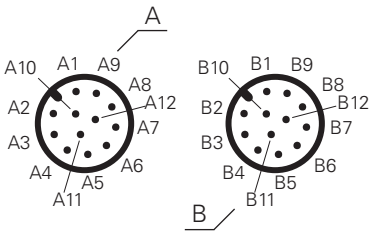
Pin No.	Cable colour
1	brown
2	blue
3	white
4	green
5	pink
6	yellow

Pin No.	Cable colour
7	black
8	grey
9	red
10	purple
11	grey-pink
12	red-blue

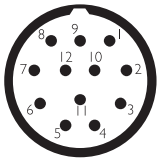
M12 connector, 12-pole



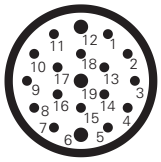
Two M12 connectors, 12-pole



M23 connector, 12-pole



M23 connector, 19-pole

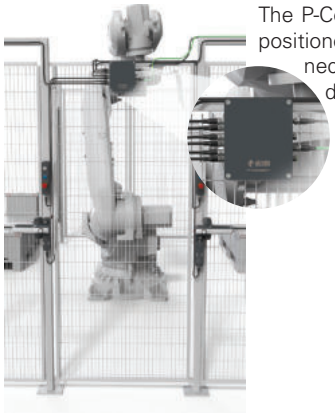


P-Connect connection gateway for safety devices

Description

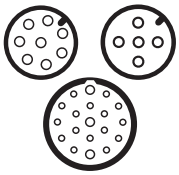
The P-Connect connection gateway is a system that allows up to six (6) devices to be connected to a data network. Safety information is exchanged via PROFIsafe extensions. Depending on its configurations, the gateway can transmit signals from two NG or NS series RFID safety switches with lock. The connection is performed safely using PROFIsafe standards. Furthermore, the P-Connect gateway can be connected to a number of devices available in the Pizzato Elettrica catalogue. These include the BN series modular control device units, and AN series handles with integrated signalling LED.

Positioning in safe areas



The P-Connect connection gateway can be positioned in safe areas, away from the connected devices, to limit the risk of accidental damage or tampering.

Various configurations available



The P-Connect connection gateway is available in various configurations for every kind of application. Depending on the configuration in fact it comes with various types of connectors to connect the devices to be monitored.

Field diagnostics

The P-Connect connection gateway has 3 integrated signalling LEDs to give the user a quick diagnostic overview:

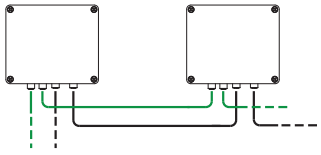
- "System status" LED: multicolour signalling LED, which by lighting, flashing and using different colours, indicates the various device operating states, as well as any warnings or errors affecting internal electronic components;
- "Network status" LED: state monitoring of the connected Ethernet network;
- "Module status" LED: diagnostic events' signalling LED.

Connection to the PROFINET/PROFIsafe network

The P-Connect connection gateway is designed to connect safety devices to PROFINET and PROFIsafe networks.

It can in fact convert the communication protocols used by the safety devices into PROFINET compatible protocols, so the devices can be integrated in the industrial network. Furthermore, the PROFIsafe function guarantees a high gateway safety level when transmitting safety data between the devices and the control system.

Series connection



P-Connect connection gateways have two connectors. One supplies electrical power to the device and the other is used for the connection to the fieldbus network. This means several P-Connect gateways can be connected in series by simply connecting together the input and output connectors. This notably reduces the time required for installing, uninstalling and replacing components during maintenance.

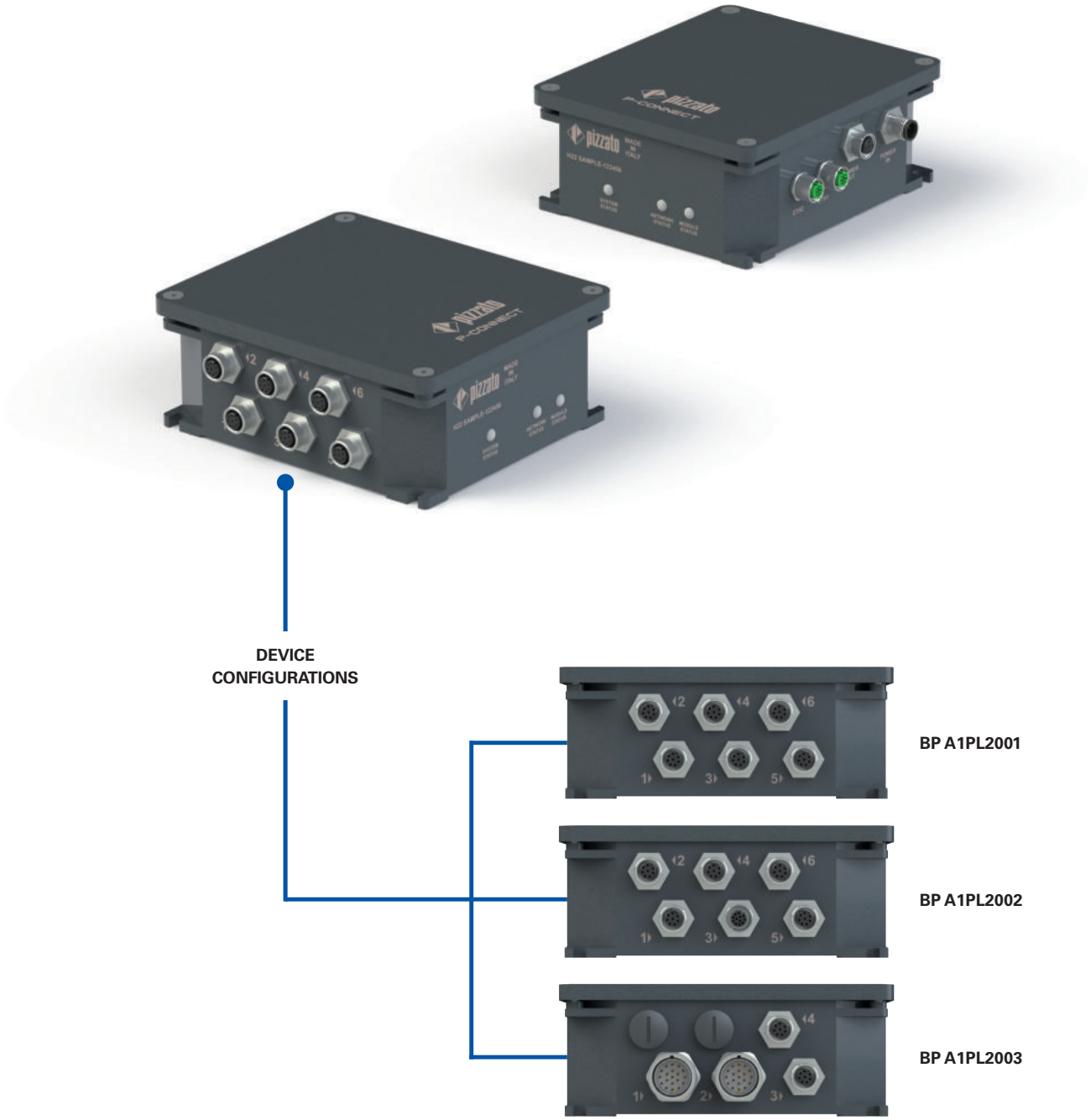
Plug&Play device

With connectors on both the power side and the device side, the P-Connect connection gateway is a Plug&Play solution that saves installation time compared to traditional solutions that must be wired into a cabinet. What's more, it can quickly be replaced if there's a malfunction or if it gets damaged.

Diagnostic data

The P-Connect connection gateway allows quick access to diagnostic data such as internal temperature, gateway supply voltage, or current consumption of the connected devices. This makes it easy to monitor the gateway and the connected devices, quickly detecting any malfunctions.

Selection diagram



Code structure

BP A1PL2001

Communication protocol	
P	PROFINET / PROFIsafe

Power supply connector	
2	1 x M12 5-pole male connector + 1 x M12 5-pole female connector

Input configuration	
001	Configuration 001
002	Configuration 002
003	Configuration 003
...	Other configurations on request

P-Connect connection gateway for safety devices

Main features

- Aluminium housing
- Protection degree IP65
- Operating temperature -15 °C … +50 °C
- 3 LEDs integrated in the device for status indication
- Devices can be connected in series

Quality marks:

EC-type examination certificate: M6A 075157 0034
TÜV SÜD approval: Z10 075157 0033
UL approval: E530502
PROFINET approval: Z13641
PROFIsafe approval: Z20348

Technical data

Aluminium housing, baked powder coating.

Protection degree:	IP65 acc. to EN 60529 with connectors of equal or higher protection degree

General data

Operating temperature:	-15°C … +50°C
Storage temperature:	-30°C … +70°C
Pollution degree:	2
Overvoltage category:	III

Power supply electrical data

Rated voltage (U_e):	24 Vdc SELV/PELV
Supply voltage tolerance:	±15%
Operating current at U_e voltage	
- no devices connected:	0.1 A
- maximum current supported:	3.1 A
Insulation voltage U_i:	32 V
Shock and vibration resistance:	acc. to EN 60947-1
EMC protection:	acc. to EN 61000-4 e EN 61326-3-1

Input and output circuits

Number of safety inputs:	3 dual-channel
Number of safety outputs:	1 dual channel (or 2 single channel)
Number of unsafe inputs:	14
Number of unsafe outputs:	24
Number of test outputs:	2
Maximum voltage at unsafe inputs:	24 Vdc
Voltage at unsafe outputs:	24 Vdc
Maximum control current at unsafe outputs:	50 mA
Maximum current at test outputs:	100 mA
Maximum current at unsafe outputs:	250 mA

In compliance with standards:

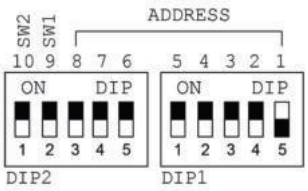
EN 60947-1, EN 61326-1, EN 61326-3-1, UL 508, CSA C22.2 No. 14, EN IEC 63000, EN 60529, IEC 61784-3-3, EN 61508, EN 62061, EN ISO 13849-1, EN 61131-2.

Compliance with the requirements of:

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

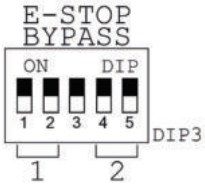
→ The 2D and 3D files are available at **www.pizzato.com**

F - Address



The PROFIsafe F - Address identifies the device on the PROFIsafe network with an unique ID, protecting standard address mechanisms such as IP addresses. The safety address (F - Address) must be set using two "ADDRESS" DIP switches located under the cover of the P-Connect gateway. This value can be set from 1 to 255 and must be unique for every device connected to the network. Restart the device after setting the F - Address.

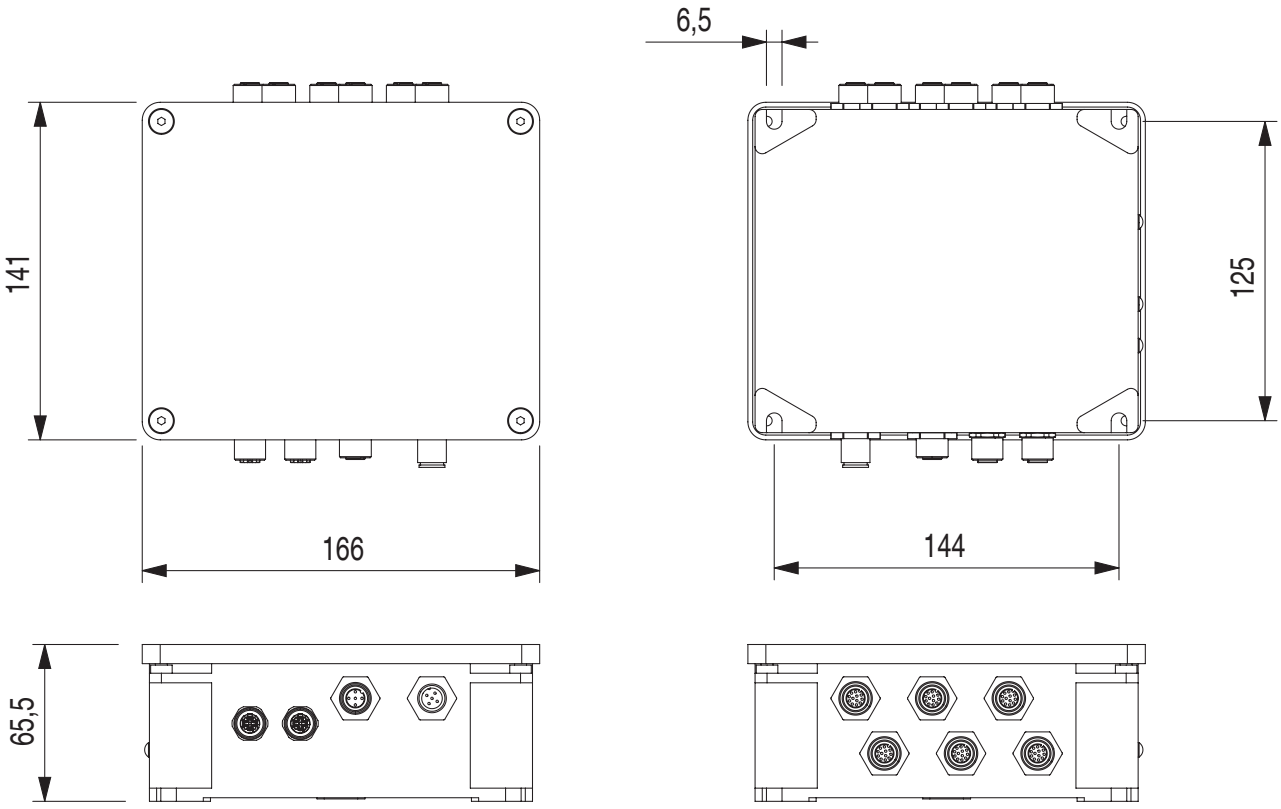
Emergency stop buttons



Some of the P-Connect gateway configurations can be used to manage up to two emergency stop buttons connected internally in series to the gateway. If you are not going to use both emergency stop buttons, bypass one of them using the "DIP3" switch (called "E-STOP BYPASS") located under the cover of the P-Connect gateway.

If switches "1" and "2" are switched "ON" this bypasses the first emergency stop button connected. Switches "4" and "5" bypass the second emergency stop button connected. The switches must only be switched when the P-Connect gateway is OFF, to prevent incoherent input test signal readings.

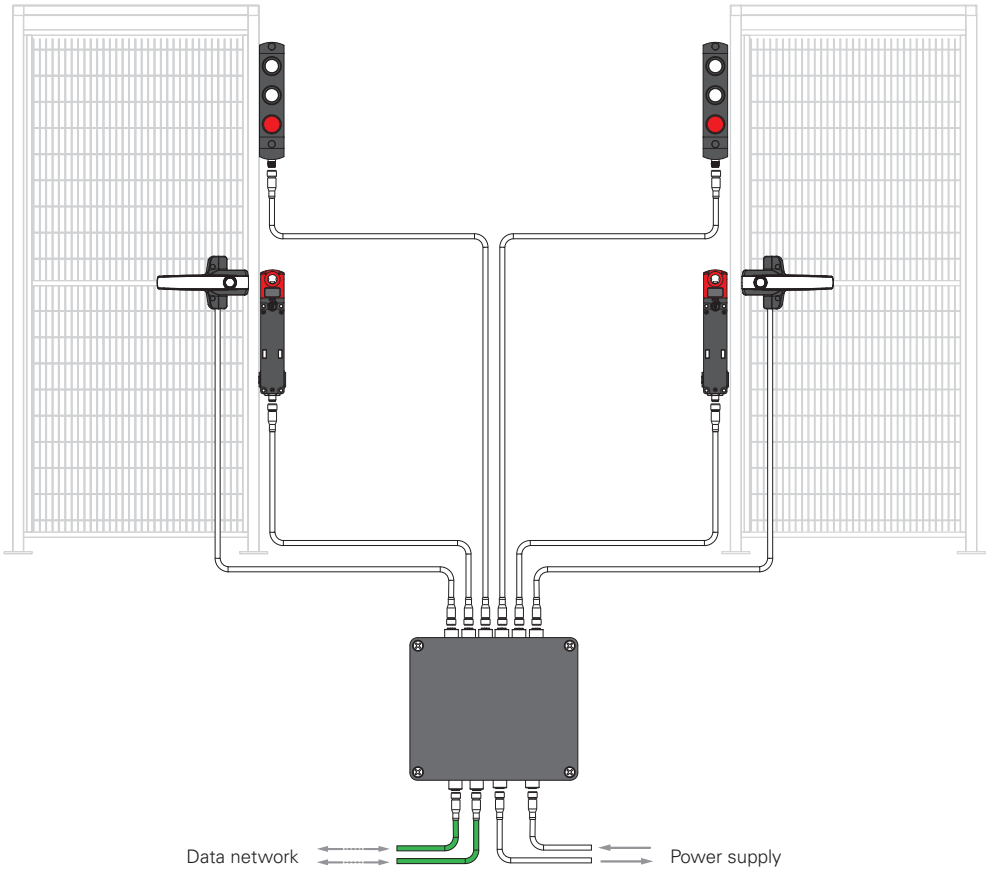
Dimensional drawings



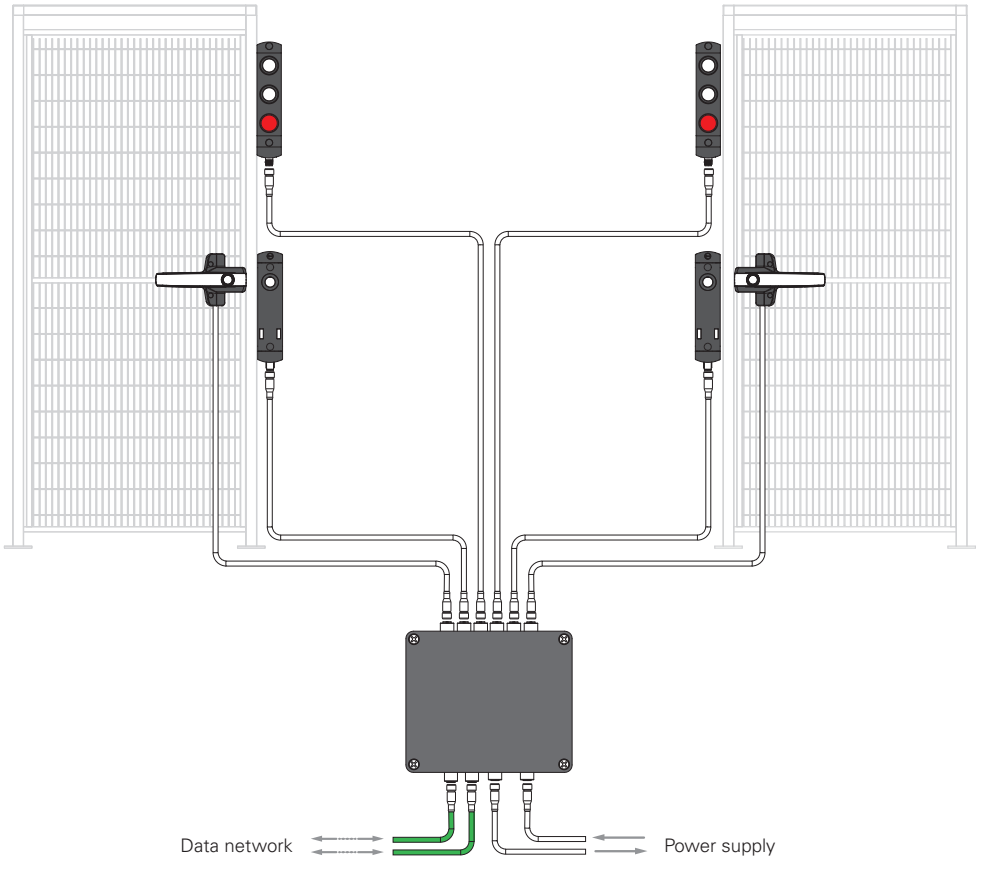
All values in the drawings are in mm

BP A1PL2001

Solution with NG series switches, P-KUBE Krome safety handle and BN series control device units



Solution with NS series switches, P-KUBE Krome safety handle and BN series control device units

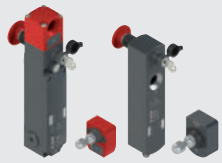


Note: the position of the connectors in the diagram is for illustrative purposes only.

Functional safety

Safety parameters	SIL	PL	Cat.
Monitoring function for the safety outputs	3	e	4
Locking function of the single channel actuator	1	c	1

Selection table for BP A1PL2001 devices

	Description	Quantity	Article number	
	RFID safety switch with lock, with separate actuator, NG/NS series	2	NG ••••311A-F3•K958 (1) NG ••••321A-F3•K958 (1) NG ••••411A-F3•K958 (1) NG ••••421A-F3•K958 (1) NS •3••••P•-F4• (1)	NG ••••311B-F3•K958 (1) NG ••••321B-F3•K958 (1) NG ••••411B-F3•K958 (1) NG ••••421B-F3•K958 (1) NS •4••••P•-F4• (1)
	P-Connect connection box	1	BP A1PL2001	BP A1PL2001
	P-KUBE Krome safety handle with illuminated white grip with control device	2	AN G1B00••-PM• (1) (2)	AN S1B00••-PM• (1) (2)
	Signalling device chosen by installer, to be used as an alternative to the P-KUBE Krome safety handle (for example: indicator light tower)	1	Check that the electrical connections of the chosen device are compatible with the diagrams shown in the paragraph "Pin assignments of usable devices"	
	BN series control device unit with 3 control devices	2	BN AC3Z••• (1) (3)	BN AC3Z••• (1) (3)

Notes:
(1) For the configurations, refer to pages 169 and 229, or contact technical assistance.
(2) Only configurations with M12 8-pole connector.
(3) Only configurations with two non-illuminated devices with 1NO or 1NC, an emergency stop button 2NC, with M12 8-pole connector.

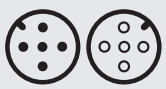
⚠ **Attention:** The articles listed above correspond to the maximum configuration that can be realised with the P-Connect connection gateway. Solutions with fewer devices can be implemented. If devices with emergency stop buttons are removed, the internal dip switches must be set accordingly to correctly configure the internal electronics of the connection system.

Cables with compatible connectors

Article	Description
VF CA5•••M	M12 female connectors with cable, 5-pole
VF CA5•••M-MD	M12 extension cables, 5-pole
VF CA8•••M-MD	M12 extension cables, 8-pole

Note: For the article codes of available cables with connectors refer to the chapter "Accessories".

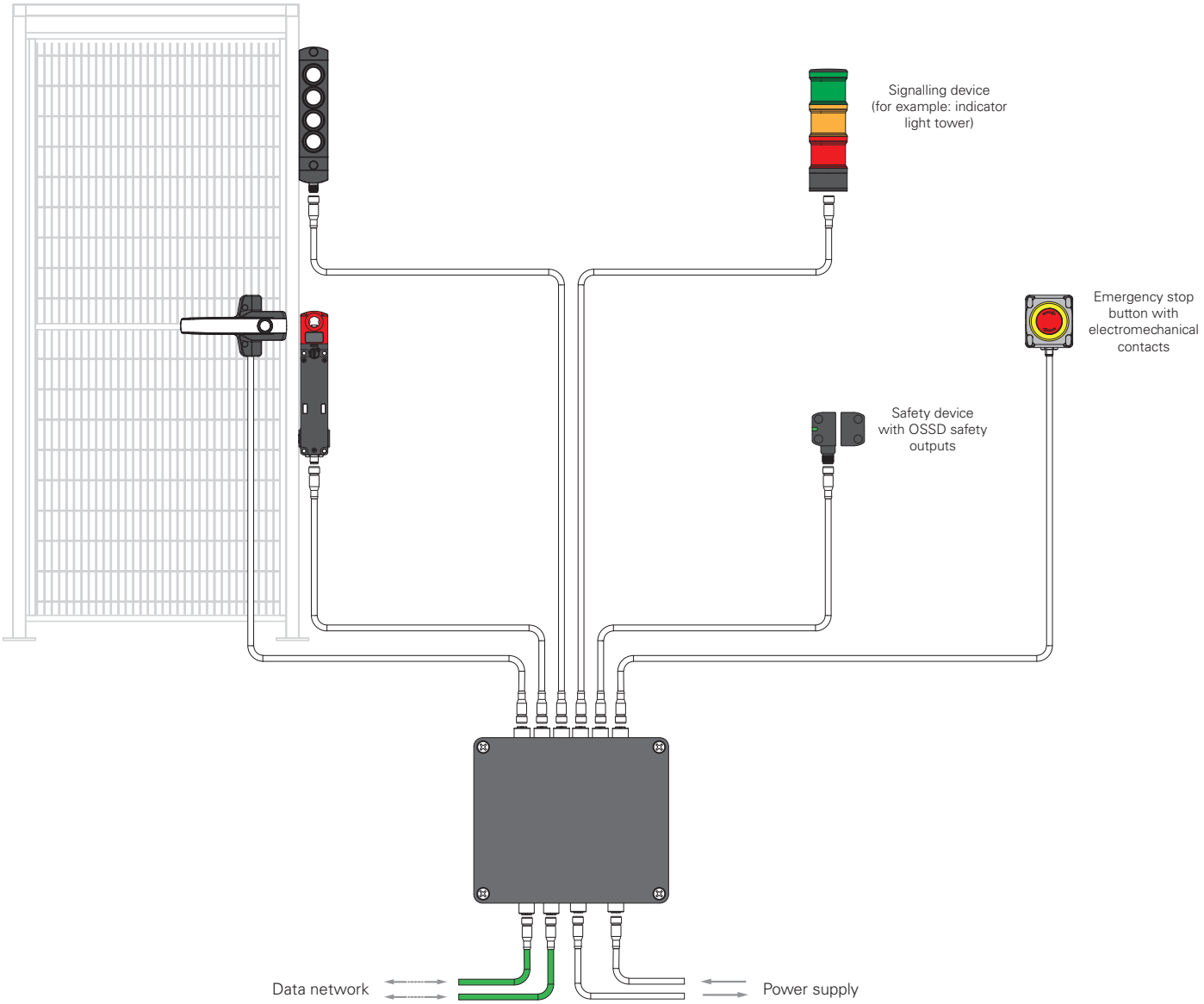
Connections

Article	Power supply ports	Network ports	Device inputs					
			1	2	3	4	5	6
BP A1PL2001	 1 x M12, 5-pole, male 1 x M12, 5-pole, female	 2 x M12, 4-pole, female, D-coded	 M12, 8-pole, female	 M12, 8-pole, female	 M12, 8-pole, female	 M12, 8-pole, female	 M12, 8-pole, female	 M12, 8-pole, female

Note: For the internal connections of usable devices, refer to pages 299-301.

BP A1PL2002

Solutions with NG/NS series switch, P-KUBE Krome safety handle, BN series control device unit, signalling device, safety device with OSSD safety outputs and control device unit including emergency stop

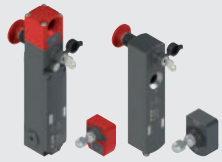


Note: the position of the connectors in the diagram is for illustrative purposes only.

Functional safety

Safety parameters	SIL	PL	Cat.
Monitoring function for the safety outputs	3	e	4
Locking function of the dual channel actuator	3	e	4

Selection table for BP A1PL2002 devices

	Description	Quantity	Article number	
	RFID safety switch with lock, with separate actuator, NG/NS series	1	NG ••••311A-F3•K958 (1) NG ••••321A-F3•K958 (1) NG ••••411A-F3•K958 (1) NG ••••421A-F3•K958 (1) NS •3••••P•-F4• (1)	NG ••••311B-F3•K958 (1) NG ••••321B-F3•K958 (1) NG ••••411B-F3•K958 (1) NG ••••421B-F3•K958 (1) NS •4••••P•-F4• (1)
	Safety device with OSSD safety outputs, at the user's discretion	1	Check that the electrical connections of the chosen device are compatible with the diagrams shown in the paragraph "Pin assignments of usable devices"	
	P-Connect connection box	1	BP A1PL2002	
	BN series control device unit with 4 control devices	1	BN AC4Z••• (1) (2)	
	Signalling device chosen by the user (for example: indicator light tower)	1	Check that the electrical connections of the chosen device are compatible with the diagrams shown in the paragraph "Pin assignments of usable devices"	
	P-KUBE Krome safety handle with illuminated white grip with control device	1	AN G1B00••-PM• (1) (3) AN S1B00••-PM• (1) (3)	
	Control device unit including emergency stop and luminous disc for signalling	1	ES AC31••• (1) (3)	

Notes:
(1) For the configurations, refer to pages 229 and 275, or contact technical assistance.
(2) Only configurations with four buttons 1NO + LED, M12 12-pole connector.
(3) Only configurations with M12 8-pole connector.

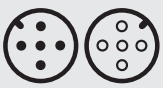
⚠ **Attention:** The articles listed above correspond to the maximum configuration that can be realised with the P-Connect connection gateway. Solutions with fewer devices can be implemented. If devices with emergency stop buttons are removed, the internal dip switches must be set accordingly to correctly configure the internal electronics of the connection system.

Cables with compatible connectors

Article	Description
VF CF••••M	M12 male connectors with cable, 5-pole
VF CA5•••M	M12 female connectors with cable, 5-pole
VF CA5•••M-MD	M12 extension cable, 5-pole
VF CA8•••M-MD	M12 extension cable, 8-pole
VF CA12•••M-MD	M12 extension cable, 12-pole

Note: For the article codes of available cables with connectors refer to the chapter "Accessories".

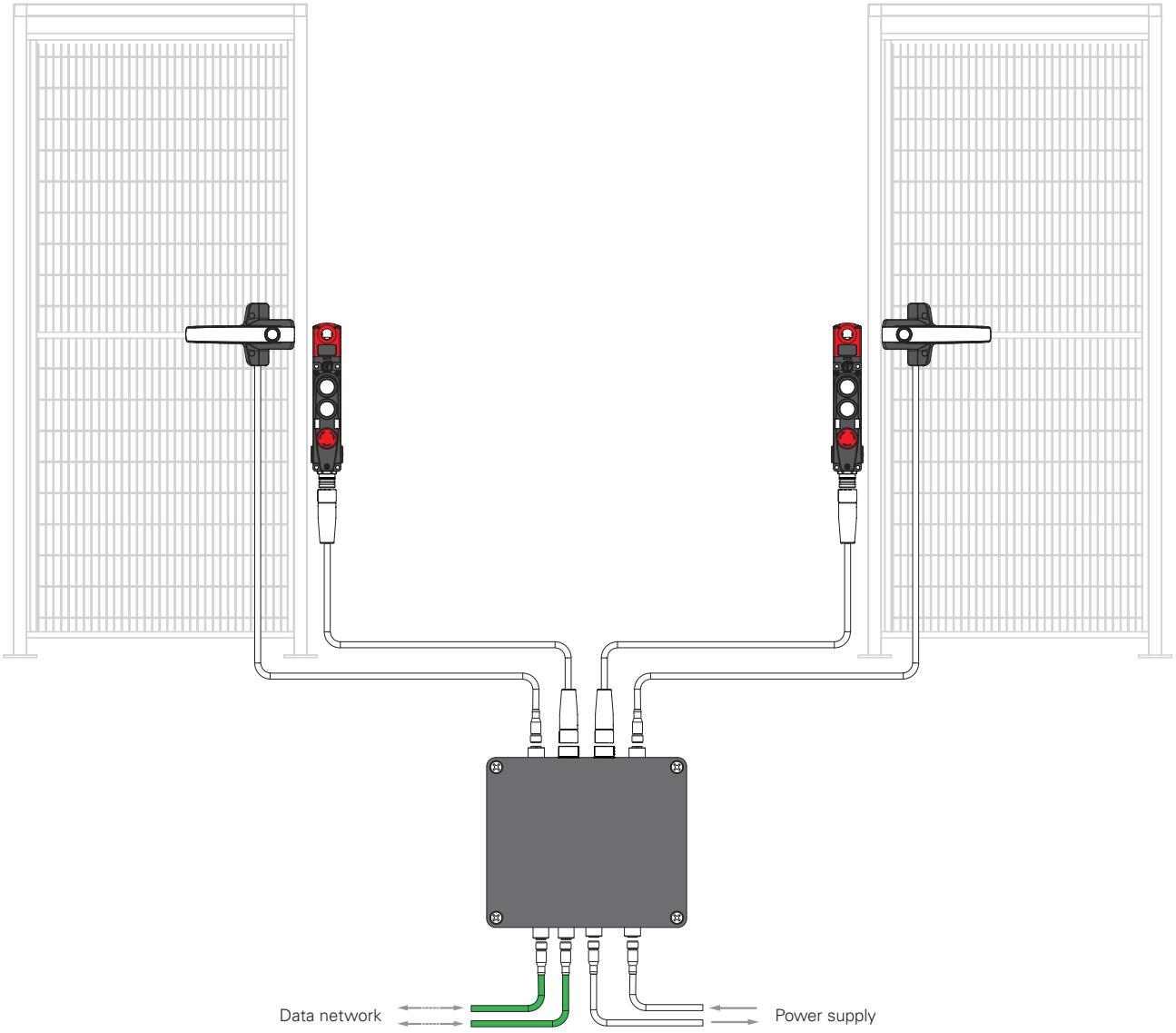
Connections

Article	Power supply ports	Network ports	Device inputs					
			1	2	3	4	5	6
BP A1PL2002	 1 x M12, 5-pole, male 1 x M12, 5-pole, female	 2 x M12, 4-pole, female, D-coded	 M12, 8-pole, female	 M12, 5-pole, female	 M12, 12-pole, female	 M12, 8-pole, female	 M12, 8-pole, female	 M12, 8-pole, female

Note: For the internal connections of usable devices, refer to pages 299-301.

BP A1PL2003

Solution with NG/NS series switches and P-KUBE Krome safety handles

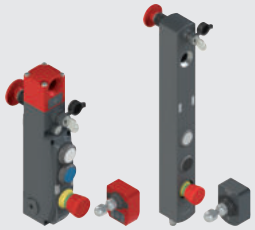


Note: the position of the connectors in the diagram is for illustrative purposes only.

Functional safety

Safety parameters	SIL	PL	Cat.
Monitoring function for the safety outputs	3	e	4
Locking function of the single channel actuator	1	c	1

Selection table for BP A1PL2003 devices

	Description	Quantity	Article number	
	RFID safety switch with lock, with integrated control devices, with separate actuator, NG/NS series	2	NG ••••311C-F3•K60• (1) NG ••••321C-F3•K60• (1) NG ••••411C-F3•K60• (1) NG ••••421C-F3•K60• (1) NG ••••311D-F3•K60• (1) NG ••••321D-F3•K60• (1) NG ••••411D-F3•K60• (1) NG ••••421D-F3•K60• (1) NS •3•••STK-F4•N••• (1)	NG ••••312V-F3•K60• (1) NG ••••322V-F3•K60• (1) NG ••••412V-F3•K60• (1) NG ••••422V-F3•K60• (1) NG ••••315R-F3•K60• (1) NG ••••325R-F3•K60• (1) NG ••••415R-F3•K60• (1) NG ••••425R-F3•K60• (1) NS •4•••STK-F4•N••• (1)
	P-Connect connection box	1	BP A1PL2003	
	P-KUBE Krome safety handle with illuminated white grip with control device	2	AN G1B00••-PM• (1) (2) AN S1B00••-PM• (1) (2)	

Notes:
(1) only codes with with 19-pole M23 connector. For the configurations, refer to pages 169 and 229, or contact technical assistance.
(2) Only configurations with M12 8-pole connector.

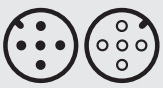
⚠ **Attention:** The articles listed above correspond to the maximum configuration that can be realised with the P-Connect connection gateway. Solutions with fewer devices can be implemented. If devices with emergency stop buttons are removed, the internal dip switches must be set accordingly to correctly configure the internal electronics of the connection system.

Cables with compatible connectors

Article	Description
VF CA5•••M	M12 female connectors with cable, 5-pole
VF CA5•••M-MD	M12 extension cable, 5-pole
VF CA8•••M-MD	M12 extension cable, 8-pole
VF CA19•••S-SD	M23 extension cable, 19-pole

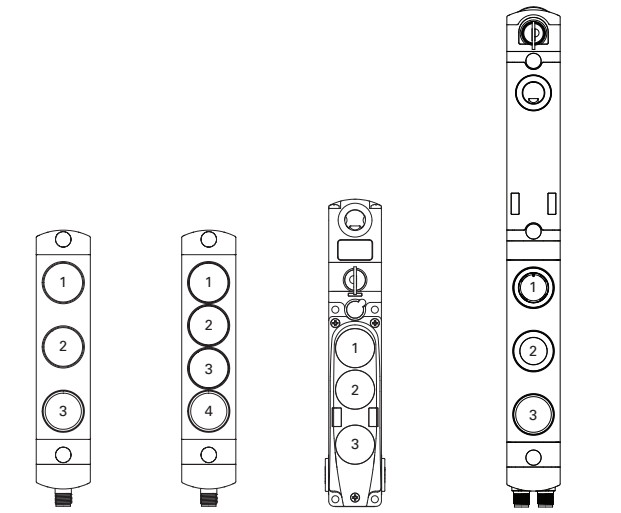
Note: For the article codes of available cables with connectors refer to the chapter "Accessories".

Connections

Article	Power supply ports	Network ports	Device inputs			
			1	2	3	4
BP A1PL2003	 1 x M12, 5-pole, male 1 x M12, 5-pole, female	 2 x M12, 4-pole, female, D-coded	 M23, 19-pole, female	 M23, 19-pole, female	 M12, 8-pole, female	 M12, 8-pole, female

Note: For the internal connections of usable devices, refer to pages 299-301.

Numbering of control devices



BN AC3•••• BN AC4•••• NG •••••••• NS ••••••••-N•••

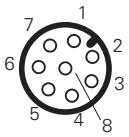
Legend:
A1 = Supply input +24 Vdc
A2 = Supply input 0 V
IE1, IE2 = Solenoid activation inputs
O3 = Signalling output, actuator inserted
O4 = Signalling output, actuator inserted and locked
ISx = Safety inputs
OSx = Safety outputs
I3 = Actuator programming input/reset
I5 = EDM input (cannot be used on BP series)

I = Device input
O = Device output

Pin assignments of usable devices

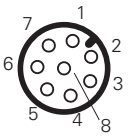
BP A1PL2001

Connectors no. 1 & 2:
NG - NS series safety switches



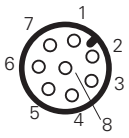
Pin	Type	P-Connect side	NG - NS side
1	O	+24 Vdc power supply	A1
2	I	Actuator enabled signal input	O3
3	O	0 Vdc power supply	A2
4	I	Safety input IS1/IS3	OS1
5	O	Solenoid activation command OS1	IE2
6	O	Actuator programming / reset	I3
7	I	Safety input IS2/IS4	OS2
8	O	Solenoid activation command OS2	IE1

Connectors no. 3 & 4:
BN AC3•••• series control device units



Pin	Type	P-Connect side	BN side
1	O	+24 Vdc power supply	Power supply +24 V
2	I	Button 1 contact non-safety input	Button 1 contact
3	-	Disconnected	Disconnected
4	I	Button 2 contact non-safety input	Button 2 contact
5	O	Test output TO1	Emergency stop button test input
6	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact
7	O	Test output TO2	Emergency stop button test input
8	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact

Connectors no. 5 & 6:
AN series safety handles



Pin	Type	P-Connect side	AN side
1	I	0 Vdc power supply	Power supply 0 V
2	O	+24 Vdc power supply	Power supply +24 V
3	O	Control output LED 1	Control input green LED (G)
4	O	Control output LED 4	Button LED control input
5	O	+24 V output for button contact	Button NO voltage-free contact input
6	I	Input for button contact	Button NO voltage-free contact output
7	O	Control output LED 2	Control input blue LED (B)
8	O	Control output LED 3	Control input red LED (R)

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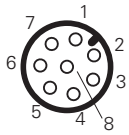
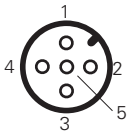
Connector no. 1:
NG - NS series safety switches



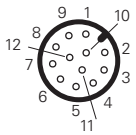
Pin	Type	P-Connect side	NG - NS side
1	O	+24 Vdc power supply	A1
2	I	Actuator enabled signal input	O3
3	O	0 Vdc power supply	A2
4	I	Safety input IS1	OS1
5	O	Solenoid activation command OS1	IE2
6	O	Actuator programming / reset	I3
7	I	Safety input IS2	OS2
8	O	Solenoid activation command OS2	IE1

Connector no. 2:
ST series safety sensors



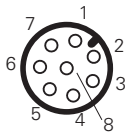
Pin	Type	P-Connect side	ST side
1	O	+24 Vdc power supply	A1
2	I	Safety input IS3	OS1
3	O	0 Vdc power supply	A2
4	I	Safety input IS4	OS2
5	I	Signalling input	O3

Connector no. 3:
BN AC4•••• series control device units



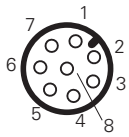
Pin	Type	P-Connect side	BN side
1	O	+24 Vdc power supply	+24 Vdc power supply
2	O	Position 1 LED control output	Position 1 LED control input
3	I	0 Vdc power supply	0 Vdc power supply
4	I	Input for button contact 1	Button 1 contact
5	I	Input for button contact 2	Button 2 contact
6	O	Position 2 LED control output	Position 2 LED control input
7	I	Input for button contact 3	Button 3 contact
8	O	Position 3 LED control output	Position 3 LED control input
9	I	Input for button contact 4	Button 4 contact
10	-	Disconnected	Disconnected
11	-	Disconnected	Disconnected
12	O	Position 4 LED control output	Position 4 LED control input

Connector no. 4:
Control unit with emergency stop and luminous disc



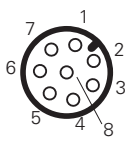
Pin	Type	P-Connect side	Control unit side
1	-	Disconnected	Disconnected
2	O	Control output luminous disc +24 Vdc	Control input luminous disc +24 V
3	O	Luminous disc power supply 0 Vdc	Power supply 0 V
4	-	Disconnected	Disconnected
5	O	Test output TO1	Emergency stop button test input
6	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact
7	O	Test output TO2	Emergency stop button test input
8	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact

Connector no. 5:
AN series safety handles



Pin	Type	P-Connect side	AN side
1	I	0 Vdc power supply	Power supply 0 V
2	O	+24 Vdc power supply	Power supply +24 V
3	O	Control output LED 1	Control input green LED (G)
4	O	Control output LED 4	Button LED control input
5	O	+24 V output for button contact	Button NO voltage-free contact input
6	I	Input for button contact	Button NO voltage-free contact output
7	O	Control output LED 2	Control input blue LED (B)
8	O	Control output LED 3	Control input red LED (R)

Connector no. 6:
Indicator light tower (reference wiring diagram)



Pin	Type	P-Connect side	Indicator light tower side
1	I	0 Vdc power supply	Power supply 0 V
2	O	+24 Vdc power supply	Power supply +24 V
3	O	Control output LED 1	Control input LED 1
4	O	Control output LED 4	Control input LED 4
5	O	Buzzer control output	Buzzer control input
6	I	Signalling input	Signalling output
7	O	Control output LED 2	Control input LED 2
8	O	Control output LED 3	Control input LED 3

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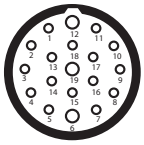
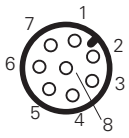
Connectors no. 1 & 2:
NG - NS series safety switches



Pin	Type	P-Connect side	NG - NS side
1	O	Single-channel solenoid activation output	I4
2	O	Short circuit +24 VDC	IS1
3	O	Short circuit +24 VDC	IS2
4	I	Safety input IS1/IS3	OS1
5	I	Safety input IS2/IS4	OS2
6	O	+24 Vdc power supply	A1
7	O	Actuator programming / reset	I3
8	I	Actuator enabled signal input	O3
9	I	Locked guard signal input	O4
10	O	Test output TO1	Emergency stop button test input
11	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact
12	-	Not connected	I5
13	O	Test output TO1	Emergency stop button test input
14	I	Safety input for emergency stop button NC contact	Emergency stop button NC safety contact
15	I	Input for position 2 contact	Position 2 contact
16	O	Position 2 LED control output	Position 2 LED control input
17	I	Input for position 1 contact	Position 1 contact
18	O	Position 1 LED control output	Position 1 LED control input
19	I	0 Vdc power supply	A2

Connectors no. 3 & 4:
AN series safety handles



Pin	Type	P-Connect side	AN side
1	I	0 Vdc power supply	Power supply 0 V
2	O	+24 Vdc power supply	Power supply +24 V
3	O	Control output LED 1	Control input green LED (G)
4	O	Control output LED 4	Button LED control input
5	O	+24 V output for button contact	Button NO voltage-free contact input
6	I	Input for button contact	Button NO voltage-free contact output
7	O	Control output LED 2	Control input blue LED (B)
8	O	Control output LED 3	Control input red LED (R)

Notes

Selection diagram

SAFETY FUNCTION AND OUTPUT CONTACTS

For emergency stops and end position monitoring for movable guards

For emergency stops, end position monitoring for movable guards, safety mats and safety bumpers with 4-wire technology

For emergency stops and end position monitoring for movable guards with delayed contacts upon opening of the inputs

CS AR

01	2NO + 1NC	**08**	2NO	**25**	4NO + 1NC
02	3NO	**20**	2NO	**40**	2NO
04	3NO + 1NC	**21**	2NO	**41**	2NO
05	3NO + 1NC	**22**	3NO + 1NC	**46**	1NO
06	3NO + 1NC	**23**	3NO + 1NC	**91**	2NO + 1OPT
07	4NO + 1NC	**24**	4NO + 1NC		

CS AR-51

51	2NO

CS AT

0•	2NO + 1NC (instantaneous) 2NO (delayed)
1•	3NO (instantaneous) 2NO (delayed)
3•	2NO (instantaneous) 1NO (delayed)

Safety timer modules

For two-hand controls or synchronism monitoring

For motor standstill monitoring

Expansion modules

CS FS

1•	1NO + 2NC
2•	1NO + 1NC + 1CO
3•	1NO + 1NC + 1CO
5•	1NO + 1NC + 1CO

CS DM

01	3NO + 1NC
02	2NO
20	2NO

CS AM

01	2NO + 1NC

CS ME

01	5NO + 1NC (instantaneous) 1NC (feedback)
02	4NO + 2NC (instantaneous) 1NC (feedback)
03	3NO (instantaneous) 1NC (feedback)
20	4NO + 2NC (delayed) 1NC (feedback)
31	4NO + 2NC (delayed) 1NC (feedback)

CONNECTION

V
Screw terminals

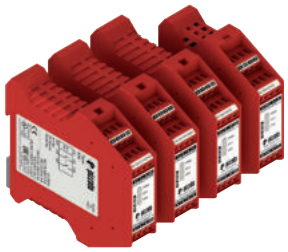
M
Connector with screw terminals

X
Connector with spring terminals

SUPPLY VOLTAGE

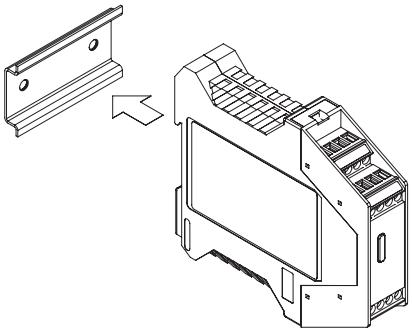
12 V DC	24 V AC/DC	10...30 V DC	120 V AC	230 V AC
U12	**024**	**E02**	**120**	**230**

Introduction



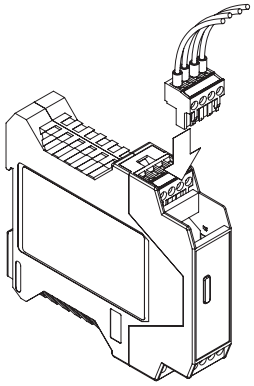
With decades of experience in the field of safety and industrial automation, Pizzato Elettrica offers the safety modules of the CS series, made for the main safety functions present in industrial machinery.
All CS series safety modules are implemented with cutting edge technology, and attention to detail.
They are produced on the premises of Pizzato Elettrica, at Marostica (in Italy), using special SMT (surface mount technology) assembly lines that are able to operate with lead-free technology. This meets eco-compatibility requirements laid down by the RAEE and RoHS Directives.

Mounting on DIN rails



The housings of all CS series safety modules are suitable for DIN rail mounting and are compact (22.5 or 45 mm wide) to minimize the overall dimensions inside the control cabinets.

Fast wiring with removable connectors



The CS series safety modules can be ordered as versions with screw terminals, or with removable connectors and screw or spring terminals.
The versions with removable connectors are faster and easier to wire and install.
Furthermore, should a damaged module require replacement, machine downtimes are significantly reduced.

EC-type examination certificate

CE 0051

The EC-type examination certificate is issued by a Notified Body, and guarantees compliance with the safety requirements of the Machinery Directive. The EC-type examination certificate guarantees to the customer, that experts of a Notified Body have verified compliance with directives and continuously monitor the production process and check the conformity of products with the sample (type) verified during approval. A product that is awarded EC-type certification can be marketed with the CE symbol, followed by a four-digit number identifying the Notified Body.

Final inspection of 100% of all products

To provide the user with a guarantee of the high quality standards of Pizzato Elettrica products, each safety module is tested individually using automated test stations, and identified by a unique serial number.
This process allows preventive identification of products displaying production defects, or deviations from standard operating parameters.

Quality marks

All Pizzato Elettrica safety modules bear quality marks that confirm their fulfilment of safety requirements and compliance with product directives in force in international markets.

Technical assistance

The technical department of Pizzato Elettrica supports installers of CS series safety modules with useful information before, during, and after the installation phase, in the most complex applications.

Code structure

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

CS AR-01V024

Safety function	
AR	For emergency stops and end position monitoring for movable guards
AT	For emergency stops and end position monitoring for movable guards with delayed contacts upon opening of the inputs
FS	Safety timer modules
DM	For two-hand controls or synchronism monitoring
AM	For motor standstill monitoring
ME	Expansion modules

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
U12	12 Vdc
024	24 Vac/dc
E02	10 … 30 Vdc
120	120 Vac
230	230 Vac

Selection table for safety modules with single function

Product code	Supply voltage	For applications up to			Output contacts			Housing dimensions
		PL	SIL	Safety category	instantaneous	delayed	feedback	
Safety modules for emergency stops and end position monitoring for movable guards								
CS AR-01	24 Vac/dc; 120 Vac; 230 Vac; 10...30 Vdc	e	3	4	**2 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-02	24 Vac/dc; 120 Vac; 230 Vac; 10...30 Vdc	e	3	4	**3 NO**	-	-	22,5 x 114 mm
CS AR-04	24 Vac/dc; 120 Vac; 230 Vac	e	3	4	**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-05	24 Vac/dc; 120 Vac; 230 Vac	e	3	4	**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-06	24 Vac/dc; 120 Vac; 230 Vac	e	3	4	**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-07	24 Vac/dc	e	3	4	**4 NO + 1 NC**	-	-	22,5 x 129 mm
CS AR-08	12 Vdc, 24 Vac/dc; 120 Vac; 230 Vac	e	3	4	**2 NO**	-	-	22,5 x 114 mm
CS AR-20	24 Vac/dc; 120 Vac; 230 Vac	e	3	3	**2 NO**	-	-	22,5 x 114 mm
CS AR-21	24 Vac/dc; 120 Vac; 230 Vac	e	3	3	**2 NO**	-	-	22,5 x 114 mm
CS AR-22	24 Vac/dc; 120 Vac; 230 Vac	e	3	3	**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-23	24 Vac/dc; 120 Vac; 230 Vac	e	3	3	**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-24	24 Vac/dc	e	3	3	**4 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-25	24 Vac/dc	e	3	3	**4 NO + 1 NC**	-	-	22,5 x 114 mm
CS AR-40	24 Vac/dc	d	2	2	**2 NO**	-	-	22,5 x 91 mm
CS AR-41	24 Vac/dc	d	2	2	**2 NO**	-	-	22,5 x 91 mm
CS AR-46	24 Vac/dc	c	1	1	**1 NO**	-	-	22,5 x 91 mm
CS AR-91	24 Vac/dc	e	3	4	**2 NO + 1 OPT**	-	-	22,5 x 114 mm
Module for emergency stops, end position monitoring for movable guards, safety mats and safety bumpers with 4-wire technology								
CS AR-51	24 Vac/dc	e	3	4	**2 NO**	-	-	22,5 x 114 mm
Safety modules for emergency stop and end position monitoring for movable guards with delayed contacts upon opening of the inputs								
CS AT-0③	24 Vac/dc; 120 Vac; 230 Vac	e	3	4 (②)	**2 NO + 1 NC**	**2 NO**	-	45 x 114 mm
CS AT-1③	24 Vac/dc; 120 Vac; 230 Vac	e	3	4 (②)	**3 NO**	**2 NO**	-	45 x 114 mm
CS AT-3③	24 Vac/dc	e	3	4 (②)	**2 NO**	**1 NO**	-	45 x 114 mm
Safety timer modules								
CS FS-1③	24 Vac/dc; 120 Vac; 230 Vac	①	①	①	-	**1 NO + 2 NC**	-	45 x 114 mm
CS FS-2③	24 Vdc; 120 Vac	d	2	3	-	**1 NO +1 NC +1 CO**	-	45 x 114 mm
CS FS-3③	24 Vdc; 120 Vac	d	2	3	-	**1 NO +1 NC +1 CO**	-	45 x 114 mm
CS FS-5③	24 Vdc; 120 Vac	d	2	3	-	**1 NO +1 NC +1 CO**	-	45 x 114 mm
Safety modules for two-hand controls or synchronism monitoring								
CS DM-01	24 Vac/dc; 120 Vac; 230 Vac	III C in compliance with EN ISO 13851			**3 NO + 1 NC**	-	-	22,5 x 114 mm
CS DM-02	24 Vac/dc; 120 Vac; 230 Vac	III C in compliance with EN ISO 13851			**2 NO**	-	-	22,5 x 114 mm
CS DM-20	24 Vac/dc; 120 Vac; 230 Vac	III A in compliance with EN ISO 13851			**2 NO**	-	-	22,5 x 114 mm
Safety modules for motor standstill monitoring								
CS AM-01	24 ... 230 Vac/dc	d	2	3	**2 NO + 1 NC**	-	-	45 x 114 mm
Expansion modules with instantaneous contacts or delayed contacts at de-energizing								
CS ME-01	24 Vac/dc	①	①	①	**5 NO + 1 NC**	-	**1 NC**	22,5 x 114 mm
CS ME-02	24 Vdc	①	①	①	**4 NO + 2 NC**	-	**1 NC**	22,5 x 114 mm
CS ME-03	24 Vdc	①	①	①	**3 NO**	-	**1 NC**	22,5 x 91 mm
CS ME-20VU24-⑤	24 Vdc	①	①	①	-	**4 NO + 2 NC**	**1 NC**	22,5 x 114 mm
CS ME-31VU24-TS12	24 Vdc	①	①	①	-	**4 NO + 2 NC**	**1 NC**	45 x 114 mm

■ Available for this article
- Not available for this article
① Depending on the base module
② Category 4 for instantaneous contacts, category 3 for delayed contacts

③ Release times for delayed contacts
0 fixed time
1 adjustable, 0.3 … 3 s, 0.3 s steps
2 adjustable, 1 … 10 s, 1 s steps
3 adjustable, 3 … 30 s, 3 s steps
4 adjustable, 30 … 300 s, 30 s steps

④ Connection type
V Screw terminals
M Connector with screw terminals
X Connector with spring terminals

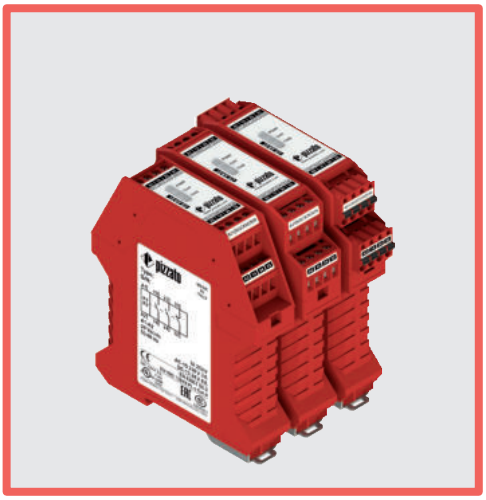
Product code	Autom. & manual start	Monitored start	Inputs of opposite potentials	Equipo-tential inputs	Parallel start (24 Vdc only)	Input type (⑥)				Connection type (④)			Page
										V	M	X	
CS AR-01	■	■	■	■	■	■	■	⑦	-	■	■	■	307
CS AR-02	■	■	■	■	■	■	■	⑦	-	■	■	■	309
CS AR-04	■	■	■	-	■	■	-	⑦	-	■	■	■	311
CS AR-05	■	-	■	■	■	■	■	■	-	■	■	■	313
CS AR-06	-	■	■	■	■	■	■	■	-	■	■	■	313
CS AR-07	■	■	■	-	■	■	-	-	-	-	■	■	315
CS AR-08	■	■	■	■	■	■	■	■	-	■	■	■	317
CS AR-20	■	-	-	-	-	■	-	-	-	■	■	■	319
CS AR-21	-	■	-	-	-	■	-	-	-	■	■	■	319
CS AR-22	■	-	-	-	-	■	-	-	-	■	■	■	321
CS AR-23	-	■	-	-	-	■	-	-	-	■	■	■	321
CS AR-24	■	-	-	-	-	■	-	-	-	■	■	■	323
CS AR-25	-	■	-	-	-	■	-	-	-	■	■	■	323
CS AR-40	■	-	-	-	-	■	-	-	-	■	■	■	325
CS AR-41	-	■	-	-	-	■	-	-	-	■	■	■	325
CS AR-46	■	-	■	-	-	■	-	■	-	■	■	■	327
CS AR-91	■	■	■	-	■	■	-	■	-	■	■	■	329
CS AR-51	■	■	■	-	-	■	-	-	■	■	■	■	331
CS AT-0③	■	■	■	■	■	■	■	■	-	■	■	■	333
CS AT-1③	■	■	■	■	■	■	■	■	-	■	■	■	335
CS AT-3③	■	■	■	-	-	■	-	■	-	■	■	■	337
CS FS-1③	-	-	-	-	-	■	-	-	-	■	■	■	339
CS FS-2③	-	-	-	-	-	■	-	-	-	■	■	■	341
CS FS-3③	-	-	-	-	-	■	-	-	-	■	■	■	343
CS FS-5③	■	■	-	■	-	■	-	■	-	■	■	■	345
CS DM-01	-	-	■	-	-	■	-	-	-	■	■	■	347
CS DM-02	-	-	■	-	-	■	-	-	-	■	■	■	349
CS DM-20	-	-	■	-	-	■	-	-	-	■	■	■	351
CS AM-01	-	-	-	-	-	■	-	-	-	■	■	■	353
CS ME-01	-	-	①	①	-	■	-	-	-	■	■	■	355
CS ME-02	-	-	①	①	-	■	-	-	-	■	■	■	357
CS ME-03	-	-	-	■	-	■	■	-	-	■	■	■	359
CS ME-20VU24-⑤	-	-	①	①	-	■	-	-	-	■	■	■	361
CS ME-31VU24-TS12	-	-	①	①	-	■	-	-	-	■	■	■	363

⑤ Release time in absence of power supply
- TF0.5 0.5 s fixed time
- TF1 1 s fixed time
- TF2 2 s fixed time
- TF3 3 s fixed time

⑥ Input type
- electromechanical contacts
- semiconductor outputs (e.g. light barriers)
- magnetic safety sensors
- 4-wire safety mats and safety bumpers

⑦ Modules compatible with magnetic sensors from June 2014

Safety module **CS AR-01**



Module for emergency stops, end position monitoring for movable guards, OSSD semiconductor outputs and magnetic safety sensors

Main features

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start or monitored start
- Can be connected to OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- Reduced housing width of 22.5 mm
- Output contacts:
  2 NO safety contacts,
  1 NC auxiliary contact
- Supply voltage:
  10 … 30 Vdc, 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 415, design A

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	10 … 30 Vdc 24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	30 mA (typical)
Min. duration of start impulse t_{MIN}:	> 100 ms, > 50 ms (E02)
Response time t_A:	< 300 ms, < 150 ms (E02)
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 70 ms, < 100 ms (E02)
Simultaneity time t_C:	unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 No. 14, GB/T14048.5

Output circuit

Output contacts:	2 NO safety contacts, 1 NC auxiliary contact
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	72 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 355-364.

Code structure

CS AR-01V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc
120	120 Vac
230	230 Vac
E02	10 … 30 Vdc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

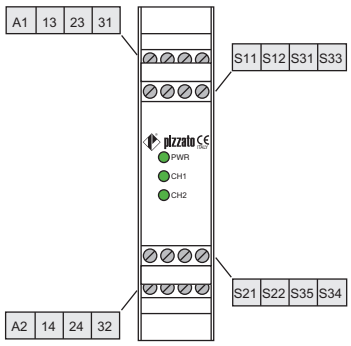
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

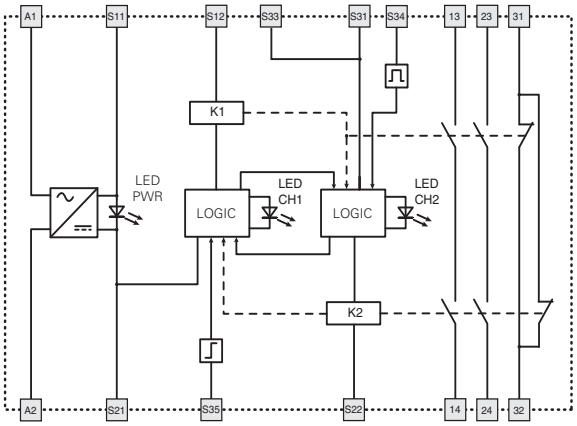
- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

Safety module CS AR-01

Pin assignment

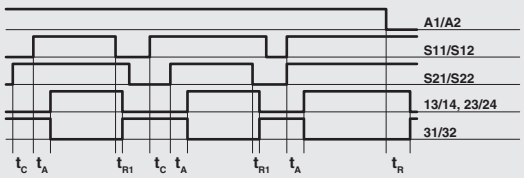


Internal wiring diagram

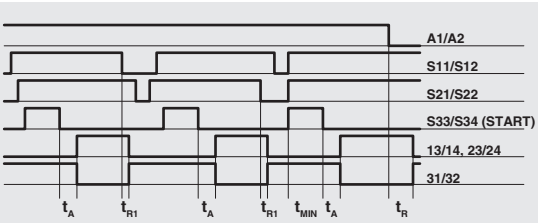


Function diagrams

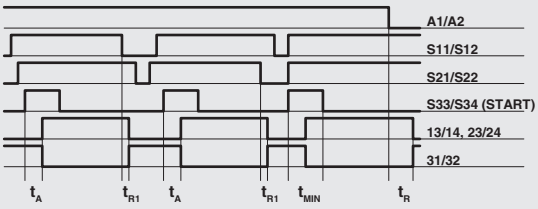
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

t_{MIN}: Min. duration of start impulse
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply

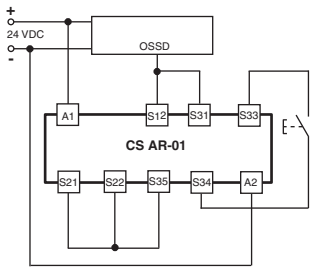
Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Input configuration

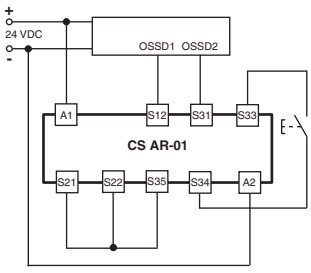
OSSD semiconductor outputs (e.g. ST, NS, NG series or light barriers)

Input configuration with manual start

1 channel



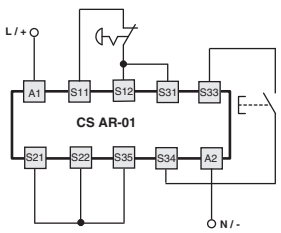
2 channels



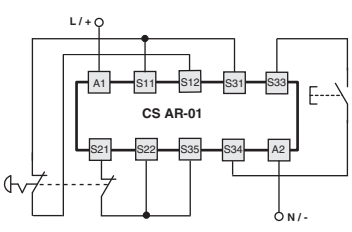
Emergency stop circuits

Input configuration with manual start

1 channel



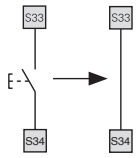
2 channels



The diagram does not show the exact position of the terminals in the product

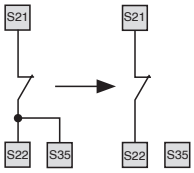
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



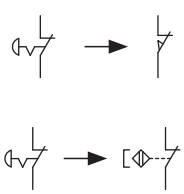
Monitored start

With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts.
The sensors can only be used in 2-channel configuration.



Application examples See page 365

Safety module **CS AR-02**

Module for emergency stops, end position monitoring for movable guards, OSSD semiconductor outputs and magnetic safety sensors

Main features

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start or monitored start
- Can be connected to OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- Reduced housing width of 22.5 mm
- Output contacts: 3 NO safety contacts
- Supply voltage: 10 … 30 Vdc, 24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 415, design A

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	10 … 30 Vdc 24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	< 30 mA
Min. duration of start impulse t_{MIN}:	> 100 ms, > 50 ms (E02)
Response time t_A:	< 300 ms, < 150 ms (E02)
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 70 ms, < 100 ms (E02)
Simultaneity time t_C:	unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 No. 14, GB/T14048.5

Output circuit

Output contacts:	3 NO safety contacts,
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	72 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 355-364.

Code structure

CS AR-02V024

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc
120	120 Vac
230	230 Vac
E02	10 … 30 Vdc

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

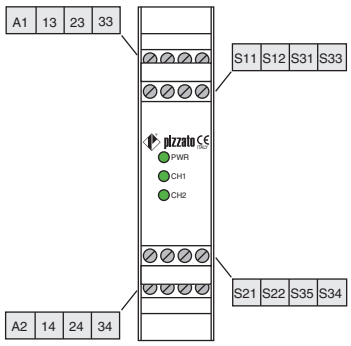
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

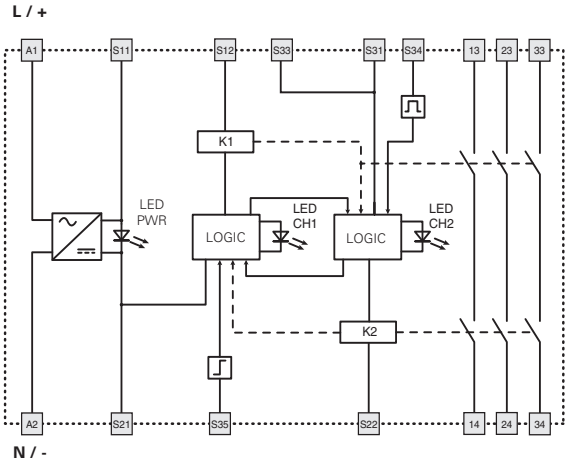
- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

Safety module CS AR-02

Pin assignment

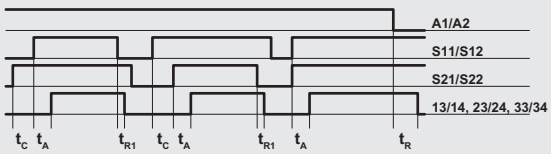


Internal wiring diagram

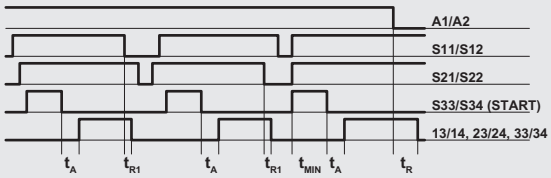


Function diagrams

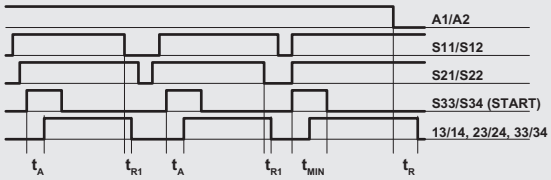
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



Legend:

t_{MIN}: Min. duration of start impulse
t_C: simultaneity time
t_A: response time
t_{R1}: release time
t_R: release time in absence of power supply

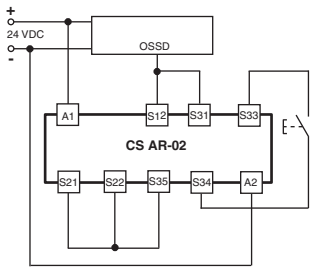
Notes:
The configurations with one channel are obtained taking into consideration the S11/S12 input only. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN} referred to the start.

Input configuration

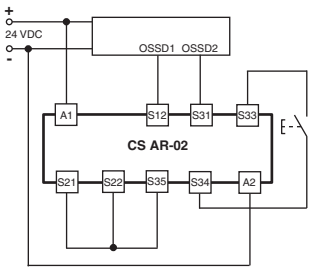
OSSD semiconductor outputs (e.g. ST, NS, NG series or light barriers)

Input configuration with manual start

1 channel



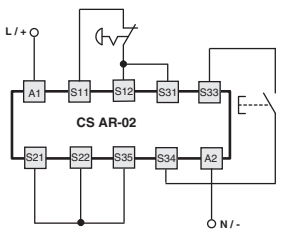
2 channels



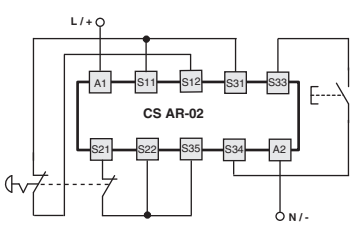
Emergency stop circuits

Input configuration with manual start

1 channel



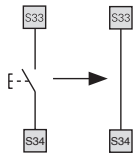
2 channels



The diagram does not show the exact position of the terminals in the product

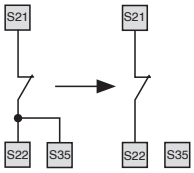
Automatic start

With regard to the indicated diagrams, bridge the start button between S33 and S34 in order to activate the automatic start module.



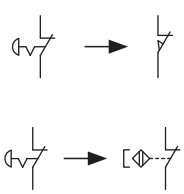
Monitored start

With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



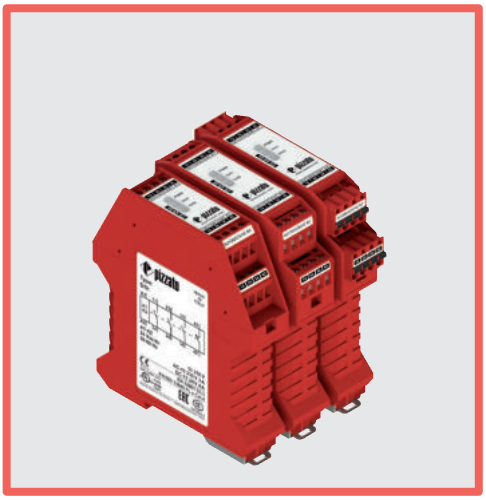
Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts.
The sensors can only be used in 2-channel configuration.



Application examples See page 365

Safety module **CS AR-04**



Module for emergency stops, end position monitoring for movable guards and magnetic safety sensors

Main features

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts:
  3 NO safety contacts,
  1 NC auxiliary contact
- Supply voltage:
  24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 415, design A

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	30 mA (typical)
Min. duration of start impulse t_{MIN}:	> 100 ms
Response time t_A:	< 50 ms
Release time t_{R1}:	< 20 ms
Release time in absence of power supply t_R:	< 70 ms
Simultaneity time t_C:	unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 No. 14, GB/T14048.5

Output circuit

Output contacts:	3 NO safety contacts 1 NC auxiliary contact
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	64 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 355-364.

Code structure

CS AR-04V024

Connection type		Supply voltage	
V	Screw terminals	**024**	24 Vac/dc
M	Connector with screw terminals	**120**	120 Vac
X	Connector with spring terminals	**230**	230 Vac

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

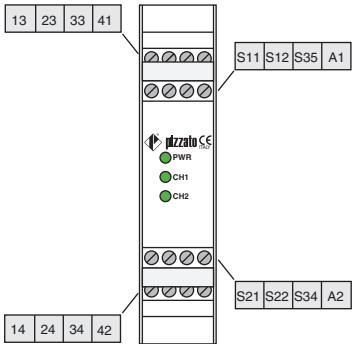
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

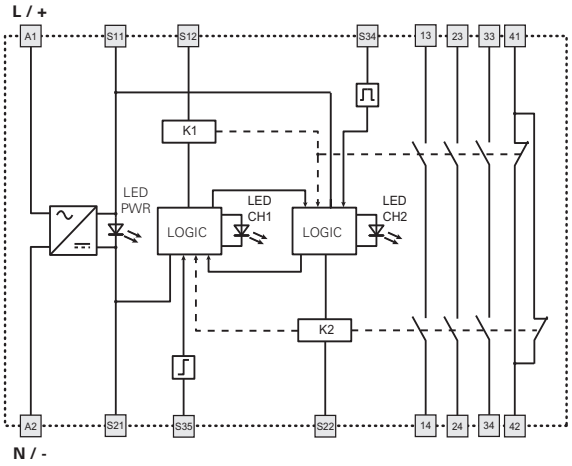
- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

Safety module CS AR-04

Pin assignment

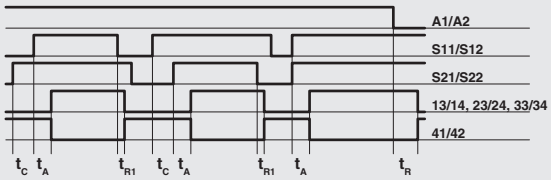


Internal wiring diagram

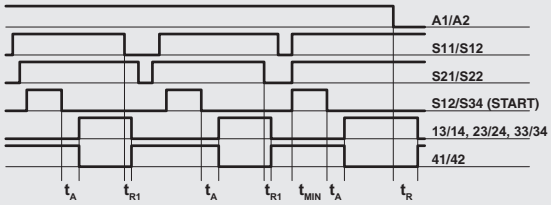


Function diagrams

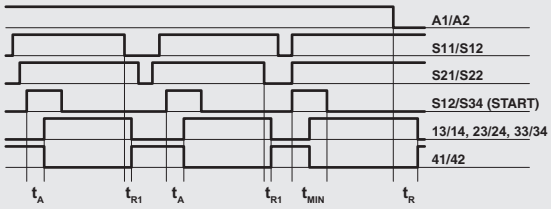
Configuration with automatic start



Configuration with monitored start



Configuration with manual start



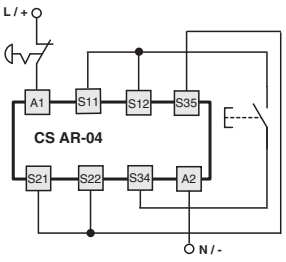
Legend:

t_{MIN}:	Min. duration of start impulse	t_{R1}:	release time
t_C:	simultaneity time	t_R:	release time in absence of power supply
t_A:	response time		

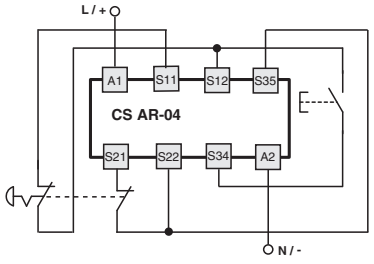
Notes:
The configurations with one channel are obtained taking into consideration only the effect of the S11/S12 input on the supply. In this case it is necessary to consider time t_{R1} referred to input S11/S12, time t_R referred to the supply, time t_A referred to input S11/S12 and to the start, and time t_{MIN}.

Input configuration

Emergency stop circuits	
Input configuration with manual start	
1 channel	2 channels

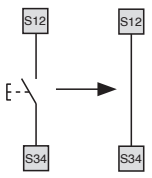


The diagram does not show the exact position of the terminals in the product



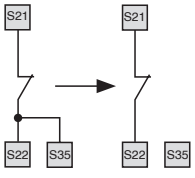
Automatic start

With regard to the indicated diagrams, bridge the start button between S12 and S34 in order to activate the automatic start module.



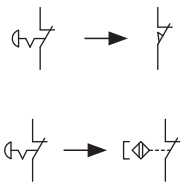
Monitored start

With regard to the indicated diagrams, remove the connection between the S22 and S35 terminals in order to activate the monitored start module.



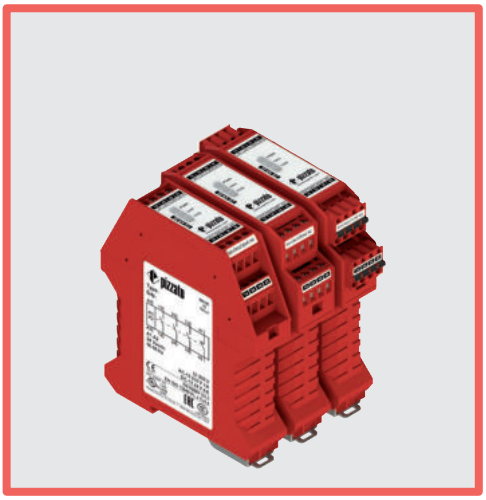
Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts.
The sensors can only be used in 2-channel configuration.



Application examples See page 365

Safety module **CS AR-05 / CS AR-06**



Module for emergency stops, end position monitoring for movable guards, OSSD semiconductor outputs and magnetic safety sensors

Main features

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start (CS AR-05 only) or monitored start (CS AR-06 only)
- Can be connected to OSSD semiconductor outputs, to electromechanical contacts or to magnetic safety sensors
- Output contacts:
  3 NO safety contacts,
  1 NC auxiliary contact
- Supply voltage:
  24 Vac/dc, 120 Vac, 230 Vac

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 415, design A

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	< 30 mA
Min. duration of start impulse t_{MIN}:	> 250 ms
Response time t_A:	< 300 ms
Release time t_{R1}:	< 15 ms
Release time in absence of power supply t_R:	< 70 ms
Simultaneity time t_C:	unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 No. 14, GB/T14048.5

Output circuit

Output contacts:	3 NO safety contacts 1 NC auxiliary contact
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 300 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	64 A^2
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 355-364.

Code structure

CS AR-05V024

Start mode	
05	manual or automatic start
06	monitored start

Connection type	
V	Screw terminals
M	Connector with screw terminals
X	Connector with spring terminals

Supply voltage	
024	24 Vac/dc
120	120 Vac
230	230 Vac

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz 120 Vac; 50…60 Hz 230 Vac; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

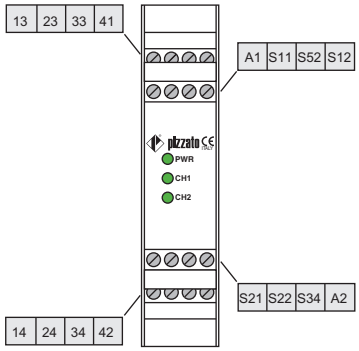
Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

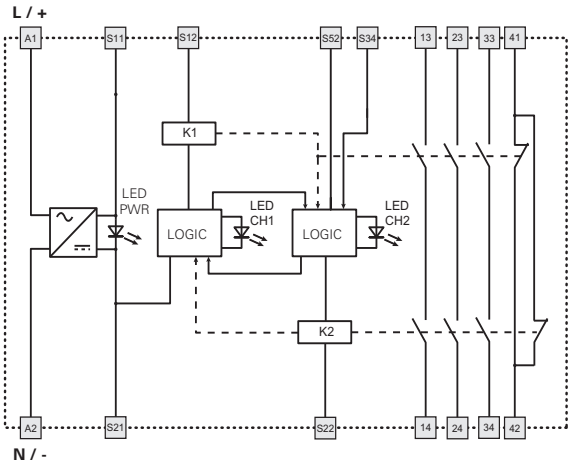
- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.

Safety module CS AR-05 / CS AR-06

Pin assignment

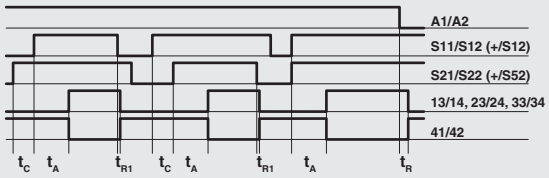


Internal wiring diagram

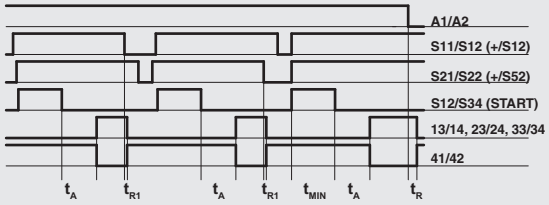


Function diagrams

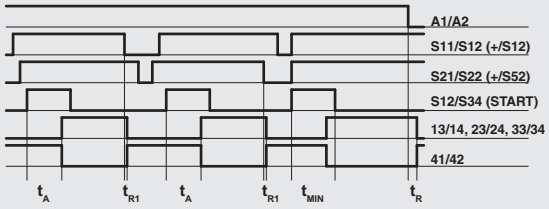
Configuration with automatic start (CS AR-05 only)



Configuration with monitored start (CS AR-06 only)



Configuration with manual start (CS AR-05 only)



Legend:

t_{MIN}:	Min. duration of start impulse	t_{R1}:	release time
t_c:	simultaneity time	t_R:	release time in absence of power supply
t_A:	response time		

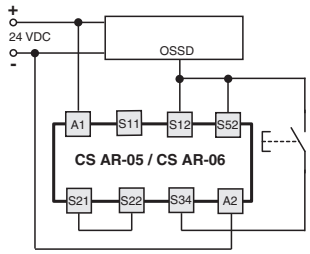
Notes:
The configurations with one channel are obtained taking into consideration the CH1 input only. In this case it is necessary to consider time t_{R1} referred to input CH1, time t_R referred to the supply, time t_A referred to input CH1 and to the start, and time t_{MIN} referred to the start.

Input configuration

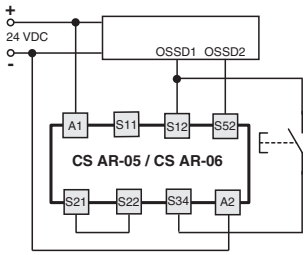
OSSD semiconductor outputs (e.g. ST, NS, NG series or light barriers)

Input configuration with manual start (CS AR-05)

1 channel



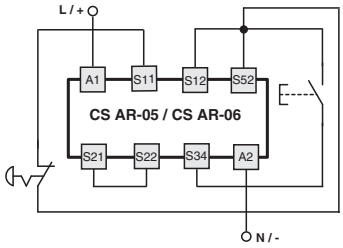
2 channels



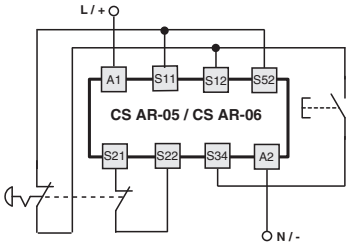
Emergency stop circuits

Input configuration with manual start (CS AR-05)

1 channel



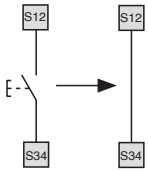
2 channels



The diagram does not show the exact position of the terminals in the product

Automatic start (CS AR-05 only)

Bridge the start button between S12 and S34 in order to activate the automatic start module.

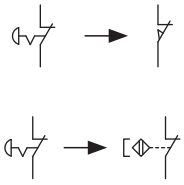


Monitored start

Use module CS AR-06 with the circuit diagrams for manual start.

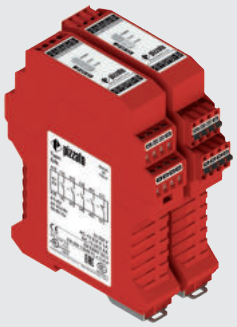
Monitoring of movable guards and magnetic safety sensors

The safety module can monitor emergency stop circuits, control circuits for movable guards as well as magnetic safety sensors. Replace the emergency stop contacts with switch contacts or sensor contacts. **The sensors can only be used in 2-channel configuration.**



Application examples See page 365

Safety module **CS AR-07**



Module for emergency stops and end position monitoring for movable guards

Main features

- For safety applications up to SIL CL 3/PL e
- Input with 1 or 2 channels
- Choice between automatic start, manual start or monitored start
- Connection of input channels of opposite potentials
- Reduced housing width of 22.5 mm
- Output contacts:
  4 NO safety contacts,
  1 NC auxiliary contact
- Supply voltage:
  24 Vac/dc

Utilization categories

Alternating current: AC15 (50…60 Hz)
Ue (V) 230
Ie (A) 3
Direct current: DC13 (6 oper. cycles/min.)
Ue (V) 24
Ie (A) 4

Quality marks:

EC type examination certificate: IMQ CP 432 DM
UL approval: E131787
CCC approval: 2021000305000107
EAC approval: RU C-IT.УТ03.B.00035/19

Compliance with the requirements of:

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

Technical data

Housing

Polyamide housing PA 66, self-extinguishing V0 acc. to UL 94

Protection degree acc. to EN 60529:	IP40 (housing), IP20 (terminal strip)
Dimensions:	see page 415, design B

General data

SIL level (SIL CL) up to:	SIL CL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety category up to:	cat. 4 acc. to EN ISO 13849-1
Safety parameters:	see page 481
Ambient temperature:	-25°C…+55°C
Mechanical endurance:	>10 million operating cycles
Electrical endurance:	>100,000 operating cycles
Pollution degree:	external 3, internal 2
Rated impulse withstand voltage (U_{imp}):	4 kV
Rated insulation voltage (U_i):	250 V
Overvoltage category:	II

Supply

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Max. DC residual ripple in DC:	10%
Supply voltage tolerance:	±15% of U_n
Power consumption AC:	< 5 VA
Power consumption DC:	< 2 W

Control circuit

Protection against short circuits:	PTC resistance, Ih=0.5 A
PTC times:	response time > 100 ms, release time > 3 s
Maximum resistance per input:	≤ 50 Ω
Current per input:	30 mA (typical)
Min. duration of start impulse t_{MIN}:	> 100 ms
Response time t_A:	< 70 ms
Release time t_{R1}:	< 40 ms
Release time in absence of power supply t_R:	< 80 ms
Simultaneity time t_C:	unlimited

In compliance with standards:

EN 60204-1, EN ISO 13855, EN ISO 14118, EN ISO 12100, EN ISO 13850, EN 60529, EN 61000-6-2, EN 61000-6-3, EN 61326-1, EN 60664-1, EN 60947-1, EN IEC 63000, EN ISO 13849-1, EN ISO 13849-2, EN 62061, UL 508, CSA C22.2 No. 14, GB/T14048.5

Output circuit

Output contacts:	4 NO safety contacts 1 NC auxiliary contact
Contact type:	forcibly guided
Material of the contacts:	gold-plated silver alloy
Maximum switching voltage:	230/240 Vac; 220 Vdc
Max. current per contact:	6 A
Conventional free air thermal current I_{th}:	6 A
Max. total current ΣI_{th}^2:	72 A²
Minimum current:	10 mA
Contact resistance:	≤ 100 mΩ
External protection fuse:	4 A

The number and the load capacity of output contacts can be increased by using expansion modules or contactors. See pages 355-364.

Code structure

CS AR-07M024

Connection type		Supply voltage	
M	Connector with screw terminals	**024**	24 Vac/dc
X	Connector with spring terminals		

Features approved by UL

Rated supply voltage (U_n):	24 Vac/dc; 50…60 Hz
Power consumption AC:	< 5 VA
Power consumption DC:	< 4 W

Electrical ratings:
- NO contacts: 230/240 Vac, 6 A general use, C300 pilot duty
- NC contacts: 230/240 Vac, 6 A resistive, B300 pilot duty

Notes:
- Use 60 or 75°C copper (Cu) conductor and wire size No. 30-12 AWG, stranded or solid.
- The terminal tightening torque of 5-7 lb in.
- Only for 24 Vac/dc versions: supply from remote Class 2 source or limited voltage limited energy.

- Utiliser des conducteurs en cuivre (Cu) 60 ou 75°C rigides ou flexibles de section 30-12 AWG.
- Couple de serrage des bornes de 5-7 Lb In.
- Seulement pour les versions 24 Vac/dc, alimenter avec sources de classes 2 ou avec tension limitée et énergie limitée.