SWITCHES for AUTOMATION and SAFETY

The original COELBO limit switches, certainly among the first ever designed to be used in environments with risk of explosion, allow to extend also to classified areas all forms of machine automation (and/or process) in total safety complying with the ATEX Directive.

Our limit switches are normally used as detectors of the relative position of moving parts, between them coordinated (eg: by automation systems such as smart wired logic, dedicated microprocessors and PLC) or as elements associated with automatic devices for protection and safety for operators and machinery (e.g. alarm and shutdown intrusion, penetration, collision, presence systems, etc.).

To cover all possible needs have developed two different types of limit switches characterized by two distinct technologies: one purely mechanical and the other more properly magnetic; in the first case the movement of the limit switch, or of another element in relative motion, moves a piston or lever to produce the subsequent actuation of an electrical circuit (associated with its own automation or alarm/safety system on which the limit switch is installed) contained within the same explosionproof enclosure.
The other technology, the magnetic one, takes advantage of the effects produced by the interference of a stranger metal item in a normally stable magnetic circuit. It is evident that the "proximity" - with no contact or mechanical action - of such foreign items to alter the magnetic field of the sensor and thus providing the actuation of an electric circuit in turn associated to the automation or alarm/security system.

These products are usually available from stock. Although designed for a virtually unlimited duration, to guarantee the operational safety and certified compatibility, purchasing any spare parts directly from COELBO is reccommended.

NOTES:

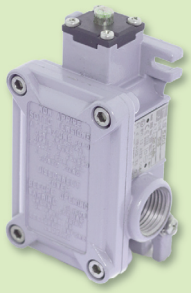
POSITION SWITCHES

series **LS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIB+H_2 T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	IP66

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C



Entries Threading	NPT ANSI B1.20
Material	Aluminum light alloy
Painting	External epoxy RAL7000

Standards and Certificates

Directive 2014/34/EU (ATEX)
EN 60079-0 • EN 60079-1
EN 60079-31
CE BVI 13 ATEX 0084

IECEx
IEC 60079-0 • IEC 60079-1
IEC 60079-31
IECEx EPS 13.0034

- Ideal for use in dangerous process in hazardous environments: simple and rugged construction, compact size with the possibility of entry and branching on the three sides of the enclosure.
- Complete with two plugs for closing unused entries.
- Wide range of actuators in metal or in self-estinguishing glass-fiber-reinforced polymer (GFRP).
- Wide variety of options for adaptation and assembly.
- Internal operating rod in Stainless Steel AISI 303 on OT 58 UNI 5705/65 brass bushing.
- External screws in Stainless Steel except for actuators that may have components in tropicalized steel.

D

Options

- Contact Units for currents and/or voltages beyond the standard.
- Cable entry with metric thread M20x1.5 (M).
- Rollers in Metal.
- Different diameters rollers.
- Actuators with some metal parts in Stainless Steel.

Degree of pollution: 3 conforming to IEC/EN 60947-5-1 Standards.
Frequency of operations: 20/min (*) max
Number of cycles: 8÷10 millions
Storage Temperature: -40°C ÷ +85°C

Contact Unit

Nominal current (active): : 10 A
Insulating Voltage: U_i= 500 V_{ac} / 600 V_{dc}
Short Circuit Protection: 10 A Fuse
Minimum conductor section :1.5 mm²
Max Current Density: : 5 A/mm²

	AC15 - A600				DC13 - Q600		
U_e (V)	24	130	240	400	24	110	250
I_e (A)	10	5.5	3	1.8	2.8	0.6	0.27

Electrical Diagram

Type	Contact	Diagram	Operating
C2	1NO+1NC 1NO+1NC	13 21 43 31 14 22 44 32	Snap action
C3I	1NC+1NC	11 21 12 22	Simultaneous snap action
C4I	1NO+1NO	13 23 14 24	Simultaneous slow action
C5I	1NC+1NO	21 13 22 14	Snap action
C6I	1NC+1NO	21 13 22 14	Non overlapping slow action
C7I	1NC+1NO	21 13 22 14	Overlapping slow action
C9I	2NC	11 21 12 22	Simultaneous slow action

Contacts identification (by numbers) in compliance with IEC/EN 60947-1 Standards
All types (except C2) allow different voltages at the contacts terminals.
For type C2 the contacts 13-14 and 21-22 are electrically separated from contacts 31-32 and 43-44.

Positive opening of contacts ⊖ (**) for some models available in compliance with IEC/EN 60947-5-1 e CEI 17-45 - F. 1914 Standards.

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with ⊖ symbol shall be used.

The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

POSITION SWITCHES

D

Swivel heads
All switches allow to rotate the head by 90° x90° by unscrewing the four fixing screws (fig. 1).

Adjustable levers
Position switches with roller lever have the lever adjustable by 10° x 10° (fig. 2). The positive movement transmission is always ensured by the particular geometric coupling between the lever and the shaft.

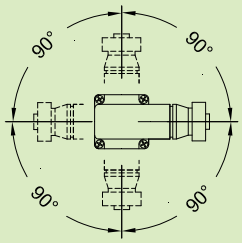


Fig. 1

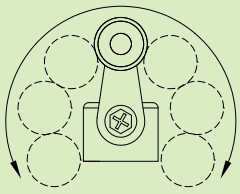
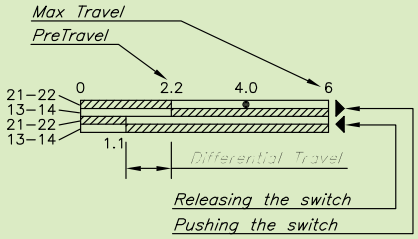
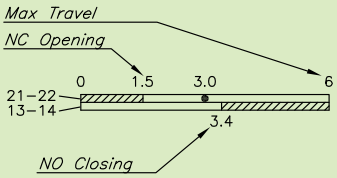
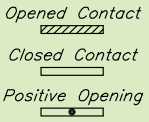


Fig. 2

Stroke diagrams







Example: LS 5101M

Order coding

Type	Contact Unit	Actuator	Threading
LS	C51	01	**N** = NPT (N) **M** = metric (M)

Series LS: AVAILABLE MODELS

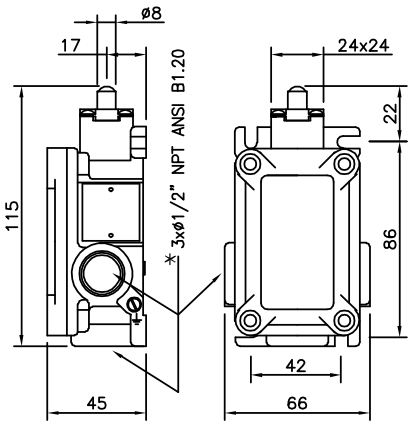
✸ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A PERNO IN ACCIAIO
With push button stainless steel

VELOCITA' MASSIMA: *Max speed* 0.5 m/s
FORZA MIN. DI AZIONAMENTO: *Min. force actuation:* 15 N
FORZA MIN. PER APERTURA POSITIVA: *Min. force positive opening operation:* 30 N

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

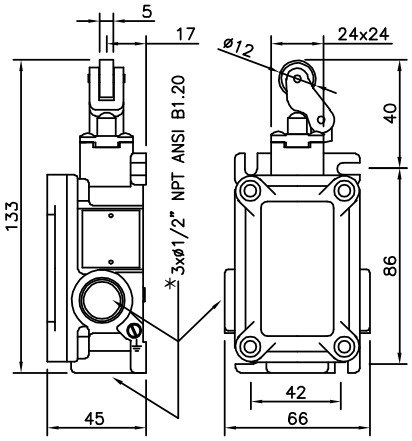


A LEVA SEMPLICE CON ROTELLA
With simple roller lever

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
FORZA MIN. DI AZIONAMENTO: *Min. force actuation:* 7 N
FORZA MIN. PER APERTURA POSITIVA: *Min. force positive opening operation:* 24 N

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C51 1NC+1NO	LS5101N ✸	0 2.5 4.1 5.6 / 1.3
C61 1NC+1NO	LS6101N ✸	0 1.6 3.2 5.6 / 2.5
C71 1NC+1NO	LS7101N	0 2.9 4.5 5.6 / 1.5
C91 1NC+1NC	LS9101N	0 1.5 3.1 5.6
C41 1NO+1NO	LS4101N	0 1.4 5.6
C31 1NC+1NC	LS3101N	0 2.4 4.0 5.6 / 1.3
C2 1NO+1NC 1NO+1NC	LS201N ✸	0 1.3 6 / 0.7
C51 1NC+1NO	LS5102N ✸	0 9.0 14.5 21.0 / 4.9
C61 1NC+1NO	LS6102N ✸	0 6.0 10.5 21.0 / 8.6
C71 1NC+1NO	LS7102N	0 10.2 14.6 21.0 / 5.4
C91 1NC+1NC	LS9102N	0 5.7 10.2 21.0
C41 1NO+1NO	LS4102N	0 5.3 21.0
C31 1NC+1NC	LS3102N	0 8.6 13.1 21.0 / 5.1
C2 1NO+1NC 1NO+1NC	LS202N ✸	0 2.0 8.0 / 1.1

✳IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

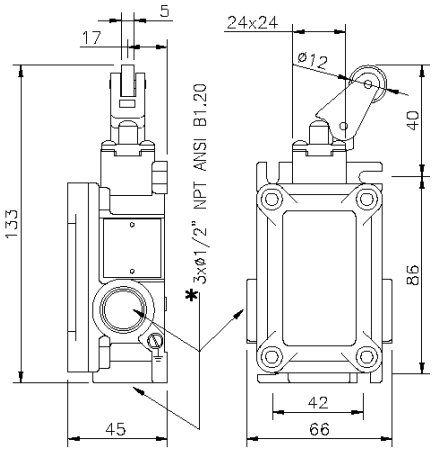
✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A LEVA ANGOLARE CON ROTELLA
With angular roller lever

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
FORZA MIN. DI AZIONAMENTO: *Min. force actuation:* 7 N
FORZA MIN. PER APERTURA POSITIVA: *Min. force positive opening operation:* 24 N

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

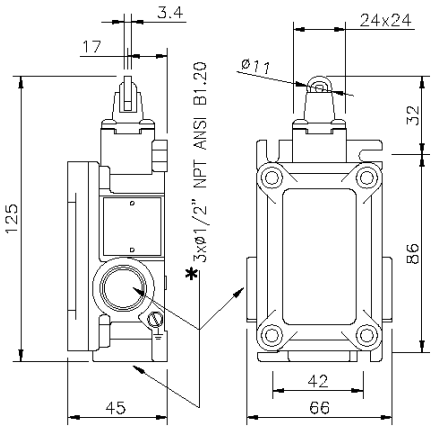


A PERNO CON ROTELLA
With push button roller

VELOCITA' MASSIMA: *Max speed* 0.3 m/s
FORZA MIN. DI AZIONAMENTO: *Min. force actuation:* 12 N
FORZA MIN. PER APERTURA POSITIVA: *Min. force positive opening operation:* 30 N

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

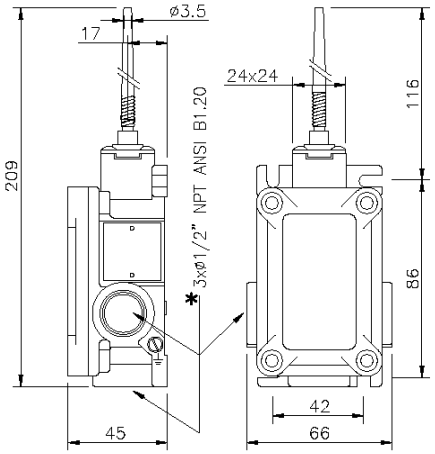


AD ASTA CON MOLLA INOX
With spring rod stainless steel

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.12 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* – Nm

LEGENDA *Legenda*

- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

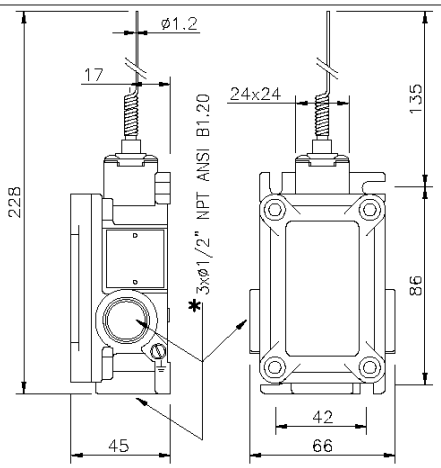


A STELO CON MOLLA INOX
With spring rod stainless steel

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.12 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* – Nm

LEGENDA *Legenda*

- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



✱IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C5 1NC+1NO	LS5105N ✱	21-22 / 13-14 / 21-22 / 13-14 — 0 — 9.0 — 14.5 — 21.0 — 4.9
C6 1NC+1NO	LS6105N ✱	21-22 / 13-14 — 0 — 6.0 — 10.5 — 21.0 — 8.6
C7 1NC+1NO	LS7105N	21-22 / 13-14 — 0 — 10.2 — 14.6 — 21.0 — 5.4
C9 1NC+1NC	LS9105N	11-12 / 21-22 — 0 — 5.7 — 10.2 — 21.0
C4 1NO+1NO	LS4105N	13-14 / 23-24 — 0 — 5.3 — 21.0
C3 1NC+1NC	LS3105N	11-12 / 21-22 / 11-12 / 21-22 — 0 — 8.6 — 13.1 — 21.0 — 5.1
C2 1NO+1NC 1NO+1NC	LS205N ✱	13-14 / 21-22 / 43-44 / 31-32 — 0 — 1.6 — 8.0 — 0.9
C5 1NC+1NO	LS5115N	21-22 / 13-14 / 21-22 / 13-14 — 0 — 4.7 — 7.6 — 9.6 — 2.5
C6 1NC+1NO	LS6115N ✱	21-22 / 13-14 — 0 — 3.2 — 6.0 — 9.6 — 4.8
C7 1NC+1NO	LS7115N	21-22 / 13-14 — 0 — 5.3 — 8.2 — 9.6 — 3.0
C9 1NC+1NC	LS9115N	11-12 / 21-22 — 0 — 3.0 — 5.9 — 9.6
C4 1NO+1NO	LS4115N	13-14 / 23-24 — 0 — 2.8 — 9.6
C3 1NC+1NC	LS3115N	11-12 / 21-22 / 11-12 / 21-22 — 0 — 4.5 — 7.4 — 9.8 — 2.5
C2 1NO+1NC 1NO+1NC	LS21N5N ✱	13-14 / 21-22 / 43-44 / 31-32 — 0 — 1.3 — 6.0 — 0.7
C5 1NC+1NO	LS5120N ✱	21-22 / 13-14 / 21-22 / 13-14 — 0° — 23° — 12°
C6 1NC+1NO	LS6120N ✱	21-22 / 13-14 — 0° — 14° — 21°
C7 1NC+1NO	LS7120N	21-22 / 13-14 — 0° — 25° — 12°
C9 1NC+1NC	LS9120N	11-12 / 21-22 — 0° — 14°
C4 1NO+1NO	LS4120N	13-14 / 23-24 — 0° — 13°
C3 1NC+1NC	LS3120N	11-12 / 21-22 / 11-12 / 21-22 — 0° — 22° — 12°
C2 1NO+1NC 1NO+1NC	LS220N ✱	13-14 / 21-22 / 43-44 / 31-32 — 0° — 8° — 4°
C5 1NC+1NO	LS5121N ✱	21-22 / 13-14 / 21-22 / 13-14 — 0° — 23° — 12°
C6 1NC+1NO	LS6121N ✱	21-22 / 13-14 — 0° — 14° — 21°
C7 1NC+1NO	LS7121N	21-22 / 13-14 — 0° — 25° — 12°
C9 1NC+1NC	LS9121N	11-12 / 21-22 — 0° — 14°
C4 1NO+1NO	LS4121N	13-14 / 23-24 — 0° — 13°
C3 1NC+1NC	LS3121N	11-12 / 21-22 / 11-12 / 21-22 — 0° — 22° — 12°
C2 1NO+1NC 1NO+1NC	LS221N ✱	13-14 / 21-22 / 43-44 / 31-32 — 0° — 8° — 4°

D

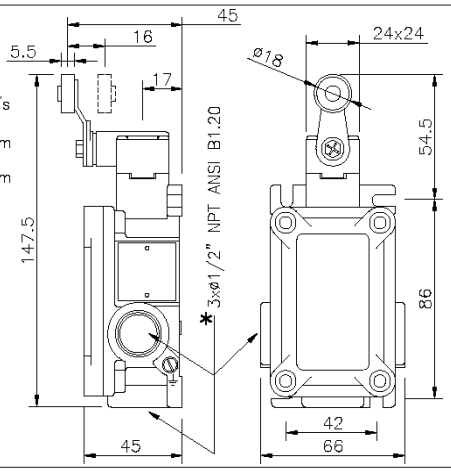
✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A LEVA CON ROTELLA
With roller lever

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.32 Nm

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

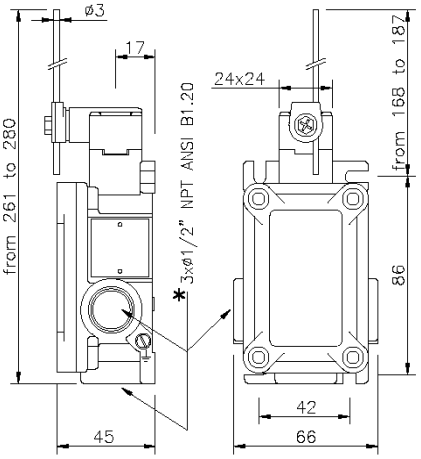


A LEVA CON ASTA RIGIDA TONDA INOX
With rigid round rod lever stainless steel

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.32 Nm

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

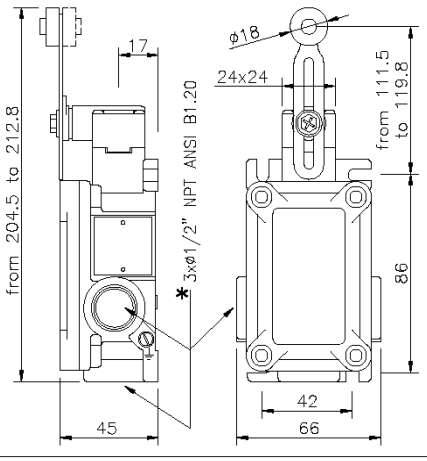


A LEVA LUNGA CON ROTELLA
With lenghtened roller lever

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.32 Nm

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

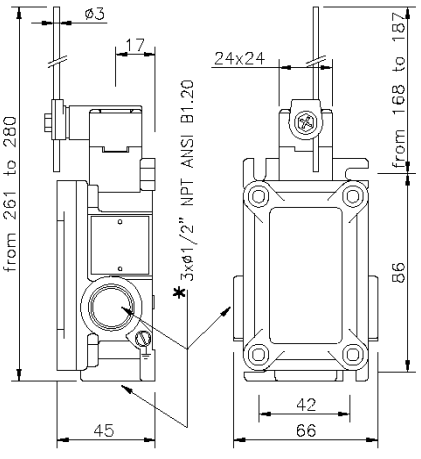


A LEVA CON ASTA RIGIDA IN NYLON
With rigid rod lever nylon

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.32 Nm

LEGENDA *Legenda*

- APERTURA POSITIVA *Positive opening*
- CORSA APERTURA POSITIVA *Positive opening travel*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C51 1NC+1NO	LS5130N ✱	0° 31° 47° 74° / 21-22 13-14 21-22 13-14 / 17°
C61 1NC+1NO	LS6130N ✱	0° 21° 37° 74° / 21-22 13-14 / 30°
C71 1NC+1NO	LS7130N	0° 35° 51° 74° / 21-22 13-14 / 18°
C91 1NC+1NC	LS9130N	0° 19° 37° 74° / 11-12 21-22
C41 1NO+1NO	LS4130N	0° 18° 74° / 13-14 23-24
C31 1NC+1NC	LS3130N	0° 30° 46° 74° / 11-12 21-22 11-12 21-22 / 17°
C2 1NO+1NC 1NO+1NC	LS230N ✱	0° 20° 75° / 13-14 21-22 43-44 31-32 / 13°
C51 1NC+1NO	LS5150N ✱	0° 31° 47° 74° / 21-22 13-14 21-22 13-14 / 17°
C61 1NC+1NO	LS6150N ✱	0° 21° 37° 74° / 21-22 13-14 / 30°
C71 1NC+1NO	LS7150N	0° 35° 51° 74° / 21-22 13-14 / 18°
C91 1NC+1NC	LS9150N	0° 19° 37° 74° / 11-12 21-22
C41 1NO+1NO	LS4150N	0° 18° 74° / 13-14 23-24
C31 1NC+1NC	LS3150N	0° 30° 46° 74° / 11-12 21-22 11-12 21-22 / 17°
C2 1NO+1NC 1NO+1NC	LS250N ✱	0° 20° 75° / 13-14 21-22 43-44 31-32 / 13°
C51 1NC+1NO	LS5155N ✱	0° 31° 47° 74° / 21-22 13-14 21-22 13-14 / 17°
C61 1NC+1NO	LS6155N ✱	0° 21° 37° 74° / 21-22 13-14 / 30°
C71 1NC+1NO	LS7155N	0° 35° 51° 74° / 21-22 13-14 / 18°
C91 1NC+1NC	LS9155N	0° 19° 37° 74° / 11-12 21-22
C41 1NO+1NO	LS4155N	0° 18° 74° / 13-14 23-24
C31 1NC+1NC	LS3155N	0° 30° 46° 74° / 11-12 21-22 11-12 21-22 / 17°
C2 1NO+1NC 1NO+1NC	LS255N ✱	0° 20° 75° / 13-14 21-22 43-44 31-32 / 13°
C51 1NC+1NO	LS5169N ✱	0° 31° 47° 74° / 21-22 13-14 21-22 13-14 / 17°
C61 1NC+1NO	LS6169N ✱	0° 21° 37° 74° / 21-22 13-14 / 30°
C71 1NC+1NO	LS7169N	0° 35° 51° 74° / 21-22 13-14 / 18°
C91 1NC+1NC	LS9169N	0° 19° 37° 74° / 11-12 21-22
C41 1NO+1NO	LS4169N	0° 18° 74° / 13-14 23-24
C31 1NC+1NC	LS3169N	0° 30° 46° 74° / 11-12 21-22 11-12 21-22 / 17°
C2 1NO+1NC 1NO+1NC	LS269N ✱	0° 20° 75° / 13-14 21-22 43-44 31-32 / 13°

✱IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

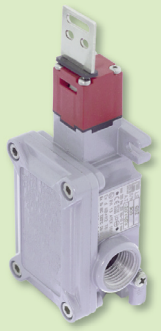
KEY-LOCK SAFETY SWITCHES with POSITIVE OPENING

series **LS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIB+H_2 T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	IP66

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C



Entries Threading	NPT ANSI B1.20

Material	Aluminum light alloy

Painting	External epoxy RAL7000

Standards and Certificates

Directive 2014/34/EU (ATEX)
EN 60079-0 • EN 60079-1
EN 60079-31
CE BVI 13 ATEX 0084

IECEx
IEC 60079-0 • IEC 60079-1
IEC 60079-31
IECEx EPS 13.0034

- Ideal to control Gates, Protections, Carters and any moving mechanical parts.
- Stainless Steel operating key has to be fixed to the mobile part of the protection.
  When opening the protection the key is removed from the switch and a mechanism ensures the positive opening of the electric contact.
- Applicable to any type of protection (hinged, sliding or removable).
- For any other information pls. see pages D03 and D04.

Options

- Contact Units for currents and/or voltages beyond the standard.
- Cable entry with metric thread M20x1.5 (M).
- Orthogonal key.
- Jointed Key.

Information on available contacts: see pages D03 and D04.

Installation instructions

- The safety circuit shall be connected to the contact NC 21-22 when the key is inserted.
- The safety switches shall be assemblied to the body of the machine, while the key-lock is fixed to the protection.
- The head may be positioned on any of the four sides of the switch just by removing the four fixing screws: This allows up to 8 different actuation directions.
- The head of model LS ...93, adjustable over 360°, may be positioned in any actuation direction. **When the key is not inserted make sure that any dust and dirt do not obstruct its seat.**
- **Verify periodically the correct operation of the switch.**
- Fix the switch interposing a washer under fixing screws head.

Application on fences

When the switch is used to protect parts of machines physically accessible to people, to prevent the door or gate may accidentally close when the operator is inside, a padlock may be used at the appropriate hole on the key.
The arc of the padlock shall be of 6 mm diameter minimum.

Order coding

Key-lock safety switch with positive opening ⇒: LS ..92N

Type	Contact Unit	Actuator	Threading
LS	..	92	**N** = NPT (N) **M** = metric (M)

Key-lock safety switch with positive opening ⇒ with swivel head: LS ..93N

Type	Contact Unit	Actuator	Threading
LS	..	93	**N** = NPT (N) **M** = metric (M)

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with ⇒ symbol shall be used.

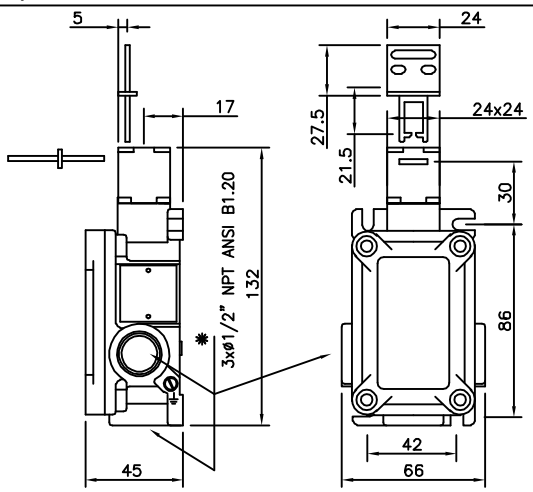
The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

D

✸ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*

A CHIAVE
With key



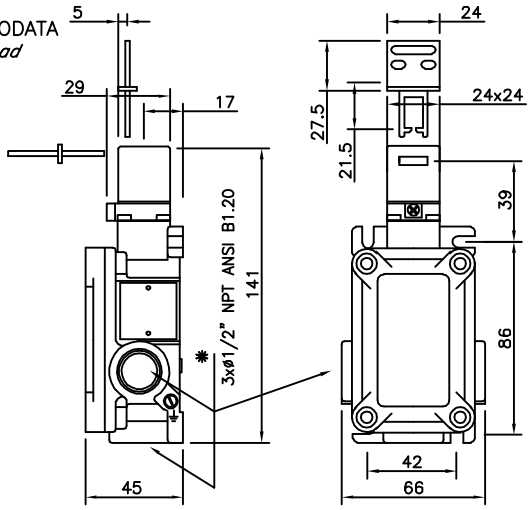
A RICHIESTA CON CHIAVE SNODATA
On request with jointed key

C6 1NO+1NC	LS 692N ✸	21–22 13–14	0 5 8 27
C9 2NC	LS 992N	11–12 21–22	0 7 27

LEGENDA
Legenda

APERTURA POSITIVA
Positive opening

A CHIAVE E TESTA SNODATA
With key and jointed head



A RICHIESTA CON CHIAVE SNODATA
On request with jointed key

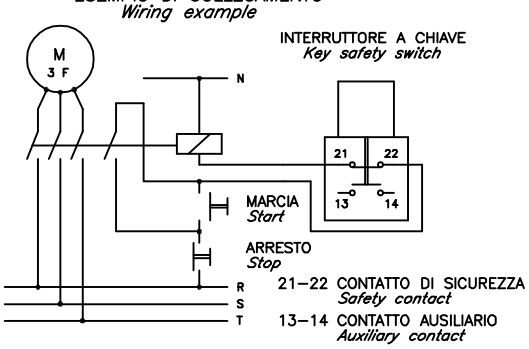
C6 1NO+1NC	LS 693N ✸	21–22 13–14	0 5 8 27
C9 2NC	LS 993N	11–12 21–22	0 7 27

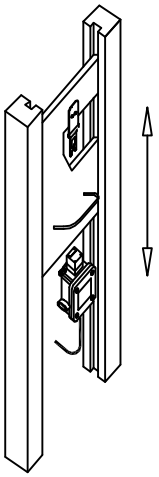
LEGENDA
Legenda

APERTURA POSITIVA
Positive opening

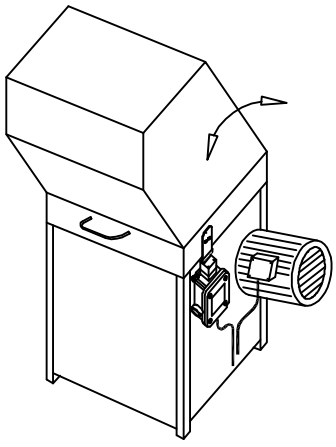
✳IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

ESEMPIO DI COLLEGAMENTO
Wiring example





ESEMPI DI APPLICAZIONE
Installation example



SLOTTED HOLE LEVER SAFETY SWITCHES with POSITIVE OPENING

series **LS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIB+H_2 T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	
IP66	

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C

Entries Threading	
NPT ANSI B1.20	

Material	
Aluminum light alloy	

Painting	
External epoxy RAL7000	

Standards and Certificates	
	Directive 2014/34/EU (ATEX)
	EN 60079-0 • EN 60079-1 EN 60079-31
CE	BVI 13 ATEX 0084
IECEx	IEC 60079-0 • IEC 60079-1 IEC 60079-31
	IECEx EPS 13.0034

- Ideal to control Gates, Protections, Carters and any moving mechanical parts.
- Positively opens the contacts when exceeding a rotation of a few degrees, immediately releasing the stop signal.
- Applicable to any type of protection (hinged, removable or sliding).
- For any other characteristics see pages D03 and D04.

Options

- Contact Units for currents and/or voltages beyond the standard.
- Cable entry with metric thread M20x1.5 (M).

Information on available contacts: see pages D03 and D04.

Installation instructions

- The safety circuit must be connected to the NC contact (11-12 or 21-22).
- Fix the switch interposing a washer under fixing screws head.
- To connect the scrolling slotted hole lever to the hinged door (or equivalent) use a suitable swivel (i.e. a rivet) that will not derail from the scrolling slottedhole lever.
- The switch must be mounted having the lever rotation axis as close as possible to the hinge rotation axis.
- Make sure that at the maximum opening of the door (or equivalent) the swivel is not acting as a mechanical stop.
- **Verify periodically the correct operation of the switch.**

Order Coding

Slotted hole lever safety switchwith positive opening → 180° to the right: LS ..A77N

Type	Contact Unit	Actuator	Threading
LS	..	A77	**N** = NPT (N) **M** = metric (M)

Slotted hole lever safety switchwith positive opening → 90°: LS ..B77M

Type	Contact Unit	Actuator	Threading
LS	..	B77	**N** = NPT (N) **M** = metric (M)

Slotted hole lever safety switchwith positive opening → 180° to the left: LS ..C77N

Type	Contact Unit	Actuator	Threading
LS	..	C77	**N** = NPT (N) **M** = metric (M)

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

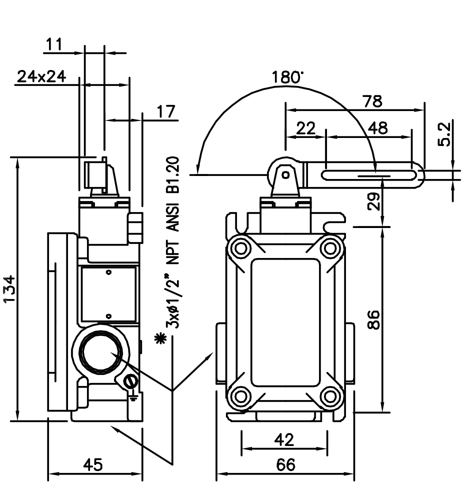
(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with → symbol shall be used.

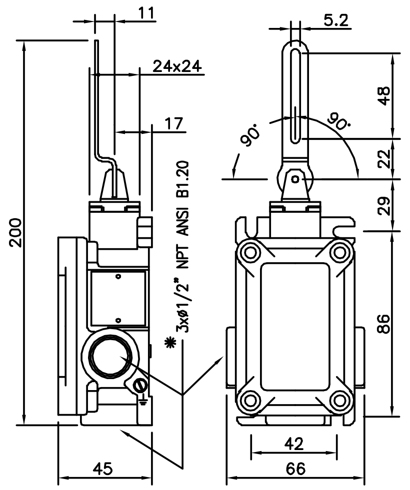
The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

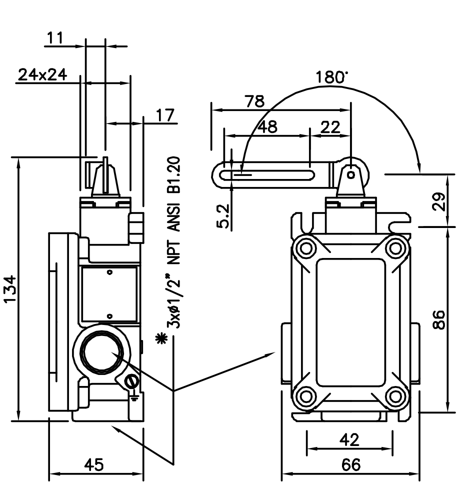
A LEVA ASOLATA DX
With slotted hole lever DX



A LEVA ASOLATA
With slotted hole lever

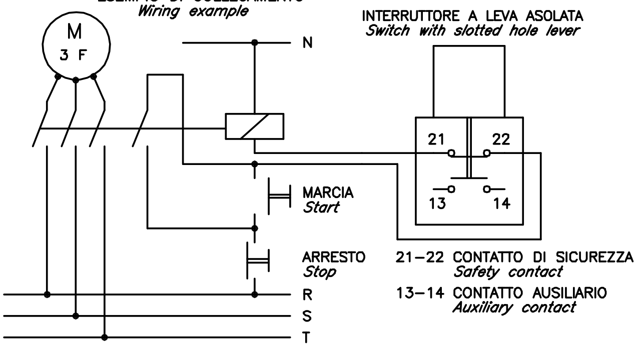


A LEVA ASOLATA SX
With slotted hole lever SX



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C6 (13 21 / 14 22) 1NO+1NC	LS 6A77N ⊖	21–22 13–14; 4°; 0° 8° 180°	LS 6B77N ⊖ ✱	21–22 13–14; 90° 4° 4° 90°; 8° 0° 8°	LS 6C77N ⊖	21–22 13–14; 4°; 0° 8° 180°
C9 (11 21 / 12 22) 2NC	LS 9A77N ⊖	11–12 21–22; 0° 180°; 10°	LS 9B77N ⊖	11–12 21–22; 90° 90°; 10° 0° 10°	LS 9C77N ⊖	11–12 21–22; 0° 180°; 10°

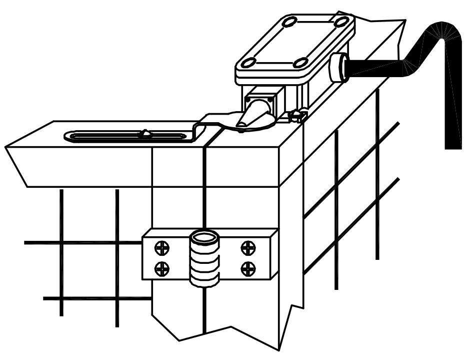
ESEMPIO DI COLLEGAMENTO
Wiring example



APERTURA POSITIVA ⊖
Positive opening

✱IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

ESEMPIO DI APPLICAZIONE –*Installation examples*



SAFETY SWITCHES for HINGES with POSITIVE OPENING

series **LS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIB+H_2 T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	
IP66	

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C

Entries Threading	
NPT ANSI B1.20	

Material	
Aluminum light alloy	

Painting	
External epoxy RAL7000	

Standards and Certificates	
Directive 2014/34/EU (ATEX)	
EN 60079-0 • EN 60079-1 EN 60079-31	
CE	BVI 13 ATEX 0084
IECEx	IEC 60079-0 • IEC 60079-1 IEC 60079-31
	IECEx EPS 13.0034

- Ideal to control Gates, Protections, Carters and any moving mechanical parts.
- Positively opens the contacts when exceeding a rotation of a few degrees, immediately releasing the stop signal.
- Applicable to any type of protection (hinged, removable or sliding).
- For any other information pls. see pages D03 and D04.

Options

- Contact Units for currents and/or voltages beyond the standard.
- Cable entry with metric thread M20x1.5 (M).

Information on available contacts: see pages D03 and D04.

Installation instructions

- The safety circuit shall be connected to the NC contact (11-12 or 21-22).
- Fix the switch interposing a washer under fixing screws head.
- Insert the pivot Ø 8 mm (outgoing from the hinge) in the shaft of the switch temporarily fixing it with the M4 screw (included).
- Verify the opening set position of the NC safety contact and adjust it as necessary. When the set position is adjusted the pin of the hinge has to be drilled in coincidence with the the most convenient hole between the two present on the shaft and then secured with the relevant plug (supplied).
- **Periodically verify the correct operations of the switch.**

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with ➔ symbol shall be used.

The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

Order Coding

Safety switch for hingeswith positive opening ➔: LS ..95N

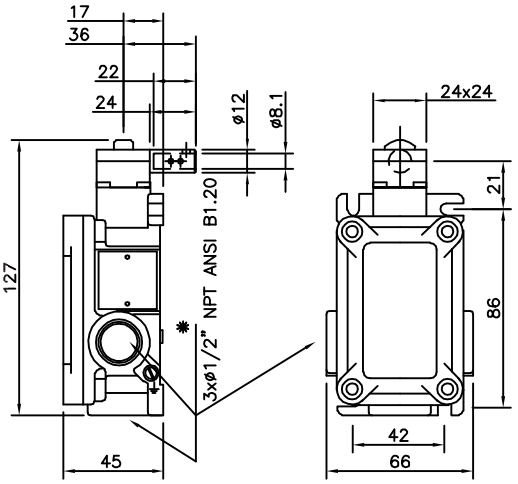
Type	Contact unit	Actuator	Threading
LS	..	95	**N** = NPT (N) **M** = metric (M)

D

D

✸ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

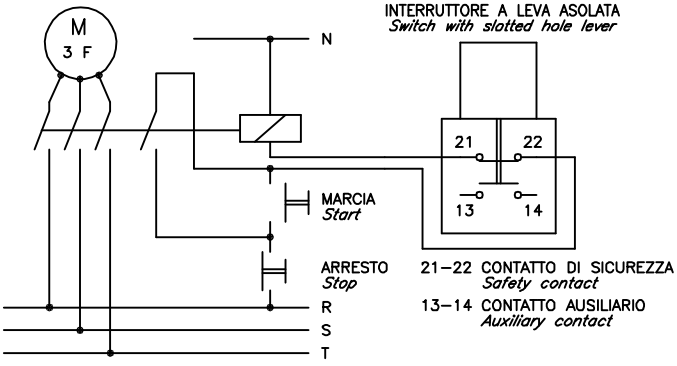
A PERNO PER CERNIERE
With hinge push button



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C6 1NO+1NC (13 21 / 14 22)	LS 695N ✸	21–22 / 13–14 : 4° ; 0° 8° 347°
C9 2NC (11 21 / 12 22)	LS 995N	11–12 / 21–22 : 0° 355° ; 5°

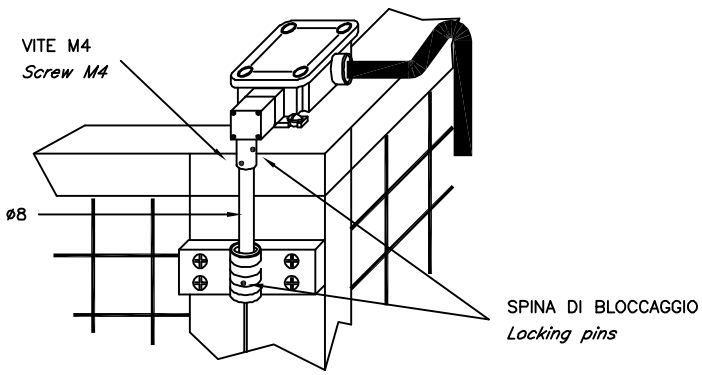
✸IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

ESEMPIO DI COLLEGAMENTO
Wiring example



APERTURA POSITIVA
Positive opening

ESEMPIO DI APPLICAZIONE – *Installation examples*



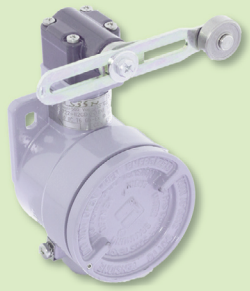
LIMIT SWITCHES

series **PS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIC T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	
	IP66/67

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C



Entries Threading	
	NPT ANSI B1.20

Material	
	Aluminum light alloy

Painting	
	External epoxy RAL7000

Standards and Certificates	
	Directive 2014/34/EU (ATEX)
	EN 60079-0 • EN 60079-1 EN 60079-31
CE	BVI 13 ATEX 0083
IECEx	IEC 60079-0 • IEC 60079-1 IEC 60079-31
	IECEx EPS 13.0033

- Compact and lightweight (450 g) design with ideal features for use in dangerous process and hazardous environments.
- Wide range of actuators in metal or in self-estinguishing glass-fiber-reinforced polymer (GFRP).
- Wide variety of options for adaptation and assembly.
- Internal operating rod in Stainless Steel AISI 303 on a brass bushing OT 58 UNI 5705/65.
- External screws in Stainless Steel except for actuators that may have components in tropicalized steel.

Options

- Stainless Steel version (see page I19).
- Quick snap-action contact units 2NC (C11) with positive opening ⊖.
- Cable entry with metric thread M20x1.5 (M).
- Rollers in Metal.
- Different diameters rollers.
- Actuators with some metal parts in Stainless Steel.

Degree of pollution: 3 conforming to IEC/EN 60947-5-1 Standards.
Frequency of operations: 20/min (*) max
Number of cycles: 8÷10 millions
Storage Temperature: -40°C ÷ +70°C

Contact Unit

Nominal current (active): I: 10 A
Insulating Voltage: U_i: 500 Vac / 600 Vdc [°]
Impulse Withstand Voltage: U_{imp}: 6 kV
Short Circuit Current : 1000 AV
Short Circuit Protection: Fuse 10 A 500 V
Minimum conductor section : 1.5 mm²
Max Current Density : 5 A/mm²

	AC15 - A600			DC13 - Q600		
U_e (V)	240	400	500	24	125	250
I_e (A)	6	4	1	3	0.55	0.3

Electrical Diagram

Type	Contact	Diagram	Operating
C2	1NO+1NC 1NO+1NC	13 21 43 31 / 14 22 44 32	Snap action
C5	1NO+1NC	13 21 / 14 22	Snap action
C6	1NO+1NC	13 21 / 14 22	Slow action
C7	1NO+1NC	13 21 / 14 22	Overlapping slow action
C9	2NO	11 21 / 12 22	Slow action
C10	2NO	13 23 / 14 24	Slow action
C11	2NC	11 21 / 12 22	Snap action
C14	2NC	11 21 / 12 22	Slow action
C15	2NO	13 23 / 14 24	Slow action
C20	1NO+2NC	11 21 33 / 12 22 34	Slow action

Contacts identification (by numbers) in compliance with IEC/EN 60947-1 Standards
All types (except C2) allow different voltages at the contacts terminals.
For type C2 the contacts 13-14 and 21-22 are electrically separated from contacts 31-32 and 43-44.

Positive opening of contacts ⊖ (**) for some models available in compliance with IEC/EN 60947-5-1 e CEI 17-45 - F. 1914 Standards.

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

[°] The insulating voltage is equal to 400 VAC / 500 VDC for C2 and C11 contacts.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with ⊖ symbol shall be used.

The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

D

Swivel heads

All switches allow to rotate the head by 90° x90° by unscrewing the four fixing screws (fig. 1).

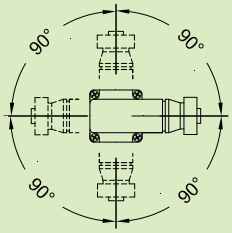


Fig. 1

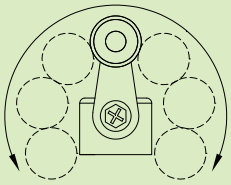


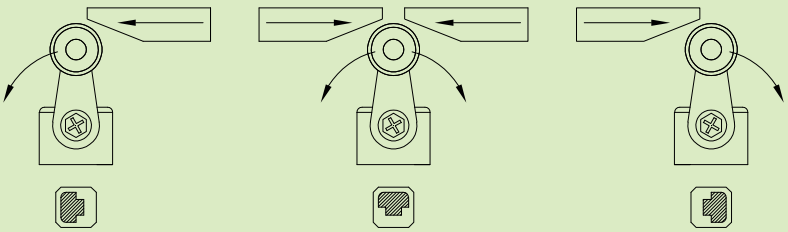
Fig. 2

Adjustable levers

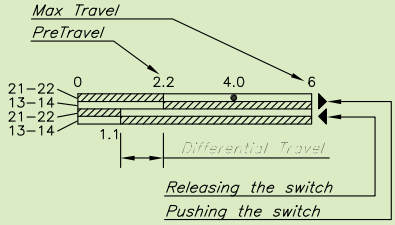
Position switches with roller lever have the lever adjustable by 10° x 10° (fig. 2). The positive movement transmission is always ensured by the particular geometric coupling between the lever and the shaft.

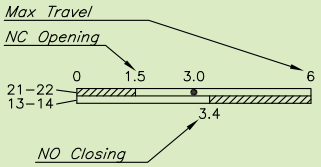
Unidirectional heads

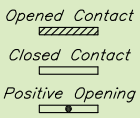
To get the unidirectional operation on switches with revolving lever it is necessary to remove the four screws of the head and totate the internal piston.



Stroke Diagrams







Example: PS 511N

Order coding

Type	Contact Unit	Actuator	Threading
PS	**C5**	**11**	**N =** NPT (N) **M =** metric (M)

Series PS : AVAILABLE MODELS

✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A PERNO
With push button

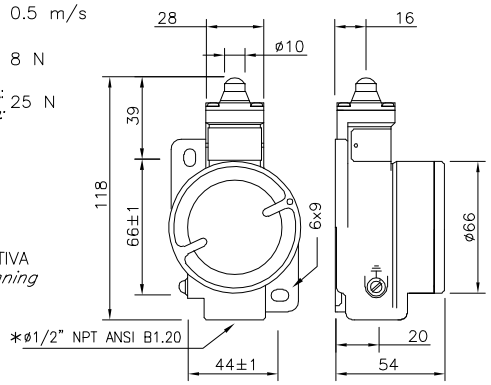
VELOCITA' MASSIMA: *Max speed* 0.5 m/s

FORZA MIN. DI AZIONAMENTO: *Min. force actuation:* 8 N

FORZA MIN. PER APERTURA POSITIVA: *Min. force positive opening operation:* 25 N

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C2 — 1NO.1NC+ 1NO.1NC	PS 20IN	13–14, 21–22, 43–44, 31–32 — 0, 1.3, 6 — 0.7
C5 — 1NO+1NC	PS 50IN	21–22, 13–14, 21–22, 13–14 — 0, 2.2, 4.0, 6 — 1.1
C6 — 1NO+1NC	PS 60IN	21–22, 13–14 — 0, 1.5, 3.0, 6 — 3.4
C7 — 1NO+1NC	PS 70IN	21–22, 13–14 — 0, 3.1, 4.6, 6 — 1.6
C9 — 2NC	PS 90IN	11–12, 21–22 — 0, 2.9, 4.4, 6
C10 — 2NO	PS 100IN	13–14, 23–24 — 0, 1.4, 6
C14 — 2NC	PS 140IN	11–12, 21–22 — 0, 3.0, 4.5, 6 — 1.4
C15 — 2NO	PS 150IN	13–14, 23–24 — 0, 3.0, 6 — 1.4
C20 — 1NO+2NC	PS 200IN	13–14, 21–22, 33–34 — 0, 1.5, 3.0, 6 — 2.0

✱IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

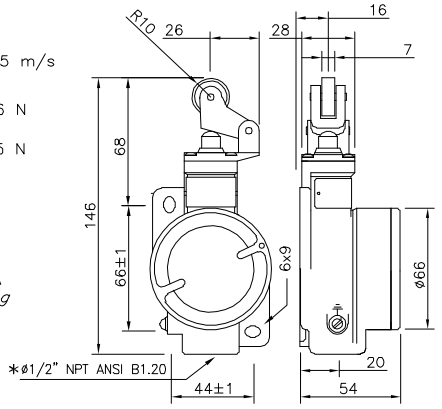
✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*

A LEVA SEMPLICE CON ROTELLA
With simple roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° 0.5 m/s
Max speed with 30° cam:
FORZA MIN. DI AZIONAMENTO: 6 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

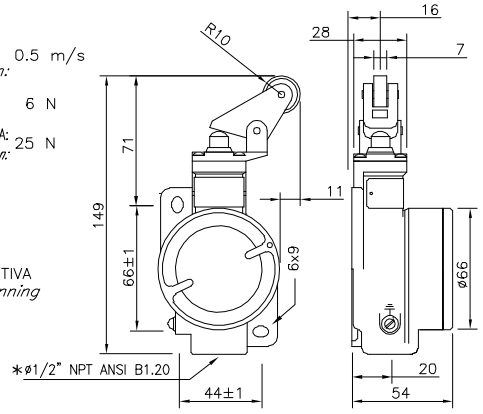


C2 1NO.1NC+ 1NO.1NC	PS 202N	
C5 1NO+1NC	PS 502N	
C6 1NO+1NC	PS 602N	
C7 1NO+1NC	PS 702N	
C9 2NC	PS 902N	
C10 2NO	PS 1002N	
C14 2NC	PS 1402N	
C15 2NO	PS 1502N	
C20 1NO+2NC	PS 2002N	

A LEVA ANGOLARE CON ROTELLA
With angular roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° 0.5 m/s
Max speed with 30° cam:
FORZA MIN. DI AZIONAMENTO: 6 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

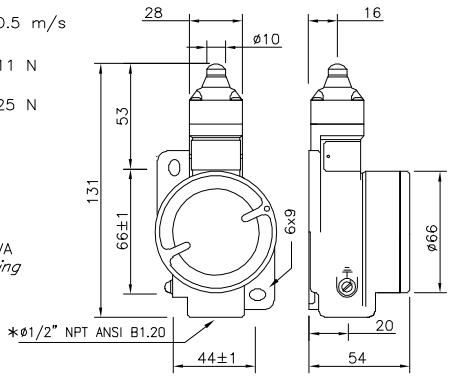


C2 1NO.1NC+ 1NO.1NC	PS 205N	
C5 1NO+1NC	PS 505N	
C6 1NO+1NC	PS 605N	
C7 1NO+1NC	PS 705N	
C9 2NC	PS 905N	
C10 2NO	PS 1005N	
C14 2NC	PS 1405N	
C15 2NO	PS 1505N	
C20 1NO+2NC	PS 2005N	

A PERNO CON PROTEZIONE IN GOMMA
With rubber gasket push button

VELOCITA' MASSIMA: 0.5 m/s
Max speed
FORZA MIN. DI AZIONAMENTO: 11 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

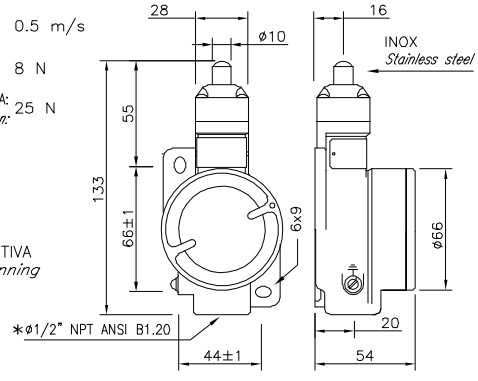


C2 1NO.1NC+ 1NO.1NC	PS 210N	
C5 1NO+1NC	PS 510N	
C6 1NO+1NC	PS 610N	
C7 1NO+1NC	PS 710N	
C9 2NC	PS 910N	
C10 2NO	PS 1010N	
C14 2NC	PS 1410N	
C15 2NO	PS 1510N	
C20 1NO+2NC	PS 2010N	

A PERNO ALLUNGATO
With lenghtened push button

VELOCITA' MASSIMA: 0.5 m/s
Max speed
FORZA MIN. DI AZIONAMENTO: 8 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



C2 1NO.1NC+ 1NO.1NC	PS 211N ✱	
C5 1NO+1NC	PS 511N ✱	
C6 1NO+1NC	PS 611N ✱	
C7 1NO+1NC	PS 711N	
C9 2NC	PS 911N	
C10 2NO	PS 1011N	
C14 2NC	PS 1411N	
C15 2NO	PS 1511N	
C20 1NO+2NC	PS 2011N	

✱IN ALTERNATIVA: M20x1.5 ISO 262
Alternative:

D

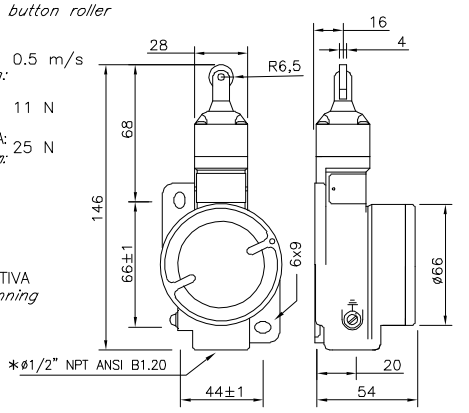
✸ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*

A PERNO CON ROTELLA E PROTEZIONE IN GOMMA
With rubber gasket push button roller

VELOCITA' MASSIMA: CON CAMMA A 30° 0.5 m/s
Max speed with 30° cam:
FORZA MIN. DI AZIONAMENTO: 11 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

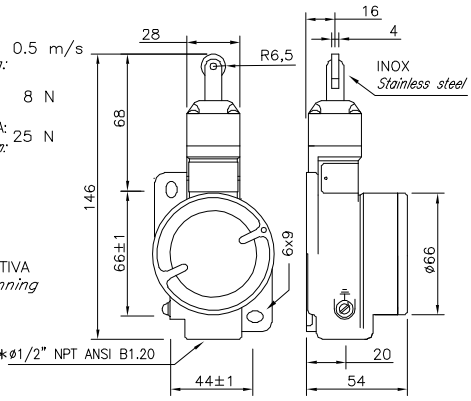


C2 1NO.1NC+ 1NO.1NC	PS 215N	
C5 1NO+1NC	PS 515N	
C6 1NO+1NC	PS 615N	
C7 1NO+1NC	PS 715N	
C9 2NC	PS 915N	
C10 2NO	PS 1015N	
C14 2NC	PS 1415N	
C15 2NO	PS 1515N	
C20 1NO+2NC	PS 2015N	

A PERNO CON ROTELLA
With push button roller

VELOCITA' MASSIMA: CON CAMMA A 30° 0.5 m/s
Max speed with 30° cam:
FORZA MIN. DI AZIONAMENTO: 8 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

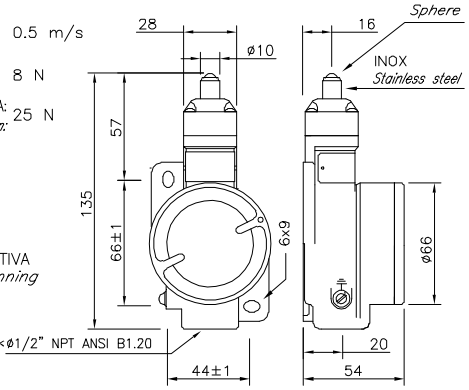


C2 1NO.1NC+ 1NO.1NC	PS 216N ✸	
C5 1NO+1NC	PS 516N ✸	
C6 1NO+1NC	PS 616N ✸	
C7 1NO+1NC	PS 716N	
C9 2NC	PS 916N	
C10 2NO	PS 1016N	
C14 2NC	PS 1416N	
C15 2NO	PS 1516N	
C20 1NO+2NC	PS 2016N	

A PERNO CON SFERA
With push button sphere

VELOCITA' MASSIMA: 0.5 m/s
Max speed
FORZA MIN. DI AZIONAMENTO: 8 N
Min. force actuation:
FORZA MIN. PER APERTURA POSITIVA: 25 N
Min. force positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

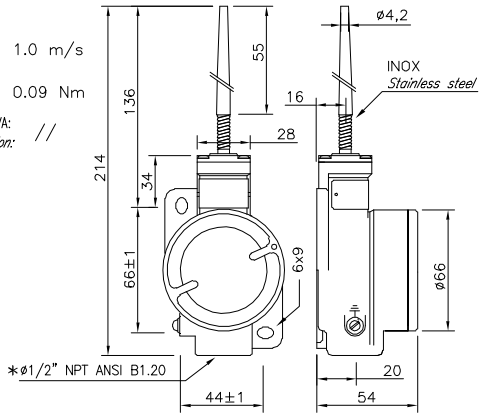


C2 1NO.1NC+ 1NO.1NC	PS 218N	
C5 1NO+1NC	PS 518N	
C6 1NO+1NC	PS 618N	
C7 1NO+1NC	PS 718N	
C9 2NC	PS 918N	
C10 2NO	PS 1018N	
C14 2NC	PS 1418N	
C15 2NO	PS 1518N	
C20 1NO+2NC	PS 2018N	

AD ASTA CON MOLLA
With spring rod

VELOCITA' MASSIMA: 1.0 m/s
Max speed
COPPIA MIN. DI AZIONAMENTO: 0.09 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: //
Min. torque positive opening operation:

LEGENDA
Legenda
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



C2 1NO.1NC+ 1NO.1NC	PS 220N	
C5 1NO+1NC	PS 520N	
C10 2NO	PS 1020N	
C20 1NO+2NC	PS 2020N	

*IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

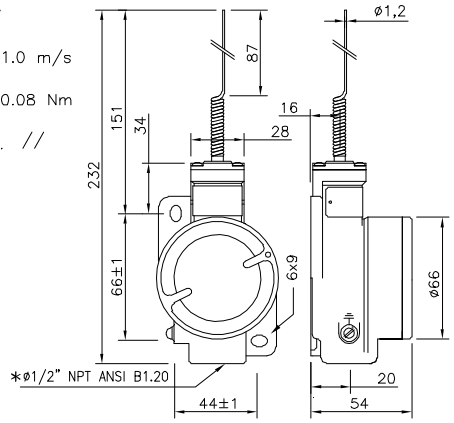
✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*

CON MOLLA INOX
With spring stainless steel

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.08 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

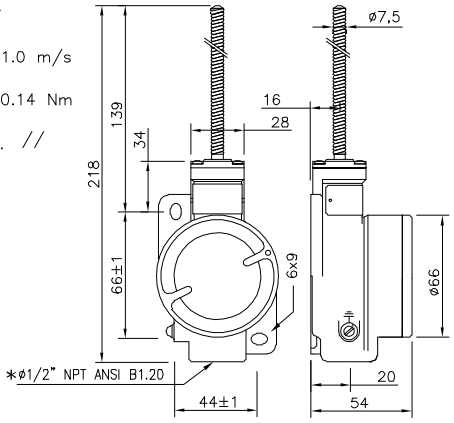


C2 1NO.1NC+ 1NO.1NC	PS 22IN	
C5 1NO+1NC	PS 52IN	
C10 2NO	PS 102IN	
C20 1NO+2NC	PS 202IN	

CON MOLLA INOX
With spring stainless steel

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.14 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

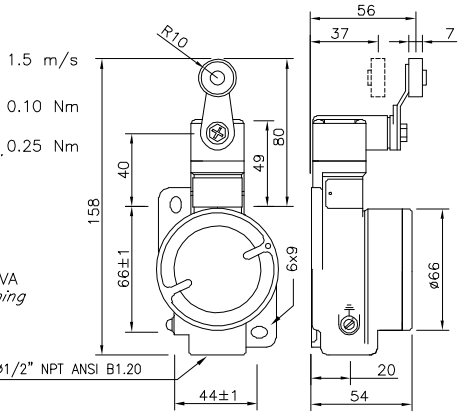


C2 1NO.1NC+ 1NO.1NC	PS 225N ✱	
C5 1NO+1NC	PS 525N ✱	
C10 2NO	PS 1025N	
C20 1NO+2NC	PS 2025N	

A LEVA CON ROTELLA
With roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° *Max speed with 30° cam:* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.25 Nm

LEGENDA *Legenda*
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

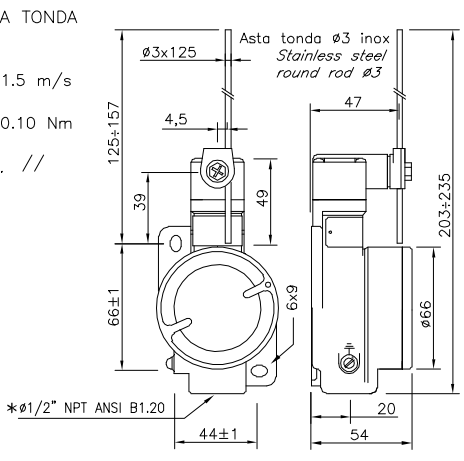


C2 1NO.1NC+ 1NO.1NC	PS 23IN ✱	
C5 1NO+1NC	PS 53IN ✱	
C6 1NO+1NC	PS 63IN ✱	
C7 1NO+1NC	PS 73IN	
C9 2NC	PS 93IN	
C10 2NO	PS 103IN	
C14 2NC	PS 143IN	
C15 2NO	PS 153IN	
C20 1NO+2NC	PS 203IN	

A LEVA CON ASTA RIGIDA TONDA
With rigid round rod lever

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



C2 1NO.1NC+ 1NO.1NC	PS 232N ✱	
C5 1NO+1NC	PS 532N ✱	
C6 1NO+1NC	PS 632N ✱	
C7 1NO+1NC	PS 732N	
C9 2NC	PS 932N	
C10 2NO	PS 1032N	
C14 2NC	PS 1432N	
C15 2NO	PS 1532N	
C20 1NO+2NC	PS 2032N	

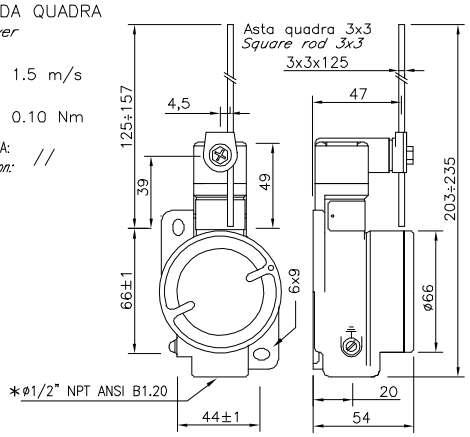
✱IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A LEVA CON ASTA RIGIDA QUADRA
With rigid square rod lever

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

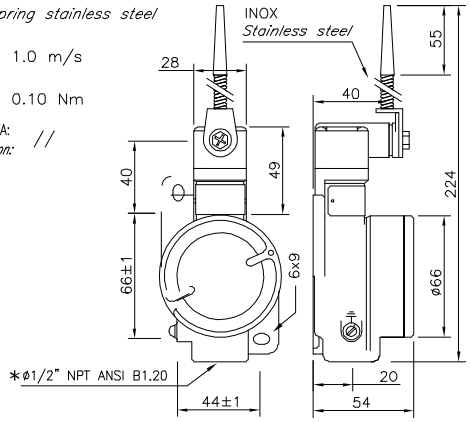
LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA CON ASTA IN PVC E MOLLA INOX
With PVC rod lever and spring stainless steel

VELOCITA' MASSIMA: *Max speed* 1.0 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

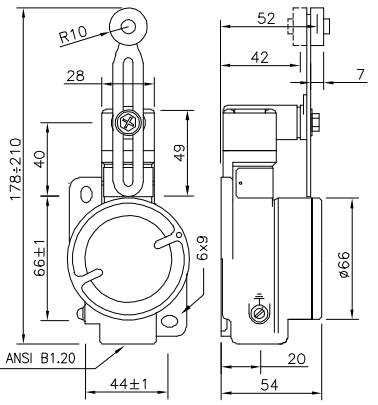
LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA LUNGA CON ROTELLA
With lenghtened roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° *Max speed with 30° cam:* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* 0.25 Nm

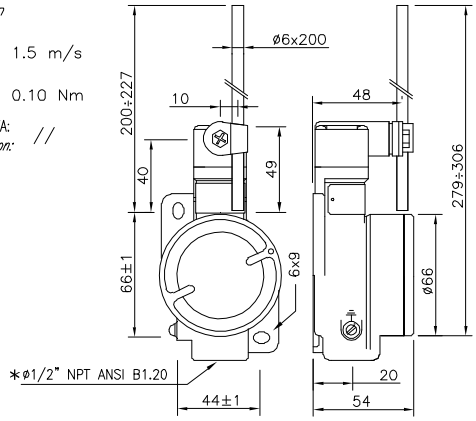
LEGENDA *Legenda*
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA CON ASTA RIGIDA IN NYLON
With rigid rod lever nylon

VELOCITA' MASSIMA: *Max speed* 1.5 m/s
COPPIA MIN. DI AZIONAMENTO: *Min. torque actuation:* 0.10 Nm
COPPIA MIN. PER APERTURA POSITIVA: *Min. torque positive opening operation:* //

LEGENDA *Legenda*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO 2NO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C2 1NO.1NC+ 1NO.1NC	PS 233N	13-14 0° 20° 75° / 21-22 / 43-44 / 31-32 13°
C5 1NO+1NC	PS 533N	21-22 0° 22° 75° / 13-14 9°
C6 1NO+1NC	PS 633N	21-22 0° 75° / 13-14 34°
C7 1NO+1NC	PS 733N	21-22 0° 32° 75° / 13-14 15°
C9 2NC	PS 933N	11-12 0° 32° 75° / 21-22
C10 2NO	PS 1033N	13-14 0° 14° 75° / 23-24
C14 2NC	PS 1433N	11-12 0° 32° 75° / 21-22 14°
C15 2NO	PS 1533N	13-14 0° 32° 75° / 23-24 14°
C20 1NO+2NC	PS 2033N	13-14 0° 15° 75° / 21-22 / 33-34 21°
C2 1NO.1NC+ 1NO.1NC	PS 234N	13-14 0° 20° 75° / 21-22 / 43-44 / 31-32 13°
C5 1NO+1NC	PS 534N	21-22 0° 22° 75° / 13-14 9°
C6 1NO+1NC	PS 634N	21-22 0° 75° / 13-14 34°
C7 1NO+1NC	PS 734N	21-22 0° 32° 75° / 13-14 15°
C9 2NC	PS 934N	11-12 0° 32° 75° / 21-22
C10 2NO	PS 1034N	13-14 0° 14° 75° / 23-24
C14 2NC	PS 1434N	11-12 0° 32° 75° / 21-22 14°
C15 2NO	PS 1534N	13-14 0° 32° 75° / 23-24 14°
C20 1NO+2NC	PS 2034N	13-14 0° 15° 75° / 21-22 / 33-34 21°
C2 1NO.1NC+ 1NO.1NC	PS 235N	13-14 0° 20° 75° / 21-22 / 43-44 / 31-32 13°
C5 1NO+1NC	PS 535N ➔	21-22 0° 22° 52° 75° / 13-14 9°
C6 1NO+1NC	PS 635N ➔	21-22 0° 14° 34° 75° / 13-14 34°
C7 1NO+1NC	PS 735N ➔	21-22 0° 32° 52° 75° / 13-14 15°
C9 2NC	PS 935N ➔	11-12 0° 32° 52° 75° / 21-22
C10 2NO	PS 1035N	13-14 0° 14° 75° / 23-24
C14 2NC	PS 1435N ➔	11-12 0° 32° 52° 75° / 21-22 14°
C15 2NO	PS 1535N	13-14 0° 32° 75° / 23-24 14°
C20 1NO+2NC	PS 2018N ➔	13-14 0° 15° 35° 75° / 21-22 / 33-34 21°
C2 1NO.1NC+ 1NO.1NC	PS 236N	13-14 0° 20° 75° / 21-22 / 43-44 / 31-32 13°
C5 1NO+1NC	PS 536N	21-22 0° 22° 75° / 13-14 9°
C6 1NO+1NC	PS 636N	21-22 0° 75° / 13-14 34°
C7 1NO+1NC	PS 736N	21-22 0° 32° 75° / 13-14 15°
C9 2NC	PS 936N	11-12 0° 32° 75° / 21-22
C10 2NO	PS 1036N	13-14 0° 14° 75° / 23-24
C14 2NC	PS 1436N	11-12 0° 32° 75° / 21-22 14°
C15 2NO	PS 1536N	13-14 0° 32° 75° / 23-24 14°
C20 1NO+2NC	PS 2036N	13-14 0° 15° 75° / 21-22 / 33-34 21°

✱IN ALTERNATIVA: *Alternative:* M20x1.5 ISO 262

✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

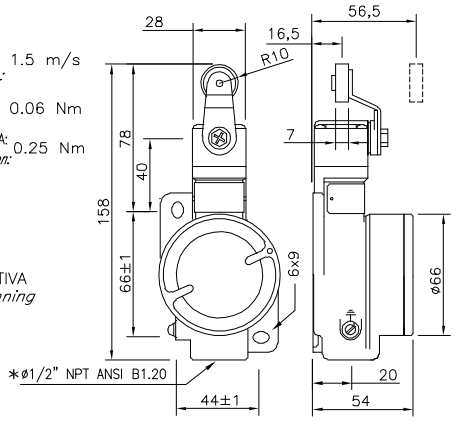
UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C2 1NO.1NC+ 1NO.1NC	PS 25IN	13-14 21-22 43-44 31-32
C5 1NO+1NC	PS 55IN	21-22 13-14 21-22 13-14
C6 1NO+1NC	PS 65IN	21-22 13-14
C7 1NO+1NC	PS 75IN	21-22 13-14
C9 2NC	PS 95IN	11-12 21-22
C10 2NO	PS 105IN	13-14 23-24
C14 2NC	PS 145IN	11-12 21-22
C15 2NO	PS 155IN	13-14 23-24
C20 1NO+2NC	PS 205IN	13-14 21-22 33-34

A LEVA CON ROTELLA
With roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



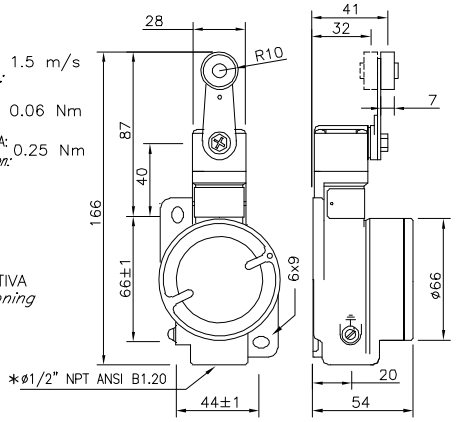
UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C2 1NO.1NC+ 1NO.1NC	PS 252N	13-14 21-22 43-44 31-32
C5 1NO+1NC	PS 552N	21-22 13-14 21-22 13-14
C6 1NO+1NC	PS 652N	21-22 13-14
C7 1NO+1NC	PS 752N	21-22 13-14
C9 2NC	PS 952N	11-12 21-22
C10 2NO	PS 1052N	13-14 23-24
C14 2NC	PS 1452N	11-12 21-22
C15 2NO	PS 1552N	13-14 23-24
C20 1NO+2NC	PS 2052N	13-14 21-22 33-34

A LEVA CON ROTELLA
With roller lever

VELOCITA' MASSIMA: CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*

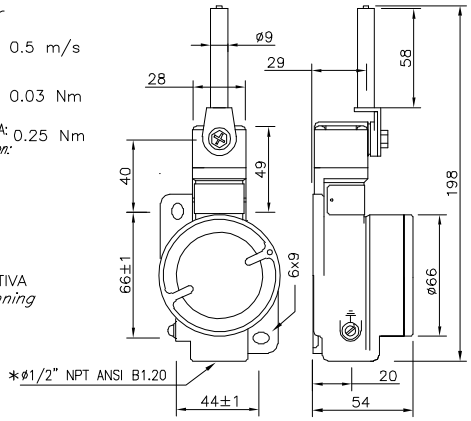


A LEVA CON RULLO IN PORCELLANA
With porcelain roller lever

VELOCITA' MASSIMA: 0.5 m/s
Max speed
COPPIA MIN. DI AZIONAMENTO: 0.03 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



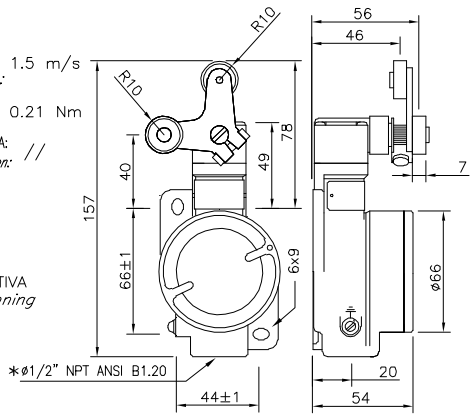
UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C5 1NO+1NC	PS 553N	21-22 13-14 21-22 13-14
C6 1NO+1NC	PS 653N	21-22 13-14

CON LEVA A LIRA
With lyra lever

VELOCITA' MASSIMA: CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.21 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: //
Min. torque positive opening operation:

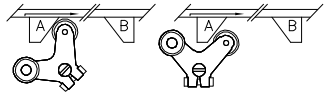
LEGENDA
Legenda

- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C5 1NO+1NC	PS 542N	21-22 13-14 21-22 13-14

FINECORSA A DUE POSIZIONI STABILI
Limit switch with two stable position
Leva a lyra s due piste
Double trak lyra lever



Escursione meccanica
Mechanical excursion

A richiesta
On request

PS 54IN Leva a lyra ad una pista
Single trak lyra lever

✱IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

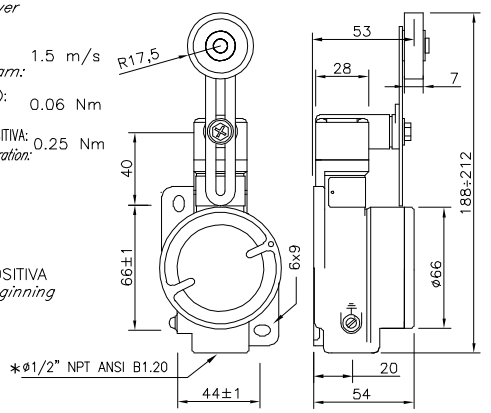
D

✱ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

A LEVA ALLUNGABILE CON ROTELLA
With roller extensible lever

VELOCITA' MASSIMA:
CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

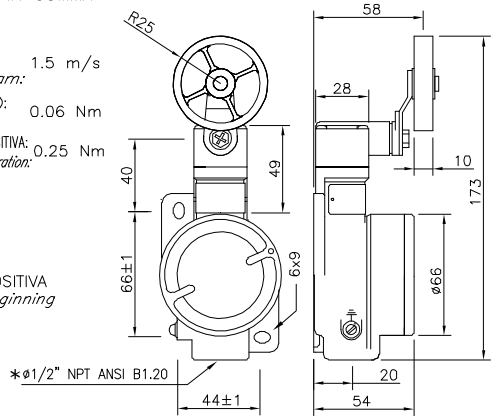
LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA CON ROTELLA IN GOMMA
With rubber roller lever

VELOCITA' MASSIMA:
CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

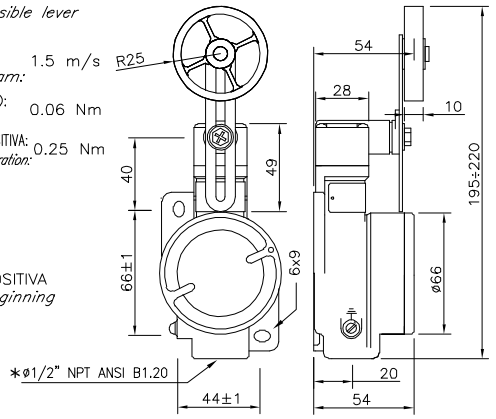
LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA ALLUNGABILE CON ROTELLA IN GOMMA
With rubber roller extensible lever

VELOCITA' MASSIMA:
CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

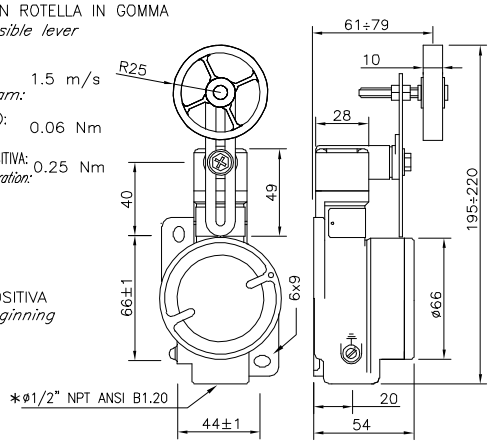
LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



A LEVA ALLUNGABILE CON ROTELLA IN GOMMA
With rubber roller extensible lever

VELOCITA' MASSIMA:
CON CAMMA A 30° 1.5 m/s
Max speed with 30° cam:
COPPIA MIN. DI AZIONAMENTO: 0.06 Nm
Min. torque actuation:
COPPIA MIN. PER APERTURA POSITIVA: 0.25 Nm
Min. torque positive opening operation:

LEGENDA
Legenda
- APERTURA POSITIVA *Positive opening*
- INIZIO APERTURA POSITIVA *Positive opening beginning*
- PREMENDO *Pushing*
- RILASCIANDO *Releasing*



UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C2 1NO.1NC+ 1NO.1NC	PS 238EN ✱	13-14 / 21-22 / 43-44 / 31-32 — 0° 20° 75° — 13°
C5 1NO+1NC	PS 538EN ✱	21-22 / 13-14 / 21-22 / 13-14 — 0° 30° 60° 75° — 17°
C6 1NO+1NC	PS 638EN ✱	21-22 / 13-14 — 0° 22° 42° 75° — 42°
C7 1NO+1NC	PS 738EN	21-22 / 13-14 — 0° 40° 60° 75° — 23°
C9 2NC	PS 938EN	11-12 / 21-22 — 0° 40° 60° 75°
C10 2NO	PS 1038EN	13-14 / 23-24 — 0° 22° 75°
C14 2NC	PS 1438EN	11-12 / 21-22 — 0° 40° 60° 75° — 22°
C15 2NO	PS 1538EN	13-14 / 23-24 — 0° 40° 75° — 22°
C20 1NO+2NC	PS 2038EN	13-14 / 21-22 / 33-34 — 0° 23° 43° 75° — 29°
C2 1NO.1NC+ 1NO.1NC	PS 238AN	13-14 / 21-22 / 43-44 / 31-32 — 0° 20° 75° — 13°
C5 1NO+1NC	PS 538AN	21-22 / 13-14 / 21-22 / 13-14 — 0° 30° 60° 75° — 17°
C6 1NO+1NC	PS 638AN	21-22 / 13-14 — 0° 22° 42° 75° — 42°
C7 1NO+1NC	PS 738AN	21-22 / 13-14 — 0° 40° 60° 75° — 23°
C9 2NC	PS 938AN	11-12 / 21-22 — 0° 40° 60° 75°
C10 2NO	PS 1038AN	13-14 / 23-24 — 0° 22° 75°
C14 2NC	PS 1438AN	11-12 / 21-22 — 0° 40° 60° 75° — 22°
C15 2NO	PS 1538AN	13-14 / 23-24 — 0° 40° 75° — 22°
C20 1NO+2NC	PS 2038AN	13-14 / 21-22 / 33-34 — 0° 23° 43° 75° — 29°
C2 1NO.1NC+ 1NO.1NC	PS 238BN	13-14 / 21-22 / 43-44 / 31-32 — 0° 20° 75° — 13°
C5 1NO+1NC	PS 538BN	21-22 / 13-14 / 21-22 / 13-14 — 0° 30° 60° 75° — 17°
C6 1NO+1NC	PS 638BN	21-22 / 13-14 — 0° 22° 42° 75° — 42°
C7 1NO+1NC	PS 738BN	21-22 / 13-14 — 0° 40° 60° 75° — 23°
C9 2NC	PS 938BN	11-12 / 21-22 — 0° 40° 60° 75°
C10 2NO	PS 1038BN	13-14 / 23-24 — 0° 22° 75°
C14 2NC	PS 1438BN	11-12 / 21-22 — 0° 40° 60° 75° — 22°
C15 2NO	PS 1538BN	13-14 / 23-24 — 0° 40° 75° — 22°
C20 1NO+2NC	PS 2038BN	13-14 / 21-22 / 33-34 — 0° 23° 43° 75° — 29°
C2 1NO.1NC+ 1NO.1NC	PS 238CN	13-14 / 21-22 / 43-44 / 31-32 — 0° 20° 75° — 13°
C5 1NO+1NC	PS 538CN	21-22 / 13-14 / 21-22 / 13-14 — 0° 30° 60° 75° — 17°
C6 1NO+1NC	PS 638CN	21-22 / 13-14 — 0° 22° 42° 75° — 42°
C7 1NO+1NC	PS 738CN	21-22 / 13-14 — 0° 40° 60° 75° — 23°
C9 2NC	PS 938CN	11-12 / 21-22 — 0° 40° 60° 75°
C10 2NO	PS 1038CN	13-14 / 23-24 — 0° 22° 75°
C14 2NC	PS 1438CN	11-12 / 21-22 — 0° 40° 60° 75° — 22°
C15 2NO	PS 1538CN	13-14 / 23-24 — 0° 40° 75° — 22°
C20 1NO+2NC	PS 2038CN	13-14 / 21-22 / 33-34 — 0° 23° 43° 75° — 29°

✱IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

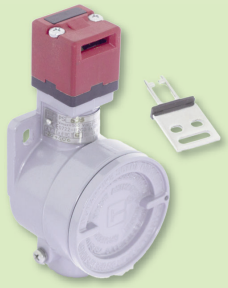
KEY-LOCK SAFETY SWITCHES with POSITIVE OPENING

series **PS**

Protection		Zone			
Gas	1-2	II2G	Ex db IIC T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	IP66/67

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C



Entries Threading	NPT ANSI B1.20
Material	Aluminum light alloy
Painting	External epoxy RAL7000

Standards and Certificates

Directive 2014/34/EU (ATEX)

EN 60079-0 • EN 60079-1
EN 60079-31

CE BVI 13 ATEX 0083

IECEx

IEC 60079-0 • IEC 60079-1
IEC 60079-31

IECEx EPS 13.0033

- Ideal to control Gates, Protections, Carters and any moving mechanical parts.
- Stainless Steel operating key has to be fixed to the mobile part of the protection. The key is removed from the switch when opening the protection and a mechanism ensures the positive opening of the electric contact.
- Applicable to any type of protection (hinged, removable or sliding)
- Possibility to operate the switch with a key allowing the restart only by inserting the same key
- The switch with manual mechanical delay are used on machines where dangerous conditions continue for a limited time even after pressing the stop command of the machine (mechanical inertia of pulleys, belt saw, grinders, etc.)
- Electrical power or timers not required
- For any other information pls. see pages D13 and D14.

Options

- Stainless Steel version (see page I19).
- Cable entry with metric thread M20x1.5 (M).
- Orthogonal key.
- Jointed Key.

Information on available contacts: see pages D13 and D14.

Installation

- The safety circuit shall be connected to the NC contact 21-22 when the key is inserted.
- The safety switches must be mounted to the body of the machine while the key-lock is fixed to the protection.
- Safety switches with manual mechanical delay firmly lock the key, once installed. Turn the knob to release/remove the key. Since the early rounds of rotation the electrical contact is positively open, only after about 20 seconds, the key is released: for closing the knob must be rotated in reverse.
- The head may be positioned on any of the four sides of the switch just by removing the four fixing screws: this allows up to 8 different actuation directions (the head has two key entries). Switches with manual mechanical delay allow up to 32 different possible configurations as the head has two key entries and a release knob independently swiveled 90° x 90°.
- When the key is not inserted make sure that any dust and dirt do not obstruct its seat (use the protection cap).
- **Periodically verify the correct operation of the switch.**
- Fix the switch interposing a washer under fixing screws head.

Application on fences

When the switch is used to protect parts of machines physically accessible to people, to prevent the door or gate may accidentally close when the operetor is inside, a padlock may be used at the appropriate hole on the key.
The arc of the padlock shall be of 6 mm diameter minimum.

Codifica d'Ordine

Key-lock safety switch with positive opening ⇒: PS 693N

Type	Contact unit	Actuator	Threading
PS	C6	93	**N** = NPT (N) **M** = metric (M)

Key-lock safety switch with manual mechanical delay and positive opening ⇒: PS 9R2M

Type	Contact unit	Actuator	Threading
PS	C9	R2	**N** = NPT (N) **M** = metric (M)

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

[°] The insulating voltage is equal to 400 VAC / 500 VDC for C2 and C11 contacts.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

(**) As safety switches only those with ⇒ symbol shall be used.

The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

D

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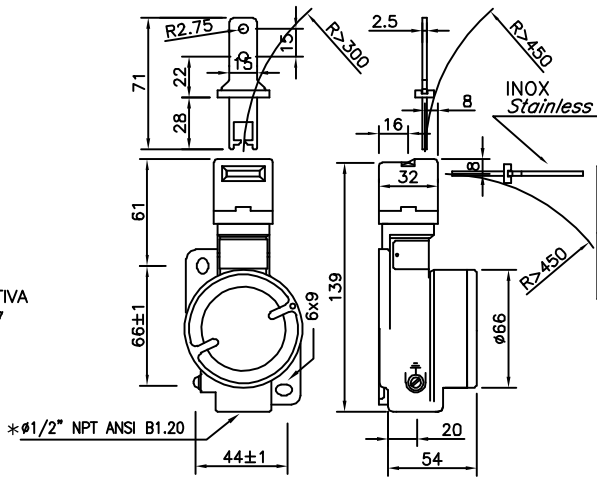
✹ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C6 1NO+1NC (13 21 / 14 22)	PS 693N ✹	21–22 / 13–14 — 0 4.7 7.2 — 7
C9 2NC (11 21 / 12 22)	PS 993N	11–12 / 21–22 — 0 6.5 9

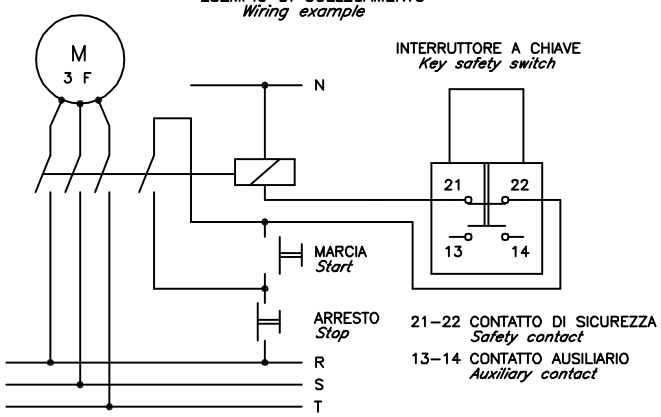
A CHIAVE
With key



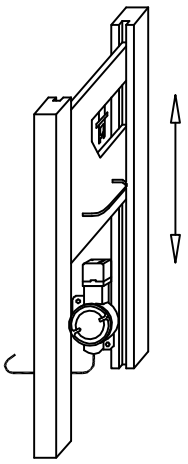
LEGENDA
Legenda

APERTURA POSITIVA
Positive opening

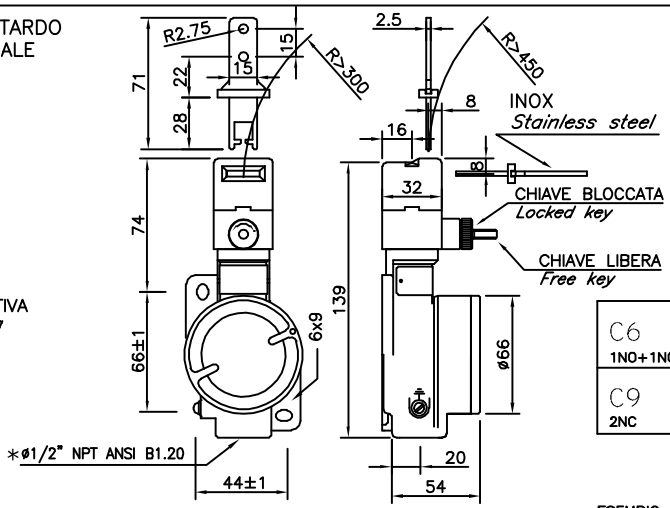
ESEMPIO DI COLLEGAMENTO
Wiring example



ESEMPIO DI APPLICAZIONE
Installation example



A CHIAVE CON RITARDO MECCANICO MANUALE
With key manual mechanical delay

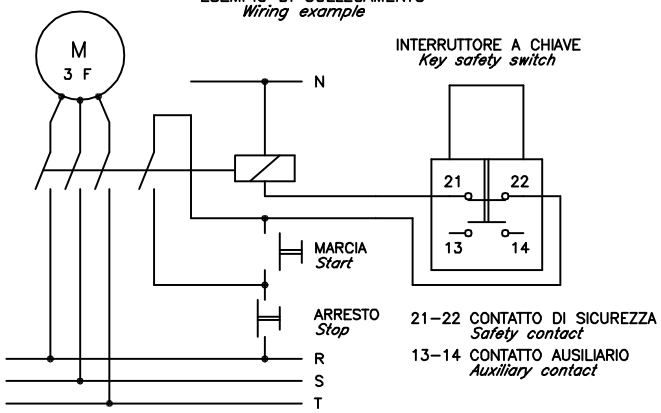


LEGENDA
Legenda

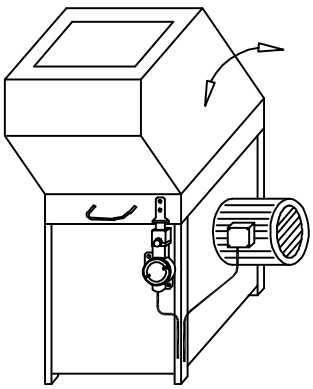
APERTURA POSITIVA
Positive opening

C6 1NO+1NC (13 21 / 14 22)		PS 6R2N
C9 2NC (11 21 / 12 22)		PS 9R2N

ESEMPIO DI COLLEGAMENTO
Wiring example



ESEMPIO DI APPLICAZIONE
Installation example



*IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

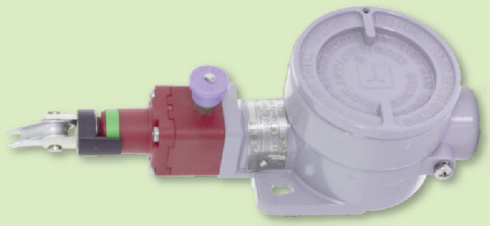
CABLE OPERATED SAFETY SWITCHES with POSITIVE OPENING

series **PS**

Protection		Zone			
Gas		1-2	II2G	Ex db IIC T6÷T5 Gb
Dusts		21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection: **IP66/67**

Amb. Temp.: Standard -20°C +40°C; Extended -50°C +80°C



Entries Threading: **NPT ANSI B1.20**

Material: **Aluminum light alloy**

Painting: **External epoxy RAL7000**

Standards and Certificates:

- Directive 2014/34/EU (ATEX)
- EN 60079-0 • EN 60079-1 EN 60079-31
- CE BVI 13 ATEX 0083
- IECEx: IEC 60079-0 • IEC 60079-1 IEC 60079-31
- IECEx EPS 13.0033

- Ideal to control any moving mechanical parts especially conveyors. They make possible to stop the machine from any point of intervention by manually pulling the cable.
- Self-diagnostic for the correct operation of the unit by opening the contacts in case of cable loosening or breakage detection.
- The version with reset includes the indicator of correct tension of the cable as well as a mechanical indicator of the status of the contacts. Contacts remain open after the intervention even if the cable is released.
- Suitable for cables with free span up to 16 m and, with appropriate extensions, even beyond.
- For any other information pls. see pages D13 and D14.

D

Options

- Stainless Steel version (see page I19).
- Cable entry with metric thread M20x1.5 (M).

Information on available contacts: see pages D13 and D14.

Installation

The switch is supplied with the following accessories:
- Plastic coated steel cable Ø5 mm lenght 6 m or 16 m;
- 1 tie rod for tensioning the cable;
- 2 terminals;
- 2 jumpers.

- The safety circuit shall be connected to NC contact (11-12 or 21-22).
- For tensioning the cable allow a stroke of about 8 mm to the cursor of the switch.
- Use original acccessories only, otherwise the switch performances are not guaranteed.
- **Periodically verify the correct operation of the switch.**

Order coding

Safety switch with tie rod for cable and positive opening ⇒: PS 680M

Type	Contact unit	Actuator	Threading
PS	**C6**	**80**	**N** = NPT (N) **M** = metric (M)

Safety switch with tie rod for cable and positive opening ⇒ with reset: PS 984N

Type	Contact unit	Actuator	Threading
PS	**C9**	**84** = right **83** = left	**N** = NPT (N) **M** = metric (M)

Safety switch with tie rod for vertical cable and positive opening ⇒ with reset: PS 678M

Type	Contact unit	Actuator	Threading
PS	**C6**	**78**	**N** = NPT (N) **M** = metric (M)

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas, class T5/T100°C considers an A.T. extended up to +80°C.

[°] The insulating voltage is equal to 400 VAC / 500 VDC for C2 and C11 contacts.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

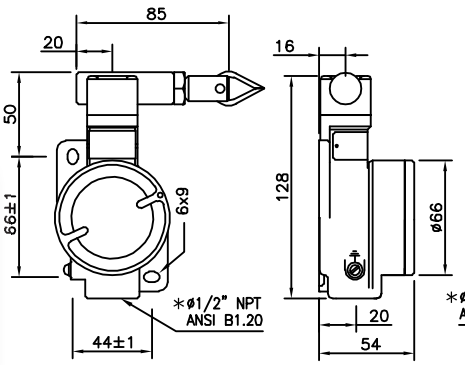
(**) As safety switches only those with ⇒ symbol shall be used.

The safety circuit must always be connected to NC contacts (11-12 or 21-22). Exceed by 1.5 mm (25°) the gap between the contacts. Operate the switch with the indicated opening force.

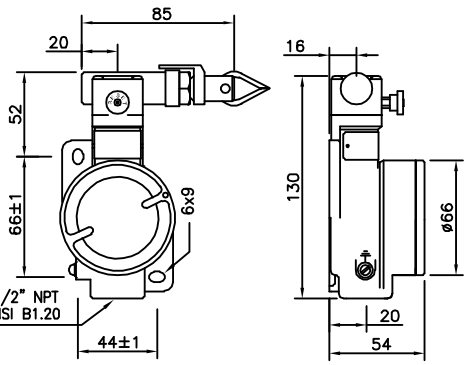
D

✸ I PRODOTTI CONTRASSEGNATI SONO NORMALMENTE DISPONIBILI A MAGAZZINO
The marked products are normally available to store

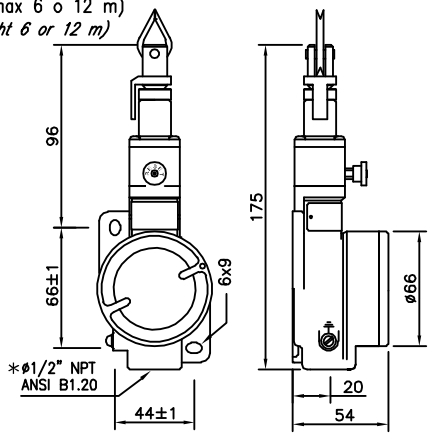
CON TIRANTE PER FUNE
With connecting rod for rope



CON TIRANTE PER FUNE DESTRA (684N–984N) E SINISTRA (683N–983N)
CON RESET
With connecting rod reset rope on the right (684N–984N) and left (683N–983N)

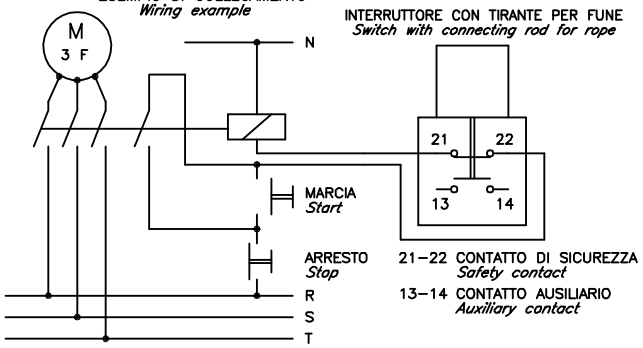


CON TIRANTE PER FUNE VERTICALE E RESET
With connecting rod reset rope on the vertical
(Lungh. max 6 o 12 m)
(max lenght 6 or 12 m)



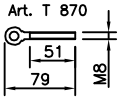
UNITA' DI CONTATTO *Contact blocks*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*	N°CATALOGO *Catalogue n°*	DIAGRAMMI CORSE *Travel diagrams*
C6 13 21 / 14 22 — 1NO+1NC	PS 680N✸	21–22 / 13–14: 0 — 4.0 — 8 — 12.6 14 16; 3.5 S 13	PS 684N✸ PS 683N✸	21–22 / 13–14: 0 — 8 — 14 16; R4.5 S R12	PS 678N✸	21–22 / 13–14: 0 — 4 — 8 8.5; R1.5 S R6.5
C9 11 21 / 12 22 — 2NC	PS 980N	11–12 / 21–22: 0 — 3.5 — 8 — 13 16; S 14.5	PS 984N PS 983N	11–12 / 21–22: 0 — 8 — 14 16; R4.5 S R12	PS 978N	11–12 / 21–22: 0 — 4 — 8 8.5; R1.5 S R6.5

ESEMPIO DI COLLEGAMENTO
Wiring example



ACCESSORI – *Accessories*

Art. T 870 — TIRANTE PER METTERE IN TENSIONE LA FUNE IN MODO CORRETTO (Pz. 1).
Stay bolt suitable for setting the rope in tension correctly (pcs. 1).

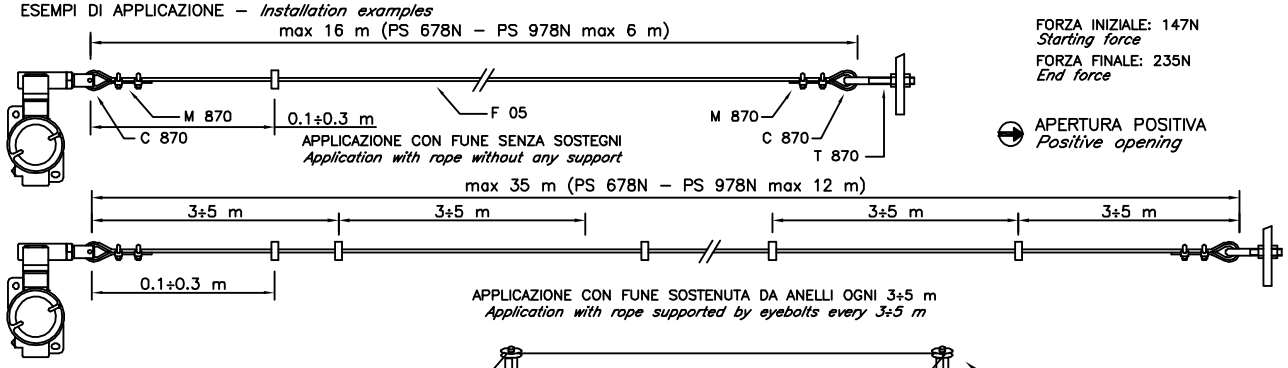


Art. M 870 — MORSETTO (Pz. 2 o 4).
Rope clamp (pcs. 2 or 4).

Art. C 870 — CAVALLOTTO (Pz. 1).
Thimble (pcs. 1).

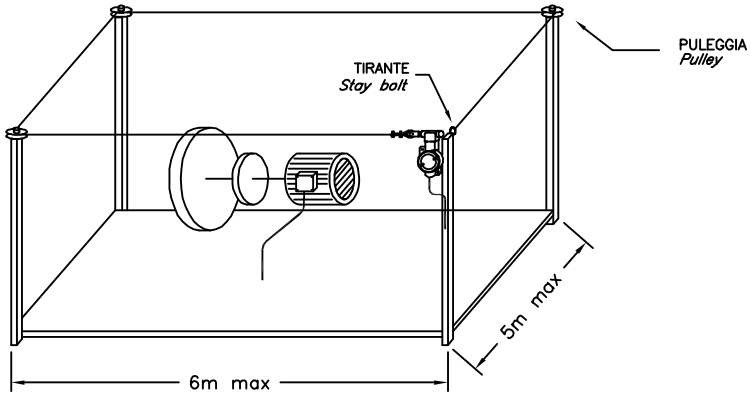
Art. F 05 — FUNE IN ACCIAIO PLASTIFICATA ROSSA ø5 mm (in rotoli da 100 m).
Red plasticized steel rope ø5 mm (coils of 100 m).

ESEMPI DI APPLICAZIONE – *Installation examples*



FORZA INIZIALE: 147N
Starting force
FORZA FINALE: 235N
End force

APERTURA POSITIVA
Positive opening



*IN ALTERNATIVA:
Alternative: M20x1.5 ISO 262

BUOYANT OPERATED LIMIT SWITCHES

series **PS**

Protection		Zone			
Gas		1-2	II2G	Ex db IIC T6÷T5 Gb
Dusts		21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection: **IP66/67**

Amb. Temp.: Standard -20°C +40°C; Extended -50°C +80°C

Entries Threading: **NPT ANSI B1.20**

Material: **Aluminum light alloy**

Painting: **External epoxy RAL7000**

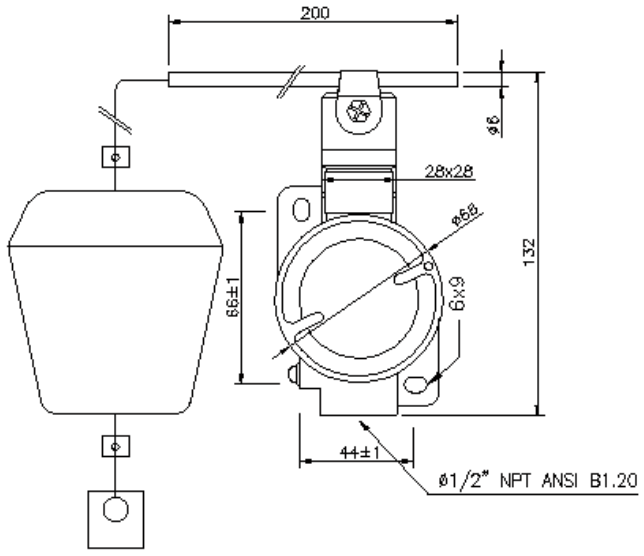
Standards and Certificates:

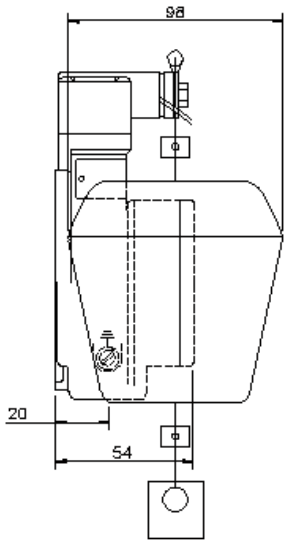
- Directive 2014/34/EU (ATEX)
- EN 60079-0 • EN 60079-1 EN 60079-31
- CE BVI 13 ATEX 0083
- IECEx: IEC 60079-0 • IEC 60079-1 IEC 60079-31
- IECEx EPS 13.0033

- Buoyant in Moplen, Cable in Nylon (2 m) and counterweight in Zinc plated Steel
- The limit switch may used in any position and the mechanical actuator rotated by 90° x 90°.
- Tags and screws in Stainless Steel.
- Information on available contacts: see pages D13 and D14.

Opzioni

- Stainless Steel version (see page I19).
- Cable entriy with metric thread M20x1,5 (M).
- Double counterweight.
- Stainless Steel AISI 304 counterweight/s and buoyant.





CHARACTERISTICS of the CONTACT ELEMENTS				
MODEL	**CONTACT TYPE**	**CONTACT**	**CURRENT (A)**	**VOLTAGE (V)**
PS 10AG	Single Pole	1NO+1NC	I_{max}=10 A	V_{max}=220 V AC/DC
PS 20AG	Double Pole	2NO+2NC	I_{max}=10 A	V_{max}=220 V AC/DC

- The rod can be adjusted in length and tilt.
- The switch is normally supplied with actuator acting in both directions (actuator with float left or right) to set one sole direction loose the screws of the turret beneath which there is a knurled ring: by pressing and rotating it 90 ° to the right or left the desired direction of actuation is set. Restore the turret.
- **Periodically verify the correct operation of the switch.**

NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas class T5/T100°C considers an A.T. extended up to +80°C.

(*) For A.T. up to +40°C the max surface temperature is 65°C reducing the number of operations to 600/h.

Use screw-terminals for wiring. Max section wires 2.5 mm².

Order Coding

Example: PS 10AG N

Type	Contact Unit	Actuator	Threading
PS	**10** = Single Pole **20** = Double Pole	**AG**	**N** = NPT (N) **M** = metric (M)

LIMIT SWITCHES

series **FCL**

Protection		Zone			
Gas	1-2	II2G	Ex db IIB+H_2 T6 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C Db

Degree of Protection	IP65

Amb. Temp.			
Standard	-25°C	+60°C
Extended	-50°C	+60°C

Entries Threading	NPT ANSI B1.20
Material	Aluminum light alloy
Painting	External epoxy RAL7000

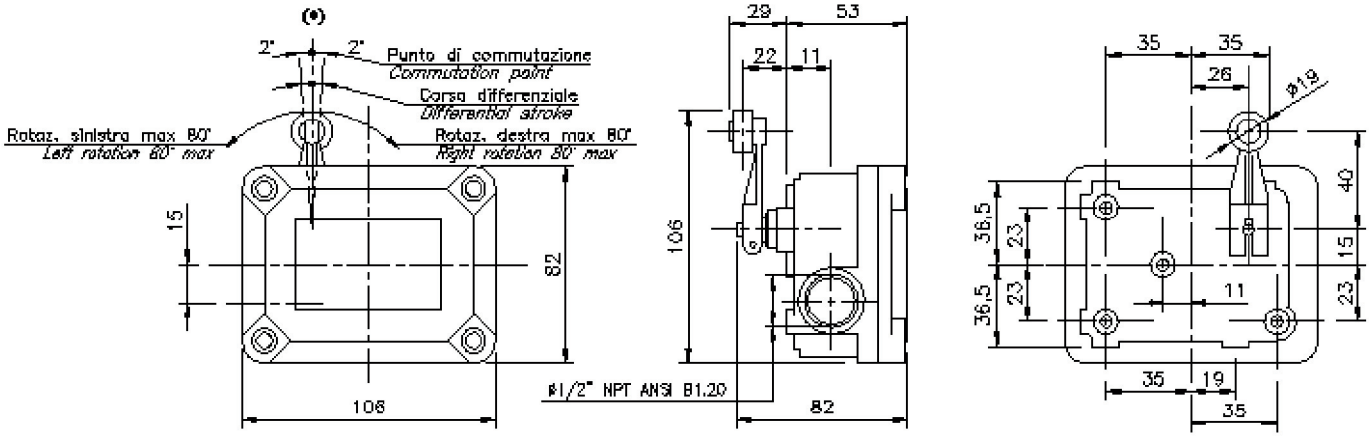
Standards and Certificates

Directive 2014/34/EU (ATEX)
EN 60079-0 • EN 60079-1
EN 60079-31
CE INERIS 13 ATEX 0040X

IECEx
IEC 60079-0 • IEC 60079-1
IEC 60079-31
IECEx INE 13.0054X

- Stainless Steel shaft over a brass bush.
- Lever may bepositioned along 360°.
- The lever may be operated either clockwise or counterclockwise.
- External screws in Stainless Steel.
- Single or double pole contact element.

Options
- Cable entry with metric thread M20x1,5 (M).



Code	Lever Actuation	Contact Element		Weight (g)
FCL 110 RS	Counterclockwise rotation	Single Pole Switch	10 A - 250 V AC 0.4 A - 125 V DC 5 A - 30 V DC	640
FCL 110 RD	Clockwise rotation			640
FCL 205 RS	Counterclockwise rotation	Double Pole Switch	5 A - 250 V AC 0.4 A - 125 V DC 5A - 30 V DC	640
FCL 205 RD	Clockwise rotation			640

Order Coding

Example: FCL 110 RD M

Type	Contact Element	Lever Actuation	Threading
FCL	**110** = Single Pole	**RS** = Counterclockwise	**N** = NPT (N)
	205 = Double Pole	**RD** = Clockwise	**M** = metric (M)

INSTALLATION OF SINGLE SWITCHES WITH SAFETY FUNCTIONS

- Use **only** switches with the symbol ⊖.
- Connect the safety circuit to **the NC normally closed contacts (11-12, 21-22 or 31-32)**.
- **The NO normally open contacts (13-14, 23-24, 33-34)** should be used only for signalling; these contacts are not to be connected with the safety circuit. However, if in the same protection two or more switches are used, it is possible to connect the contact NO to the safety circuit. In this case at least one of the two switches must have a positive opening and a normally closed contact NC (11-12, 21-22 or 31-32) must be connected to the safety circuit.
- Actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol ⊖.
- Operate the switch **at least with the positive opening force** indicated.
- The fixing of the device must occur in compliance with the standard EN ISO 14119.

Whenever the machine guard is opened and during the whole opening travel, **the switch must be pressed directly** (fig. 1) or **through a rigid connection** (fig. 2).
Only in this way the positive opening of the NC normally closed contacts (11-12, 21-22, 31-32) is guaranteed.

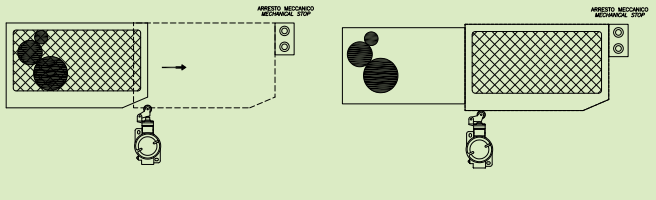


Fig. 1

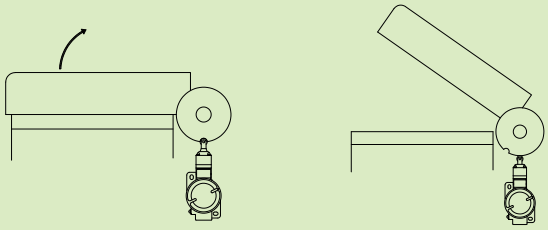


Fig. 2

In safety applications with only one switch for each guard, the switches **must never be activated by a release** (fig. 3) or **through a non rigid connection** (i.e. by a spring).

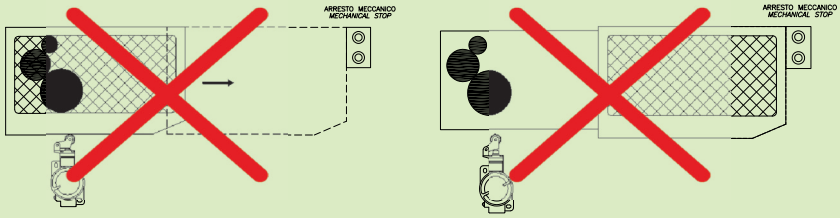
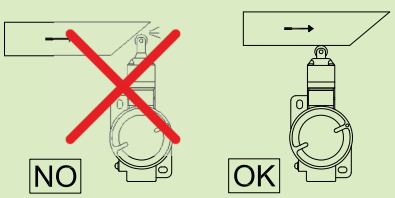
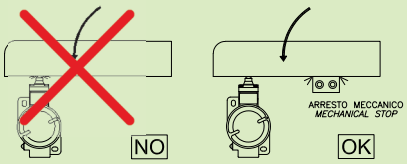


Fig. 3

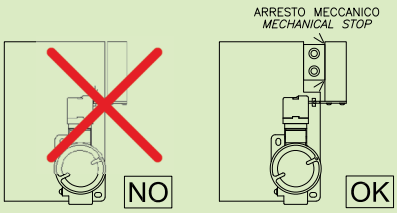
MECHANICAL STOP
Limit switches must not be used as mechanical stop.



The actuator must not exceed the max. travel as indicated in the travel diagrams.



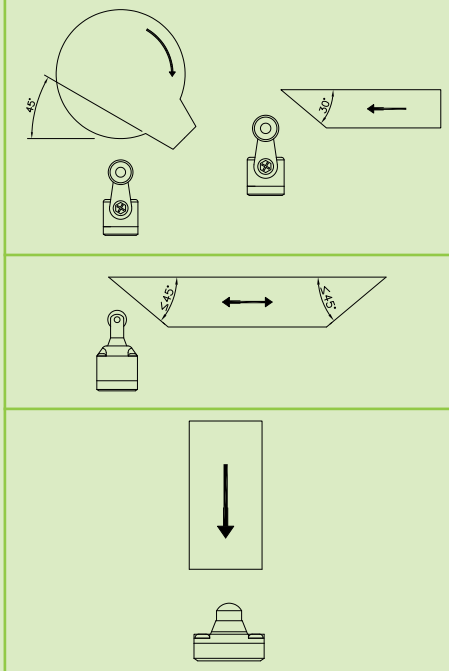
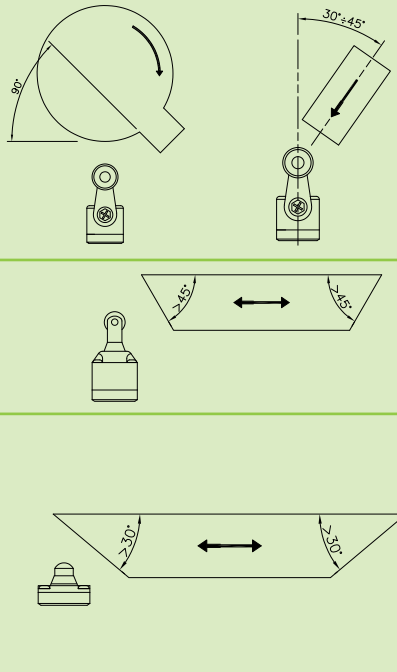
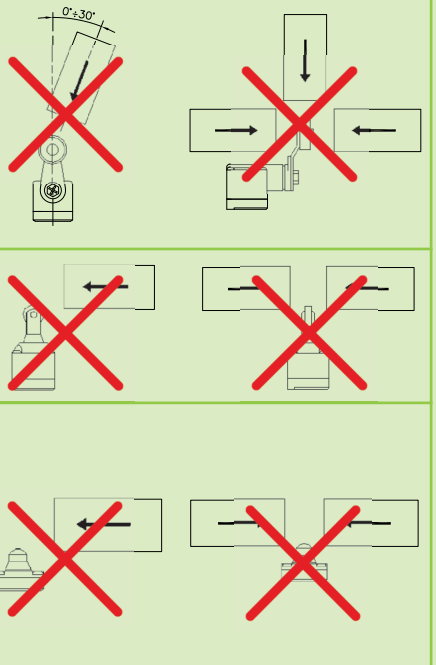
The guard must not make a mechanical stop on the switch head.



The actuator must not strike directly against the switch head

D

ACTUATION MODES

Recommended application	Application to avoid Possible application but with mechanical stress for the switch higher than expected, mechanical endurance is not guaranteed	Forbidden application
		

General prescriptions

- The installation must be performed only by qualified staff aware of the regulations in force in the country of installation.
- The device must be used exactly as supplied, properly fixed to the machine and wired.
- It is not allowed to disassemble the product and use only parts of the same; it is prohibited to modify the device.
- Failure to comply with these requirements or incorrect use during operation can lead to the damage of the device and the loss of the function performed by the device itself. This entails the cessation of the warranty on the item and relieves the manufacturer of any liability.

Device utilization

- Before use, check if the national rules provide for further requirements in addition to those given here.
- Before installation, make sure the device is not damaged in any part.
- Do not use the device as mechanical stop of the actuator.
- Do not apply excessive force to the device once it has reached the end of its actuating travel.
- Do not exceed the maximum actuation travel.
- Do not stress the device with bending and torsion.
- Do not disassemble or try to repair the device, in case of defect or fault replace the whole device.
- In case the device is deformed or damaged replace it completely. There is no guarantee of working for a deformed or damage device.

Wiring and installation

- The installation has to be made by qualified staff.
- Limit the use of these devices to control functions.
- Keep the electrical load below the value specified by the respective utilization category.
- Turn off the power before access to the contacts, also during the wiring.
- Do not paint or varnish the devices.
- Do not bend or deform the device during installation.
- Do not use the device as a support for other parts of the machine (e.g. wireways, conduits, etc.).
- Comply with the minimum and maximum sections of electrical conductors admitted by terminals (if present).
- Do not introduce polluting agents into the device as: talc, lubricants for cable sliding, powder separating agents for multipolar cables, small strands of copper and other pollutants that could affect the proper functioning of the device.
- Verify that the electrical cables, terminals, cable numbering systems and any other part do not obstruct the cover from closing correctly or if pressed between them do not damage or compress the internal contact block.
- After the installation and before commissioning of the machine, verify: the correct operation of the device and all its parts, the correct wiring and tightening of all screws and that the actuating travel of the actuator is shorter than the maximum travel allowed by the device.
- After installation, periodically check for correct device operation.

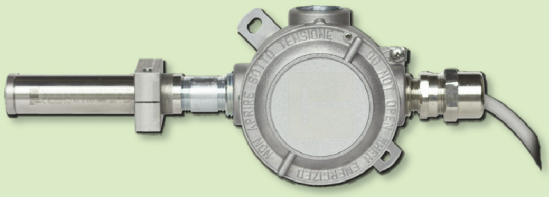
MAGNETIC PROXIMITY SWITCHES

series **IM**

Protection		Zone			
Gas	1-2	II2G	Ex db IIC T6÷T5 Gb
Dusts	21-22	II2D	Ex tb IIIC T85°C÷T100°C Db

Degree of Protection	
	IP66

Amb. Temp.				
Standard	-20°C	+40°C
Extended	-50°C	+80°C



Entries Threading	
	NPT ANSI B1.20

Material	
	Stainless Steel AISI 316

Painting	
	N.A.

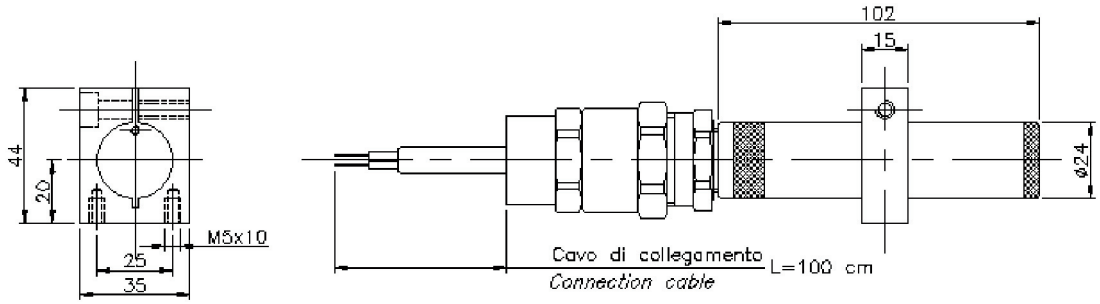
Standards and Certificates	
	Directive 2014/34/EU (ATEX)
	EN 60079-0 • EN 60079-1 EN 60079-31
CE	BVI 13 ATEX 0085X
IECEx	IEC 60079-0 • IEC 60079-1 IEC 60079-31
	IECEx EPS 13.0037X

- Ideal for any contactless control.
- Peculiar for applications in critical environments dominated by the presence of oils, greases, liquids, dusts, etc.
- Indispensable to detect and/or count any items passing by at remarkable speed.
- Not subject to any mechanical wear and thus, compared to traditional switches, a longer operating life is guaranteed.
- The switch actuated by a permanent magnet series MG (see page D30).
- Fixing bracket in Stainless Steel AISI 316L.
- Cable gland with female bushing 1/2" NPT ANSI B1.20 and 1 m cable included.
- Available version provided with junction box (SX 14 see page B3) and sealing nipple.

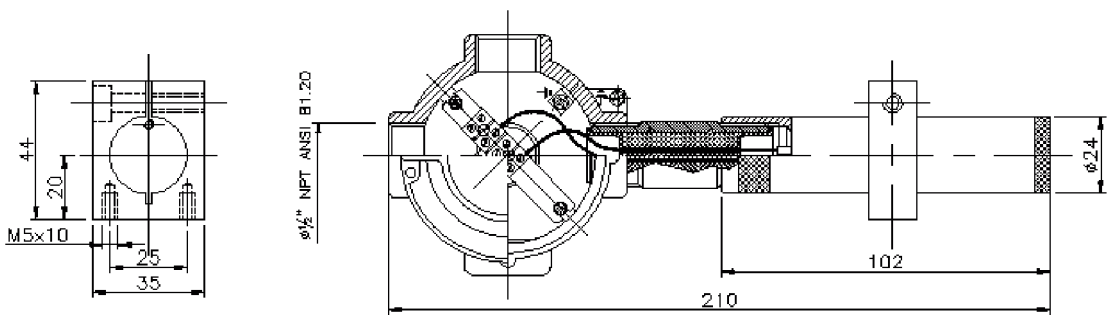
Options

- Bistable contact (Available only with 1NO contact).
- Cable gland with female bushing M20x1,5.
- Stainless steel AISI 316L cable gland.
- Cable with length other than standard.
- Junction box and sealing nipple in Stainless Steel.

IM..



IM..S..



NOTES

To read the installation and maintenance instructions is reccommended.

The temperature class T6/T85°C considers an Ambient Temperature (A.T.) extended up to +60°C, whereas class T5/T100°C considers an A.T. extended up to +80°C.

Contact	Scheme	Box	Weight (g)
1 switchin		Stainless steel	370
1 Normally open		Stainless steel	370

Order COding

Example: IM/U

Type	Material (cable gland)	Junction Box	Contact	Threading
IM	.. = Nikel Plated Brass I = Stainless Steel	SX 14 = presence .. = absence	U = Monostable deviation AB = Bistable deviation	.. = NPT (N) M = metric (M)

MAGNETIC PROXIMITY SWITCHES

series **IM**

Contact elements Technical Data:

• Contact type	Switching (NO)	• Switching hysteresis	~5 mm
• Contatti material	Rhodium	• Set point accuracy	0.01 mm
• Max switching power	40 VA	• Axial vibration resistance	100 gr
• Max switching voltage	250 VDC - 220 VAC	• Contact mechanical life	10^8 operations
• Max current peak	1 A	• Storage temperature	-10 °C ÷ +80 °C
• Contact resistance	0.075 Ω	• Connecting cable	2x0.75 mm² ÷ 3x0.75 mm²
• Contact vibration time	0.3 ms		
• Switching frequency	100 Hz		

D

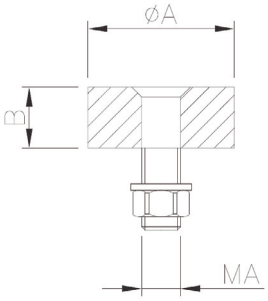
Instructions

- The enclosure must neither be distorted nor subjected to shocks since the contact element may be damaged.
- Magnetic proximity switches are sensitive to high current loads.
- As the elasticity of the contact shells is minimum, a small welding effect can cause the bonding of the contact blades.
- The opening of the contacts is very fast so that, by switching off inductive loads such as coils of relays, solenoid valves, electromagnets, etc.. high voltages are determined by self-induction. To prevent the sticking of contacts the allowed max. electrical values (power, voltage and current peak) must never be exceeded.
  Pay attention to the insertion current peak. The charging currents of the capacitors must be limited by appropriate pre-resistors (i.e. incandescent lamps insertion demands 3-4 times the nominal current value; consequently contacts rated for 100 W can pilot incandescent lamps lower than 25 W).
- The control of inductive loads (relays, solenoid valves, etc.) makes essential the spark suppression by inserting in parallel:
  - in d.c. a diode
  - in a.c.. an RC circuit (resistence + capacitor)
- For the switching contacts the color code is as follows:
  - brown-black: contact NO;
  - brown-blue: contact NC.

PERMANENT MAGNETS

series **MG**

- Used to operate the magnetic proximity switches series IM...
- Available in three different sizes.



PERMANENT MAGNETS					
Code	**A**	**B**	**MA**	**Actuation Distance**	**Weight (g)**
MG1	20	6	M3x16	3 ÷ 7	10
MG2	20	10	M4x20	5 ÷ 12	15
MG3	31	15	M5x20	12 ÷ 25	50

Instructions

- Permanent magnets must be mounted by countersunk screws in non-magnetic materials such as brass, aluminum, stainless steel or plastic.
- Larger switch control distance is reached when the permanent magnet is fixed directly on an iron support.
- Embedding the permanent magnet in a mass of iron causes a short circuit of the magnetic field; it is necessary provide for a distance of 1-3 millimeters from the iron surface.
  This type of mounting significantly reduces the operating distance of magnetic switch.
- The permanent magnets featuring north polarity are painted red.