

NG Series RFID safety switches with block



NG Series RFID safety switches with block

Description

These switches are used on machines where the hazardous conditions remain for a while, even after the machines have been switched off, for example because of mechanical inertia of pulleys, saw disks, parts under pressure or with high temperatures. They can also be used when it is necessary to control machine guards allowing the opening of protections only under specific conditions.

Maximum safety with a single device

PLe + SIL3 Constructed with redundant electronic technology, the NG series switches make it possible to create circuits having maximum PLe and SIL3 safety levels by fitting just one device on the protection. This avoids expensive wiring on the field and allows quicker installation. Inside the panel, the two electronic safety outputs must be connected to a Pizzato Elettrica safety module or to a safety PLC.

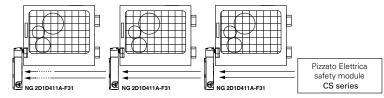
Connection of several switches in series

PLe + SIL3 One of the most relevant features of the NG line is the optional connection in series of several switches, up to a maximum number of 32 devices, while maintaining the maximum PLe safety level prescribed by the

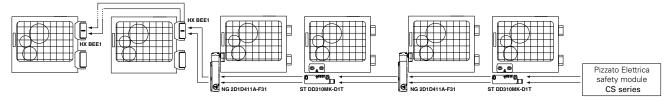
 $\rm EN$ 13849-1 standard and the SIL3 safety level according to the $\rm EN$ 62061 standard.

Such connection method is permitted in safety systems where a safety module, which evaluates the outputs of the last NG switch, is present at the end of the chain.

The fact that the PLe safety level can be maintained, even with 32 switches connected in series, is indicative of the extremely safe structure found inside each individual device.



Connection in series to other devices



The NG series features two safe inputs and two safe outputs, which can be connected in series with other Pizzato Elettrica safety devices. This option allows the creation of safety chains containing various devices, for example the creation of circuits with connections in series, including stainless steel safety hinges (HX BEE1 series), transponder sensors (ST series) and door lock sensors (NG series), while maintaining maximum PLe and SIL3 safety levels.

RFID actuators with high coding level



NG series features an electronic system based on RFID technology to detect the actuator. This system gives a different coding to each actuator and makes it impossible to tamper with a device by using another actuator belonging to the same series. The actuators may have millions of different coding combinations,

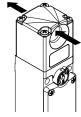
and are therefore classified as actuators with a high coding level, according to ISO 14119.

Actuator holding force



The sturdy interlocking system guarantees the Fzh actuator a maximum holding force equal to 7500 N. This is one of the highest values available on the market today, making this device suitable for severe heavy-duty applications.

Dustproof



The switch is provided with a through hole for inserting the actuator and, thanks to this peculiarity, any dust which may go inside the actuator hole can always come out of the opposite side instead of being left there. Moreover, the lock pin is provided with an external diaphragm gasket which makes it suitable for any environment where dust is present.

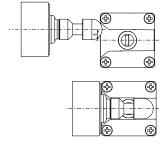
High protection degree



The NG series switches by Pizzato Elettrica, besides having an IP67 protection degree, have passed the test proving their IP69K protection degree according to the prescriptions established by the ISO 20653 standard. Therefore they are suitable for use in

machineries subjected to intense washing with high pressure and high temperature water jets and for any condition or environment where a particular attention for cleanness and hygiene is required, such as in food or pharmaceutical industry.

Centring



The switch is provided with a wide centring inlet for the actuator pin. Such solution makes it easier to align the actuator with the hole found in the head during the fitting stage. Moreover, this solution drastically reduces any probable collisions between the actuator and the switch, also allowing it to be fitted on inaccurate doors.

Push-in spring connections



The switch is provided with a PUSH-IN type spring connection system on the inside. This technology allows quick handy wiring, since the wire simply needs to be inserted in the appropriate hole for it to be secured and for the electrical connection to be established. Such operation can be carried out without the help of any tool but just using rigid or flexible wires with a tip. The wires can be released by pressing the appropriate wire-releasing push-buttons.

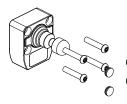


5 LEDs for immediate diagnosis



As the LEDs have been designed for quick immediate diagnosis, the status of each input and output is highlighted by one specific LED. This makes it possible to quickly identify the interruption points in the safe chain, which device is released, which door is opened and any errors inside the device. All that in a straightforward way without needing to decode complex blinking sequences.

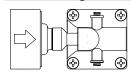
Double anti-tampering safety

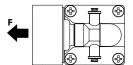


Each NG series actuator is supplied with four stainless steel anti-crash screws, for it to be fitted on the protection. Four protection insert caps are also supplied together with the screws. Besides preventing any deposit from building up and making it easy to clean the actuator, these caps help to prevent any tampering

as they obstruct access to the anti-crash screws.

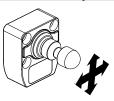
30 N holding force





The inside of each switch features a device which holds the actuator in its closed position. Ideal for all those applications where several doors are unlocked simultaneously, but only one is actually opened. The device keeps all the unlocked doors in their position, stopping any vibrations or gusts of wind from opening them.

Articulated joint for inaccurate doors



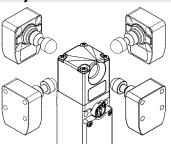
All the NG series actuators are articulated, and allow the pin to match the centring hole found in the switch. This way there is no need for precise actuator-switch aligning operations during the fitting stage. Moreover, thanks to its flexibility, this device can be used on doors with an activating range up to 80mm, without having to tilt the pin beforehand.

Laser marking



All the NG series switches are marked indelibly by means of a dedicated laser system which makes the marking suitable for extreme environment. Thanks to this system, which does not use labels, it is possible to avoid the loss of identification data and to make the marking more resistant over the years.

Adjustable head and devices

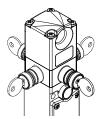


The head can be quickly positioned on all four sides by turning the 4 fixing screws.

The lock release devices and the release push-button can also be adjusted by 90° at a time, thus obtaining as many as 32 different configurations with the same article.

Release device with adjustable lock

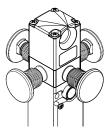
The auxiliary lock release device is used to allow machinery to be



exclusively maintained or accessed by authorised personnel. Key rotation carries out the same action as that of the electromagnet, i.e. actuator release. The device is adjustable, and this allows the safety switch to be fitted inside the machine and the release device to be made accessible on the outside of the protection. This provides the switch with better protection against any tampering,

while the external machine surface keeps its smart appearance.

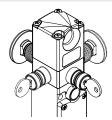
Adjustable anti-panic release button



This device is used when the safety switch controls dangerous areas, where operators can physically enter with their whole body. The release button, facing towards the inside of the machine, enables an operator to get out after being unintentionally trapped, even in case of a power cut. To reset the switch, just return the push-button to its initial position. The anti-panic button can be adjusted and

easily lengthened by means of appropriate extensions (see accessories) so that it can also be fitted on particularly thick walls.

Lock release device and anti-panic button

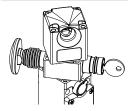


This device simultaneously carries out the two functions underlined above. Also in this case the device is adjustable and the release button can be medified

and the release button can be modified to various lengths. Push-button activation has a priority over the locking action, which is to say that even with the lock on, it is still possible to activate the push-button and release the switch. To reset

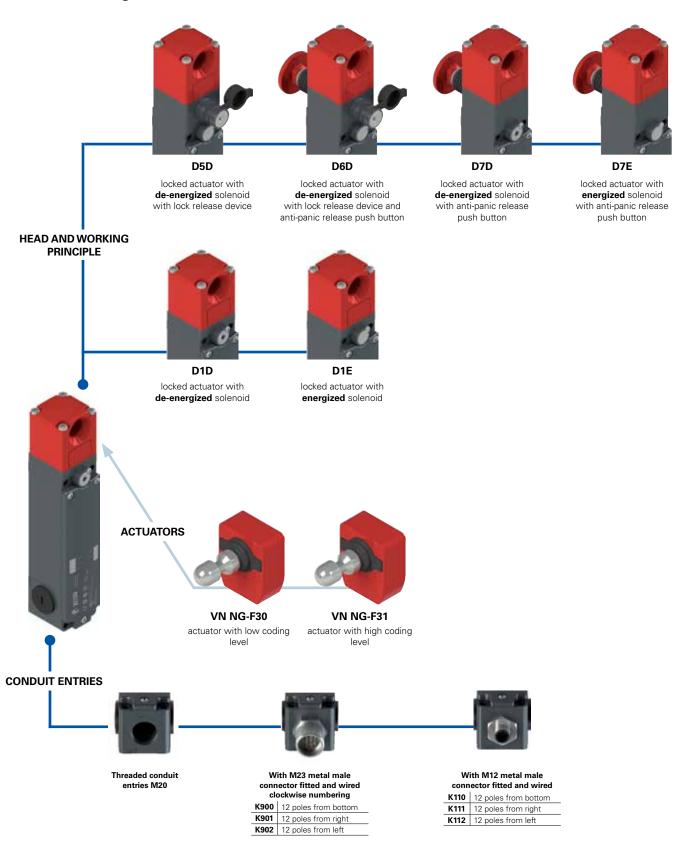
the switch, the lock and the push-button need to be returned to their initial positions.

Non-detachable heads and devices



The head and the release device can be adjusted but cannot be detached from each other. This makes the switch more secure since the installer need not worry about how to assemble the various pieces, and the switch is less likely to become damaged (small parts being lost, dirt getting in etc.).

Selection diagram





Code structure

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

NG 2<u>D1D4</u>11A-<u>F31K900LP30</u>

Working principle				
D1D	locked actuator with de-energized solenoid			
D1E	locked actuator with energized solenoid			
D5D	locked actuator with de-energized solenoid. With lock release device			
locked actuator with de-energized solenoid. With lock release device and anti-panic release push button				
D7D	locked actuator with de-energized solenoid. With anti-panic release push button			
D7E	locked actuator with energized solenoid. With anti-panic release push button			

Inpu	Inputs, outputs and programming						
	safety outputs OS	auxiliary outputs O	safety inputs IS	programming inputs I3	electromagnet activation inputs I4		
4	2	2	2	1	1		

	no connectors (standard)
K110	with M12 metal connector assembled and wired, 12 poles from bottom
K900	with M23 metal connector assembled and wired, 12 poles from bottom
	Other connectors on request

Actuator					
F30	provided with VN NG-F30 actuator with low coding level the switch recognises any type F30 actuator				
F31	provided with VN NG-F31 actuator with high coding level the switch recognises one single actuator				

Preinstalled connectors

Actuator code structure

VN NG-<u>F30</u>

	:			
Actuator				
	F30 actuator with low coding level the switch recognises any type F30 actuator			
	F31	actuator with high coding level the switch recognises one single actuator		



Main data

- Activation without contact using RFID technology
- Actuator coded with a digital code
- Actuator holding force 7500 N
- SIL 3/ PLe/ Cat. 4 with one single device
- Metal housing, three M20 cable inlets
- IP67 and IP69K protection degree
- Versions with lock release and anti-panic release button
- Can be connected in series with up to 32 devices
- Signalling LEDs

Markings and quality marks:



In conformity with standards:

ISO 14119, EN 60947-5-3, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 12100-1, EN ISO 12100-2, IEC 60529, EN 60529, EN 61000-6-2, EN 61000-6-3, BG-GS-ET-19, IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, SN 29500, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 61326-1, EN 61326-3-1, EN 61326-3-2, ETSI 301 489-1, ETSI 301 489-3, ETSI 300 330-2, UL 508

In conformity with requirements requested

Machinery Directive 2006/42/CE Electromagnetic Compatibility 2004/108/CE Directive R&TTE 1999/05/EC FCC Part 15

Connection terminals

Connection system: PUSH-IN type with spring Cross section of solid and flexible leads with

min 1 x 0.34 mm² (1 x AWG 24) max 1 x 1.5 mm² (1 x AWG 16)

Cross section of leads with pre-insulated tips: min 1 x 0.34 mm² (1 x AWG 24)

max 1 x 0.75 mm² (1 x AWG 18) Cable stripping length (x):

min: 8 mm max: 12 mm

Technical data

Housing

Metal housing and head, coated with baked powder.

Three M20x1.5 threaded cable inlets

Protection degree: IP67 according to EN 60529 IP69K according to ISO 20653 with cable clamp having equal or

higher protection degree

General data

For safety applications up to: SIL 3/PLe/Cat.4

Interlock with lock: type 4 according to ISO 14119 Safety parameters:

MTTÉd: 2031 years PFHd: 5.99 E-10 DC: High

from -20°C to +50°C Ambient temperature:

Maximum activation frequency with

actuator lock and release: 600 operation cycles¹/hour Mechanical endurance: 1 million of operations cycles¹

Max actuating speed: 0.5 m/s Min. actuating speed: 1 mm/s Maximum force before breakage F_{1max}

according to ISO 14119 9750 N

Maximum holding force F_{zh}

according to ISO 14119 7500 N Maximum play of locked actuator: 4 mm Extraction force of released actuator: 30 N

(1) One operation cycle means two movements, one to close and one to open contacts, as foreseen by FN 60947-5-1 standard.

Electrical data of IS1/IS2/I3/I4 inputs

Rated operation voltage Ue1: 24 Vdc Rated absorbed current: 5 mA

Electrical data of OS1/OS2 safe outputs

Rated operation voltage Ue1: 24 Vdc

Type of output: OSSD type PNP

Maximum current for le1 output: Category of use: DC12; Ue=24 Vdc, le=0.25 A

Short-circuit detection: Yes Protection against overcurrent: Yes Internal self-resetting protection fuse: Time for deactivation impulses on safe outputs: < 300 µs

Maximum capacity admitted between output and output: < 220 nF Maximum capacity admitted between output and earth: < 200 nF

Electrical data of O3/O4 signalling outputs

Rated operation voltage Ue1: 24 Vdc Type of output: PNP Maximum current for le1 output: 0.1 A

Category of use: DC12; Ue=24 Vdc, le=0.1 A

Short-circuit detection: Nο Protection against overcurrent: Yes 1.1 A Internal self-resetting protection fuse:

RFID sensor data

Assured operating distance S_{ao}: $2 \text{ mm} \pm 10\%$

Assured release distance S_{ar}: 4 mm (actuator not locked) 7 mm (actuator locked)

Rated intervention distance S_a: 2, 5 mm Repeatability precision: ≤ 10 % S ≤ 20 % S Differential travel: Maximum switching frequency: 1 Hz

Electrical data

Rated operation voltage Ue: 24 Vdc ±10% SELV

Operation current at Ue voltage:

40 mA - minimum: - with electromagnet activated: 0.4 A

- with electromagnet activated and all outputs at maximum power: 1.2 A

Rated insulation voltage Ui: 32 V Rated impulse withstand voltage U_{imp}: 1.5 kV External protection fuse: 1.5 A type F

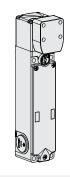
Overvoltage category:

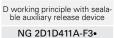
1 million operation cycles Electrical life:

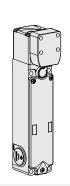
Solenoid insertion ratio: 100% ED Electromagnet consumption: 9 W



Switch with actuator selection table

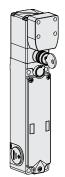






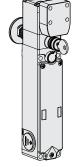
E working principle

NG 2D1E411A-F3•



Working principle D, supplied with lock release

NG 2D5D411A-F3•

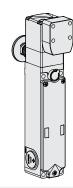


Working principle D, supplied with lock release and anti-panic release button

NG 2D6D411A-F3•



Working principle D, supplied with anti-panic release button



Working principle E, supplied with anti-panic release button

NG 2D7D411A-F3• NG 2D7E411A-F3•

Switch selection table

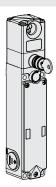


Working principle D, supplied with sealable auxiliary release and without actuator

NG 2D1D411A



Working principle E, supplied without actuator
NG 2D1E411A

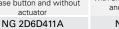


Working principle D, supplied with lock release and without actuator

NG 2D5D411A



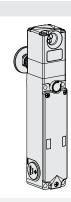
Working principle D, supplied with lock release, anti-panic release button and without actuator





Working principle D, supplied with anti-panic release button and without actuator

NG 2D7D411A



Working principle E, supplied with anti-panic release button and without actuator

NG 2D7E411A

Actuator selection table



Type of coding	Level coding according to ISO 14119	Article
coded	low	VN NG-F30
univocally coded	high	VN NG-F31

The RFID technology featured in the NG series devices allows them to be used in a wide variety of applications. Pizzato Elettrica makes two different versions of actuators available in order to best suit specific requirements. The type F30 actuators are all coded with the same code. This implies that a device associated with a type F30 actuator can be activated by means of other type F30 actuators.

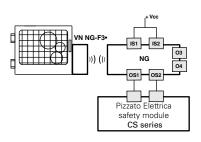
The type F31 actuators are always coded differently. This implies that a device associated with a type F31 actuator can only be activated by one specific actuator. Another F31 type actuator will not be recognised until a new association procedure is carried out (reprogramming). After reprogramming, the old F31 actuator will no longer be recognised.

Sensors used for safety applications

The redundant internal structure of the NG series switch meets the characteristics requested by the EN ISO 13489-1 and IEC 62061 standards, allowing a single device to be used even in circuits of category 4, PLe and SIL 3. Its high diagnostic cover and high MTTF for each single channel make it possible for the switch not to lose its safety function even in the case of one single anomaly. These are the reason why the switch can be used in series, while maintaining the PLe safety level, as long as it is connected to an appropriate module which controls its correct operation.

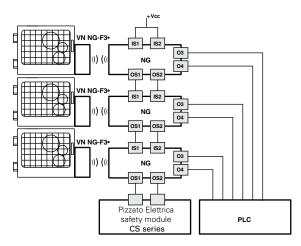
Complete safety system

The use of complete solutions and heads provides the customer with assurance of electrical compatibility between the NG series switch and the Pizzato Elettrica safety modules, guaranteeing greater reliability. In fact, these sensors have been checked for operating with the modules specified in the table on the side.

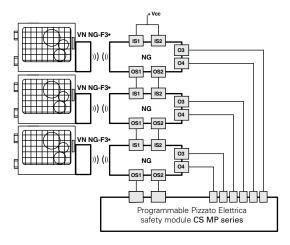


Switches	Compatible safety modules	Safety m Safety instantaneous contacts	odule output of Safety delayed contacts	Signaling contacts
	CS AR-05•••• CS AR-06•••• CS AR-08••••	3NO 3NO 2NO	/ / /	1NC 1NC /
NG 2•••411A	CS AT-0•••• CS AT-1•••• CS MP••••• CS MF•••••		2NO 2NO 63 / of the gene 69 / of the gene	

The NG series switch can be used individually, prior evaluation of the safe outputs by means of a Pizzato Elettrica safety module (see table for safety modules to be combined).

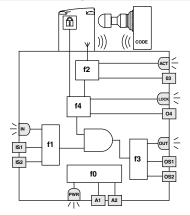


Possible connection in series of several switches in order to simplify the safety system wiring, prior evaluation of the outputs of the last switch in the chain by means of a Pizzato Elettrica safety module (see table for safety modules to be combined). Each NG series switch is provided with two signalling outputs which are activated when the guard is closed (O3) or locked (O4). This piece of information can be managed by a PLC, depending on the specific requirements of the system installed.



Possible connection in series of several switches in order to simplify the safety system wiring, prior evaluation of the outputs of the last switch in the chain by means of a Pizzato Elettrica CS MP safety module, which allows management of the safety function as well as the signalling function.

Internal diagram



The diagram on the side represents the 5 logic functions which interact inside the device.

Function F0 is a global function which deals with the device power supply and the internal tests which it cyclically undergoes.

The task of function f1 is to evaluate the status of the device inputs, whereas function f2 checks the presence of the actuator inside the switch intervention areas.

Function f4 checks the actuator lock condition.

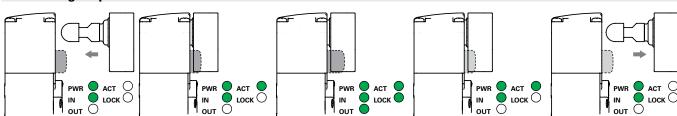
Function f3 is intended to activate or otherwise the safe outputs and check for any faults or short circuits in the outputs.

The macro-function which combines the functions that have just been described gets the safe outputs to activate only in the presence of active inputs, with the actuator in the safe area and after the actuator has been locked.

The status of each function is displayed by the corresponding LED (PWR, IN, ACT, LOCK, OUT), in such a way that the general device status becomes immediately obvious to the operator.



Activating sequence



The switch is supplied with power (PWR LED on, green), the IS1 and IS2 inputs are enabled (IN LED on, green), the OS1 and OS2 safety outputs are disabled (OUT LED off). The actuator is outside the activation area (ACT LED off).

When the actuator is brought inside the safe activation area (dark grey area), the switch turns on the ACT LED (green). In this position, the O3 door-closed signalling output is activated. The actuator is not locked (LOCK LED off).

The I4 input can be used to lock the actuator (LOCK LED on, green). The OS1 and OS2 safe outputs are enabled (OUT LED on, green). The O4 signalling output is activated at the same time. The safe activation area is extended in order to allow greater play for the actuator.

The I4 input can be used to unlock the actuator (LOCK LED off). The switch disables the OS1 and OS2 safety outputs and turns off the OUT LED. The O4 signalling output is deactivated at the same time. The safe activation area returns to the initial values.

When the actuator leaves the activation limit area, the device turns off the ACT LED and the O3 signalling output.

Operation status

PWR LED	IN LED	OUT LED	ACT LED	LOCK LED	Device status	Description
0	0	0	0	0	OFF	Device switched off.
					POWER ON	Internal tests on activation.
•	0	0	*	*	RUN	Device with safe inputs not active.
•		*	*	*	RUN	Activation of safe inputs.
•		0	*	*	RUN	Non-coherence of safe inputs. Recommended action: check for presence and/or wiring of inputs.
•	*	*	•	*	RUN	Actuator in safe area. O3 signalling output active.
•	*	*	•	•	RUN	Actuator in safe area and locked; O3 and O4 outputs active.
•	•	•	•	•	RUN	Activation of the IS1 and IS2 safe inputs. Actuator in safe area and locked; O3, OS1, OS2 and O4 outputs active.
•	*	•	*	*	ERROR	Error on safe outputs. Recommended action: check for any short circuits between the outputs, outputs and earth or outputs and power supply, then restart the device.
•	*	*		*	ERROR	Actuator detection error. Check for physical integrity of the device, if faulty replace the entire device. If undamaged, realign the actuator with the switch and restart the device.
•	*	0	*	*	ERROR	Internal error. Recommended action: restart the device. If the fault persists, replace the device.

Legend: \bigcirc = off \blacksquare = on $\widehat{\widehat{\blacksquare}}$ = blinking \blacksquare = alternate colours \bigstar = indifferent

Signalling LEDs

The Pizzato Elettrica NG series switches feature 5 status signalling LEDs. The purpose of these LEDs is to help to understand the operation of the actual device.

LEDs	Function		
PWR power supply/self-diagnos			
IN	safe input status		
OUT safe output status			
ACT	actuator status		
LOCK	actuator lock status		

NG Series RFID safety switches with block

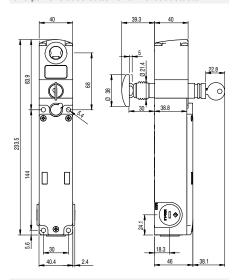
Dimensional drawings

Switch NG 2D1D411A

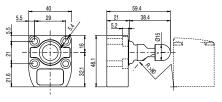
Working principle D, supplied with sealable auxiliary release and without actuator

Switch NG 2D6D411A

Working principle D, supplied with lock release, anti-panic release button and without actuator

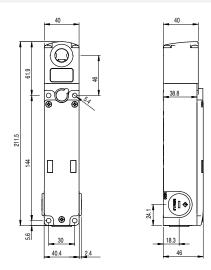


Actuator VN NG-F3•



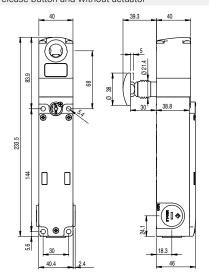
Switch NG 2D1E411A

Working principle E, supplied without actuator



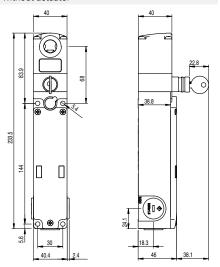
Switch NG 2D7D411A

Working principle D, supplied with anti-panic release button and without actuator



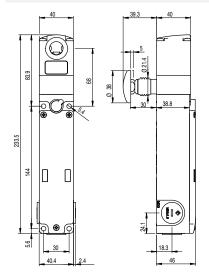
Switch NG 2D5D411A

Working principle D, supplied with lock release and without actuator



Switch NG 2D7E411A

Working principle E, supplied with anti-panic release button and without actuator



Internal connections

Internal terminal board	M23 male connector	M12 male connector	Connec	etion
1	3	3	A2	Power supply input 0 V
2	/	/	B2	Auxiliary power supply 0 V
3	10	10	14	Electromagnet activation input
4	5	5	03	Signalling output for actuator switched on
5	9	9	04	Signalling output for actuator switched on and locked
6	8	8	13	Actuator programming input
10	1	1	A1	Power supply input +24 Vdc
11	/	/	B1	Auxiliary power supply +24 Vdc, 0.3 A max
12	2	2	IS1	Safe input
13	6	6	IS2	Safe input
15	4	4	OS1	Safe output
16	7	7	OS2	Safe output







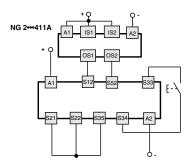
Warning: terminals 7, 8, 9, 14, 17 and 18 must not be used.



Wiring with safety modules

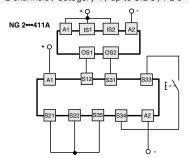
Wiring with safety modules CS AR-08 ••••

Input configuration with monitored start 2 channels / Category 4 / up to SIL 3 / PL e



Wiring with safety modules CS AT-0 •••• / CS AT-1 •••••

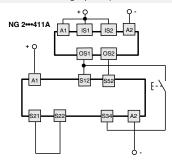
Input configuration with monitored start 2 channels / Category 4 / up to SIL 3 / PL e



Wiring with safety modules CS AR-05 •••• / CS AR-06 ••••

Input configuration with manual start (CS AR-05••••) and monitored start (CS AR-06••••)

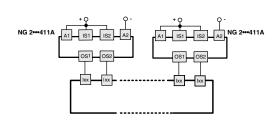
2 channels / Category 4 / up to SIL 3 / PL e



Wiring with safety modules CS MF••••0, CS MP••••0

The connections vary according to the program of the module

Category 4/ up to SIL 3 / PL e



Safety screws bits



Bits for tamper-resistant safety screws, ¼" drive.

Article	Description
VF VAIT1T25	Bits for tamper-resistant Torx T25, M5 screw

Safety screws

10 pcs packs



These new screws have tamperresistant Torx buttonheads.

Devices fixed with this kind of screws cannot be removed or tampered by common tools.

Stickers for anti-panic release button



Polycarbonate yellow adhesive, rectangular 300x32 mm, red writing. Applied on the jamb internal part it helps finding the emergency release push button.

Article	Description
VF AP-A1AGR01	PREMERE PER USCIRE
VF AP-A1AGR02	PUSHTO EXIT
VF AP-A1AGR04	ZUM OFFNEN DRUCKEN
VF AP-A1AGR05	POUSSER POUR SORTIR
VF AP-A1AGR06	PULSAR PARA SALIR
VF AP-A1AGR07	НАЖАТЬ ДЛЯ ВЫХОДА
VF AP-A1AGR08	NACISNĄĆ ABY WYJŚĆ
VF AP-A1AGR09	PRESSIONAR PARA SAIR

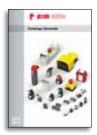
Article	Description
VF VAM5X20BX-X	M5X20 screw, tamper-resistant Torx T25, AISI 304
VF VAM5X25BX-X	M5X25 screw, tamper-resistant Torx T25, AISI 304

Extensions for release push-button

Article	Description	Drawing
VN NG-LP30	Metal extension for release push-button. For max wall thickness of 30 mm.	11 10 20
VN NG-LP40	Metal extension for release push-button. For max wall thickness of 40 mm.	11 M10 30
VN NG-LP60	Metal extension for release push-button. For max wall thickness of 60 mm.	11 10 10 50

Metal extensions can be combined together until the required length is obtained. Do not exceed an overall length of 500 mm between the release button and the switch.

Items with code on the ${\bf green}$ background are available in stock



General Catalog



Production program



EROUND brochure



LIFT General Catalog



DVD



Web site www.pizzato.com



Pizzato Elettrica s.r.l. ViaTorino, 1 - 36063 Marostica (VI) Italy Phone +39.0424.470.930 - Fax +39.0424.470.955 E-mail: info@pizzato.com - Web site: www.pizzato.com

