RFID Safety switch with solenoid
NS series

Description

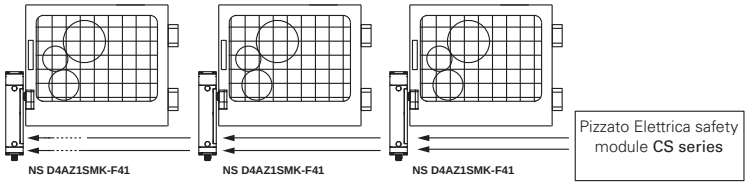
These switches are used on machines where the hazardous conditions remain for a while, even after the machines have been switched off, for example because of mechanical inertia of pulleys, saw disks, parts under pressure or with high temperatures. They can also be used when it is necessary to control machine guards allowing the opening of protections only under specific conditions. The mode 1 (active safety outputs with closed and locked guard) versions are considered interlocks with locking in accordance with EN ISO 14119, and the product is marked on the side with the symbol shown.

Maximum safety with a single device

PL e + SIL 3 Constructed with redundant electronic technology, the NS series switches make it possible to create circuits having maximum PL e and SIL 3 safety levels by installing 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 safety module with OSSD inputs or to a safety PLC.

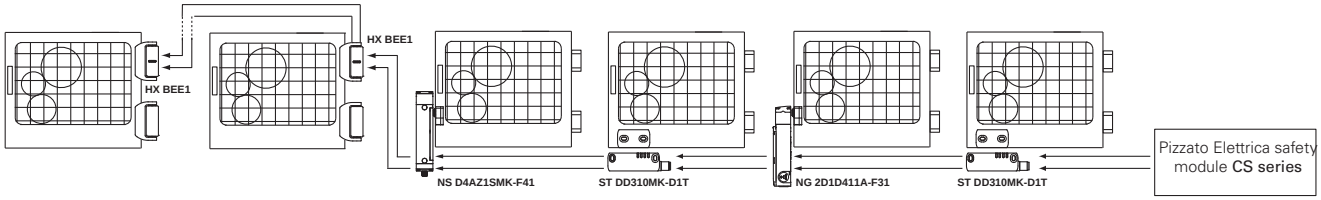
Connection of several switches in series

PL e + SIL 3 One of the most relevant features of the NS series is the optional connection in series of several switches, up to a maximum number of 32 devices, while maintaining the maximum PL e safety level prescribed by the EN 13849-1 standard and the SIL 3 safety level according to the EN 62061 standard.
This connection method is permitted in safety systems which, at the end of the chain, feature a safety module evaluating the outputs of last NS switch. The fact that the PL e safety level can be maintained even with 32 switches connected in series indicates the presence of an extremely safe structure inside each individual device.



Series connection with other devices

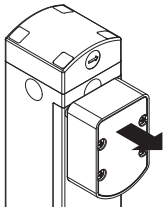
PL e + SIL 3 The NS series features two safe inputs and two safe outputs, which can be connected in series with other Pizzato Elettrica safety devices. This option allows the creation of safety chains containing various devices, for example the creation of circuits with connections in series, including stainless steel safety hinges (HX BEE1 series), RFID sensors (ST series) and door lock sensors (NS series), while maintaining maximum PL e and SIL 3 safety levels.



RFID actuators with high coding level

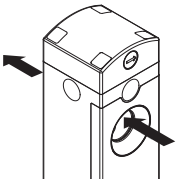
The NS series features an electronic system based on RFID technology to detect the actuator. This system gives a different coding to each actuator and makes it impossible to tamper with a device by using another actuator belonging to the same series. The actuators may have millions of different coding combinations, and are therefore classified as actuators with a high coding level, according to EN ISO 14119.

Holding force of the locked actuator



2100 N The sturdy interlocking system guarantees the actuator a maximum holding force F_{1max} of 2100 N.

Dustproof

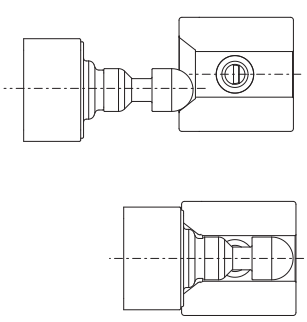


The switch is provided with a through hole for inserting the actuator and, thanks to this peculiarity, any dust which may go inside the actuator hole can always come out of the opposite side instead of being left there. Moreover, the lock pin is provided with an external diaphragm gasket which makes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

Modularity

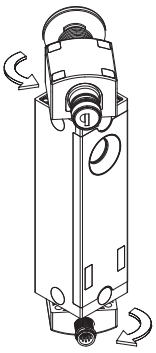
The innovative design of release devices allows different combinations of front and rear release, with key or screw devices and emergency pushbuttons when needed.
The connection interface is also highly flexible: both cable and connector outputs are available, at the bottom or on the side of the switch.

Centering



The switch is provided with a wide centering 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.

Orientable / not detachable head and devices

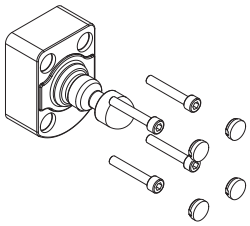


The upper and lower modules of the switch, incorporating the release devices and the connection outputs respectively, are steerable and no-removable. Loosing the fixing screws, the modules can be rotated in 90° steps, thus obtaining different combinations with the same item. The installer does not need to worry about how to assemble the pieces.
Plug-in protection caps are provided for the fixing screws, in order to prevent the accumulation of dirt and keep the switch clean.

Six LEDs for immediate diagnosis

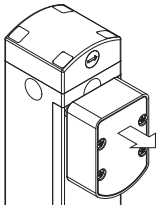
As the LEDs have been designed for quick immediate diagnosis, the status of each input and output is highlighted by one specific LED. This makes it possible to quickly identify the interruption points in the safe chain, which device is released, which door is opened and any errors inside the device.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

Anti-tampering safety



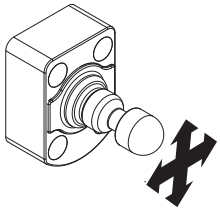
Each actuator of the NS series is provided with four plug-in protections caps. These caps not only prevent the accumulation of dirt and keep the actuator clean, but also protect the fastening screws against tampering. Therefore, standard screws can be used instead of tamper-proof screws.

Holding force of the unlocked actuator



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 with a retaining force of 20 N~, stopping any vibrations or gusts of wind from opening them.

Articulated joint for inaccurate doors



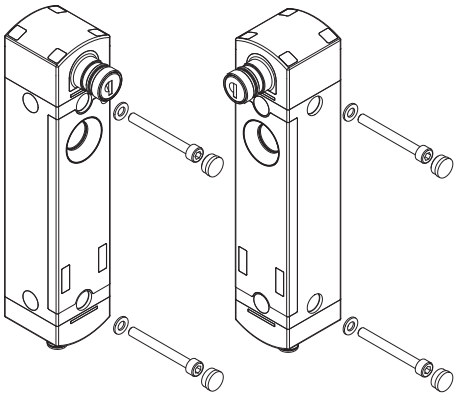
All the NS series actuators are jointed and allow the pin to match the centering hole of the switch. This way there is no need for precise actuator-switch aligning operations during the fitting stage. Moreover, thanks to its flexibility, this device can be used on doors with an activating range of 150 mm, without having to tilt the pin beforehand.

Laser engraving

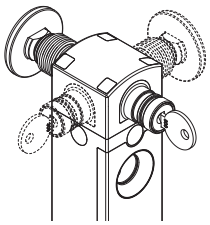
All the NS series switches are indelibly marked with a dedicated laser system that allows the marking to be also suitable for extreme environments. This system that does not use labels, prevents the loss of plate data and the marking is more resistant over time.

Front and side fastening

The cover of the NS switches contains a hole for inserting the pin of the actuator, thus creating a robust single body with holes for a front or side fastening.
This solution makes it easier to fasten the switch sideways if needed: the switch is fixed straight on the surface, without any additional operation such as rotating the module where the actuator is to be inserted. The fixing holes can then be sealed with the protection caps supplied, in order to avoid any possible accumulation of dirt and prevent tampering.



Key release device and emergency release button



The auxiliary lock release device is used to permit unlocking of the actuator only by personnel in possession of the key. It also works with no power supply and once actuated, prevents the guard from locking.
The emergency release button allows actuator release and immediate opening of the door. Generally used in machines within which an operator could inadvertently become trapped, it faces towards the machine interior, to allows the operator to exit even in the event of a black out. Equipped with bistable function, it can be freely extended with suitable extensions (see accessories).
Both these devices can be positioned on the four switch sides, thus allowing its installation both to the interior and to the exterior of the machine.

High protection degree

IP69K
IP67

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to IEC 60529. They can therefore be used in all environments where the maximum protection of the housing is required. Special measures also allow devices to be used even in machines which are subjected to washing with high pressure warm water jets. In fact these devices pass the IP69K test according to ISO 20653, using jets of water to 100 atmospheres at a temperature of 80°C.

Two safety output actuation modes

CLOSED
OR
CLOSED & LOCK

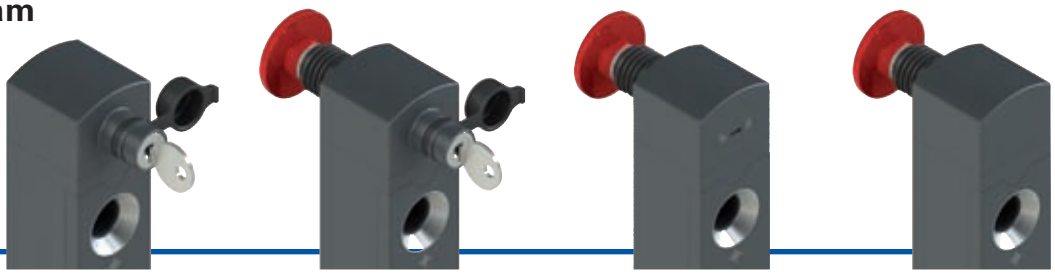
The switch can be selected from two different safety output activation modes: safety outputs active with protection closed and locked (mode 1) for machines with inertia or safety outputs active with protection closed (mode 2) for machines without inertia.

External device monitoring

EDM

On request we can supply the device with EDM (External Device Monitoring) function, so that the device itself can check the integrity of the relays connected to the safety outputs. These safety relays or safety contactors send a feedback signal to the EDM input, which verifies the consistency of the received signal with the safety outputs state.

Selection diagram



D•ST
locked actuator with **de-energised** solenoid front key release

D•SE
locked actuator with **de-energised** solenoid front key release and rear emergency pushbutton

D•CE
locked actuator with **de-energised** solenoid front screw release and rear emergency pushbutton

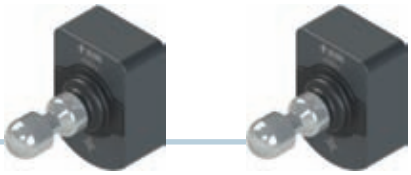
E•TE
locked actuator with **energised** solenoid without front release and with rear emergency pushbutton

D•AZ
locked actuator with **de-energised** solenoid front screw release

E•ZZ
locked actuator with **energised** solenoid

HEAD TYPE AND WORKING PRINCIPLE

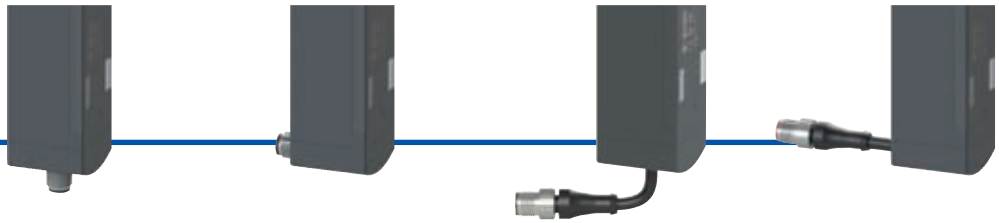
ACTUATORS



VN NS-F40
low level coded actuator

VN NS-F41
high level coded actuator

CONNECTIONS



M12 connector bottom

SMK	12 poles
SPK	8 poles for stand-alone connection
SQK	8 poles for series connection with "Y" connectors

Orientable side M12 connector

DMK	12 poles
DPK	8 poles for stand-alone connection
DQK	8 poles for series connection with "Y" connectors

with cable, length 0.2 m and M12 connector at bottom

SM0.2	12 poles
SP0.2	8 poles for stand-alone connection
SQ0.2	8 poles for series connection with "Y" connectors

with cable, length 0.2 m and orientable side M12 connector

DM0.2	12 poles
DP0.2	8 poles for stand-alone connection
DQ0.2	8 poles for series connection with "Y" connectors

product options

accessory sold separately

Code structure

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

article: **NS D4AZ1SMK** — options: **-F41E36LP30**

Working principle

D	locked actuator with de-energised solenoid mode 1: OS safety outputs active with locked protection
E	locked actuator with energised solenoid mode 1: OS safety outputs active with locked protection
G	locked actuator with de-energised solenoid mode 2: OS safety outputs active with closed protection
H	locked actuator with energised solenoid mode 2: OS safety outputs active with closed protection

Release button length

	for wall thickness max. 15 mm (standard)
LP30	for wall thickness max. 30 mm
LP40	for wall thickness max. 40 mm
LP50	for wall thickness max. 50 mm

Actuator extraction force

	actuator extraction force 20 N (standard)
E36	actuator freely removable

Inputs and outputs

3	2 safety inputs IS1, IS2 2 safety outputs OS1, OS2 1 signalling output O3: closed protection 1 signalling output O4: locked protection 2 solenoid activation inputs IE1, IE2 1 reset input I3 The switch is only available with its actuator
4	2 safety inputs IS1, IS2 2 safety outputs OS1, OS2 1 signalling output O3: closed protection 1 signalling output O4: locked protection 2 solenoid activation inputs IE1, IE2 1 programming / reset input I3
5	2 safety inputs IS1, IS2 2 safety outputs OS1, OS2 1 signalling output O3: closed protection 1 signalling output O4: locked protection 2 solenoid activation inputs IE1, IE2 1 programming / reset input I3 1 EDM input I5

Actuator

F40	low level coded actuator VN NS-F40 the switch recognises any type F40 actuator
F41	high level coded actuator VN NS-F41 the switch recognises one single type F41 actuator

Connection type

K	M12 connector
0.2	cable, length 0.2 m and M12 connector

Cable or connector type

M	M12 metal connector, 12 poles
P	M12 metal connector, 8 poles, for stand-alone connection
Q	M12 metal connector, 8 poles, for series connection with “Y” connectors

Front and rear auxiliary release

AZ	front screw release Working principle D and G only
ST	front key release Working principle D and G only
SE	front key release and rear emergency pushbutton Working principle D and G only
CE	front screw release and rear emergency pushbutton Working principle D and G only
ZZ	without release Working principle E and H only
TE	without front release and with rear emergency pushbutton Working principle E and H only

Output connection direction

D	side cable or connector
S	cable or connector at bottom

Actuator code structure

VN NS-F40

Actuator

F40	low level coded actuator the switch recognises any type F40 actuator
F41	high level coded actuator the switch recognises one single type F41 actuator

Main features

- Actuation without contact, using RFID technology
- Digitally coded actuator
- SIL 3 and PL e also in series of up to 32 devices
- Actuator holding force 2100 N
- SIL 3 and PL e with a single device
- M12 integrated connector connections
- Protection degrees IP67 and IP69K
- Versions with key release and emergency release button
- 6 Signaling LEDs

Markings and quality marks:

CE

In conformity with standards:
EN ISO 14119, EN 60947-5-3, EN 60947-1, IEC 60204-1, EN 60204-1, EN ISO 12100, 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, CSA 22.2 No.14

In conformity with the requirements of:
Machinery Directive 2006/42/EC
EMC Directive 2014/30/CE
RED Directive 2014/53/UE
FCC Part 15

Technical data

Housing
Housing made of glass fiber reinforced technopolymer, self-extinguishing, shock-proof

Protection degree:	IP67 acc. to EN 60529 IP69K acc. to ISO 20653 (Protect the cables from direct high-pressure and high-temperature jets)

General data

SIL level (SIL CL):	up to SIL 3 acc. to EN 62061
Performance Level (PL):	up to PL e acc. to EN ISO 13849-1
Safety category:	up to cat. 4 acc. to EN ISO 13849-1
Coded interlock, no contact, with lock:	type 4 acc. to EN ISO 14119
Level of coding acc. to EN ISO 14119	Low with F40 actuator High with F41 actuator
Safety parameters:	
$MTTF_d$:	2807 years
PFH_d:	5,09 E-10
DC:	High
Mission time:	20 years
Ambient temperature:	-20°C … +50°C
Max. actuation frequency with actuator lock and release:	600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Maximum force before breakage F_{1max}:	2100 N acc. to EN ISO 14119
Max. holding force F_{Zh}:	1615 N acc. to EN ISO 14119
Maximum play of locked actuator:	4 mm
Released actuator extraction force:	~ 20 N

Electrical data of inputs IS1/IS2/I3/IE1/IE2/I5/EDM

Rated operating voltage U_{e1}:	24 Vdc
Rated current consumption I_{e1}:	5 mA

Electrical data of safety outputs OS1/OS2

Rated operating voltage U_{e2}:	24 Vdc
Output type:	OSSD, PNP
Maximum current per output I_{e2}:	0.25 A
Minimum current per output I_{m2}:	0.5 mA
Thermal current I_{th2}:	0.25 A
Utilization category:	DC-13; U_{e2}=24 Vdc, I_{e2}=0.25 A
Short circuit detection:	Yes
Protection against overcurrent:	Yes
Internal self-resetting protection fuse:	1.1 A

Duration of the deactivation impulse at the safety outputs: < 300 µs
Permissible maximum capacitance between outputs: < 200 nF
Permissible maximum capacitance between output and ground: < 200 nF

Electrical data of signaling output O3/O4

Rated operating voltage U_{e3}:	24 Vdc
Output type:	PNP
Maximum current per output I_{e3}:	0.1 A
Utilization category:	DC-13; U_{e3}=24 Vdc, I_{e3}=0.1 A
Short circuit detection:	No
Protection against overcurrent:	Yes
Internal self-resetting protection fuse:	1.1 A

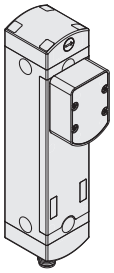
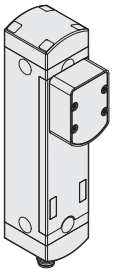
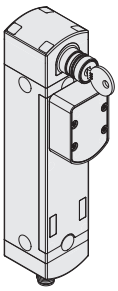
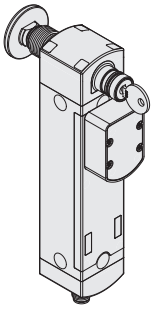
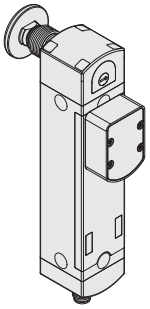
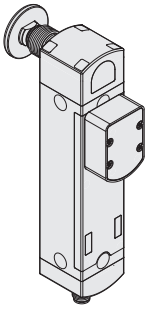
RFID sensor data

Assured operating distance s_{ao}:	2 mm
Assured release distance s_{ar}:	4 mm (actuator not locked) 10 mm (locked actuator)
Rated operating distance s_n:	2.5 mm
Repeat accuracy:	≤ 10 % s_n
Differential travel:	≤ 20 % s_n
Max. switching frequency:	1 Hz

Electrical data

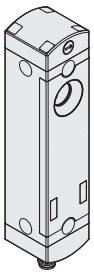
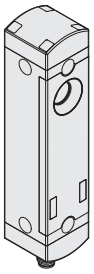
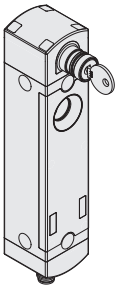
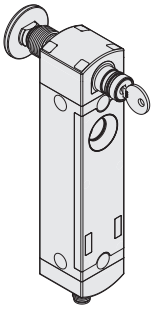
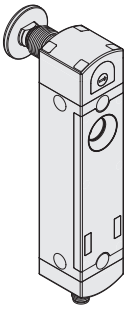
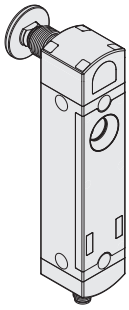
Rated operating voltage U_e SELV:	24 Vdc ±10%
Operating current at voltage U_e:	
- minimum:	40 mA
- with activated solenoid:	0.4 A max
- with activated solenoid and all outputs at maximum power:	1.2 A
Rated insulation voltage U_i:	32 Vdc
Rated impulse withstand voltage U_{imp}:	1.5 kV
External protection fuse:	2 A type gG or equivalent device
Overvoltage category:	III
Electrical endurance:	1 million operating cycles
Solenoid duty cycle:	100% ED
Solenoid consumption:	9 W

Selection table for switches with high level coded actuator

	Working principle: locked actuator with de-energised solenoid. front screw release	Working principle: locked actuator with energised solenoid	Working principle: locked actuator with de-energised solenoid. front key release	Working principle: locked actuator with de-energised solenoid. front key release and rear emergency pushbutton	Working principle: locked actuator with de-energised solenoid. front screw release and rear emergency pushbutton	Working principle: locked actuator with energised solenoid. without front release and with rear emergency pushbutton
Mode 1 OS safety outputs active with locked and closed protection	NS D4AZ1SMK-F41	NS E4ZZ1SMK-F41	NS D4ST1SMK-F41	NS D4SE1SMK-F41	NS D4CE1SMK-F41	NS E4TE1SMK-F41
Mode 2 OS safety outputs active with closed protection	NS G4AZ1SMK-F41	NS H4ZZ1SMK-F41	NS G4ST1SMK-F41	NS G4SE1SMK-F41	NS G4CE1SMK-F41	NS H4TE1SMK-F41

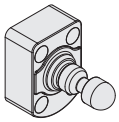
Switch selection table

	Working principle: locked actuator with de-energised solenoid. front screw release	Working principle: locked actuator with energised solenoid	Working principle: locked actuator with de-energised solenoid. front key release	Working principle: locked actuator with de-energised solenoid. front key release and rear emergency pushbutton	Working principle: locked actuator with de-energised solenoid. front screw release and rear emergency pushbutton	Working principle: locked actuator with energised solenoid. without front release and with rear emergency pushbutton
Mode 1 OS safety outputs active with locked and closed protection	NS D4AZ1SMK	NS E4ZZ1SMK	NS D4ST1SMK	NS D4SE1SMK	NS D4CE1SMK	NS E4TE1SMK
Mode 2 OS safety outputs active with closed protection	NS G4AZ1SMK	NS H4ZZ1SMK	NS G4ST1SMK	NS G4SE1SMK	NS G4CE1SMK	NS H4TE1SMK

To purchase a product with side connections replace letter **S** with letter **D** in the codes shown above. Example: NS D4AZ1**S**MK → NS D4AZ1**D**MK
To purchase a product with EDM input replace number **4** with number **5** in the codes shown above. Example: NS D**4**AZ1SMK → NS D**5**AZ1SMK
Legend: interlock with lock monitoring in accordance with EN ISO 14119

Actuator selection table



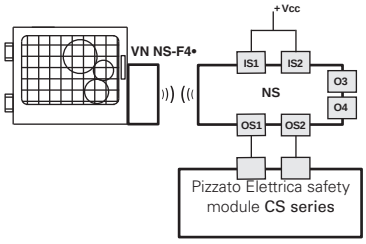
Level of coding acc. to EN ISO 14119	Article
low	VN NS-F40
high	VN NS-F41

The use of RFID technology in NS series devices makes them suitable for several applications. Pizzato Elettrica offers two different versions of actuators, in order to best suit customers' specific needs.
Type F40 actuators are all encoded with the same code. This implies that a device associated with an actuator type F40 can be activated by other actuators type F40.
Type F41 actuators are always encoded with different codes. This implies that a device associated with an actuator type F41 can be activated only by a specific actuator. Another F41 type actuator will not be recognised by the device until a new association procedure is carried out (reprogramming). After reprogramming, the old actuator F41 will no longer be recognized.

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

Complete safety system

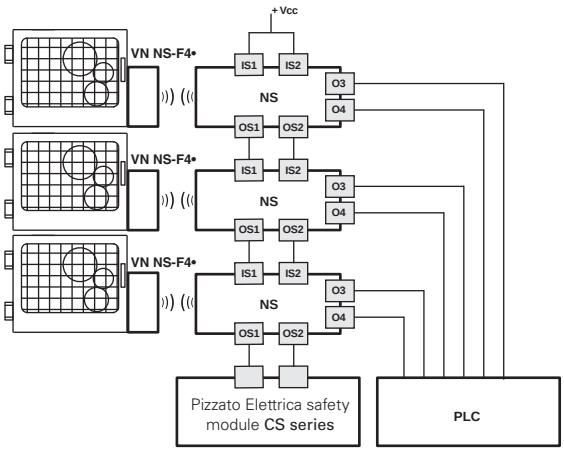
The use of complete tested solutions means that the customer can be certain of the electrical compatibility between the NS series switch and Pizzato Elettrica safety modules, thus ensuring greater reliability. In fact, these sensors have been tested for operation with the modules specified in the table shown on the side.



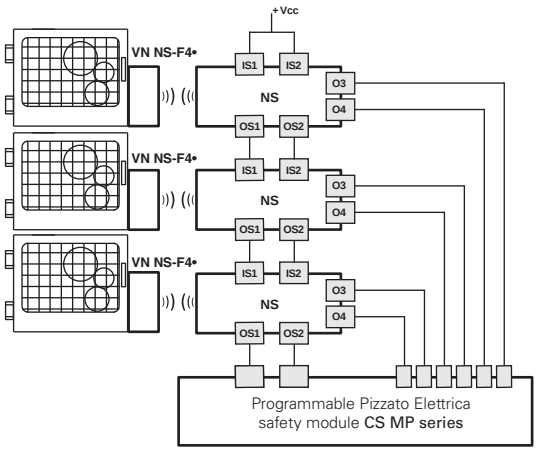
Switches	Compatible safety modules	Safety module output contacts		
		Instantaneous safety contacts	Delayed safety contacts	Signalling contacts
NS ••••1•••	CS AR-05••••	3NO	/	1NC
	CS AR-06••••	3NO	/	1NC
	CS AR-08••••	2NO	/	/
	CS AT-0•••••	2NO	2NO	1NC
	CS AT-1•••••	3NO	2NO	/
	CS MP••••••	page 243 - CATALOGUE SAFETY 2015/16		
	CS MF••••••	page 271 - CATALOGUE SAFETY 2015/16		

Once their compatibility has been verified, all NS series safety switches can generally be connected to safety modules or safety PLCs recognising OSSD input signals.

The NS 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).

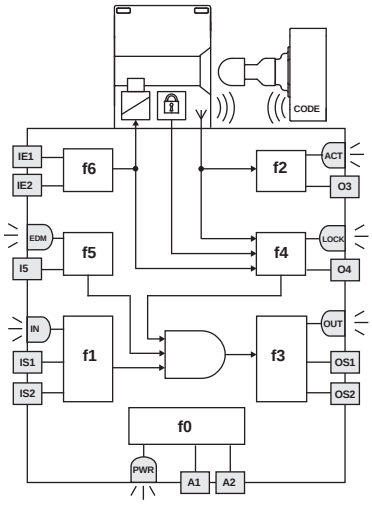


Possible connection in series of several switches in order to simplify the safety system wiring, after evaluating the outputs from the last switch in the chain by means of a Pizzato Elettrica safety module (table for safety modules to be combined). Each NS series switch is provided with two signalling 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, after evaluating the outputs from the last switch in the chain by means of a safety module from Pizzato Elettrica CS MP series, which allows management of both safety and signalling functions.
The examples listed above refer to applications with NS ••••1•••

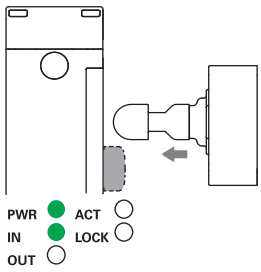
Internal diagram



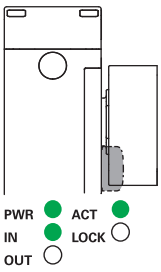
The diagram on the side represents the 7 logic functions which interact inside the device.
Function f0 is a global function which deals with the device power supply and the internal tests which it cyclically undergoes. The task of function f1 is to evaluate the status of the device inputs, whereas function f2 checks the presence of the actuator inside the switch operating areas.
Function f4 checks the actuator lock condition.
Function f3 is intended to activate or deactivate the safety outputs and check for any faults or short circuits in the outputs.
In the EDM versions, the f5 function verifies the consistency of the EDM signal during safety output state changes. The macro-function, which controls the above mentioned functions, enables the safety outputs only in the presence of active inputs, of the actuator within the safe zone, and where locking of the actuator has taken place, for mode 1 switches. For mode 2 switches, the safety outputs enable only in the presence of active inputs and with the actuator within the safe zone. The f6 function checks the consistency of the activation/deactivation signals of the actuator lock command. The status of each function is displayed by the corresponding LED (PWR, IN, OUT, ACT, LOCK, EDM), in such a way that the general device status becomes immediately obvious to the operator.

LED	Function
PWR	power supply/self-diagnosis
IN	status of safety inputs
OUT	status of safety outputs
ACT	actuator state
LOCK	actuator locked
EDM	state of EDM inputs (NS •5••1•••)

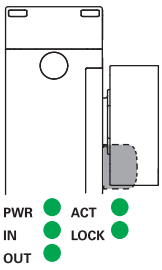
Actuation sequence in mode 1



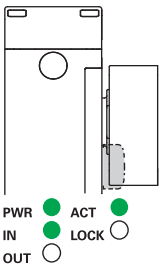
The switch is supplied with power (PWR LED on, green), the IS1 and IS2 inputs are enabled (IN LED on, green), the OS1 and OS2 safety outputs are disabled (OUT LED off). The actuator is on the outside of the activation zone (LED ACT off).



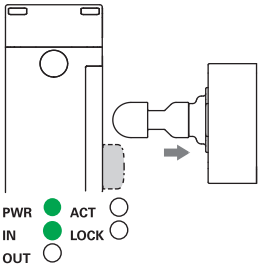
When the actuator is brought inside the safe activation area (dark grey area), the switch turns on the ACT LED (green). In this position, the O3 door-closed signalling output is activated. The actuator is not locked (LOCK LED off).



The IE1 and IE2 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 IE1 and IE2 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.

Actuation sequence in mode 2

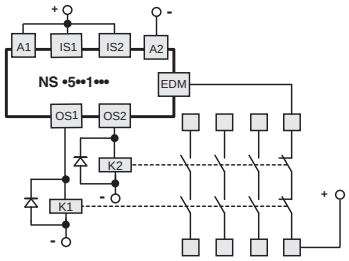
In contrast to the above mode 2 description, the safety outputs OS1 and OS2 enable when the actuator is detected, and disable when the actuator is no longer detectable.

Operating states

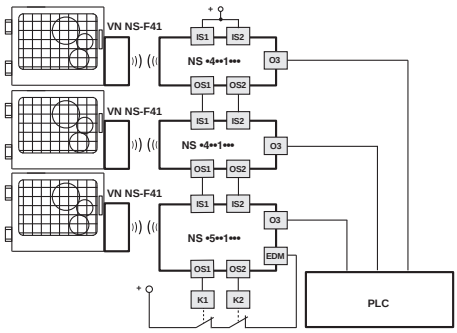
PWR LED	IN LED	OUT LED	ACT LED	LOCK LED	EDM LED (a)	Device status	Description
○	○	○	○	○	○	OFF	Device switched off.
◐	◐	◐	◐	◐	◐	POWER ON	Internal tests upon activation.
●	○	○	✳	✳	●	RUN	Safety inputs of the device not active.
●	●	✳	✳	✳	✳	RUN	Activation of safety inputs.
●	◐	○	✳	✳	✳	RUN	State of the safety inputs not coherent. Recommended action: check for presence and/or wiring of inputs.
●	✳	✳	✳	●	✳	RUN	Inconsistency of the electromagnet activation inputs IE1, IE2. Recommended action: check the presence of the inputs and/or their wiring.
●	✳	✳	✳	◐	✳	RUN	Auxiliary release activated. Deactivate the auxiliary release in order to lock the actuator
●	✳	✳	●	✳	✳	RUN	Actuator in safe area. O3 signalling output active.
●	✳	✳	●	●	○	RUN	Actuator in safe area and locked; O3 and O4 outputs active.
●	●	●	●	●	○	RUN	**Mode 1** Activation of safety inputs IS1, IS2. Actuator in safe area and locked. O3, O4, OS1 and OS2 outputs active.
●	●	●	●	✳	○	RUN	**Mode 2** Activation of safety inputs IS1, IS2. Actuator in safe area. O3, OS1 and OS2 outputs active.
◐	✳	✳	✳	✳	✳	RUN	Quick flashing: too high supply voltage Slow flashing: temperature out of range
●	✳	●	✳	✳	✳	ERROR	Error on safety outputs. Recommended action: check for any short circuits between the outputs, outputs and ground 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.
●	○	○	○	○	○	ERROR	Internal error. Recommended action: restart the device. If the fault persists, replace the device.
●	✳	○	✳	✳	●	RUN	EDM signal active (external relay off)[a]
●	●	●	●	●	○	RUN	EDM signal not active (external relay on)[a]
●	○	○	○	○	●	ERROR	Error in function EDM[a]

Legend: ○ = off ● = on ● = blinking ◐ = alternating colours ✳ = indifferent (a) Available only in versions NS •5••1•••

External device monitoring (EDM)



The NS •5••1••• version, in addition to maintaining the operating and safety characteristics of the NS series, allows control of **forcibly guided NC contacts of contactors or relays** controlled by the safety outputs of the switch itself. As an alternative to the relays or contactors you can use Pizzato Elettrica expansion modules CS ME-03. See page 235 - CATALOGUE SAFETY 2015/16. This check is carried out via the EDM input (External Device Monitoring as defined in EN 61496-1) of the switch.

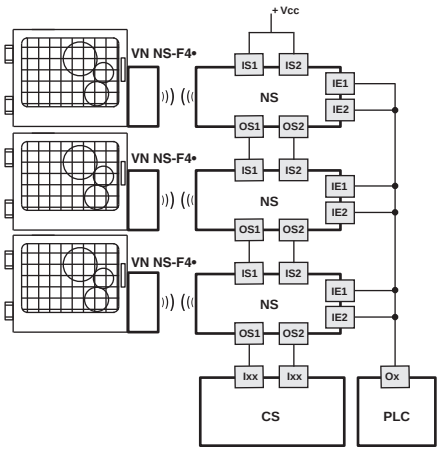


This version, with the IS safety inputs, **can be used at the end of a series** of NS switches, **up to a maximum number of 32 devices**, while maintaining the maximum PL e safety level and acc. to EN ISO 13849-1 and SIL 3 safety level acc. to EN 62061.
This solution allows you to dispense with the safety module connected to the last device in the chain. If present, the EDM function must be used.

Connection of several switches in series

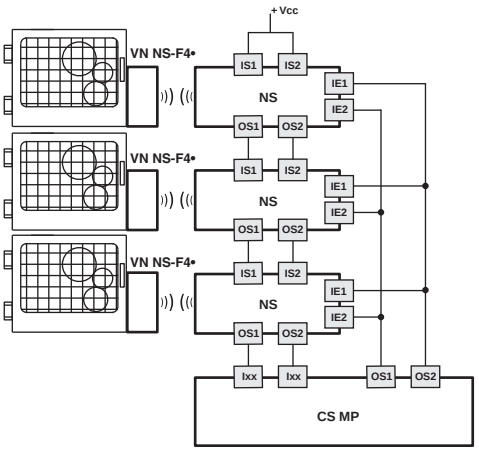
Interlocking function (closed guard)
2 channels / Category 4 / up to SIL 3 / PL e

Locking function (locked guard)
1 channel / Category 2 /up to SIL 2 / PL d



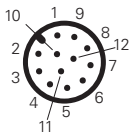
Interlocking function (closed guard)
2 channels / Category 4 / up to SIL 3 / PL e

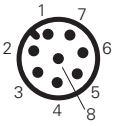
Locking function (locked guard)
2 channels / Category 4 / up to SIL 3 / PL e

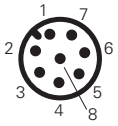


Internal connections

M12 connector 12 poles	M12 connector 8 poles stand-alone connection	M12 connector 8 poles series connection with "Y" connectors	Connection	
3	3	3	A2	0 V supply input
10	8	8	IE1	Solenoid activation input
12	5	/	IE2	Solenoid activation input
5	2	/	O3	Signalling output, actuator inserted
9	/	5	O4	Signalling output, actuator inserted and locked
8	6	/	I3	Actuator programming / reset input
1	1	1	A1	+24 Vdc supply input
2	/	2	IS1	Safety input
6	/	6	IS2	Safety input
11	/	/	I5	EDM input (a)
4	4	4	OS1	Safety output
7	7	7	OS2	Safety output







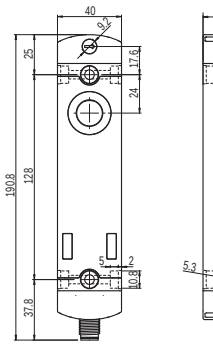
(a) Available only in version NS •5••1•••

Sockets See page 287 - CATALOGUE SAFETY 2015/16

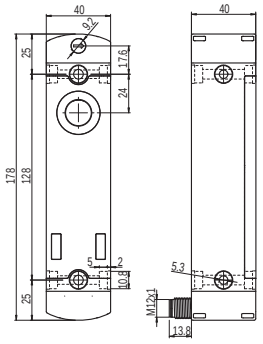
Dimensional drawings

All measures in the drawings are in mm

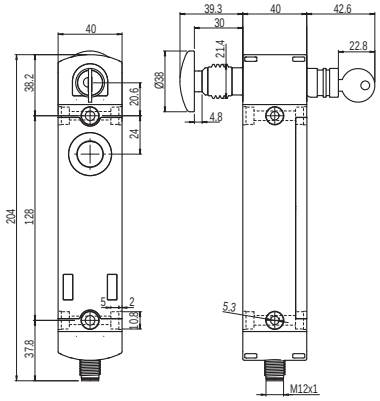
Switch
NS ••AZ1SMK
NS ••ZZ1SMK



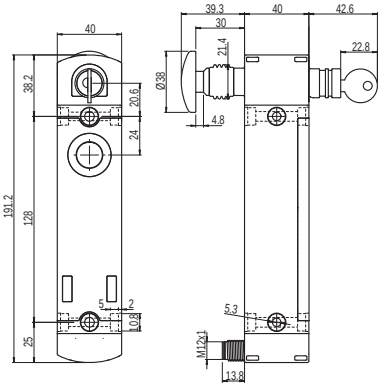
Switch
NS ••AZ1DMK
NS ••ZZ1DMK



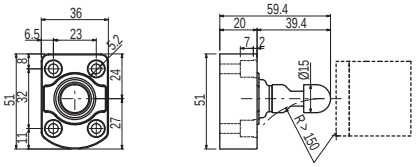
Switch
NS ••ST1SMK
NS ••SE1SMK
NS ••CE1SMK
NS ••TE1SMK



Switch
NS ••ST1DMK
NS ••SE1DMK
NS ••CE1DMK
NS ••TE1DMK



Actuator VN NS-F4•

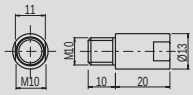
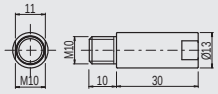
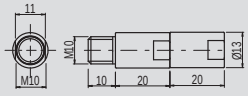
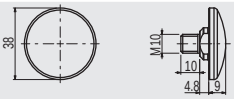


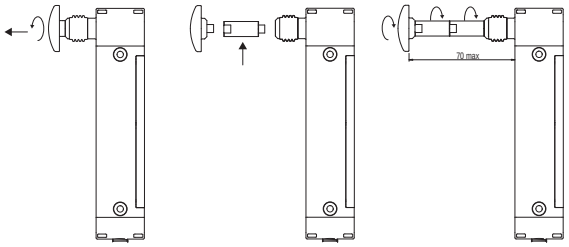
Accessories

Article	Description
VF KLB300	Set of two locking keys

Extra copy of the locking keys to be purchased if further keys are needed (standard supply 2 units).
The keys of all switches have the same code. Other codes on request.

Extensions for release button

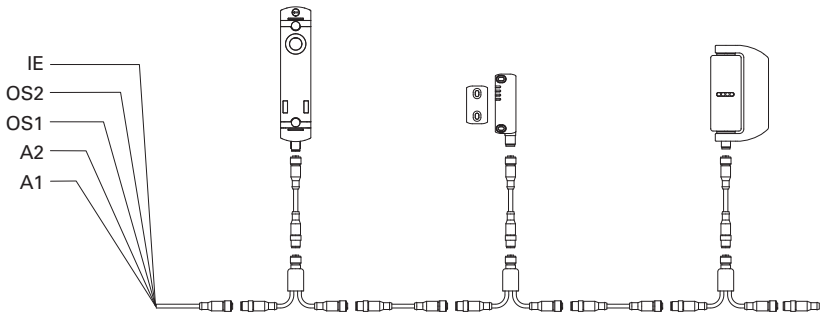
Article	Description	Drawing
VN NG-LP30	Metal extension for release button. For max. wall thickness of 30 mm	
VN NG-LP40	Metal extension for release button. For max. wall thickness of 40 mm	
VN NG-LP50	Metal extension for release button. For max. wall thickness of 50 mm	
VN NG-ERB	Metal release button	



Metal extensions can be combined together until the required length is obtained. Do not exceed an overall length of **70 mm** between the release button and the switch.

Series connection

To simplify serial connections, a series of M12 connectors are available that allow complete wiring.
This solution significantly reduces installation times, whilst maintaining the maximum PL e and SIL 3 safety levels of the interlocking function.
For further information see page 290 - CATALOGUE SAFETY 2015/16.



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

Accessories See page 287 - CATALOGUE SAFETY 2015/16

General Catalogue
Detection

General Catalogue
HMI

General Catalogue
Safety

General Catalogue
LIFT

DVD

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