

Description



These switches are used mainly on machines where the hazardous conditions persist even after the machine has been switched off. Mechanical parts such as pulleys, saw blades, etc., could continue to move after the machine is switched off or could still be hot or under pressure. Thus, the switches can also be used if individual guards are only to be opened under certain conditions. Versions with mode 1 (safety outputs active when guard closed and locked) are interlocks with guard locking acc. to ISO 14119; the product is labelled with the symbol shown.



Maximum safety with a single device

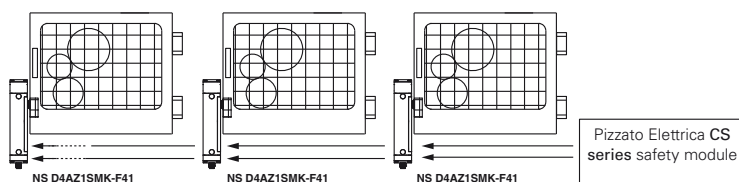
PL e + SIL 3 The NS series switches are constructed with redundant electronics. As a result, the maximum PL e and SIL 3 safety levels can still be achieved through the use of a single device on a guard. This avoids expensive wiring in the field and allows faster installation. Inside the control cabinet, the two electronic safety outputs must be connected to a safety module with OSSD inputs or to a safety PLC.

Series connection of several switches

PL e + SIL 3 One of the most important features of the NS series is the possibility of connecting up to 32 sensors in series, while still maintaining the maximum safety levels PL e laid down in EN 13849-1 and SIL 3 acc. to EN 62061.

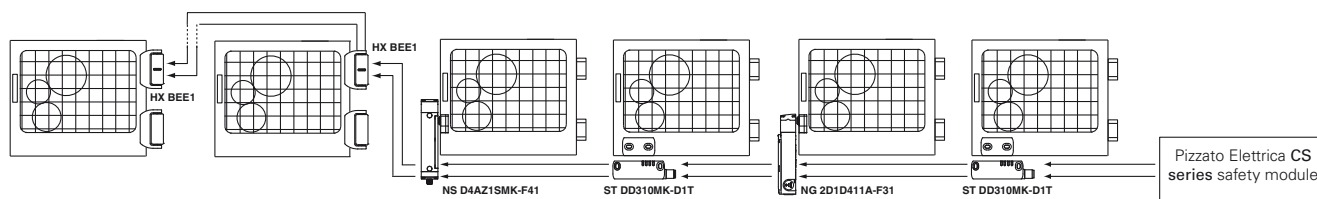
This connection type is permissible in safety systems which have a safety module at the end of the chain that monitors the outputs of the last NS switch.

The fact that the PL e safety level can be maintained even with 32 sensors connected in series demonstrates the extremely secure structure of each single device.



Series connection with other devices

PL e + SIL 3 The NS series features two safety inputs and two safety 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, stainless steel safety hinges (HX BEE1 series), RFID sensors (ST series) and door lock sensors (NG series) can be connected in series while still maintaining the maximum PL e and SIL 3 safety levels.

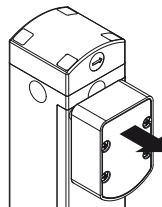


RFID actuators with high coding level



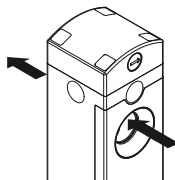
The NS series is provided with an electronic system based on RFID technology to detect the actuator. This allows to provide each actuator with different coding and makes it impossible to tamper with a device by using another actuator of the same series. Millions of different coding combinations are possible for the actuators. They are therefore classified as high level coded actuators, according to EN ISO 14119.

Holding force of the locked actuator



2100 N The strong interlocking system guarantees a maximum actuator holding force of $F_{1max} = 2100 \text{ N}$.

Dustproof

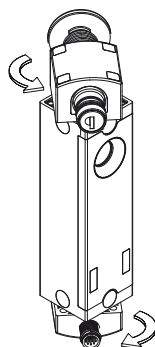


The switch is provided with a through hole for inserting the actuator. Thanks to this unique feature, any dust that enters the actuator hole can always come out on the opposite side instead of remaining inside. Moreover, the lock pin is provided with a diaphragm seal, making the system suitable for critical environments with a high level of dust.

Modularity

The innovative design of the auxiliary releases makes possible a wide range of combinations of auxiliary releases with lock, emergency release buttons or screwdriver releases with front and rear mounting. The electrical connection is also highly flexible: outputs are available with cables as well as with connectors, which can be oriented axially or laterally.

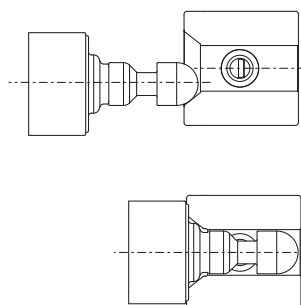
Head and release devices with variable orientation, not detachable



The upper part of the switch, which contains the release devices, can be rotated and is permanently connected to the lower part, which contains the outputs for the electrical connection. After loosening the fastening screws, the individual modules can be rotated in 90° steps. As a result, a single device can be used to realise various configurations without the installation technician needing to concern himself with the correct assembly of various parts.

The fastening screws are provided with protective caps to prevent dirt build-up and thereby simplify cleaning.

Centring



The switch is provided with a wide centring inlet for the actuator pin. This solution makes it easier to align the actuator and the opening hole on the head during installation. Moreover, this solution drastically reduces the probability of a collision between the switch and the actuator, making it possible to install the device even on inaccurately closing doors.

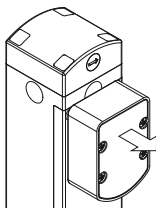


Six LEDs for immediate diagnosis



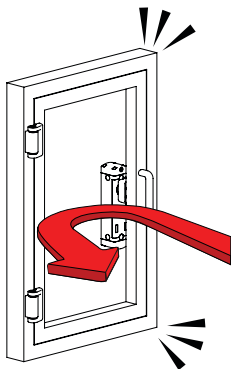
As the LEDs have been designed for quick immediate diagnosis, the status of each input and output is highlighted by one specific LED. This makes it possible to quickly identify the interruption points in the safety chain, which device is released, which door is opened and any errors inside the device.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

Holding force of the unlocked actuator



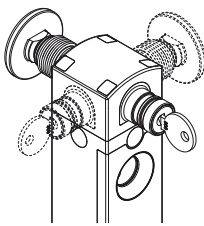
The inside of each switch features a device which holds the actuator in its closed position. Ideal for all those applications where several doors are unlocked simultaneously, but only one is actually opened. The device keeps all the unlocked doors in their position with a retaining force of 20 N~, stopping any vibrations or gusts of wind from opening them.

Function for protecting against recoil forces



If a door is closed too quickly or with so much force that the recoil would cause it to open again, a special function in the NS switch prevents locking. This function prevents the immediate locking of the door if the lock signal is applied. This protects the switch against recoil forces that occur during instantaneous locking. This serves to protect the switch from damage and forces the operator to close the door more gently.

Key release device and emergency release button



The key release device (auxiliary release) is used to permit unlocking of the actuator only by personnel in possession of the key. The device also functions with no power supply and, once actuated, prevents the guard from being locked.

The emergency release button (escape release) 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 allow the operator to exit even in the event of a power failure. The button has two stable states and can be freely extended in length with suitable extensions (see accessories).

Both devices can be positioned on the four sides of the switch. As a result, it can be installed both towards the interior and towards the exterior of the machine.

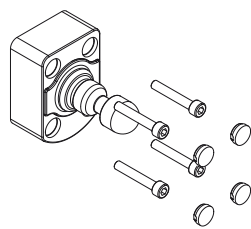
Two safety output actuation modes

**CLOSED
OR
CLOSED & LOCK**

Two different activation modes are available for the switch: active safety outputs with guard closed and locked (mode 1) for machines with inertia or active safety outputs with guard closed (mode 2) for machines without inertia.

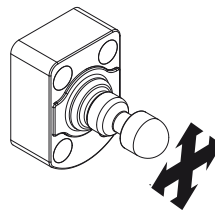
Two different activation modes are available for the switch: active safety outputs with guard closed and locked (mode 1) for machines with inertia or active safety outputs with guard closed (mode 2) for machines without inertia.

Protection against tampering



Each actuator of the NS series is supplied with four protective caps. Not only do the caps prevent dirt from accumulating and simplify cleaning, they also block access to the fastening screws of the actuator. As a result, standard screws can be used instead of tamper-proof screws.

Articulated actuator for inaccurately closing doors

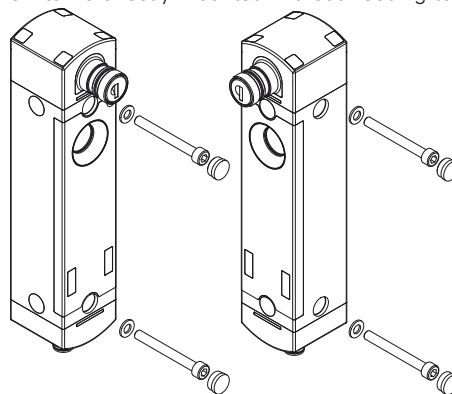


All NS series actuators are articulated, thereby allowing the actuator pin to be safely guided into the switch through the centring hole. As a result, the actuator and switch do not need to be precisely aligned during installation. In addition, the device can thereby be used on doors with a minimum actuation radius of 150 mm without the actuation pin needing to be angled.

Front and side mounting

Integrated in the housing of the NS series is a hole for inserting the actuator pin. Fixing holes are also provided in the robust body for front and side mounting.

This makes it easier to mount the switch during lateral installation: the switch is directly mounted without needing to rotate the module that



contains the hole for inserting the actuator pin. The fixing holes can be sealed with the protective caps provided for this purpose. Dirt deposits and tampering attempts are thereby prevented.

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 EN 60529.

They can therefore be used in all environments where maximum protection degree of the housing is required. Due to their special design,

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

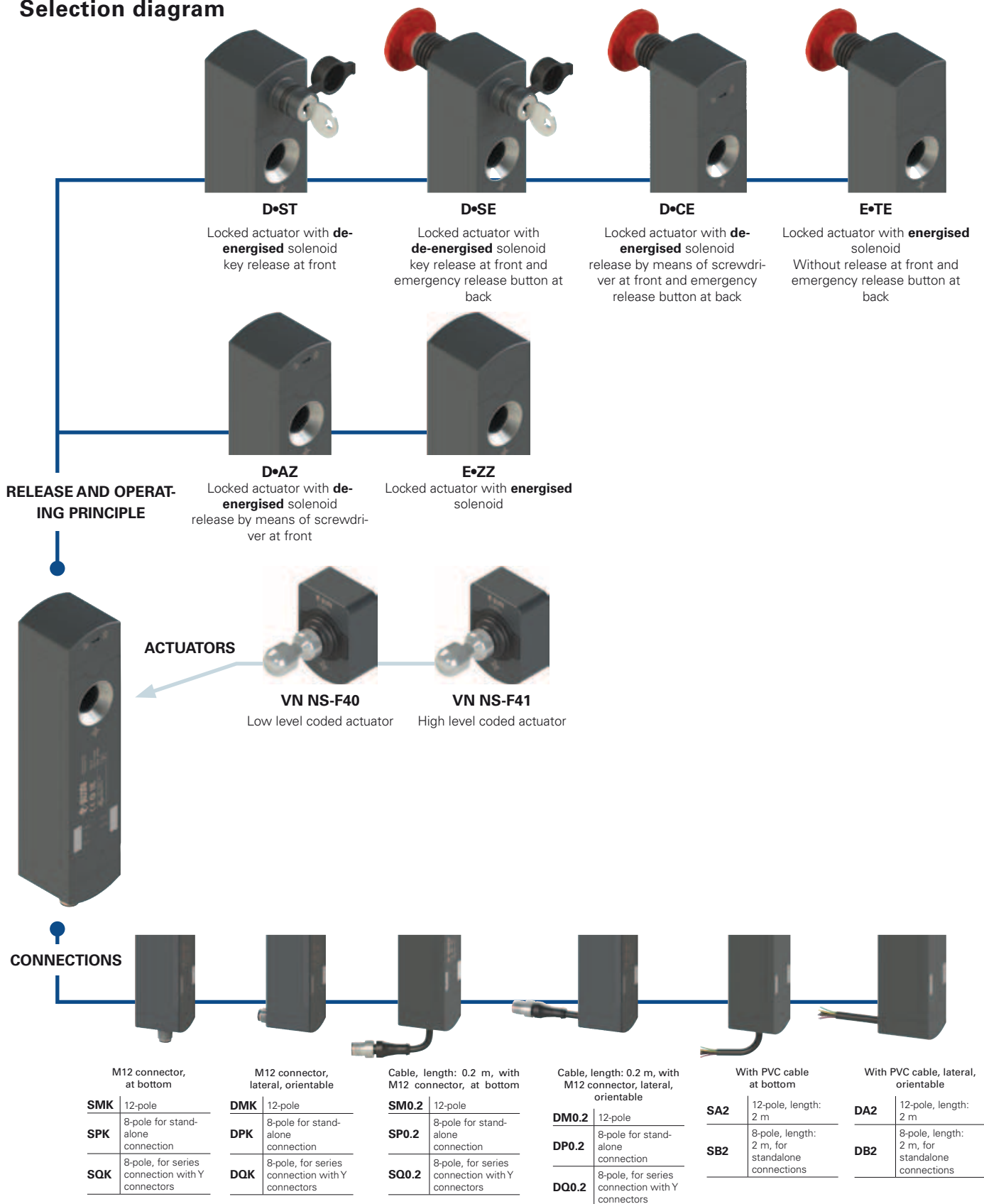
External device monitoring

EDM

On request, the switch can be supplied with EDM function (External Device Monitoring). In this case, the switch itself checks the proper function of the devices connected to

the safety outputs. These devices (usually relays or safety contactors) must send a feedback signal to the EDM input, which checks that the received signal is consistent with the state of the safety outputs.

Selection diagram



- product options
- Sold separately as accessory



Code structure

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

article options

NS D4AZ1SMK-F41E36LP30

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

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

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 guard 1 signalling output O4: locked guard 2 solenoid activation inputs IE1, IE2 1 reset input I3 <i>Note: Supplied only together with actuator</i>
4	2 safety inputs IS1, IS2 2 safety outputs OS1, OS2 1 signalling output O3: closed guard 1 signalling output O4: locked guard 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 guard 1 signalling output O4: locked guard 2 solenoid activation inputs IE1, IE2 1 programming / reset input I3 1 feedback input EDM 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	integrated M12 connector (standard)
0.2	cable, length: 0.2 m, with M12 connector
2	cable, length: 2 m (standard)
...
10	cable, length: 10 m

Cable or connector type	
A	PVC cable 12x0.14 mm ² (standard)
B	PVC cable 8x0.34 mm ² for stand-alone connection <i>Note: without inputs IS1, IS2, I5 and without output O4</i>
E	PUR cable, halogen-free, 8x0.34 mm ² for stand-alone connection <i>Note: without inputs IS1, IS2, I5 and without output O4</i>
M	M12 connector, 12-pole (standard)
P	M12 connector, 8-pole, for stand-alone connections <i>Note: without inputs IS1, IS2, I5 and without output O4</i>
Q	M12 connector, 8-pole, for series connection with Y connectors <i>Note: without inputs IE2, I3, I5 and without output O3</i>

Auxiliary release at front and back	
AZ	release by means of screwdriver at front <i>only available for operating principle D or G</i>
ST	key release at front <i>only available for operating principle D or G</i>
SE	key release at front and emergency release button at back <i>only available for operating principle D or G</i>
CE	release by means of screwdriver at front and emergency release button at back <i>only available for operating principle D or G</i>
ZZ	without release <i>only available for operating principle E or H</i>
TE	Without release at front and emergency release button at back <i>only available for operating principle E or H</i>

Output direction, connections	
D	cable or connector, lateral
S	cable or connector, at bottom

Code structure for actuator

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 with series connection of up to 32 devices
- Actuator holding force: 2100 N
- SIL 3 and PL e with a single device
- Protection degrees IP67 and IP69K
- Versions with key release and emergency release button
- 6 signalling LEDs

Quality marks:



0 1 2 3
 EC type examination certificate: M6A170475157015
 UL approval: E131787
 TÜV SÜD approval: Z10170475157014
 EAC approval: RU C-IT.AQ35.B.00454

In compliance 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

Compliance with the requirements of:

Machinery Directive 2006/42/EC
 EMC Directive 2014/30/EU
 RED Directive 2014/53/EU
 FCC Part 15

Technical data

Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing and shock-proof
 Versions with integrated cable 12x0.14m² or 8x0.34m², standard length 2 m, other
 lengths from 0.5 ... 10 m on request
 Versions with integrated M12 stainless steel connector
 Versions with 0.2 m cable and M12 connector, other lengths from 0.1 ... 3 m on request
 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
 Interlock, no contact, coded, with guard locking: 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	PFH _D	MTTF _D	PL	SIL	Cat
System	1.24 E-09	1671 years	e	3	4
Lock (locked guard)	1.23 E-09	2657 years	e	3	4
Interlock (closed guard)	1.22 E-09	1840 years	e	3	4
Locking control	2.29 E-10	2243 years	e	3	4

DC: High
 Service life: 20 years
 Ambient temperature: -20°C ... +50°C
 Max. actuation frequency: 600 operating cycles/hour
 with actuator lock and release: 1 million operating cycles
 Mechanical endurance: 0.5 m/s
 Max. actuation speed: 1 mm/s
 Min. actuation speed: 2100 N acc. to EN ISO 14119
 Maximum force before breakage F_{1max}: 1615 N acc. to EN ISO 14119
 Max. holding force F_{Zh}: 4 mm
 Maximum clearance of locked actuator: ~ 20 N
 Released actuator extraction force: see page 313-324
 Tightening torques for installation:

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 OS1/OS2 safety outputs

Rated operating voltage U_{e2}: 24 Vdc
 Output type: PNP type OSSD
 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
 Overcurrent protection: Yes
 Internal self-resettable protection fuse: 1.1 A
 Duration of the deactivation impulses at the safety outputs: < 300 µs
 Permissible maximum capacitance between outputs: < 200 nF
 Permissible maximum capacitance between
 output and ground: < 200 nF
 Response time upon deactivation of IS1/IS2 inputs: typically 7 ms, max. 15 ms
 Response time upon actuator removal: typically 120 ms, max. 200 ms

Electrical data of O3/O4 signalling output

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
 Overcurrent protection: Yes
 Internal self-resettable protection fuse: 1.1 A

RFID sensor data

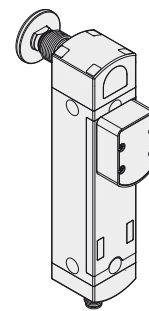
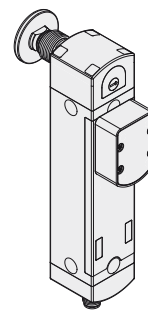
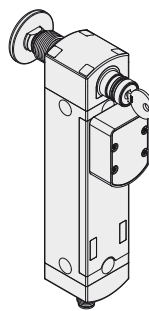
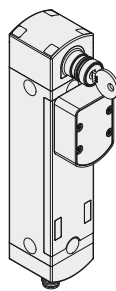
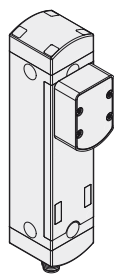
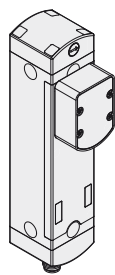
Assured operating distance S_{ao}: 2 mm
 Assured release distance S_{ar}: 6 mm (actuator not locked)
 10 mm (actuator locked)
 Rated operating distance S_n: 3 mm
 Repeat accuracy: ≤ 10 % s_n
 Differential travel: ≤ 20 % s_n
 Max. switching frequency: 1 Hz


Power supply electrical data

Rated operating voltage U_e SELV: 24 Vdc ±10%
 Operating current at U_e voltage:
 - 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: type gG fuse 2 A or equivalent device
 III
 Overvoltage category: 1 million operating cycles
 Electrical endurance: 100% ED (continuous operation)
 Solenoid duty cycle: 9 W max.
 Solenoid consumption:

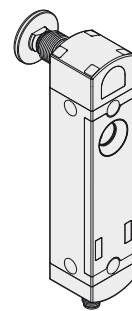
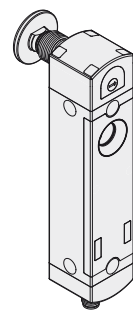
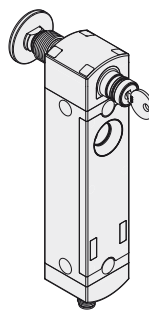
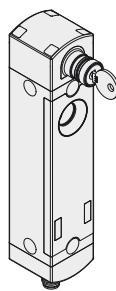
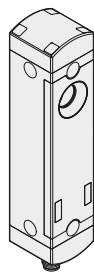
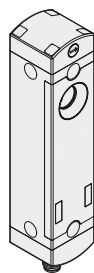



Selection table for switches with high level coded actuators



	Operating principle: locked actuator with de-energised solenoid. With screwdriver release	Operating principle: locked actuator with energised solenoid	Operating principle: locked actuator with de-energised solenoid. With key release	Operating principle: locked actuator with de-energised solenoid. With key release and emergency release button	Operating principle: locked actuator with de-energised solenoid. With screwdriver release and emergency release button	Operating principle: locked actuator with energised solenoid. With emergency release button
Mode 1  OS safety outputs active with locked and closed guard	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 guard	NS G4AZ1SMK-F41	NS H4ZZ1SMK-F41	NS G4ST1SMK-F41	NS G4SE1SMK-F41	NS G4CE1SMK-F41	NS H4TE1SMK-F41


Selection table for switches



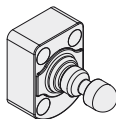
	Operating principle: locked actuator with de-energised solenoid. With screwdriver release	Operating principle: locked actuator with energised solenoid	Operating principle: locked actuator with de-energised solenoid. With key release	Operating principle: locked actuator with de-energised solenoid. With key release and emergency release button	Operating principle: locked actuator with de-energised solenoid. With screwdriver release and emergency release button	Operating principle: locked actuator with energised solenoid. With emergency release button
Mode 1  OS safety outputs active with locked and closed guard	NS D4AZ1SMK	NS E4ZZ1SMK	NS D4ST1SMK	NS D4SE1SMK	NS D4CE1SMK	NS E4TE1SMK
Mode 2 OS safety outputs active with closed guard	NS G4AZ1SMK	NS H4ZZ1SMK	NS G4ST1SMK	NS G4SE1SMK	NS G4CE1SMK	NS H4TE1SMK

To order a product with lateral connection replace character **S** with character **D** in the order codes shown above. Example: NS D4AZ1SMK → NS D4AZ1DMK

To order a product with EDM input replace number **4** with number **5** in the codes shown above. Example: NS D4AZ1SMK → NS D5AZ1SMK

Legend:  interlock with lock monitoring acc. to EN ISO 14119

Selection table for actuators



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

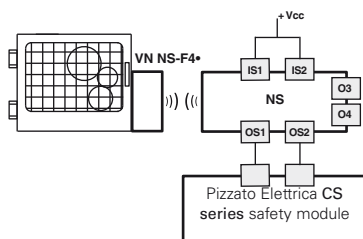
The use of RFID technology in NS series devices makes them suitable for several applications. Pizzato Elettrica offers two different versions of actuators, in order to best suit customers' specific needs.

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.

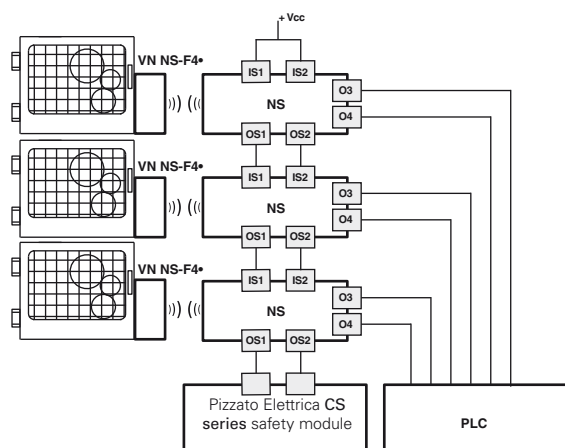
Type F41 actuators are always encoded with different codes. This implies that a device associated with an actuator type F41 can be activated only by a specific actuator. Another F41 type actuator will not be recognised by the device until a new association procedure is carried out (reprogramming). After reprogramming, the old actuator F41 will no longer be recognized.

Complete safety system

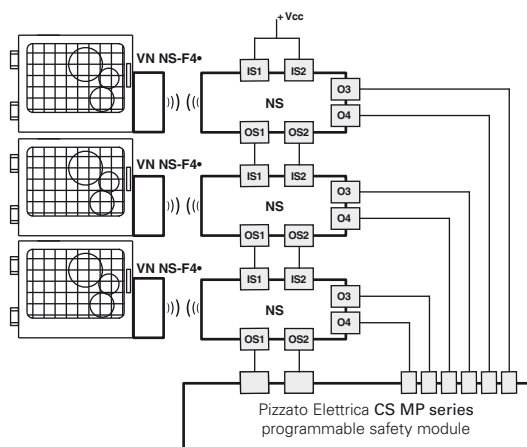
The use of complete and tested solutions guarantees the electrical compatibility between the NS series switches and the safety modules from Pizzato Elettrica, as well as high reliability. The switches have been tested with the modules listed in the adjacent table.



NS series switches can be used as individual devices provided that the safety outputs be evaluated by a Pizzato Elettrica safety module (see table for combinable safety modules).



Possibility of series connection of multiple switches for simplifying the wiring of the safety system, whereby only the outputs of the last switch are evaluated by a Pizzato Elettrica safety module (see table with compatible safety modules). Each NS series switch is provided with two signalling outputs which are activated when the guard is closed (O3) or locked (O4). Depending on the specific requirements of the system that has been realised, the signals of the signalling outputs can be evaluated by a PLC.



Possibility of series connection of multiple switches for simplifying the wiring of the safety system, whereby only the outputs of the last switch are evaluated by a Pizzato Elettrica safety module of the CS MP series. Both the safety-relevant evaluation and the evaluation of the signalling outputs are performed by the CS MP series.

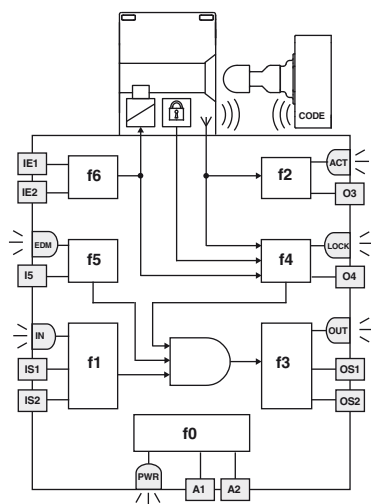
The examples listed above refer to applications with NS ●●●1●●●

Application example on page 253.

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 255	
CS MF●●●●●●		page 283		

All NS series switches can be connected, provided that compatibility is checked, to safety modules or safety PLCs with OSSD inputs.

Internal block diagram



The diagram on the side represents the 7 logic functions which interact inside the device.

Function f0 is a basic function and includes the monitoring of the power supply as well as internal, cyclical tests. Function f1 monitors the status of the device inputs, whereas function f2 monitors the presence of the actuator within the detection areas of the switch.

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 safety-related function, which combines the sub-functions mentioned above, only activates the safety outputs for the switches in mode 1 if the input signals are correctly applied and the actuator pin is in the safe actuation area in the head and locked. The safety outputs for switches in mode 2 are activated if the input signals are correctly applied and the actuator pin is in the safe actuation area in the head. The f6 function verifies the coherence of the enable/disable 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 outside of the actuation zone (LED ACT off).

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

The IE1, IE2 inputs can be used to lock the actuator (LOCK LED on, green). The OS1 and OS2 safety outputs are enabled (OUT LED on, green). The O4 signalling output is activated at the same time. The safe actuation area is extended in order to allow greater play for the actuator.

The IE1, IE2 inputs 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 actuation area returns to the initial values.

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

Actuation sequence in mode 2

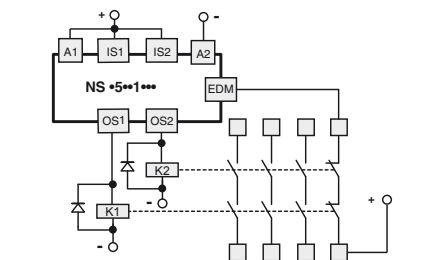
In contrast to the above mode 2 description, the safety outputs OS1 and OS2 enable when the actuator is detected, and disable when the actuator is no longer detectable.

Operating states

PWR LED	IN LED	OUT LED	ACT LED	LOCK LED	EDM LED (a)	Device state	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	Safety inputs incoherence. Recommended action: check for presence and/or wiring of inputs.
●	*	*	*	●	*	RUN	Incoherence of solenoid activation inputs IE1, IE2. Recommended action: check for presence and/or wiring of inputs.
●	*	*	*	●	*	RUN	Auxiliary release activated. Deactivate the auxiliary release 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	Rapid flashing: supply voltage too high. Slow flashing: supply voltage within the tolerance limits
●	*	●	*	*	*	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 the physical integrity of the device and, in case of failure, please 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 failure persists, replace the device.
●	*	○	*	*	●	RUN	EDM signal active (external relay off) ^a
●	●	●	●	●	○	RUN	EDM signal not active (external relay on) ^a
●	○	○	○	○	●	ERROR	Error in the EDM ^a function

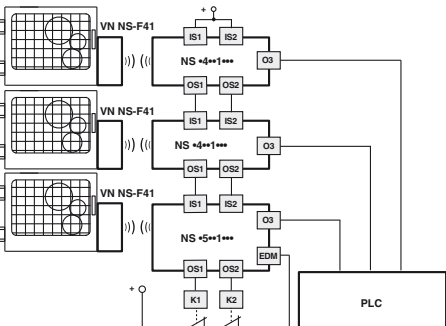
Legend: ○ = off ● = on ● = flashing ● = alternating colours * = indifferent (a) Available only in versions NS •5••1•••

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 245. This check is carried out via the EDM input (External Device Monitoring as defined in EN 61496-1) of the switch.



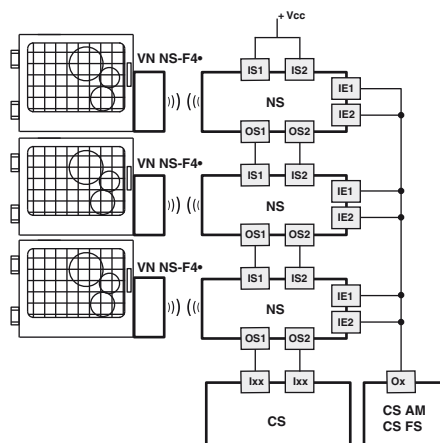
This version, with the IS safety inputs, **can be used at the end of a series of NS switches, up to a maximum number of 32 devices**, while maintaining the maximum PL e safety level and acc. to EN ISO 13849-1 and SIL 3 safety level acc. to EN 62061.

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.

Series connection of several switches

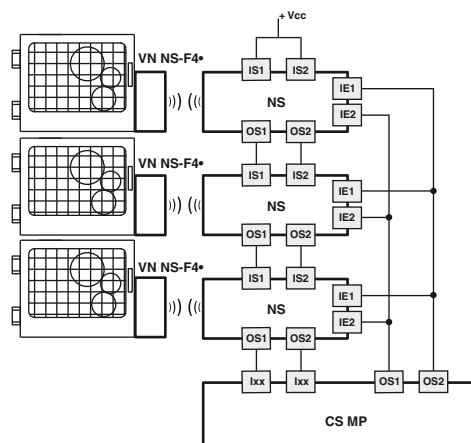
Lock detection function (guard locked)
2 channels / Category 4 / up to SIL 3 / PL e

Locking control function
1 channel / Category 2 / up to SIL 2 / PL d



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

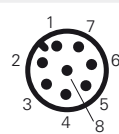
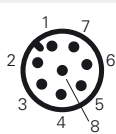
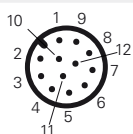
Locking control function
2 channels / Category 4 / up to SIL 3 / PL e



Connector pin assignment

Internal cable wiring

M12 connector, 12-pole	M12 connector, 8-pole stand-alone connection	M12 connector, 8-pole series connection with "Y" connectors	Cable 12x0.14 mm ² external Ø 6 mm	Cable 8x0.34 mm ² external Ø 7 mm	Connection
3	3	3	White	Blue	A2 Supply input 0 V
10	8	8	Purple	Red	IE1 Solenoid activation input
12	5	/	Red-Blue	Purple	IE2 Solenoid activation input
5	2	/	Pink	Black	O3 Signalling output, actuator inserted
9	/	5(b)	Red	/	O4 Signalling output, actuator inserted and locked
8	6	/	Grey	purple-white	I3 Actuator programming input / reset
1	1	1	Brown	Brown	A1 Supply input +24 Vdc
2	/	2	Blue	/	IS1 Safety input
6	/	6	Yellow	/	IS2 Safety input
11	/	/	Grey-Pink	/	I5 EDM input (a)
4	4	4	Green	Red-White	OS1 Safety output
7	7	7	Black	Black-White	OS2 Safety output



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

(b) Available for 8-pole connector, not available for the end of a chain with Y connectors.



Dimensional drawings

All values in the drawings are in mm

Switch
NS ••AZ1SMK
NS ••ZZ1SMK

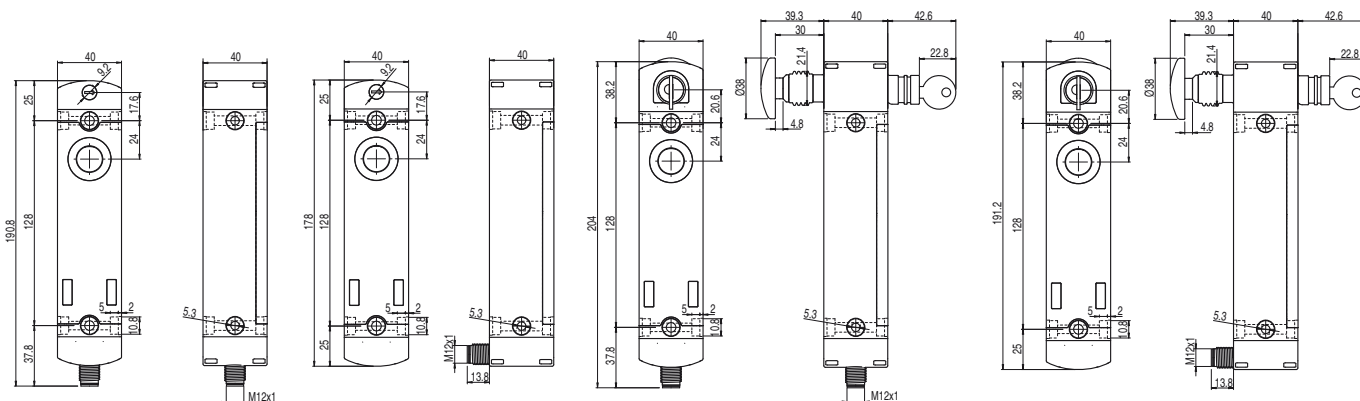
Switch
NS ••AZ1DMK
NS ••ZZ1DMK

Switch
NS ••ST1SMK
NS ••SE1SMK

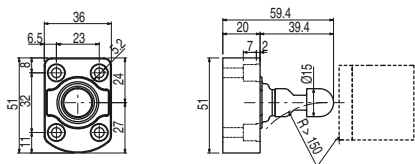
NS ••CE1SMK
NS ••TE1SMK

Switch
NS ••ST1DMK
NS ••SE1DMK

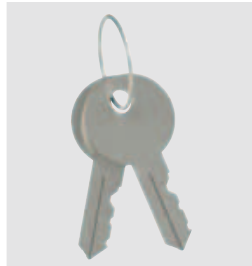
NS ••CE1DMK
NS ••TE1DMK



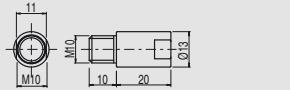
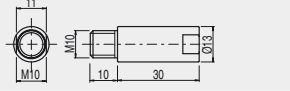
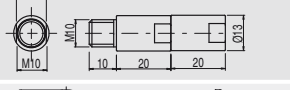
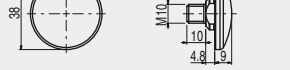
Actuator VN NS-F4•

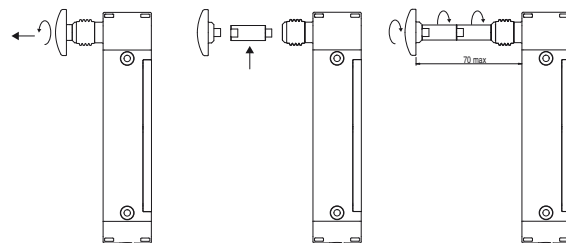


Accessories

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	Red metal release button	



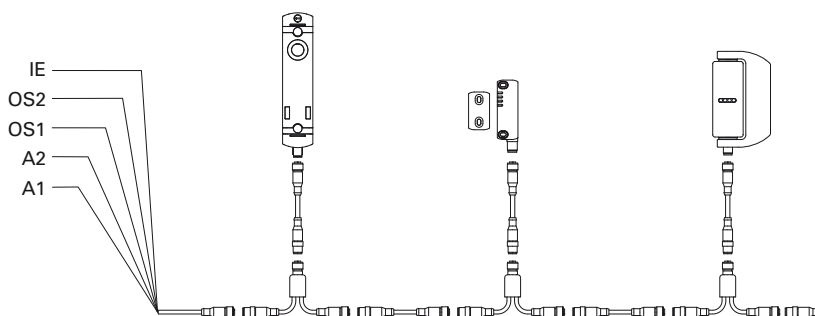
- Metal extensions can be combined with one another to achieve the desired length.
- Do not exceed an overall length of **70 mm** between the release button and the switch.
- Use medium-strength thread locker to secure the extensions

Series connection

To simplify series connections of the devices, various M12 connectors are available that allow complete wiring.

This solution significantly reduces installation times while at the same time maintaining the maximum safety levels PL e and SIL 3 for the interlocking function.

For further information see page 304.



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

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