

Correct use

Safety switches of type series NZ.VZ interlock movable safety guards without guard locking, thus ensuring that

- ▶ dangerous work on machines can only be carried out if the safety guard is closed.
- ▶ a STOP command is triggered if the guard is opened when the machine is running.

Before safety switches are used, a risk assessment must be performed on the machine in accordance with

- ▶ EN 954-1, Safety of machinery. Safety related parts of control systems. General principles for design, annex B
- ▶ EN 1050, Safety of machinery. Principles for risk assessment
- ▶ IEC 62061, Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems

Correct use includes compliance with the relevant requirements for installation and operation, in particular

- ▶ EN 954-1, Safety of machinery. Safety related parts of control systems. General principles for design
- ▶ EN 1088, Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
- ▶ EN 60 204-1, Safety of machinery. Electrical equipment of machines. General requirements.

⚠ Safety precautions ⚠

Safety switches perform a personal protection function. Incorrect installation or tampering can lead to severe injuries to personnel.

⚠ Safety switches must **not** be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.

⚠ The switching operation must only be triggered by actuators specifically provided for this purpose which are permanently connected to the safety guard.

The two letters on the rating plate represent the switch's date of manufacture.

Function

The safety switch signals that the safety guard is closed.

The switch does not perform guard locking!

- ▶ Closing

The safety contacts are closed by inserting the actuator.

- ▶ Opening

The safety contacts are positively opened by withdrawing the actuator.

Mounting

⚠ Mounting must be performed only by authorized personnel.

Assemble the safety switch so that

- ▶ access to the switch is difficult for operating personnel when the safety guard is open.
- ▶ It is possible to check and replace the safety switch.

⚠ Safety switches and actuators must not be used as an end stop.

⚠ Mount the safety switch only in assembled condition!

- ▶ Insert the actuator in the actuating head.
- ▶ Mount the safety switch positively.
- ▶ Permanently connect the actuator to the safety guard so that it cannot be detached, e.g. using the enclosed non-removable screws, rivets or welding.
- ▶ Fit an additional stop for the movable part of the safety guard.

Changing the approach direction

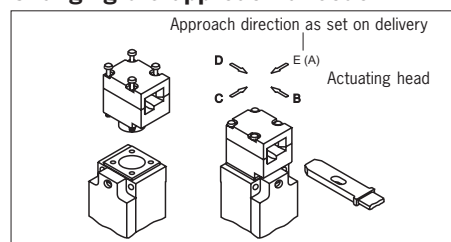


Figure 1: Changing the approach direction

- ▶ Remove the screws from the actuating head.
- ▶ Set the required direction.
- ▶ Tighten the screws with a torque of 1.2 Nm.

Protection against environmental effects

A lasting and correct safety function requires that the actuating head must be protected against the penetration of foreign bodies such as swarf, sand, blasting shot, etc.

Cover the actuating slot, the actuator and the rating plate during painting work!

Electrical connection

⚠ Electrical connection must be performed only by authorized personnel.

⚠ When choosing the insulation material and wire for the connections, attention is to be paid to the over-temperature in the housing (depending on the operating conditions).

For NZ2VZ:

For use and applications as per the requirements of C_{23} , a class 2 power supply or a class 2 transformer according to UL1310 or UL1585 must be used.

Connection leads of safety switches installed at the application site must be separated from all movable and permanently installed leads and non-insulated active parts of other installation parts which operate with a voltage of over 150 V, in such a way that a constant clearance of 50.8 mm is observed. This does not apply if the movable leads are equipped with suitable insulation materials which possess an identical voltage stability to the other relevant installation parts or higher.

- ▶ Version NZ1VZ-...-M (cable entry)
- ▶ Fit cable gland M20x1.5 with appropriate degree of protection.
- ▶ For pin assignment see Figure 2.
- ▶ Tighten screws for connections to the switching element to 0.5 Nm.

- ▶ Check that the cable entry is sealed.
- ▶ Close switch cover and tighten screws to 1.2 Nm.
 - ▶ Version NZ2VZ-5... (plug connector SR6)
 - ▶ Conductor cross-section 0.5 to 1.5 mm².
 - ▶ For pin assignment see Figure 2a.
 - ▶ Version NZ2VZ-2.../NZ2VZ-3... (plug connector SR11)
 - ▶ Conductor cross-section 0.5 mm².
 - ▶ For pin assignment see Figure 2b.

Setup

- ▶ Mechanical function test

The actuator must slide easily into the actuating head. Close the safety guard several times to check function.

- ▶ Electrical function test

- ▶ Close the safety guard.

Start the machine.

Check whether the machine stops when the guard is opened.

- ▶ Switch off the machine.

Open the safety guard.

The machine must **not start** when the safety guard is open!

Service and inspection

No servicing is required, but **regular inspection** of the following is necessary to ensure trouble-free long-term operation:

- ▶ correct switching function
- ▶ secure mounting of components
- ▶ dirt and wear
- ▶ sealing of cable entry
- ▶ loose cable connections or plug connectors

⚠ If damage or wear is found, the complete switch and actuator assembly must be replaced.

Replacement of individual parts or assemblies is not permitted!

⚠ The complete safety switch assembly must be replaced:

- after 2 million operating cycles in the case of straight actuators
- after 500,000 operating cycles in the case of hinged actuators.

Exclusion of liability under the following conditions:

- ▶ if the unit is not used for its intended purpose
- ▶ non-compliance with safety regulations
- ▶ installation and electrical connection not performed by authorized personnel
- ▶ failure to perform functional checks.

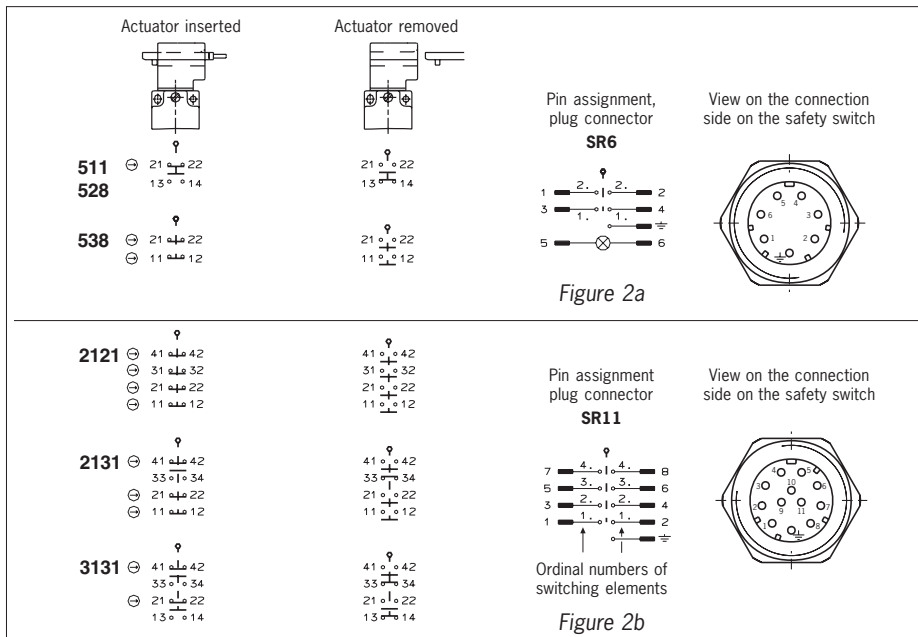


Figure 2: Switching elements with switching functions and pin assignment

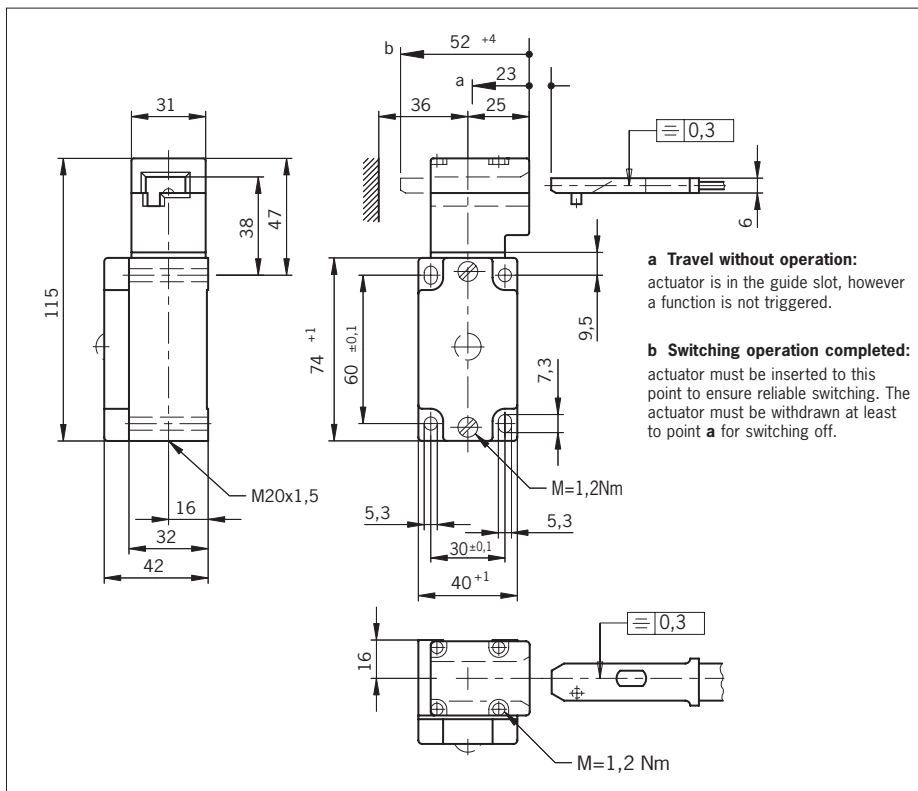


Figure 3: Dimension drawing NZ1VZ... with cable entry

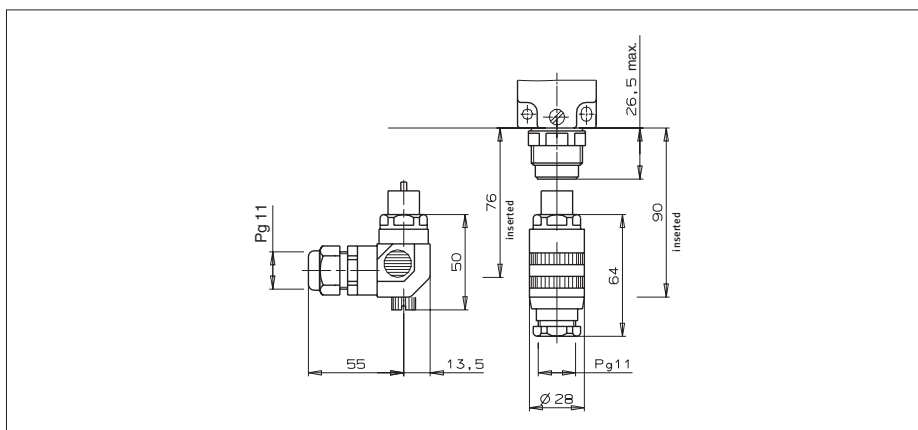


Figure 4: Dimension drawing NZ2VZ-5... with plug connector SR6

Technical data

Parameters	Value
Housing material	Anodized die-cast alloy
Degree of protection according to IEC 60529	
NZ1VZ...	IP67
NZ2VZ...	IP65 (mating connector tightened)
Mech. operating cycles	2 x 10 ⁶
Ambient temperature	-25 °C ... +80 °C
Installation position	Any
Approach speed, max.	20 m/min
Approach speed, min.	0.02 m/min (NZ.VZ-511...)
Actuation frequency	7000/h
Actuating force at 20 °C	35 N
Extraction force	35 N
Retention force	10 N
Weight	Approx. 0.3 kg
Switching principle switching elements	
511	Snap-action switching element
528, 538, 2121, 2131, 3131	Slow-action switching element
Contact material	Silver alloy, gold flashed
Type of connection	
NZ1VZ...	Screw terminals M20 x 1.5
NZ2VZ...	Connector
Conductor cross-section (rigid/flexible)	
NZ1VZ...	0.34 ... 1.5 mm ²
NZ1VZ...L (with indicator LED)	0.34 ... 0.75 mm ²
Conductor cross-section mating connector	
SR6 (NZ2VZ-5...)	0.5 ... 1.5 mm ²
SR11 (NZ2VZ-2.../NZ2VZ-3...)	0.5 mm ²
Rated insulation voltage	
NZ1VZ.../NZ2VZ-5...	U _i = 250 V
NZ2VZ-2.../NZ2VZ-3...	U _i = 50 V
Rated impulse withstand voltage	
NZ1VZ.../NZ2VZ-5...	U _{imp} = 2.5 kV
NZ2VZ-2.../NZ2VZ-3...	U _{imp} = 1.5 kV
Degree of contamination (external, according to EN 60947-1)	3 (industrial)
Switching current, min., at 24 V	
NZ.VZ-511...	10 mA
NZ.VZ...	1 mA
Switching voltage, min., at 10 mA 12 V	
Utilization category according to IEC 60947-5-1	
NZ.VZ-511...	AC-15 6A 230V / DC-13 6A 24V
NZ1VZ.../NZ2VZ-5...	AC-15 4A 230V / DC-13 4A 24V
NZ2VZ-2.../NZ2VZ-3...	AC-15 4A 50V / DC-13 4A 24V
Conventional thermal current I _{th}	
NZ.VZ-511...	6 A
NZ.VZ...	4A
Short circuit protection (control circuit fuse)	
NZ.VZ-511...	6 A gG
NZ.VZ...	4A gG
Indicator LED (only with switching element 511, 528, 538)	
L060	AC/DC 12...60 V
L110	AC 110 V (±15 %)
L220	AC 230 V (±15 %)
Limitations at ambient temperature above +70 ... +80 °C	
Utilization category	
NZ2VZ-5...	AC-15 2A 230V / DC-13 2A 24V
NZ2VZ-2.../NZ2VZ-3...	AC-15 2A 50V / DC-13 2A 24V
Conventional thermal current I _{th}	2 A
Short circuit protection	2 A gG