

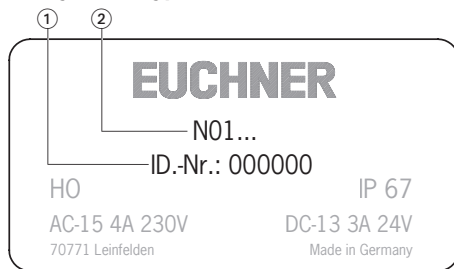
### Scope

These operating instructions are valid for all N01/NB01/SN01. These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.

#### Important!

Make sure to use the operating instructions valid for your product version. The version numbers can be found on the type label of your product. Please contact the EUCHNER service team if you have any questions.

### Safety switch type label



- ① Item number
- ② Item designation

### Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2105376)	(this document)	
Declaration of conformity	Declaration of conformity	
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	

#### Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from [www.euchner.com](http://www.euchner.com). For this purpose, enter the doc. no. or the order number for the device in the search box.

### Correct use

Precision single limit switches series N01/NB01/SN01 are interlocking devices without guard locking (type 1). The actuator is uncoded (e.g. dogs). In combination with a movable guard and the machine control, this safety component prevents dangerous machine functions from occurring while the guard is open. A stop command is triggered if the guard is opened during the dangerous machine function.

For general applications, snap-action switching elements that are not positively driven are used. For use as safety switches, only the switching element ES588 with positively driven contacts is allowed.

This means:

- ▶ Starting commands that cause a dangerous machine function must become active only when the guard is closed.
- ▶ Opening the guard triggers a stop command.
- ▶ Closing a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Devices from this series can be used as safe position encoders.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- ▶ EN ISO 13849-1
- ▶ EN ISO 12100
- ▶ EN IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- ▶ EN ISO 13849-1
- ▶ EN ISO 14119
- ▶ EN IEC 60204-1

#### Important!

- ▶ The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-1.
- ▶ If the simplified method according to section 6.2.3 of EN ISO 13849-1:2023 is used for determining the Performance Level (PL), the PL might be reduced if several devices are connected in series.
- ▶ The logical series connection of safe contacts may limit the achievable Performance Level (PL) in certain circumstances. More information about this is available in EN ISO 14119:2025, section 9.4.
- ▶ If a data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

### Safety precautions

#### ⚠ WARNING

Danger to life due to improper installation or due to bypassing (tampering). Safety components fulfill a personnel protection function.

- ▶ Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2025, section 8.
- ▶ Mounting, electrical connection and setup only by authorized personnel possessing special knowledge about handling safety components.

### Function

Precision single limit switches are used for positioning and control applications in mechanical and systems engineering.

The switching elements are actuated by means of plungers. Different plungers and trip dogs are used depending on the application (operating point accuracy and approach speed) (see Fig. 2).

In general applications, the plungers are actuated by trip dogs according to DIN 69639 that are mounted with an interference fit in trip rails according to DIN 69638.

The switching contacts are actuated when the actuating element is moved from the free position to the end position. The safety contacts  $\ominus$  are positively driven in this process.

### Switching states

The detailed switching states for your switch can be found in Fig. 11. All available switching elements are described there.

#### Actuating element in free position

The safety contacts  $\ominus$  are closed.

#### Actuating element in end position

The safety contacts  $\ominus$  are open.

### Mounting

#### NOTICE

Device damage due to improper mounting and unsuitable ambient conditions.

- ▶ Safety switches and actuators must not be used as an end stop.
- ▶ Observe EN ISO 14119:2025, sections 6.2 and 6.3, for information about mounting the safety switch and the actuator.
- ▶ Observe EN ISO 14119:2025, section 8, for information about reducing the possibilities for bypassing an interlocking device.
- ▶ For the safety circuits, observe the actuating travel with the tolerances on the dimension drawing.
- ▶ Protect the switch head against damage.
- ▶ The specified IP degree of protection is applicable only if the housing screws, cable entries and plug connectors are properly tightened. Observe the tightening torques.

### Protection against environmental effects

Safety venting valves (see Fig. 3, for example) are used for pressure equalization to compensate for the pumping action of the plungers. They must not be sealed with paint.

- ▶ Mask plunger, plunger guide, safety venting valves and type label during painting work!

### Changing the actuating direction

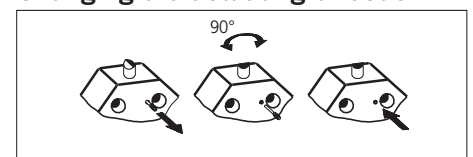


Fig. 1: Changing the actuating direction

1. Unscrew the locking screw.
2. Set the required direction.
3. Screw in the locking screw again.

### Electrical connection

#### ⚠ WARNING

Loss of the safety function due to incorrect connection.

- ▶ Use only safe contacts ( $\ominus$ ) for safety functions.
- ▶ Strip the insulation from the ends of the individual wires over a length of  $6 \pm 1$  mm to ensure a safe contact.

### Use of the safety switch as an interlocking device for personnel protection

At least one contact  $\ominus$  must be used. This signals the position of the guard (for terminal assignment, see Fig. 11).

### The following information applies to devices with plug connector:

- ▶ Check that the plug connector is sealed.

### The following information applies to devices with cable entry:

1. Use a suitable tool to open the desired insertion opening.
2. Mount the cable gland with the appropriate degree of protection.
3. Connect and tighten the terminals (for terminal assignment, see Fig. 11; for tightening torque values, see technical data).
4. Check that the cable entry is sealed.
5. Close the switch cover and screw in place (tightening torque 0.5 Nm).

## Function test

### **WARNING**

Fatal injury due to faults during the function test.

- ▶ Before carrying out the function test, make sure that there are no persons in the danger area.
- ▶ Observe the valid accident prevention regulations.

Check the device for correct function after installation and after every fault.

Proceed as follows:

### **Mechanical function test**

The actuating element must move easily. Close the guard several times to check the function.

### **Electrical function test**

1. Switch on operating voltage.
2. Close all guards.
  - ➔ The machine must not start automatically.
3. Start the machine function.
4. Open the guard.
  - ➔ The machine must switch off and it must not be possible to start it as long as the guard is open.

Repeat steps 2 - 4 for each guard.

## Inspection and service

### **WARNING**

Danger of severe injuries due to the loss of the safety function.

- ▶ In safety circuits, the entire switch must be replaced in case of damage or wear. Replacement of individual parts or assemblies is not permitted.
- ▶ Check the device for proper function at regular intervals and after every fault. For information about possible time intervals, refer to EN ISO 14119:2025, section 9.2.1.

Inspection of the following is necessary to ensure trouble-free long-term operation:

- ▶ Correct switching function
- ▶ Secure mounting of all components
- ▶ Precise adjustment of trip dogs in relation to single limit switch
- ▶ Damage, heavy contamination, dirt and wear
- ▶ Sealing of cable entry
- ▶ Loose cable connections or plug connectors.

**Info:** The year of manufacture can be seen in the bottom right corner of the type label.

## Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

## Notes about UL

### **The following information applies to devices with plug connector:**

This device is intended to be used with a Class 2 power source in accordance with UL1310. Connecting cables for safety switches installed at the place of use must be separated from all moving and permanently installed cables and un-insulated active elements of other parts of the system that operate at a voltage of over 150 V. A constant clearance of 50.8 mm must be maintained. This does not apply if the moving cables are equipped with suitable insulation materials that possess an identical or higher dielectric strength compared to the other relevant parts of the system.

## Declaration of conformity

The product complies with the requirements according to

- ▶ Machinery Directive 2006/42/EC (until January 19, 2027)
- ▶ Machinery Regulation (EU) 2023/1230 (from January 20, 2027)

The EU declaration of conformity can be found at [www.euchner.com](http://www.euchner.com). Enter the order number of your device in the search box. The document is available under *Downloads*.

## Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG  
Kohlhammerstraße 16  
70771 Leinfelden-Echterdingen  
Germany

### **Service telephone:**

+49 711 7597-500

### **E-mail:**

[support@euchner.de](mailto:support@euchner.de)

### **Internet:**

[www.euchner.com](http://www.euchner.com)

### Technical data

Parameter	Value
Housing material	Die-cast aluminum, anodized
Plunger material	Stainless steel
Degree of protection	IP67
Mech. operating cycles	30 x 10 <sup>6</sup>
Ambient temperature with switching element	
ES550/553/556/558/562/620	-5 ... +80 °C
ES572 (high-temp. version)	-5 ... +125 °C (200 h at 180 °C)
ES588 ☹	-25 ... +70 °C
ES560/593	-5 ... +125 °C (manufacturer's data max. +140 °C)
Installation position	Any
Approach speed, max.	
Plunger Chisel D	20 m/min
Roller R (slide bearing)	50 m/min
Ball K	8 m/min
Approach speed, min.	0.01 m/min
Actuating force with switching element	≥ 15 N
Switching element	
ES550/553/556/560/562/572/593/620	1 changeover contact
ES558	1 NC + 1 NO contacts
ES588 ☹	1 pos. driven contact
Switching principle	
ES550/553/556/558/560/562/572/593/620	Snap-action switching contact
ES588 ☹	Positively driven slow-action switching contact
Switching hysteresis	
ES550/553/556/560/562/572/593/620	Max. 0.1 mm
ES558	0.5 mm
Connection	
ES550/558/560/562/572/593	Soldered connection
ES553/556/588/620	Screw terminal
Tightening torque of screw terminal	
ES553/556 (hexagon socket, A/F 1.3 mm)	0.2 Nm
ES588 (slot-head screw)	0.3 Nm
ES620 (slot-head screw)	0.5 Nm
Conductor cross-section	
ES553/556/558/620	0.14 ... 1.0 mm <sup>2</sup>
ES588	Max. 1.5 mm <sup>2</sup>
Contact material	
ES550/553/556/558/572/588/593/620	Silver
ES560/562	Gold cross cut contacts
Rated impulse withstand voltage	
with cable entry	U <sub>imp</sub> = 2.5 kV
with plug connector, 4-pin	U <sub>imp</sub> = 2.0 kV
with plug connector, 5-pin	U <sub>imp</sub> = 1.5 kV
Rated insulation voltage	
with cable entry	U <sub>i</sub> = 250 V
with plug connector	U <sub>i</sub> = 50 V
with B-coded plug connector	U <sub>i</sub> = 250 V
Conditional short-circuit current	100 A
Rated data for the switching elements	
<b>ES558</b>	
Convent. thermal current I <sub>th</sub>	10 A
Utilization category AC-15	230 V / 4 A
Utilization category DC-13	24 V / 3 A
Switching current, min., at	10 mA
Switching voltage	DC 5 V
Short circuit protection	10 A gG
Mechanical life	Up to 10 x 10 <sup>6</sup> operating cycles
<b>ES550/553/556/620</b>	
Convent. thermal current I <sub>th</sub>	6 A
Utilization category AC-15	230 V / 2 A
Utilization category DC-13	24 V / 2 A
Switching current, min., at	10 mA
Switching voltage	DC 24 V
Short circuit protection	6 A gG
Mechanical life	Up to 10 x 10 <sup>6</sup> operating cycles
<b>ES560</b>	
Convent. thermal current I <sub>th</sub>	2 A
Utilization category DC-12	30 V / 1 A
Switching current, min., at	1 mA
Switching voltage	DC 5 V

Parameter	Value
Short circuit protection	2 A gG
Mechanical life	Up to 10 x 10 <sup>6</sup> operating cycles
Ideal application	1 mA/5 V ... 0.3 A/30 V
<b>ES562</b>	
Convent. thermal current I <sub>th</sub>	0.1 A
Utilization category AC-12	30 V / 0.1 A
Utilization category DC-13	30 V / 0.1 A
Switching current, min., at	5 mA
Switching voltage	DC 5 V
Short circuit protection	0.125 A gG
Mechanical life	Up to 15 x 10 <sup>6</sup> operating cycles
<b>ES572 (high-temperature version)</b>	
Convent. thermal current I <sub>th</sub>	5 A
Utilization category AC-15	230 V / 4 A
Utilization category DC-13	24 V / 1 A
Switching current, min., at	10 mA
Switching voltage	DC 12 V
Short circuit protection	5 A gG
Mechanical life	5 x 10 <sup>6</sup> operating cycles (or 100 h at 204 °C; manufacturer's data)
<b>ES588 ☹</b>	
Convent. thermal current I <sub>th</sub>	10 A
Utilization category AC-15	230 V / 4 A
Utilization category DC-13	24 V / 3 A
Switching current, min., at	1 mA
Switching voltage	DC 5 V
Short circuit protection	10 A gG
Mechanical life	Up to 10 x 10 <sup>6</sup> operating cycles
<b>ES593</b>	
Convent. thermal current I <sub>th</sub>	3 A
Utilization category AC-15	230 V / 3 A
Utilization category DC-13	24 V / 1 A
Switching current, min., at	10 mA
Switching voltage	DC 24 V
Short circuit protection	3 A gG
Mechanical life	5 x 10 <sup>6</sup> operating cycles (manufacturer's data 5 x 10 <sup>6</sup> )
<b>Rated data with plug connector</b>	
<b>N01.550SVM5</b>	
Utilization category AC-15	30 V / 2 A
Utilization category DC-13	24 V / 2 A
<b>N01.550C1526</b>	
Utilization category DC-13	24 V / 2 A
<b>SN01.558SVM5</b>	
Utilization category AC-15	30 V / 4 A
Utilization category DC-13	24 V / 3 A
<b>Characteristics acc. to EN ISO 13849-1 for NB01 with switching element ES588</b>	
<b>Safe position sensing</b>	
B <sub>100</sub> at DC-13 100 mA/24 V	2 x 10 <sup>7</sup>

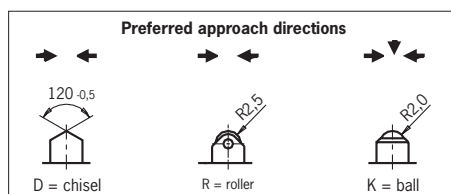


Fig. 2: Plungers and approach directions

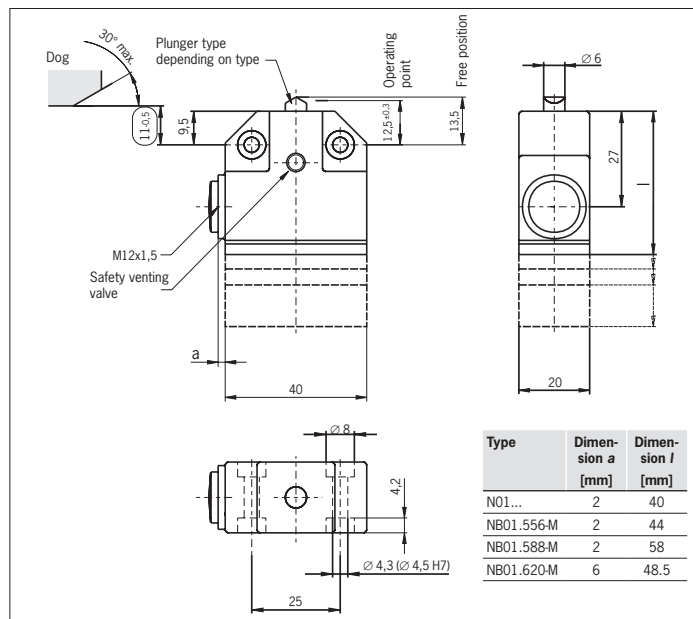


Fig. 3: Dimension drawing for N01.../NB01... with cable entry

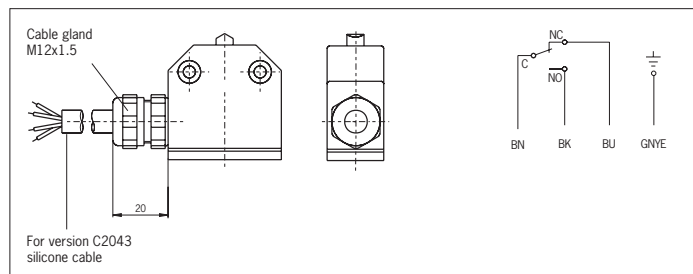


Fig. 4: Dimension drawing/connection diagram for N01.550X... with connecting cable (PUR cable, 4x0.5 mm²)

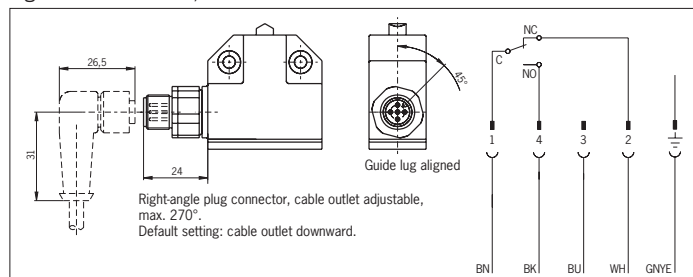


Fig. 5: Dimension drawing/connection diagram for N01.550/562SVM5 with plug connector M12 (SVM5, 5-pin)

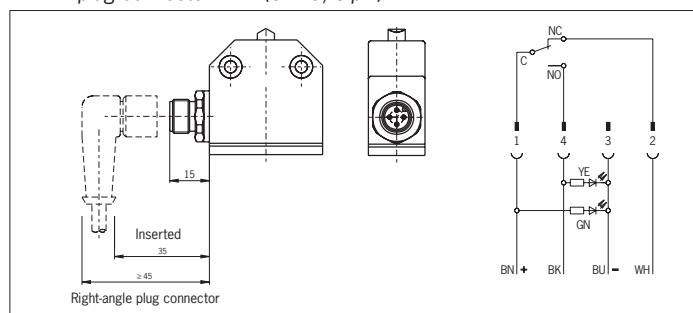


Fig. 6: Dimension drawing/connection diagram for N01.550C1526 with plug connector M12 (4-pin)

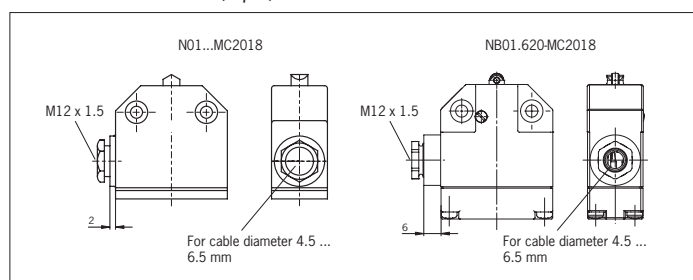


Fig. 7: Dimension drawing for N01...MC2018/NB01.620-MC2018 with special cable gland

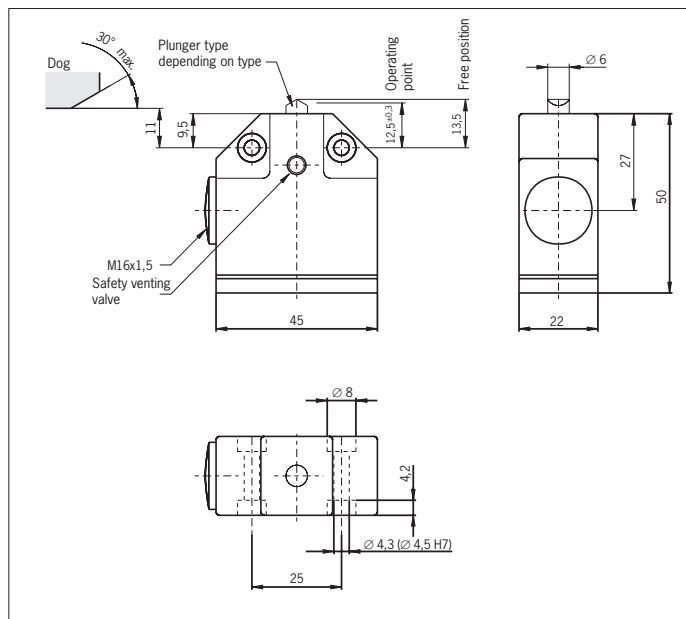


Fig. 8: Dimension drawing for SN01... with cable entry

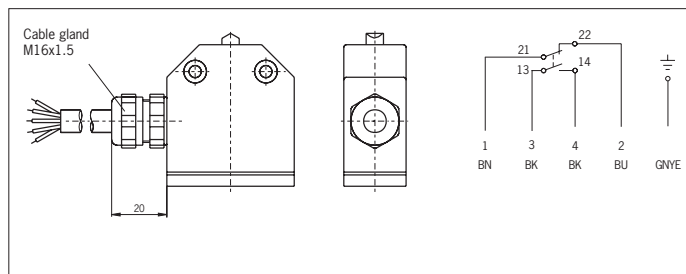


Fig. 9: Dimension drawing/connection diagram for SN01.558X... with connecting cable (PUR cable, 5x0.5 mm²)

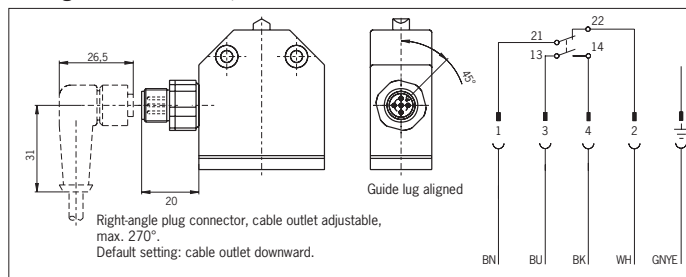


Fig. 10: Dimension drawing/connection diagram for SN01.558SVM5 with plug connector M12 (SVM5, 5-pin)

Switching element	Wiring diagram	Terminal assignment
ES550 ES560 ES593		1 4 2
ES553 ES556		1 4 2
ES562	1 (C) — 2 (NC)	1 4 2
ES572	— 4 (NO)	1 4 2
ES620		1 4 2
ES558	1 (NC) — 2 (NC) 3 (NO) — 4 (NO)	4 1 2 3
ES588	1 (C) — 2 (NC)	1 4 2

Fig. 11: Switching elements, wiring diagrams and terminal assignment for N01.../NB01.../SN01... with cable entry