

# Limit Switches according to EN 50041



More than safety.

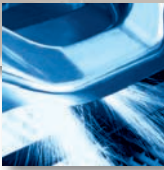


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# More than safety.



*Emil Euchner, the company's founder and inventor of the multiple limit switch, circa 1928.*



## **Around the world – the Swabian specialists in motion sequence control for mechanical and systems engineering.**

EUCHNER's history began in 1940 with the establishment of an engineering office by Emil Euchner. Since that time, EUCHNER has been involved in the design and development of switchgear for controlling a wide variety of motion sequences in mechanical and systems engineering. In 1953, Emil Euchner founded EUCHNER + Co., a milestone in the company's history. In 1952, he developed the first multiple limit switch – to this day a symbol of the enterprising spirit of this family-owned company.

## **Automation – Safety – ManMachine**

Today, our products range from electromechanical and electronic components to complex system solutions. With this wide range of products we can provide the necessary technologies to offer the right solution for special requirements – regardless of whether these relate to reliable and precise positioning or to components and systems for safety engineering in the automation sector.

EUCHNER products are sold through a world-wide sales network of competent partners. With our closeness to the customer and the guarantee of reliable solutions throughout the globe, we enjoy the confidence of customers all over the world.

## **Quality, reliability, precision**

Quality, reliability and precision are the hallmarks of our corporate philosophy. They represent concepts and values to which we feel totally committed.

At EUCHNER, quality means that all our employees take personal responsibility for the company as a whole and, in particular, for their own field of work. This individual commitment to perfection results in products which are ideally tailored to the customers' needs and the requirements of the market. After all: our customers and their needs are the focus of all our efforts. Through efficient and effective use of resources, the promotion of personal initiative and courage in finding unusual solutions to the benefit of our customers, we ensure a high level of customer satisfaction. We familiarize ourselves with their needs, requirements and products and we learn from the experiences of our customers' own customers.

**EUCHNER – More than safety.**



Quality – made by EUCHNER

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# Limit switches according to EN 50041

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## Introduction

### EUCHNER limit switches - precise, reliable and versatile

EUCHNER limit switches are manufactured in accordance with the European standard EN 50041. Robust construction and the use of high quality corrosion resistant materials, precision finishing and degree of protection IP 67 according to IEC 60529 guarantee trouble-free and reliable operation under the toughest conditions.

Various EUCHNER limit switch designs can be used as safety switches with certain switching elements whose NC contacts are positively opened by a rigid plunger, even if the switching element is damaged due to a broken spring or contact weld. Limit switches with direct opening action contacts are used in those cases where a guarantee of machine and/or human safety is absolutely essential. Example: End travel limit switching or an EMERGENCY STOP.

### Approvals for type series NG ...



### Approvals for type series NZ ...

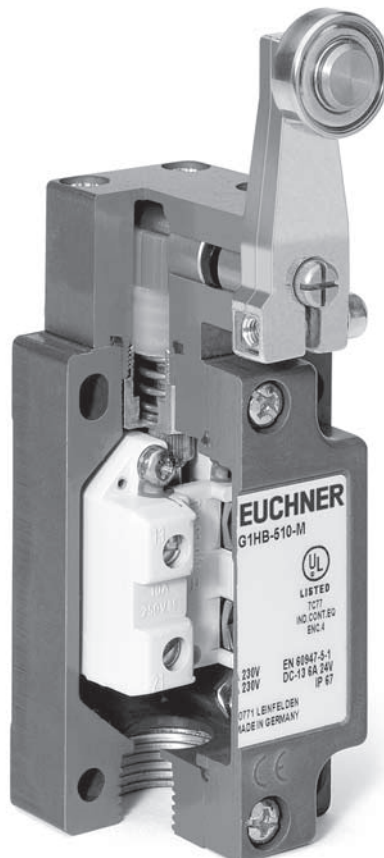


## Limit switches according to EN 50041

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### **EUCHNER limit switches offer important advantages and special features**

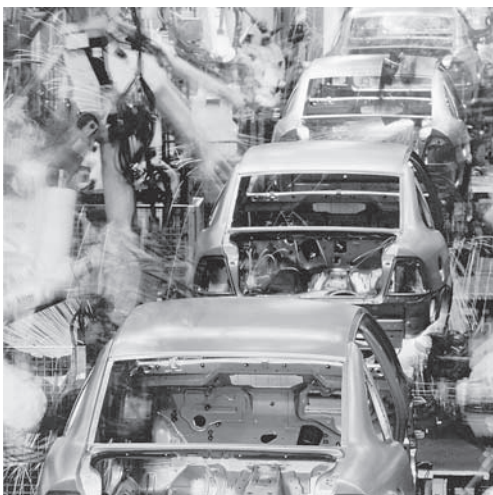
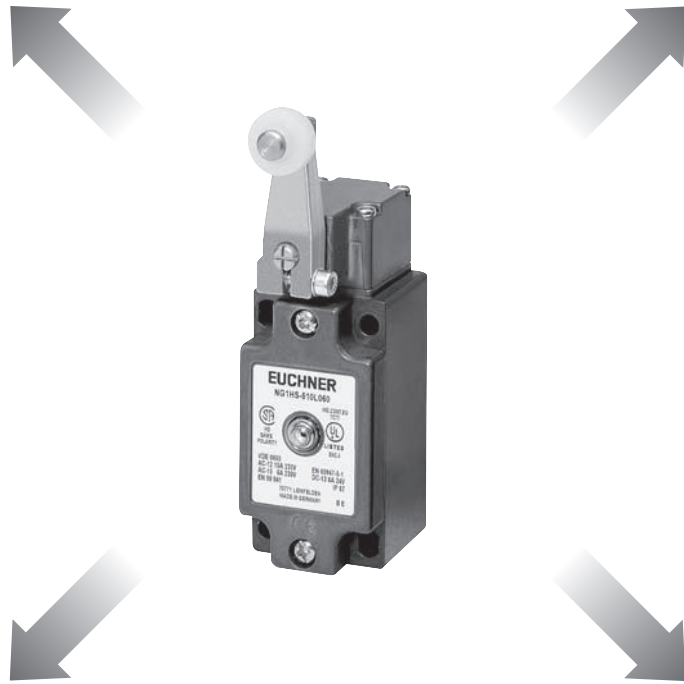
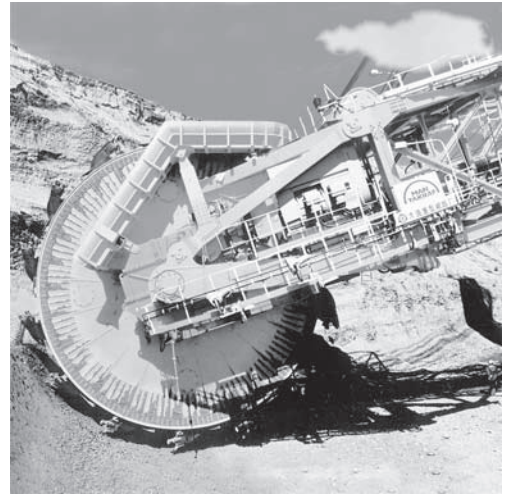
- ▶ Housing and cover made of robust die-cast aluminum.
- ▶ Actuation heads can be adjusted 4 x 90°, lever arm can be adjusted and fixed either continuously or 4 x 90°
- ▶ Switching elements with 2 or 4 contacts (e.g. 2 direct opening action contacts + 2 NO contacts), silver alloy contacts, gold flashed
- ▶ Cable entry M 20x1.5 or plug connection
- ▶ Mechanical service life up to 30 million operating cycles
- ▶ Degree of protection according to IEC 60529 IP 67
- ▶ High switching accuracy up to  $\pm 0.002$  mm
- ▶ Use of silicone-free lubricants
- ▶ Diaphragm seal and cover seal made of NBR plastic (acrylonitrile rubber) to protect the switching chamber against coolants and lubricants
- ▶ High flexibility is guaranteed by the optional LED function display, plug connector and multiple adjustability



# Limit switches according to EN 50041

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## Typical applications for type series NG... and NZ... limit switches



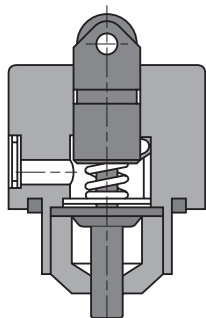
# Limit switches according to EN 50041

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## Limit switch in detail

### Plunger actuation

The plunger actuated versions allow the user a choice of 6 different designs. The stainless steel hardened standard plunger with telescopic action (safety limit switches with direct opening action contacts have rigid plungers) is precisely guided within the anodized die-cast alloy head, and is almost maintenance free. The approach direction of the actuator head can be easily changed by 90°.



### The diaphragm seal

In switches with plunger actuation, the plunger chamber and the switch chamber are separated by a diaphragm seal made of NBR (acrylonitrile rubber). Because of their outstanding technical properties, NBR materials are used wherever possible for all mechanical and system engineering applications.

The seal is firmly fixed to the plunger, and after each switching operation it is returned to the initial position by the plunger return spring and not by the switching element.

Any build-up of pressure during plunger actuation is reliably prevented by a relief valve.

The switching element is actuated by means of a metal cap pressed onto the seal.

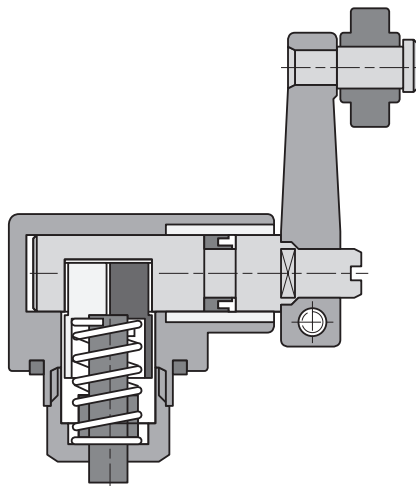
Switching point displacement (a logical consequence due to the high elasticity of the seal) is therefore completely eliminated.

### Lever-arm actuation

Different types of actuators may be used for lever-arm actuation. The stainless steel shaft is guided precisely through the housing.

With the numerous adjusting options a high degree of flexibility is given:

- ▶ Approach direction adjustable by 4 x 90°
- ▶ Actuator direction for lever-arm actuation adjustable by 4 x 90°
- ▶ Switches to the left, or to the right, or on both sides



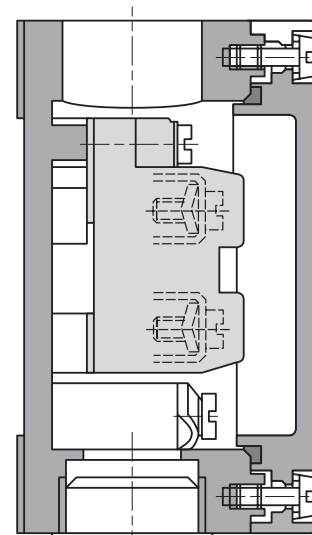
### The edge seal

In lever-arm actuated switches, an edge seal protects the actuating mechanism and the switch chamber against dirt and dust. The edge seal, which is made of NBR, is resistant to all known coolants and lubricants.

### The housing

With their robust design, the die-cast alloy housings have proven themselves highly resistant to corrosion even under the toughest conditions.

Either the M20 x 1.5 cable gland or the pre-wired plug connector (straight or angled) may be used for the cable. The angled plug connector can be adjusted in 7 directions around the longitudinal axis of the switch.



### Cable connections

Before delivery to the customer, EUCHNER limit switches according to EN 50041 undergo routine check tests for compliance with degree of protection IP 67. In order to obtain this degree of protection, only high-quality metal cable glands with captive sealing rings or the pre-wired straight or angled plug connector must be used.

### Function display

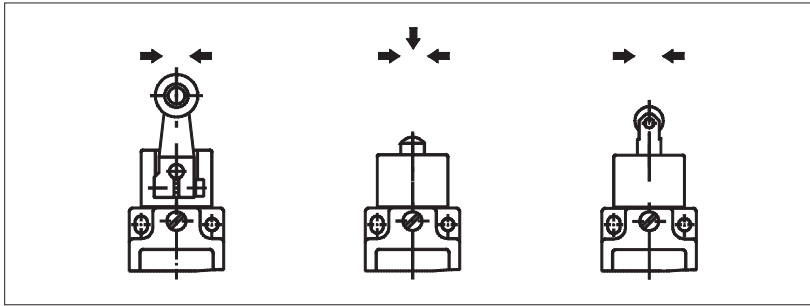
Limit switches may be fitted with an LED on request. Voltage ranges of 10 to 60 V AC/DC, 110 V AC and 230 V AC are available.

# Limit switches according to EN 50041

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## Adjustment options

### Actuator and approach directions



Lever arm  
 HS = steel roller      WO = domed plunger      RG = plastic roller  
 HB = plastic roller      KO = ball plunger      RS, RK, RL = steel roller

The large selection of actuator heads guarantees maximum flexibility and is suitable for a variety of applications.

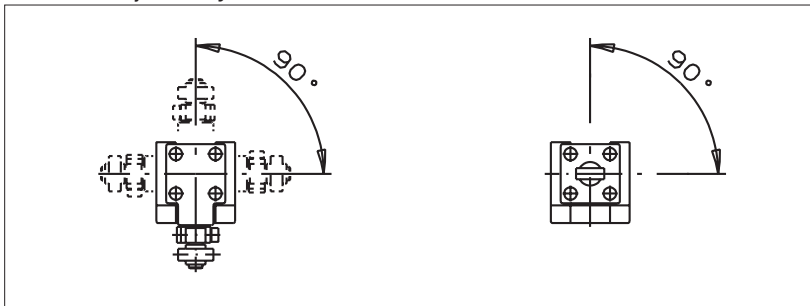
For example, the aluminum lever arm is used for high approach speeds and generous actuating mechanism tolerances.

The domed plunger with its polished-ground surface is designed for a high repeat accuracy of  $\pm 0.002$  mm.

The ball plungers can be actuated from a number of different directions.

### Adjustment option for the actuator

horizontal adjustability 4 x 90°

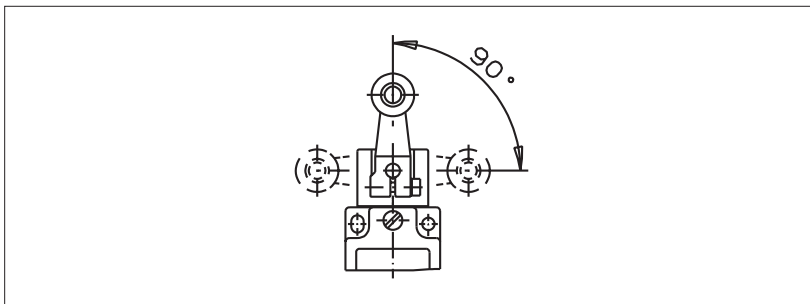


Lever arm

Straight actuator

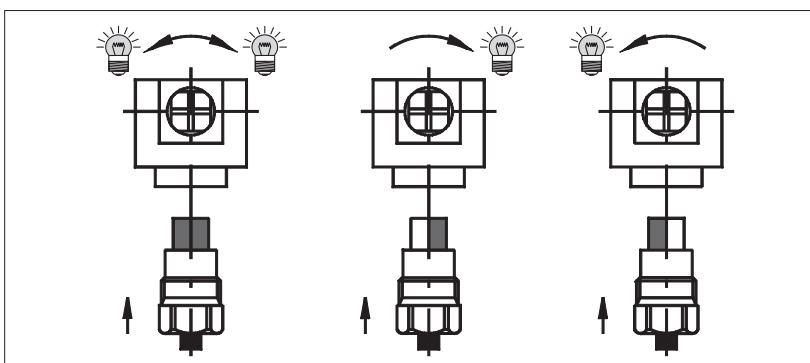
Having removed the stainless steel mounting screws, the actuator heads can each be adjusted horizontally by 90°.

### Vertical adjustment 4 x 90°



In the case of limit switches with no safety function, the lever arm can be adjusted continuously. However limit switches with a safety function, can be adjusted by 90°.

### Adjustment option for switching direction



Left/right switching  
(default setting)

right switching

left switching

On delivery, the lever-arm actuation is set to left and right switching.

If necessary, it can be set to right switching or left switching only.



# Limit switches according to EN 50041

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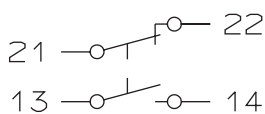
## Switching elements

### Switching element ES 510 <sup>2)</sup>

(without direct opening action)  
Snap-action contact element with one NC contact and one NO contact.

Double gap contacts, electrically isolated switching bridge, silver alloy gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NG...

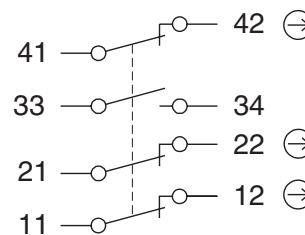


### Switching element SK 2131 H <sup>3)</sup>

Slow-action contact element with three direct opening action contacts and one NO contact.

Double gap contacts, electrically isolated H-contact bridges for currents from 1 mA to 4 A, silver alloy, gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...

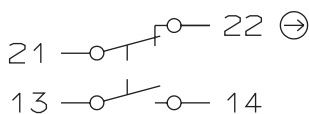


### Switching element ES 511 <sup>2)</sup>

Snap-action contact element with one direct opening action contact and one NO contact.

Double gap contacts, electrically isolated contact elements, silver alloy gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...

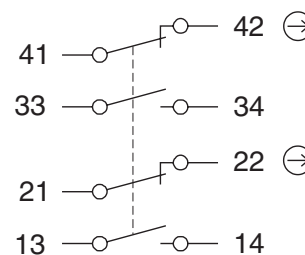


### Switching element SK 3131 H <sup>3)</sup>

Slow-action contact element with two direct opening action contacts and two NO contacts.

Double gap contacts, electrically isolated H-contact bridges for currents from 1 mA to 4 A, silver alloy, gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...

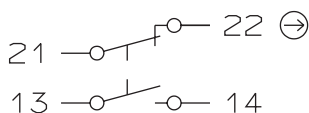


### Switching element ES 528H <sup>1) 3)</sup>

Slow-action contact element with one direct opening action contact and one NO contact.

Double gap contacts, electrically isolated H-contact bridges for currents from 1 mA to 4 A, silver alloy, gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...

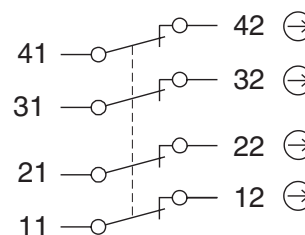


### Switching element SK 2121 H <sup>3)</sup>

Slow-action contact element with four direct opening action contacts.

Double gap contacts, electrically isolated H-contact bridges for currents from 1 mA to 4 A, silver alloy, gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...

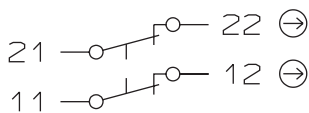


### Switching element ES 538H <sup>1) 3)</sup>

Slow-action contact element with two direct opening action contacts.

Double gap contacts, electrically isolated H-contact bridges for currents from 1 mA to 4 A, silver alloy, gold flashed contact material, screw terminals with self-lifting clamp washers.

Used for NZ...



EUCHNER limit switches marked with this symbol meet the IEC 60947-5-1 requirements for safety limit switches with direct opening action contacts.

**Safety switching elements marked with this symbol are not available as replacement switching elements.**

#### 1) Slow-action contact element

The slow-action contact element has a contact element which opens and closes depending on its actuation speed.

#### 2) Snap-action contact element

The snap-action contact element has a contact element which opens and closes regardless of its actuation speed.

#### 3) H-contact bridge

The design properties of the H-contact bridge (H-shaped) ensure that these switching elements reliably switch currents from 1 mA (e.g. low current PLCs) to 4 A.

# Limit switches according to EN 50041

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## Wiring diagrams

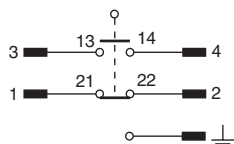
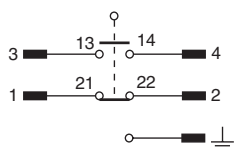
### Plug connector SR6

Pin assignment for plug  
(Top view of on switch  
mounted connector)



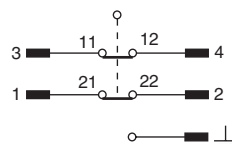
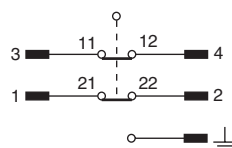
### Contact assignment for switching elements

ES 510 / ES 511 / ES 528H



with LED display

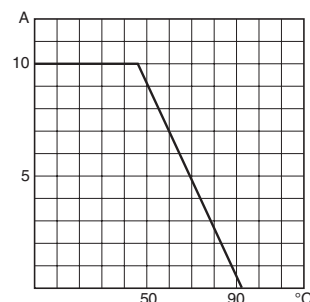
ES 538H



with LED display

### Derating diagram

for connection cross section  
1,5 mm<sup>2</sup>



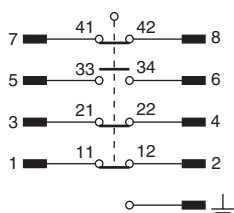
### Plug connector SR11

Pin assignment for plug  
(Top view of on switch  
mounted connector)

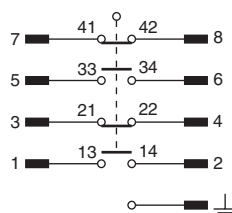


### Contact assignment for switching elements

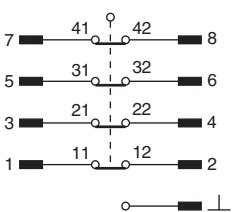
SK 2131H



SK 3131H

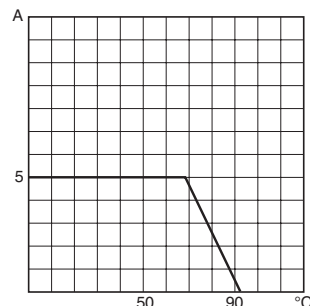


SK 2121H



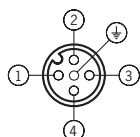
### Derating diagram

for connection cross section  
0,5 mm<sup>2</sup>



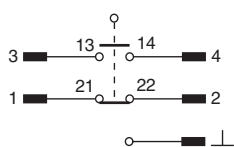
### Plug connector SVM5 (M12, 5-pole)

Pin assignment for plug  
(Top view of on switch  
mounted connector)



### Contact assignment for switching elements

ES 510 / ES 511 /  
ES 528H / ES 538H



# Limit switches according to EN 50041



## Plunger types

Plungers for limit switches are made of stainless steel and are extremely accurate. With its special surface-finished plunger guide, an extremely reliable and maintenance-free operation is given.

There are two different types of actuating systems, depending on the application. For standard applications, the plunger is fitted with a telescopic device. With this system, the plunger can be depressed to the reference surface without damaging the switching element.

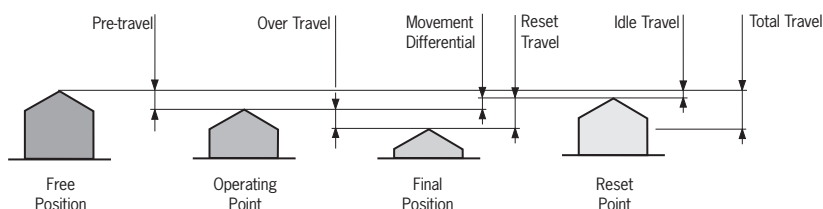
Instead of this telescopic plunger, limit switches which have a safety function (with safety switching element) have a *rigid* plunger which ensures a direct opening action contact in accordance with IEC 60947-5-1. This means that in the event of mechanical failure of the switching element - e.g. failure of a contact spring or contact weld resulting from an overload, - the contact point will be reliably opened.

## Plunger travel

The pictures show the various positions of plunger actuated by a control cam. The precise values for the relevant design are shown in the technical data.

### Travel ratio plunger-switching cam

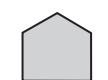
All the plunger travel data shown in the technical data refers to axial actuation. The travel for radial actuation with angled switching cams is increased and this must be calculated.



## Plunger types

Depending on the technical requirements, four different plunger types (chisel, roller, ball and domed plungers) are used.

### Chisel plunger



Hardened and polish-ground. Repeat accuracy to  $\pm 0.002$  mm. Max. approach speed of 10 m/min. With its high repeat accuracy, the domed plunger is ideal for setting reference points for moderate approach speeds.

### Domed plunger



Hardened and polish-ground. Repeat accuracy to  $\pm 0.002$  mm. Max. approach speed of 10 m/min. This plunger can be actuated from a number of different directions. For use in conjunction with safety switching elements!

### Roller plunger



Hardened roller. Repeat accuracy to  $\pm 0.01$  mm. Max. approach speed of 50 m/min. The roller plunger is suitable for higher approach speeds. For very high approach speeds and long travel distances, roller plungers with a protected ball bearing can be offered on request.

### Extended roller plunger



Robust roller plunger for moderate approach speeds.

### Ball plunger



Hardened ball. Repeat accuracy to  $\pm 0.01$  mm. Max. approach speed of 10 m/min. This plunger can be actuated from a number of different directions. It must not be used in conjunction with safety switching elements!



# Limit switches according to EN 50041

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## Limit switch type series NG1.../NZ1...

- ▶ Roller lever arm **HB** (plastic roller)  
**HS** (steel roller)
- ▶ Cable entry **M20 x 1.5**

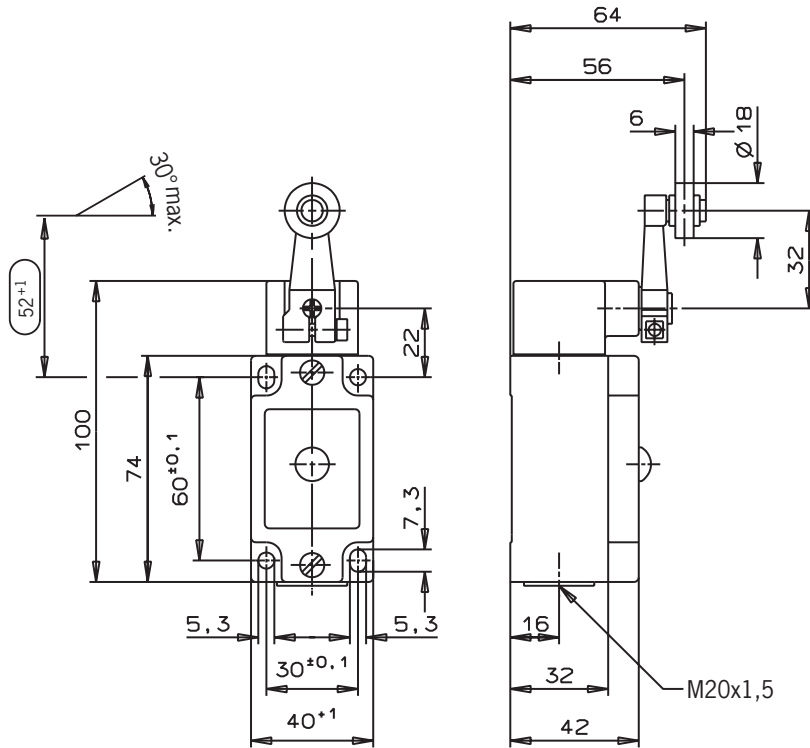
NG...



NZ...



## Dimension drawing



## Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts  
+ 2 NO contact
- (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC L060
- ▶ 110 V AC ±15% L110
- ▶ 230 V AC ±15% L220

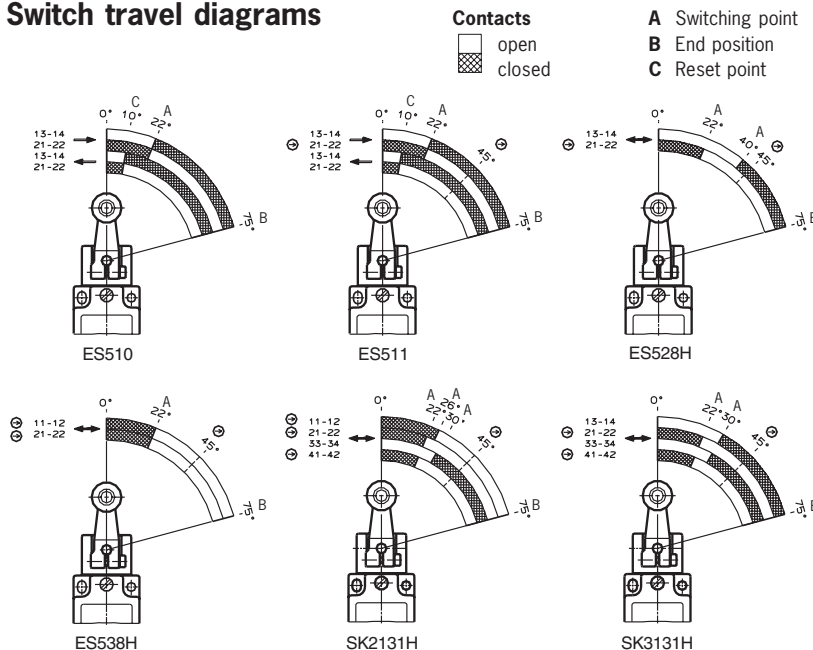
## Adjustment options

Horizontal and vertical 4 x 90° (see page 8).

## Switching direction

Switches to the right, left and to both sides (see page 8).

## Switch travel diagrams



⚠ If damaged or worn, safety switches should be replaced as a unit.

### Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam gap shown in the dimension  $52^{+1}$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

# Limit switches according to EN 50041

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## Technical data

| Parameters   | Value                                 |  |   |    | Unit            |      |
|--|---------------------------------------|--|---|----|-----------------|------|
| Housing material   | Anodized die-cast alloy               |  |   |    |                 |      |
| Degree of protection according to IEC 60529                              | IP 67                                 |  |   |    |                 |      |
| Installation position  | Optional                              |  |   |    |                 |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |  |   |    |                 |      |
| Ambient temperature  | -25 to +80                            |  |   |    | °C              |      |
| Weight   | Approx. 0.3                           |  |   |    | kg              |      |
| Actuator   | Roller lever arm                      |  |   |    |                 |      |
| Roller material  | Plastic (HB)                          |  | Steel (HS)  |    |                 |      |
| Approach speed, max. <sup>1)</sup>                                       | 300                                   |  | 60  |    | m/min           |      |
| Approach speed, min.   | 0.1                                   |  |   |    | m/min           |      |
| Repeat accuracy  | ± 0.25                                |  |   |    | °               |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |  |   |    | °               |      |
| Actuating force, min.  | 15                                    |  |   |    | N               |      |
| Switching elements   | ES 510                                | ES 528H                                  | ES 538H   |    |                 |      |
|  | 1 NC + 1 NO                           | 1 NC ⊖ + 1 NO                            | 2 NC ⊖  |    |                 |      |
| Switching principle  | ES 511                                | SK 2131H                                 | SK 3131H  |    |                 |      |
|  | 1 NC ⊖ + 1 NO                         | 3 NC ⊖ + 1 NO                            | 2 NC ⊖ + 2 NO                                     |    |                 |      |
| Switching principle  | Snap-action contact element           |  | Slow-action contact element with H-contact bridge |    |                 |      |
| Contact material   | Silver alloy, gold flashed            |  |   |    |                 |      |
| Contact closing time   | < 4                                   |  |   |    | ms              |      |
| Contact bounce time  | < 3                                   |  |   |    | ms              |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                   |  |   |    | kV              |      |
| Rated insulation voltage U <sub>i</sub>                                  | 250                                   |  |   |    | V               |      |
| Utilization category according to IEC 60947-5-1                          | AC12                                  | I <sub>e</sub> 10 A U <sub>e</sub> 230 V | -   |    |                 |      |
|  | AC15                                  | I <sub>e</sub> 6 A U <sub>e</sub> 230 V  | I <sub>e</sub> 4 A U <sub>e</sub> 230 V           |    |                 |      |
|  | DC13                                  | I <sub>e</sub> 6 A U <sub>e</sub> 24 V   | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            |    |                 |      |
|  |                                       |  |   |    |                 |      |
| Switching current min. at  | 10                                    | 1  | 10  | 1  | 10              | mA   |
| Switching voltage  | 24                                    | 24                                       | 12  | 24 | 12              | V DC |
| Conventional thermal current I <sub>th</sub>                             | 6                                     | 4  |   |    |                 | A    |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6                                  | 4  |   |    |                 | A gG |
| Type of connection   | Screw terminal <sup>2)</sup>          |  |   |    |                 |      |
| Conductor cross-section, max.  | 2 x 1.5                               |  |   |    | mm <sup>2</sup> |      |

1) The approach speed specified applies to an approach angle of 30°.

2) For wiring diagram see page 9.

## Ordering table

| Type Series | Roller               | Switching Element  | Order No. |                       |            |      |   |
|-------------|----------------------|--------------------|-----------|-----------------------|------------|------|---|
|             |                      |                    | None      | Function Display L060 | L110       | L220 |   |
| NG1...-M    | HB<br>Plastic roller | -510               | 079 926   | 090 360               | on request |      |   |
|             |                      | -511               | 079 952   | 090 039               |            |      |   |
| NZ1...-M    |                      | -528               | 088 199   | 090 965               |            |      |   |
|             |                      | -538               | 090 966   | 090 967               |            |      |   |
| NG1...-M    |                      | HS<br>Steel roller | -2131     | 090 968               | -          | -    | - |
|             |                      |                    | -3131     | 090 969               | -          | -    | - |
| NG1...-M    | -510                 |                    | 079 927   | 079 937               | on request |      |   |
|             | -511                 |                    | 079 953   | 090 035               |            |      |   |
| NZ1...-M    | -528                 |                    | 090 970   | 090 971               |            |      |   |
|             | -538                 |                    | 090 972   | 090 760               |            |      |   |
|             |                      | -2131              | 090 973   | -                     | -          | -    |   |
|             |                      | -3131              | 090 747   | -                     | -          | -    |   |

**Ordering example:** Limit switch without safety function **NG**, cable entry **1**, roller lever arm with steel roller **HS**, snap-action contact element **510**, function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**  
**NG1HS-510L060-M**

Order No. 079 937

# Limit switches according to EN 50041

# EUCHNER

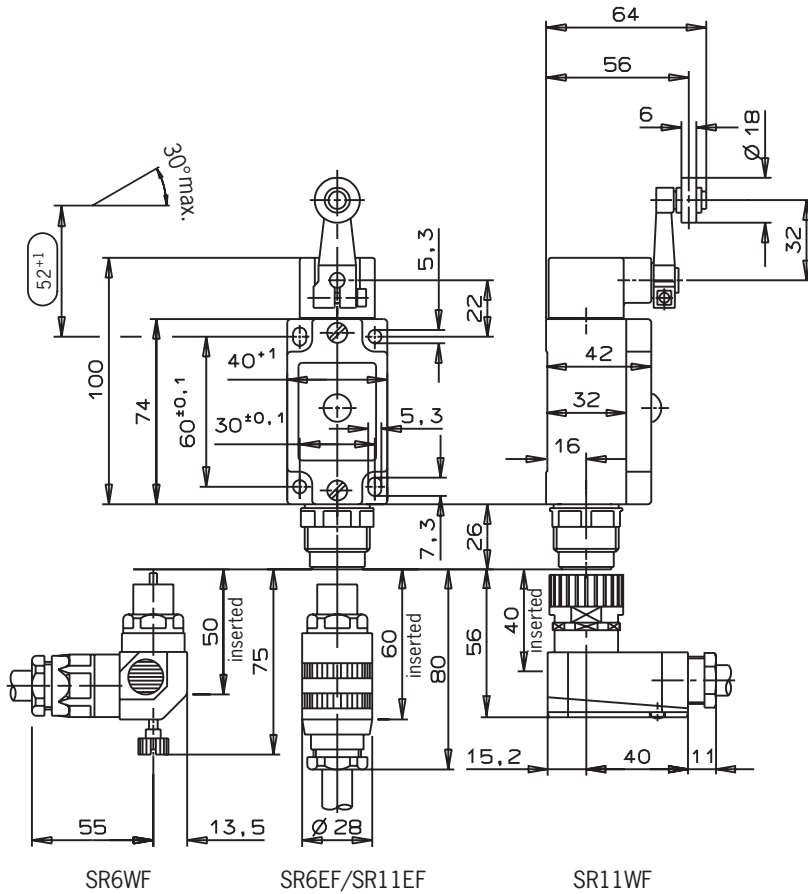
## Limit switch type series NG2.../NZ2...

- ▶ **Roller lever arm HB** (plastic roller)  
HS (steel roller)
- ▶ **Plug connectors SR6 and SR11**

NZ...



## Dimension drawing



## Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts  
+ 2 NO contact
- (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

## Adjustment options

Horizontal and vertical 4 x 90° (see page 8).

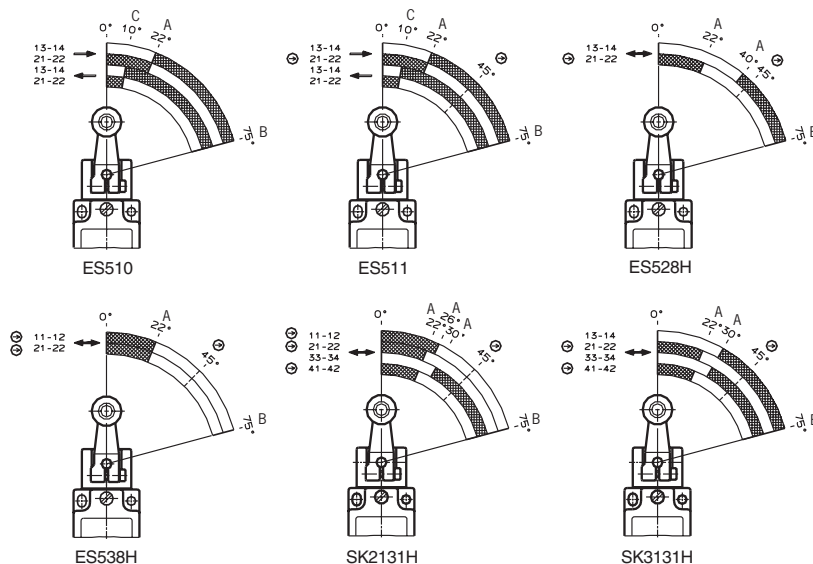
## Switching direction

Switches to the right, left and to both sides (see page 8).

## Switch travel diagrams

**Contacts**

**A** Switching point  
**B** End position  
**C** Reset point



⚠ If damaged or worn, safety switches should be replaced as a unit.

## Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam gap shown in the dimension  $52^{+1}$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                     |   |   |    |    | Unit  |
|--|---|---|---|----|----|-------|
| Housing material   | Anodized die-cast alloy                   |   |   |    |    |       |
| Degree of protection according to IEC 60529                              | IP 65                                     |   |   |    |    |       |
| Installation position  | Optional                                  |   |   |    |    |       |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles     |   |   |    |    |       |
| Ambient temperature  | -25 to +80                                |   |   |    |    | °C    |
| Weight   | Approx. 0.3                               |   |   |    |    | kg    |
| Actuator   | Roller lever arm                          |   |   |    |    |       |
| Roller material  | Plastic (HB)                              |   | Steel (HS)  |    |    |       |
| Approach speed, max. <sup>1)</sup>                                       | 300                                       |   | 60  |    |    | m/min |
| Approach speed, min.   | 0.1                                       |   |   |    |    | m/min |
| Repeat accuracy  | ± 0.25                                    |   |   |    |    | °     |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram     |   |   |    |    | °     |
| Actuating force, min.  | 15  |   |   |    |    | N     |
| Switching elements   | ES 510<br>1 NC + 1 NO                     | ES 528H<br>1 NC ⊖ + 1 NO                | ES 538H<br>2 NC ⊖                                 |    |    |       |
|  | ES 511<br>1 NC ⊖ + 1 NO                   | SK 2131H<br>3 NC ⊖ + 1 NO               | SK 3131H<br>2 NC ⊖ + 2 NO                         |    |    |       |
| Switching principle  | Snap-action contact element               |   | Slow-action contact element with H-contact bridge |    |    |       |
| Contact material   | Silver alloy, gold flashed                |   |   |    |    |       |
| Contact closing time   | < 4                                       |   |   |    |    | ms    |
| Contact bounce time  | < 3                                       |   |   |    |    | ms    |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                       |   |   |    |    | kV    |
| Switching current min. at  | 10  | 1                                       | 10  | 1  | 10 | mA    |
| Switching voltage  | 24  | 24                                      | 12  | 24 | 12 | V DC  |
| Conventional thermal current I <sub>th</sub>                             | 6   | 4                                       |   |    |    | A     |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 6   | 4                                       |   |    |    | A gG  |
| Type of connection   | Plug connector to DIN 43651 <sup>2)</sup> |   |   |    |    |       |
| Rated insulation voltage U <sub>i</sub>                                  |   |   |   |    |    | V     |
| with plug connector SR6  | 250                                       |   |   |    |    |       |
| with plug connector SR11   | 50  |   |   |    |    |       |
| Rated impulse withstand voltage U <sub>imp</sub>                         |   |   |   |    |    | kV    |
| with plug connector SR6  | 2.5                                       |   |   |    |    |       |
| with plug connector SR11   | 1.5                                       |   |   |    |    |       |
| Utilization category according to IEC 60947-5-1                          |   |   |   |    |    |       |
| with plug connector SR6  | AC15                                      | I <sub>e</sub> 6 A U <sub>e</sub> 230 V | I <sub>e</sub> 4 A U <sub>e</sub> 230 V           |    |    |       |
|  | DC13                                      | I <sub>e</sub> 6 A U <sub>e</sub> 24 V  | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            |    |    |       |
| with plug connector SR11   | AC15                                      |   | I <sub>e</sub> 4 A U <sub>e</sub> 50 V            |    |    |       |
|  | DC13                                      |   | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            |    |    |       |

1) The approach speed specified applies to an approach angle of 30°.

2) For wiring and derating diagram see page 10.

## Ordering table

| Type Series          | Roller               | Switching Element | Order No.                         |                  |                     |
|----------------------|----------------------|-------------------|-----------------------------------|------------------|---------------------|
|                      |                      |                   | Plug Connector / Function Display |                  |                     |
|                      |                      |                   | SR6<br>without LED                | SR6<br>with L060 | SR11<br>without LED |
| NG2...<br><br>NZ2... | HB<br>Plastic roller | -510              | 089 088                           | 089 089          | -                   |
|                      |                      | -511              | 089 091                           | 089 092          | -                   |
|                      |                      | -528              | 090 845                           | 090 846          | -                   |
|                      |                      | -538              | 090 847                           | 090 848          | -                   |
|                      |                      | -2131             | -                                 | -                | 090 136             |
|                      |                      | -3131             | -                                 | -                | 090 137             |
| NG2...<br><br>NZ2... | HS<br>Steel roller   | -510              | 090 851                           | 089 090          | -                   |
|                      |                      | -511              | 089 093                           | 089 094          | -                   |
|                      |                      | -528              | 090 852                           | 088 196          | -                   |
|                      |                      | -538              | 090 853                           | 090 854          | -                   |
|                      |                      | -2131             | -                                 | -                | 090 146             |
|                      |                      | -3131             | -                                 | -                | 090 856             |

**Ordering example:** Limit switch without safety function **NG**, plug connector **2**, roller lever arm with steel roller **HS**, snap-action contact element **510**, function display **L060** 10 - 60 V  
**NG2HS-510L060**

Order No. 089 090

# Limit switches according to EN 50041

# EUCHNER

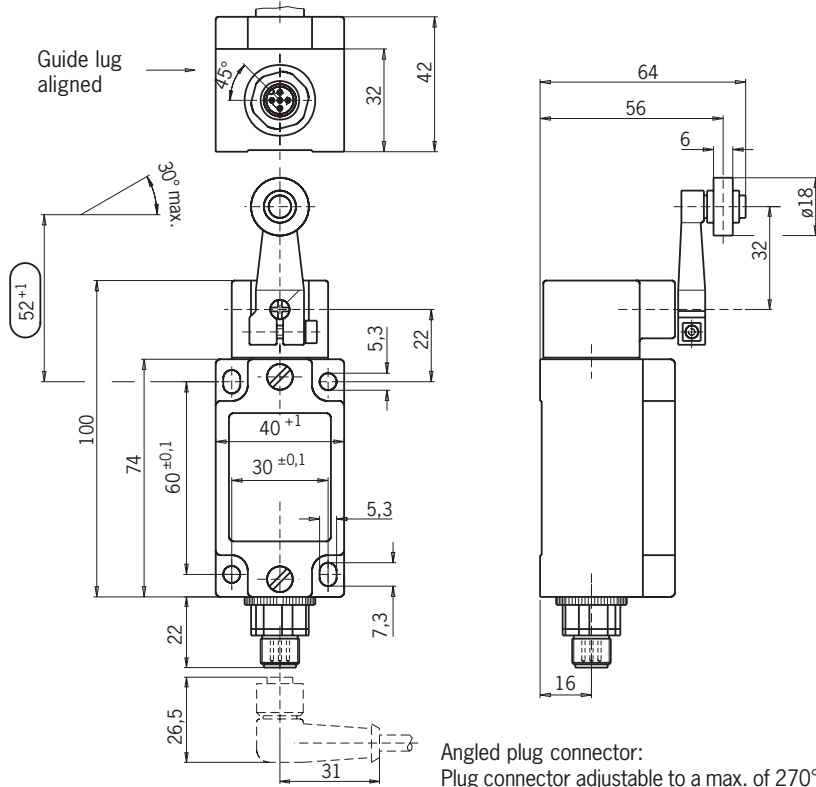
## Limit switch type series NG2.../NZ2...

- ▶ **Roller lever arm** HB (plastic roller)  
HS (steel roller)
- ▶ **M12/SVM5 plug connector**

NZ...



### Dimension drawing



### Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
- ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
- ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
- ES 538H** Slow-action contact element  
2 direct opening action contacts  
(for further details see page 9)

### LED function display

Available on request

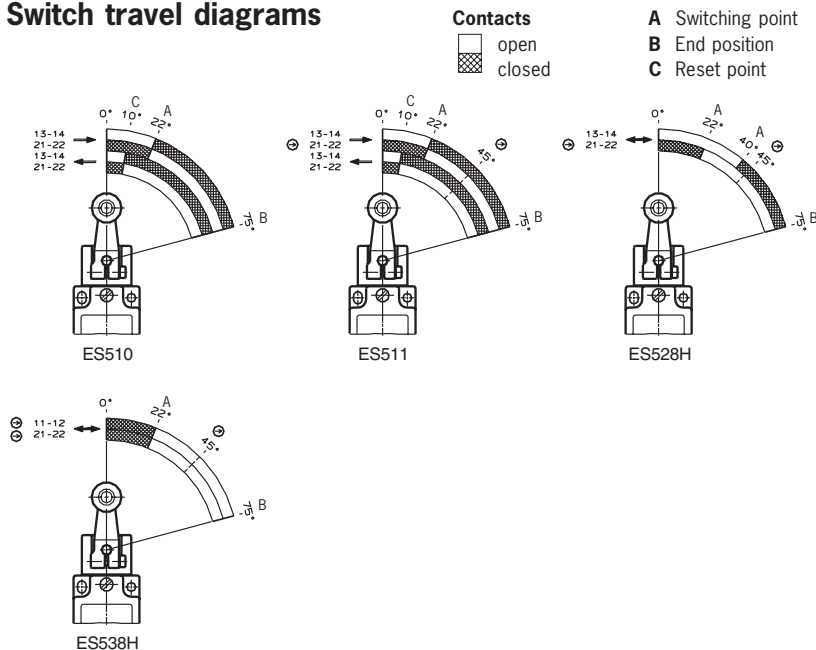
### Adjustment options

Horizontal and vertical 4 x 90° (see page 8).

### Switching direction

Switches to the right, left and to both sides (see page 8).

### Switch travel diagrams



⚠ If damaged or worn, safety switches should be replaced as a unit.

### Notes on installation for limit switches with safety switching elements

To obtain the direct travel, the switching cam gap shown in the dimension  $52^{+1}$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.



## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                 |   |  | Unit  |      |      |
|--|---------------------------------------|---|--|-------|------|------|
| Housing material   | Anodized die-cast alloy               |   |  |       |      |      |
| Degree of protection according to IEC 60529                              | IP 67                                 |   |  |       |      |      |
| Installation position  | Optional                              |   |  |       |      |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |   |  |       |      |      |
| Ambient temperature  | -25 to +80                            |   |  | °C    |      |      |
| Weight   | Approx. 0.3                           |   |  | kg    |      |      |
| Actuator   | Roller lever arm                      |   |  |       |      |      |
| Roller material  | Plastic (HB)                          | Steel (HS)  |  |       |      |      |
| Approach speed, max. <sup>1)</sup>                                       | 300                                   | 60  |  | m/min |      |      |
| Approach speed, min.   | 0.1                                   |   |  | m/min |      |      |
| Repeat accuracy  | ± 0.25                                |   |  | °     |      |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |   |  | °     |      |      |
| Actuating force, min.  | 15                                    |   |  | N     |      |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                 | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                      |       |      |      |
|  | ES 511<br>1 NC ⊖ + 1 NO               |   |  |       |      |      |
| Switching principle  | Snap-action contact element           | Slow-action contact element with H-contact bridge |  |       |      |      |
| Contact material   | Silver alloy, gold flashed            |   |  |       |      |      |
| Contact closing time   | < 4                                   |   |  | ms    |      |      |
| Contact bounce time  | < 3                                   |   |  | ms    |      |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.0                                   |   |  | kV    |      |      |
| Rated insulation voltage U <sub>i</sub>                                  | 50                                    |   |  | V     |      |      |
| Utilization category according to IEC 60947-5-1 with SVM5 plug connector | AC15                                  | I <sub>e</sub> 4 A U <sub>e</sub> 30 V            | I <sub>e</sub> 4 A U <sub>e</sub> 30 V |       |      |      |
|  | DC13                                  | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V |       |      |      |
| Switching current min. at  | 10                                    | 1   | 10                                     | 1     | 10   | mA   |
| Switching voltage  | 24                                    | 24  | 12                                     | 24    | 12   | V DC |
| Conventional thermal current I <sub>th</sub>                             | 4                                     | 4   |  |       | A    |      |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 4                                     | 4   |  |       | A gG |      |
| Type of connection   | M12 plug connector <sup>2)</sup>      |   |  |       |      |      |

1) The approach speed specified applies to an approach angle of 30°.

2) For wiring diagram see page 10.

## Ordering table

| Type Series | Roller               | Switching Element | Order No.           |  |
|-------------|----------------------|-------------------|---------------------|--|
|             |                      |                   | Plug Connector SVM5 |  |
| NG2...      | HB<br>Plastic roller | -510              | 088 631             |  |
|             |                      | -511              | 090 861             |  |
|             |                      | -528              | 090 864             |  |
|             |                      | -538              | 090 862             |  |
| NG2...      | HS<br>Steel roller   | -510              | 090 866             |  |
|             |                      | -511              | 090 867             |  |
|             |                      | -528              | 090 868             |  |
|             |                      | -538              | 090 869             |  |

**Ordering example:** Limit switch without safety function **NG**, plug connector **2**, roller lever arm with steel roller **HS**, snap-action contact element **510**, M12 plug with PE connection **SVM5**  
**NG2HS-510SVM5**

Order No. 090 866

# Limit switches according to EN 50041

# EUCHNER

## Limit switch type series NG1.../NZ1...

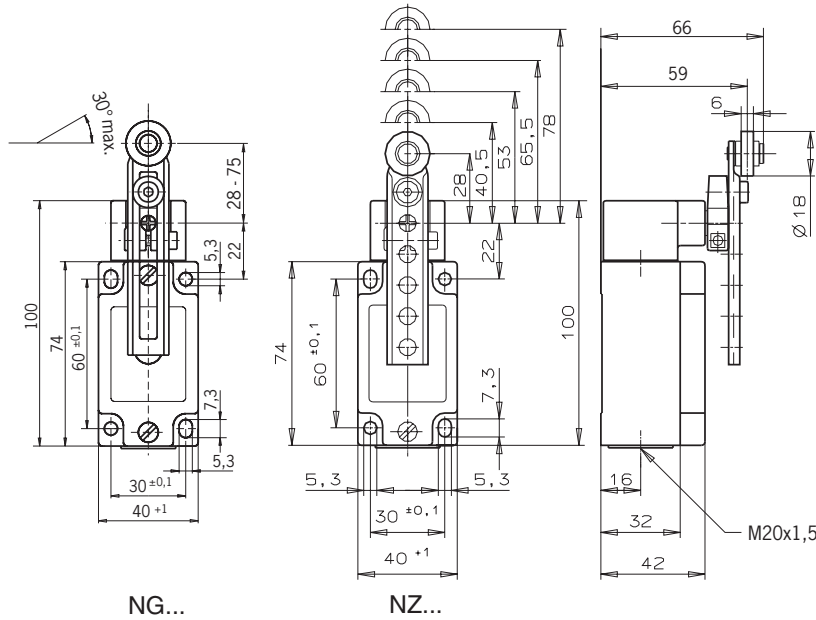
- ▶ **Adjustable roller lever arm**  
**VB** (plastic) / **PB** (plastic roller)  
**VS** (steel roller) / **PS** (steel roller)
- ▶ **Cable entry M20 x 1.5** (plug connector on request)

NZ...



\* Approval applied

## Dimension drawing



## Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contact  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contact  
+ 2 NO contact
- (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

## Adjustment options

Horizontal and vertical 4 x 90° (see page 8).

## Switching direction

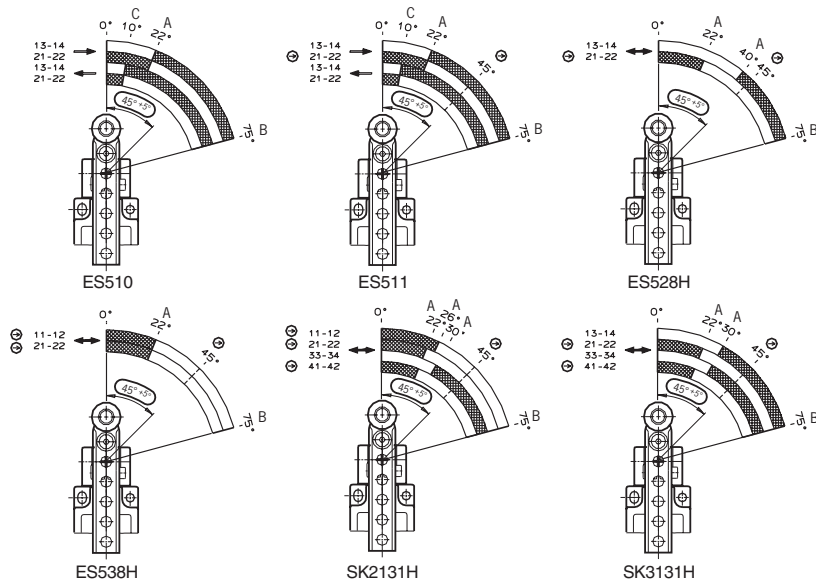
Switches to the right, left and to both sides (see page 8).

## Switch travel diagrams

### Contacts



- A** Switching point
- B** End position
- C** Reset point



⚠ If damaged or worn, safety switches should be replaced as a unit.

### Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam must actuate the lever arm to an angle of  $45^{\circ} \pm 5^{\circ}$ . Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

## Limit switches according to EN 50041

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## Technical data

| Parameters   | Value                                 |   |   |            | Unit            |      |
|--|---------------------------------------|---|---|------------|-----------------|------|
| Housing material   | Anodized die-cast alloy               |   |   |            |                 |      |
| Degree of protection according to IEC 60529                              | IP 67                                 |   |   |            |                 |      |
| Installation position  | Optional                              |   |   |            |                 |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |   |   |            |                 |      |
| Ambient temperature  | -25 to +80                            |   |   |            | °C              |      |
| Weight   | Approx. 0.3                           |   |   |            | kg              |      |
| Actuator   | Adjustable Roller lever arm           |   |   |            |                 |      |
| Roller material  | Plastic (VB)                          | Plastic (PB)                                      | Steel (VS)                              | Steel (PS) |                 |      |
| Approach speed, max. <sup>1)</sup>                                       | 120                                   | 120   | 30                                      | 30         | m/min           |      |
| Approach speed, min.   | 0.5                                   |   |   |            | m/min           |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |   |   |            | °               |      |
| Actuating force, min.  | 15                                    |   |   |            | N               |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                 | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                       |            |                 |      |
|  | ES 511<br>1 NC ⊖ + 1 NO               | SK 2131H<br>3 NC ⊖ + 1 NO                         | SK 3131H<br>2 NC ⊖ + 2 NO               |            |                 |      |
| Switching principle contact bridge                                       | Snap-action contact element           | Slow-action contact element with H-contact bridge |   |            |                 |      |
| Contact material   | Silver alloy, gold flashed            |   |   |            |                 |      |
| Contact closing time   | < 4                                   |   |   |            | ms              |      |
| Contact bounce time  | < 3                                   |   |   |            | ms              |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                   |   |   |            | kV              |      |
| Rated insulation voltage U <sub>i</sub>                                  | 250                                   |   |   |            | V               |      |
| Utilization category according to IEC 60947-5-1                          | AC12                                  | I <sub>e</sub> 10 A U <sub>e</sub> 230 V          | -                                       |            |                 |      |
|  | AC15                                  | I <sub>e</sub> 6 A U <sub>e</sub> 230 V           | I <sub>e</sub> 4 A U <sub>e</sub> 230 V |            |                 |      |
|  | DC13                                  | I <sub>e</sub> 6 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |            |                 |      |
|  |                                       |   |   |            |                 |      |
| Switching current min. at  | 10                                    | 1   | 10                                      | 1          | 10              | mA   |
| Switching voltage  | 24                                    | 24  | 12                                      | 24         | 12              | V DC |
| Conventional thermal current I <sub>th</sub>                             | 6                                     | 4   |   |            |                 | A    |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6                                  | 4   |   |            |                 | A gG |
| Type of connection   | Screw terminal <sup>2)</sup>          |   |   |            |                 |      |
| Conductor cross-section, max.  | 2 x 1.5                               |   |   |            | mm <sup>2</sup> |      |

1) The approach speed specified applies to an approach angle of 30°.

2) For wiring diagram see page 9.

## Ordering table

| Type Series | Roller                      | Switching Element | Order No.        |            |
|-------------|-----------------------------|-------------------|------------------|------------|
|             |                             |                   | Function Display |            |
|             |                             |                   | None             | L060       |
| NG1...-M    | <b>VB</b><br>Plastic roller | -510              | 086 322          | 091 288    |
|             | <b>VS</b><br>Steel roller   | -510              | 079 934          | 090 599    |
| NZ1...-M    | <b>PB</b><br>Plastic roller | -511              | 088 618          | on request |
|             |                             | -528              | 090 870          |            |
|             |                             | -538              | 090 871          |            |
|             |                             | -2131             | 090 872          |            |
|             |                             | -3131             | 090 873          |            |
|             | <b>PS</b><br>Steel roller   | -511              | 088 613          | -          |
|             |                             | -528              | 090 874          | 090 430    |
|             |                             | -538              | 090 875          | -          |
|             |                             | -2131             | 090 876          | -          |
|             |                             | -3131             | 090 877          | -          |

**Ordering example:** Limit switch with safety function **NZ**, cable entry **1**, adjustable roller lever arm with plastic roller **PB**, Snap-action contact element **511**, metric thread M20 x 1.5 **M**  
**NZ1PB-511-M**

Order No. 088 613

# Limit switches according to EN 50041

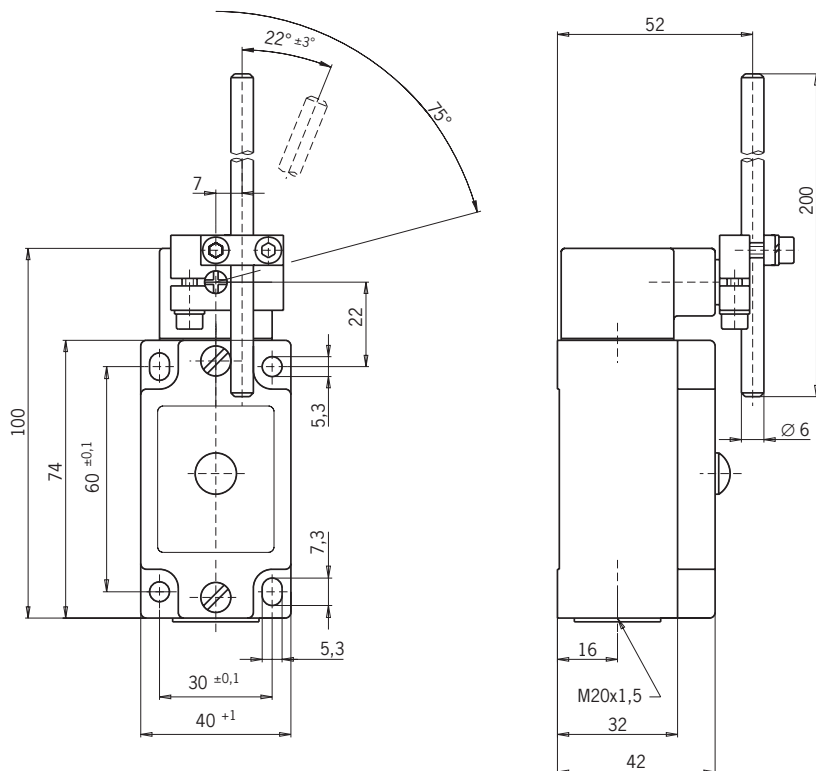
# EUCHNER

## Limit switch type series NG1...



- ▶ **Pivoted lever arm SB** (plastic rod)  
**SM** (aluminum rod)
- ▶ **Cable entry M20 x 1.5** (plug connector on request)

## Dimension drawing



## Switching elements

**ES 510** Snap-action contact element  
 1 NC contact + 1 NO contact  
 (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

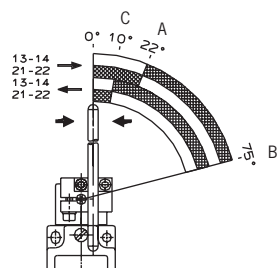
## Adjustment options

Horizontal and vertical 4 x 90° (see page 8).

## Switching direction

Switches to the right, left and to both sides (see page 8).

## Switch travel diagrams



**Contacts**  
  
**A** Switching point  
**B** End position  
**C** Reset point

# Limit switches according to EN 50041

# EUCHNER

## Technical data

| Parameters   | Value                                 | Unit                                     |
|--|---------------------------------------|--|
| Housing material   | Anodized die-cast alloy               |  |
| Degree of protection according to IEC 60529                              | IP 67                                 |  |
| Installation position  | Optional                              |  |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |  |
| Ambient temperature  | -25 to +80                            | °C                                       |
| Weight   | Approx. 0.3                           | kg                                       |
| Actuator   | Pivoted lever arm                     |  |
| Roller material  | Plastic (SB)   Aluminum (SM)          |  |
| Approach speed, max.   | 60                                    | m/min                                    |
| Approach speed, min.   | 0.5                                   | m/min                                    |
| Repeat accuracy  | ± 1                                   | °  |
| Actuating force, min.  | 15                                    | N  |
| Switching elements   | ES 510<br>1 NC + 1 NO                 |  |
| Switching principle  | Snap-action contact element           |  |
| Contact material   | Silver alloy, gold flashed            |  |
| Contact closing time   | < 4                                   | ms                                       |
| Contact bounce time  | < 3                                   | ms                                       |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                   | kV                                       |
| Rated insulation voltage U <sub>i</sub>                                  | 250                                   | V  |
| Utilization category according to IEC 60947-5-1                          |                                       |  |
|  | AC12                                  | I <sub>e</sub> 10 A U <sub>e</sub> 230 V |
|  | AC15                                  | I <sub>e</sub> 6 A U <sub>e</sub> 230 V  |
|  | DC13                                  | I <sub>e</sub> 6 A U <sub>e</sub> 24 V   |
| Switching current min. at  | 10                                    | mA                                       |
| Switching voltage  | 24                                    | V DC                                     |
| Conventional thermal current I <sub>th</sub>                             | 6                                     | A  |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6                                  | A gG                                     |
| Type of connection   | Screw terminal <sup>1)</sup>          |  |
| Conductor cross-section, max.  | 2 x 1.5                               | mm <sup>2</sup>                          |

1) For wiring diagram see page 9.

## Ordering table

| Type Series | Roller             | Switching Element | Order No.        |         |
|-------------|--------------------|-------------------|------------------|---------|
|             |                    |                   | Function Display |         |
|             |                    |                   | None             | L060    |
| NG1...-M    | SB<br>plastic rod  | -510              | 088 609          | 090 577 |
|             | SM<br>Aluminum rod |                   | 079 932          | 090 575 |

**Ordering example:** Limit switch without safety function **NG**, cable entry **1**, pivoted arm lever with plastic rod **SB**, snap-action contact element **510**, function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**  
**NG1SB-510L060-M**

**Order No. 090 577**

# Limit switches according to EN 50041

# EUCHNER

## Limit switch type series NG1.../NZ1...

NG...

NZ...

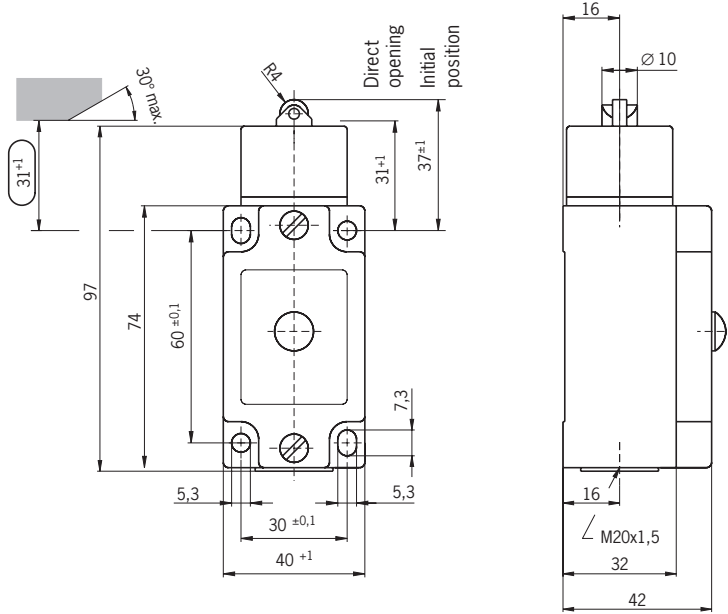


▶ **Plunger actuator**

- WO** (Domed plunger) / **KO** (Ball plunger)
- DO** (Chisel plunger) / **RK** (Roller plunger with small steel roller)

▶ **Cable entry M20 x 1.5**

### Dimension drawing



### Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts  
+ 2 NO contact
- (for further details see page 9)

### LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

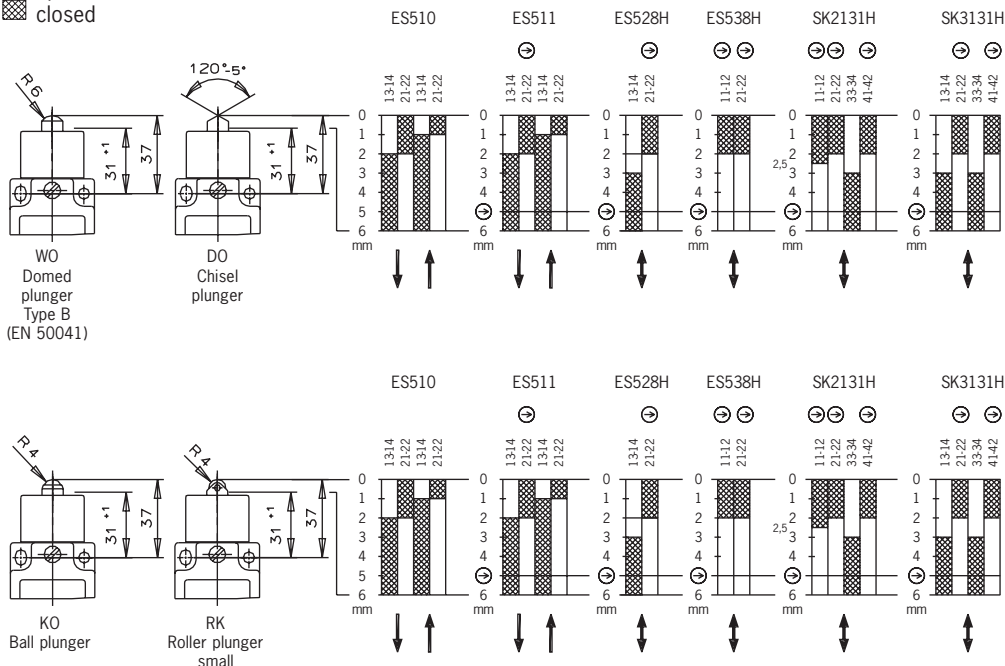
⚠ To obtain the direct opening travel, the switching cam gap shown in the dimension (31<sup>+1</sup>) must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

### Adjustment options

Horizontal 4 x 90° (see page 8).

## Switch travel diagrams

### Contacts



## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value  |   |                           |                           | Unit            |      |
|--|--|---|---------------------------|---------------------------|-----------------|------|
| Housing material   | Anodized die-cast alloy                          |   |                           |                           |                 |      |
| Degree of protection according to IEC 60529                              | IP 67  |   |                           |                           |                 |      |
| Installation position  | Optional   |   |                           |                           |                 |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles            |   |                           |                           |                 |      |
| Ambient temperature  | -25 to +80                                       |   |                           |                           | °C              |      |
| Weight   | Approx. 0.3                                      |   |                           |                           | kg              |      |
| Actuator   | Domed plunger (WO)                               | Chisel plunger (DO)                               | Ball plunger (KO)         | Roller plunger Small (RK) |                 |      |
| Approach speed, max. <sup>1)</sup>                                       | 10   |   |                           | 50                        | m/min           |      |
| Approach speed, min.   | 0.1  |   |                           |                           | m/min           |      |
| Repeat accuracy <sup>3)</sup>  | ± 0.002  |   | 0.01                      |                           | mm              |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram            |   |                           |                           | mm              |      |
| Actuating force, min.  | 15   |   |                           |                           | N               |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                            | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖         |                           |                 |      |
|  | ES 511<br>1 NC ⊖ + 1 NO                          | SK 2131H<br>3 NC ⊖ + 1 NO                         | SK 3131H<br>2 NC ⊖ + 2 NO |                           |                 |      |
| Switching principle  | Snap-action contact element                      | Slow-action contact element with H-contact bridge |                           |                           |                 |      |
| Contact material   | Silver alloy, gold flashed                       |   |                           |                           |                 |      |
| Contact closing time   | < 4  |   |                           |                           | ms              |      |
| Contact bounce time  | < 3  |   |                           |                           | ms              |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5  |   |                           |                           | kV              |      |
| Rated insulation voltage U <sub>i</sub>                                  | 250  |   |                           |                           | V               |      |
| Utilization category according to IEC 60947-5-1                          | AC12<br>I <sub>e</sub> 10 A U <sub>e</sub> 230 V | -   |                           |                           |                 |      |
|  | AC15<br>I <sub>e</sub> 6 A U <sub>e</sub> 230 V  | I <sub>e</sub> 4 A U <sub>e</sub> 230 V           |                           |                           |                 |      |
|  | DC13<br>I <sub>e</sub> 6 A U <sub>e</sub> 24 V   | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            |                           |                           |                 |      |
| Switching current min. at  | 10   | 1   | 10                        | 1                         | 10              | mA   |
| Switching voltage  | 24   | 24  | 12                        | 24                        | 12              | V DC |
| Conventional thermal current I <sub>th</sub>                             | 6  | 4   |                           |                           |                 | A    |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6   | 4   |                           |                           |                 | A gG |
| Type of connection   | Screw terminal <sup>2)</sup>                     |   |                           |                           |                 |      |
| Conductor cross-section, max.  | 2 x 1.5  |   |                           |                           | mm <sup>2</sup> |      |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring diagram see page 9.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                     | Switching Element | Order No.        |            |
|-------------|----------------------------|-------------------|------------------|------------|
|             |                            |                   | Function Display | L060       |
| NG1...-M    | WO<br>Domed plunger        | -510              | 079 945          | on request |
|             |                            | -511              | 088 611          | 089 057    |
|             |                            | -528              | 089 624          | 089 078    |
|             |                            | -538              | 090 878          | 089 046    |
|             |                            | -2131             | 089 629          | -          |
|             |                            | -3131             | 089 626          | -          |
| NG1...-M    | DO<br>Chisel plunger       | -510              | 088 616          |            |
|             |                            | -511              | 088 620          |            |
|             |                            | -528              | 090 901          |            |
|             |                            | -538              | 090 902          | on request |
|             |                            | -2131             | 090 903          |            |
|             |                            | -3131             | 090 904          |            |
| NG1...-M    | RK<br>Roller plunger small | -510              | 088 619          |            |
|             |                            | -511              | 088 608          | 090 354    |
|             |                            | -528              | 090 905          | 090 358    |
|             |                            | -538              | 090 906          | on request |
|             |                            | -2131             | 090 907          | -          |
|             |                            | -3131             | 090 908          | -          |
| NG1...-M    | KO<br>Ball plunger         | -510              | 088 604          | on request |

**Ordering example:** Limit switch without safety function **NZ**, cable entry **1**, domed plunger **WO**, snap-action contact element **511**, function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**  
**NZ1WO-511L060-M**

Order No. 089 057

# Limit switches according to EN 50041



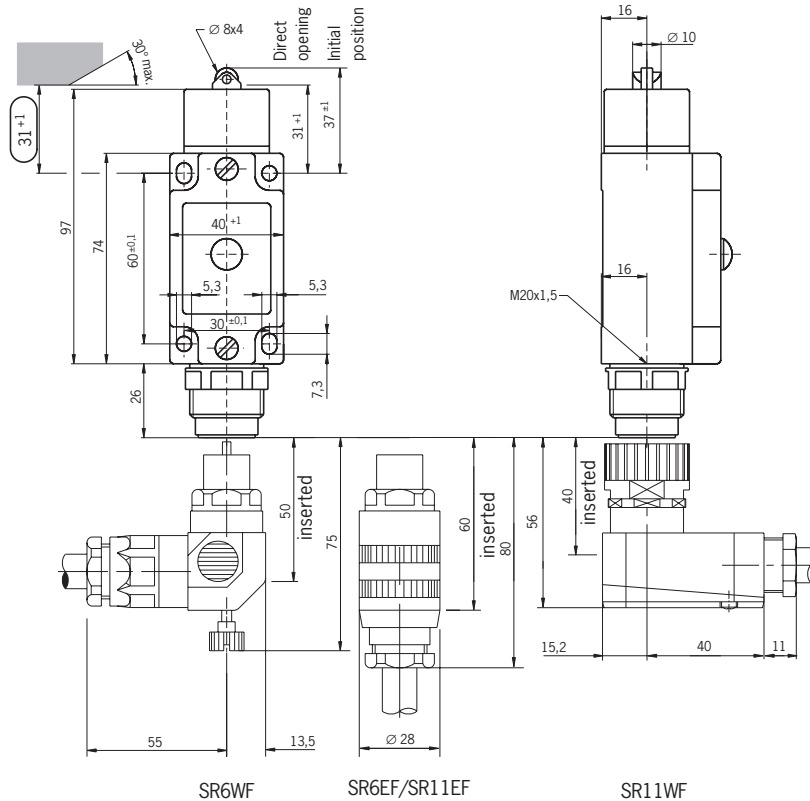
## Limit switch type series NG2.../NZ2...

NZ...



- ▶ **Plunger actuator**  
**WO** (Domed plunger) / **KO** (Ball plunger)  
**DO** (Chisel plunger) / **RK** (Roller plunger with small steel roller)
- ▶ **Plug connectors SR6 and SR11**

### Dimension drawing



### Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact + 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact + 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts + 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts + 2 NO contact
- (for further details see page 9)

### LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

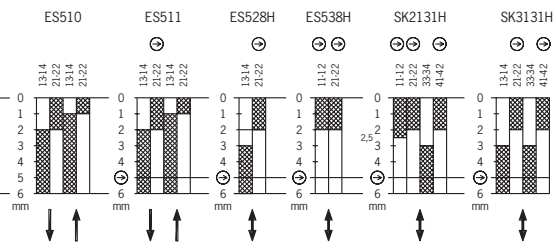
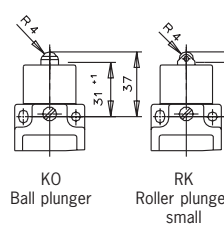
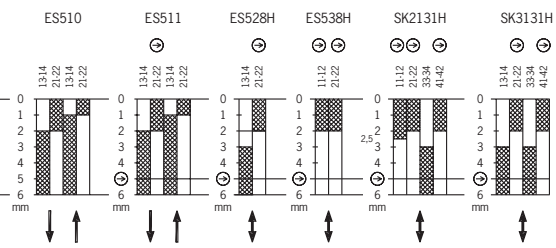
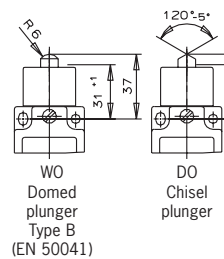
### Adjustment options

Horizontal 4 x 90° (see page 8).

⚠ To obtain the direct opening travel the switching cam gap shown in the dimension  $31^{+1}$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

### Switch travel diagrams

#### Contacts





## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                     |   |   |                           |       | Unit  |
|--|---|---|---|---------------------------|-------|-------|
| Housing material   | Anodized die-cast alloy                   |   |   |                           |       |       |
| Degree of protection according to IEC 60529                              | IP 65                                     |   |   |                           |       |       |
| Installation position  | Optional                                  |   |   |                           |       |       |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles     |   |   |                           |       |       |
| Ambient temperature  | -25 to +80                                |   |   |                           |       | °C    |
| Weight   | Approx. 0.3                               |   |   |                           |       | kg    |
| Actuator   | Domed plunger (WO)                        | Chisel plunger (DO)                               | Ball plunger (KO)                       | Roller plunger Small (RK) |       |       |
| Approach speed, max. <sup>1)</sup>                                       | 10  |   | 50                                      |                           | m/min |       |
| Approach speed, min.   | 0.1                                       |   |   |                           |       | m/min |
| Repeat accuracy <sup>3)</sup>  | ± 0.002                                   |   | 0.01                                    |                           |       | mm    |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram     |   |   |                           |       | mm    |
| Actuating force, min.  | 15  |   |   |                           |       | N     |
| Switching elements   | ES 510<br>1 NC + 1 NO                     | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                       |                           |       |       |
|  | ES 511<br>1 NC ⊖ + 1 NO                   | SK 2131H<br>3 NC ⊖ + 1 NO                         | SK 3131H<br>2 NC ⊖ + 2 NO               |                           |       |       |
| Switching principle  | Snap-action contact element               | Slow-action contact element with H-contact bridge |   |                           |       |       |
| Contact material   | Silver alloy, gold flashed                |   |   |                           |       |       |
| Contact closing time   | < 4                                       |   |   |                           |       | ms    |
| Contact bounce time  | < 3                                       |   |   |                           |       | ms    |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                       |   |   |                           |       | kV    |
| Switching current min. at  | 10  | 1   | 10                                      | 1                         | 10    | mA    |
| Switching voltage  | 24  | 24  | 12                                      | 24                        | 12    | V DC  |
| Conventional thermal current I <sub>th</sub>                             | 6   |   | 4                                       |                           |       | A     |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 6   |   | 4                                       |                           |       | A gG  |
| Type of connection   | Plug connector to DIN 43651 <sup>2)</sup> |   |   |                           |       |       |
| Rated insulation voltage U <sub>i</sub>                                  |   |   |   |                           |       |       |
| with plug connector SR6  | 250                                       |   |   |                           |       | V     |
| with plug connector SR11   | 50  |   |   |                           |       |       |
| Rated impulse withstand voltage U <sub>imp</sub>                         |   |   |   |                           |       |       |
| with plug connector SR6  | 2.5                                       |   |   |                           |       | kV    |
| with plug connector SR11   | 1.5                                       |   |   |                           |       |       |
| Utilization category according to IEC 60947-5-1                          |   |   |   |                           |       |       |
| with plug connector SR6  | AC15                                      | I <sub>e</sub> 6 A U <sub>e</sub> 230 V           | I <sub>e</sub> 4 A U <sub>e</sub> 230 V |                           |       |       |
|  | DC13                                      | I <sub>e</sub> 6 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |                           |       |       |
| with plug connector SR11   | AC15                                      |   | I <sub>e</sub> 4 A U <sub>e</sub> 50 V  |                           |       |       |
|  | DC13                                      |   | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |                           |       |       |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring and derating diagram see page 10.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                     | Switching Element | Order No. |            |
|-------------|----------------------------|-------------------|-----------|------------|
|             |                            |                   | Function  | Display    |
|             |                            |                   | None      | L060       |
| NG2...      | WO<br>Domed plunger        | -510              | 090 012   | on request |
|             |                            | -511              | 090 909   | 091 280    |
|             |                            | -528              | 090 910   | 091 279    |
|             |                            | -538              | 090 911   | 087 558    |
|             |                            | -2131             | 090 912   | -          |
| NG2...      | DO<br>Chisel plunger       | -3131             | 090 913   | -          |
|             |                            | -510              | 090 011   |            |
|             |                            | -511              | 090 015   |            |
|             |                            | -528              | 090 914   | on request |
|             |                            | -538              | 090 915   |            |
| NG2...      | RK<br>Roller plunger small | -2131             | 090 916   | -          |
|             |                            | -3131             | 090 917   | -          |
|             |                            | -510              | 090 918   |            |
|             |                            | -511              | 090 016   | on request |
|             |                            | -528              | 090 919   | 091 292    |
| NG2...      | KO<br>Ball plunger         | -538              | 090 920   | on request |
|             |                            | -2131             | 090 921   | -          |
|             |                            | -3131             | 090 922   | -          |
| NG2...      |                            | -510              | 090 020   | on request |



## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                 |   |  |                           | Unit  |
|--|---------------------------------------|---|--|---------------------------|-------|
| Housing material   | Anodized die-cast alloy               |   |  |                           |       |
| Degree of protection according to IEC 60529                              | IP 67                                 |   |  |                           |       |
| Installation position  | Optional                              |   |  |                           |       |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |   |  |                           |       |
| Ambient temperature  | -25 to +80                            |   |  |                           | °C    |
| Weight   | Approx. 0.3                           |   |  |                           | kg    |
| Actuator   | Domed plunger (WO)                    | Chisel plunger (DO)                               | Ball plunger (KO)                      | Roller plunger Small (RK) |       |
| Approach speed, max. <sup>1)</sup>                                       | 10                                    |   | 50                                     |                           | m/min |
| Approach speed, min.   | 0.1                                   |   |  |                           | m/min |
| Repeat accuracy <sup>3)</sup>  | ± 0.002                               |   | 0.01                                   |                           | mm    |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |   |  |                           | mm    |
| Actuating force, min.  | 15                                    |   |  |                           | N     |
| Switching elements   | ES 510<br>1 NC + 1 NO                 | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                      |                           |       |
|  | ES 511<br>1 NC ⊖ + 1 NO               |   |  |                           |       |
| Switching principle  | Snap-action contact element           | Slow-action contact element with H-contact bridge |  |                           |       |
| Contact material   | Silver alloy, gold flashed            |   |  |                           |       |
| Contact closing time   | < 4                                   |   |  |                           | ms    |
| Contact bounce time  | < 3                                   |   |  |                           | ms    |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.0                                   |   |  |                           | kV    |
| Rated insulation voltage U <sub>i</sub>                                  | 50                                    |   |  |                           | V     |
| Utilization category according to IEC 60947-5-1                          |                                       |   |  |                           |       |
| with SVM5 plug connector   | AC15                                  | I <sub>e</sub> 4 A U <sub>e</sub> 30 V            | I <sub>e</sub> 4 A U <sub>e</sub> 30 V |                           |       |
|  | DC13                                  | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V |                           |       |
| Switching current min. at  | 10                                    | 1   | 10                                     | 1                         | 10    |
| Switching voltage  | 24                                    | 24  | 12                                     | 24                        | 12    |
| Conventional thermal current I <sub>th</sub>                             | 4                                     |   |  |                           | A     |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 4                                     |   |  |                           | A gG  |
| Type of connection   | M12 plug connector <sup>2)</sup>      |   |  |                           |       |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring diagram see page 10.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                     | Switching Element | Order No.           |  |
|-------------|----------------------------|-------------------|---------------------|--|
|             |                            |                   | Plug Connector SVM5 |  |
| NG2...      | WO<br>Domed plunger        | -510              | 090 018             |  |
|             |                            | -511              | 089 014             |  |
| NZ2...      |                            | -528              | 090 923             |  |
|             |                            | -538              | 090 924             |  |
| NG2...      | DO<br>Chisel plunger       | -510              | 090 014             |  |
|             |                            | -511              | 090 927             |  |
| NZ2...      |                            | -528              | 090 928             |  |
|             |                            | -538              | 090 929             |  |
| NG2...      | RK<br>Roller plunger small | -510              | 089 020             |  |
|             |                            | -511              | 089 007             |  |
| NZ2...      |                            | -528              | 090 930             |  |
|             |                            | -538              | 089 018             |  |
| NG2...      | KO<br>Ball plunger         | -510              | 090 931             |  |

**Ordering example:** Limit switch without safety function **NG**, plug connector **2**, small roller plunger with steel roller **RK**, snap-action contact element **510**, M12 plug with PE connection **SVM5**  
**NG2RK-510SVM5**

Order No. 089 020

# Limit switches according to EN 50041



## Limit switch type series NG1.../NZ1...

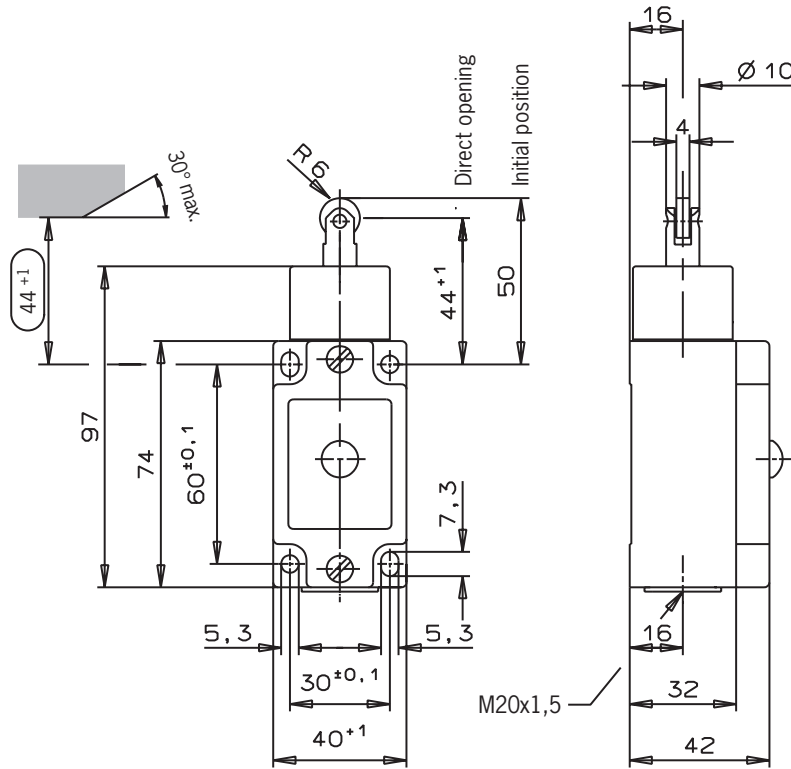
NG...

NZ...



- ▶ **Plunger actuator** **RG** (Roller plunger - plastic roller)  
**RS** (Roller plunger - steel roller)  
**RL** (Extended roller plunger)
- ▶ **Cable entry M20 x 1.5**

## Dimension drawing



## Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts  
+ 2 NO contact
- (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

## Adjustment options

Horizontal 4 x 90° (see page 8).

⚠ If damaged or worn, safety switches should be replaced as a unit.

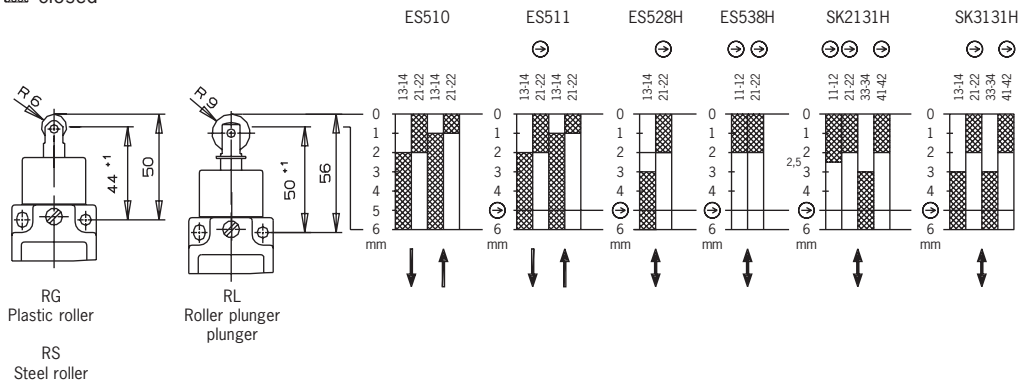
### Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam gap shown in the dimension 44<sup>+1</sup> must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

## Switch travel diagrams

### Contacts

- open
- ▨ closed



## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                 |   |   |    | Unit            |      |
|--|---------------------------------------|---|---|----|-----------------|------|
| Housing material   | Anodized die-cast alloy               |   |   |    |                 |      |
| Degree of protection according to IEC 60529                              | IP 67                                 |   |   |    |                 |      |
| Installation position  | Optional                              |   |   |    |                 |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |   |   |    |                 |      |
| Ambient temperature  | -25 to +80                            |   |   |    | °C              |      |
| Weight   | Approx. 0.3                           |   |   |    | kg              |      |
| Actuator   | Roller plunger<br>Plastic roller (RG) | Roller plunger<br>Steel (RS)                      | Roller plunger<br>Extended (RL)         |    |                 |      |
| Approach speed, max. <sup>1)</sup>                                       | 20                                    |   |   |    | m/min           |      |
| Approach speed, min.   | 0.1                                   |   |   |    | m/min           |      |
| Repeat accuracy <sup>3)</sup>  | ± 0.1                                 |   |   |    | mm              |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |   |   |    | mm              |      |
| Actuating force, min.  | 15                                    |   |   |    | N               |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                 | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                       |    |                 |      |
|  | ES 511<br>1 NC ⊖ + 1 NO               | SK 2131H<br>3 NC ⊖ + 1 NO                         | SK 3131H<br>2 NC ⊖ + 2 NO               |    |                 |      |
| Switching principle  | Snap-action contact element           | Slow-action contact element with H-contact bridge |   |    |                 |      |
| Contact material   | Silver alloy, gold flashed            |   |   |    |                 |      |
| Contact closing time   | < 4                                   |   |   |    | ms              |      |
| Contact bounce time  | < 3                                   |   |   |    | ms              |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                   |   |   |    | kV              |      |
| Rated insulation voltage U <sub>i</sub>                                  | 250                                   |   |   |    | V               |      |
| Utilization category according to IEC 60947-5-1                          | AC12                                  | I <sub>e</sub> 10 A U <sub>e</sub> 230 V          | -                                       |    |                 |      |
|  | AC15                                  | I <sub>e</sub> 6 A U <sub>e</sub> 230 V           | I <sub>e</sub> 4 A U <sub>e</sub> 230 V |    |                 |      |
|  | DC13                                  | I <sub>e</sub> 6 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |    |                 |      |
| Switching current min. at  | 10                                    | 1   | 10                                      | 1  | 10              | mA   |
| Switching voltage  | 24                                    | 24  | 12                                      | 24 | 12              | V DC |
| Conventional thermal current I <sub>th</sub>                             | 6                                     | 4   |   |    |                 | A    |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6                                  | 4   |   |    |                 | A gG |
| Type of connection   | Screw terminal <sup>2)</sup>          |   |   |    |                 |      |
| Conductor cross-section, max.  | 2 x 1.5                               |   |   |    | mm <sup>2</sup> |      |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring diagram see page 9.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                                 | Switching Element | Order No.        |         |
|-------------|--|-------------------|------------------|---------|
|             |  |                   | Function Display | L060    |
| NG1...-M    | RG<br>Roller plunger<br>Plastic roller | -510              | 079 941          | 090 398 |
|             |  | -511              | 088 605          | 089 052 |
|             |  | -528              | 090 932          | 090 008 |
|             |  | -538              | 090 933          | 090 009 |
|             |  | -2131             | 090 934          | -       |
|             |  | -3131             | 090 935          | -       |
| NG1...-M    | RS<br>Roller plunger<br>Steel roller   | -510              | 079 942          | 079 943 |
|             |  | -511              | 079 960          | 089 053 |
|             |  | -528              | 089 627          | 086 413 |
|             |  | -538              | 090 936          | 090 555 |
|             |  | -2131             | 089 633          | -       |
|             |  | -3131             | 089 631          | -       |
| NG1...-M    | RL<br>Extended roller plunger          | -510              | 086 324          | 090 602 |
|             |  | -511              | 088 614          | 088 996 |
|             |  | -528              | 090 937          | 090 938 |
|             |  | -538              | 090 939          | 090 940 |
|             |  | -2131             | 090 941          | -       |
|             |  | -3131             | 090 942          | -       |

**Ordering example:** Limit switch with safety function **NZ**, cable entry **1**,  
Roller plunger with plastic roller **RG**, snap-action contact element **511**,  
function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**  
**NZ1RG-511L060-M**

Order No. 089 052

# Limit switches according to EN 50041

# EUCHNER

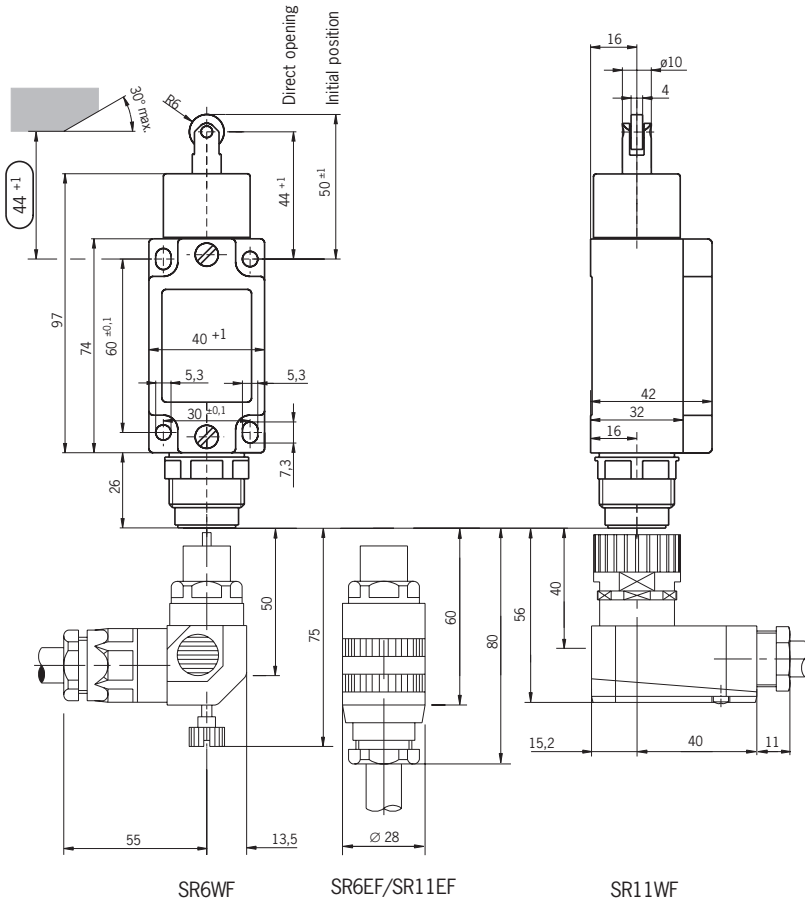
## Limit switch type series NG2.../NZ2...

- ▶ **Plunger actuator** **RG** (Roller plunger - plastic roller)  
**RS** (Roller plunger - steel roller)  
**RL** (Extended roller plunger)
- ▶ **Plug connectors** **SR6** and **SR11**

NZ...



## Dimension drawing



## Switching elements

- ES 510** Snap-action contact element  
1 NC contact + 1 NO contact
  - ES 511** Snap-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 528H** Slow-action contact element  
1 direct opening action contact  
+ 1 NO contact
  - ES 538H** Slow-action contact element  
2 direct opening action contacts
  - SK 2131H** Slow-action contact element  
3 direct opening action contacts  
+ 1 NO contact
  - SK 3131H** Slow-action contact element  
2 direct opening action contacts  
+ 2 NO contact
- (for further details see page 9)

## LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

## Adjustment options

Horizontal 4 x 90° (see page 8).

⚠ If damaged or worn, safety switches should be replaced as a unit.

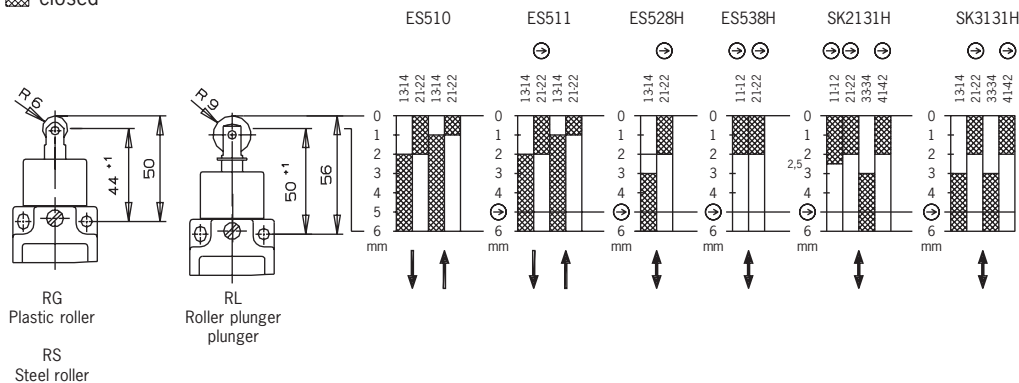
### Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam gap shown in the dimension  $44 \pm 1$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

## Switch travel diagrams

### Contacts

- open
- ▣ closed



## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                     |  |   |    | Unit  |      |
|--|---|--|---|----|-------|------|
| Housing material   | Anodized die-cast alloy                   |  |   |    |       |      |
| Degree of protection according to IEC 60529                              | IP 65                                     |  |   |    |       |      |
| Installation position  | Optional                                  |  |   |    |       |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles     |  |   |    |       |      |
| Ambient temperature  | -25 to +80                                |  |   |    | °C    |      |
| Weight   | Approx. 0.3                               |  |   |    | kg    |      |
| Actuator   | Roller plunger<br>Plastic roller (RG)     | Roller plunger<br>Steel (RS)                         | Roller plunger<br>Extended (RL)         |    |       |      |
| Approach speed, max. <sup>1)</sup>                                       | 20  |  |   |    | m/min |      |
| Approach speed, min.   | 0.1                                       |  |   |    | m/min |      |
| Repeat accuracy <sup>3)</sup>  | ± 0.1                                     |  |   |    | mm    |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram     |  |   |    | mm    |      |
| Actuating force, min.  | 15  |  |   |    | N     |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                     | ES 528H<br>1 NC ⊖ + 1 NO                             | ES 538H<br>2 NC ⊖                       |    |       |      |
|  | ES 511<br>1 NC ⊖ + 1 NO                   | SK 2131H<br>3 NC ⊖ + 1 NO                            | SK 3131H<br>2 NC ⊖ + 2 NO               |    |       |      |
| Switching principle  | Snap-action<br>contact element            | Slow-action contact element<br>with H-contact bridge |   |    |       |      |
| Contact material   | Silver alloy, gold flashed                |  |   |    |       |      |
| Contact closing time   | < 4                                       |  |   |    | ms    |      |
| Contact bounce time  | < 3                                       |  |   |    | ms    |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5                                       | 2.5  |   |    | kV    |      |
| Switching current min. at  | 10  | 1  | 10                                      | 1  | 10    | mA   |
| Switching voltage  | 24  | 24   | 12                                      | 24 | 12    | V DC |
| Conventional thermal current I <sub>th</sub>                             | 6   | 4  |   |    | A     |      |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 6   | 4  |   |    | A gG  |      |
| Type of connection   | Plug connector to DIN 43651 <sup>2)</sup> |  |   |    |       |      |
| Rated insulation voltage U <sub>i</sub>                                  |   |  |   |    |       |      |
| with plug connector SR6  | 250                                       |  |   |    | V     |      |
| with plug connector SR11   | 50  |  |   |    |       |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         |   |  |   |    |       |      |
| with plug connector SR6  | 2.5                                       |  |   |    | kV    |      |
| with plug connector SR11   | 1.5                                       |  |   |    |       |      |
| Utilization category according to IEC 60947-5-1                          |   |  |   |    |       |      |
| with plug connector SR6  | AC15                                      | I <sub>e</sub> 6 A U <sub>e</sub> 230 V              | I <sub>e</sub> 4 A U <sub>e</sub> 230 V |    |       |      |
|  | DC13                                      | I <sub>e</sub> 6 A U <sub>e</sub> 24 V               | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |    |       |      |
| with plug connector SR11   | AC15                                      | I <sub>e</sub> 4 A U <sub>e</sub> 50 V               | I <sub>e</sub> 4 A U <sub>e</sub> 50 V  |    |       |      |
|  | DC13                                      | I <sub>e</sub> 4 A U <sub>e</sub> 24 V               | I <sub>e</sub> 4 A U <sub>e</sub> 24 V  |    |       |      |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring and derating diagram see page 10.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                                 | Switching Element | Order No.        |            |
|-------------|--|-------------------|------------------|------------|
|             |  |                   | Function Display | L060       |
| NG2...      | RG<br>Roller plunger<br>Plastic roller | -510              | 090 021          | 090 949    |
|             |  | -511              | 090 032          | 091 284    |
|             |  | -528              | 090 943          | 090 944    |
|             |  | -538              | 090 945          | 090 946    |
|             |  | -2131             | 090 947          | -          |
|             |  | -3131             | 090 948          | -          |
| NG2...      | RS<br>Roller plunger<br>Steel roller   | -510              | 090 953          | on request |
|             |  | -511              | 090 024          | 090 147    |
|             |  | -528              | 090 950          | 088 197    |
|             |  | -538              | 090 951          | 090 952    |
|             |  | -2131             | 090 149          | -          |
|             |  | -3131             | 090 954          | -          |
| NG2...      | RL<br>Extended roller plunger          | -510              | 090 022          | 091 285    |
|             |  | -511              | 090 025          | 090 955    |
|             |  | -528              | 090 956          | 091 282    |
|             |  | -538              | 090 957          | 091 278    |
|             |  | -2131             | 090 958          | -          |
|             |  | -3131             | 090 959          | -          |

# Limit switches according to EN 50041

# EUCHNER

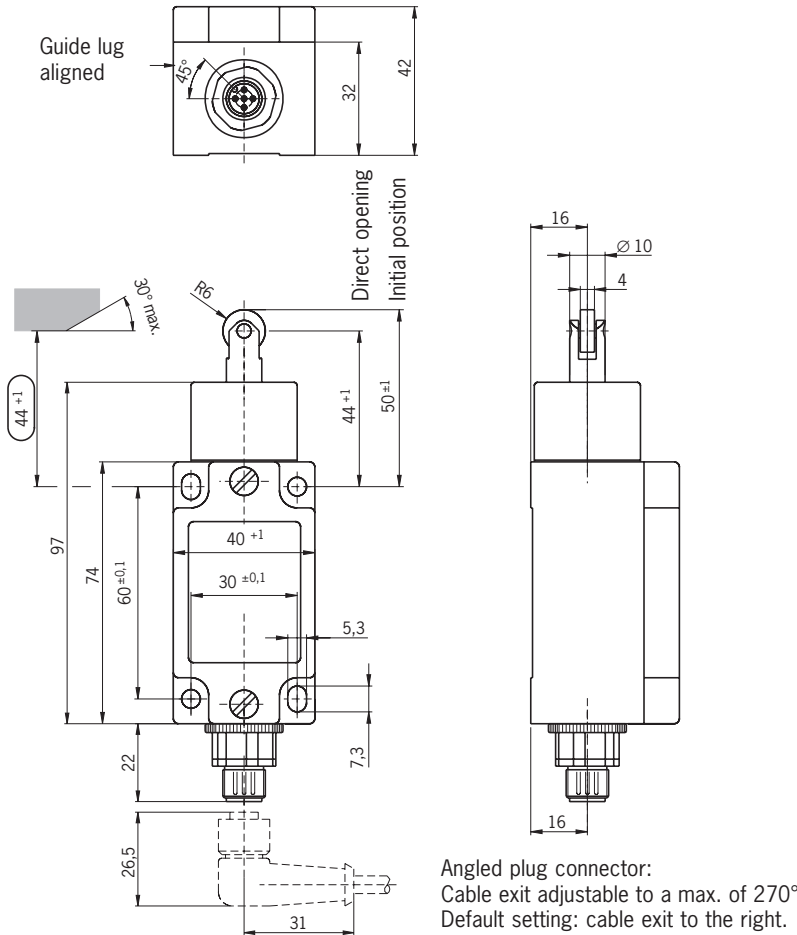
## Limit switch type series NG2.../NZ2...

- ▶ **Plunger actuator** **RG**(Roller plunger - plastic roller)  
**RS**(Roller plunger - steel roller)  
**RL** (Extended roller plunger)
- ▶ **M12 plug connector**

NZ...



### Dimension drawing



### Switching elements

- ES 510** Snap-action contact element  
 1 NC contact + 1 NO contact
- ES 511** Snap-action contact element  
 1 direct opening action contact  
 + 1 NO contact
- ES 528H** Slow-action contact element  
 1 direct opening action contact  
 + 1 NO contact
- ES 538H** Slow-action contact element  
 2 direct opening action contacts  
 (for further details see page 9)

### LED function display

Available on request

### Adjustment options

Horizontal 4 x 90° (see page 8).

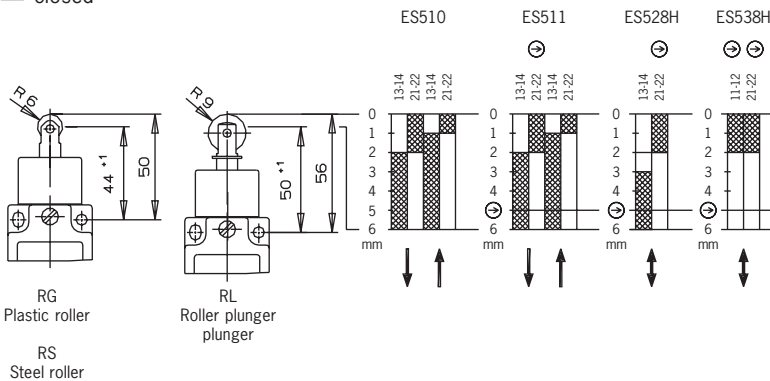
⚠ If damaged or worn, safety switches should be replaced as a unit.

### Notes on installation for limit switches with safety switching elements

To obtain the direct opening travel, the switching cam gap shown in the dimension  $44 \pm 1$  must be complied with. Actuation elements such as cam approach guides must be firmly mounted in accordance EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

### Switch travel diagrams

**Contacts**  
 □ open  
 ▨ closed





## Limit switches according to EN 50041

EUCHNER

## Technical data

| Parameters   | Value                                 |   |  |    | Unit  |      |
|--|---------------------------------------|---|--|----|-------|------|
| Housing material   | Anodized die-cast alloy               |   |  |    |       |      |
| Degree of protection according to IEC 60529                              | IP 67                                 |   |  |    |       |      |
| Installation position  | Optional                              |   |  |    |       |      |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles |   |  |    |       |      |
| Ambient temperature  | -25 to +80                            |   |  |    | °C    |      |
| Weight   | Approx. 0.3                           |   |  |    | kg    |      |
| Actuator   | Roller plunger<br>Plastic roller (RG) | Roller plunger<br>Steel (RS)                      | Roller plunger<br>Extended (RL)        |    |       |      |
| Approach speed, max. <sup>1)</sup>                                       | 20                                    |   |  |    | m/min |      |
| Approach speed, min.   | 0.1                                   |   |  |    | m/min |      |
| Repeat accuracy <sup>3)</sup>  | ± 0.1                                 |   |  |    | mm    |      |
| Direct opening action contact according to IEC 60947-5-1, appendix K     | See symbol ⊖ in switch travel diagram |   |  |    | mm    |      |
| Actuating force, min.  | 15                                    |   |  |    | N     |      |
| Switching elements   | ES 510<br>1 NC + 1 NO                 | ES 528H<br>1 NC ⊖ + 1 NO                          | ES 538H<br>2 NC ⊖                      |    |       |      |
|  | ES 511<br>1 NC ⊖ + 1 NO               |   |  |    |       |      |
| Switching principle  | Snap-action contact element           | Slow-action contact element with H-contact bridge |  |    |       |      |
| Contact material   | Silver alloy, gold flashed            |   |  |    |       |      |
| Contact closing time   | < 4                                   |   |  |    | ms    |      |
| Contact bounce time  | < 3                                   |   |  |    | ms    |      |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.0                                   |   |  |    | kV    |      |
| Rated insulation voltage U <sub>i</sub>                                  | 50                                    |   |  |    | V     |      |
| Utilization category according to IEC 60947-5-1 with SVM5 plug connector | AC15                                  | I <sub>e</sub> 4 A U <sub>e</sub> 30 V            | I <sub>e</sub> 4 A U <sub>e</sub> 30 V |    |       |      |
|  | DC13                                  | I <sub>e</sub> 4 A U <sub>e</sub> 24 V            | I <sub>e</sub> 4 A U <sub>e</sub> 24 V |    |       |      |
| Switching current min. at  | 10                                    | 1   | 10                                     | 1  | 10    | mA   |
| Switching voltage  | 24                                    | 24  | 12                                     | 24 | 12    | V DC |
| Conventional thermal current I <sub>th</sub>                             | 4                                     | 4   |  |    |       | A    |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 4                                     | 4   |  |    |       | A gG |
| Type of connection   | M12 plug connector <sup>2)</sup>      |   |  |    |       |      |

1) The approach speed specified applies in conjunction with EUCHNER control cams is in accordance with DIN 69639.

2) For wiring diagram see page 10.

3) The reproducible repeat accuracy refers to the plunger's axial travel, after a run-in of approx. 2000 switching cycles

## Ordering table

| Type Series | Roller                                 | Switching Element | Order No.           |  |  |  |
|-------------|--|-------------------|---------------------|--|--|--|
|             |  |                   | Plug Connector SVM5 |  |  |  |
| NG2...      | RG<br>Roller plunger<br>Plastic roller | -510              | 090 960             |  |  |  |
|             |  | -511              | 090 026             |  |  |  |
| NZ2...      |  | -528              | 090 961             |  |  |  |
|             |  | -538              | 090 962             |  |  |  |
| NG2...      | RS<br>Roller plunger<br>Steel roller   | -510              | 088 632             |  |  |  |
|             |  | -511              | 090 027             |  |  |  |
| NZ2...      |  | -528              | 090 963             |  |  |  |
|             |  | -538              | 090 964             |  |  |  |
| NG2...      | RL<br>Extended roller plunger          | -510              | on request          |  |  |  |
|             |  | -511              | 090 028             |  |  |  |
| NZ2...      |  | -528              | on request          |  |  |  |
|             |  | -538              | on request          |  |  |  |

**Ordering example:** Limit switch with safety function **NZ**, plug connector **2**,  
Roller plunger with plastic roller **RG**, snap-action contact element **511**,  
M12 plug with PE connection **SVM5**  
**NZ2RG-511SVM5**

Order No. 090 026

# Limit switches according to EN 50041

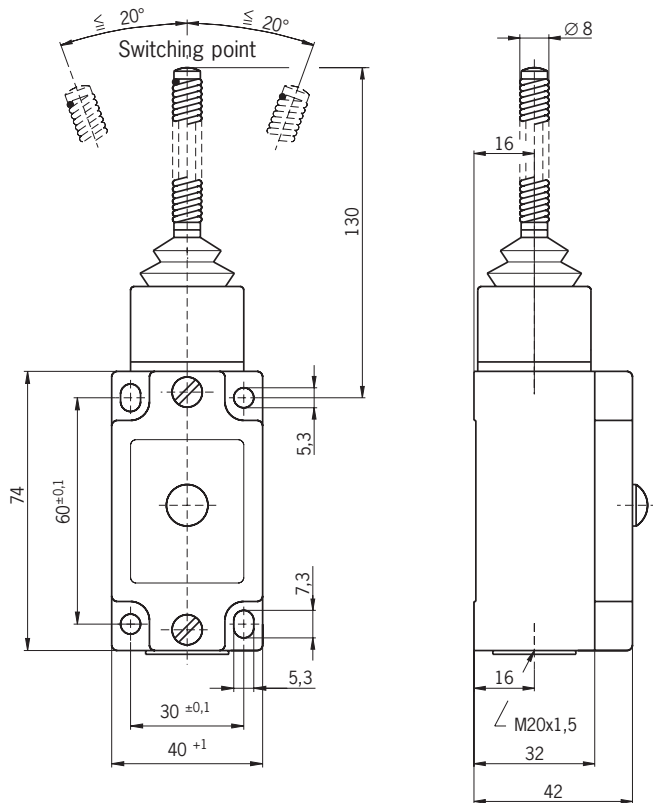
# EUCHNER

## Limit switch type series NG1...



- ▶ Spring actuator FO
- ▶ Cable entry M20 x 1.5 (plug connector on request)

### Dimension drawing



### Switching elements

**ES 510** Snap-action contact element  
1 NC contact + 1 NO contact  
(for further details see page 9)

### LED function display

A red function display LED is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (as standard) L060
- ▶ 110 V AC ±15% (on request) L110
- ▶ 230 V AC ±15% (on request) L220

### Adjustment options

Horizontal 4 x 90° (see page 8).

# Limit switches according to EN 50041

# EUCHNER

## Technical data

| Parameters   | Value  | Unit                                     |
|--|--|--|
| Housing material   | Anodized die-cast alloy                        |  |
| Degree of protection according to IEC 60529                              | IP 67  |  |
| Installation position  | Optional                                       |  |
| Mechanical service life  | 30 x 10 <sup>6</sup> switching cycles          |  |
| Ambient temperature  | -25 to +80                                     | °C                                       |
| Weight   | Approx. 0.35                                   | kg                                       |
| Actuator   | Spring actuator made of spring steel wire (FO) |  |
| Approach speed, max.   | 20   | m/min                                    |
| Approach speed, min.   | 0.5  | m/min                                    |
| Actuating force, min.  | 5  | N  |
| Switching elements   | ES 510<br>1 NC + 1 NO                          |  |
| Switching principle  | Snap-action contact element                    |  |
| Contact material   | Silver alloy, gold flashed                     |  |
| Contact closing time   | < 4  | ms                                       |
| Contact bounce time  | < 3  | ms                                       |
| Rated impulse withstand voltage U <sub>imp</sub>                         | 2.5  | kV                                       |
| Rated insulation voltage U <sub>i</sub>                                  | 250  | V  |
| Utilization category according to IEC 60947-5-1                          |  |  |
|  | AC12   | I <sub>e</sub> 10 A U <sub>e</sub> 230 V |
|  | AC15   | I <sub>e</sub> 6 A U <sub>e</sub> 230 V  |
|  | DC13   | I <sub>e</sub> 6 A U <sub>e</sub> 24 V   |
| Switching current min. at  | 10   | mA                                       |
| Switching voltage  | 24   | V DC                                     |
| Conventional thermal current I <sub>th</sub>                             | 6  | A  |
| Short-circuit protection according to IEC 60269-1 (control circuit fuse) | 10/6   | A gG                                     |
| Type of connection   | Screw terminal <sup>1)</sup>                   |  |
| Conductor cross-section, max.  | 2 x 1.5  | mm <sup>2</sup>                          |

1) For wiring diagram see page 9.

## Ordering table

| Type Series | Roller                | Switching Element | Order No.        |         |
|-------------|-----------------------|-------------------|------------------|---------|
|             |                       |                   | Function Display |         |
|             |                       |                   | None             | L060    |
| NG1...-M    | FO<br>Spring actuator | -510              | 079 911          | 090 029 |

**Ordering example:** Limit switch without safety function **NG**, cable entry **1**,  
Spring actuator made of spring steel wire **FO**, snap-action contact element **510**,  
function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**  
**NG1FO-510L060-M**

**Order No. 090 029**

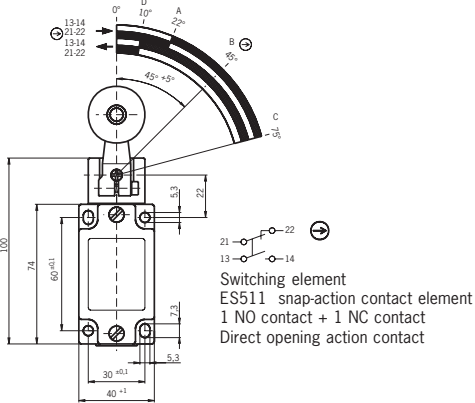
# Limit switches according to EN 50041

# EUCHNER

## Customized versions (other customized designs available on request)

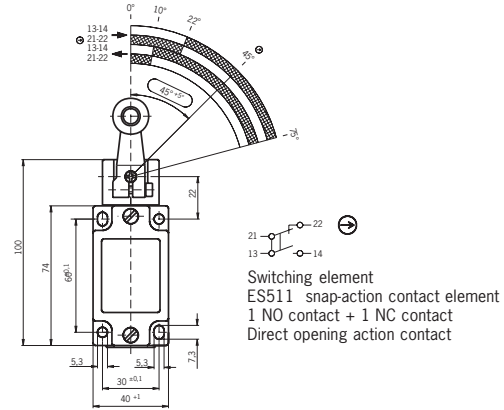
### Limit switch with large plastic roller Diameter 30 mm

| Article         | Order No. |
|-----------------|-----------|
| NZ1HB-511-MC569 | 079 965   |



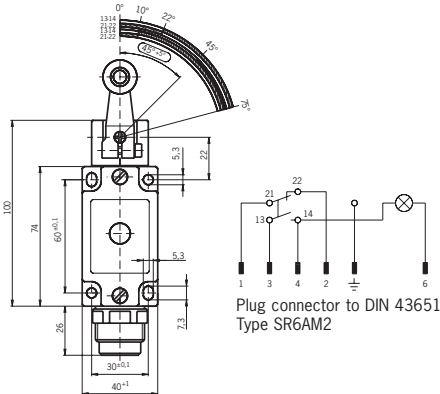
### Limit switch with sealed ball bearings Diameter 19 mm

| Article          | Order No. |
|------------------|-----------|
| NZ1HS-511-MC1833 | 091 312   |



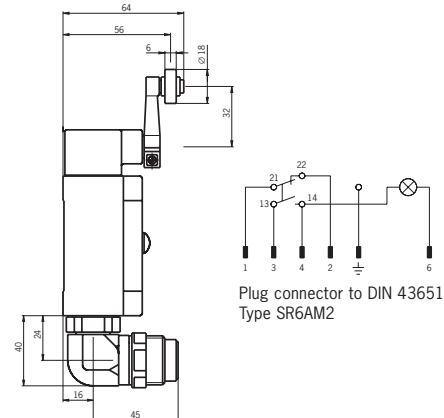
### Limit switch with plug connector to DIN 43651 VW/Audi, VW mat. no. 2348

| Article            | Order No. |
|--------------------|-----------|
| NZ2HB-511L060C1630 | 054 121   |



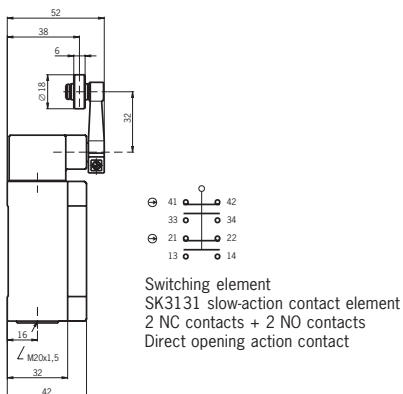
### Limit switch with plug connector and angled piece to DIN 43651 VW/Audi, VW mat. no. 2349

| Article            | Order No. |
|--------------------|-----------|
| NZ2HB-511L060C1631 | 054 122   |



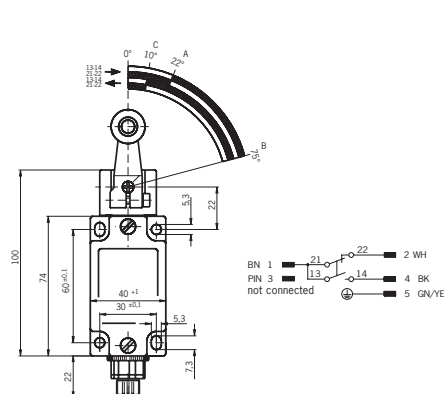
### Limit switch with steel roller on the inside of the lever

| Article           | Order No. |
|-------------------|-----------|
| NZ1HS-3131-MC1779 | 079 996   |



### Limit switch with M12 plug connector and pin assignment for LED display (pin 3 not used)

| Article            | Order No. |
|--------------------|-----------|
| NG2HB-510SVM5C1883 | 086 561   |



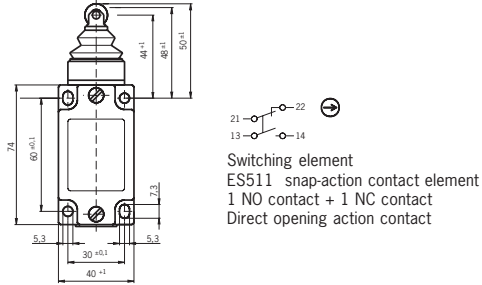
# Limit switches according to EN 50041

# EUCHNER

## Limit switch with protective NBR bellows on the plunger guide

Protection against serious contamination and aggressive coolants

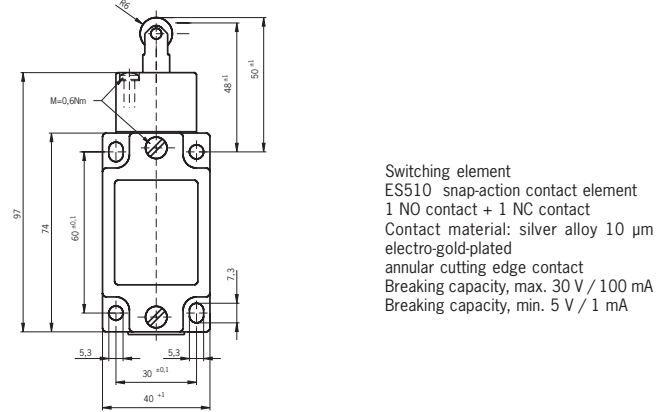
| Article          | Order No. |
|------------------|-----------|
| NZ1RS-511-MC1588 | 091 352   |



## Limit switch with gold plated contacts

For switching low currents of at least 1 mA

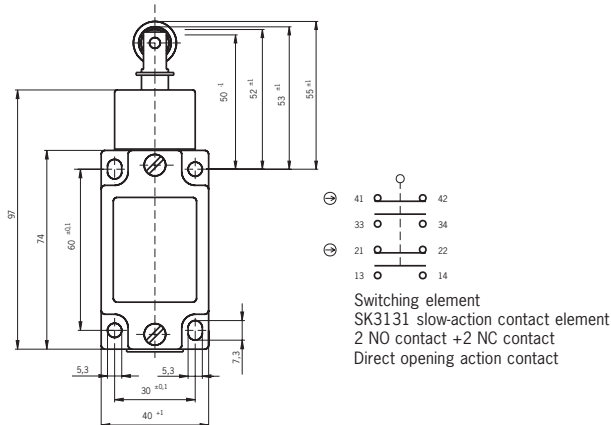
| Article       | Order No. |
|---------------|-----------|
| NZ1RS-510AU-M | 090 416   |



## Limit switch with sealed ball bearings

Diameter 16 mm

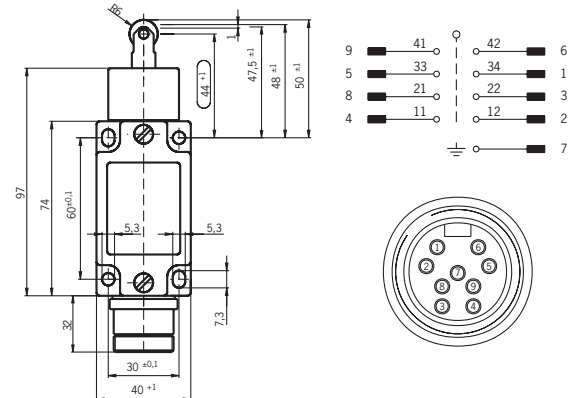
| Article           | Order No. |
|-------------------|-----------|
| NZ1RL-3131-MC1831 | 089 082   |



## Limit switch with MENCOCOM plug connector

### MIN-9MR-1-18

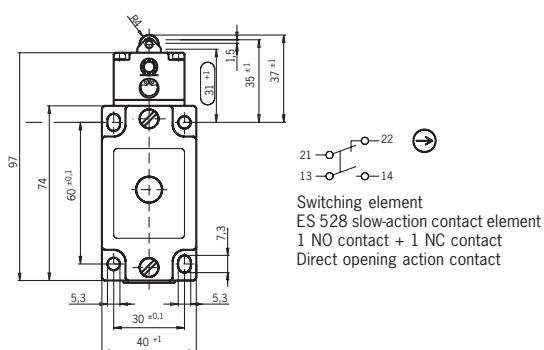
| Article            | Order No. |
|--------------------|-----------|
| NZ1RS-2131-9C-GMMF | 077 362   |



## Limit switch with small ball bearing

For high approach speeds and long travel distances

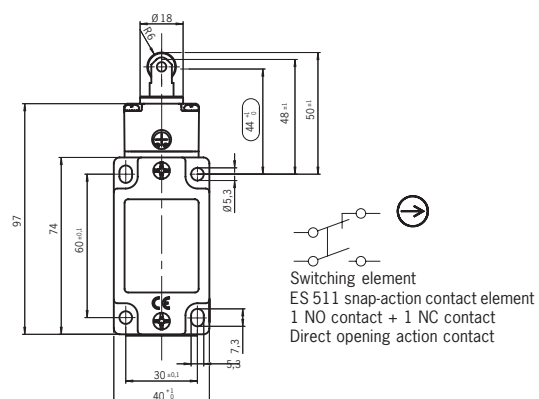
| Article          | Order No. |
|------------------|-----------|
| NZ1RK-528-MC1912 | 090 572   |



## Limit switch with steel bush

For high approach speed

| Artikel         | Best. Nr. |
|-----------------|-----------|
| NZ1RS-511-MC782 | 093 141   |



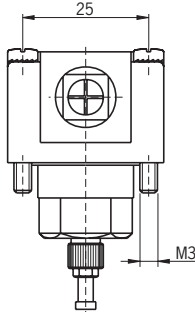
# Limit switches according to EN 50041

# EUCHNER

## Accessories

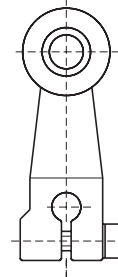
### Lever-arm actuation

| Article | Order No. |
|---------|-----------|
| NSA     | 012 051   |



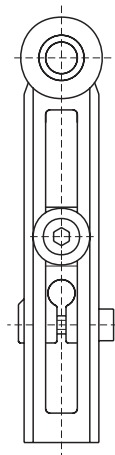
### Roller arm

| Article                                     | Order No. |
|---|-----------|
| NHB (plastic roller)                        | 012 042   |
| NHS (steel roller)                          | 012 043   |
| NHSC1834 (ball bearing $\varnothing$ 19 mm) | 077 349   |



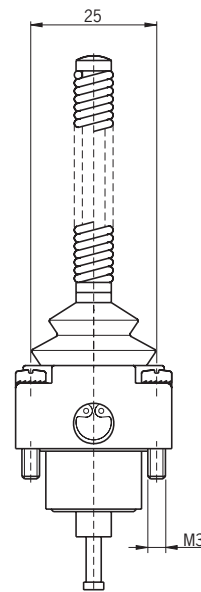
### Adjustable roller lever

| Article              | Order No. |
|----------------------|-----------|
| NVB (plastic roller) | 012 064   |
| NVS (steel roller)   | 012 065   |



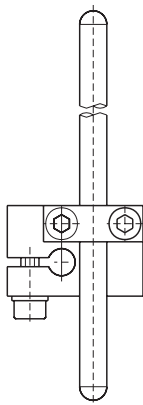
### Spring actuator

| Article                 | Order No. |
|-------------------------|-----------|
| NFO (spring steel wire) | 011 909   |



### Rod lever

| Article            | Order No. |
|--------------------|-----------|
| NSB (plastic rod)  | 012 052   |
| NSM (aluminum rod) | 012 053   |



## Note

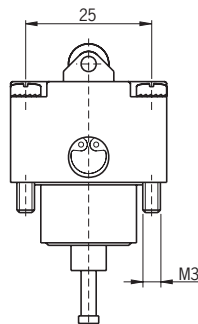
The actuator heads shown are spare parts for limit switches without safety function. They do not fit limit switches with safety function and must not be operated with these switches!

# Limit switches according to EN 50041

# EUCHNER

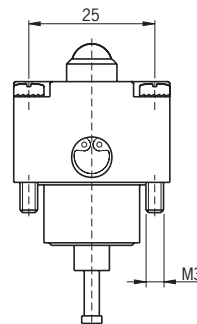
## Actuator with small roller plunger

| Article                  | Order No. |
|--------------------------|-----------|
| NRK (small steel roller) | 012 049   |



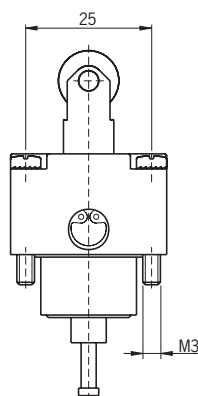
## Actuator with ball plunger

| Article          | Order No. |
|------------------|-----------|
| NKO (steel ball) | 012 045   |



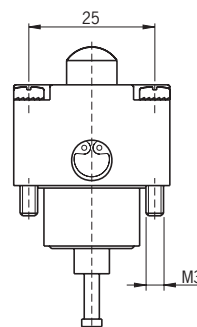
## Actuator with roller plunger Ø 12 mm

| Article              | Order No. |
|----------------------|-----------|
| NRG (plastic roller) | 012 046   |
| NRS (steel roller)   | 012 047   |



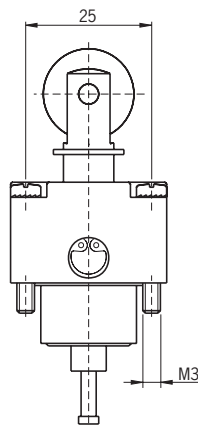
## Actuator with domed plunger

| Article                  | Order No. |
|--------------------------|-----------|
| NWO (polish-ground dome) | 012 066   |



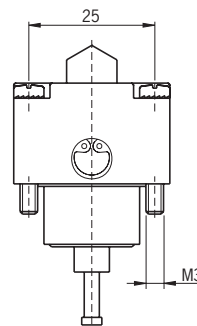
## Actuator with extended roller plunger Ø 18 mm

| Article                  | Order No. |
|--------------------------|-----------|
| NRL (large steel roller) | 012 050   |



## Actuator with chisel plunger

| Article                            | Order No. |
|------------------------------------|-----------|
| NDO (polish-ground chisel plunger) | 011 908   |



### Note

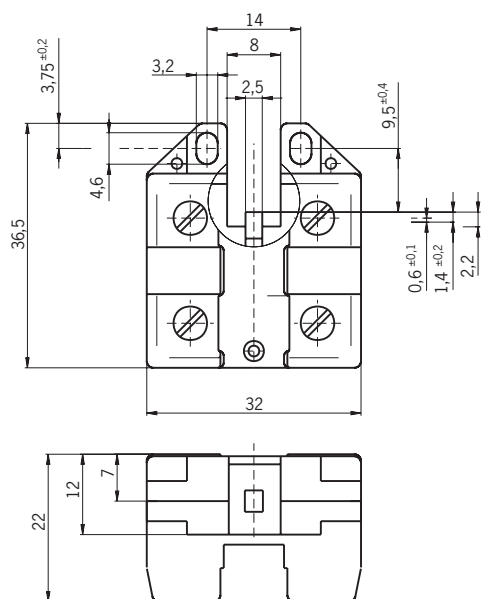
The actuator heads shown are spare parts for limit switches without safety function. They do not fit limit switches with safety function and must not be operated with these switches!

# Limit switches according to EN 50041

# EUCHNER

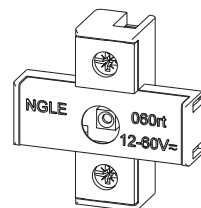
## Switching element ES 510 for type series NG...

| Article | Order No. |
|---------|-----------|
| ES 510  | 010 422   |



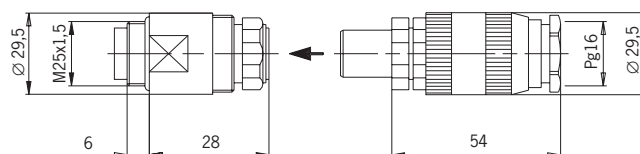
## LED function display for type series NG.../NZ...

| Article     | Voltage [V]  | Current [mA] | Order No. |
|-------------|--------------|--------------|-----------|
| NGLE 060 rt | 12 -60 AC/DC | ≤ 6.5        | 029 220   |
| NGLE 110 rt | 110 ±15% AC  | ≤ 3.5        | 045 822   |
| NGLE 220 rt | 230 ±15% AC  | ≤ 3.5        | 045 825   |



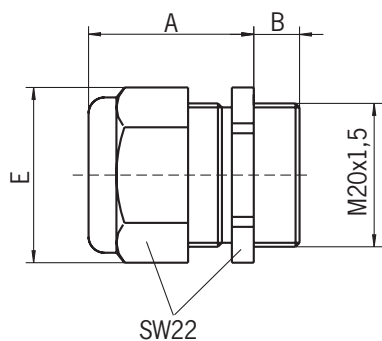
## Plug / socket plug 12-pole

| Article           | Order No. |
|-------------------|-----------|
| Plug SD 12-M      | 085 648   |
| Socket plug BS 12 | 002 763   |



## Cable gland M20 x 1.5

| Article   | Outer cable diameter [mm] | A  | B | E    | Order No. |
|-----------|---------------------------|----|---|------|-----------|
| EKVM20/06 | 6.5 - 9.5                 | 20 | 6 | 24.5 | 077 683   |
| EKVM20/09 | 9 - 13                    | 21 | 6 | 24.5 | 077 684   |



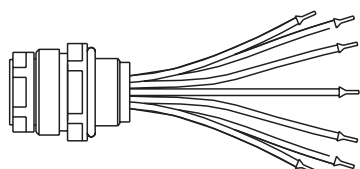
## Technical data

| Parameters                                   | Value                       |
|--|-----------------------------|
| Housing material                             | Metal                       |
| Number of poles                              | 11 + PE                     |
| Nominal voltage                              | 250 V <sub>≅</sub>          |
| Level of contamination VDE 0110              | 2                           |
| Type of connection                           | Soldered connections        |
| Conductor cross-section, max.                | 1 mm <sup>2</sup>           |
| Contact material / surface                   | CuZn<br>1μ hard gold-plated |
| Clamping for cable                           | 12 - 14 mm                  |
| Degree of protection according to IEC 60 529 | IP65 /inserted              |
| Ambient temperature range                    | -20 °C to +80 °C            |

## Appliance socket 7-pole

for type series NG.../NZ... with plug connector SR6

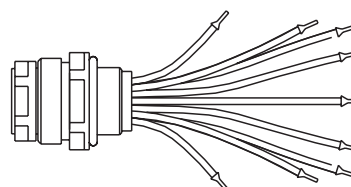
| Article                           | Order No. |
|-----------------------------------|-----------|
| Appliance socket 7-pole NG/NZ-SR6 | 093 342   |



## Appliance socket 12-pole

for type series NG.../NZ... with plug connector SR11

| Article                          | Order No. |
|----------------------------------|-----------|
| Appliance socket 12-pole NZ-SR11 | 093 343   |

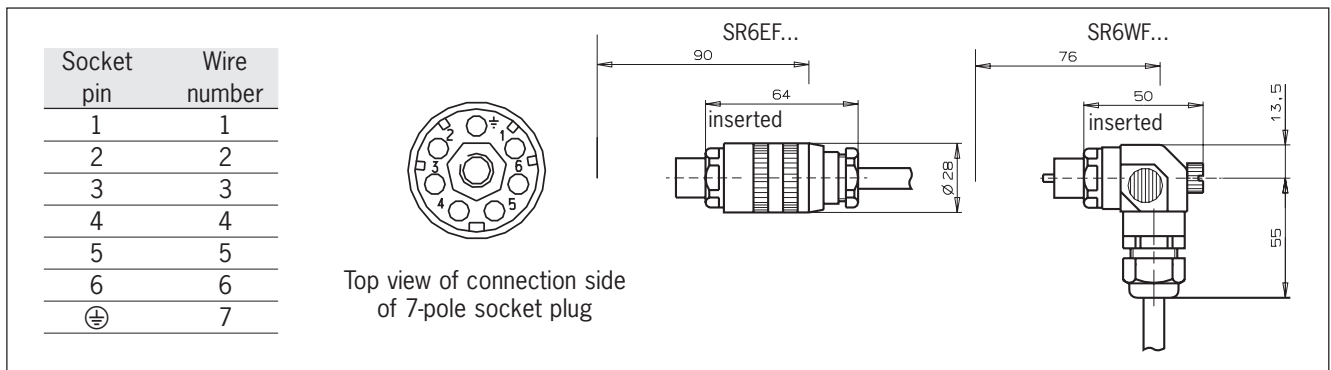




# Limit switches according to EN 50041

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## Plug connector SR6 (socket 6+PE) with / without connection cable



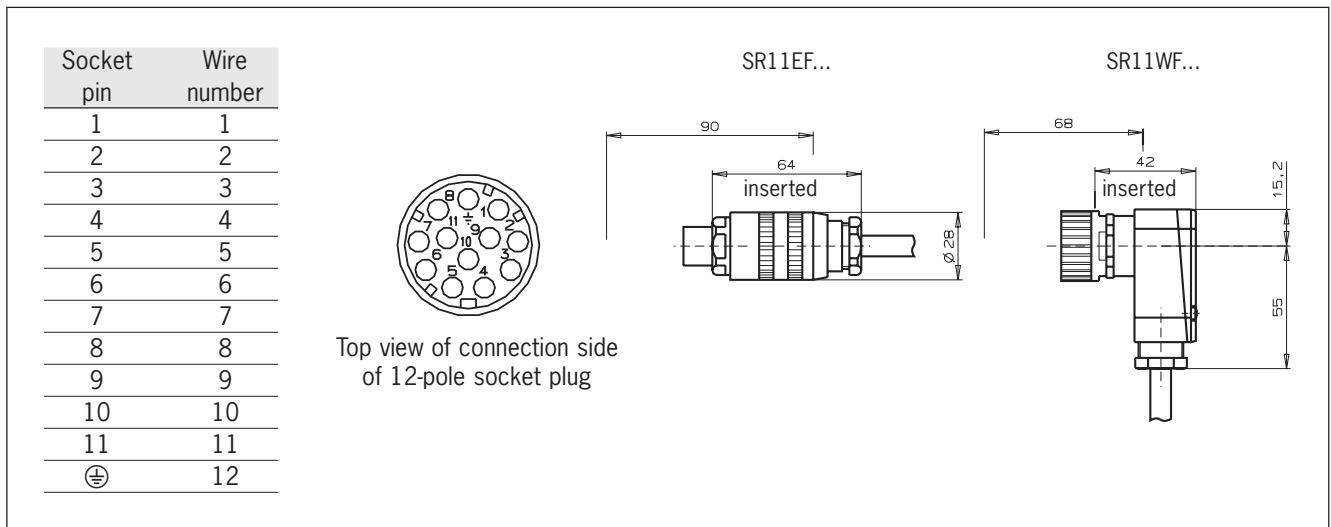
### Technical data

| Parameters                                   | Value               |
|--|---------------------|
| Housing material                             | plastic             |
| Number of poles                              | 6 + PE              |
| Nominal voltage                              | 250 V <sub>≐</sub>  |
| Degree of protection according to IEC 60 529 | IP65 /inserted      |
| Connection cable                             | PUR grey            |
| Outer diameter                               | ∅ 8 mm              |
| Wire cross-section                           | 1.0 mm <sup>2</sup> |

### Ordering table

| Plug type       | Connection cable | Product designation | Order No. |
|-----------------|------------------|---------------------|-----------|
| Socket straight | None             | SR6EF               | 013 176   |
|                 | 5 m              | SR6EF-5000          | 077 632   |
|                 | 10 m             | SR6EF-10000         | 077 633   |
| Socket angled   | 15 m             | SR6EF-15000         | 077 634   |
|                 | None             | SR6WF               | 024 999   |
|                 | 5 m              | SR6WF-5000          | 077 638   |
| Socket angled   | 10 m             | SR6WF-10000         | 077 639   |
|                 | 15 m             | SR6WF-15000         | 077 640   |

## Plug connector SR11 (socket 11+PE) with / without connection cable



### Technical data

| Parameters                                   | Value               |
|--|---------------------|
| Housing material                             | plastic             |
| Number of poles                              | 11 + PE             |
| Nominal voltage                              | 50 V <sub>≐</sub>   |
| Degree of protection according to IEC 60 529 | IP65 /inserted      |
| Connection cable                             | PUR grey            |
| Outer diameter                               | ∅ 10.5 mm           |
| Wire cross-section                           | 1.0 mm <sup>2</sup> |

### Ordering table

| Plug type       | Connection cable | Product designation | Order No. |
|-----------------|------------------|---------------------|-----------|
| Socket straight | None             | SR11EF              | 070 859   |
|                 | 5 m              | SR11EF-5000         | 077 629   |
|                 | 10 m             | SR11EF-10000        | 077 630   |
| Socket angled   | 15 m             | SR11EF-15000        | 077 631   |
|                 | None             | SR11WF              | 054 773   |
|                 | 5 m              | SR11WF-5000         | 077 635   |
| Socket angled   | 10 m             | SR11WF-10000        | 077 636   |
|                 | 15 m             | SR11WF-15000        | 077 637   |

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