

Position Switches according to EN 50041



B

EUCHNER

More than safety.

Position Switches According to EN 50041

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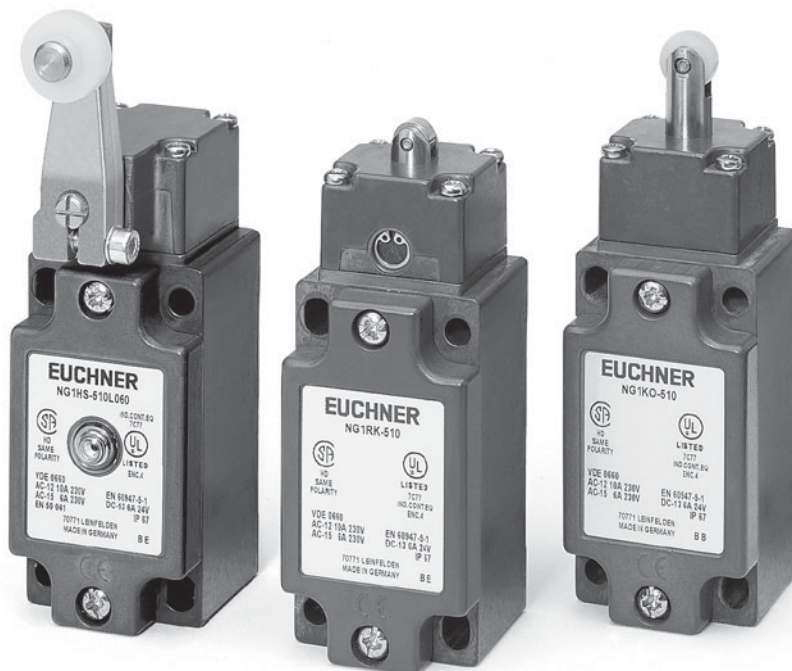
General information

EUCHNER position switches – precise, reliable and versatile

EUCHNER position switches are manufactured in accordance with 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.

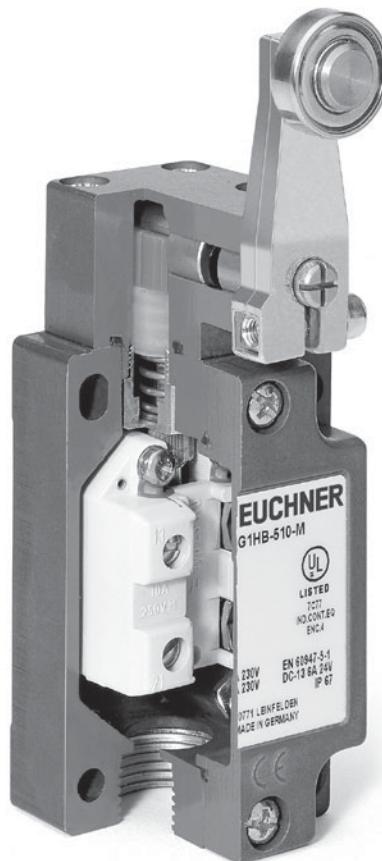
Various EUCHNER position switch variants are also equipped as safety switches with switching elements whose NC contacts are positively opened by a rigid plunger, even if the switching element is damaged due to a broken spring or contact weld. Positively driven position switches are used in cases where a guarantee of machine and/or human safety is absolutely essential, e.g. final position limitation or an EMERGENCY STOP.

Approvals for series NG... and NZ...

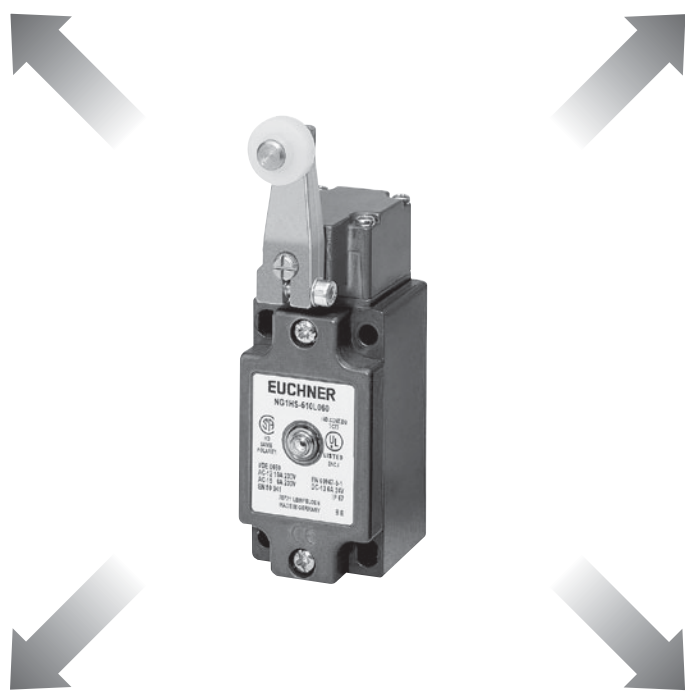


EUCHNER position switches offer important advantages and special features

- ▶ Housing and cover made of robust die-cast aluminum to take ten different actuators
- ▶ Actuating heads can be adjusted 4 x 90°, lever arms can be adjusted and fixed either continuously or 4 x 90°
- ▶ Double or quadruple switching elements (e.g. two positively driven contacts + two NO contacts), silver alloy contacts, gold flashed
- ▶ Cable entry M20 x 1.5 or plug connection
- ▶ Mechanical life up to 30 million operating cycles
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ High operating point accuracy to ± 0.002 mm
- ▶ Use of silicone-free lubricants
- ▶ Cover made of die-cast aluminum with inserted edge seal
- ▶ Diaphragm seal and cover seal made of NBR plastic (acrylonitrile-butadiene rubber): protection of the switching space against coolants and lubricants
- ▶ Great versatility thanks to LED function display, plug connector and multiple adjustment options



Application examples for position switches from series NG... and NZ...



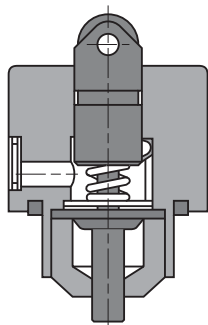
Position switch in detail

Plunger actuation

The plunger actuated versions allow the user a choice of six different designs.

The hardened stainless steel plungers with telescopic action (positively driven position switches have rigid plungers) are precisely guided within the anodized actuator head, and are almost maintenance free.

The approach direction of the actuator head can easily be changed by 90°.

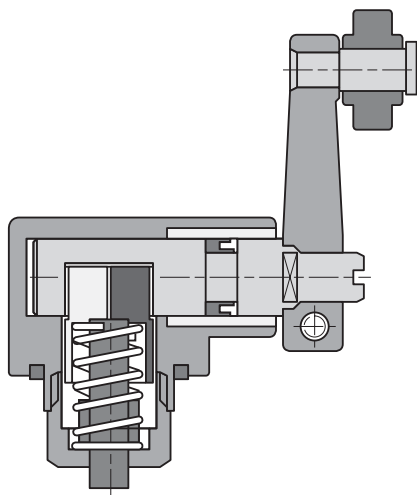


Lever arm actuation

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:

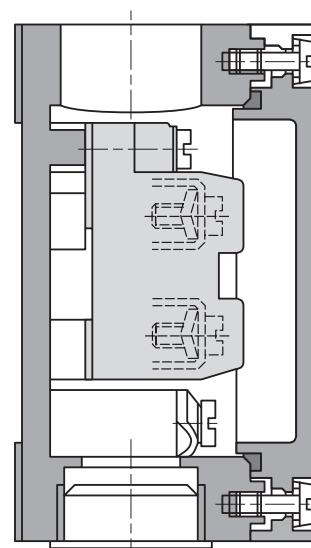
- ▶ Approach direction adjustable by 8 x 90°
- ▶ Actuator direction for lever arm actuation adjustable by 4 x 90°
- ▶ Switches to the left or to the right, or on both sides



The housing

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

The control cable can be connected with a cable gland M20 x 1.5 or via pre-wired plug connectors with straight or angled outlet. The right-angle plug connectors can be adjusted in seven directions around the longitudinal axis of the switch.



The diaphragm seal

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

The seal is permanently connected to the plunger, and the plunger – not the switching element – returns it to the free position by means of the plunger return spring after every switching operation. 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.

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.

Cable connections

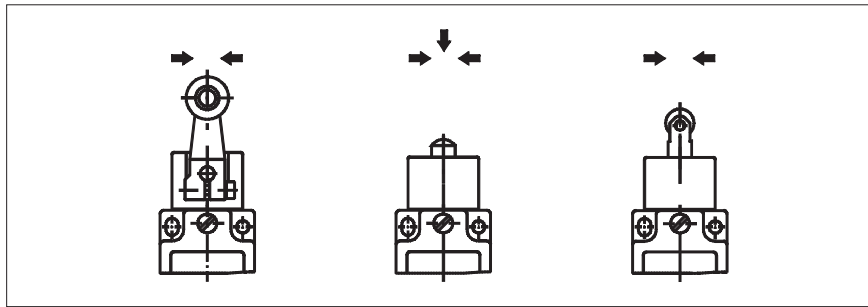
EUCHNER position switches according to EN 50041 undergo routine check tests for compliance with degree of protection IP 67 before delivery to the customer. To achieve this degree of protection, only high-quality metal cable glands with a captive sealing ring or the pre-wired straight or angled plug connectors must be used.

Function display

The position switches can be fitted with a function display (LED) on request. Voltage ranges of 10 to 60 V AC/DC, 110 V AC and 230 V AC are available.

Adjustment options

Actuator and approach directions



Lever arm
 HS = steel roller
 HB = plastic roller

WO = domed plunger
 KO = ball plunger

RG = plastic roller
 RS, RK, RL = steel roller

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

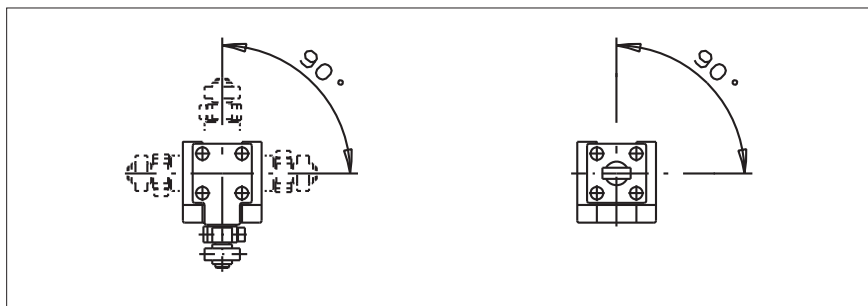
For example, the aluminum lever arm is used for high approach speeds and generous actuating mechanism tolerances.

The chisel plunger with polish-ground surface is designed for a high operating point accuracy of ± 0.002 mm.

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

Adjustment option for the actuator

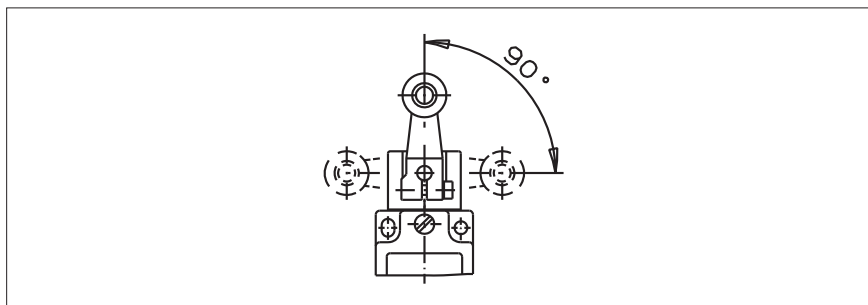
Horizontal adjustment 4 x 90°



Lever arm Straight actuator

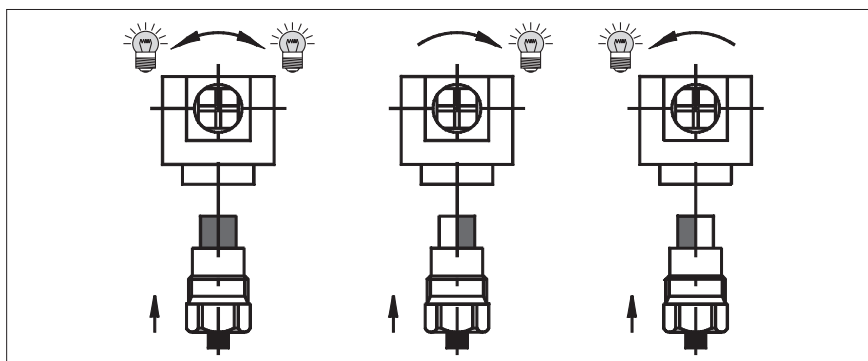
After removal of the stainless steel fixing screws, the actuator heads can each be adjusted horizontally by 90°.

Vertical adjustment 4 x 90° or 8 x 45°



The lever arm can be adjusted continuously for position switches without a safety function and by 45° for position switches with a safety function.

Adjustment option for switching direction



left/right switching (default setting) right switching left switching

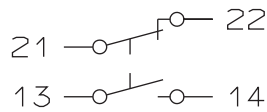
On delivery, the lever arm actuation is set to left and right switching.

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

Switching elements

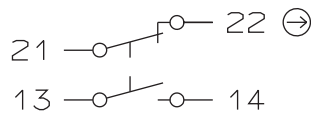
Switching element 510 ²⁾

(without positively driven contact)
 Snap-action switching contact with one NC contact and one NO contact. Double gap, electrically isolated switching bridge, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NG...



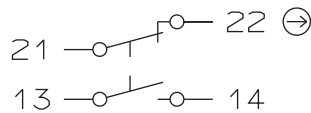
Switching element 511 ²⁾

Snap-action switching contact with one positively driven contact and one NO contact. Double gap, electrically isolated contacts, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



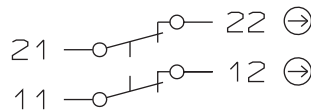
Switching element 528H ^{1) 3)}

Slow-action switching contact with one positively driven contact and one NO contact. Double gap, electrically isolated H contact bridges for currents from 1 mA to 4 A, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



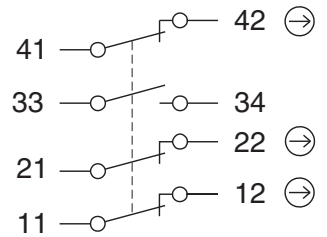
Switching element 538H ^{1) 3)}

Slow-action switching contact with two positively driven contacts. Double gap, electrically isolated H contact bridges for currents from 1 mA to 4 A, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



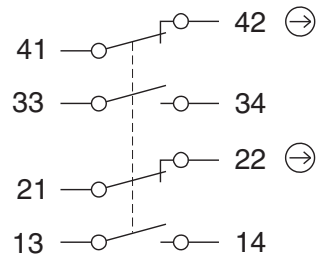
Switching element 2131 H ³⁾

Slow-action switching contact with three positively driven contacts and one NO contact. Double gap, electrically isolated H contact bridges for currents from 1 mA to 4 A, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



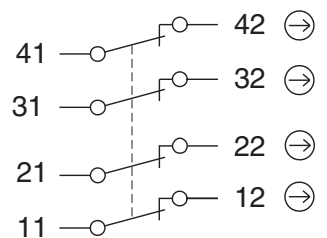
Switching element 3131 H ³⁾

Slow-action switching contact with two positively driven contacts and two NO contacts. Double gap, electrically isolated H contact bridges for currents from 1 mA to 4 A, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



Switching element 2121 H ³⁾

Slow-action switching contact with four positively driven contacts. Double gap, electrically isolated H contact bridges for currents from 1 mA to 4 A, silver alloy gold flashed contact material, screw terminal with self-lifting clamp washers. Used for NZ...



EUCHNER position switches marked with this symbol meet the IEC 60947-5-1 requirements for positively driven position switches. **Safety switching elements marked with this symbol are not available as replacement switching elements.**

1) Slow-action switching element

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

2) Snap-action switching element

The snap-action switching element has a switching contact that opens and closes independently 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 to 4 A.



Wiring diagrams

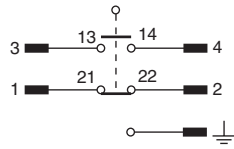
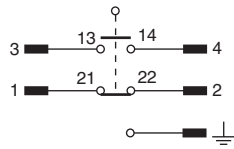
Plug connector SR6

Pin assignment for male socket
(top view of
switch mounted connector)



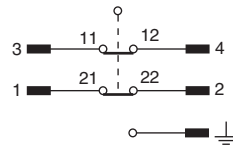
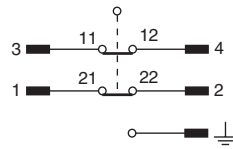
Terminal assignment for switching elements

510 / 511 / 528H



with LED indicator

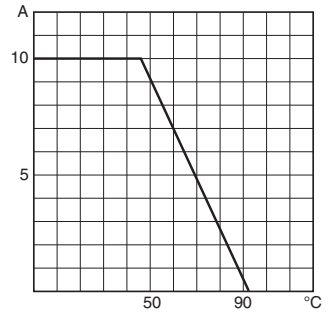
538H



with LED indicator

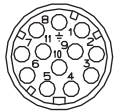
Current rating curve

for connection cross section
1.5 mm²



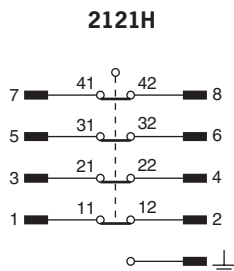
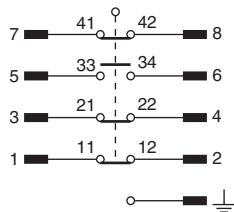
Plug connector SR11

Pin assignment for male socket
(top view of
switch mounted connector)



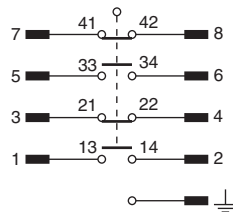
Terminal assignment for switching elements

2131H



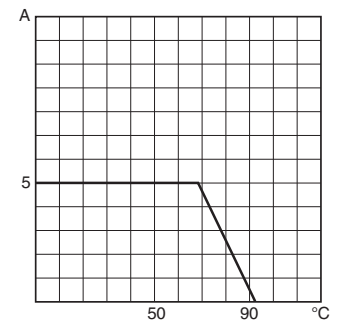
2121H

3131H



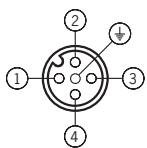
Current rating curve

for connection cross section
0.5 mm²



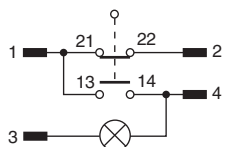
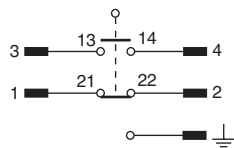
Plug connector SVM5 (M12, 5-pin)

Pin assignment for male socket
(top view of
switch mounted connector)



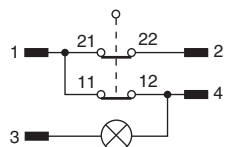
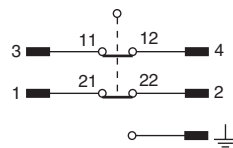
Terminal assignment for switching elements

510 / 511 / 528H



with LED indicator

538H



with LED indicator

Plunger types

Plungers for position switches are made of stainless steel and are extremely accurate.

In conjunction with a plunger guide with a special surface finish, operation is extremely reliable and maintenance-free even beyond the guaranteed mechanical life.

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, position switches with safety function (with safety switching element) have a *rigid* plunger to ensure positive driving according to IEC 60947-5-1. This means that the contact point will be reliably opened in the event of mechanical failure of the switching element – e.g. owing to the failure of a contact spring or contact weld resulting from an overload.

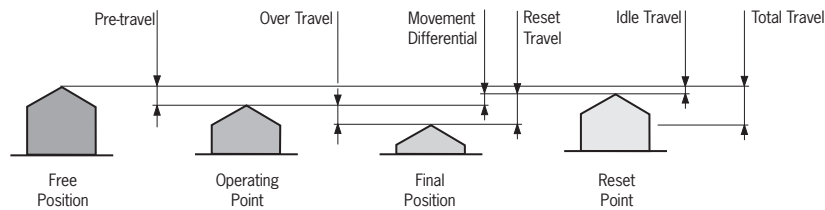
Plunger travel

The pictures show the various positions of the plunger actuated by a trip dog.

The precise values for the relevant design are shown in the technical data.

Travel ratio for plunger/trip dog

All the plunger travel data shown in the technical data refers to axial actuation. The travel for radial actuation with angled trip dogs is increase, 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.
Operating point accuracy to $\pm 0.002 \text{ mm}^{1)}$.
Max. approach speed of 10 m/min.
With its high operating point accuracy, the chisel plunger is ideal for setting reference points for moderate approach speeds.

Domed plunger



Hardened and polished ground.
Operating point accuracy to $\pm 0.002 \text{ mm}^{1)}$.
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.
Operating point accuracy to $\pm 0.01 \text{ mm}^{1)}$.
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 bearing can be offered on request.

Extended roller plunger



Robust roller plunger for medium approach speeds.

Ball plunger



Ball hardened.
Operating point accuracy to $\pm 0.01 \text{ mm}^{1)}$.
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!

1) The reproducible operating point accuracy refers to the axial travel of the plunger after the switching element ES 502 E has been run in with approx. 2,000 operating cycles.

Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Roller lever arm					
Roller material	Plastic (HB)		Steel (HS)			
Approach speed, max. ¹⁾	300		60		m/min	
Approach speed, min.	0.1				m/min	
Operating point accuracy	± 0.25					
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	3131H 2 NC ⊖ + 2 NO			
Switching principle	Snap-action switching contact		Slow-action switching contact 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 _{imp}	2.5				kV	
Rated insulation voltage U _i	250				V	
Utilization category acc. to IEC 60947-5-1	AC12	I _e 10 A U _e 230 V	-			
	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V			
	DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V			
Switching current, min., at switching voltage	10	1	10	1	10	mA
	24	24	12	24	12	V DC
Conventional thermal current I _{th}	6	4			A	
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6	4			A gG	
Connection	Screw terminal ²⁾					
Conductor cross-section, max.	2 x 1.5				mm ²	

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

2) Wiring diagram: see page B-9.

Ordering table

Series	Roller	Switching element	Order no.		
			without	Function display L060	L110
NG1...-M NZ1...-M	HB Plastic roller	510	079926	090360	On request
		511	079952	090039	
		528	088199	090965	
		538	090966	090967	-
		2131	090968	-	
		3131	090969	-	
NG1...-M NZ1...-M	HS Steel roller	510	079927	079937	On request
		511	079953	090035	
		528	090970	090971	
		538	090972	090760	-
		2131	090973	-	
		3131	090747	-	

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

Order no. 079937

Position switch series NG2.../NZ2...

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

NG...

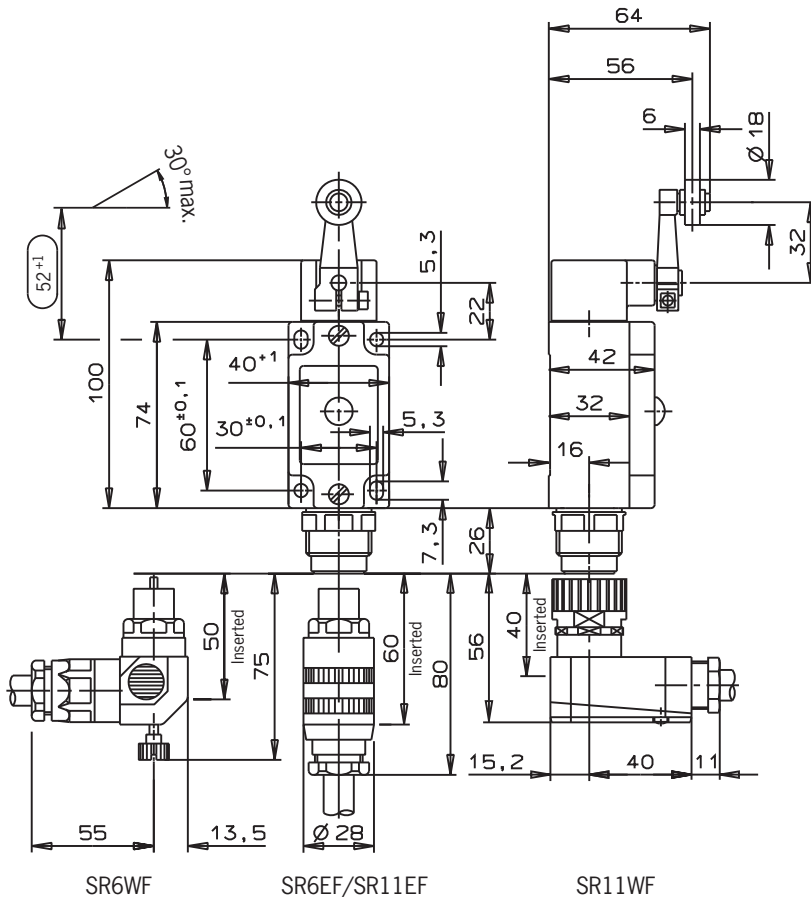


NZ...



1) Not applicable to NZ with switching element 511.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖
- ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO

(further information: see page B-9)

LED function display

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

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

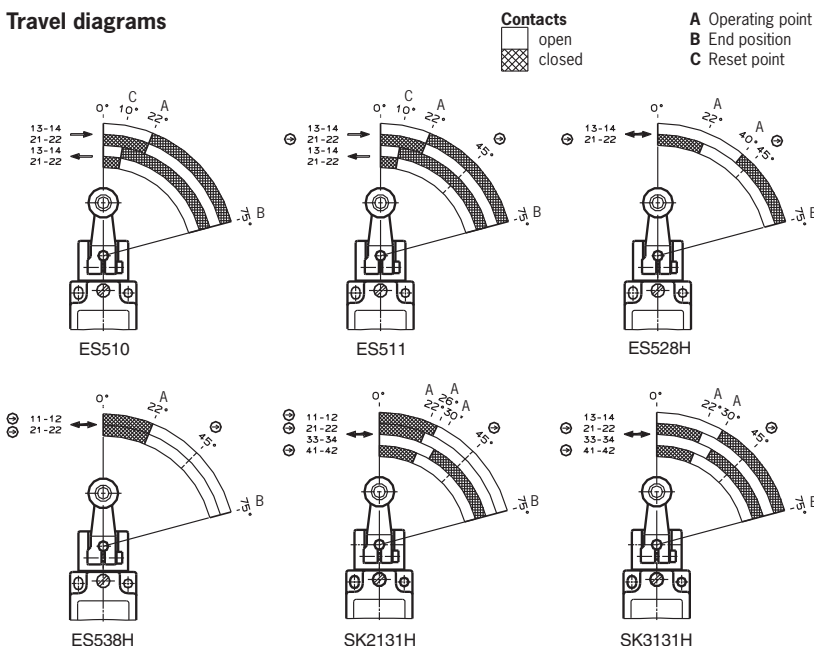
Adjustment options (see page B-8)

- ▶ Horizontal 4 x 90°
- ▶ Vertical 8 x 45°

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



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

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the dimension 52^{+1} must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Technical data

Parameter	Value					Unit
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 65					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)					°C
Weight	Approx. 0.3					kg
Actuator	Roller lever arm					
Roller material	Plastic (HB)		Steel (HS)			
Approach speed, max. ¹⁾	300		60			m/min
Approach speed, min.	0.1					m/min
Operating point accuracy	± 0.25					
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15					N
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO		538H 2 NC ⊖		
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO		3131H 2 NC ⊖ + 2 NO		
Switching principle	Snap-action switching cont.		Slow-action switching contact with H-contact bridge			
Contact material	Silver alloy, gold flashed					
Contact closing time	< 4					ms
Contact bounce time	< 3					ms
Switching current, min., at switching voltage	10	1	10	1	10	mA
	24	24	12	24	12	V DC
Conventional thermal current I _{th}	6	4				A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	6	4				A gG
Connection	Plug connector according to DIN 43651 ²⁾					
Rated impulse withstand voltage U _{imp}	With plug connector SR6					kV
	2.5					
	With plug connector SR11					
1.5						
Rated insulation voltage U _i	With plug connector SR6					V
	250					
	With plug connector SR11					
50						
Utilization category acc. to IEC 60947-5-1	With plug connector SR6	AC15	I _e 6 A U _e 230 V		I _e 4 A U _e 230 V	
		DC13	I _e 6 A U _e 24 V		I _e 4 A U _e 24 V	
	With plug connector SR11	AC15			I _e 4 A U _e 50 V	
		DC13			I _e 4 A U _e 24 V	

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

2) Wiring diagram: see page B-10.

Ordering table

Series	Roller	Switching element	Order no.			
			Plug connector/function display			
			SR6 without	SR6 L060	SR11 without	SR11 L110
NG2...	HB Plastic roller	510	089088	089089	-	-
		511	089091	089092	-	-
		528	090845	090846	-	-
		538	090847	090848	-	-
		2131	-	-	-	090136
3131	-	-	-	090137		
NG2...	HS Steel roller	510	090851	089090	-	-
		511	089093	089094	-	-
		528	090852	088196	-	-
		538	090853	090854	-	-
		2131	-	-	-	090146
3131	-	-	090856	-		

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

Order no.
089090

Position switch series NG2.../NZ2...

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

NG...

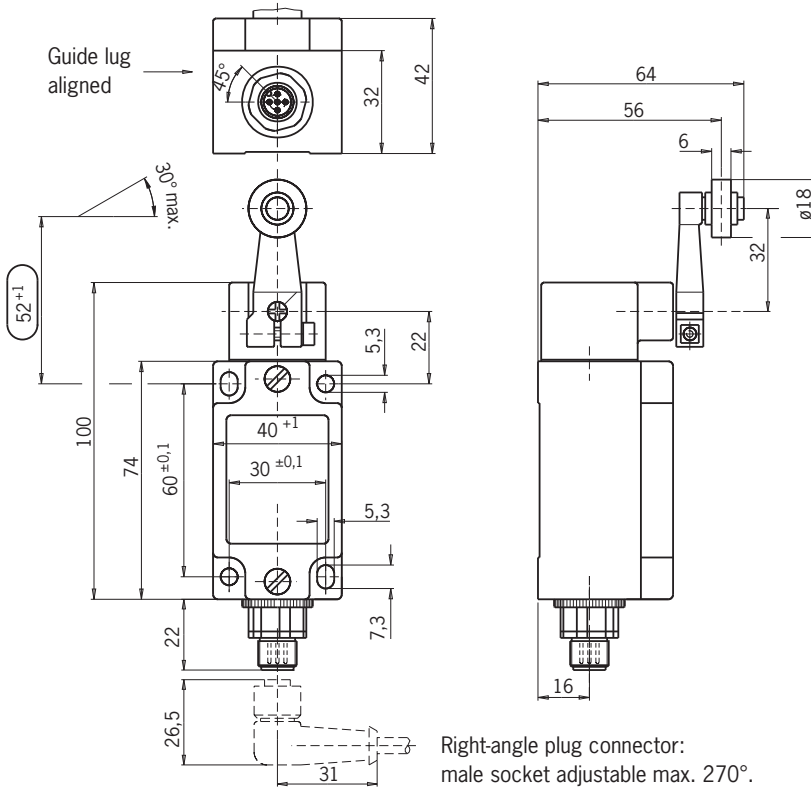


NZ...



1) Not applicable to NZ with switching element 511.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖

(further information: see page B-9)

LED function display

Available on request

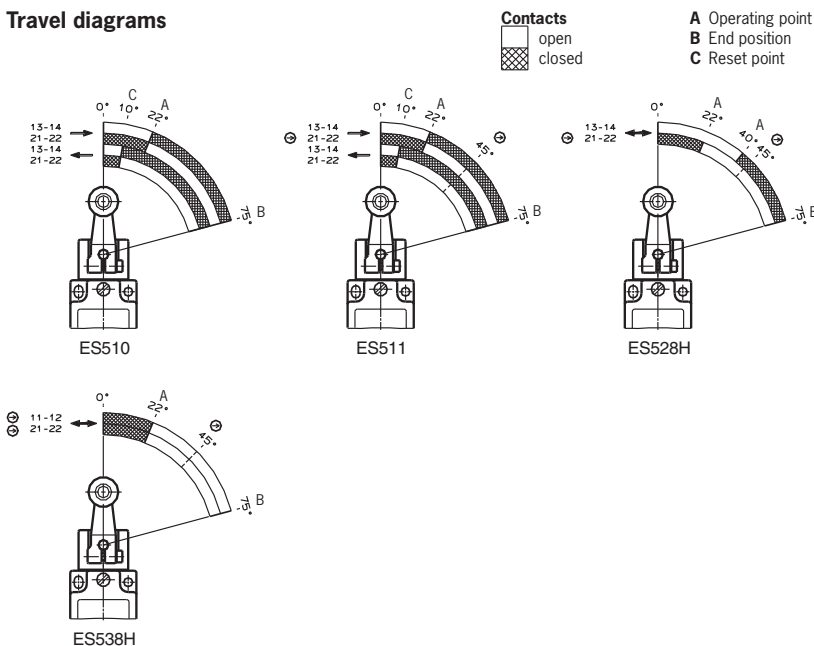
Adjustment options (see page B-8)

- ▶ Horizontal 4 x 90°
- ▶ Vertical 8 x 45°

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



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

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the dimension $52+1$ must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Technical data

Parameter	Value				Unit
Housing material	Anodized die-cast alloy				
Degree of protection acc. to IEC 60529	IP 67				
Installation position	Any				
Mechanical life	30 x 10 ⁶ operating cycles				
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C
Weight	Approx. 0.3				kg
Actuator	Roller lever arm				
Roller material	Plastic (HB)		Steel (HS)		
Approach speed, max. ¹⁾	300		60		m/min
Approach speed, min.	0.1				m/min
Operating point accuracy	± 0.25				
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram				
Actuating force, min.	15				N
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖		
	511 1 ⊖ + 1 NO				
Switching principle	Snap-action switching contact		Slow-action switching contact 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 _{imp}	1.5				kV
Rated insulation voltage U _i	50				V
Utilization category acc. to IEC 60947-5-1 with plug connector SVM5	AC15	I _e 4 A U _e 30 V	I _e 4 A U _e 30 V		
	DC13	I _e 4 A U _e 24 V	I _e 4 A U _e 24 V		
Switching current, min., at switching voltage	10	1	10	1	10
	24	24	12	24	12
Conventional thermal current I _{th}	4				A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4				A gG
Connection	Plug connector M12 ²⁾				

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

2) Wiring diagram: see page B-10.

Ordering table

Series	Roller	Switching element	Order no.			
			Plug connector SVM5			
NG2...	HB Plastic roller	510	088631			
		511	090861			
528		090864				
538		090862				
NG2...	HS Steel roller	510	090866			
		511	090867			
528		090868				
538		090869				

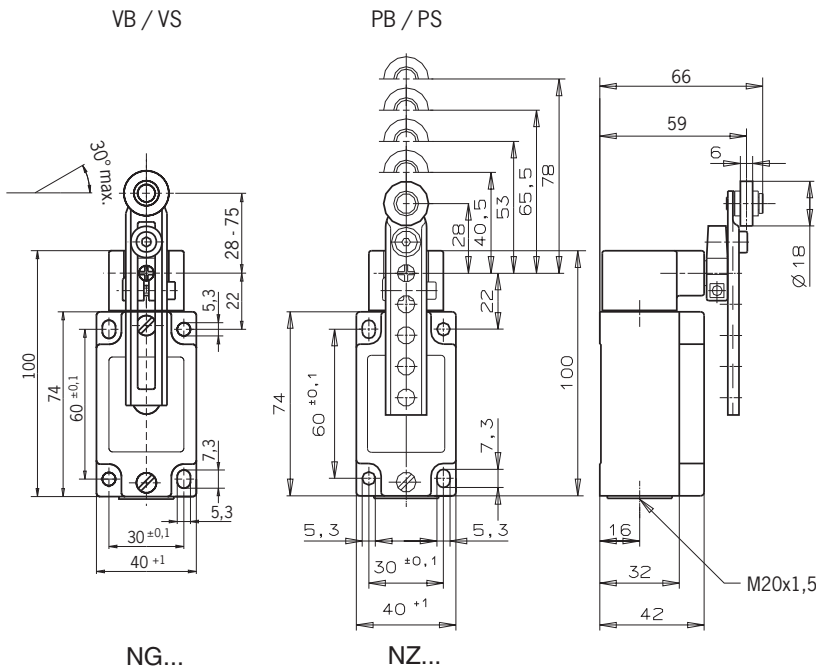
Ordering example: Position switch without safety function **NG**, plug connector **2**, lever arm with steel roller **HS**, snap-action switching element **510**, M12 male socket with PE connection **SVM5**
NG2HS-510SVM5

Order no. 090866

Position switch 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)

Dimension drawing



NG...

NZ...



1) Not applicable to NZ with switching element 511.

Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖
- ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO

(further information: see page B-9)

LED function display

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

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

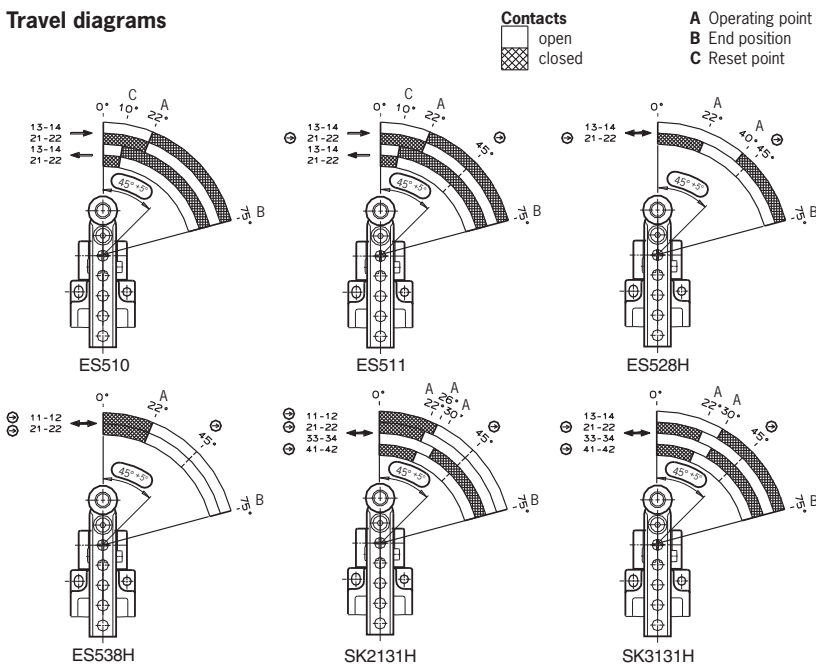
Adjustment options (see page B-8)

- ▶ Horizontal 4 x 90°
- ▶ Vertical 8 x 45°

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



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

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the trip dog must be mounted so that it actuates the lever arm to the angle 45^{+5} . Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Adjustable roller lever arm					
Roller material	Plastic (VB)	Plastic (PB)	Steel (VS)	Steel (PS)		
Approach speed, max. ¹⁾	120	120	30	30	m/min	
Approach speed, min.	0.5				m/min	
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊕ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊕ + 1 NO	538H 2 NC ⊕			
	511 1 ⊕ + 1 NO	2131H 3 NC ⊕ + 1 NO	3131H 2 NC ⊕ + 2 NO			
Switching principle	Snap-action switching contact	Slow-action switching contact 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 _{imp}	2.5				kV	
Rated insulation voltage U _i	250				V	
Utilization category acc. to IEC 60947-5-1	AC12	I _e 10 A U _e 230 V	-			
	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V			
	DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V			
Switching current, min., at switching voltage	10 24	1 24	10 12	1 24	10 12	mA V DC
Conventional thermal current I _{th}	6	4			A	
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6	4			A gG	
Connection	Screw terminal ²⁾					
Conductor cross-section, max.	2 x 1.5				mm ²	

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

2) Wiring diagram: see page B-9.

Ordering table

Series	Roller	Switching element	Order no.	
			without	Function display L060
NG1...-M	VB Plastic roller	510	086322	091288
	VS Steel roller	510	079934	090599
NZ1...-M	PB Plastic roller	511	088618	094753
		528	090870	On request
		538	090871	
		2131	090872	
		3131	090873	-
	PS Steel roller	511	088613	-
		528	090874	090430
		538	090875	-
		2131	090876	-
		3131	090877	-

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

Order no. 088613

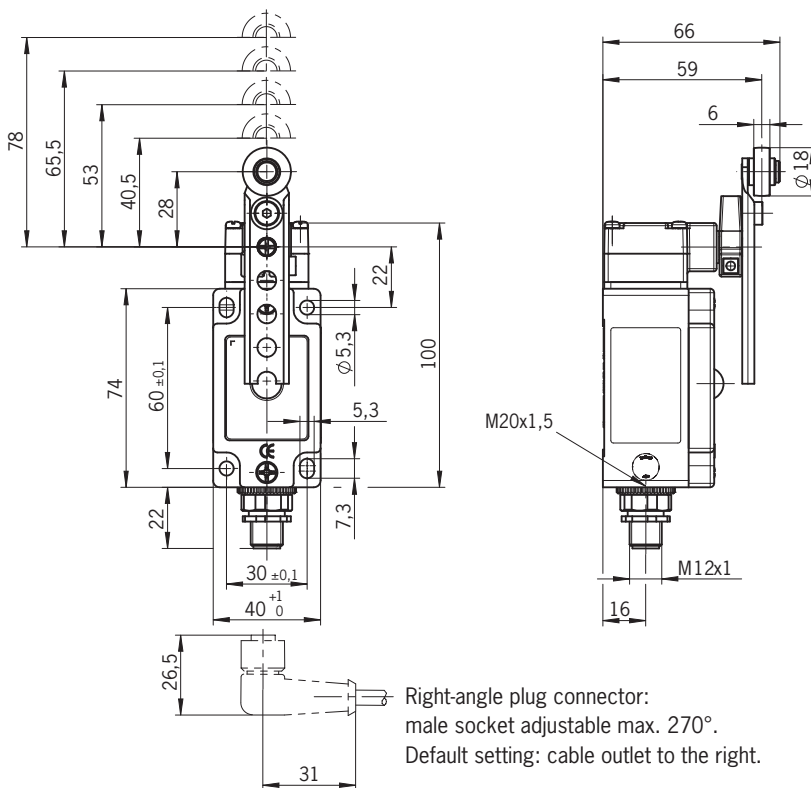
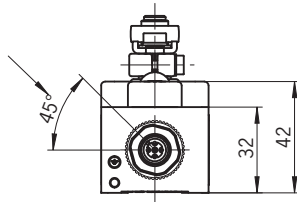
Position switch series NZ2...



- ▶ **Adjustable roller lever arm**
 - PB** (plastic roller)
 - PS** (steel roller)
- ▶ **Plug connector M12/SVM5**

Dimension drawing

Guide lug aligned



Switching elements

- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
(further information: see page B-9)

LED function display

A yellow function display is available for the following voltage ranges:

- ▶ 12-60 V AC/DC (standard) L060

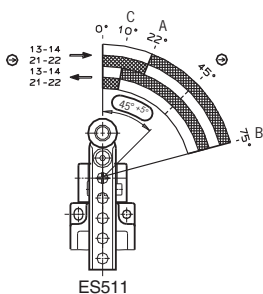
Adjustment options (see page B-8)

- ▶ Horizontal 4 x 90°
- ▶ Vertical 8 x 45°

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



Contacts
□ open
▨ closed

A Operating point
B End position
C Reset point

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

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the trip dog must be mounted so that it actuates the lever arm to the angle $(45^{\circ} \pm 5^{\circ})$. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Technical data

Parameter	Value		Unit
Housing material	Anodized die-cast alloy		
Degree of protection acc. to IEC 60529	IP 67		
Installation position	Any		
Mechanical life	30 x 10 ⁶ operating cycles		
Ambient temperature	- 25 ... + 80 (-40 °C on request)		°C
Weight	Approx. 0.3		kg
Actuator	Adjustable roller lever arm		
Roller material	Plastic (PB)	Steel (PS)	
Approach speed, max. ¹⁾	120	30	m/min
Approach speed, min.	0.5		m/min
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol \ominus in travel diagram		
Actuating force, min.	15		N
Switching elements	511 1 \ominus + 1 NO		
Switching principle	Snap-action switching contact		
Contact material	Silver alloy, gold flashed		
Contact closing time	< 4		ms
Contact bounce time	< 3		ms
Rated impulse withstand voltage U _{imp}	1.5		kV
Rated insulation voltage U _i	50		V
Utilization category acc. to IEC 60947-5-1			
with plug connector SVM5	AC15	I _e 4 A U _e 30 V	
	DC13	I _e 4 A U _e 24 V	
Switching current, min., at switching voltage	10		mA
	24		V DC
Conventional thermal current I _{th}	4		A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4		A gG
Connection	Plug connector M12 ²⁾		

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

2) Wiring diagram: see page B-10.

Ordering table

Series	Roller	Switching element	Order no.	
			without	Function display L060
NZ2...	PB Plastic roller	511	-	098646
	PS Steel roller	511	106697	098645

Ordering example: Position switch with safety function **NZ**, plug connector **2**, adjustable lever arm with steel roller **PS**, snap-action switching element **511**, M12 male socket with PE connection **SVM5**
NZ2PS-511SVM5

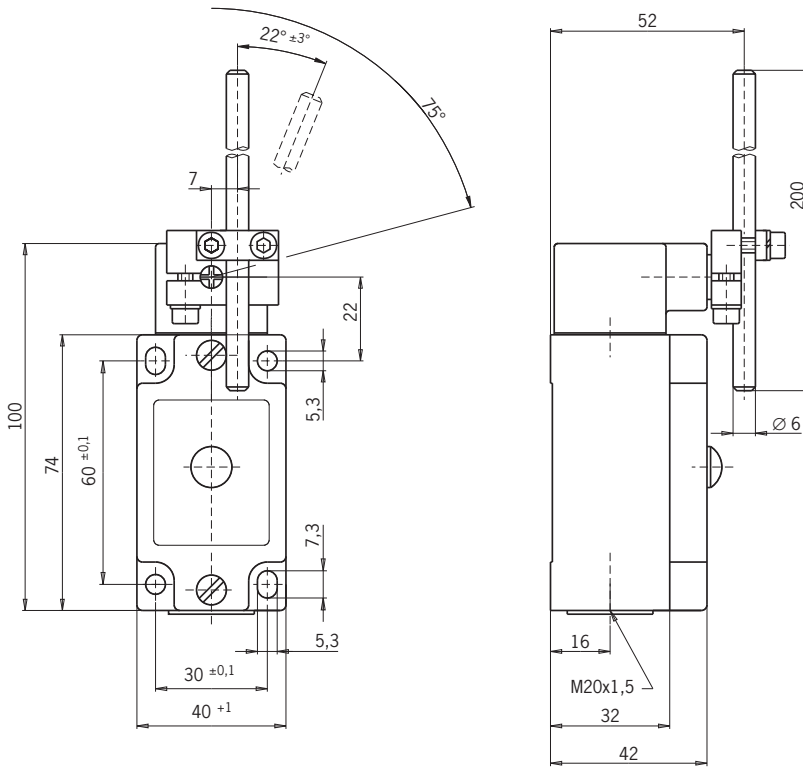
Order no. 106697

Position switch 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

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
(further information: see page B-9)

LED function display

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

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

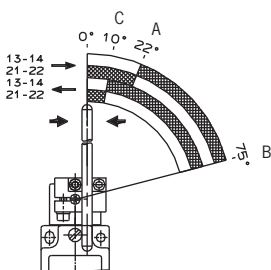
Adjustment options

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

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



Contacts

 open
 closed

A Operating point
B End position
C Reset point

Technical data

Parameter	Value		Unit
Housing material	Anodized die-cast alloy		
Degree of protection acc. to IEC 60529	IP 67		
Installation position	Any		
Mechanical life	30 x 10 ⁶ operating cycles		
Ambient temperature	- 25 ... + 80 (-40 °C on request)		°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
Operating point accuracy	± 1		°
Actuating force, min.	15		N
Switching elements	510 1 NC + 1 NO		
Switching principle	Snap-action switching contact		
Contact material	Silver alloy, gold flashed		
Contact closing time	< 4		ms
Contact bounce time	< 3		ms
Rated impulse withstand voltage U _{imp}	2.5		kV
Rated insulation voltage U _i	250		V
Utilization category acc. to IEC 60947-5-1			
	AC12	I _e 10 A U _e 230 V	
	AC15	I _e 6 A U _e 230 V	
	DC13	I _e 6 A U _e 24 V	
Switching current, min., at switching voltage	10 24		mA V DC
Conventional thermal current I _{th}	6		A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6		A gG
Connection	Screw terminal ¹⁾		
Conductor cross-section, max.	2 x 1.5		mm ²

1) Wiring diagram: see page B-9.

Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display
NG1...-M	SB Plastic rod	510	088609	L060 090577
	SM Aluminum rod	510	079932	090575

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

Order no. 090577

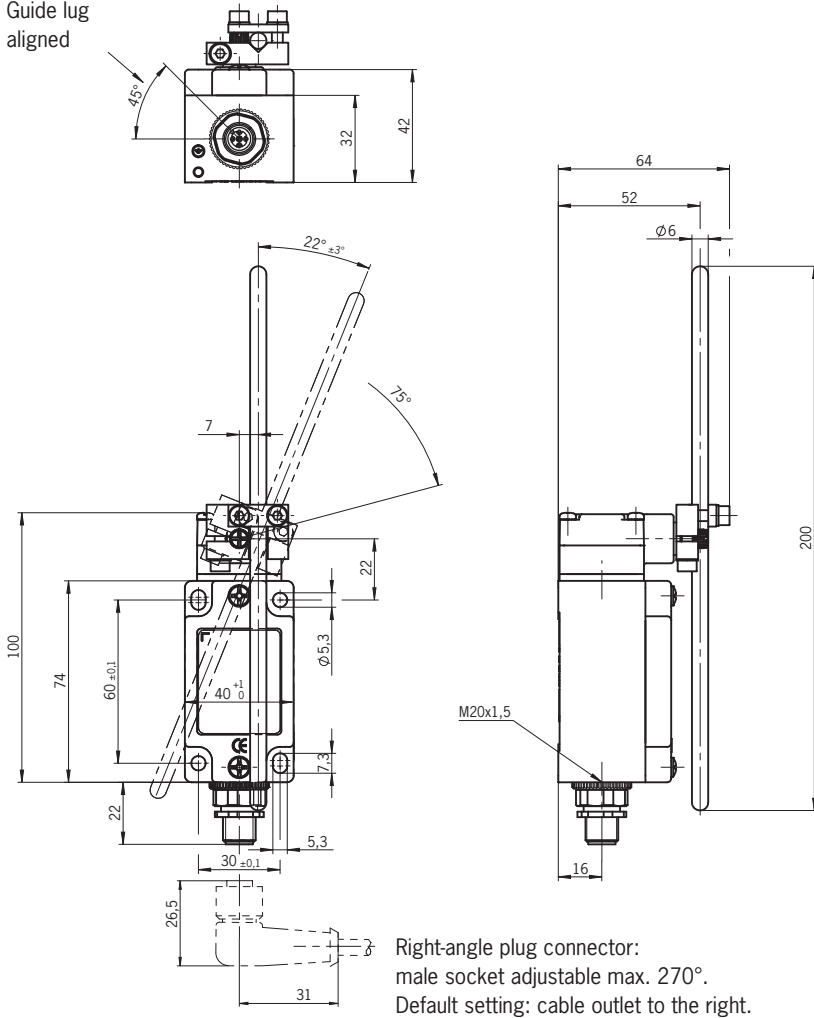
Position switch series NG2...



- ▶ Pivoted lever arm **SB** (plastic rod)
SM (aluminum rod)
- ▶ Plug connector M12/SVM5

Dimension drawing

Guide lug aligned



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
(further information: see page B-9)

LED function display

Available on request

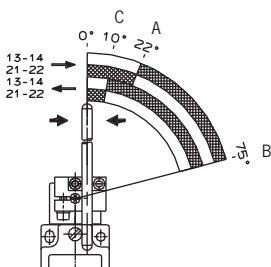
Adjustment options

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

Switching direction

Switches to the right, left or both sides (see page B-8).

Travel diagrams



Contacts



A Operating point

B End position

C Reset point

Technical data

Parameter	Value		Unit
Housing material	Anodized die-cast alloy		
Degree of protection acc. to IEC 60529	IP 67		
Installation position	Any		
Mechanical life	30 x 10 ⁶ operating cycles		
Ambient temperature	- 25 ... + 80 (-40 °C on request)		°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
Operating point accuracy	± 1		°
Actuating force, min.	15		N
Switching elements	510 1 NC + 1 NO		
Switching principle	Snap-action switching contact		
Contact material	Silver alloy, gold flashed		
Contact closing time	< 4		ms
Contact bounce time	< 3		ms
Rated impulse withstand voltage U _{imp}	1.5		kV
Rated insulation voltage U _i	50		V
Utilization category acc. to IEC 60947-5-1			
Plug connector SVM5	AC15	I _e 4 A U _e 30 V	
	DC13	I _e 4 A U _e 24 V	
Switching current, min., at switching voltage	10		mA
	24		V DC
Conventional thermal current I _{th}	4		A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4		A gG
Connection	Plug connector M12 ¹⁾		

1) Wiring diagram: see page B-10.

Ordering table

Series	Actuator	Switching element	Order no.
			Plug connector SVM5
NG2...	SB Plastic rod	510	091303
	SM Aluminum rod	510	094059

Ordering example: Position switch without safety function **NG**, plug connector **2**, pivoted lever arm with plastic rod **SB**, snap-action switching element **510**, M12 male socket with PE connection **SVM5**
NG2SB-510SVM5

Order no. **091303**

Position switch series NG1.../NZ1...

- ▶ **Plunger actuator**
WO (domed plunger) / **KO** (ball plunger)
DO (chisel plunger) / **RK** (roller plunger with small steel roller)
- ▶ **Cable entry M20 x 1.5**

NG...

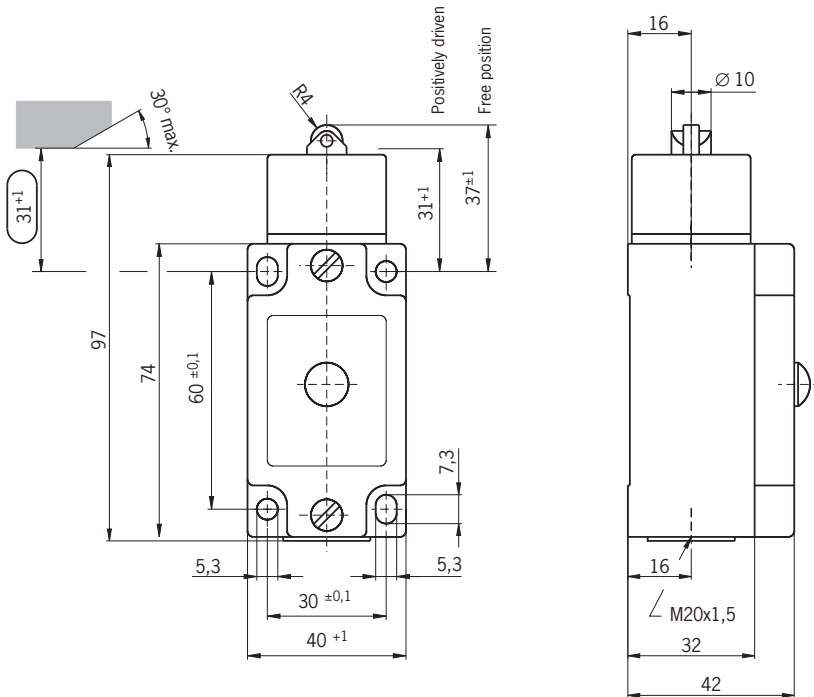


NZ...



- 1) - Not applicable to NZ with switching element 511.
- Not applicable to NZ versions DO and KO.
- 2) - Not applicable to NG/NZ versions DO and KO with switching element 528H, 538H, 2131H, 3131H.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖
- ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO

(further information: see page B-9)

LED function display

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

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

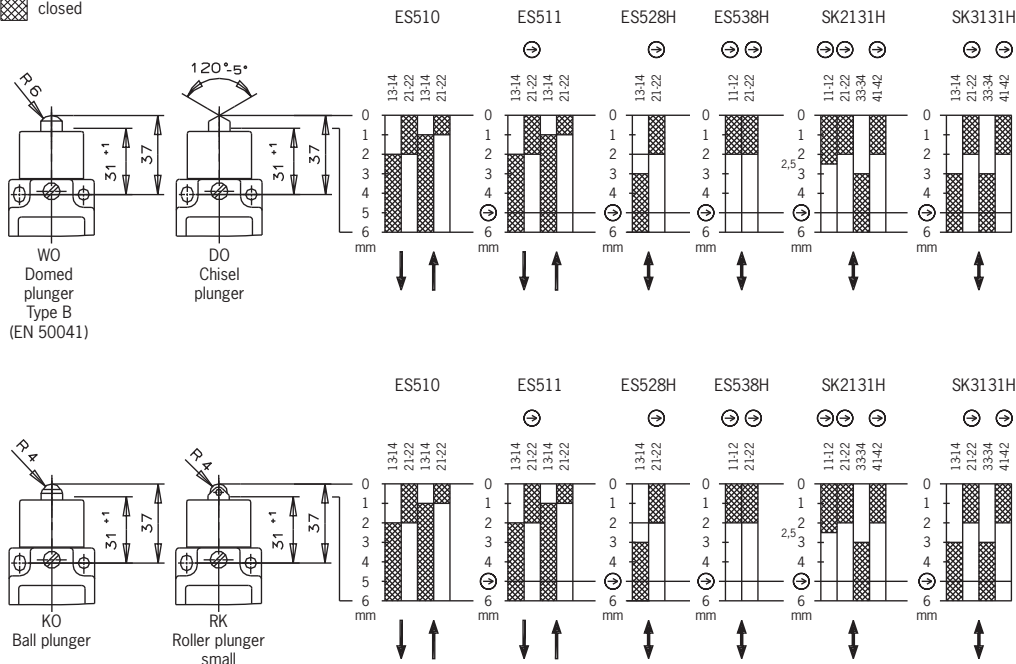
Adjustment options

Horizontal 4 x 90° (see page B-8).

⚠ To achieve the positively driven travel, the dimension (31 ±1) must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Travel diagrams

Contacts



Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Domed plunger (WO)	Chisel plunger (DO)	Ball plunger (KO)	Roller plunger, small (RK)		
Approach speed, max. ¹⁾	10			50	m/min	
Approach speed, min.	0.1				m/min	
Operating point accuracy ²⁾	± 0.002		0.01		mm	
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	3131H 2 NC ⊖ + 2 NO			
Switching principle	Snap-action switching cont.	Slow-action switching contact 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 _{imp}	2.5				kV	
Rated insulation voltage U _i	250				V	
Utilization category acc. to IEC 60947-5-1	AC12	I _e 10 A U _e 230 V	-			
	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V			
	DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V			
Switching current, min., at switching voltage	10 24	1 24	10 12	1 24	10 12	mA V DC
Conventional thermal current I _{th}	6	4			A	
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6	4			A gG	
Connection	Screw terminal ³⁾					
Conductor cross-section, max.	2 x 1.5				mm ²	

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-9.

Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display L060
NG1...-M	WO Domed plunger	510	079945	On request
		511	088611	089057
		528	089624	089078
		538	090878	089046
		2131	089629	-
		3131	089626	-
NG1...-M	DO Chisel plunger	510	088616	On request
		511	088620	
		528	090901	
		538	090902	
		2131	090903	
		3131	090904	
NG1...-M	RK Roller plunger, small	510	088619	On request
		511	088608	090354
		528	090905	090358
		538	090906	On request
		2131	090907	-
		3131	090908	-
NG1...-M	KO Ball plunger	510	088604	On request

Ordering example: Position switch with safety function **NZ**, cable entry **1**, domed plunger **WO**, snap-action switching element **511**, function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**
NZ1WO-511L060-M

Order no. **089057**

Position switch series NG2.../NZ2...

- ▶ **Plunger actuator**
WO (domed plunger) / **KO** (ball plunger)
DO (chisel plunger) / **RK** (roller plunger with small steel roller)
- ▶ **Plug connectors SR6 and SR11**

NG...

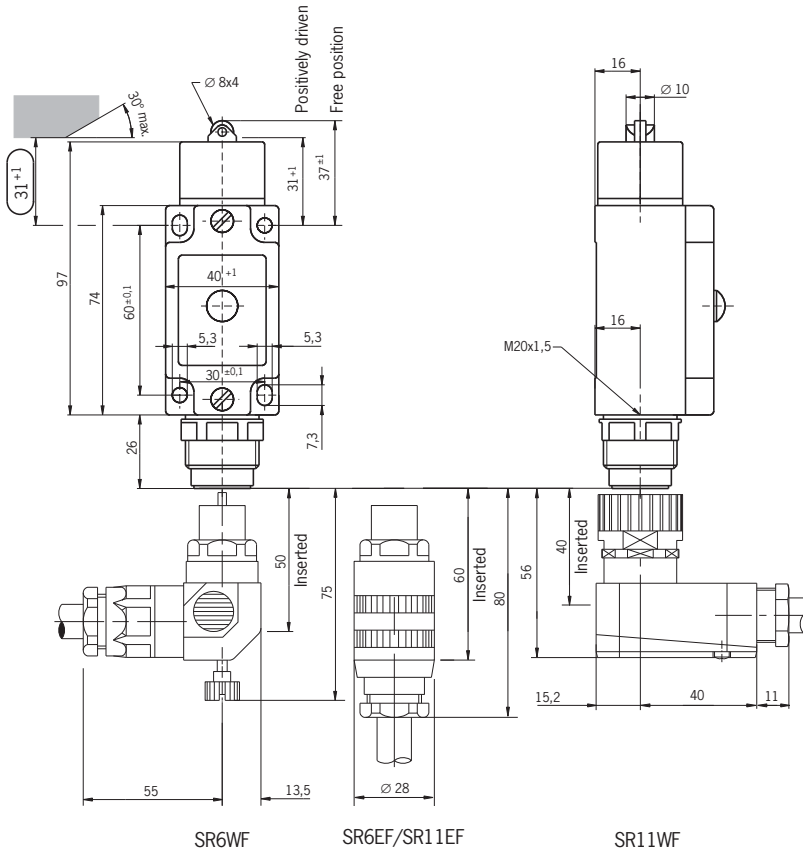


NZ...



- 1) - Not applicable to NZ with switching element 511.
- Not applicable to NZ versions DO and KO.
- 2) - Not applicable to NG/NZ versions DO and KO with switching element 528H, 538H, 2131H, 3131H.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖
- ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO

(further information: see page B-9)

LED function display

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

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

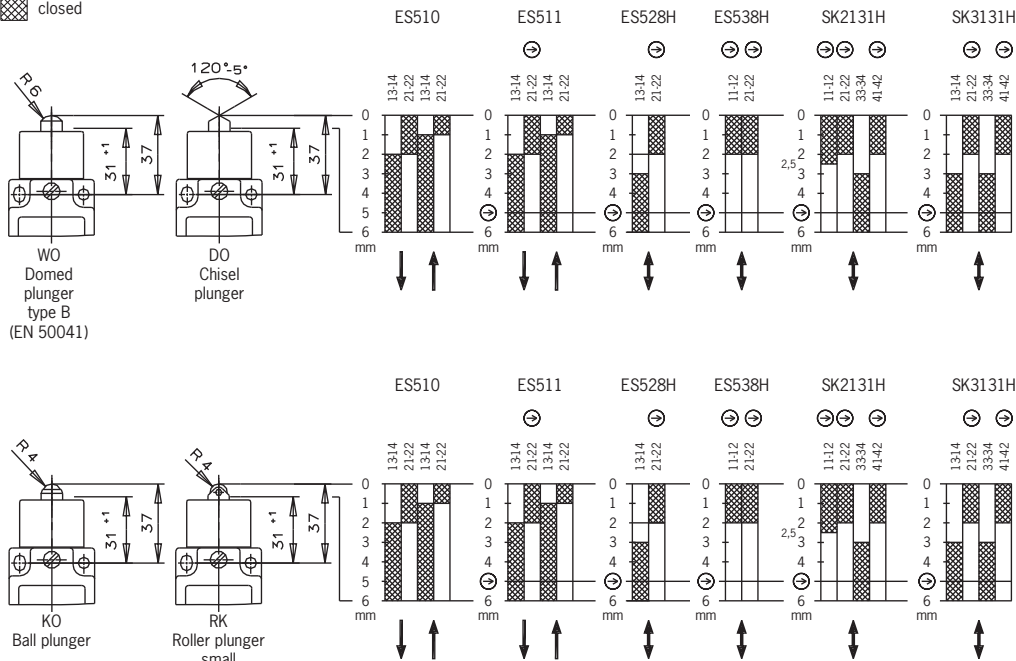
Adjustment options

Horizontal 4 x 90° (see page B-8).

⚠ To achieve the positively driven travel, the dimension 31^{+1} must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Travel diagrams

Contacts



Technical data

Parameter	Value					Unit
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 65					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)					°C
Weight	Approx. 0.3					kg
Actuator	Domed plunger (WO)	Chisel plunger (DO)	Ball plunger (KO)	Roller plunger, small (RK)		
Approach speed, max. ¹⁾	10			50		m/min
Approach speed, min.	0.1					m/min
Operating point accuracy ²⁾	± 0.002		0.01			°
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15					N
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	3131H 2 NC ⊖ + 2 NO			
Switching principle	Snap-action switching cont.	Slow-action switching contact with H-contact bridge				
Contact material	Silver alloy, gold flashed					
Contact closing time	< 4					ms
Contact bounce time	< 3					ms
Switching current, min., at switching voltage	10	1	10	1	10	mA
	24	24	12	24	12	
Conventional thermal current I _{th}	6	4				A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	6	4				A gG
Connection	Plug connector according to DIN 43651 ³⁾					
Rated impulse withstand voltage U _{imp}	With plug connector SR6					kV
	With plug connector SR11					
	With plug connector SR11					
Rated insulation voltage U _i	With plug connector SR6					V
	With plug connector SR11					
	With plug connector SR11					
Utilization category acc. to IEC 60947-5-1	With plug connector SR6	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V		
		DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V		
	With plug connector SR11	AC15		I _e 4 A U _e 50 V		
		DC13		I _e 4 A U _e 24 V		

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-10.

Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display L060
NG2...	WO Domed plunger	510	090012	On request
		511	090909	091280
		528	090910	091279
		538	090911	087558
		2131	090912	-
		3131	090913	-
NG2...	DO Chisel plunger	510	090011	On request
		511	090015	
		528	090914	
		538	090915	
		2131	090916	
		3131	090917	
NG2...	RK Roller plunger, small	510	090918	091300
		511	090016	099273
		528	090919	091292
		538	090920	On request
		2131	090921	-
		3131	090922	-
NG2...	KO Ball plunger	510	090020	On request

Position switch series NG2.../NZ2...

- ▶ **Plunger actuator**
WO (domed plunger) / **KO** (ball plunger)
DO (chisel plunger) / **RK** (roller plunger with small steel roller)
- ▶ **Plug connector M12/SVM5**

NG...

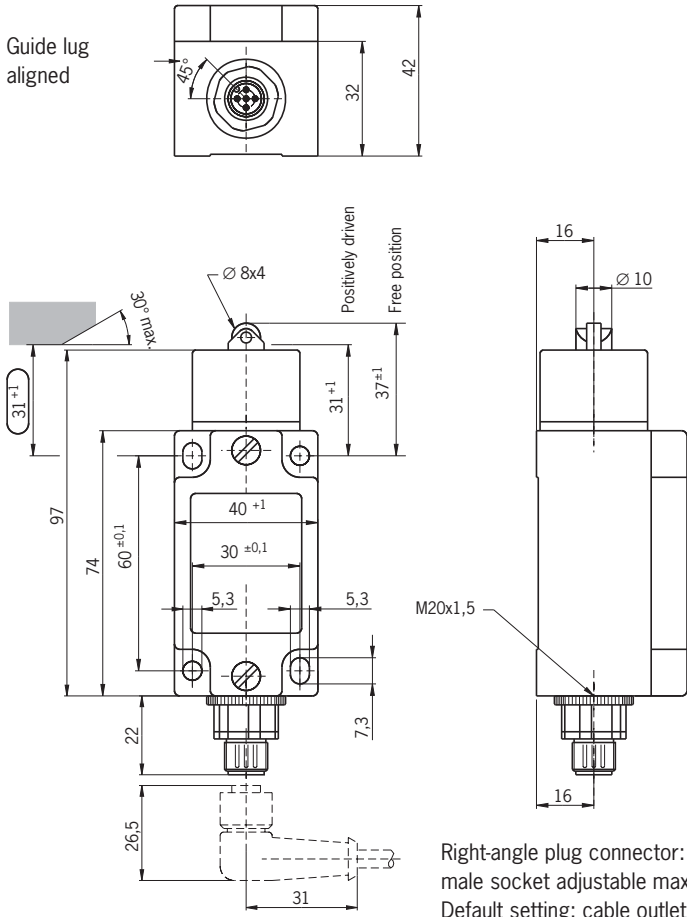


NZ...



- 1) - Not applicable to NZ with switching element 511.
- Not applicable to NZ versions DO and KO.
- 2) - Not applicable to NG/NZ versions DO and KO with switching element 528H, 538H, 2131H, 3131H.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖

(further information: see page B-9)

LED function display

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

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

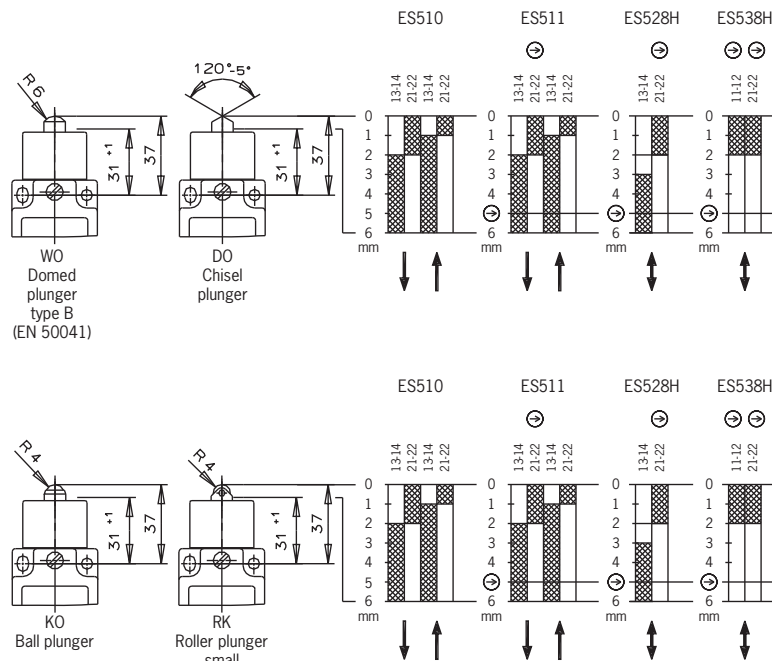
Adjustment options

Horizontal 4 x 90° (see page B-8).

⚠ To achieve the positively driven travel, the dimension 31⁺¹ must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Travel diagrams

Contacts
 □ open
 ▨ closed



Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Domed plunger (WO)	Chisel plunger (DO)	Ball plunger (KO)	Roller plunger, small (RK)		
Approach speed, max. ¹⁾	10			50	m/min	
Approach speed, min.	0.1				m/min	
Operating point accuracy ²⁾	± 0.002		0.01		mm	
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO					
Switching principle	Snap-action switching contact	Slow-action switching contact 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 _{imp}	1.5				kV	
Rated insulation voltage U _i	50				V	
Utilization category acc. to IEC 60947-5-1	Plug connector SVM5		AC15		I _e 4 A U _e 30 V	
			DC13		I _e 4 A U _e 24 V	
					I _e 4 A U _e 24 V	
Switching current, min., at switching voltage	10	24	10	1	10	mA
Conventional thermal current I _{th}	4			4		A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4			4		A gG
Connection	Plug connector M12 ³⁾					

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-10.

Ordering table

Series	Actuator	Switching element	Order no.	
			Plug connector SVM5	
NG2...	WO Domed plunger	510	090018	
		511	089014	
		528	090923	
		538	090924	
NG2...	DO Chisel plunger	510	090014	
		511	090927	
		528	090928	
		538	090929	
NG2...	RK Roller plunger, small	510	089020	
		511	089007	
		528	090930	
		538	089018	
NG2...	KO Ball plunger	510	090931	

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

Order no. 089020

Position switch series NG1.../NZ1...

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

NG...

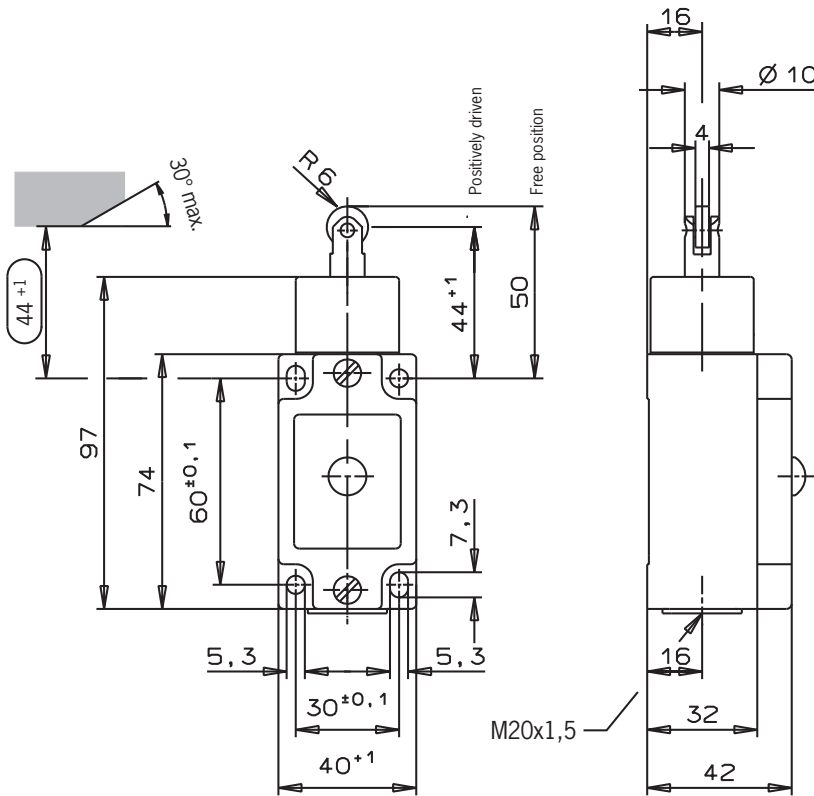


NZ...



1) Not applicable to NZ with switching element 511.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
 - ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
 - ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
 - ▶ **538H** Slow-action switching contact
2 NC ⊖
 - ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
 - ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO
- (further information: see page B-9)

LED function display

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

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

Adjustment options

Horizontal 4 x 90° (see page B-8).

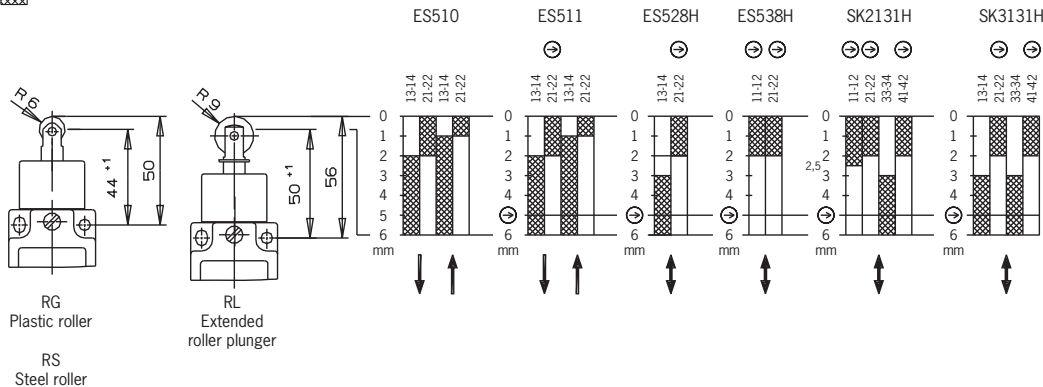
⚠ If damaged or worn, safety switches must be replaced as a unit.

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the dimension (44 +1) must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Travel diagrams

Contacts



Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Roller plunger, plastic roller (RG)	Roller plunger, steel roller (RS)	Extended roller plunger (RL)			
Approach speed, max. ¹⁾	20				m/min	
Approach speed, min.	0.1				m/min	
Operating point accuracy ²⁾	± 0.1				mm	
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	3131H 2 NC ⊖ + 2 NO			
Switching principle	Snap-action switching contact	Slow-action switching contact 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 _{imp}	2.5				kV	
Rated insulation voltage U _i	250				V	
Utilization category acc. to IEC 60947-5-1	AC12	I _e 10 A U _e 230 V	-			
	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V			
	DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V			
Switching current, min., at switching voltage	10	1	10	1	10	mA
	24	24	12	24	12	V DC
Conventional thermal current I _{th}	6	4			A	
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6	4			A gG	
Connection	Screw terminal ³⁾					
Conductor cross-section, max.	2 x 1.5				mm ²	

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-9.

Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display L060
NG1...-M	RG Roller plunger Plastic roller	510	079941	090398
		511	088605	089052
		528	090932	090008
		538	090933	090009
		2131	090934	-
		3131	090935	-
NG1...-M	RS Roller plunger Steel roller	510	079942	079943
		511	079960	089053
		528	089627	086413
		538	090936	090555
		2131	089633	-
		3131	089631	-
NG1...-M	RL Extended roller plunger	510	086324	090602
		511	088614	088996
		528	090937	090938
		538	090939	090940
		2131	090941	-
		3131	090942	-

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

Order no. 089052

Position switch series NG2.../NZ2...

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

NG...

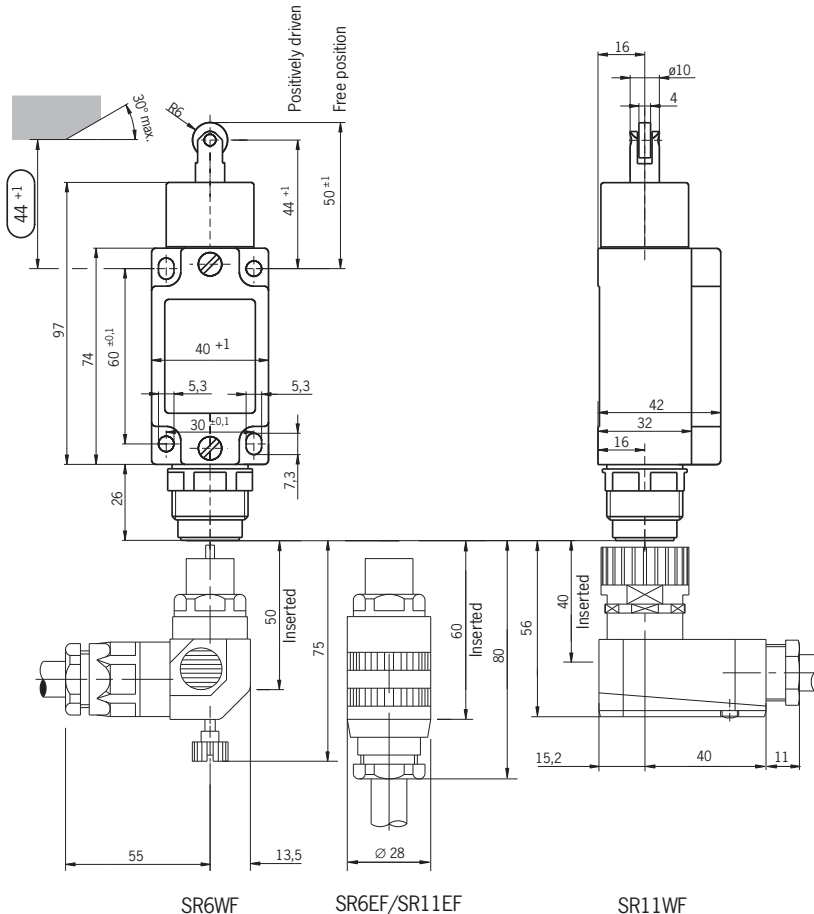


NZ...



1) Not applicable to NZ with switching element 511.

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
 - ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
 - ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
 - ▶ **538H** Slow-action switching contact
2 NC ⊖
 - ▶ **2131H** Slow-action switching contact
3 NC ⊖ + 1 NO
 - ▶ **3131H** Slow-action switching contact
2 NC ⊖ + 2 NO
- (further information: see page B-9)

LED function display

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

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

Adjustment options

Horizontal 4 x 90° (see page B-8).

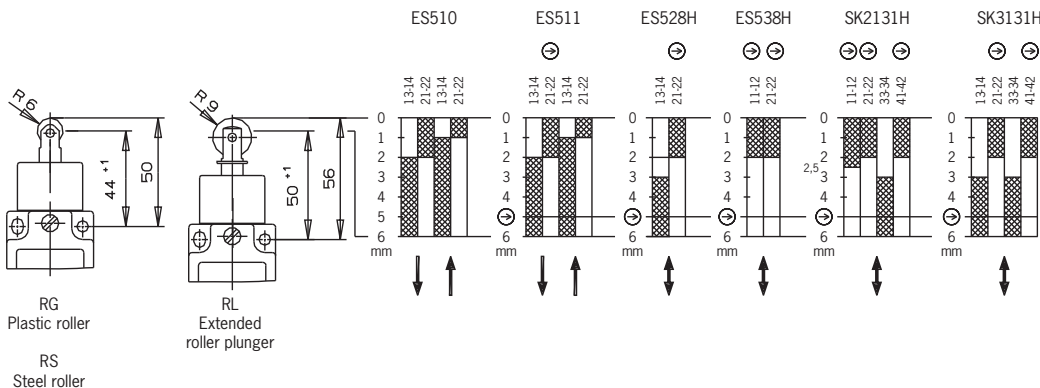
⚠ If damaged or worn, safety switches must be replaced as a unit.

Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the dimension 44^{+1} must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Travel diagrams

Contacts



Technical data

Parameter	Value					Unit
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 65					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)					°C
Weight	Approx. 0.3					kg
Actuator	Roller plunger, plastic roller (RG)	Roller plunger, steel roller (RS)	Extended roller plunger (RL)			
Approach speed, max. ¹⁾	20					m/min
Approach speed, min.	0.1					m/min
Operating point accuracy ²⁾	± 0.1					mm
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15					N
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	3131H 2 NC ⊖ + 2 NO			
Switching principle	Snap-action switching cont.	Slow-action switching contact with H-contact bridge				
Contact material	Silver alloy, gold flashed					
Contact closing time	< 4					ms
Contact bounce time	< 3					ms
Switching current, min., at switching voltage	10	1	10	1	10	mA
	24	24	12	24	12	
Conventional thermal current I _{th}	6	4				A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	6	4				A gG
Connection	Plug connector according to DIN 43651 ³⁾					
Rated impulse withstand voltage U _{imp}	With plug connector SR6					kV
	With plug connector SR11					
	With plug connector SR11					
Rated insulation voltage U _i	With plug connector SR6					V
	With plug connector SR11					
	With plug connector SR11					
Utilization category acc. to IEC 60947-5-1	With plug connector SR6	AC15	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V		
		DC13	I _e 6 A U _e 24 V	I _e 4 A U _e 24 V		
	With plug connector SR11	AC15	I _e 4 A U _e 50 V	I _e 4 A U _e 50 V		
		DC13	I _e 4 A U _e 24 V	I _e 4 A U _e 24 V		

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-10.

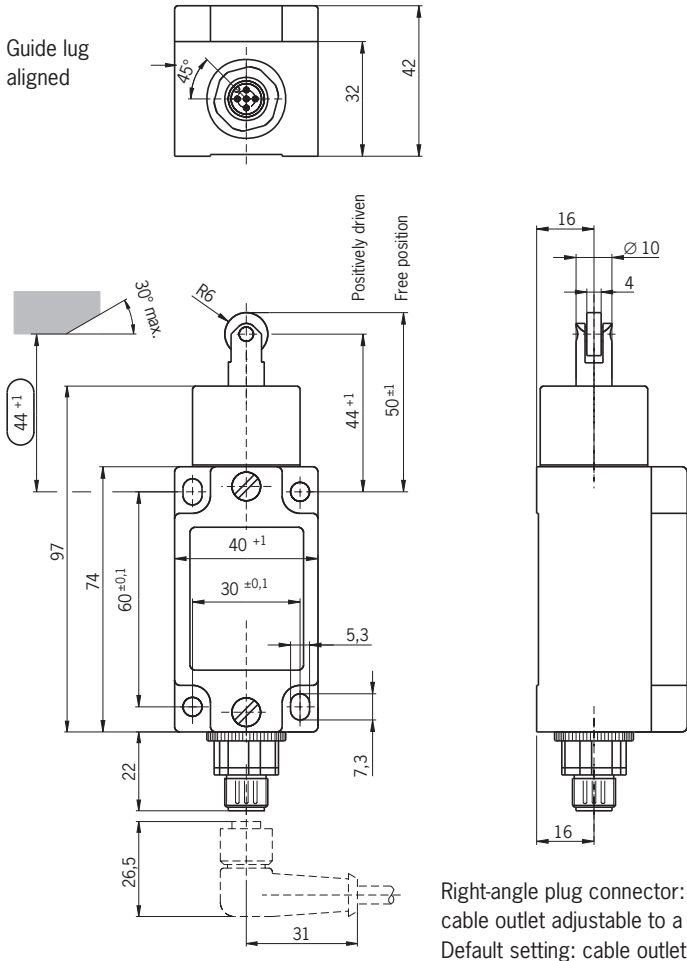
Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display L060
NG2... NZ2...	RG Roller plunger Plastic roller	510	090021	090949
		511	090032	091284
		528	090943	090944
		538	090945	090946
		2131	090947	-
		3131	090948	-
NG2... NZ2...	RS Roller plunger Steel roller	510	090953	On request
		511	090024	090147
		528	090950	088197
		538	090951	090952
		2131	090149	-
		3131	090954	-
NG2... NZ2...	RL Extended roller plunger	510	090022	091285
		511	090025	090955
		528	090956	091282
		538	090957	091278
		2131	090958	-
		3131	090959	-

Position switch series NG2.../NZ2...

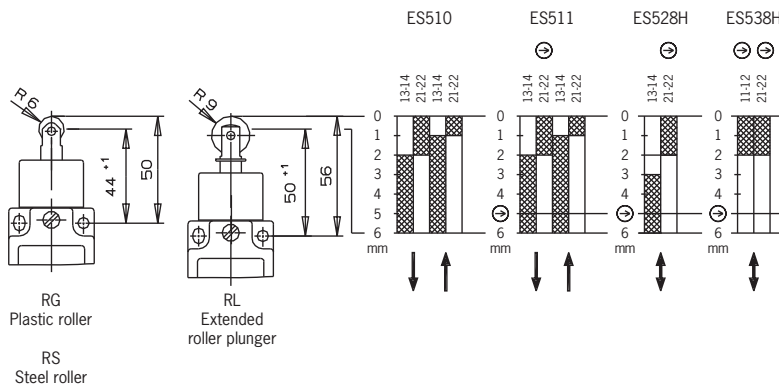
- ▶ **Plunger actuator** **RG** (roller plunger, plastic roller)
- RS** (roller plunger, steel roller)
- RL** (extended roller plunger)
- ▶ **Plug connector** **M12/SVM5**

Dimension drawing



Travel diagrams

Contacts



NG...



NZ...



1) Not applicable to NZ with switching element 511.

Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
- ▶ **511** Snap-action switching contact
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching contact
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching contact
2 NC ⊖

(further information: see page B-9)

LED function display

Available on request

Adjustment options

Horizontal 4 x 90° (see page B-8).

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

⚠ Notes on installation for position switches with safety switching elements

To achieve the positively driven travel, the dimension (44 +1) must be maintained by the trip dog. Actuating elements such as cam approach guides must be positively mounted in accordance with EN 1088, i.e. riveted, welded or otherwise secured against becoming loose.

Technical data

Parameter	Value				Unit	
Housing material	Anodized die-cast alloy					
Degree of protection acc. to IEC 60529	IP 67					
Installation position	Any					
Mechanical life	30 x 10 ⁶ operating cycles					
Ambient temperature	- 25 ... + 80 (-40 °C on request)				°C	
Weight	Approx. 0.3				kg	
Actuator	Roller plunger, plastic roller (RG)	Roller plunger, steel roller (RS)	Extended roller plunger (RL)			
Approach speed, max. ¹⁾	20				m/min	
Approach speed, min.	0.1				m/min	
Operating point accuracy ²⁾	± 0.1				mm	
Positively driven acc. to IEC 60947-5-1, appendix K	See symbol ⊖ in travel diagram					
Actuating force, min.	15				N	
Switching elements	510 1 NC + 1 NO	528H 1 NC ⊖ + 1 NO	538H 2 NC ⊖			
	511 1 ⊖ + 1 NO					
Switching principle	Snap-action switching contact	Slow-action switching contact 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 _{imp}	1.5				kV	
Rated insulation voltage U _i	50				V	
Utilization category acc. to IEC 60947-5-1	Plug connector SVM5		AC15		I _e 4 A U _e 30 V	
			DC13		I _e 4 A U _e 24 V	
					I _e 4 A U _e 24 V	
Switching current, min., at switching voltage	10	24	10	1	10	mA
Conventional thermal current I _{th}	4			4		A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4			4		A gG
Connection	Plug connector M12 ³⁾					

1) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639.

2) The reproducible operating point accuracy refers to the plunger's axial travel, after a run-in of approx. 2,000 operating cycles.

3) Wiring diagram: see page B-10.

Ordering table

Series	Actuator	Switching element	Order no.			
			Plug connector SVM5			
NG2...	RG Roller plunger Plastic roller	510	090960			
		511	090026			
NZ2...		528	090961			
		538	090962			
NG2...	RS Roller plunger Steel roller	510	088632			
		511	090027			
NZ2...		528	090963			
		538	090964			
NG2...	RL Extended roller plunger	510	On request			
NZ2...		511	090028			
		528	On request			
		538				

Ordering example: Position switch with safety function **NZ**, plug connector **2**, roller plunger with plastic roller **RG**, snap-action switching element **511**, M12 male socket with PE connection **SVM5**
NZ2RG-511SVM5

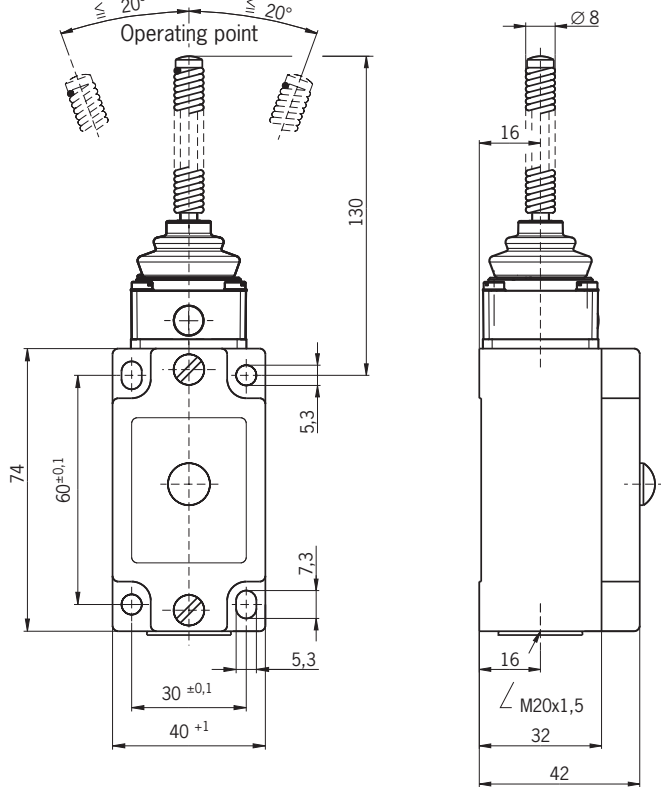
Order no. 090026

Position switch series NG1...



- ▶ Spring actuator FO
- ▶ Cable entry M20 x 1.5
- ▶ Actuating direction: all sides

Dimension drawing



Switching elements

- ▶ **510** Snap-action switching contact
1 NC + 1 NO
(further information: see page B-9)

LED function display

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

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

Technical data

Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection acc. to IEC 60529	IP 67	
Installation position	Any	
Mechanical life	30 x 10 ⁶ operating cycles	
Ambient temperature	- 25 ... + 80 (-40 °C on request)	°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	510 1 NC + 1 NO	
Switching principle	Snap-action switching contact	
Contact material	Silver alloy, gold flashed	
Contact closing time	< 4	ms
Contact bounce time	< 3	ms
Rated impulse withstand voltage U _{imp}	2.5	kV
Rated insulation voltage U _i	250	V
Utilization category acc. to IEC 60947-5-1		
	AC12 I _e 10 A U _e 230 V	
	AC15 I _e 6 A U _e 230 V	
	DC13 I _e 6 A U _e 24 V	
Switching current, min., at switching voltage	10 24	mA V DC
Conventional thermal current I _{th}	6	A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	10/6	A gG
Connection	Screw terminal ¹⁾	
Conductor cross-section, max.	2 x 1.5	mm ²

1) Wiring diagram: see page B-9.

Ordering table

Series	Actuator	Switching element	Order no.	
			without	Function display L060
NG1...-M	FO Spring actuator	510	079911	090029

Ordering example:

Position switch without safety function **NG**, cable entry **1**, spring steel wire spring actuator **FO**, snap-action switching element **510**, function display **L060** 10 - 60 V, metric thread M20 x 1.5 **M**
NG1FO-510L060-M

Order no. 090 029

Technical data

Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection acc. to IEC 60529	IP 67	
Installation position	Any	
Mechanical life	30 x 10 ⁶ operating cycles	
Ambient temperature	- 25 ... + 80 (-40 °C on request)	°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	510 1 NC + 1 NO	
Switching principle	Snap-action switching contact	
Contact material	Silver alloy, gold flashed	
Contact closing time	< 4	ms
Contact bounce time	< 3	ms
Rated impulse withstand voltage U _{imp}	1.5	kV
Rated insulation voltage U _i	50	V
Utilization category acc. to IEC 60947-5-1		
Plug connector SVM5	AC15 DC13	I _e 4 A U _e 30 V I _e 4 A U _e 24 V
Switching current, min., at switching voltage	10 24	mA V DC
Conventional thermal current I _{th}	4	A
Short circuit prot. acc. to IEC 60269-1 (control circuit fuse)	4	A gG
Connection	Plug connector M12 ¹⁾	

1) Wiring diagram: see page B-10.

Ordering table

Series	Actuator	Switching element	Order no.
			Plug connector SVM5
NG2...	FO Spring actuator	510	092058

Ordering example:

Position switch without safety function **NG**, plug connector **2**, spring steel wire spring actuator **FO**, snap-action switching element **510**, M12 male socket with PE connection **SVM5**
NG2FO-510SVM5

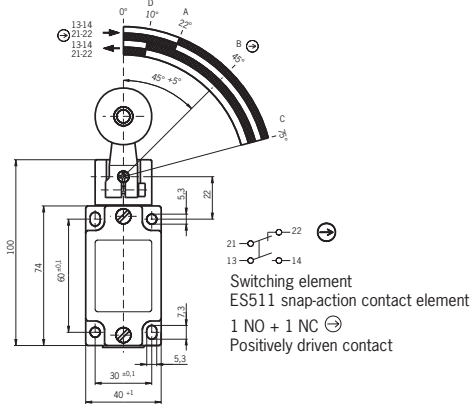
Order no. 092 058

Special versions (other special versions available on request)

Position switch with large plastic roller

Diameter 30 mm

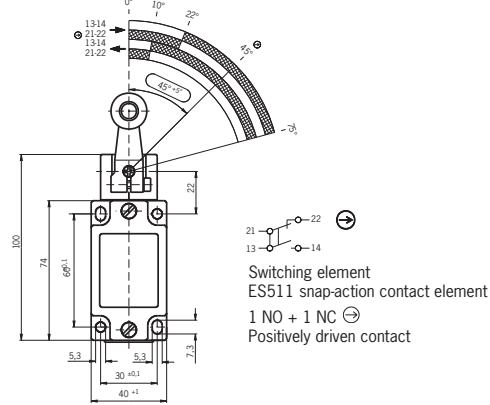
Item	Order no.
NZ1HB-511-MC569	079965



Position switch with sealed bearings

Diameter 19 mm

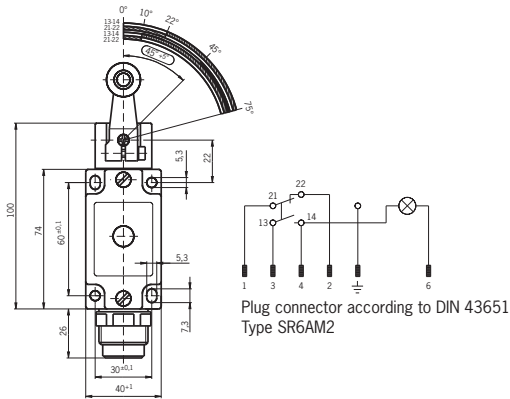
Item	Order no.
NZ1HS-511-MC1833	091312



Position switch with plug connector according to DIN 43651

VW/Audi, VW mat. no. 2348

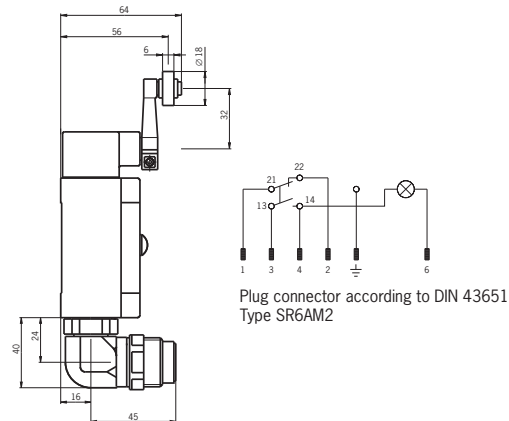
Item	Order no.
NZ2HB-511L060C1630	054121



Position switch with plug connector and elbow adapter according to DIN 43651

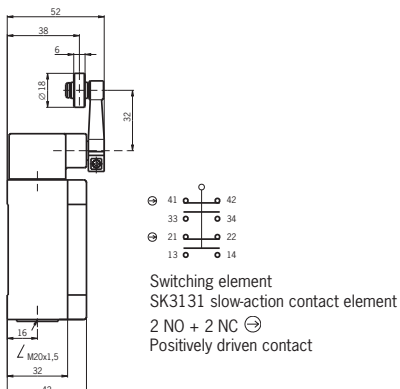
VW/Audi, VW mat. no. 2349

Item	Order no.
NZ2HB-511L060C1631	054122



Position switch with steel roller on the inside of the lever

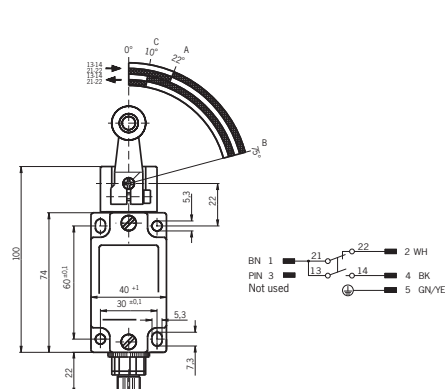
Item	Order no.
NZ1HS-3131-MC1779	079996



Position switch with M12 plug connector and pin assignment for LED indicator

(pin 3 not used)

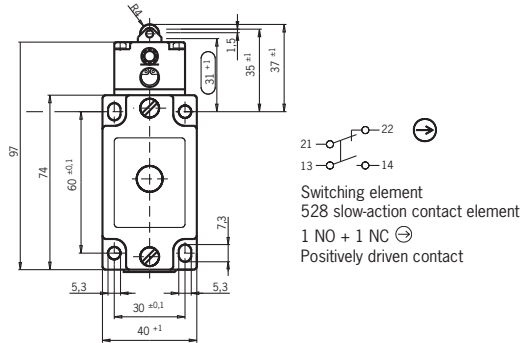
Item	Order no.
NG2HB-510SVM5C1883	086561



Position switch with small bearing

For high approach speeds and long travel distances

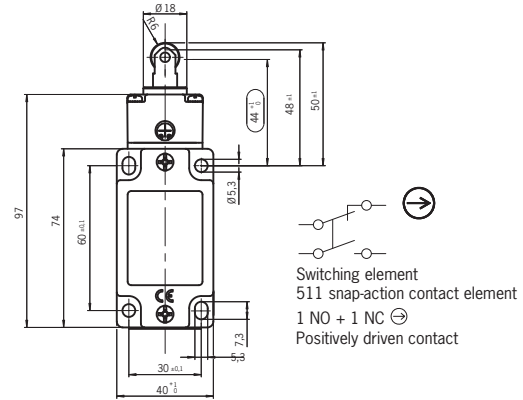
Item	Order no.
NZ1RK-528-MC1912	090572



Position switch with steel sleeve

For high approach speeds and protected guidance

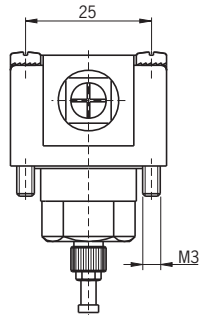
Item	Order no.
NZ1RS-511-MC782	093141



Accessories

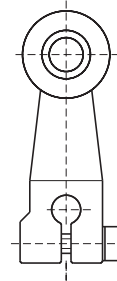
Lever arm actuation

Item	Order no.
NSA	012051



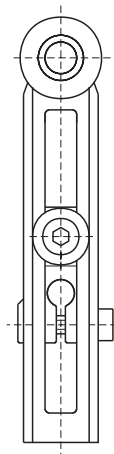
Roller arm

Item	Order no.
NHB (plastic roller)	012042
NHS (steel roller)	012043
NHSC1834 (ball bearing \varnothing 19 mm)	077349



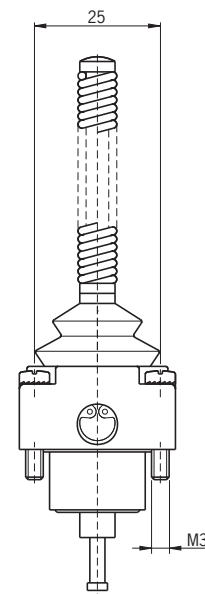
Adjustable roller arm

Item	Order no.
NVB (plastic roller)	012064
NVS (steel roller)	012065



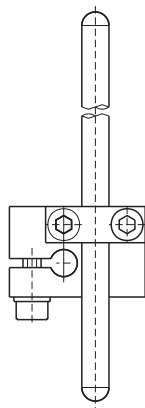
Spring actuator

Item	Order no.
NFO (spring steel wire)	011909



Rod lever

Item	Order no.
NSB (plastic rod)	012052
NSM (aluminum rod)	012053



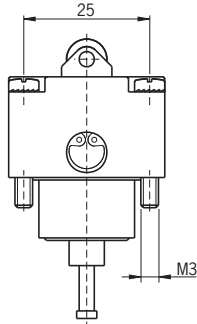
Notice:

The actuator heads and actuators (except for roller lever NHB, NHS, NHSC...) are replacement parts for position switches without safety function. They do not fit position switches with safety function and must not be operated with these switches.



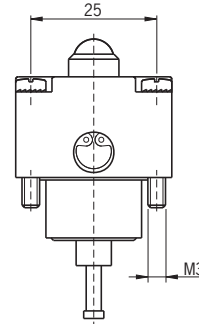
Actuator with small roller plunger

Item	Order no.
NRK (small steel roller)	012049



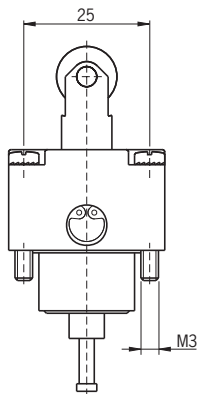
Actuator with ball plunger

Item	Order no.
NKO (steel ball)	012045



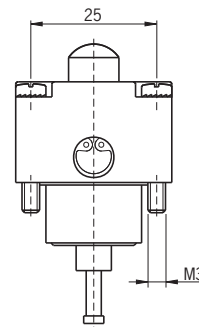
Actuator with roller plunger \varnothing 12 mm

Item	Order no.
NRG (plastic roller)	012046
NRS (steel roller)	012047



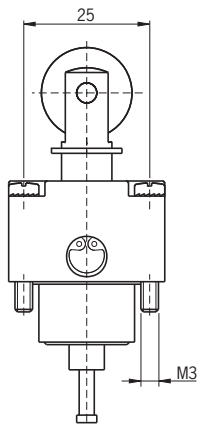
Actuator with domed plunger

Item	Order no.
NWO (polish-ground dome)	012066



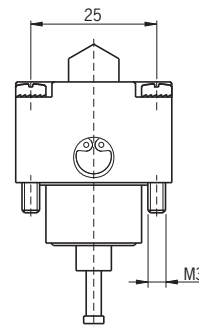
Actuator with extended roller plunger \varnothing 18 mm

Item	Order no.
NRL (large steel roller)	012050



Actuator with chisel plunger

Item	Order no.
NDO (polish-ground chisel plunger)	011908

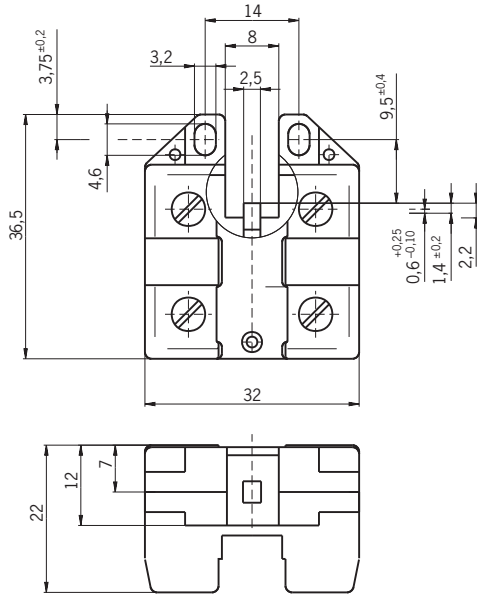


Notice:

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

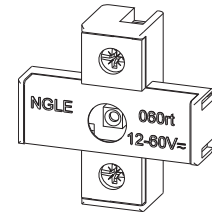
Switching element ES 510 for series NG...

Item	Order no.
ES 510	010422



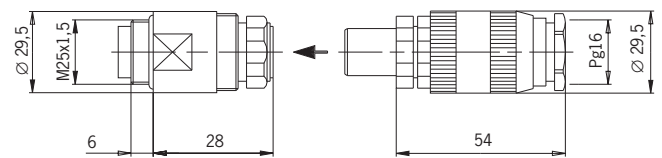
LED function display for series NG.../NZ...

Item	Voltage [V]	Current [mA]	Order no.
NGLE 060 rt	12 -60 AC/DC	≤ 6.5	029220
NGLE 110 rt	110 ±15% AC	≤ 3.5	045822
NGLE 220 rt	230 ±15% AC	≤ 3.5	045825



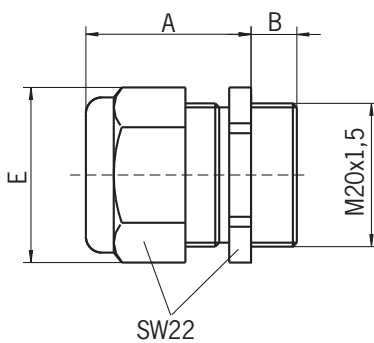
Male socket/female plug, 12-pin

Item	Order no.
Male socket SD 12-M	085648
Female plug BS 12	002763



Cable gland M20 x 1.5

Item	Cable outer diameter [mm]	A [mm]	B [mm]	E [mm]	Order no.
EKVM20/06	6.5 - 9.5	20	6	24.5	077683
EKVM20/09	9 - 13	21	6	24.5	077684



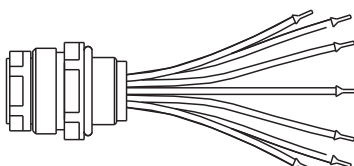
Technical data

Parameter	Value
Housing material	Metal
Number of pins	11 + PE
Rated voltage	250 V _≅
Level of contamination VDE 0110	2
Connection	Soldered connections
Max. conductor cross-section	1 mm ²
Contact material / surface	CuZn 1 μ hard gold-plated
Clamping range for cable	12 - 14 mm
Degree of protection acc. to IEC 60529	IP 67/inserted
Ambient temperature range	-20 °C ... +80 °C

Appliance socket, 7-pin

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

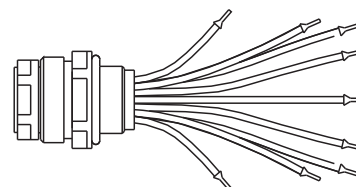
Item	Order no.
Appliance socket, 7-pin, NG/NZ-SR6	093342



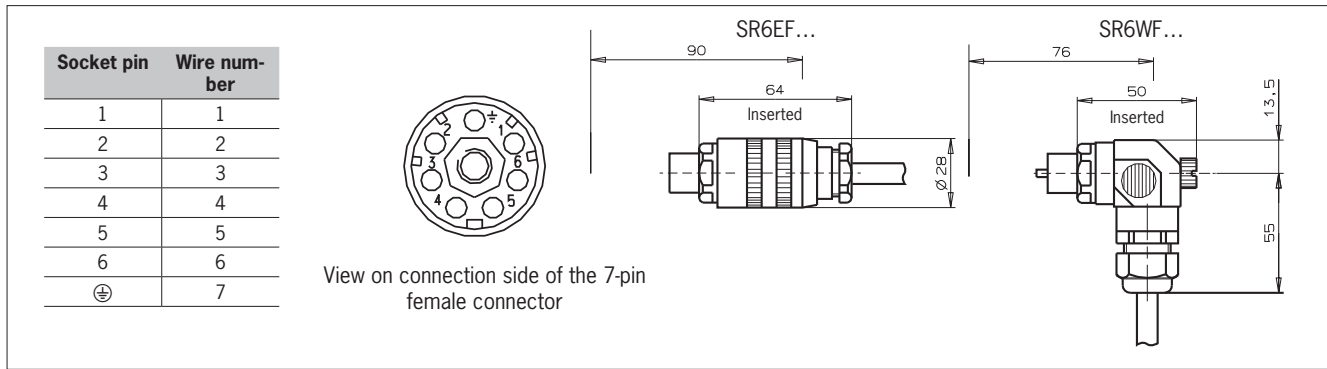
Appliance socket, 12-pin

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

Item	Order no.
Appliance socket, 12-pin, NZ-SR11	093343



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



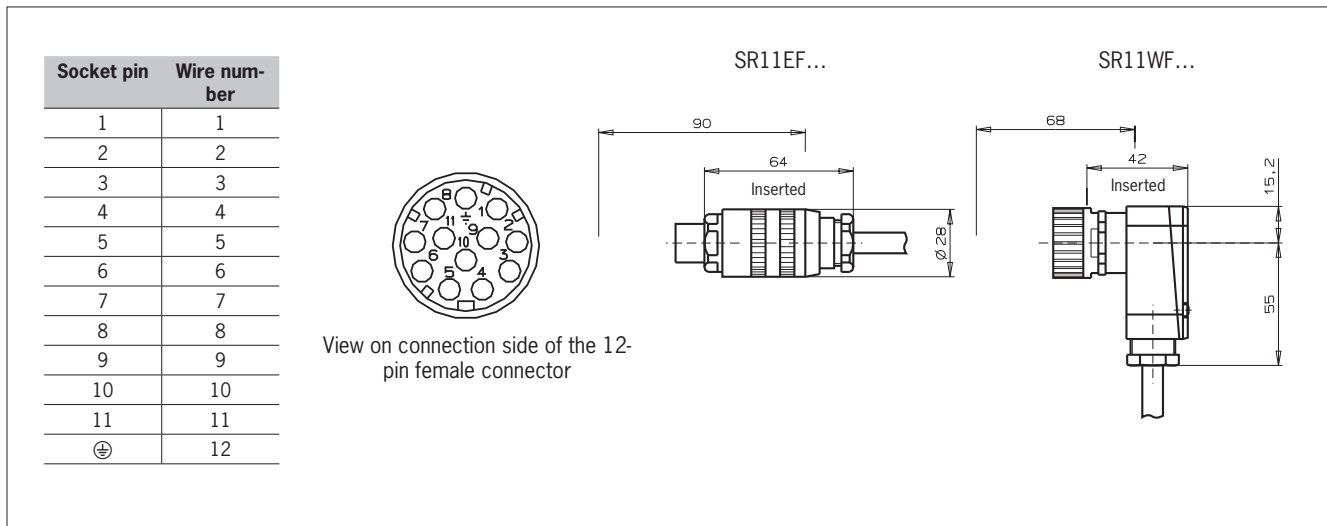
Technical data

Parameter	Value
Housing material	Plastic
Number of pins	6 + PE
Rated voltage	250 V _≅
Degree of protection acc. to IEC 60529	IP 65/inserted
Connecting cable	PUR gray
Outer diameter	∅ 8 mm
Conductor cross-section	1.0 mm ²

Ordering table

Plug version	Connecting cable	Item	Order no.
Socket Straight	without	SR6EF	013176
	5 m	SR6EF-5000	077632
	10 m	SR6EF-10000	077633
	15 m	SR6EF-15000	077634
Socket Angled	without	SR6WF	024999
	5 m	SR6WF-5000	077638
	10 m	SR6WF-10000	077639
	15 m	SR6WF-15000	077640

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



Technical data

Parameter	Value
Housing material	Plastic
Number of pins	11 + PE
Rated voltage	50 V _≅
Degree of protection acc. to IEC 60529	IP 65/inserted
Connecting cable	PUR gray
Outer diameter	∅ 10.5 mm
Conductor cross-section	1.0 mm ²

Ordering table

Plug version	Connecting cable	Item	Order no.
Straight socket	without	SR11EF	070859
	5 m	SR11EF-5000	077629
	10 m	SR11EF-10000	077630
	15 m	SR11EF-15000	077631
Angled socket	without	SR11WF	054773
	5 m	SR11WF-5000	077635
	10 m	SR11WF-10000	077636
	15 m	SR11WF-15000	077637