

Multiple Limit Switches, Trip Rails and Trip Dogs



EUCHNER

More than safety.

EUCHNER

More than safety.



Headquarters in Leinfelden-Echterdingen



Logistics center in Leinfelden-Echterdingen



Production location in Unterböhringen

Internationally successful – the EUCHNER company

EUCHNER GmbH + Co. KG is a world-leading company in the area of industrial safety technology. EUCHNER has been developing and producing high-quality switching systems for mechanical and systems engineering for more than 60 years.

The medium-sized family-operated company based in Leinfelden, Germany, employs more than 600 people around the world.

15 subsidiaries and other sales partners in Germany and abroad work for our international success on the market.

Quality and innovation – the EUCHNER products

A look into the past shows EUCHNER to be a company with a great inventive spirit. We take the technological and ecological challenges of the future as an incentive for extraordinary product developments.

EUCHNER safety switches monitor safety doors on machines and installations, help to minimize dangers and risks and thereby reliably protect people and processes. Today, our products range from electromechanical and electronic components to intelligent integrated safety solutions. Safety for people, machines and products is one of our dominant themes.

We define future safety technology with the highest quality standards and reliable technology. Extraordinary solutions ensure the great satisfaction of our customers.

The product ranges are subdivided as follows:

- ▶ Transponder-coded Safety Switches
- ▶ Transponder-coded Safety Switches with guard locking
- ▶ Multifunctional Gate Box MGB
- ▶ Access management systems (Electronic-Key-System EKS)
- ▶ Electromechanical Safety Switches
- ▶ Magnetically coded Safety Switches
- ▶ Enabling Switches
- ▶ Safety Relays
- ▶ Emergency Stop Devices
- ▶ Hand-Held Pendant Stations and Handwheels
- ▶ Safety Switches with AS-Interface
- ▶ Joystick Switches
- ▶ Position Switches

 **made
in
Germany**

Multiple Limit Switches, Trip Rails and Trip Dogs

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General information on mechanical multiple limit switches

Application

EUCHNER precision multiple limit switches are used for controlling and positioning in all areas of mechanical and systems engineering and for solving automation tasks.

The main advantages of these highly accurate and reliable positioning devices are:

- ▶ Minimum space requirements due to compact design
- ▶ Low-cost connection through the use of a common wiring cable
- ▶ Easy access to all switch stations for test and service purposes
- ▶ Easy installation

A range of housing versions, including DIN versions, are available to suit the full spectrum of application fields. A high standard of quality is always guaranteed in every installation position by the degree of protection IP 67.

Function

Precision multiple limit switches possess several switching elements arranged in a row. The spacing between the individual switching positions of 12 mm and 16 mm is standardized in accordance with DIN 43697. The range is completed with a particularly compact, space-saving version with a spacing of 8 mm.

The switching elements are actuated by means of plungers. This action is achieved with trip dogs in accordance with DIN 69 639, which are mounted with an interference fit in trip rails according to DIN 69 638 (see separate page 33).

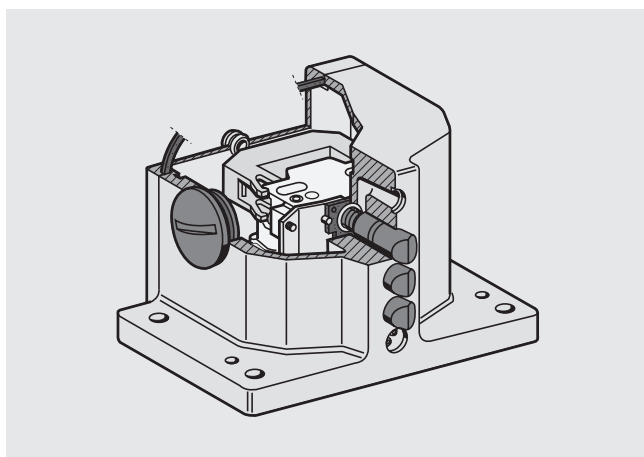
Design

Depending on the technical requirements in terms of switching point accuracy and approach speed, four functionally different plunger types (chisel, roller, ball and domed plungers) are used.

Depending on the plunger type, the reproducible switching point accuracy is ± 0.002 mm and the maximum approach speed is 120 m/min.

The precision multiple limit switches can be assembled with snap-action and safety switching elements, or also in combination with inductive switching elements. The mechanical life of the switching elements amounts to 30×10^6 mechanical operating cycles.

EUCHNER uses the high-quality and proven acrylonitrile-butadiene rubber (NBR) for all seals and sealed areas. This material is resistant to oils, greases, fuels, hydraulic fluids and most known cooling lubricants. Moreover, NBR possesses high mechanical rigidity over a wide temperature range and so it is perfectly suitable for the highly stressed diaphragm seal, which separates the plunger compartment and the interior of the switch. The material used for the diaphragm seal is a key criterion for the quality, mechanical life and precision of the EUCHNER multiple limit switches. The same material is used for the cover seal and the cable entry.

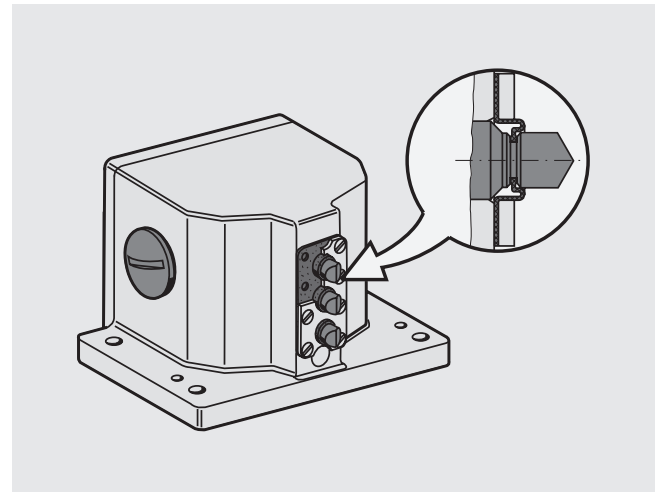


Exterior diaphragm

A series with an exterior diaphragm which is designed to resist the effect of resinous cooling lubricants is also available.

The exterior diaphragm provides additional sealing of the plunger outside the housing.

The plunger guides in the housing are thus reliably protected from the penetration of the cooling lubricant. Plunger sticking is prevented and the replacement of the switch or plunger is unnecessary. For technical data on this series see page 24 and 25.



Plunger systems

General

Plungers for multiple limit 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.

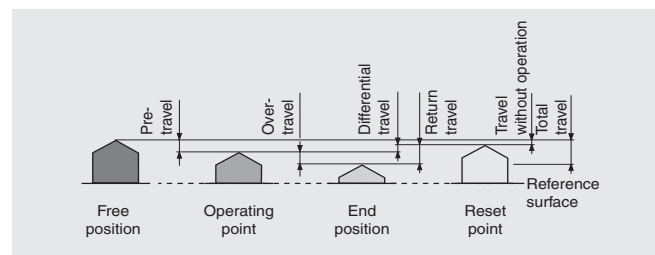
There are two different types of actuating systems, depending on the application. For standard applications, the plunger is fitted with a telescopic device.

With this system, the plunger can be depressed to the reference surface without damaging the switching element.

Multiple limit switches with safety switching elements possess a "rigid" plunger instead of this plunger with telescopic action, which ensures positive action in accordance with EN 60947. 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.

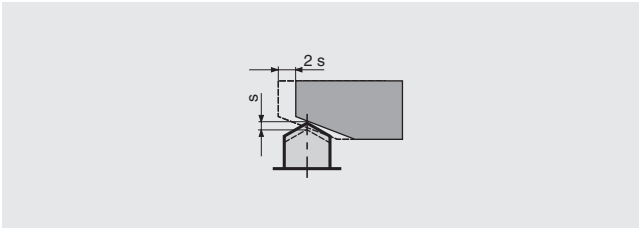
Plunger travel

The pictures show the various positions of a 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. When using our trip dogs in accordance with DIN 69639, this travel is doubled at the trip rail.



Plunger types

Depending on the technical requirements, four functionally different plunger types (chisel, roller, ball and domed plungers) are used for 8, 12 or 16 mm plunger spacing respectively.

Chisel plunger D

Hardened and polish-ground.
Operating point accuracy up to ± 0.002 mm.
Max. approach speed of 40 m/min.



Roller plunger R with plain bearing

(standard version for roller plunger)
Hardened roller.
Operating point accuracy up to ± 0.01 mm.
Max. approach speed of 80 m/min.



Roller plunger B with ball bearing

Hardened roller.
Operating point accuracy up to ± 0.01 mm.
Max. approach speed of 120 m/min.



Ball plunger K

(not in conjunction with safety switching elements)
Hardened ball.
Can be actuated from various directions.
Operating point accuracy up to ± 0.01 mm.
Max. approach speed of 10 m/min.



Dome plunger W

(instead of ball plunger with safety switching elements)
Hardened and polish-ground.
Can be actuated from various directions.
Operating point accuracy up to ± 0.002 mm.
Max. approach speed of 10 m/min.



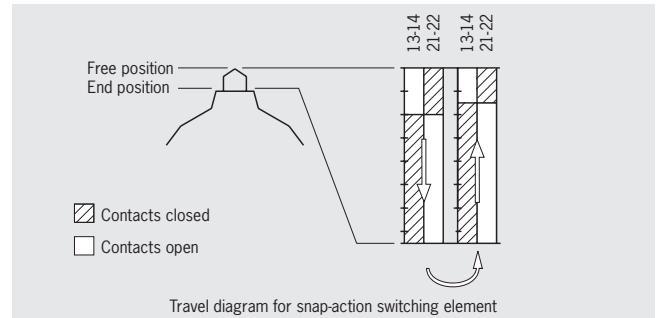
Switching elements

Snap-action switching element

Snap-action switching elements are predominantly used in mechanical limit switches.

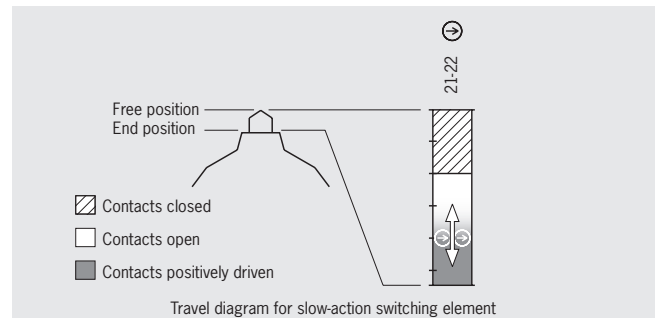
On snap-action switching elements, the change from the completely closed state to the completely open state is made at a defined point (operating point).

As a result the switching point is at a defined position unlike on slow-action contact elements. Snap-action switching elements typically have a switching hysteresis.



Slow-action switching element

On slow-action switching elements the opening of the switching element is directly dependent on the position of the plunger. The further the plunger is moved, the further the switching element is opened. The plunger travel is therefore directly proportional to the travel covered by the switching contact in the switching element. From the travel diagrams it can be seen at which point the switching element changes from the closed state to the open state.



Positively driven contacts \rightarrow

Positively driven contacts are used in the switching elements. These are special contact elements that are designed to ensure the switching contacts are always reliably separated. Even if contacts are welded together, the connection is opened by the actuating force.

It is a common feature of all safety switching elements that at least one switching element is designed as a positively driven contact. In safety-related circuits, only switching elements with positively driven NC contacts are allowed.

General information on inductive multiple limit switches

Inductive multiple limit switches are used for positioning and control in all areas of mechanical and systems engineering. Inductive multiple limit switches are used for automation tasks in machines for the wood, textile and plastics industry, as well as for area monitoring for robotics.

Due to their non-contact and thus wear-free principle of operation, inductive multiple limit switches are insensitive to heavy vibration, heavy soiling and have an above average mechanical life even in aggressive ambient conditions.

Four different designs of inductive multiple limit switches are available for a very wide range of applications with 8 mm, 12 mm or 16 mm proximity switch spacing; these can be equipped with numerous inductive switching elements. In addition to these multiple limit switches, single limit switches according to DIN 43693 and the particularly compact ESN design are also available. With these versions a solution can be provided for almost every requirement.

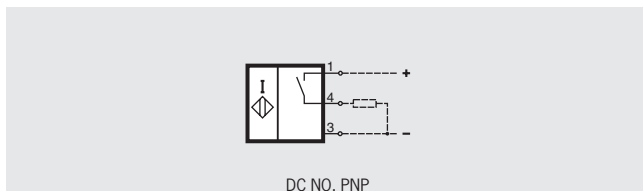
Interchangeability with mechanical multiple limit switches and single limit switches means that it is possible to straightforwardly modify machines. The switches can therefore be retrofitted on existing machine installations to take full advantage of the benefits of non-contact switches.

For safety-relevant end of travel limit switching, EMERGENCY STOP functions or other safety critical applications, it is possible to equip the multiple limit switches with a mixture of the necessary mechanical safety switching elements and inductive switching elements. You can combine the advantages of non-contact switching with positively driven NC contacts.

Switching functions

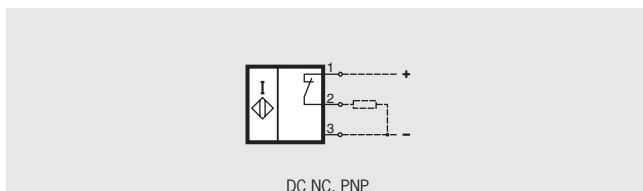
NO function

The NO function means that the load current flows when the active face of the inductive switching element is activated and that no current flows when the active face is not activated.



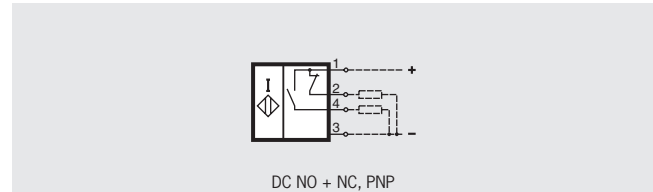
NC function

The NC function means that the load current does not flow when the active face of the inductive switching element is activated and that current flows when the active face is not activated.



NO + NC function

The NO + NC function incorporates both an NO function and an NC function. Associated circuit diagrams and wiring diagrams are given in the technical data.



Suppressor circuits

The inductive switching elements are largely protected against external interference by use of various circuit techniques (suppressor circuits). For utilization category DC-13 the output is to be protected with a free-wheeling diode for inductive loads.

Approvals

All multiple limit switches with this plug connector or permanently connected cable are approved by Underwriters Laboratories (UL, Canada and USA).

Customized versions

Mixed contact assembly

(only in multiple limit switches with 12 and 16 mm plunger spacing)
For specific functions on machines and systems, e.g. end of travel limit switching, EMERGENCY STOP or similar, one or more stations on multiple limit switches can be equipped with safety switching elements. Multiple limit switches with 12 mm plunger spacing can **be assembled on request** with a mixture of **mechanical** and **inductive** switching elements.

Plug connector

Many of our multiple limit switches are also available in a version with a plug connector. These versions all have UL approval.

Approach speed and usage with roller plungers

Using high quality bearings and technology matched to the application, approach speeds up to 120 m/min and very high usage can be realized at the same time.

High/low temperature

For use in extreme temperature conditions, multiple limit switches can be supplied in special versions on request.

General information on trip rails/trip dogs

EUCHNER trip rails and trip dogs are successfully used in conjunction with EUCHNER multiple limit switches in all areas of mechanical and systems engineering and for solving automation tasks. They are needed wherever travel-dependent positioning of various work steps is required.

The particular advantages of the EUCHNER combination include:

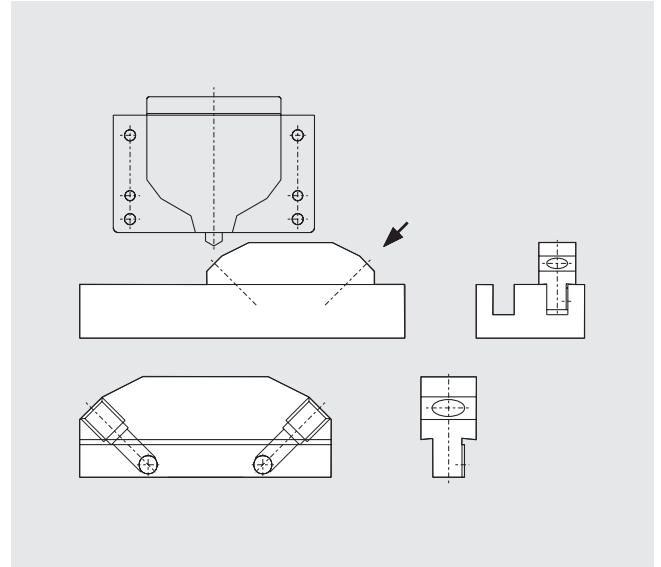
- ▶ Very high accuracy (to 0.002 mm).
- ▶ Long mechanical life (low mechanical wear and resistant to corrosion due to selected materials).
- ▶ Easy to use (user-friendly fastening and adjustment using refined precision mechanics).

EUCHNER trip rails and trip dogs are available in two variants. The function is exactly the same, in principle they only differ in the adjustment of the dog.

System-U

U-trip rails enable the trip dogs to be adjusted from the switch side. The trip dogs can be installed and adjusted quickly and easily in any location. Materials are cast iron or aluminum.

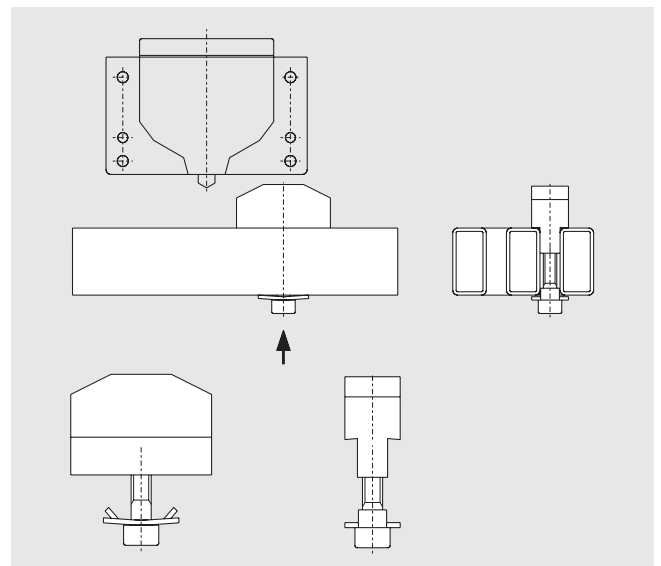
U-trip dogs are designed for usage in U-trip rails. They have a split plate clamp mechanism and enable delicate, accurate adjustment, even when the limit switch is activated.



System-G

G-trip rails enable the trip dogs to be adjusted from the side opposite the switch. They are made of steel and are protected from corrosion by a special surface treatment. The G-trip rails can be ordered pre-assembled or as a kit for self-assembly.

G-trip dogs are designed for usage in G-trip rails. The trip dogs are clamped by a hexagon socket head screw with spring washer. This spring washer locks the trip dog in place even when the trip rail is in a vertical position and allows precise adjustment.



Selection table for mechanical precision multiple limit switches

Series (here only preferable series: for other series see catalog)

RGBF Standard switch according to DIN 43697, upright housing, large product range

SN Compact upright housing; high market acceptance due to versatile applications, low cost

GSBF Upright housing, versions with up to max. 20 plungers possible

Plunger spacing (mm)

8 Small housing for installations where there is little space

12 Industry standard, large product range

16 Only necessary in special applications

Plunger types

D Chisel plunger for high operating point accuracy

R Roller plunger for approach speeds up to max. 80 m/min

B Roller plunger for approach speeds up to max. 120 m/min

K Ball plunger, only necessary in special applications

W Dome plunger; only necessary in special applications

Switching element

502 1 NC + 1 NO, precision snap-action switching element

508 1 NC, safety switching element, slow-action switching element

514 1 NC + 1 NO, safety switching element, snap-action switching element

552 1 C/O, snap-action switching element (standard)

614 1 C/O, snap-action switching element for low currents

Options

AM Exterior diaphragm

St Plug connector

LED LED display

Series			Plunger spacing			Plunger types					Switching element					Options			Page
RGBF	SN	GSBF	8	12	16	D	R	B	K	W	502	508	514	552	614	AM	St	LED	
•				•		•	•	•	○	○	•	•	•				○	•	10
•				•		•	•				•		○			•	○	○	24
•					•	•	•	○	○	○	•	•	•				○	•	10
	•		•			•	•		•					•	•		○		14
	•			•		•	•	•	○	○	•	•	•				○	•	12
	•			•		•	•				•					•	○	○	25
	•				•	•	•	○	○	○	•	•	•				○	•	12
		•	•			•	•		○					•	•		○		18
		•		•		•	•		○	○	•	•	•				○	•	16
		•			•	•	•		○	○	•	•	•				○	•	16

• Available

○ Available on request

Selection table for inductive multiple limit switches

Series (here only preferable series: for other series see catalog)																
Series			Proximity switch spacing (mm)			Switching element								Options		Page
RGBF	SN	GSBF	8	12	16	771	772	777	779	780	781	785	786	St	LED	
Standard switch according to DIN 43697, upright housing, large product range																
Compact upright housing; high market acceptance due to versatile applications, low cost																
Upright housing, versions with up to max. 20 proximity switches possible																
			Rated operating distance 1mm, small housing for installations where there is little space													
			Rated operating distance 2 mm, industry standard, large product range													
			Rated operating distance 5 mm, only necessary in special applications													
						DC NO + NC, NPN										
						DC NO + NC, PNP										
						DC NO, PNP										
						DC NO, PNP										
						DC NO + NC, NPN										
						DC NO + NC, PNP										
						DC NO, PNP										
						DC NC, PNP										
														Plug connector		
														LED display		

Series			Proximity switch spacing			Switching element								Options		Page
RGBF	SN	GSBF	8	12	16	771	772	777	779	780	781	785	786	St	LED	
•				•				•		•	•			○	•	11
•					•	•	•		•					○	•	11
	•			•				•		•	•			○	•	13
	•				•	•	•		•					○	•	13
		•	•									•	•	○	•	19

• Available

○ Available on request

Series RGBF... 12/16 mm mechanical

- ▶ Plunger spacing 12 or 16 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP67 according to IEC 60529
- ▶ LED function display optional



Switching elements

- ▶ **ES 502 E** Snap-action switching element
1 NC + 1 NO
- ▶ **ES 508** Slow-action switching element
1 NC ⊖
- ▶ **ES 514** Snap-action switching element
1 NC ⊖ + 1 NO

On the usage of safety switching elements, the dog distance (4.0.5) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN 1088, i.e. riveted, welded or secured in some other way against becoming loose.

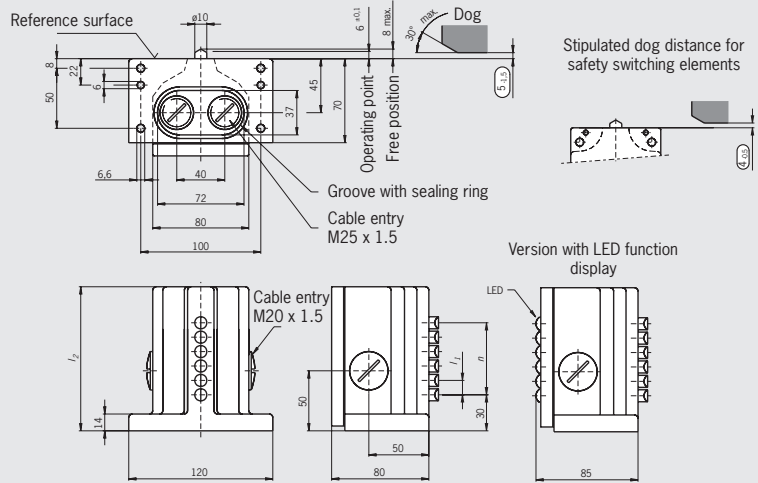
LED function display (optional)

Function displays are available for the following voltage ranges (see accessories page 26):

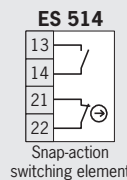
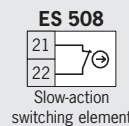
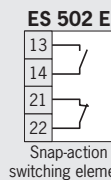
- ▶ **LE060** 12 ... 60 V AC/DC
- ▶ **LE110** 110 V AC ±15%
- ▶ **LE220** 220 V AC ±15%

Series RGBF... mechanical Plunger spacing 12 or 16 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version



Switching elements



Plunger types	D	R	B	K ⁴⁾	W ⁴⁾	
	Chisel	Roller (plain bearing)	Roller (ball bearing)	Ball ³⁾	Dome	
Operating point accuracy ¹⁾	± 0.002	± 0.01	± 0.01	± 0.01	± 0.002	mm
Approach speed max. ²⁾	40	80	120	10	10	m/min

- 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. 2000 operating cycles
- 2) The approach speed given applies in conjunction with EUCHNER trip dogs according to DIN 69639. Special versions of roller plungers for high usage on request
- 3) For safety reasons, multiple limit switches with switching elements ES 508 and ES 514 are not available with ball plungers
- 4) Plunger type on request

n Number of plungers/ proximity switches	Plunger/proximity switch spacing			
	I ₁ = 12		I ₁ = 16	
	I ₂	Housing material	I ₂	Housing material
2	70	Die-cast aluminum, anodized	70	Die-cast aluminum, anodized
3	80		90	
4	90		105	
5	105		120	
6	120		140	
8	140		170	
10	170	Sand-cast aluminum, anodized	200	
12	200		240	

Series RGBF... 12/16 mm inductive

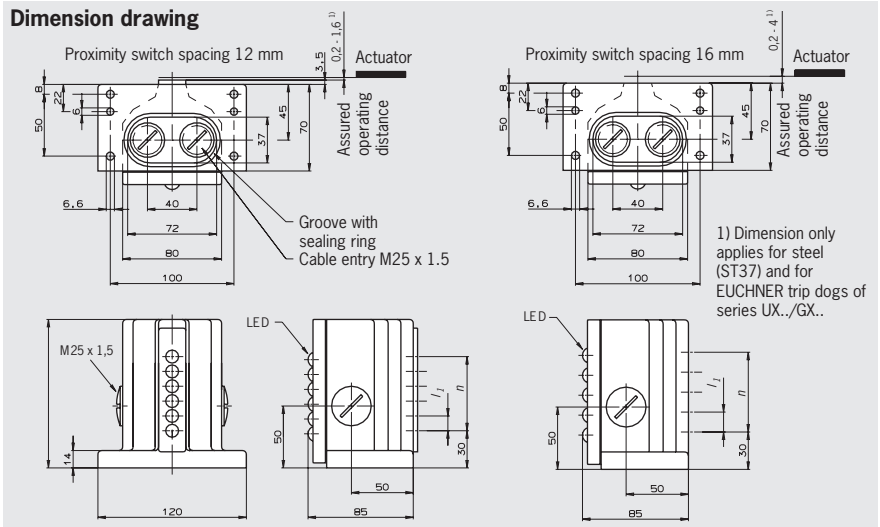
- ▶ Proximity switch spacing 12 or 16 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP67 according to IEC 60529
- ▶ LED function display



Series RGBF... inductive

Proximity switch spacing 12 or 16 mm

Dimension drawing



Rated operating distance

With 12 mm proximity switch spacing, the rated operating distance is 2 mm, with 16 mm proximity switch distance it is 5 mm.

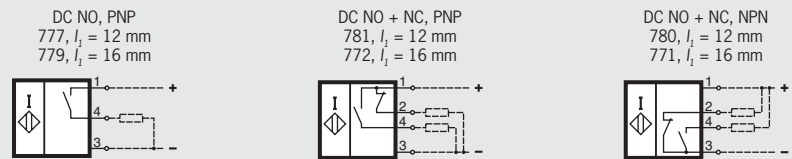
Mixed contact assembly

On request, mixed assembly with electromechanical safety switching elements according to IEC 60947 is possible for 12 mm proximity switch spacing.

LED function display

DC and AC switching elements are equipped as standard with a function display on the switching element (yellow). The function display can be seen from the exterior.

Switching elements



Switching elements with 5 mm operating distance (16 mm proximity switch spacing) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

Further switching elements on request (see page 31)

Ordering code	Mechanical	R	G	B	F					-	L	E					-	M
	Inductive	R	G	B	F		X					L					-	M
Series	_____																	
Number of plungers/proximity switches	_____																	
Plunger type (only mechanical switch, e. g. D = chisel)	_____																	
Plunger/proximity switch spacing (12 or 16 mm)	_____																	
Switching elements (e. g. ES 508 or 777)	_____																	
Visible LED (yellow) (on inductive switches)	_____																	
LED function display (optional on mechanical switches, e. g. 12 ... 60 V AC/DC = 060)	_____																	
LED color; red standard (rt), others on request	_____																	
Cable entry M25 x 1.5 (plug connector on request)	_____																	

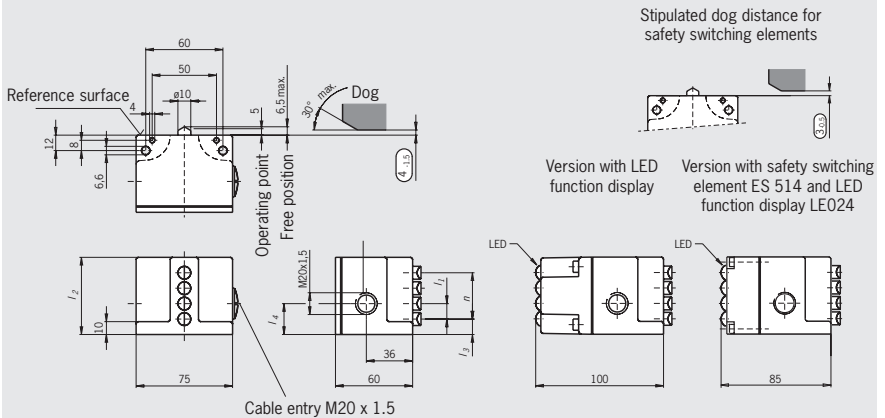
Series SN... 12/16 mm mechanical

- ▶ Plunger spacing 12 or 16 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP67 according to IEC 60529
- ▶ LED function display optional



Series SN... mechanical Plunger spacing 12 or 16 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version



Switching elements

- ▶ **ES 502 E** Snap-action switching element
1 NC + 1 NO
- ▶ **ES 508** Slow-action switching element
1 NC ⊖
- ▶ **ES 514** Snap-action switching element
1 NC ⊖ +1 NO

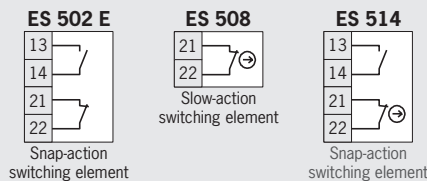
On the usage of safety switching elements, the dog distance (3.0) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN 1088, i.e. riveted, welded or secured in some other way against becoming loose.

LED function display (optional)

Function displays are available for the following voltage ranges (see accessories page 26):

- ▶ **LE024ge** 24 V DC (for ES 514)
- ▶ **LE060** 12 ... 60 V AC/DC
- ▶ **LE110** 110 V AC ±15%
- ▶ **LE220** 220 V AC ±15%

Switching elements



Plunger types

	D	R	B	K ⁴⁾	W ⁴⁾	
	Chisel	Roller (plain bearing)	Roller (ball bearing)	Ball ³⁾	Dome	
Operating point accuracy ¹⁾	± 0.002	± 0.01	± 0.01	± 0.01	± 0.002	mm
Approach speed max. ²⁾	40	80	120	10	10	m/min

- 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. 2000 operating cycles
- 2) The approach speed given applies in conjunction with EUCHNER trip dogs according to DIN 69639. Special versions of roller plungers for high usage on request
- 3) For safety reasons, multiple limit switches with switching elements ES 508 and ES 514 are not available with ball plungers
- 4) Plunger type on request

n Number of plungers/ proximity switches	Plunger/proximity switch spacing						Housing material
	l ₂	l ₁ = 12		l ₁ = 16			
		l ₃	l ₄	l ₂	l ₃	l ₄	
2	36	12	19	48	16	24	Die-cast aluminum, anodized
3	48			72			
4	60			84			
5	72			-			
6	84			-			
				-			

Series SN... 12/16 mm inductive

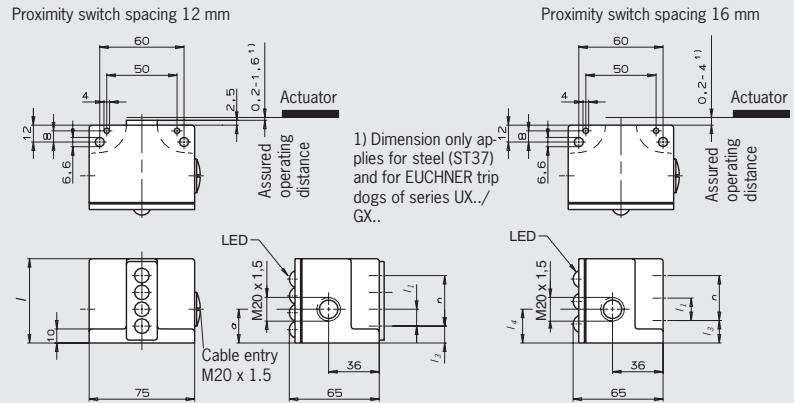
- ▶ Proximity switch spacing 12 or 16 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP67 according to IEC 60529
- ▶ LED function display



Series SN... inductive

Proximity switch spacing 12 or 16 mm

Dimension drawing



Rated operating distance

With 12 mm proximity switch spacing, the rated operating distance is 2 mm, with 16 mm proximity switch distance it is 5 mm.

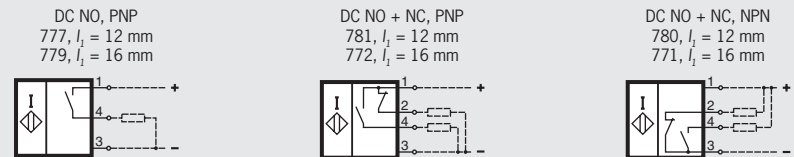
Mixed contact assembly

On request, mixed assembly with electromechanical safety switching elements according to IEC 60947 is possible for 12 mm proximity switch spacing.

LED function display

DC and AC switching elements are equipped as standard with a function display on the switching element (yellow). The function display can be seen from the exterior.

Switching elements



Switching elements with 5 mm operating distance (16 mm proximity switch spacing) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

Further switching elements on request (see page 31)

Ordering code

Mechanical

Inductive

S	N					-				L	E					-	M
S	N			X						L							M

Series

Number of plungers/proximity switches

Plunger type (only mechanical switch, e. g. **D** = chisel)

Plunger/proximity switch spacing (**12** or **16** mm)

Switching elements (e. g. ES **508** or **777**)

Visible LED (yellow) (for inductive switches)

LED function display (optional on mechanical switches, e. g. 12 ... 60 V AC/DC = **060**)

LED color; red standard (**rt**), others on request

Cable entry M25 x 1.5 (plug connector on request)

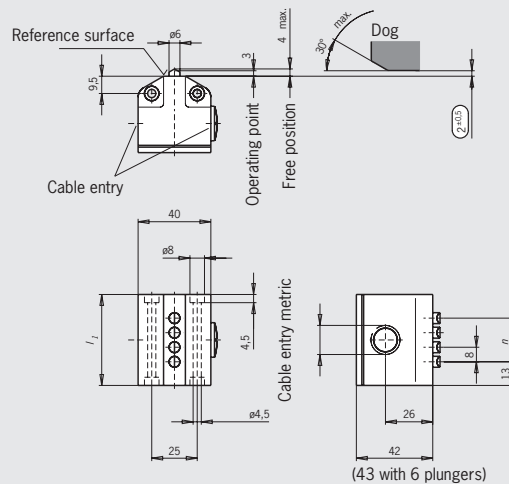
Series SN... 8 mm mechanical

- ▶ Plunger spacing 8 mm
- ▶ Upright housing, without flange
- ▶ Degree of protection IP67 according to IEC 60529



Series SN... mechanical Plunger spacing 8 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version

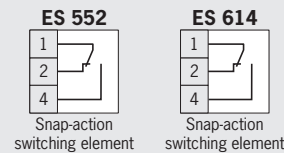


Switching elements

- ▶ **ES 552** Snap-action switching element
1 changeover contact Standard switching element
- ▶ **ES 614** Snap-action switching element
1 changeover contact suitable for switching low currents

(See technical data on the switching elements)

Switching elements



Plunger types	D	R	K	
	 Chisel	 Roller (plain bearing)	 Ball	
Operating point accuracy ¹⁾	± 0.02	± 0.05	± 0.03	mm
Approach speed, max. ²⁾	20	50	8	m/min

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. 2000 operating cycles

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

n Number of plungers	I ₁	Plunger spacing 8 mm		Housing material
		Cable entry		
2	34	M16 x 1.5	Die-cast aluminum, anodized	
3	42			
4	50			
5	58	M20 x 1.5		
6	66			

Ordering code	Mechanical	S	N			0	8	-				-	M
Series	_____												
Number of plungers	_____												
Plunger type (e. g. D = chisel)	_____												
Plunger spacing (8 mm)	_____												
Switching element (ES 552 or ES 614)	_____												
Cable entry with metric thread (plug connector on request)	_____												

For technical data see page 29

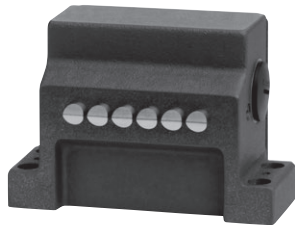
Series GSBF... 12/16 mm inductive: not available

Ordering code	Mechanical	G	S	B	F					-			L	E					-	M
Series																				
Number of plungers																				
Plunger type (e. g. D = chisel)																				
Plunger spacing (12 or 16 mm)																				
Switching elements (e. g. ES 508)																				
LED function display (optional, e. g. 12 ... 60 V AC/DC = 060)																				
LED color; red standard (rt), others on request																				
Cable entry M25 x 1.5																				

For technical data see page 29

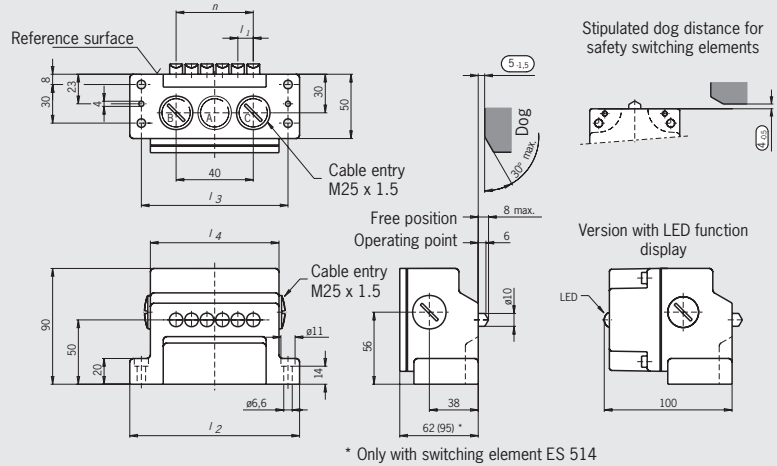
Series GLBF... 12/16 mm mechanical

- ▶ Plunger spacing 12 or 16 mm
- ▶ Horizontal housing
- ▶ Degree of protection IP67 according to IEC 60529
- ▶ LED function display optional



Series GLBF... mechanical Plunger spacing 12 or 16 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version

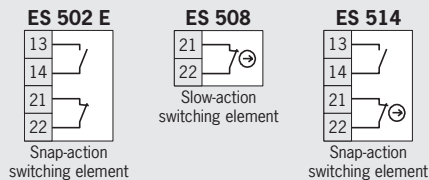


Switching elements

- ▶ **ES 502 E** Snap-action switching element
1 NC + 1 NO
- ▶ **ES 508** Slow-action switching element
1 NC ⊖
- ▶ **ES 514** Snap-action switching element
1 NC ⊕ + 1 NO

On the usage of safety switching elements, the dog distance (4.0.5) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN 1088, i.e. riveted, welded or secured in some other way against becoming loose.

Switching elements



LED function display (optional)

Function displays are available for the following voltage ranges (see accessories page 26):

- ▶ **LE060** 12 ... 60 V AC/DC
- ▶ **LE110** 110 V AC ±15%
- ▶ **LE220** 220 V AC ±15%

Plunger types	D Chisel	R Roller (plain bearing)	K ⁴⁾ Ball ³⁾	W ⁴⁾ Dome	
Operating point accuracy ¹⁾	± 0.002	± 0.01	± 0.01	± 0.002	mm
Approach speed, max. ²⁾	40	80	10	10	m/min

- 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. 2000 operating cycles
- 2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639
- 3) For safety reasons, multiple limit switches with switching elements ES 508 and ES 514 are not available with ball plungers
- 4) Plunger type on request

n Number of plungers/ proximity switches	Plunger/proximity switch spacing							Housing material	
	I ₁ = 12			I ₁ = 16					
	I ₂	I ₃	I ₄	Cable entry	I ₂	I ₃	I ₄	Cable entry	
2	84	66	52	A M25 x 1.5	84	66	52	A M25 x 1.5	Sand-cast aluminum, anodized
3	84	66	52		100	82	68		
4	100	82	68		114	98	84		
5	114	98	84	B + C M25 x 1.5	132	114	100	B + C M25 x 1.5	
6	132	114	100		148	130	116		
8	148	130	116		180	162	148		
10	180	162	148		-	-	-		

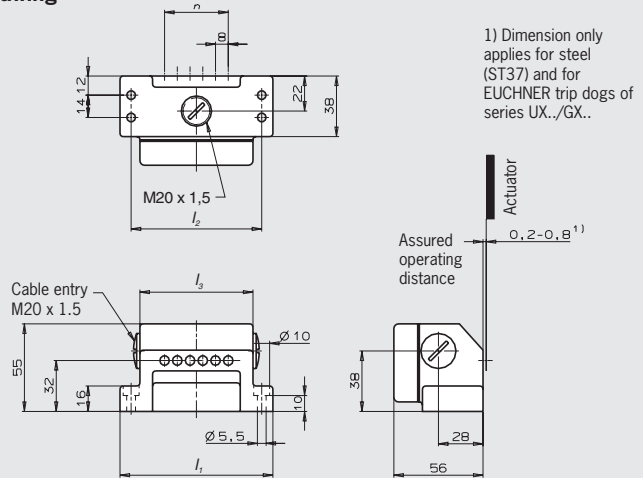
Series GLBF... 8 mm inductive (on request)

- ▶ Proximity switch spacing 8 mm
- ▶ Horizontal housing
- ▶ Degree of protection IP67 according to IEC 60529



Series GLBF... inductive Proximity switch spacing 8 mm

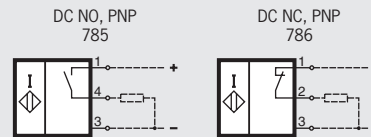
Dimension drawing



Rated operating distance

With 8 mm proximity switch spacing, the rated operating distance is 1 mm.

Switching elements



Further switching elements on request (see page 31)

Ordering code

Mechanical

G	L	B	F				0	8	-	5	5	2	-	M
G	L	B	F			X	0	8	-				-	M

On request

Inductive

Series

Number of plungers/proximity switches

Plunger type (only mechanical switch, e. g. **D** = chisel)

Plunger/proximity switch spacing (8 mm)

Switching element (e. g. **785**)

Cable entry M20 x 1.5

Series RGBF...AM 12 mm mechanical

- ▶ With exterior diaphragm
- ▶ Plunger spacing 12 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP67 according to IEC 60529



Exterior diaphragm

The exterior diaphragm protects the plunger guide against the entry of very fine dust (dust from grinding casting, glass, etc.) and prevents the plunger seizing. At the same time, plunger sticking, caused by resinous lubricating coolants, can be prevented by this exterior diaphragm version.

Switching elements

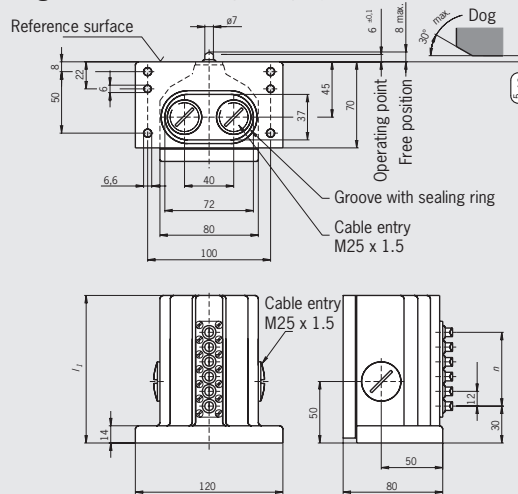
- ▶ **ES 502 E** Snap-action switching element
1 NC + 1 NO
- ▶ **ES 514** Snap-action switching element
1 NC ⊕ +1 NO

LED function display possible on request.

Series RGBF... AM mechanical

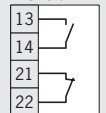
Plunger spacing 12 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version



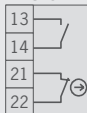
Switching elements

ES 502 E



Snap-action switching element

ES 514



Snap-action switching element (on request)

Plunger types	D	R	
	Chisel	Roller (plain bearing)	
Operating point accuracy ¹⁾	± 0.002	± 0.01	mm
Approach speed, max. ²⁾	20	50	m/min

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. 2000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639

n Number of plungers	Plunger spacing 12 mm	
	l_1	Housing material
2	70	Die-cast aluminum, anodized
3	80	
4	90	
5	105	
6	120	
8	140	

Plunger type	Number of plungers	Order No./Item	
 Chisel plunger	2	082325 RGBF 02 D 12 -502 AM -M	
	3	088365 RGBF 03 D 12 -502 AM -M	
	4	082326 RGBF 04 D 12 -502 AM -M	
	5	088366 RGBF 05 D 12 -502 AM -M	
	6	087097 RGBF 06 D 12 -502 AM -M	
	8	087135 RGBF 08 D 12 -502 AM -M	
	 Roller plunger	2	087098 RGBF 02 R 12 -502 AM -M
		3	088364 RGBF 03 R 12 -502 AM -M
4		082327 RGBF 04 R 12 -502 AM -M	
5		087099 RGBF 05 R 12 -502 AM -M	
6		087100 RGBF 06 R 12 -502 AM -M	
8		085730 RGBF 08 R 12 -502 AM -M	

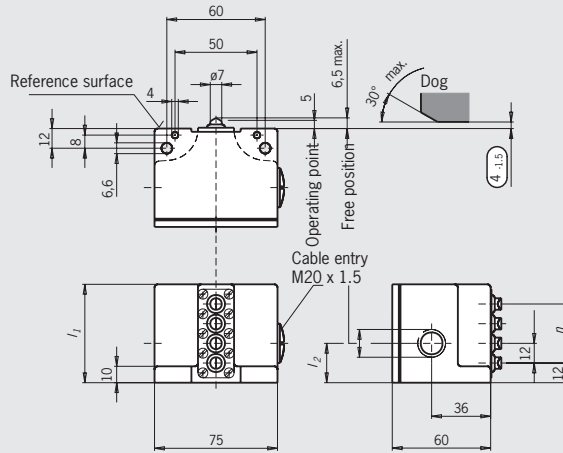
Series SN...AM 12 mm mechanical

- ▶ With exterior diaphragm
- ▶ Plunger spacing 12 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP67 according to IEC 60529



Series SN...AM mechanical Plunger spacing 12 mm

Dimension drawing illustration with chisel plunger, plunger type dependent on version



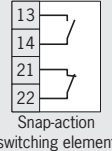
Exterior diaphragm

The exterior diaphragm protects the plunger guide against the entry of very fine dust (dust from grinding casting, glass, etc.) and prevents the plunger seizing. At the same time, plunger sticking, caused by resinous lubricating coolants, can be prevented with this exterior diaphragm version.

Switching elements

- ▶ **ES 502 E** Snap-action switching element
1 NC + 1 NO

ES 502 E



Switching elements

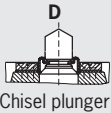

Plunger types	D	R	
	Chisel	Roller (plain bearing)	
Operating point accuracy ¹⁾	± 0.002	± 0.01	mm
Approach speed, max. ²⁾	20	50	m/min

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. 2000 operating cycles

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

LED function display possible on request.

n Number of plungers	Plunger spacing 12 mm		Housing material
	I_1	I_2	
2	36	19	Die-cast aluminum, anodized
3	48	24	
4	60		
5	72		
6	84		

Plunger type	Number of plungers	Order No./Item
 Chisel plunger	2	086584 SN 02 D 12 -502 AM -M
	3	086585 SN 03 D 12 -502 AM -M
	4	086586 SN 04 D 12 -502 AM -M
	5	088752 SN 05 D 12 -502 AM -M
	6	088753 SN 06 D 12 -502 AM -M
	 Roller plunger	2
3		086587 SN 03 R 12 -502 AM -M
4		086588 SN 04 R 12 -502 AM -M
5		088765 SN 05 R 12 -502 AM -M
6		088766 SN 06 R 12 -502 AM -M

Accessories for mechanical multiple limit switches

▶ LED function display

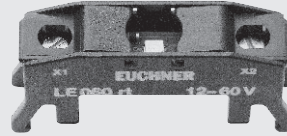
LED function display

LED function display

Three versions in various voltage ranges are available in the standard colors red, green and yellow.

The built-in electronic regulation (LE060 only) ensures that the luminosity remains constant, independent of the voltage applied.

Figure



Ordering table

Designation	Operating voltage [V]	Color	Order No. / Item
LED function display ¹⁾	AC/DC 12 - 60	Red	035495 LE 060 rt
		Green	On request LE 060 gr
		Yellow	035497 LE 060 ge
	AC 110 ±15%	Red	045579 LE 110 rt
		Green	On request LE 110 gr
		Yellow	On request LE 110 ge
	AC 220 ±15%	Red	045582 LE 220 rt
		Green	On request LE 220 gr
		Yellow	On request LE 220 ge

1) If color not stated, red will be supplied as standard

▶ Mechanical replacement switching elements

Replacement switching elements

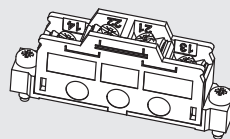
Replacement switching elements

Replacement switching elements for multiple limit switches with 8, 12 and 16 mm plunger spacing.

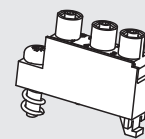
The safety switching elements ES 508 and ES 514 are not allowed to be replaced for safety reasons and are therefore not available as spare parts.

In safety circuits, the entire multiple limit switch must be replaced in case of damage or wear. Repairs must be performed only by the manufacturer.

Figure



ES 502 E



ES 552/ES 614

Ordering table

Designation	Order No. / Item
Replacement switching elements	010387 ES 502 E
	099513 ES 552
	099507 ES 614

Accessories for inductive multiple limit switches

► Inductive replacement switching elements

The switching elements used for all inductive multiple limit switches supplied are available as spare parts

Ordering table

Designation	Function	Order No.
ES785	NO contact/PNP	008054
ES786	NO contact/PNP	008055
ES777	NO contact/PNP	008401
ES781	NO + NC/PNP	031535
ES780	NO + NC/NPN	031534
ES779 ¹⁾	NO contact/PNP	008470
ES779/2 ¹⁾	NO contact/PNP	036731
ES772 ¹⁾	NO + NC/PNP	053674
ES772/2 ¹⁾	NO + NC/PNP	053677
ES771 ¹⁾	NO + NC/NPN	053685
ES771/2 ¹⁾	NO + NC/NPN	053688

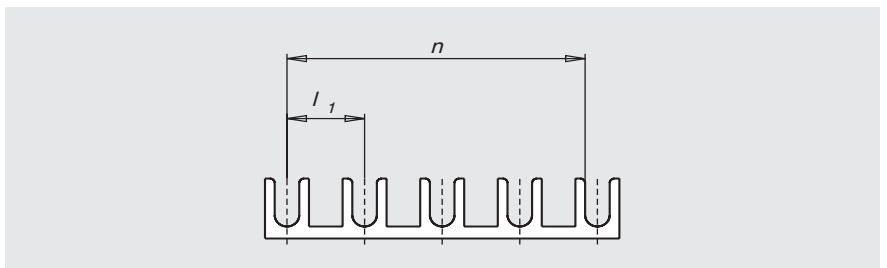
1) Switching elements with 5 mm operating distance (proximity switch spacing 16 mm) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

► Separate connector bridge

Separate connector bridge

A separate connector bridge is available for making an electrical connection between individual inductive switching elements with a common operating voltage.

Separate connector bridge



Ordering table

Designation	Use	l_1	n (Number)	Order No. / Item
Separate connector bridge	Inductive multiple limit switch	12	20	017130 Bridge 12 mm spacing
		16	16	017131 Bridge 16 mm spacing

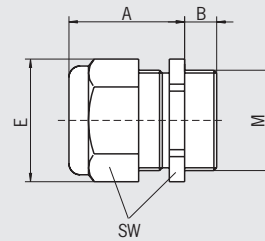
Cable glands

- ▶ M16 x 1.5
- ▶ M20 x 1.5
- ▶ M25 x 1.5

Cable glands

Suitable for various cable diameters. Versions in metal.

Cable glands






Item	Thread	Cable Ø [mm]	A [mm]	B [mm]	E [mm]	SW [mm]
EKVM16/04	M16x1.5	4 - 6.5	20	6	20	18
EKVM16/05	M16x1.5	5 - 8	20	6	20	18
EKVM16/06	M16x1.5	6.5 - 9.5	20	6	20	18
EKVM20/06	M20x1.5	6.5 - 9.5	20	6	24.4	22
EKVM20/09	M20x1.5	9 - 13	21	6	24.4	22
EKVM25/09	M25x1.5	9 - 13	21	6.5	31.2	28
EKVM25/11	M25x1.5	11.5 - 15.5	21	6.5	31.2	28

Ordering table

Thread	Version	Order No. / Item
M16 x 1.5	Cable diameter 4 - 6.5 mm	086328 EKVM16/04
	Cable diameter 5 - 8 mm	086329 EKVM16/05
	Cable diameter 6.5 - 9.5 mm	086330 EKVM16/06
M20 x 1.5	Cable diameter 6.5 - 9.5 mm	077683 EKVM20/06
	Cable diameter 9 - 13 mm	077684 EKVM20/09
M25 x 1.5	Cable diameter 9 - 13 mm	086334 EKVM25/09
	Cable diameter 11.5 - 15.5 mm	086335 EKVM25/11

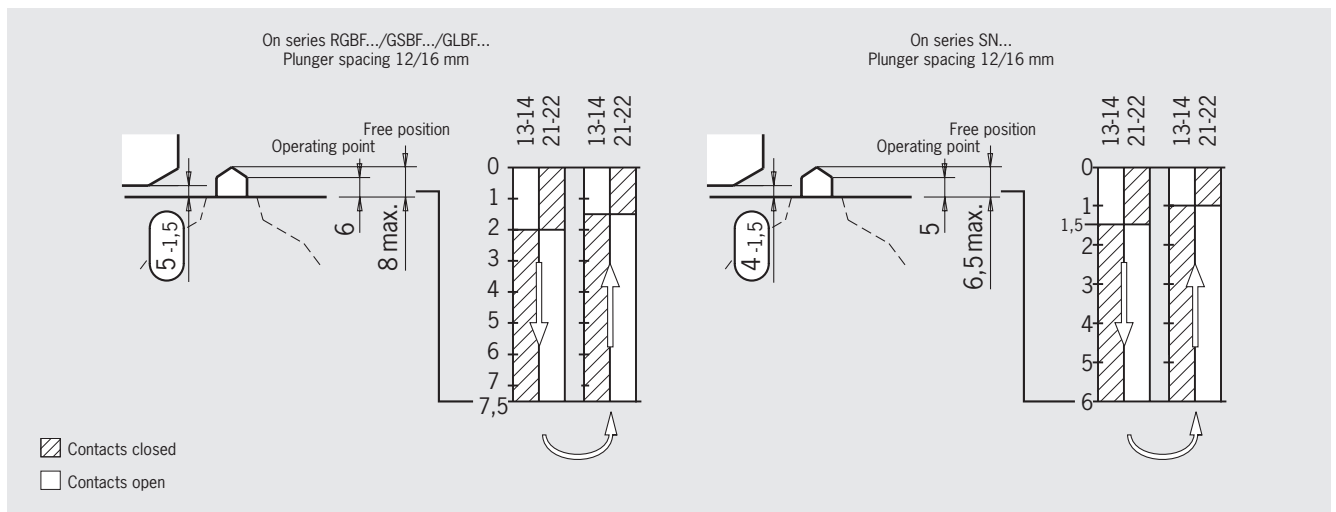
Plug connector on request.

Multiple limit switches mechanical

Parameter	Value					Unit
Switching elements ES	502 E	508	514	552	614	
Degree of protection acc. to EN IEC 60529	IP67					
Installation position	Any					
Plunger material	Stainless steel					
Plunger guide	Maintenance-free					
Ambient temperature	-5 ... +80					°C
Contact elements	1 NO + 1 NC	1 NC	1 NO + 1 NC	1 changeover contact		
Switching principle	Snap-action sw. element	Slow-action sw. element	Snap-action switching element			
Actuating force	≥ 20	≥ 15	≥ 30	≥ 15		N
Approach speed, min.	0.01	-	0.01			m/min
Differential travel	0.8	-	0.6	0.1		mm
Switching frequency	≤ 300	≤ 50		≤ 200		min ⁻¹
Mechanical life (operating cycles)	≥ 30 x 10 ⁶		≥ 1 x 10 ⁶	≥ 10 x 10 ⁶		
Rated impulse withstand voltage U _{imp}	4			2.5		kV
Rated insulation voltage U _i	250					V
Utilization category according to EN IEC 60947-5-1	AC-12	I _e 10 A U _e 250 V	-	-	-	-
	AC-15	I _e 6 A U _e 230 V		I _e 2.5 A U _e 230 V	I _e 2 A U _e 230 V	-
	DC-13	I _e 6 A U _e 24 V			I _e 2 A U _e 24 V	I _e 1 A U _e 30 V
Switching current min.	10	10	5	10	1	mA
At switching voltage	12	24	24	24	5	V DC
Conventional thermal current I _{th}	10			6	2	A
Contact closing time	< 4	-	≤ 5	-		ms
Contact bounce time	< 3	-	≤ 3	≤ 2		ms
Short circuit protection according to EN IEC 60269-1 (control circuit fuse)	10		6		2	A gG
Connection type	Screw terminal					
Conductor cross-section, max.	0.34 ... 1.5			0.14 ... 1.0		mm ²
Approvals for switching elements		-			-	
LED function display (optional)	Red standard, others on request		LE024ge	-		

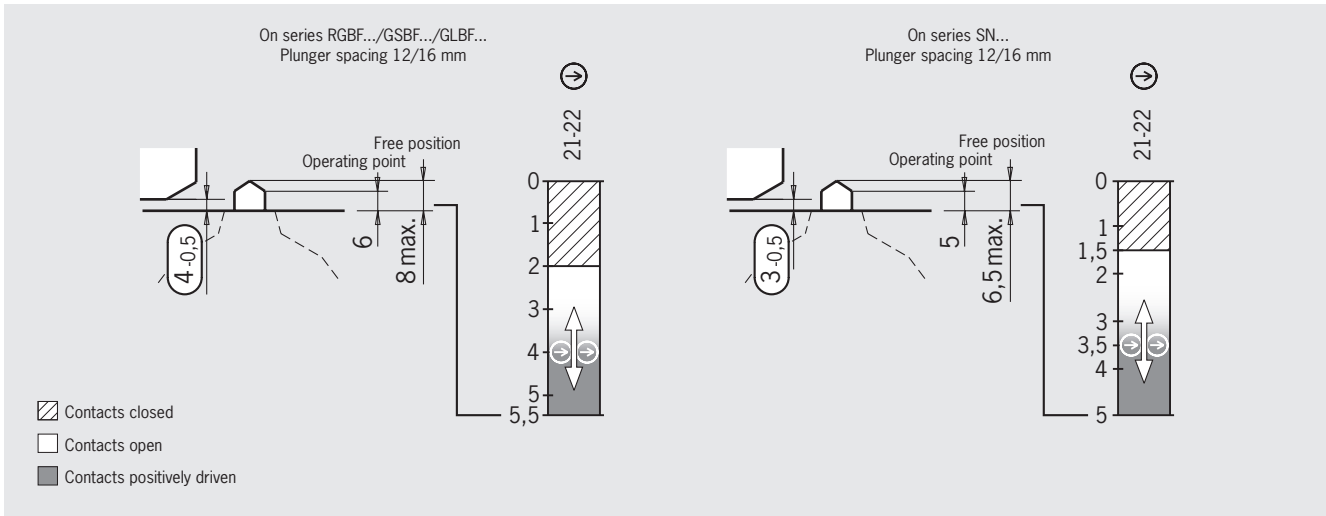
Travel diagram ES 502 E

Snap-action switching element according to DIN 43695 with one NO and one NC contact. Double gap, electrically isolated switching elements, silver contact, electro-gold plated. Screw terminal with self-raising clamp washers.



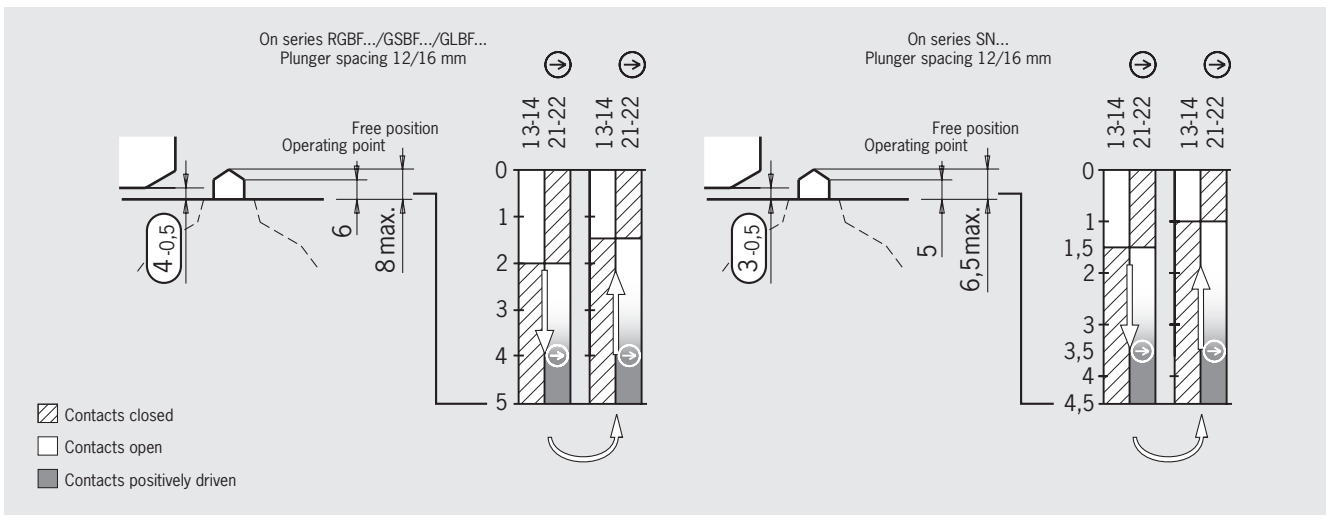
Travel diagram ES 508

Slow-action switching element with one positively driven NC contact. Double gap, silver contact, electro-gold plated. Screw terminal with self-raising clamp washers.



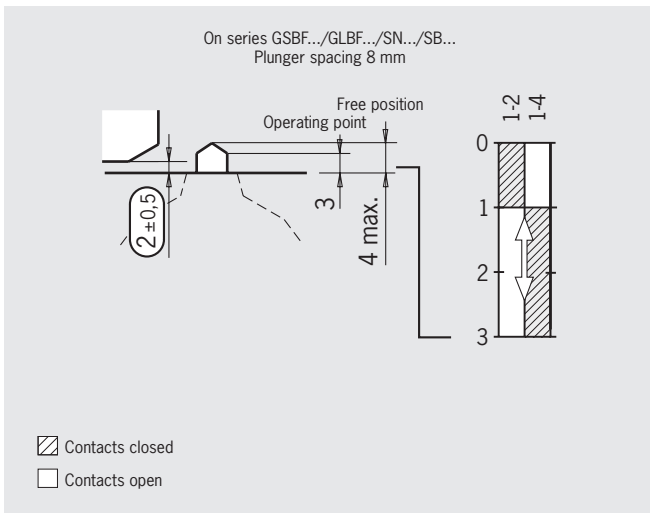
Travel diagram ES 514

Magnetic snap-action switching element with one positively driven NC contact and one NO contact. Double gap, electrically isolated switching elements, silver contact, electro-gold plated. Screw terminal with self-raising clamp washers.



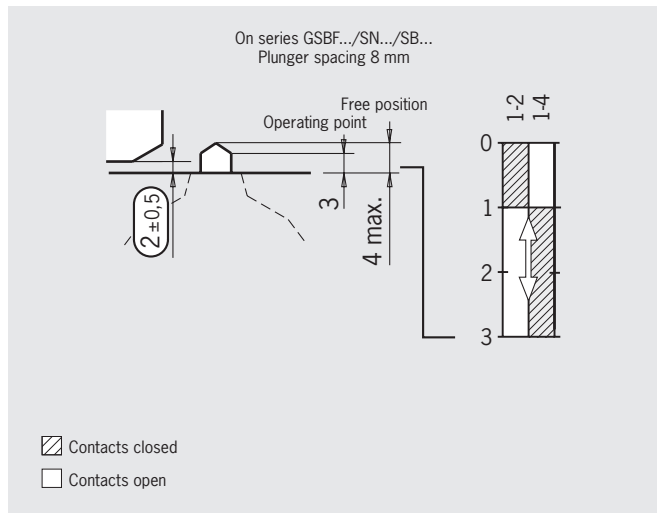
Travel diagram ES 552

Snap-action switching element with one changeover contact. Silver contact, electro-gold plated. Screw terminal.



Travel diagram ES 614

Snap-action switching element with one changeover contact. Silver contact, electro-gold plated. Screw terminal.



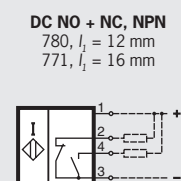
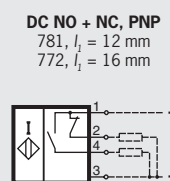
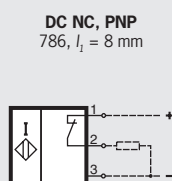
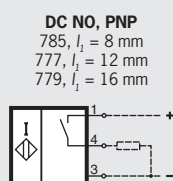
Multiple limit switches inductive

Parameter	Value								Unit	
Switching element ES	785	786	777	781	780	779 ¹⁾ 779/2	772 ¹⁾ 772/2	771 ¹⁾ 771/2		
Proximity switch spacing	8		12			16			mm	
Rated operating distance s_n	1		2			5			mm	
Assured operating distance s_a	0 ... 0.8		0 ... 1.6			0 ... 4			mm	
Switching function	NO contact	NC contact	NO contact	NO + NC		NO contact	NO + NC			
Output	PNP		PNP		NPN	PNP		NPN		
LED function display	Yes									
Operating voltage U_b	DC 10 ... 30			DC 10 ... 55					V	
Permissible residual ripple s	≤ 10									%
Voltage drop U_d	≤ 2.5									V
Rated insulation voltage U_i	DC 60									V
Rated operating current I_e	250									mA
Off-state current I_f	≤ 0.05			≤ 0.001						mA
No-load current I_0	≤ 15									mA
Short circuit and overload protection, pulsed	Yes									
Reverse polarity protection	Yes									
EMC compliance as per	EN IEC 60947-5-2									
Hysteresis H (in installed state)	≤ 0.1		≤ 0.2			≤ 0.5			mm	
Repeat accuracy R	≤ 5									%
Switching frequency f	≤ 500									Hz
Utilization category according to EN IEC 60947-5-2	DC-13									
Housing material	PBT glass-fiber reinforced									
Material active face	PBT									
Ambient temperature T	-25 ... +70									°C
Connection type	Connection terminals									
Conductor cross-section, max.	1.5									mm ²

1) Switching elements with 5 mm operating distance (proximity switch spacing 16 mm) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

When ordering single elements, please prefix the part number with ES. E.g. Switching element ES 781

Wiring diagrams



Selection table for trip rails

Trip rail series (here only preferable series, for other series see catalog)

UFA	Aluminium
ULA	Aluminum, according to DIN 69638
UL	Aluminum, can be expanded
UF	Cast iron, according to DIN 69638
GF	Steel, galvanized, G-trip rail according to DIN 69638

Slot spacing [mm]

8

12

16

Number of slots (max.)

3

4

6

8

20

Series					Slot spacing [mm]			Number of slots (max.)					Page
UFA	ULA	UL	UF	GF	8	12	16	3	4	6	8	20	
●					●					●			34
	●					●				●			34
	●						●			●			34
		●				●		can be expanded					34
		●					●						34
			●		●						●		34
			●			●					●		34
			●				●				●		34
				●			●					●	37
				●			●					●	37

● Available

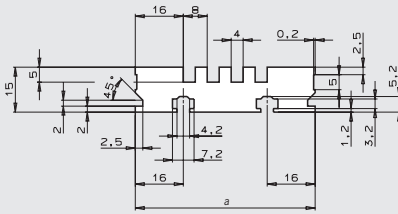
○ Available on request

Trip rails with 8 mm, 12 mm or 16 mm spacing



Series UFA...
Slot spacing 8 mm, aluminum

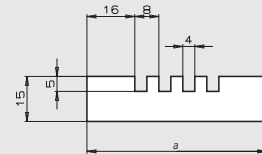
Dimension drawing



Dimension a [mm]	44	52	60	68	76
Number of slots	2	3	4	5	6

Minimum order 2010 mm, 1 bar

Series UF...
Slot spacing 8 mm, cast iron



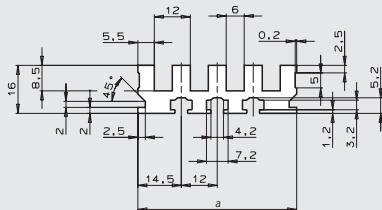
Dimension a [mm]	44	52	60	68	76	92
Number of slots	2	3	4	5	6	8
Dimension a [mm]	108	124	140	156	172	188
Number of slots	10	12	14	16	18	20

Length to suit customer requirement, max. 1000 mm
Gray figures on request



Series ULA... according to DIN 69638 form A
Slot spacing 12 mm, aluminum

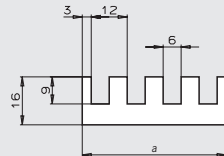
Dimension drawing



Dimension a [mm]	29	41	53	65	77
Number of slots	2	3	4	5	6

Minimum order 2010 mm, 1 bar

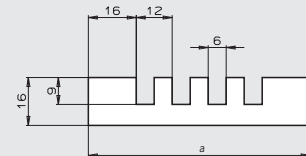
Series UL... can be placed in a row
Slot spacing 12 mm, aluminum



Dimension a [mm]	24	36	48
Number of slots	2	3	4

Preferable lengths 1000, 2000, 3000 and 4000 mm (preferable lengths correspond to minimum order)

Series UF... according to DIN 69638 form A
Slot spacing 12 mm, cast iron



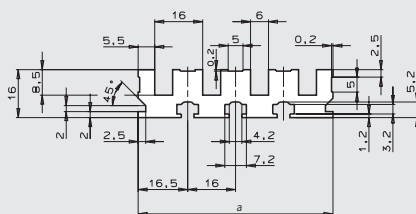
Dimension a [mm]	50	62	74	86	98	122
Number of slots	2	3	4	5	6	8
Dimension a [mm]	146	170	194	218		
Number of slots	10	12	14	16		

Length to suit customer requirement, max. 1000 mm
Gray figures on request



Series ULA... according to DIN 69638 form A
Slot spacing 16 mm, aluminum

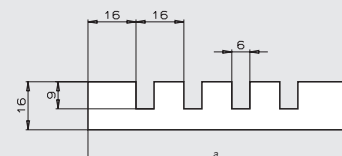
Dimension drawing



Dimension a [mm]	33	49	65	97
Number of slots	2	3	4	6

Minimum order 2010 mm, 1 bar

Series UF... according to DIN 69638 form A
Slot spacing 16 mm, cast iron



Dimension a [mm]	54	70	86	102	118	150
Number of slots	2	3	4	5	6	8
Dimension a [mm]	182	214				
Number of slots	10	12				

Length to suit customer requirement, max. 1000 mm
Gray figures on request

Ordering code

U - -

Series

Number of slots (see tables)

Slot spacing (8, 12 or 16 mm)

Length [mm] (note minimum order/preferable length)

Trip dogs for trip rails with 8 mm, 12 mm or 16 mm spacing

Type of actuation mechanical

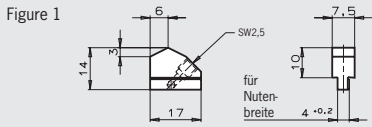
Type of actuation inductive (on request)

Series U8...
for 8 mm slot spacing, hardened, ground steel

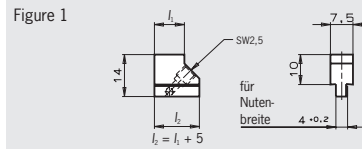
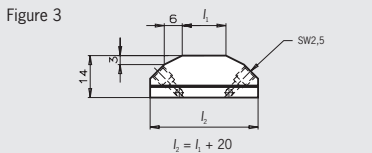
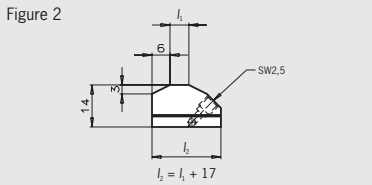
Series UX8...
for 8 mm slot spacing, black painted steel



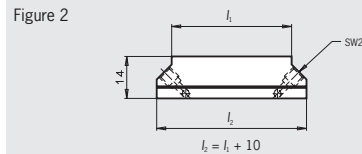
Dimension drawing



l_1	Figure
0	1
4	2
6,3	2
10	3
16	3
20	3
25	3
40	3
63	3
100	3



l_1	Figure
6	1
10	1
16	1
25	2
40	2
63	2
100	2

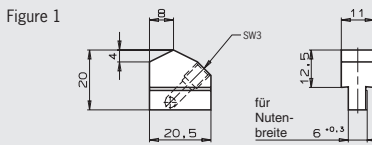


Series U1216... according to DIN 69639 form UA/UB
for 12 or 16 mm slot spacing, hardened, ground steel

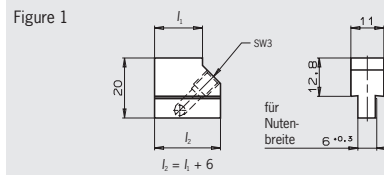
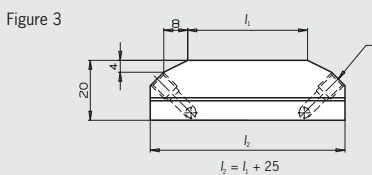
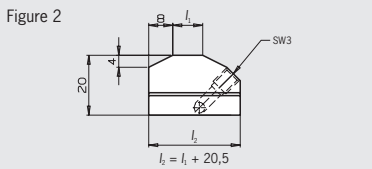
Series UX1216...
for 12 or 16 mm slot spacing, black painted steel



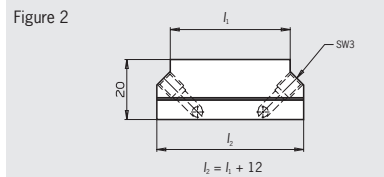
Dimension drawing



l_1	Figure	DIN/form
0	1	UA
4	2	UA
6,3	2	-
10	2	UA
16	3	UB
25	3	UB
40	3	UB
63	3	UB
100	3	UB
125	3	-



l_1	Figure
10	1
16	1
25	2
40	2
63	2
100	2
125	2



Ordering code

U -

Series _____

Length l_1 _____

Special trip dogs for trip rails with 12 mm or 16 mm spacing

Type of actuation mechanical

- ▶ Safety dog
- ▶ Fine adjustment dog

Safety dog UZ

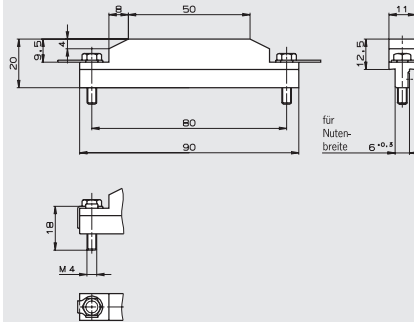
For limit switches with safety function the safety dog must be positively mounted

Fine adjustment dog UE

The fine adjustment dog UE1216-4 can be mounted in all U-trip rails with 12 or 16 mm slot spacing. The fine adjustment is made using a self-locking hexagon socket head screw

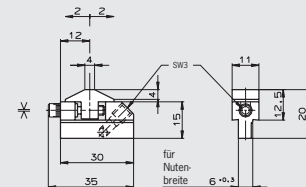
Safety dog UZ for 12/16 mm slot spacing, hardened, ground steel

Dimension drawing UZ1216-50



Fine adjustment dog UE 12/16 mm for slot spacing, hardened, ground steel

Dimension drawing UE1216-4



Adjustment range [mm]	4
Graduation Δ [mm]	0.02

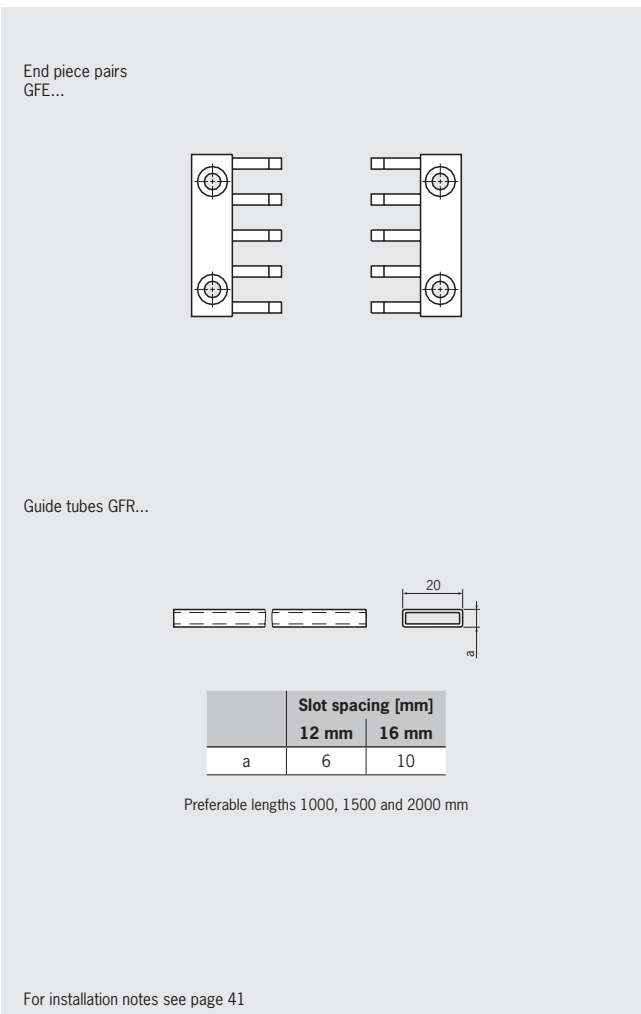
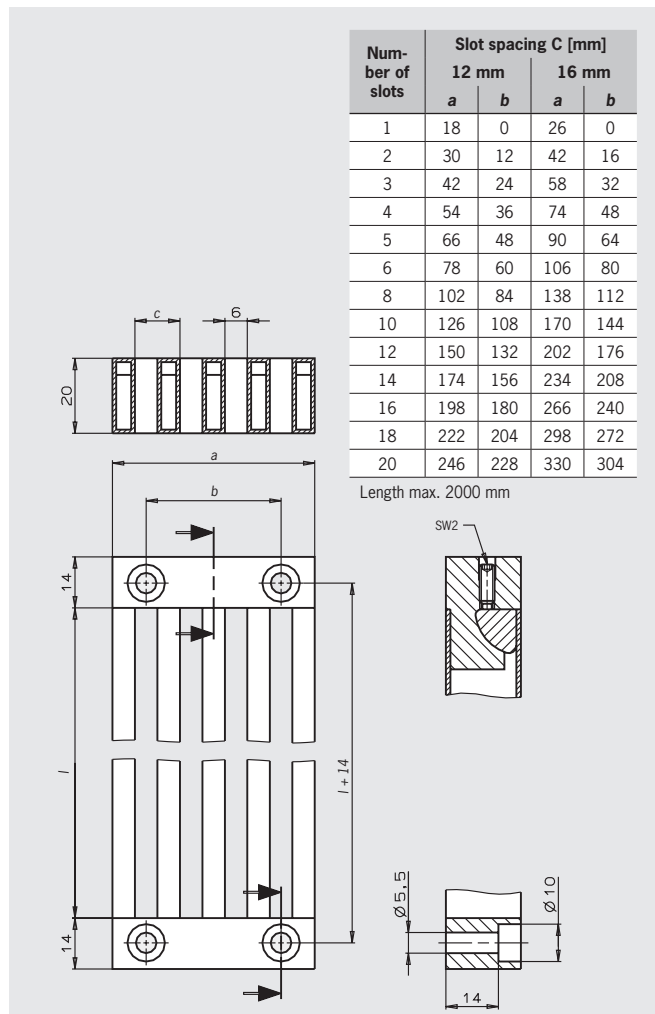
Ordering table

Designation	Use	Order No. / Item
Safety dog UZ	For trip rails ULA/UL/UF 12 or 16 mm	022734 UZ1216-50
Fine adjustment dog UE	For trip rails ULA/UL/UF 12 or 16 mm	013340 UE1216-4

G-trip rails with 12 mm or 16 mm spacing (on request)

G-trip rails GF... according to DIN 69638 form C, fully assembled, galvanized steel

G-trip rail GFE.../GFR... according to DIN 69638 form C, kit for self-assembly, galvanized steel



G-trip rail, fully assembled

Ordering code **G-trip rail GF...**

G	F		-		-			
---	---	--	---	--	---	--	--	--

Series _____

Number of slots (see table) _____

Slot spacing (12 or 16 mm) _____

Length l * [mm] (note maximum length) _____

Kit for self-assembly

Ordering code **Guide tubes GFR...**

G	F	R		-			
---	---	---	--	---	--	--	--

End piece pairs GFE...

G	F	E		-		
---	---	---	--	---	--	--

Series _____

Number of slots (see table) _____

Slot spacing (12 or 16 mm) _____

Length l * [mm] (note preferable length) _____

* For lengths over 600 mm, support brackets are required (see page 40)

Trip dogs for G-trip rails with 12 mm or 16 mm spacing (on request)

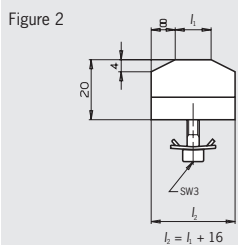
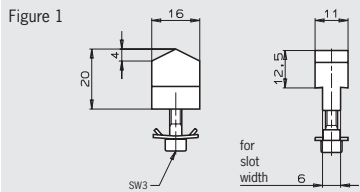
Type of actuation mechanical

Type of actuation inductive

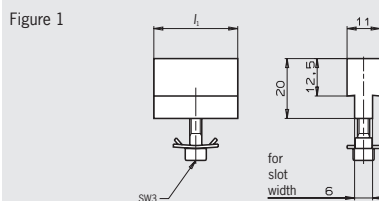
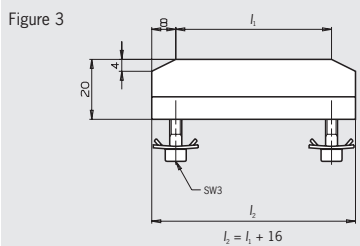
Series G1216.... according to DIN 69639 form G
for G-trip rails GF, hardened, ground steel

Series GX1216...
for G-trip rails GF, black painted steel

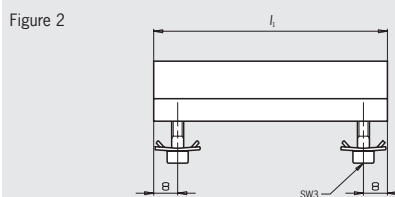
Dimension drawing



l_1	Figure	DIN/form
0	1	G
4	2	G
10	2	G
16	2	G
25	2	G
40	2	G
63	3	G
100	3	G



l_1	Figure
10	1
16	1
25	1
40	1
63	2
100	2



Ordering code

G								-			
---	--	--	--	--	--	--	--	---	--	--	--

Series

Length l_1

Special trip dogs for G-trip rails with 12 mm or 16 mm spacing (on request)

- ▶ **Fine adjustment dog**
- ▶ **Fine adjustment dog with micrometer**

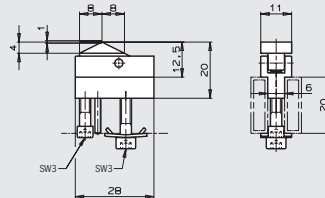
Fine adjustment dog

The fine adjustment dog GE1216-0 can be mounted in the G-trip rails with 12 or 16 mm slot spacing. The fine adjustment is made using a self-locking hexagon socket head screw.

Type of actuation mechanical

Fine adjustment dog for G-trip rails GF, hardened, ground steel

Dimension drawing GE1216-0



Adjustment range [mm] 1

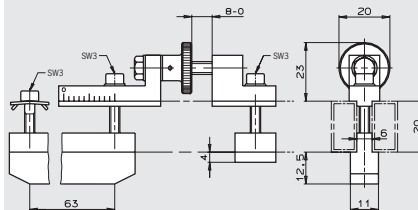
Type of actuation inductive

Fine adjustment dog with micrometer

The fine adjustment dog GEN1216-63/GEX1216-40 can be mounted in the G-trip rails with 12 or 16 mm slot spacing. The fine adjustment is made using a knurled screw.

Fine adjustment dog with micrometer for trip rails GF, hardened, ground steel

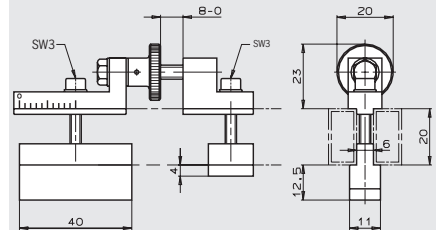
Dimension drawing GEN 1216-63



Adjustment range [mm] 8

Fine adjustment dog for micrometer for trip rails GF, black painted steel

Dimension drawing GEX1216-40



Adjustment range [mm] 8

Ordering table

Designation	Type of actuation	Use	Order No. / Item
Fine adjustment dog	Mechanical	For G-trip rails GF 12 or 16 mm	010493 GE1216-0
Fine adjustment dog with Micrometer	Mechanical	For G-trip rails GF 12 or 16 mm	024563 GEN1216-63
	Non-contact	For G-trip rails GF 12 or 16 mm	001601 GEX1216-40

Accessories

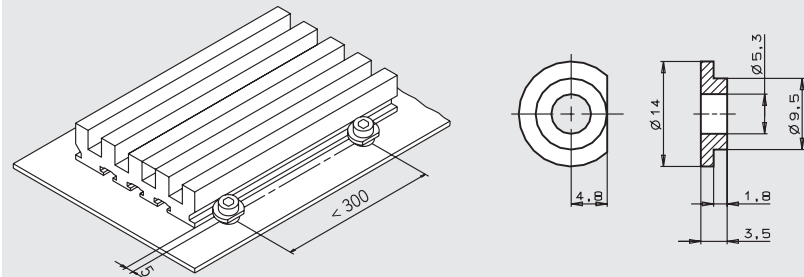
- ▶ Clamping piece
- ▶ Support brackets

Clamping piece

The trip rails ULA and UFA made of aluminum are preferably fastened to the body of the machine using special clamping pieces.

Clamping piece for trip rails ULA/UFA

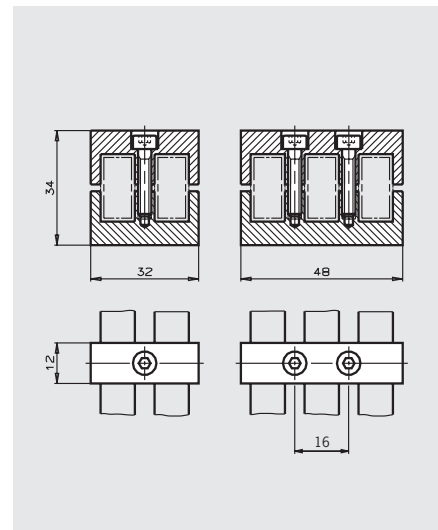
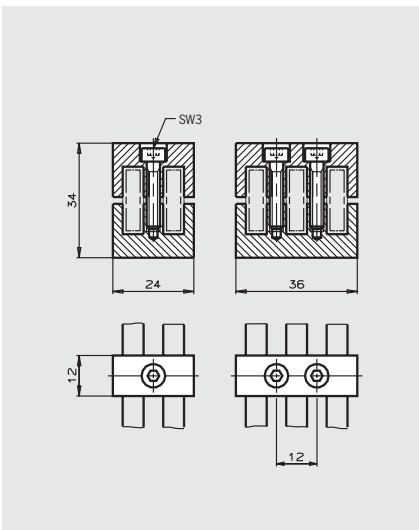
Dimension drawing



Support brackets, can be placed in a row
For the G-trip rails GFE/GFR kit, support brackets must be used from a length of 600 mm.

Support brackets slot spacing 12 mm for G-trip rail GFE/GFR

Support brackets slot spacing 16 mm for G-trip rail GFE/GFR



Ordering table

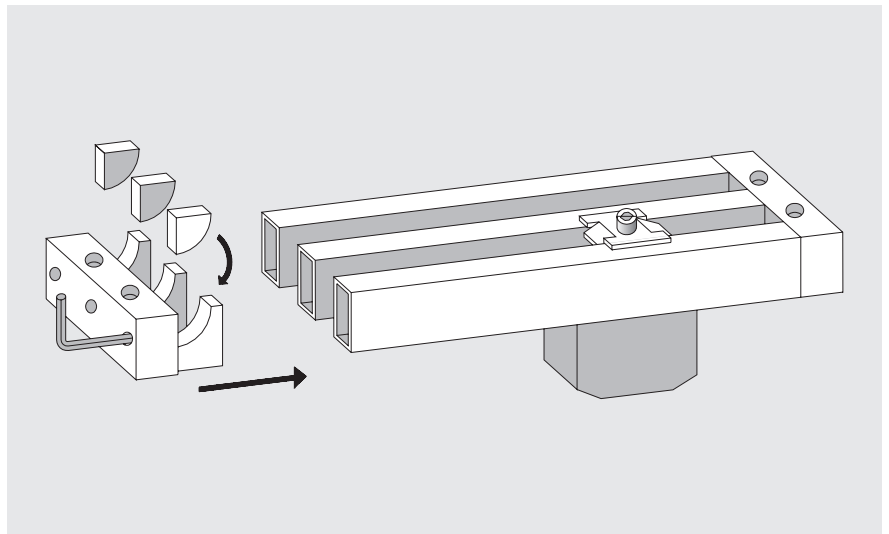
Designation	Use	Slot spacing [mm]	Number of guide tubes	Order No. / Item
Clamping piece	For trip rails ULA/UFA	-		025519 Clamping piece
Support brackets	For G-trip rails GFE/GFR	12 mm	2	027459 ZW02-12
			3	027460 ZW03-12
		16 mm	2	027461 ZW02-16
			3	027462 ZW03-16

Installation notes

Trip rail system-G kit for self-assembly

A kit comprises two end pieces, the pressure segments and the related number of guide tubes. All parts are protected against corrosion by a special surface treatment.

The kit enables the user to assemble trip rails of the required length (from 600 mm special support brackets are required) of up to 2000 mm. For this purpose the guide tubes are cut to the required length and bolted together to form a trip rail with the aid of the end pieces (see example).



Glossary

Ambient temperature T

The ambient temperature is the temperature range in which the reliable operation of the inductive switching element is guaranteed. This range is between - 25 and + 70°C.

Assured operating distance s_a

The assured operating distance is the operating distance at which correct operation of the inductive switching element is guaranteed within the permissible operating conditions (temperature and voltage). The actuation distance lies between 0 and 81 % of the rated operating distance s_n .

Degree of protection

The degree of protection is defined according to EN 60529-1 and is given as an IP. After the IP there are two digits; the first digit gives the degree of protection against the penetration of solid foreign bodies and the second digit gives the degree of protection against the penetration of liquids.

Hysteresis H

The hysteresis is the difference in distance terms between the ON point as the test plate approaches and the OFF point as it moves away from the active face of the inductive switching element.

Inrush current I_k

The inrush current is the maximum current which can flow in an AC-2-wire switching element for a particular period at the moment it is switched on. The details in the technical data are valid for 20 ms.

Minimum operating current I_m

The minimum operating current is the minimum current required for the function of a 2-wire switching element in active energized condition.

Off-state current I_o

The off-state current is the current which flows in the load circuit of an inductive DC-2-wire switching element in the non-conducting condition. In practical terms, this current has to be taken into account only for 2-wire switching elements.

Operating voltage U_b

The operating voltage defines the voltage range in which the inductive switching element functions reliably. The specified values represent limits without any tolerances. The values can be obtained by referring to the technical data for the switching element. In the case of two-wire switching elements, this is applicable only in series connection with the load.

Rated operating current I_e

The rated operating current is the nominal current which can load the inductive switching element in continuous operation.

Rated operating distance s_n

The rated operating distance is a general variable used for measurement of operating distances. It does not take into account either the production tolerances or changes caused by external effects such as voltage and temperature.

Repeat accuracy R

The repeat accuracy is the accuracy of the real operating distance s_r for two switching actions in succession within 8 hours at an operating temperature of 23 ± 5 °C and an operating voltage of $U_b \pm 5$ %.

Reverse polarity protection

Protection against reverse polarization of the operating voltage.

Short-circuit and overload protection

The inductive switching elements are designed so that short circuits cannot damage the outputs. Pulsed short circuit protection is used. This means that the output transistor is switched off and on again in quick succession in the event of overloading or a short-circuit. In this way, it is possible to establish whether the fault is still present or has been rectified.

Slow-action contact element

A slow-action contact element is characterized by the opening of the switching element as a function of the speed at which the plunger is moved.

Snap-action contact element

On snap-action contact elements the switching element jumps to the other switch state from a defined plunger position. The movement of the contact element is independent of the speed at which the actuator is moved. Snap-action contact elements typically have hysteresis.

Switching elements

Switching elements are used in mechanical limit switches. Switching elements are available with a normally closed function, a normally open function and as positively driven contacts. EUCHNER supplies switching elements with one or two contacts for the various switch types. Switching elements can be **slow-action contact elements* or **snap-action contact elements*.

Switching frequency f

The switching frequency is the maximum possible number of switching operations per second. This is determined according to IEC 60947-5-2 and is based on a mark-space ratio of 1:2. The switching frequency is a switch-specific variable and can be obtained by referring to the technical data for the switching element.

Transient protection

EUCHNER proximity switches are protected against interference caused by the occurrence of inductive voltage peaks in accordance with IEC 801-4. Testing is performed in accordance with the stipulations in DIN VDE 0660, Part 208 and IEC 947-5-2.

Voltage drop U_d

The voltage drop is measured across the active output of the inductive switching element when the output is in the "active energized" condition and when the rated operating current I_e flows.

Wire break safety

The EUCHNER proximity switches with wire break safety are designed such that on a wire break on any connection, the switch does not output a spurious signal.

A series of 30 horizontal grey bars, evenly spaced, filling the majority of the page below the header. These bars are intended for taking notes.

A series of 30 horizontal grey bars, evenly spaced, intended for writing notes. The bars are uniform in length and width, providing a structured area for text entry.

A series of horizontal grey lines for writing notes, spanning the width of the page below the header.

Representatives

International

Australia

Micromax
Sensors & Automation Pty. Ltd.
Unit 2, 106-110 Beaconsfield Street
Silverwater, NSW 2128
Tel. +61 2 87482800
Fax +61 2 96483245
info@micromaxsa.com.au

Austria

EUCHNER GmbH
Süddruckgasse 4
2512 Tribuswinkel
Tel. +43 2252 42191
Fax +43 2252 45225
info@euchner.at

Benelux

EUCHNER (BENELUX) BV
Visschersbuurt 23
3356 AE Papendrecht
Tel. +31 78 615-4766
Fax +31 78 615-4311
info@euchner.nl

Brazil

EUCHNER Ltda
Av. Prof. Luiz Ignácio Anhaia Mello,
no. 4387
Vila Ema
São Paulo - SP - Brasil
CEP 03295-000
Tel. +55 11 29182200
Fax +55 11 23010613
euchner@euchner.com.br

Canada

IAC & Associates Inc.
2105 Fasan Drive
Oldcastle, ON NOR 1L0
Tel. +1 519 737-0311
Fax +1 519 737-0314
sales@iacnassociates.com

China

EUCHNER (Shanghai)
Trading Co., Ltd.
No. 8 Workshop A, Hi-Tech Zone
503 Meinengda Road Songjiang
201613 Shanghai
Tel. +86 21 5774-7090
Fax +86 21 5774-7599
info@euchner.com.cn

Czech Republic

EUCHNER electric s.r.o.
Videňská 134/102
61900 Brno
Tel. +420 533 443-150
Fax +420 533 443-153
info@euchner.cz

Denmark

Duelco A/S
Systemvej 8 - 10
9200 Aalborg SV
Tel. +45 7010 1007
Fax +45 7010 1008
info@duelco.dk

Finland

Sähkölehto Oy
Holkkitie 14
00880 Helsinki
Tel. +358 9 7746420
Fax +358 9 7591071
office@sahkolehto.fi

France

EUCHNER France S.A.R.L.
Parc d'Affaires des Bellevues
Allée Rosa Luxembourg
Bâtiment le Colorado
95610 ERAGNY sur OISE
Tel. +33 1 3909-9090
Fax +33 1 3909-9099
info@euchner.fr

Hong Kong

Imperial
Engineers & Equipment Co. Ltd.
Unit B 12/F
Cheung Lee Industrial Building
9 Cheung Lee Street Chai Wan
Hong Kong
Tel. +852 2889 0292
Fax +852 2889 1814
info@imperial-elec.com

Hungary

EUCHNER Ges.m.bH
Magyarország Fióktelep
FSD Park 2,
2045 Törökbálint
Tel. +36 2342 8374
Fax +36 2342 8375
info@euchner.hu

India

EUCHNER (India) Pvt. Ltd.
401, Bremen Business Center,
City Survey No. 2562,
University Road
Aundh, Pune - 411007
Tel. +91 20 64016384
Fax +91 20 25885148
info@euchner.in

Israel

Ilan & Gavish Automation Service Ltd.
26 Shenkar St. Qiryat Arie 49513
P.O. Box 10118
Petach Tikva 49001
Tel. +972 3 9221824
Fax +972 3 9240761
mail@ilan-gavish.com

Italy

TRITECNICA SpA
Viale Lazio 26
20135 Milano
Tel. +39 02 541941
Fax +39 02 55010474
info@tritecnica.it

Japan

EUCHNER
Representative Office Japan
8-20-24 Kamisurumahoncho
Minami-ku, Sagami-hara-shi
Kanagawa 252-0318
Tel. +81 42 8127767
Fax +81 42 7642708
hayashi@euchner.jp

Solton Co. Ltd.

2-13-7, Shin-Yokohama
Kohoku-ku, Yokohama
Japan 222-0033
Tel. +81 45 471-7711
Fax +81 45 471-7717
sales@solton.co.jp

Korea

EUCHNER Korea Co., Ltd.
115 Gasan Digital 2 - Ro
(Gasan-dong, Daeryung
Technotown 3rd Rm 810)
153 - 803 Kumchon-Gu, Seoul
Tel. +82 2 2107-3500
Fax +82 2 2107-3999
info@euchner.co.kr

Mexico

SEPIA S.A. de C.V.
Maricopa # 10
302, Col. Nápoles.
Del. Benito Juárez
03810 Mexico D.F.
Tel. +52 55 55367787
Fax +52 55 56822347
alazcano@sepia.mx

Poland

ELTRON
Pl. Wolności 7B
50-071 Wrocław
Tel. +48 71 3439755
Fax +48 71 3460225
eltron@eltron.pl

Republic of South Africa

RUBICON
ELECTRICAL DISTRIBUTORS
4 Reith Street, Sidwell
6061 Port Elizabeth
Tel. +27 41 451-4359
Fax +27 41 451-1296
sales@rubiconelectrical.com

Romania

First Electric SRL
Str. Ritmului Nr. 1 Bis
Ap. 2, Sector 2
021675 Bucuresti
Tel. +40 21 2526218
Fax +40 21 3113193
office@firstelectric.ro

Russia

VALEX electro
Uliza Karjer dom 2, Str. 9, Etash 2
117449 Moskwa
Tel. +7 495 41196-35
Fax +7 495 41196-36
info@valex-electro.ru

Singapore

Sentronics
Automation & Marketing Pte Ltd.
Blk 3, Ang Mo Kio Industrial Park 2A
#05-06
Singapore 568050
Tel. +65 6744 8018
Fax +65 6744 1929
info@sentronics-asia.com

Slovakia

EUCHNER electric s.r.o.
Videňská 134/102
61900 Brno
Tel. +420 533 443-150
Fax +420 533 443-153
info@euchner.cz

Slovenia

SMM proizvodni sistemi d.o.o.
Jaskova 18
2000 Maribor
Tel. +386 2 4502326
Fax +386 2 4625160
franc.kit@smm.si

Spain

EUCHNER, S.L.
Gurutzegi 12 - Local 1
Polígono Belartza
20018 San Sebastian
Tel. +34 943 316-760
Fax +34 943 316-405
comercial@euchner.es

Sweden

Censit AB
Box 331
33123 Värnamo
Tel. +46 370 691010
Fax +46 370 18888
info@censit.se

Switzerland

EUCHNER AG
Falknisstrasse 9a
7320 Sargans
Tel. +41 81 720-4590
Fax +41 81 720-4599
info@euchner.ch

Taiwan

Daybreak Int'l (Taiwan) Corp.
3F, No. 124, Chung-Cheng Road
Shihlin 11145, Taipei
Tel. +886 2 8866-1234
Fax +886 2 8866-1239
day111@ms23.hinet.net

Turkey

EUCHNER Endüstriyel Emniyet
Teknolojileri Ltd. Şti.
Hattat Bahattin Sok.
Ceylan Apt. No. 13/A
Göztepe Mah.
34730 Kadıköy / Istanbul
Tel. +90 216 359-5656
Fax +90 216 359-5660
info@euchner.com.tr

United Kingdom

EUCHNER (UK) Ltd.
Unit 2 Petre Drive,
Sheffield
South Yorkshire
S4 7PZ
Tel. +44 114 2560123
Fax +44 114 2425333
info@euchner.co.uk

USA

EUCHNER USA Inc.
6723 Lyons Street
East Syracuse, NY 13057
Tel. +1 315 701-0315
Fax +1 315 701-0319
info@euchner-usa.com

EUCHNER USA Inc.

Detroit Office
130 Hampton Circle
Rochester Hills, MI 48307
Tel. +1 248 537-1092
Fax +1 248 537-1095
info@euchner-usa.com

Germany

Chemnitz

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Am Vogelherd 2
09627 Bobritzsch-Hilbersdorf
Tel. +49 37325 906000
Fax +49 37325 906004
jens.zehrtrner@euchner.de

Düsseldorf

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Tel. +49 711 7597-500
Fax +49 711 753316
support@euchner.de

Essen/Dortmund

Thomas Kreißl
fördern - steuern - regeln
Hackenbergweg 8a
45133 Essen
Tel. +49 201 84266-0
Fax +49 201 84266-66
info@kreissl-essen.de

Freiburg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Steige 5
79206 Breisach
Tel. +49 7664 4038-33
Fax +49 7664 4038-34
peter.seifert@euchner.de

Hamburg

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Tel. +49 711 7597-500
Fax +49 711 753316
support@euchner.de

Magdeburg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Tismarstraße 10
39108 Magdeburg
Tel. +49 391 736279-22
Fax +49 391 736279-23
bernhard.scholz@euchner.de

München

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Tel. +49 711 7597-500
Fax +49 711 753316
support@euchner.de

Nürnberg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Steiner Straße 22a
90522 Oberasbach
Tel. +49 911 6693829
Fax +49 911 6696722
ralf.paulus@euchner.de

Stuttgart

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Tel. +49 711 7597-0
Fax +49 711 7597-303
oliver.laier@euchner.de
uwe.kupka@euchner.de

Wiesbaden

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Adolfsallee 3
68185 Wiesbaden
Tel. +49 611 98817644
Fax +49 611 98895071
giancarlo.pasquesi@euchner.de



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EUCHNER GmbH + Co. KG

Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany
Tel. +49 711 7597-0
Fax +49 711 753316
info@euchner.de
www.euchner.com

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