

Multiple Limit Switches, Trip Rails and Trip Dogs



EUCHNER

More than safety.

Multiple limit switches, trip rails and trip dogs

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General information on mechanical multiple limit switches

Use

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 control 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 page C-29).

Layout

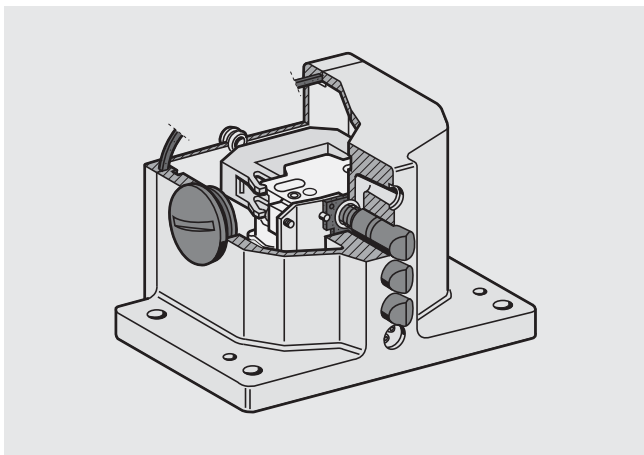
Depending on the technical requirements in terms of operating point accuracy and approach speed, four functionally different plunger types (chisel, roller, ball and domed plungers) are used.

Depending on the plunger type, the reproducible operating 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 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 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.

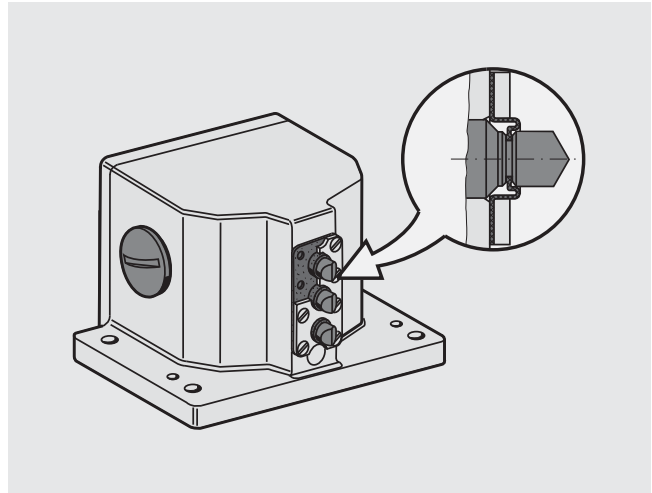


Exterior diaphragm

A series with an exterior diaphragm that 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. Technical data for this series: see page C-21 and C-22.



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 even beyond the guaranteed mechanical life.

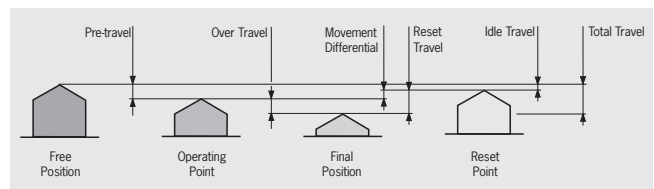
There are two different types of actuating systems, depending on the application. For standard applications, the plunger is fitted with a telescopic device.

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

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.

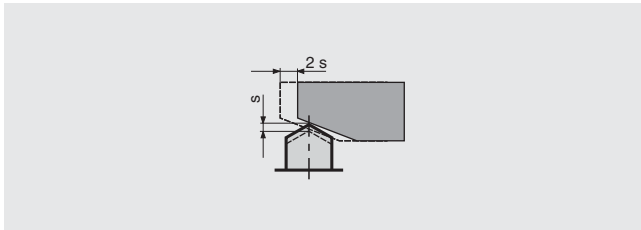
Plunger travel

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 to $\pm 0.002 \text{ mm}^{1)}$
Max. approach speed of 40 m/min.



Roller plunger R with plain bearing

(standard version for roller plunger)
Hardened roller.
Operating point accuracy to $\pm 0.01 \text{ mm}^{1)}$
Max. approach speed of 80 m/min.



Roller plunger B with ball bearing

Hardened roller.
Operating point accuracy to $\pm 0.01 \text{ mm}^{1)}$
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 to $\pm 0.01 \text{ mm}^{1)}$
Max. approach speed of 10 m/min.



Dome plunger W

(instead of ball plungers in safety switching elements)
Hardened and polish-ground.
Can be actuated from various directions.
Operating point accuracy to $\pm 0.002 \text{ mm}^{1)}$
Max. approach speed of 10 m/min.



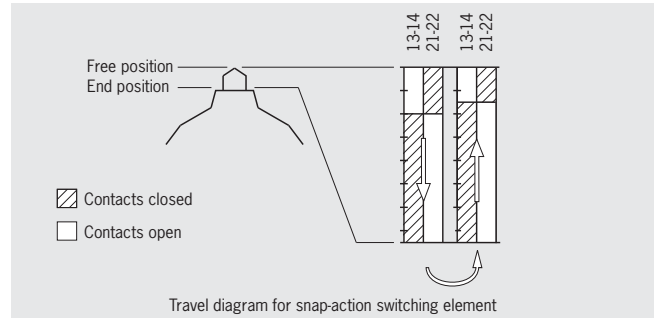
Switching elements

Snap-action switching element

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

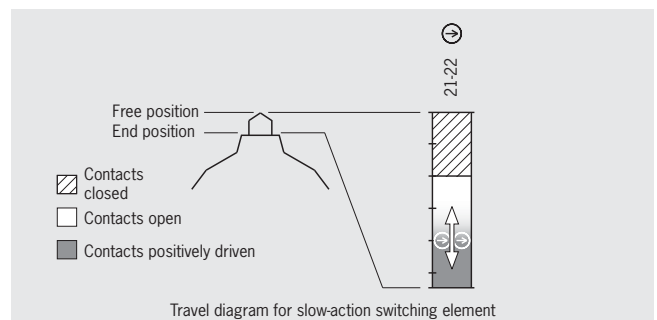
On snap-action switching elements, the change from the completely closed state to the completely open state is made at a defined point (operating point).

As a result the operating point is at a defined position, unlike on slow-action switching 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 \ominus

Positively driven contacts are used in the switching elements. These are special switching contacts 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 contact is designed as a positively driven contact. In safety-relevant circuits, only switching elements with positively driven contacts are allowed.

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.

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.

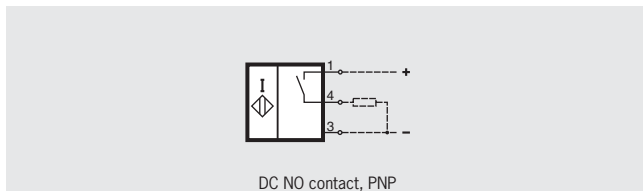
Interchangeability with mechanical multiple limit switches and single limit switches means that it is possible to straightforwardly convert machines. The switches can therefore be retrofitted on existing machine installations to take full advantage of the benefits of non-contact switches.

For safety-relevant final position limitation, 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 contacts.

Switching functions

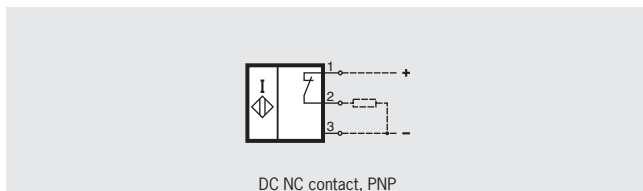
NO function

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.



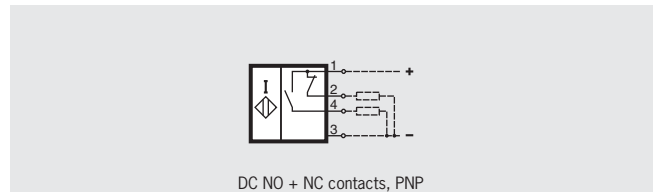
NC function

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 plug connector or permanently connected cable are approved by Underwriters Laboratories (UL, Canada and USA).

Special versions

Mixed contact assembly

(Only in multiple limit switches with 12 mm and 16 mm plunger spacing) For specific functions on machines and systems, e.g. final position limitation, 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:

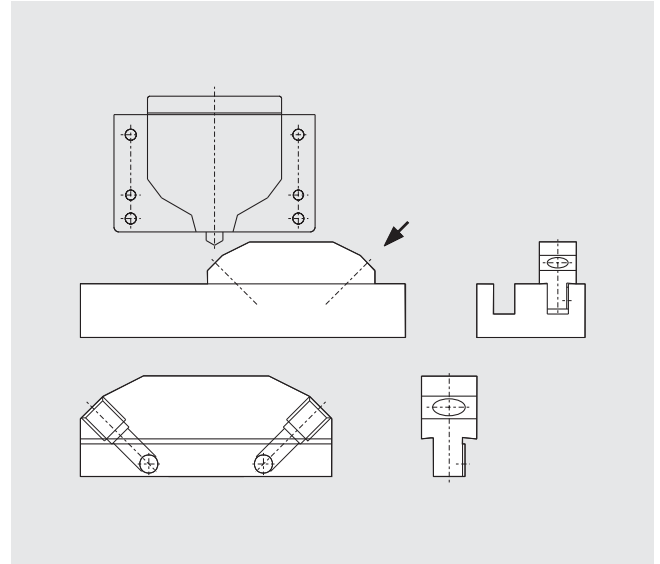
- ▶ Very high accuracy (to 0.002 mm).
- ▶ Long mechanical life (low mechanical wear and resistant to corrosion due to selected materials).
- ▶ Easy to use (user-friendly fastening and adjustment using refined precision mechanics).

EUCHNER trip rails and trip dogs are available in two variants. The function is exactly the same, in principle they differ only 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 sensitive, accurate adjustment, even when the limit switch is activated.



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

GLBF Horizontal housing

Plunger spacing (mm)

8 Small housing for installations where there is little space

12 Industry standard, large product range

16 Necessary only 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; necessary only in special applications

W Dome plunger; necessary only in special applications

Switching element

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

508 1 NC \ominus , safety switching element, slow-action switching contact

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

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

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

Options

AM Exterior diaphragm

ST Plug connector

LED LED indicator

Series				Plunger spacing			Plunger types					Switching element					Options			Page	
RGBF	SN	GSBF	GLBF	8	12	16	D	R	B	K	W	502	508	514	552	614	AM	St	LED		
•					•		•	•	•	○	○	•	•	•				○	•	C-10	
•					•		•	•				•		○			•	○	○	C-21	
•						•	•	•	○	○	○	•	•	•				○	•	C-10	
	•			•			•	•		•					•	•		○		C-14	
	•				•		•	•	•	○	○	•	•	•				○	•	C-12	
	•				•		•	•				•					•	○	○	C-22	
	•					•	•	•	○	○	○	•	•	•				○	•	C-12	
		•		•			•	•		○					•	•		○		C-17	
		•			•		•	•		○	○	•	•	•				○	•	C-15	
		•				•	•	•		○	○	•	•	•				○	•	C-15	
			•	•			•	•		•					•	•				C-20	
			•		•		•	•		○	○	•	•	•						•	C-18
			•			•	•	•		○	○	•	•	•						•	C-18

• Available

○ Available on request

Selection table for inductive 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								
Proximity switch spacing (mm)										
12		Rated operating distance 2 mm, industry standard, large product range								
16		Rated operating distance 5 mm; necessary only in special applications								
Switching element										
772		DC NO + NC contacts, PNP								
777		DC NO contact, PNP								
779		DC NO contact, PNP								
780		DC NO + NC contacts, NPN								
781		DC NO + NC contacts, PNP								
<hr/>										
St		Plug connector								
LED		LED indicator								

Series		Proximity switch spacing		Switching element					Options		Page
RGBF	SN	12	16	772	777	779	780	781	St	LED	
●		●			●		●	●	○	●	C-11
●			●	●		●			○	●	C-11
	●	●			●		●	●	○	●	C-13
	●		●	●		●			○	●	C-13

● Available ○ Available on request

Series RGBF... 12/16 mm, mechanical

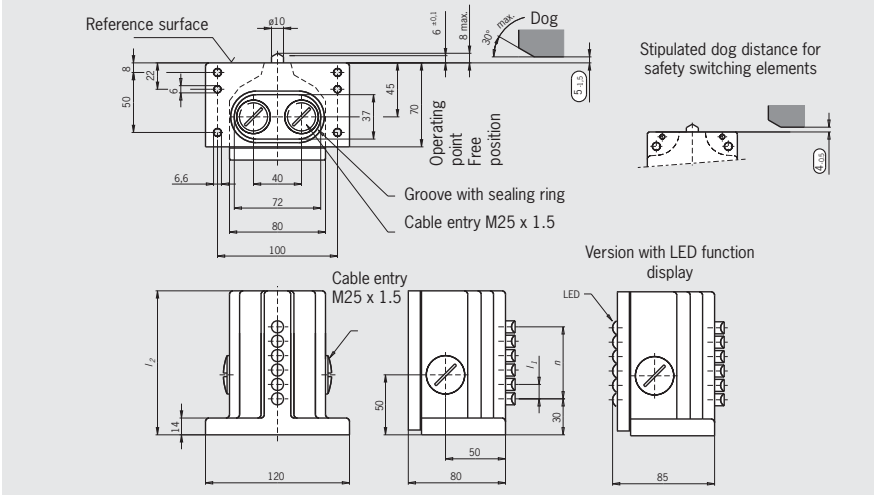


- ▶ Plunger spacing 12 or 16 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ LED function display optional



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

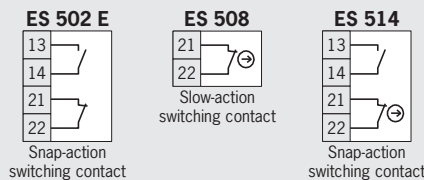
Dimension drawing Illustration with chisel plunger; plunger type depending on version



Switching elements

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

Switching elements



On the usage of safety switching elements, the dog distance (4.05) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN ISO 14119, 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 C-23):

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

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. 2,000 operating cycles
- 2) The approach speed specified 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	

Series RGBF... 12/16 mm, inductive

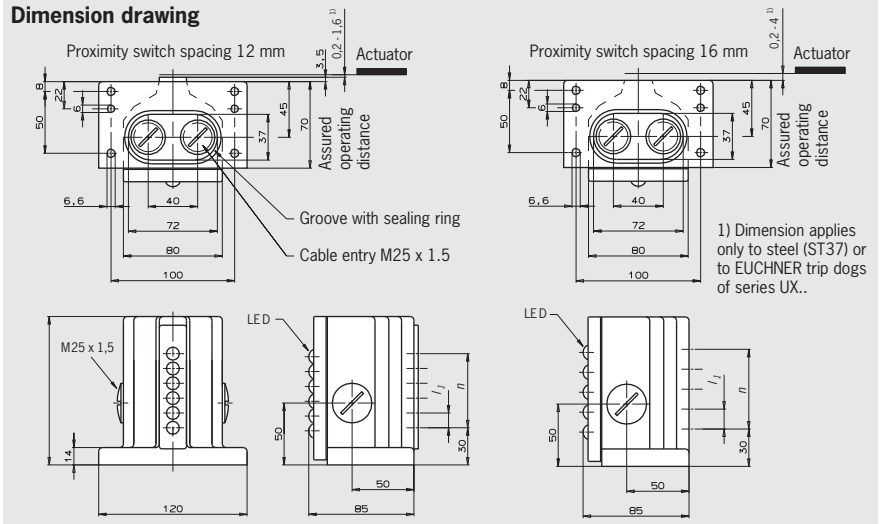
- ▶ Proximity switch spacing 12 or 16 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ LED function display



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

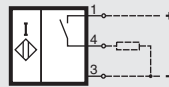
On request mixed assembly with electro-mechanical safety switching elements according to IEC 60947-5-1 is possible for 12 mm proximity switch spacing.

LED function display

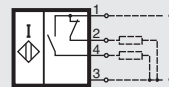
DC and AC switching elements are equipped as standard with a function display on the switching element (yellow). The function display can be seen from the exterior.

Switching elements

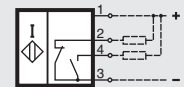
DC NO contact, PNP
777, $I_1 = 12$ mm
779, $I_1 = 16$ mm



DC NO + NC contacts, PNP
781, $I_1 = 12$ mm
772, $I_1 = 16$ mm



DC NO + NC contacts, NPN
780, $I_1 = 12$ mm



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 C-28)

Ordering code

Mechanical

R	G	B	F					-				L	E					-	M	
R	G	B	F		X			-				L							-	M

Series

Number of plungers/proximity switches

Plunger type (only mechanical switches, 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; others on request)

Cable entry M25 x 1.5 (plug connector on request)

Series SN... 12/16 mm, mechanical

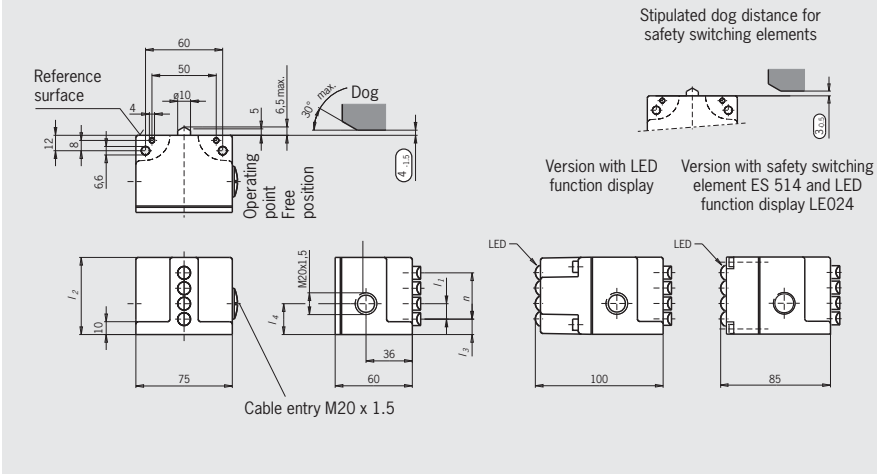


- ▶ Plunger spacing 12 or 16 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ LED function display optional



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

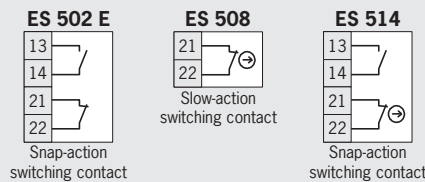
Dimension drawing Illustration with chisel plunger; plunger type depending on version



Switching elements

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

Switching elements



On the usage of safety switching elements, the dog distance (3.0_{±0.5}) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN ISO 14119, 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 C-23):

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

Plunger types	D Chisel	R Roller (plain bearing)	B Roller (ball bearing)	K ⁴⁾ Ball ³⁾	W ⁴⁾ 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. 2,000 operating cycles
- 2) The approach speed specified 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
	I ₁ = 12		I ₁ = 16				
	I ₂	I ₃	I ₄	I ₂	I ₃	I ₄	
2	36	12	19	48	16	24	Die-cast aluminum, anodized
3	48		24	72			
4	60			84			
5	72			-			
6	84			-			

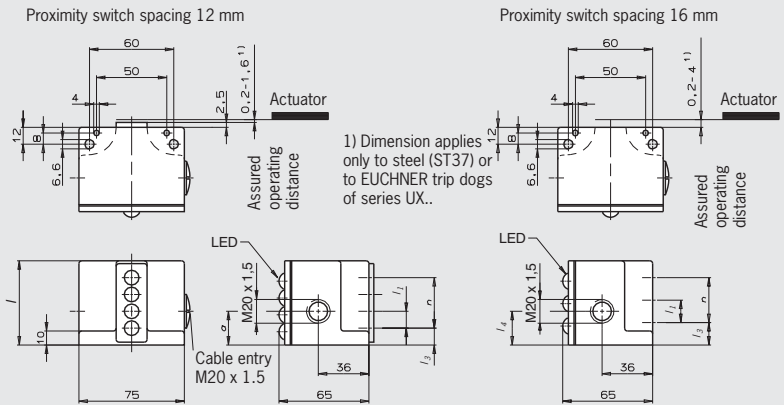
Series SN... 12/16 mm, inductive

- ▶ Proximity switch spacing 12 or 16 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP 67 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

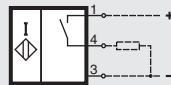
On request mixed assembly with electro-mechanical safety switching elements according to IEC 60947-5-1 is possible for 12 mm proximity switch spacing.

LED function display

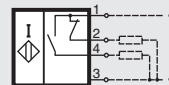
DC and AC switching elements are equipped as standard with a function display on the switching element (yellow). The function display can be seen from the exterior.

Switching elements

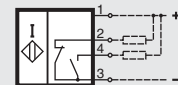
DC NO contact, PNP
777, $l_1 = 12$ mm
779, $l_1 = 16$ mm



DC NO + NC contacts, PNP
781, $l_1 = 12$ mm
772, $l_1 = 16$ mm



DC NO + NC contacts, NPN
780, $l_1 = 12$ mm



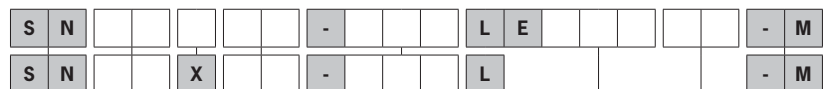
Switching elements with 5 mm operating distance (16 mm proximity switch spacing) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

Further switching elements on request (see page C-28)

Ordering code

Mechanical

Inductive



Series

Number of plungers/proximity switches

Plunger type (only mechanical switches, 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; others on request)

Cable entry M20 x 1.5 (plug connector on request)

Series SN... 8 mm, mechanical

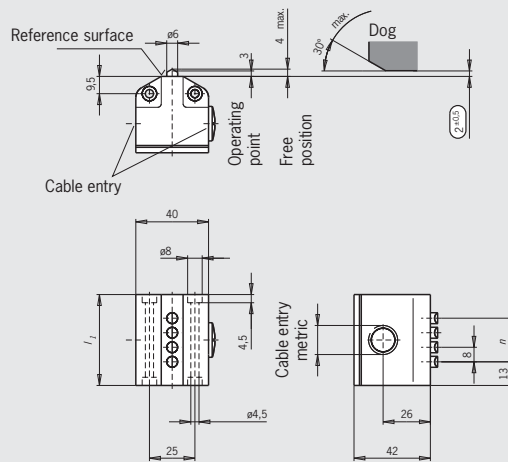


- ▶ Plunger spacing 8 mm
- ▶ Upright housing, without flange
- ▶ Degree of protection IP 67 according to IEC 60529



Series SN... mechanical Plunger spacing 8 mm

Dimension drawing Illustration with chisel plunger; plunger type depending on version

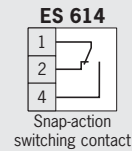
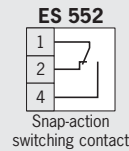


Switching elements

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

(See technical data on the switching elements)

Switching elements



Plunger types	D	R	CI	
	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 552 E has been run-in with approx. 2,000 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			
6	66	M20 x 1.5		

Ordering code

Mechanical



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)

Series GSBF... 12/16 mm, mechanical

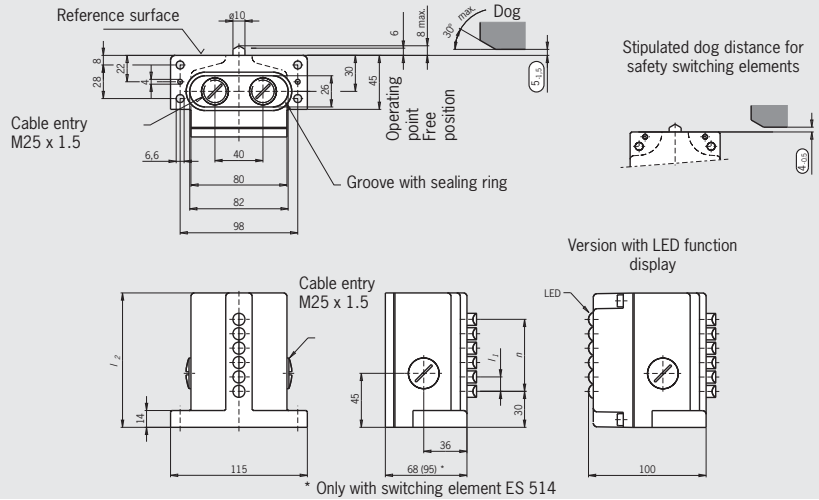


- ▶ Plunger spacing 12 or 16 mm
- ▶ Upright housing
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ LED function display optional



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

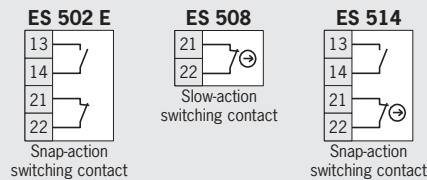
Dimension drawing Illustration with chisel plunger; plunger type depending on version



Switching elements

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

Switching elements



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 ISO 14119, 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 C-23):

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

Plunger types	D	R	K ⁴⁾	W ⁴⁾	
	Chisel	Roller (plain bearing)	Ball ³⁾	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. 2,000 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	Plunger spacing		Housing material
	I ₁ = 12 I ₂	I ₁ = 16 I ₂	
2	70	70	Die-cast aluminum, anodized
3	70	82	
4	82	96	
5	96	112	
6	112	130	
8	130	-	

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; others on request)	_____																				
Cable entry M25 x 1.5	_____																				

Series GSBF... 8 mm, mechanical

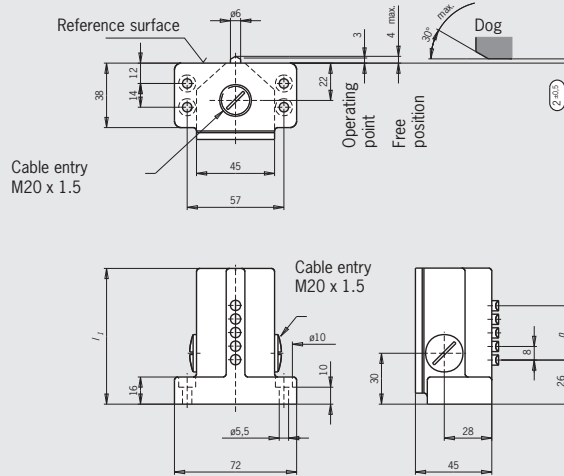


- ▶ Plunger spacing 8 mm
- ▶ Upright housing
- ▶ Degree of protection IP 67 according to IEC 60529



Series GSBF... mechanical Plunger spacing 8 mm

Dimension drawing Illustration with chisel plunger; plunger type depending on version

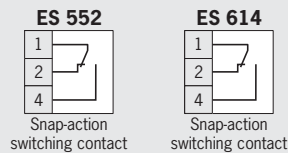


Switching elements

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

(See technical data on the switching elements)

Switching elements



Plunger types	D	R	K ⁴⁾	
	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 552 E has been run-in with approx. 2,000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639
3) Plunger type on request

n Number of plungers/proximity switches	Plunger/proximity switch spacing 8 mm	
	I ₁	Housing material
2	48	Sand-cast aluminum, anodized
3	64	
4	64	
5	80	
6	80	

Ordering code **Mechanical** **G S B F** **O 8 - - M**

Series _____

Number of plungers/proximity switches _____

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

Plunger/proximity switch spacing (**8 mm**) _____

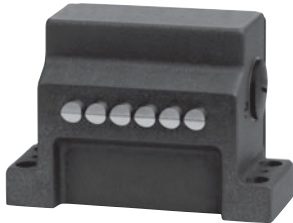
Switching element (ES **552** or ES **614**) _____

Cable entry M20 x 1.5 _____

Series GLBF... 12/16 mm, mechanical (on request)

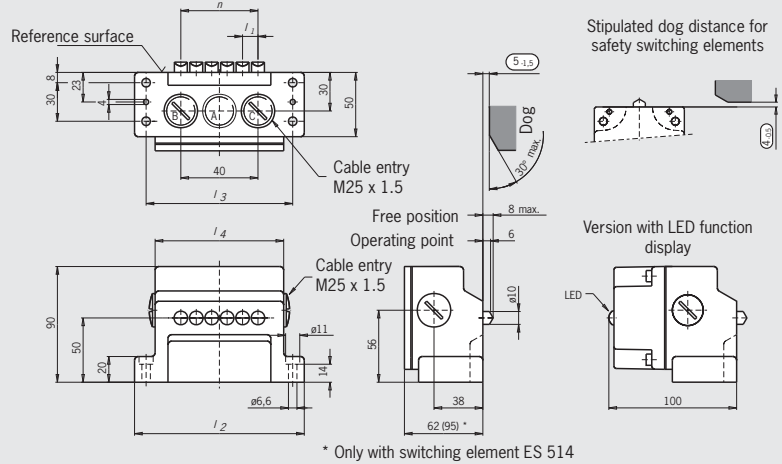


- ▶ Plunger spacing 12 or 16 mm
- ▶ Horizontal housing
- ▶ Degree of protection IP 67 according to IEC 60529
- ▶ LED function display optional



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

Dimension drawing Illustration with chisel plunger; plunger type depending on version



Switching elements

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

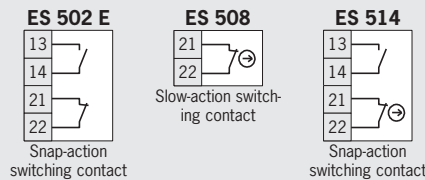
On the usage of safety switching elements, the dog distance (4.05) must be maintained to achieve the positively driven travel. The dogs must be positively mounted according to EN ISO 14119, i.e. riveted, welded or secured in some other way against becoming loose.

LED function display (optional)

Function displays are available for the following voltage ranges (see accessories page C-23):

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

Switching elements



Plunger types	D	R	K ⁴⁾	W ⁴⁾	
	Chisel	Roller (plain bearing)	Ball ³⁾	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. 2,000 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	
	l ₁ = 12			Cable entry	l ₁ = 16				Cable entry
	l ₂	l ₃	l ₄		l ₂	l ₃	l ₄		
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	B + C M25 x 1.5	114	98	84	B + C M25 x 1.5	
5	114	98	84		132	114	100		
6	132	114	100	148	130	116			

Ordering code	Mechanical	G	L	B	F					-				L	E					-	M
Series																					
Number of plungers/proximity switches																					
Plunger type (only mechanical switches, e.g. D = chisel)																					
Plunger/proximity switch spacing (12 or 16 mm)																					
Switching elements (e.g. ES 508)																					
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; others on request)																					
Cable entry M25 x 1.5																					

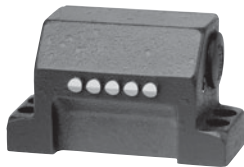


For technical data see page C-26

Series GLBF... 8 mm, mechanical

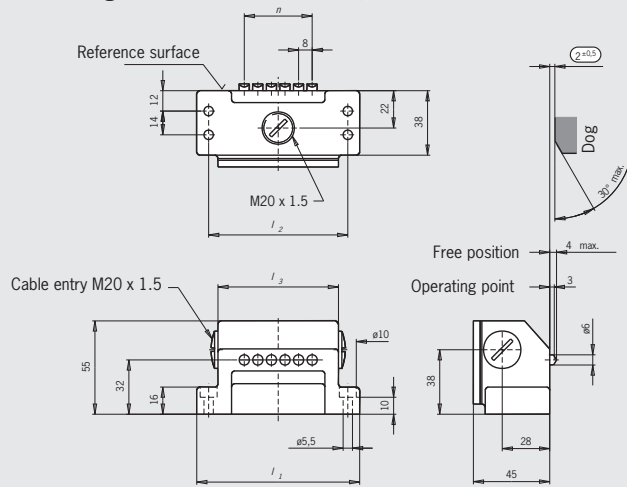


- ▶ Plunger spacing 8 mm
- ▶ Horizontal housing
- ▶ Degree of protection IP 67 according to IEC 60529



Series GLBF... mechanical Plunger spacing 8 mm

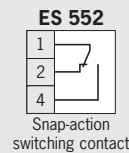
Dimension drawing Illustration with chisel plunger; plunger type depending on version



Switching elements

- ▶ **ES 552** Snap-action switching contact
1 changeover contact
Standard switching element
- (See technical data on the switching elements)

Switching elements



Plunger types	D Chisel	R Roller (plain bearing)	K ³⁾ 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 552 E has been run-in with approx. 2,000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639
3) Plunger type on request

n Number of plungers/proximity switches	Plunger/proximity switch spacing 8 mm			Housing material
	I ₁	I ₂	I ₃	
2	64	50	39	Sand-cast aluminum, anodized
3	80	66	55	
4	80	66	55	

Ordering code **Mechanical** **G L B F** **0 8 - 5 5 2 - M**

Series _____

Number of plungers/proximity switches _____

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

Plunger/proximity switch spacing (**8** mm) _____

Switching element **ES 552** _____

Cable entry M20 x 1.5 _____

Series RGBF...AM 12 mm, mechanical

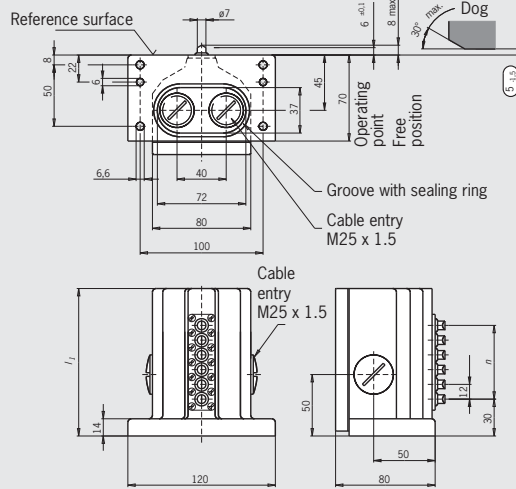


- ▶ With exterior diaphragm
- ▶ Plunger spacing 12 mm
- ▶ Upright housing according to DIN 43697
- ▶ Degree of protection IP 67 according to IEC 60529



Series RGBF... AM mechanical Plunger spacing 12 mm

Dimension drawing Illustration with chisel plunger; plunger type depending on version



Exterior diaphragm

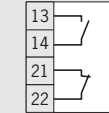
The exterior diaphragm protects the plunger guide against the entry of very fine dust (dust from grinding, casting, glass, etc.) and prevents the plunger from seizing. At the same time, plunger sticking, caused by resinous lubricating coolants, can be prevented with this exterior diaphragm version.

Switching elements

- ▶ **ES 502 E** Snap-action switching contact
1 NC + 1 NO
- ▶ **ES 514** Snap-action switching contact
1 NC ⊖ + 1 NO

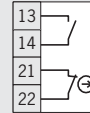
Switching elements

ES 502 E



Snap-action switching contact

ES 514



Snap-action switching contact (on request)

Plunger types	D Chisel	R 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. 2,000 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	
	I 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
<p>Chisel plunger</p>	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
	<p>Roller plunger</p>	2
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

Series SN...AM 12 mm, mechanical

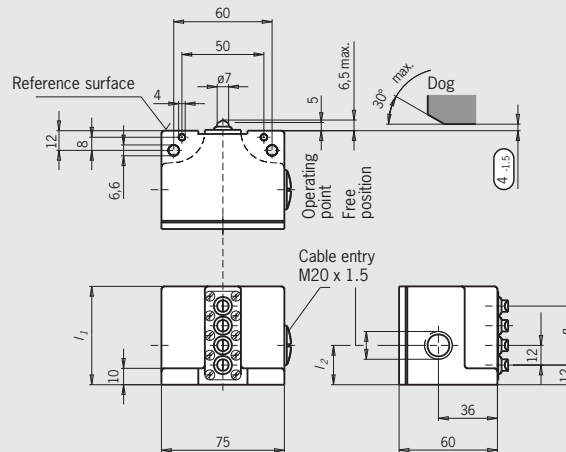


- ▶ With exterior diaphragm
- ▶ Plunger spacing 12 mm
- ▶ Upright housing, small flange
- ▶ Degree of protection IP 67 according to IEC 60529



Series SN...AM mechanical Plunger spacing 12 mm

Dimension drawing Illustration with chisel plunger; plunger type depending on version



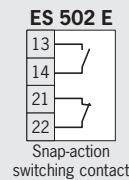
Exterior diaphragm

The exterior diaphragm protects the plunger guide against the entry of very fine dust (dust from grinding, casting, glass, etc.) and prevents the plunger from 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 contact
1 NC + 1 NO

Switching elements



LED function display possible on request.

Plunger types	D Chisel	R 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. 2,000 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		Housing material
	l ₁	l 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