EN

Multiple Limit Switches

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 50 years.
The medium-sized family-operated company based in Leinfelden, Germany, employs more than 500 people around the world, 400 in Germany alone.

In addition to the production locations in Unterböhringen and Shanghai/China, 14 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 (CES)
- Transponder-coded Safety Switches with guard locking (CET)
- Interlocking and guard locking systems (Multifunctional Gate Box MGB)
- Access management systems (Electronic-Key-System EKS)
- Electromechanical Safety Switches
- Magnetically coded Safety Switches (CMS)
- 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

Contents

Multiple Limit Switches

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

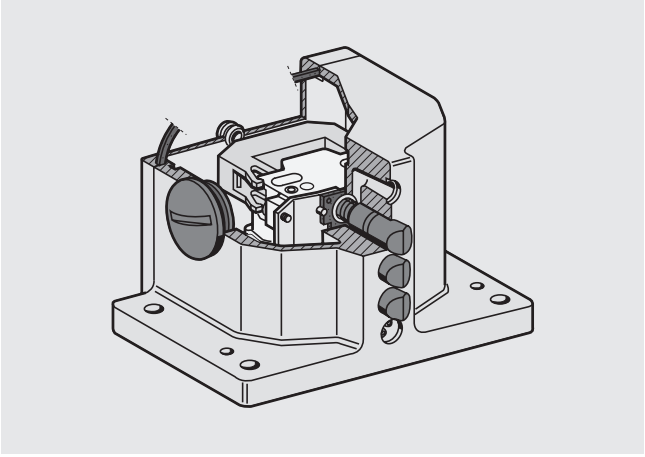
A range of housing versions, including DIN versions, are available to suit the full spectrum of application fields. A high standard of quality is always guaranteed in every installation position by the degree of protection IP 67.

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 35).

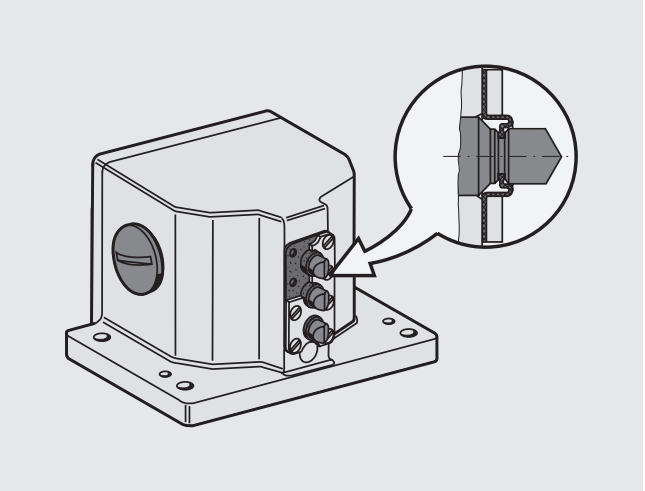
Design

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 x 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.



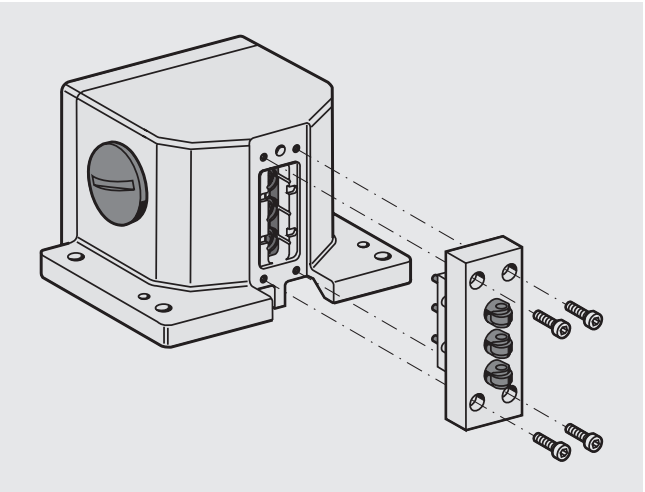
Exterior diaphragm

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.



Interchangeable plunger guide

The series RGCS with its interchangeable plunger guide facilitates quick and easy plunger replacement without re-adjustment of the multiple limit switch. This keeps production downtimes as brief as possible.
In case of damage or wear to the plunger, e. g. when processing abrasive materials, and also when the plunger has become completely stuck due to resinous cooling lubricants, it is only necessary to replace the plunger guide and plunger on these multiple limit switches.
The complete plunger guide is dismantled from the plunger side. The plunger can be replaced easily and quickly by the operator without special tools. Specialist knowledge is not required. It is not necessary to make changes to the machine installation or perform time-consuming re-adjustment of the system.
In this way, repair costs are reduced and machine downtimes are minimized. For technical data on this series see page 26.



Plunger systems

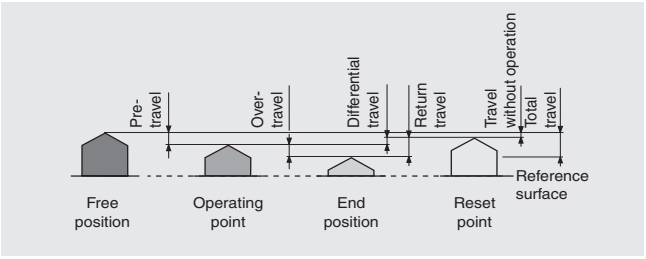
General

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.

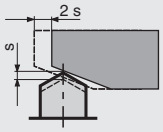
Plunger travel

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.

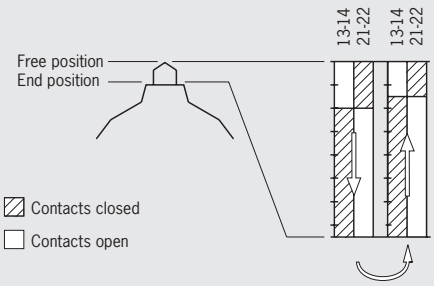
Ball plunger K
(not in conjunction with safety switching elements)
Hardened ball.
Can be actuated from various directions.
Operating point accuracy up to ± 0.01 mm.
Max. approach speed of 10 m/min.

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

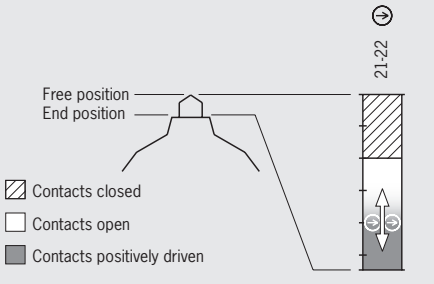
Snap-action switching elements are predominantly used in mechanical limit switches.
On snap-action switching elements, the change from the completely closed state to the completely open state is made at a defined point (operating point).
As a result the switching point is at a defined position unlike on slow-action contact elements. Snap-action switching elements typically have a switching hysteresis.



Travel diagram for snap-action switching element

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.



Travel diagram for slow-action switching element

Positively driven contacts ⊖

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.

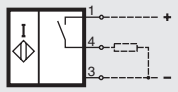
Interchangeability with mechanical multiple limit switches and single limit switches means that it is possible to straightforwardly modify machines. The switches can therefore be retrofitted on existing machine installations to take full advantage of the benefits of non-contact switches.

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

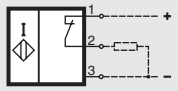
The NO function means that the load current flows when the active face of the inductive switching element is activated and that no current flows when the active face is not activated.



DC NO, PNP

NC function

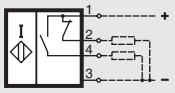
The NC function means that the load current does not flow when the active face of the inductive switching element is activated and that current flows when the active face is not activated.



DC NC, PNP

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.



DC NO + NC, PNP

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.

Special switching elements

Inductive switching elements according to NAMUR

These switching elements fulfill the specification IEC 60 947-5-6 and IEC 61 934.
The current consumption at an operating voltage of 8.2 V is greater than 2.5 mA when the oscillator face is not activated and less than 1.0 mA when the oscillator face is activated. The current consumption characteristic is linear during the transition from the inactivated to the activated state of the oscillator face, i. e. these switches do not have a snap action.

DC-2-wire switching elements

Two-wire switching elements can be used in principle instead of mechanical switches. Their low off-state current makes them especially suitable for use in conjunction with programmable logic controllers.
Compared with three-wire switching elements they have the advantage of requiring less wiring.

Increased operating distance

For designs with 12 mm proximity switch spacing, switching elements with increased operating distance are available on request (rated operating distance 5 mm).
Due to their technical characteristics, these switching elements can be used both with a pulsed operating voltage and an operating voltage that is not pulsed.

Customized versions

Approvals

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

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

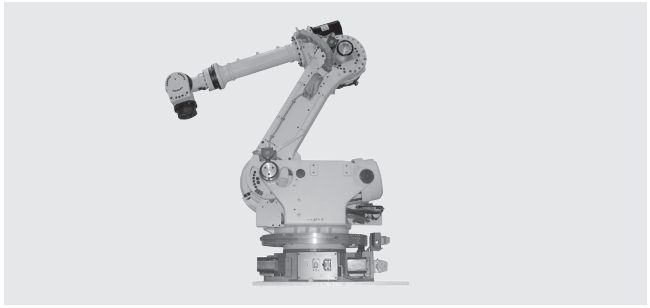
Using high quality bearings and technology matched to the application, approach speeds up to 120 m/min and very high usage can be realized at the same time.

High/low temperature

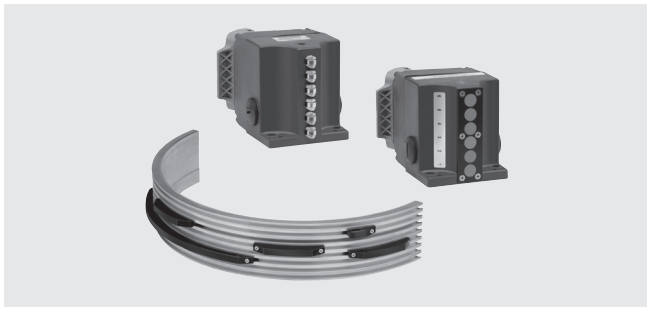
For use in extreme temperature conditions, multiple limit switches can be supplied in special versions on request.

Axis area monitoring

EUCHNER multiple limit switches and trip rails are also suitable for use in axis area monitoring.



On request, complete solutions are available in different versions.



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.

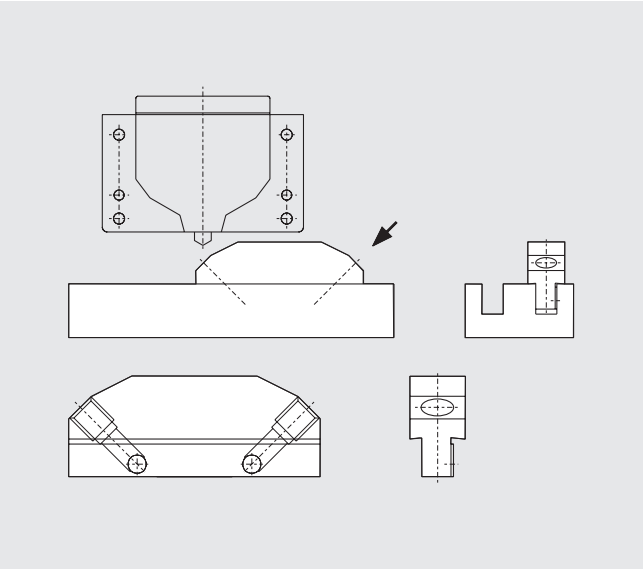
The particular advantages of the EUCHNER combination include:

- 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.

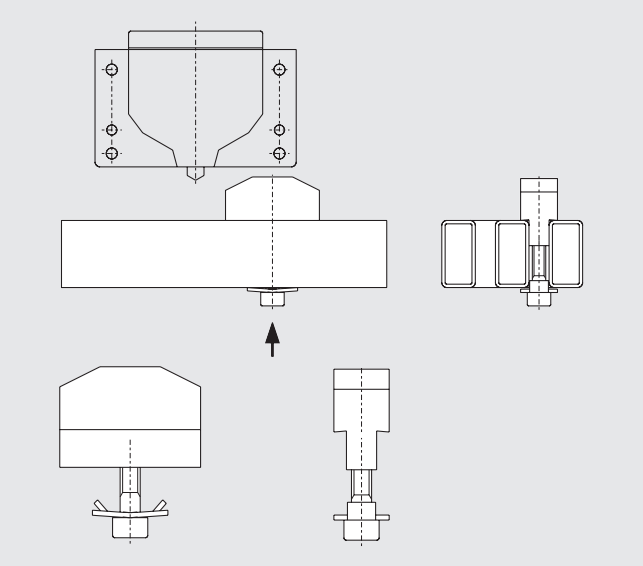
System-U

U-trip rails enable the trip dogs to be adjusted from the switch side. The trips 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
- **SB** Small housing with enlarged space for wiring (only with 8 mm plunger spacing)
- **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	SB	GSBF	8	12	16	D	R	B	K	W	502	508	514	552	614	AM	St	LED	
●					●		●	●	●	○	○	●	●	●				○	●	10
●					●		●	●				●		○			●	○	○	24
●						●	●	●	○	○	○	●	●	●				○	●	10
	●			●			●	●		●					●	●		○		14
	●				●		●	●	●	○	○	●	●	●				○	●	12
	●				●		●	●				●					●	○	○	25
	●					●	●	●	○	○	○	●	●	●				○	●	12
		●		●			●	●		●					●	●		○		15
			●	●			●	●		○					●	●		○		18
			●		●		●	●		○	○	●	●	●				○	●	16
			●			●	●	●		○	○	●	●	●				○	●	16

● 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
- **GSBF** Upright housing, versions with up to max. 20 proximity switches possible

Proximity switch spacing (mm)

- **8** Rated operating distance 1mm, small housing for installations where there is little space
- **12** Rated operating distance 2 mm, industry standard, large product range
- **16** Rated operating distance 5 mm, only necessary in special applications

Switching element

- **750** AC NO
- **755** AC NO
- **771** DC NO + NC, NPN
- **772** DC NO + NC, PNP
- **777** DC NO, PNP
- **779** DC NO, PNP
- **780** DC NO + NC, NPN
- **781** DC NO + NC, PNP
- **785** DC NO, PNP
- **786** DC NC, PNP

Options

- **St** Plug connector
- **LED** LED display

Series			Proximity switch spacing			Switching element										Options		Page
RGBF	SN	GSBF	8	12	16	750	755	771	772	777	779	780	781	785	786	St	LED	
●				●		●				●		●	●			○	●	11
●					●		●	●	●		●					○	●	11
	●			●		●				●		●	●			○	●	13
	●				●		●	●	●		●					○	●	13
		●	●											●	●	○	●	19

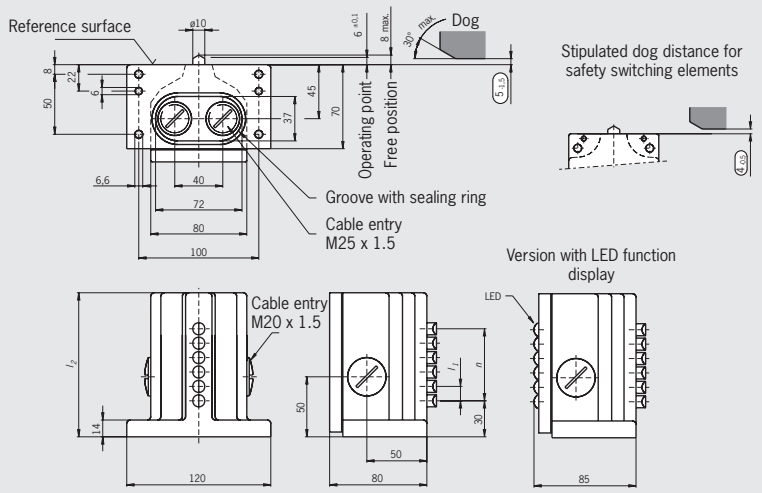
● Available ○ Available on request

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**

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

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



Switching elements

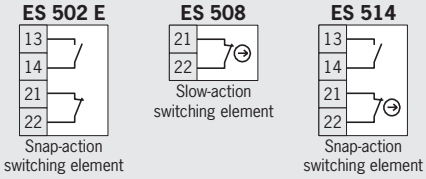
- **ES 502 E** Snap-action switching element 1 NC + 1 NO
- **ES 508** Slow-action switching element 1 NC ⊖
- **ES 514** Snap-action switching element 1 NC ⊖ +1 NO

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.

LED function display (optional)
Function displays are available for the following voltage ranges (see accessories page 27):

- **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 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. 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

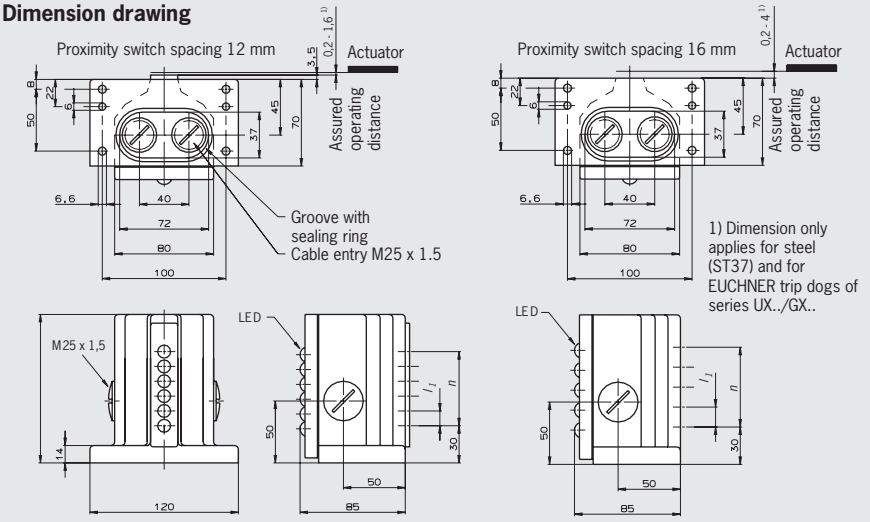
n Number of plungers/ proximity switches	Plunger/proximity switch spacing l_1 = 12 l_2	Housing material	l_1 = 16 l_2	Housing material
2	70	Die-cast aluminum, anodized	70	Die-cast aluminum, anodized
3	80		90	
4	90		105	
5	105		120	
6	120		140	
8	140		170	
10	170		200	Sand-cast aluminum, anodized
12	200	Sand-cast aluminum, anodized	240	
14	240		-	-
16	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

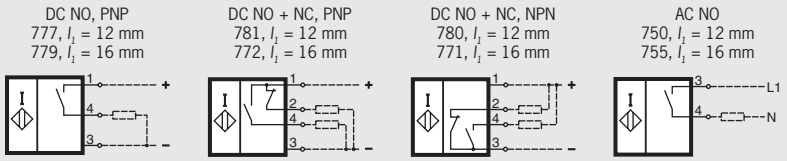


Rated operating distance
With 12 mm proximity switch spacing, the rated operating distance is 2 mm, with 16 mm proximity switch distance it is 5 mm.

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 32/33)

Ordering code

	R	G	B	F						-				L	E						-	M
Mechanical																						
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)

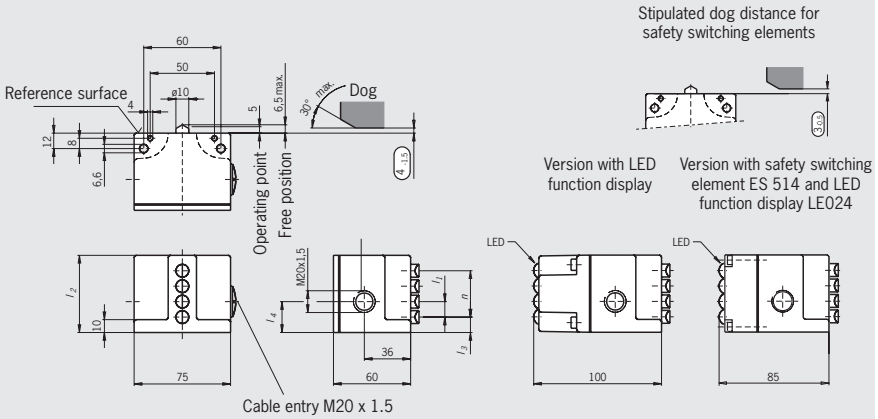
For technical data see page 30

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

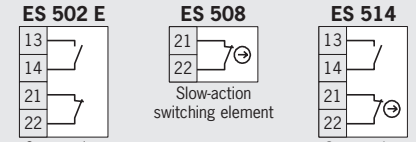
- **ES 502 E** Snap-action switching element 1 NC + 1 NO
- **ES 508** Slow-action switching element 1 NC ⊖
- **ES 514** Snap-action switching element 1 NC ⊖ +1 NO

On the usage of safety switching elements, the dog distance (3-0.5) 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 27):

- **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



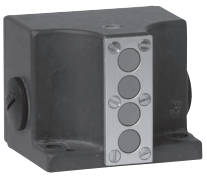
Plunger types	D Chisel	R Roller (plain bearing)	B Roller (ball bearing)	K [4] Ball [3]	W [4] Dome	
Operating point accuracy [1]	± 0.002	± 0.01	± 0.01	± 0.01	± 0.002	mm
Approach speed max. [2]	40	80	120	10	10	m/min

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. 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 l_1 = 12 l_2	l_3	l_4	l_1 = 16 l_2	l_3	l_4	Housing material
2	36	12	19	48	16	24	Die-cast aluminum, anodized
3	48		24	72			
4	60			84			
5	72			-	-	-	
6	84			-	-	-	

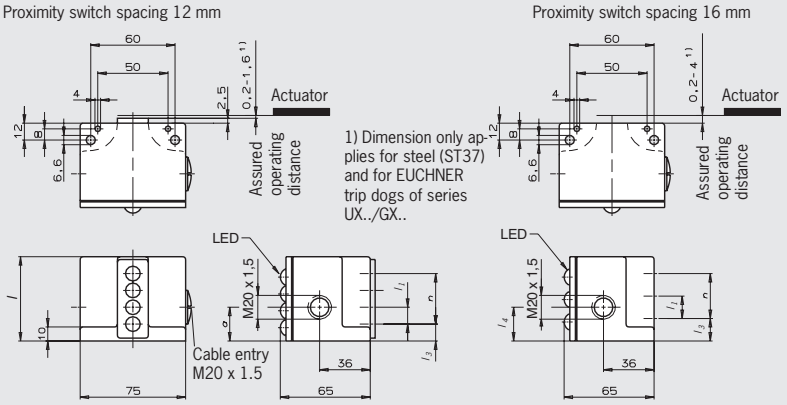
Series SN... 12/16 mm inductive

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



Series SN... inductive
Proximity switch spacing 12 or 16 mm

Dimension drawing

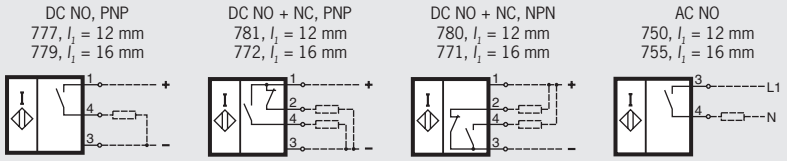


Rated operating distance
With 12 mm proximity switch spacing, the rated operating distance is 2 mm, with 16 mm proximity switch distance it is 5 mm.

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 32/33)

Ordering code

	S	N			X			-				L	E						-	M
Mechanical																				
Inductive	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)

For technical data see page 30

Series SN... 8 mm mechanical

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

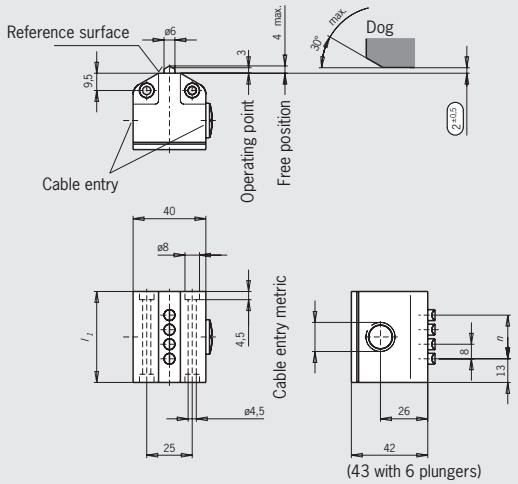
Switching elements

- **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

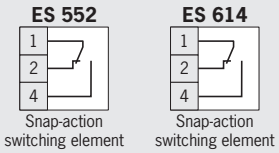
(See technical data on the switching elements)

Series SN... mechanical
Plunger spacing 8 mm

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



Switching elements



Plunger types	D Chisel	R Roller (plain bearing)	K 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

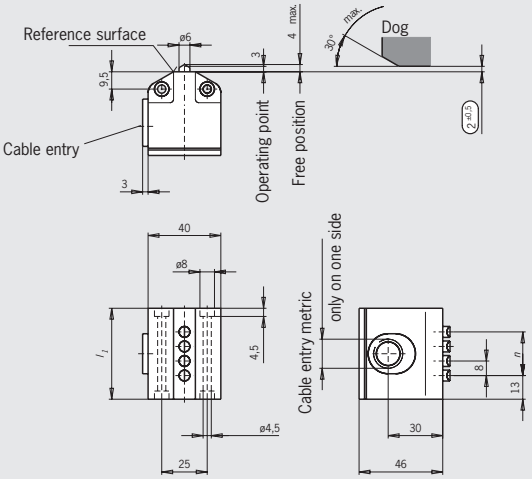
n Number of plungers	Series SN... plunger spacing 8 mm			Series SB... plunger spacing 8 mm		
	l_1	Cable entry	Housing material	l_1	Cable entry	Housing material
2	34	M16 x 1.5	Die-cast aluminum, anodized	34	M16 x 1.5	Die-cast aluminum, anodized
3	42			42		
4	50			50		
5	58	M20 x 1.5		58	M20 x 1.5	
6	66			-	-	-

Series SB... 8 mm mechanical

- **Plunger spacing 8 mm**
- **Upright housing, without flange**
- **With enlarged space for wiring**
- **Degree of protection IP67 according to IEC 60529**

Series SB... mechanical
Plunger spacing 8 mm

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

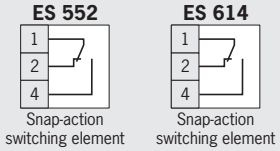


Switching elements

- **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 Chisel	R Roller (plain bearing)	K 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

Ordering code

Mechanical	**Series SN**	**S**	**N**				**0**	**8**	**-**				**-**	**M**
Mechanical	**Series SB**	**S**	**B**				**0**	**8**	**-**				**-**	**M**

Series

Number of plungers

Plunger type (e. g. **D** = chisel)

Plunger spacing (**8** mm)

Switching element (ES 552 / ES **592** / ES **614**)

Cable entry with metric thread (plug connector on request)

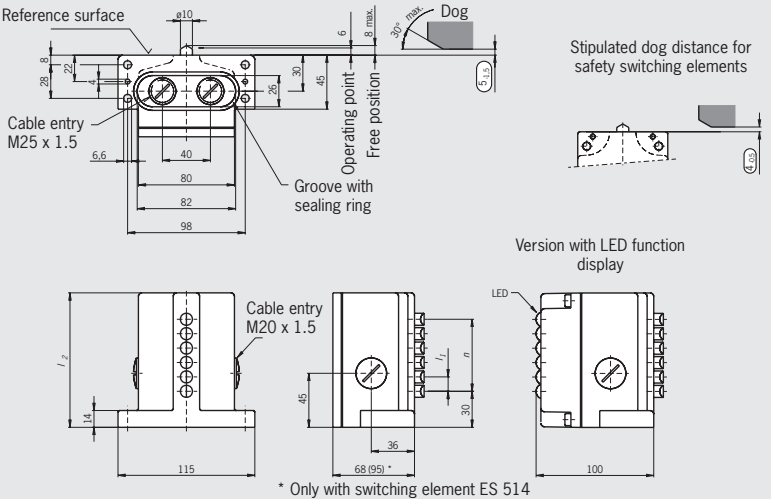
For technical data see page 30

Series GSBF... 12/16 mm mechanical

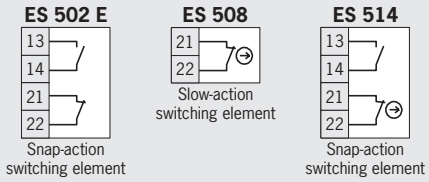
- **Plunger spacing 12 or 16 mm**
- **Upright housing**
- **Degree of protection IP67 according to IEC 60529**
- **LED function display optional**

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

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



Switching elements



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 27):

- **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	Plunger spacing l_1 = 12 l_2	Housing material	l_1 = 16 l_2	Housing material
2	70	Die-cast aluminum, anodized	70	Die-cast aluminum, anodized
3	70		82	
4	82		96	
5	96		112	
6	112		130	
8	130		160	Sand-cast aluminum, anodized
10	160	Sand-cast aluminum, anodized	192	
12	179		226	
14	208		256	
16	226		288	
18	256		-	-
20	288		-	-

Gray figures on request

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 30

Series GSBF... 8 mm mechanical

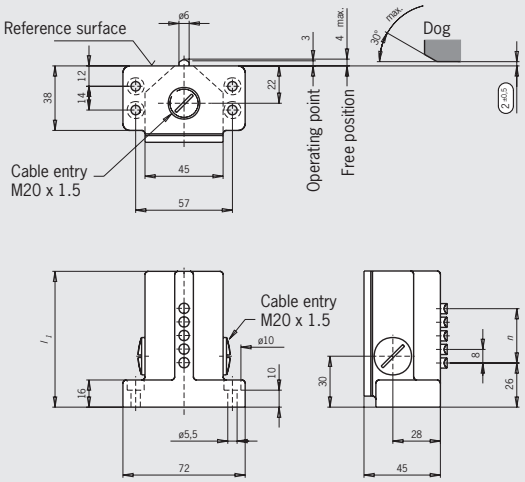
- **Plunger spacing 8 mm**
- **Upright housing**
- **Degree of protection IP67 according to IEC 60529**

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

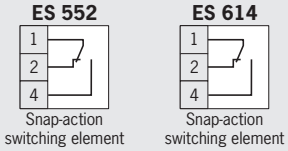
(See technical data on the switching elements)

Series GSBF... mechanical
Plunger spacing 8 mm

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



Switching elements



Plunger types	D Chisel	R Roller (plain bearing)	K 4) Ball	
Operating point accuracy 1)	± 0.02	± 0.05	± 0.03	mm
Approach speed, max. 2)	20	50	8	m/min

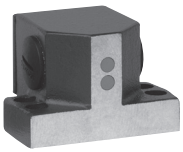
1) The reproducible operating point accuracy refers to the axial travel of the plunger after the switching element ES 502 E has been run-in with approx. 2000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639
3) Plunger type on request

n Number of plungers/proximity switches	Plunger/proximity switch spacing 8 mm l_1	Housing material
2	48	Sand-cast aluminum, anodized
3	64	
4	64	
5	80	
6	80	
8	96	
10	112	
12	128	
14	144	
16	160	
18	176	
20	192	

Gray figures on request

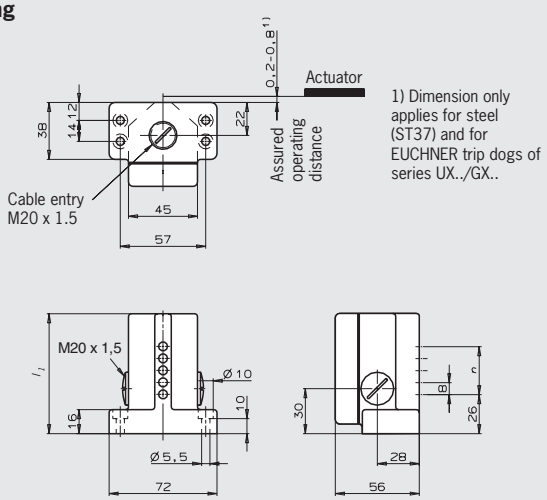
Series GSBF... 8 mm inductive

- **Proximity switch spacing 8 mm**
- **Upright housing**
- **Degree of protection IP67 according to IEC 60529**



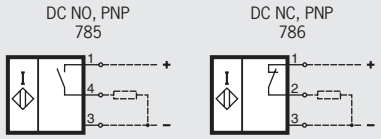
Series GSBF... inductive
Proximity switch spacing 8 mm

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 32/33)

Ordering code

Mechanical	G	S	B	F					0	8	-				-	M
Inductive	G	S	B	F			X		0	8	-				-	M

Series

Number of plungers/proximity switches

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

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

Switching element (ES **552** or **785**)

Cable entry M20 x 1.5

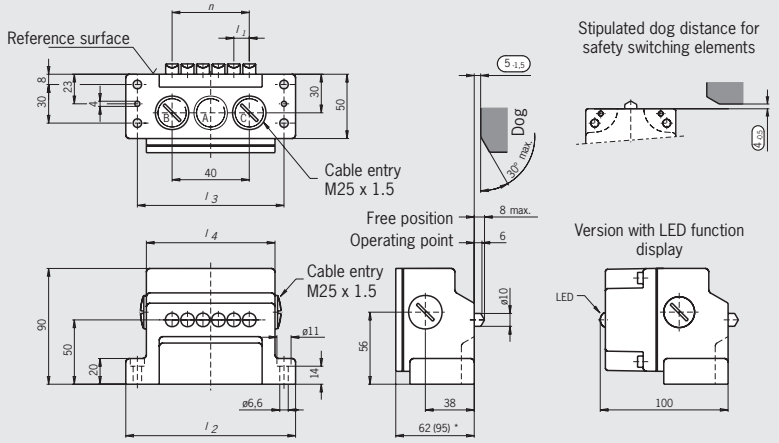
For technical data see page 30

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

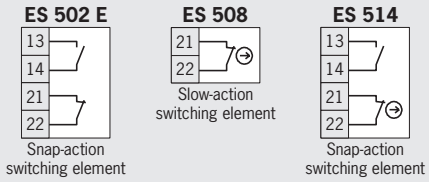
- **ES 502 E** Snap-action switching element 1 NC + 1 NO
- **ES 508** Slow-action switching element 1 NC ⊖
- **ES 514** Snap-action switching element 1 NC ⊖ +1 NO

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.

LED function display (optional)
Function displays are available for the following voltage ranges (see accessories page 27):

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

Switching elements



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 l_1 = 12				l_1 = 16				Housing material
	l_2	l_3	l_4	Cable entry	l_2	l_3	l_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	B + C M25 x 1.5	
5	114	98	84	B + C M25 x 1.5	132	114	100		
6	132	114	100		148	130	116		
8	148	130	116		180	162	148		
10	180	162	148		212	194	180		
12	199	178	167		244	226	212		
14	228	210	196		276	258	244		
16	244	226	212		308	290	276		
18	276	258	244		340	322	308		
20	308	290	276		-	-	-	-	

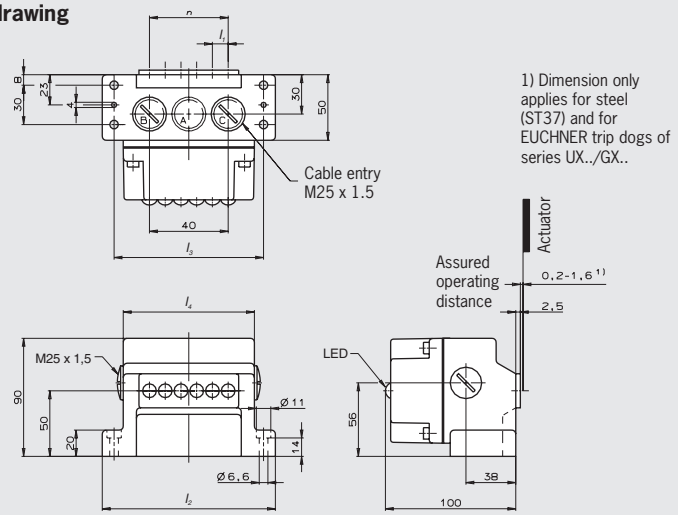
Gray figures on request

Series GLBF... 12/16 mm inductive (on request)

- **Proximity switch spacing 12 or 16 mm**
- **Horizontal housing**
- **Degree of protection IP67 according to IEC 60529**
- **LED function display**

Series GLBF... inductive
Proximity switch spacing 12 or 16 mm

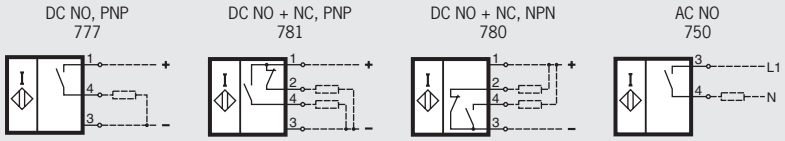
Dimension drawing



Rated operating distance
With 12 mm proximity switch spacing and 16 mm proximity switch spacing, the rated operating distance for this multiple limit switch is 2 mm.

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



Further switching elements on request (see page 32/33)

Ordering code	**Mechanical**	G	L	B	F					-				L	E					-	M
On request	Inductive	G	L	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**)

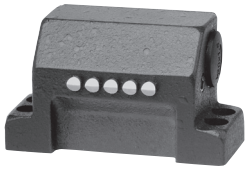
LED color; red standard (**rt**), others on request

Cable entry M25 x 1.5

For technical data see page 30

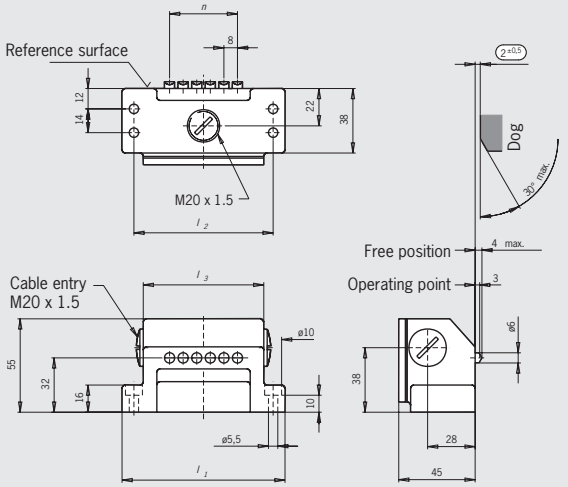
Series GLBF... 8 mm mechanical

- **Plunger spacing 8 mm**
- **Horizontal housing**
- **Degree of protection IP67 according to IEC 60529**



Series GLBF... mechanical
Plunger spacing 8 mm

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



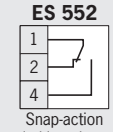
Switching elements

- **ES 552** Snap-action switching element 1 changeover contact Standard switching element

(See technical data on the switching elements)

Switching elements

ES 552



Snap-action switching element

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

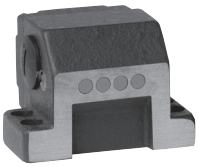
1) The reproducible operating point accuracy refers to the axial travel of the plunger after the switching element ES 502 E has been run-in with approx. 2000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639
3) Plunger type on request

n Number of plungers/proximity switches	Plunger/proximity switch spacing 8 mm l_1	l_2	l_3	Housing material
2	64	50	39	Sand-cast aluminum, anodized
3	80	66	55	
4	80	66	55	
5	96	82	71	
6	96	82	71	
8	112	98	87	
10	128	114	103	
12	144	130	119	

Gray figures on request

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

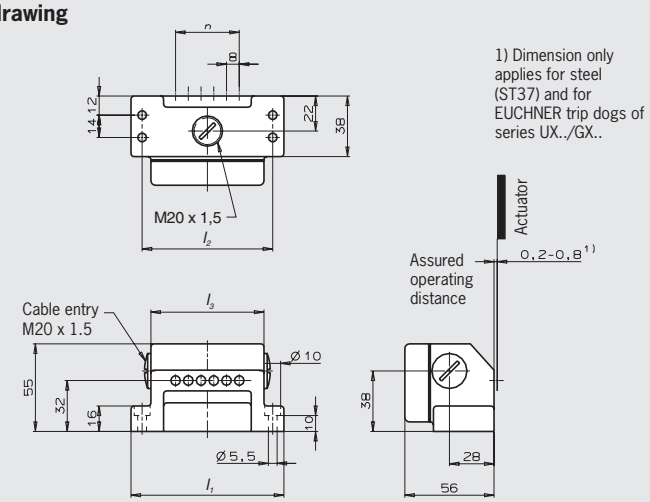
- **Proximity switch spacing 8 mm**
- **Horizontal housing**
- **Degree of protection IP67 according to IEC 60529**



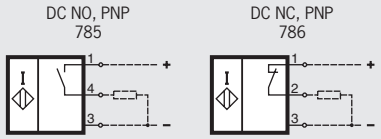
Rated operating distance
With 8 mm proximity switch spacing, the rated operating distance is 1 mm.

Series GLBF... inductive
Proximity switch spacing 8 mm

Dimension drawing



Switching elements



Further switching elements on request (see page 32/33)

Ordering code	**Mechanical**	G	L	B	F				0	8	-	5	5	2	-	M
On request	Inductive	G	L	B	F			X	0	8	-				-	M

Series

Number of plungers/proximity switches

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

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

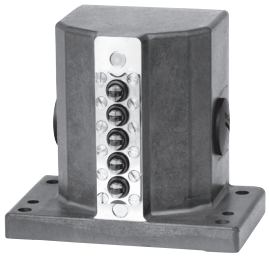
Switching element (e. g. **785**)

Cable entry M20 x 1.5

For technical data see page 30

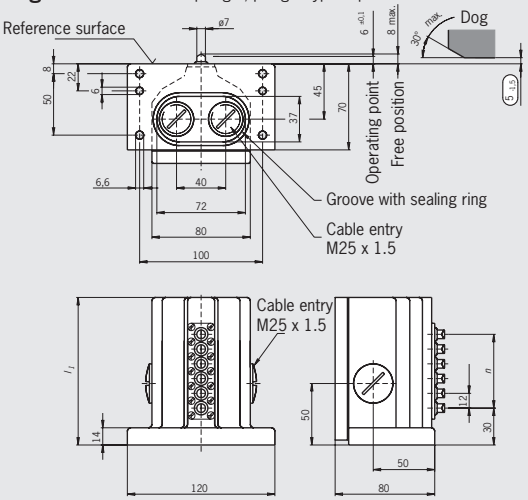
Series RGBF...AM 12 mm mechanical

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

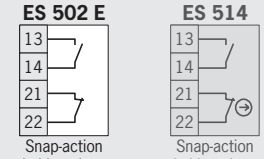


Series RGBF... AM mechanical
Plunger spacing 12 mm

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



Switching elements



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.

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

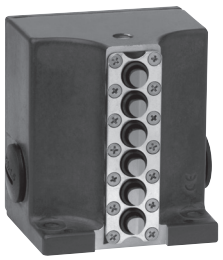
1) The reproducible operating point accuracy refers to the axial travel of the plunger after the switching element ES 502 E has been run-in with approx. 2000 operating cycles
2) The approach speed specified applies in conjunction with EUCHNER trip dogs according to DIN 69639

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
D Chisel plunger	2	**082 325** RGBF 02 D 12 -502 AM -M
	3	**088 365** RGBF 03 D 12 -502 AM -M
	4	**082 326** RGBF 04 D 12 -502 AM -M
	5	**088 366** RGBF 05 D 12 -502 AM -M
	6	**087 097** RGBF 06 D 12 -502 AM -M
	8	**087 135** RGBF 08 D 12 -502 AM -M
R Roller plunger	2	**087 098** RGBF 02 R 12 -502 AM -M
	3	**088 364** RGBF 03 R 12 -502 AM -M
	4	**082 327** RGBF 04 R 12 -502 AM -M
	5	**087 099** RGBF 05 R 12 -502 AM -M
	6	**087 100** RGBF 06 R 12 -502 AM -M
	8	**085 730** RGBF 08 R 12 -502 AM -M

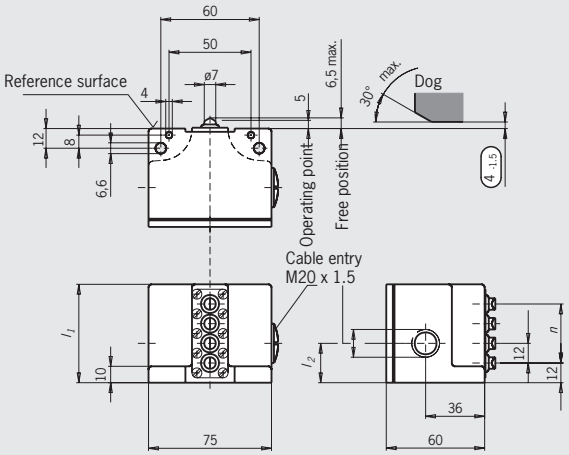
Series SN...AM 12 mm mechanical

- **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

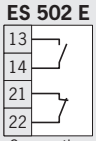
Dimension drawing illustration with chisel plunger, plunger type dependent on version



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

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

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

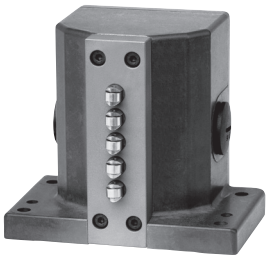
n Number of plungers	Plunger spacing 12 mm l_1	l_2	Housing material
2	36	19	Die-cast aluminum, anodized
3	48	24	
4	60		
5	72		
6	84		

Plunger type	Number of plungers	Order No./Item
D Chisel plunger	2	**086 584** SN 02 D 12 -502 AM -M
	3	**086 585** SN 03 D 12 -502 AM -M
	4	**086 586** SN 04 D 12 -502 AM -M
	5	**088 752** SN 05 D 12 -502 AM -M
	6	**088 753** SN 06 D 12 -502 AM -M
R Roller plunger	2	**079 289** SN 02 R 12 -502 AM -M
	3	**086 587** SN 03 R 12 -502 AM -M
	4	**086 588** SN 04 R 12 -502 AM -M
	5	**088 765** SN 05 R 12 -502 AM -M
	6	**088 766** SN 06 R 12 -502 AM -M

For technical data see page 30

Series RGCS...12 mm mechanical

- **With interchangeable plunger guide**
- **Plunger spacing 12 mm**
- **Upright housing according to DIN 43697**
- **Degree of protection IP67 according to IEC 60529**



Interchangeable plunger guide in case of damage or wear
The interchangeable plunger guide facilitates quick and easy plunger replacement without re-adjustment of the multiple limit switch. Expensive wiring effort is not required. The result is the shortest possible interruptions to production.

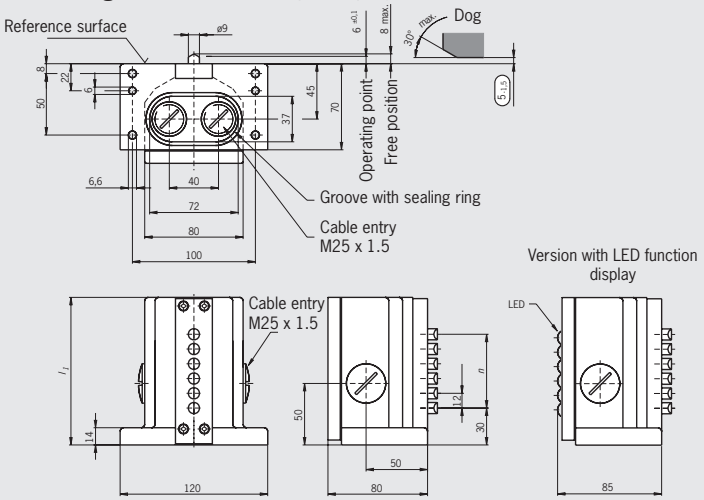
Features
- Plunger guide made of special material
- Can be dismantled from the plunger side
- Complete plunger guide can be interchanged

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

LED function display (optional)
Function displays are available for the following voltage ranges (see accessories page 27):
- **LE060ge** 12 ... 60 V AC/DC

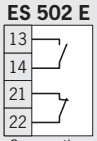
Series RGCS... mechanical
Plunger spacing 12 mm

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



Switching elements

ES 502 E



Snap-action switching element

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. 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	
		Without LED	LE060ge
D Chisel plunger	2	**087 452** RGCS 02 D 12 -502 -M	**087 500** RGCS 02 D 12 -502 LE060GE -M
	3	**087 453** RGCS 03 D 12 -502 -M	**087 501** RGCS 03 D 12 -502 LE060GE -M
	4	**087 454** RGCS 04 D 12 -502 -M	**087 502** RGCS 04 D 12 -502 LE060GE -M
	5	**087 455** RGCS 05 D 12 -502 -M	**087 503** RGCS 05 D 12 -502 LE060GE -M
	6	087 456 RGCS 06 D 12 -502 -M	**087 504** RGCS 06 D 12 -502 LE060GE -M
	8	**087 457** RGCS 08 D 12 -502 -M	**087 505** RGCS 08 D 12 -502 LE060GE -M
R Roller plunger	2	**087 459** RGCS 02 R 12 -502 -M	**087 506** RGCS 02 R 12 -502 LE060GE -M
	3	**087 460** RGCS 03 R 12 -502 -M	**087 507** RGCS 03 R 12 -502 LE060GE -M
	4	**087 461** RGCS 04 R 12 -502 -M	**087 508** RGCS 04 R 12 -502 LE060GE -M
	5	**087 462** RGCS 05 R 12 -502 -M	087 509 RGCS 05 R 12 -502 LE060GE -M
	6	**087 463** RGCS 06 R 12 -502 -M	**087 510** RGCS 06 R 12 -502 LE060GE -M
	8	**087 464** RGCS 08 R 12 -502 -M	**087 511** RGCS 08 R 12 -502 LE060GE -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	**035 495** LE 060 rt
		Green	On request LE 060 gr
		Yellow	**035 497** LE 060 ge
	AC 110 ±15%	Red	**045 579** LE 110 rt
		Green	On request LE 110 gr
		Yellow	On request LE 110 ge
	AC 220 ±15%	Red	**045 582** 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

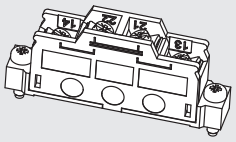
▶ **Mechanical replacement switching elements**

Replacement switching elements

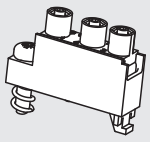
Replacement switching elements
Replacement switching elements for multiple limit switches with 8, 12 and 16 mm plunger spacing.

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	**010 387** ES 502 E
	099 513 ES 552
	099 507 ES 614

For technical data see page 30

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**
ES787	NO contact/NPN	On request
ES788	NC contact/NPN	On request
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**
ES790	NO contact/DC-2-wire[2]	On request
ES791	NC contact/DC-2-wire[2]	On request
ES700 [1]	NO contact/DC-2-wire[2]	On request
ES700/2 [1]	NO contact/DC-2-wire[2]	On request
ES701 [1]	NC contact/DC-2-wire[2]	On request
ES701/2 [1]	NC contact/DC-2-wire[2]	On request
ES750	NO contact/AC-2-wire	**010457**
ES751	NC contact/AC-2-wire	On request
ES755 [1]	NO contact/AC-2-wire	**014125**
ES755/2 [1]	NO contact/AC-2-wire	**023902**
ES756 [1]	NC contact/AC-2-wire	On request
ES756/2 [1]	NC contact/AC-2-wire	On request
ES789	According to NAMUR	On request
ES796	According to NAMUR	On request
ES797 [1]	According to NAMUR	On request
ES797/2 [1]	According to NAMUR	On request

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.

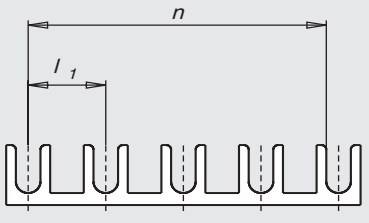
2) DC-2-wire switching elements are not suitable for inductive loads.

▸ 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

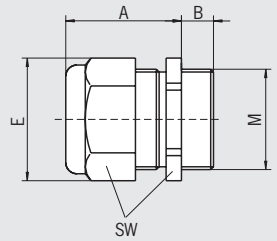
Designation	Use	l_1	n (Number)	Order No. / Item
Separate connector bridge	Inductive multiple limit switch	12	20	**017 130** Bridge 12 mm spacing
		16	16	**017 131** Bridge 16 mm spacing

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 ∅ [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	**086 328** EKVM16/04
	Cable diameter 5 - 8 mm	**086 329** EKVM16/05
	Cable diameter 6.5 - 9.5 mm	**086 330** EKVM16/06
M20 x 1.5	Cable diameter 6.5 - 9.5 mm	**077 683** EKVM20/06
	Cable diameter 9 - 13 mm	**077 684** EKVM20/09
M25 x 1.5	Cable diameter 9 - 13 mm	**086 334** EKVM25/09
	Cable diameter 11.5 - 15.5 mm	**086 335** EKVM25/11

Plug connector on request.

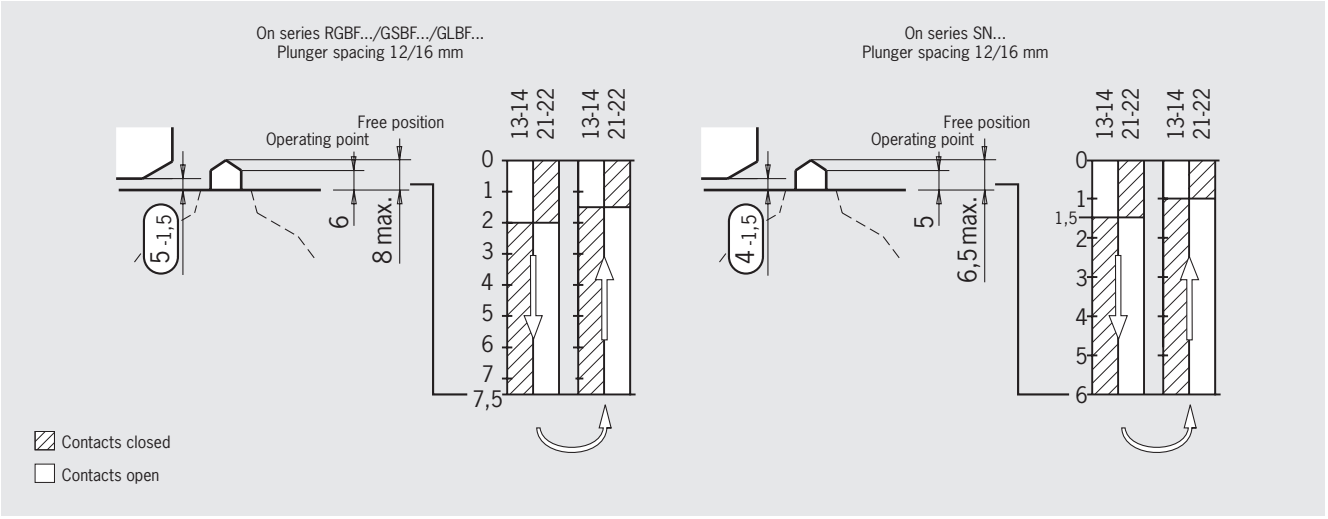
For technical data see page 30

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. At switching voltage		10 12	10 24	5 24	10 24	1 5	mA 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		cULus	-	cULus		-	
LED function display (optional)		Red standard, others on request		LE024ge	-		

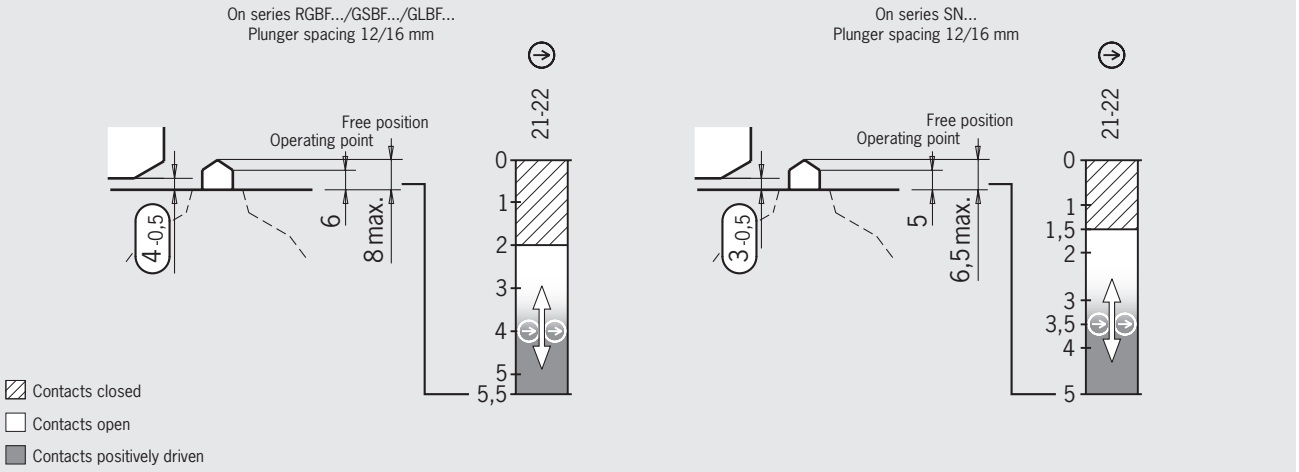
Travel diagram ES 502 E

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.



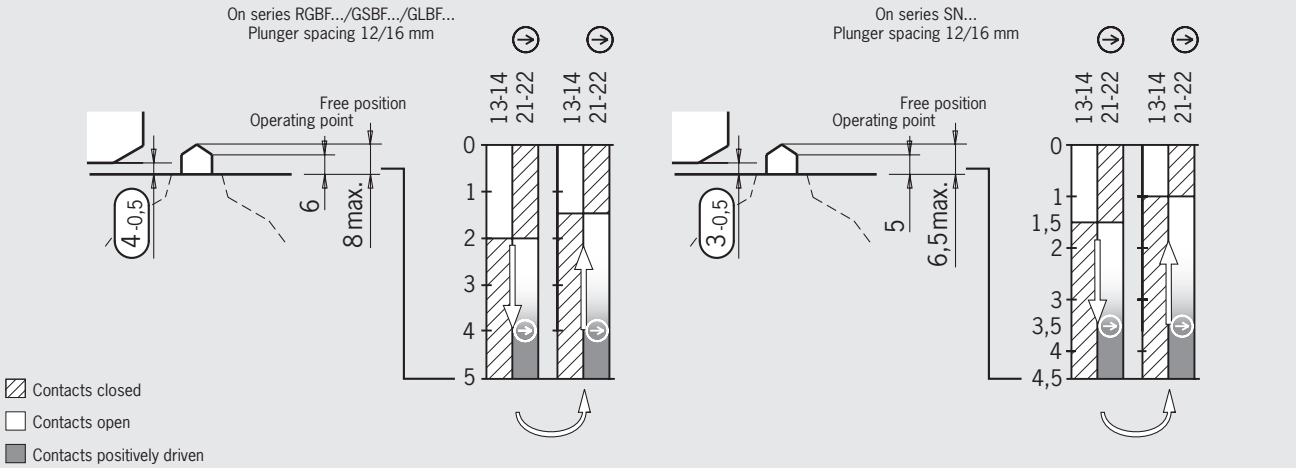
Travel diagram ES 508

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



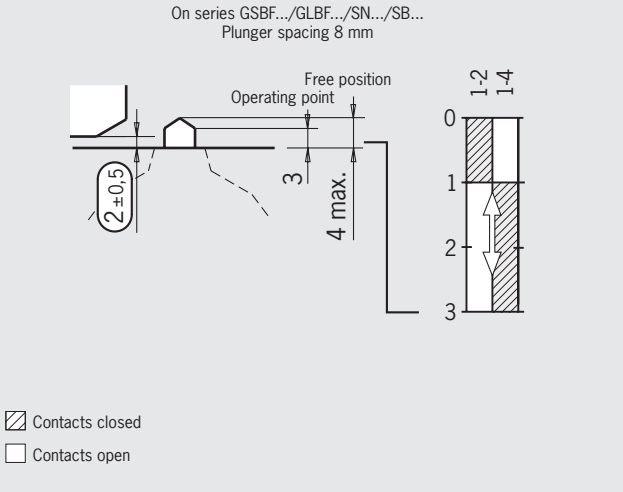
Travel diagram ES 514

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.



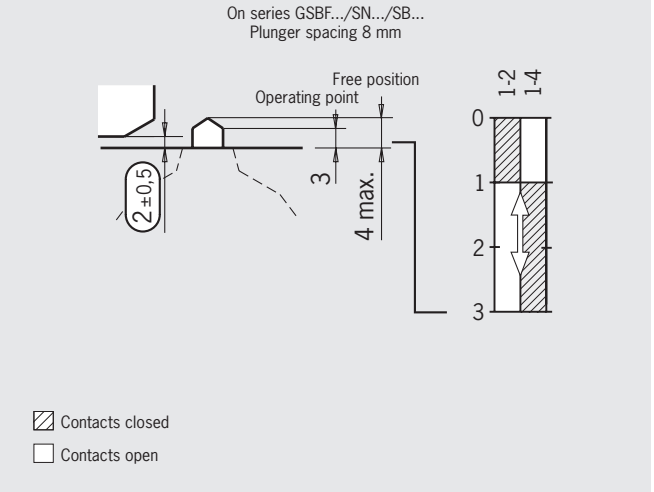
Travel diagram ES 552

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**	**787**	**788**	**777**	**781**	**780**	**779** [1] **779/2**	**772** [1] **772/2**	**771** [1] **771/2**	
Proximity switch spacing	8				12			12			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	NC contact	NO contact	NO + NC		NO contact	NO + NC		
Output	PNP		NPN		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_r	≤ 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										mm²

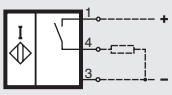
1) Switching elements with 5 mm operating distance (proximity switch spacing 16 mm) are supplied with two different oscillator frequencies to avoid mutual interference. Multiple limit switches must therefore be assembled alternately with these switching elements.

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

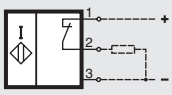
Gray figures on request

Wiring diagrams

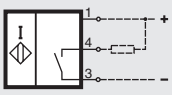
DC NO, PNP
785, l_i = 8 mm
777, l_i = 12 mm
779, l_i = 16 mm



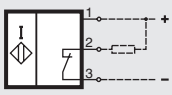
DC NC, PNP
786, l_i = 8 mm



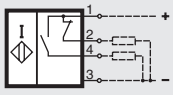
DC NO, NPN
787, l_i = 8 mm



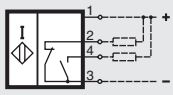
DC NC, NPN
788, l_i = 8 mm



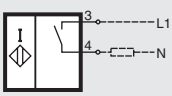
DC NO + NC, PNP
781, l_i = 12 mm
772, l_i = 16 mm



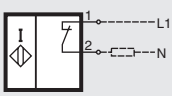
DC NO + NC, NPN
780, l_i = 12 mm
771, l_i = 16 mm



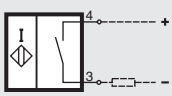
AC NO
750, l_i = 12 mm
755, l_i = 16 mm



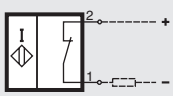
AC NC
751, l_i = 12 mm
756, l_i = 16 mm



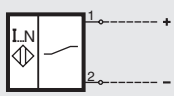
DC-2-wire, NO (PNP/NPN)
790, l_i = 12 mm
700, l_i = 16 mm



DC-2-wire, NC (PNP/NPN)
791, l_i = 12 mm
701, l_i = 16 mm



According to NAMUR
789, l_i = 8 mm
796, l_i = 12 mm
797, l_i = 16 mm



Parameter	Value											Unit
Switching element ES	790	791	700 [1] 700/2	701 [1] 701/2	750	751	755 [1] 755/2	756 [1] 756/2	789	796	797 [1] 797/2	
Proximity switch spacing	12		16		12		16		8	12	16	mm
Rated operating distance s_n	2		5		2		5		1	2	5	mm
Assured operating distance s_a	0 ... 1.6		0 ... 4		0 ... 1.6		0 ... 4		0...0.8	0...1.6	0...4	mm
Switching function	NO contact	NC contact	NO contact	NC contact	NO contact	NC contact	NO contact	NC contact	-	-	-	
Output	DC-2-wire[2] (PNP/NPN)				AC-2-wire				According to NAMUR			
LED function display	Yes								-			
Operating voltage U_B	DC 15 ... 55				AC 20 ... 250				DC 7.7 ... 9			V
Permissible residual ripple s	≤ 10				-				≤ 10			%
Voltage drop U_d	≤ 8								-			V
Rated insulation voltage U_i	DC 60				AC 250				DC 60			V
Rated operating current I_e	50				250				-			mA
Off-state current I_r	≤ 1				≤ 3				-			mA
Inrush current I_k (20 ms)	-				1.5				-			A
Minimum operating current I_m	2				10				-			mA
Current consumption, active face not activated	-								≥ 2.5			mA
Current consumption, active face activated	-								≤ 1			mA
Short circuit and overload protection, pulsed	Yes				-				-			
Reverse polarity protection	Yes				-				-			
EMC compliance as per	EN IEC 60947-5-2								EN IEC 60947-5-6			
Hysteresis H (in installed state)	≤ 0.2		≤ 0.5		≤ 0.2		≤ 0.5		≤ 0.1	≤ 0.2	≤ 0.3	mm
Repeat accuracy R	≤ 5											%
Switching frequency f	≤ 750		≤ 300		≤ 10				≤ 2000	≤ 1000	≤ 500	Hz
Utilization category according to EN IEC 60947-5-2	DC-13				AC-140				DC-13			
Rated supply frequency	-				50 ... 60				-			Hz
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.

2) DC-2-wire switching elements are not suitable for inductive loads

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

Gray figures on request

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	
●					●					●			36
	●					●				●			36
	●						●			●			36
		●				●		can be expanded					36
		●					●						36
			●		●						●		36
			●			●					●		36
			●				●				●		36
				●		●						●	39
				●			●					●	39

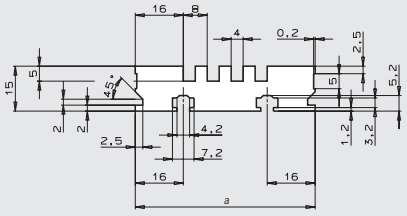
● Available ○ Available on request

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

8 mm

Series UFA...
Slot spacing 8 mm, aluminum

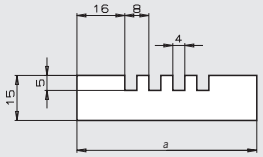
Dimension drawing



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



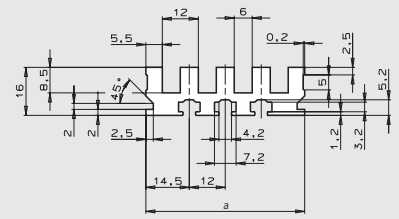
Dimension *a* [mm]	44	52	60	68	76	92
Number of slots	2	3	4	5	6	8
Dimension *a* [mm]	108	124	140	156	172	188
Number of slots	10	12	14	16	18	20

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

12 mm

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

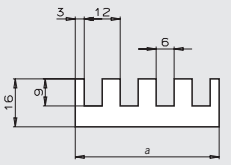
Dimension drawing



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

Minimum order 2010 mm, 1 bar

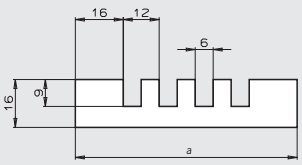
Series UL... can be placed in a row
Slot spacing 12 mm, aluminum



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



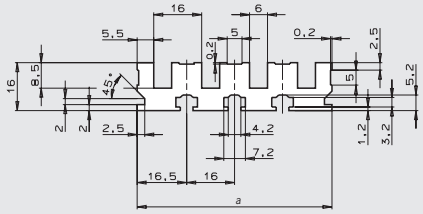
Dimension *a* [mm]	50	62	74	86	98	122
Number of slots	2	3	4	5	6	8
Dimension *a* [mm]	146	170	194	218		
Number of slots	10	12	14	16		

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

16 mm

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

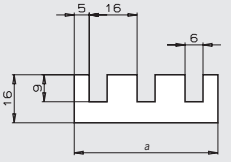
Dimension drawing



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

Minimum order 2010 mm, 1 bar

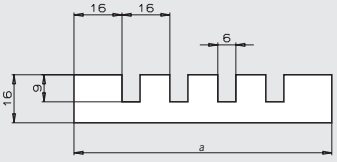
Series UL... can be placed in a row
Slot spacing 16 mm, aluminum



Dimension *a* [mm]	32	48
Number of slots	2	3

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

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

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

Dimension drawing

Figure 1

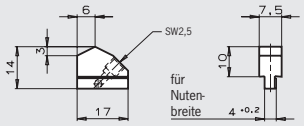


Figure 2

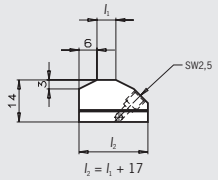
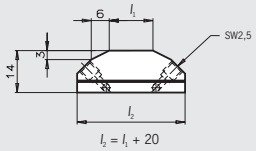


Figure 3



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

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

Dimension drawing

Figure 1

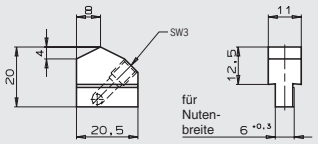


Figure 2

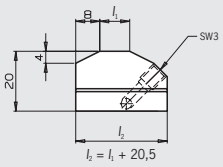
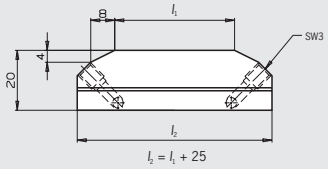


Figure 3



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	-

Type of actuation inductive

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

8 mm

Figure 1

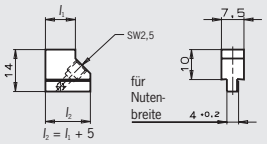
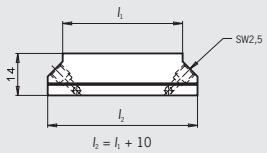


Figure 2



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

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

12 mm

16 mm

Figure 1

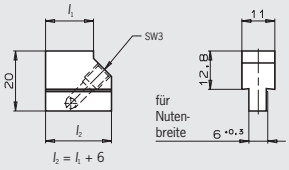
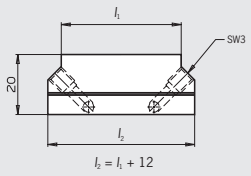


Figure 2



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

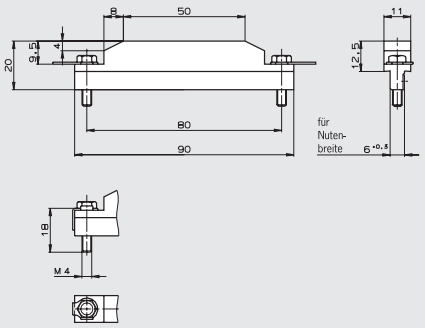
- **Safety dog**
- **Fine adjustment dog**
- **Fine adjustment dog with micrometer**

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

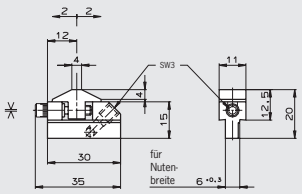
Safety dog UZ for 12/16 mm slot spacing, hardened, ground steel

Dimension drawing UZ1216-50



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

Dimension drawing UE1216-4

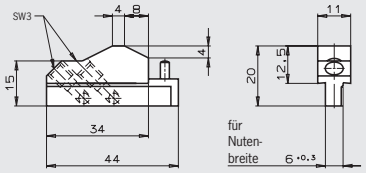


Adjustment range [mm]	4
Graduation [mm]	0.02

Fine adjustment dog with micrometer
The fine adjustment dog UEN1216/UEG1216 can be mounted in all U-trip rails with 12 or 16 mm slot spacing. After clamping the micrometer UEG1216, the fine adjustment dog UEN1216 can be moved to the required dimension by turning the micrometer screw.
The fine adjustment dog is clamped after adjustment as required.
The micrometer can be removed from the trip rail for further use after undoing the clamping screw, or it can be left in the trip rail.
The micrometer UEG1216 must be used for adjusting fine adjustment dogs UEN1216.

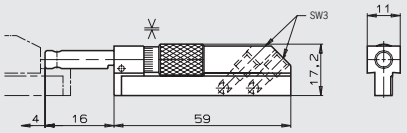
Fine adjustment dog for 12/16 mm slot spacing, hardened, ground steel

Dimension drawing UEN1216



Micrometer for fine adjustment dog UEN1216, mat, chromium-plated steel

Dimension drawing UEG1216



Adjustment range [mm]	4
Graduation [mm]	0.02

Ordering table

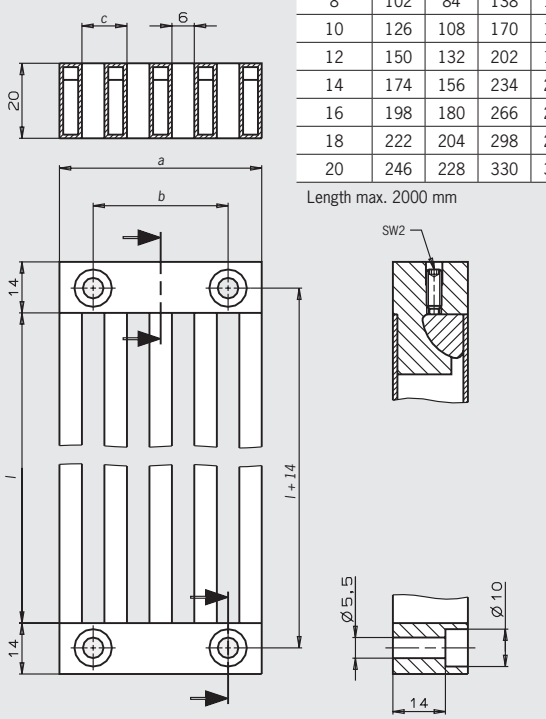
Designation	Use	Order No. / Item
Safety dog UZ	For trip rails ULA/UL/UF 12 or 16 mm	**022 734** UZ1216-50
Fine adjustment dog UE	For trip rails ULA/UL/UF 12 or 16 mm	**013 340** UE1216-4
Micrometer UEG	For fine adjustment dog UEN1216	**013 338** UEG1216
Fine adjustment dog UEN	For micrometer UEG1216 For trip rails ULA/UL/UF 12 or 16 mm	**013 339** UEN1216

G-trip rails with 12 mm or 16 mm spacing

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

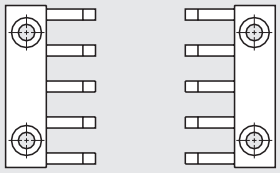
Number of slots	Slot spacing C [mm] 12 mm a	12 mm b	16 mm a	16 mm b
1	18	0	26	0
2	30	12	42	16
3	42	24	58	32
4	54	36	74	48
5	66	48	90	64
6	78	60	106	80
8	102	84	138	112
10	126	108	170	144
12	150	132	202	176
14	174	156	234	208
16	198	180	266	240
18	222	204	298	272
20	246	228	330	304

Length max. 2000 mm



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

End piece pairs GFE...



Guide tubes GFR...

	Slot spacing [mm] 12 mm	16 mm
a	6	10

Preferable lengths 1000, 1500 and 2000 mm

For assembly instructions see page 43

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 42)

Trip dogs for G-trip rails with 12 mm or 16 mm spacing

Type of actuation mechanical

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

Dimension drawing

Figure 1

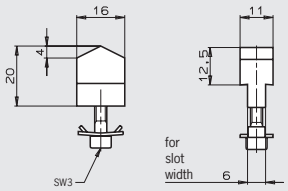


Figure 2

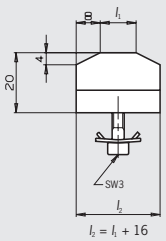
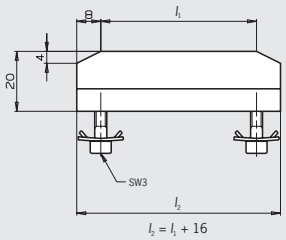


Figure 3

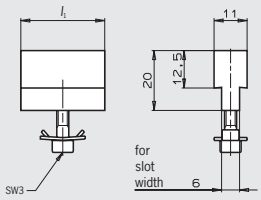


l_1	Figure	DIN/form
0	1	G
4	2	G
10	2	G
16	2	G
25	2	G
40	2	G
63	3	G
100	3	G

Type of actuation inductive

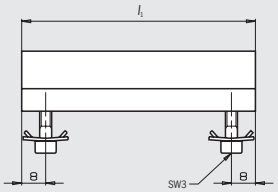
Series GX1216...
for G-trip rails GF, black painted steel

Figure 1



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

Figure 2



Ordering code

G						-			

Series

Length l_1

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

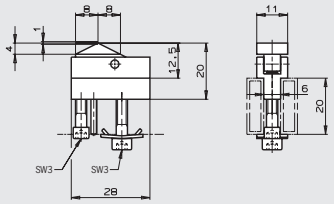
- **Fine adjustment dog**
- **Fine adjustment dog with micrometer**

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	Type of actuation inductive
Fine adjustment dog for G-trip rails GF, hardened, ground steel	

Dimension drawing GE1216-0



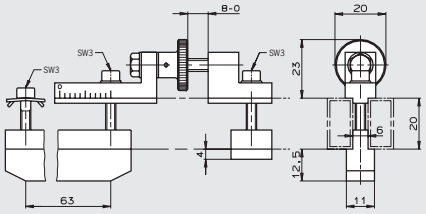
Adjustment range [mm]	1

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.

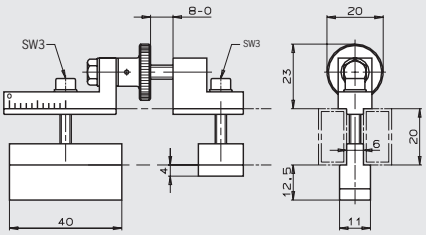
Type of actuation mechanical	Type of actuation inductive
Fine adjustment dog with micrometer for trip rails GF, hardened, ground steel	**Fine adjustment dog** for micrometer for trip rails GF, black painted steel

Dimension drawing GEN 1216-63



Adjustment range [mm]	8

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	**010 493** GE1216-0
Fine adjustment dog with Micrometer	Mechanical	For G-trip rails GF 12 or 16 mm	**024 563** GEN1216-63
	Non-contact	For G-trip rails GF 12 or 16 mm	**001 601** GEX1216-40

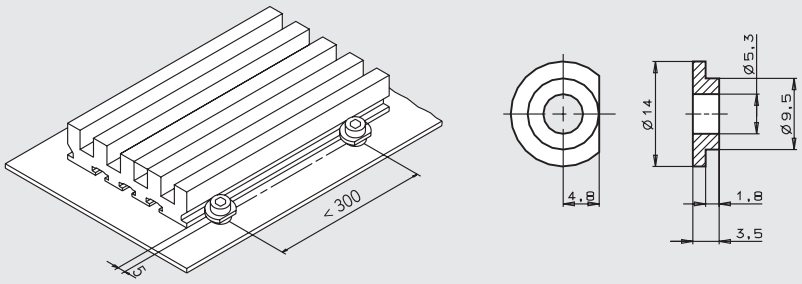
Accessories

- **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.

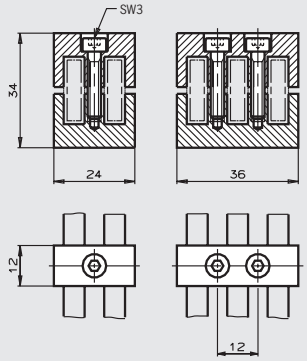
Clamping piece
for trip rails ULA/UFA

Dimension drawing

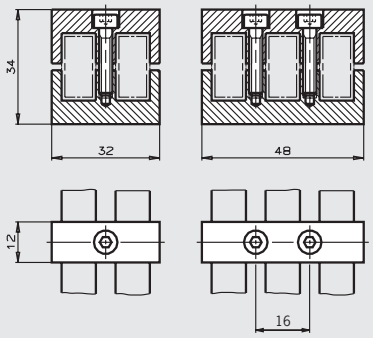


Support brackets, can be placed in a row
For the G-trip rails GFE/GFR kit, support brackets must be used from a length of 600 mm.

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



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

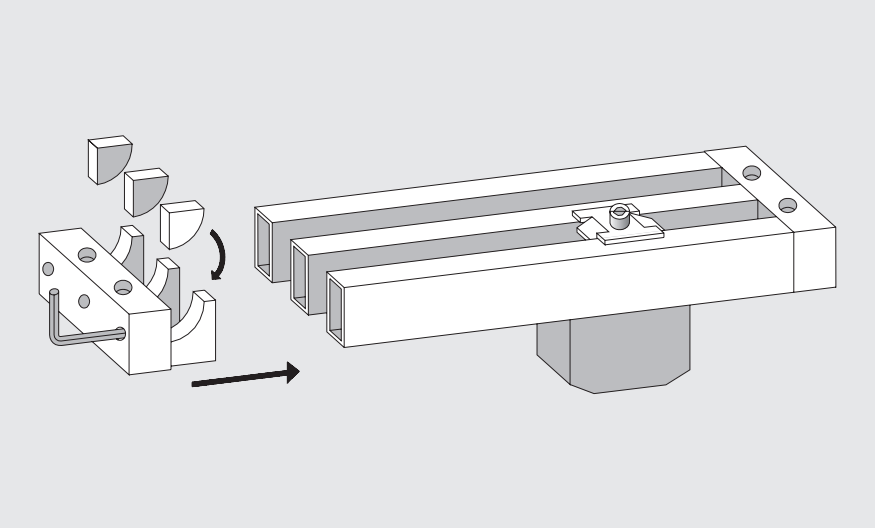


Ordering table

Designation	Use	Slot spacing [mm]	Number of guide tubes	Order No. / Item
Clamping piece	For trip rails ULA/UFA	-		**025 519** Clamping piece
Support brackets	For G-trip rails GFE/GFR	12 mm	2	**027 459** ZW02-12
			3	**027 460** ZW03-12
		16 mm	2	**027 461** ZW02-16
			3	**027 462** 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_r

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 ±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.

Representatives

International

Australia
Micromax Sensors & Automation
Unit 2, 106-110 Beaconsfield Street
Silverwater, NSW 2128
Tel. +61 2 87482800
Fax +61 2 96482345
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
S. Lucas
São Paulo - SP - Brasil
CEP 03295-000
Tel. +55 11 29182200
Fax +55 11 23010613
euchner@euchner.com.br

Canada
IAC & Associates Inc.
2180 Fasan Drive
Unit A
Oldcastle, Ontario
N0R 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
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.mbH
Magyarországi Fióktelep
2045 Törökbálint
FSD Park 2.
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 S.r.l.
Viale Lazio 26
20135 Milano
Tel. +39 02 541941
Fax +39 02 55010474
info@tritecnica.it

Japan
EUCHNER
Representative Office Japan
8-20-24 Kamitsurumahoncho
Minami-ku, Sagamihara-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.
RM 810 Daerung Technotown 3rd
#448 Gasang-Dong
Gumcheon-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. Napoles.
Del. Benito Juarez
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

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
sentronics@pacific.net.sg

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
Grofstrasse 17
8887 Mels
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
Entek Otomasyon Urunleri
San.ve Tic.Ltd.Sti.
Perpa Tic.Mer. B Blok
Kat: 11 No:1622 - 1623
34384 Okmeydani / Istanbul
Tel. +90 212 320-2000 / 01
Fax +90 212 320-1188
entekotomasyon@entek.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
Tel. +49 37325 906000
Fax +49 37325 906004
jens.zehrtner@euchner.de

Düsseldorf
EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Sundernholz 24
45134 Essen
Tel. +49 201 43083-93
Fax +49 201 43083-94
juergen.eumann@euchner.de

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

Wiesbaden
EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Schiersteiner Straße 28
65187 Wiesbaden
Tel. +49 611 98817644
Fax +49 611 98895071
giancarlo.pasquesi@euchner.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
Ingenieur- und Vertriebsbüro
Bleickenallee 13
22763 Hamburg
Tel. +49 40 636740-57
Fax +49 40 636740-58
volker.behrens@euchner.de

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

München
EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Obere Bahnhofstraße 6
82110 Germering
Tel. +49 89 800846-85
Fax +49 89 800846-90
st.kornes@euchner.de

Nürnberg
EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Steiner Straße 22a
90522 Oberasbach
Tel. +49 911 669-3829
Fax +49 911 669-6722
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

01/13

EUCHNER

More than safety.

Support hotline

You have technical questions about our products or how they can be used?
For further questions please contact your local sales representative.

Comprehensive download area

You are looking for more information about our products?
You can simply and quickly download operating instructions, CAD or ePLAN data and accompanying software for our products at www.euchner.com.

Customer-specific solutions

You need a specific solution or have a special requirement?
Please contact us. We can manufacture your custom product even in small quantities.

EUCHNER near you

You are looking for a contact at your location? Along with the headquarters in Leinfelden-Echterdingen, the worldwide sales network includes 14 subsidiaries and numerous representatives in Germany and abroad – you will definitely also find us near you.

www.euchner.com

EN

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

EUCHNER
More than safety.