MAYSER®

Innovative by tradition.

Safety shoe NG

EN | Product information

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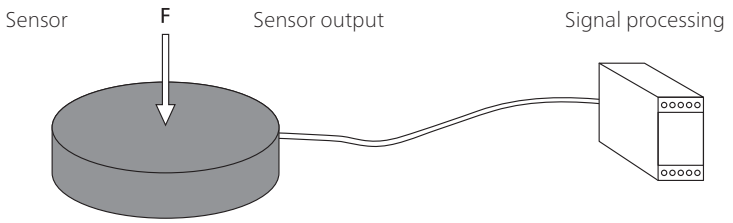
Definitions

Pressure-sensitive sensor system

A pressure-sensitive sensor system consists of a pressure-sensitive sensor, a signal processing unit and one or more output signal switching devices. The signal processing unit and the output signal switching device(s) are often combined. The pressure-sensitive sensor system is triggered when the sensor is activated.

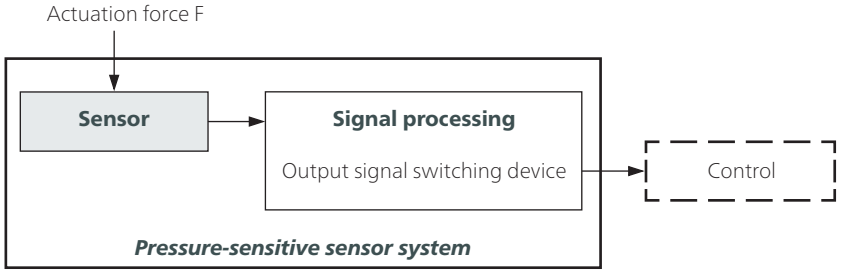


Sensor

The sensor is the part of the pressure-sensitive sensor system that generates a signal when the actuation force is applied. Mayser sensors feature a locally deformable actuation area.

Signal processing

The signal processing unit is the part of the pressure-sensitive sensor system that converts the output signal of the sensor and controls the status of the output signal switching device. The output signal switching device is the part of the signal processing unit which is connected to the downstream control system and which transmits signals such as STOP.

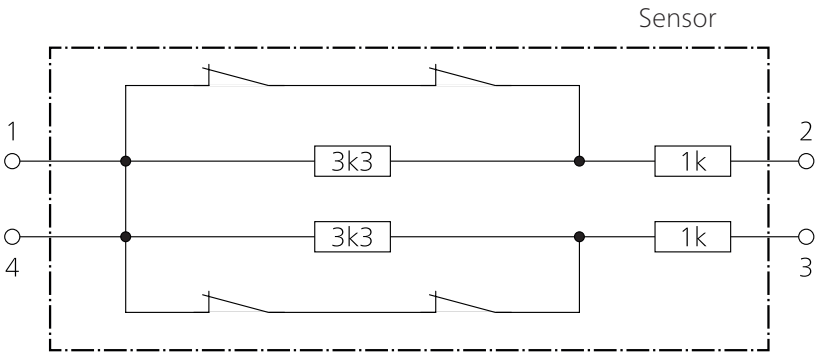


Sensor + signal processing unit = sensor system

The safety shoe is a pressure-sensitive sensor.
When combined with a connected signal processing unit, it forms a pressure-sensitive sensor system.

Subject to technical modifications.

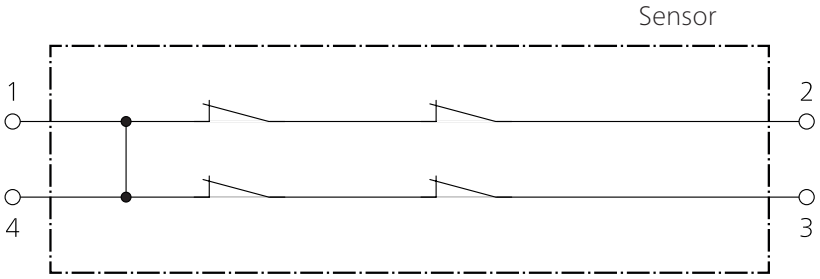
Operational principle of circuit 2 (1k/4k3)



Sensor not activated
1 kilohms

Sensor activated
4.3 kilohms

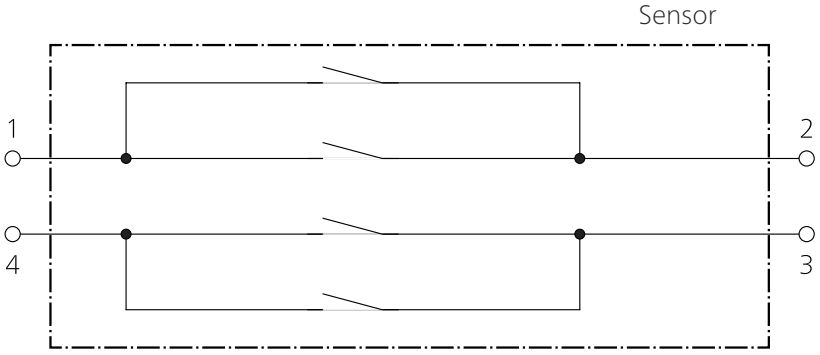
Operational principle of circuit 3 (NC)



Sensor not activated
0 ohms

Sensor activated
>1 megohm

Operational principle of circuit 4 (NO)

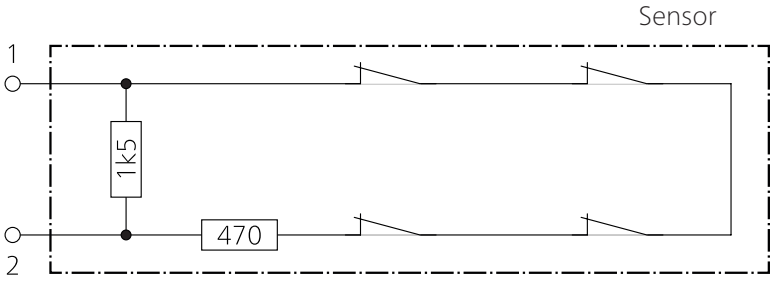


Sensor not activated
>1 megohm

Sensor activated
0 ohms

Subject to technical modifications.

Operational principle of circuit 5 (358/1k5)



Sensor not activated
358 ohms

Sensor activated
1.5 kilohms

Safety

Intended use

The safety shoe usually takes the form of a linear sensor with a tripping function. It detects the lowering of an object, such as an aircraft door, through pressure exerted on the effective actuation area. This pressure activates the interior switches. The safety shoe is responsible for detecting potential hazards posed by objects and informing the higher-level control system via the signal processing unit. Typical areas of application include collision protection for the level control of ground support equipment (GSE), such as passenger, baggage, catering and maintenance platforms. When used as part of a backup protective device, the safety shoe helps meet, for example, the requirements set out in Section 9.1.8 of IATA AHM 922.
The product's extra-rugged design makes it ideal for use in challenging environments, with the sensor surface ensuring excellent water resistance. The safety shoe functions correctly even in wet conditions.
Safe operation of a safety shoe depends entirely on

- selecting the correct underside for the sensor,
- selecting the correct signal processing unit and
- handling the safety shoe properly.

Due to the design, the actuation area is actually smaller than it looks because of the non-sensitive edges. Once these have been allowed for, what remains is the effective actuation area (see chapter *Effective actuation area*).

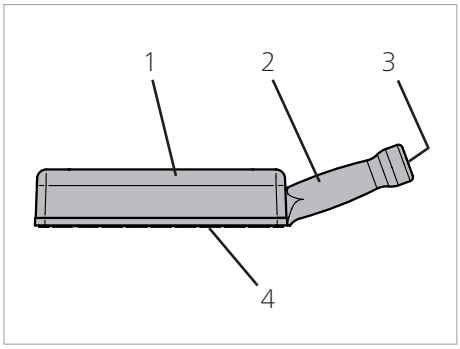
Limits

- The product is designed exclusively for use within the EU.
- It has a service life of at least 50,000 switching cycles or a minimum of 2 years.

Exclusions

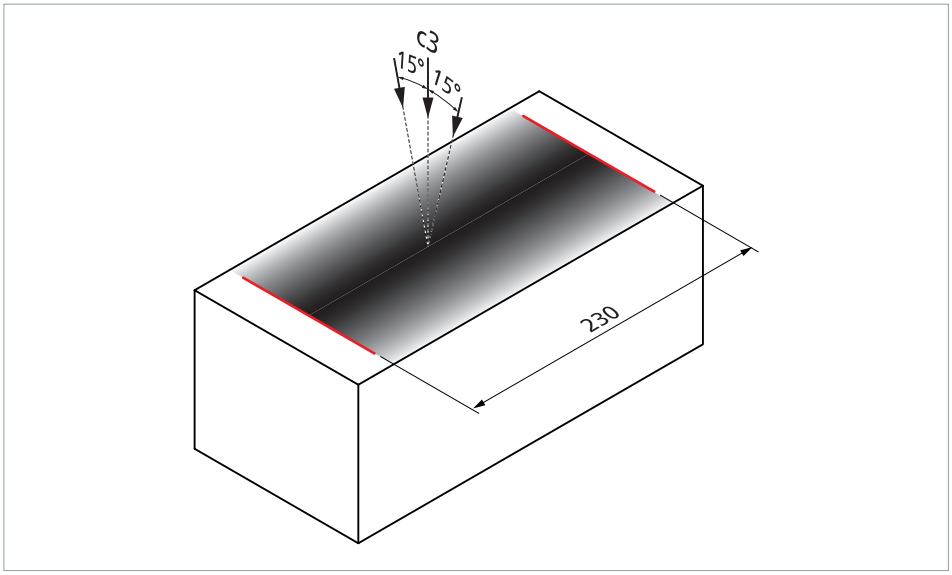
There are no known exclusions for this product.

Design



The safety shoe consists of the following:
(1) Sensor
(2) Handle
(3) Sensor output
(4) Underside of sensor

Effective actuation area

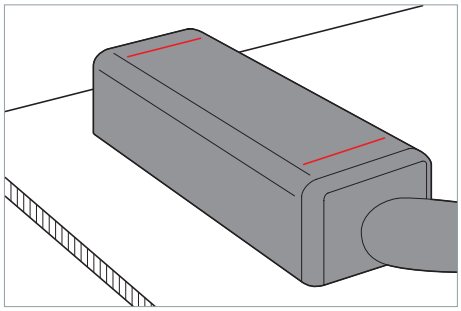


Subject to technical modifications.

Operating position

The side with the two markings must face upwards.
The underside of the sensor is the surface that makes contact with the floor.

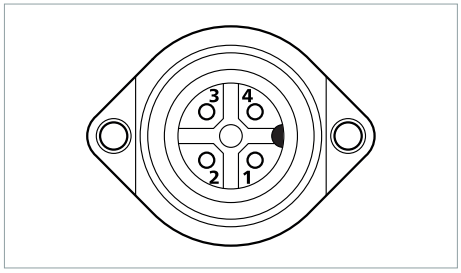
The object to be detected must touch the safety shoe inside the markings.



Connection

Sensor output

There is a CA 3 GS circular connector incorporated into the end of the handle. This is the sensor output.
The signal is transmitted to the signal processing unit via a CA 3 LD coupling and cable.



Tip: A reliable connection can be achieved using the connector protection sets (see *Accessories*).

Pin assignment

	Channel 1		Channel 2	
	Pin 1	**Pin 2**	**Pin 3**	**Pin 4**
Circuit 2 (1k/4k3) *	•	•	•	•
Circuit 3 (NC) *	•	•	•	•
Circuit 4 (NO)	•	•	•	•
Circuit 5 (358/1k5)	•	•	–	–

* Pins 1 and 4 are connected.

Subject to technical modifications.

Sensor surface

Colours

The safety shoe is available in three different colour versions:

- Plain black (BK)
- Plain yellow (YE)
- Black and yellow stripes (YE/BK)

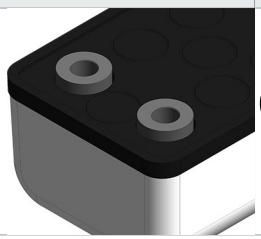
BK	YE	YE/BK
		

Both the sensor surface and the handle are sealed with a protective coating. This makes the safety shoe largely weatherproof.

Underside of sensor

The following types of non-slip underside are available for the sensor:

- Rubber studs (GM)
- Rubber buffers (F)
- Magnets (M)

GM	F	M
		

Subject to technical modifications.

Accessories

Connector protection set

There is a CA 3 GS circular connector incorporated into the end of the handle. An optional connector protection set is available to create the perfect connection.

Version V1	Version V2
2204557 (optional) Connector protection set B13301-Set-V1, **with** circular connector coupling CA 3 LD, with strain relief sleeve, for cables with an outer diameter of 6 to 12 mm	2204558 (optional) Connector protection set B13301-Set-V2, **without** circular connector coupling CA 3 LD, without strain relief sleeve, for cables with an outer diameter of 6 to 12 mm

Maintenance and cleaning

The sensor is virtually maintenance-free.

Regular inspection

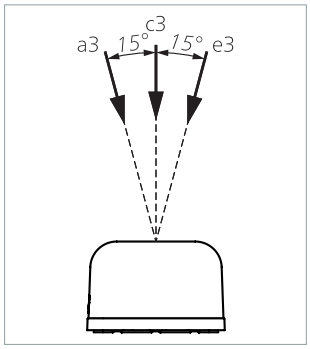
Depending on the operational demands, the sensors must be inspected at regular intervals (at least monthly)

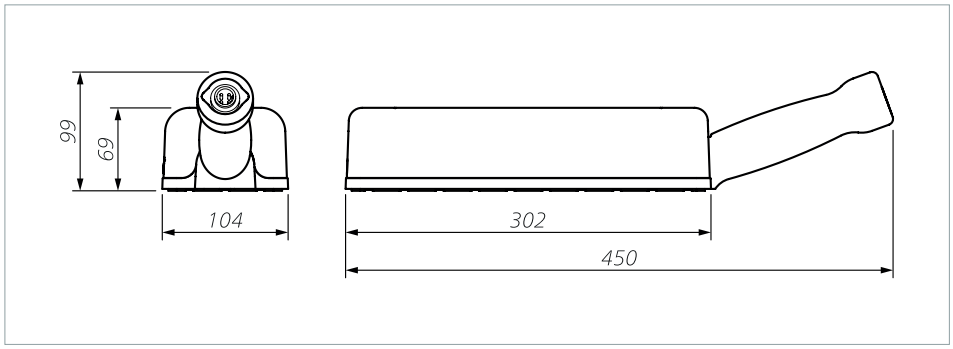
- for proper functioning,
- for damage and
- to ensure that the connectors are properly connected.

Cleaning

If the sensors become dirty, they can be cleaned with a mild cleaning product.

Technical data





Safety shoe NG	1k/4k3	NC	NO	358/1k5
Switching characteristics at v_{test} = 10 mm/s				
Actuation force (c3)	**+23°C**			
Test piece (cylinder) Ø 80 mm	< 150 N			
Actuation distance (c3)	5 ±3 mm			
Actuation angle (a3 to e3)	±15°			
ISO 13856: recovery of shape after 30 s	> 80%			
Mechanical operating conditions				
Service life (min.)	2 a			
Non-slip underside	Rubber studs (GM), rubber buffers (F) or magnets (M)			
IEC 60529: degree of protection				
with CA 3 LD coupling	IP67			
Operating temperature	–20 to +45°C			
Storage temperature	–20 to +45°C			
Weight (max.)	1.2 kg			
Electrical operating conditions				
Switching operations (min.)	50,000			
Switching voltage	DC 10 V to DC 24 V	Max. AC 230 V DC 30 V	Max. AC 230 V DC 30 V	DC 6 V to DC 24 V
Switching current (min.)	–	10 mA	10 mA	–
Switching current (max.)	25 mA	200 mA	200 mA	70 mA
Resistance (ohms)				
Sensor not activated	1k ±6%	< 2	> 1M	358 ±6%
Sensor activated	4k3 ±6%	> 1M	< 2	1k5 ±6%

Conformity

Conformity

The CE symbol indicates that this Mayser product complies with the relevant EC directives and that the stipulated conformity assessments have been carried out.

The design type of the product complies with the basic requirements of the following directives:

- 2014/35/EU (LVD)
- 2011/65/EU (RoHS)

The Declaration of Conformity is available in the Downloads section of our website: www.mayser.com.

Order key

SafetyShoeNG - XX - YY - ZZ

Circuitry	
1k/4k3	Circuit 2
NC	Circuit 3
NO	Circuit 4
358/1k5	Circuit 5

Colour	
BK	Black
YE	Yellow
YE/BK	Black and yellow

Underside of sensor	
GM	Rubber studs
F	Rubber buffers
M	Magnets

Example 1: SafetyShoeNG - NO - GM - BK
This is a safety shoe NG
- with circuit 4
- with rubber studs
- in plain black

Example 2: SafetyShoeNG -1k/4k3 - F - YE/BK
This is a safety shoe NG
- with circuit 2
- with rubber buffers
- with black and yellow stripes