

# RE300

Safety switches



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**Described product**

RE300

**Manufacturer**

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**Original document**

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### 1 About this document

These operating instructions are original operating instructions.

These operating instructions are included with SICK part number 8011171 (all available languages of this document)

## 2 On safety

This chapter deals with your own safety and the safety of the equipment operators.

- ▶ Please read this chapter carefully before working with the safety switch or with the machine protected by the safety switch.

The national/international rules and regulations apply to the installation, commissioning, use and periodic technical inspections of the safety switch, in particular the work safety regulations and safety rules.

### 2.1 Qualified safety personnel

The switch must be mounted, installed and commissioned only by qualified safety personnel. Qualified safety personnel are defined as persons who ...

- have undergone the appropriate technical training
- and
- who have been instructed by the responsible machine operator in the operation of the machine and the current valid safety guidelines
- and
- who have access to the operating instructions.

### 2.2 Application

Series RE300 safety switches are magnetically operated, non-contact safety switches. In combination with a suitable safety-related evaluation unit, they protect movable guards in the following way:

- The dangerous state of the machine can only be switched on when the guard is closed.
- If the guard is opened while the machine is running, a stop command is triggered.

For the control this means:

- Activation commands that result in dangerous states are only allowed to become effective if the guard is in the protective position.
- Dangerous states must have been terminated before the protective position is left.

Prior to the use of safety switches, a risk assessment must be performed on the machine.

### 2.3 Correct use

The safety switch must be used only as defined in section ["Application", page 5](#). The safety switch must be used only on the machine where it has been mounted, installed and initialized by qualified safety personnel in accordance with these operating instructions.

The product may be used in safety functions.

All warranty claims against SICK AG are forfeited in the case of any other use, or alterations being made to the safety switch, even as part of its mounting or installation.

Correct use includes also regular inspection of the guard by qualified safety personnel in accordance with [section 6.2](#).

### 2.4 General safety notes and protective measures

Safety switches provide a protection function for persons. Incorrect installation or manipulation can result in serious injuries.

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#### **DANGER**

Safety switches are not allowed to be bypassed, turned away or made ineffective in any other manner.

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### 3 Function description

The safety switch is magnetically coded. Its contacts are operated by the related actuator RE300-KA. The safety switches are equipped with contacts:

The switching signals are sampled by a suitable safety-related evaluation unit, e.g. a safe programmable logic controller.

#### 3.1 Evaluating the switching signals

On integrating magnetic safety switches into suitable safe evaluation units, the following must be taken into account:

- The user is responsible for ensuring that the device is safely incorporated into a safe overall system. This involves validating the overall system according to specifications such as those defined in EN ISO 13849-2.
- On the detection of a fault related to the safety switch, the safe evaluation unit must shut down and adopt a locked state.
- Both contacts must switch opposite to each other with a maximum discrepancy time of 1500 ms; this time is to be monitored using the evaluation electronics.
- On the connection of the safety switch to a safe evaluation unit, the input module should be configured such that the discrepancy time set has no effect on the shutdown time for the evaluation (typical configuration “provide 0”). If this is not possible, the calculation must take into account the response time.

#### RE300

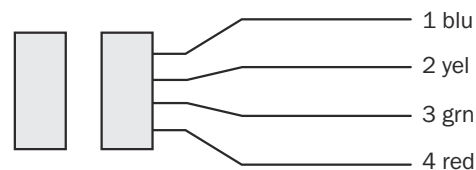


Figure 1: Wire colours RE300-DA..

Contact assignments	Function
1 blue/4 red	NO contact
3 yellow/4 green	NC contact

In the unactivated state (output state OFF), the NO contact 1 (blue)/4 (red) is open and the NC contact 2 (yellow)/3 (green) is closed (see figure X).

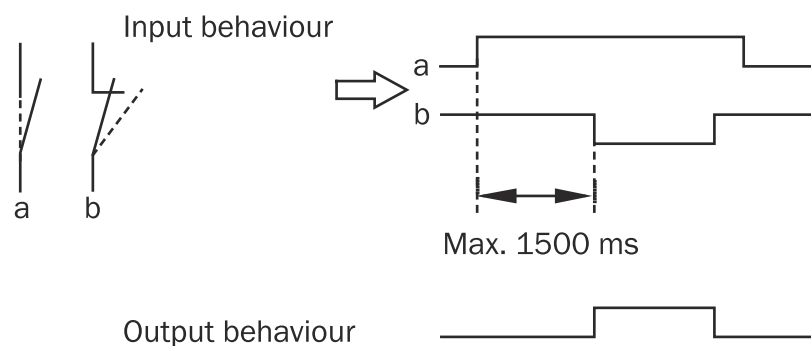


Figure 2: Switching behaviour (unactivated)

### 4 Mounting



#### WARNING

Mounting is only allowed to be performed by qualified safety personnel.

- ▶ Pay attention to EN ISO 14119 on mounting the safety switch and the actuator.
- ▶ Pay attention to EN ISO 14119 on reducing possible ways of bypassing an interlocking device.

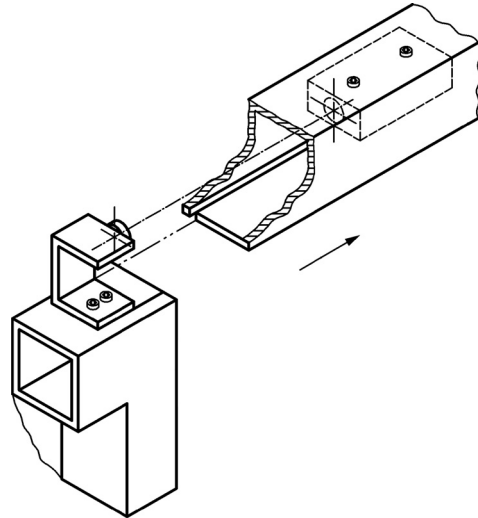


Figure 3: Protection example for bypassing a magnetic safety switch in compliance with EN ISO 14119

- ▶ Do not mount safety switches in an environment with interfering magnetic fields.
- ▶ Note the possible operating positions.



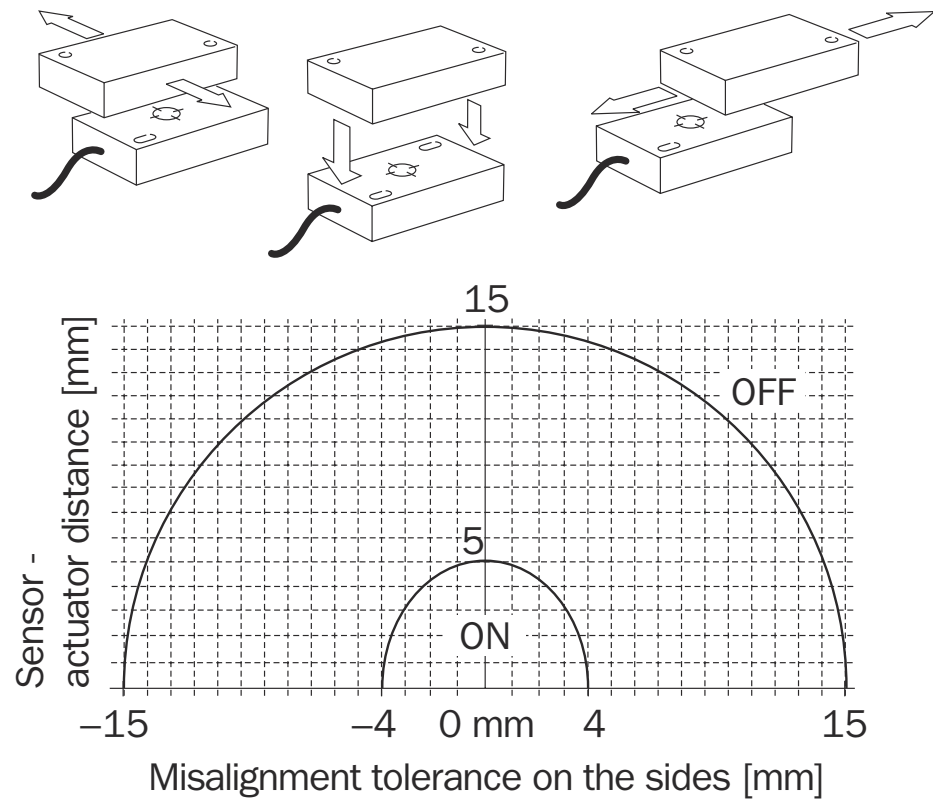


Figure 4: Alignment of sensor and actuator

- ▶ Fit safety switch and actuating element such that they do not touch each other: minimum distance between the front faces with the guard closed 1 mm.

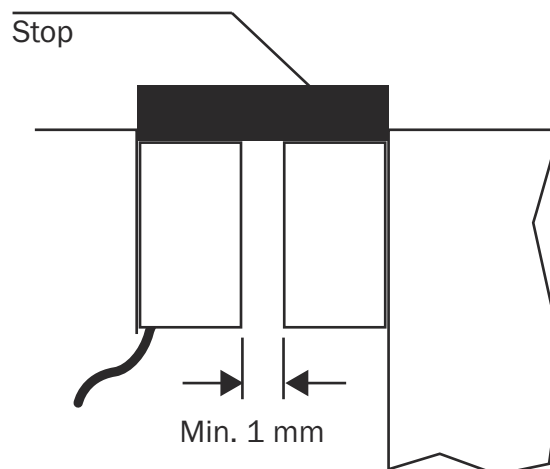


Figure 5: Mounting example for safety switch and actuator

- ▶ Fit an additional stop and guide for the moving part of the protective device (figure 5).
- ▶ Mount the actuator on guard so that it cannot be detached (e.g. using safety screws).
- ▶ Tighten self-locking screws to 1.0 Nm.
- ▶ Do not use anaerobic adhesive (e.g. Loctite) to lock the screws, as this will attack the plastic housing.

- ▶ Minimum distance between two adjacent magnetic safety switches: 25 mm. On swivelling doors the actuator is to be fitted to the closing edge.

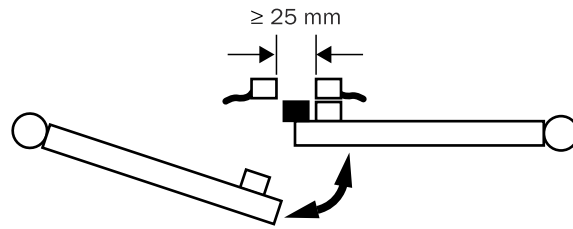


Figure 6: Mounting example on swivelling doors

## 5 Electrical installation

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**WARNING**

**An incorrect connection may result in the loss of the safety function!**

An incorrect connection may cause the device to malfunction or become damaged.

The electrical connection is only allowed to be made by qualified safety personnel trained in EMC.

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- ▶ Only use copper wires. In case of use in high ambient temperatures, the temperature data for the field cable must not be lower than the ambient temperature.
- ▶ The connecting cables must be protected when laid in order to prevent the risk of cross-circuits.

### 6 Commissioning

#### 6.1 Tests before the initial commissioning

- Mechanical functional check:
  - Safety switch and actuating element must not touch when the guard is closed.
  - Minimum distance with guard closed 1 mm
- Electrical functional check:
  - ▶ Close the guard.
  - ▶ Start machine.
  - ▶ Open the guard.

**DANGER**

Check whether the machine stops when the guard is opened.

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- ▶ Switch off machine.
  - ▶ Open the guard.
  - ▶ Start machine.
- 

**DANGER**

The machine must not start with a guard open!

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#### 6.2 Periodic technical checks

To ensure correct function over the long term, regular checks are necessary. Check that the protective device functions reliably, particularly ...

- after every commissioning process
- every time a component is replaced
- after a prolonged period of downtime
- after any kind of error

Aside from these checks, the reliable functioning of the protective device should be checked at appropriate intervals as part of the maintenance program. For information on possible intervals refer to EN ISO 14 119.

##### 6.2.1 Regular examinations

Check the safety switch for the following points:

- correct function
- visible signs of tampering

At appropriate intervals, it is also necessary to check:

- the safe mounting of actuators and safety switches
  - the sealing of the cable glands on the safety switches
  - the placement of the cable connections on the evaluation unit
  - the shutdown distances
- 

**DANGER**

Damaged or worn system components must be replaced.

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### 6.2.2 Inspection by qualified safety personnel

The inspection by qualified safety personnel must be performed regularly as per the applicable national and international regulations within the intervals defined. This procedure ensures that any changes on the machine or manipulations of the guard after commissioning are detected.

### 7 Maintenance

- ▶ Remove iron filings from the safety switch and actuator at regular intervals.
- ▶ Only use solvent-free cleaning agents to clean the safety switches and actuators.

## 8 Disposal



Always dispose of serviceability devices in compliance with local/ national rules and regulations with respect to waste disposal.



## 9 Technical data

### 9.1 Data sheet

Table 1: Data sheet

Safety-related parameters	
$B_{10d}$	$20 \times 10^6$ with low load (EN ISO 13849-1)
$PFH_D^{1)}$	$2.5 \times 10^{-8}$
Type	Type 4 (EN ISO 14119)
Actuator coding level	Low coding level (EN ISO 14119)
Safe state in the event of a fault	The switch has no internal fault detection and is unable to assume a safe state in the event of a fault. Fault detection is performed by the connected safety-related logic unit.
$T_M$ (mission time)	20 years (EN ISO 13849)
General data	
Housing material	Vistal®
Enclosure rating	IP 67 (IEC 60529)
Function	Magnetic
Operating temperature	-10 °C ... +55 °C
Storage temperature	-25 °C ... +70 °C
Switching voltage $U_{max}$	30 V DC
Max. switching current <sup>2)</sup>	
RE300	30 mA
Shock resistance	30 g/11 ms
Vibration resistance	10 ... 55 Hz, ampl. 0.35 mm $\pm$ 15%
Safe switch on distance $S_{ao}$ <sup>3)</sup>	5 mm
Safe switch off distance $S_{ar}$	15 mm
Type of connection	
RE300-DA..	Cable with flying leads
Cable material	PVC
Wire material	Copper
Coupling nut material	Zinc die cast, nickel plated
Cable diameter	5.8 mm
Wire cross-section	0.25 mm <sup>2</sup>
Bend radius (for fixed installation)	> 12 × cable diameter
Bend radius (for flexible use)	> 15 × cable diameter
Max. cable length	Overall resistance < 75 Ω

1) At low load with a switching frequency of 1 operation/minute, 24 hours/day, 365 days/year, there are 525,600 switching operations per year.

2) For UL Class 2 applications the maximum switching capacity is limited to 5 W.

3) There must not be any ferro-magnetic material near the read head or actuator. All data apply for approach from the front and alignment offset  $m = 0$ .



## 9.2 Dimensional drawings

### RE300

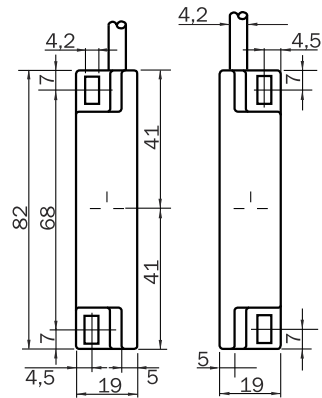


Figure 7: Dimensional drawing RE300-DA.. magnetic safety switch

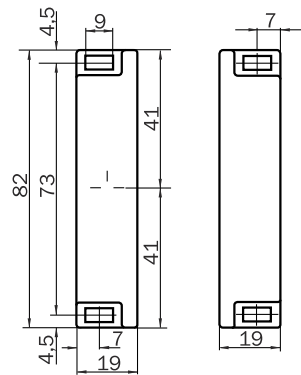


Figure 8: Dimensional drawing actuator RE300-KA..

### 10 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at [www.sick.com](http://www.sick.com). To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

#### 10.1 EU declaration of conformity

##### Excerpt

The undersigned, representing the manufacturer, herewith declares that the product is in conformity with the provisions of the following EU directive(s) (including all applicable amendments), and that the standards and/or technical specifications stated in the EU declaration of conformity have been used as a basis for this.

- ROHS DIRECTIVE 2011/65/EU
- EMC DIRECTIVE 2014/30/EU
- LV DIRECTIVE 2014/35/EU
- MACHINERY DIRECTIVE 2006/42/EC

#### 10.2 UK declaration of conformity

##### Excerpt

The undersigned, representing the following manufacturer herewith declares that this declaration of conformity is issued under the sole responsibility of the manufacturer. The product of this declaration is in conformity with the provisions of the following relevant UK Statutory Instruments (including all applicable amendments), and the respective standards and/or technical specifications have been used as a basis.

- Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
- Electromagnetic Compatibility Regulations 2016
- Electrical Equipment (Safety) Regulations 2016
- Supply of Machinery (Safety) Regulations 2008



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