OPERATING INSTRUCTIONS

i11S

Safety switches

SICK
Sensor Intelligence.

Described product

i11S

Manufacturer

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Original document

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1 Scope

These operating instructions apply to the safety switches i11S from the date of manufacture:

- 1007

You will find the device's date of manufacture on the type label in the field Date Code in the format yyww (yy = year, ww = calender week).

These operating instructions are original operating instructions.

2 On Safety

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

▶ Please read this chapter carefully before working with the i11S or with the machine protected by the i11S.

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

- the machinery directive,
- the safety regulations as well as
- the work safety regulations/ safety rules.

2.1 Qualified safety personnel

The i11S safety 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

- have been instructed by the responsible machine owner in the operation of the machine and the current valid safety guidelines

and

- who have access to these operating instructions.

2.2 Applications

Safety switches of the i11S series are electromagnetic switching devices. They lock guards (without locking device) so that

- the dangerous state of the machine can only be switched on when the protective device is closed and locked,
- a STOP command is triggered if the protective device is opened with the machine running.

For the control this means that

- starting is only possible when the protective device is in the closed position and the dangerous motion should cease before opening the protective device.

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

Important:

The user is responsible for the safe integration of the safety switch in a safe overall system. For this purpose the overall system must be validated, e.g. in accordance with EN ISO 13849-2.

If the safety switches are connected in series the Performance Level (PL) may be reduced due to reduced fault detection, depending on the application (ISO/TR 24119).

2.3 Correct use

The i11S safety switch must be used only as defined in section 2.2 “Applications of the safety switches”.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.

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 the regular inspection of the protective device by qualified safety personnel in accordance with section 5.2.

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.

WARNING
Safety switches are not allowed to be bypassed, turned away, removed or made ineffective in any other manner. Take measures to reduce bypassing options as necessary.

Observe EN ISO 14119 for using interlocking devices associated with physical guards.

WARNING
The switching procedure may only be activated by actuators specifically designated for that purpose, which are connected to the protective device in such a manner that they cannot be detached.

Restrict access to replacement actuators, so they cannot be used for bypassing.

3 Mounting

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

- ▶ Observe EN ISO 14119 for using interlocking devices associated with physical guards.

Fit the safety switches such that

- it is difficult for operators to access when the protective device is open,
- it is possible to inspect and replace the safety switches.

NOTICE
Safety switches and actuators must not be used as a mechanical stop.

NOTICE
Mount only in the assembled condition!

- ▶ Insert the actuator into the actuating head.
- ▶ Mount the safety switch positively. For safety applications (fixed position), mount safety switch using M5 × 30 screws.
- ▶ Connect the actuator to the protective device durably and non-detatchably, e.g. using one-way bolts or by riveting or welding.
- ▶ Fit additional stop for moving parts of the protective device.

3.1 Reversing the actuating direction

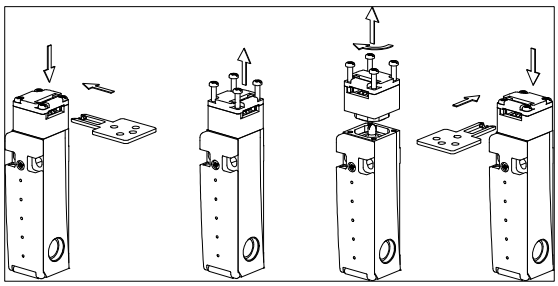

Figure 1: Reversing the actuating direction

1. Insert the actuator in the safety switch.
2. Loosen the bolts on the control cam.
3. Set the required direction.
4. Tighten screws to 0.8 Nm.
5. Fit enclosed plugs into unused actuator slots.

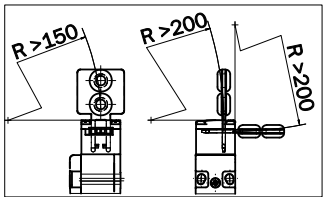

Figure 2: Minimum approach radius (the pivot point for the door must be in the same plane as the insertion opening for the actuator)

3.2 Protection against surroundings

A precondition for a durable and perfect safety function is the protection of the control cam against penetration by foreign matter such as shavings, sand, abrasive materials etc.; seal unused actuating slots with the enclosed slot covers.
Cover the control slot, the actuator and the rating plate when painting. Use only solvent-free cleaning materials when cleaning the safety switch.

4 Elektroinstallation

WARNING
The electrical connection is only allowed to be made by qualified safety personnel.

WARNING
Take note of the excess temperature in the casing when selecting insulation material or pigtails (depending on the operating conditions)!

WARNING
To ensure a secure contact, strip the individual wires back about 6 mm (± 1 mm).

DANGER
For application and usage as per the requirement in cULus, a copper cable (60/70 °C) is to be used.

DANGER
For deployment and use according to the requirements of UL, a class 2 power supply according to UL1310 must be used.

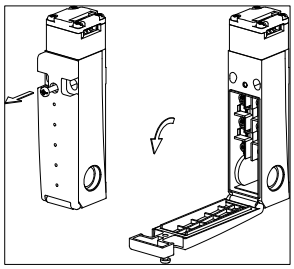

Figure 3: Opening the safety switch

1. Break open the desired lead-in.
2. Assemble screwed cable gland M16 with the corresponding enclosure rating.
3. Use wire cross section 0.34 to 1.5 mm².
   ⚠ **WARNING** | Operate all contact pairs in the same voltage range.
4. Connect all live parts to one side of the contact block.

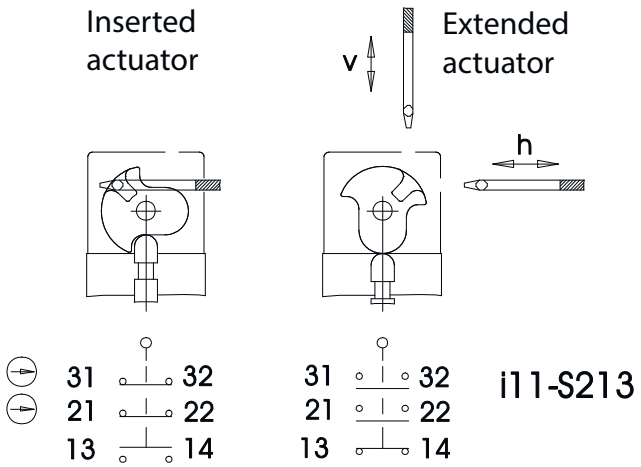

Figure 4: Switching elements and switching functions

5. Tighten the clamping bolts of the switching elements by 0.5 Nm.

6. Take account of the density of the line entrance.
7. Close switch cover and tighten screws.

5 Commissioning

5.1 Tests before the initial commissioning

- mechanical functional check It must be possible to insert the actuator into the actuating head without any problem. Close the protective device several times to verify.
- electrical functional check

▶ Close the guard.
▶ Start the machine.

WARNING
Check whether the machine stops when the guard is opened.

▶ Switch off the machine.
▶ Open the guard.
▶ Attempt to start the machine.

WARNING
The machine must not start with a guard open!

5.2 Periodic technical inspections

To ensure correct function over the long term, regular checks are necessary.

Daily or prior to the start of the shift the operator must check for:

- correct function
- no visible evidence of tampering

Regularly according to the machine maintenance schedule by qualified safety personnel:

- correct switching function

DANGER
Check whether the machine stops when the guard is opened.

- safe mounting of the modules
- deposits and wear and tear
- correct sealing of the cable entry or plug connection
- loose cable connections or plug connectors

DANGER
The entire switch and actuator must be replaced in the case of damage or wear and tear. It is not permitted to exchange individual components or modules!

Safety switches must be completely replaced after 1 million switching operations.

6 Disposal

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

7 Technical data

7.1 General system data

Housing material	Glass-fibre reinforced thermoplast
Enclosure rating in compliance with IEC 60529	IP67
Mechanical life	1 × 10^6 switching operations
B_{10d} (EN ISO 13849) at DC-13 100 mA / 24 V (positive opening normally closed contact)	4 × 10^6 switching operations
Type	Type 2 (EN ISO 14119)
Actuator coding level	Low coding level (EN ISO 14119)
Operating temp.	–20 ... +80 °C
Type of connection	3 × M16
Switching principle for switching elements	Slow-action switch
Switching elements of forced opening/closing devices	2/1
Approaching speed max.	20 m/min
Frequency of use (maximum)	7000/h
Actuation power	10 N
Retaining force	10 N
Rated withstand voltage U_{imp}	2,5 kV
Contamination level (external, acc. to EN 60947-1)	3 (industry)
Rated insulation voltage U_i	250 V
Usage category in compliance with EN 60947-5-1	AC-15: 230 V 4 A DC-13: 24 V 4 A
Switching voltage min.	12 V DC
Switching current min. at 24 V DC	1 mA
Wire cross-section (rigid/flexible)	0,34 ... 1,5 mm^2
Conventional thermal flow I_{th}	4 A
Conditional short circuit current	100 A
Short-circuit protection (control safety IEC 60269-1)	4 A gG
Breakaway torque for screws Mounting screws housing Cover screws Jam screws contacts Head screw	 1,5 Nm 0,8 Nm 0,5 Nm 0,8 Nm
Minimum approach radius	see figure 2

7.2 Dimensional drawing

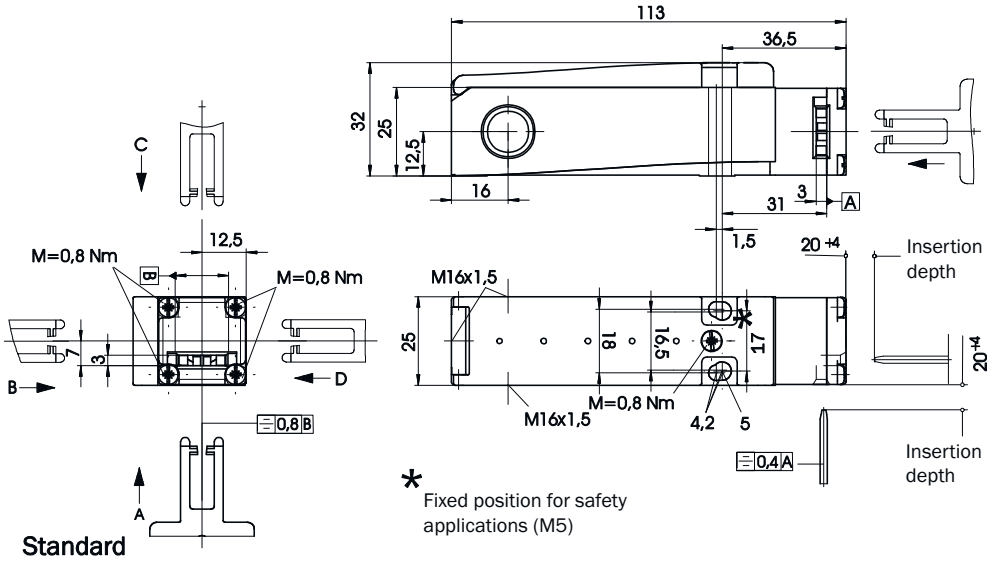

Figure 5: Dimensional drawing i11S-S213 (A, B, C, D: Directions of approach)

8 Conformities and certificates

You can obtain declarations of conformity, certificates and the current documentation for the product at 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).

8.1 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
- MACHINERY DIRECTIVE 2006/42/EC

8.2 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
- Supply of Machinery (Safety) Regulations 2008

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