



EN Operating instructions.pages 1 to 6
Original

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1. About this document

1.1 Function

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Target group: authorised qualified personnel

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used



Information, hint, note:

This symbol is used for identifying useful additional information.



Caution: Failure to comply with this warning notice could lead to failures or malfunctions.

Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use

Products in Schmersal's range are not intended to be used by private end consumers.

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: products.schmersal.com.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

1.6 Warning about misuse



In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded.

1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

EX-BNS 303-12Z①-2187-3G/D

No.	Option	Description
①	G	without LED with LED

2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

The safety sensor can be used for monitoring the position of movable guards and flaps in explosion-endangered areas of Zone 2 and 22 category 3GD. The installation and maintenance requirements to the standard series 60079 must be met. To actuate the EX-BNS 303 safety sensors, only the BPS 300, BPS 303 or BPS 303 SS actuators can be used.

The safety switches are used for applications, in which the hazardous situation is terminated without delay when the safety guard is opened.



The safety switchgears are classified according to EN ISO 14119 as type 4 interlocking devices.

Only the entire system consisting of the safety sensor (EX-BNS), the actuator (BPS) and the safety-monitoring module (AES/SRB/AZR) meets the requirements of the standard EN 60947-5-3.

Conditions for safe operation

Due to their specific impact energy, the components must be fitted with a protection against mechanical stresses. The specific ambient temperature range must be observed. The user must provide for a protection against the permanent influence of UV rays. The energy restriction for LED versions (24 V/10 mA) must be ensured by the user.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.



The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

2.4 Technical data

Equipment category:	Ⓜ II 3GD
Ex protection:	Ex nC IIC T6 Gc X Ex tc IIIC T80°C Dc X
Standards:	EN 60947-5-3, EN IEC 60079-0, EN IEC 60079-15, EN 60079-31, EN ISO 80079-36
Design:	cylindrical
Tightening torque:	SW 36 max. 300 Ncm
Enclosure:	glass-fibre reinforced thermoplastic
Max. impact energy:	1 J
Degree of protection:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	6 x 0.25 mm ²
Operating principle:	magnetic
Actuating magnet:	BPS 300 ,BPS 303, BPS 303 SS, coded
Assured switching distance s_{so} :	5 mm
Assured switch-off distance s_{ar} :	15 mm
Coding level according to EN ISO 14119:	low
Switching condition indication:	LED only with ordering suffix G
Switching voltage max.:	without LED: 100 VAC / DC with LED: 24 VDC
Switching current max.:	without LED: 400 mA with LED: 10 mA
Switching capacity max.:	without LED: 10 W with LED: 240 mW
Ambient temperature:	-25 °C ... +70 °C
Storage and transport temperature:	-25 °C ... +70 °C
Max. switching frequency:	5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55 Hz, amplitude 1 mm

2.5 Safety classification

Standards:	EN ISO 13849-1
B_{10D} (NC/NO contact):	25,000,000 at max. 20 % contact load
Mission time:	20 years

$$MTTF_D = \frac{B_{10D}}{0,1 \times n_{op}} \quad n_{op} = \frac{d_{op} \times h_{op} \times 3600 \text{ s/h}}{t_{cycle}}$$

(Determined values can vary depending on the application-specific parameters h_{op} , d_{op} and t_{cycle} as well as the load.)

An individual switch can be used in a category 3 or 4 architecture up to PL e.

If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

3. Mounting

3.1 General mounting instructions

- Fitting is only authorised in a de-energised condition
- Screw both nuts in the provided mounting holes to fix the safety sensor (max. tightening torque 300 Ncm)
- Do not use the sensor and the actuator as a mechanical backstop
- Any mounting position, provided that the active surfaces and signs on it are opposite
- Inseparably fix the safety sensor and the actuator to the safety guard
- Do not install the safety sensor and the actuator in strong magnetic fields
- If possible, do not install the safety sensor and the actuator on ferromagnetic material.
- Do not subject the safety sensor and actuator to extreme vibrations and shocks.
- Keep away from metal chips
- The mounting distance between two sensors should always be at least 50 mm.



Please observe the specifications for the maximum impact energy in the technical data.

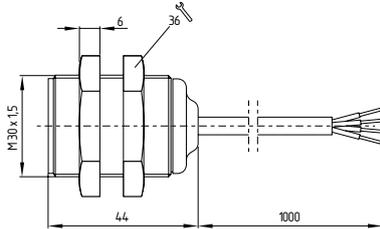


Safety sensor and actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling of the screw heads).

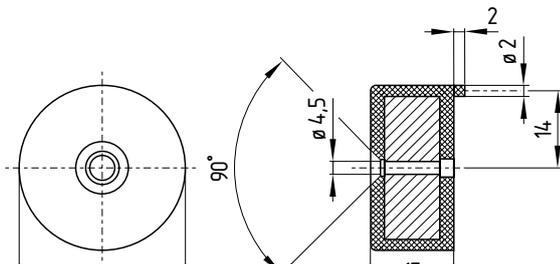
3.2 Dimensions

All measurements in mm.

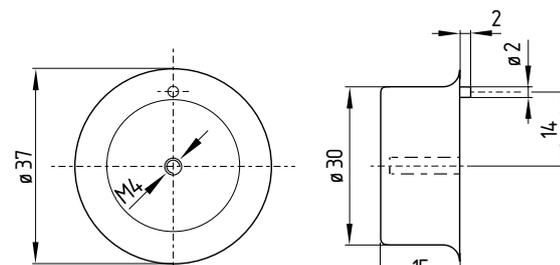
Safety sensor with cable



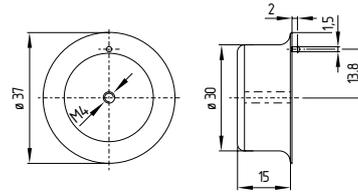
Actuator BPS 300



BPS 303



BPS 303 SS



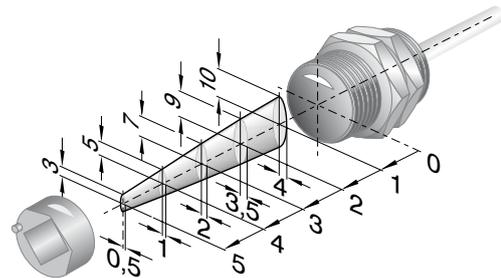
Actuator BPS 303 and BPS 303 SS

The actuators are primarily provided for use in the food-processing industry and therefore are not labelled. The actuators are fixed by means of the supplied tamper-proof screws. The mounting hole must have a diameter of 4.5 mm. Next to the mounting hole, a second mounting hole must be provided. This hole is used for the fixture of the displacement protection dowel. Position of the dowel: refer to the image in chapter "Axial misalignment".

3.3 Axial misalignment

A horizontal and vertical misalignment of the safety sensor and the actuator is tolerated. The possible misalignment depends on the distance of the active surfaces of the sensor and the actuator. The sensor remains active within the tolerance range.

The specified switching distances refer to oppositely mounted safety sensors and actuators.



Assured switching distance: $s_{ao} = 5 \text{ mm}$
 Assured switch-off distance: $s_{a0} = 15 \text{ mm}$

3.4 Adjustment

The LED can only be used as rough setting tool. The correct functionality of both safety channels must be checked by means of the connected safety-monitoring module.

4. Electrical connection

4.1 General information for electrical connection



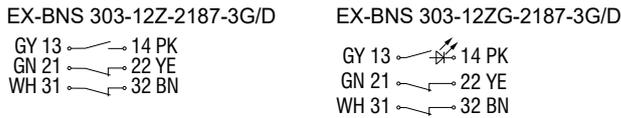
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The safety sensors must be wired in accordance with the specified wire colours.

4.2 Contact variants

The contact position shows the actuated sensor function when the safety guard is closed.

1 NO contact / 2 NC contacts with LED



4.3 Connection

For safety-monitoring modules with two NC inputs, the wires of the safety sensor must be wired as follows:

NO contacts: GY (13) and PK (14) at the "NO input" of the safety-monitoring module

NC contacts: GN (21) und YE (22) at the "NC input" of the safety-monitoring module

NC contacts: WH (31) und BN (32) can be used for signalling purposes.



Information for the selection of suitable safety-monitoring modules can be found in the Schmersal catalogues or in the online catalogue on our website: products.schmersal.com.

Technically, multiple safety sensors can be wired to one AES safety-monitoring module (check if authorised!). The NO contacts are wired parallel and the NC contacts in series. The input expander modules PROTECT-IE-11 and -02 or PROTECT-PE-11(-AN) and -02 can be used for joint connection up to 4 safety sensors with NC/NC or NC/NO contacts.

Connecting more than two EX-BNS 303-12Z safety sensors to the AES 7112 or AES 1102/1112 safety-monitoring module is not possible. For connecting only one safety sensor: refer to the operating instructions manual of the AES 7112 or AES 1102/1112.

Safety sensors equipped with LED's shall not be wired in series, except for the PROTECT-IE or PROTECT-PE input expander module. As a result of this, the luminosity of the LED's would considerably decrease and the voltage could drop below the minimum input voltage of the downstream safety-monitoring module.

In case of series-wiring at SRB max. 1 sensor with LED indication for U_N .

5. Set-up and maintenance

5.1 Functional testing

The safety function of the safety components must be tested. The following conditions must be previously checked and met:

1. The installation is executed according to the instructions
2. The connection is executed correctly
3. The safety component is not damaged
4. The system is free of dirt and soiling (in particular metal chips)
5. Check cable entry and connections in a de-energised condition

5.2 Maintenance

In the case of correct installation and adequate use, the safety sensor features maintenance-free functionality. A regular visual inspection and functional test, including the following steps, is recommended:

- Check the fitting of the sensor and the actuator
- Remove possible metal chips
- Check the cable for damage.
- Check cable entry and connections in de-energised condition



Adequate measures must be taken to ensure protection against tampering either to prevent tampering of the safety guard, for instance by means of replacement actuators.

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

The safety switchgear must be disassembled in a de-energised condition only.

6.2 Disposal

The safety switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. EU Declaration of conformity

EU Declaration of conformity



Original
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We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component: EX-BNS 303
⊕ II 3G Ex nC IIC T6 Gc X
⊕ II 3D Ex tc IIIC T80°C Dc X

Type: See ordering code

Description of the component: Coded safety-sensor with magnetic operating principle in combination with the AES / AZR / SRB safety-monitoring modules from Schmersal or an equivalent safety-oriented control system fulfilling the requirements of the EN 60947-5-3.

Relevant Directives: Machinery Directive 2006/42/EC
Explosion Protection Directive (ATEX) 2014/34/EU
RoHS-Directive 2011/65/EU

Applied standards: EN 60947-5-3:2013
EN ISO 14119:2013
EN IEC 60079-0:2018
EN IEC 60079-15:2019
EN 60079-31:2014
EN ISO 80079-36:2016

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Place and date of issue: Wuppertal, November 4, 2022

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EX-BNS303-E-EN



The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.



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