



EN Operating instructions..... pages 1 to 6
Translation of the original operating instructions

FR Vous trouverez la version actuelle du mode d'emploi dans votre langue nationale officielle sur l'Internet, www.schmersal.net.

ES Encontrará el manual de instrucciones actual en su idioma oficial de la UE en nuestra página de Internet www.schmersal.net.

NL U vindt de huidige versie van de gebruikshandleiding in uw officiële landstaal op het Internet, www.schmersal.net.

IT Il manuale d'istruzioni aggiornato nella vostra lingua (lingua ufficiale UE) è scaricabile in Internet all'indirizzo www.schmersal.net.

JP EU公用語で書かれた最新の取扱説明書は、インターネット (www.schmersal.net) からダウンロードできます。

Content

1 About this document	
1.1 Function	1
1.2 Target group: authorised qualified personnel	1
1.3 Explanation of the symbols used	1
1.4 Appropriate use	1
1.5 General safety instructions	1
1.6 Warning about misuse	2
1.7 Exclusion of liability	2
2 Product description	
2.1 Ordering code	2
2.2 Special versions	2
2.3 Destination and use	2
2.4 Technical data	2
2.5 Safety classification	2
3 Mounting	
3.1 General mounting instructions	2
3.2 Dimensions	3
3.3 Axial misalignment	3
4 Electrical connection	
4.1 General information for electrical connection	3
4.2 Contact variants	3
5 Set-up and maintenance	
5.1 Functional testing	4
5.2 Maintenance	4
6 Disassembly and disposal	
6.1 Disassembly	4
6.2 Disposal	4
7 Appendix	
7.1 EC Declaration of conformity	5

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

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 proper functionality of the entire machinery 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: www.schmersal.net.

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



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. The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

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 inadequate or improper use or manipulations of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded. The relevant requirements of the standard EN 1088 must be observed.

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:

BNS 16-12Z①		
No.	Option	Description
①		Actuating plane
	V	front side
	R	right-hand side
	L	left-hand side
	D	cover-side
	U	bottom
	LR	left- and right-hand side

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 Destination and use

The BNS 16 safety sensor is designed for application in safety circuits and is used for monitoring the position of movable safety guards to EN 1088 and EN 60947-5-3. To actuate the safety sensors, only the BPS 16 actuators can be used, conventional magnets are not suitable. To ensure a safe switch-off, the distance between the safety sensor and the actuator must be at least 18 mm (s_{ar}) or higher (opening width of the safety guard).

For the BNS 16-12ZLR, the safe condition is only obtained, when the left and the right actuator are located in front of the safety sensor. The safety switches are used for applications, in which the hazardous situation is terminated without delay when the safety guard is opened. Only the entire system consisting of the safety sensor (BNS 16), the actuator (BP 16) and the safety-monitoring module (AES) meets the requirements of the standard EN 60947-5-3.

Connecting multiple BNS 16 safety sensors to one AES safety-monitoring module is technically possible. To connect multiple safety sensors (check if authorised!), the NO contacts are wired in parallel and the NC contacts in series. The Protect-IE-11 input expander module can be used to connect up to 4 safety sensors as NC/NO version.

Recommended suitable safety-monitoring modules

AES 11../12../13../21../22../23../25../3075
AES 1102/1112/6112/7112
SRB 207AN*, SRB 301AN*

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

Connecting more than two BNS 16-12Z to the AES 1112/6112/7112 safety-monitoring modules is not possible.

2.4 Technical data

Standards:	IEC 60947-5-3, BG-GS-ET-14
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Protection class:	IP 67 to EN 60529
Cable entry:	3 x M20 x 1.5
Termination:	Screw terminals
Cable section:	max. 2 x 1.5 mm ² (including conductor ferrules)
Mode of operation:	magnetic
Actuator:	BPS 16, coded
Limit distances:	
assured switching distance s_{ao} :	8 mm
assured switch-off distance s_{ar} :	18 mm
Switching voltage:	max. 100 VAC/DC
Switching current:	max. 400 mA
Switching capacity:	max. 10 W
Ambient temperature:	-25 °C ... +70 °C
Storage and transport temperature:	-25 °C ... +70 °C
Switching frequency:	max. 5 Hz
Resistance to shock:	30 g / 11ms
Resistance to vibrations:	10 ... 55 Hz, amplitude 1 mm

2.5 Safety classification

Standards:	EN ISO 13849-1
B_{10d} (NC/NO contact):	25,000,000
Service life T_M	20 years

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

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

3 Mounting

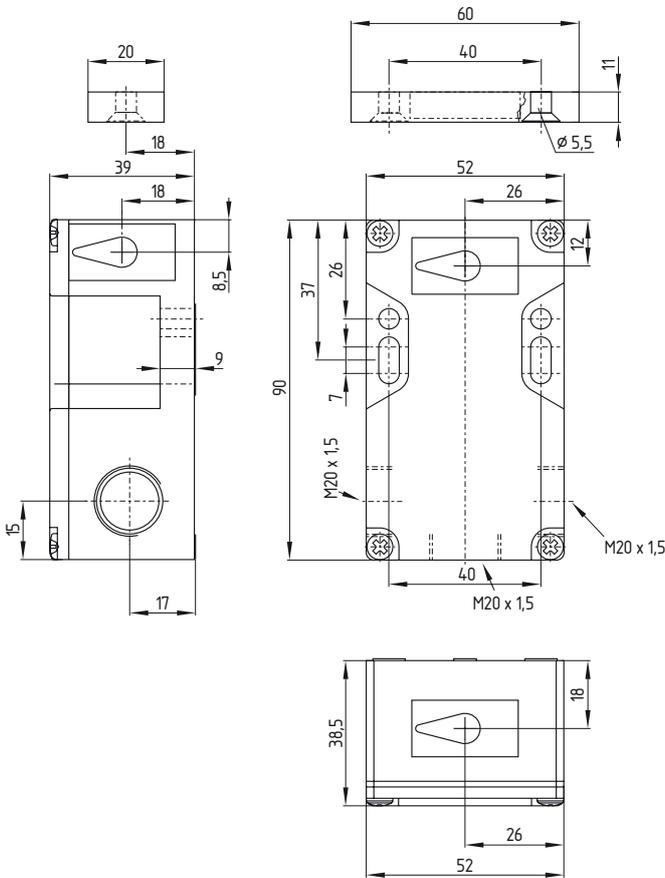
3.1 General mounting instructions

- Install the actuator(s) so that the marks of the safety sensor and the actuator(s) are completely opposite when the safety guard is closed. The marking of the BNS 16 simultaneously identifies the active face.
- Uniformly tighten the cover screws (approx. 1 Nm).
- Fitting is only authorised in a de-energised condition
- Do not use the sensor and the actuator as a mechanical backstop.
- Any mounting position, provided that the active surfaces are opposite
- Inseparably fix the sensor and the actuator to the safety guard
- Exclusively mount the safety sensor on flat surfaces to avoid tensile stresses that could damage the sensor or lead to varying switching distances
- If possible, do not install the safety sensor and the actuator on ferromagnetic material.
- Do not install the safety sensor and the actuator in strong magnetic fields
- 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

3.2 Dimensions

All measurements in mm.

Safety sensor and actuator



Actuating planes BNS 16 Actuating planes BNS 16 LR



BNS 16-12ZD
BNS 16-12ZU
BNS 16-12ZV
BNS 16-12ZR
BNS 16-12ZL

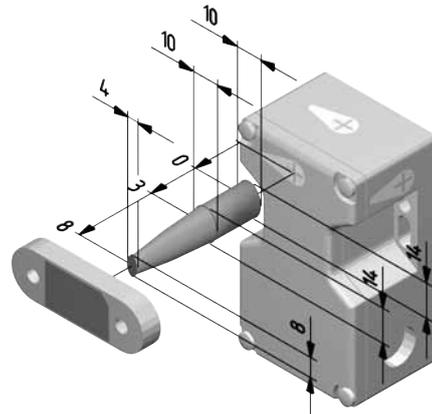


BNS 16-12ZLR

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: $s_{ao} = 8 \text{ mm}$
assured switch-off distance: $s_{ar} = 18 \text{ mm}$

Adjustment

The proper functionality must always 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.

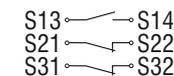
The safety sensors must be wired in accordance with the specified terminal diagram.

4.2 Contact variants

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

Safety contacts: S21-S22 and S13-S14
Signalling contact: S31-S32

BNS 16-12Z



In combination with an AES safety-monitoring module, the wires of the safety sensor must be wired in the following way:
NO contact: S13-S14 at the "NO input" of the safety-monitoring module
NC contact: S21-S22 at the "NC input" of the safety-monitoring module
NC contact: S31-S32 can be used for signalling purposes.
In this way, the coding of the safety sensor is ensured. Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

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. Fitting of the sensor and the actuator
2. Fitting and integrity of the power cable
3. The system is free of dirt and soiling (in particular metal chips)

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.

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.

7.1 EC Declaration of conformity

	
<h2>EC Declaration of conformity</h2>	
Translation of the original declaration of conformity valid as of December 29, 2009	K.A. Schmersal GmbH Industrielle Sicherheitsschaltssysteme Mödinghofe 30, D - 42279 Wuppertal Germany Internet: www.schmersal.com
We hereby certify that the hereafter described safety components both in its basic design and construction conforms to the applicable European Directives.	
Name of the safety component:	BNS 16
Description of the safety 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.
Harmonised EC-Directives:	2006/42/EC EC-Machinery Directive
Person authorized for the compilation of the technical documentation:	Ulrich Loss Mödinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, July 22, 2009
BNS 16-B-EN	
	Authorised signature Heinz Schmersal Managing Director



Note

The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.



K. A. Schmersal GmbH
Industrielle Sicherheitssysteme
Möddinghofe 30, D - 42279 Wuppertal
Postfach 24 02 63, D - 42232 Wuppertal

Telefon +49 - (0)2 02 - 64 74 - 0
Telefax +49 - (0)2 02 - 64 74 - 1 00
E-Mail: info@schmersal.com
Internet: <http://www.schmersal.com>