S SCHMERSAL

EN Operating instructionspage

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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. he 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 correct 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 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 when safety switchgear is used. The relevant requirements of the standard ISO 14119 must be observed.

BNS 40S

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 40S-12Z1)-2-3

No.	Option	Description
1		without LED
	G	with LED
2		Through-holes
	С	Rear-side threaded hole
3		Cable, 1 m
	LST	Cable with connector M12, 0.3 m
Actuator		
BPS 40S-1,		Actuator installation position, horizontally
BPS 40S-1-C		on one level with the sensor
BPS 40S-2,		Actuator installation position vertically 90°
BPS 40S-2-C		offset to sensor

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 safety sensor is designed for application in safety circuits and is used for monitoring the position of movable safety guards to ISO 14119 and IEC 60947-5-3. The safety switches are used for applications. in which the hazardous situation is terminated without delay when the safety guard is opened. To actuate the safety sensors, only the above-mentioned actuators can be used, conventional magnets are not

Only the entire system consisting of the safety sensor the actuator and the safety-monitoring module meets the requirements of the standard IEC 60947-5-3.



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

The safety sensor is especially suitable for food-processing machinery and plants. Due to the stainless steel enclosure, the safety sensor is resistent to corrosion and cleaning agents. The safety sensor is suitable for concealed mounting behind non-ferromagnetic covers.



Information for the selection of suitable safety-monitoring modules can be found in the Schmersal catalogues or in the online catalogue on the Internet: www.schmersal.net.

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

Safety sensors equipped with LED's shall not be wired in series, except for the Protect-IE 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. Please observe that the diagnostic coverage could reduce if multiple safety sensors are connected to one safety-monitoring module.



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

2.4 Technical data

IEC 60947-5-3, BG-GS-ET-14	2.4 Technical data Standards:
rectangular	Design:
stainless steel V4A	Enclosure:
(material desgination according to DIN 1.3960)	(mat
IP69K according to IEC 60529	Protection class:
	Connection type:
LIYY, 1 m, (food safe)	- Cable:
or: LIYY, 0.3 m, (food safe),	- Cable with connector:
Connector with VA-thread M12, 8-pin	
6 × 0.25 mm²	Cable section:
magnetic	Operating principle:
BPS 40S-1, BPS 40S-2,	Actuating magnet:
BPS 40S-1-C, BPS 40S-2-C, coded	
stance s _{ao} : 8 mm	Assured switching distance sa
istance s _{ar} : 18 mm	Assured switch-off distance s
ling to ISO 14119: low	Coding levels according to IS
ndication: LED only with ordering suffix G	Switching condition indication
	Switching voltage:
max. 100 VAC/DC	- without LED:
max. 24 VDC	- with LED:
max. 30 VAC/DC	- Version LST:
max. 30 VAC/DC	Switching current:
max. 250 mA	Switching current:
max. 250 mA	Switching current: - without LED:
max. 250 mA max. 10 mA	Switching current: - without LED: - with LED:
max. 250 mA max. 10 mA max. 3 W	Switching current: - without LED: - with LED: Switching capacity:
max. 250 mA max. 10 mA max. 3 W max. 240 mW	Switching current: - without LED: - with LED: Switching capacity: - without LED:
max. 250 mA max. 10 mA max. 3 W max. 240 mW it current:	Switching current: - without LED: - with LED: Switching capacity: - without LED: - with LED:
max. 250 mA max. 10 mA max. 3 W max. 240 mW it current: 100 A e: -25 °C +80 °C rt temperature: -25 °C +80 °C	Switching current: - without LED: - with LED: Switching capacity: - without LED: - with LED: Required short-circuit current: Ambient temperature: Storage and transport temper
max. 250 mA max. 10 mA max. 3 W max. 240 mW it current: 100 A e: -25 °C +80 °C rt temperature: -25 °C +80 °C	Switching current: - without LED: - with LED: Switching capacity: - without LED: - with LED: Required short-circuit current: Ambient temperature:
e: -25 °C +80 °C rt temperature: -25 °C +80 °C max. 5 Hz	Switching current: - without LED: - with LED: Switching capacity: - without LED: - with LED: Required short-circuit current: Ambient temperature: Storage and transport temper

2.5 Safety classification

2.5 Galety classification	
Standards:	ISO 13849-1
Safety contact:	
- NC / NC combination:	S21-S22 and S31-S32
- NC / NC combination:	S21-S22 and S13-S14
Intended structure:	
- 2-channel usage	useable to cat. 4 / PL e
	with suitable logic unit
B _{10d} NC contacts at 20 % contact load:	25.000.000
B _{10d} NO contacts at 20 % contact load:	25.000.000
Service life:	20 years

$$\mbox{MTTF}_{d} = \frac{B_{10d}}{0.1 \, x \, n_{op}} \qquad n_{op} = \frac{d_{op} \, x \, h_{op} \, x \, 3600 \, s/h}{t_{\, cycle}} \label{eq:nop}$$

(Determined values can vary depending on the application-specific parameters $\mathbf{h}_{\text{op}},\,\mathbf{d}_{\text{op}}$ and $\mathbf{t}_{\text{cycle}}$ as well as the load.)

If multiple safety components are wired in series, the Performance Level to 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.
- 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.
- Do not install the safety sensor and the actuator in strong magnetic fields.
- If possible, do not mount the sensor and the actuator on ferromagnetic material. When the sensor and the actuator are installed on ferromagnetic material, variations can be expected in the limit distances. The use of a non-magnetic spacer of at least 5 mm thick must be used. The use of non-magnetic fixing screws is recommended also.
- 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.

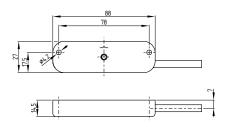


Also suitable for concealed mounting behind non-ferromagnetic covers.

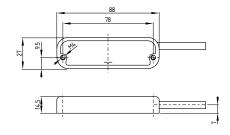
3.2 Dimensions

All measurements in mm.

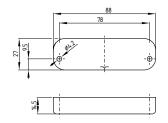
BNS 40 AS safety sensor



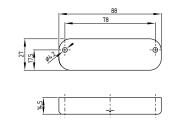
BNS 40S-...-C safety sensor



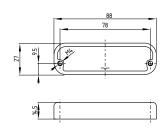
BPS 40S- Actuator



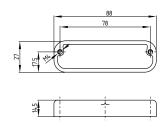
BPS 40S-2 Actuator



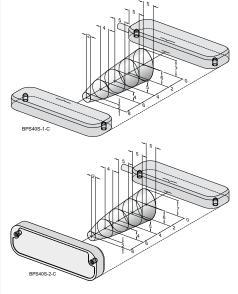
BPS 40S-1-C Actuator



BPS 40S-2-C Actuator



3.3 Installation position and switch distance



3.4 Adjustment

Align the central markings of the safety sensor and the actuator with each other. 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.



Recommended Adjustment

Align the safety sensor and actuator at a distance of 0.5 x sao

4. Electrical connection

4.1 General information for electrical connection

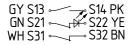


The electrical connection may only be carried out by authorised personnel in a de-energised condition.

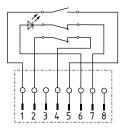
The safety sensors must be wired in accordance with the specified wire colours.

4.2 Contact variants

The contact position shows the actuated sensor function when the safety guard is closed. For safety sensors with LED, the LED is illuminated when the safety guard is closed. The contact configurations of the versions with or without LED are identical.



BNS 40S-...(G)-LST



4.3 Connection

The safety sensor is suitable for use in conjunction with safety-monitoring modules, which are controlled through NO/NC safety inputs or NC/NC safety inputs.

In these versions, the optional LED is integrated in the S21-S22 circuit.

Connection to safety-monitoring modules with NO/NC inputs:

NO contacts: S13 - S14 to the NO input of

the safety-monitoring module (AES safety-monitoring module:

terminal S13 - S14)

NC contacts: S21 - S22 at the NC input S21 - S22

of the safety-monitoring module (AES safety-monitoring module:

terminal S21 - S22)

NC contacts: S31 - S32 can be used as signalling contact

Connection to safety-monitoring modules with NC/NC inputs:

NC contacts: S21 - S22 at the 1st NC input

safety-monitoring module (AES safety-monitoring module:

terminal S11 - S12)

NC contacts: S31 - S32 at the 2st NC input

safety-monitoring module (AES safety-monitoring module:

terminal S21 - S22)

NO contacts: S13 - S14 can be used as signalling contact

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.



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.

7.1 EC Declaration of conformity

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EC Declaration of conformity

Translation of the K.A. Schmersal GmbH & Co. KG original Declaration of Conformity Möddinghofe 30

Möddinghofe 30 42279 Wuppertal Germany

Internet: www.schmersal.com

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

Name of the safety component: BNS 40S

Type: Refer to ordering code

Description of the safety component: Coded magnetically operated safety sensor

Relevant EC-Directives: 2006/42/EC - EC-Machinery Directive

Person authorised for the compilation of the technical documentation:

Oliver Wacker Möddinghofe 30 42279 Wuppertal

Place and date of issue: Wuppertal, May 6, 2015

Authorised signature Philip Schmersal Managing Director

BNS40S-B-EN



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

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