SCHMERSAL

EN Operating instructions. . . . . .pages 1 to 6
Original

Content

1. About this document

1.1 Function

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning for the safe operation and disassembly of the safety-monitoring module. 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 correct functionality of the entire machine or plant.

The safety-monitoring module 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.

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

x.000 / 11.2017 / v.A. - 101126006-EN / H / 2017-11-17 / AE-Nr. 8410

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-monitoring module, 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:

AES 1102. ①

No.	Option	Description
①	Without	24 VDC
	1	110 VAC
	2	230 VAC
	3	24 VAC
	4	42 VAC

AES 1112. ①

No.	Option	Description
①	Without	24 VDC
	1	110 VAC
	2	230 VAC
	3	24 VAC
	4	42 VAC

Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive is maintained.

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-monitoring modules for integration in safety circuits are designed for fitting in control cabinets. They are used for the safe evaluation of the signals of positive break position switches for safety functions or magnetic safety sensors on sliding, hinged and removable safety guards.

AES 1102
Monitoring one safety switch or multiple safety switches in series-parallel circuits.
The number of connected safety switches is restricted by the contract transition resistance and the conduction resistance. This overall resistance must not exceed 300 Ω. For magnetic safety sensors with LED, the brightness of the LED's reduce as the amount of guard doors opened increases.

AES 1112
Monitoring of two safety switches, which are actuated by different safety guards (e.g. two guard doors, which are opened independently from one another). The green LED indicates that the authorised operation.

2.4 Technical data

Standards:	IEC / EN 60204-1; EN 60947-5-3; EN ISO 13849-1; IEC 61508; BG-GS-ET-14; BG-GS-ET-20
Start conditions:	Automatic
Feedback circuit available:	no
Start-up test:	no
Drop-out delay in case of "emergency stop":	< 50 ms
Rated operating voltage U_e:	AES 1102 / 1112: 24 VDC ± 15% AES 1102.1 / 1112.1: 110 VAC AES 1102.2 / 1112.2: 230 VAC AES 1102.3 / 1112.3: 24 VAC AES 1102.4 / 1112.4: 42 VAC
Rated operating current I_e:	AES 1102: 0.1 A AES 1112: 0.03 A
Rated insulation voltage U_i:	250 V
Rated impulse withstand voltage U_{imp}:	4 kV
Thermal test current I_{the}:	4 A
Internal electronic fuse:	no
Power consumption:	< 5 W
Monitored inputs:	
Cross-wire short detection:	no
Wire breakage detection:	yes
Earth connection detection:	no
Number of NC contacts:	AES 1102: 2 AES 1112: 4
Number of NO contacts:	AES 1102: 1 AES 1112: 2
Outputs:	
Stop category 0:	1
Stop category 1:	0
Number of safety contacts:	1
Number of auxiliary contacts:	0
Switching capacity of the safety contacts:	min. 10 mA max. 4 A
Utilisation category to EN 60947-5-1:	AC-15: 230 V / 3 A DC-13: 24 V / 2 A
Max. fuse rating:	4 A gG D-fuse
Mechanical life:	3 million operations
LED display:	green LED: Authorized operation
Ambient conditions:	
Operating temperature:	0 °C ... +55 °C
Storage and transport temperature:	−25 °C ... +70 °C
Protection class:	Enclosure: IP40 Terminals: IP20 Clearance: IP54
Degree of pollution:	2
Mounting:	Snaps onto standard DIN rail to EN 60715
Connection type:	Screw connection
Min. cable section:	0.25 mm²
Max. cable section:	2.5 mm², solid strand or multi-strand lead (including conductor ferrules)
Tightening torque:	0.6 Nm
Max. cable length:	1000 m of 0.75 mm² conductor

Weight:	AES 1102 / 1112: 120 g AES 1102.1 / 1112.1: 160 g AES 1102.2 / 1112.2: 160 g AES 1102.3 / 1112.3: 125 g AES 1102.4 / 1112.4: 160 g
Dimensions (H x W x D):	75 x 22.5 x 110 mm

2.5 Safety classification

Standards:	EN ISO 13849-1; IEC 61508
PL:	up to
Control category:	up to 1
PFH-value:	1.14 x 10^{-6} / h; applicable ' for applications with up to max. 50,000 switching cycles / year and max. 80 % contact load. Diverging applications upon request.
SIL:	up to 1
Service life:	20 years

3. Mounting

3.1 General mounting instructions

Mounting: snaps onto standard DIN rails to EN 60715.

3.2 Dimensions

Device dimensions (H/W/D): 75 x 22,5 x 110 mm

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.

Wiring examples: see appendix

As far as the electrical safety is concerned, the protection against unintentional contact of the connected and therefore electrically interconnected apparatus and the insulation of the feed cables must be designed for the highest voltage, which can occur in the device.

To avoid EMC disturbances, the physical ambient and operational conditions at the place where the product is installed, must meet the provisions laid down in the paragraph "Electromagnetic Compatibility (EMC)" of DIN EN 60204-1.

5. Operating principle and settings

5.1 Operating principle

The AES 1102 and AES 1112 have a triple redundant structure for monitoring guard doors. A first fault can lead to a failure of one of the three channels, whereby the two other channels maintain their safe function. This also applies in case of a second fault. In this way, the requirements in case of fault to EN 60947-5-3 are fulfilled. Only when a third fault occurs, a hazardous situation can be created, when the three accepted faults lead to the actuation of the output relay. As the safety-monitoring modules do not automatically recognise the faults, a regular check of the system is recommended. The test intervals must be adjusted to the specific application (hazard level, mechanical and electrical stress).

If the safety guard is opened, the enabling path of the safety-monitoring module will open. The machine is stopped.

Inputs

AES 1102: C/S14/S22/S32
Connect the safety switch with two NC contacts and one NO contact to input S14/S22/S32

AES 1112: S1- C/S14/S22/S32; S2- C/S14/S22/S32
Connect the safety switch with two NC contacts and one NO contact to input S14/S22/S32

Outputs

Enabling paths 13-14: NO contacts for safety functions

6. Set-up and maintenance

6.1 Functional testing

The safety function of the safety-monitoring module must be tested.
The following conditions must be previously checked and met:
1. Correct fitting of the safety-monitoring module
2. Fitting and integrity of the power cable

6.2 Maintenance

In the case of correct installation and adequate use, the safety-monitoring module features maintenance-free functionality.
A regular visual inspection and functional test, including the following steps, is recommended:
• Check the correct fixing of the safety monitoring module
• Check the cable for damage.

The device has to be integrated into the periodic check-ups according to the Ordinance on Industrial Safety and Health, however at least 1x/year.

Damaged or defective components must be replaced.

7. Disassembly and disposal

7.1 Disassembly

The safety monitoring module must be disassembled in the de-energised condition only.

7.2 Disposal

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

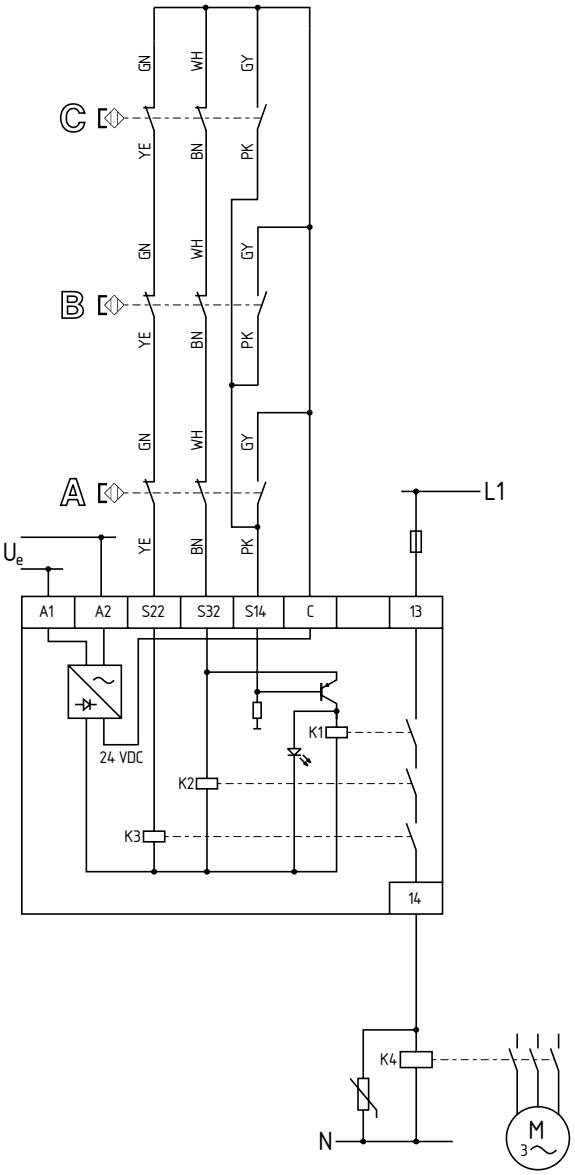
8. Appendix

8.1 Wiring examples

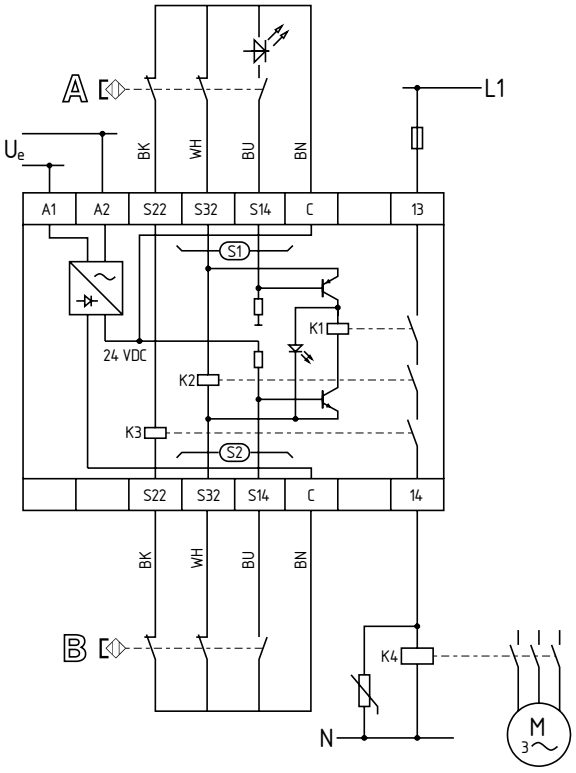
The application examples shown are suggestions. They however do not release the user from carefully checking whether the switchgear and its set-up are suitable for the individual application.

The wiring diagram is shown with guard doors closed and in a de-energised condition. Inductive loads (e.g. contactors, relays, etc.) are to be provided with suitable interference suppression circuitry. Do not connect additional loads to terminal S..

AES 1102
Monitoring of multiple safety guards in series-parallel circuits by mens of magnetic safety sensors



AES 1112
Monitoring of two safety guards by means of a magnetic safety sensor



Key

⊖	Positive break
A - C	Non-contact safety sensor

9. EU Declaration of conformity

EU Declaration of conformity

SCHMERSAL

Original

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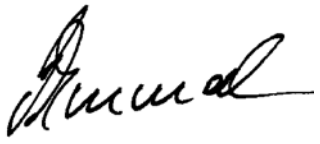
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component:	AES 1102, AES 1112
Type:	See ordering code
Description of the component:	Safety-monitoring module for non-contact safety switches and safety relay combination in connection with the BNS series magnetic safety switches
Relevant Directives:	Machinery Directive 2006/42/EC EMC-Directive 2014/30/EU RoHS-Directive 2011/65/EU
Applied standards:	DIN EN 60947-5-3:2014, DIN EN ISO 13849-1:2016, DIN EN ISO 13849-2:2013
Notified body for the prototype test:	DGUV Test Prüf- und Zertifizierungsstelle Elektrotechnik Gustav-Heinemann-Ufer 130 50968 Köln ID n°: 0340
EC-prototype test certificate:	ET 16118
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, June 19, 2017



Authorised signature
Philip Schmersal
Managing Director

AES1102-1112-E-EN

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

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