



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-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 indicates 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 relay modules may be used exclusively 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 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 ISO 14119 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 1185^①

No.	Option	Description
①	.3	24 VDC 24 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 as well as emergency stop control devices.

Design

The safety relay module is a two-channel version. It includes two safety relays with monitored positive action contacts. The series-wired NO contacts of the relays form the enabling path.



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

Standards:	EN 60947-5-3, EN ISO 13849-1
Start conditions:	Automatic or start button
Feedback circuit available:	yes
Start-up test:	no
Pull-in delay for automatic start:	adjustable 0.1 / 1.0 second
Drop-out delay in case of "emergency stop":	< 50 ms
Rated operating voltage U_e :	AES 1185: 24 VDC \pm 15 % AES 1185.3: 24 VAC \pm 15 %/-10 %
Rated operating current I_e :	0.2 A
Rated insulation voltage U_i :	250 V
Rated impulse withstand voltage U_{imp} :	4.8 kV
Thermal test current I_{the} :	4 A
Internal fuse:	yes
Power consumption:	< 5 W
Monitored inputs:	
Cross-wire short detection:	yes
Wire breakage detection:	yes
Earth connection detection:	yes
Number of NC contacts:	3
Number of NO contacts:	3
Outputs:	
Stop category 0:	1
Stop category 1:	0
Number of safety contacts:	1
Number of auxiliary contacts:	0
Number of signalling outputs:	0
Switching capacity of the safety contacts:	4 A
Utilisation category to EN 60947-5-1:	AC-15: 250 V / 2 A, DC-13: 24 V / 2 A
Max. fuse rating:	4 A gG D-fuse
Mechanical life:	> 50 million operations
LED display:	ISD
Ambient conditions:	
Operating temperature:	0 °C ... +55 °C
Storage and transport temperature:	-25 °C ... +70 °C
Degree of protection:	Enclosure: IP40 Terminals: IP20 Clearance: IP54
Degree of pollution:	2
Mounting:	snaps onto standard rail to EN 60715
Connection type:	Screw connection
Min. cable section:	0.25 mm ²
Max. cable section:	2.5 mm ² , solid strand or multi-strand lead (including conductor ferrules)
Tightening torque:	0.6 Nm
Weight:	140 g

2.5 Safety classification

Standards:	EN ISO 13849-1, IEC 61508
PL:	up to d
Control category:	up to 3
PFH-value:	1.0 x 10 ⁻⁷ / h; applicable for applications with up to max. 50,000 switching cycles / year and max. 80 % contact load. Diverging applications upon request.
SIL:	suitable for SIL 2 applications
Mission time:	20 years

3. Assembly

3.1 General mounting instructions

Mounting: snaps onto standard 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.

Settle length x of the conductor: 6 ... 7 mm



Wiring examples: see appendix

5. Operating principle and settings

5.1 Operating principle after the operating voltage is switched on

If a safety guard is opened, the microprocessors switch off the internal relays and the enabling path is opened. The relays are only switched back on, when the function of the relays and all connected components could be tested. During a start-up cycle (opening and closing of at least one of the safety guards), all individual faults of the switches, cables/wires and safety relay module, which could lead to a dangerous situation, are detected. This always causes the relays to be switched off and therefore the enabling path to be opened.

Inputs

A1, A2	Supply Voltage
S1-S14 / S22, S2-S14 / S22, S3-S14/S22	Inputs for switches with one NC and one NO contact
X1	Input for the feedback of the external contactors.
S13	The terminal supplies the necessary supply voltage for the safety switch.

Notice

If one or two safety guards are connected, the unused terminal S22 must be bridged with terminal S13.

Outputs

Enabling path 13-14 NO contact for safety functions

Extension of enable delay time

On safety guards with strong residual vibrations, the end position of a non-contact position switch is often "overrun". This leads to an error message on the safety relay module. To avoid this, the "enabling delay time" can be extended by removing the device cover and setting an internal bridge (jumper).

Bridge closed:	enabling delay time = 1.0 second
Bridge open:	enabling delay time = 0.1 second (factory setting)

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. 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.

Damaged or defective components must be replaced.

7. Disassembly and disposal

7.1 Disassembly

The safety-monitoring module must be disassembled in a 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

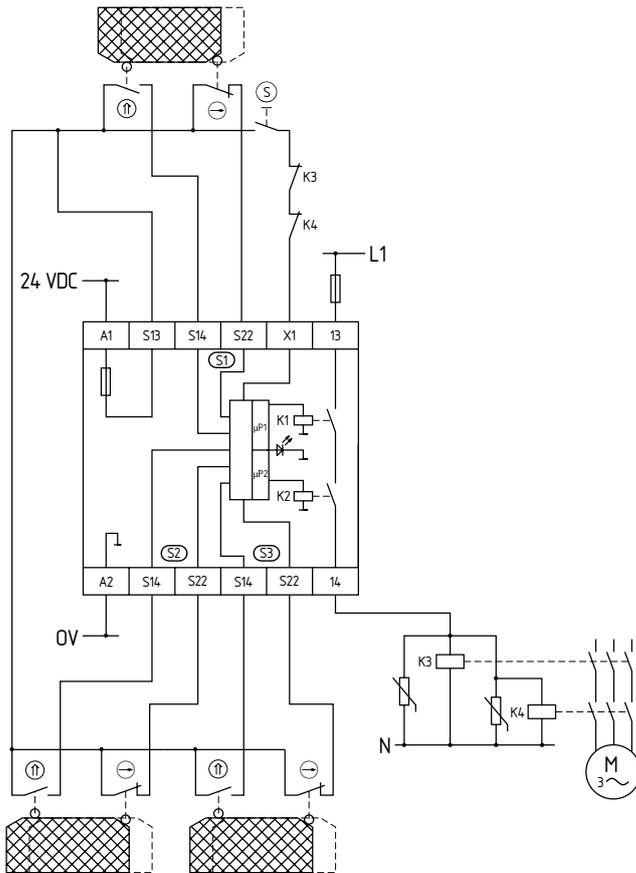
8.1 Wiring examples

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 application examples shown are suggestions.

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..

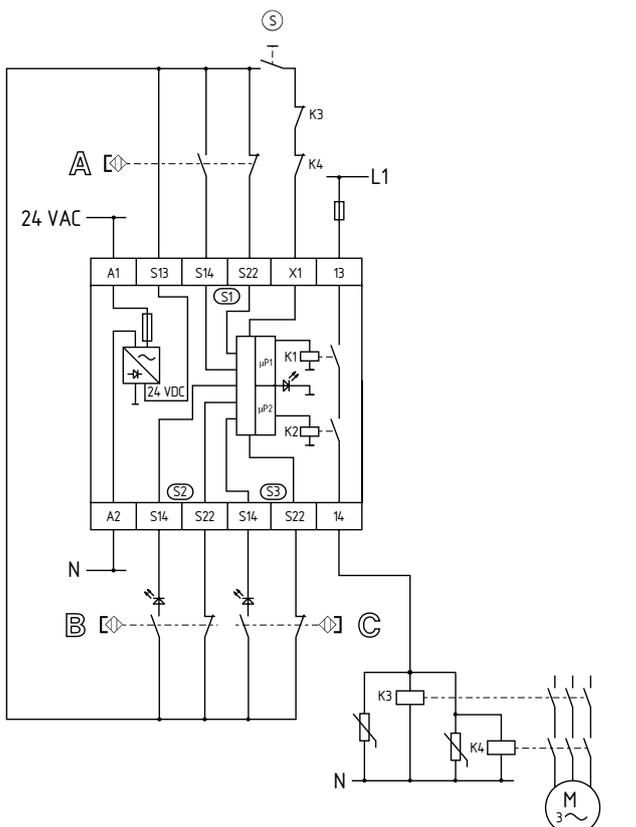
AES 1185 - DC devices

Monitoring of three safety guards by means of position switches with safety function



AES 1185.3 - AC devices

Monitoring of three safety guards by means of one magnetic safety sensor (BNS)



Key

- ⊖ Positive break
- Ⓢ Start button
- Ⓢ Actuated
- A - C Ⓢ Non-contact safety sensor

8.2 Integral System Diagnostics (ISD)

The LED indication of the safety relay module shows the different switching conditions and errors. The following tables show the different switching conditions.

Tables switching condition indication

Diagnostic LED	System condition
The LED is green.	Enabling paths closed
LED flashes green	Enable delay time running, enabling paths opened
LED flashes yellow (2 Hz)	Feedback circuit is open

If a safety guard is opened, the LED indication changes.

Indication (yellow) LED	System condition
1 impulse	Safety guard 1 open
2 impulses	Safety guard 2 open
3 impulses	Safety guard 3 open

Table error indications

Indication (orange) LED	Error	Cause
1 impulse	Error safety guard 1	Defective supply voltage lead, defective switch, erroneous fitting of the switch; switch only partially actuated* for at least 5 s; cross-wire short
2 impulses	Error safety guard 2	Refer to Error safety guard 1
3 impulses	Error safety guard 3	Refer to Error safety guard 1
5 impulses	One or both relays did not close within the monitoring time	Too low operating voltage U_e , Defective relay
6 impulses	Relay not disabled upon the actuation of the switch	Welded relay contact
7 impulses	Interference signals at the inputs (no safe evaluation assured)	Too high capacitive or inductive interference at the input signal

* Partial actuation: position of the switch, in which only one contact was actuated.

Deleting the error message

The error message is deleted once the fault has been rectified and after the connected switch has been actuated to check the various functions (open and then close the safety guard).

9. EU Declaration of conformity

EU Declaration of conformity



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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 1185

Type: See ordering code

Description of the component: Safety relay 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:
EN 60947-5-3:2013
EN ISO 13849-1:2015

Notified body, which approved the full quality assurance system, referred to in Appendix X, 2006/42/EC:
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AES1185-D-EN



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



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