



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 monitor. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.



Detailed information can be found in the wiring and operating instructions manual as well as in the "asimon configuration software" manual. These manuals can be found on the "asimon CD".

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 monitor 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 inadequate or improper use or manipulations of the safety device, personal hazards or damage 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:

ASM ①		
No.	Option	Description
①	E1-R2	1 Enabling circuit
	E2-R2/R2	2 Enabling circuits

2.2 Destination and use

When used as intended, the AS-i safety monitor enables the operation of sensor-controlled devices for the protection of man and other safety components up to and including control category 4 / PL e to EN ISO 13849-1. If sensors with a lower safety levels are connected, the maximum achievable control category for the corresponding safety path is defined by these sensors.

The safety monitor also executes the compulsory emergency stop function (stop category 0 or 1) for all non hand-operated machines as well as the dynamic monitoring of the restart function and the contactor control function.



The setting and modification of the device configuration by means of a PC and the asimon configuration software must only be executed by a safety expert authorised to that effect. The password required to change the device configuration must be locked away by the safety expert.

Suitable for:

- Safety monitor for 1 AS-i circuit
- Monitoring of up to 31 safe AS-i slaves, e.g. safety switches, solenoid interlocks, emergency stop buttons, two-hand controls, light curtains and light grids, etc.
- Control of up to 2 redundant enabling circuits
- Configurable monitoring devices for the different safety switchgear
- Filter functions for de-bouncing of safety guards
- Other functions:
 - AND operations, OR operations, start modules, on-site acknowledgment, start-up test, stop categories 0 and 1
- Edge-sensitive start button
- Feedback circuit to monitor external contactors
- LED status indication
- Signalling outputs (semi-conductor, short-circuit proof)



These devices are not suitable for:

- Controlling safe AS-i outputs
- Network connection of 2 AS-i circuits



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

2.3 Technical data

Standards:	EN 62026-2, IEC 60947-5-1, IEC 60204-1, EN 61496-1, ISO 13849-1, IEC 61508
Enclosure:	Polyamide PA 66, black
Mounting:	snaps onto standard DIN rail to EN 50022
Screw connection:	max. 2.5 mm ² (including conductor ferrules)
Protection class:	terminals IP20, enclosure IP20
U _b :	24 VDC ±15%
Residual ripple:	< 15%
I _b :	ASM E1-R2: 0.15 A; ASM E2-R2/R2: 0.2 A
Peak current upon start-up:	600 mA
AS-Interface voltage range:	18.5 ... 31.6 V
AS-interface power consumption:	< 45 mA
AS-Interface specification:	Profil-Monitor 7.F
Configuration interface:	RS 232: 9600 Baud, no parity, 1 startbit, 1 stopbit, 8 databits
Inputs:	1.Y1; 1.Y2; 2.Y1; 2.Y2
Input signal:	I _e < 10 mA, 24 VDC (optocoupler, high-active)
Outputs:	
Signalling outputs:	1.32; 2.32: transistor outputs PNP, max. 200 mA, protection against short-circuits and polarity reversal
Relay outputs:	
- ASM E1-R2:	1 enabling circuit, 1.13/14, 1.23/24;
- ASM E2-R2/R2:	2 enabling circuits, 1.13/14, 1.23/24; 2.13/14, 2.23/24
Utilisation category:	AC-15, DC-13
I _e /U _e :	3 A / 230 VAC; 1 A / 24 VDC
Switching voltage:	max. 230 VAC
I _{the} :	ASM E1-R2: 3 A each output circuit; ASM E2-R2/R2: 2 A each output circuit
Max. fuse rating:	max. 4 A (medium slow blow), external
Time to readiness:	≤ 10 s
Response time:	< 40 ms
Messages AS interface:	Supply voltage LED green, communication LED red; enabling circuits: status LED green/yellow/red
EMV:	conforming to EMC Directive
Overtoltage category:	III to DIN VDE 0110
Ambient temperature:	-20 °C ... +60 °C
Storage and transport temperature:	-30 °C ... +70 °C
Weight:	ASM E1-R2: approx. 350 g; ASM E2-R2/R2: approx. 450 g
Dimensions (H x W x D):	105 x 45 x 120 mm

2.4 Safety classification

Standards:	ISO 13849-1; IEC 61508
PL:	e
Control Category:	4
PFH value:	depending on n _{op} : PFH ≤ 9.1 x 10 ⁻⁹ / h for n _{op} ≤ 10,500 PFH ≤ 2.1 x 10 ⁻⁸ / h for n _{op} ≤ 28,000 PFH ≤ 5.0 x 10 ⁻⁸ / h for n _{op} ≤ 66,000
PFD:	≤ 6.1 x 10 ⁻⁵
SIL:	suitable for SIL 3 applications
Service life:	20 years
- Note:	The PFH values refer to 100 % of the nominal load and the contact load AC-15, DC-13

3. Mounting

3.1 General mounting instructions

The AS-i monitor is fitted in the control cabinet onto 35 mm DIN rails to EN 50022.

Mounting accessories

As the AS-i safety monitor is a safety component, the configuration interface CONFIG and the button operation can be sealed to prevent unauthorised access. To that effect, the device is supplied with a transparent cover with attachment hook for installing a seal wire once the monitor is fitted.

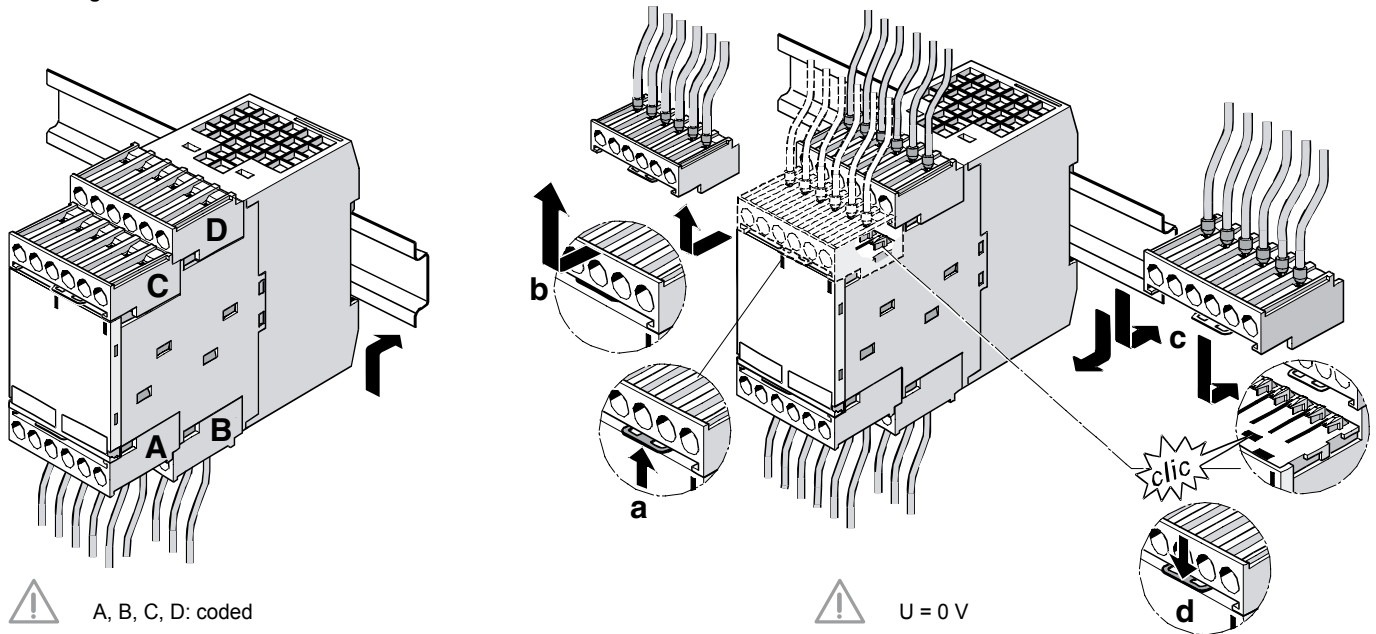
Note

The transparent cover with attachment hook must always be installed, considering that it offers a good protection against electrostatic discharges (ESD) and the penetration of foreign particles into the RJ45 connector CONFIG of the configuration interface of the AS-i safety monitor.

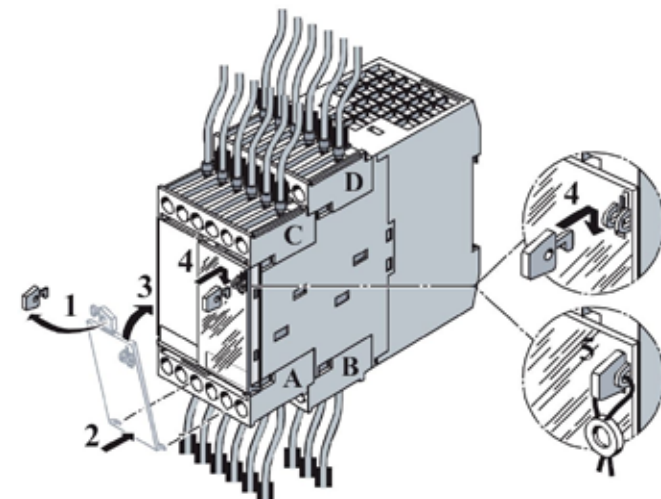
3.2 Dimensions

Device dimensions (H/W/D): 105 x 45 x 120 mm

Mounting



Sealing



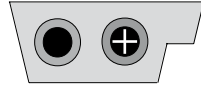
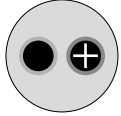
4. Electrical connection

4.1 General information for electrical connection



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

AS-i bus connection



2-strand AS-i rounded cable

(recommended: flexible power line H05VV-F2x1.5 to DIN VDE 0281):

- AS-i -: Blue
- AS-i +: Brown

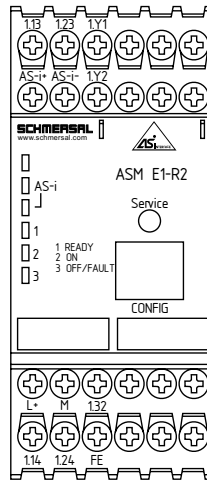
Yellow AS-i ribbon cable

- AS-i -: Blue
- AS-i +: Brown

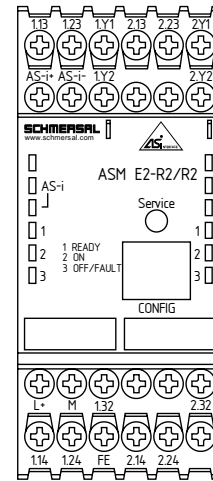
4.2 Pin configuration

Clip	Signal / Description
AS-i +	AS-i connection at the AS-i bus system
AS-i -	AS-i connection at the AS-i bus system
L+	+24 VDC / Supply voltage
M	GND / Ground
FE	functional earth connection
1.Y1	EDM 1 / input contactor control channel 1
1.Y2	Start 1 / start input channel 1
1.13 / 1.14	Enabling path 1 channel 1
1.23 / 1.24	Enabling path 2 channel 1
1.32	Signalling output "safety on" channel 1
2.Y1	EDM 2 / input contactor control channel 2
2.Y2	Start 2 / start input channel 2
2.13 / 2.14	Enabling path 1 channel 2
2.23 / 2.24	Enabling path 2 channel 2
2.32	Signalling output 2 "safety on" channel 2

ASM E1-R2



ASM E2-R2/R2



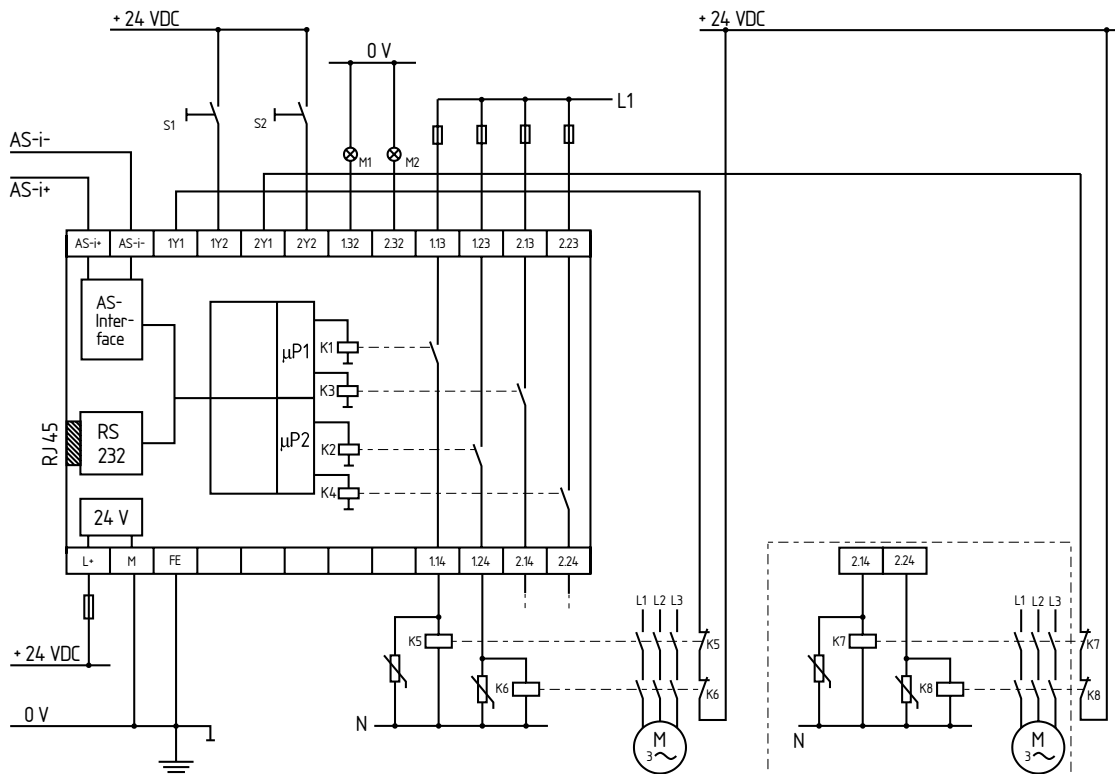
4.3 Wiring example

The wiring example represents the ASM E2-R2/R2 safety monitor taking account of start buttons and feedback circuits. Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

If multiple safety circuits must be set up, the number of safety components, safety monitor included, must not exceed a total of 31 safe participants.

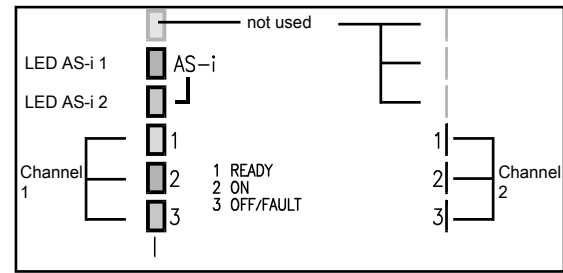
For the planning, the configuration and the set-up of the AS-i network, the system limits to EN 62026-2 must be observed, especially the maximum number of AS-i participants and the max. AS-i cable length. (< 100 m without repeater).

When using multiple AS-i safety monitors, all safety sensors can be assigned to one or multiple ASM's in the configuration software.



4.4 LED indications

The LED indications located on the front of the AS-i safety monitor provide information about the operating mode and the device status.



LED	Colour	Meaning
AS-i 1	green, off green, continuously on	No supply AS-i supply present
AS-i 2	red, off red, continuously on	Normal operation Communication error
1 READY (each channel)	yellow, off yellow, continuously on yellow, flashing	– Start/restart interlock active external test required
2 ON (each channel)	green, off green, continuously on green, flashing	Contacts of the output switching element open Contacts of the output switching element closed Delay time running for stop category 1
3 OFF/FAULT (for each channel)	red, off red, continuously on red, flashing	Contacts of the output element closed Contacts of the output element open Fault at the monitored AS-i components level
1 READY 2 ON 3 OFF/FAULT (for each channel)	all together fast flashing	Internal device error

5. Set-up and maintenance

5.1 Functional testing

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

1. Fitting of the safety monitor
2. Fitting and integrity of the power cable

5.2 Maintenance

In the case of correct installation and adequate use, the safety monitor features maintenance-free functionality.

A regular visual inspection and functional test, including the following steps, is recommended:

- Check the fitting of the safety monitor
- Check the cable for damage.

Damaged or defective components must be replaced.

6. Disassembly and disposal


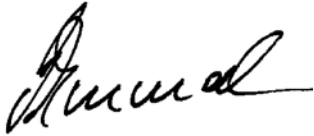
6.1 Disassembly

The AS-i safety monitor must be disassembled in de-energised condition only.

6.2 Disposal

The AS-i safety monitor 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		 SCHMERSAL
Original	K.A. Schmersal GmbH & Co. KG Möddinghofe 30 42279 Wuppertal Germany Internet: www.schmersal.com	
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:	ASM E1-R2, ASM E2-R2/R2	
Type:	See ordering code	
Description of the component:	AS-i safety monitor with monitoring function for safe AS-i slave at the AS-Interface	
Relevant Directives:	Machinery Directive	2006/42/EC
	EMC-Directive	2014/30/EU
	RoHS-Directive	2011/65/EU
Applied standards:	EN 62026-2:2013, EN 61496-1:2013, EN 50178:1997, EN ISO 13849-1:2015, IEC 61508 parts 1-7:2010, IEC 62061:2015 + AC:2015	
Notified body for the prototype test:	TÜV Rheinland Industrie Service GmbH Alboinstr. 56, 12103 Berlin ID n°: 0035	
EC-prototype test certificate:	01/205/5276.01/17	
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
Place and date of issue:	Wuppertal, February 23, 2017	
ASM E1-R2-D-EN		
	Authorised signature Philip Schmersal Managing Director	



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



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