Correct Use

The SR103AM is a universal emergency stop safety switching device with three safe relay outputs that can quickly and safely stop the moving parts of a machine or system in case of danger.

Applications for the SR103AM include single or dual-channel emergency stop circuits and guard monitoring on machines and systems.

Features

- 3 safe, redundant relay outputs
- 1 auxiliary contact (signaling contact)
- Connection of:
  - Emergency stop buttons
  - Safety switches
  - Non-contact safety switches
  - OSSD-Outputs
- Single and dual-channel operation possible
- Feedback loop for monitoring downstream contactors or expansion modules
- Cyclical monitoring of the output contacts
- Indication of the switching state via LED
- 2 start behaviors possible:
  - Monitored manual start
  - Automatic start
- Short circuit and earth fault monitoring
- Up to PL e, SIL CL 3, category 4

Function

The emergency stop safety switching device SR103AM is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 4, PL e according to EN ISO 13849-1.

The internal logical system closes the safety contacts when the start button is pressed.

When the safety switch is opened, the positively driven safety contacts are opened and safety switch the machine off. It is ensured that a single fault does not lead to a loss of the safety function and that every fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

Installation

As per EN 60204-1, the device is intended for installation in control cabinets with a minimum degree of protection of IP54. It is mounted on a 35 mm DIN rail according to DIN EN 60715 TH35.

Safety Precautions

- Installation and commissioning of the device must be performed only by authorized personnel.
- Observe the country-specific regulations when installing the device.
- The electrical connection of the device is only allowed to be made with the device isolated.
- The wiring of the device must comply with the instructions in this user information, otherwise there is a risk that the safety function will be lost.
- It is not allowed to open the device, tamper with the device or bypass the safety devices.
- All relevant safety regulations and standards are to be observed.
- The overall concept of the control system in which the device is incorporated must be validated by the user.
- Failure to observe the safety regulations can result in death, serious injury and serious damage.

Electrical Connection

- When the 24 V version is used, a control transformer according to EN 61558-2-6 or a power supply unit with electrical isolation from the mains must be connected.
- External fusing of the safety contacts (6A slow-blow or 8A quick-action or 10 A gG) must be provided.
- A maximum length of the control lines of 1000 meters with a line cross section of 0.75 mm² must not be exceeded.
- The line cross section must not exceed 2.5 mm².
- If the device does not function after commissioning, it must be returned to the manufacturer unopened. Opening the device will void the warranty.
Safety Technology & Innovation

Note: The items listed under “Electrical connection” must be observed during commissioning.

Commissioning Procedure

1. Wiring emergency stop circuit:
   Wire the emergency stop circuit according to the required Performance Level determined (see Fig. 1 to Fig. 5).

2. Wiring start circuit:
   Wire the start circuit according to Fig. 6 or Fig. 7 to set the starting behavior.
   Warning:
   If “Automatic start” is set, bear in mind that the safety contacts will switch immediately after the power supply is connected. If “Monitor manual start” is set, the start button must be opened after wiring.

3. Wiring feedback loop:
   If your application provides for external contactors or expansion modules, connect them to the device according to Fig. 8 or Fig. 9.

4. Wiring power supply:
   Connect the power supply to terminals A1 and A2 (Fig. 10).
   Warning: Wiring only in de-energized state.

5. Starting the device:
   Switch the operating voltage on.
   Warning:
   If the “Automatic start” starting behavior is set, the safety contacts will close immediately.
   If the “Monitor manual start” starting behavior is set, close the start button to close the safety contacts.

LEDs K1 and K2 are lit.

Reactivation:
Close the emergency stop circuit. If “Automatic start” is selected, the safety contacts will close immediately.
If the “Monitor manual start” starting behavior is set, close the start button to close the safety contacts.

Applications

Depending on the application or the result of the risk assessment according to EN ISO 13849-1, the device must be wired as shown in Fig. 1 to Fig. 11.

Fig. 1: Two-channel emergency stop circuit with short circuit and earth fault monitoring.
(category 4, up to PL e)

Fig. 2: Two-channel emergency stop circuit with earth fault monitoring.
(category 3, up to PL d)

Fig. 3: Single-channel emergency stop circuit with earth fault monitoring.
(category 1, up to PL c)

Fig. 4: Two-channel sliding guard monitoring with short circuit and earth fault monitoring.
(category 4, up to PL e)

Fig. 5: Two-channel emergency stop with pnp-outputs/OSSD-outputs with short circuit monitoring.
(category 4, up to PL e)

Notice:
In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC115/230V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN60204-1.

Fig. 6: Monitored manual start. It is monitored that the start button was opened before the emergency stop button closes. (Prerequisite: operating voltage must not be interrupted.)

Fig. 7: Automatic start. Max perm. delay during closing of the safety switches on S12 and S13:
S12 before S13: 300 ms
S13 before S12: any

Warning:
Safety contacts switch immediately when the power supply is connected.

Fig. 8: Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules.

Fig. 9: Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules.

Fig. 10: Power supply A1 and A2.
(Power supply according to techn. Data)

Fig. 11: Connecting load to safety contacts.
(Figure shows example. Voltage +V according to techn. Data)
Maintenance

The device must be checked once per month for proper function and for signs of tampering and bypassing of the safety function.

What to Do in Case of a Fault?

Device does not switch on:
- Check the wiring by comparing it to the wiring diagrams.
- Check the safety switch used for correct function and adjustment.
- Check whether the emergency stop circuit is closed.
- Check whether the start button (with manual start) is closed.
- Check the operating voltage at A1 and A2.
- Is the feedback loop closed?

Device cannot be switched on again after an emergency stop:
- Check whether the emergency stop circuit was closed again.
- Was the start button opened before closing of the emergency stop circuit (with manual start)?
- Is the feedback loop closed?
If the fault still exists, perform the steps listed under "Commissioning Procedure". If these steps do not remedy the fault either, return the device to the manufacturer for examination. Opening the device is impermissible and will void the warranty.

Device does not switch on:
- Check the wiring by comparing it to the wiring diagrams.
- Check the safety switch used for correct function and adjustment.
- Check whether the emergency stop circuit is closed.
- Check whether the start button (with manual start) is closed.
- Check the operating voltage at A1 and A2.
- Is the feedback loop closed?

Opening the device is impermissible and will void the warranty.

Technical Data

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<thead>
<tr>
<th>Load (DC13; 24V)</th>
<th>&lt;= 0.1A</th>
<th>&lt;= 1A</th>
<th>&lt;= 2A</th>
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<tr>
<td>Category:</td>
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<td>4</td>
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<tr>
<td>PL</td>
<td>e</td>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>PFHd [1h]:</td>
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<td>1,2E-08</td>
<td>1,2E-08</td>
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<tr>
<td>nop [cycle / year]</td>
<td>&lt;= 500.000</td>
<td>&lt;= 350.000</td>
<td>&lt;= 100.000</td>
</tr>
</tbody>
</table>

Note:
Additional data can be requested from the manufacturer for applications that deviate from these conditions.

Safety characteristics according to EN ISO 13849-1 for all variants of SR103AM

<table>
<thead>
<tr>
<th>Load (DC13; 24V)</th>
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<tr>
<td>Category:</td>
<td>4</td>
<td>4</td>
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<td>PFHd [1h]:</td>
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</tr>
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</table>

Note:
Additional data can be requested from the manufacturer for applications that deviate from these conditions.

Technical Data

Corresponds to the standards  
EN 60204-1; EN ISO 13849-1; EN 62061

Operating voltage  
SR103AM01 AC/DC 24V  
SR103AM02 AC 115V  
SR103AM03 AC 230V

Rated supply frequency  
50-60 Hz

Permissible deviation  
+ / - 10%

Power consumption  
DC 24V  
Ca. 2.3 W  
AC 230V  
ca. 6.9 VA

Control voltage at S11  
DC 24 V

Control current S11...S14  
approx. 60 mA

Safety contacts  
3 NO contacts

Auxiliary contacts  
1 NC contact

Max. switching voltage  
AC 250 V

Safety contact breaking capacity (13-14, 23-24, 33-34)  
AC: 250 V, 2000 VA, 8 A for ohmic load,  
250 V, 3 A for AC-15  
DC: 50 V, 400 W, 8 A for ohmic load;  
24 V, 3 A for DC-13  
Max. total current through all 3 contacts  
15 A (13-14, 23-24, 33-34) *

Auxiliary contact breaking capacity (41-42)  
AC: 250 V, 500 VA, 2 A for AC-12  
DC: 50 V, 100 W, 2 A for DC-12

Minimum contact load  
24 V, 20 mA

Min. Contact fuses  
6 A slow-blow or 8 A quick-action or 10 A gG

Max. line cross section  
0.14 - 2.5 mm²

Max. length of control line  
1000 m with 0.75 mm²

Contact material  
AgNi

Contact service life  
mech. approx. 1 x 10⁷; electr. 1 x 10⁸ operating cycles

Test voltage  
2.5 kV (control voltage/contacts)

Rated impulse withstand voltage, leakage path/air gap  
4 kV (DIN VDE 0110-1)

Rated insulation voltage  
250 V

Degree of protection  
IP20

Temperature range  
-15°C to +40°C *

Degree of contamination  
2 (DIN VDE 0110-1)

Overvoltage category  
3 (DIN VDE 0110-1)

Weight  
approx. 230 g

Mounting  
DIN rail according to EN 60715TH35

*) If several SR103AM devices are closely spaced under load, the max. total current at the ambient temperature of T=20°C: 9A;  
At T=30°C: 3A; at T=40°C =1A. If these currents are exceeded, a spacing of 5 mm between the devices must be observed.
EC Declaration of Conformity
The manufacturer named below herewith declares that the product fulfills the provisions of the directive(s) listed below and that the related standards have been applied.

OMRON Scientific Technologies Inc.
6550 Dumbarton Circle
Fremont, CA 94555, U.S.A.

Directives applied:
EMC directive 2004/108/EC
Machinery directive 2006/42/EC
RoHS directive 2002/95/EC

Standards applied:

Certificates:01/205/0692/14
TÜV: NB 0035
TÜV Rheinland Industrie Service GmbH - TÜV Rheinland Group
AM Grauen Stein, 51105 Köln, Germany

Fremont, May 2014
Marty Krikorian
Director, Quality Control
(Authorized Signer of Declarations of Conformity)
OMRON Scientific Technologies, Inc.

Representative in EU: J.H.P.W. Vogelaar
European Quality & Environment Operations Manager
Omron Europe B.V.
Zilverenbert 2, 5234 GM, ’s-Hertogenbosch
The Netherlands

The signed EC Declaration of Conformity is included with the product.
Authorized Distributor:

**Automation Control Systems**
- Machine Automation Controllers (MAC) • Programmable Controllers (PLC)
- Operator interfaces (HMI) • Distributed I/O • Software

**Drives & Motion Controls**
- Servo & AC Drives • Motion Controllers & Encoders

**Temperature & Process Controllers**
- Single and Multi-loop Controllers

**Sensors & Vision**
- Proximity Sensors • Photoelectric Sensors • Fiber-Optic Sensors
- Amplified Photomicrosensors • Measurement Sensors
- Ultrasonic Sensors • Vision Sensors

**Industrial Components**
- RFID/Code Readers • Relays • Pushbuttons & Indicators
- Limit and Basic Switches • Timers • Counters • Metering Devices
- Power Supplies

**Safety**
- Laser Scanners • Safety Mats • Edges and Bumpers • Programmable Safety Controllers • Light Curtains • Safety Relays • Safety Interlock Switches