

SR106ED

User Information for SR106ED

Correct Use

The SR106ED is an expansion module that can be operated with any basic device from the OMRON STI SR series, e.g. SR102AM or SR103AM, in order to permit delayed switch-off of machine parts. This could be the case if it is safer to return a tool to its initial position first instead of stopping operation immediately, for example. The SR106ED was developed as a component for a modular system.



(not for the plug-in terminals)

Any combination of SR106ED units and non-time-delayed SR105E expansion blocks can be interconnected with just a few lines, permitting realization of an overall system with different times and the specific number of safety contacts required.

Features

- 3 safe, redundant, time-delayed relay outputs
1 auxiliary contact (fault monitoring)
- Activation via basic device from the OMRON STI series
- Continuously adjustable delay, 1 to 30s
- Modular, freely configurable safety system
- Corresponds to STOP category 1
- Fault monitoring by basic device
- Indication of the switching state via LED
- Up to PL d, category 3, SILCL 2

Function

The time-delayed emergency stop safety switching device SR106ED in combination with a basic device from the OMRON STI SR series is designed for safe isolation of safety circuits according to EN 60204-1 and can be used up to safety category 3, PL d according to EN ISO 13849-1. The SR106ED provides a control voltage of DC 24V at terminal S11. In order for the SR106ED to switch together with the connected basic device, the control voltage at S11 is connected to terminals S15 and S16 of the SR106ED via one of the safety contacts of the basic device (see Wiring section on page 2).

The safety contacts of the basic device close when the basic device is activated, and the DC 24V control voltage at terminal S11 is then connected with terminals S15 and S16 of the SR106ED. The safety contacts of the SR106ED switch immediately.

The basic device disconnects the control voltage when the safety switch is operated, and the safety contacts of the SR106ED open after the time set on the SR106ED elapses (the power supply must be present during the time sequence).

If a fault occurs in the SR106ED, this is detected by the

basic device via terminals S25 and S26. Independent operation without basic device is not possible.

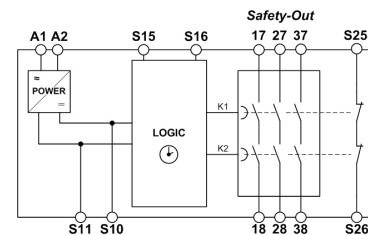


Fig. 1 Block diagram SR106ED

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.

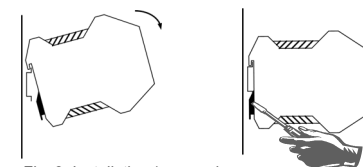


Fig. 2 Installation / removal

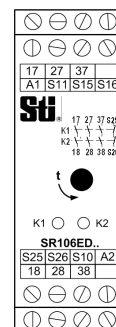
Safety Precautions



- 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 (4 A slow-blow or 6 A 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.



- A1: Power supply
- A2: Power supply
- S11: DC 24V control voltage
- S10: Control line
- S15: Control line
- S16: Control line
- S25: Fault monitoring
- S26: Fault monitoring
- 17-18: Time-delayed safety contact 1
- 27-28: Time-delayed safety contact 2
- 37-38: Time-delayed safety contact 3

Fig. 3 Connections

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Applications

Depending on the application, the device must be wired with an OMRON STI basic device as shown in Fig. 1 to Fig. 2.

Wiring

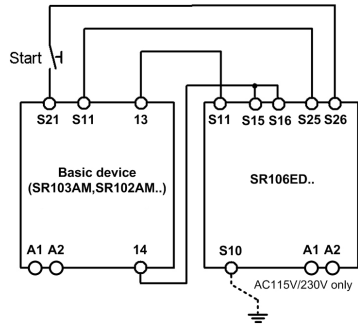


Fig. 1: Connection of SR106ED to basic device

Wiring of the SR106ED via only 4 lines:

A safety contact of the OMRON STI basic device (e.g. 13-14) activates the relays of the SR106ED (S11 and S15/S16).

Two lines on S25 and S26 are required for feedback/fault monitoring. A fault in the SR106ED thereby prevents the entire safety chain from restarting. Earth faults in the control lines are detected in addition to internal faults.

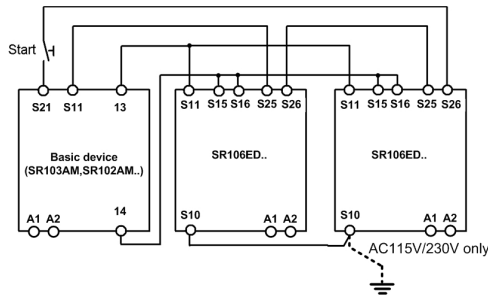


Fig. 2: Connection of several SR106ED units to basic device

If further SR106ED units are to be integrated into the system, terminals S11 must be connected in parallel on all SR106ED units. This also applies to terminals S10 and terminals S15/S16.

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.

Feedback Loop

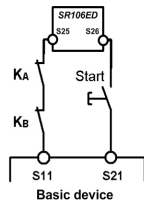


Fig. 3: Feedback Loop

Contacts connected to the SR106ED or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.

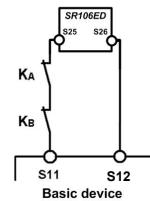


Fig. 4: Feedback Loop with Auto-Start

Contacts connected to the SR106ED or the basic devices are monitored via the feedback loop of the basic device. KA and KB are the positively driven contacts of the connected contactor or expansion module.

Power supply and Safety contacts

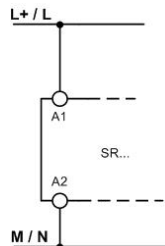


Fig. 5:

Power supply A1 and A2.

(Power supply according to techn. Data)

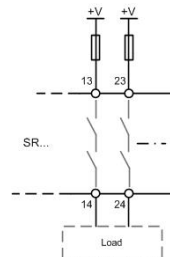


Fig. 6:

Connecting load to safety contacts.

(Figure shows example. Voltage „+V“ according to techn. Data)

Commissioning Procedure

Hinweis: Während der Inbetriebnahme sind die unter „Elektrischer Anschluss“ aufgeführten Punkte zu berücksichtigen.

1. Wiring SR106ED :

Wire the SR106ED with the OMRON STI basic device according to your application (see Fig. 1 to Fig. 2).

2. Wiring basic device:

Wire the basic device according to the required Performance Level determined (see user information for the basic device).

3. Wiring feedback loop:

Wire the feedback loop as shown in Fig. 3 and Fig. 4.

4. Wiring power supply:

Connect the power supply to terminals A1 and A2 (Fig. 5).

Warning: Wiring only in de-energized state.

5. Setting delay time:

Set the desired time delay on the rotary knob and seal the knob with the supplied sticker.

Warning:

Scale division lines should be regarded only as a setting aid. Always make sure to measure the delay time.

6. Starting the device:

Switch the operating voltage on.

Warning:

If the “Automatic start” starting behavior is set on the basic device, the safety contacts will close immediately.

If the “Monitored manual start” starting behavior is set, close the start button on the basic device to close the safety contacts.

The LEDs **K1** and **K2** on the basic device and on the SR106ED are lit when the safety contacts are closed.

7. Triggering safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts of the basic device open immediately; the safety contacts of the SR106ED open after expiration of the time set on the rotary knob.

Warning: Measure the delay time.

8. Reactivation:

Close the emergency stop circuit. If “Automatic start” is selected on the basic device, the safety contacts will close immediately.

If the “Monitored manual start” starting behavior is set, close the start button on the basic device to close the safety contacts of the basic device and the SR106ED.



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Maintenance

Once per month, the device must be checked for proper function and for signs of tampering and bypassing of the safety function (to do this, check the wiring of the device and activate the emergency stop function. Check the delay time).

The device is otherwise maintenance free, provided that it was installed properly.

What to Do in Case of a Fault?

Device does not switch on:

- Check the wiring of the SR106ED and the basic device by comparing it with the wiring diagrams (also see user information for the basic device).
- Check the safety switch used on the basic device for correct function and adjustment.
- Check whether the emergency stop circuit of the basic device is closed.
- Check whether the start button on the basic device (with manual start) is closed.
- Check the operating voltage at A1 and A2 on the basic device and on the SR106ED.
- 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?
- Is the power supply present during the time sequence?

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.

Safety Characteristics According to EN ISO 13849-1

The device is certified according to EN ISO 13849-1 up to a Performance Level of PL e.

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 SR106ED			
Load (DC13; 24V)	<= 0,1A	<= 1A	<= 2A
T10d [years]	20	20	20
Category:	3	3	3
PL	D	d	d
PFFhd [1/h]:	1,03E-07	1,03E-07	1,03E-07
nop [cycle / year]	<= 400.000	<= 73.000	<= 17.000

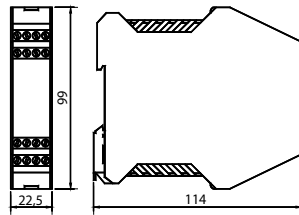
Technical Data

Corresponds to the standards	EN 60204-1; EN ISO 13849-1 ; EN 62061
Operating voltage	SR106ED01 SR106ED02 SR106ED03 AC/DC 24V AC 115V AC 230V
Rated supply frequency	50-60 Hz
Permissible deviation	+ / - 10%
Power consumption	DC 24V AC 230V ca. 1.5 W ca. 4 VA
Delay time	1 to 30 s, continuously adjustable
Control voltage at S11	DC 24 V
Control current S11...S14	max. 40 mA
Safety contacts	3 NO contacts
Signaling contacts	1 NC contact; monitoring contact for basic device
Max. switching voltage	AC 250 V
Safety contact breaking capacity	AC: 250 V, 1500 VA, 6 A for ohmic load, 250 V, 4 A for AC-15 DC: 24 V, 30 W, 1.25 A for ohmic load; 24 V, 30 W, 2 A for DC-13 Max. total current through all 3 contacts: 10.5 A
Minimum contact load	24 V, 20 mA
Min. Contact fuses	4 A slow-blow or 6 A quick-action or 10 A gG
Max. line cross section	0.14 - 2.5 mm ²
Max. length of control line	1000 m with 0.75 mm ²
Contact material	AgNi
Contact service life	mech. approx. 1 x 10 ⁷ , electr. 1 x 10 ⁵ 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	DC 24 V: -15°C to +60°C AC 230/115 V: -15°C to +40°C
Degree of contamination	2 (DIN VDE 0110-1)
Overvoltage category	3 (DIN VDE 0110-1)
Weight	approx. 230g
Mounting	DIN rail according to EN 60715TH35

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Dimensional Drawing



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:
EN ISO 13849-1:2008 + AC:2009
EN 62061:2005

Certificates:968/EZ 400.00/09
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.

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