Emergency Stop Safety Relay SRLC

Operating Instructions

English translation

Errors and technical changes reserved

Correct Use

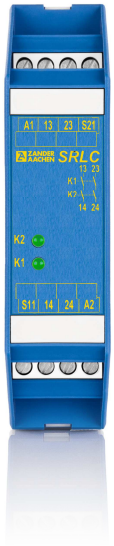
EN ISO 13849-1

EN IEC 62061
IEC 61511
IEC 61508

SRLC is low-cost emergency stop safety relay with which machines and systems can be safely switched off by disconnecting the power supply.

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

- *2 safe, redundant relay outputs*
- *Connection of:*
  - *Emergency stop buttons*
  - *Safety switches*
  - *Non-contact safety switches*
- *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:*
  - *Manual start*
  - *Automatic start*
- *Short circuit and earth fault monitoring*
- *Up to PL d, SIL 2, category 3*



Product Safety Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

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Function

The emergency stop safety switching device SRLC 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 internal logical system closes the safety contacts when the start button is pressed.

If the safety switch is opened, the positively driven safety contacts are opened and safely switch the machine off. It is ensured that a single fault does not lead to a loss of the safety function and that every internal fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again. Only a fault in the safety switch itself is not detected. This must be checked regularly as part of a maintenance plan.

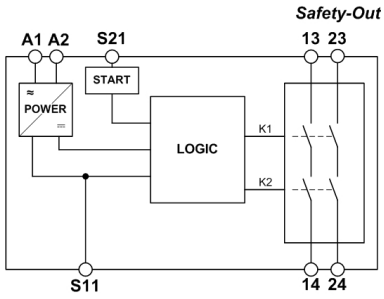


Fig. 1 Block diagram SRLC

Installation

As per EN 60204-1, the device is intended for installation in control cabinets with a minimum degree of protection of IP54. The following should be noted:

- Mounting on 35 mm rail according to EN 60715 TH35
- Ensure sufficient heat dissipation in the control cabinet
- With the AC 115 V / 230 V version, a minimum distance of 10 mm to adjacent devices must be maintained

Note: Spacer from ZANDER AACHEN (Art. No. 472596) for defined distances - See section Accessories.

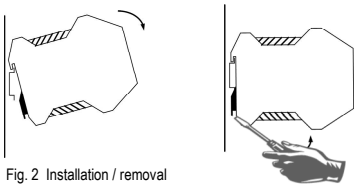


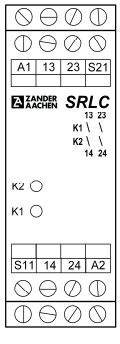
Fig. 2 Installation / removal

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.
- Note down the version of the product (see label “Ver: x”) and check it prior to every commissioning of a new device. If the version has changed, the overall concept of the control system in which the device is incorporated must be validated again by the user.

Electrical Connection

- Consider the information in the section "Techn. data"
- 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 contacts must be provided
- If the device does not function after commissioning, it must be returned to the manufacturer unopened. Opening the device will void the warranty
- Use adequate protective circuit for inductive loads (e.g. free-wheeling diode)



A1:	*Power supply*
A2 :	*Power supply*
S11:	*DC 24 V control voltage*
S21:	*Control line*
13-14:	*Safety contact 1*
23-24:	*Safety contact 2*

Fig. 3 Connections

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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. 4 to Fig. 8.

Emergency Stop Circuit

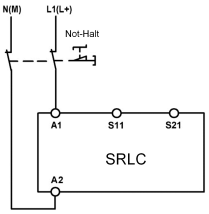

Fig. 4:
Two-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(up to category 3, PL d)

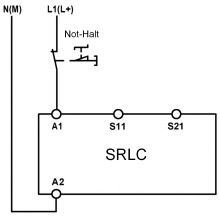

Fig. 5:
Single-channel emergency stop circuit without fault monitoring of the emergency stop button and the supply cables.
(up to category 1, PL c)

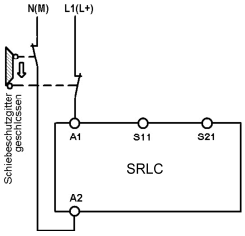

Fig. 6:
Two-channel sliding guard monitoring with positively driven limit switches.
(up to category 3, PL d)

Warning:
Corresponded to the application, the starting circuit have to be wired according to Fig. 7 or Fig. 8.

Starting Behavior

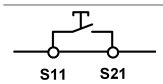

Fig. 7:
Manual start.

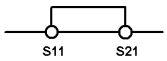

Fig. 8:
Automatic start
(e.g. for applications with a safety door).

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

Feedback Loop

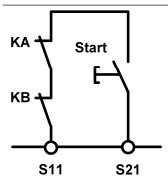

Fig. 9:
Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules .

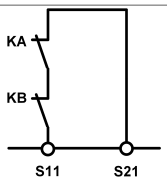

Fig. 10:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules .

Safety contacts

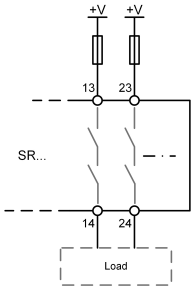

Fig. 11:
Connecting load to safety contacts.

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

Commissioning Procedure

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

1. Wiring emergency stop circuit:
Wire the emergency stop circuit according to the required Performance Level determined (see Fig. 4 to Fig. 6).

2. Wiring start circuit:
Wire the start circuit according to Fig. 7 or Fig. 8 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 “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. 9 or Fig. 10.

4. 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 “Manual start” starting behavior is set, close the start button to close the safety contacts.

LEDs ***K1*** and ***K2*** are lit.

5. Triggering safety function:
Open the emergency stop circuit by actuating the connected safety switch. The safety contacts open immediately.

6. Reactivation:
Close the emergency stop circuit. If “Automatic start” is selected, the safety contacts will close immediately.

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

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Maintenance

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

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 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.
- 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.

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 d.

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 SRLC

Load (DC-13; 24 V)	**<= 0,1 A**	**<= 1 A**	**<= 2 A**
T10d [years]	**20**	**20**	**20**
Category	**3**	**3**	**3**
PL	**d**	**d**	**d**
PFHd [1/h]	**1,03E-07**	**1,03E-07**	**1,03E-07**
nop [cycle / year]	**<= 400.000**	**<= 73.000**	**<= 17.000**

Techn. Data

Corresponds to the standards	EN 60204-1; EN ISO 13849-1; EN IEC 62061; IEC 61508 Parts 1-2 and 4-7; IEC 61511-1
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V
Rated supply frequency	50-60 Hz
Permissible deviation	+ / - 10 %
Power consumption	**DC 24 V** approx. 1.2 W **AC 230 V** approx. 3.5 VA
Control voltage at S11	DC 24 V
Control current S11...S14	max. 40 mA
Safety contacts	2 NO contacts
Max. switching voltage	AC 250 V
Safety contact breaking capacity (13-14, 23-24)	AC: 230 V, 1500 VA, 6 A for ohmic load 230 V, 4 A for AC-15 DC: 24 V, 30 W, 1.25 A for ohmic load 24 V, 30 W, 2A for DC-13
Minimum contact load	24 V, 20 mA
Contact fuses	6 A gG
Max. line cross section	0.14 - 2.5 mm^2
Tightening moment (Min. / Max.)	0.5 Nm / 0.6 Nm
Typ. switch-on delay / switch-off delay for NO contacts requested via safety circuit	< 50 ms / < 70 ms
Max. length of control line	1000m with 0.75 mm^2
Contact material	AgNi
Contact service life	mech. approx. 1 x 10^7
Test voltage	2.5 kV (control voltage/contacts)
Rated impulse withstand voltage, leakage path/air gap	4 kV (EN 60664-1)
Rated insulation voltage	250 V
Degree of protection	IP20
Temperature range	DC 24 V: -15 °C to +60 °C AC 230 V/ 115 V/ 24V: -15 °C to +40 °C
Max. altitude	≤ 2000 m (above sea level)
Degree of contamination	2 (EN 60664-1)
Overvoltage category	3 (EN 60664-1)
Weight	approx. 230 g
Mounting	DIN rail according to EN 60715 TH35

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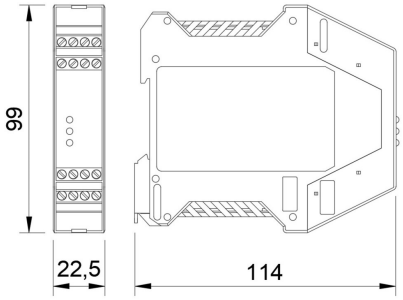
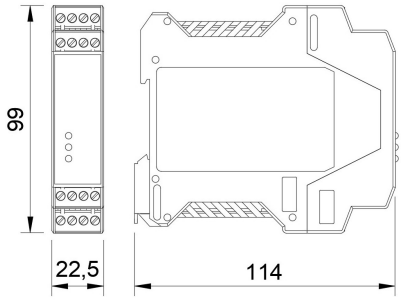
Dimension Drawing

Fixed Terminals



Plug-In Terminals



Note: Actual number of front LEDs may differ from the number shown in the drawing, depending on the variant.

Variants

Order No. 472160	SRLC, AC 230 V (50-60 Hz),	fixed screw terminals
Order No. 472161	SRLC, AC 115 V (50-60 Hz),	fixed screw terminals
Order No. 472162	SRLC, AC/DC 24 V (AC: 50-60 Hz),	fixed screw terminals
Order No. 474160	SRLC, AC 230 V (50-60 Hz),	incl. plug-in screw terminals
Order No. 474161	SRLC, AC 115 V (50-60 Hz),	incl. plug-in screw terminals
Order No. 474162	SRLC, AC/DC 24 V (AC: 50-60 Hz),	incl. plug-in screw terminals
Order No. 475160	SRLC, AC 230 V (50-60 Hz),	incl. push-in twin spring connector
Order No. 475161	SRLC, AC 115 V (50-60 Hz),	incl. push-in twin spring connector
Order No. 475162	SRLC, AC/DC 24 V (AC: 50-60 Hz),	incl. push-in twin spring connector

Accessories

Order No. 472592	EKLS4,	set of plug-in screw terminals
Order No. 472595	EKLZ4,	set of push-in twin spring connector
Order No. 472596	Spacer Electric Cabinet	rail spacer 5mm, PU = 12 pcs

CE ***Konformitätserklärung***
EC Declaration of Conformity
Déclaration de conformité

Hersteller: H. ZANDER GmbH & Co. KG
Producer: Am Gut Wolf 15 • 52070 Aachen • Deutschland
Fabricant:

Produktgruppe: Sicherheits-Not-Halt-Schaltgeräte
Product Group: Safety emergency stop switching devices
Groupe de produits: Relais de sécurité d'arrêt d'urgence

Produkt Name Product Name Nom du produit	Anbringung der CE-Kennzeichnung Affixing of CE marking: Application du marque CE	Zertifikats-Nr. No of Certificate N° du certificat
SRLC	2023	01/205/5463.03/23
SR2C	2023	01/205/5463.03/23
SR3C	2023	01/205/5463.03/23
SR3D	2023	01/205/5463.03/23
SR3A	2023	01/205/5463.03/23
SR3AD	2023	01/205/5463.03/23
SK3D	2023	01/205/5463.03/23

Die Produkte stimmen mit den Vorschriften folgender Europäischer Richtlinien überein:
The products conform with the essential protection requirements of the following European directives:
Les produits sont conformes aux dispositions des directives européennes suivantes:

2006/42/EG : Maschinenrichtlinie
2006/42/EG : Machinery directive
2006/42/EG : Directive Machines

2011/65/EU: RoHS Richtlinie
2011/65/EU: RoHS directive
2011/65/EU: Directive RoHS

2014/30/EU : EMV Richtlinie
2014/30/EU : EMC directive
2014/30/EU : Directive CEM

Die Übereinstimmung der bezeichneten Produkte mit den Vorschriften der o.a. Richtlinie wird, falls anwendbar, nachgewiesen durch die vollständige Einhaltung folgender Normen:
If applicable, the conformity of the designated products is proved by full compliance with the following standards:
Le strict respect des norms suivantes confirme, s´il y a lieu, que les produits désignés sont conformes aux dispositions de la directive susmentionnée:

EN 61326-3-1:2018 **EN IEC 61000-6-2:2019** **IEC 63000:2018**

Gemäß Zertifikat der benannten Stelle:
According to the certificate of the below mentioned organisation:
Selon de organisme notifé:

EN ISO 13849-1:2015 **EN ISO 13849-1:2023** **IEC 61508 Parts 1-7:2010**

Benannte Stelle / Organisme notifé: Nr. NB 0035
TÜV Rheinland Industrie Service GmbH
51105 Köln
Zertifizierungsstelle für Maschinen

Dokumentationsbeauftragte/-r: Christiane Nittschalk
Documentation manager
Autorisé à constituer le dossier technique

Aachen, den 24.10.2023

Dr.-Ing. Marco Zander
Geschäftsleitung
General Manager
Direction

Dipl.-Ing. Alfons Austerhoff
Leiter CE-Konformitätsbewertung
Manager for EC declaration of conformity
Responsable évaluation de conformité CE

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