

User Information

English translation

Correct Use

SR3D is an all-purpose emergency stop device which ensures the quick and safe deactivation of the moving parts of a machine in case of danger.

Applications for the SR3D include single or dual-channel emergency stop circuits and guard monitoring on machines and plants.

The SR3D is specially designed and certified for the use in furnaces and ancillary equipment in continuously mode according to EN 50156-1 and EN 746-2 and the use on ships, certified by Germanischer Lloyd.

Features

- 3 safety contacts
- 1 auxiliary contact
- Connection of:
 - Emergency stop buttons
 - Safety switches
 - Non-contact safety switches
 - OSSD-Outputs
- Control: single or dual channel
- Feedback loop for external contactors or extension modules
- Redundancy and cyclical monitoring
- Diversified forcibly guided output relays
- LED indicator for status channel 1 and 2



German Lloyd Certificate 32915-06HH

- 2 start performances:
 - monitored manual start
 - automatic start
- Short-circuit monitoring and earth fault monitoring
- Up to PL e, SILCL 3, category 4

Function

The emergency stop safety switching device SR3D 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.

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 fault is detected by cyclical self-monitoring no later than when the system is switched off and switched on again.

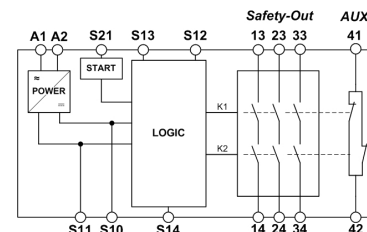


Fig. 1 Block diagram SR3D

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.

For the AC 115V/230V type, keep a minimum space of 10mm between the devices.

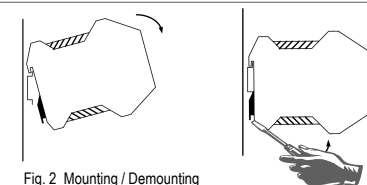


Fig. 2 Mounting / Demounting

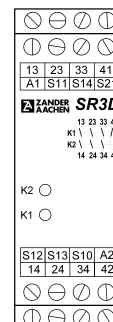
Safety Precautions



- 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.>") 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

- When the 24 V version is used, a safety 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 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 24 V control voltage
- S10: Control line
- S21: Start control line
- S13: Control line
- S14: Control line
- S12: Control line
- 13-14: Safety contact 1
- 23-24: Safety contact 2
- 33-34: Safety contact 3
- 41-42: Auxiliary contact

Fig. 3 Terminals

User Information

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. 14.

Emergency Stop Circuit

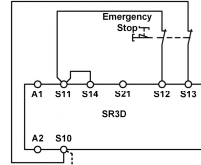


Fig. 1:
Dual channel emergency stop with short circuit and earth fault detection.
(category 4, up to PL e / SIL 3)

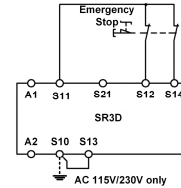


Fig. 2:
Dual channel emergency stop with earth fault detection.
(category 3, up to PL d / SIL 2)

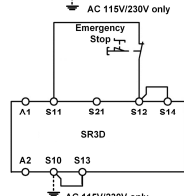


Fig. 3:
Single channel emergency stop with earth fault detection.
(category 1, up to PL c / SIL 1)

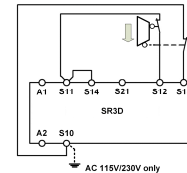


Fig. 4:
Dual channel safety guard monitoring with short circuit and earth fault detection.
(category 4, up to PL e / SIL 3)



Notice:

In order to activate earth fault monitoring, S10 must be connected to PE (protective earth) on the AC 115 V / 230 V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN 60204-1. Corresponded to the application, the starting circuit have to be wired according to Fig. 9 or Fig. 10.

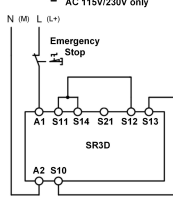


Fig. 5:
Single channel emergency stop without fault-detection of the safety switch and the wires.
(category 1, up to PL c / SIL 1)

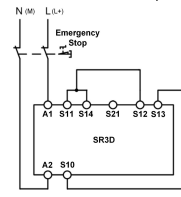


Fig. 6:
Dual channel emergency stop without fault-detection of the safety switch and the wires.
(category 3, up to PL d / SIL 2)

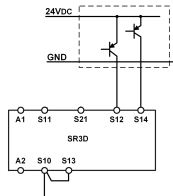


Fig. 7:
Two channel emergency stop with prnp-outputs/OSSD-outputs with its own short circuit monitoring.
(category 4, up to PL e / SIL 3)

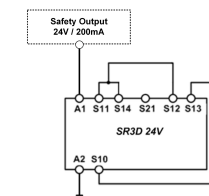


Fig. 8:
Single channel emergency stop with a safety output. Wired inside a control cabinet (minimum degree of protection IP54)
(category 4, bis PL e / SIL 3; Condition: Safety output meets PL e, SIL 3)

Start Behavior

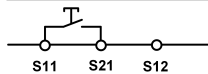


Fig. 9:
Monitored manual start.
It is monitored that the start button has been opened before the safety switch is closed.
(Condition: power supply may not be interrupted)

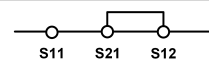


Fig. 10:
Automatic start.
Maximum allowable delay when closing the safety switches at S12 and S13: S12 before S13: 300ms S13 before S12: no limit

Warning:
Safety contacts will be activated immediately at power-on.

Feedback Loop

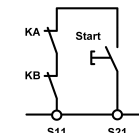


Fig. 11:
Feedback loop for monitored manual start:
The feedback loop monitors contactors or the expansion modules.

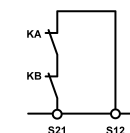


Fig. 12:
Feedback loop for automatic start:
The feedback loop monitors contactors or the expansion modules.

Power supply and Safety contacts

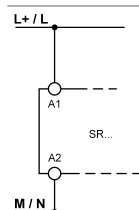


Fig. 13:
Power supply A1 and A2.
(Power supply according to techn. Data)

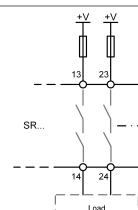


Fig. 14:
Connecting load to safety contacts.
(Figure shows example. Voltage „+V“ according to techn. Data)

Commissioning Procedure



Advice: Follow the guidelines in „Electrical Connection“ during the start-up.

1. Input circuit:

Depending on the risk evaluation choose one of the wiring diagrams in „Applications“ (Fig. 1 to 8).

2. Choose start mode:

Connect the start button with S11 and S21 for monitored manual start or connect S21 with S12 directly for automatic start (Fig. 9 or 10).

Warning:

If „Automatic start“ is set, bear in mind that the safety contacts will switch immediately after the power supply is connected. If „Monitored manual start“ is set, the start button must be opened after wiring.

3. Feedback loop:

If external contactors or extension modules are used, connect them according to Fig. 11 or Fig. 12.

4. Power supply:

Connect the power supply to A1 and A2 (Fig. 13). **Cauti-**
tion: Power must not yet be activated.

5. Starting the device:

Switch on the operating voltage.

Warning:

If the „Automatic start“ starting behavior is set, the safety contacts will close immediately.

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

LEDs K1 and K2 are lit.

6. Triggering safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts open immediately.

7. 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.

User Information

Check and Maintenance

The following checks are regularly required to ensure proper and continuous functioning:

- Check the switch function
- Check for signs of manipulation and safety function bypassing
- Check if the device is mounted and connected securely
- Check for soiling

Check if the safety device is working properly, in particular:

- Every time after initial commissioning
- Every time after replacing a component
- After every fault in the safety circuit

Regardless of this, the safe functioning of the safety device should be checked at suitable intervals, e.g. as part of the maintenance schedule of the plant. No maintenance is required for the device itself

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 (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:

- Emergency stop circuit was closed again.
- Was the start button opened before closing of the emergency stop circuit (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.

Caution:

Opening the device is impermissible and will void the warranty.

Safety Characteristics according to EN ISO 13849-1

Load (DC-13; 24 V) per contact	<= 0,1 A	<= 1 A	<= 2 A
Max. lifetime [years]	20	20	20
Category:	4	4	4
PL	e	e	e
PFHd [1/h]	1,2E-08	1,2E-08	1,2E-08
nop [Cycles per year]	<= 500.000	<= 350.000	<= 100.000

Conditions: Operating days / year: 365; Operating hours / day: 24; Switching-Cycle / hour: 1; Maximum load AC-15 / DC-13

Safety Characteristics according to EN 62061 / EN 61508

Max. lifetime [years]	20
Proof test interval [years]	20
PFH [1/h]	6,2E-11
PFD _{AVG}	5,43E-06
SILCL	3

Advice:

For other applications than described, please contact the manufacturer for further information.

Techn. Data

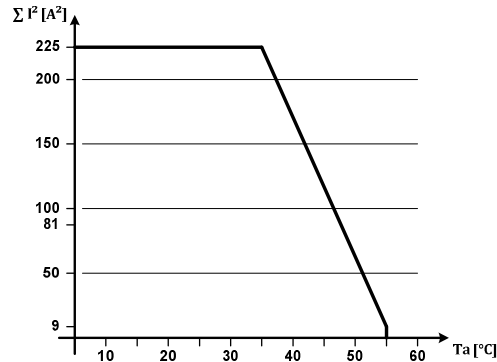
In compliance with	EN 60204-1; DIN EN ISO 13849-1; EN 62061; EN 50156-1; EN 746-2; IEC 61508 Parts 1-2 and 4-7; IEC 61511-1	
Operating voltage	AC 230 V, AC 115 V, AC/DC 24 V	
Rated supply frequency	50-60 Hz	
Allowable tolerance	+ / - 10 %	
Power consumption	DC 24 V	AC 230 V
	approx. 2 W	approx. 6.9 VA
Control voltage at S11	DC 24 V	
Control current at S11...S14	max. 100 mA	
Safety contacts	3 NO	
Auxiliary contacts	1 NC	
Switching voltage max.	AC 250 V	
Contact rating of safety contacts (13-14, 23-24, 33-34) *)	AC: 250 V, 2000 VA, 8 A for resistive load 250 V, 3 A for AC-15	
6 switching cycles/ min	DC: 30 V, 240 W, 8 A for resistive load 24 V, 3 A for DC-13	
Cumulative current	Max. 15 A (13-14, 23-24, 33-34)	
Contact rating of auxiliary contact (41-42)	AC: 250 V, 500 VA, 2 A for resistive load DC: 30 V, 60 W, 2 A for resistive load	
Minimum voltage/current	24 V, 20 mA	
External fuses for safety contacts	10 A gG 6 A gG for applications acc. to EN 50156-1 (See Chapter 10.5.5.3.4)	
Wire width	0.14 - 2.5 mm ²	
Length of control lines	Max. 1000m at 0.75 mm ²	
Contact material	AgSnO ₂	
Service Life	mech. approx. 1 x 10 ⁷	
Rated impulse withstand voltage	2.5 kV (control voltage / contacts)	
Dielectric strength	4 kV (DIN VDE 0110-1)	
Rated insulation voltage	250 V	
Protection	IP20	
Temperature range	DC 24 V:	-15 °C bis +55 °C
	AC 115 V / 230 V:	-15 °C bis +55 °C (see load curve)
Degree of pollution	2 (DIN VDE 0110-1)	
Overvoltage category	3 (DIN VDE 0110-1)	
Weight	approx. 230 g	
Mounting	DIN rail according to EN 60715 TH35	

*) If several SR3D-24V are mounted closely together the maximum cumulative current is 9A at an ambient temperature of 20°C or 3 A at 30 °C or 1 A at 40 °C. If the current exceeds these limits, keep a minimum space of 5 mm between the devices.

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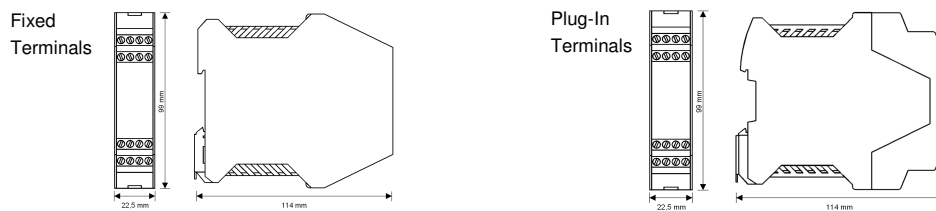
Load curve

Max. cumulative current depending on the ambient temperature for AC 115 V / 230 V variants.



(Min. space of 10mm between the devices)

Dimension Drawing



Variants

Order No. 472270	SR3D, AC 230 V (50-60 Hz),	fixed screw terminals
Order No. 472271	SR3D, AC 115 V (50-60 Hz),	fixed screw terminals
Order No. 472272	SR3D, AC/DC 24 V (AC: 50-60 Hz),	fixed screw terminals
Order No. 473270	SR3D, AC 230 V (50-60 Hz),	without terminals
Order No. 473271	SR3D, AC 115 V (50-60 Hz),	without terminals
Order No. 473272	SR3D, AC/DC 24 V (AC: 50-60 Hz),	without terminals
Order No. 474270	SR3D, AC 230 V (50-60 Hz),	incl. plug-in screw terminals
Order No. 474271	SR3D, AC 115 V (50-60 Hz),	incl. plug-in screw terminals
Order No. 474272	SR3D, AC/DC 24 V (AC: 50-60 Hz),	incl. plug-in screw terminals
Order No. 475270	SR3D, AC 230 V (50-60 Hz),	incl. plug-in dual tensile terminals
Order No. 475271	SR3D, AC 115 V (50-60 Hz),	incl. plug-in dual tensile terminals
Order No. 475272	SR3D, AC/DC 24 V (AC: 50-60 Hz),	incl. plug-in dual tensile terminals
Order No. 472592	EKLS4, plug-in screw terminals kit	
Order No. 472593	EKLZ4, set of plug-in tensile spring terminals	

CE Konformitätserklärung EC Declaration of Conformity Déclaration de conformité

Hersteller: H. ZANDER GmbH & Co. KG
Produced: 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	Anbringung der CE-Kennzeichnung	Zertifikats-Nr.
Product Name	Affixing of CE marking	No. of Certificate
Nom du produit	Application du marquage CE	N° du certificat
SR1C 2016	01/205/6463 01/16
SR2C 2016	01/205/6463 01/16
SR3C 2016	01/205/6463 01/16
SR3D 2016	01/205/6463 01/16
SK3D 2016	01/205/6463 01/16
TE-OR3 2016	01/205/6463 01/16
TE-OR3D 2016	01/205/6463 01/16

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	2011/65/EU RoHS Richtlinie
2006/42/EG : Machinery directive	2011/65/EU : RoHS directive
2006/42/EG : Directive Machines	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 normes suivantes confirme, s'il y a lieu, que les produits désignés sont conformes aux dispositions de la directive susmentionnée.

EN 60439-1:2005-01	EN 60947-1:2011-10	EN 60947-5-1:2010-04
EN 61000-6-2:2008-03	EN 61000-6-3:2011-09	DIN EN 61326-3-1:2008-11

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

EN 62061:2005 +AC:2010-A1:2013+A2:2015	DIN EN ISO 13849-1:2015
IEC 61508 Parts 1-2 and 4-7:2010	IEC 61511-1:2016
EN 50156-1:2015 in extracts (SR3D, SK3D, TE-OR3D)	EN 746-2:2010 in extracts (SR3D, SK3D, TE-OR3D)

Benannte Stelle / Organisme notifié: Nr. NB 0035
TUV Rheinland Industrie Service GmbH
10882 Berlin
Zertifizierungsstelle für Maschinen

Dokumentationsbeauftragter/-r: Christiane Nitschalk
Documentation manager:
Autorisée à constituer le dossier technique

Aachen, den 04.07.2017

Dipl.-Ing. Walter Zander
Geschäftsführung
General Manager
Direction

Dipl.-Ing. Alfons Aikeshoff
Leiter CE-Konformitätsbewertung
Manager for EC declaration of conformity
Responsible evaluation of conformity CE

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