SIGMATEK

SRO 021

S-DIAS Safety
Relay Output Module

Instruction Manual

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Translation of the Original Instruction

S-DIAS Safety Relay Output Module SRO 021

The S-DIAS Safety SRO 021 relay output module has the safety integrity level SIL3 (EN IEC 62061) or Performancelevel e (PL e) (EN ISO 13849). The SRO 021 has:

2 Safe outputs (EN 61131-2; EN IEC 62061 und EN ISO 13849)

Both outputs are used for the Safety-oriented closing (NO) of an electric circuit with a permissible rated voltage of 24 V DC and a maximum continuous current of 6 A.

The SRO 021 is used for example, for switching higher power loads or potential-isolated circuits – such as hydraulic valves or the relaying of emergency stop circuits.

The safety-related SRO 021 is ideal for use in systems with optional modules and interface variables according to Safety System Handbook, see homepage[1].

To use the SRO 021 in an application, at least one Safety CPU module that regulates the synchronized communication with the safety modules using safe bus telegrams is also required. This also includes

- Processing the safe application and
- The distribution of configuration data to remote Safety modules.

[1] Using the search function with the keyword “Safety System Handbook”

Contents

1 Introduction

1.1 Target Group/Purpose of this Operating Manual

This operating manual contains all information required for the operation of the product.

This operating manual is intended for:

- Project planners
- Technicians
- Commissioning engineers
- Machine operators
- Maintenance/test technicians

General knowledge of automation technology is required.

Further help and training information, as well as the appropriate accessories can be found on our website www.sigmatek-automation.com.

Our support team is happily available to answer your questions.
Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

- Safety System Handbook

This and additional documents can be downloaded from our website or obtained through support.

1.3 Contents of Delivery

1x SRO 021

2 Basic Safety Guidelines

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes:

DANGER

Danger indicates that death or serious injury **will occur**, if the specified measures are not taken.

⇨ To avoid death or serious injuries, observe all guidelines.

Danger indique une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

WARNING

Warning indicates that death or serious injury **can** occur, if the specified measures are not taken.

⇨ To avoid death or serious injuries, observe all guidelines.

Avertissement d'une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Caution indicates that moderate to slight injury **can** occur, if the specified measures are not taken.

⇨ To avoid moderate to slight injuries, observe all guidelines.

Attention indique une situation dangereuse qui, faute de prendre les mesures adéquates, **peut** entraîner des blessures assez graves ou légères.

⇨ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Danger for ESD-sensitive components.

Les signes de danger pour les composants sensibles aux décharges électrostatiques.

INFORMATION

Information

⇨ Provides important information on the product, handling or relevant sections of the documentation, which require attention.

2.2 Disclaimer

INFORMATION

The contents of this operating manual were prepared with the greatest care. However, deviations cannot be ruled out. This operating manual is regularly checked and required corrections are included in the subsequent versions. The machine manufacturer is responsible for the proper assembly, as well as device configuration. The machine operator is responsible for safe handling, as well as proper operation.

The current operating manual can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following operating manual is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding documents and this operating manual before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through, non-compliance with these instructions or applicable regulations.

2.3 General Safety Directives

The Safety Directives in the other sections of this operating manual must be observed. These instructions are visually emphasized by symbols.

INFORMATION

According to EU Directives, the operating manual is a component of a product.

This operating manual must therefore be accessible in the vicinity of the machine since it contains important instructions.

This operating manual should be included in the sale, rental or transfer of the product, or its online availability indicated.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine directives 2006/42/EG before introducing a machine to the market.

Operate the unit with devices and accessories approved by SIGMATEK only.

CAUTION

Handle the device with care and do not drop or let fall.

Prevent foreign bodies and fluids from entering the device.

The device must not be opened!

Manipulez l'appareil avec précaution et ne le laissez pas tomber.

Empêchez les corps étrangers et les liquides de pénétrer dans l'appareil.

L'appareil ne doit pas être ouvert!

If the device does not function as intended or has damage that could pose a danger, it must be replaced!

En cas de fonctionnement non conforme ou de dommages pouvant entraîner des risques, l'appareil doit être remplacé!

The module complies with EN 61131-2.

In combination with a facility, the system integrator must comply with EN 60204-1 standards.

For your own safety and that of others, compliance with the environmental conditions is essential.

Le module est conforme à la norme EN 61131-2.

En combinaison avec une équipement, l'intégrateur de système doit respecter la norme EN 60204-1.

Pour votre propre sécurité et celle des autres, le respect des conditions environnementales est essential.

2.4 Designated Use

The Safety functions implemented in the product are designed for use with safety applications in a SIGMATEK control and meet the required conditions for safe operation according to SIL 3, HFT 1 n compliance with EN 62061 and according to PL e, Kat. 4 in compliance with EN ISO 13849-1.

CAUTION

The instructions contained in this operating manual must be followed.

For error-free operation, proper transport and storage are essential.

Installation, mounting, programming, initial start-up, operation, maintenance and decommissioning can only be performed by qualified personnel.

Qualified personnel in this context are people, who have completed training or have trained under supervision of qualified personnel and have been authorized to operate and maintain safety-related equipment, systems and facilities in compliance with the strict directives and standards of safety technology (Functional Safety).

Les instructions contenues dans ce manuel technique doivent être suivies.

Pour un fonctionnement sans erreur, le transport et le stockage appropriés sont essentiels.

L'installation, le montage, la programmation, la mise en service initiale, l'exploitation, la maintenance et la mise hors service ne peuvent être effectués que par une personne qualifiée.

Dans ce contexte, on entend par personnel qualifié les personnes qui ont suivi une formation ou qui ont été formées sous la supervision d'un personnel qualifié et qui ont été autorisées à utiliser et à entretenir l'équipement, les systèmes et les installations de sécurité conformément aux directives et aux normes strictes de la technique de sécurité (Sécurité fonctionnelle).

For your own safety and that of others, the product should be used for their designated purpose only.

Correct EMC installation is also included under designated use.

Pour votre propre sécurité et celle des autres, le produit ne doivent être utilisés qu'à des fins prévues.

Une installation CEM correcte est également incluse dans l'utilisation prévue.

Non-designated use consists of:

- any changes made to the module or the use of damaged modules.
- use of the module inconsistent with the technical margins described in this operating manual or the specifications defined in the technical data.

L'utilisation non désignée consiste en:

- toute modification apportée au module ou l'utilisation des modules endommagés.
- utilisation du module non conforme aux marges techniques décrites dans ce manuel ou aux spécifications définies dans les données techniques.

Before delivering the module, the machine manufacturer must ensure that it is in "delivery condition". See chapter Transport/Storage for more information.

Avant de livrer le module, le constructeur de la machine doit s'assurer qu'il est en "état de livraison". Voir le chapitre Transport/Storage pour plus d'informations.

2.5 Software/Training

The application is created with the software LASAL CLASS 2 and LASAL SCREEN Editor, the Safety application is created using the SAFETYDesigner. Basic information on Safety (Functional Safety) can be found in the Safety System Handbook.

Training for the LASAL development environment, with which the product can be configured, is provided. Information on our training schedule can be found on our website.

3 Standards and Directives

3.1 Residual Risks

CAUTION

The following residual risks for the product must be included in the system integrator's risk assessment:

- Release of non-environmentally safe substances, emissions and unusual temperatures
- Possible effects of information technology devices

Les risques résiduels suivants pour le produit doivent être inclus dans l'évaluation des risques de l'intégrateur de système:

- Libération de substances non respectueuses de l'environnement, émissions et températures inhabituelles
- Effets possibles des dispositifs de technologie de l'information

3.2 Safety of the Machine or Equipment

INFORMATION

Observe all on-site rules and regulations for accident prevention and occupational safety.

3.3 Directives

The product was constructed in compliance with the following European Union directives and tested for conformity.

3.3.1 Functional Safety Standards

EN IEC 62061 - Safety of machinery - Functional safety of safety-related control systems
EN ISO 13849-1 - Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design
EN ISO 13849-2 - Safety of machinery — Safety-related parts of control systems — Part 2: Validation

3.3.2 EU Conformity Declaration

EU Declaration of Conformity

The product SRO 021 conforms to the following European directives:

- **2006/42/EG** Machine Directive
- **2014/30/EU** Electromagnetic Compatibility (EMC Directive)
- **2011/65/EU** “Restricted use of certain hazardous substances in electrical and electronic equipment” (RoHS Directive)

The EU Conformity Declarations are provided on the SIGMATEK website. See Products/Downloads or use the search function and the keyword “EU Declaration of Conformity”.

3.4 Safety-Relevant Parameters

3.4.1 Mounting position horizontal 0-55 °C ambient temperature

Relay Module	Safety Parameters	Safety Levels
SRO 021 including CPU module **SCP 011/SCP 111**	PFH_D = 9.7E-09 (1/h) $MTTF_D$ = 240 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3

The above failure probability (PFH_D, $MTTF_D$ and SFF)) is based on the assumption that the output relay is operated with 25.000 switching cycles per year (nop). If more switching cycles per year are required, you can request the safety parameters from SIGMATEK via the support.

3.4.2 Mounting position horizontal 0-60 °C ambient temperature

Relay Module	Safety Parameters	Safety Levels
SRO 021 including CPU-module **SCP 011/SCP 111**	PFH_D = 1.0E-08 (1/h) $MTTF_D$ = 233 years DC = 98 % SFF = 99 %	PL e / Kat. 4 SIL 3

Relay Module	Safety Parameters	Safety Levels
SRO 021 including CPU-module **SCP 211/SCP 111-S**	PFH_D = 1.1E-08 (1/h) $MTTF_D$ = 217 years DC = 98 % SFF = 99 %	PL e / Kat. 4 SIL 3

The above failure probability (PFH_D, $MTTF_D$ and SFF)) is based on the assumption that the output relay is operated with 25.000 switching cycles per year (nop). If more switching cycles per year are required, you can request the safety parameters from SIGMATEK via the support.

INFORMATION

Time of use of the relay output module depending on the number of switching cycles per year, see chapter 5.2.

3.5 Compatibility

INFORMATION

Compatibility

For compatibility of the S-DIAS Safety modules, see section "Compatibility of S-DIAS Safety Modules" in the system handbook.

4 Type Plate

Exemplary nameplate (symbol image)

HW: Hardware version
SW: Software version

5 Technical Data

5.1 Relay Output Specifications

Number	2	
Configuration	two-channel	
Contact	normally open	
Relay type	SIS212 21VDC SEN	
Nominal voltage	+24 V DC	230 V AC
Switching voltage	maximum +30 V DC	maximum 250 V AC
Maximum continuous current /channel	maximum 6 A at 55 °C maximum 4 A at 60 °C	maximum 6 A at 55 °C maximum 4 A at 60 °C
Short-circuit and overload protection	external fuse category gG, maximum 6 A	
Concurrence of all outputs	100 %	
Response time	typically 10 ms (*)	
fall time	typically 3 ms (*)	
Miscellaneous	no protective circuit	

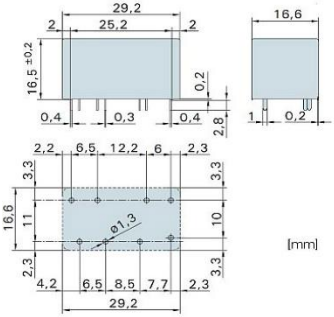
(*) Pure relay characteristics not considering the application cycle time of the Safety Designer

This module exceeds the defined current consumption for S-DIAS Safety modules; therefore it should be considered as two S-DIAS Safety modules.

Relays of the HW versions ≤3.00:

Relaisdaten

- Printrelais mit zwangsgeführten Kontakten
- Sichere Trennung zwischen Steuer- und Lastkreis (Luft- und Kriechstrecke > 8mm)
- EN 50205 Anwendungstyp A
- Doppelte und verstärkte Isolierung zwischen den Kontakten
- Kontaktbestückung: SIS212 2AK/1RK
- Kleine Aussenabmessungen
- Mittlere Antriebsleistung 0,6W
- Halteleistung 0,18 W



Kontaktmaterial	AgCuNi+0,2-0,4µm Au
Kontaktart	Einfachkontakt mit Zackenkrone
Nennschaltleistung	250VAC 6A AC1 1'500VA
Elektr. Lebensdauer AC1 (360 S/h) ca.	100'000
Einschaltstrom max.	30A für 20ms
Schaltspannungsbereich	5 bis 250VDC/VAC
Schaltstrombereich*	5mA bis 6A
Schaltleistungsbereich*	60mW bis 1'500W (VA)

Kontaktübergangswid. (Neuzustand) ≤ 100mΩ / 28V / 100mA

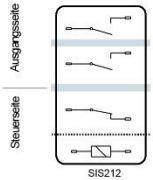
* Richtwerte

Normspulen für Gleichstrom
(andere Spannungen auf Anfrage)

Nennspannung VDC	Min. Anzugs-spannung bei 20°C	Abfallspannung bei 20 °C	Nennstrom in mA	Widerstand in Ohm bei 20 °C	Toleranz in %
21	≤ 14,7	≥ 2,1	28.6	735	± 10

Allgemeine Daten

Schaltbild (Ansicht Relaisoberseite)



Basisisolierung
Doppelte bzw. verstärkte Isolierung

Mechan. Lebensdauer > 10 x 10 ^{6} Schaltspiele	
Schaltfrequenz mechanisch	15Hz
Ansprechzeit (alle AK geschlossen) typ.	10ms
Abfallzeit** (alle RK geschlossen) typisch	3ms
Prellzeit Arbeitskontakt typisch	2ms
Prellzeit Ruhekontakt typisch	15ms
Schockfestigkeit 16ms	Arbeitskontakt 17g Ruhekontakt 10g
Vibrationsfestigkeit 10-200Hz	Arbeitskontakt 7g Ruhekontakt 3g
Prüfspannung Spule/Steuerkontakt	2'500Veff 1min
Prüfspannung Ausgangskontakte gegeneinander	4'000Veff 1min
Prüfspannung Kontakt offen	1'500Veff 1min
Isolationswiderstand bei Up 500V	10^8 Ω
Kriechstromfestigkeit	CTI 175
Gewicht	ca. 20g
Einbaulage	beliebig
Umgebungstemperatur	-40°C bis +70°C
Schutzart	RT III
Lötbadtemperatur	270°C/5s
Thermischer Widerstand	55K/W
Spulengrenztemperatur	120°C
Verschmutzungsgrad	2
Überspannungskategorie	III
Kurzschlussfestigkeit	1'000A SCPD 6A gG (Vorsicherung)

** ohne Beschaltung

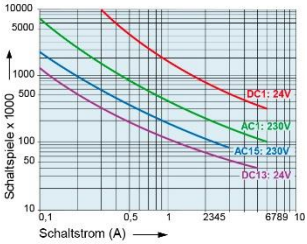
Isolationsbegriffe

Spule zu Steuerkontakt:	Basisisolierung
Spule/Steuerkontakt zu Ausgangskontakte:	Doppelte bzw. verstärkte Isolierung > 8mm

Prüfungen, Vorschriften	
Approbationen	SEV, UL, cUL, TÜV
UL File E188953	Sec. 5
Isolationsgruppe nach IEC 60664-1	250VAC
Schutzklasse II	VDE 0106
Brandschutzbedingungen	UL 94 / V0

Diagramme

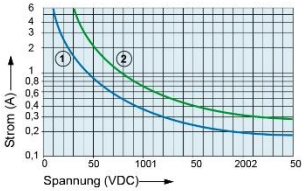
Kontaktlebensdauer



Max. Schaltvermögen (DIN EN 60947-4-1 / EN 60947-5-1):
AC 1: 250V/6A
AC 15: 230V/3A
DC 1: 24V/6A
DC 13: 24V/5A/0,1 Hz
UL 508: B300 / R300

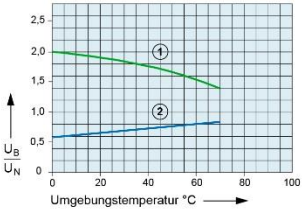
Maximale Kontaktbelastung bei AC 1 mit 230V 2 Kontakte mit je 6A

Lastgrenzkurve bei Gleichstrom



1) Induktive Belastung, L/R 40 ms
2) Ohmsche Belastung

Erregerspannungsbereich



INFORMATION

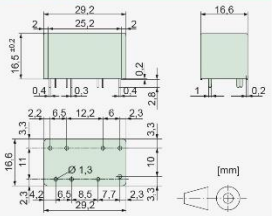
The module SRO 021 is only designed for a maximum voltage range of +30 V.

Relays of the HW versions ≥3.00:

Eigenschaften

- Printrelais mit zwangsgeführten Kontakten
- Sichere Trennung zwischen:
  - Spule und allen Kontakten (siehe Isolationsdaten)
  - den Kontakten (siehe Isolationsdaten)
- IEC 61810-3 Anwendungstyp A
- Doppelte und verstärkte Isolierung zwischen den Kontakten
- Kontaktbestückung: SIS212SEN 2 NO + 1 NC
- Kleine Aussenabmessungen
- Spulennennleistung 0,4 W
- Halteleistung 0,14 W

Abmessungen



Kontaktdaten

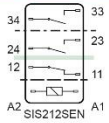
Kontaktmaterial	AgCuNi+0,2-0,4 µm Au
Kontaktart	Einfachkontakt mit Zackenkrone
Nennschaltleistung	250 VAC 6 A AC1 1 500 VA
Elektr. Lebensdauer AC1 (360 S / h)	>90 000
Einschaltstrom	30 A für 20 ms
Schaltspannungsbereich	5 ... 250 VDC / VAC
Schaltstrombereich*	3 mA ... 6 A
Schallleistungsbereich*	40 mW ... 1 500 W(VA)
Kontaktübergangswid. (Neuzustand)	≤100 mΩ / 6 V / 100 mA

*Richtwerte

Spulen für Gleichspannung

Nennspannung VDC	Min. Ansprechspannung VDC bei 20 °C	Rückfallspannung VDC bei 20 °C	Nennstrom in mA bei 20 °C	Widerstand in Ohm bei 20 °C	
21	≤15,7	≥2,1	19,1	1100	± 10%

Schaltbild (Ansicht Relaisoberseite)



Isolationsdaten

	Basisisolierung	bei 250 VAC
	Luft- und Kriechstrecke	>4 mm
	Prüfspannung	2 500 V / 50 Hz / 1 min
	Dopp. bzw. verstärkte Isolierung bei 250 VAC	
	Luft- und Kriechstrecke	>5,5 mm
	Prüfspannung	4 000 V / 50 Hz / 1 min
	Dopp. bzw. verstärkte Isolierung bei 250 VAC	
	Luft- und Kriechstrecke	>8 mm
	Prüfspannung	4 000 V / 50 Hz / 1 min
Prüfspannung Kontakt offen		1 500 V / 50 Hz / 1 min
Kriechstromfestigkeit		CTI 175
Verschmutzungsgrad		2
Überspannungskategorie		III
Isolationswiderstand bei Up 500 VDC		>100 MΩ

Weitere Daten

Mechanische Lebensdauer	>10x10⁶ Schaltspiele
Schaltfrequenz mechanisch	15 Hz
Ansprechzeit (NO geschlossen)	typ. 10 ms
Rückfallzeit (NC geschlossen)	typ. 3 ms
Prellzeit NO-Kontakt	typ. 2 ms
Prellzeit NC-Kontakt	typ. 15 ms
Schockfestigkeit 16 ms	NO > 17 g / NC > 10 g
Vibrationsfestigkeit (10-200 Hz)	NO > 7 g / NC > 3 g
Kurzschlussfestigkeit Kontakte	1 000 A SCPD 6 A gG / gL (Vorsicherung)
Umgebungstemperatur	-40 °C ... +85 °C
Thermischer Widerstand	55 K / W
Spulengrenztemperatur	120 °C
Gewicht	ca. 20 g
Einbaulage	beliebig
Montageabstand	Empfehlung >1 mm
Prüfverfahren	A / Gruppenmontage
Schutzart	RT III
Lötbadtemperatur	270 °C / 5 s

Prüfungen, Vorschriften, Normungen

Approbationen	UL, cUL, TÜV
UL File	E188953 Sec. 5
Isolationsgruppe nach IEC 60664-1	250 VAC
Brandschutzbedingungen	UL 94 / V0
Normungen	IEC 61810-1, IEC 61810-3

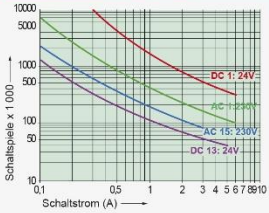
Optionen, Zubehör

DIN-Schienenfassung	
Variable Pinlängen	2,2 mm / 3,8 mm

Produktschlüssel

SIS	2	1	2	21VDC	SEN
Typenbezeichnung	Anzahl NO-Kontakte	Anzahl NC-Kontakte	Lötanschlüsse	Spulennennspannung	sensitive Spule

Kontaktlebensdauer für NO-Kontakt

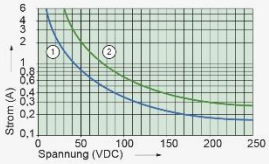


Max. Schaltvermögen (DIN EN 60947-5-1)

AC 1:	250 V / 6 A
AC 15:	230 V / 3 A
DC 1:	24 V / 6 A
DC 13:	24 V / 5 A / 0,1 Hz
UL 508:	B300 / R300

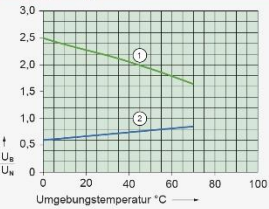
Maximale Kontaktbelastung bei AC 1 mit 230 V:
2 Kontakte mit je 6 A

Lastgrenzkurve bei Gleichstrom



1) Induktive Belastung L/R 40 ms
2) Ohmsche Belastung

Erregerspannungsbereich



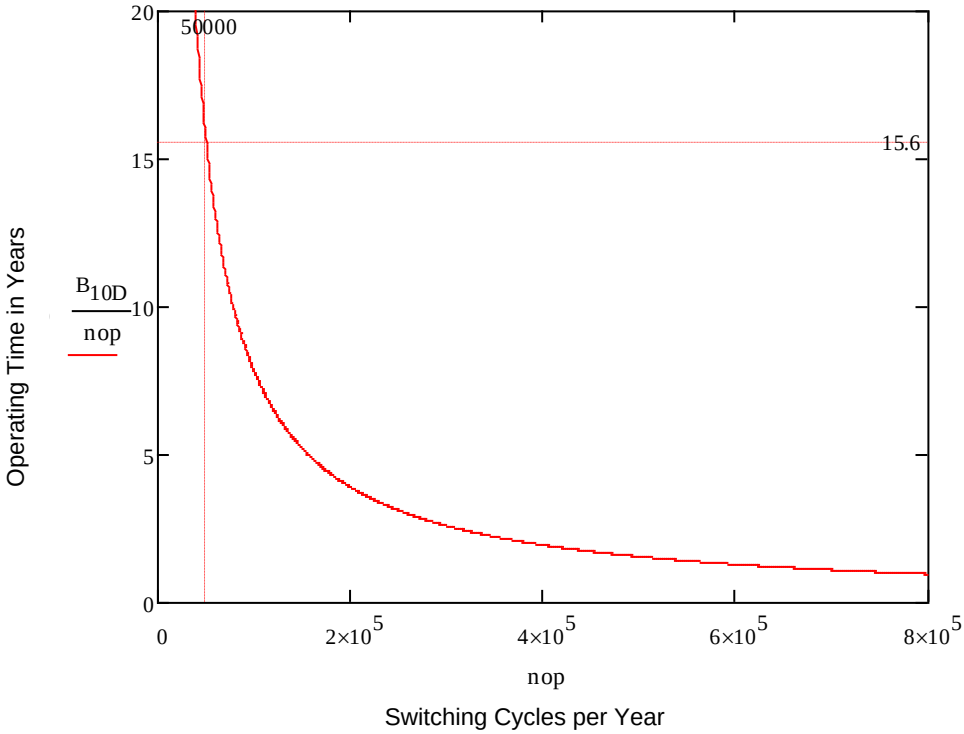
1) Max. Erregerspannung mit Kontaktbelastung: ≤ 4 A
2) Min. Erregerspannung (garantierte Werte) ohne vorangegangenen Betrieb

- einzelnes Relais auf PCB
- ohne benachbarte Bauelemente
- Einschaltdauer 100%

INFORMATION

The module SRO 021 is only designed for a maximum voltage range of +30 V.

5.2 Lifespan of the Relay Output Module depending on the Number of Switching Cycles Per Year

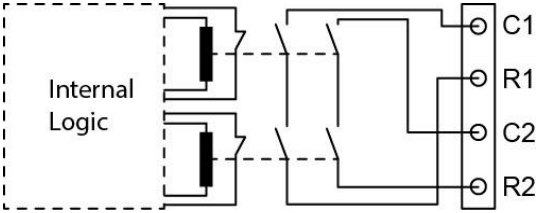


Duration of relay output module use	20a
B_{10D}-value of the relay used	780000 switching cycles under rated load

Example calculation: With 50000 switching cycles per year, the relay output module must be exchanged after 15.6 years (=);

with 39000 $\frac{B_{10D}}{50000} = 15.6$ switching cycles per year, the lifespan is 20 years.

5.3 Relay Circuit



The outputs are internally wired as a series circuit of to two relays.

5.4 Electrical Requirements

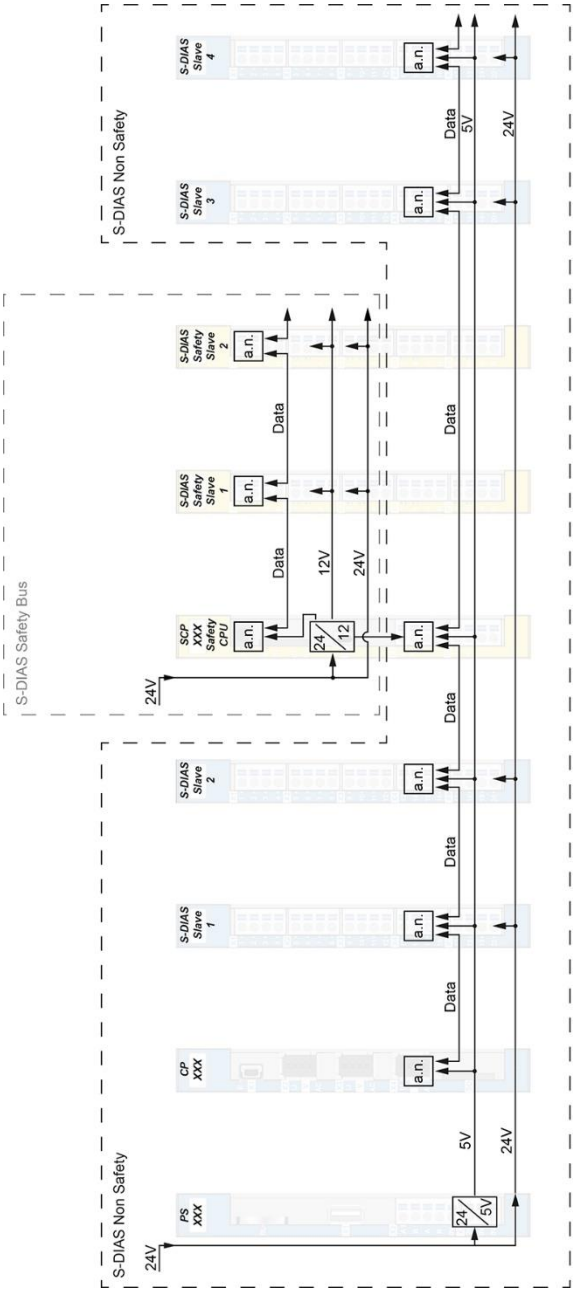
Voltage supply from Safety bus	+12 V	
Current consumption on Safety bus (+12 V supply)	typically 30 mA	maximum 40 mA
Voltage supply from Safety bus	+24 V	
Current consumption on Safety bus (+24 V supply)	typically 90 mA	maximum 100 mA

INFORMATION

If this S-DIAS Safety module is connected to an SCP with several modules, the total current of the S-DIAS Safety modules used must be determined and checked.

The total current of the +24 V supply cannot exceed 800 mA.
The total current of the +12 V supply cannot exceed 800 mA.

The S-DIAS Safety CPU Module supports a maximum of 16 safe I/O modules. The S-DIAS Safety Relay Module SRO 021 corresponds to two safe I/O modules.



Wiring S-DIAS Safety in S-DIAS System

- each S-DIAS module is an active module (active node)
- Safety CPU is connected to the S-DIAS bus (incl. +5 V supply)
- Safety bus is independent and separated from the S-DIAS bus

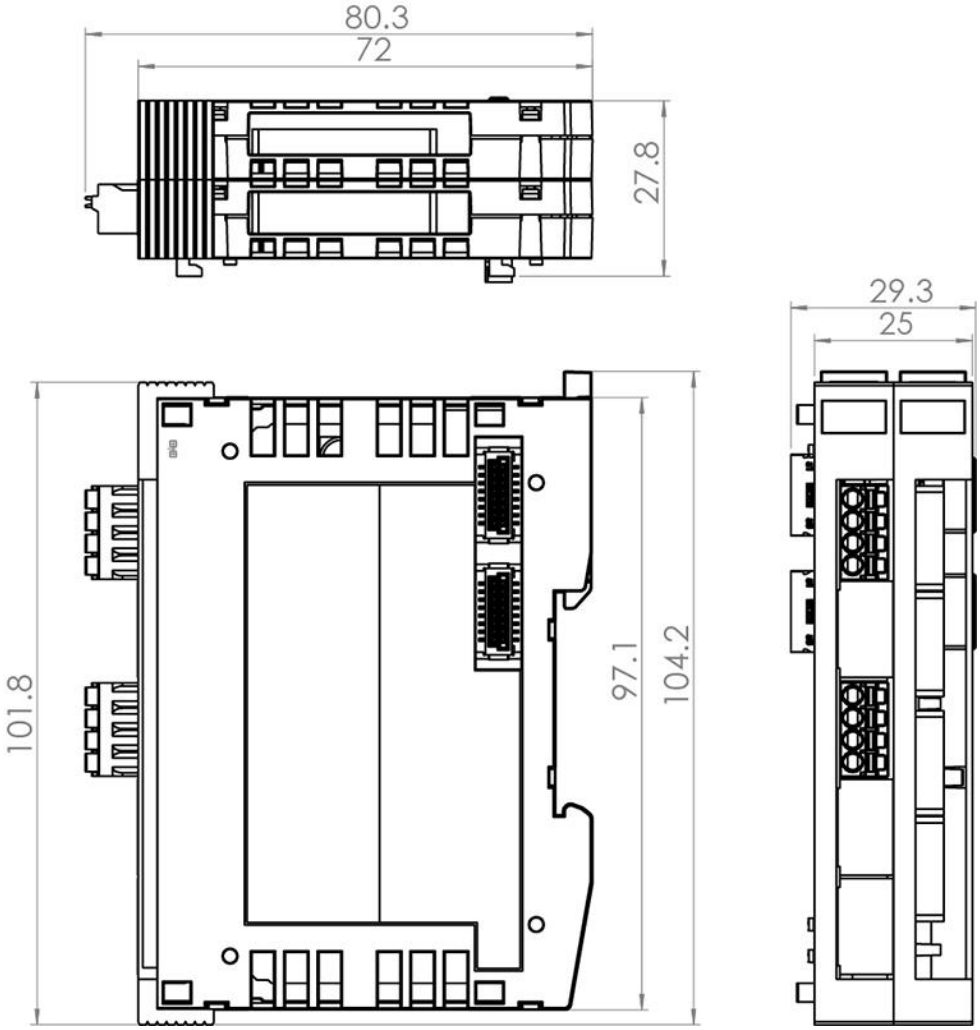
5.5 Miscellaneous

Article number	20-893-021
Standard	EN 62061 SIL 3 EN ISO 13849-1 PL e/Cat. 4 UL 508 (E247993)
Approbations	CE, TÜV EC type-examination tested, cULus
Mission time	20 years

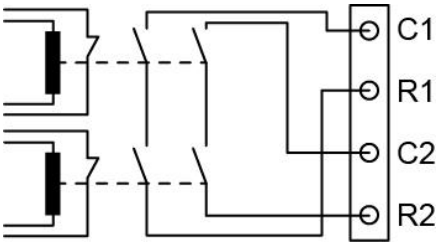
5.6 Environmental Conditions

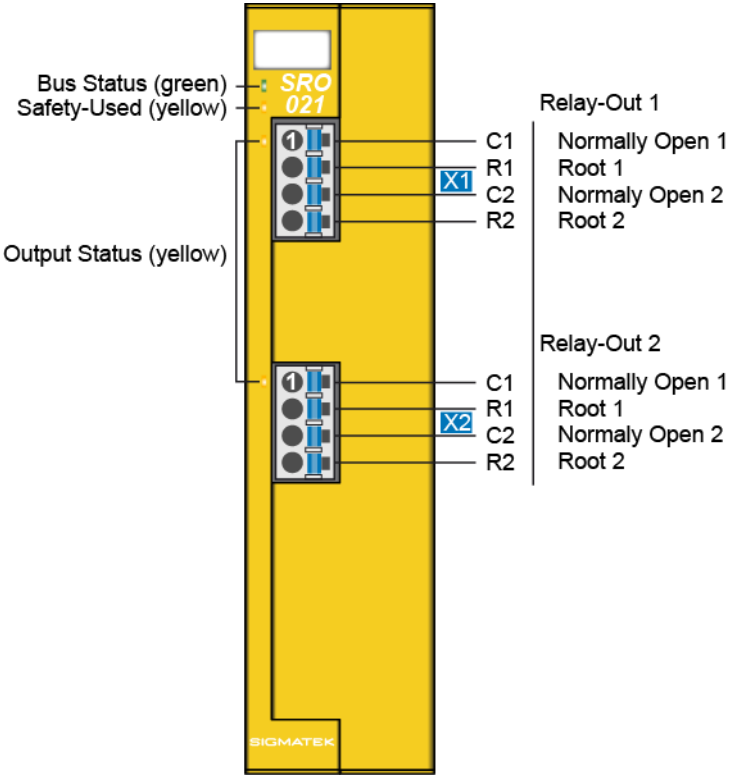
Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C (UL) +55 … +60 °C with derating since HW version 3.10 (CE)	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	Pollution degree 2	
Noise emissions	≤ 70 dB	
EMC resistance	in accordance with 61000-6-7:2015 (Generic standards - Immunity requirements for equipment intended to perform functions in safety-related systems (functional safety) at industrial locations) in accordance with EN 61000-6-2:2007 (industrial area) (increased requirements in accordance with IEC 62061)	
EMC noise generation	in accordance with EN 61000-6-4:2007 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

6 Mechanical Dimensions



7 Connector Layout





7.1 Status LEDs

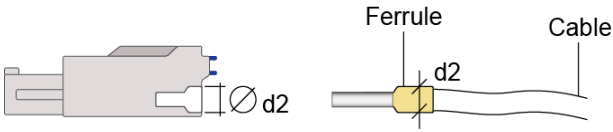
Bus Status	green	ON	bus communication OK
		OFF	no supply available
		BLINKING (5 Hz)	no communication
Safety-Used	yellow	ON	module is used and no error
		OFF	module is not used or not in operational mode
Output Status	yellow	ON	output ON
		OFF	output ON

7.2 Applicable Connectors

Connectors:
X1, X2: Connectors with spring terminals (included in delivery)
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

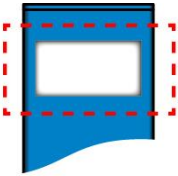
Connections:

Stripping length/Sleeve length:	10 mm
Plug-in direction:	parallel to conductor axis or to PCB
Conductor cross section, rigid:	0.2-1.5 mm^2
Conductor cross section, flexible:	0.2-1.5 mm^2
Conductor cross section, ultrasonically compacted:	0.2-1.5 mm^2
Conductor cross section AWG/kcmil:	24-16
Conductor cross section flexible, with ferrule without plastic sleeve:	0.25-1.5 mm^2
Conductor cross section flexible, with ferrule with plastic sleeve:	0.25-0.75 mm^2 (ground for reducing d2 of the ferrule)



d2 = max. 2.8 mm

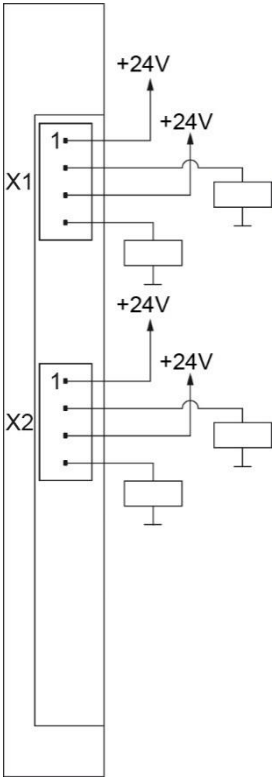
7.3 Label Field



Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Weidmüller article number	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Weidmüller article number	1324380000

8 Wiring

8.1 Wiring Example



8.2 Note

The input filters, which suppress noise signals, allow operation in harsh environmental conditions. A careful wiring method is also recommended to ensure error-free function.

The following installation guidelines should be observed:

- Avoid parallel connections between input lines and load-bearing circuits.
- Protective circuits for all relays (RC networks or free-wheeling diodes)
- Correct wiring to ground

INFORMATION
The ground bus should be connected to the control cabinet when possible!
The wiring and assembly must be performed when no voltage is applied!
The S-DIAS module CANNOT be connected or disconnected while voltage is applied!

9 Assembly/Installation

9.1 Check Contents of Delivery

Ensure that the contents of the delivery are complete and intact. See chapter Contents of Delivery.

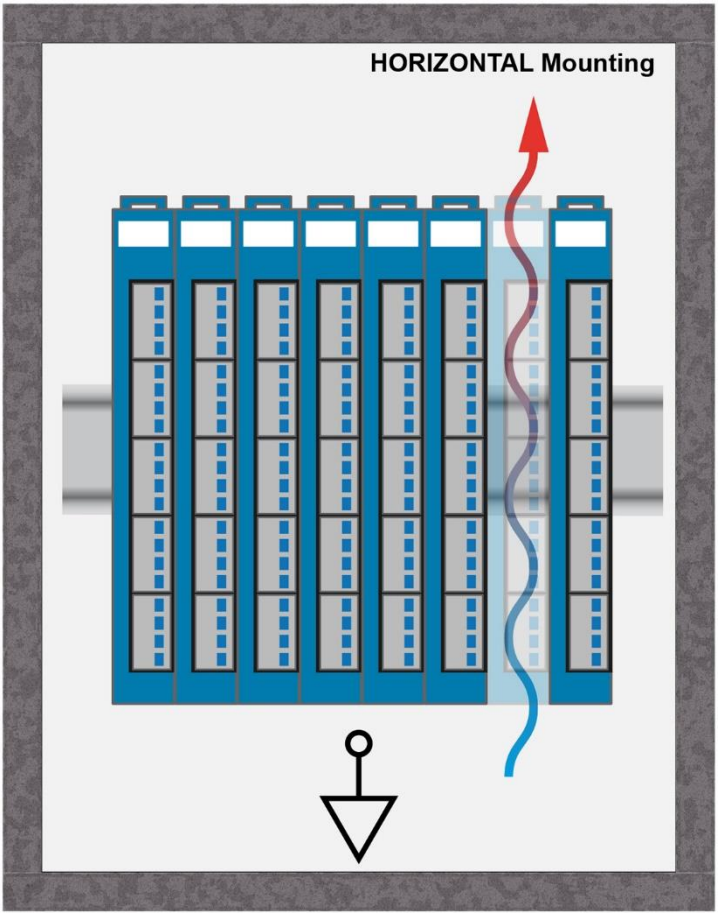
INFORMATION

On receipt and before initial use, check the device for damage. If the device is damaged, contact our customer service and do not install the device in your system.

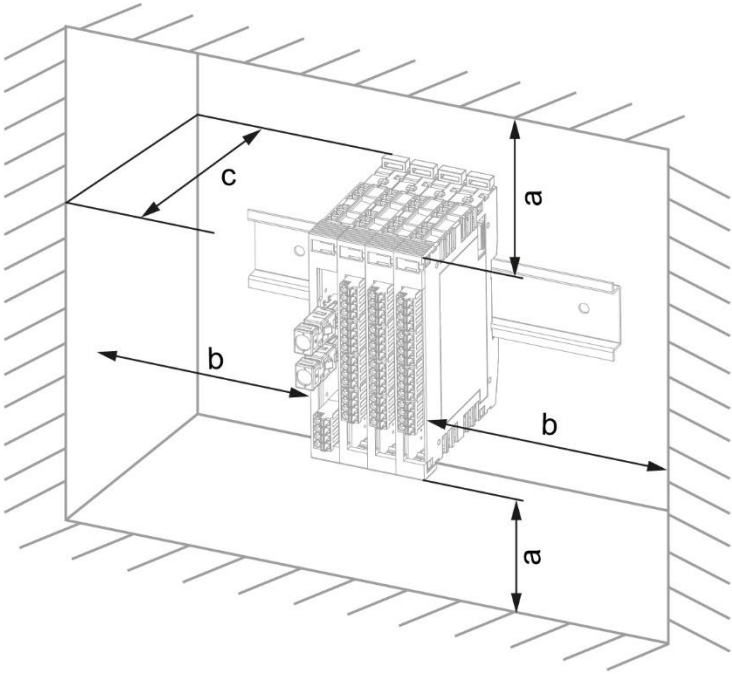
Damaged components can disrupt or damage the system.

9.2 Mounting

The S-DIAS modules are designed for installation into the control cabinet. To mount the modules a DIN-rail is required. The DIN rail must establish a conductive connection with the back wall of the control cabinet. The individual S-DIAS modules are mounted on the DIN rail as a block and secured with latches. The functional ground connection from the module to the DIN rail is made via the grounding clamp on the back of the S-DIAS modules. The modules must be mounted horizontally (module label up) with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is necessary for optimal cooling and air circulation, so that proper function up to the maximum operating temperature is ensured.



Recommended minimum distances of the S-DIAS modules to the surrounding components or control cabinet wall:



a	b	c
30 mm (1.18″)	**30 mm** (1.18″)	**100 mm** (3.94″)

a, b, c … distances in mm (inches)

10 Transport/Storage

INFORMATION

This device contains sensitive electronics. During transport and storage, high mechanical stress must therefore be avoided.

For storage and transport, the same values for humidity and vibration as for operation must be maintained!

Temperature and humidity fluctuations may occur during transport. Ensure that no moisture condenses in or on the device, by allowing the device to acclimate to the room temperature while turned off.

When sent, the device should be transported in the original packaging if possible. Otherwise, packaging should be selected that sufficiently protects the product from external mechanical influences. Such as cardboard filled with air cushioning.

11 Storage

INFORMATION

When not in use, store the device according to the storage conditions. See chapter 10 Transport/Storage.

During storage, ensure that all protective covers (if available) are placed correctly, so that no contamination, foreign bodies or fluids enter the device.

12 Maintenance

INFORMATION

During maintenance as well as servicing, observe the safety instructions from chapter 2 Basic Safety Directives.

12.1 Service

This product was constructed for low-maintenance operation.

12.2 Repair

INFORMATION

In the event of a defect/repair, send the device with a detailed error description to the address listed at the beginning of this document.

For transport conditions, see chapter 10 Transport/Storage.

13 Disposal

INFORMATION

Should you need to dispose of the device, the national regulations for disposal must be followed.

The device appliance must not be disposed of as household waste.

Documentation Changes

Change date	Affected page(s)	Chapter	Note
11.02.2014	14 15	5 Connector Layout 5.2 Applicable Connectors	Changed image Connection capacity added French notes added
03.03.2014	16 17	5 Connector Layout 5.1 Status LEDs	Changed image Changed/expanded Status LEDs table
01.04.2014	20	7 Mounting	Text updated
20.05.2014	13	3.4 Electrical Requirements	Note added
23.05.2014	10	2.3 Compatibility	Added chapter
08.09.2014	14	3.5 Miscellaneous	Added Standard
13.01.2015	13	3.4 Electrical Requirements	Changed 2nd notice
30.01.2015	19	6.2 Note	Added note concerning connecting the S-DIAS module while voltage is applied
26.03.2015	17	5.2 Applicable Connectors	Added connections
07.05.2015			New writing: EN ISO 13849
18.05.2015	14	3.6 Environmental Conditions	Expanded vibration resistance
27.05.2015			new cover, pictures changed
01.07.2015	12	3.1 Relay Output Specifications	Added new data sheet
04.08.2015			Info Cover Translation from German added
09.03.2016	15	3.4 Electrical Requirements	Graphics
28.04.2016	23	7 Mounting	Graphics distances
28.06.2017	12	3.1 Relay Output Specification	Note added
17.08.2017	16 19	3.6 Environmental Conditions 5.2 Applicable Connectors	Pollution Degree Sleeve length added Added info regarding ultrasonically welded strands
18.10.2017	20 24	5.3 Label Field 7 Mounting	Added chapter Graphic replaced

16.11.2017	10	2 Conformity with EU Guidelines	SCP 111 values added
02.04.2019	10 17 all	2.3 Safety-Relevant Parameters 3.6 Environmental Conditions	Values adjusted Corrections Corrections due to CE
14.11.2019		8 Supported Cycle Times	Chapter added
02.12.2019		2.3 Safety-Relevant Parameters	Values updated
28.02.2020	26	8 Supported Cycle Times	Text adapted
28.05.2020	26	8 Supported Cycle Times	Chapter removed
23.07.2020	1		Introductory text changed
19.08.2020	1 10 11 13 14 15 19 19	 2.2 EU Conformity Declaration 2.3 Safety-Relevant Parameters 3.1 Relay Output Specifications 3.1 Relay Output Specifications 3.1 Relay Output Specifications 3.5 Miscellaneous 3.6 Environmental Conditions	SIL CL 3 removed adapted Sub-chapter added Contact current adapted Headline added New data sheet inserted Standard adapted Environmental temperature adapted
02.09.2020	19	3.6 Environmental Conditions	At Environmental temperature "since HW version 3.10" added
08.09.2020	29	9 Hardware Class SRO021	Chapter added
04.11.2020	26	7 Mounting	Expansion functional ground connection
19.11.2020	15	3.1 Relay Output Specifications	Warning note inserted under the relay data sheet
05.03.2021		3.6 Environmental Conditions	Standards added
07.02.2022	11	2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature	Parameters SCP 211/SCP 111-S added
05.12.2023	18	5.1 Relay Output Specifications	Chapter extended

	24	5.5 Miscellaneous	Mission time added
	24	5.6 Environmental Conditions	Noise emissions added
		9 Hardware Class SRO021	Chapter removed