SIGMATEK

SDM 081

S-DIAS Safety
Digital Mixed Module

Instruction Manual

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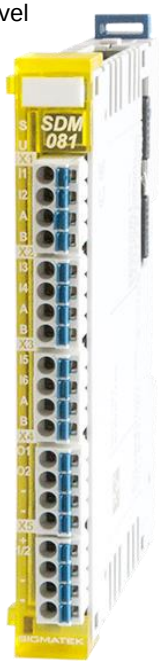
Translation of the Original Instruction

S-DIAS Safety Digital Mixed Module SDM 081



The S-DIAS Safety SDM 081 digital mixed module has the safety integrity level **SIL3** in accordance with EN IEC 62061 or **Performancelevel e** (PL e) in accordance with EN ISO 13849.

The SDM 081 has:

- 2 Safe +24 V outputs with a maximum of 2 A per output (EN 61131-2; EN IEC 62061 und EN ISO 13849)
- 6 Safe +24 V DC/0.5 ms inputs (EN 61131-2; EN IEC 62061 und EN ISO 13849)
- Redundant output signal (short-circuit proof)

The safe outputs are used for the safety-oriented output of two actuator signals to, for example, control relays, valves, etc.

The safety inputs are used for reading six actuator signals (Emergency Stop, confirmation button etc.). To test inputs and detect cross circuits (e.g. Emergency Stop), the SDM 081 has two non-safe signal outputs, A and B.

The safety-related SDM 081 is ideal for use in systems with optional modules and interface variables according to Safety System Handbook, see homepage[1].

To use the Safety digital input module in an application, the SDM 081 also requires a Safety CPU module that regulates the synchronized communication with the safety modules using safe bus telegrams. 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 SDM 081

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 IEC 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.

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 IT Security

S-DIAS safety modules were developed for integration into a network protected against unauthorized access. For example, the following dangers can affect the network:

- Unauthorized access
- Data manipulation
- and many other IT security violations

It is the responsibility of the operator to protect the safe connection between S-DIAS modules against unauthorized access. The following measures, for example, are suitable for this:

- Firewalls
- Password-protected user accounts
- Data encryption
- and much more

4 Standards and Directives

4.1 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

4.2 Safety of the Machine or Equipment

INFORMATION

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

4.3 Directives

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

4.3.1 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

4.3.2 EU Conformity Declaration

CE

EU Declaration of Conformity

The product SDM 081 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. They can be found in the download area of the respective product.

4.4 Safety-Relevant Parameters

4.4.1 Mounting Position Horizontal 0-55 °C Ambient Temperature

Mixed Module	Safety Parameters	Safety Levels
SDM 081 in combination with **SCP 011/SCP 111** CPU Module		
Inputs	1-channel application: PFH = 2.20E-09 (1/h) $MTTF_D$ = 1552 years DC = 97 % SFF = 99 % 2-channel application: PFH = 7.70E-10 (1/h) $MTTF_D$ = 1753 Jahre DC = 97 % SFF = 99 %	1-channel application: PL d(1) / Cat. 2 SIL 3 2-channel application: PL e / Cat. 4 SIL 3
Outputs **up to HW version 3.00**	PFH = 2.00E-09 (1/h) $MTTF_D$ = 1680 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3
Outputs **starting with HW version 4.00**	PFH = 2.40E-09 (1/h) $MTTF_D$ = 1346 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3

4.4.2 Mounting Position Horizontal 0-60 °C Ambient Temperature

Mixed Module	Safety Parameters	Safety Levels
SDM 081 in combination with **SCP 011/SCP 111** CPU Module		
Inputs	1-channel application: PFH = 2.60E-09 (1/h) $MTTF_D$ = 1300 years DC = 97 % SFF = 99 % 2-channel application: PFH = 9.50E-09 (1/h) $MTTF_D$ = 1475 Jahre DC = 97 % SFF = 99 %	1-channel application: PL d(1) / Cat. 2 SIL 3 2-channel application: PL e / Cat. 4 SIL 3
Outputs **up to HW version 3.00**	PFH = 2.20E-09 (1/h) $MTTF_D$ = 1461 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3
Outputs **starting with HW version 4.00**	PFH = 2.70E-09 (1/h) $MTTF_D$ = 1140 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3

Mixed Module	Safety Parameters	Safety Levels
SDM 081 in combination with **SCP 211/SCP 111-S** CPU Module		
Inputs	1-channel application: PFH = 2.90E-09 (1/h) $MTTF_D$ = 973 years DC = 97 % SFF = 99 % PFH = 9.60E-10 (1/h) $MTTF_D$ = 1063 years DC = 98 % SFF = 99 %	1-channel application: PL d(1) / Cat. 2 SIL 3 2-channel application: PL e / Cat. 4 SIL 3
Outputs	PFH = 3.50E-09 (1/h) $MTTF_D$ = 791 years DC = 98 % SFF = 99 %	PL e / Cat. 4 SIL 3

(1) According to Table 5 and the corresponding notes EN ISO 13849 in the "high" range. In combination with the high $MTTF_D$ value and the good PFH value, DC is the performance level PLd according to table K.1.

Reason for SIL 3 with single-channel use:

Because the high SFF value is greater than 99 %, SIL 3 can be accepted with a hardware tolerance (HFT) of 0 according to EN IEC 62061.

4.5 Compatibility

INFORMATION

Compatibility

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

Test Signals for Cross-Circuit Detection

The module sends pulses in cyclic time intervals to detect a crossed circuit in the outputs. When selecting the actuators, keep in mind that these pulses do not activate the actuators or trigger any diagnostic messages. The pulse signals cannot be deactivated or configured.

Contact Short Detection

It is important to keep in mind that the cross-circuit detection only functions correctly when it is configured and wired correctly. This applies equally to in- and outputs.

It must also be considered that the cross-circuit detection only works between adjacent inputs. Cross circuits between adjacent inputs must be prevented via constructive measures (e.g. separate wiring, insulated cables).

5 Type Plate

Exemplary nameplate (symbol image)

HW: Hardware version
SW: Software version

6 Technical Data

6.1 Input Specifications

The inputs are Type 1 in accordance with EN 61131-2

Number	6	
Input voltage	+24 V DC	
Input voltage range	minimum +18 V	maximum +30 V[1)]
Signal level	low: ≤ +5 V	high: ≥ +15 V
Switching threshold	typically +11 V	
Input current	3 mA at +24 V	
Input delay	0.5 ms	

INFORMATION

[1)] With increased ambient temperature >55 °C the maximum permissible supply voltage is reduced from 30 V to 28.8 V.

6.2 Specifications for Cross-Circuit Detection Signal Outputs

Number	3x signal A	3x signal B
Rated output voltage	+24 V DC	
Output voltage range	minimum +18 V	maximum +30 V[2)]
Output current	100 mA at +24 V	
Miscellaneous	short-circuit proof	

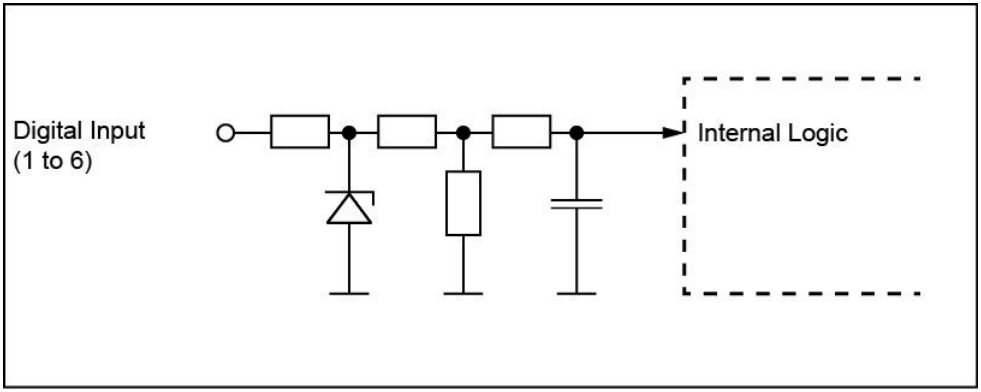
INFORMATION

[2)] With increased ambient temperature >55 °C the maximum permissible supply voltage is reduced from 30 V to 28.8 V.

The clock outputs A and B are generated once internally and are wired in parallel to the connectors. A direct cross-circuit of Clock A and/or B of a connector therefore results in cross-circuit detection in all channels.

When using the digital inputs with the clock outputs for cross-fault detection for long cable lengths, make sure that the cable capacitance from the clock output to the digital input does not exceed a value of 100 nF and that the cable resistance does not exceed a value of 250 Ω, so that the cross-fault detection does not detect a wiring error with proper wiring.

6.3 Input Circuit

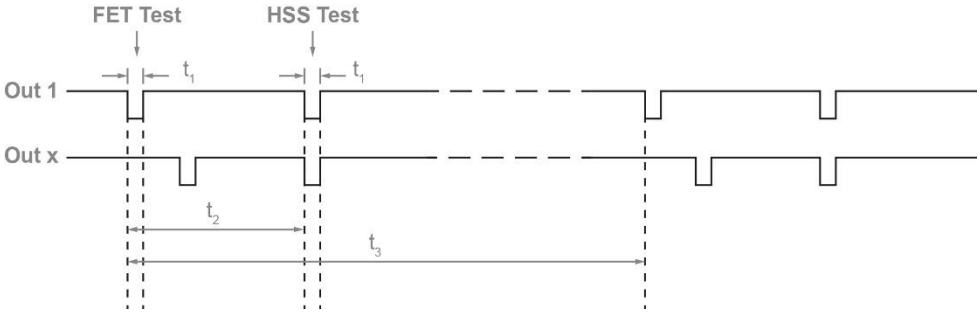


6.4 Output Specifications

All safety outputs are short-circuit protected and specified in accordance with EN 61131-2. The outputs are compatible with input of Types 1, 2 and 3.

Number	2	
Rated output voltage	+24 V DC	
Output voltage range	minimum +18 V	maximum +30 V
Maximum output current	2 A	
Maximum total current (2 outputs)	4 A up to a max. environmental temperature of 55 °C	
Brake voltage with switching-off inductive loads	typically 0.85 V	
Maximum switch-off energy of the outputs (inductive load)	maximum 0.4 Joule per channel	
Turn-on delay	< 200 µs	
Turn-off delay	< 1 ms	
Miscellaneous	Short-circuit proof	
Cutoff test pulse width (t_1)	minimum 0.1 ms	maximum 1.5 ms
Cutoff test pulse interval bet. FET Test and HSS Test (t_2)	minimum 112 ms	maximum 6450 ms
Cutoff test pulse interval (t_3)	60 s	

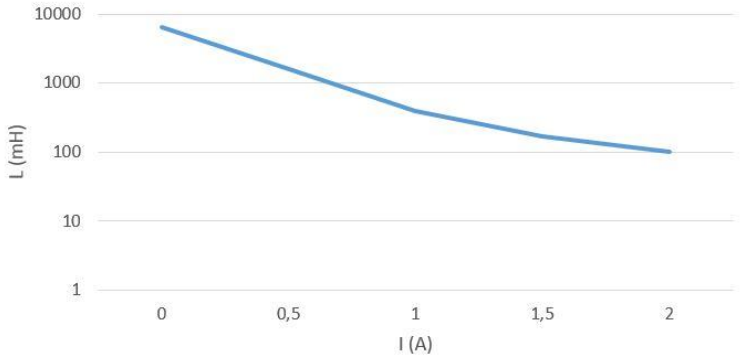
Cutoff Test Pulse Timing



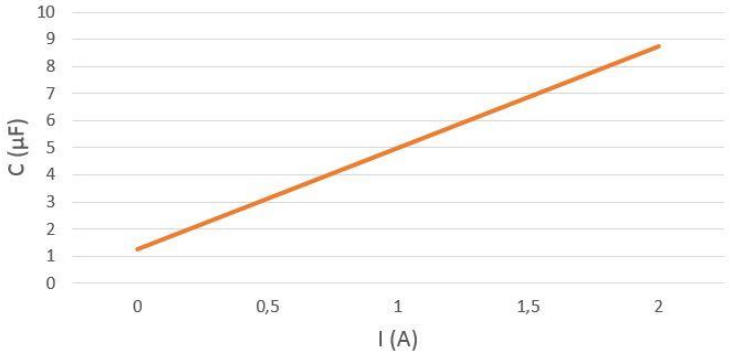
INFORMATION

A fuse for the supply voltage must be installed, which can sufficiently limit voltage and current.

6.4.1 Maximum Inductive Load L (mH) at Load Current I (A)

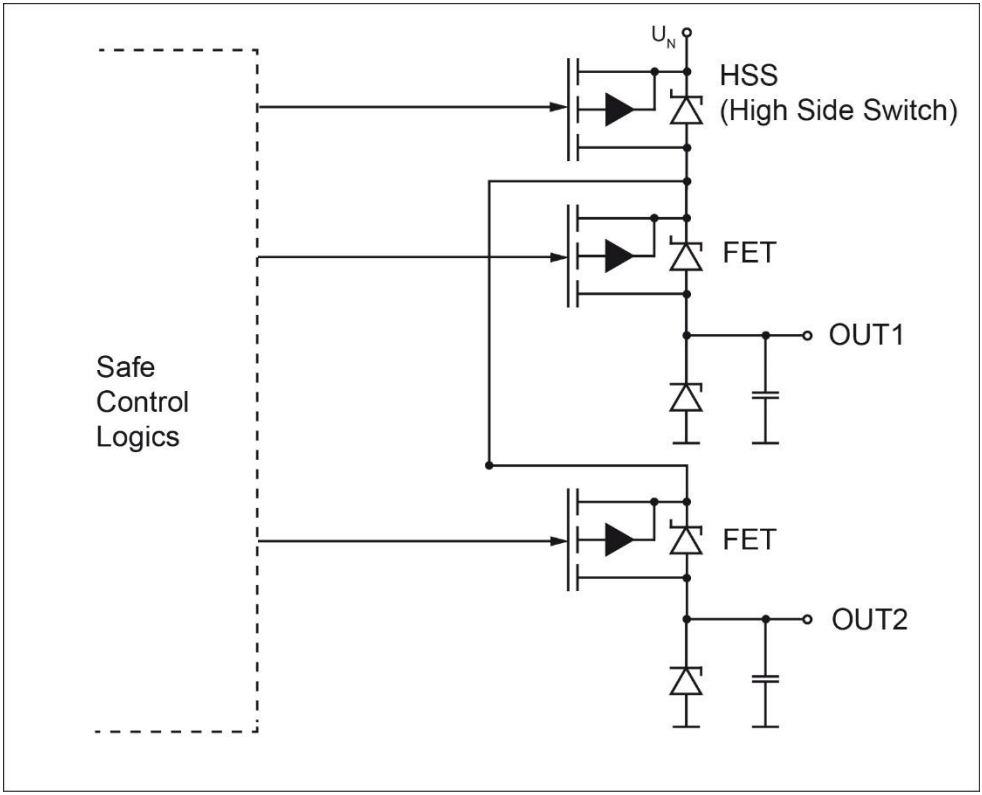


6.4.2 Maximum Capacitive Load C (µF) at Load Current I (A)



I (A)	L (mH)	C (µF)
0	6400	1,25
0,5	1600	3,13
1	400	5
2	100	8,75

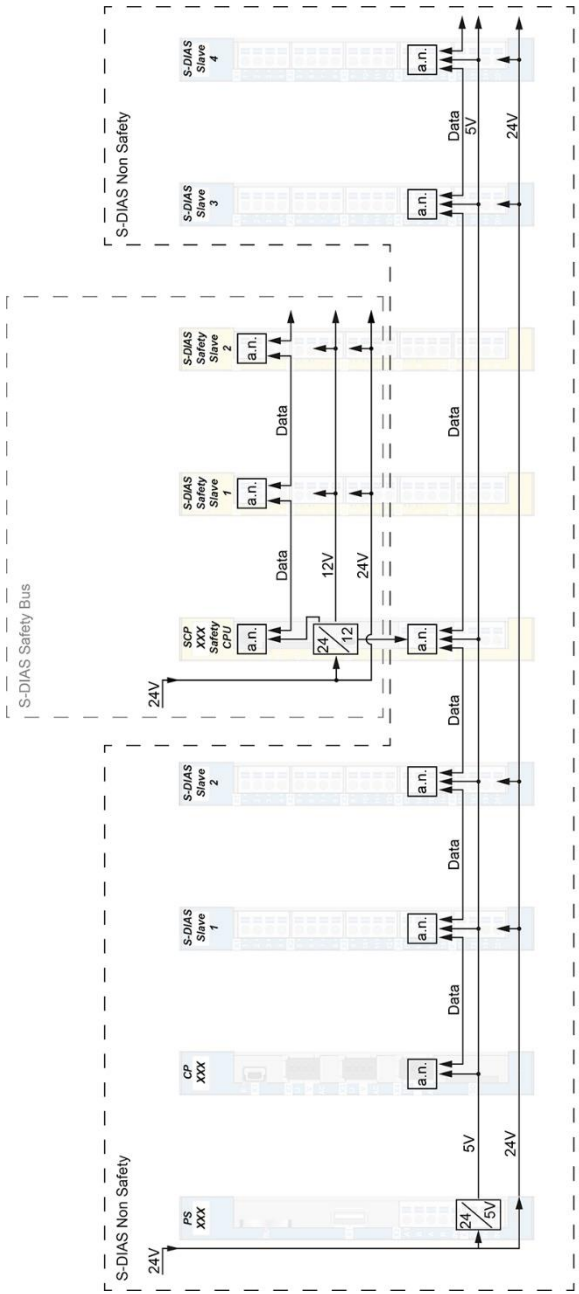
6.5 Output Circuit



The figure shows the internal output circuit of the STO 081.

6.6 Electrical Requirements

Voltage supply from Safety bus	+12 V
Current consumption on the Safety bus (+12 V supply)	maximum 34 mA
Voltage supply from Safety bus	+24 V
Current consumption on the Safety bus (+24 V supply)	maximum 21 mA


S-DIAS Safety Bus
S-DIAS Non Safety
S-DIAS Non Safety
24V
PS XXX
CP XXX
SCP XXX Safety CPU
S-DIAS Slave 1
S-DIAS Slave 2
S-DIAS Safety Slave 1
S-DIAS Safety Slave 2
S-DIAS Slave 3
S-DIAS Slave 4
a.n.
Data
5V
12V
24V
24/5V
24/12
a.n. = active node
Beschaltung S-DIAS Safety im S-DIAS System
- jedes S-DIAS Modul ist ein aktives Modul (active node)
- Safety-CPU ist am S-DIAS-Bus angeschlossen (inkl. +5 V-Versorgung)
- Safety-Bus ist eigenständig und vom S-DIAS-Bus getrennt

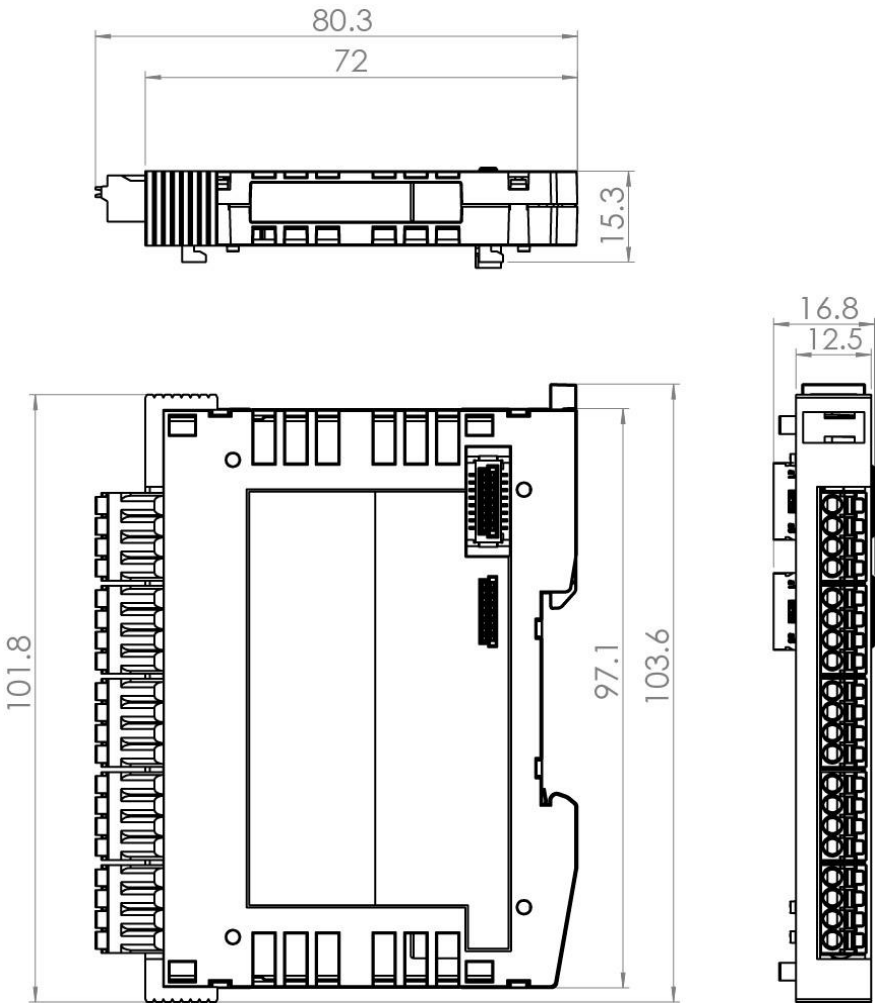
6.7 Miscellaneous

Article number	20-895-081
Standard	UL 508 (E247993)
Approbations	cULus, CE, TÜV Austria EG type-tested
Mission time	20 years

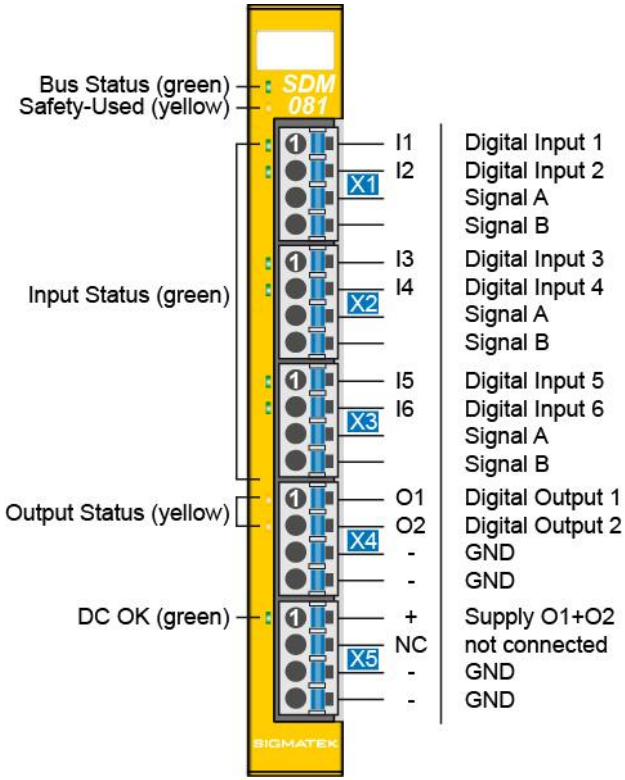
6.8 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 … +55 °C (UL) 0 … +60 °C (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	
EMV resistance	in accordance with EN 61000-6-7 (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 (industrial area) (increased requirements in accordance with EN IEC 62061)	
EMC noise generation	in accordance with EN 61000-6-4 (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

7 Mechanical Dimensions



8 Connector Layout



INFORMATION

The GND supply (X5: Pin 3 and Pin 4) is internally bridged. Only one GND pin (pin 3 or pin 4) is required to power the module. The bridged connections may be used for further looping of the GND supply. However, it must be taken into account that a total current of 6 A per connection is not exceeded by the forward looping!

8.1 Status LEDs

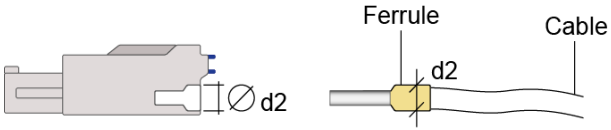
Bus Status	green	ON	bus communication OK
		OFF	no supply available
		BLINKING (5 Hz)	no communication
Safety Used	yellow	ON	module is used and no errors exist
		OFF	module is not used or not in operational mode
Input Status	green	ON	input ON
		OFF	input OFF
Output Status	yellow	ON	output on
		OFF	output off
DC OK	green	ON	voltage is supplied to the output group

8.2 Applicable Connectors

Connectors:
X1-X5: Connectors with spring terminals (included in delivery)
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

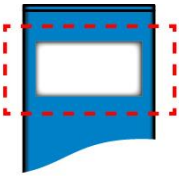
Connections:

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

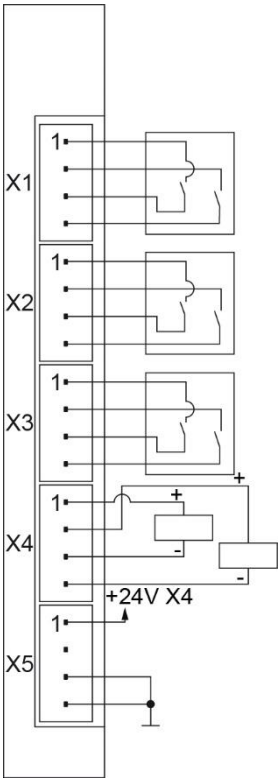
8.3 Label Field



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

9 Wiring

9.1 Wiring Example



9.2 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!

Wiring and mounting must be performed with no voltage applied!

The S-DIAS module CANNOT be connected or disconnected while voltage is applied!

10 Assembly/Installation

10.1 Check Contents of Delivery

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

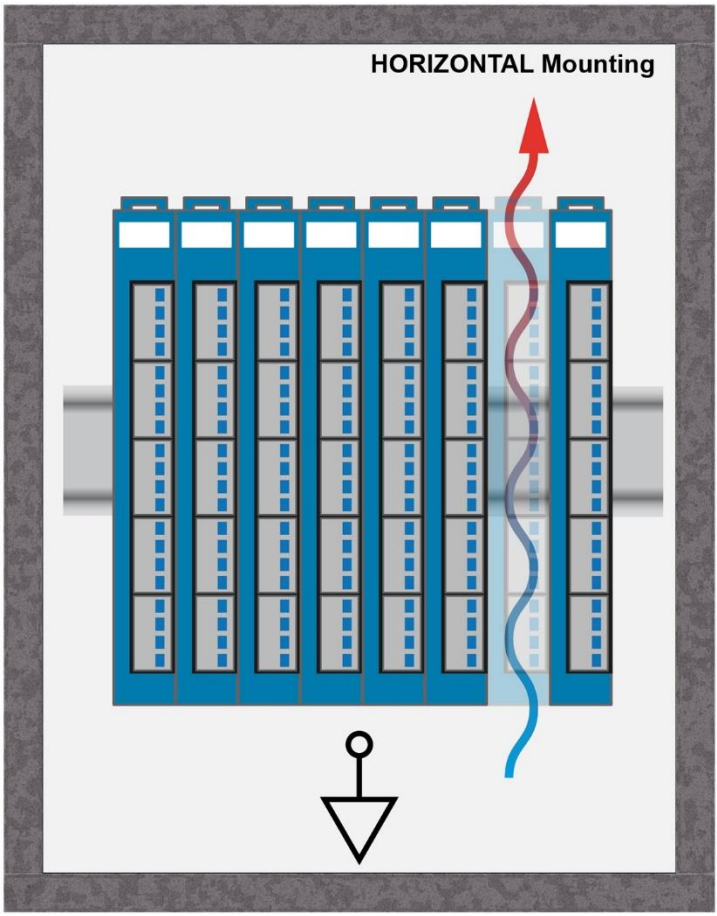
INFORMATION

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.

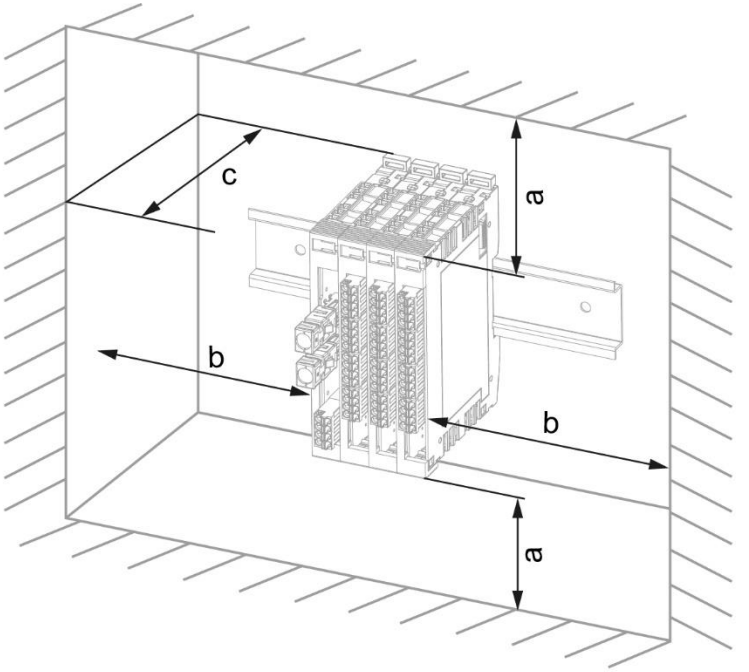
Damaged components can disrupt or damage the system.

10.2 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)

11 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.

12 Storage

INFORMATION

When not in use, store the device according to the storage conditions. See chapter 11 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.

13 Maintenance

INFORMATION

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

13.1 Service

This product was constructed for low-maintenance operation.

13.2 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 11 Transport/Storage.

14 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
18.07.2014	17	5 Connector Layout	Added wiring notice
08.09.2014	15	3.8 Miscellaneous	Added Standard
30.01.2015	20	6.2 Note	Added note concerning connecting the S-DIAS module while voltage is applied
26.03.2015	18	5.2 Applicable Connectors	Added connections
07.05.2015			New writing: EN ISO 13849
18.05.2015	15	3.9 Environmental Conditions	Expanded vibration resistance
08.07.2015	13	3.7 Output Specifications	Added mnemotechnic verse
04.08.2015			Info Cover Translation from German added
28.08.2015	15	5 Connector Layout	Changed Notice in grey box
17.02.2016	13	3.4	Switching-off inductive loads
18.02.2016	16	5 Connector Layout	Graphics changed
28.04.2016	24	7 Mounting	Graphics distances
13.03.2017	12	3.2 Signal Output Specifications for Cross-Circuit Detection	Note added
15.05.2017	14	3.4.1 Maximum Inductive Load L (mH) at Load Current I (A) 3.4.2 Maximum Capacitive Load C (µF) at Load Current I (A)	Chapter added Chapter added
17.08.2017	17 20	3.8 Environmental Conditions 5.2 Applicable Connectors	Pollution Degree Sleeve length added Added info regarding ultrasonically welded strands
23.08.2017	13	3.4 Output Specifications	Table expanded, Cutoff Test Pulse Timing added
30.08.2017	13	3.1 Output Specifications	Cutoff Test Pulse Timing
18.10.2017	22 26	5.3 Label Field 7 Mounting	Added chapter Graphic replaced
20.09.2018		5 Connector Layout	Note added

05.10.2018		3.2 Specifications for Cross-Circuit Detection Signal Outputs	Note for cable capacitance and for cable resistance added
02.04.2019	11	2.3 Safety-Relevant Parameters	Correction of the safety-relevant parameters
	19	3.8 Environmental Conditions	Corrections environmental conditions
	all		Corrections due to CE
20.09.2019	10	2.3 Safety-Relevant Parameters	Values adjusted
14.11.2019		8 Supported Cycle Times	Chapter added
02.12.2019		2.3 Safety-Relevant Parameters	Values updated
28.02.2020	27	8 Supported Cycle Times	Text adapted
28.05.2020	27	8 Supported Cycle Times	Chapter removed
20.07.2020	all		Up to 60 °C ambient temperature
02.09.2020	1		Text correction
	7	1.3 General Requirements	Text correction of Designated Use
	10	2.3.1 Mounting Position Horizontal 0-55 °C Ambient Temperature	Safety Parameters changed
	11	2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature	Safety Parameters changed
	12	2.4 Compatibility	Text correction of Contact Short Detection
	13	Technical Data	Text “horizontal mounting position and” removed from footnotes
	19	3.8 Environmental Conditions	At Environmental temperature 0 ... +55 °C deleted
08.09.2020	29	9 Hardware Class SDM081	Chapter added
04.11.2020	26	7 Mounting	Expansion functional ground connection
05.03.2021		3.8 Environmental Conditions	Standards added
07.02.2022	12	2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature	Parameters SCP 211/SCP 111-S added

22.03.2022	10	2.3.1 Mounting Position Horizontal 0-55 °C Ambient Temperature	Safety characteristic values outputs changed Safety parameters added as of HW version 4.00
	11	2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature	Safety parameters added as of HW version 4.00 SDM 081 in combination with SCP 211/SCP 111-S outputs value PFHD changed.
12.09.2022	20	3.7 Miscellaneous	Hardware version removed
20.04.2023	22	5 Connector Layout	Info box corrected
05.12.2023	27	5.7 Miscellaneous	Mission time added
	27	5.8 Environmental Conditions	Noise emissions added
		9 Hardware Class SDM081	Chapter removed
01.02.2024	14	3.3.2 EU Conformity Declaration	Note on download adjusted
	15	3.4 Safety-Relevant Parameters	The safety indicators (PFH, $MTTF_D$) were adjusted slightly with the recertification.
21.02.2024	13	IT Security	Chapter added