SIGMATEK

SAI 041

S-DIAS Safety Analog Input Current Module

Instruction Manual

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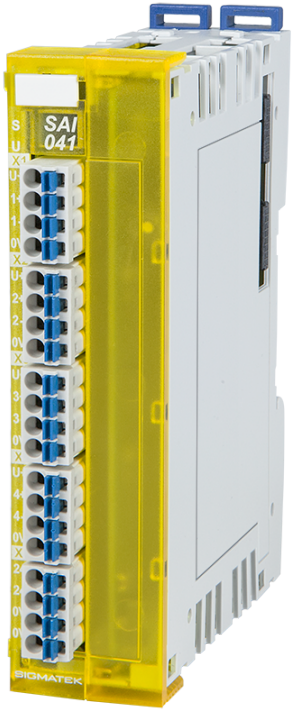
Translation of the Original Instructions

S-DIAS Safety Analog Input Current Module SAI 041



The S-DIAS safety analog input module provides the values of four analog current inputs from the Safe CPU (Safety CPU). The analog inputs can also be read by the functional control CPU via the S-DIAS bus from the safety CPU.

The four current inputs have an input range of 4-20 mA with a resolution of 16 bits. A +24 V sensor supply is provided for the analog inputs, which must be powered externally. The external +24 V voltage supply for the analog inputs is monitored for over- and under voltage.

Safe evaluation of the analog inputs is ensured by two independent diversitary evaluations with mutual monitoring.

The safety functions of the module meet

for two-channel application
the requirements according to SIL 3 in accordance with EN IEC 62061 and PL e, Cat. 4 in accordance with EN ISO 13849.

as well as

for one-channel application
the requirements according to SIL 3 in accordance with EN IEC 62061 and PL e, Cat. 3 in accordance with EN ISO 13849.

Table of 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 SAI 041

2 Basic Safety Directives

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 particular 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 PLC control and meet the required conditions for safe operation according to SIL 3 in compliance with EN IEC 62061 and according to PL e, Cat. 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 integrator or operator to carry out a risk analysis of the connections between S-DIAS modules and the integration into the overall infrastructure. The following measures, for example, may result from this (if necessary):

- Separation of IT/OT networks (VLANs or physical)
- Firewalls
- Password-protected user accounts
- Data encryption
- and much more

With regard to the functional safety objective, in this case the STO safety function, no direct effects on the function or its integrity are possible, since the function cannot be influenced via communication-based interfaces.

The availability of the overall system (as with all safety functions) can be compromised by external attacks, hence the above measures are necessary.

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
- Hazardous contact voltages
- Effects of operational electrical, magnetic and electromagnetic fields
- 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
- Tensions de contact dangereuses
- Effets des champs électriques, magnétiques et électromagnétiques opérationnels
- 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 SAI 041 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.

5 Safety-Relevant Parameters

5.1 Mounting Position Horizontal 0-60 °C Ambient Temperature

CPU Module	Safety Parameters	Safety Levels
SAI 041	PFH = 9.60E-09 (1/h) SFF = 99 % $MTTF_D$ = 218 years DC = 97 %	**1-channel application:** PL e / Cat. 3 SIL 3
	PFH = 1.40E-08 (1/h) SFF = 99 % $MTTF_D$ = 218 years DC = 97 %	**2-channel application:** PL e / Cat. 4 SIL 3

INFORMATION

The system integrator must perform a separate verification according to EN ISO 13849-1 for the overall system consisting of SAI 041 and encoder. The safety characteristics of the encoder are to be requested from the manufacturer. The specified safety parameters refer only to the product SAI 041.

1- and 2-channel application

The application for a specific PL, category or SIL requires a correct installation. Please note possible normative requirements of the end application (machine) for installation and selecting the sensor. For two-channel use, both sensors must be monitored in the Safety-oriented application (SCP 211/111-S) for example, via the function block SDINT_Compare.

5.2 Compatibility

INFORMATION

Compatibility

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

6 Type Plate

Exemplary nameplate (symbol image)

HW: Hardware version
SW: Software version

7 Technical Data

7.1 Analog Input Specifications

Number of channels	4
Measurement Range	4-20 mA
Measurement value	12,000-60,000
Measurement range Overrange and Underrange[1)]	0.5-21.6 mA
Measurement range Overrange and Underrange	1,500-64,800
Input type	differential input
Galvanic separation	none
Measurement range resolution	16 bits
	ca. 0.371 µA/LSB
Conversion time for all channels	1 ms
Common mode range	±10 V
Load	typically 55 Ω
Cable break monitor	configurable min. 0.5 mA
Input filter hardware	1 kHz, low pass 3rd order (common mode)
Input filter software	low pass 1st order (configurable or can be deactivated)
Input delay	dependent on software filter [3)]
Measurement precision 1-channel	±1.0 %/200 µA (0-60 °C) [2)]
Measurement precision 2-channel	±2.0 %/400 µA (0-60 °C) [2)]
Linearity	0.006 %
Status display	1x green status LED per channel, 1x red error LED per channel

[1] A safety error is triggered if the value exceeds the upper or lower limits of this measuring range.

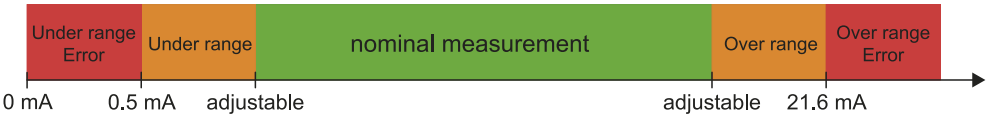
[2] The measuring accuracy refers to the nominal measuring range of 4-20 mA

[3] The input delay t in milliseconds can be calculated using the formula below

$$t = \frac{5000}{2 * \pi * filter\ frequency(Hz)}$$

7.2 Measurement Range

The diagram shown below shows the configuration of the SAI 041's measurement range. The measurement range is configured to 4-20 mA by default. In the SAFETYDesigner, the measurement range can be expanded from 0.5-21.6 mA. Input currents < 0.5 mA or > 21.6 mA trigger a safety error.



7.3 Electrical Requirements

Supply voltage for sensor supply	typically +24 V DC ±20 % (SELV/PELV) UL: Class 2 or LVLC	
Protection class	III	
Current consumption X5[1)]	typically 3.5 mA internal consumption	maximum 5 mA internal consumption + connected sensors (maximum 500 mA for sensor supply)
Voltage supply from Safety bus	+12 V (with missing +24 V connection X5)	
Current consumption on the Safety bus (+12 V supply)	typically 100 mA	maximum 120 mA
Voltage supply from S-DIAS bus	+24 V (with missing +24 V connection X5)	
Current consumption on the S-DIAS bus (+24 V supply)	typically 55 mA	maximum 65 mA

1) The outgoing sensor supply for X1, X2, X3 and X4 are fed via X5. A common fuse is provided for the sensor supplies with a maximum of 500 mA.

INFORMATION

USA and Canada:

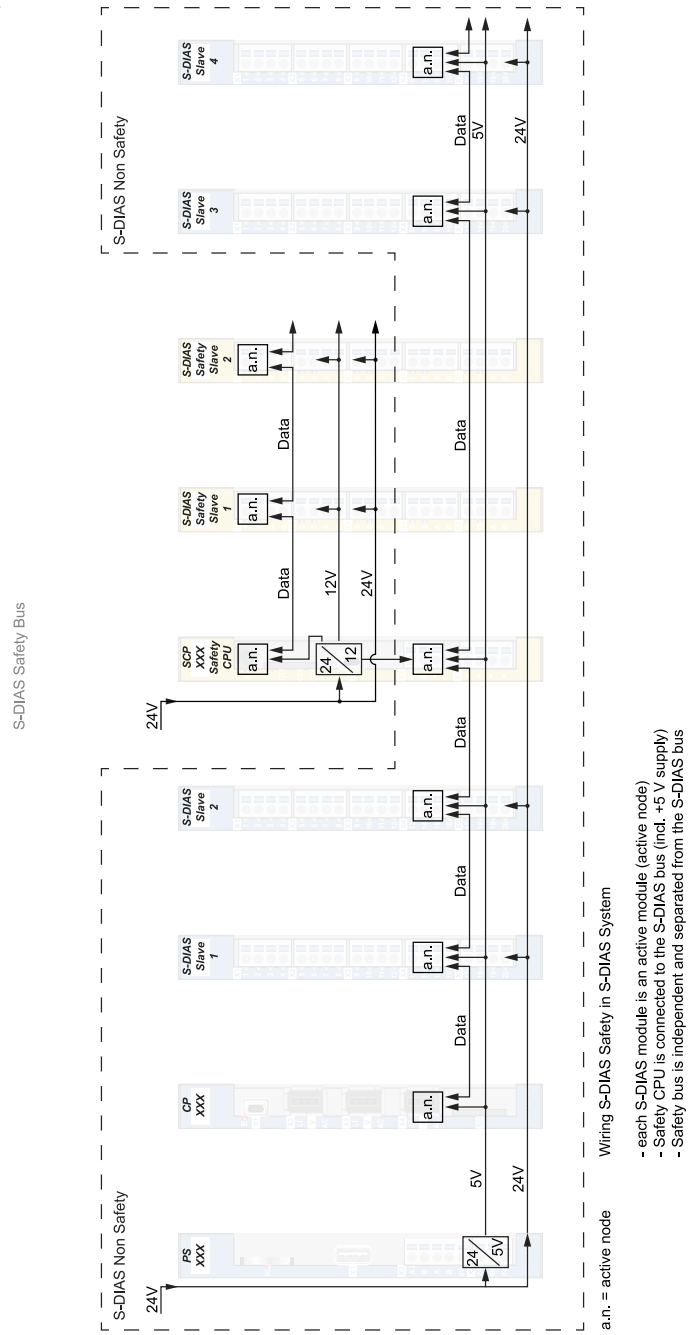
The supply must be limited to:
a) max. 5 A at voltages from 0-20 V DC, or
b) 100 W at voltages from 20-60 V DC

The limiting component (e.g., transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory.

A fuse for the supply voltage must be installed, which can sufficiently limit voltage and current! (Dependent on the number of modules connected on the S-DIAS Safety bus)

The S-DIAS Safety analog input module is supported by the SCP 211 (starting from FW version v505) and the SCP 111/SCP 111-S (starting from FW version v465). The SCP 011 does not support the S-DIAS Safety analog input module.

When used in combination with an SAI 041, the Safety CPU must be supplied with at least +19.2 V!



a.n. = active node

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

7.4 Miscellaneous

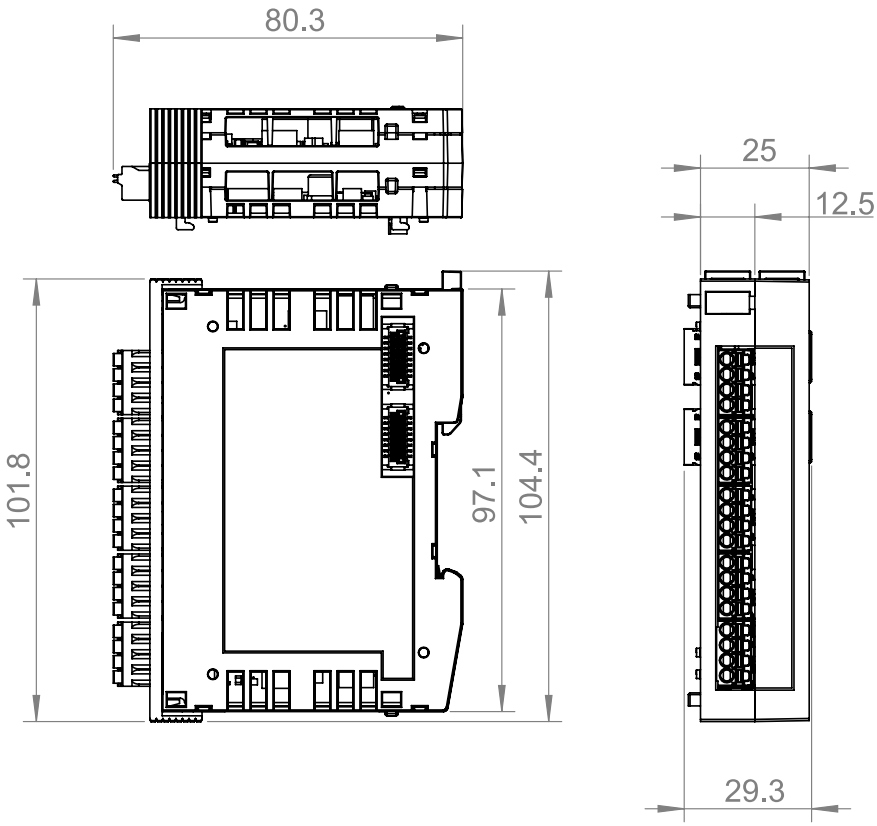
Article number	20-896-041
Printed circuit board coating	no
Standard	UL 61010 (E247993), cULus
Approvals	CE, TÜV EG type tested
Mission time	20 years

7.5 Environmental Conditions

Storage temperature	-40 ... +85 °C	
Environmental temperature	0 ... +60 °C[1)]	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
Noise emission	≤ 70 dB	
EMC resistance	EN 61000-6-2 (industrial area) EN 61000-6-7 (noise immunity industry functional safety) (increased requirements in accordance with EN IEC 62061)	
EMC noise generation	EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm von 5-8.4 Hz 1 g von 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s²)
Protection type	EN 60529/NEMA 250	IP20/Type1 (not evaluated by UL)

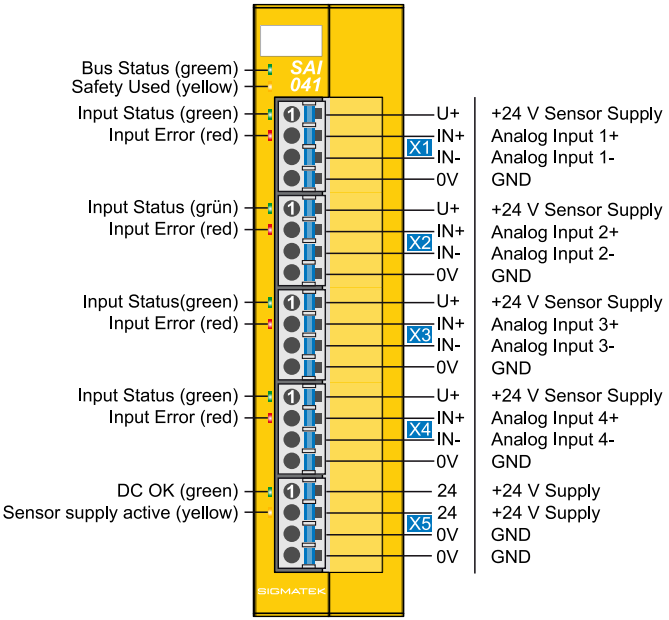
1) Starting at an ambient temperature of +55 °C, the safety parameter from chapter 5 Safety-Relevant Parameters must be used.

8 Mechanical Dimensions



Measurements	25 x 104 x 72 mm (W x H x D)

8.1 Connector Layout



INFORMATION

The connections of the +24 V supply (X5: pin 1 and pin 2) or the GND supply (X5: pin 3 and pin 4) are internally bridged. To supply the module, only one connection to a +24 V pin (pin 1 or pin 2) and a GND pin (pin 3 or pin 4) is required. The bridged connections may be used for further looping of the +24 V supply and 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!

8.2 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
Input status	green	ON	analog input is active and input range valid
		BLINKING (0.5 Hz)	analog input below measurement range
		BLINKING (4 Hz)	analog input above measurement range
		OFF	analog input inactive
Input error	red	OFF	no errors
		BLINKS	safety error
DC OK	green	ON	+24 V input voltage for sensor supply OK
Sensor supply	yellow	ON	+24 V sensor supply active

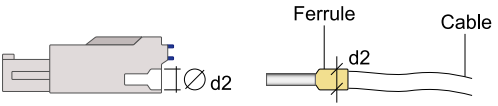
8.3 Applicable Connectors

X1-X5: Connectors with spring terminals (included in delivery)

The spring terminals are suited for the connection of ultrasonically compacted (ultrasonically welded) stranded wire.

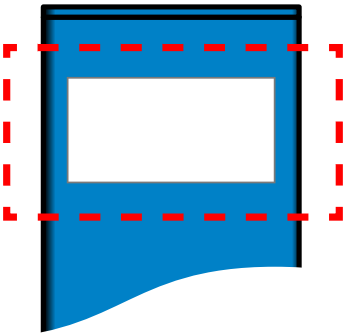
Connection capacity:

Stripping length/sleeve length	10 mm
Mating direction	parallel to the conductor axis or circuit board
Conductor cross section rigid	0.2-1.5 mm²
Conductor cross section flexible	0.2-1.5 mm²
Conductor cross section, ultrasonically compacted	0.2-1.5 mm²
Conductor cross section AWG/kcmil	24-16
Conductor cross section flexible with ferrule without plastic sleeve	0.25-1.5 mm²
Conductor cross section flexible with ferrule with plastic sleeve	0.25-0.75 mm² (reason for reduction d2 of the ferrule)



d2 = max. 2.8 mm

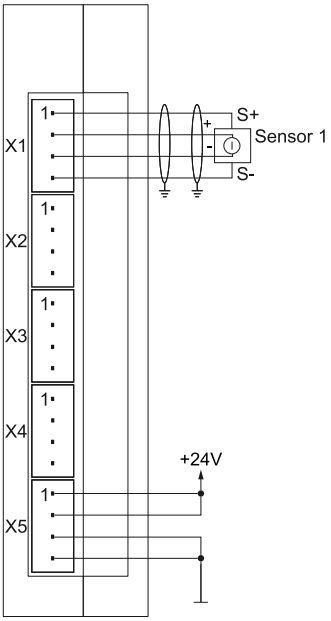
8.4 Label Field



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

9 Wiring

9.1 Single-channel Use

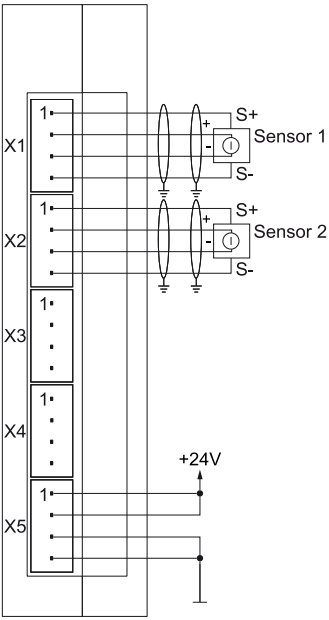


1 sensor: max. achievable level SIL3, PL e, Cat. 3

INFORMATION

In order to achieve the desired safety level, the sensor must be systematically suitable for the desired safety level.

9.2 Two-channel Use



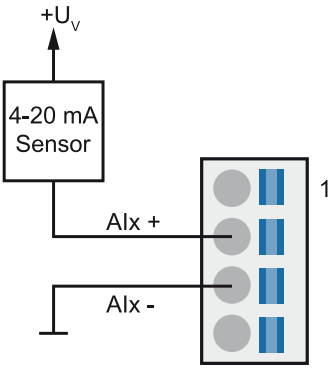
Combination of 2 sensors: max. achievable level SIL3 PL e Cat. 4 4

INFORMATION

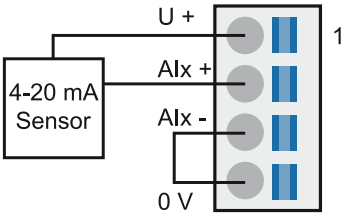
In order to achieve the desired safety level, the sensor must be systematically suitable for the desired safety level.

9.3 Connecting a 2-Wire Sensor

with external +24 V sensor supply

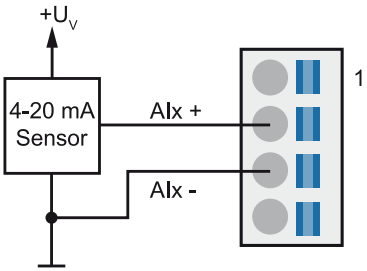


with internal sensor supply

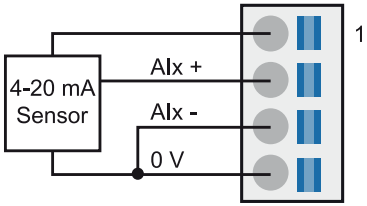


9.4 Connecting a 3-Wire Sensor

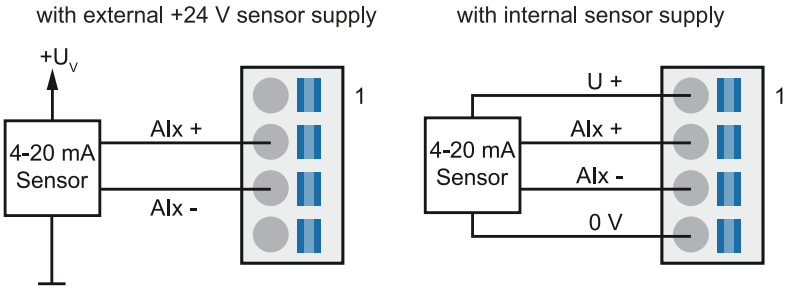
with external +24 V sensor supply



with internal sensor supply

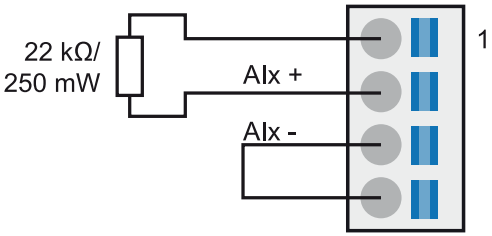


9.5 Connecting a 4-Wire Sensor



9.6 Wiring Example: Terminating Open Inputs

The cable-break monitor of the analog input is active as soon as the corresponding channel is activated in the SAFETYDesigner. Open inputs return a safety error and the error LED of the affected channel blinks. To suppress the blinking of the error LED and safety error, unused inputs can be terminated with a 22 kΩ resistor that provides an input current 1.09 mA @ +24 V supply voltage for the measurement channel and thereby maintains the minimum current of 0.5 mA. The channel is then no longer in safety error and the input status LED blinks green (LED indicates under range, measurement range default set to 4-20 mA)



9.7 Note

To ensure error-free operation, a careful wiring method must be followed.

The following installation guidelines should be observed:

- Use copper cables (Cu) rated for at least 77 °C for wiring the module.
- The 0 V connection of the supply voltage must be connected with the 0 V collection point over the shortest route possible.
- The DIN rail must have an adequate mass connection.
- The lines connected to the source of the analog components must be as short as possible and parallel wiring to digital signal lines must be avoided.
- The signal lines must be shielded.
- The shielding must be connected to a shielding bus.
- 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!

10 Reaction Times

The table below shows the reaction times to external error influences. The reaction time describes the time from when the error occurs in the safety analog input card to when it is reported to the Safety CPU. The time until the safe state is initiated depends on the application and system.

Error type	Description	Reaction time
Error of Channel	Under- / Overrange measurement value	2 ms + filter time[1)]
Error of Channel	Measurement deviation too high	5 ms + filter time[1)]
Error of Module	Common mode voltage to a channel is too high	120 ms
Error of Module	+24 V sensor supply too large / small	30 ms
Error of Module	SCP supply voltage drop	8 ms

1) Low-pass filter time: Depends on the configuration and can also differ between analog inputs. The calculation of this time is described in chapter 7.1 Analog Input Specifications.

11 Assembly/Installation

11.1 Check Contents of Delivery

Ensure that the contents of the delivery are complete and intact. See chapter 1.3 Contents of Delivery.

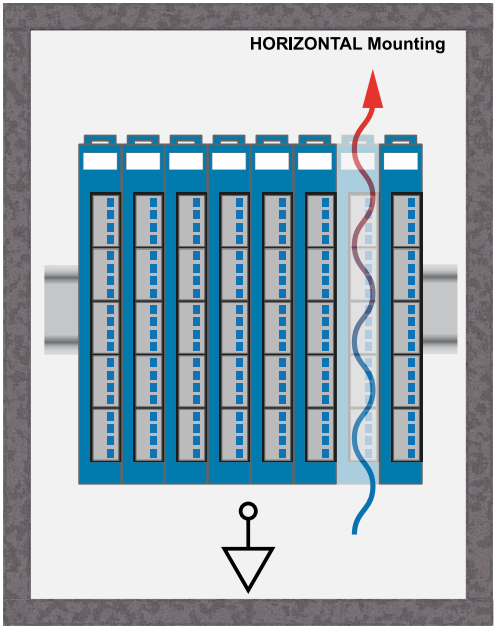
INFORMATION

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.

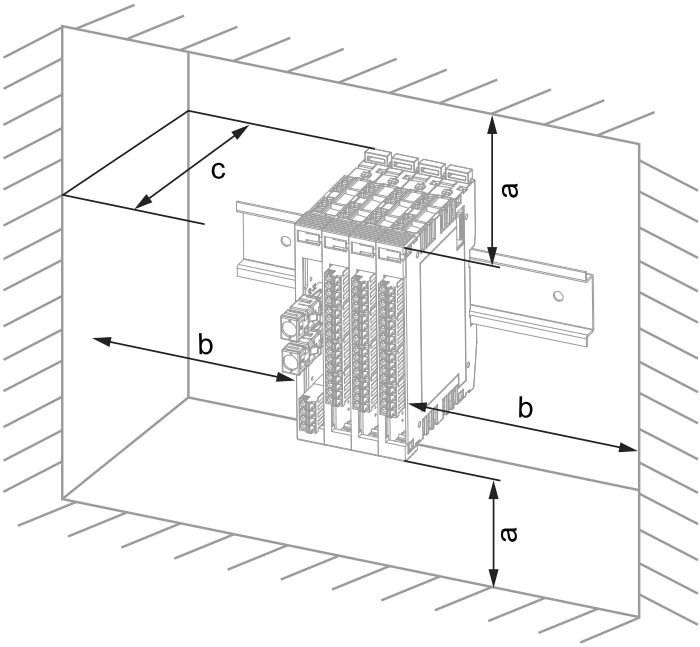
Damaged components can disrupt or damage the system.

11.2 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 rai is made via the grounding lug 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 to ensure proper function up to the maximum operating temperature.



Recommended minimum distances between the S-DIAS modules and 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)

12 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.

13 Storage

INFORMATION

When not in use, store the operating panel according to the storage conditions. See chapter 12 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.

14 Maintenance

INFORMATION

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

Lors de l'entretien et de la maintenance, respectez les consignes de sécurité du chapitre 2 Basic Safety Directives.

14.1 Service

This product was constructed for low-maintenance operation.

14.2 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 12 Transport/Storage.

15 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.

Change History

Change date	Affected page(s)	Chapter	Note
05.05.2022	27	9 Wiring	First two graphics changed and note added
18.05.2022	19	7.3 Electrical Requirements	Removed hint SPC as master
	1		1oo1, 1oo2 evaluation removed
	15	5.1 Mounting Position Horizontal 0-60 °C Ambient Temperature	SCP 111 changed to SCP 111-S
02.03.2023	19	7.3 Electrical Requirements	Sentence “The SAI 041 is currently not supported by the SCP 111.” removed
24.03.2023	15	5.1 Mounting Position Horizontal 0-60 °C Ambient Temperature	PFHd and $MTTF_D$ corrected
05.12.2023	21	7.4 Miscellaneous	Mission time added
	21	7.5 Environmental Conditions	Noise emissions added
	27	9.1 Single-channel Use	Title, graphics and note changed
	28	9.2 Two-channel Use	Title, graphics and note changed
01.02.2024	14	4.3.2 EU Conformity Declaration	Note on download adjusted
	15	5 Safety-Relevant Parameters	The safety indicators (PFH, $MTTF_D$) were adjusted slightly with the recertification.
21.02.2024	12	3 IT Security	Chapter added
			Wording of standards corrected
13.03.2025	15	5 Safety-Relevant Parameters	Typo PL d corrected to PL e
18.03.2025		Document	Layout corrected
19.03.2025	21	7.4 Miscellaneous	UL certified