

# SSI 021

## S-DIAS Safety SSI Absolute Value Encoder

### Operating Manual

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### **Translation from German**

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## S-DIAS Safety SSI Absolute Value Encoder SSI 021

The S-DIAS Safety SSI absolute value encoder module SSI 021 provides the values of two absolute value encoders, the Safety CPU as well as the non-Safe CPU (standard PLC). Since hardware version 2.0 rotary encoders are supported.

The 2-channel Safety function is implemented by processing the position values in the so-called Safety core (two micro controllers with cross communication).

The connection to the Safety CPU (SCP 011 / SCP 111) is made via the internal Safety bus, which is completely independent of the S-DIAS bus.

The components supply the Safety CPU values, such as position, speed and absolute value limit violation. For a detailed listing of the function and settable parameters, see the module description in the SafetyDesigner.

The SSI 021 parameters are set via the program in the default PLC (bit length of the SSI signal, SSI frequency, ...) and therewith, participants in the S-DIAS bus of the standard PLC as well as on the internal Safety bus of the Safety CPU. Stand-alone mode with a Safety CPU (without standard PLC) is therefore not possible.

The safety-related component of the module meets the requirements for SIL3 in accordance with EN / IEC 62061 and PL e, cat. 4 in accordance with EN ISO 13849-1/-2 (with two-channel use).



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# 1 Basic Safety Guidelines

## 1.1 General Information on Safety

If the safety guidelines are not followed, danger to personnel can arise that could lead to serious injury or in worst cases, death. In less serious cases, systems and equipment can be damaged.

The following symbols identify the individual risks as well as the degree of seriousness; their respective meanings are briefly explained. You should therefore familiarize yourself with the safety symbols and their meanings to prevent dangers and risks.

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### DANGER



### DANGER!

Identifies an immediate danger with high risk, which can lead to immediate death or serious injury if not avoided.

Indique un danger direct à haut risque d'un décès immédiat ou des blessures graves si les consignes de sécurité ne sont pas respectées.

---

### Warning



### DANGER!

Identifies an immediate danger with high risk, which can lead to immediate death or serious injury if not avoided.

Indique un danger direct à haut risque d'un décès immédiat ou des blessures graves si les consignes de sécurité ne sont pas respectées.

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### CAUTION



### CAUTION!

Identifies a low risk danger, which can lead to injury or property damage if not avoided.

Indique un danger avec un niveau de risque faible des blessures légères ou des dommages matériels si les consignes de sécurité ne sont pas respectées.

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## 1.2 Further Safety Guidelines

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Warning, dangerous electrical voltage

Avertissement d'une tension électrique dangereuse

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Hot surface warning

Avertissement d'une surface chaude

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Danger for ESD-sensitive components

Les signes de danger pour les composants sensibles aux décharges électrostatiques

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This symbol identifies important or additional information regarding the operation of the safety modules.

Ce symbole indique des informations importantes ou supplémentaires concernant le fonctionnement des modules de sécurité particuliers.

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## 1.3 General Requirements

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### Technical Documentation



This technical documentation is a component of this product.

- This document must be accessible in the vicinity of the machine, since it contains important instructions.
  - The technical documentation should be included in the sale, rental or transfer of the product.
- 

### Documentation technique



Cette documentation technique fait partie intégrale du produit.

- Gardez la toujours à portée de main et à la proximité de la machine, car elle contient des informations importantes.
  - Distribuez la documentation technique aux secteurs de la vente et/ou de la location du produit.
- 

### Acceptance of the Safety Guidelines



Before handling the product belonging to this documentation, the operating instructions and safety guidelines must be read. SIGMATEK GmbH & Co KG accepts no liability for damages resulting from non-compliance with the safety guidelines or the relevant regulations.

Acceptance of the safety guidelines and the explanations in this document, as well as the Safety System Handbook (see homepage<sup>1</sup>) are a basic requirement for proper use. Therefore, read this operating manual thoroughly and familiarize yourself with each of them.

More information on standards and regulations etc. can be found in the system handbook.

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### Prendre connaissance de consignes de sécurité



Avant toute manipulation on doit impérativement prendre connaissance de consignes de sécurité et du mode d'emploi. SIGMATEK GmbH & Co KG n'assume aucune responsabilité pour les dommages causés par le non-respect des consignes de sécurité ou du mode d'emploi respectif.

La connaissance de consignes de sécurité et le contenu de cette documentation ainsi que le mode d'emploi du système de sécurité constitue une condition préalable à l'utilisation prévue.

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<sup>1</sup> Using the search function with the keyword "Safety System Handbook"



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Lisez ce mode d'emploi et assurez-vous de le comprendre jusqu'aux détails.

Pour plus d'informations sur les normes et les lignes directrices, etc., reportez-vous au mode d'emploi

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### Qualified Personnel



Installation, assembly, programming and initial start-up, operation, maintenance and decommissioning of control and automation technology products in general, as well as safety-related products especially, 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 guidelines and standards of safety technology.

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### Personnel qualifié



Installation, montage, programmation, mise en service, l'exploitation, l'entretien et mise hors service de produits de commande et d'automatisation en général, et de produits liés à la sécurité, en particulier, ne peut être effectuée que par le personnel qualifié.

On entend sous terme personnel qualifié les personnes ayant acquis une formation professionnelle dispensé par un spécialiste sur l'utilisation et surveillance des composants et des systèmes de sécurité, ceci conformément aux lignes directrices et les normes en vigueur.

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## Designated Use



The Safety modules are designed for use in safety-oriented applications and meet the required conditions for safety operation in compliance with Performancelevel e (PL e), in accordance with EN ISO 13849-1/-2 and SIL3 in accordance with EN 62061.

For your own safety and the safety of others, use safety modules for their designated purpose. Correct EMC installation as well as proper transport and storage are also included in designated use.

Non-designated use consists of

- Any change made to the safety modules of any kind.
- The use of damaged safety modules.
- The use of the safety module outside of the instructions described in this handbook.
- The use of the safety module outside of the technical data described in this handbook.

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## Operator Due Diligence



The operator must ensure that

- the Safety modules are to be used for their designated purpose only.
  - the Safety modules are to be operated in error-free, fully functional condition only.
  - only sufficiently qualified and authorized personnel may operated the Safety modules.
  - the documentation is complete and in readable condition and available at the site of operation.
-

## 2 Safety Conformity

### 2.1 Functional Safety Standards

- EN / IEC 62061:2005/A2:2015
- EN ISO 13849-1:2015
- EN ISO 13849-2:2012

### 2.2 EU Conformity Declaration



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#### EU Declaration of Conformity

The SSI 021 complies with the following European directives:

- 2006/42/EG “Directive of the European Parliament and of the Council of 17 May 2006 on Machinery and Change to the Directive 95/16/EC” (machine guideline)
- 2014/30/EU “Electromagnetic Compatibility” (EMC guideline)
- 2011/65/EU Restricted use of certain hazardous substances in electrical and electronic equipment (RoHS Guideline)

The EU Conformity Declarations are provided on the SIGMATEK website. Using the search function with the keyword “EU Declaration of Conformity”.

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## 2.3 Safety-Relevant Parameters

### 2.3.1 Mounting Position Horizontal 0-55 °C Ambient Temperature

Input Module	Safety Parameters	Safety Levels
SSI 021 including CPU module SCP 011/SCP 111	1-channel application: PFH <sub>D</sub> = 2.4E-8 (1/h) MTTF <sub>D</sub> = 660 years DC = 85 % SFF = 95 %	1-channel application: PL d <sup>(1)</sup> / Cat. 2 SIL 2
	2-channel application: PFH <sub>D</sub> = 2.7E-09 (1/h) MTTF <sub>D</sub> = 677 years DC = 99 % SFF = 99 %	2-channel application: PL e / Cat. 4 SIL 3

- (1) According to Table 5 and the corresponding notes EN / ISO 13849 in the "medium" range. In combination with the high MTTF<sub>D</sub> value and the good PFH<sub>D</sub> value, DC is the performance level PLd according to table K.1.

### 2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature

Input Module	Safety Parameters	Safety Levels
SSI 021 including CPU module SCP 011/SCP 111	1-channel application: PFH <sub>D</sub> = 3.0E-8 (1/h) MTTF <sub>D</sub> = 566 years DC = 84 % SFF = 95 %	1-channel application: PL d <sup>(1)</sup> / Cat. 2 SIL 2
	2-channel application: PFH <sub>D</sub> = 3.2E-09 (1/h) MTTF <sub>D</sub> = 579 years DC = 99 % SFF = 99 %	2-channel application: PL e / Cat. 4 SIL 3

Input Module	Safety Parameters	Safety Levels
<b>SSI 021</b> including CPU module <b>SCP 211/SCP 111-S</b>	1-channel application: $PFH_D = 3.0E-8$ (1/h) $MTTF_D = 477$ years $DC = 87\%$ $SFF = 96\%$	1-channel application: $PL\ d^{(1)} / Cat. 2$ SIL 2
	2-channel application: $PFH_D = 2.7E-09$ (1/h) $MTTF_D = 677$ years $DC = 99\%$ $SFF = 99\%$	2-channel application: $PL\ e / Cat. 4$ SIL 3

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

## 2.4 Compatibility

### Compatibility



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

### Compatibility SSI encoder

When selecting the SSI encoder, it must be ensured that the absolute value range of the encoder covers the entire range of use.

For the support of rotary encoders, the absolute position of the encoder in the safety control is extended to 32bit. This 32bit extension is not saved and after a restart of the safety control the absolute position of the encoder is loaded again. Position monitoring outside the absolute value range of the encoder is not permitted.

### 3 Technical Data

#### 3.1 SSI Encoder Specifications

Number	2
Encoder	absolute encoder with RS422 interface
Data transfer speed	125 kHz, 250 kHz, 500 kHz, 1 MHz (configurable)
Encoder resolution	maximum 32 bits
Coding	binary / gray
Encoder power supply	+24 V supply, maximum 300 mA when installing the SSI 021 in ambient temperature up to 50 °C +24 V supply, maximum 200 mA in 60 °C ambient temperature  internal voltage monitor +24 V (+20 % / -15 %)
Status LED	yes

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

**Un fusible conforme aux limites de la tension et du courant d'alimentation doit être présent en amont de l'alimentation.**

### 3.2 Electrical Requirements

Voltage supply from Safety bus	+12 V	
Current consumption on the Safety bus (+12 V supply)	typically 70 mA	maximum 100 mA
Voltage supply from S-DIAS bus	+24 V	
Current consumption on the S-DIAS bus (+24 V supply)	typically 30 mA	maximum 50 mA

**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.**

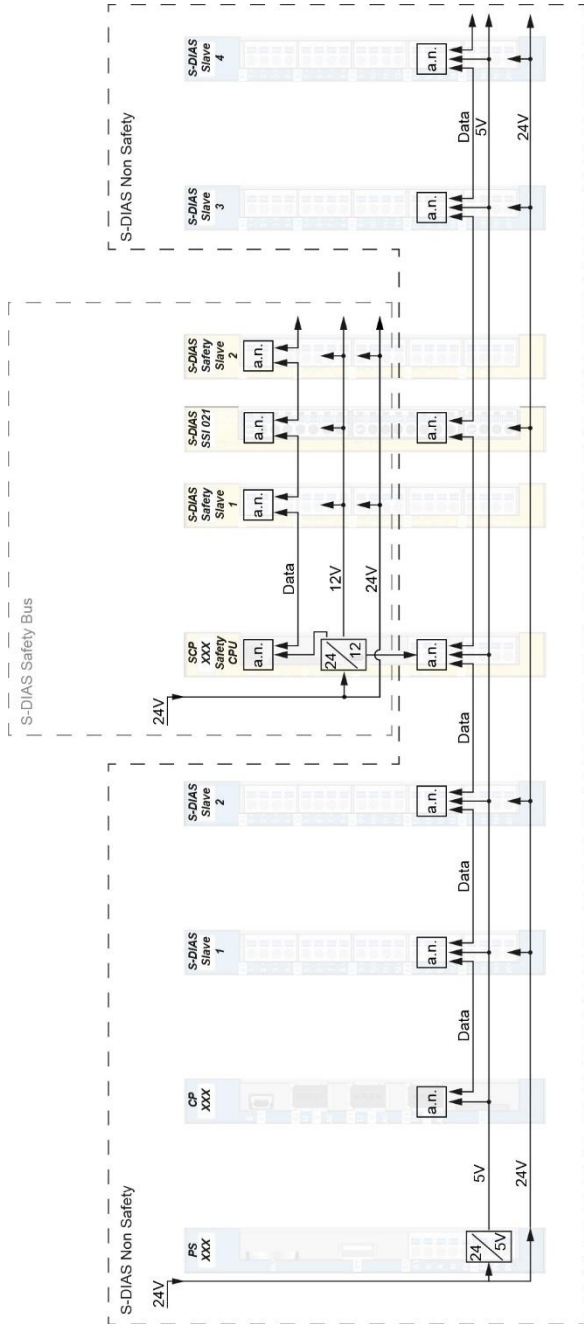
**The total current of the +12 V supply cannot exceed 800 mA.**

**Si ce module S-DIAS Safety est connecté à un SCP avec plusieurs modules S-DIAS, le courant total des modules utilisés doit être défini et contrôlé.**

**Le courant total de l'alimentation +24 V ne peut pas dépasser 800 mA!**

**Le courant total de l'alimentation +12 V ne peut pas dépasser 800 mA!**





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

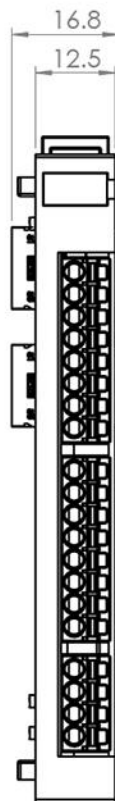
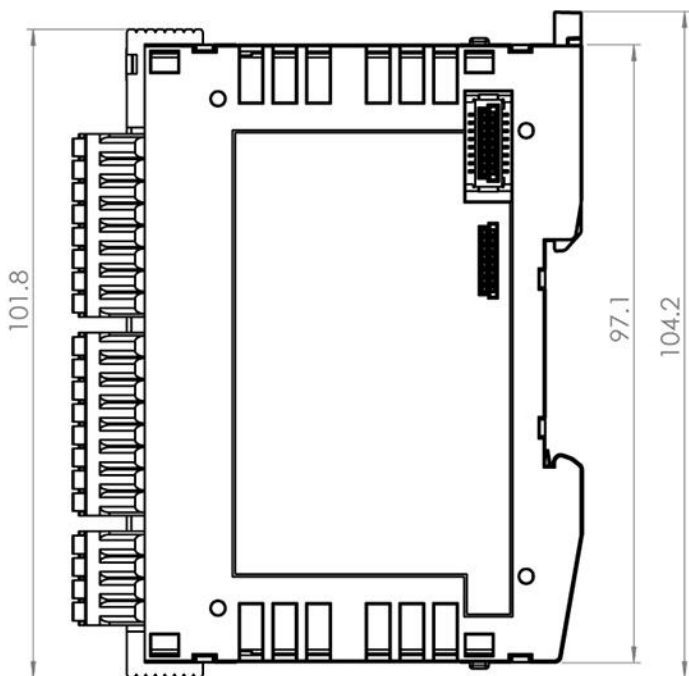
### 3.3 Miscellaneous

Article number	20-894-021	
Hardware version	1.00 / 1.10 / 2.00 / 2.10 / 3.xx	
Standard	2-channel application:	EN 62061 SIL 3 EN ISO 13849-1 PL e/Cat. 4
	1-channel application:	EN 62061 SIL 2 EN ISO 13849-1 PL d/Cat. 2
		UL 508 (E247993)
Approbations	CE, cUL <sub>US</sub> , TÜV Austria EG type-tested	

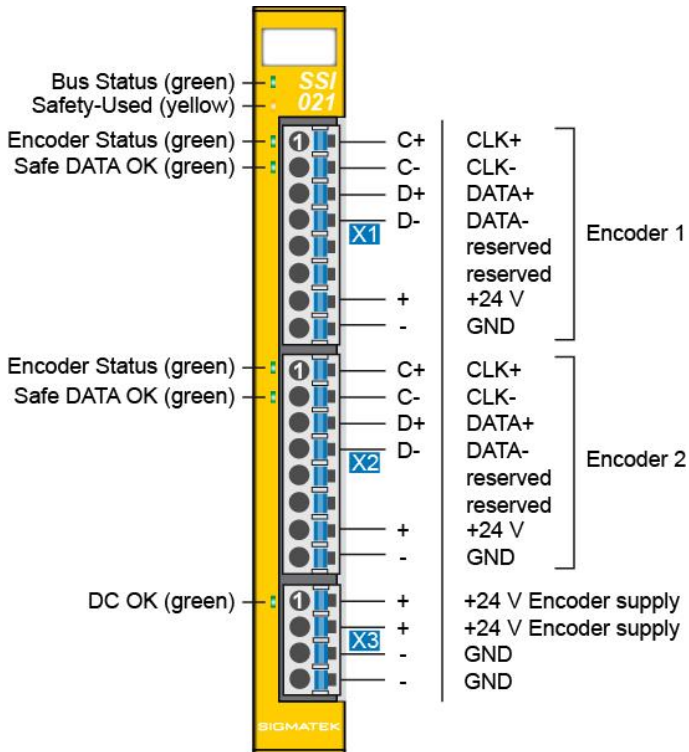
### 3.4 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C (UL) 0 ... +60 °C starting with 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	
EMV 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

## 4 Mechanical Dimensions



## 5 Connector Layout



The connections of the +24 V supply (X3: pin 1 and pin 2) or the GND supply (X3: 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!

## 5.1 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
Encoder Status	green	ON	communication with encoder OK
		OFF	communication with encoder not OK
Safe DATA OK	green	ON	if valid SSI data is available
		OFF	no valid SSI data available
DC OK	green	ON	+24 V encoder supply OK

## 5.2 Applicable Connectors

### Connectors:

**X1-X3:** Connectors with spring terminals (included in delivery)

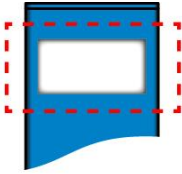
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

### 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 <sup>2</sup>
Conductor cross section, flexible:	0.2-1.5 mm <sup>2</sup>
Conductor cross section, ultrasonically compacted:	0.2-1.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil:	24-16
Conductor cross section flexible, with ferrule without plastic sleeve:	0.25-1.5 mm <sup>2</sup>
Conductor cross section flexible, with ferrule with plastic sleeve:	0.25-0.75 mm <sup>2</sup> (ground for reducing d2 of the ferrule)



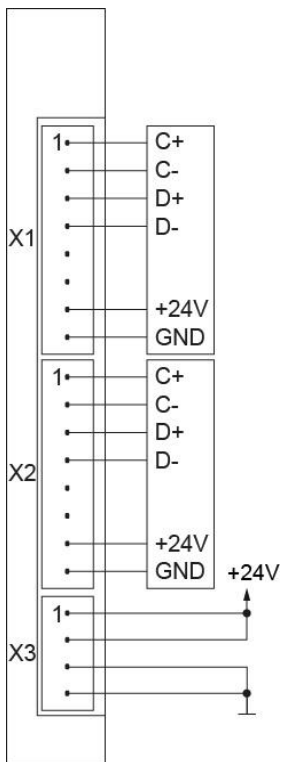
### 5.3 Label Field



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

## 6 Wiring

### 6.1 Wiring Example



## 6.2 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

**The ground bus should be connected to the control cabinet when possible!**

**Si possible la terre doit être connectée à l'armoire de commande!**



The wiring and assembly must be performed when no voltage is applied!

Le câblage et l'installation ne doivent être effectués que sur un système hors tension !

**IMPORTANT:**

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

**IMPORTANT:**

**Le module S-Dias NE PEUT PAS être inséré ou retiré sous tension.**

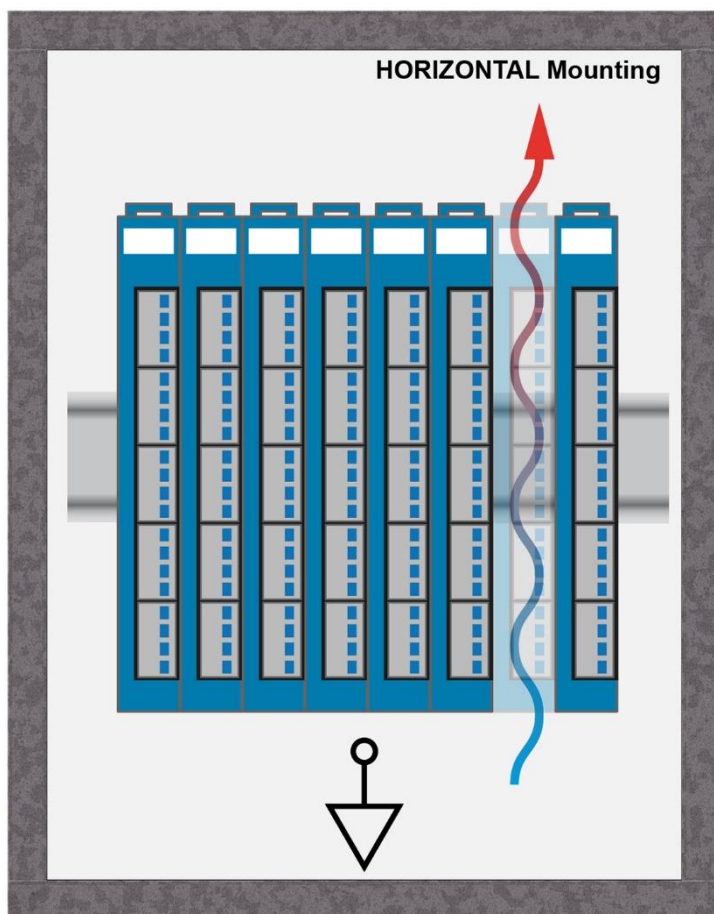
## 7 RS422 Interface

The RS422 interface is internally connected in the component.

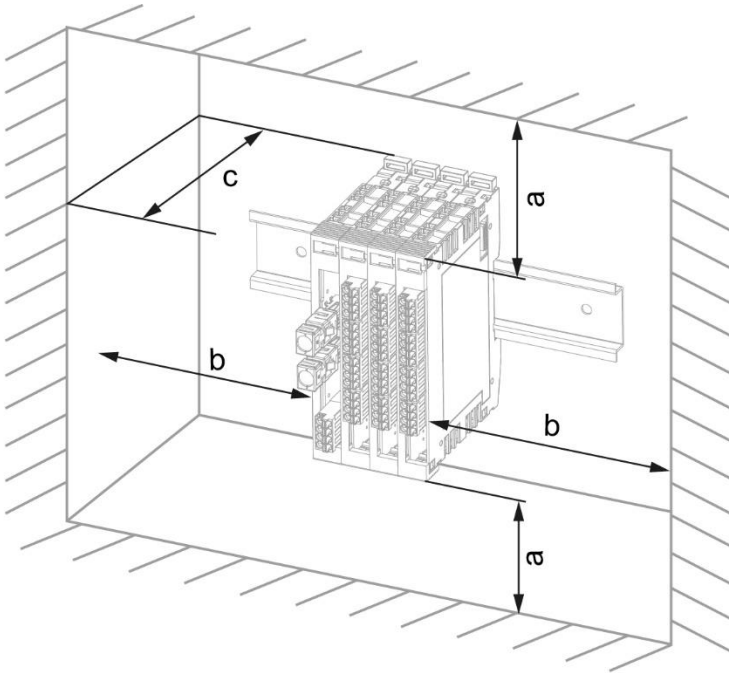


## 8 Mounting

The S-DIAS modules are designed to be mounted in 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 vertically with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is required to provide optimal cooling and air circulation so that functionality is ensured up to the maximum operating temperature.



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



<b>a</b>	<b>b</b>	<b>c</b>
<b>30 mm (1.18")</b>	<b>30 mm (1.18")</b>	<b>100 mm (3.94")</b>


















a, b, c ... distances in mm (inches)

## 9 Disposal

For the disposal of the product, the respective guidelines, possibly country-specific, must be observed and followed.

## 10 Hardware Class SSI021

### Hardware Class SSI021 for the S-DIAS SDI 021 SSI encoder module

		SAFE_SDIA5:03, <b>SSI021</b> (SSI0212)
		Class State (ClassState) <-[]->
		Device ID (DeviceID) <-[]->
		Hardware Version (HwVersion) <-[]->
		Serial Number (SerialNo) <-[]->
		Safety number (SafetyNumber) <-[]->
		Retry Counter uC1 (RetryCounteruC1) <-[]->
		Retry Counter uC2 (RetryCounteruC2) <-[]->
		FPGA Version (FPGAVersion) <-[]->
		Retry Counter (RetryCounter) <-[]->
		QuitComError (QuitComError) <-[]->
		Data Channel 1 (Ch1_Data) <-[]->
		Error Channel 1 (Ch1_Error) <-[]->
		Data Channel 2 (Ch2_Data) <-[]->
		Error Channel 2 (Ch2_Error) <-[]->
		ALARM:00, Empty

This hardware class is used to control the SSI 021 hardware module with 2 SSI encoder interfaces. More information on the hardware can be found in the module documentation.

## 10.1 Interfaces

### 10.1.1 Clients

<b>SdiasSafetyIn</b>	The client must be connected to a Save S-DIAS port, an "SdiasSafetyOut_x]" server.								
<b>Place</b>	The physical location of the hardware module is entered in this client. Up to 16 modules, 0 to 15, can be assigned.								
<b>Required</b>	This client is active by default, which means that the S-DIAS hardware module at this position is mandatory for the system and can under no circumstances be disconnected or return an error. Otherwise, the entire hardware deactivated. If the hardware module is missing or removed, an S-DIAS error is triggered. If his client is initialized with 0, the hardware module located in this position is not mandatory. This means that it doesn't have to be available or error-free. However, which components identified as "not required" should be selected with regard to the safety of the system.								
<b>Ch[1-2]_SSIBitSize</b>	In this client, the length of the SSI write register is set as an initialization value. (1-32 bits)								
<b>Ch[1-2]_SSIDouble Read</b>	To protect the data transfer, this client can be set so that each value is read twice and simultaneously checked for uniformity.								
<b>Ch[1-2]_Frequency</b>	In this client, the frequency for the SSI transfer is set. <table border="1" data-bbox="381 683 991 815"> <tr> <td>0</td> <td>125 kHz</td> </tr> <tr> <td>1</td> <td>250 kHz</td> </tr> <tr> <td>2</td> <td>500 kHz</td> </tr> <tr> <td>3</td> <td>1 MHz</td> </tr> </table>	0	125 kHz	1	250 kHz	2	500 kHz	3	1 MHz
0	125 kHz								
1	250 kHz								
2	500 kHz								
3	1 MHz								
<b>Ch[1-2]_UseGraycode</b>	This client can be used to select whether the SSI data is provided in "binary" or decoded using Gray code. <table border="1" data-bbox="381 866 991 935"> <tr> <td>0</td> <td>Binary data</td> </tr> <tr> <td>1</td> <td>Gray code data</td> </tr> </table>	0	Binary data	1	Gray code data				
0	Binary data								
1	Gray code data								

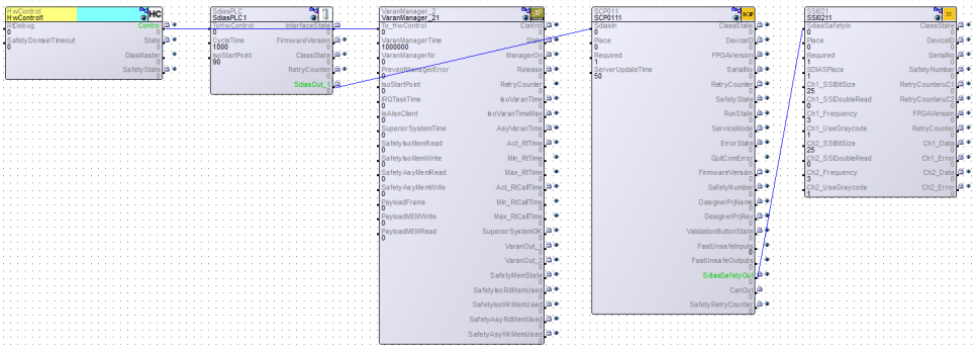
## 10.1.2 Servers

<b>ClassState</b>	This server shows the actual status of the hardware class.																		
<b>DeviceID</b>	The device ID of the hardware module is shown in this server.																		
<b>Hardware version</b>	Hardware version of the module in the format 16#XXYY (e.g. 16#0120 = version 1.20) If 0 is shown here, the display of the hardware version is not supported by the used firmware.																		
<b>SerialNo</b>	The serial number of the hardware module is shown in this server.																		
<b>SafetyNumber</b>	Shows the unique Safety number of the module																		
<b>RetryCounteruC1</b>	Shows the current number of retries by microprocessor 1. -1 The operating system does not yet support reading the retry counter.																		
<b>RetryCounteruC2</b>	Shows the current number of retries by microprocessor 2. -1 The operating system does not yet support reading the retry counter.																		
<b>QuitComError</b>	<p>A communication error is canceled by writing to this server. If the safety.dlm is used, the dlm can also cancel other errors starting with version 6. The canceling of errors is forwarded to the Safety CPU and canceled with all other errors in the Safety CPU.</p> <p><b>Caution!</b> Canceling can activate safety outputs and thereby lead to unexpected responses from machine elements.</p> <p>If this function is provided through the visualization, a corresponding warning should be displayed.</p> <p>The server shows the status of the cancellation:</p> <table border="1"> <tr> <td>2</td> <td>Busy canceling error</td> </tr> <tr> <td>1</td> <td>Busy cancelling communication error</td> </tr> <tr> <td>0</td> <td>Ready</td> </tr> <tr> <td>-1</td> <td>Error creating Safety statement via dlm</td> </tr> <tr> <td>-2</td> <td>Deactivation of user input request failed.</td> </tr> <tr> <td>-3</td> <td>Selection of module via Safety number failed</td> </tr> <tr> <td>-4</td> <td>Error during connection set-up with module via dlm (the SafetyDesigner cannot be online while canceling errors!)</td> </tr> <tr> <td>-5</td> <td>Error canceling in the module failed</td> </tr> <tr> <td>-6</td> <td>Remove the Safety statement via dlm failed</td> </tr> </table>	2	Busy canceling error	1	Busy cancelling communication error	0	Ready	-1	Error creating Safety statement via dlm	-2	Deactivation of user input request failed.	-3	Selection of module via Safety number failed	-4	Error during connection set-up with module via dlm (the SafetyDesigner cannot be online while canceling errors!)	-5	Error canceling in the module failed	-6	Remove the Safety statement via dlm failed
2	Busy canceling error																		
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-5	Error canceling in the module failed																		
-6	Remove the Safety statement via dlm failed																		
<b>FPGAVersion</b>	FPGA version of the module in 16#XY (e.g. 16#10 = version 1.0).																		
<b>RetryCounter</b>	This server increments when a transfer fails.																		
<b>Ch[1-2]_Data</b>	Input value of the SSI encoder scaled over 32 bits.																		
<b>Ch[1-2]_Error</b>	<table border="1"> <tr> <td>0</td> <td>values in server Ch[1-2]_Data are valid</td> </tr> <tr> <td>1</td> <td>error occurred while reading the SSI values</td> </tr> </table>	0	values in server Ch[1-2]_Data are valid	1	error occurred while reading the SSI values														
0	values in server Ch[1-2]_Data are valid																		
1	error occurred while reading the SSI values																		

### 10.1.3 Communication Interfaces

<b>ALARM</b>	Downlink	With this downlink the corresponding alarm class can be placed via the hardware editor.
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### 10.2 Beispiel



## Documentation Changes

Change date	Affected page(s)	Chapter	Note
22.04.2009	8	2.2 Safety-Relevant Parameters	Value changed
01.04.2014	16	8 Mounting	Text updated
23.05.2014	9	2.3 Compatibility	Added chapter
18.07.2014	13	5 Connector Layout	Added wiring notice
08.09.2014	11	3.3 Miscellaneous	Added Standard
30.01.2015	16	6.2 Note	Added note concerning connecting the S-DIAS module while voltage is applied
26.03.2015	14	5.2 Applicable Connectors	Added connections
07.05.2015			New writing: EN ISO 13849-1/-2
18.05.2015	11	3.4 Environmental Conditions	Expanded vibration resistance
08.07.2015	10	3.1 SSI Encoder Specifications	Added mnemotechnic verse
04.08.2015			Info Cover Translation from German added
15.12.2015	1		Rotary encoder added
28.04.2016	18	8 Mounting	Graphics distances
01.06.2016	10	3.2 Electrical Requirements	Graphics added
17.08.2017	12	3.4 Environmental Conditions	Pollution Degree
	15	5.2 Applicable Connectors	Sleeve length added Added info regarding ultrasonically welded strands
18.10.2017	16	5.3 Label Field	Added chapter
	20	8 Mounting	Graphic replaced
20.09.2018		5 Connector Layout	Note added
02-04-2019	10	2.3 Safety-Relevant Parameters	Correction of the safety-relevant parameters
	14	3.4 Environmental Conditions	Corrections environmental conditions
	all		Corrections due to CE
14.11.2019		9 Supported Cycle Times	Chapter added



02.12.2019		2.3 Safety-Relevant Parameters	Values updated
28.02.2020	22	9 Supported Cycle Times	Text adapted
28.05.2020	22	9 Supported Cycle Times	Chapter removed
20.07.2020	all		Up to 60 °C ambient temperature
02.09.2020	1		Text correction
	8	1.3 General Requirements	Text correction of Designated Use
	10	2.3.2 Mounting Position Horizontal 0-60 °C Ambient Temperature	Safety Parameters changed
	15	3.3 Miscellaneous	Standard changed
08.09.2020	25	10 Hardware Class SSI021	Chapter added
04.11.2020	22	8 Mounting	Expansion functional ground connection
05.03.2021		3.4 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
25.04.2022		2.4 Compatibility	Compatibility SSI encoder added