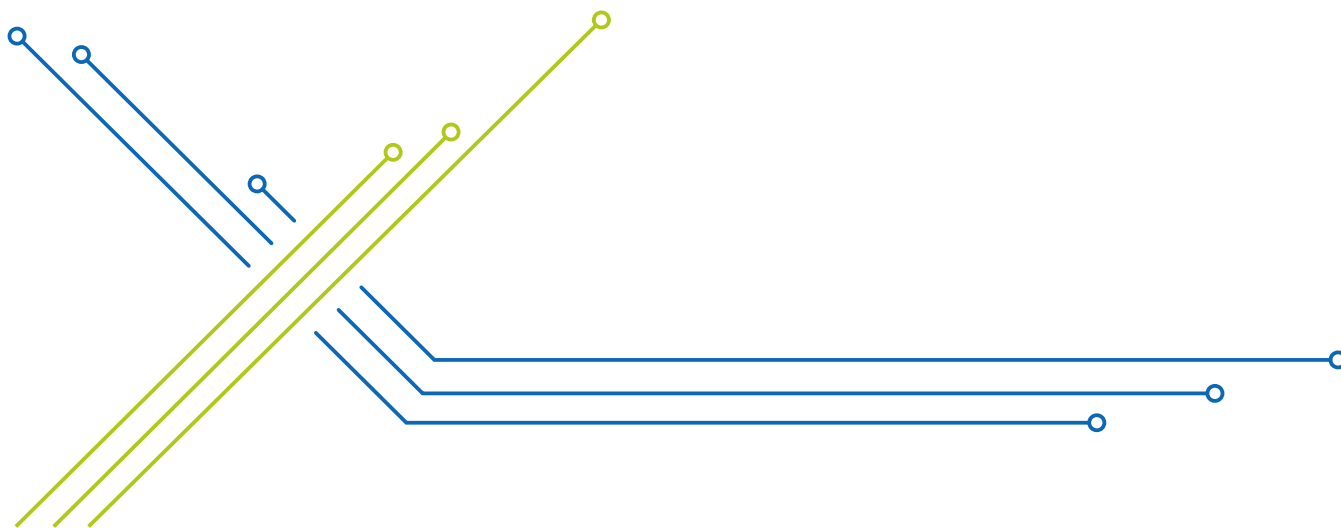


SEC 171

S-DIAS EtherCAT Splitter

INSTRUCTION MANUAL

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S-DIAS EtherCAT Splitter

SEC 171

1 EtherCAT-IN

7 EtherCAT-OUT

With its 7 EtherCAT OUT ports, the S-DIAS EtherCAT Splitter SEC 171 enables the creation of an EtherCAT bus system in line, tree and star structure.

The EtherCAT-IN port is the input port for the splitter.

Additional EtherCAT splitters and EtherCAT modules can be connected to the EtherCAT OUT ports.

The splitter is operated with +24 V supply voltage. It has the S-DIAS design and can be mounted on a top-hat rail together with S-DIAS modules.



Table of Contents

1 Introduction	4
1.1 Target Group/Purpose of this Operating Manual	4
1.2 Important Reference Documentation	4
1.3 Contents of Delivery	4
1.4 Trademarks	4
2 Basic Safety Directives	5
2.1 Symbols Used	5
2.2 Disclaimer	6
2.3 General Safety Directives	6
2.4 Software/Training	7
3 Standards and Directives	8
3.1 Directives	8
3.1.1 EU Declaration of Conformity	8
4 Type Plate	9
5 Technical Data	10
5.1 Performance Data	10
5.2 EtherCAT Specifications	10
5.3 Electrical Requirements	10
5.4 Miscellaneous	12
5.5 Environmental Conditions	12
6 Mechanical Dimensions	13
7 Connector Layout	14
7.1 Status LEDs	15
7.2 Applicable Connectors	16
7.3 Connectors	16
7.3.1 X1: EtherCAT-IN (RJ45)	16
7.3.2 X2-X8: EtherCAT OUT (RJ45)	17
7.4 Label Field	17
8 Wiring	18
8.1 ESD Protection	18
8.2 Strain Relief	18

8.3 Shielding Recommendation 19

8.4 Shielding 19

9 Structure 20

10 Assembly/Installation 22

10.1 Check Contents of Delivery 22

10.2 Mounting 22

11 Transport/Storage 24

12 Storage 25

13 Maintenance 26

13.1 Service 26

13.2 Repair 26

14 Disposal 27

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 or assist you in case of any issues. Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

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

1.3 Contents of Delivery

1x SEC 171

1.4 Trademarks

EtherCAT® 

Safety over
EtherCAT® 

EtherCAT® and Safety over EtherCAT® are registered trademarks and patented technologies, licensed by Beckhoff Automation GmbH, Germany.

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

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.

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.

INFORMATION



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 !

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

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

2.4 Software/Training

The application is created with the software LASAL CLASS 2 and LASAL SCREEN Editor.

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

3 Standards and Directives

3.1 Directives

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

3.1.1 EU Declaration of Conformity



EU Declaration of Conformity

The product SEC 171 conforms to the following European directives:

- 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 Type Plate

The type plate provides information about the product's features. The type plate shown here is only an example.

Approbations		Standards
QR-Code  BJ: XXXX/XX S/N XXXXXXXX	Short Name Specifications FS: XXX.XX.XX FW: XXX LD: XX.X HW: X.XX	Electrical Ratings  SIGMATEK Sigmathekstraße 1 A-5112 Lamprechtshausen www.sigmatek-automation.com
Article Number		Product Name

HW: Hardware version
FS: Safety version number
FW: Firmware version
LD: Logic device version
QR-Code: Serial number

5 Technical Data

5.1 Performance Data

Interfaces	1x EtherCAT IN (RJ45) 7x EtherCAT OUT (RJ45)
Cable length	maximum 100 m between stations
Propagation delay	approx. 1 µs per port
Data transfer rate	100 Mbits/s

5.2 EtherCAT Specifications

5.3 Electrical Requirements

Supply voltage +24 V	+24 V DC $\pm 20\%$ (SELV/PELV) UL: NEC Class 2	
Protection class	III	
Current consumption of +24 V power supply	typically 125 mA internal electronics supply (all ports active)	maximum 160 mA internal electronics supply (all ports active)

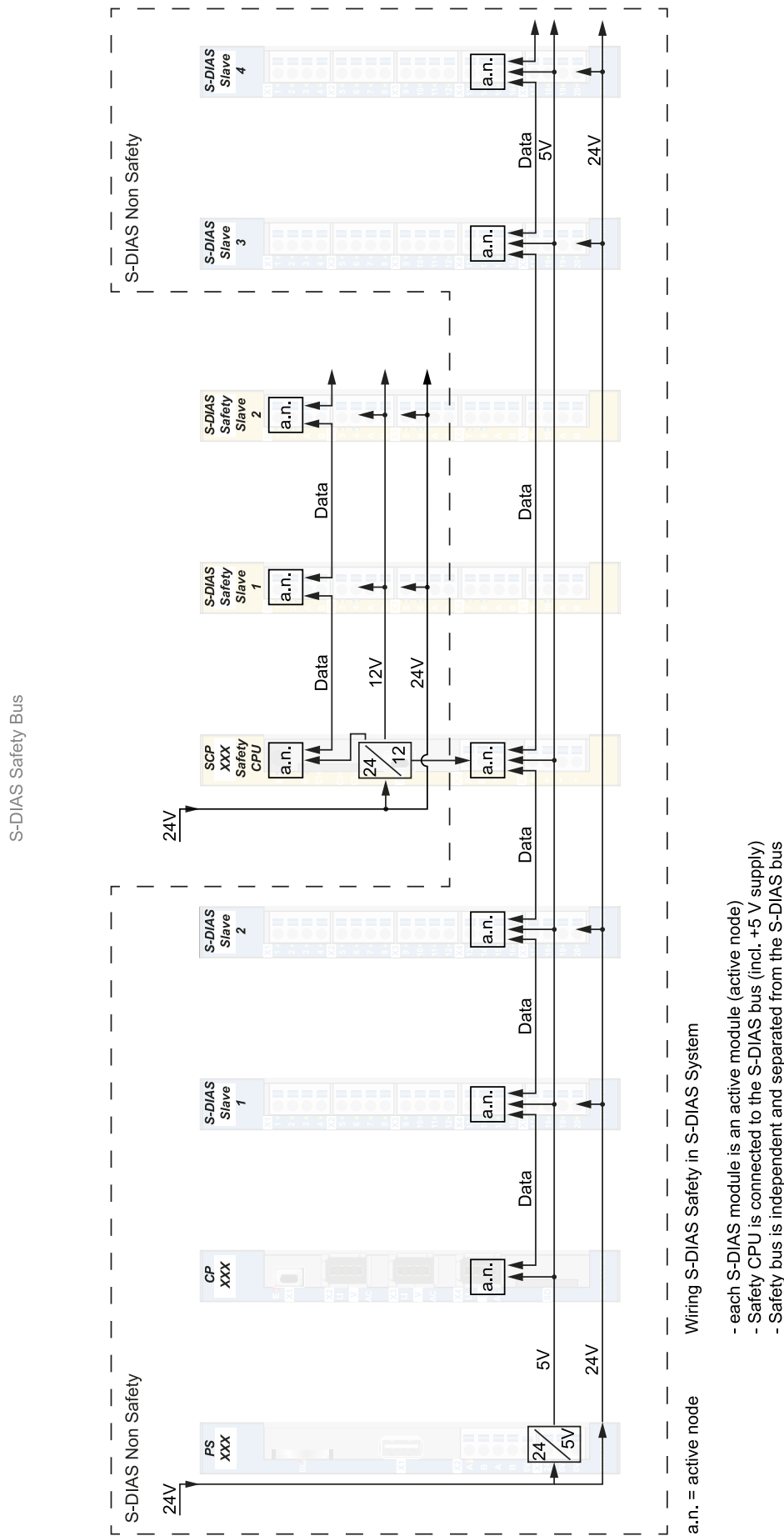
INFORMATION



The supply of the module shall be protected by or connected to:

1. Listed fuse (UL 248-14) meeting the requirements of Limited Energy Circuit (table 18) of UL/CSA 61010-1 3rd ed. Cl. 9.4 or
2. The devices are intended to be supplied from an isolated Limited Energy Source per UL 61010-1, 3rd ed. cl. 9.4 or Limited Power Source per UL 60950-1 or Class 2 per NEC.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



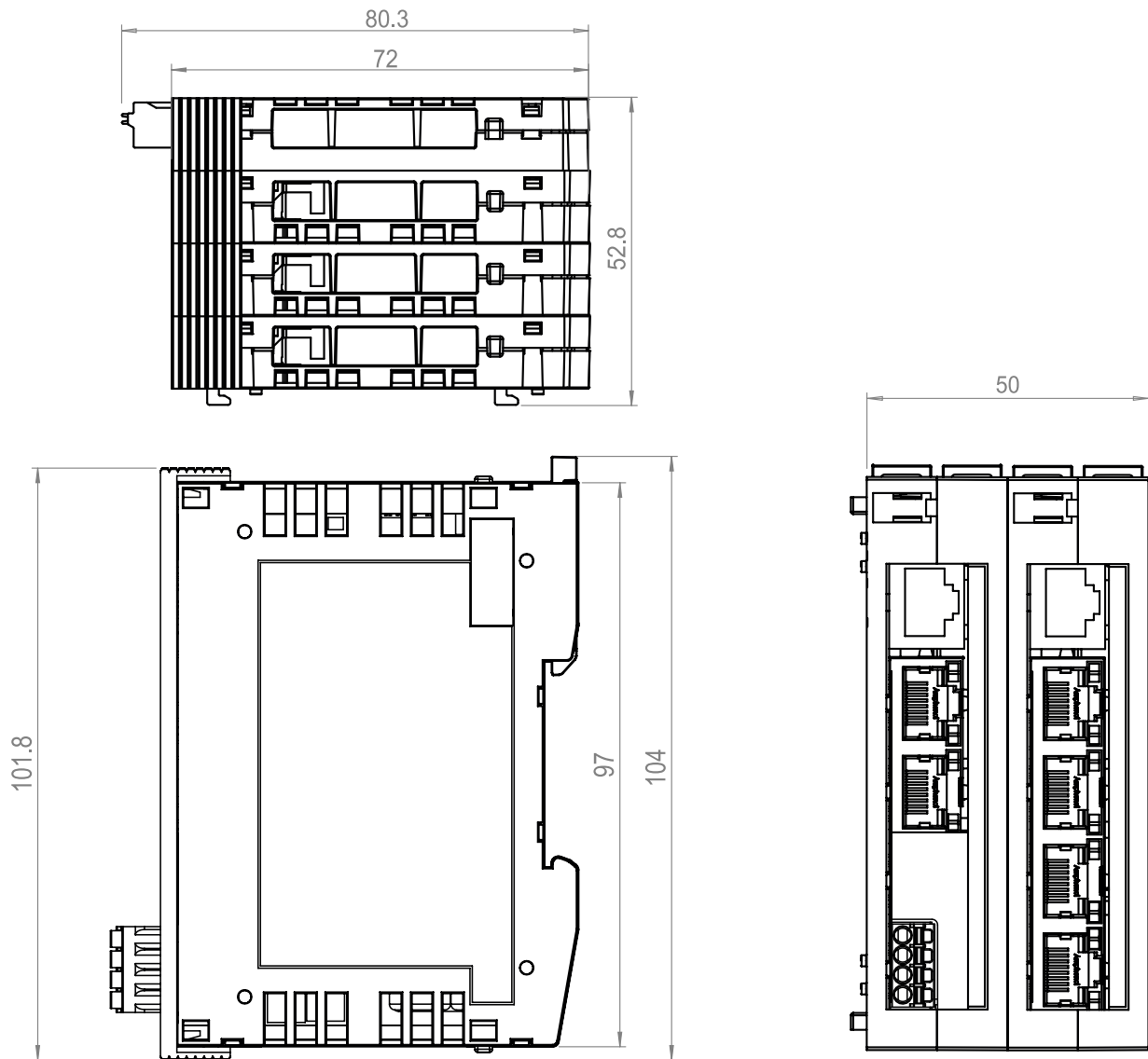
5.4 Miscellaneous

Article number	20-023-171	
Printed circuit board coating	no	
Approvals	CE	yes
	UL	cULus (E247993)
	Functional Safety	no
	UKCA	no

5.5 Environmental Conditions

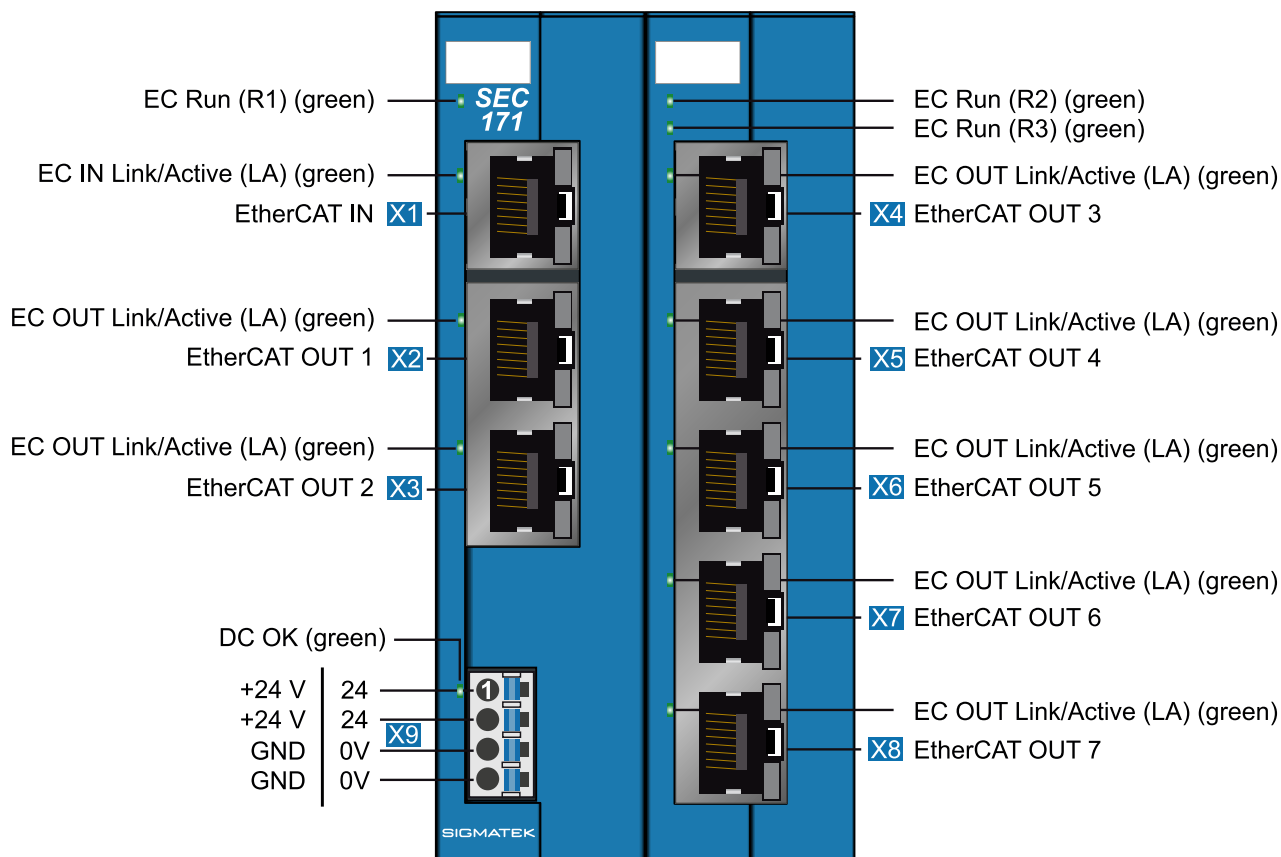
Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
Noise emission	≤ 70 dB	
EMC resistance	EN 61000-6-2 (industrial area)	
EMC noise generation	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 (147.15 m/s²)
Protection type	EN 60529	IP20 (not evaluated by UL)

6 Mechanical Dimensions



Measurements	50 x 104 x 72 mm (W x H x D)
--------------	------------------------------

7 Connector Layout



INFORMATION



The connections of the +24 V supply (X9: pin 1 and pin 2) or the GND supply (X9: 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 4 A per connection is not exceeded by the forward looping!

7.1 Status LEDs

DC OK	green	ON	module is supplied with a voltage > 18 V
EC Run	green	ON	status operational
		BLINKS FAST	status initialization or bootstrap
		SINGLE FLASH	status safe operational
		FAST BLINKING	pre-operational status
		OFF	init status
EC IN Link/Active	green	ON	connection to the upstream EtherCAT module established without data communication
		BLINKS	connection to the upstream EtherCAT module established with data communication
		OFF	no connection to the upstream EtherCAT module
EC OUT Link/Active	green	ON	connection to the downstream EtherCAT module established without data communication
		BLINKS	connection to the downstream EtherCAT module established with data communication
		OFF	no connection to the downstream EtherCAT module

7.2 Applicable Connectors

X1-X8: RJ45 (not included in delivery)

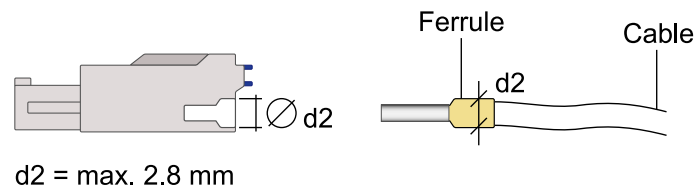
X9: Connectors with spring terminals (included in delivery)

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

Use copper cables (Cu) rated for at least 65 °C for wiring.

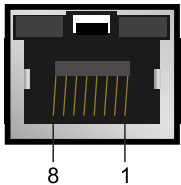
Connection capacity:

Stripping length/sleeve length	10 mm
Mating direction	parallel to conductor axis or to circuit board
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 (reason for reducing d2 of the ferrule)



7.3 Connectors

7.3.1 X1: EtherCAT-IN (RJ45)



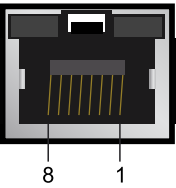
Pin	Function
1	Tx+/Rx+
2	Tx-/Rx-
3	Rx+/Tx+
4-5	n.c.
6	Rx-/Tx-
7-8	n.c.
n.c. = do not use	

INFORMATION



Only for use in LAN, not for connection to telecommunication circuits.

7.3.2 X2-X8: EtherCAT OUT (RJ45)



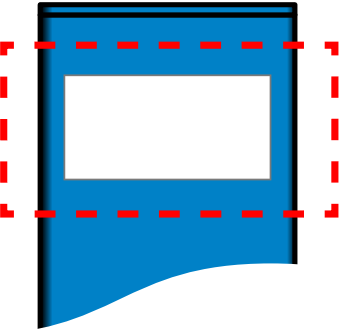
Pin	Function
1	Tx+/Rx+
2	Tx-/Rx-
3	Rx+/Tx+
4-5	n.c.
6	Rx-/Tx-
7-8	n.c.
n.c. = do not use	

INFORMATION



Only for use in LAN, not for connection to telecommunication circuits.

7.4 Label Field



The labeling field is printed directly on the module.

8 Wiring

8.1 ESD Protection

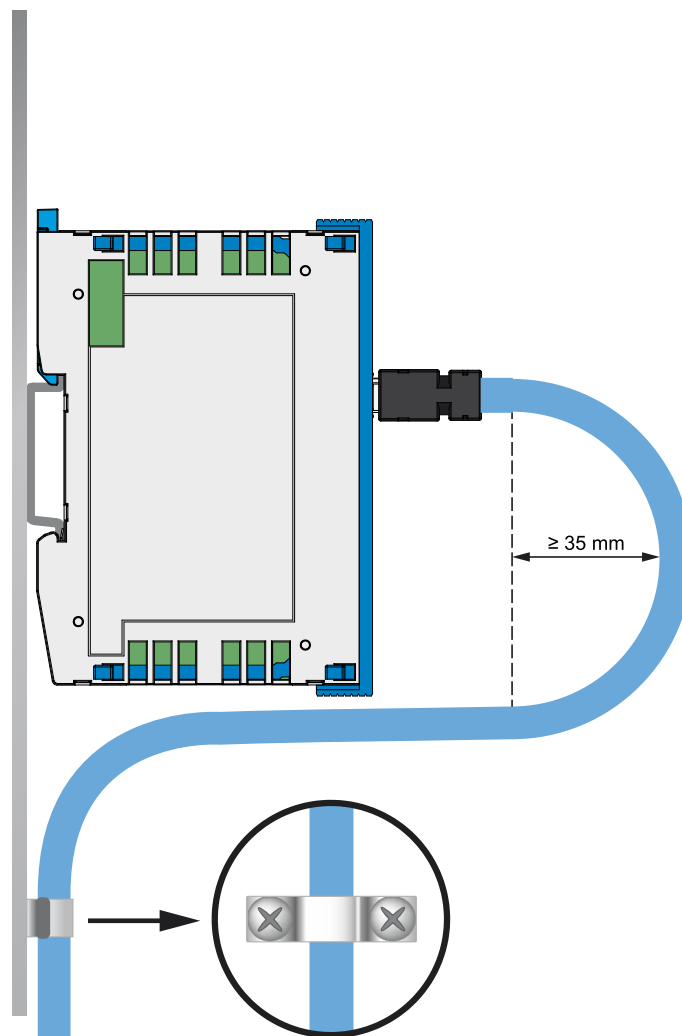
CAUTION



The operator must ensure that no ESD interference affects the product.

L'opérateur doit s'assurer qu'aucune interférence due à des décharges électrostatiques n'affecte le produit.

8.2 Strain Relief



INFORMATION



The EtherCAT cable must be mounted close to the module (e.g. using a clamp)!
No mechanical stress can be applied to the connection!

8.3 Shielding Recommendation

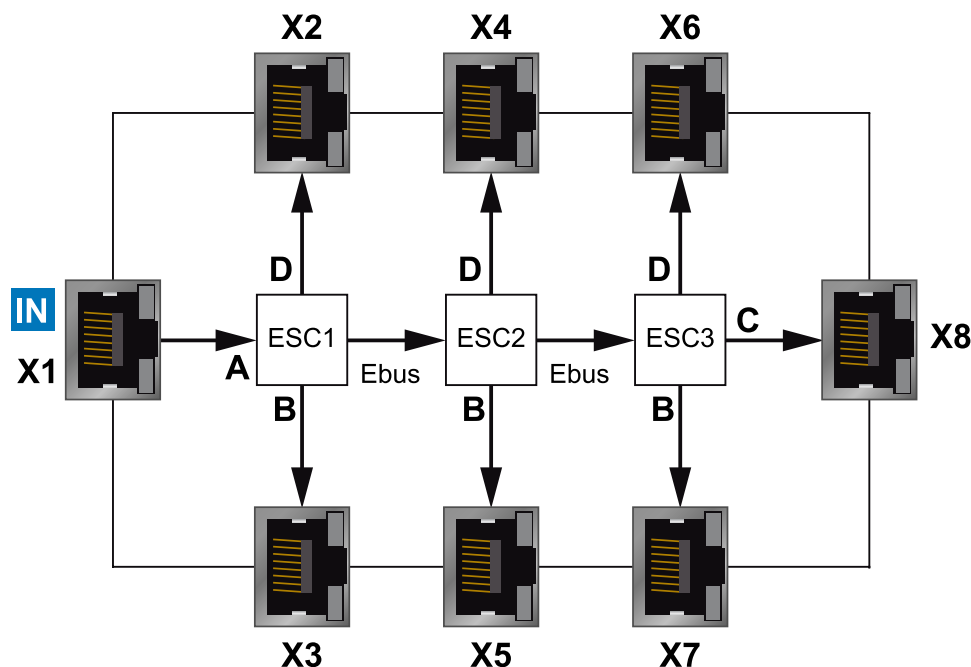
Laying the EtherCAT cables in accordance with the EtherCAT Technologies Group (ETG) specification.

8.4 Shielding

CAT5e (STP - Shielded Twisted Pair) cables are recommended for Ethernet. The cable shielding is connected to ground via the RJ45 connector. Noise signals can then be prevented from reaching the electronics and affecting the function.

9 Structure

To provide eight EtherCAT connections, the SEC 171 has three internal communication modules (ESC), which are connected in series within the device. As a result, the appears in the EtherCAT configurator as three individual slaves that are installed together in one housing. The relationship between the internal ESC ports (A, B, C, D) and the designations of the connection sockets (X1-8) is as follows.



When devices are connected to the SEC 171, the ports are addressed in the order specified for EtherCAT.

Please note:

- port X1 is always the input for EtherCAT traffic via the SEC 171
- the other ports X2-8 are to be used as outputs
- it is not permitted to delete sub-devices after creating the SEC 171

INFORMATION



The representation of the sequence and indentation of the connected modules depends on the EtherCAT configuration tool.

Please refer to the documentation of the configuration tool used if necessary!

When using the LASAL CLASS 2 tool together with a CPU unit from SIGMATEK, the devices are addressed automatically. Ports X2-8 are provided in sequence ("EtherCatOut_1-7" server). The connections of the individual ESC ports are automatically taken into account (client "SlaveIndex", "SlaveIndexB" and "SlaveIndexC"):

SEC171			
SEC1711			
toMaster	ClassSvr	0	
0	ClassState	0	
SlaveIndex	EtherCAT State	0	
0	SlaveState	0	
SlaveIndexB	DeviceAddress	0	
3	VendorID	0	
SlaveIndexC	ProductCode	0	
5	RevisionNo	0	
	SerialNo	0	
	DeviceName	0	
	ProductRevision	0	
	AL_StatusCode	0	
	Online	0	
	EtherCatOut_1	0	
	EtherCatOut_2	0	
	EtherCatOut_3	0	
	EtherCatOut_4	0	
	EtherCatOut_5	0	
	EtherCatOut_6	0	
	EtherCatOut_7	0	

10 Assembly/Installation

10.1 Check Contents of Delivery

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

INFORMATION

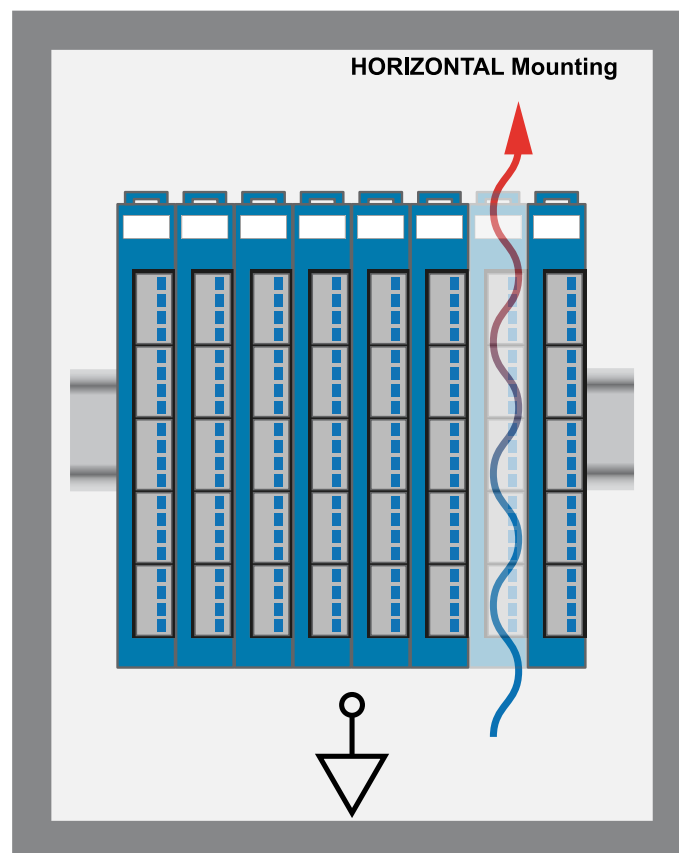


On receipt and before initial use, check the device for damage. If the device is damaged, contact our customer service and do not install the device in your system.

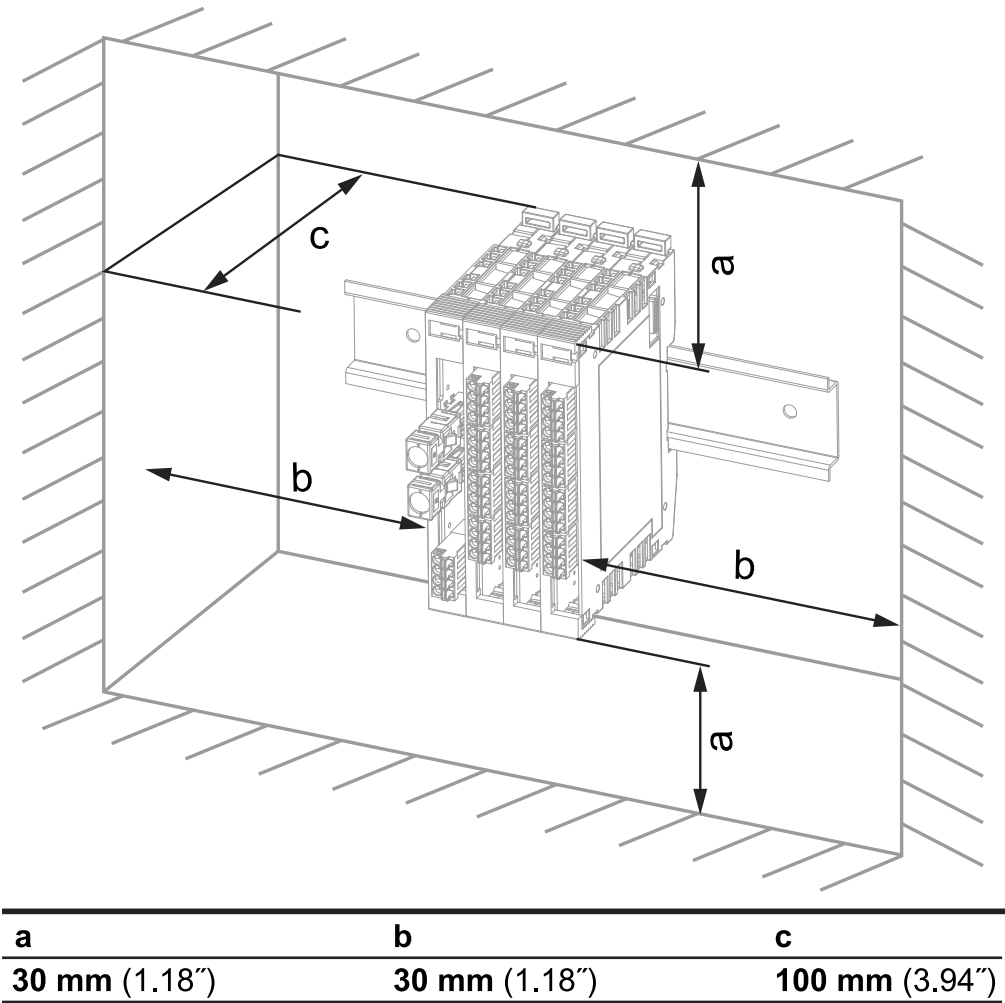
Damaged components can disrupt or damage the system.

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 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 ... distances in mm (inches)

11 Transport/Storage

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

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

INFORMATION



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

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

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.



Changes Chart

Change date	Affected page(s)	Chapter	Note
21.07.2026	10	5.3 Electrical Requirements	UL information added
	16	7.2 Applicable Connectors	
	16	7.3 Connectors	