SIGMATEK

IPN 021-1

S-DIAS PROFINET I/O Slave

Instruction Manual

Translation of the Original Instructions

S-DIAS Profinet I/O Slave Module   IPN 021-1

with 1 Profinet I/O IN

> **1 Profinet I/O OUT**

The S-DIAS Profinet I/O slave module IPN 021-1 slave module is an interface module between the S-DIAS control system and PROFINET Bus.

Brandlabeling of this module is possible.

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

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

1.3   Contents of Delivery

1x IPN 021-1

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

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.

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   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 Conformity Declaration

EU Declaration of Conformity

The product IPN 021-1 conforms to the following European directives:

- **2014/35/EU** Low-voltage Directive

- **2014/30/EU** Electromagnetic Compatibility (EMC Directive)

- **2011/65/EU** "Restricted use of certain hazardous substances in electrical and electronic equipment" (RoHS Directive)

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

4   Type Plate


```
[QR]   HW: X.XX
       SW: XX.XX.XXX
       Safety Version: SXX.XX.XX
       SIGMATEK GMBH & CO KG
Serial No.   Sigmatekstrasse 1  A-5112 LAMPRECHTSHAUSEN

Article Number   Product Name   Short Name
```

Exemplary nameplate (symbol image)

```
[QR]   HW: 1.00
       SW: 01.00.000
       Safety Version: S01.00.00
       SIGMATEK GMBH & CO KG
12345678   Sigmatekstrasse 1  A-5112 LAMPRECHTSHAUSEN

12-246-133-3   Handbediengerät Wireless HGW 1033-3
```

HW: Hardware version
SW: Software version

5   Technical Data

5.1   Performance Data

Bus Controller	Profinet I/O (lt. Profinet I/O Specification V2.3)
Configuration	2x shielded Tyco Mini I/O port
Cable length	maximum of 100 m between two stations (segment length)
Minimum cyclic time	1 ms
Maximum input data per cycle [1]	1440
Maximum output data per cycle [1]	1440
Data transfer rate	100 Mbits/s Full duplex auto negotiation auto crossover
Diagnosis	module status — per status LED and SW status bus function — per status LED and SW status
Supported conformity classes	Class A, Class B
Media redundancy support	yes, the module can be used as a client in a Profinet MRP ring, but there must be at least one other client with redundancy manager (RM, MRM) functionality in the ring
Status LEDs	yes

[1] Maximum 1440 bytes, whereby 4 bytes are for the Profinet nodes in each direction overhead and each sub module has one byte overhead in every direction.

5.2   Electrical Requirements

Voltage supply from S-DIAS bus	+24 V	
Current consumption on the S-Dias bus (+24 V power supply)	typically	maximum
	125 mA at +18 V	140 mA at +18 V
	95 mA at +24 V	110 mA at +24 V
	75 mA at +30 V	95 mA at +30 V

INFORMATION

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

The total current of the +24 V supply cannot exceed 1.6 A!

The total current of the +5 V supply cannot exceed 1.6 A!

The specification for the current can be found in the module-specific documentation under "Electrical Requirements".
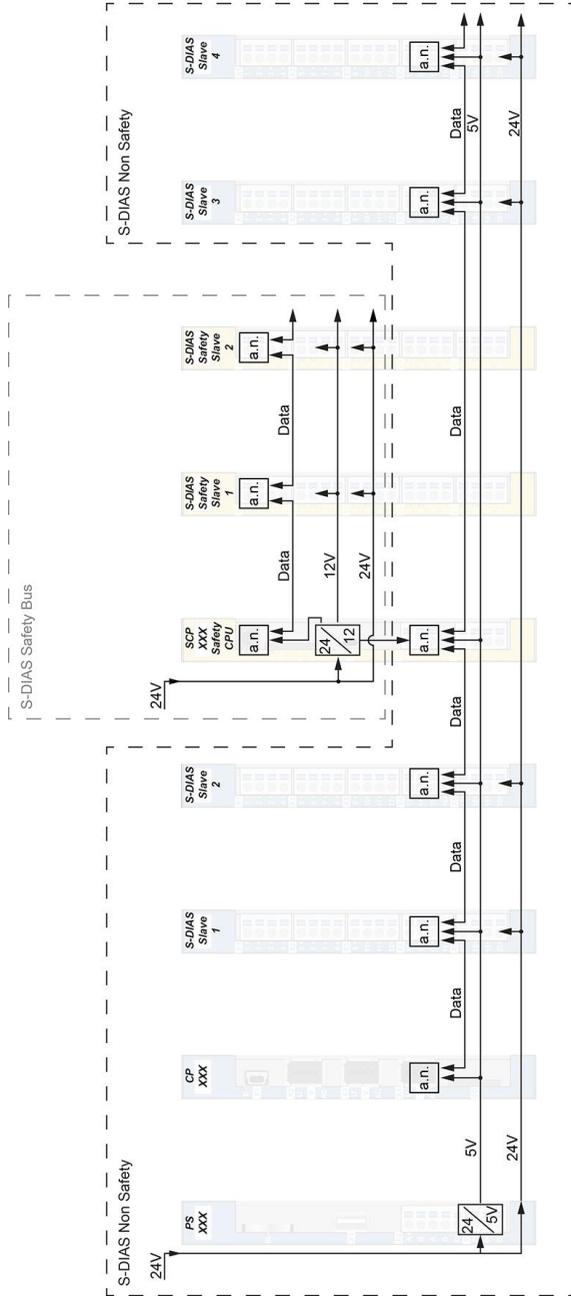
Wiring S-DIAS Safety in S-DIAS System

- 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

a. n. = active node

5.3   Miscellaneous

Article number	20-103-021-1
Standard	UL 508 (E247993)
Approbations	UL, cUL, CE, UKCA

5.4   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	
EMC resistance	in accordance with EN 61000-6-2 (industrial area)	
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 1g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

6 Mechanical Dimensions

7   Connector Layout

Modul Status (green)	
User (yellow)	
Profinet Run (green)	
Profinet Ready (yellow)	
Profinet Link (green)	X1 — PI Profinet IN
Profinet Active (yellow)	
Profinet Link (green)	X2 — PO Profinet Out
Profinet Active (yellow)	
Profinet Error1 (red)	
Profinet Error2 (red)	
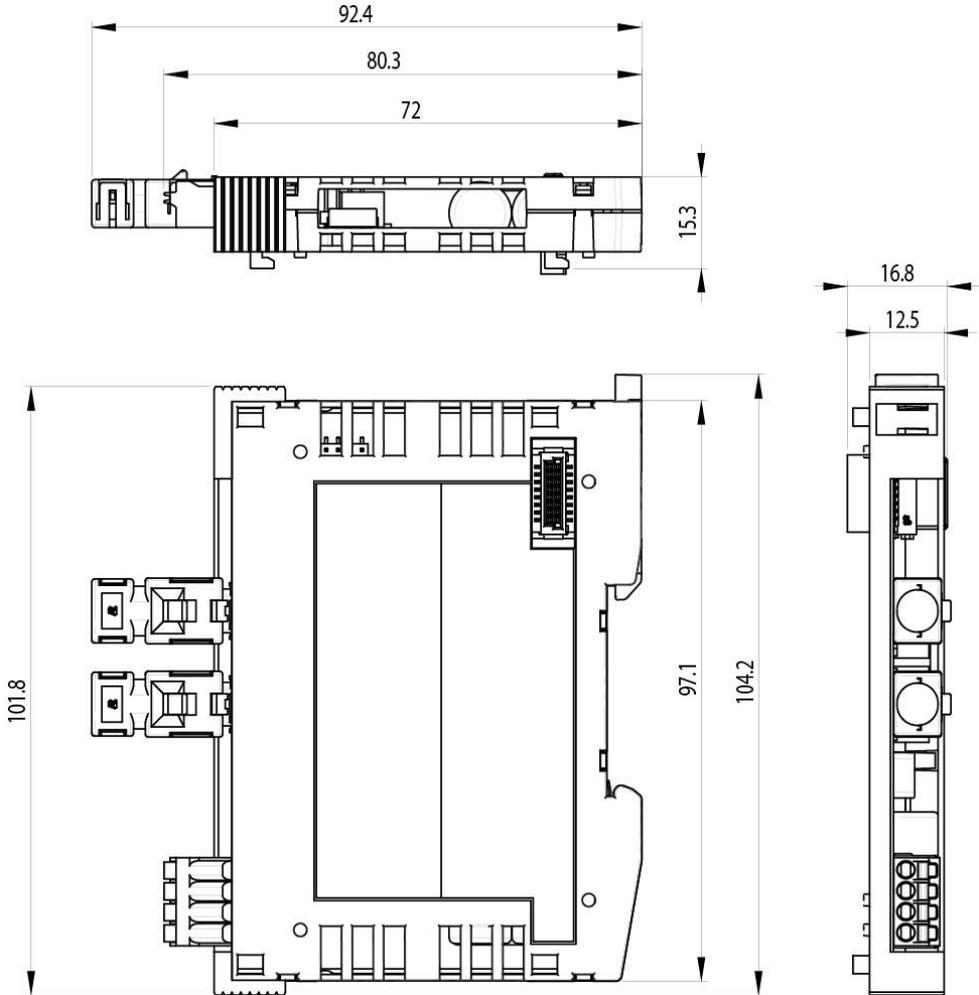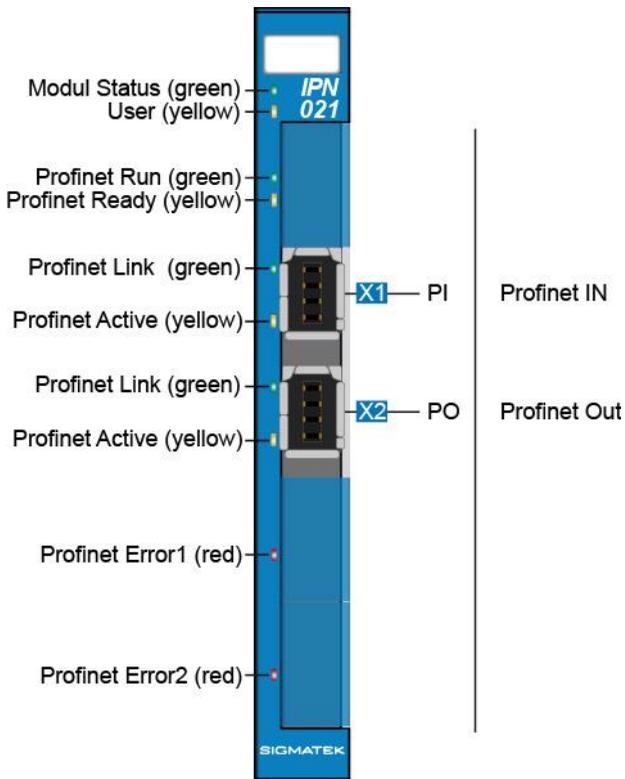
7.1   Status LEDs

Module Status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	can be set from the application
		OFF	(e.g. the module LED can be set to blinking through the visualization so that the module is easily found in the control cabinet)
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Profinet RN	green	ON	Profinent I/O user application runs without errors
Profinet RY	yellow	ON	Profinet I/O Bus Controller running
PROFINET IN Link	green	ON	connection between the two PHYs made
		BLINKS	PROFINET I/O IN of the primary client has no link
PROFINET IN Active	yellow	ON	Data is exchanged over the PROFINET bus
PROFINET OUT Link	green	ON	connection between the two PHYs made
		BLINKS	There is no connection between PROFINET I/O IN and the primary client.
PROFINET OUT Active	yellow	ON	Data is exchanged over the PROFINET bus
Profinet E1	red	ON	Profinet I/O system error
Profinet E2	red	ON	Profinet I/O bus error

7.2 Applicable Connectors

Connectors:
X1-X2: Tyco Mini I/O Plug Type 1 Lock Extend Version (not included in delivery)

INFORMATION

The S-DIAS module cannot be connected/disconnected while voltage is applied!

X1 Profinet I/O-IN, X2 Profinet I/O-OUT (Tyco Mini I/O)
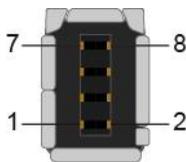
Pin	Function
1	TX/RX+
2	Tx/Rx-
3	Rx/Tx+
4-5	n.c.
6	Rx/Tx-
7-8	n.c.

n.c. = not connected

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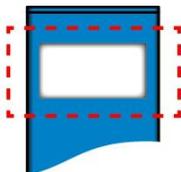
Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Weidmüller article number	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Weidmüller article number	1324380000

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8   ESD Protection

CAUTION

Before any device is connected to or disconnected from the IPN 021-1, the potential with ground should be equalized (by touching the control cabinet or ground terminal). This will allow the dissipation of electrostatic loads (caused by clothing/shoes).

9   Strain Relief

≥ 35 mm
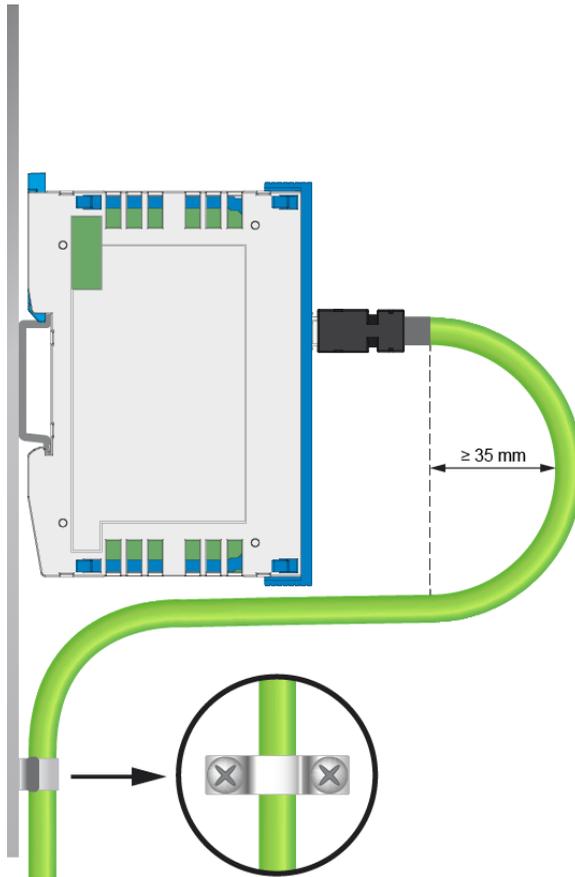
INFORMATION

The PROFINET cable must be mounted close to the module (e.g. using a clamp)!

No mechanical stress can be applied to the connection!

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 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.
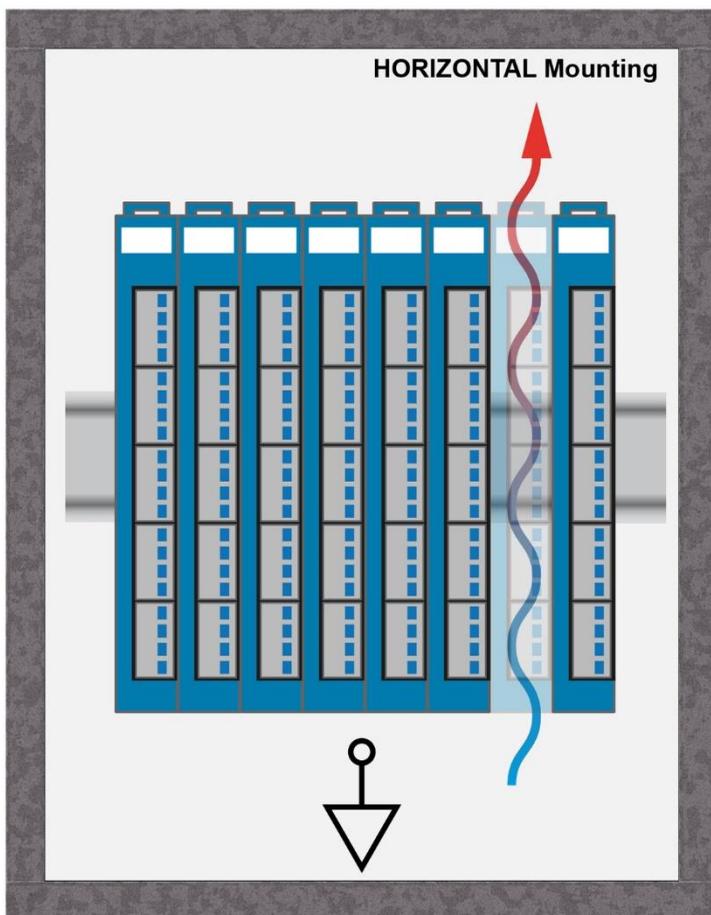
Recommended minimum distances of the S-DIAS modules to the surrounding components or control cabinet wall:
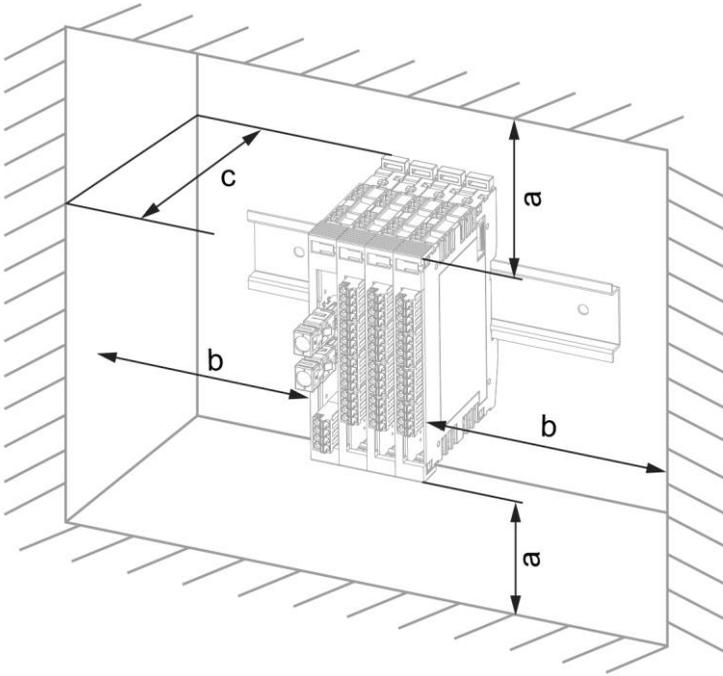
a	b	c
30 mm (1.18˝)	**30 mm** (1.18˝)	**100 mm** (3.94˝)

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 operating panel according to the storage conditions. See chapter 11.

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 Addressing

Address (hex)	Size (bytes)	Access Type	Description
Copy State Machine 1			
0000	4	r/w	Address register
0004	1	r/w	Status/Control 1 Bit 0 Write Enable (o = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
0005	1	r/w	Access size 1
4000	2	r	Reserved
0008	128	r/w	Data register 1
Copy State Machine 2			

0088	4	r/w	Address register 2
3 m	1	r/w	Status/Control 2 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
3 m	1	r/w	Access size 2
3 m	2	r	reserved
0090	128	r/w	Data register 2
Copy State Machine 3			
0110	4	r/w	Address register 3
0114	1	r/w	Status/Control 3 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
0115	1	r/w	Access size 3
0116	2	r	Reserved
0118	128	r/w	Data register 3
Copy State Machine 4			
0198	4	r/w	Address register 4
3 m	1	r/w	Status/Control 4 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
3 m	1	r/w	Access size 4
3 m	2	r	reserved

01A0	128	r/w	Data register 4
Copy State Machine 5			
0220	4	r/w	Address register 5
0224	1	r/w	Status/Control 5 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
0225	1	r/w	Access size 5
0226	2	r	reserved
0228	64	r/w	Data register 5
Copy State Machine 6			
0268	4	r/w	Address register 6
3 m	1	r/w	Status/Control 6 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
3 m	1	r/w	Access size 6
3 m	2	r	reserved
0270	64	r/w	Data register 6
Copy State Machine 7			
02B0	4	r/w	Address register 7
02B4	1	r/w	Status/Control 7 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start

02B5	1	r/w	Access size 7
02B6	2	r	reserved
02B8	64	r/w	Data register 7
Copy State Machine 8			
02F8	4	r/w	Address register 8
02FC	1	r/w	Status/Control 8 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
02FD	1	r/w	Access size 8
02FE	2	r	reserved
0300	64	r/w	Data register 8
Copy State Machine 9			
0340	4	r/w	Address register 9
0344	1	r/w	Status/Control 9 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
0345	1	r/w	Access size 9
0346	2	r	reserved
0348	64	r/w	Data register 9
Copy State Machine 10			
0388	4	r/w	Address register 10

3 m	1	r/w	Status/Control 10 Bit 0 Write Enable (0 = Read Enable) Bit 1 Busy (readable only) Bit 2 AutoIncrement Enable Bit 3 Sync0 Start Bit 4 Sync1 Start Bit 5 IRQStart Bit 6 Address Start Bit 7 SW Start
3 m	1	r/w	Access size 10
3 m	2	r	reserved
0390	64	r/w	Data register 10

15 Supported Cycle Times

15.1 Cycle Times below 1 ms (in µs)

50	100	125	200	250	500
x	x	x	x	x	x

x= supported

15.2 Cycle Times equal to or higher than 1 ms (in ms)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x= supported

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x= supported

16 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