

DM 108

S-DIAS Digital Mixed Module

Technical Manual

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Translation from German

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S-DIAS Digital Mixed Module

DM 108

- with **4 digital inputs +24 V/5 ms/3.7 mA**
- 4 digital outputs +24 V/0.5 A/short-circuit proof**
- 2 digital outputs +24 V/0.5 A/short-circuit proof, back-readable**
- 4 supply connections +24 V/0.25 A for sensors/actuators**

The S-DIAS DM 108 digital mixed module has four digital inputs (+24 V/3.7 mA/5 ms), four short-circuit proof digital outputs (+24 V/0.5 A) and two short-circuit proof back-readable outputs (+24 V/0.5 A). These can be used as digital inputs (+24 V/3.7 mA/0.5 ms).

Four +24 V/0.25 A supply connections for sensors or actuators. The supply voltage is monitored for under voltage.



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1 Introduction

1.1 Target Group/Purpose of this Manual

This manual contains all information required for operating the DM 108.

This manual is intended for:

- Project planners
- Technicians
- Configurators/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.
For our support hotline and business hours, please visit our website.

1.2 Contents of Delivery

1x DM 108

5x opposing connector

This document can be downloaded from our website.
Additional documents may be included with delivery.

2 Basic Safety Guidelines

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes:

DANGER 	identifies an immediate danger with high risk, which will lead to immediate death or serious injury if not avoided. Identifie un danger immédiat avec un risque élevé, entraînant le décès immédiat ou des blessures graves s'il n'est pas évité
WARNING 	Identifies a possible danger with a mid-level risk, which can lead to death or (serious) injury if not avoided. Indique un danger possible d'un risque moyen de décès ou de (graves) blessures si les consignes de sécurité ne sont pas respectées
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
	Warning, dangerous electrical voltage. Attention, tension électrique dangereuse.
	Provides user tips, informs of special features and identifies especially important information in the text. Fournit des conseils d'utilisation, informe sur les fonctions particulières et souligne les informations particulièrement importantes dans le texte.
	Danger for ESD-sensitive components. Les signes de danger pour les composants sensibles aux décharges électrostatiques

2.2 Disclaimer



The contents of this document were prepared with the greatest care. However, deviations cannot be ruled out. This document 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 document can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following documentation is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding data sheets, operating instructions and this system handbook before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through non-compliance with these instructions or applicable regulations.

The general and special safety instructions described in the following sections, as well as technical regulations, must therefore be observed.

2.3 General Safety Guidelines



According to EU Guidelines, the operating instructions are a component of a product.

This manual must therefore be accessible in the vicinity of the machine since it contains important instructions.

This technical documentation should be included in the sale, rental or transfer of the product, or its online availability indicated.

Maintain this manual in readable condition and keep it accessible for reference.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine guidelines 2006/42/EG before introducing a machine to the market.

Before commissioning this product, check that conformance with the provisions of the 2006/42/EG guidelines is correct. As long as the machine with which the with the device should be used does not comply with the guideline, operating this product is prohibited.

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, otherwise it could be damaged!

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, sinon il risque d'être endommagé!

2.4 Guidelines

The device was constructed in compliance with European Union guidelines.

2.4.1 EU Conformity Declaration



CE Declaration of Conformity

The DM 108 conforms to the following European guidelines:

- 2014/35/EU Low-voltage 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. See: Products/downloads, or using the search function and keyword “EU Declaration of Conformity”

3 Technical Data

3.1 Digital Input Specifications

Number	4	
Input voltage	typically +24 V	maximum +30 V
Signal level	low: < +8 V	high: > +14 V
Signal level (starting with HW version 1.10)	low: < +5 V	high: > +15 V
Input current	3.7 mA at +24 V	
Input delay	typically 5 ms	

3.2 Digital Outputs Specifications

Number	4
Short-circuit proof	yes
Maximum continuous current load/channel allowed	0.5 A
Maximum total current (all 4 outputs)	2 A (100 % of on time)
Maximum braking energy of the output (inductive load)	maximum 0.1 Joule/channel
Residual current output (off)	$\leq 10 \mu\text{A}$
Turn-on delay	< 100 μs
Turn-off delay	< 150 μs

3.3 Digital Back-readable Output Specifications

Number	2	
Short-circuit proof	yes	
Maximum continuous current load/channel allowed	0.5 A	
Maximum total current (all 2 outputs)	1 A (100 % of on-time)	
Maximum braking energy of the output (inductive load)	maximum 0.1 Joule/channel	
Residual current output (off)	$\leq 10 \mu\text{A}$	
Turn-on delay	$< 100 \mu\text{s}$	
Turn-off delay	$< 150 \mu\text{s}$	
Back-reading input voltage	typically +24 V ^(*)	maximum +30 V ^(*)
Back-reading signal level	low: $< +8 \text{ V}$	high: $> +14 \text{ V}$
Back-reading switching threshold	typically +11 V	
Input current	3.7 mA at +24 V	
Back-reading input delay	typically 5 ms	

(*) When using the back-readable digital output as a digital input, the externally applied voltage cannot exceed the voltage of the +24 V supply at X5 by more the 0.7 V.

3.4 Sensor/Actuator Supply Specifications

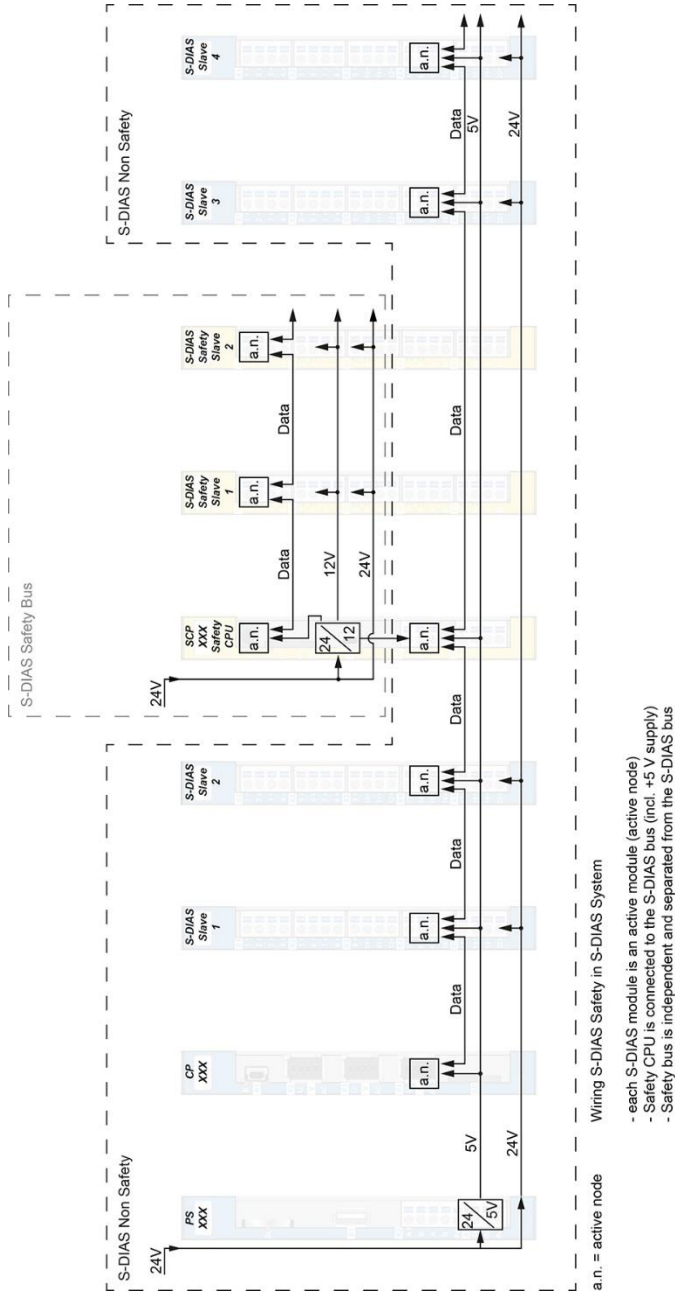
Sensor/actuator supply	corresponds to the +24 V supply applied at X5
Short-circuit proof	yes
Maximum permissible continuous current/supply connection	0.25 A
Maximum total current (all 4 outgoing supply connections)	1.0 A

3.6 Voltage Monitor

Power supply +24 V	supply voltage > 18 V (DC OK-LED lights green)
--------------------	--

3.7 Electrical Requirements

Supply voltage +24 V (X5)	18-30 V	
Current consumption of the +24 V supply (X5)	corresponds to the load on the digital outputs and sensor/actuator supply (max. 4 A)	
Voltage supply from S-DIAS bus	+24 V	
Current consumption on the S-DIAS bus (+24 V supply)	-	-
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V supply)	typically 40 mA	maximum 50 mA



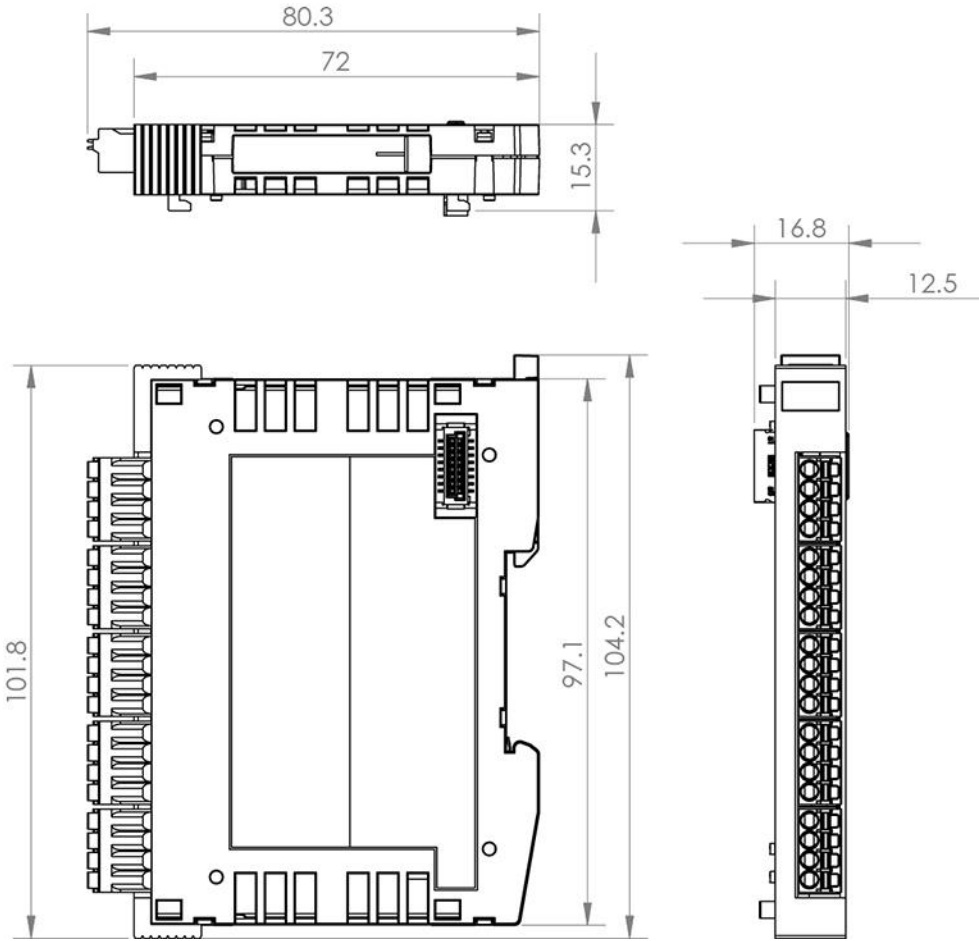
3.8 Miscellaneous

Article number	20-008-108
Hardware version	1.x
Standard	CE

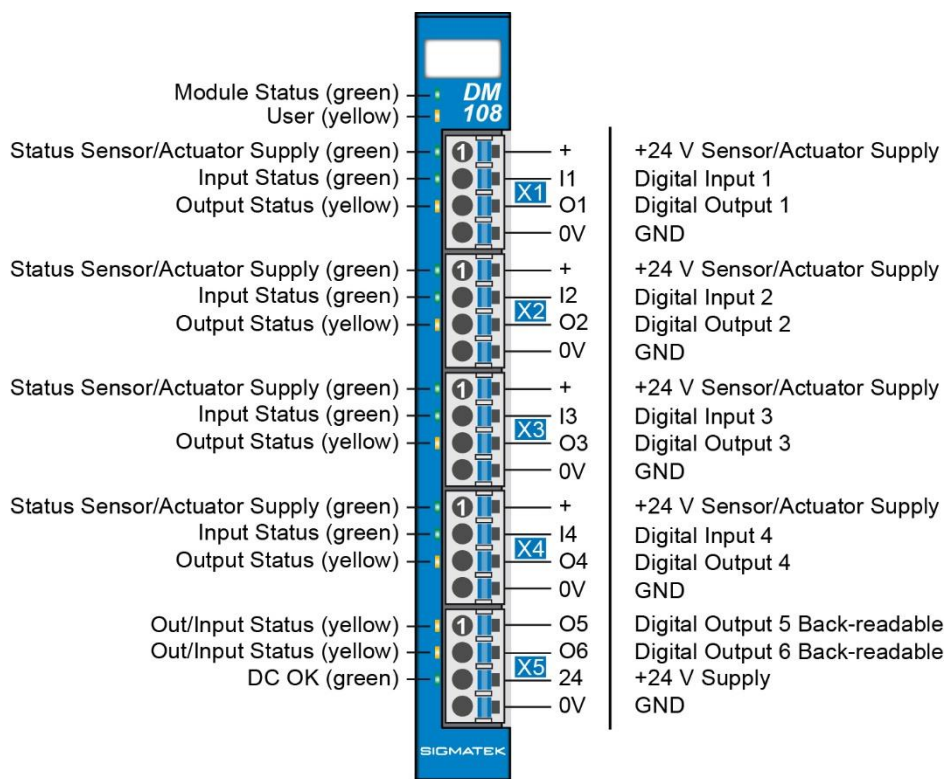
3.9 Environmental Conditions

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 with derating of the maximum environment temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
EMC resistance	according to EN 61000-6-2:2007 (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 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



5.1 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 it is easily found in the control cabinet)
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Status sensor/ actuator supply	green	ON	outgoing sensor/actuator supply OK
Input Status	green	ON	input ON
		OFF	input OFF
output status	yellow	ON	output ON (or back-reading of channel 5, 6 ON)
		OFF	output OFF (or back-reading of channel 5, 6 OFF)
DC OK	green	ON	+24 V supply for digital outputs and sensor/actuator supply is available

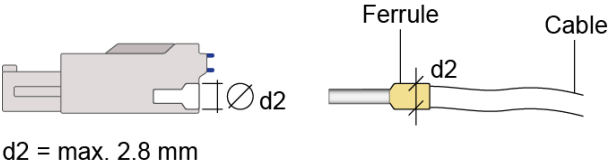
5.1.1 Applicable Connectors

Connectors:

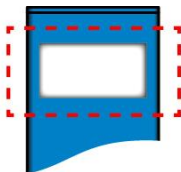
X1-X5: Connectors with spring terminals (included in delivery)
The spring terminals are suited for the connection of ultrasonically compacted (ultrasonically welded) stranded wire.

Connections:

Stripping length/sleeve length:	10 mm
Mating direction:	parallel to the conductor axis or 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 strands 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 reduction d2 of the ferrule)



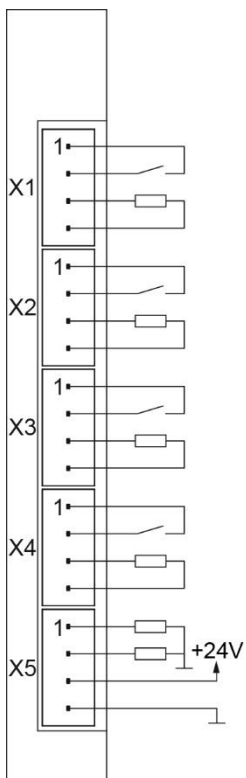
5.2 Labeling Field



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

6 Wiring

6.1 Wiring Example



6.2 Note

- The digital inputs, which suppress noise signals, allow for operation in harsh environmental conditions. In addition, we recommend a careful wiring method to ensure error-free function. Avoid parallel connections between input lines with load-bearing circuits.
- All digital outputs are supplied from a common +24 V supply.
- The cross section of the conductor for the +24 V supply must be sufficient for the maximum total current.
- The outputs can be turned off by turning off the +24 V supply voltage.
- Applying power to an output whose supply voltage exceeds 0.7 V is not allowed.



Inductive loads must always be connected to a freewheeling diode or an RC network. This should be placed as close to the load as possible.

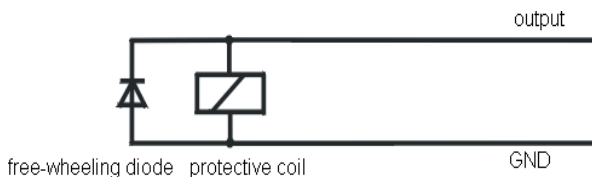
CAUTION



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

Le module S-DIAS NE PEUT PAS être connecté/déconnecté lorsque la tension est appliquée!

6.2.1 Connecting Inductive Loads



7 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!

CAUTION

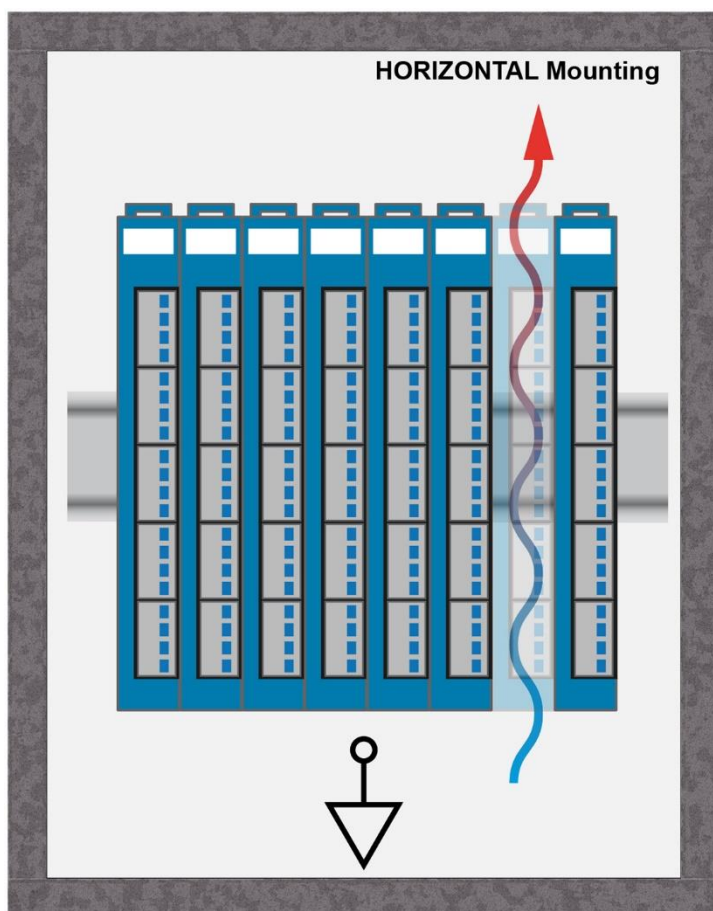


During transport, temperature and humidity fluctuations may occur. Ensure that no moisture condenses in or on the device.

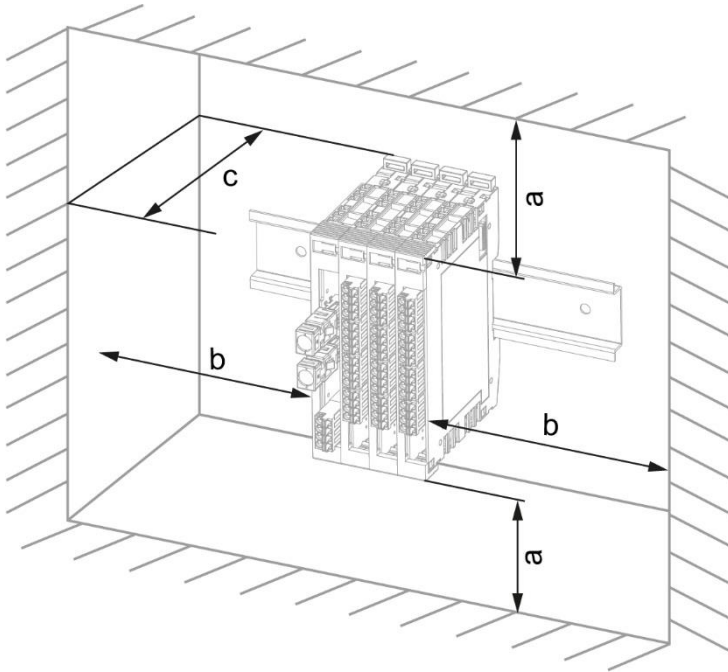
Pendant le transport, des fluctuations de température et d'humidité peuvent survenir. Veillez à ce qu'il n'y ait pas de condensation d'humidité dans ou sur l'appareil.

8 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)

9 Supported Cycle Times

9.1 Cycle Times below 1 ms (in μs)

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

x= supported

9.2 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

10 Maintenance

WARNING



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

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

10.1 Maintenance

This product was constructed for low-maintenance operation.

10.2 Repair



When sent for repair, the panel 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.

In the event of a defect/repair, send the panel with a detailed error description to the address listed at the beginning of this document.

11 Disposal



When disposing of the panel, the national electronic scrap regulation must be observed.

The panel cannot be discarded with domestic waste.



12 Hardware Class DM108

Hardware class DM108 for the S-DIAS DM108 digital module

```
SDIAS:18, DM108 (DM1081)
S Class State (ClassState) <-[]->
S Device ID (DeviceID) <-[]->
S FPGA Version (FPGAVersion) <-[]->
S Hardware Version (HwVersion) <-[]->
S Serial Number (SerialNo) <-[]->
S Retry Counter (RetryCounter) <-[]->
O LED Control (LEDControl) <-[]->
----- Digital Inputs -----
I Digital Input 1 (Input1) <-[]->
I Digital Input 2 (Input2) <-[]->
I Digital Input 3 (Input3) <-[]->
I Digital Input 4 (Input4) <-[]->
I Digital Input 5 (Input5) <-[]->
I Digital Input 6 (Input6) <-[]->
I Input Byte (InputByte) <-[]->
----- Digital Outputs -----
O Digital Out 1 (Output1) <-[]->
O Digital Out 2 (Output2) <-[]->
O Digital Out 3 (Output3) <-[]->
O Digital Out 4 (Output4) <-[]->
O Digital Out 5 (Output5) <-[]->
O Digital Out 6 (Output6) <-[]->
O Output Byte (OutputByte) <-[]->
S Voltage OK (VoltageOk) <-[]->
S Connector Voltage OK (ConnectorVoltageOk) <-[]->
ALARM:00, Empty
```

This hardware class is used to control the hardware module DM108 with 6 digital outputs of which 2 can be read back and 4 digital inputs. More information on the hardware can be found in the module documentation.

12.1 Interfaces

12.1.1 General

Class State	State	This server shows the actual status of the hardware class.								
Device ID	State	This server shows the device ID of the hardware module.								
FPGA Version	State	FPGA version of the module in 16#XY (e.g. 16#10 = version 1.0).								
Hardware Version	State	Hardware version of the module in format 16#XXYY (e.g. 16#0120 = version 1.20)								
Serial Number	State	The serial number of the hardware module is shown in this server.								
Retry Counter	State	This server increments when a transfer fails.								
LED Control	Output	With this server, the application LED of the S-DIAS module can be activated to find the module in the network more quickly. The following status are possible:<table><tr><td>0</td><td>LED off</td></tr><tr><td>1</td><td>LED on</td></tr><tr><td>2</td><td>blinks slowly</td></tr><tr><td>3</td><td>blinks rapidly</td></tr></table>	0	LED off	1	LED on	2	blinks slowly	3	blinks rapidly
0	LED off									
1	LED on									
2	blinks slowly									
3	blinks rapidly									
Required	Property	This client is activated by default, i.e. this S-DIAS hardware module at this position is absolutely necessary for the system and may under no circumstances be missing, disconnected or deliver an error, otherwise the entire hardware is switched off. If the hardware module is missing, it returns an error or if it is removed, this triggers an S-DIAS error. If this client is initialized with 0, this hardware module is not mandatory at the position. This means that it can be removed at any time. However, which components identified as "not required" should be selected with regard to the safety of the system.								

12.1.2 Digital Inputs and Outputs

Input [1-6]	Input	Status of the respective input or the two readable outputs 5 and 6.
Output [1-6]	Output	Outputs 1-6, set output via Write() method. Outputs 5 and 6 can be read back.
Input Byte	Input	On this server, the digital inputs are displayed in an 8-bit bit field. Within this bit field, bits 1 to 6 are assigned the inputs Input1 to Input6.
Output Byte	Output	On this server, the digital outputs are displayed in an 8-bit bit field. In this word, bits 1 to 6 are allocated to output1 to output8. A Write() instruction to this server writes the bit pattern to these outputs.
Voltage Ok	State	Shows the supply status of the outputs 1-6. 0 power supply error 1 power supply OK
Connector Voltage Ok	State	Shows the supply status for the connectors 1-4. 0 power supply error 1 power supply OK

12.1.3 Communication Interfaces

ALARM	Downlink	With this downlink the corresponding alarm class can be placed via the hardware editor.
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Documentation Changes

Change date	Affected page(s)	Chapter	Note
14.11.2019	25	10 Supported Cycle Times	Chapter added
28.02.2020	25	10 Supported Cycle Times	Text adapted
08.09.2020	27	12 Hardware Class DM108	Chapter added
04.11.2020	22	8 Mounting	Expansion functional ground connection
03.09.2021	9	3.1 Digital Input Specifications	Signal level and Switching threshold
18.03.2022	15	5 Connector Layout	Wrong translation corrected