

DI 160

S-DIAS Digital Input Module

Operating Manual

Publisher: SIGMATEK GmbH & Co KG
A-5112 Lamprechtshausen
Tel.: +43/6274/4321
Fax: +43/6274/4321-18
Email: office@sigmatek.at
WWW.SIGMATEK-AUTOMATION.COM

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S-DIAS Digital Input Module

DI 160

with 16 inputs

The S-DIAS digital input module DI 160 is equipped with 16 inputs and a +24 V signal for reading the signal states “0” and “1”. Input filters are available to suppress noise signals occurring in the signal lines.



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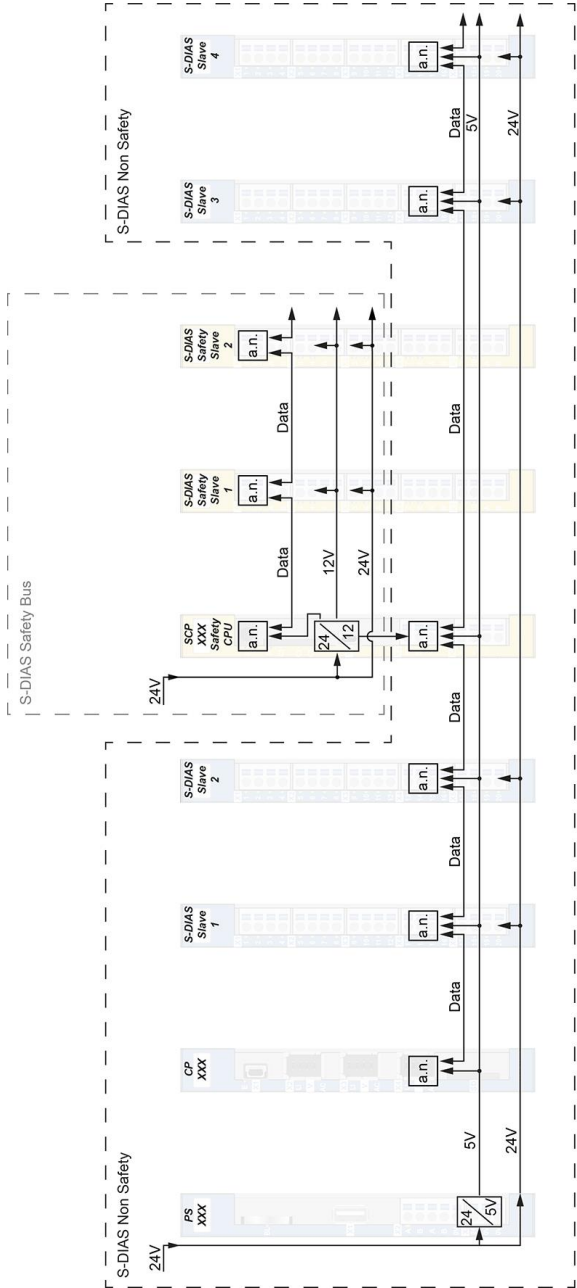
1 Technical Data

1.1 Digital Input Specifications

Number	16	
Input voltage	typically +24 V	maximum +30 V
Signal level (up to HW version 3.10)	low: < +8 V	high: > +14 V
Signal level (starting with HW version 3.20)	low: < +5 V	high: > +15 V
Input current	3.7 mA at +24 V	
Input delay	typically 5 ms	

1.2 Electrical Requirements

Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V supply) HW1.x to HW5.x	typically 36 mA	maximum 40 mA
Current consumption on the S-DIAS bus (+5 V supply) HW6.x	typically 51 mA	maximum 56 mA



Wiring S-DIAS Safety in S-DIAS System

a.n. = active node

- 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

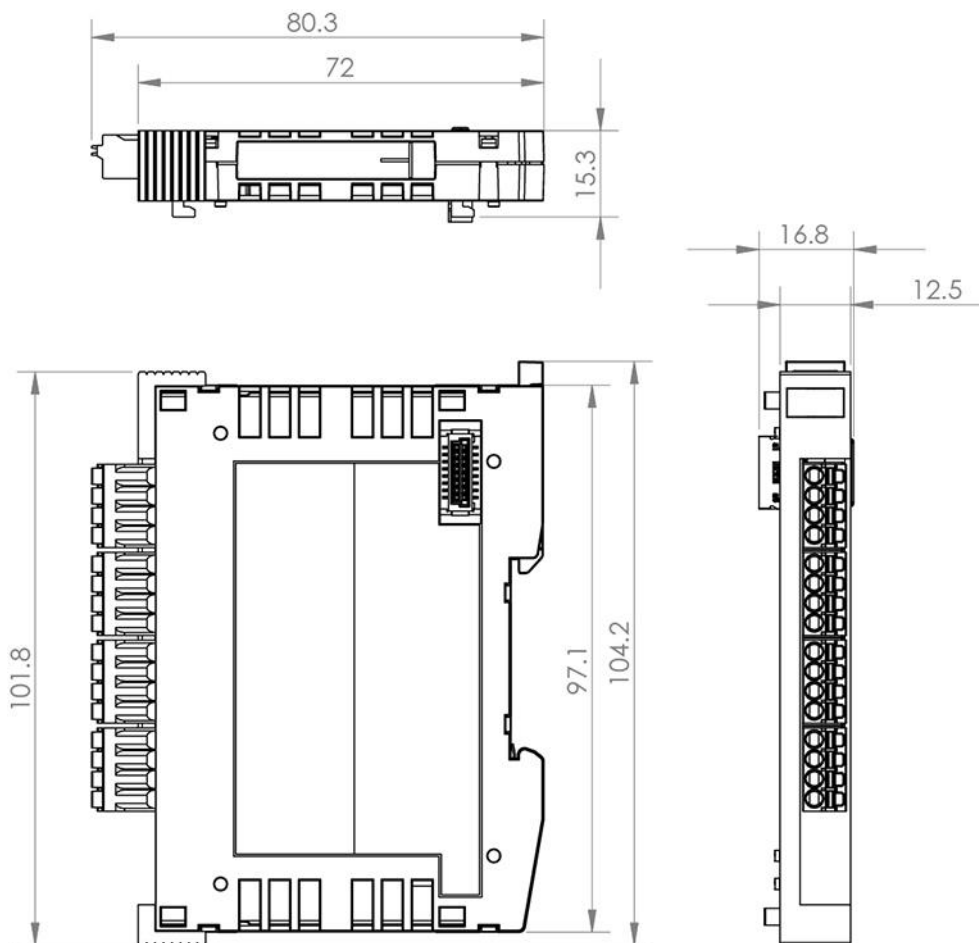
1.3 Miscellaneous

Article number	20-006-160
Hardware version	1.x-6.x
Standard	UL 508 (E247993)
Approbations	UL, cUL, CE

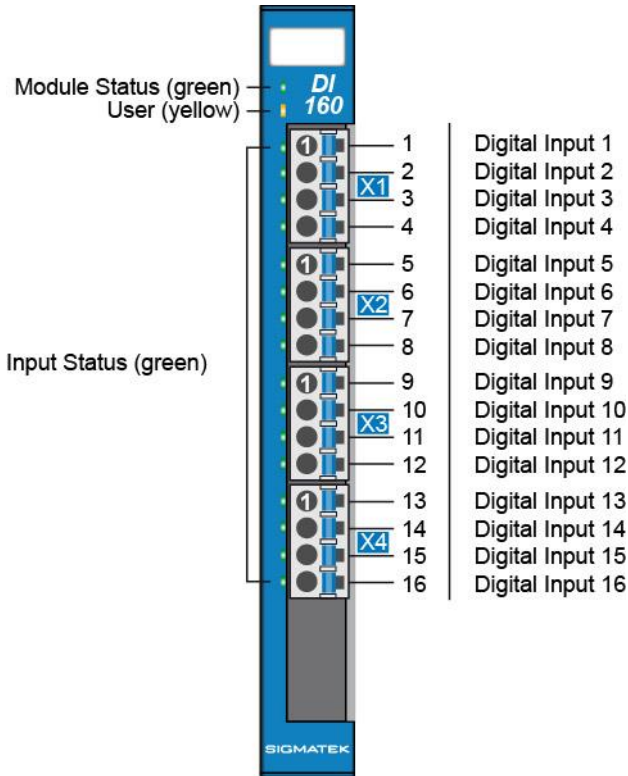
1.4 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +60 °C	
Humidity	0-95 %, non-condensing	
Operating conditions	Pollution degree 2 altitude up to 2000 m	
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 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

2 Mechanical Dimensions



3 Connector Layout



3.1 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)	
Input Status	green	ON	input ON
		OFF	input OFF

3.2 Applicable Connectors

Connectors:

X1-X4: Connectors with spring terminals (included in delivery)

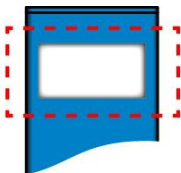
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

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 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 (ground for reducing d2 of the ferrule)



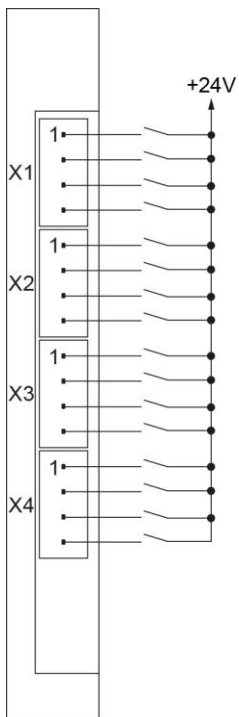
3.3 Label Field



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

4 Wiring

4.1 Wiring Example



4.2 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 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 switch box when possible!

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

IMPORTANT:

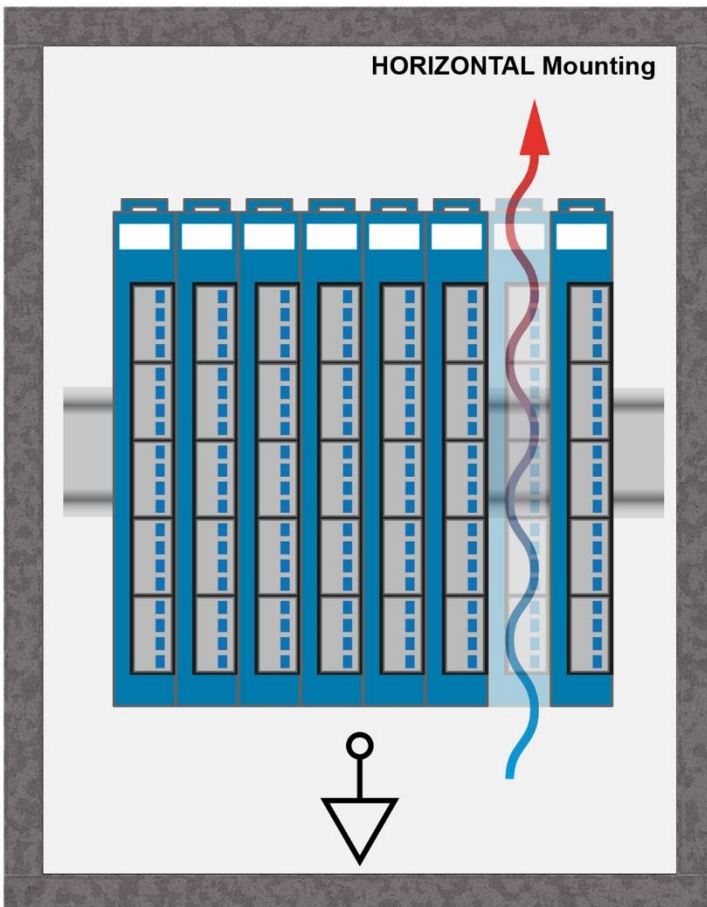
The S-DIAS module CANNOT be connected or disconnected while voltage is applied!

IMPORTANT:

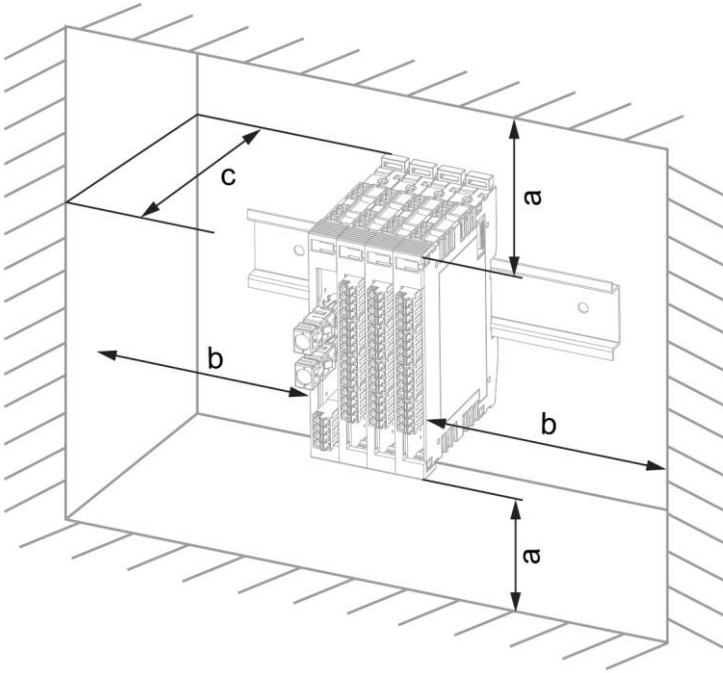
Le module S-Dias NE PEUT PAS être inséré ou retiré sous tension.

5 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)

6 Addressing

Address (hex)	Size (bytes)	Access Type	Description	Reset value
Memory				
0000	2	r	Input Register Bit 0 Input 1 Bit 1 Input2 ... Bit 15 Input 16	0000

7 Supported Cycle Times

7.1 Cycle Times below 1 ms (in μs)

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

x= supported

7.2 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

8 Hardware Class DI160

Hardware Class DI160 for the S-DIAS DI160 digital input module

```
SDIAS:35, DI160 (DI1601)
[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] Digital Input 7 (Input7) <-[]->
[I] Digital Input 8 (Input8) <-[]->
[I] Digital Input 9 (Input9) <-[]->
[I] Digital Input 10 (Input10) <-[]->
[I] Digital Input 11 (Input11) <-[]->
[I] Digital Input 12 (Input12) <-[]->
[I] Digital Input 13 (Input13) <-[]->
[I] Digital Input 14 (Input14) <-[]->
[I] Digital Input 15 (Input15) <-[]->
[I] Digital Input 16 (Input16) <-[]->
[I] Input Word (InputWord) <-[]->
[ ] ALARM:00, Empty
```

This hardware class is used to control the DI 160 hardware module with 16 digital outputs. More information on the hardware can be found in the module documentation.

8.1 Interfaces

8.1.1 Clients

SdiasIn	The client must be connected to an S-DIAS port, an "SdiasOut"_[x]" server.
Place	The physical location of the hardware module is entered in this client. Up to 64 modules, 0 to 63, can be assigned.
Required	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.

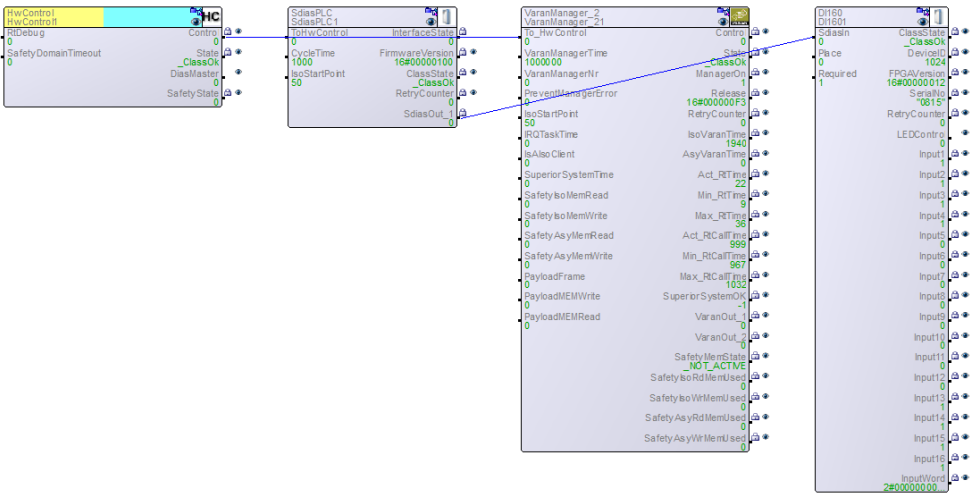
8.1.2 Servers

ClassState	This server shows the actual status of the hardware class.								
DeviceID	The device ID of the hardware module is shown in this server.								
FPGAVersion	FPGA version of the module in 16#XY (e.g. 16#10 = version 1.0).								
SerialNo	The serial number of the hardware module is shown in this server.								
RetryCounter	This server increments when a transfer fails.								
LEDControl	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 statuses are possible: <table border="1" data-bbox="400 868 1016 999"> <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								
Input[1-16]	Status of input 1-16								
InputWord	In this server, the digital outputs are shown in a 16-bit field. Bits 0 to 15 are assigned to input1 to input16 in this bit field.								

8.1.3 Communication Interfaces

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



Documentation Changes

Change Date	Affected page(s)	Chapter	Note
01.04.2014	3	1.3 Miscellaneous	UL added
	9	5 Mounting	Text updated
30.01.2015	8	4.2 Note	Added note concerning connecting the S-DIAS module while voltage is applied
26.03.2015	7	3.2 Applicable Connectors	Added connections
28.04.2016	12	5 Mounting	Graphics distances
17.08.2017	5	1.4 Environmental	Pollution Degree
	8	3.2 Applicable Connectors	Sleeve length added Added info regarding ultrasonically welded strands
18.10.2017	9	3.3 Label Field	Added chapter
	13	5 Mounting	Graphic replaced
14.11.2019		7 Supported Cycle Times	Chapter added
28.02.2020	15	7 Supported Cycle Times	Text adapted
08.09.2020	17	8 Hardware Class DI160	Chapter added
04.11.2020	13	5 Mounting	Expansion functional ground connection
24.08.2021	4	1.1 Digital Input Specifications	Signal level and Switching threshold
13.09.2021	4	1.2 Electrical Requirements	Current consumption changed
05.10.2021	4	1.2 Electrical Requirements	HW version changed

