SR 020

S-DIAS Current Controller Module

Instruction Manual

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Translation of the Original Instructions

S-DIAS Current Controller Module SR 020

with1 DC motor driver

1 Power LED driver

1 LED driver

The S-DIAS SR 020 current controller module is used to operate a DC motor with a 12-30 V supply voltage and a maximum motor current of 3.5 A. Higher starting currents are possible for a short period.

The module also contains a current-controlled LED driver with a maximum current of 20 mA, as well as a current-controlled power LED with a maximum of 350 mA.

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 SR 020

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.

WARNING

Hot Surfaces

Surfaces chaudes

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 SR 020 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

HW: X.XX
SW: XX.XX.XXX
Safety Version: SXX.XX.XX

Serial No.

SIGMATEK GMBH & CO KG
Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN

Article Number Product Name Short Name

Exemplary nameplate (symbol image)

HW: 1.00
SW: 01.00.000
Safety Version: S01.00.00

12345678

SIGMATEK GMBH & CO KG
Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN

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

HW: Hardware version
SW: Software version

5 Technical Data

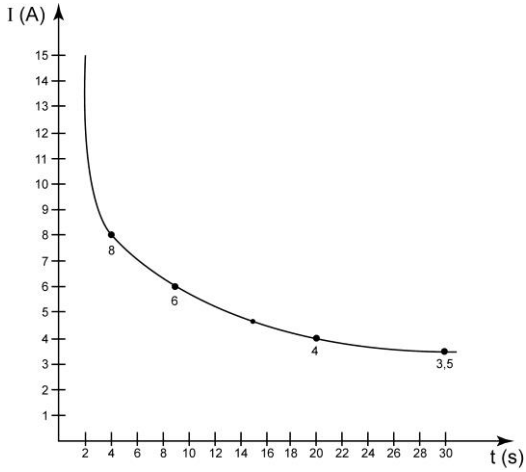
5.1 Motor Output Specifications

Number	1
Supply voltage	12-30 V DC
Controller frequency	30 kHz
Current	0-3.5 A
Motor peak start current	Maximum I2T value = 16 A^2s
Operation mode	S3 / 50 % with a maximum duty cycle of 1.5 min
DC-link capacitance	140 µF
Voltage monitor	Over and under voltage monitor
Motor current measurement	0-3.5 A
Safety functions	Short circuit cutoff I^2t cutoff over temperature cut-off

INFORMATION

The motor current should not exceed the defined value of 3.5 A, this also applies to braking and start-up of the motor. The module can regulate the peak start current of the motor for only a short time. The maximum starting current is determined by the I2T value. The I2T value is the integral of the current squared over a given time span and a mass for the maximum energy that the motor output can supply.

The EMC response of the total system is significantly affected by the motor used and its wiring. The use of shielded wires is recommended.



5.2 Current Output Specifications

Number	2
LED 1	0-20 mA at max. 10 V LED forward bias
Resolution	8 bits
LED 2 (power LED)	0-350 mA at max. 10 V LED forward bias
Resolution	8 bits

5.3 Electrical Requirements

Power supply +24 V	18-30 V	
Current consumption of +24 V power supply	maximum 210 mA / 24 V	
Motor supply voltage	12-30 V	
Current consumption of motor supply	depends on the motor	
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V supply)	typically 68 mA	maximum 80 mA
Voltage supply from S-DIAS bus	+24 V	

Current consumption on the S-DIAS bus (+24 V supply)	typically 15 mA	maximum 20 mA

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!

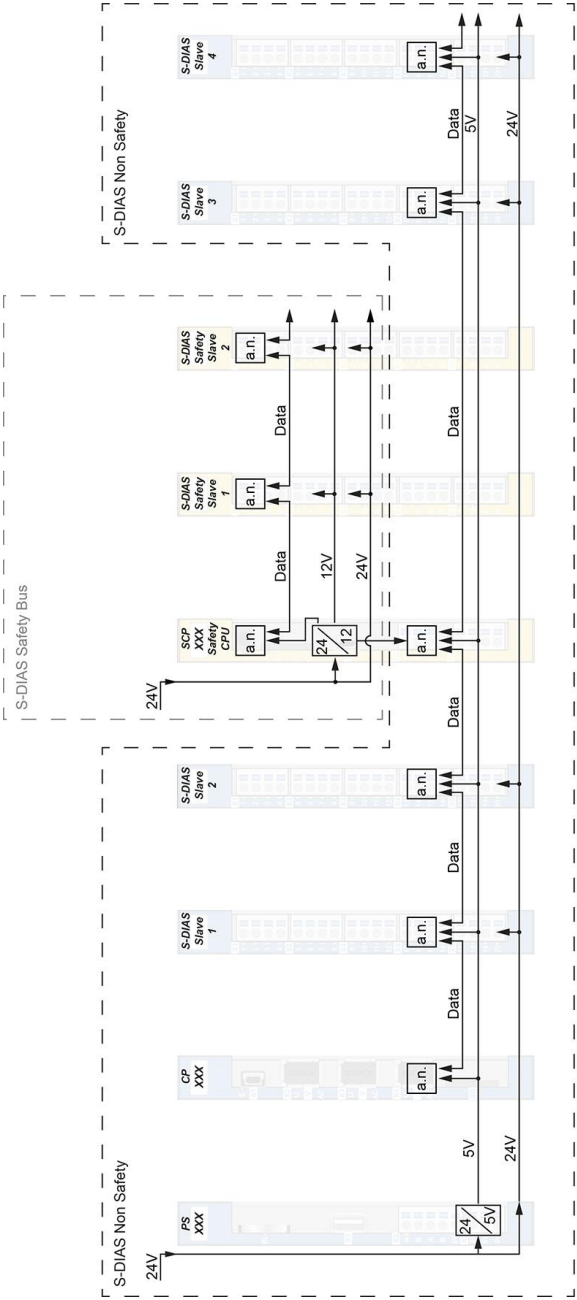
The total current of the +5 V supply cannot exceed 1.6 A!

The specification for the current can be found in the module-specific documentation under "Electrical Requirements".

UL Requirements

INFORMATION

The module must be powered by a galvanically separated voltage source.



a.n. = active node

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

5.4 Miscellaneous

Article number	20-029-020 20-029-020-X (polymer coated printed circuit board)
Standard	UL 61800-5-1 (E247993)
Approvals	UL, cUL, CE, UKCA

5.5 Environmental Conditions

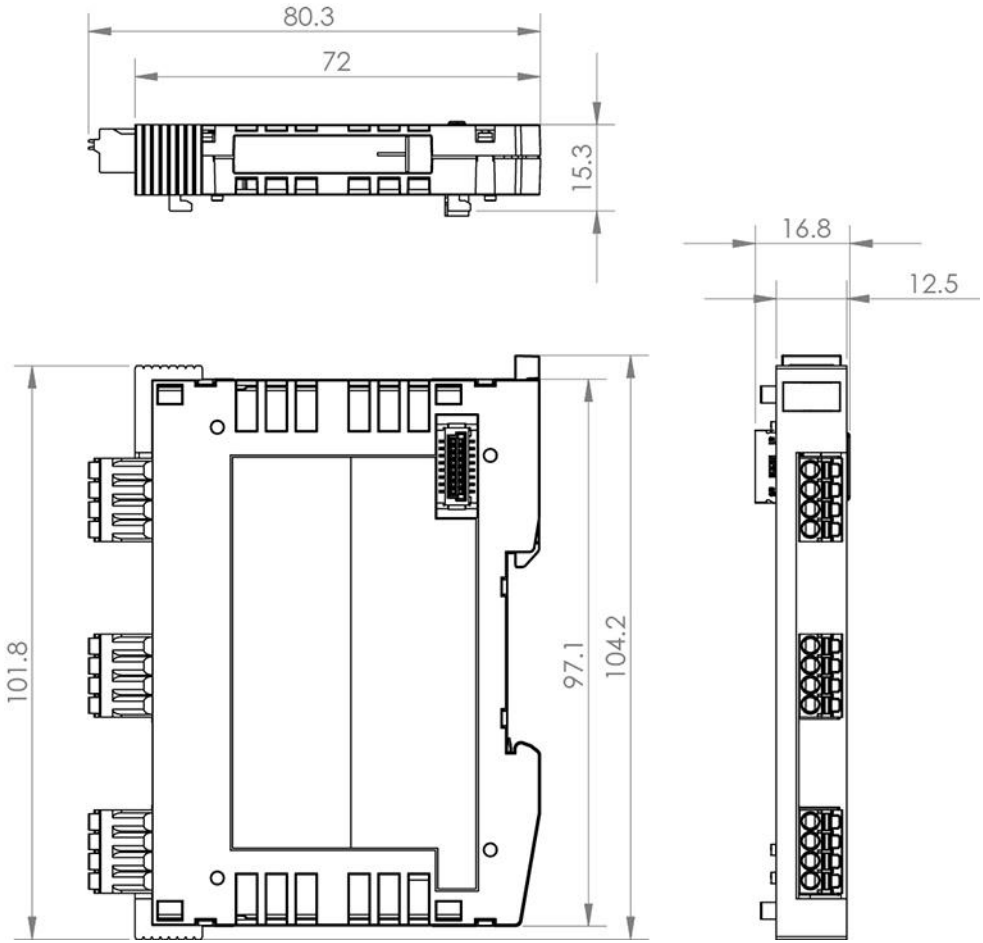
Storage temperature	-20 ... +85°C	
Environmental temperature	0 ... +55°C	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
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

INFORMATION

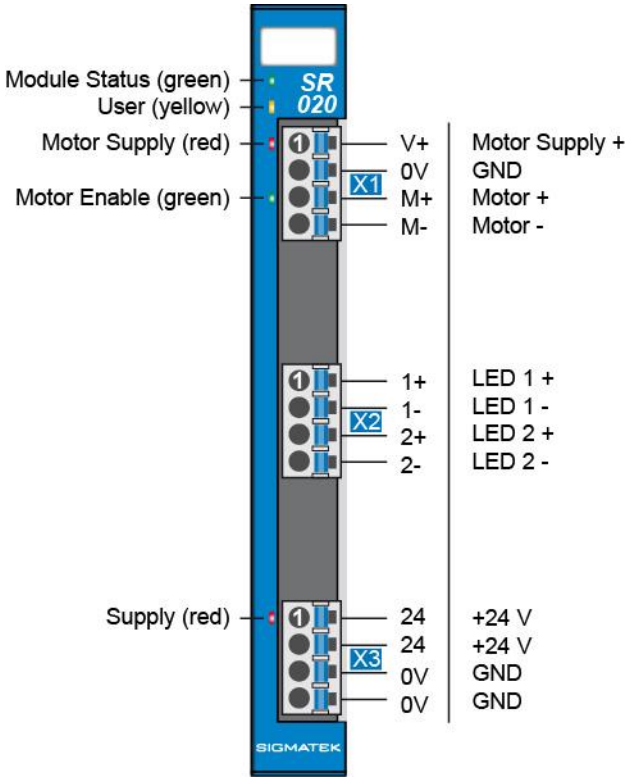
The motor over temperature sensor is not provided with the drive.

The products can only be used for the SIGMATEK S-DIAS listed in the file E247993.

6 Mechanical Dimensions



7 Connector Layout



INFORMATION

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!

7.1 Status LEDs

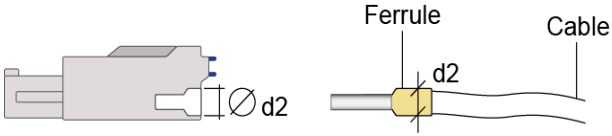
Module Status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	can be set from the application (e.g. the module LED can be set to blinking through the visualization, so that it is easily found in the control cabinet)
		OFF	
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Motor supply	red	ON	motor supply missing
		OFF	motor supply available
Motor Enable	green	ON	motor controller enable active
		OFF	Motor controller enable inactive
Power supply	red	ON	Supply missing
		OFF	supply available

7.2 Applicable Connectors

Connectors:
X1-X3: Connectors with spring terminals (included in delivery)
The spring terminals are suited for the connection of ultrasonically compacted (ultrasonically welded) stranded wire.

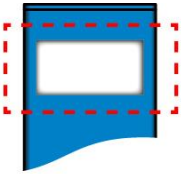
Connections:

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)



d2 = max. 2.8 mm

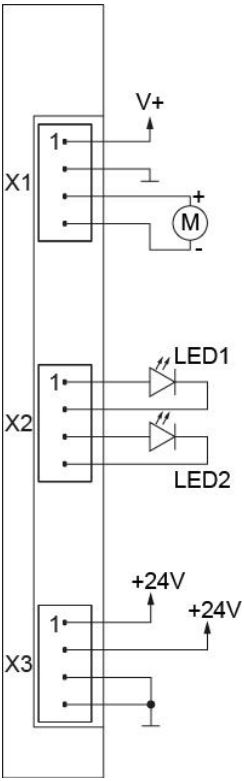
7.3 Label Field



Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Article number Weidmüller	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Article number Weidmüller	1,324,380,000

8 Wiring

8.1 Wiring Example



8.2 Note

The signals recorded by the analog modules are very small, as compared to the digital signals. To ensure error-free operation, a careful wiring method must be followed:

- The DIN rail must have an adequate connection to mass.
- The lines connected to the source of the analog signals must be as short as possible and parallel wiring to digital signal lines must be avoided.
- The signal lines must be shielded.
- The shielding must be connected to a shielding bus.
- Avoid parallel connections between input lines and load-bearing circuits.
- Protective circuits for all relays (RC networks or free-wheeling diodes).

INFORMATION
Connect the ground bus to the control cabinet.
The S-DIAS module CANNOT be connected/disconnected while voltage is applied!
The maximum length of the LED and motor cables is 30 m.

9 Assembly/Installation

9.1 Check Contents of Delivery

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

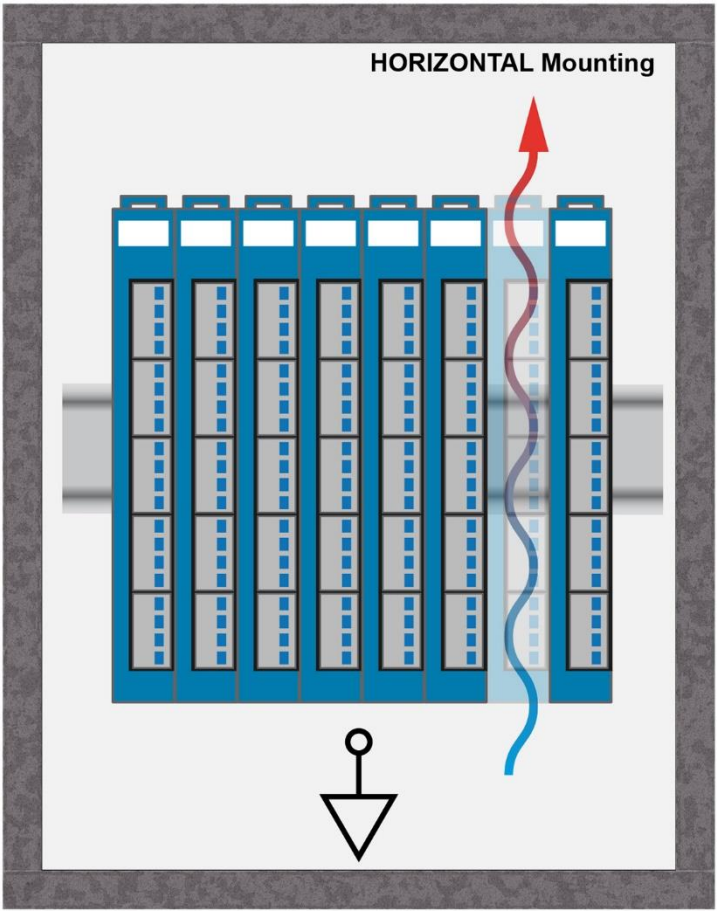
INFORMATION

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.

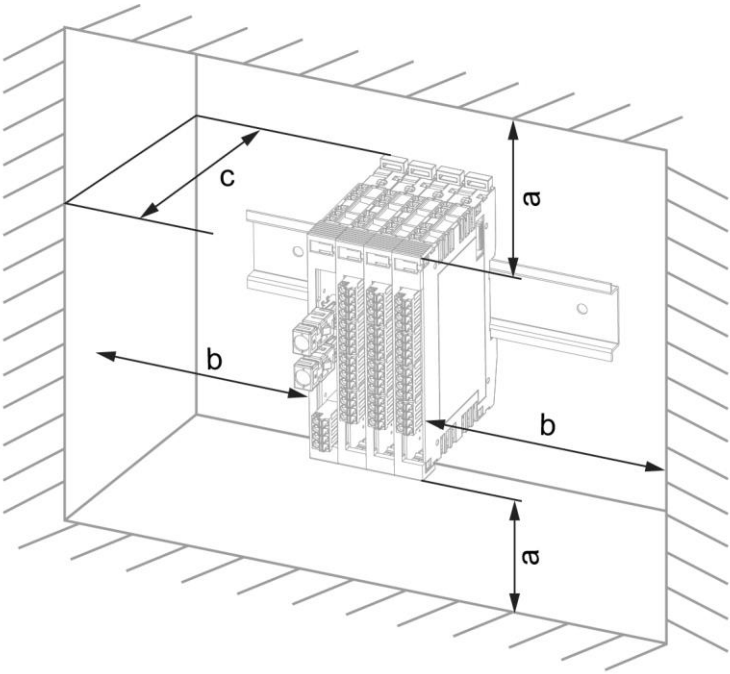
Damaged components can disrupt or damage the system.

9.2 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 panel 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)

10 Addressing

Address (hex)	Size (bytes)	Description
CFG for the Firmware (memory address range)		
0200	2	CRC
0202	2	Data length
0204	1	Info (special purpose or status bits) Bit 0 PMB mode Bit 1 boot loader/ update request
0205	1	reserved
	Standard mode (info register bit 0 = 0)	
0206	0	-
	PMB mode (Info register bit 0 = 1)	
0206	0	-
CFG for the Firmware (memory address range)		
0280	2	CRC
0282	2	Data length
0284	2	Firmware Version
Firmware update (mem-address area)		
0300	x	SDO communication

Address (hex)	Size (bytes)	Access Type	Description	Reset point
0000	2	r16	Data sequence 1. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0002	2	r16	Data sequence 2. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0004	2	r16	Data sequence 3. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0006	2	r16	Data sequence 4. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0008	2	r16	Period Value / clock frequency	0000

Cyclic read				
000A	2	r16	T the temperature in °K	0000
000C	2	r16	16-bit actual value (sign)	0000
000E	2	r	Status register latched (deleted when read, except bit 10 and bit 12) Bit 0 - reserved Bit 1: Wrong sequence (impermissible setting of output sequence bits) Bit 2: Absolute time error (the absolute time values must increase with each sequence) Bit 3: High motor current Bit 4: Motor current too high (additional periphery reset) Bit 5: Dc_ok (external supply of LEDs) Bit 6: Dc_ok Motor Bit 7: Periphery reset LED Bit 8: Periphery reset motor Bit 9: Induction voltage of motor too high (additional periphery set) Bit 10: 1 = temperature above 95 °C Bit 11: reserved Bit 12: 1 = i^2t error Bit 15..13: reserved	0000
0012	4	r32	i2t-Wert Bit 20..0: i2t-Wert Bit 31..21: reserved	0000 0000
0016	2	r16	FW Status Register	0000
Cyclic write				
0000	2	w16	Data sequence 1. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0002	2	w16	Data sequence 2. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000

0004	2	w16	Data sequence 3. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0006	2	w16	Data sequence 4. 16-bit value Bit 10..0: Time / signal frequency Bit 11: 1 = use absolute time counter 0 = use relative time counter Bit 12: left high Bit 13: right high Bit 14: left low Bit 15: right low	0000
0008	2	w16	Period Value / signal frequency [50 MHz]	0000
000A	1	w	Raw value for PWM output on time for 20 mA LED	00
000B	1	w	Raw value for PWM output on time for 350 mA LED	00
000C	2	w	Control register: Bit 0: Sequence activated Bit 1 - reserved Bit 2 - reserved Bit 3: latched high motor current activated Bit 4: activated latched motor current too high (additional periphery reset) Bit 5: activated latched motor current too high (external supply for LEDs, current measurement (OpAmp)) Bit 6: activated latched Dc_ok Motor Bit 7: activate latched periphery setting LED Bit 8: activate latched periphery reset motor Bit 9: Induction voltage of motor too high (additional periphery set) Bit 10: 1 = Activate over temperature cutoff Bit 11: 1 = Quit (delete) over temperature 95 °C Bit 12: 1 = activate i^2t error cutoff Bit 13: 1 = Quit (delete) i^2t error Bit 14: LED 20 mA activate PWM SW (1 = on) Bit 15: LED 350 mA activate PWM SW (1 = on)	0000

SDO				
0018	2	r16	PWM distributor register for 20 mA LED Distributes the 50 MHz input signal in 5.55 MHz. 5.55 MHz/256 (8-bit resolution) ≈20 kHz PWM frequency	0009
001A	2	r16	Distributor register for 350 mA LED Distributes the 50 MHz input signal in 900 MHz. 900 MHz/ 256 (8-bit resolution) ≈3.5 kHz PWM frequency	0037
001C	1	r8	PWM period for 20 mA LED Maximum value of the PWM counter	FF
001D	1	r8	PWM distributor register for 350 mA LED Maximum value of the PWM counter	FF
001E	2	r16	reserved	0000
0020	4	r/ w32	i2t cutoff threshold Bit 20..0: i2t cutoff threshold Bit 31..21: reserved	00000400

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 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.

15 SR020 Hardware Class

SR020 hardware class for the S-DIAS SR020 motor module

```
SDIAS:23, SR020 (SR0201)
  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) <-[]->
  S Firmware Version (FirmwareVersion) <-[]->
  S Error Bits (ErrorBits) <-[]->
  S Voltage OK (VoltageOk) <-[]->
  S Voltage OK Motor (VoltageOkMotor) <-[]->
    ------------------------- Motor ---------------
  O Enable (Enable) <-[]->
  O Set Speed (SetSpeed) <-[]->
  O Minimal Pulsewidth (MinPulse) <-[]->
  I Motor Current (MotorCurrent) <-[]->
  I Temperature (Temperature) <-[]->
  I I²T (I2T) <-[]->
  O Quit Errors (ErrorQuit) <-[]->
    ---------------------- LED Outputs -----------
  O Led 20 (Led20) <-[]->
  O Led 350 (Led350) <-[]->
  ALARM:00, Empty
```

This hardware class is used to control the SR 020 hardware module with 1 x DC motor driver, and 1 x 20 mA LED driver and 1 x 350 mA power LED drivers. More information on the hardware can be found in the module documentation.

15.1 Interfaces

15.1.1 Clients

SdiasIn	This 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 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.
PWMPeriod	This client contains the PWM in µsec (Default: 32). As an initialization value
I2TThreshold	With this client, the I2T threshold is defined in percent of the maximum threshold value (maximum permitted I2T value of hardware). If exceeded, an I2T error is triggered and the motor output deactivated. As an initialization value

15.1.2 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 conditions are possible: 0 ...LED off 1 ...LED on 2 ...blinks slowly 3 ...blinks rapidly
Firmware version	The firmware version of the hardware module is shown in this server.

ErrorBits	this server contains the status bits of the module. The respective bits mean the following: Bit 0... not defined Bit 1 .. no Sync available Bit 2... Flash Data CRC Error Bit 3... Ram Data CRC Error Bit 4 .. invalid EEProm version .. Bit16 .. sequencer deactivated Bit17 .. invalid sequence input Bit18 .. incorrect absolute time (absolute times are not in ascending order). Bit19 .. motor start current is running in the current limit Bit 20 .. motor current is continuously too high Bit21 .. external supply voltage is not ok Bit22 .. supply voltage of the motor is not ok Bit 23 .. periphery reset of the LEDs: Deactivate the LED control due to: - Config Clear in S-DIAS - Reset Watchdog in S-DIAS - Reset S-DIAS - LED control watchdog Bit24 .. periphery reset of the motor: Deactivate the motor due to: - Config Clear in S-DIAS - Reset Watchdog in S-DIAS - Reset S-DIAS - Motor control watchdog - Short circuit current - Induction voltage too high Bit25 .. induction voltage is too high Bit26 ..over temperature error (temperature > 95 °C) .. Bit28 ..I^2T error (threshold setting was exceeded)
Led20	Output current for the 20 mA LED in components (8-bit). The server value can be changed over the write() method.
Led350	Output current for the 350 mA LED in components (8-bit). The server value can be changed over the write() method.
Enable	0 Motor turned off 1 Motor turned on The server value can be changed over the write() method. If the motor is deactivated (server "Enable" set 0) the set speed (server "SetSpeed") is reset to 0. The server cannot be set to 1 as long as a short circuit current or too high a motor induction voltage has not been canceled with "QuitError".
SetSpeed	This server can be used to set the motor speed. The valid range of values is between -10000 and +10000 (equals - 100% to +100%) whereas the turn direction is defined by the sign. The server value can be changed over the write() method.
MinPulse	With this server, the minimum pulse width of the PWM can be defined per mil. The server value can be changed over the write() method. The control assumes a change only after the write() method of the SetSpeed server has first been called (Default: 7).

MotorCurrent	This server shows the measured bridge current in mA. The relevant total current for the heating of the components both branches is measured. Higher values than the actual motor current are therefore shown in the component load range. The measured current value forms the basis for the I2T calculation. The status is queried over read().
Temperature	Temperature in °C. The status is queried over read().
I2T-	Shows the actual I²t value in [(1/160)A²s]
ErrorQuit	Reset error bits with value 1.
VoltageOK	Supply voltage +24 OK with server value 1.
VoltageOkMotor	Supply voltage motor is ok with server value 1.

15.1.3 Communication Interfaces

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

15.2 Example

Documentation Changes

Change date	Affected page(s)	Chapter	Note
04.10.2013	3	1.4	Note
23.10.2013	 5	6 1.6	Addressing added Vibration resistance added
23.12.2013	7	3 Connector Layout	Image changed
11.02.2014	7 8 9	3 Connector Layout 3.2 Applicable Connectors 4.1 Wiring Example	Image changed Connections added French notes added Chapter added
01.04.2014	11	5 mounting	Text updated
18.07.2014	7	3 Connector Layout	Wiring Guidelines added
30.01.2015	10	4.2 note	Note regarding connecting/disconnecting the S-DIAS module under voltage.
26.03.2015	9	3.2 Applicable Connectors	Added connections
15.07.2015	4	1.3 Electrical requirements	Current consumption on the S-DIAS bus (+5 V supply) changed
17.02.2016	4, 5, ..	1.3 Electrical requirements 1.4 Miscellaneous	UL added
28.04.2016	13	5 mounting	Graphic distances
04.07.2017	6	1.5 Environmental Conditions	Note added
02.08.2017	6	1.5 Environmental Conditions	Operating conditions added
17.08.2017	6 9	1.5 Environmental Conditions 3.2 Applicable Connectors	Pollution level Sleeve length added Information regarding ultrasound-welded strands expanded
23.08.2017	3	1.1 Motor Output Specifica-tions	Table contents for a detailed specification changed and expanded
18.10.2017	11 15	3.3 Label Field 5 mounting	Chapter expanded Graphic replaced

05.09.2018	4	1.2 Current Output Specifications	LED 1 and 2 specified
20.09.2018		3 Connector Layout	Merksatz added
14.11.2019		7 Supported Cycle Times	Chapter added
28.02.2020	21	7 Supported Cycle Times	Text modified
28.05.2020	21	7 Supported Cycle Times	Entire chapter removed
08.09.2020	23	7 SR020 Hardware Class	Chapter added
04.11.2020	16	5 Mounting	Expansion functional ground connection
02.03.2021		7.1.1 Clients	Client I2TThreshold updated
04.04.2022		1.4 Miscellaneous	Variant SR 020-X added
06.12.2022	8	1.4 Miscellaneous	UKCA conformity
26.07.2023		Document	General chapters added, design