SIGMATEK

SR 022

S-DIAS Current Controller Module

Instruction Manual

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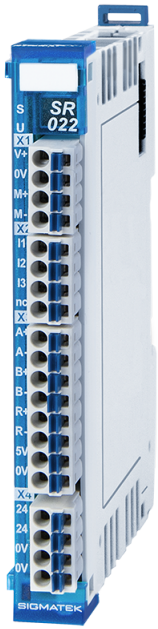
Translation of the Original Instructions

S-DIAS Current Controller Module SR 022



1 DC motor driver

1 incremental encoder input

1 digital input +5 V

2 digital inputs +24 V

The S-DIAS Current Controller Module SR 022 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.

Additionally, the motor contains an incremental encoder input (optional TTL or RS422 signal), as well as three digital inputs (1x +5 V, 2x +24 V).

Table of 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 022

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.

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.

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.

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 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

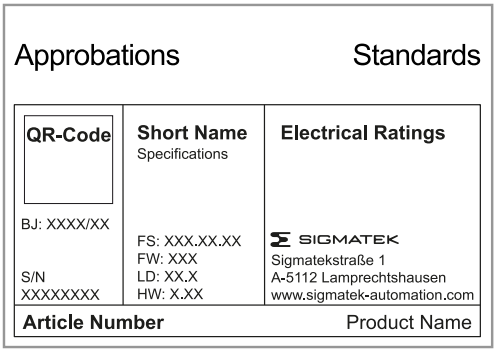
The product SR 022 conforms to the following European directives:

- → 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.



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

5 Technical Data

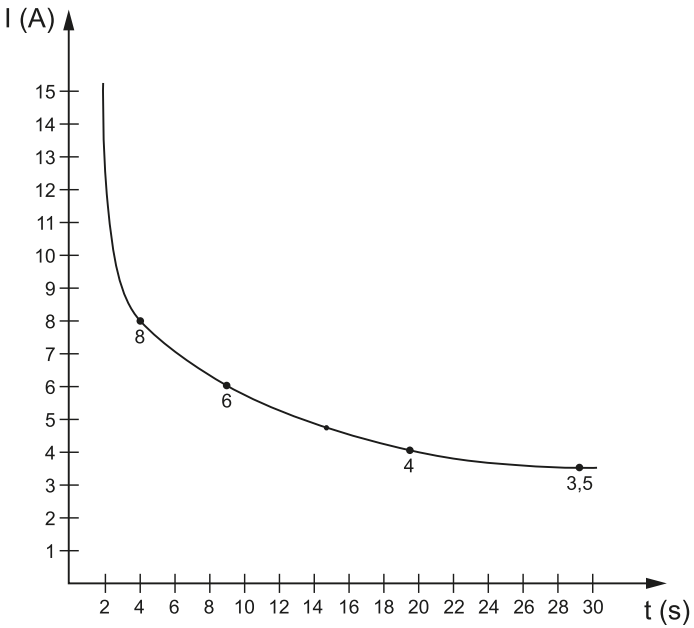
5.1 Motor Output Specifications

Number	1
Supply voltage	+12-30 V DC
Controller frequency	30 kHz
	0-2.0 A in S1 mode
	0-3.5 A in S3 mode
Output current over the environmental temperature	2.0 A (S1)/3.5 A (S3) up to 45 °C
	1.0 A (S1)/1.4 A (S3) up to 55 °C
Motor peak start current	maximum I^2t value = 16 A^2s
Operation mode	S1 / 100 % duty cycle
	S3/50 % duty cycle wita a maximum ON time of 1.5 min.
DC-link capacitance	140 µF
Voltage monitoring	overvoltage and under voltage monitoring
Motor current measurement	0-3.5 A
Protective functions	short circuit cut-off
	I^2t switch-off
	overtemperature switch-off

INFORMATION

The motor current should not exceed the defined value of 3.5 (S3) or 2.0 A (S1). 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 I^2T value. The I^2T 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.


I (A)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
8
6
4
3,5
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
t (s)

5.2 Incremental Encoder Input Specifications

Number	1
Input signals	Incremental encoder signals RS422 (A, /A, B, /B, R, /R)
	RS422 level (120 Ω termination, integrated in module)
	Incremental encoder signal TTL (A, B, R)
	TTL level (1200 Ω pull-up, integrated in module)
Input frequency	maximum 125 kHz from LD version L1.1 onwards, the input frequency can be adjusted via software between 400 Hz and 125 kHz (maximum value).[1)]
Counter frequency	maximum 500 kHz from LD version L1.1 onwards, the input frequency can be adjusted via software, resulting in a maximum counter frequency between 1,6 kHz and 500 kHz (maximum value, counter frequency = input frequency x 4 with 4-fold signal evaluation).[1)]
Signal analysis	4x
Counter resolution	16 bits
Encoder power supply	+5 V/0.2 A short-circuit proof

5.3 +5 V Digital Inputs Specifications

Number	1	
Input voltage	typically +5 V	maximum +5.5 V
Signal level	low: < +0.8 V	High: > +2.0 V
Switching threshold	typically +1.4 V	
Input current	1.5 mA at +5 V	
Input delay	typically 5 ms	

1) When the filter is enabled with a software-adjustable cutoff frequency, the input signal is limited to the set filter frequency. This assumes an input signal with an ideal duty cycle of 50%. If the duty cycle of the sensor deviates from the ideal 50% value, or if the sensor's maximum output frequency is subject to system-inherent tolerances, it is recommended to increase the set filter frequency accordingly so that the effective sensor frequency is not filtered out.

5.4 +24 V Digital Input Specifications

Number	2	
Input voltage	typically +24 V	maximum +30 V
Signal level	low: < +8 V	high: > +14 V
Switching threshold	typically +11 V	
Input current	3.7 mA at +24 V	
Input delay	typically 5 ms	

5.5 Electrical Requirements

Supply voltage +24 V	+18-30 V	
Current consumption of the +24 V supply	maximum 70 mA (at +24 V)	
Supply voltage motor	+12-30 V	
Current consumption supply voltage Motor	depends on the motor	
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V supply)	typically 85 mA	maximum 95 mA
Supply from S-DIAS bus	+24 V	
Current consumption on the S-DIAS bus (+24 V supply)	typically 20 mA	maximum 25 mA

INFORMATION

The SR 022 may only be operated by power supply units that meet the requirements of SELV or PELV in accordance with EN 60204.

INFORMATION

1) For USA and Canada:

The supply must be limited to:
a) max. 5 A at voltages from +0-20 V DC, or
b) 100 W at voltages from +20-60 V DC

The limiting component (e.g., transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory, e.g. UL).

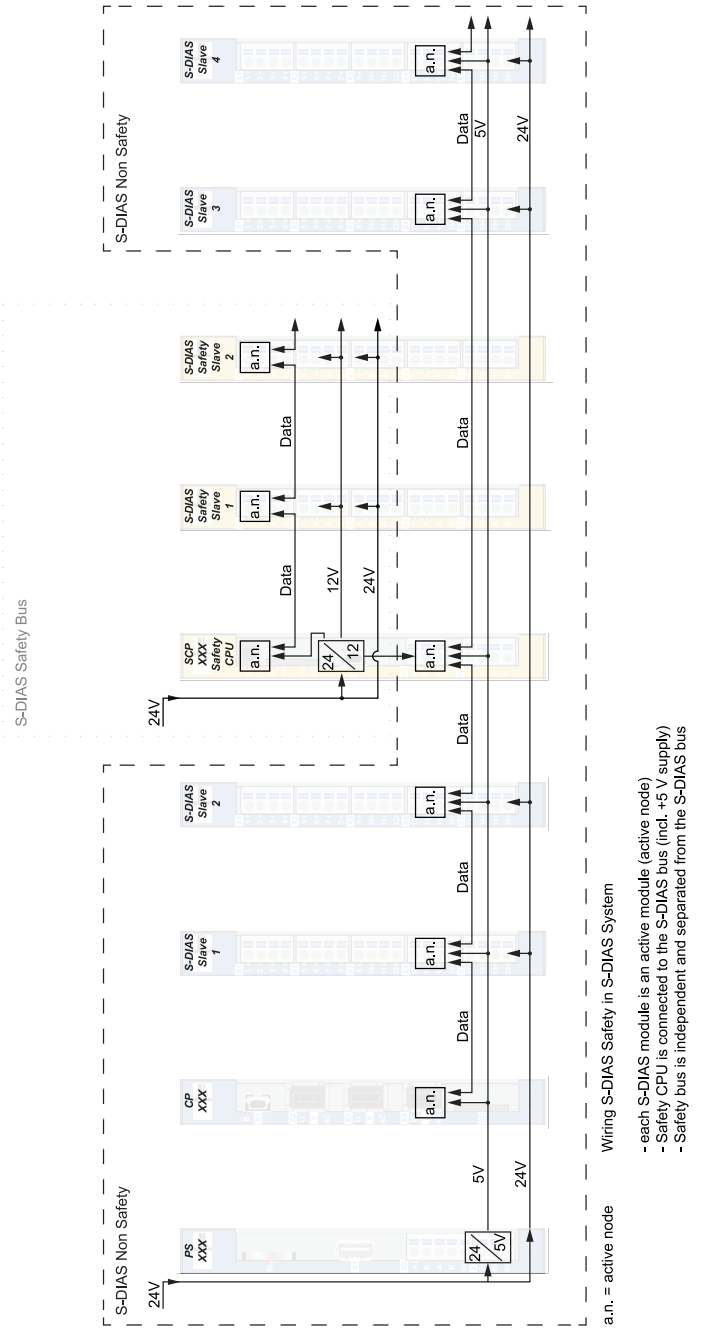
If this S-DIAS module is connected to an S-DIAS supply module with several S-DIAS modules, the total current of the modules used must be determined and checked.
The total current of the +24 V supply cannot exceed 1.6 A!
The total current of the +5 V supply cannot exceed 1.6 A!
The specification for the current can be found in the module-specific documentation under "Electrical Requirements".

2) The motor supply (X2) must be connected with an intermediate circuit capacitance appropriate for the application (at least 2000 µF/100 V). Attention must be paid to short cables and appropriate cable cross-sections.(maximum 15 cm between module and capacitor / 1.5 mm²)

Braking a DC motor:
When braking a DC motor, a generative process can occur whereby the kinetic energy of the motor is converted into electrical energy. The energy of the motor is thereby fed back into the supply of the DC motor output stage; this then increases the supply voltage. It should be noted that the feedback voltage supply voltage of 65 V cannot be exceeded! The external capacity of the motor supply is may be needed. If the capacitors in the power supply are insufficient, a regen resistor, which converts the excess energy into heat must be connected to the DC motor output stage. When selecting the power supply, it is important to ensure that it is appropriately feedback-resistant up to the maximum regenerative voltage that occurs.

Use only conductors, which are rated for at least 75 °C!

Incorrectly set parameter or incorrect wiring can lead to destruction of the motor. In particular, motor currents and the I^2T settings (A-I2TT, A-I2TERR) must be monitored, which can be parameterized in the DIAS-Drive Editor via the LASAL CLASS 2 tool.
Only motors in a star configuration can be used.


S-DIAS Safety Bus
S-DIAS Non Safety
24V
PS XXX
CP XXX
S-DIAS Slave 1
S-DIAS Slave 2
S-DIAS Non Safety
24V
SCP XXX Safety CPU
S-DIAS Safety Slave 1
S-DIAS Safety Slave 2
S-DIAS Slave 3
S-DIAS Slave 4
a.n.
Data
5V
12V
24V
24/5V
24/12
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

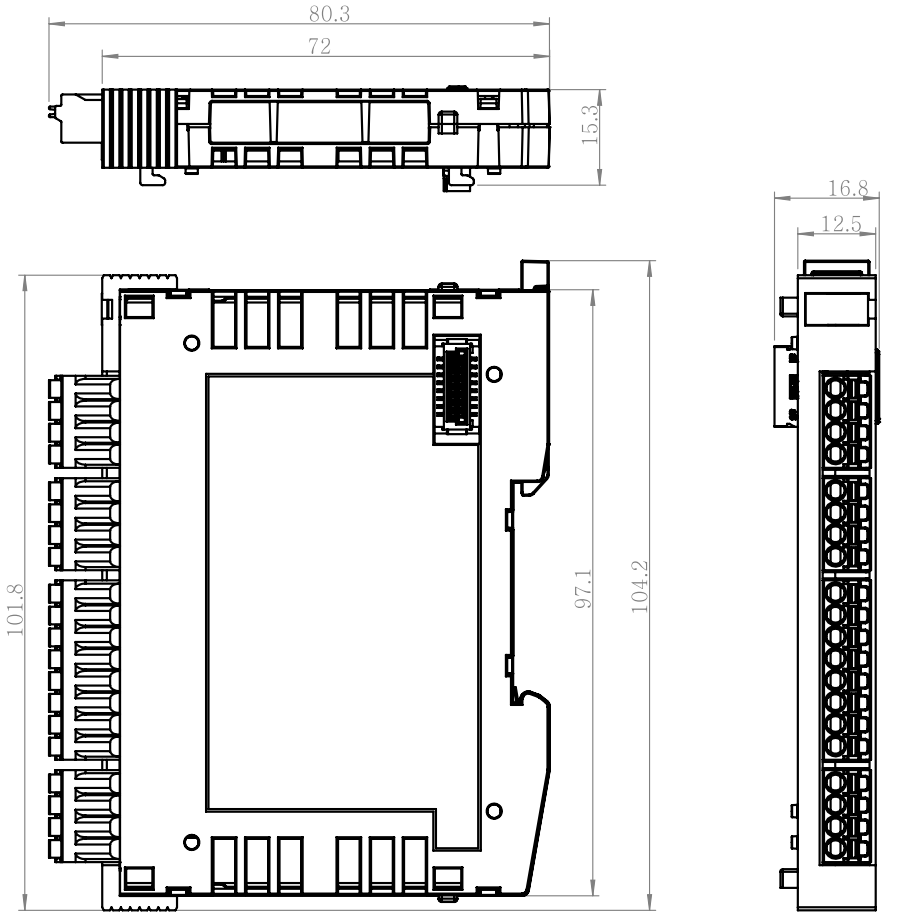
5.6 Miscellaneous

Article number	20-029-022	
Printed circuit board coating	no	
Approvals	CE	yes
	UL	designed according to UL
	Functional Safety	no
	UKCA	yes

5.7 Environmental Conditions

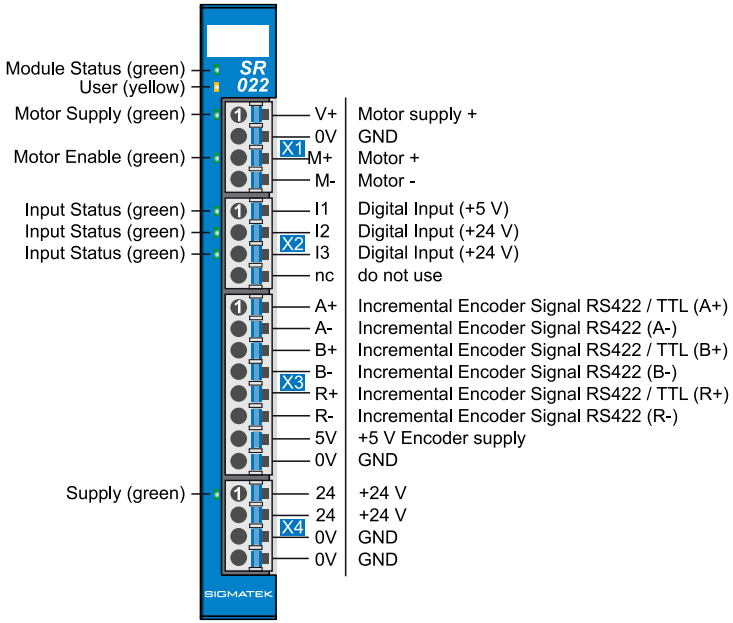
Storage temperature	-20 … +85 °C	
Environmental temperature	0 … +55 °C	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	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 von 5-8.4 Hz 1 g von 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s²)
Protection type	EN 60529/NEMA 250	IP20/Type1

6 Mechanical Dimensions



Measurements	12.5 x 104 x 72 mm (W x H x D)

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 ensured that through looping, a total current of 6 A per connection is not exceeded!

7.1 Status LEDs

Module status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	adjustable by application (e.g. the module LED can be set to blinking through the visualization so that the module is easily found in the control cabinet)
		OFF	
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Motor supply	green	ON	motor supply available
		OFF	motor supply missing
Motor enable	green	ON	motor controller enable active
		OFF	motor controller enable inactive
Input status	green	ON	input ON
		OFF	input OFF
Power supply	green	ON	supply available
		OFF	supply missing

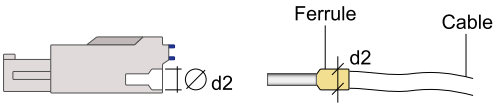
7.2 Applicable Connectors

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

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

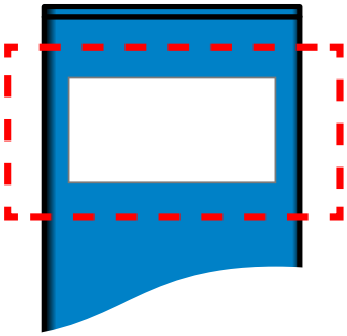
Connection capacity:

Stripping length/sleeve length	10 mm
Mating direction	parallel to conductor axis or to circuit board
Conductor cross section rigid	0.2-1.5 mm²
Conductor cross section flexible	0.2-1.5 mm²
Conductor cross section, ultrasonically compacted	0.2-1.5 mm²
Conductor cross section AWG/kcmil	24-16
Conductor cross section flexible with ferrule without plastic sleeve	0.25-1.5 mm²
Conductor cross section flexible with ferrule with plastic sleeve	0.25-0.75 mm² (reason for reducing d2 of the ferrule)



d2 = max. 2.8 mm

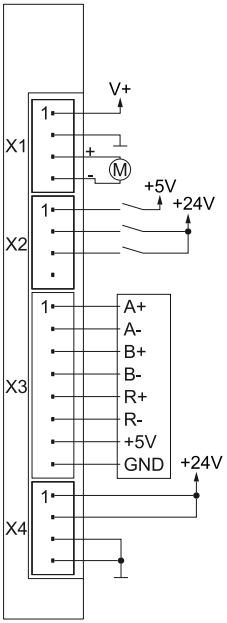
7.3 Label Field



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

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 following installation guidelines should be observed:

- Avoid parallel connections between input lines and load-bearing circuits.
- The DIN rail must have an adequate mass connection.
- The lines connected to the source of the analog components 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.
- To wire the incremental encoder, a shielded cable is required. With an RS422 encoder, the use of shielded, twisted pair cables is recommended. The shield must be placed as close as possible before the module.

INFORMATION

The ground bus should be connected to the control cabinet when possible!

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

The maximum length of the encoder 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 1.3 Contents of Delivery.

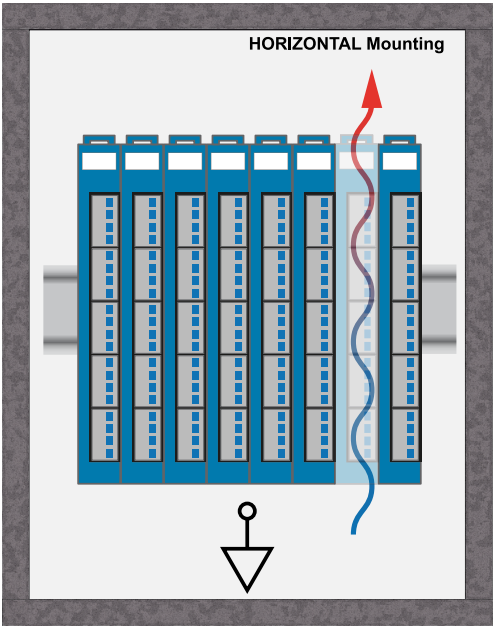
INFORMATION

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.

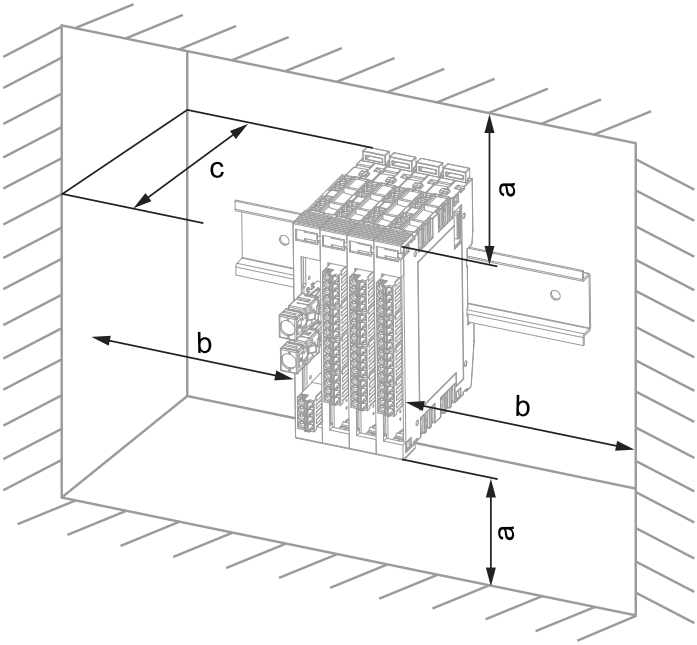
Damaged components can disrupt or damage the system.

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 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 rai 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
30 mm (1.18″)	**30 mm** (1.18″)	**100 mm** (3.94″)

a, b, c … distances in mm (inches)

10 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.

11 Storage

When not in use, store the device according to the storage conditions. See chapter 10 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.

12 Maintenance

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

12.1 Service

This product was constructed for low-maintenance operation.

12.2 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 10 Transport/Storage.

13 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.

14 Addressing

14.1 Adress Mapping overview

Address (hex)	Size (bytes)	Access type	Description		Reset value
Cyclic Writing					
0001	1	w	Control register		0000
			Bit 0	Sequence activated (note: bit 1 from the latched status register "False sequence occurred" must be '0' to be able to set this bit)	
			Bit 2…1	Reserved	
			Bit 3	1 = cancel (delete) false sequence occurred	
			Bit 4	1 = over temperature - cut-off activated	
			Bit 5	1 = cancel (delete) over temperature 100 °C	
			Bit 6	1 = i^2t error – cut-off activated	
			Bit 7	1 = cancel (delete) i^2t error	
0002	2	w16	Sequence 2 data. 16-bit value		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	

0004	2	w16	Sequence 4 data. 16-bit value		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	
Cyclic Reading					
0008	2	r	Status register (Delete when reading excl. bit 1, bit 7, bit 8)		0000
			Bit 0	DC_ok Motor latched	
			Bit 1	False sequence occurred (setting of the output sequence not allowed)	
			Bit 2	Absolute time error (the values of the absolute time must be increased with each sequence) latched	
			Bit 3	High motor current latched	
			Bit 4	Motor current too high (additional periphery reset) latched	
			Bit 5	Motor periphery reset latched	
			Bit 6	Induction voltage from motor too high (additional periphery reset)	
			Bit 7	1 = over temperature 100 °C latched	
			Bit 8	1 = i^2t error latched	
			Bit 9	Digital input 1 (5 V)	
			Bit 10	Digital input 2	
			Bit 11	Digital input 3	
			Bit 12	Null position R1	

0008	2	r	Bit 13	Null position latced (delete when reading)	0000
			Bit 15…14	Reserved	
000A	2	r16	Incremental encoder		0000
			Actual counter value		
SDO					
000C	2	r16	incremental encoder latched		0000
			Latched counter value		
000E	2	r16	Temperature in °K		0000
0010	2	r16	16-bit current value (with sign)		0000
0012	2	r16	FW status register		0000
0014	4	r32	i^2t - value		00000000
			Bit 20…0	i^2t - value	
			Bit 31…21	Reserved	
0018	4	r/w32	i^2t - cut-off threshold		00000400
			Bit 20…0	i^2t - cut-off threshold	
			Bit 31…21	Reserved	
001C	2	r/w	Setup register		0030
			Bit 0	Reserved	
			Bit 1	TTL/RS422 (0 = TTL, 1 = RS422)	
			Bit 2	Null position inversion (1 = inverted)	
			Bit 3	Phase B inversion (1 = inverted)	
			Bit 4…5	Edge scan	
				00 = incremental encoder off	
				01 = 1 edge	
				10 = 2 edges	
				11 = 4 edges	

001C	2	r/w	Bit 6	A/B counter mode 1 edge input curve	0030
				0 = signal (A) and direction (B)	
				1 = true A/B	
			Bit 7	Reserved	
			Bit 9…8	5 V input latched incremental encoder value	
				00: inactive	
				01: rising edge	
				10: falling edge	
				11: both edges	
			Bit 11…10	Z-signal latches incremental encoder value	
				00: inactive	
				01: rising edge	
				10: falling edge	
				11: both edges	
			Bit 15…12	Reserved	
DC Sequencer					
0020	2	r16/w16	Sequence 1 data. 16 bit values		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	

0022	2	r16/w16	Sequence 2 data. 16 bit values		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	
0024	2	r16/w16	Sequence 3 data. 16 bit values		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	
0026	2	r16/w16	Sequence 4 data. 16 bit values		0000
			Bit 10…0	Time value / clock frequency	
			Bit 11	1 = use absolute time counter	
				0 = use relative time counter	
			Bit 12	Top left	
			Bit 13	Top right	
			Bit 14	Bottom left	
			Bit 15	Bottom right	
0028	2	r16/w16	Timespan		0000
			Value / clock frequency		

Changes Chart

Change date	Affected page(s)	Chapter	Note
17.08.2017	18	5.7 Environmental Conditions	Added operating conditions
17.08.2017	22	7.2 Applicable Connectors	Added info regarding ultrasonically welded strands
23.08.2017	11	5.1 Motor Output Specifications	Changed and extended the table content for a more datailed specification
18.10.2017	23	7.3 Label Field	Added chapter
	26	9 Assembly/Installation	Graphic replaced
20.09.2018	20	7 Connector Layout	Note added
14.11.2019	23	7 Supported Cycle Times	Chapter added
28.02.2020	23	7 Supported Cycle Times	Text adapted
28.05.2020	23	7 Supported Cycle Times	Chapter removed
08.09.2020	42	15 Hardware Class SR 022	Chapter added
04.11.2020	26	9 Assembly/Installation	Expansion functional ground connection
01.07.2021	13	5.2 Incremental Encoder Input Specifications	Integrated in module
06.12.2022	18	5.6 Miscellaneous	UKCA conformity
26.07.2023		Document	General chapters added, design
08.01.2025	14	5.5 Electrical Requirements	Information about the power supply changed
19.09.2025	13	5.2 Incremental Encoder Input Specifications	Input frequency and counter frequency expanded
06.11.2025	13	5.2 Incremental Encoder Input Specifications	Input frequency and counter frequency changed

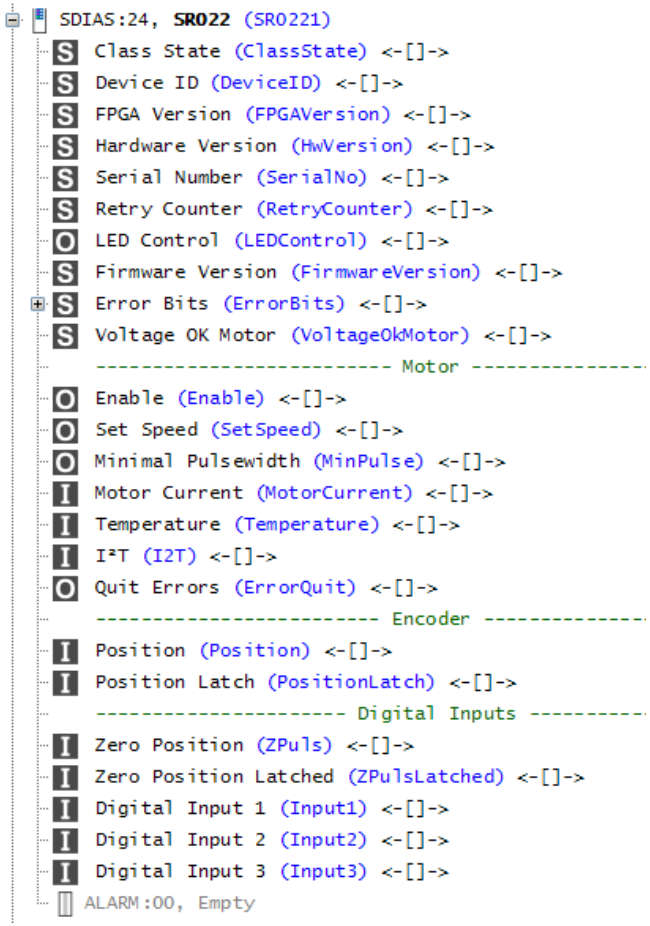
15 Hardware Class

The HW classes are used to configure the module under LASAL CLASS and this document is available in the LASAL CLASS help.

Table of Contents

SR022

Hardware Class SR022 for the S-DIAS SR022 module



This hardware class is used to control the hardware module SR 022 with 1x DC motor driver and 1x incremental encoder (RS422/TTL). More information on the hardware can be found in the module documentation.

1 Interfaces

General

ClassState	State	This server shows the actual status of the hardware class.
Device ID	State	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)
Firmware version	State	The firmware version of the hardware module is shown in this server.
Serial number	State	Shows the serial number of the hardware module.
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. 0 LED off 1 LED on 2 blinks slowly 3 blinks rapidly
Required	Property	This setting 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 can be inserted or removed at any time. However, which components identified as "not required" should be selected with regard to the safety of the system.

Error Bits	State	In this server, the status bits of the FW are shown.

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
...	
Bit 16	supply voltage of the motor is not OK
Bit 17	invalid sequence input
Bit 18	incorrect absolute time (absolute times are not in ascending order)
Bit 19	motor start current is running in the current limit
Bit 20	motor current is continuously too high
Bit 21	external supply voltage is not OK
Bit 22	supply voltage of the motor is not OK
Bit 23	periphery reset of the motor: Deactivate the motor control 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
Bit 24	induction voltage too high
Bit 25	over temperature error (temperature > 95 °C)
Bit 26	I^2T error (defined threshold exceeded)

Extended Data	Property	Is used to activate the extended PDO data as initialization value. When activated, also MotorCurrent, Temperature, I^2T and PostionLatch are sent cyclically.

0	deactivated
1	activated

DC Motor

Enable	Output	Is used to switch on the motor. 0 motor switched off 1 motor switched 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".
Set Speed	Output	This server can be used to set the motor speed. The valid range of values is between -10000 and +10000 (equals +/- 100%) whereas the turn direction is defined by the sign. The server value can be changed over the write() method.
Min Pulse	Output	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. A change is not valid before calling the write() method of the server SetSpeed in the control (default: 7).
Motor Current	Input	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(). The value is only updated, if “ExtendedData” is 1. As invalid value 16#80000010 is displayed.
Temperature	Input	Shows the temperature in °C. The status is queried over read(). The value is only updated, if “ExtendedData” is 1. As invalid value 16#80000010 is displayed.
I2T	Input	Shows the actual I^2t value in $[(1/160)A^2s]$ The value is only updated, if “ExtendedData” is 1. As invalid value 16#80000010 is displayed.
Error Quit		Reset error bits with value 1.
Voltage OK Motor	State	Shows, whether the supply voltage of the motor is OK. 0 not OK

		1 OK
PWM Period	Property	Period of the PWM in µs (default: 32). As initialization value
I2T Threshold	Property	With this setting the I2T threshold in percent of the maximum threshold value (the maximum allowed I²T value of the hardware is 78000 [(1/160)A²s]) is defined. If exceeded, an I2T error is triggered and the motor output deactivated. as initialization value

Incremental Encoder

Position	Input	Position of the incremental encoder (32-bit signed up/down counter). The status is queried over read().
Position Latch	Input	Latch position of the incremental encoder (32-bit signed up/down counter). The status is queried over read(). The value is only updated, if “ExtendedData” is 1. As invalid value 16#80000010 is displayed.
Z Puls	Input	Reference position of the encoder. 0 actual position does not match the reference position 1 actual position matches the reference position The status is queried over read().
Z Puls Latched	Input	Latched reference position of the encoder 0 reference position has not been reached since last status query 1 reference position has been reached since last status query The status is queried over read(). During the status query, the server is reset to 0.
Digital Input [1-3]	Input	Digital Inputs 1-3 0 off 1 on
Encoder Mode	Property	Encoder mode. 0 switched off 1 TTL mode (default) 2 RS422 mode as initialization value
Encoder Sampling	Property	Here, the setting for the edge evaluation of the encoder can be defined. 0 encoder off 1 1x analysis 2 2x analysis 3 4x analysis (default) as initialization value

Encoder Direction	Property	Direction of the encoder count. 0 normal (default) 1 inverted as initialization value
Encoder Filter Frequence	Property	Filter frequency of the encoder input (Valid from FPGA version v1.1 onwards. In older versions, the value is automatically reset to 0.) 0 .. Default: The current filter frequency of the FPGA is used. (=125 kHz) The filter frequency can be set in the range from a minimum of 125 Hz to a maximum of 125 kHz. Invalid values are automatically corrected! as initialization value
Invert Zero Position	Property	When this setting is activated, the ZeroPosition and ZeroPositionLatched servers are inverted. This setting is used by the encoder and must therefore be configured so that in the ZeroPosition and ZeroPositionLatched servers, the idle status is shown as "0" and the reference signal as "1". 0 normal (default) 1 inverted as initialization value
ABCntMode	Property	Setting of the counter mode of the encoder. 0 A pulses and B direction 1 true A/B as initialization value
Latch on Input1 Config	Property	To select which edge(s) of Input1 lead(s) to latching of the position. 0 no edge 1 positive edge 2 negative edge 3 both edges
Latch on ZPuls Config	Property	To select which edge(s) of ZPuls lead(s) to latching of the position. 0 no edge 1 positive edge 2 negative edge

		3 both edges

Communication Interfaces

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