SIGMATEK

BC 031

S-DIAS Gyroscope Sensor Module

Instruction Manual
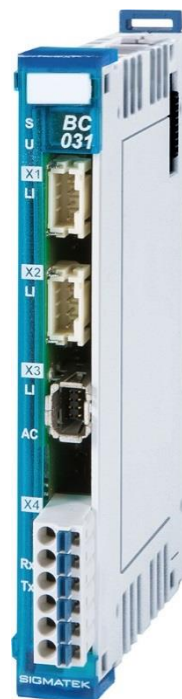
Translation of the Original Instructions

S-DIAS Gyroscope Sensor Module   BC 031

with 1 Ethernet

   1 RS485

The S-DIAS gyroscope sensor module provides rotation speeds and linear acceleration information in 3 axes. To filter the raw data, the module has a microcontroller. The BC 031 also enables data exchange between 2 S2 bus systems and an S-DIAS system. In addition, the gyroscope sensor module provides an Ethernet, as well as an RS485 interface. With the RS485 interface, is equipped with a line termination that can be enabled via software.

In the BC 031 the S2 connections are not terminated, the BC 031-R has terminating resistors.

The supply is provided from the S-DIAS bus.

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 BC 031

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 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

 C €   **EU Declaration of Conformity**

The product BC 031 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
	SIGMATEK GMBH & CO KG Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN
Serial No.	
Article Number	Product Name Short Name

Exemplary nameplate (symbol image)

	HW: 1.00 SW: 01.00.000 Safety Version: S01.00.00
	SIGMATEK GMBH & CO KG Sigmatekstrasse 1 A-5112 LAMPRECHTSHAUSEN
12345678	
12-246-133-3	Handbediengerät Wireless HGW 1033-3

HW: Hardware version
SW: Software version

5   Technical Data

5.1   Bus Coupler

Functional principle	Triple Buffer
Buffer size	500 bytes
Synchronization	RT start time
Clock master	selectable, S-DIAS, S2A or S2B[1]

[1] If a CP 101 or a CP 102 is used as S-DIAS CPU, it can be used as a clock master. Synchronizing these S-DIAS CPUs to a S2 CPU is not possible.

5.2   Controller Performance Data

Controller	LPC1112
Internal program memory (Flash PROM)	128-kByte (Flash)

5.3   MEMS Sensor Specifications

Sensor type	LSM6DSL (STMicro)
Number of linear axes	3
Number of rotational axes	3
Linear axis resolution	0.061 mg/LSB
Rotational axis resolution	4.375 mdps/LSB
Number of temperature sensors	1
Temperature resolution	0.1 °C
Temperature measuring range	-40 … +85 °C

5.4   Electrical Requirements

Power supply +24 V	+18-30 V DC	
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus (+5 V supply)	typically 0 mA	maximum 0 mA
Voltage supply from S-DIAS bus	+24 V	
Current consumption on the S-DIAS bus (+24 V supply)	typically 45 mA	maximum 55 mA
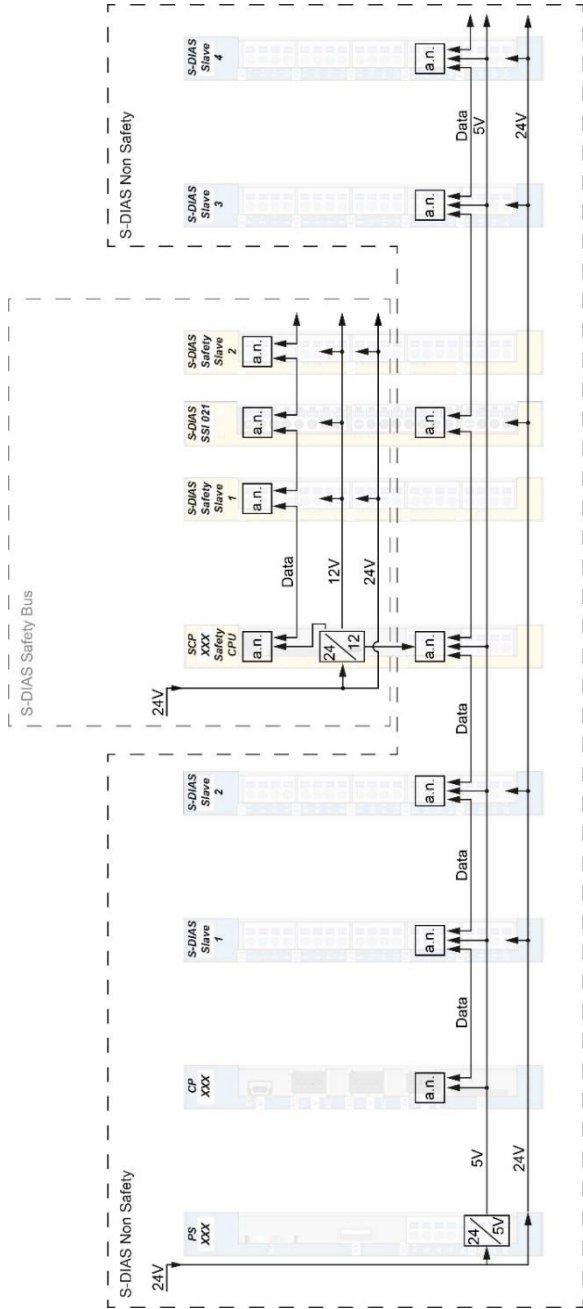
Wiring S-DIAS Safety in S-DIAS System

- each S-DIAS module is an active module (active node)
- Safety CPU is connected to the S-DIAS bus (incl. +5 V supply)
- Safety bus is independent and separated from the S-DIAS bus

a.n. = active node

5.5   Miscellaneous

Product variant	BC031	BC031-R
S2 termination	no	yes
Article number	20-054-031	20-054-031-R
Approvals	CE	CE

INFORMATION

A firmware and FPGA update of the modules using a SIGMATEK system stick is only possible via the S-DIAS bus.

5.6   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

5.7   S-DIAS Protocol Version

For a correct function of the BC031, a S-DIAS protocol version v1.3.0 must be supported by the Master/Manager CPU. This is the case with:

-    CP101 since FPGA version v1.2
-    CP102 since FPGA version v1.2
-    CP111 since FPGA version v1.4
-    CP112 since FPGA version v1.3
-    CP212 since FPGA version v1.4
-    CP311 since FPGA version v1.4
-    CP312 since FPGA version v1.3
-    CP731 since FPGA version v1.0

6   Mechanical Dimensions

7   Connector Layout

Modul Status (green)		
User (yellow)		
S2A Link (yellow)	**1** n.c.	not used
	S2 D	D+
	X1 S2 D	D-
	GND	Ground
S2B Link (yellow)	**1** n.c.	not used
	S2 D	D+
	X2 S2 D	D-
	GND	Ground
Ethernet Link (green)		
	X3	ETHERNET
Ethernet Active (yellow)		
	1 A	RS485 A
	B	RS485 B
Rx (yellow)	GND	Ground
Tx (green)	X4 A	RS485 A
	B	RS485 B
	GND	Ground
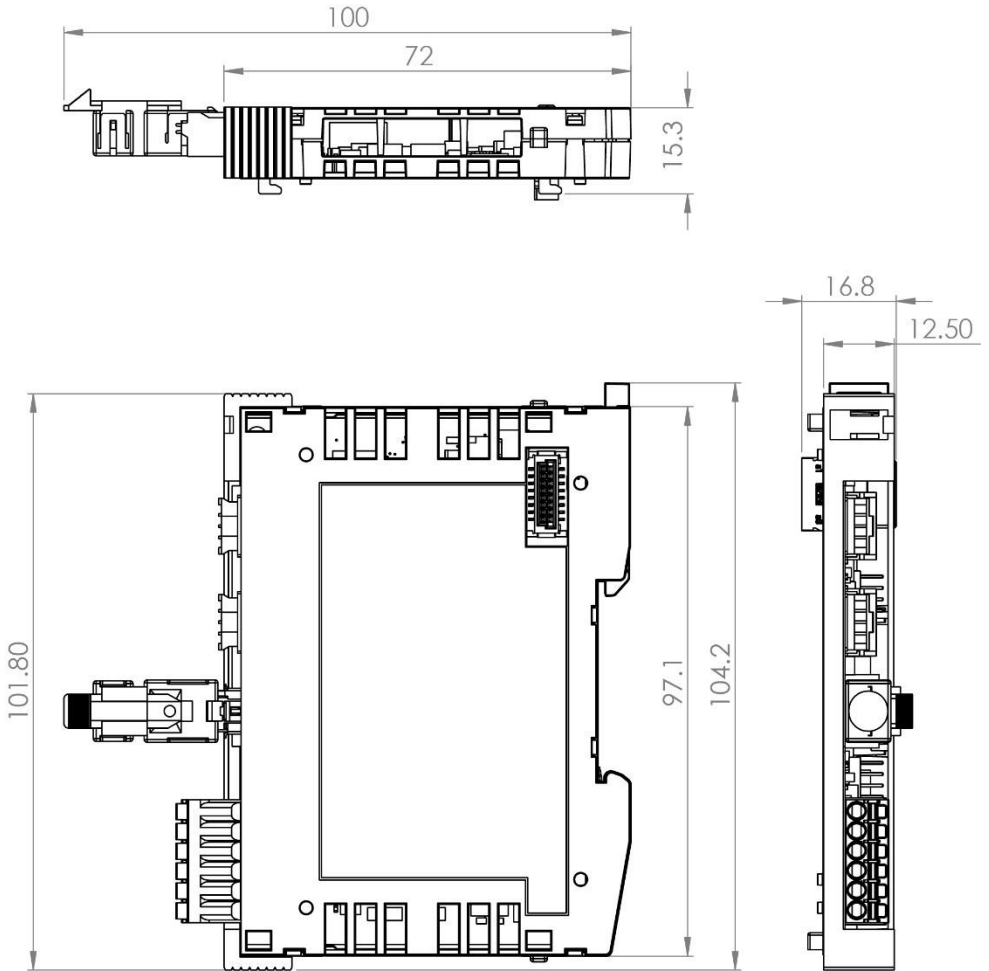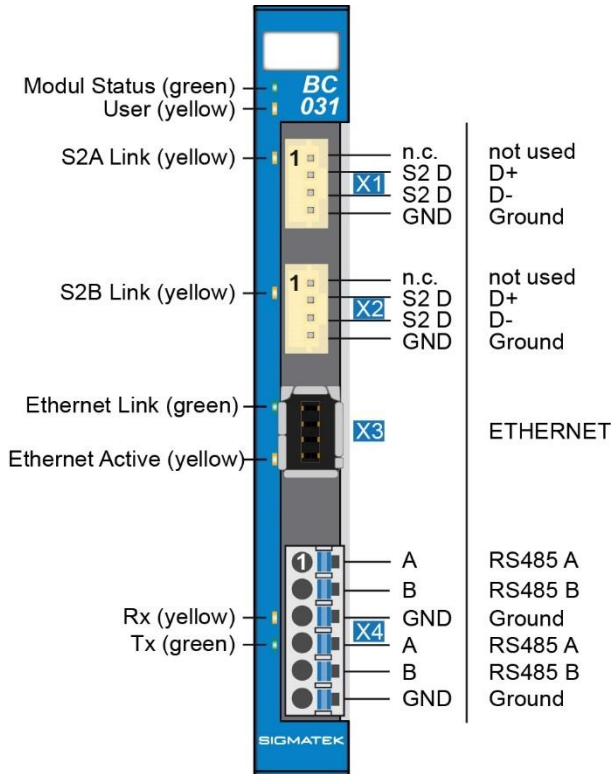
7.1   Status LEDs

Module status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	can be set from the application
		OFF	(e.g. the module LED can be set to blinking through the visualization, so that it is easily found in the control cabinet)
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Ethernet Link	green	ON	connection between the two PHYs made
Ethernet Active	yellow	ON	data is exchanged over the Ethernet bus
S2A, S2B Link	yellow	ON	data is exchanged over the Ethernet bus
Rx	yellow	ON	data is received via the RS485 bus
Tx	green	ON	data is sent via the RS485 bus

7.2   Connectors

X3: Ethernet (Industrial Mini I/O)
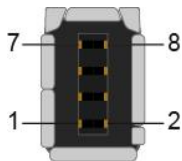
Pin	Function
1	Tx/Rx+
2	Tx/Rx-
3	Rx/Tx+
4-5	n.c.
6	Rx/Tx-
7-8	n.c.

7.3   Applicable Connector Cables

Ethernet:

Cable type	Length	Article number
RJ45 on industrial Mini I/O Type 1, drag chain capable	0.5 m	16-911-005
	1 m	16-911-010
	1.5 m	16-911-015
	2 m	16-911-020
	3 m	16-911-030
	5 m	16-911-050
	10 m	16-911-100
	20 m	16-911-200
	50 m	16-911-500
Industrial Mini I/O Type 1 on industrial Mini I/O Type 1, drag chain capable	0.5 m	16-912-005
	1 m	16-912-010
	1.5 m	16-912-015
	2 m	16-912-020
	3 m	16-912-030
	5 m	16-912-050
	10 m	16-912-100
	20 m	16-912-200

7.4   Applicable Connectors

Connectors:
X1, X2: 4-pin plug JST PHR4
X3: Tyco Mini I/O Plug Type 1 Lock Extend Version (not included in delivery)
**X4:** Connectors with spring terminals (included in delivery)
The spring terminals are suitable for the connection of ultrasonically compressed (ultrasonically welded) strands.

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

8   Strain Relief
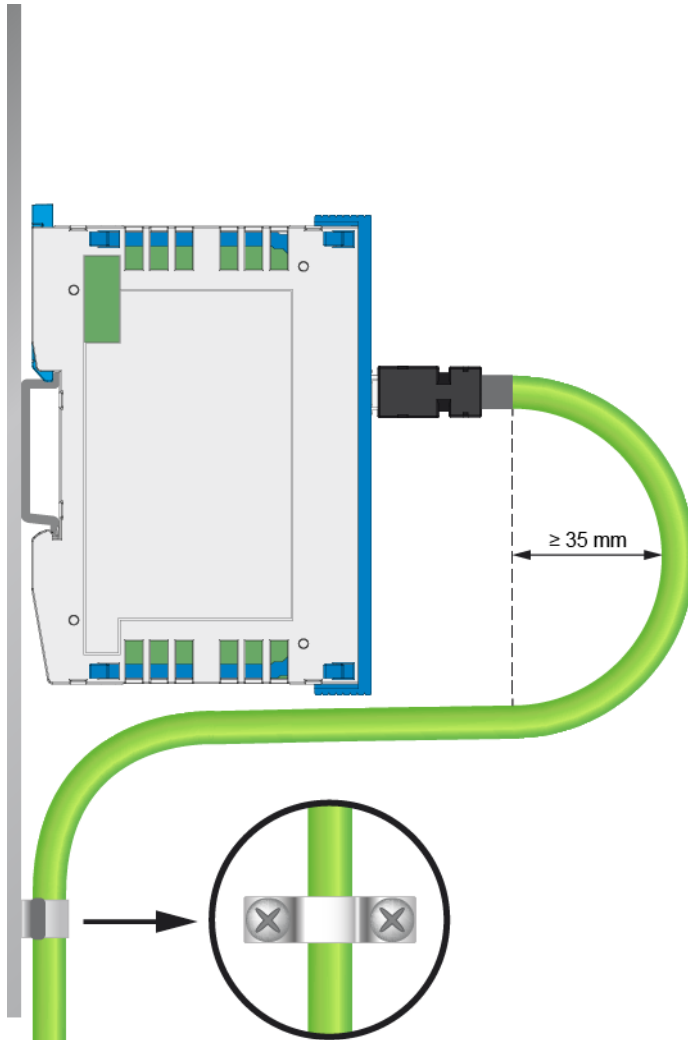
INFORMATION

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

No mechanical stress can be applied to the connection!

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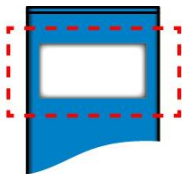
Manufacturer	Weidmüller
Type	MF 10/5 CABUR MC NE WS
Article number Weidmüller	1854510000
Compatible printer	Weidmüller
Type	Printjet Advanced 230V
Article number Weidmüller	1324380000

9   Wiring
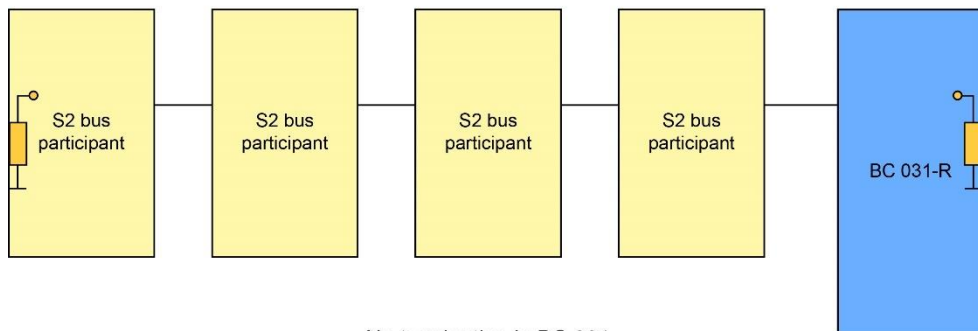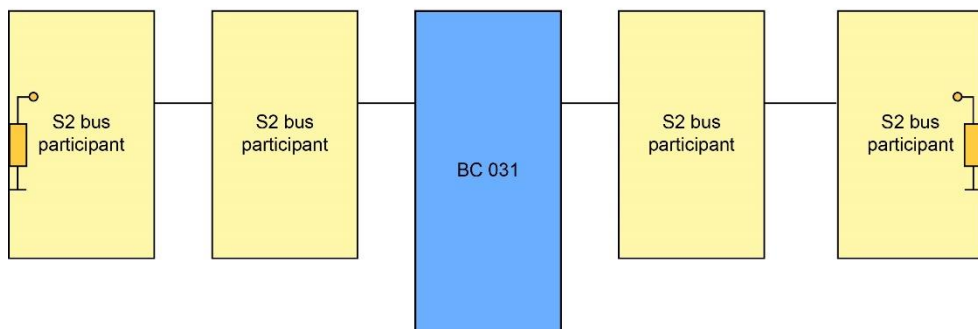
9.1   Wiring Example
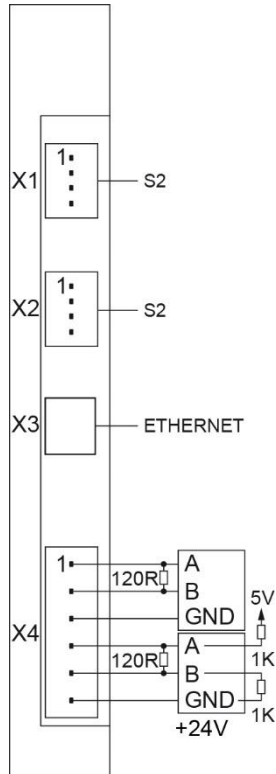
INFORMATION

The module is designed to be installed after a S-DIAS CPU and cannot be placed after a VI module.

9.2   Example BC 031 and BC 031-R

Termination in BC 031-R

No termination in BC 031

⊇ SIGMATEK

9.3   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

INFORMATION

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

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

9.4   Shielding

The Ethernet wiring must be shielded.

The low-ohm shielding is either connected at the entry to the control cabinet or directly before the BC 031 over a large, low-ohm surface (cable grommets, grounding clamps)!

Noise signals can therefore be prohibited from reaching the electronics and affecting the function.

To avoid compensating currents from the PE, which flow over the shielding the conductors, it is recommended that the system components have low Ohm and low impedance connections to one another.

Shield Support
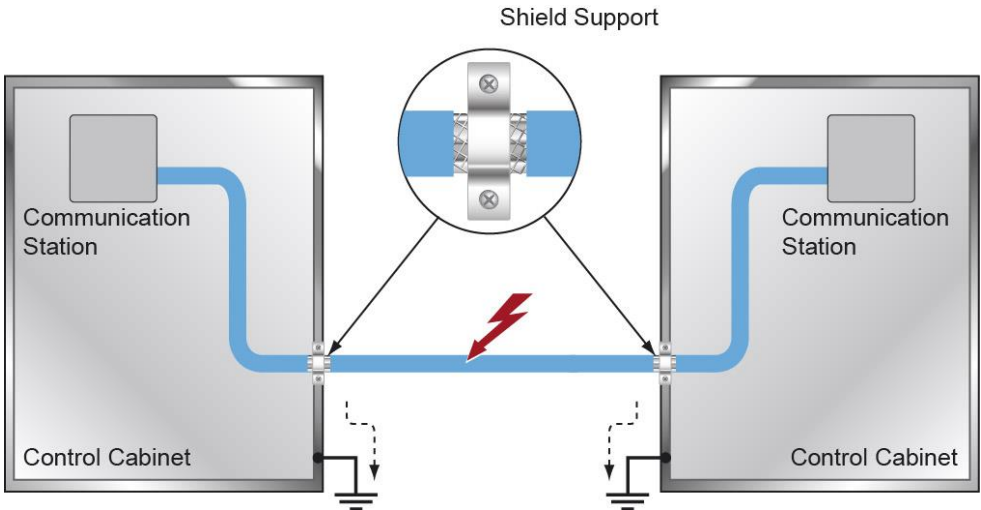
10 Assembly/Installation

10.1 Check Contents of Delivery

Ensure that the contents of the delivery are complete and intact. See chapter 1.3 Contents of Delivery.

> **INFORMATION**
>
> On receipt and before initial use, check the device for damage. If the device is damaged, contact our customer service and do not install the device in your system.
>
> Damaged components can disrupt or damage the system.

10.2   Mounting

The S-DIAS modules are designed for installation into the control cabinet. To mount the modules, a DIN-rail is required. The DIN rail must establish a conductive connection with the back wall of the control cabinet. The individual S-DIAS modules are mounted on the DIN rail as a block and secured with latches. The functional ground connection from the module to the DIN rail is made via the grounding clamp on the back of the S-DIAS modules. The modules must be mounted horizontally (module label up) with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is necessary for optimal cooling and air circulation, so that proper function up to the maximum operating temperature is ensured.
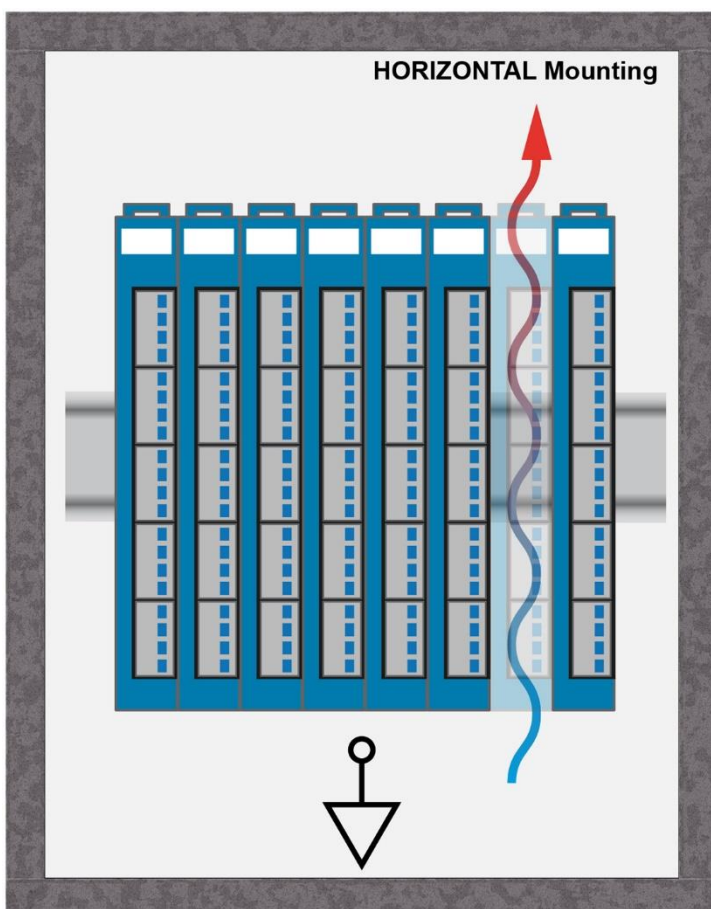
Recommended minimum distances of the S-DIAS modules to the surrounding components or control cabinet wall:
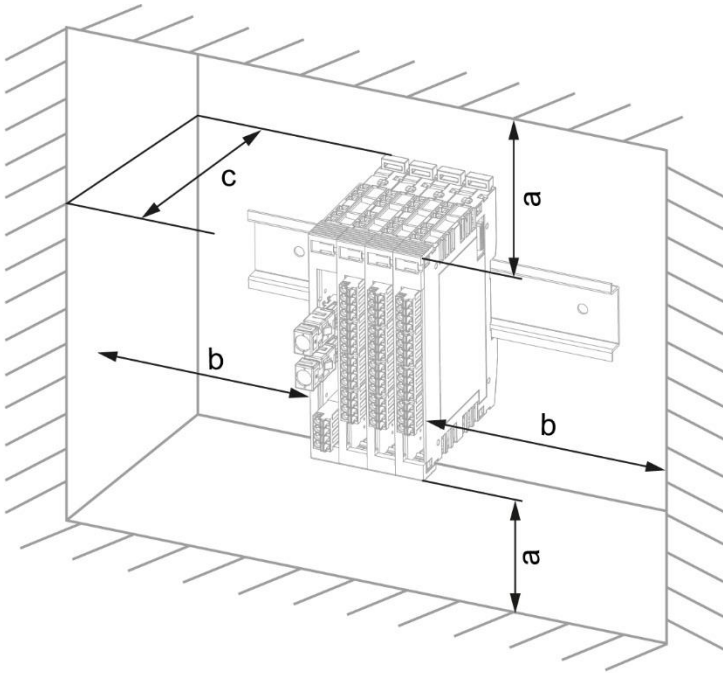
a	b	c
30 mm (1.18˝)	**30 mm** (1.18˝)	**100 mm** (3.94˝)

a, b, c … distances in mm (inches)

11 Hardware Class BC031_Sdias

Hardware class BC031_Sdias for the bus coupler module BC 031

This hardware class is used to control the BC 031 bus coupler module and the BC 031-R variant. This class controls the S-DIAS side.
The module couples 1x SDIAS bus (class BC031_Sdias) and 2x VaranS2 bus (class BC031_VaranS2). Furthermore, the module has a serial RS485 interface (class BC031_Serial) and an integrated gyro sensor (class BC031_Gyro).

```
SDIAS:51, BC031_Sdias (BC031_Sdias2)
    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  State Bus Coupler (StateBusCoupler) <-[]->
    ALARM:00, Empty
```

Properties	✕
Object of class BC031_Sdias	BC031_Sdias1
Place	0
Comment	
Required	Module is not required
Is Master	0 Bus Slave
Asy Mode	0 Synchronisation required
Phase Regulation Damping	0
Broadcast write bytes	6
VaranS2_1 write bytes	168
VaranS2_2 write bytes	168
Broadcast read bytes VaranS2_1	6
Read bytes VaranS2_1	168
Broadcast read bytes VaranS2_2	6
Read bytes VaranS2_2	168
⊞ Settings for 'BC031_Sdias1'	
⊞ Voltage 5000 [mV]	
⊞ Voltage 24000 [mV]	

11.1   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 counts up if a data transfer fails.
LED Control	Output	With this server, the application LED of the S-DIAS module can be controlled in order to find the module in the system more quickly. The following status are possible:

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 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.

11.2   Bus Coupler

Is Master	Property	Bus master selection

1	The class is placed on the bus master side.
0	The class is placed on a bus slave side. The hardware class synchronizes the CPU to the master CPU.

as initialization value

Asy Mode	Property	Selection for asynchronous data transfer.

0	This bus side needs a synchronization to the master CPU.
1	Data transfer with this bus side is asynchronous. Data consistency is also guaranteed in this case.

as initialization value

Phase Regulation Damping	Property	Damping of the bus synchronization regulation. With this value the regulation for the bus synchronization can be slowed down If several buses are coupled in series and all buses are readjusted at the same speed, the rear bus systems may lose an existing synchronicity with their slave modules during synchronization to the master bus. To avoid this case, the front bus systems must have slower regulation.	
		0	Regulation with maximum speed. No damping
		1	Regulation at 93.75 % of maximum speed
		2	Regulation at 87.50 % of maximum speed
		3	Regulation at 81.25 % of maximum speed
		4	Regulation at 75.00 % of maximum speed
		5	Regulation at 68.75 % of maximum speed
		6	Regulation at 62.50 % of maximum speed
		7	Regulation at 56.25 % of maximum speed
		8	Regulation at 50.00 % of maximum speed
		9	Regulation at 43.75 % of maximum speed
		10	Regulation at 37.50 % of maximum speed
		11	Regulation at 31.25 % of maximum speed
		12	Regulation at 25.00 % of maximum speed
		13	Regulation at 18.75 % of maximum speed
		14	Regulation at 12.50 % of maximum speed
		15	Regulation at 6.25 % of maximum speed
		as initialization value	
State Bus Coupler	State	Bus coupler status.	
		1	The CPUs of the different buses run synchronously. The successful. User data are exchanged.

11.2.1 Communication Interfaces

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

11.3 Global Methods

The following methods can be called via the StateBusCoupler server.

11.3.1 AddIsoReadData

Registers isochronous read data for data exchange with the bus coupler. If data is received with the created ID, the transferred callback method is called.

Transfer parameters	Type	Description
usRdIndex	USINT	Identification for the read data. The number must be unique and must match the number of the write data on the remote station. Allowed range 0-240.
usMemSize	USINT	Number of read bytes. A maximum of 500 bytes are available for all read data per bus.
pThis	pVoid	This pointer of the calling object.
pCallBackFunction	pVoid	Pointer to the function to be called during callback.
srcBusID	USINT	Bus identification of the data source. See chapter Bus Identification.

Return parameters	Type	Description	
sdRetcode	DINT	0	OK
		-1	Transfer parameter usRdIndex is higher than 240.
		-3	Method was not called in the Init.
		-10	Memory allocation for data failed.
		-11	Not enough memory for these data available. Usually 500 bytes are available.
		-12	Input parameter srcBusID is invalid.
		-14	Initialization of the hardware class failed. See Log Messages.

11.3.2   AddIsoWriteData

Registers isochronous write data for data exchange with the bus coupler. The cyclic data are then transferred using the "SetIsoWriteData" method.

Transfer parameters	Type	Description
usWrIndex	USINT	Identification for the write data. The number must be unique and must match the number of the read data on the remote station. Allowed range 0-240.
usMemSize	USINT	Number of write bytes. A maximum of 500 bytes are available for all write data per bus.
destBusID	USINT	Target bus identification for the data. See chapter Bus Identification.
Return parameters	Type	Description
sdRetcode	DINT	0	OK

		-1	Transfer parameter usWrIndex is higher than 240.
		-3	Method was not called in the Init.
		-10	Memory allocation for data failed.
		-11	Not enough memory for these data available. Usually 500 bytes are available.
		-12	Input parameter destBusID is invalid.
		-14	Initialization of the hardware class failed. See Log Messages.

11.3.3   SetIsoWriteData

This method must be called cyclically to pass the isochrone write data. The data must first be registered with the method AddIsoWriteData.

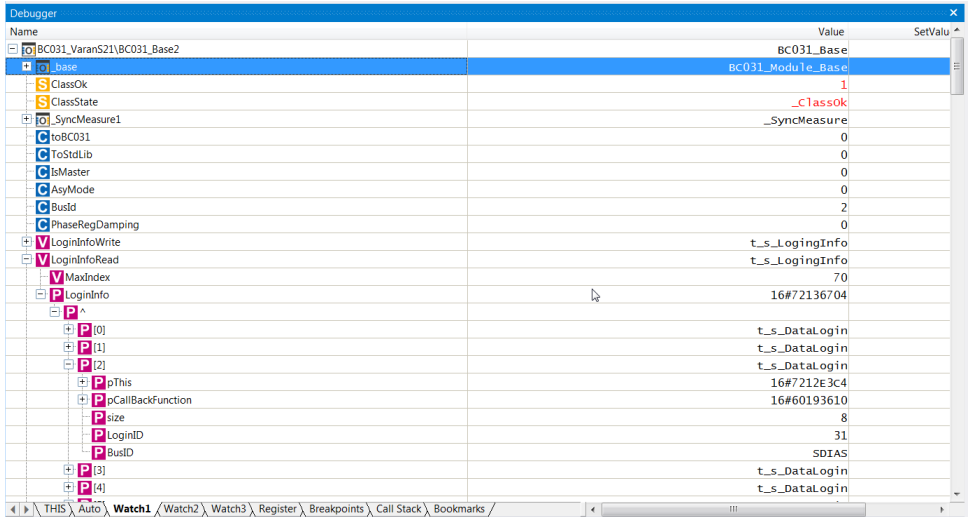| Transfer parameters	Type	Description	
usWrIndex	USINT	Identification for the write data. The same number as in "AddIsoWriteData" must be specified.	
pDataSource	pVoid	Pointer to the write data. The number of used bytes is specified in the method "AddIsoWriteData".	
Return parameters	**Type**	**Description**	
sdRetcode	DINT	0	OK
		-1	Transfer parameter usWrIndex is higher than 240.
		-2	Index "usWrIndex" was not registered using the AddIsoWriteData method.
		-4	Bus coupler is not ready for data transfer. State Bus Coupler is not 1.
		-5	The output buffer of the hardware class is full. The output buffer is designed so that all write data is transferred once per bus cycle.

11.4   Bus Identification

The methods "AddIsoReadData" and "AddIsoWriteData" must specify which bus is the destination or source of the data. The permissible BusIDs are defined in the global Enum BC031_Module_Base::t_e_BC031BusID.

Enumname	Value	Description
SDIAS	0	Target, source bus is the SDIAS bus.
VaranS2_1	1	Target, source bus is the 1st VaranS2 bus. (Connector X1)
VaranS2_2	2	Target, source bus is the 2nd VaranS2 bus. (Connector X2)
SDIAS_BroadCastRd	128	Source bus is the SDIAS bus. The source sends the data to both bus systems. See BroadCastWr.
VaranS2_1BroadCast Rd	129	Source bus is the 1st VaranS2 bus. The source sends the data to both bus systems. See BroadCastWr.
VaranS2_2BroadCast Rd	130	Source bus is the 2nd VaranS2 bus. The source sends the data to both bus systems. See BroadCastWr.
BroadCastWr	255	Target bus are the two other bus systems.

The isochronous data with BusIDs "SDIAS", "VaranS2_1" and "VaranS2_2" must always be created in pairs. One side writes, the other side reads.

The isochronous broadcast data must be created in all three bus systems. One side sends the data with BusID "BroadCastWr", the two other bus systems must create the corresponding "x-BroadCastRd" data. (SDIAS_BroadCastRd, VaranS2_1BroadCastRd, VaranS2_2BroadCastRd)

It is possible to check the registered isochronous read and write data during runtime. The data is mapped to the variables "LoginInfoWrite" and "LoginInfoRead" of the internal class "BC031_Base".

11.5   Synchronization

The BC031_Sdias and BC031_VaranS2 hardware classes synchronize the real-time clock of the 3 CPUs. The CPU in which the "Is Master" property of the HWK BC031_x is set to 1 sets the CPU clock. The other two CPUs synchronize to this clock.

The bus systems do not necessarily run synchronously if the CPUs are synchronous! This is only given if the bus cycle time and iso-start time are set to the same for all 3 CPUs. Due to the triple buffer in the module, the data transmitted via the BC031 is always consistent.

The bus cycle times cannot be selected arbitrarily for the BC031 synchronization. The slower bus cycle time must be an integer multiple of the faster bus cycle time.

Ex.: 1: Cycle time master: 1 ms, cycle time slave: 2 ms => Ok

Ex.: 2: Cycle time master: 2 ms, cycle time slave: 1 ms => Ok

Ex.: 3: Cycle time master: 0.75 ms, cycle time slave: 1 ms => not OK

12 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.

13 Storage

INFORMATION

When not in use, store the operating panel according to the storage conditions. See chapter 12.

During storage, ensure that all protective covers (if available) are placed correctly, so that no contamination, foreign bodies or fluids enter the device.

14 Maintenance

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

14.1 Service

This product was constructed for low-maintenance operation.

14.2 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 12 Transport/Storage.

15 Disposal

> **INFORMATION**
>
> Should you need to dispose of the device, the national regulations for disposal must be followed.
>
> The device appliance must not be disposed of as household waste.

Documentation Changes

Change date	Affected page(s)	Chapter	Note
04.04.2019	5	1.4 Miscellaneous	Product variant BC 031-R added
09.07.2019	7	1.6 S-DIAS Protocol Version	Chapter added
08.09.2020	21	7 Hardware Class BC031_Sdias	Chapter added
04.11.2020	19	6 Mounting	Expansion functional ground connection
30.11.2020		1.1 Bus Coupler 5.2 Example BC 031 and BC 031-R	Chapters added
07.04.2021	4	1.3 MEMS Sensor Specifications	Table extended
26.07.2023		Document	General chapters added, design