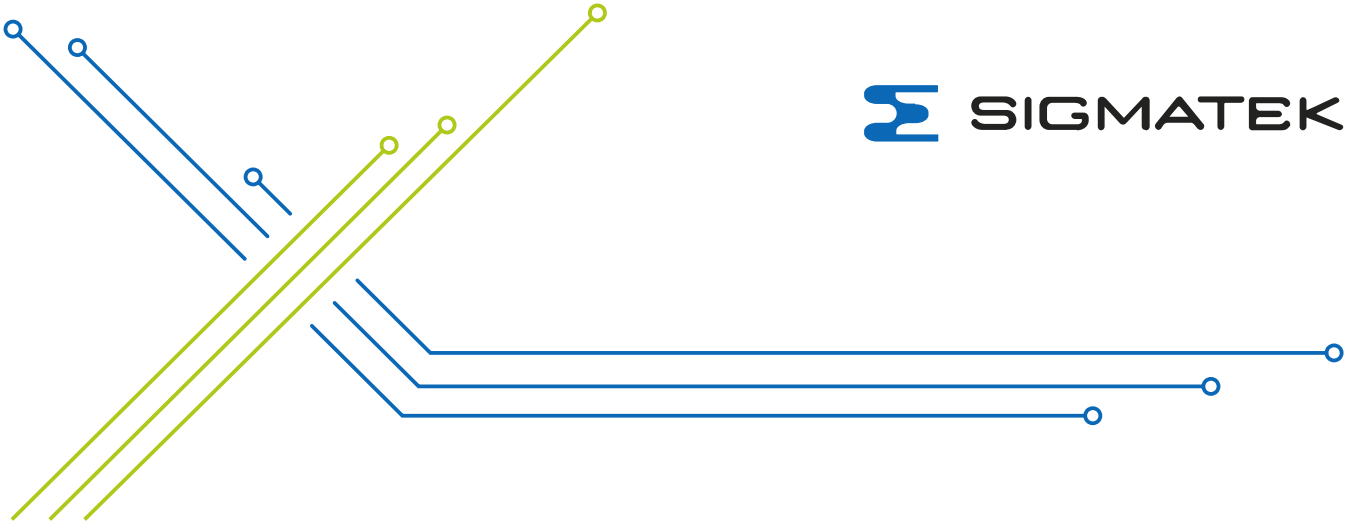

SIGMATEK

CP 102

S-DIAS CPU Module

INSTRUCTION MANUAL

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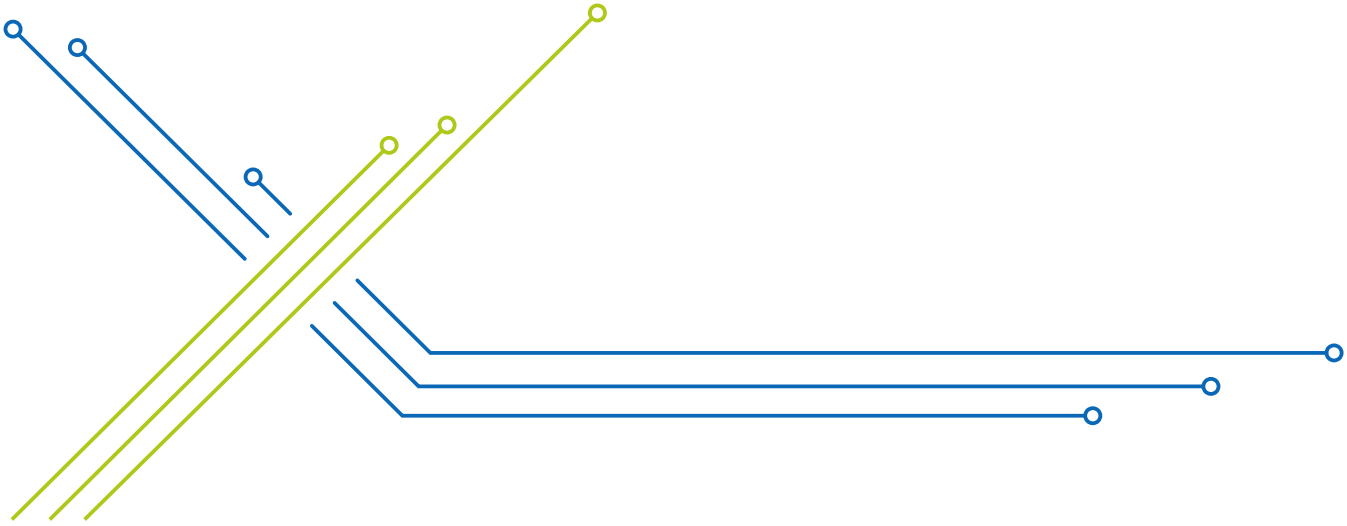

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Translation of the Original Instructions

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S-DIAS CPU Module CP 102

1 Ethernet

1 USB-OTG

1 CAN

The S-DIAS CPU ModuleCP 102 is a high-performance processor unit for the S-DIAS I/O modules. With Ethernet, CAN bus and USB OTG (Host and Device) interfaces, the module can be used for various applications. A zero-voltage protected RAM area is available, which is implemented by copying a data block from the DDR RAM to the NAND Flash.

The voltage supply is already available in the module. The number of modules that can be supplied depends on the total current consumption. The CP 102 can supply a maximum of 0.6 A.

S-DIAS has no intelligent master (manager).

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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 or assist you in case of any issues.
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 CP 102

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.

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 Declaration of Conformity

EU Declaration of Conformity

The product CP 102 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)

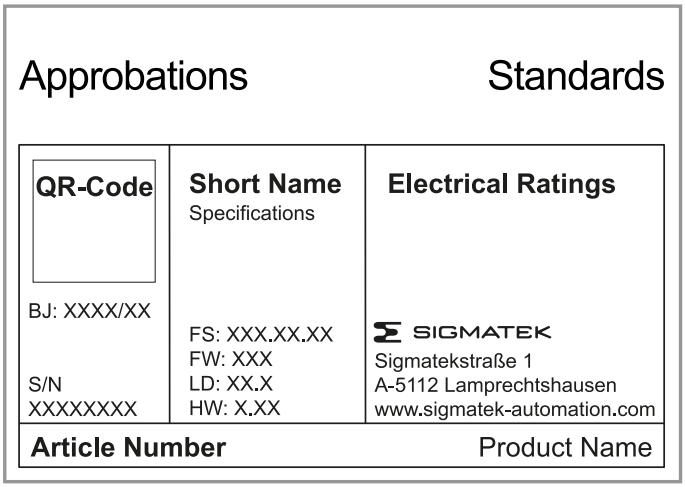
The EU Conformity Declarations are provided on the SIGMATEK website. They can be found in the download area of the respective product.

3.2 Safety-Relevant Parameters

Conditions	+55 °C
Number of hours per year	8760
MTBF	107 years
$MTTF_D$	213 years
The MTBF is a calculated value, which represents the failure probability and must not be confused with the product lifespan.	

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 Performance Data

Processor	EDGE2 Technology
Processor cores	1
Addressable I/O/P modules	CAN participants: > 110 S-DIAS bus: 64[1)]
Internal I/O	no
Internal cache	512 Kbytes L2 Cache
Internal program and data memory (DDR3 RAM)	256 Mbytes
Internal remnant data memory	2 Kbytes (one Flash block)
Internal storage device	NAND Flash, 256 Mbytes
Interfaces	1x USB OTG (host/device) (only for service purposes) 1x Ethernet 1x CAN 1x S-DIAS (without manager)
Status display	no
Status LEDs	yes
Real-time clock	no
	(After voltage is on, the date and time is set to the defined value 1.1 1970. The application must ensure that the actual time and date is set after the CPU start-up phase.)
Cooling	passive (fanless)

INFORMATION

[1)] The CP 102 can only supply the number of modules supported by the maximum output current (0.6 A) on the S-DIAS bus.

5.2 Standard Configuration

Ethernet	X2	IP: 10.10.150.1	Subnet mask: 255.0.0.0

INFORMATION

Problems can arise if a control is connected to an IP network, which contains modules that are not running with a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with such a high frequency (i.e. broadcasts), that the high interrupt load could cause a real-time runtime error or runtime error. By configuring the packet filter (Firewall or Router) accordingly however, it is possible to connect a network with SIGMATEK hardware to a third party network without triggering the error mentioned above.

5.3 Electrical Requirements

5.3.1 Module Supply (Input)

Supply voltage	+18-30 V DC, typically +24 V DC UL: Class 2 or LVLC	
Current consumption of +24 V supply voltage	typically 100 mA[2)]	maximum 1 A[1)]

INFORMATION

For loading the internal capacitors, power consumption may be increased for a short time (in the microsecond range).
This value is dependent on the input voltage and impedance of the power source.

INFORMATION

For USA and Canada:

Only suitable for connection to secondary isolated power supply rated 24 V DC, class 2 or fuse rated max. 4 A in accordance with UL 248 shall be connected in the field between the supply source and device terminals.

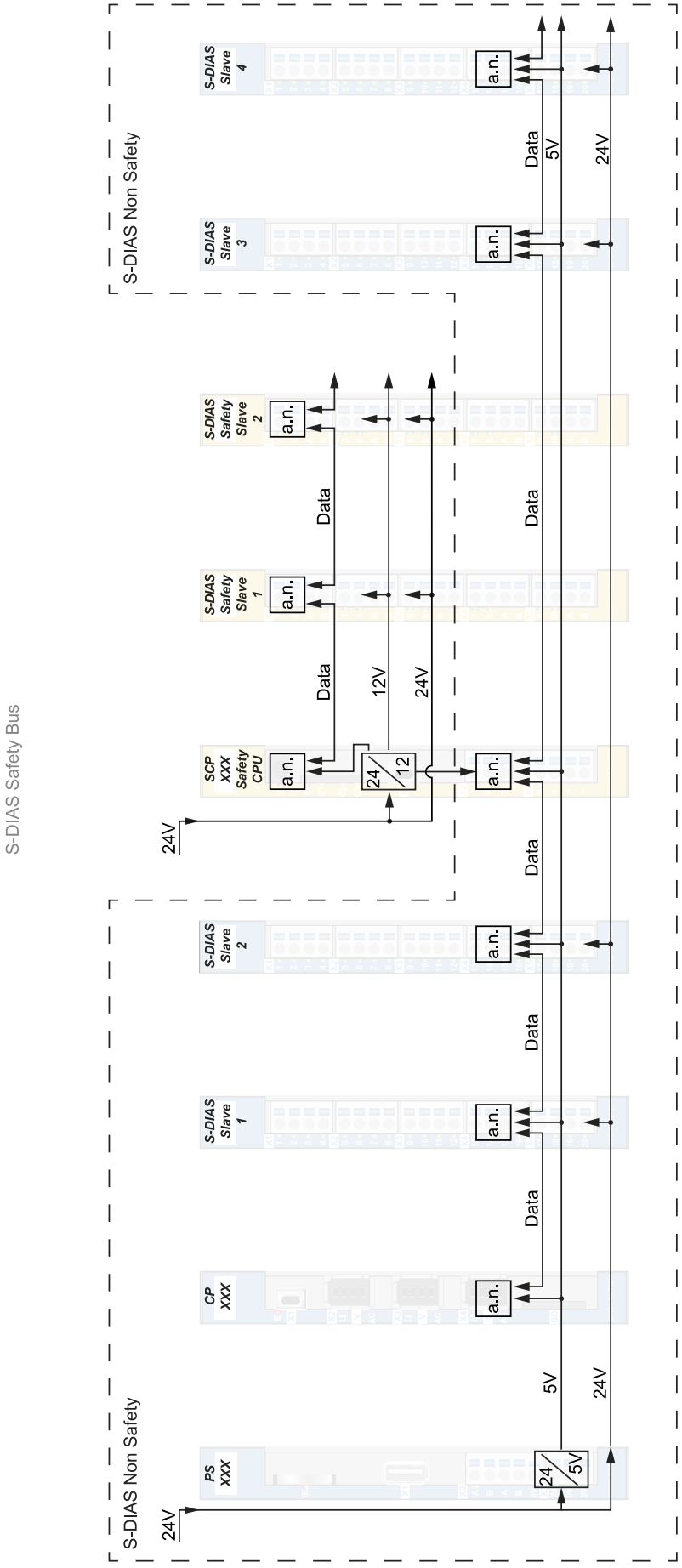
If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1) The current consumption is dependent on the connected load.

5.4 S-DIAS Bus Supply (Output)

Supply from S-DIAS bus	+5 V
Current consumption on the S-DIAS bus (+5 V supply)	maximum 0.6 A[1)]
Supply from S-DIAS bus	+24 V
Current consumption on the S-DIAS bus (+24 V supply)	maximum 0.6 A[1)]
USB host (OTG) (can only be used with a USB stick for service purposes)	+5 V DC, maximum 200 mA (current limited)

1) The current consumption is dependent on the connected load.


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

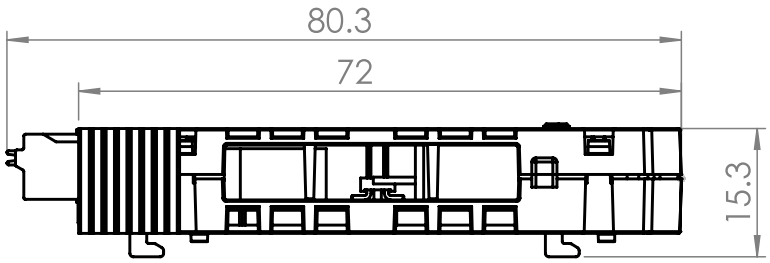
5.5 Miscellaneous

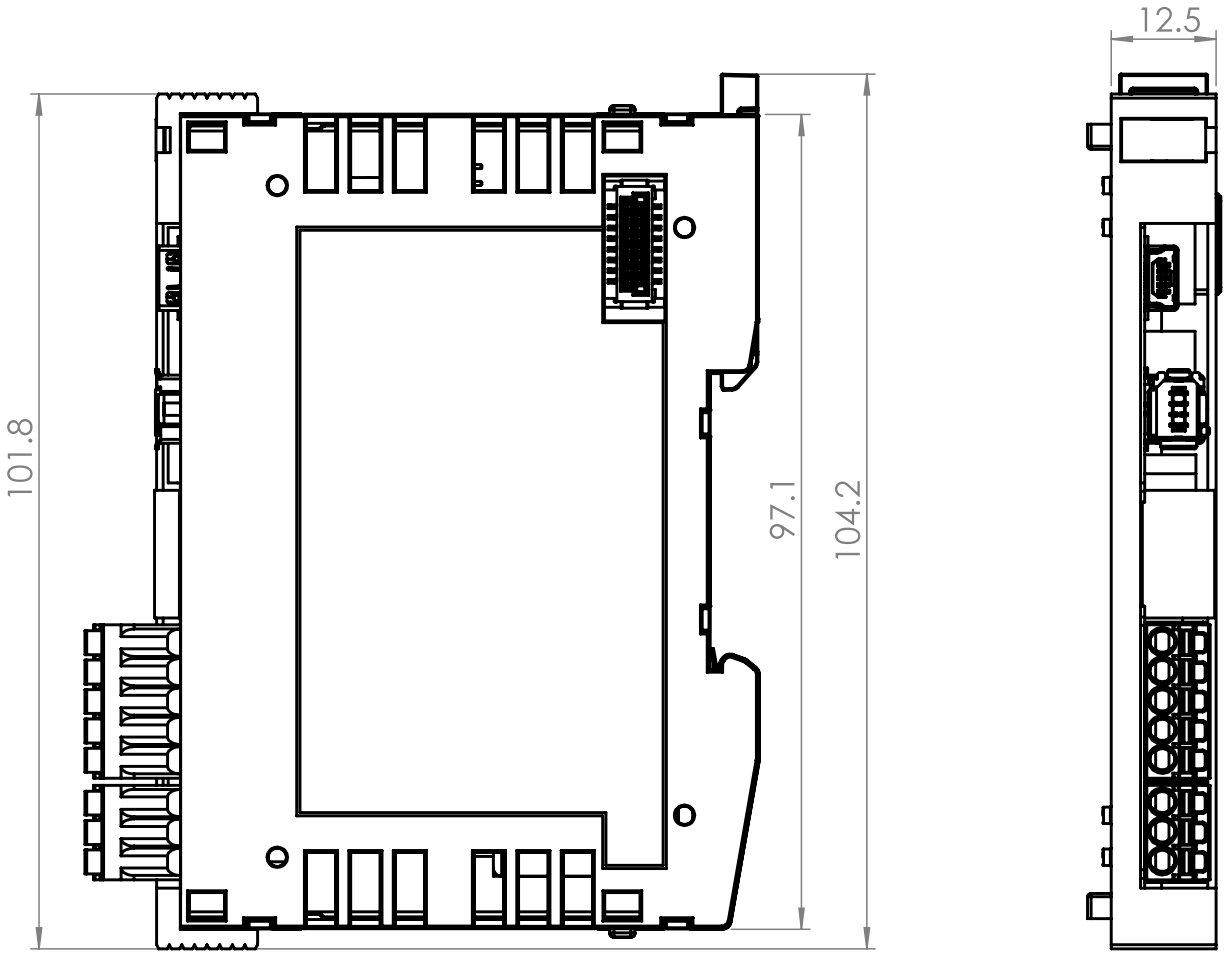
Article number	20-004-102	
Printed circuit board coating	no	
Approvals	CE	yes
	UL	cULus (E247993)
	Functional Safety	no
	UKCA	yes

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	
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 from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s²)
Protection type	EN 60529	IP20 (not evaluated by UL)

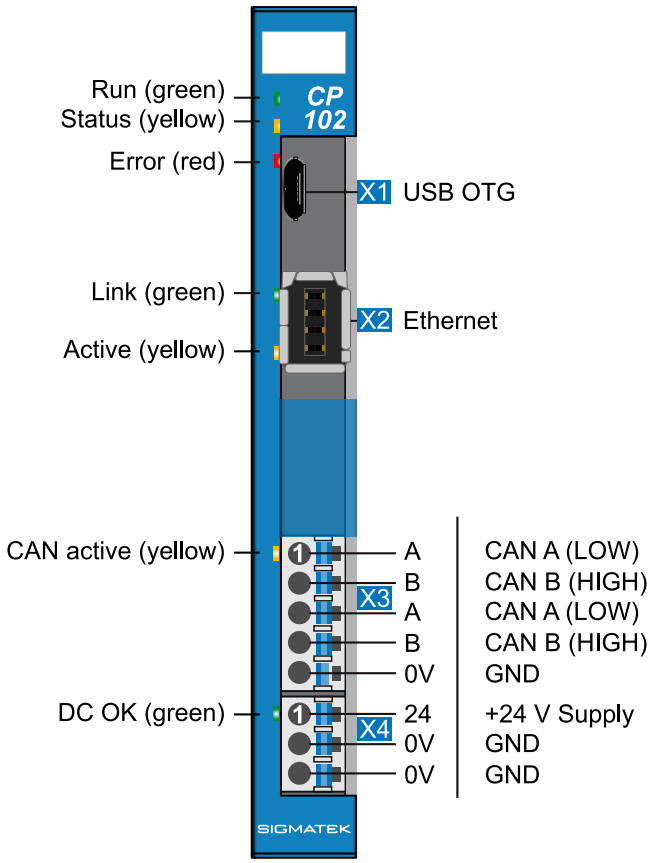
6 Mechanical Dimensions





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

7 Connector Layout



INFORMATION

The GND supply (X4: Pin 2 and Pin 3) is internally bridged. Only one GND pin (pin 2 or pin 3) is required to power the module. The bridged connections may be used for further looping of 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!

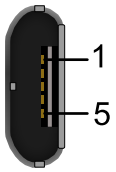
7.1 Status LEDs

Run	green	ON	from activation of the voltage supply until processing of the autoexec.lsl
			when the application is running (except when controlled differently via the application)
		BLINKS	in the CLI, while processing the autoexec.lsl until the application is running
			during installation of the operation system (starting from OS version 09.03.054)
		OFF	when an error or reset occurs
	can be set from the application (ON, BLINKING, OFF)		

Status	yellow	OFF	during start process
			during RUN status (application running)
			when an error or reset occurs
	can be set from the application (ON, BLINKING, OFF)		
Error	red	BLINKS	when an error or reset occurs
		OFF	during start process
			during RUN status (application running)
	can be set from the application (ON, BLINKING, OFF)		
Ethernet Link	green	ON	connection between the two PHYs made
Ethernet Active	yellow	ON	data is exchanged over the Ethernet bus
CAN active	yellow	BLINKS	data is being exchanged
DC OK	green	ON	module is supplied with a voltage > 18 V

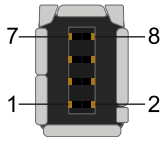
7.2 Connectors

7.2.1 X1: USB Device 1.1 (Type Micro-B) (can be used with OTG cable as USB host, otherwise USB device for service purposes)



Pin	Function
1	+5 V
2	D-
3	D+
4	ID
5	GND

7.2.2 X2 : Ethernet (Industrial Mini I/O)



Pin	Function
1	Tx+
2	Tx-
3	Rx+
4-5	n.c.
6	Rx-
7-8	n.c.
n.c. = do not use	

7.3 Applicable Connector Cables

7.3.1 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

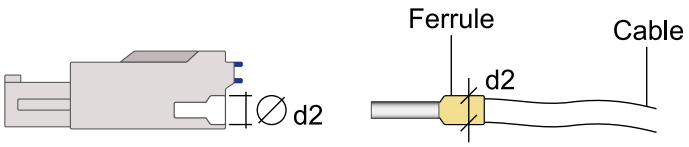
7.4 Applicable Connectors

X1: USB Type Micro-B OTG cable (host) or USB Type Micro-B to USB Type A cable (device) (no included in delivery)
X2: Industrial Mini I/O Plug Type 1 Lock Extended Version (not included in delivery)
X3, X4: Connectors with spring terminals (included in delivery)

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

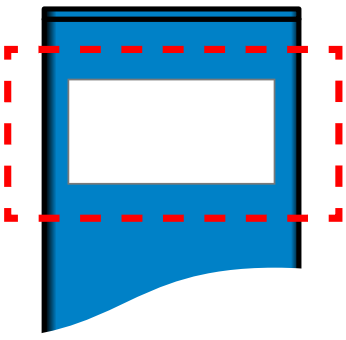
Connection capacity:

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

7.5 Label Field



The labeling field is printed directly on the module.

8 Wiring

8.1 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 installation 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 when possible!

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

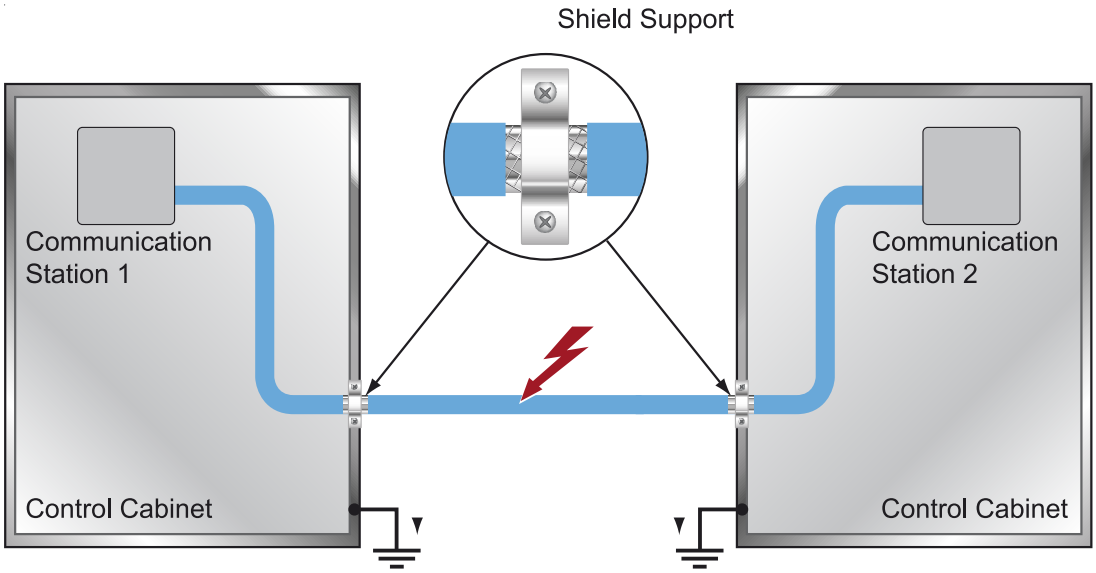
8.2 Shielding

The CAN and Ethernet wiring must be shielded.

The low-ohm shielding must be either connected either at the entry to the control cabinet or directly before the CP 102 over a large 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.



8.3 ESD Protection

CAUTION

Before any device is connected to or disconnected from the CP 102, the potential with ground must be equalized (by touching the control cabinet or ground terminal). Electrostatic loads (through clothing and shoes) can thereby be dissipated.

8.4 CAN Bus

This section explains how to correctly configure the CAN bus. The following parameters must first be set: Station number and data transfer rate.

8.4.1 CAN Bus Station Number

Each CAN bus station is assigned its own station number. With this station number, data can be exchanged with other stations connected to the bus. In a CAN bus system however, each station number can only be assigned once!

8.4.2 Number of CAN Bus Participants

The maximum number of participants on the CAN bus depends on the cable length, termination resistance, data transfer rate and the drivers used in the participants. With a termination resistance of 120 Ω, at least 100 participants are possible.

8.4.3 CAN Bus Data Transfer Rate

Various data transfer rates (baud rates) can be set on the CAN bus. The longer the bus line is, the lower the data transfer rate that must be selected.
These values apply to the following cable: 120 Ω Twisted Pair.

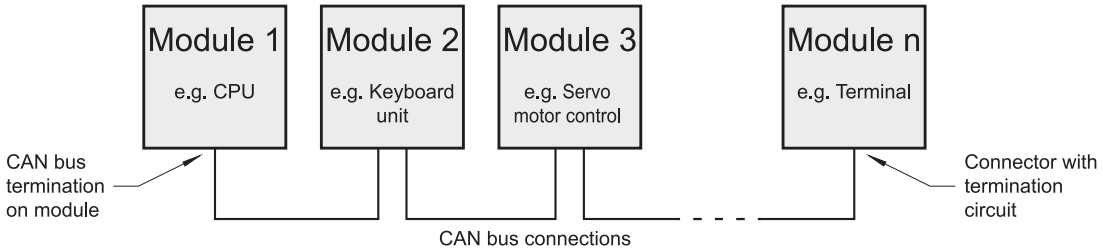
Value	Baud Rate	Maximum Length
0	615 kbit/s	60 m
1	500 kbit/s	80 m
2	250 kbit/s	160 m
3	125 kbit/s	320 m
4	100 kbit/s	400 m
5	50 kbit/s	800 m
6	20 kbit/s	1200 m
7	1 Mbit/s	30 m

INFORMATION

For the CAN bus protocol: 1 kbit/s = 1 kBaud

8.4.4 CAN Bus Termination

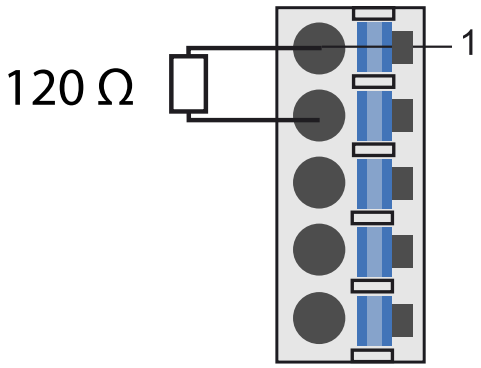
In a CAN bus system, both end modules must be terminated. This is necessary to avoid transmission errors caused by reflections in the line.



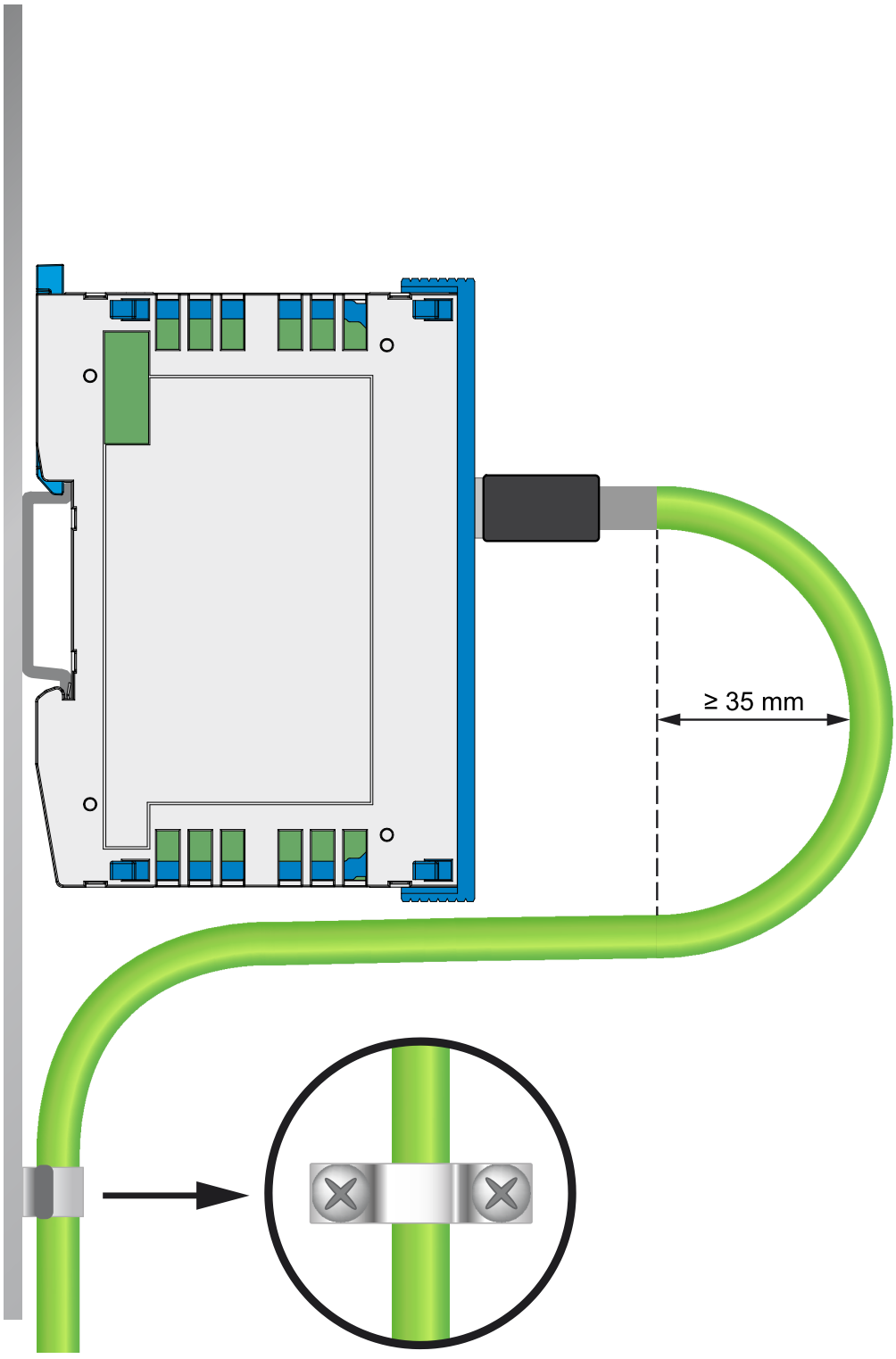
Example

INFORMATION

The termination is made by placing a 120 Ω resistor between CAN A (LOW) and CAN B (HIGH).



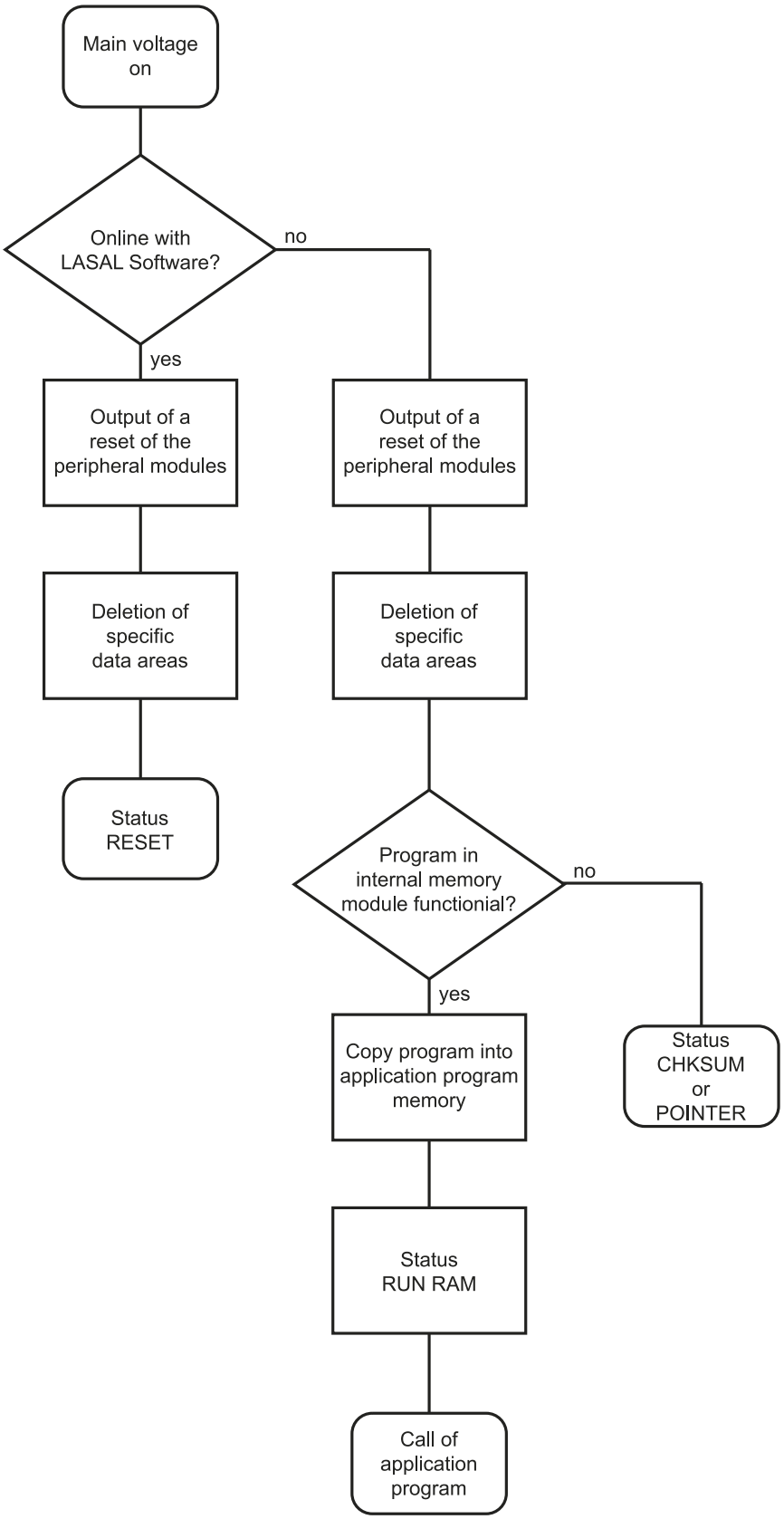
9 Strain Relief



INFORMATION

The VARAN cable must be mounted close to the module (e.g. using a clamp)!
No mechanical stress can be applied to the connection!

10 Process Diagram



11 Status and Error Messages

Status and error messages are shown in the status test of the LASAL CLASS software. POINTER or CHKSUM messages can also be shown on the screen.

Number	Message	Definition	Cause/Solution
00	**RUN RAM**	The user program is currently running in RAM. The display is not affected.	Info
01	**RUN ROM**	The user program stored in the program memory module was loaded into the RAM and is currently running. The display is not affected.	Info
02	**RUNTIME**	The total time for all cyclic objects exceeds the maximum time; the time can be configured using 2 system variables: ■ Runtime: Remaining time ■ SWRuntime: Preset value for runtime counter	Solution: ■ Optimize the application's cyclic task. ■ Use higher capacity CPU. ■ Configure preset value
03	**POINTER**	Incorrect program pointers were detected before running the user program	Possible Causes: ■ The program memory module is missing, not programmed or defective. ■ The program in the user program memory (RAM) is not executable. ■ The buffer battery has failed. ■ The user program has overwritten a software error. Solution: ■ Reprogram the memory module, if the error reoccurs exchange the module. ■ Exchange the buffering battery ■ Correct programming error
04	**CHKSUM**	An invalid checksum was detected before running the user program.	Cause/Solution: s. POINTER

Number	Message	Definition	Cause/Solution
05	**WATCHDOG**	The program was interrupted via the watchdog logic.	Possible Causes: ■ User program interrupts blocked over a longer period of time (STI command forgotten). ■ Programming error in a hardware interrupt. ■ INB, OUTB, INW, OUTW instructions used incorrectly. ■ The processor is defective. Solution: ■ Correct programming error. ■ Exchange CPU
06	**GENERAL ERROR**	General error An error has occurred while stopping the application via the online interface.	This error occurs only during the development of the operating system.
07	**PROM DEFECT**	An error has occurred while programming the memory module.	Causes: ■ The program memory module is defective. ■ The user program is too large. ■ The program memory module is missing. Solution: ■ Exchange the program memory module
08	**RESET**	The CPU has received the reset signal and is waiting for further instructions. The user program is not processed.	Info
09	**WD DEFECT**	The hardware monitoring circuit (watchdog logic) is defective. After power-up, the CPU checks the watchdog logic function. If an error occurs during this test, the CPU deliberately enters an infinite loop from which no further instructions are accepted.	Solution: ■ Exchange CPU
10	**STOP**	The program was stopped by the programming system.	
11	**PROG BUSY**	Reserved	
12	**PROGRAM LENGTH**	Reserved	
13	**PROG END**	A memory module was successfully programmed.	Info
14	**PROG MEMO**	The CPU is currently programming the memory module.	Info

Number	Message	Definition	Cause/Solution
15	**STOP BRKPT**	The CPU was stopped by a breakpoint in the program.	Info
16	**CPU STOP**	The CPU was stopped by the programming software.	Info
17	**INT ERROR**	The CPU has triggered a false interrupt and stopped the user program or has encountered an unknown instruction while running the program.	Causes: ■ A nonexistent operating system was used. ■ Stack error (uneven number of PUSH and POP instructions). ■ The user program was interrupted by a software error. Solution: ■ Correct programming error.
18	**SINGLE STEP**	The CPU is in single step mode and is waiting for further instructions.	Info
19	**READY:**	A module or project has been sent to the CPU and it is ready to run the program.	Info
20	**LOAD**	The program is stopped and the CPU is currently receiving a new module or project.	Info
21	**INVALID MODULE**	The CPU has received a module that does not belong to the project.	Solution: ■ Recompile and download the entire project
22	**MEMORY FULL**	The operating system memory (heap) is too small. No memory could be reserved while calling an internal function or an interface function is called from the application.	Causes: ■ Memory is only allocated but not released. Solution: ■ Clear memory
23	**NOT LINKED**	When starting the CPU, a missing module or a module that does not belong to the project was detected.	Solution: ■ Recompile and download the entire project
24	**DIV BY 0**	A division error has occurred.	Possible Causes: ■ Division by 0. ■ The result of a division does not fit in the result register. Solution: ■ Correct programming error.
25	**DIAS ERROR**	While accessing a DIAS module, an error has occurred.	Hardware problem
26	**WAIT**	The CPU is busy.	Info

Number	Message	Definition	Cause/Solution
27	OP PROG	The operating system is currently being reprogrammed.	Info
28	OP INSTALLED	The operating system has been reinstalled.	Info
29	OS TOO LONG	The operating system cannot be loaded; too little memory.	Restart, report error to SIGMATEK.
30	NO OPERATING SYSTEM	Boot loader message, no operating system found in RAM.	Restart, report error to SIGMATEK.
31	SEARCH FOR OS	The boot loader is searching for the operating system in RAM.	Restart, report error to SIGMATEK.
32	NO DEVICE	Reserved	
33	UNUSED CODE	Reserved	
34	MEM ERROR	The operating system loaded does not match the hardware configuration.	Solution: ■ Use the correct operating system version
35	MAX IO	Reserved	
36	MODULE LOAD ERROR	The LASAL Module or project cannot be loaded.	Solution: ■ Recompile and download the entire project
37	BOOTIMAGE FAILURE	A general error has occurred while loading the operating system.	Contact SIGMATEK
38	APPLMEM ERROR	An error has occurred in the application memory (user heap).	Solution: ■ Correct allocated memory access error
39	OFFLINE	This error does not occur in the control.	This error code is used in the programming system to show that there is no connection to the control.
40	APPL LOAD	Reserved	
41	APPL SAVE	Reserved	
44	VARAN MANAGER ERROR	An error number was entered in the VARAN manager and stopped the program.	Solution: ■ Read LogFile
45	VARAN ERROR	A required VARAN client was disconnected or a communication error has occurred.	Solution: ■ Read LogFile ■ Error tree

Number	Message	Definition	Cause/Solution
46	**APPL-LOAD-ERROR**	An error has occurred while loading the application.	Cause: ■ Application was deleted. Solution: ■ Reload the application into the control.
47	**APPL-SAVE-ERROR**	An error has occurred while attempting to save the application.	
50	**ACCESS-EXCEPTION-ERROR**	Read or write access of a restricted memory area. (I.e. writing to the NULL pointer).	Solution: ■ Correct application errors
51	**BOUND EXCEEDED**	An exception error has occurred while accessing arrays. The memory area was overwritten by accessing an invalid element.	Solution: ■ Correct application errors
52	**PRIVILEDGED INSTRUCTION**	An unauthorized instruction for the current CPU level was given. For example, setting the segment register.	Cause: ■ The application has overwritten the application program code. Solution: ■ Correct application errors
53	**FLOATING POINT ERROR**	An error has occurred during a floating-point operation.	
60	**DIAS-RISC-ERROR**	Error from the Intelligent DIAS Master.	Restart, report error to SIGMATEK.
64	**INTERNAL ERROR**	An internal error has occurred, all applications are stopped.	Restart, report error to SIGMATEK.
65	**FILE ERROR**	An error has occurred during a file operation.	
66	**DEBUG ASSERTION FAILED**	Internal error	Restart, report error to SIGMATEK.
67	**REALTIME RUNTIME**	The total duration of all real-time objects exceeds the maximum time; the time cannot be configured. 2 ms for 386 CPUs 1 ms for all other CPUs	Solution: ■ Optimize the application's real-time task (RtWork). ■ Reduce the clock time for the real-time task of all objects. ■ Correct application errors ■ CPU is overloaded in real-time => use a higher capacity CPU.
68	**BACKGROUND RUNTIME**	The total time for all background objects exceeds the maximum time; the time can be configured using 2 system variables: -BTRuntime: -SWBTRuntime: pre-selected value for the runtime counter	Solution: ■ Optimize the application's background task (background) ■ Use higher capacity CPU ■ Set SWBTRuntime correctly

Number	Message	Definition	Cause/Solution
70	**C-DIAS ERROR**	A connection error with a C-DIAS module has occurred.	Cause: ■ The cause of the error is documented in the log file Solution: ■ This depends on the cause
72	**S-DIAS ERROR**	A connection error with an S-DIAS module has occurred.	Possible Causes: ■ Real network does not match the project ■ S-DIAS client is defective Solution: ■ Analyze log file
75	**SRAM ERROR**	An error occurred while initializing, reading or writing SRAM data.	Possible Causes: ■ SRAM configured incorrectly ■ Battery for powering the internal program memory is empty Solution: ■ Analyze log file (Event00.log, Event19.log) ■ Check configuration ■ Exchange battery for powering the internal program memory
95	**USER DEFINED 0**	User-definable code.	
96	**USER DEFINED 1**	User-definable code.	
97	**USER DEFINED 2**	User-definable code.	
98	**USER DEFINED 3**	User-definable code.	
99	**USER DEFINED 4**	User-definable code.	
100	**C_INIT**	Initialization start; the configuration is run.	
101	**C_RUNRAM**	The LASAL project was successfully started from RAM.	
102	**C_RUNROM**	The LASAL project was successfully started from ROM.	
103	**C_RUNTIME**		
104	**C_READY**	The CPU is ready for operation.	
105	**C_OK**	The CPU is ready for operation.	
106	**C_UNKNOWN_CID**	An unknown object from a stand-alone or embedded object, or an unknown base class was detected.	

Number	Message	Definition	Cause/Solution
107	C_UNKNOWN_CONSTR	The operating system class cannot be created; the operating system is probably wrong.	
108	C_UNKNOWN_OBJECT	Indicates an unknown object in an interpreter program; more the one DCC080 object.	
109	C_UNKNOWN_CHNL	The hardware module number is greater than 60.	
110	C_WRONG_CONNECT	No connection to the required channels.	
111	C_WRONG_ATTR	Wrong server attributes.	
112	C_SYNTAX_ERROR	Non-specific error. Recompile and download all project sections.	
113	C_NO_FILE_OPEN	An attempt was made to open an unknown table.	
114	C_OUTOF_NEAR	Memory allocation failed	
115	C_OUT OF_FAR	Memory allocation failed	
116	C_INCOMAPTIBLE	An object with the same name already exists but has a different class.	
117	C_COMPATIBLE	An object with the same name and class exists but must be updated.	
224	LINKING	The application is currently linking.	
225	LINKING ERROR	An error has occurred while linking.	
226	LINKING DONE	Linking is complete.	
230	OP BURN	The operating system is currently being burned into the Flash memory.	
231	OP BURN FAIL	An error has occurred while burning the operating system.	
232	OP INSTALL	The operating system is currently being installed.	
240	USV-WAIT	The power supply was disconnected; the UPS is active. The system is shutdown.	
241	REBOOT	The operating system is restarted.	

Number	Message	Definition	Cause/Solution
242	**LSL SAVE**		
243	**LSL LOAD**		
252	**CONTINUE**		
253	**PRERUN**	The application is started.	
254	**PRERESET**	The application is ended.	
255	**CONNECTION BREAK**		

12 Application Exceptions

Do not store, modify or write on the Flash from the user program.

12.1 Data Breakpoint

This CPU does not support the data breakpoint feature.

13 Assembly/Installation

13.1 Check Contents of Delivery

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

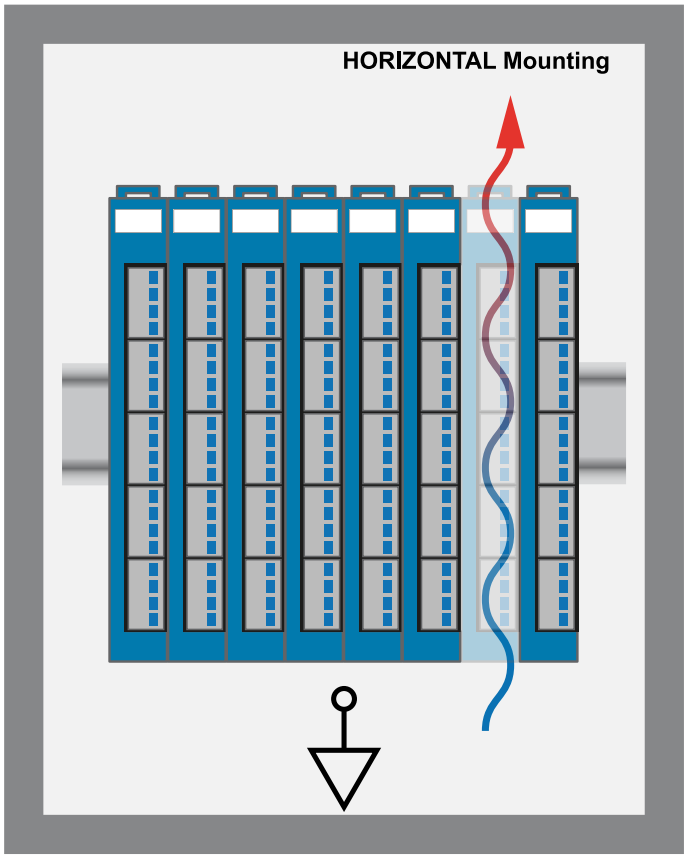
INFORMATION

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.

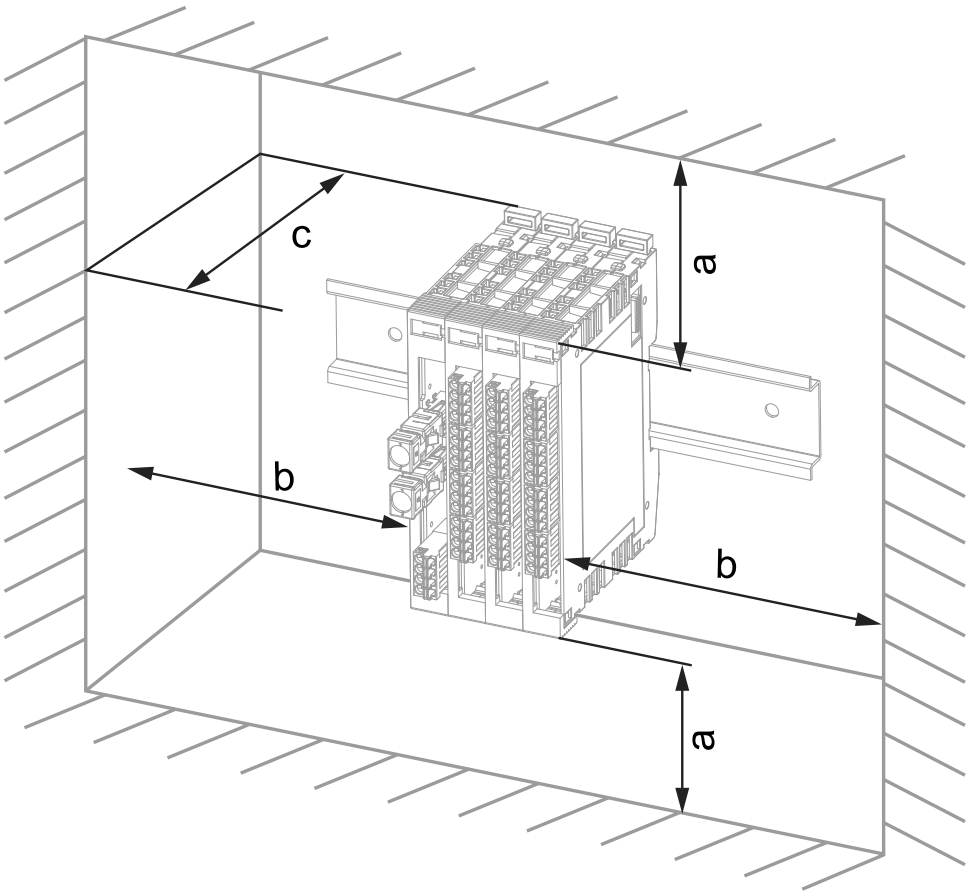
Damaged components can disrupt or damage the system.

13.2 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)

14 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.

15 Storage

When not in use, store the device according to the storage conditions. See chapter 14 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.

16 Maintenance

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

16.1 Service

This product was constructed for low-maintenance operation.

16.2 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 14 Transport/Storage.

17 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.

Changes Chart

Change date	Affected page(s)	Chapter	Note
30.01.2015	20	8.1 Note	Note regarding connecting/disconnecting the S-DIAS module under voltage added.
26.03.2015	19	7.4 Applicable Connectors	Added connections
04.05.2015	10	5.1 Performance Data	Note added
15.06.2015	21	8.4 CAN Bus	Transmission speed – note added
15.10.2015	11	5.3 Electrical Requirements	Table split
22.10.2015	11	5.3.1 Module Supply (Input)	Note added instead of table column switch-on current
12.11.2015	10	5.1 Performance Data	Sentences deleted
	33	12 Application Exceptions	
12.02.2016	10	5 Technical Data	Adjusted and graphics added
	20	8.1 Note	ESD protection and Shielding added
19.04.2016	10	5.1 Performance Data	Table updated
28.04.2016	34	13 Assembly/Installation	Graphics distances
15.12.2016	16	7.1 Status LEDs	Run / green / blinks extended
17.08.2017	14	5.6 Environmental Conditions	Pollution degree sleeve length added
	19	7.4 Applicable Connectors	Added info regarding ultrasonically welded strands
03.10.2017	18	7.3 Applicable Connector Cables	RJ45 on industrial Mini I/O Type 1, drag chain capable: 50 m cable added
18.10.2017	19	7.5 Label Field	Added chapter
	34	13 Assembly/Installation	Graphic replaced
19.06.2018	11	5.3.1 Module Supply (Input)	Note UL conditions
20.09.2018	16	7 Connector Layout	Note added
16.04.2019	8	3.2 Safety-Relevant Parameters	Chapter added
04.11.2020	34	13 Assembly/Installation	Expansion functional ground connection
06.12.2022	14	5.5 Miscellaneous	UKCA conformity
20.04.2023	16	7 Connector Layout	Info box corrected
26.07.2023		Document	General chapters added, design
22.07.2026	8	3.2 Safety-Relevant Parameters	Values deleted
29.10.2026		Document	Structure