

CP 102

S-DIAS CPU Module

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S-DIAS CPU Module**CP 102**

with 1 Ethernet

1 USB-OTG

1 CAN

The S-DIAS CPU module CP 102 is a high-performance processor unit for the S-DIAS IO 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 Technical Data

1.1 Performance Data

Processor	EDGE2 Technology
Addressable I/O/P modules	CAN participants: > 100 S-DIAS bus: 64 ⁽¹⁾
Internal I/O	no
Internal cache	512-kbyte L2 Cache
Internal program and data memory (DDR3 RAM)	256-Mbyte
Internal remnant data memory	2-kbyte (one Flash block)
Internal storage device	NAND Flash 256-Mbyte
Interfaces	1x USB-OTG (Host/Device) (for service purposes only) 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)

(1) The CP 101 can only supply the number of modules supported by the maximum output current (0.6 A) on the S-DIAS bus.

1.2 Standard Configuration

Ethernet 1	IP: 10.10.150.1	Subnet mask: 255.0.0.0
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Problems can arise if a control is connected to an IP network, which contains modules that do not run on 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.

Des problèmes peuvent survenir si un automate est connecté à un réseau IP contenant des modules qui ne fonctionnent pas sous un système d'exploitation SIGMATEK. Avec de tels dispositifs, les paquets Ethernet peuvent être envoyés à l'automate avec une fréquence tellement élevée (càd. diffusion), que les interruptions ainsi générées peuvent provoquer une erreur d'exécution. En configurant d'une façon appropriée le filtre de paquets (pare-feu ou un routeur) il est toutefois possible de connecter un réseau avec le matériel SIGMATEK à un réseau tiers sans déclencher l'erreur mentionnée ci-dessus.

1.3 Electrical Requirements

1.3.1 Module Supply (Input)

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

⁽¹⁾ Limited Voltage/Limited Current

⁽²⁾ the current consumption is dependent on the connected loads

**For loading the internal capacitors, an increase in current usage can occur over a short period of time (in the microsecond range).
This value depends on the input voltage and impedance of power source.**

⁽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).

⁽¹⁾ Pour les États-Unis et le Canada:

L'alimentation doit être limitée à:

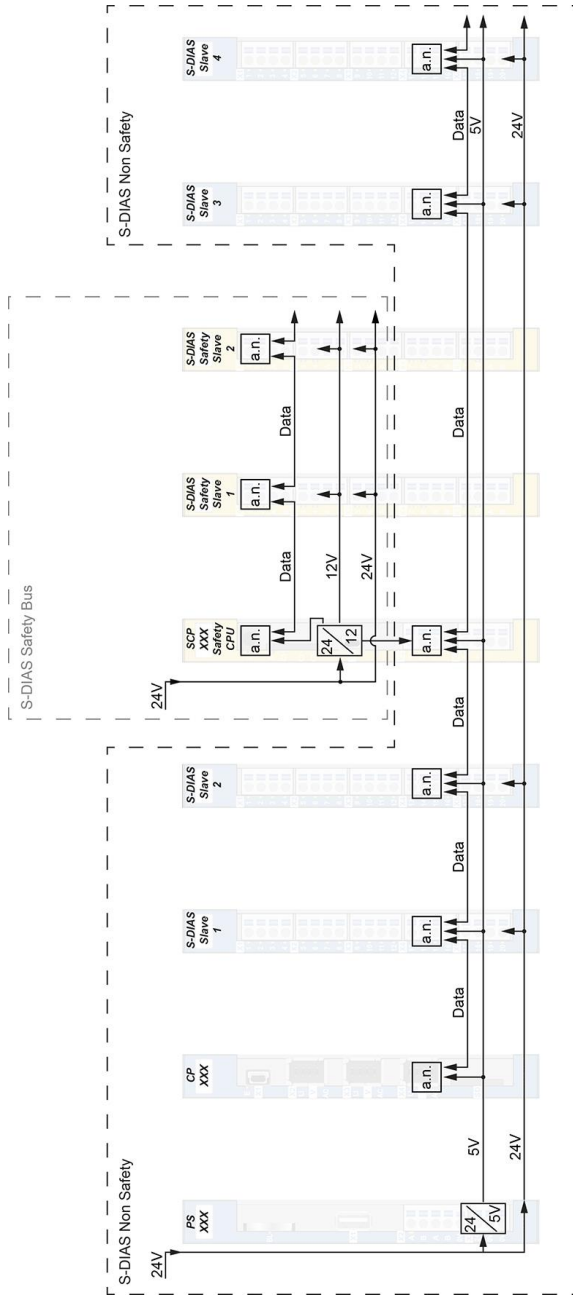
- a) max. 5 A pour des tensions de 0-20 V DC, ou
- b) 100 W pour des tensions de 20-60 V DC

Le composant imposant la limite (par exemple, transformateur, alimentation électrique ou fusible) doit être certifié par un NRTL (National Recognized Testing Laboratory, par exemple, UL).

1.3.2 S-DIAS Bus Supply (Output)

Voltage supply from S-DIAS bus	+5 V
Current consumption on the S-DIAS bus (+5 V supply)	maximum 0.6 A ⁽¹⁾
Voltage 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 loads



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

1.4 Safety-Relevant Parameters

Calculation base	IEC 61709 SN 29500 EN 13849 EN 62061
Conditions	+55 °C
Number of hours per year	8760
MTBF	107 years
MTTF _D	213 years
PFH _D based on MTTF _D = 100 J according to table K1 appendix K EN13849	$> 1,14 * 10^{-6}$
The MTBF is a calculated value, which represents the failure probability and must not be confused with the product lifespan.	
Safety classification according to EN 13849	
Category	1
Performance level	C
Safety classification according to EN 62061	
Safety integrity level	SIL 1

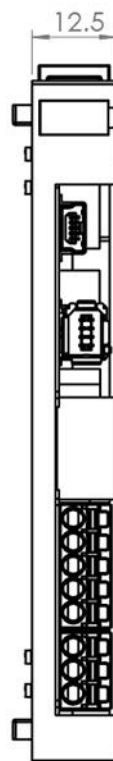
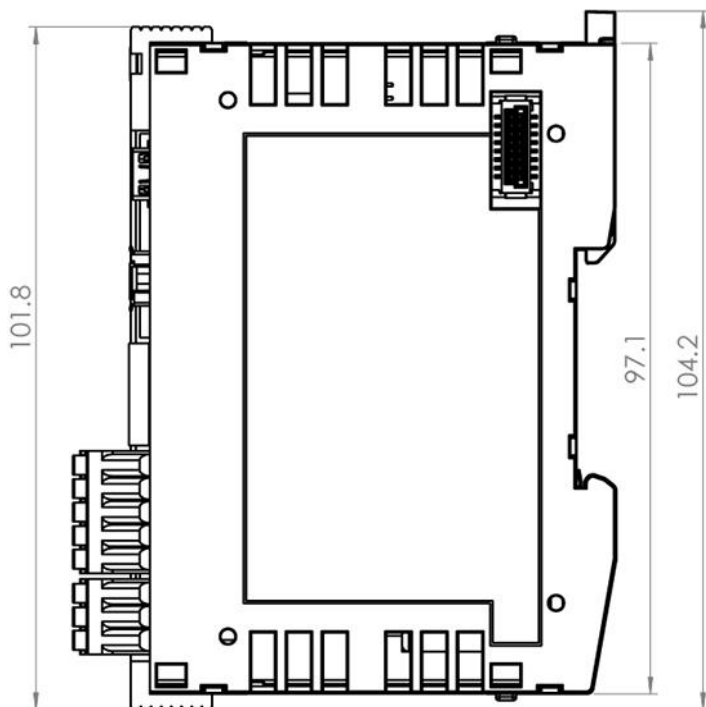
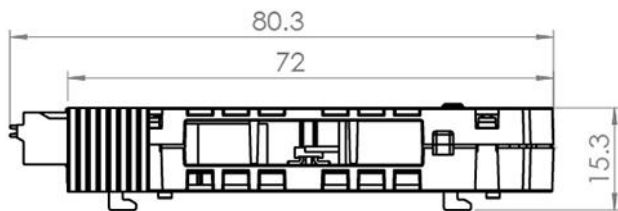
1.5 Miscellaneous

Article number	20-004-102
Hardware version	1.x
Standard	UL 508 (E247993)
Approbations	UL, cUL, CE

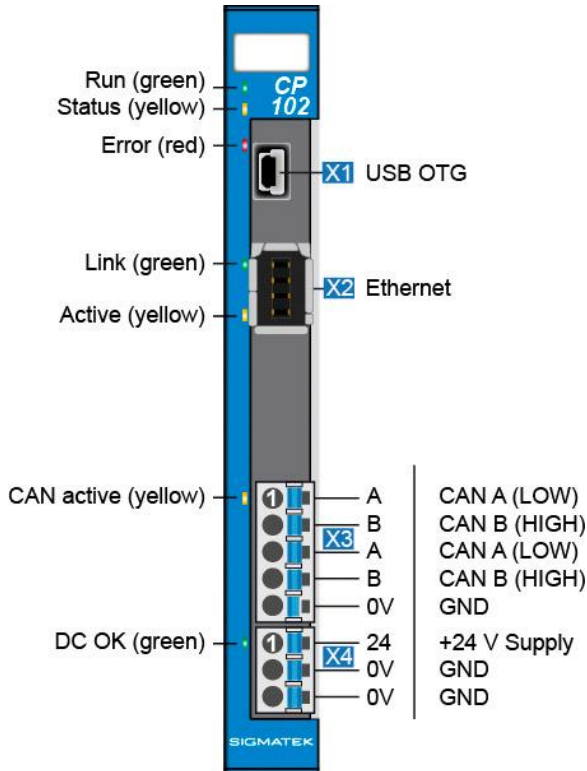
1.6 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C	
Humidity	0-95 %, non-condensing	
Operating conditions	Pollution degree 2 altitude up to 2000 m	
EMC resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

2 Mechanical Dimensions



3 Connector Layout



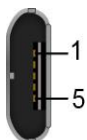
The GND supply (X4: Pin 2 and Pin 3) is internally bridged. Only one GND pin (pin 2 or pin 3) is required to power the module. The bridged connections may be used for further looping of the +24 V supply and the GND supply. However, it must be taken into account that a total current of 6 A per connection is not exceeded by the forward looping!

3.1 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 through application differently)
		BLINKS	in the CLI, while processing the autoexec.lsl until the application is running during the installation of the operating systems (since OS version 09.03.054)
		OFF	when error occurs or reset
	can be set from the application (ON, BLINKING, OFF)		
Status	yellow	OFF	during start process during RUN status (application running) when error occurs or reset
		can be set from the application (ON, BLINKING, OFF)	
Error	red	BLINKS	when error occurs or reset
		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

3.2 Connectors

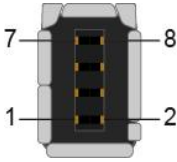
X1: USB Device 1.1 (Type Micro-B) (can be used with OTG cable as USB host, otherwise USB Device for service purposes)



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

n.c. = do not use

X2: Ethernet (Industrial Mini I/O)



Pin	Function
1	Tx+
2	Tx-
3	Rx+
4500-5	n.c.
6	Rx-
7-8	n.c.

3.3 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

3.4 Applicable Connectors

Connectors:

X1: USB Type Micro-B OTG cable (host) or USB Type Micro-B to USB Type A cable (device) (no included with 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)

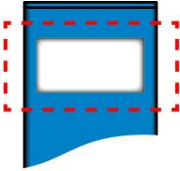
The spring terminals are suitable connecting ultrasonically compacted (ultrasonically welded) strands.

Connections:

Stripping length/Sleeve length:	10 mm
Plug-in direction:	parallel to conductor axis or to PCB
Conductor cross section, rigid:	0.2-1.5 mm ²
Conductor cross section, flexible:	0.2-1.5 mm ²
Conductor cross section, ultrasonically compacted:	0.2-1.5 mm ²
Conductor cross section AWG/kcmil:	24-16
Conductor cross section flexible, with ferrule without plastic sleeve:	0.25-1.5 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve:	0.25-0.75 mm ² (ground for reducing d2 of the ferrule)



3.5 Label Field



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

4 CAN Bus Setup

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

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!

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.

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.

Value	Baud Rate	Maximum Length
00	615 Kbits/s*	60 m
01	500 Kbit/s	80 m
02	250 Kbits/s	160 m
03	125 Kbits/s	320 m
04	100 Kbits/s	400 m
05	50 Kbits/s	800 m
06	20 kbits/s	1200 m
07	1 Mbit/s	30 m

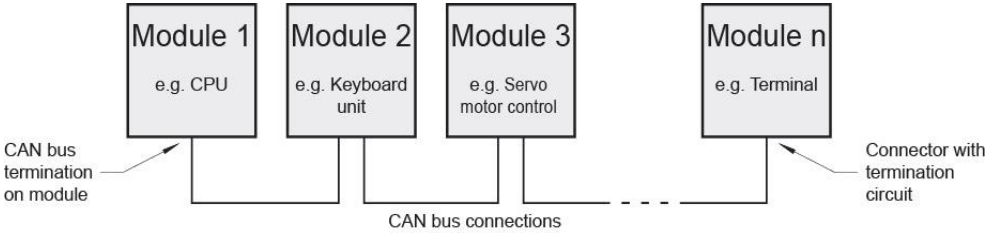
*only between devices with EDGE2 technology

These values apply to the following cable: 120 Ω Twisted Pair.

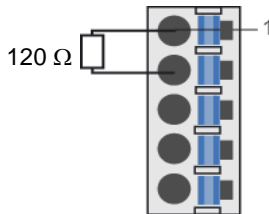
Note: 1 kbit/s = 1 kBaud

4.4 CAN Bus Termination

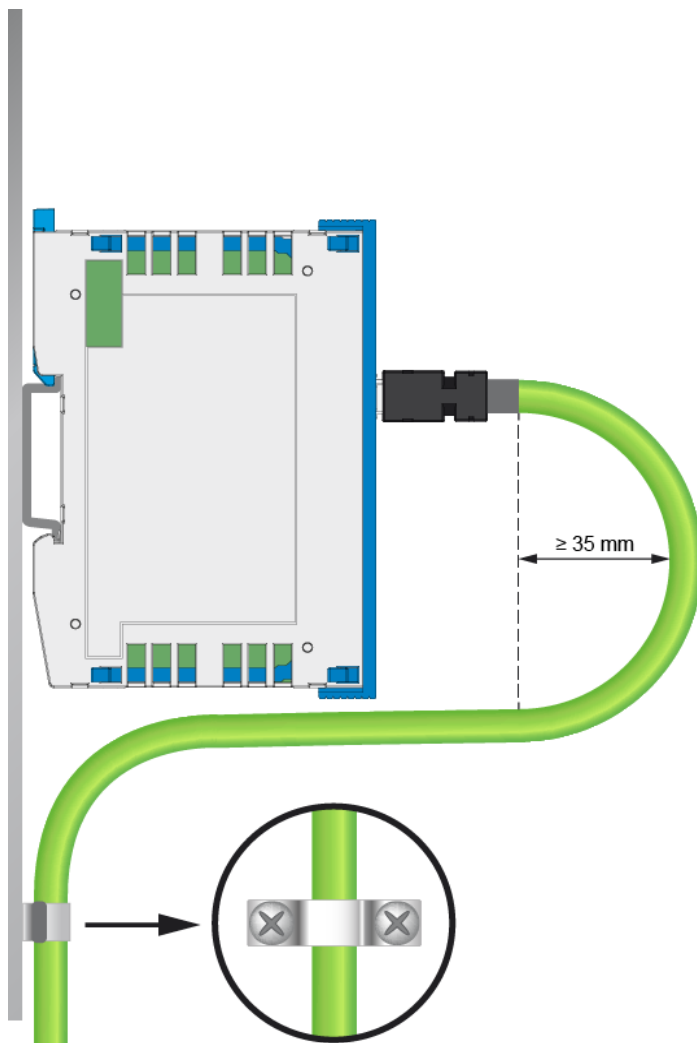
In a CAN bus system, both end modules must be terminated. This is necessary to avoid transmission errors caused by reflections in the line.



If the CP 102 processor module is an end module, it can be terminated by placing a 120Ω resistor between CAN-A (Low) and CAN-B (High).



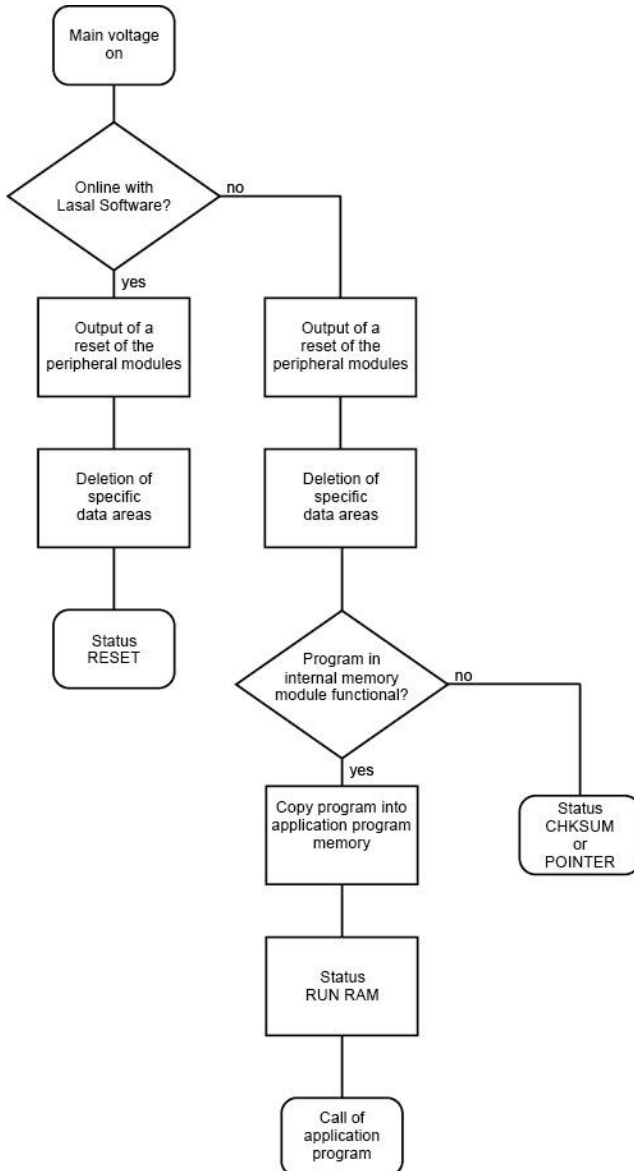
5 Strain Relief



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

**Le câble VARAN doit être fixé à proximité du module (par exemple avec une pince)!
La connexion elle-même doit être libre d'une quelconque contrainte mécanique!**

6 Process Diagram



7 Status and Error Messages

Status and error messages are shown in the status test of the LASAL Class software.

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 loaded into the RAM 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 two system variables: - RUNTIME -	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 defect. - The program in the user program memory (RAM) is not executable. - The buffering 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

05	WATCHDOG	The program was interrupted via the watchdog logic.	<p>Possible Causes:</p> <ul style="list-style-type: none"> - 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 defect. <p>Solution:</p> <ul style="list-style-type: none"> - Correct programming error. - Exchange CPU.
06	GENERAL ERROR	<p>General error</p> <p>An error has occurred while stopping the application over the online interface.</p>	The error occurs only during the development of the operating system.
07	PROM DEFECT	An error has occurred while programming the memory module.	<p>Cause:</p> <ul style="list-style-type: none"> - The program memory module is defect. - The user program is too large. - The program memory module is missing. <p>Solution:</p> <ul style="list-style-type: none"> - Exchange the program memory module
08	RESET	<p>The CPU has received the reset signal and is waiting for further instructions.</p> <p>The user program is not processed.</p>	Info
09	WD DEFECT	<p>The hardware monitoring circuit (watchdog logic) is defective.</p> <p>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.</p>	<p>Solution:</p> <ul style="list-style-type: none"> - 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
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.	Cause: - A non-existent operating system was used. - Stack error (uneven number of PUSH and POP instructions). - The user program was interrupted through a software error. Solution: - Correct program error
18	SINGLE STEP	The CPU is in single step mode and is waiting for further instructions.	Info
19	READY	A module or project was sent to CPU and it is now 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	UNZUL. 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 or interface function from the application.	Cause: - 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 program error

25	DIAS ERROR	While accessing a DIAS module, an error has occurred.	Hardware problem
26	WAIT	The CPU is busy.	Info
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 ERROR LOAD	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.	Solution: - 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 log file
45	VARAN ERROR	A required VARAN client was disconnected or communication error has occurred.	Solution: - Read LogFile - Error Tree

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 when accessing arrays. The memory area was overwritten through accessing an invalid element.	Solution: - Correct application errors
52	PRIVILEGED 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 DIASMaster.	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 time for all real time objects exceeds the maximum time allowed. 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 two system variables:	Solution: - Optimize the application's background task (background) - Use higher capacity CPU - Set SWBTRuntime correctly

70	C-DIAS ERROR	A connection error with a C-DIAS module has occurred.	<p>Cause:</p> <ul style="list-style-type: none"> - The cause of the error is documented in the log file <p>Solution:</p> <ul style="list-style-type: none"> - This depends on the cause
72	S-DIAS ERROR	A connection error with an S-DIAS module has occurred.	<p>Possible causes:</p> <ul style="list-style-type: none"> - real network does not match the project - S-DIAS client is defective <p>Solution:</p> <ul style="list-style-type: none"> - analyze log file
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.	
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	No specific error, recompile all project components and reload the project.	
113	C_NO_FILE_OPEN	An attempt was made to open an unknown table.	
114	C_OUTOF_NEAR	Memory allocation error	
115	C_OUT_OF_FAR	Memory allocation error	
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 already exists but must be updated.	
224	LINKING	The application is currently linking.	
225	LINKING ERROR	An error has occurred while linking. An error message is generated in the LASAL status window.	
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.	
242	LSL_SAVE		
243	LSL_LOAD		
252	CONTINUE		
253	PRERUN	The application is started.	
254	PRERESET	The application is ended.	
255	CONNECTION BREAK		

8 Application Exceptions

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

8.1 Data Breakpoint

This CPU does not support the data breakpoint feature.

9 Wiring Guidelines

The input filters, which suppress noise signals, allow operation in harsh environmental conditions. A careful wiring method is also recommended to ensure error-free function.

The following guidelines should be observed:

- avoid parallel connections between input lines and load-bearing circuits.
- protective circuits for all relays (RC networks or free-wheeling diodes)
- correct wiring to ground

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

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

IMPORTANT:

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

IMPORTANT:

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

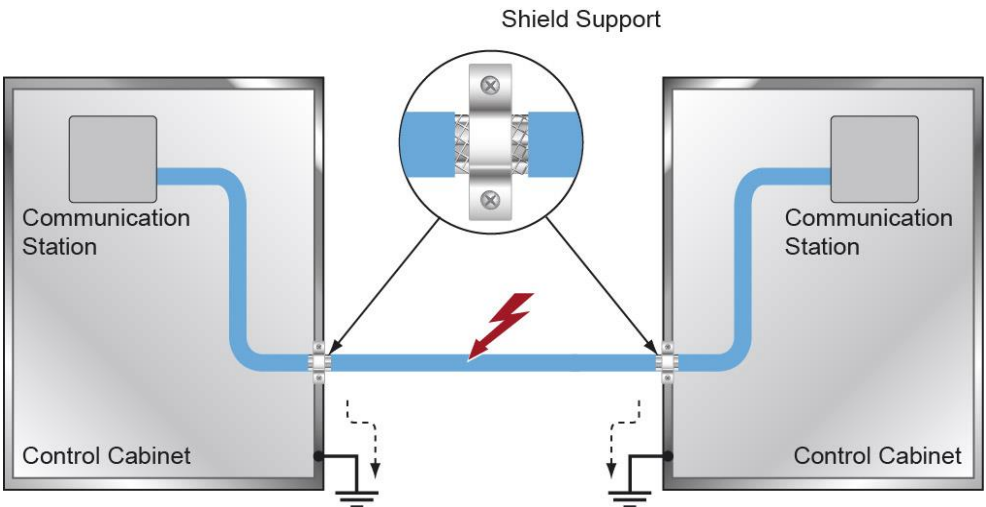
9.1 Shielding

The wiring for CAN and Ethernet must be shielded.

The low-ohm shielding is either connected at the entry to the control cabinet or directly before the CP 102 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.

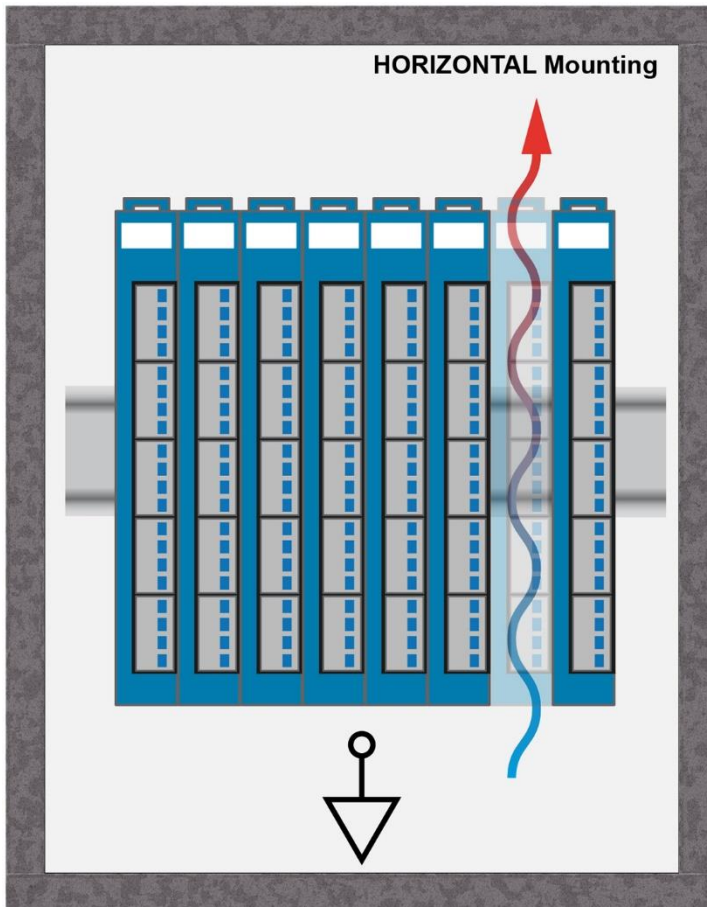


9.2 ESD-Protection

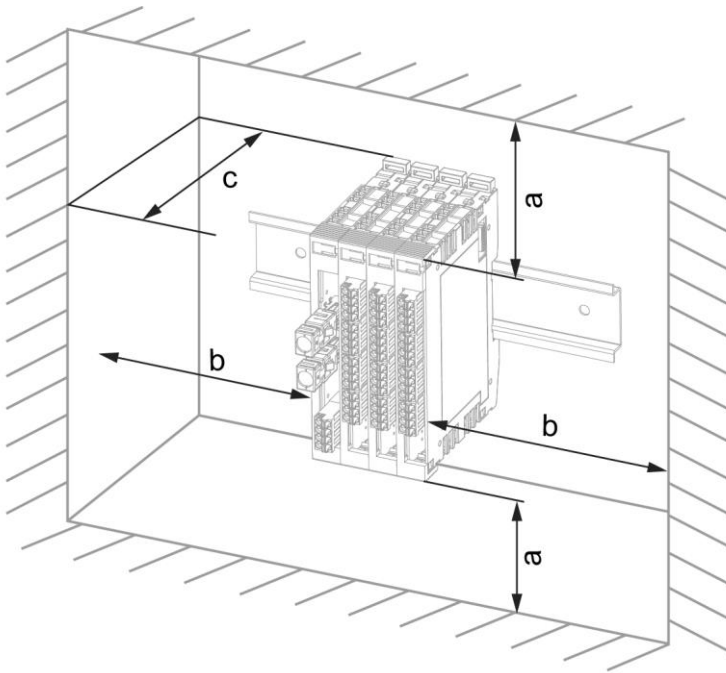
Before any device is connected to or disconnected from the CP 102, the potential with ground should be equalized (by touching the control cabinet or ground terminal). This will allow the dissipation of electrostatic loads (caused by clothing/shoes).

10 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)

Documentation Changes

Change date	Affected page(s)	Chapter	Note
30.01.2015	40	9 Wiring Guidelines	Added note concerning connecting the S-DIAS module while voltage is applied
26.03.2015	12	3.4 Applicable Conncetors	Added connections
04.05.2015	4	1.1 Performance Data	Note added
15.06.2015	12	4.3 CAN Bus Data Transfer Rate	Note added
15.10.2015	5, 6	1.3 Electrical Requirements	Table split
22.10.2015	5	1.3.1 Module Supply	Instead of column inrush current note added
12.11.2015	4	1.1 Performance Data	Sentences deleted
	23	8 Application Exception	
12.02.2016	4	1 Technical Data	Adjusted and graphics added
	26	9 Wiring Instructions	ESD protection and Shielding added
19.04.2016	4	1.1 Performance Data	Table updated
28.04.2016	28	10 Mounting	Graphics distance
15.12.2016	11	3.1 Status LEDs	Run / green / blinks extended
17.08.2017	8	1.5 Environmental Conditions	Added operating conditions
	14	3.4 Applicable Connectors	Added sleeve length Added info regarding ultrasonically welded strands
03.10.2017	12	3.3 Applicable Connector Cables	RJ45 on industrial Mini I/O Type 1, drag chain capable: 50 m cable added
18.10.2017	15	3.5 Label Field	Added chapter
	30	10 Mounting	Graphic replaced
19.06.2018	6	1.3.1 Module Supply	Note UL conditions
20.09.2018		3 Connector Layout	Note added
16.04.2019	9	1.5 Safety-Relevant Parameters	Chapter added
04.11.2020	30	10 Mounting	Expansion functional ground connection