

HZS 774

Heating Control

Instruction Manual

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Touch Operating Panel

HZS 774

The HZS 774 is an intelligent terminal for programming and visualization of automated processes. Process diagnostics as well as operating and monitoring automated procedures are simplified using this terminal.

A resistive touch screen serves as the input medium for process data and parameters. The output is shown on a 7" WVGA TFT color display.

With the LSE mask editor, graphics can be created on the PC, then stored and displayed on the terminal.

The available interfaces can be used to exchange process data or configure the build-in terminal. In the internal Flash memory, the operating system, application and application data are stored.



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1 Technical Data

1.1 Performance Data

Processor	EDGE2 Technology
Processor cores	1
Internal cache	32-kbyte L1 Instruction Cache 32-kbyte L1 Data Cache 512-Kbyte L2 Cache
Internal program and data memory (DDR3 RAM)	256-Mbyte
Internal remnant data memory	512-kbyte SRAM (battery buffered)
Internal storage device	4 GB microSD card (3D-TLC pSLC technology) ¹⁾
Internal I/O	no
Interfaces	1x USB 2.0 (Type A front) 1x USB device 1.1, Type Mini-B (back) 1x Ethernet 10/100 (RJ45) 2x CAN bus (6-pin Weidmüller) 1x RS232 (10-pin Weidmüller)
Internal interface connections and devices	1x TFT LCD color display 1x touch
Display	7" TFT color display
Resolution	800 x 480 pixels
Control panel	4-wire touch screen (analog resistive)
Signal generator	no
Status LEDs	1x front LED bi-color RED / GREEN (controllable through the application)
Real-time clock	yes
Cooling	passive (fanless)

¹⁾ The 4 GByte microSD card is formatted to 1 GByte in order to achieve the lifetime of a standard SLC card. A format change to the full 4 GByte is not allowed and will result in a massive reduction of the microSD card's lifetime.

1.2 Electrical Requirements

Supply voltage	typically +24 V DC	
	minimum +18 V DC	maximum +30 V DC
Current consumption of power supply at +24 V	typically 275 mA (without externally connected devices)	maximum 675 mA (with externally connected devices)
Current consumption of standby voltage at +24 V	typically 170 mA (without externally connected devices)	maximum 580 mA (with externally connected devices)
Inrush current	maximum 27 A for 50 μ s	

1.3 Terminal

Dimensions	180 x 135 x 50 mm (W x H x D)
Material	front plate: until HW 3.x: 3 mm plastic, RAL 9006 since HW 4.0: 3 mm aluminum, unadulterated
Weight	until HW 3.x: circa 600 g since HW 4.0: circa 641 g

1.4 Environmental Conditions

Storage temperature	-10 ... +80 °C	
Environmental temperature	0 ... +60 °C	
Humidity	10-90 %, non-condensing	
EMC stability	in accordance with product standard EN 60730-1	
Protection Type	EN 60529 protection through housing	front: IP54 cover: IP20

1.5 Display 7" WVGA incl. Touch

Type	7" TFT LCD color display
Resolution	WVGA 800 x 480 pixels
Color depth	16-bit RGB (65K colors)
LCD mode	normal white ¹
LCD Polarizer	transmissive ²
Pixel size	0.1926 x 0.1790 mm
Number of pixels	800*3 (RGB) x 480
Active surface	154.08 x 85.92 mm
Backlighting	LED
Contrast	500:1
Brightness	typically 280 cd/m ²
Visible field	left, right, below 70°, above 50°

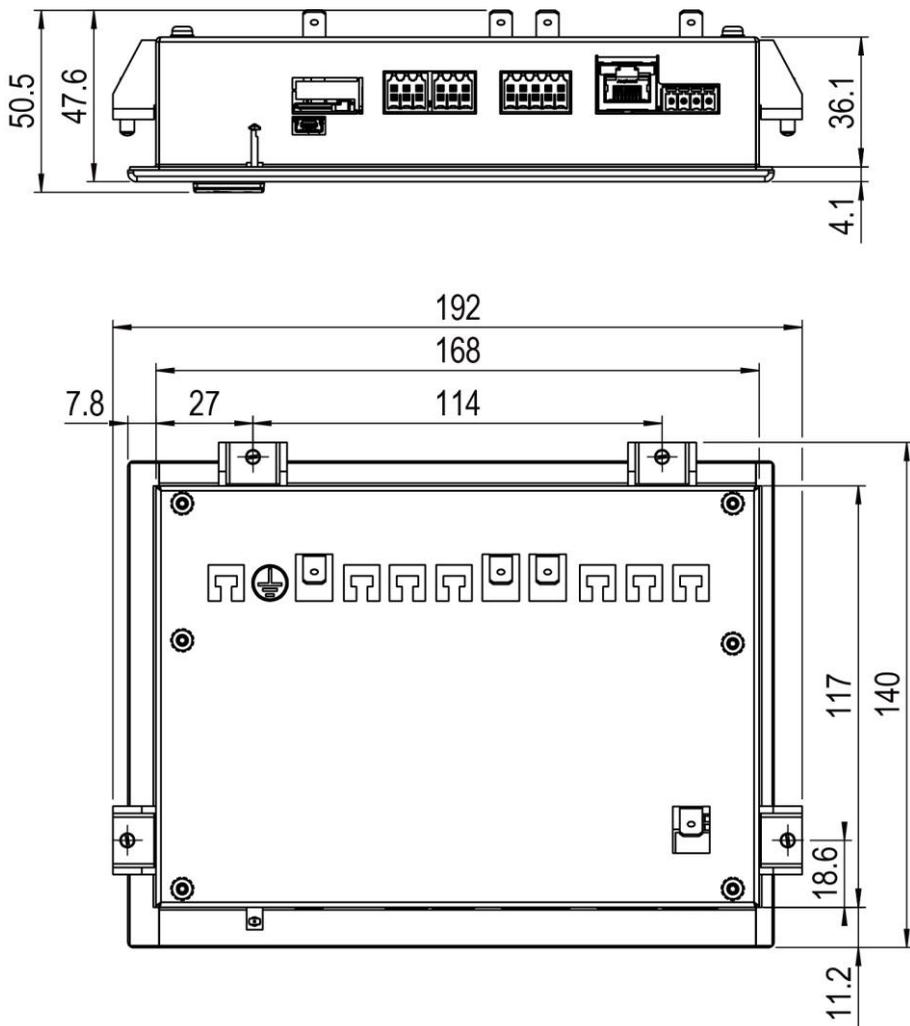
¹ If there is no display data, the display is white (LED backlight visible)

² Display technology, with which display backlighting is used.

1.6 Miscellaneous

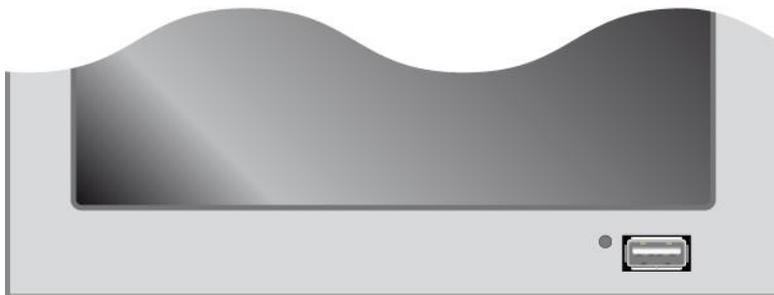
Article number	05-895-774
Hardware version	1.x-4.x
Article number in-wall housing	05-895-555-SZ1

2 Mechanical Dimensions

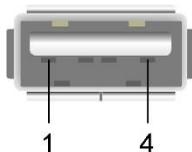


3 Connector Layout

3.1 Front



X10: USB Host 2.0 (Type A)



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

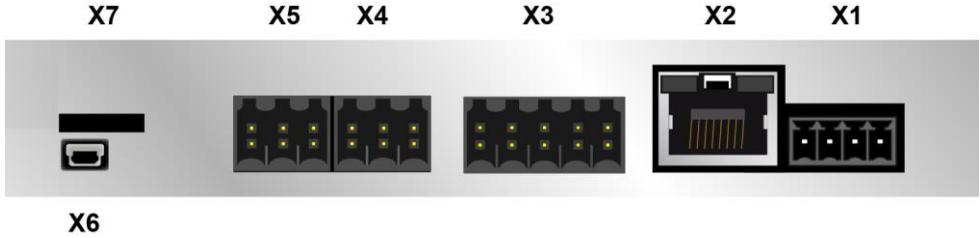
It should be noted that many of the USB devices on the market do not comply with USB specifications; this can lead to device malfunctions. It is also possible that these devices will not be detected at the USB port or function correctly. Therefore, it is recommended that every USB stick be tested before actual use.

Il faut souligner que la plupart des périphériques USB sur le marché ne sont pas conformes aux spécifications USB, ce qui peut entraîner des dysfonctionnements de l'appareil. Il est également possible que ces dispositifs ne seront pas détectés par le port USB ou qu'ils ne fonctionnent pas correctement. Par conséquent, il est recommandé que chaque clé USB soit testée avant l'utilisation sur l'automate.

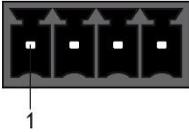
3.1.1 Status LEDs

Run	green	ON	from activation of the voltage supply until processing of the auto-exec.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
		OFF	when an error occurs or reset
	can be set from the application (ON, BLINKING, OFF)		
Error	red	BLINKS	when an error occurs or reset
		OFF	during start process during RUN status (application running)
	can be set from the application (ON, BLINKING, OFF)		

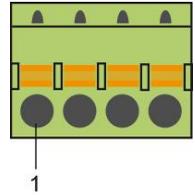
3.2 Backside



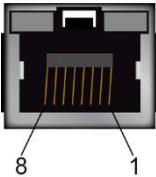
X1: Power supply (4-pin Phoenix Contact)



Pin	Function
1	+24 V DC
2	+24 V DC
3	GND
4	GND



X2: Ethernet 10/100 (RJ45)



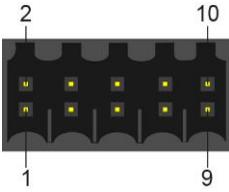
Pin	Function
1	Tx+
2	Tx-
3	RX+
4	n.c.
5	n.c.
6	RX-
7	n.c.
8	n.c.

n.c. = do not use

Problems can arise if a control is connected to an IP network, which contains modules that do not have 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 problems mentioned above.

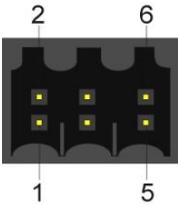
Des problèmes peuvent survenir si un automate est connecté à un réseau IP contenant des modules qui ne fonctionnent pas sous un système d'exploitation SIGMATEK. Avec de tels dispositifs, les paquets Ethernet peuvent être envoyés à l'automate avec une fréquence tellement élevée (càd. diffusion), que les 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.

X3 RS232 (10-pin Weidmüller)

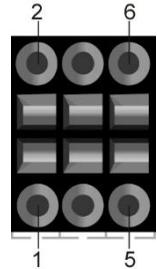


Pin	Function
1	RxD
2	RTS
3	TxD
4	CTS
5	DTR
6	GND
7	DCD
8	DSR
9	RI
10	SHIELD

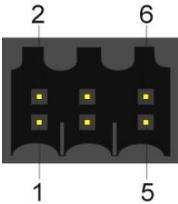
X4: CAN 1 (6-pin Weidmüller)



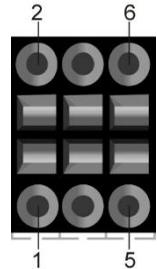
Pin	Function
1	CAN A (LOW)
2	CAN B (HIGH)
3	CAN A (LOW)
4	CAN B (High)
5	CAN GND
6	n.c.



X5: CAN 2 (6-pin Weidmüller)



Pin	Function
1	CAN A (LOW)
2	CAN B (HIGH)
3	CAN A (LOW)
4	CAN B (High)
5	CAN GND
6	n.c.

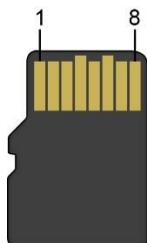


X6: USB-Device 1.1 (Type Mini-B)



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

X7: microSD Card



Pin	Function
1	DAT2
2	CD/DAT3
3	CMD
4	+3V3
5	CLK
6	GND
7	DAT0
8	DAT1

**It is recommended that only storage media provided by SIGMATEK (CompactFlash cards, microSD cards etc.) be used.
Order number for 4 Gbyte EDGE2: 12-630-105**

The number of read and write actions have a significant influence on the lifespan of the storage media.

**Il est recommandé de n'utiliser que les supports de stockage approuvés par SIGMATEK (compact flash, microSD, etc.).
Numéro de commande pour la carte microSD 4 Go Edge2 est le: 12-630-105**

Le nombre de cycles de lecture et d'écriture a l'influence notable sur la durée de vie des supports de stockage.

The μ SD card is, in this case, not used as an exchangeable storage medium and therefore should not be removed from the holder.

3.2.1 Applicable Connectors

X1:	1x 4-pin Phoenix Contact plug with spring terminals FK-MCP 1.5 / 4-ST-3.5 (not included in delivery)
X2:	8-pin RJ45 (not included in delivery)
X3:	10-pin Weidmüller (not included in delivery)
X4, X5:	6-pin Weidmüller plug B2L/B2CF 3.5/6 (not included in delivery)
X6:	USB 1.1 (Mini-B) (not included in delivery)
X7:	microSD card
X10:	Front USB

4 Cooling

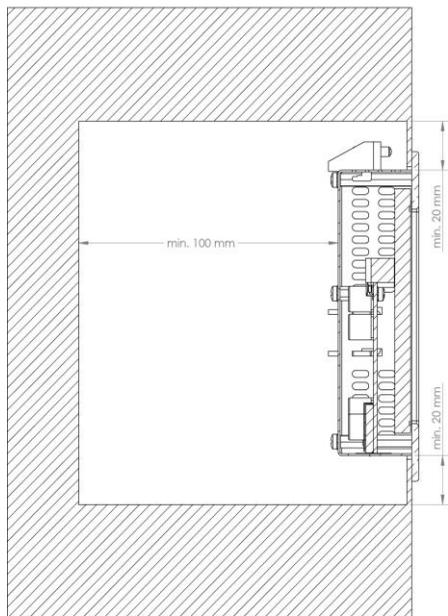
The terminal's power loss can reach up to 16.5 Watts. To ensure the necessary air circulation for cooling, the following mounting instructions must be followed!

5 Mounting Instructions

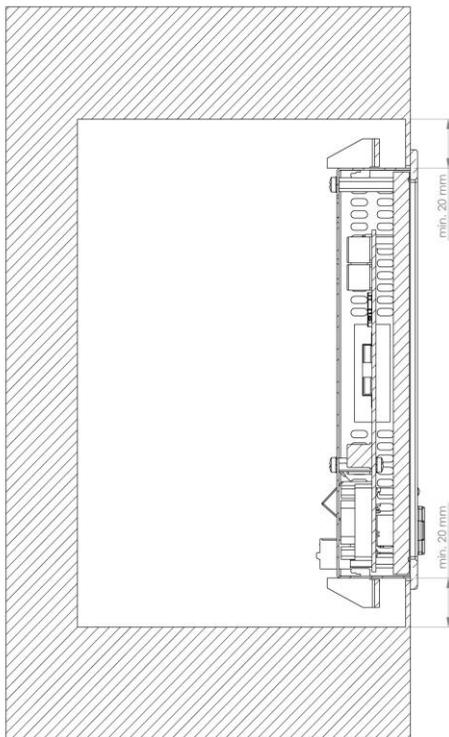
The following distance from the housing should be maintained:

- Left, right, below, above 2 cm
- Rear, 10 cm

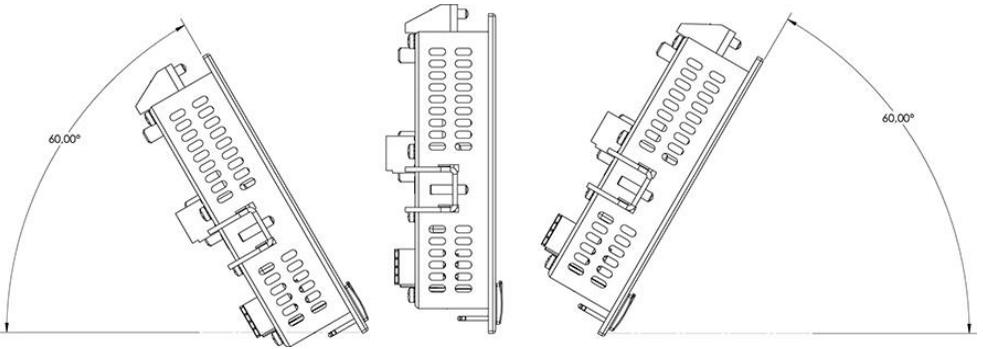
Side View:



Top view:



A mounting position of 60°-120° is also required.



6 Buffer Battery

The exchangeable buffer battery ensures that the clock time (RTC) and SRAM data of the HZS 774 are preserved in the absence of a supply voltage. A lithium battery is installed at the manufacturer.

After delivery of the HZS 774 and storage of one year, the lifespan of the battery reaches 10 years, if it can be assumed that the module is continually in operation (connected to supply voltage).

We recommend however, that the battery be replaced every 8 years to ensure optimal performance.

CAUTION: If the module is not powered for a period of 2 years, the battery is emptied.

Battery order number: **01-690-055**

	Company	Data
Lithium battery CR2032	RENATA	3.0 V/235 mAh

Use batteries from RENATA with the label CR2032 only!
WARNING! Incorrect use of the batteries could result in fire or explosion! Do not re-charge, disassemble or throw batteries in fire!

Utilisez seulement des piles de RENATA CR2032!
ATTENTION! La pile peut exploser si elle n'est pas manipulée correctement! Ne pas recharger, démonter ou jeter au feu!

If the battery voltage is located between both thresholds of the monitoring switch, the battery can be detected as good during operation, but as low after turning off and on. If this is the case, it is recommended that the battery be replaced.

6.1 Exchanging the Battery: 1. Option

1. Connect power supply
2. Using the correct Torx screwdriver, loosen and remove the battery cover.



When exchanging the battery, caution must be taken to avoid a short circuit. Otherwise, a defect can be caused in the terminal!

3. Using the strap, remove the battery from the holder.



4. Insert the new battery with the correct polarity (plus side facing the back of the terminal) and remount the battery cover.

6.2 Exchanging the Battery 2. Option:

1. The SRAM data are saved in the flash or the microSD card using the CLI command "sramsave FILENAME".

Example: sramsave C:\sram_backup

The commands can be executed via the Remote CLI of LASAL Class 2 or via direct input on the device.

CAUTION: If the data is not previously saved, the settings in the heat controller are lost

2. Disconnect the HZS 774 supply.

3. Using the correct Torx screwdriver, loosen and remove the battery cover.



4. Using the strap, remove the battery from the holder.



5. Insert the new battery with the correct polarity (plus side facing the back of the terminal) and remount the battery cover.

6. Load the SRAM data from the flash using the CLI command "sramload FILENAME" and set the time. The time and date can be set through set Time and set Date.

Example: sramload C:\sram_backup

7 Wiring Guidelines

7.1 Ground

The terminal must be connected to ground through the assembly on the control cabinet or over the connection provided. It is important to create a low-ohm ground connection, only then can error-free operation be guaranteed. The ground connection should have a maximum cross section and the largest (electrical) surface possible.

7.2 Shielding

For the Ethernet, CAT5 cables with shielded RJ45 connectors must be used. The shielding on the CAT5 cable is connected to ground via the RJ45 plug connector. Noise signals can therefore be prevented from reaching the electronics and affecting the function.

The LPB bus and the M bus lines must be shielded wires. The shielding must have a low-Ohm connection to ground.

7.3 ESD Protection

Typically, USB devices (keyboard, mouse) are not equipped with shielded cables. These devices are disrupted by ESD and in some instances, no longer function.

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

7.4 USB Interface Connections

The terminal has a USB interface connection that can be used to connect various USB devices (keyboard, mouse, storage media, hubs, etc.) in LASAL. Using a hub, several USB devices can be connected that are then fully functional in LASAL.

8 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.

8.1 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!

8.2 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.

8.3 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
0	615 kbit/s*	60 m
1	500 kbits/s	80 m
2	250 kbits/s	160 m
3	125 kbits/s	320 m
4	100 kbits/s	400 m
5	50 kbits/s	800 m
6	20 kbits/s	1200 m
7	1 Mbits/s	30 m

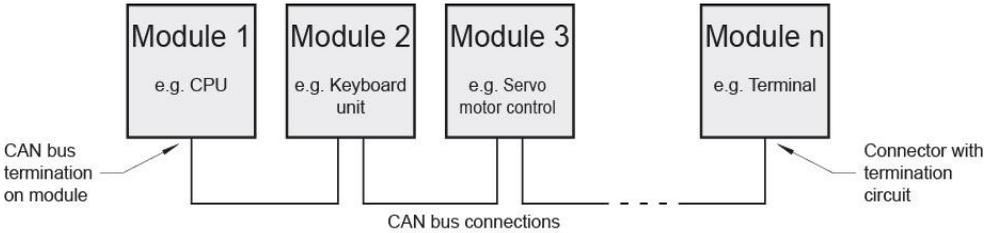
*only between devices with EDGE2 technology

These values are valid for the following cable: 120 Ω , Twisted Pair.

Note: For the CAN bus protocol: 1 kbits/s = 1 kBaud

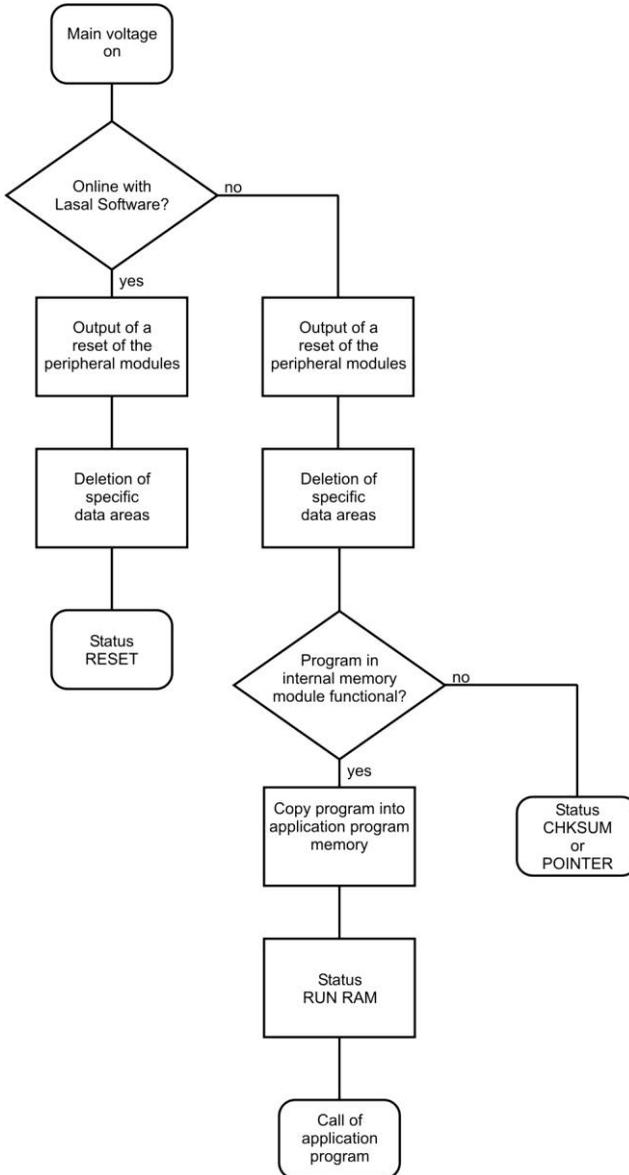
9 CAN Bus Termination

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



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

10 Process Diagram



11 Status and Error Messages

Status error messages are displayed in the LASAL CLASS software status test. POINTER or CHKSUM messages can also be shown on the terminal 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 loaded into the RAM is currently running. The display is not affected.	Info
02	RUNTIME	The total time for all cyclic objects exceed the maximum time; the time can be configured using two 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 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.	<p>Cause:</p> <ul style="list-style-type: none"> - A nonexistent operating system was used. - Stack error (uneven number of PUSH and POP instructions). - The user program was interrupted by a software error. <p>Solution:</p> <ul style="list-style-type: none"> - 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	UNZUL. MODULE	The CPU has received a module that does not belong to the project.	<p>Solution:</p> <ul style="list-style-type: none"> - 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 is called from the application.	<p>Cause:</p> <ul style="list-style-type: none"> - Memory is only allocated but not released. <p>Solution</p> <ul style="list-style-type: none"> - Clear memory
23	NOT LINKED	When starting the CPU, a missing module or a module that does not belong to the project was detected.	<p>Solution:</p> <ul style="list-style-type: none"> - Recompile and download the entire project
24	DIV BY 0	A division error has occurred.	<p>Possible Causes:</p> <ul style="list-style-type: none"> - Division by 0. - The result of a division does not fit in the result register. <p>Solution:</p> <ul style="list-style-type: none"> - Correct programming 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	Bootloader 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 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.	<p>Cause:</p> <ul style="list-style-type: none"> - Application was deleted. <p>Solution:</p> <ul style="list-style-type: none"> - 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 to a restricted memory area. (I.e. writing to the NULL pointer).	<p>Solution:</p> <ul style="list-style-type: none"> - Correct application errors
51	BOUND EXCEEDED	An exception error has occurred when accessing arrays. The memory area was overwritten through accessing an invalid element.	<p>Solution:</p> <ul style="list-style-type: none"> - Correct application errors
52	PRIVILEGED INSTRUCTION	An unauthorized instruction for the current CPU level was given. For example, setting the segment register.	<p>Cause:</p> <ul style="list-style-type: none"> - The application has overwritten the application program code. <p>Solution:</p> <ul style="list-style-type: none"> - 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	<p>The total duration of all real-time objects exceeds the maximum time; the time cannot be configured.</p> <p>2 ms for 386 CPUs 1 ms for all other CPUs</p>	<p>Solution:</p> <ul style="list-style-type: none"> - Real-time Optimize the application's real-time task (RtWork). - Real-time 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	<p>The total time for all background objects exceed the maximum time; the time can be configured using two system variables:</p> <p>-BTRuntime: Remaining time -SWBTRuntime: Preset value for runtime counter</p>	<p>Solution:</p> <ul style="list-style-type: none"> - 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.	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
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_CONNECTION	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 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 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		

12 Display “Burn-In” Effect

The “Burn-In” effect describes a pattern burned into the display after displaying the same contents over a longer period of time (e.g. a single screen).

This effect is also described mostly as “image sticking”, “memory effect/sticking” or “ghost image”. Here, a distinction is made between a temporary and permanent effect. While the temporary effect fades after the screen has been turned off for some time or when dynamic content is displayed, damage from the permanent effect is irreversible.

This effect can have the following causes:

- Operation without a screen saver
- The same contents displayed over a longer time period (e.g. a single screen)
- Operation at high ambient temperatures
- Operation above specifications

The effect can be avoided/reduced by the following actions:

- Use of a screen saver with continuous content change (e.g. video)
- ATTENTION: Switching off the backlight does not prevent this effect but only increases the life of the backlight

13 Cleaning the Touch Screen

CAUTION!

Before cleaning the touch screen, the terminal must first be turned off to avoid unintentionally triggering functions or commands!

Avant de nettoyer l'écran tactile, le H doit d'abord être éteint afin d'éviter un déclenchement involontaire des commandes!

The terminal's touch screen can only be cleaned with a soft, damp cloth. A screen cleaning solution such as an anti-static foam, water with a mild detergent or alcohol should be used to dampen the cloth. The cleaning solution should be sprayed onto the cloth and not directly onto the terminal. The cleaning solution should not be allowed to reach the terminal electronics, for example, through the ventilation slots.

No erosive cleaning solutions, chemicals, abrasive cleansers or hard objects that can scratch or damage the touch screen may be used.

If the terminal comes into contact with toxic or erosive chemicals, carefully clean the terminal immediately to prevent corrosion!

To ensure the optimal function of the terminal, the touch screen should be cleaned at regular intervals!

Pour garantir le fonctionnement optimal du terminal, le terminal doit être nettoyé régulièrement!

To extend the lifespan of the touch screen as much as possible, using the fingers to operate the terminal is recommended.

Pour prolonger la durée de vie de l'écran tactile on recommande d'utiliser les doigts pour l'opérer.

Documentation Changes

Change date	Affected page(s)	Chapter	Note
09.05.2019	32	12 Display „Burn-In“ Effect	Chapter appended
16.07.2019	5	1.3 Terminal	Aluminum front instead of plastic
05.12.2019		12 Display “Burn-In” Effect	Corrected
15.07.2020		6.2 Exchanging the Battery: Option 2	Chapter adjusted
14.12.2023	14	3.2.1 Applicable Connectors	B2CF added
13.03.2024	4 13	1.1 Performance Data 3.2 Backside	microSD card updated